

# YASKAWA

## SIGMA-7

AC SERVO DRIVES AND MOTORS  
TECHNICAL SUPPLEMENT





# Product Lineup

## Servomotors

### ◆ Rotary Servomotors



SGMMV (Low inertia, ultra-small capacity)  
10 W to 30 W



SGM7J (Medium inertia, high speed)  
50 W to 1.5 kW



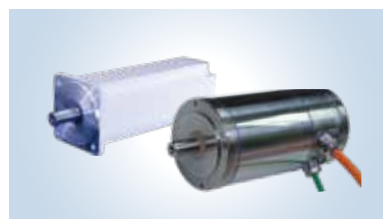
SGM7A (Low inertia, high speed)  
50 W to 7 kW



SGM7P (Medium inertia, flat type)  
100 W to 1.5 kW



SGM7G (Medium inertia, large torque)  
300 W to 15 kW



Food Grade / Hygienic Stainless  
1.4 Nm to 24.8 Nm / 2.4 Nm to 3.2 Nm

### ◆ Direct Drive Servomotors



SGM7F: Small capacity (2.0 Nm to 35.0 Nm)  
and medium capacity (45.0 Nm to 200.0 N,  
with core, inner rotor



SGM7D Small and medium capacity, with core,  
inner rotor (SGM7D), 1.3 Nm to 240 Nm



SGM7E: Small capacity, coreless,  
2 Nm to 35 Nm

### ◆ Linear Servomotors



SGLG (Coreless model)  
12.5 N to 750 N



SGLFW2 (Model with F-type iron core)  
45 N to 2520 N



SGLT (Model with T-type iron core)  
130 N to 900 N

### ◆ Linear Stages



ST2F Sigma Trac II  
45 N to 1680 N



## SERVOPACKs

- ◆ Single-axis MECHATROLINK-III Communications Reference



SGD7S-□□□□30A

- ◆ Two-axis MECHATROLINK-III Communications Reference



SGD7W-□□□□30A

- ◆ Single-axis Analog Voltage/Pulse Train Reference



SGD7S-□□□□00A

- ◆ Single-axis EtherCAT Communications Reference



SGD7S-□□□□A0A

- ◆ Two-axis EtherCAT Communications Reference



SGD7W-□□□□DA0A (400V only)

## Additional Options

- ◆ Fully-Closed Module



SGDV-OFA01A

- ◆ Advanced Safety Module



SGDV-OSA01A

- ◆ Single-Axis Control Option (Sigma-7Siec)



SGD7S-□□□□AM0A000F50

- ◆ 1.5 Axis Control Option (MP2600iec)



SGD7S-□□□□AE0A000300

- ◆ Network Indexer Option (SigmaLogic7 Compact)



SGD7S-□□□□AQ0A000F51

- ◆ Special Purpose Options (FT Options)



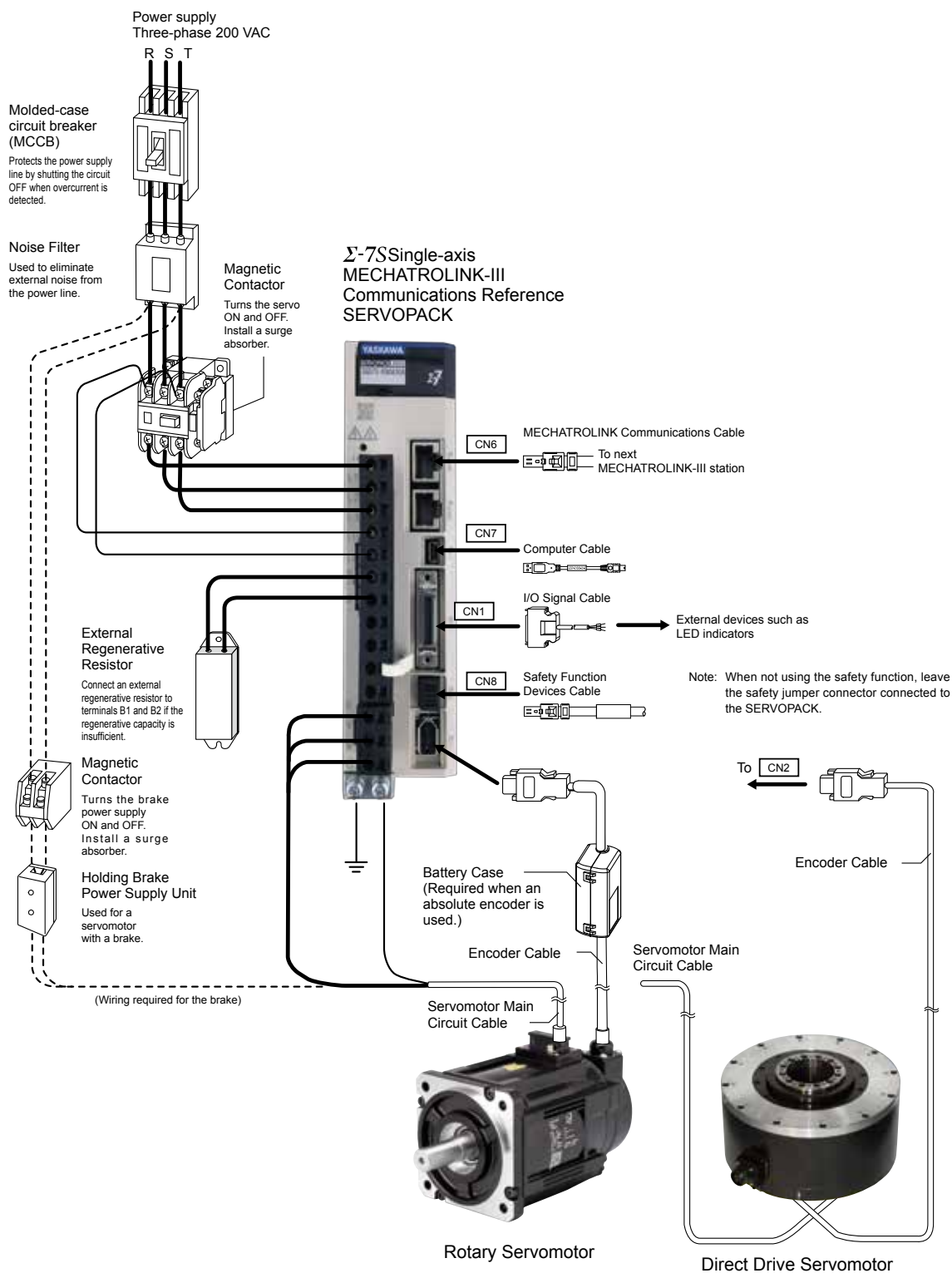
SGD7S-□□□□A□0A000F□□

- FT19: Less Deviation Control
- FT79: Built-in Indexer
- FT81: Harmonic Drive SHA Actuators
- FT82/83: for SGM7D Direct Drive Motor

# System Configuration Example

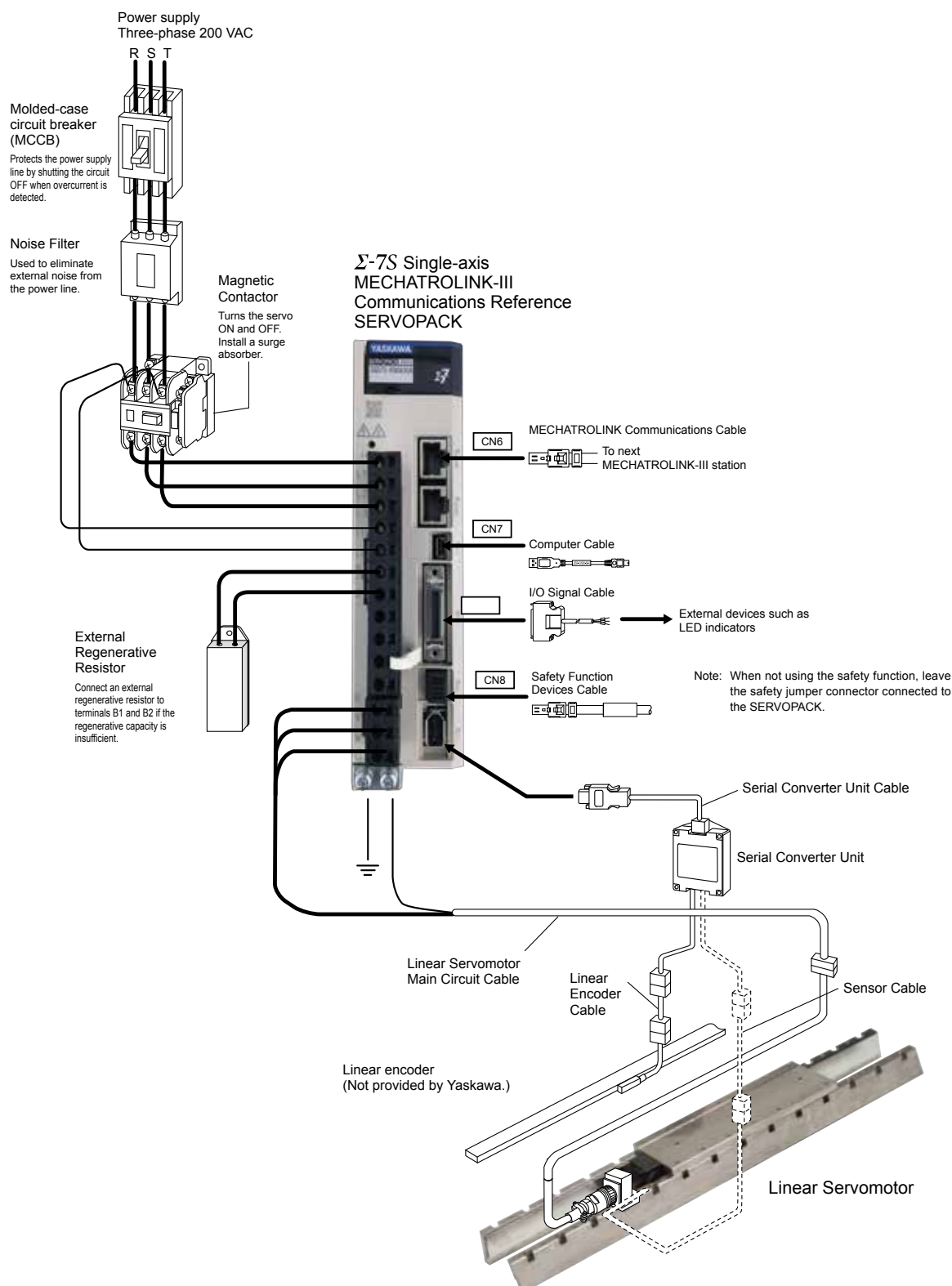
Combination of  $\Sigma$ -7S SERVOPACK and Rotary Servomotor/Direct Drive Servomotor (200V Power)

- For MECHATROLINK-III Communications  
Three-phase 200 VAC



## Combination of $\Sigma$ -7S SERVOPACK and Linear Servomotor (200V Power)

### ● For MECHATROLINK-III Communications Three-phase 200 VAC



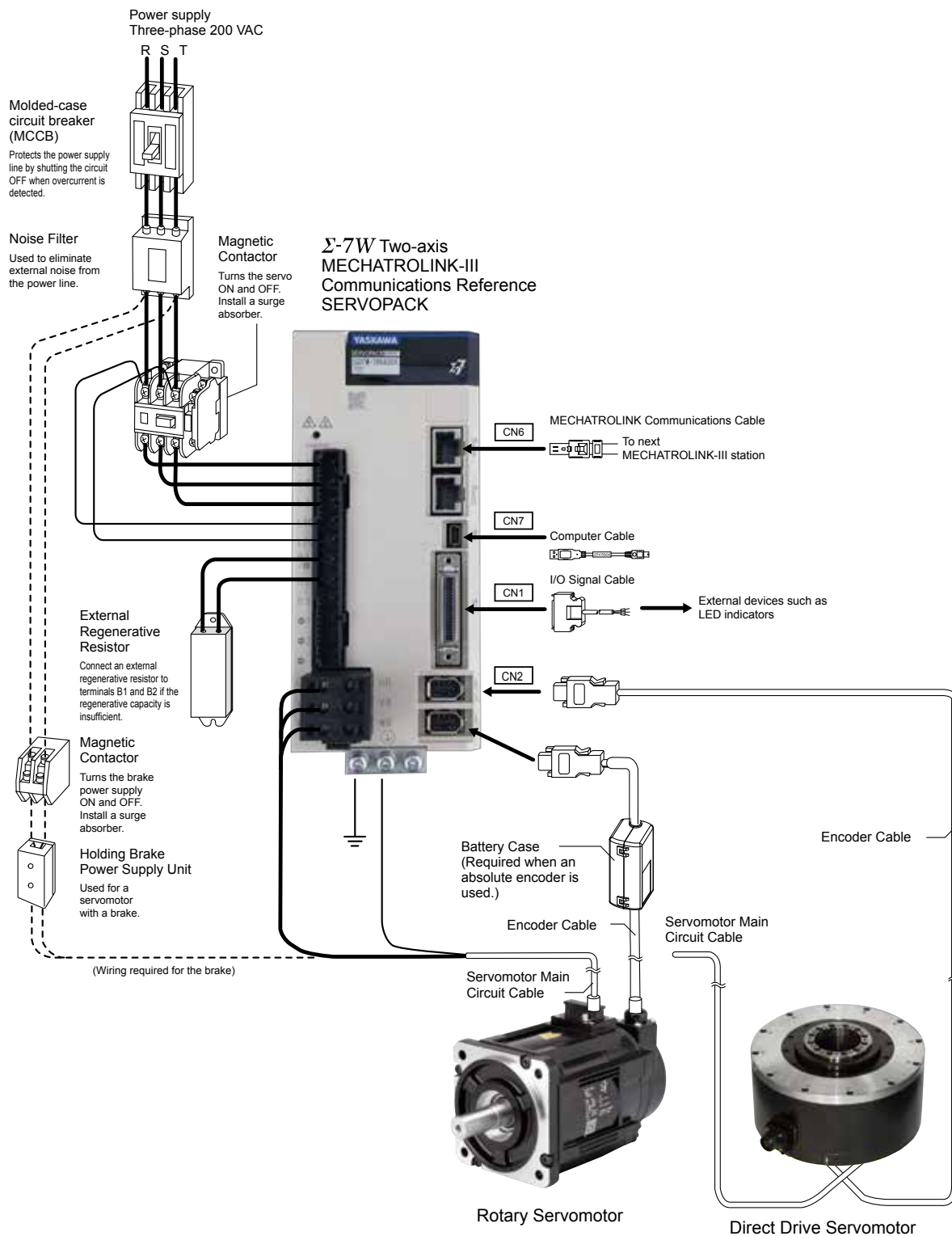




# System Configuration Example

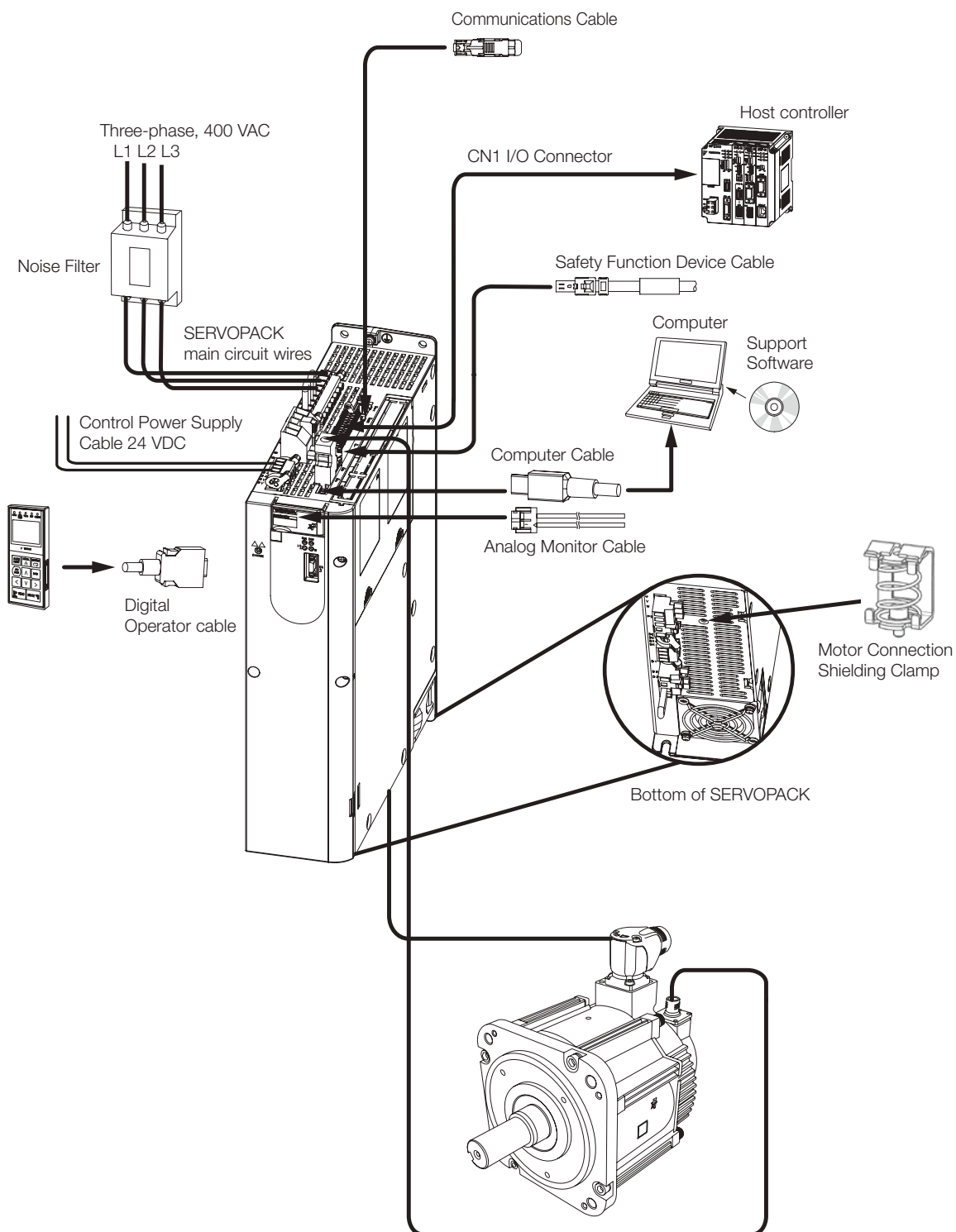
Combination of  $\Sigma$ -7W SERVOPACK and Rotary Servomotor/Direct Drive Servomotor (200V Power)

- For MECHATROLINK-III Communications  
Three-phase 200 VAC



## Combination of $\Sigma$ -7S SERVOPACK and Rotary Servomotor (400V Power)

- For MECHATROLINK-III Communications  
Three-phase 400 VAC

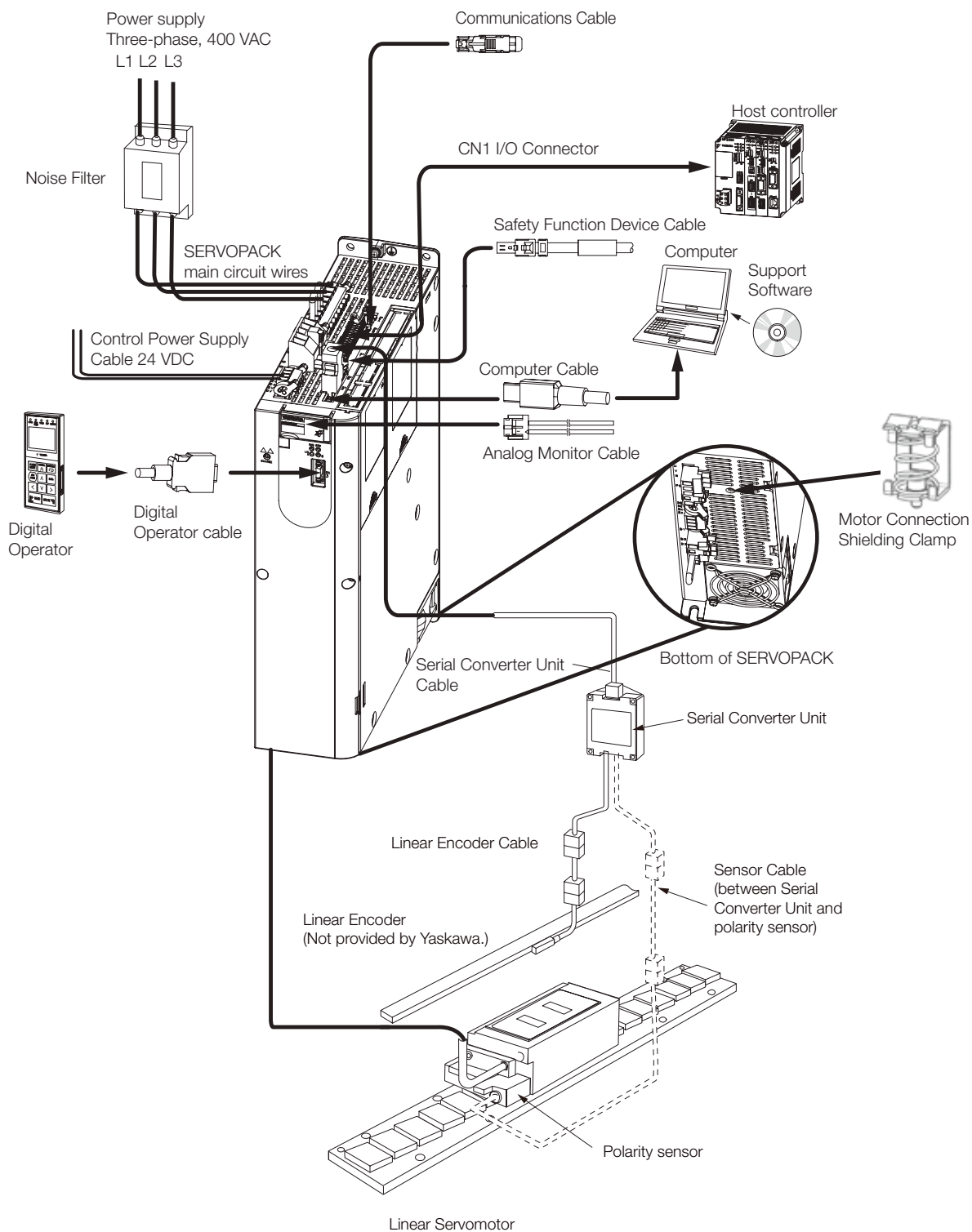




## System Configuration Example

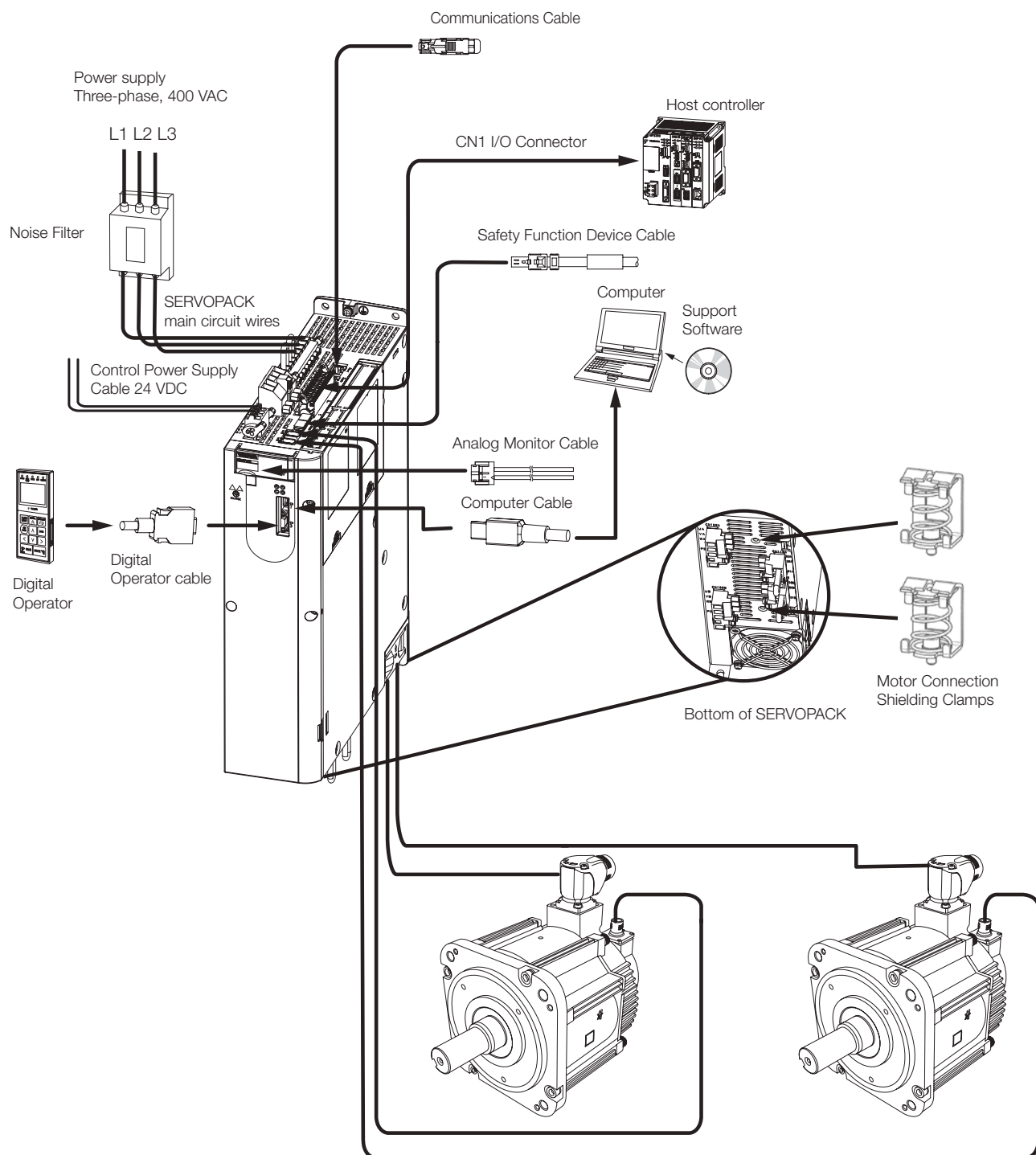
Combination of  $\Sigma$ -7S SERVOPACK and Linear Servomotor (400V Power)

- For MECHATROLINK-III Communications  
Three-phase 400 VAC



## Combination of $\Sigma$ -7W SERVOPACK and Rotary Servomotors (400V Power)

- For MECHATROLINK-III Communications  
Three-phase 400 VAC





## Stock Status Definitions

The product selection tables in this catalog contain stock status codes, which are subject to change. The codes are defined below:



### **Stock Item**

Normally 3 to 5 days leadtime for most order quantities. 3 to 5 weeks maximum if temporary outages occur. For critical lead time or large quantity shipments, check with your Yaskawa sales representative.



### **Limited Stock Item**

Typically small quantities are available from stock. Items may become stock items as demand increases.



### **Non-Stock Item**

Non-stock items typically carry a 12 - 16 week delivery time.



## Σ-7 Series Combination

### ● Combination of Rotary Servomotors and SERVOPACKs

| Rotary Servomotor Model                                  |            | Rated Output         | Sigma-7 SERVOPACK Model |                                               |                                               |               |                |
|----------------------------------------------------------|------------|----------------------|-------------------------|-----------------------------------------------|-----------------------------------------------|---------------|----------------|
|                                                          |            |                      | 100V/200V               | 200V                                          | 400V                                          |               |                |
|                                                          |            |                      | SGD7S-□□□□              | SGD7W-□□□□                                    | SGD7S-□□□□                                    | SGD7W-□□□□    |                |
| SGMMV<br>(Low inertia, ultra-small capacity)<br>6000 RPM | SGMMV-A1A  | 10 W                 | R90A, R90F              | 1R6A <sup>*1</sup> , 2R8A <sup>*1</sup>       | -                                             | -             |                |
|                                                          | SGMMV-A2A  | 20 W                 |                         |                                               |                                               |               |                |
|                                                          | SGMMV-A3A  | 30 W                 |                         |                                               |                                               |               |                |
| SGM7J<br>(Medium inertia, high speed)<br>3000 RPM        | SGM7J-A5A  | 50 W                 | R70A, R70F              | 1R6A <sup>*1</sup> , 2R8A <sup>*1</sup>       | -                                             | -             |                |
|                                                          | SGM7J-01A  | 100 W                | R90A, R90F              |                                               |                                               |               |                |
|                                                          | SGM7J-C2A  | 150 W                | 1R6A, 2R1F              |                                               |                                               |               |                |
|                                                          | SGM7J-02□  | 200 W                |                         | 1R9D                                          | 2R6D*                                         |               |                |
|                                                          | SGM7J-04□  | 400 W                | 2R8A, 2R8F              |                                               | 2R8A, 5R5A <sup>*1</sup> , 7R6A <sup>*1</sup> | -             | 2R6D* or 5R4D* |
|                                                          | SGM7J-06A  | 600 W                | 5R5A                    |                                               | 5R5A, 7R6A                                    | -             | -              |
|                                                          | SGM7J-08□  | 750 W                |                         | 3R5D                                          |                                               | 2R6D or 5R4D* |                |
|                                                          | SGM7J-15D  | 1.5 kW               | N/A                     | N/A                                           | 5R4D                                          | 5R4D          |                |
| SGM7A<br>(Low inertia, high speed)<br>3000 RPM           | SGM7A-A5A  | 50 W                 | R70A, R70F              | 1R6A <sup>*1</sup> , 2R8A <sup>*1</sup>       | -                                             | -             |                |
|                                                          | SGM7A-01A  | 100 W                | R90A, R90R              |                                               |                                               |               |                |
|                                                          | SGM7A-C2A  | 150 W                | 1R6A, 2R1F              |                                               |                                               |               | 1R9D           |
|                                                          | SGM7A-02□  | 200 W                |                         | 2R6D* or 5R4D*                                |                                               |               |                |
|                                                          | SGM7A-04□  | 400 W                | 2R8A, 2R8F              | 2R8A, 5R5A <sup>*1</sup> , 7R6A <sup>*1</sup> | -                                             | -             |                |
|                                                          | SGM7A-06A  | 600 W                | 5R5A                    | 5R5A, 7R6A                                    | -                                             | -             |                |
|                                                          | SGM7A-08□  | 750 W                |                         |                                               | 3R5D                                          | 2R6D or 5R4D* |                |
|                                                          | SGM7A-10□  | 1.0 kW               | 120A                    | -                                             | 5R4D                                          | 5R4D*         |                |
|                                                          | SGM7A-15A  | 1.5 kW               |                         |                                               | 5R4D                                          | 5R4D          |                |
|                                                          | SGM7A-20A  | 2.0 kW               | 8R4D                    |                                               | -                                             |               |                |
|                                                          | SGM7A-25A  | 2.5 kW               | 120D                    |                                               |                                               |               |                |
|                                                          | SGM7A-30A  | 3.0 kW               | 120D                    |                                               |                                               |               |                |
|                                                          | SGM7A-40A  | 4.0 kW               | 170D                    |                                               |                                               |               |                |
|                                                          | SGM7A-50A  | 5.0 kW               | 170D                    |                                               |                                               |               |                |
|                                                          | SGM7A-70A  | 7.0 kW               | 550A                    |                                               | -                                             |               |                |
| SGM7P<br>(Medium inertia, flat type)<br>3000 RPM         | SGM7P-01A  | 100 W                | R90A, R90F              | 1R6A <sup>*1</sup> , 2R8A <sup>*1</sup>       | -                                             | -             |                |
|                                                          | SGM7P-02A  | 200 W                | 2R8A, 2R8F              | 2R8A, 5R5A <sup>*1</sup> , 7R6A <sup>*1</sup> |                                               |               |                |
|                                                          | SGM7P-04A  | 400 W                |                         |                                               |                                               |               |                |
|                                                          | SGM7P-08A  | 750 W                | 5R5A                    |                                               |                                               |               | 5R5A, 7R6A     |
|                                                          | SGM7P-15A  | 1.5 kW               | 120A                    | -                                             |                                               |               |                |
| SGM7G<br>(Medium inertia, large torque)<br>1500 RPM      | SGM7G-03A  | 300 W                | 3R8A                    | 5R5A <sup>*1</sup> , 7R6A <sup>*1</sup>       | -                                             | -             |                |
|                                                          | SGM7G-05A  | 450 W                |                         |                                               | 1R9D                                          | 2R6D or 5R4D* |                |
|                                                          | SGM7G-09A  | 850 W                | 7R6A                    | 7R6A                                          | 3R5D                                          | 5R4D*         |                |
|                                                          | SGM7G-13A  | 1.3 kW               | 120A                    | -                                             | 5R4D                                          | 5R4D          |                |
|                                                          | SGM7G-20A  | 1.8 kW               | 180A                    |                                               | 8R4D                                          |               |                |
|                                                          | SGM7G-30A  | 2.9 kW <sup>*2</sup> | 330A                    |                                               | 120D                                          |               |                |
|                                                          | SGM7G-44A  | 4.4 kW               |                         |                                               | 170D                                          |               |                |
|                                                          | SGM7G-55A  | 5.5 kW               | 470A                    |                                               | 210D                                          | -             |                |
|                                                          | SGM7G-75A  | 7.5 kW               | 550A                    |                                               | 260D                                          |               |                |
|                                                          | SGM7G-1AA  | 11 kW                | 590A                    |                                               | 280D                                          |               |                |
|                                                          | SGM7G-1EA  | 15 kW                | 780A                    |                                               | 370D                                          |               |                |
|                                                          | Food Grade | M431-NN0□            | 1.4 Nm                  | 5R5A                                          | -                                             | 3R5D          | -              |
| M433-MN0□                                                |            | 3.7 Nm               | 120A, 180A              | 5R4D, 8R4D                                    |                                               |               |                |
| M443-KN0□                                                |            | 5.5 Nm               | 330A                    | 170D                                          |                                               |               |                |
| M465-GN0□                                                |            | 24.8 Nm              | 470A                    | 210D                                          |                                               |               |                |
| Hygienic Stainless                                       | M532-GK07□ | 2.4 Nm               | 5R5A                    | -                                             | 5R4D                                          | -             |                |
|                                                          | M542-GK07□ | 3.2 Nm               | 7R6A                    |                                               | 3R5D                                          |               |                |

\*1. If you use this combination, performance may not be as good, e.g., the control gain may not increase, in comparison with using a Σ-7S SERVOPACK.

\*2. The rated output is 2.4 kW if you combine the SGM7G-30A with the SGD7S-200A.



## Σ-7 Series Combination

### ● Combination of Direct Drive Servomotors and SERVOPACKs

| Direct Drive Servomotor Model     |           | Rated Torque<br>Nm | Instantaneous<br>Max. Torque<br>Nm | SERVOPACK Model |            |      |
|-----------------------------------|-----------|--------------------|------------------------------------|-----------------|------------|------|
|                                   |           |                    |                                    | SGD7S-□□□□      | SGD7W-□□□□ |      |
| SGM7D<br>(With core, outer rotor) | SGM7D-30F | 30.0               | 50.0                               | 120A*           | -          |      |
|                                   | SGM7D-58F | 58.0               | 100                                |                 |            |      |
|                                   | SGM7D-90F | 90.0               | 150                                |                 |            |      |
|                                   | SGM7D-1AF | 110                | 200                                | 2R8A*, 2R8F*    |            |      |
|                                   | SGM7D-01G | 1.30               | 4.00                               |                 |            |      |
|                                   | SGM7D-05G | 5.00               | 6.00                               |                 |            |      |
|                                   | SGM7D-08G | 8.00               | 15.0                               | 120A*           |            |      |
|                                   | SGM7D-18G | 18.0               | 30.0                               |                 |            |      |
|                                   | SGM7D-24G | 24.0               | 45.0                               |                 |            |      |
|                                   | SGM7D-34G | 34.0               | 60.0                               |                 |            |      |
|                                   | SGM7D-45G | 45.0               | 75.0                               |                 |            |      |
|                                   | SGM7D-03H | 3.00               | 4.00                               | 2R8A*, 2R8F*    |            |      |
|                                   | SGM7D-28I | 28.0               | 50.0                               | 120A*           |            |      |
|                                   | SGM7D-70I | 70.0               | 100                                |                 |            |      |
|                                   | SGM7D-1ZI | 100                | 150                                |                 |            |      |
|                                   | SGM7D-1CI | 130                | 200                                |                 |            |      |
|                                   | SGM7D-2BI | 220                | 300                                |                 |            |      |
|                                   | SGM7D-2DI | 240                | 400                                |                 |            |      |
|                                   | SGM7D-06J | 6.00               | 8.00                               |                 |            |      |
|                                   | SGM7D-09J | 9.00               | 15.0                               |                 |            |      |
|                                   | SGM7D-18J | 18.0               | 30.0                               |                 |            |      |
|                                   | SGM7D-20J | 20.0               | 45.0                               |                 |            |      |
|                                   | SGM7D-38J | 38.0               | 60.0                               |                 |            |      |
|                                   | SGM7D-02K | 2.06               | 5.00                               | 2R8A*, 2R8F*    |            |      |
|                                   | SGM7D-06K | 6.00               | 10.0                               |                 |            |      |
|                                   | SGM7D-08K | 8.00               | 15.0                               |                 |            |      |
|                                   | SGM7D-06L | 6.00               | 10.0                               |                 |            |      |
| SGM7D-12L                         | 12.0      | 20.0               |                                    |                 |            |      |
| SGM7D-30L                         | 30.0      | 40.0               | 120A*                              |                 |            |      |
| SGM7F<br>(With core, inner rotor) | SGM7F-02A | 2                  | 6                                  | 2R8A, 2R1F      | 2R8A       |      |
|                                   | SGM7F-05A | 5                  | 15                                 |                 |            |      |
|                                   | SGM7F-07A | 7                  | 21                                 | 2R8A, 2R8F      |            |      |
|                                   | SGM7F-04B | 4                  | 12                                 |                 |            |      |
|                                   | SGM7F-10B | 10                 | 30                                 |                 |            |      |
|                                   | SGM7F-14B | 14                 | 42                                 | 5R5A            |            |      |
|                                   | SGM7F-08C | 8                  | 24                                 | 2R8A, 2R8F      | 2R8A       |      |
|                                   | SGM7F-17C | 17                 | 51                                 | 5R5A            |            |      |
|                                   | SGM7F-25C | 25                 | 75                                 | 7R6A            |            |      |
|                                   | SGM7F-16D | 16                 | 48                                 | 5R5A            |            |      |
|                                   | SGM7F-35D | 35                 | 105                                | 7R6A, 120A      | 7R6A       |      |
|                                   | SGM7F-45M | 45.0               | 135                                | 7R6A            |            |      |
|                                   | SGM7F-80M | 80.0               | 240                                | 120A            | -          |      |
|                                   | SGM7F-1AM | 110                | 330                                | 180A            |            |      |
|                                   | SGM7F-80N | 80.0               | 240                                | 120A            |            |      |
|                                   | SGM7F-1EN | 150                | 450                                | 200A            |            |      |
|                                   | SGM7F-2ZN | 200                | 600                                |                 |            |      |
| SGM7E<br>(Coreless, inner rotor)  | SGM7E-02B | 2.00               | 6.00                               | 2R8A, 2R1F      | 2R8A       |      |
|                                   | SGM7E-05B | 5.00               | 15.0                               |                 |            |      |
|                                   | SGM7E-07B | 7.00               | 21.0                               |                 |            |      |
|                                   | SGM7E-04C | 4.00               | 12.0                               | 2R8A, 2R8F      |            |      |
|                                   | SGM7E-10C | 10.0               | 30.0                               |                 |            |      |
|                                   | SGM7E-14C | 14.0               | 42.0                               |                 |            |      |
|                                   | SGM7E-08D | 8.00               | 24.0                               |                 |            |      |
|                                   | SGM7E-17D | 17.0               | 51.0                               |                 |            |      |
|                                   | SGM7E-25D | 25.0               | 75.0                               |                 |            |      |
|                                   | SGM7E-16E | 16.0               | 48.0                               |                 |            | 5R5A |
|                                   | SGM7E-35E | 35.0               | 105                                |                 |            |      |

\*: Note: Use SGM7D servo motor in combination with FT-Specification SERVOPACK. The following SERVOPACK models can be used:

- SGD7S-□□□□□□A□□□F82□
- SGD7S-□□□□□□00A□□□F83□

# Σ-7 Series Combination

## ● Combination of Linear Servomotors and SERVOPACKs

| Linear Servomotor Model                                       |                | Rated Force<br>N | Max. Force<br>N | SERVOPACK Model |                          |      |
|---------------------------------------------------------------|----------------|------------------|-----------------|-----------------|--------------------------|------|
|                                                               |                |                  |                 | SGD7S-□□□□      | SGD7W-□□□□<br>SGD7C-□□□□ |      |
| SGLG<br><br>(Coreless model, with standard<br>magnetic way)   | SGLGW-30A050C  | 12.5             | 40              | R70A, R70F      | 1R6A                     |      |
|                                                               | SGLGW-30A080C  | 25               | 80              | R90A, R90F      |                          |      |
|                                                               | SGLGW-40A140C  | 47               | 140             |                 |                          |      |
|                                                               | SGLGW-40A253C  | 93               | 280             | 1R6A, 2R1F      |                          |      |
|                                                               | SGLGW-40A365C  | 140              | 420             | 2R8A, 2R8F      | 2R8A                     |      |
|                                                               | SGLGW-60A140C  | 70               | 220             | 1R6A, 2R1F      | 1R6A                     |      |
|                                                               | SGLGW-60A253C  | 140              | 440             | 2R8A, 2R8F      | 2R8A                     |      |
|                                                               | SGLGW-60A365C  | 210              | 660             | 5R5A            |                          |      |
|                                                               | SGLGW-90A200C  | 325              | 1300            | 120A            | -                        |      |
|                                                               | SGLGW-90A370C  | 550              | 2200            | 180A            |                          |      |
| SGLGW-90A535C                                                 | 750            | 3000             | 200A            |                 |                          |      |
| SGLG<br><br>(Coreless model, with high-force<br>magnetic way) | SGLGW-40A140C  | 57               | 230             | 1R6A, 2R1F      | 1R6A                     |      |
|                                                               | SGLGW-40A253C  | 114              | 460             | 2R8A, 2R8F      | 2R8A                     |      |
|                                                               | SGLGW-40A365C  | 171              | 690             | 3R8A            | 5R5A                     |      |
|                                                               | SGLGW-60A140C  | 85               | 360             | 1R6A, 2R1F      | 1R6A                     |      |
|                                                               | SGLGW-60A253C  | 170              | 720             | 3R8A            | 5R5A                     |      |
|                                                               | SGLGW-60A365C  | 255              | 1080            | 7R6A            |                          |      |
| SGLF<br><br>(Model with F-type iron core)                     | SGLFW2*        | SGLFW2-30A070A   | 45              | 135             | 1R6A, 2R1F               | 1R6A |
|                                                               |                | SGLFW2-30A120A   | 90              | 270             |                          |      |
|                                                               |                | SGLFW2-30A230A   | 180             | 540             | 3R8A                     | -    |
|                                                               |                |                  | 170             | 500             | 2R8A, 2R8F               | 2R8A |
|                                                               |                | SGLFW2-45A200A   | 280             | 840             | 5R5A                     |      |
|                                                               |                | SGLFW2-45A380A   | 560             | 1680            | 180A                     | -    |
|                                                               |                |                  | 1500            | 120A            |                          |      |
|                                                               |                | SGLFW2-90A200A   | 560             |                 | 1680                     |      |
|                                                               |                | SGLFW2-90A380A   | 1120            | 3360            | 200A                     |      |
|                                                               |                | SGLFW2-90A560A   | 1680            | 5040            | 330A                     |      |
|                                                               | SGLFW2-1DA380A | 1680             | 5040            | 200A            |                          |      |
|                                                               | SGLFW2-1DA560A | 2520             | 7560            | 330A            |                          |      |
|                                                               | SGLFW*         | SGLFW-20A090A    | 25              | 86              | 1R6A, 2R1F               | 1R6A |
|                                                               |                | SGLFW-20A120A    | 40              | 125             |                          |      |
|                                                               |                | SGLFW-35A120A    | 80              | 220             |                          |      |
|                                                               |                | SGLFW-35A230A    | 160             | 440             | 3R8A                     | 5R5A |
|                                                               |                | SGLFW-50A200B    | 280             | 600             | 5R5A                     |      |
|                                                               |                | SGLFW-50A380B    | 560             | 1200            | 120A                     | -    |
|                                                               |                | SGLFW-1ZA200B    |                 |                 |                          |      |
|                                                               |                | SGLFW-1ZA380B    | 1120            | 2400            | 200A                     |      |
| SGLT<br><br>(Model with T-type iron core)                     | SGLTW-20A170A  | 130              | 380             | 3R8A            | 5R5A                     |      |
|                                                               | SGLTW-20A320A  | 250              | 760             | 7R6A            |                          |      |
|                                                               | SGLTW-20A460A  | 380              | 1140            | 120A            | -                        |      |
|                                                               | SGLTW-35A170A  | 220              | 660             | 5R5A            |                          |      |
|                                                               | SGLTW-35A170H  | 300              | 600             |                 |                          |      |
|                                                               | SGLTW-35A320A  | 440              | 1320            | 120A            | -                        |      |
|                                                               | SGLTW-35A320H  | 600              | 1200            |                 |                          |      |
|                                                               | SGLTW-35A460A  | 670              | 2000            | 180A            |                          |      |
|                                                               | SGLTW-40A400B  | 670              | 2600            |                 |                          |      |
|                                                               | SGLTW-40A600B  | 1000             | 4000            | 330A            |                          |      |
|                                                               | SGLTW-50A170H  | 450              | 900             | 5R5A            |                          |      |
|                                                               | SGLTW-50A320H  | 900              | 1800            | 120A            | -                        |      |
|                                                               | SGLTW-80A400B  | 1300             | 5000            | 330A            |                          |      |
|                                                               | SGLTW-80A600B  | 2000             | 7500            | 550A            |                          |      |
| ST2F<br><br>(Sigma Trac II<br>Linear Stages)                  | ST2F-A1A       | 45               | 135             | 1R6A, 2R1F      |                          | 1R6A |
|                                                               | ST2F-A2A       | 90               | 270             |                 |                          |      |
|                                                               | ST2F-A3A       | 180              | 540             | 3R8A            |                          |      |
|                                                               |                | 170              | 500             | 2R8A, 2R8F      | 2R8A, 2R8F               |      |
|                                                               | ST2F-A1D       | 45               | 135             | 1R9D            | 2R6D                     |      |
|                                                               | ST2F-A2D       | 90               | 270             |                 |                          |      |
|                                                               | ST2F-A3D       | 180              | 540             |                 |                          |      |
|                                                               | ST2F-C1A       | 560              | 1680            | 120A            | -                        |      |
|                                                               | ST2F-C2A       | 1120             | 3360            | 200A            | -                        |      |
|                                                               | ST2F-C3A       | 1680             | 5040            | 330A            | -                        |      |
|                                                               | ST2F-C1D       | 560              | 1680            | 5R4D            | 5R4D                     |      |
|                                                               | ST2F-C2D       | 1120             | 3360            | 120D            | -                        |      |
|                                                               | ST2F-C3D       | 1680             | 5040            | 170D            | -                        |      |

\*: The SGLFW model is an earlier product. Select the SGLFW2 model when newly installing a linear servomotor to a machine.



## Recommended Encoders

### ● Incremental Linear Encoders

✓ : Possible

| Output Signal                                                    | Manufacturer               | Linear Encoder Type | Model                        |                        |                                      | Linear Encoder Pitch<br>μm | Resolution<br>nm | Maximum Speed <sup>3</sup><br>m/s | Support for Polarity Sensor Input | Application to Linear Motors | Application to Fully-Closed Loop Control |
|------------------------------------------------------------------|----------------------------|---------------------|------------------------------|------------------------|--------------------------------------|----------------------------|------------------|-----------------------------------|-----------------------------------|------------------------------|------------------------------------------|
|                                                                  |                            |                     | Scale                        | Sensor Head            | Interpolator (Serial Converter Unit) |                            |                  |                                   |                                   |                              |                                          |
| 1 Vp-p Analog Voltage <sup>*1</sup>                              | Heidenhain Corporation     | Exposed             | LIDA48□                      |                        | JZDP-H003/-H006 <sup>*5</sup>        | 20                         | 78.1             | 5                                 | ✓                                 | ✓                            | ✓                                        |
|                                                                  |                            |                     |                              |                        | JZDP-J003/-J006 <sup>*5</sup>        |                            | 4.9              | 2                                 | ✓                                 | ✓                            | <sup>*8</sup>                            |
|                                                                  |                            |                     | LIF48□                       |                        | JZDP-H003/-H006 <sup>*5</sup>        | 4                          | 15.6             | 1                                 | ✓                                 | ✓                            | ✓                                        |
|                                                                  |                            |                     |                              |                        | JZDP-J003/-J006 <sup>*5</sup>        |                            | 1.0              | 0.4                               | ✓                                 | <sup>*8</sup>                | <sup>*8</sup>                            |
|                                                                  | Renishaw plc <sup>*4</sup> | Exposed             | RGS20                        | RGH22B                 | JZDP-H005/-H008 <sup>*5</sup>        | 20                         | 78.1             | 5                                 | ✓                                 | ✓                            | ✓                                        |
|                                                                  |                            |                     |                              |                        | JZDP-J005/-J008 <sup>*5</sup>        |                            | 4.9              | 2                                 | ✓                                 | ✓                            | <sup>*8</sup>                            |
| Encoder for Yaskawa's Serial Interface <sup>*2</sup><br>(Σ-LINK) | Magnescale Co., Ltd.       | Exposed             | SL7□□0                       | PL101-RY <sup>*6</sup> |                                      | 800                        | 97.7             | 10                                | -                                 | ✓                            | ✓                                        |
|                                                                  |                            |                     |                              | PL101                  | MJ620-T13 <sup>*7</sup>              |                            |                  |                                   | ✓                                 | ✓                            | <sup>*8</sup>                            |
|                                                                  |                            |                     | SQ10                         | PQ10                   | MQ10-FLA                             | 400                        | 48.83            | 3                                 | -                                 | ✓                            | ✓                                        |
|                                                                  |                            |                     |                              |                        | MQ10-GLA                             |                            |                  |                                   | ✓                                 | ✓                            | -                                        |
|                                                                  |                            |                     | BL57-□□□□RED <sup>*8</sup>   |                        | BD96-Y1051LC                         | 0.4                        | 0.78             | 0.8                               | ✓                                 | ✓                            | -                                        |
|                                                                  |                            |                     |                              |                        | BD96-Y1025LC                         | 0.4                        | 1.56             | 1.0                               | ✓                                 | ✓                            | -                                        |
|                                                                  |                            |                     |                              |                        | BD96-Y2051LC                         | 0.4                        | 0.78             | 0.8                               | ✓                                 | ✓                            | -                                        |
|                                                                  |                            |                     |                              |                        | BD96-Y2025LC                         | 0.4                        | 1.56             | 1.0                               | ✓                                 | ✓                            | -                                        |
|                                                                  |                            |                     |                              |                        | BD96-YJ051LC                         | 0.4                        | 0.78             | 0.8                               | ✓                                 | ✓                            | -                                        |
|                                                                  |                            |                     |                              |                        | BD96-YJ025LC                         | 0.4                        | 1.56             | 1.0                               | ✓                                 | ✓                            | -                                        |
|                                                                  |                            |                     | BF1-□□□□RY□F□□ <sup>*8</sup> |                        |                                      | 0.25                       | 0.49             | 1.77                              | ✓                                 | ✓                            | ✓                                        |
|                                                                  |                            |                     | BF1-□□□□RY□F□□ <sup>*8</sup> |                        |                                      | 0.25                       | 0.98             | 1.8                               | ✓                                 | ✓                            | ✓                                        |
|                                                                  |                            | Sealed              | SR75-□□□□□LF                 | -                      | 80                                   | 9.8                        | 3.33             | -                                 | ✓                                 | ✓                            |                                          |
|                                                                  |                            |                     | SR75-□□□□□MF                 | -                      | 80                                   | 78.1                       | 3.33             | -                                 | ✓                                 | ✓                            |                                          |
|                                                                  |                            |                     | SR85-□□□□□LF                 | -                      | 80                                   | 9.8                        | 3.33             | -                                 | ✓                                 | ✓                            |                                          |
|                                                                  |                            |                     | SR85-□□□□□MF                 | -                      | 80                                   | 78.1                       | 3.33             | -                                 | ✓                                 | ✓                            |                                          |

\*1: You must also use a Yaskawa Serial Converter Unit. The output signal will be multiplied by 8 bits (256 divisions) or 12 bits (4,096 divisions) in the Serial Converter Unit.

\*2: The multiplier (number of divisions) depends on the Linear Encoder. Also, you must write the motor constant file to the Linear Encoder in advance.

\*3: The maximum speeds given in the above table are the maximum applicable speeds of the encoders when combined with a Yaskawa SERVOPACK. The actual speed will be restricted by either the maximum speed of the Linear Servomotor or the maximum speed of the Linear Encoder (given above).

\*4: If you use the origin signals with a Linear Encoder from Renishaw plc, the origin may sometimes be falsely detected. If that occurs, use the BID/DIR signal to output the origin signal only in one direction.

\*5: Use this model number to purchase the Serial Converter Unit.

\*6: Use this model number to purchase the Sensor Head with Interpolator.

\*7: Use this model number to purchase the Interpolator.

\*8: Contact your Yaskawa representative.

Note: 1. Confirm detailed specifications, such as the tolerances, dimensions, and operating environment, with the manufacturer of the Encoder before you use it.  
2. Σ-LINK is a registered trademark of YASKAWA ELECTRIC CORPORATION.

### ● Absolute Rotary Encoder

The following Absolute Rotary Encoders are for fully-closed control. Can not use it to control the motor.

| Output Signal                                   | Manufacturer           | Rotary Encoder Type | Model                         |             | Relay Device between Fully-Closed Module and Rotary Encoder | Resolution Bits | Maximum Speed <sup>1)</sup><br>RPM |
|-------------------------------------------------|------------------------|---------------------|-------------------------------|-------------|-------------------------------------------------------------|-----------------|------------------------------------|
|                                                 |                        |                     | Scale                         | Sensor Head |                                                             |                 |                                    |
| Encoder for Yaskawa's Serial Interface (Σ-LINK) | Magnescale Co., Ltd.   | Sealed              | RU77-4096ADF <sup>*2</sup>    |             | —                                                           | 20              | 2000                               |
|                                                 |                        |                     | RU77-4096AFFT01 <sup>*2</sup> |             | —                                                           | 22              | 2000                               |
|                                                 | Heidenhain Corporation | Exposed             | ECA4412 <sup>*2</sup>         |             | EIB3391Y                                                    | 27              | 1600                               |
|                                                 |                        |                     |                               |             |                                                             | 28              | 800                                |
|                                                 |                        |                     |                               |             |                                                             | 29              | 400                                |
|                                                 |                        | Sealed              | RCN2□10 <sup>*2</sup>         |             |                                                             | 26              | 3000                               |
|                                                 |                        |                     | RCN5□10 <sup>*2</sup>         |             |                                                             | 28              | 800                                |
|                                                 |                        |                     | RCN8□10 <sup>*2</sup>         |             |                                                             | 29              | 400                                |
|                                                 |                        |                     | ROC2310 <sup>*2</sup>         |             |                                                             | 26              | 3000                               |
|                                                 |                        |                     | ROC7310 <sup>*2</sup>         |             |                                                             | 28              | 800                                |
|                                                 | Renishaw plc           | Exposed             | RA23Y-□□□□□□□□ <sup>*2</sup>  |             | —                                                           | 23              | 14600                              |
|                                                 |                        |                     | RA26Y-□□□□□□□□ <sup>*2</sup>  |             | —                                                           | 26              | 3250                               |
|                                                 |                        |                     | RA30Y-□□□□□□□□ <sup>*2</sup>  |             | —                                                           | 30              | 200                                |

\*1: The maximum speeds given in the above table are the maximum applicable speeds of the encoders when combined with a Yaskawa SERVOPACK. The actual speed will be restricted by either the maximum speed of the Linear Servomotor or the maximum speed of the Linear Encoder (given above).

\*2: This is a single-turn absolute encoder.

Note: 1. Confirm detailed specifications, such as the tolerances, dimensions, and operating environment, with the manufacturer of the Encoder before you use it.  
2. Σ-LINK is a registered trademark of YASKAWA ELECTRIC CORPORATION.

# ● Absolute Linear Encoder

✓ : Possible

| Output Signal                                                 | Manufacturer           | Linear Encoder Type | Model                |             |                                      | Linear Encoder Pitch <sup>*2</sup><br>μm | Resolution<br>nm | Maximum Speed <sup>*3</sup><br>m/s | Support for Polarity Sensor Input | Application to Linear Motors | Application to Fully-Closed Loop Control |
|---------------------------------------------------------------|------------------------|---------------------|----------------------|-------------|--------------------------------------|------------------------------------------|------------------|------------------------------------|-----------------------------------|------------------------------|------------------------------------------|
|                                                               |                        |                     | Scale                | Sensor Head | Interpolator (Serial Converter Unit) |                                          |                  |                                    |                                   |                              |                                          |
| Encoder for Yaskawa's Serial Interface <sup>*1</sup> (Σ-LINK) | Magnescale Co., Ltd.   | Exposed             | SQ47-□□□□S□F□□□      | -           | -                                    | 20.48                                    | 5                | 3.33                               | -                                 | ✓                            | ✓                                        |
|                                                               |                        |                     | SQ47-□□□□T□F□□□      |             |                                      |                                          |                  |                                    |                                   |                              |                                          |
|                                                               |                        |                     | SQ47-□□□□A□F□□□      | -           | -                                    | 40.96                                    | 10               | 3.33                               | -                                 | ✓                            | ✓                                        |
|                                                               |                        |                     | SQ47-□□□□F□F□□□      |             |                                      |                                          |                  |                                    |                                   |                              |                                          |
|                                                               |                        |                     | SQ57-□□□□S□F□□□      | -           | -                                    | 20.48                                    | 5                | 3.33                               | -                                 | ✓                            | ✓                                        |
|                                                               |                        |                     | SQ57-□□□□T□F□□□      |             |                                      |                                          |                  |                                    |                                   |                              |                                          |
|                                                               |                        |                     | SQ57-□□□□A□F□□□      | -           | -                                    | 40.96                                    | 10               | 3.33                               | -                                 | ✓                            | ✓                                        |
|                                                               |                        |                     | SQ57-□□□□F□F□□□      |             |                                      |                                          |                  |                                    |                                   |                              |                                          |
|                                                               |                        | Sealed              | SR77-□□□□□LF         | -           | -                                    | 80                                       | 9.8              | 3.33                               | -                                 | ✓                            | ✓                                        |
|                                                               |                        |                     | SR77-□□□□□MF         | -           | -                                    | 80                                       | 78.1             | 3.33                               | -                                 | ✓                            | ✓                                        |
|                                                               |                        |                     | SR87-□□□□□LF         | -           | -                                    | 80                                       | 9.8              | 3.33                               | -                                 | ✓                            | ✓                                        |
|                                                               |                        |                     | SR87-□□□□□MF         | -           | -                                    | 80                                       | 78.1             | 3.33                               | -                                 | ✓                            | ✓                                        |
|                                                               | Mitutoyo Corporation   | Exposed             | ST781A               | -           | -                                    | 256                                      | 500              | 5                                  | -                                 | ✓                            | ✓                                        |
|                                                               |                        |                     | ST782A               | -           | -                                    | 256                                      | 500              | 5                                  | -                                 | ✓                            | ✓                                        |
|                                                               |                        |                     | ST783A               | -           | -                                    | 51.2                                     | 100              | 5                                  | -                                 | ✓                            | ✓                                        |
|                                                               |                        |                     | ST784A               | -           | -                                    | 51.2                                     | 100              | 5                                  | -                                 | ✓                            | ✓                                        |
|                                                               |                        |                     | ST788A               | -           | -                                    | 51.2                                     | 100              | 5                                  | -                                 | ✓                            | ✓                                        |
|                                                               |                        |                     | ST789A <sup>*4</sup> | -           | -                                    | 25.6                                     | 50               | 5                                  | -                                 | ✓                            | ✓                                        |
|                                                               |                        |                     | ST1381               | -           | -                                    | 5.12                                     | 10               | 8                                  | -                                 | ✓                            | ✓                                        |
|                                                               |                        |                     | ST1382               | -           | -                                    | 0.512                                    | 1                | 3.6 <sup>*6</sup>                  | -                                 | ✓                            | ✓                                        |
|                                                               | Heidenhain Corporation | Exposed             | LIC4100 Series       | -           | -                                    | 20.48                                    | 5                | 10                                 | -                                 | ✓                            | ✓                                        |
|                                                               |                        |                     | LIC2100 Series       |             |                                      | 204.8                                    | 50               | 10                                 | -                                 | ✓                            | ✓                                        |
|                                                               |                        | Sealed              | LC115                |             |                                      | 409.6                                    | 100              | 10                                 | -                                 | ✓                            | ✓                                        |
|                                                               |                        |                     | LC415                |             |                                      | 40.96                                    | 10               | 3                                  | -                                 | ✓                            | ✓                                        |
|                                                               | Renishaw plc           | Exposed             | EL36Y-□□050F□□□□     |             |                                      | 40.96                                    | 10               | 3                                  | -                                 | ✓                            | ✓                                        |
|                                                               |                        |                     | EL36Y-□□100F□□□□     |             |                                      | 40.96                                    | 10               | 3                                  | -                                 | ✓                            | ✓                                        |
|                                                               |                        |                     | EL36Y-□□500F□□□□     |             |                                      | 12.8                                     | 50               | 100                                | -                                 | ✓                            | ✓                                        |
|                                                               |                        |                     | RL36Y-□□050□□□□      |             |                                      | 12.8                                     | 50               | 100                                | -                                 | ✓                            | ✓                                        |
|                                                               |                        |                     | RL36Y-□□001□□□□      |             |                                      | 0.256                                    | 1                | 3.6                                | -                                 | ✓                            | ✓                                        |

\*1: The multiplier (number of divisions) depends on the Linear Encoder. Also, you must write the motor constant file to the Linear Encoder in advance.

\*2: These are reference values for setting SERVOPACK parameters. Contact the manufacturer for actual linear encoder scale pitches.

\*3: The maximum speeds given in the above table are the maximum applicable speeds of the encoders when combined with a Yaskawa SERVOPACK. The actual speed will be restricted by either the maximum speed of the Linear Servomotor or the maximum speed of the Linear Encoder (given above).

\*4: Contact Mitutoyo Corporation for details on the Linear Encoders.

\*5: Use this model number to purchase the Interpolator.

\*6: The speed is restricted for some SERVOPACKs.

Note: 1. Confirm detailed specifications, such as the tolerances, dimensions, and operating environment, with the manufacturer of the Encoder before you use it.  
2. Σ-LINK is a registered trademark of YASKAWA ELECTRIC CORPORATION.



## Related Documents

The documents that are related to the MP3300 Machine Controllers and  $\Sigma$ -7 series AC Servo Drives are shown in the following table. Refer to these documents as required.

| Brochure/Catalog Name<br>(Document No.)                                                      | Manual Name<br>(Manual No.)                                                                                                                  | Description of Document                                                                                                                                                                               |
|----------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Yaskawa Motion Product Brochure:<br>Confident, Consistent, Capable<br>(BL.MTN.01)            | –                                                                                                                                            | This brochure presents an introduction to Yaskawa America Motion Products and services, with an emphasis on AC Servo, Machine Controller, and IO products.                                            |
| $\Sigma$ -7 Series AC Servo Drives and Motors<br>Technical Supplement<br>(YAI-KAEPS80000123) | MP3300iec Machine Controller<br>Hardware Manual<br>(YAI-SIA-IEC-7)                                                                           | Provides detailed information on selection and installation MP3300iec machine controller components/accessories.                                                                                      |
|                                                                                              | $\Sigma$ -7S SERVOPACK with<br>MECHATROLINK-3 Communications References<br>Product Manual<br>(SIEPS80000128)                                 | Provides detailed information on selecting $\Sigma$ -7-Series SERVOPACKs and information on installing, connecting, setting, performing trial operation for, tuning, and monitoring the Servo Drives. |
|                                                                                              | $\Sigma$ -7S SERVOPACK with Analog<br>Voltage/Pulse Train References<br>Product Manual<br>(SIEPS80000126)                                    |                                                                                                                                                                                                       |
|                                                                                              | $\Sigma$ -7S SERVOPACK with EtherCAT (CoE)<br>Communication References<br>Product Manual<br>(SIEPS80000155)                                  |                                                                                                                                                                                                       |
|                                                                                              | $\Sigma$ -7W SERVOPACK with<br>MECHATROLINK-3 Communications References<br>Product Manual<br>(SIEPS80000129)                                 |                                                                                                                                                                                                       |
|                                                                                              | $\Sigma$ -V -Series/ $\Sigma$ -V -Series for Large-<br>Capacity Models/ $\Sigma$ -7-Series User's<br>Manual Safety Module<br>(SIEPC72082906) | Provides details information required for the design and maintenance of a Safety Module.                                                                                                              |
|                                                                                              | Rotary Servomotor Product Manual<br>(SIEPS80000136)                                                                                          | Provide detailed information on selecting, installing, and connecting the $\Sigma$ -7-Series Servomotors.                                                                                             |
|                                                                                              | Linear Servomotor Product Manual<br>(SIEPS80000137)                                                                                          |                                                                                                                                                                                                       |
|                                                                                              | Direct Drive Servomotor Product Manual<br>(SIEPS80000138)                                                                                    |                                                                                                                                                                                                       |
|                                                                                              | Peripheral Device Selection Manual<br>(SIEPS80000132)                                                                                        | Describes the peripheral devices for a $\Sigma$ -7-Series Servo System.                                                                                                                               |
|                                                                                              | MECHATROLINK-3 Communications<br>Standard Servo Profile Command Manual<br>(SIEPS80000131)                                                    | Provides detailed information on the MECHATROLINK-3 communications standard servo profile commands that are used for a $\Sigma$ -7- Series Servo System.                                              |
|                                                                                              | Digital Operator Operating Manual<br>(SIEPS80000133)                                                                                         | Describes the operating procedures for a Digital Operator for a $\Sigma$ -7-Series Servo System.                                                                                                      |
|                                                                                              | Engineering Tool<br>SigmaWin+ Online Manual<br>$\Sigma$ -7 Component<br>(SIEPS80000148)                                                      | Provides detailed operating procedures for the SigmaWin+ Engineering Tool for a $\Sigma$ -7-Series Servo System.                                                                                      |

| Brochure/Catalog Name<br>(Document No.)                                                      | Manual Name<br>(Manual No.)                                                                                                | Description of Document                                                                                                                                                                               |
|----------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| $\Sigma$ -7 Series AC Servo Drives and Motors<br>Technical Supplement<br>(YAI-KAEPS80000123) | $\Sigma$ -7S SERVOPACK with 400V-Input Power and EtherCAT (CoE) Communications References Product Manual (SIEPS80000180)   | Provides detailed information on selecting $\Sigma$ -7-Series SERVOPACKs and information on installing, connecting, setting, performing trial operation for, tuning, and monitoring the Servo Drives. |
|                                                                                              | $\Sigma$ -7S SERVOPACK with 400V-Input Power and MECHATROLINK III Communications References Product Manual (SIEPS80000214) |                                                                                                                                                                                                       |
|                                                                                              | $\Sigma$ -7W SERVOPACK with 400V-Input Power and EtherCAT (CoE) Communications References Product Manual (SIEPS80000219)   |                                                                                                                                                                                                       |
|                                                                                              | $\Sigma$ -7W SERVOPACK with 400V-Input Power and MECHATROLINK III Communications References Product Manual(SIEPS80000220)  |                                                                                                                                                                                                       |
|                                                                                              | $\Sigma$ -V -Series User Manual Safety Module (SIEPC 72082906E)                                                            | Provides details information required for the design and maintenance of a Safety Module.                                                                                                              |
|                                                                                              | Supplement for using with Sigma-7 SERVOPACKs (400 V-Input power models) (900-200-100)                                      |                                                                                                                                                                                                       |
|                                                                                              | Rotary Servomotor with 400 V-Input Power Product Manual (SIEPS80000186)                                                    | Provide detailed information on selecting, installing, and connecting the $\Sigma$ -7-Series Servomotors.                                                                                             |
|                                                                                              | Linear Servomotor with 400 V-Input Power Product Manual (SIEPS80000181)                                                    |                                                                                                                                                                                                       |





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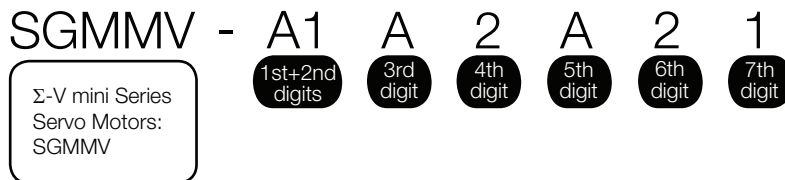
# Rotary Servo Motors

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|                          |     |
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| SGMMV .....              | 4   |
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## SGMMV

## Model Designations



1st+2nd digits Rated Output

| Code | Specification |
|------|---------------|
| A1   | 10 W          |
| A2   | 20 W          |
| A3   | 30 W          |

3rd digit Power Supply Voltage

| Code | Specification |
|------|---------------|
| A    | 200 VAC       |

4th digit Serial Encoder

| Code | Specification   |
|------|-----------------|
| 2    | 17-bit absolute |

5th digit Design Revision Order

A

6th digit Shaft End

| Code | Specification            |
|------|--------------------------|
| 2    | Straight                 |
| A    | Straight with flat seats |

7th digit Options

| Code | Specification               |
|------|-----------------------------|
| 1    | Without options             |
| C    | With holding brake (24 VDC) |

■ Non Stock Items

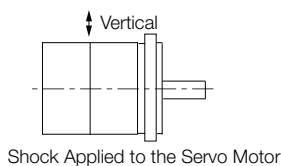
## Specifications and Ratings

### Specifications

| Voltage                            |                                       | 200 V                                                                                                                                                                                                                                                                                                                                        |     |                          |
|------------------------------------|---------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----|--------------------------|
| Model SGMMV-                       |                                       | A1A                                                                                                                                                                                                                                                                                                                                          | A2A | A3A                      |
| Time Rating                        |                                       | Continuous                                                                                                                                                                                                                                                                                                                                   |     |                          |
| Thermal Class                      |                                       | B                                                                                                                                                                                                                                                                                                                                            |     |                          |
| Insulation Resistance              |                                       | 500 VDC, 10 M $\Omega$ min.                                                                                                                                                                                                                                                                                                                  |     |                          |
| Withstand Voltage                  |                                       | 1,500 VAC for 1 minute                                                                                                                                                                                                                                                                                                                       |     |                          |
| Excitation                         |                                       | Permanent magnet                                                                                                                                                                                                                                                                                                                             |     |                          |
| Mounting                           |                                       | Flange-mounted                                                                                                                                                                                                                                                                                                                               |     |                          |
| Drive Method                       |                                       | Direct drive                                                                                                                                                                                                                                                                                                                                 |     |                          |
| Rotation Direction                 |                                       | Counterclockwise (CCW) for forward reference when viewed from the load side                                                                                                                                                                                                                                                                  |     |                          |
| Vibration Class <sup>*1</sup>      |                                       | V15                                                                                                                                                                                                                                                                                                                                          |     |                          |
| Environmental Conditions           | Surrounding Air Temperature           | 0°C to 40°C                                                                                                                                                                                                                                                                                                                                  |     |                          |
|                                    | Surrounding Air Humidity              | 20% to 80% relative humidity (with no condensation)                                                                                                                                                                                                                                                                                          |     |                          |
|                                    | Installation Site                     | <ul style="list-style-type: none"> <li>• Must be indoors and free of corrosive and explosive gases.</li> <li>• Must be well-ventilated and free of dust and moisture.</li> <li>• Must facilitate inspection and cleaning.</li> <li>• Must have an altitude of 1,000 m or less.</li> <li>• Must be free of strong magnetic fields.</li> </ul> |     |                          |
|                                    | Storage Environment                   | Store the Servo Motor in the following environment if you store it with the power cable disconnected.<br>Storage Temperature: -20°C to 60°C (with no freezing)<br>Storage Humidity: 20% to 80% relative humidity (with no condensation)                                                                                                      |     |                          |
| Shock Resistance <sup>*2</sup>     | Impact Acceleration Rate at Flange    | 490 m/s <sup>2</sup>                                                                                                                                                                                                                                                                                                                         |     |                          |
|                                    | Number of Impacts                     | 2 times                                                                                                                                                                                                                                                                                                                                      |     |                          |
| Vibration Resistance <sup>*3</sup> | Vibration Acceleration Rate at Flange | 49 m/s <sup>2</sup>                                                                                                                                                                                                                                                                                                                          |     |                          |
| Applicable SERVOPACKs              | SGD7S-                                | R90A, R90F                                                                                                                                                                                                                                                                                                                                   |     | 1R6A, 2R1F               |
|                                    | SGD7W-                                | 1R6A <sup>*4</sup> , 2R8A <sup>*4</sup>                                                                                                                                                                                                                                                                                                      |     | 1R6A, 2R8A <sup>*4</sup> |

\*1. A vibration class of V15 indicates a vibration amplitude of 15  $\mu$ m maximum on the Servo Motor without a load at the rated motor speed.

\*2. The shock resistance for shock in the vertical direction when the Servo Motor is mounted with the shaft in a horizontal position is given in the above table.

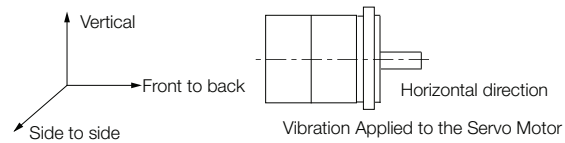


## Rotary Servo Motors

### SGMMV

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- \*3. The vertical, side-to-side, and front-to-back vibration resistance for vibration in three directions when the Servo Motor is mounted with the shaft in a horizontal position is given in the above table. The strength of the vibration that the Servo Motor can withstand depends on the application. Always check the vibration acceleration rate that is applied to the Servo Motor with the actual equipment.



- \*4. If you use a S-7W SERVOPACK, the control gain may not increase as much as with a S-7S SERVOPACK and other performances may be lower than those achieved with a S-7S SERVOPACK.



## Servo Motor Ratings

| Voltage                                                             |                                                                |                                     | 200 V                                                             |               |             |
|---------------------------------------------------------------------|----------------------------------------------------------------|-------------------------------------|-------------------------------------------------------------------|---------------|-------------|
| Model SGMMV-                                                        |                                                                |                                     | A1A                                                               | A2A           | A3A         |
| Rated Output <sup>*1</sup>                                          |                                                                | W                                   | 10                                                                | 20            | 30          |
| Rated Torque <sup>*1, *2</sup>                                      |                                                                | N•m                                 | 0.0318                                                            | 0.0637        | 0.0955      |
| Instantaneous Maximum Torque <sup>*1</sup>                          |                                                                | N•m                                 | 0.0955                                                            | 0.191         | 0.286       |
| Rated Current <sup>*1</sup>                                         |                                                                | Arms                                | 0.70                                                              | 0.66          | 0.98        |
| Instantaneous Maximum Current <sup>*1</sup>                         |                                                                | Arms                                | 2.0                                                               | 1.9           | 2.9         |
| Rated Motor Speed <sup>*1</sup>                                     |                                                                | min <sup>-1</sup>                   | 3000                                                              |               |             |
| Maximum Motor Speed <sup>*1</sup>                                   |                                                                | min <sup>-1</sup>                   | 6000                                                              |               |             |
| Torque Constant                                                     |                                                                | N•m/Arms                            | 0.0516                                                            | 0.107         |             |
| Motor Moment of Inertia                                             |                                                                | ×10 <sup>-7</sup> kg•m <sup>2</sup> | 2.72 (4.07)                                                       | 4.66 (6.02)   | 6.68 (8.04) |
| Rated Power Rate <sup>*1</sup>                                      |                                                                | kW/s                                | 3.72                                                              | 8.71          | 13.7        |
| Rated Angular Acceleration Rate <sup>*1</sup>                       |                                                                | rad/s <sup>2</sup>                  | 117000                                                            | 137000        | 143000      |
| Heat Sink Size (Aluminum)                                           |                                                                | mm                                  | 150 x 50 x 3                                                      | 250 x 250 x 6 |             |
| Protective Structure <sup>*3</sup>                                  |                                                                |                                     | Totally enclosed, self-cooled, IP55<br>(except for shaft opening) |               |             |
| Holding Brake Specifications <sup>*4</sup>                          | Rated Voltage                                                  | V                                   | 24 VDC <sup>+10%</sup> <sub>0</sub>                               |               |             |
|                                                                     | Capacity                                                       | W                                   | 2.0                                                               | 2.6           |             |
|                                                                     | Holding Torque                                                 | N•m                                 | 0.0318                                                            | 0.0637        | 0.0955      |
|                                                                     | Coil Resistance                                                | Ω (at 20°C)                         | 320                                                               | 221.5         |             |
|                                                                     | Rated Current                                                  | A (at 20°C)                         | 0.075                                                             | 0.108         |             |
|                                                                     | Time Required to Release Brake                                 | ms                                  | 40                                                                |               |             |
|                                                                     | Time Required to Brake                                         | ms                                  | 100                                                               |               |             |
| Allowable Load Moment of Inertia<br>(Motor Moment of Inertia Ratio) |                                                                |                                     | 30 times                                                          |               |             |
|                                                                     | With External Regenerative Resistor and Dynamic Brake Resistor |                                     | 30 times                                                          |               |             |
| Allowable Shaft Loads <sup>*5</sup>                                 | LF                                                             | mm                                  | 16                                                                |               |             |
|                                                                     | Allowable Radial Load                                          | N                                   | 34                                                                | 44            |             |
|                                                                     | Allowable Thrust Load                                          | N                                   | 14.5                                                              |               |             |

\*1. These values are for operation in combination with a SERVOPACK when the temperature of the armature winding is 20°C. These are typical values.

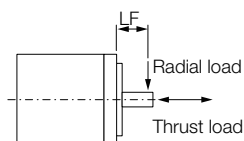
\*2. The rated torques are the continuous allowable torque values with an aluminum or steel heat sink of the dimensions given in the table.

\*3. This does not apply to the shaft opening. Protective structure specifications apply only when the special cable is used.

\*4. Observe the following precautions if you use a Servo Motor with a Holding Brake.

- The holding brake cannot be used to stop the Servo Motor.
- The time required to release the brake and the time required to brake depend on which discharge circuit is used. Confirm that the operation delay time is appropriate for the actual equipment.
- The 24-VDC power supply is not provided by Yaskawa.

\*5. The allowable shaft loads are illustrated in the following figure. Design the mechanical system so that the thrust and radial loads applied to the Servo Motor shaft end during operation do not exceed the values given in the table.

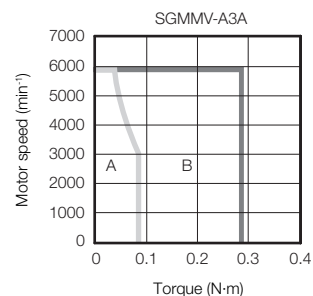
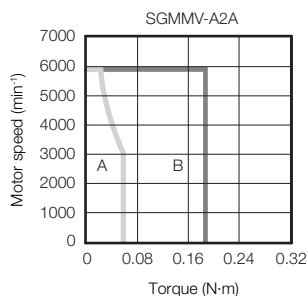
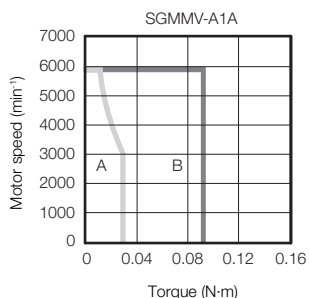


Note: The values in parentheses are for Servo Motors with Holding Brakes.

## Torque-Motor Speed Characteristics

**A** : Continuous duty zone

**B** : Intermittent duty zone\*



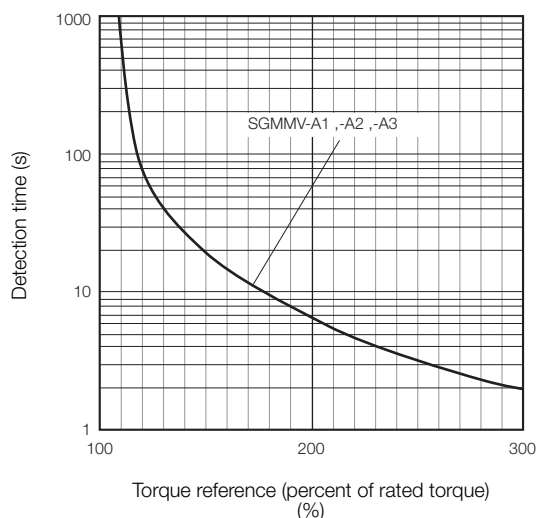
\* The characteristics are the same for three-phase 200 V, single-phase 200 V, and single-phase 100 V input.

Note: 1. These values are for operation in combination with a SERVOPACK when the temperature of the armature winding is 20°C. These are typical values.

2. The characteristics in the intermittent duty zone depend on the power supply voltage.
3. If the effective torque is within the allowable range for the rated torque, the Servo Motor can be used within the intermittent duty zone.
4. If you use a Servo Motor Main Circuit Cable that exceeds 20 m, the intermittent duty zone in the torque-motor speed characteristics will become smaller because the voltage drop increases.

## Servo Motor Overload Protection Characteristics

The overload detection level is set for hot start conditions with a Servo Motor surrounding air temperature of 40°C.



Note: The above overload protection characteristics do not mean that you can perform continuous duty operation with an output of 100% or higher. Use the Servo Motor so that the effective torque remains within the continuous duty zone given in *Torque-Motor Speed Characteristics* (page 8).

## Load Moment of Inertia

The load moment of inertia indicates the inertia of the load. The larger the load moment of inertia, the worse the response. If the moment of inertia is too large, operation will become unstable.

The allowable size of the load moment of inertia ( $J_L$ ) for the Servo Motor is restricted. Refer to *Servo Motor Ratings* (page 7). This value is provided strictly as a guideline and results depend on Servo Motor driving conditions.

An Overvoltage Alarm (A.400) is likely to occur during deceleration if the load moment of inertia exceeds the allowable load moment of inertia. SERVOPACKs with a built-in regenerative resistor may generate a Regenerative Overload Alarm (A.320). Perform one of the following steps if this occurs.

- Reduce the torque limit.
- Reduce the deceleration rate.
- Reduce the maximum motor speed.
- Install an External Regenerative Resistor if the alarm cannot be cleared using the above steps.

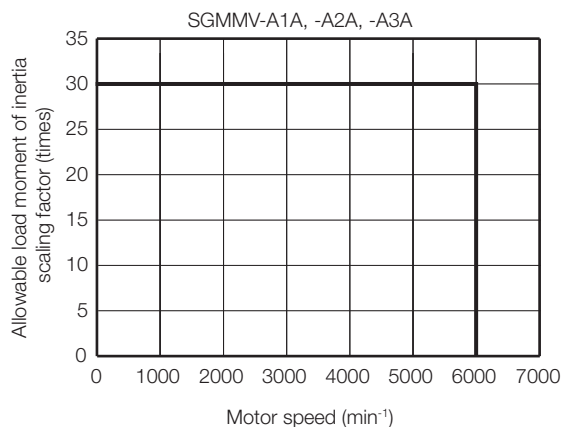
Regenerative resistors are not built into SERVOPACKs for 400-W Servo Motors or smaller Servo Motors. Even for SERVOPACKs with built-in regenerative resistors, an External Regenerative Resistor is required if the energy that results from the regenerative driving conditions exceeds the allowable loss capacity (W) of the built-in regenerative resistor.

## Allowable Load Moment of Inertia Scaling Factor for SERVOPACKs without Built-in Regenerative Resistors

The following graphs show the allowable load moment of inertia scaling factor of the motor speed for SERVOPACKs\* without built-in regenerative resistors when an External Regenerative Resistor is not connected.

If the Servo Motor exceeds the allowable load moment of inertia, an overvoltage alarm may occur in the SERVOPACK.

These graphs provide reference data for deceleration at the rated torque or higher.



\* Applicable SERVOPACK models: SGD7S-R90A, -1R6A, -R90F, and -2R1F

## Servo Motor Heat Dissipation Conditions

The Servo Motor ratings are the continuous allowable values when a heat sink is installed on the Servo Motor. If the Servo Motor is mounted on a small device component, the Servo Motor temperature may rise considerably because the surface for heat dissipation becomes smaller. Refer to the following graphs for the relation between the heat sink size and derating rate.

When using Servo Motors with derating, change the detection timing of overload warnings and overload alarms by referring to the motor overload detection level described in the following manual.

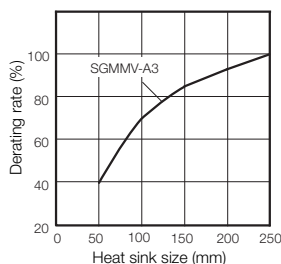
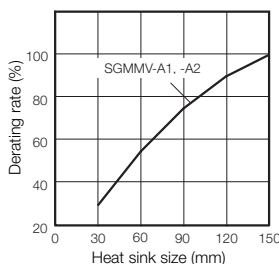
📖 *Σ-7-Series AC Servo Drive Rotary Servo Motor Product Manual* (Manual No.: SIEP S800001 36)

Note: The derating rates are applicable only when the average motor speed is less than or equal to the rated motor speed.  
If the average motor speed exceeds the rated motor speed, consult with your Yaskawa representative.



Important

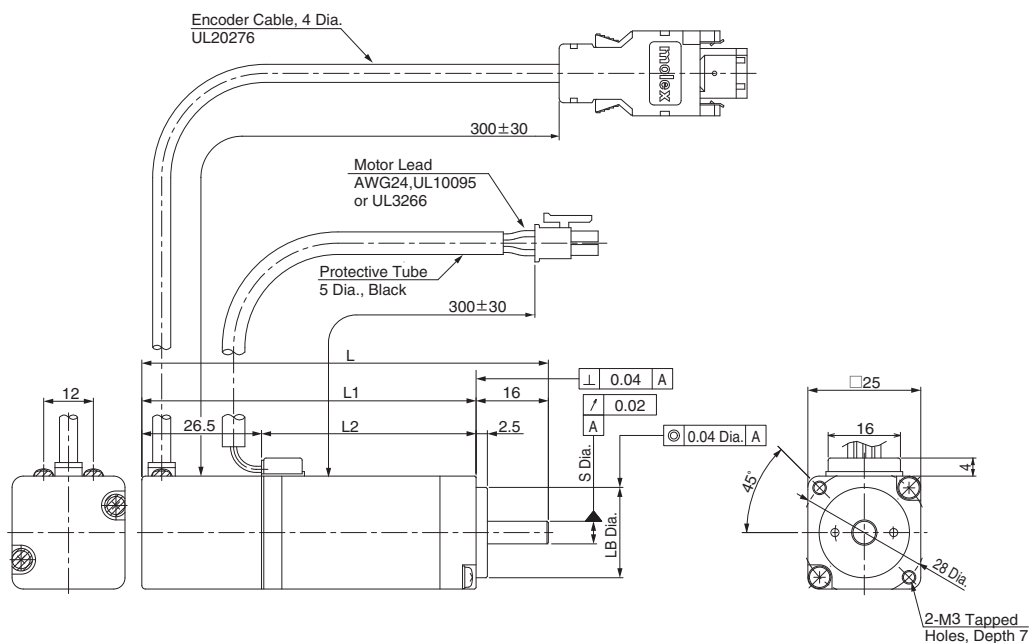
The actual temperature rise depends on how the heat sink (i.e., the Servo Motor mounting section) is attached to the installation surface, what material is used for the Servo Motor mounting section, and the motor speed. Always check the Servo Motor temperature with the actual equipment.



## External Dimensions

### Servo Motors without Holding Brakes

#### ◆ SGMMV-A1, -A2 and -A3



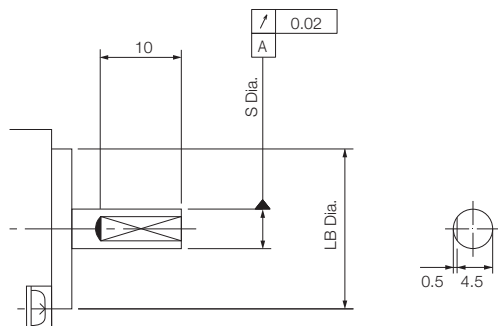
| Model<br>SGMMV- | L  | L1 | L2   | Flange<br>Dimensions |                    | Approx.<br>Mass<br>[kg] |
|-----------------|----|----|------|----------------------|--------------------|-------------------------|
|                 |    |    |      | S                    | LB                 |                         |
| A1A2A□ 1        | 70 | 54 | 27.5 | $5^{+0}_{-0.008}$    | $20^{+0}_{-0.021}$ | 0.13                    |
| A2A2A□ 1        | 80 | 64 | 37.5 | $5^{+0}_{-0.008}$    | $20^{+0}_{-0.021}$ | 0.17                    |
| A3A2A□ 1        | 90 | 74 | 47.5 | $5^{+0}_{-0.008}$    | $20^{+0}_{-0.021}$ | 0.21                    |

Refer to the following section for information on connectors.

◆ SGMMV-A1, -A2, and -A3 without Holding Brakes (page 14)

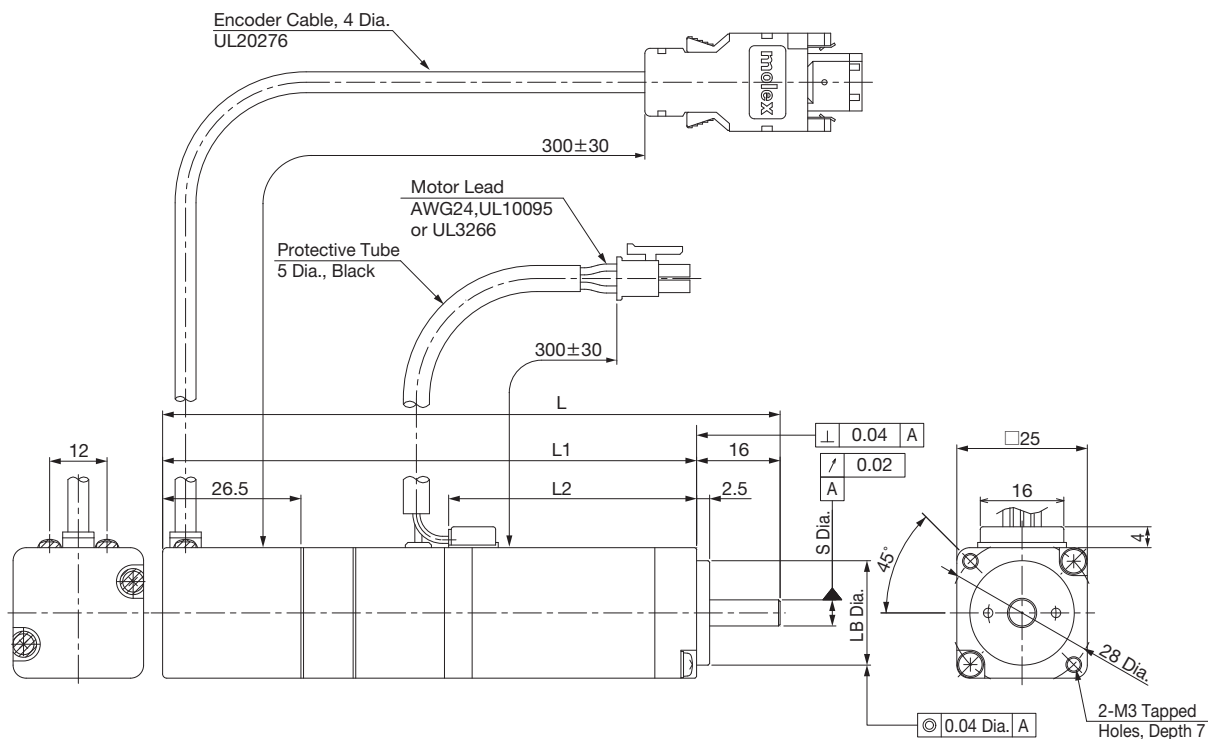
#### ■ Shaft End Specification

- Straight with Flat Seats



# Servo Motors with Holding Brakes

## ◆ SGMMV-A1, -A2 and -A3



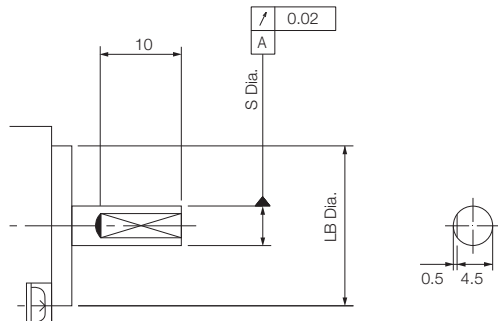
| Model<br>SGMMV- | L     | L1    | L2   | Flange<br>Dimensions             |                                   | Approx.<br>Mass<br>[kg] |
|-----------------|-------|-------|------|----------------------------------|-----------------------------------|-------------------------|
|                 |       |       |      | S                                | LB                                |                         |
| A1A2A□ C        | 94.5  | 78.5  | 27.5 | 5 <sup>0</sup> <sub>-0.008</sub> | 20 <sup>0</sup> <sub>-0.021</sub> | 0.215                   |
| A2A2A□ C        | 108.5 | 92.5  | 37.5 | 5 <sup>0</sup> <sub>-0.008</sub> | 20 <sup>0</sup> <sub>-0.021</sub> | 0.27                    |
| A3A2A□ C        | 118.5 | 102.5 | 47.5 | 5 <sup>0</sup> <sub>-0.008</sub> | 20 <sup>0</sup> <sub>-0.021</sub> | 0.31                    |

Refer to the following section for information on connectors.

◆ SGMMV-A1, -A2, and -A3 with Holding Brakes (page 14)

## ■ Shaft End Specification

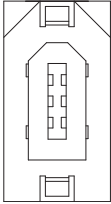
- Straight with Flat Seats



## Connector Specifications

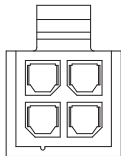
### ◆ SGMMV-A1, -A2, and -A3 without Holding Brakes

- Encoder Connector Specifications



Model: 55102-0600  
Manufacturer: Molex Japan LLC  
  
Mating connector: 54280-0609

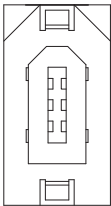
- Servo Motor Connector Specifications



Receptacle: 43025-0400  
Manufacturer: Molex Japan LLC

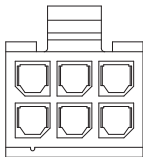
### ◆ SGMMV-A1, -A2, and -A3 with Holding Brakes

- Encoder Connector Specifications (24-bit Encoder)



Model: 55102-0600  
Manufacturer: Molex Japan LLC  
  
Mating connector: 54280-0609

- Servo Motor Connector Specifications



Receptacle: 43025-0600  
Manufacturer: Molex Japan LLC

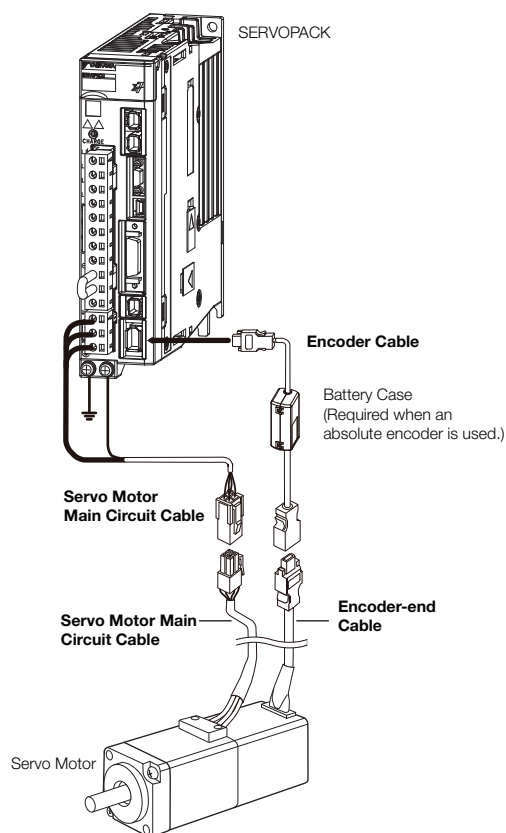


## Selecting Cables

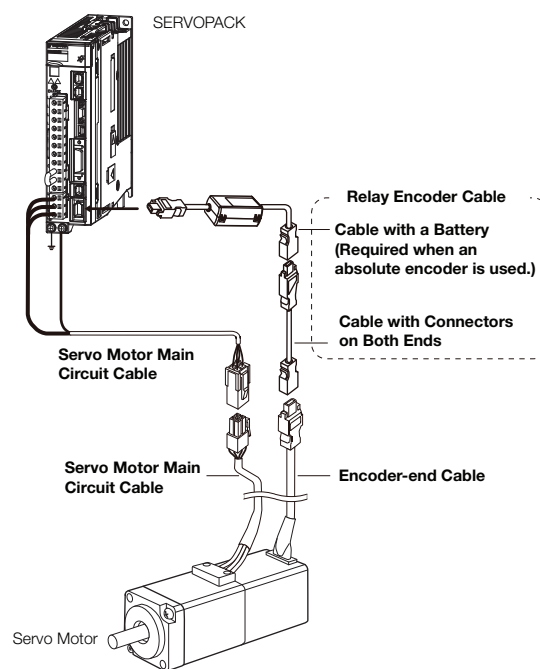
### ◆ Cable Configurations

The cables shown below are required to connect a Servo Motor to a SERVOPACK.

Encoder Cable of 20 m or Less



Encoder Cable of 30 m to 50 m (Relay Cable)



Note: 1. If the cable length exceeds 20 m, be sure to use a Relay Encoder Cable.

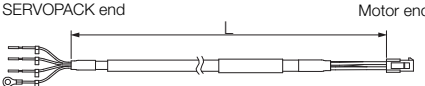
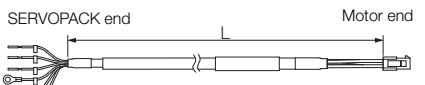
2. If you use a Servo Motor Main Circuit Cable that exceeds 20 m, the intermittent duty zone in the torque-motor speed characteristics will become smaller because the voltage drop increases.

3. Refer to the following manual for the following information.

- Cable dimensional drawings and cable connection specifications
- Order numbers and specifications of individual connectors for cables
- Order numbers and specifications for wiring materials

📖 *Σ-7-Series AC Servo Drive Peripheral Device Selection Manual* (Manual No.: SIEP S800001 32)

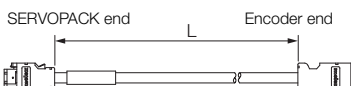
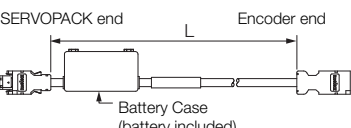
## Servo Motor Main Circuit Cables

| Servo Motor Model                                           | Name                                    | Length (L) | Order Number     |                                | Appearance                                                                         |
|-------------------------------------------------------------|-----------------------------------------|------------|------------------|--------------------------------|------------------------------------------------------------------------------------|
|                                                             |                                         |            | Standard Cable   | Flexible Cable <sup>*1*2</sup> |                                                                                    |
| SGMMV<br>-A1, -A2,<br>and -A3<br><br>10 W,<br>20 W,<br>30 W | For Servo Motors without Holding Brakes | 3 m        | JZSP-CF2M00-03-E | JZSP-CF2M20-03-E               |  |
|                                                             |                                         | 5 m        | JZSP-CF2M00-05-E | JZSP-CF2M20-05-E               |                                                                                    |
|                                                             |                                         | 10 m       | JZSP-CF2M00-10-E | JZSP-CF2M20-10-E               |                                                                                    |
|                                                             |                                         | 15 m       | JZSP-CF2M00-15-E | JZSP-CF2M20-15-E               |                                                                                    |
|                                                             |                                         | 20 m       | JZSP-CF2M00-20-E | JZSP-CF2M20-20-E               |                                                                                    |
|                                                             |                                         | 30 m       | JZSP-CF2M00-30-E | JZSP-CF2M20-30-E               |                                                                                    |
|                                                             |                                         | 40 m       | JZSP-CF2M00-40-E | JZSP-CF2M20-40-E               |                                                                                    |
|                                                             |                                         | 50 m       | JZSP-CF2M00-50-E | JZSP-CF2M20-50-E               |                                                                                    |
|                                                             | For Servo Motors with Holding Brakes    | 3 m        | JZSP-CF2M03-03-E | JZSP-CF2M23-03-E               |  |
|                                                             |                                         | 5 m        | JZSP-CF2M03-05-E | JZSP-CF2M23-05-E               |                                                                                    |
|                                                             |                                         | 10 m       | JZSP-CF2M03-10-E | JZSP-CF2M23-10-E               |                                                                                    |
|                                                             |                                         | 15 m       | JZSP-CF2M03-15-E | JZSP-CF2M23-15-E               |                                                                                    |
|                                                             |                                         | 20 m       | JZSP-CF2M03-20-E | JZSP-CF2M23-20-E               |                                                                                    |
|                                                             |                                         | 30 m       | JZSP-CF2M03-30-E | JZSP-CF2M23-30-E               |                                                                                    |
|                                                             |                                         | 40 m       | JZSP-CF2M03-40-E | JZSP-CF2M23-40-E               |                                                                                    |
|                                                             |                                         | 50 m       | JZSP-CF2M03-50-E | JZSP-CF2M23-50-E               |                                                                                    |

\*1. Use Flexible Cables for moving parts of machines, such as robots.

\*2. The recommended bending radius (R) is 90 mm or larger.

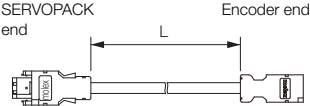
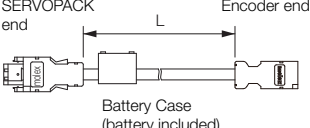
## Encoder Cables of 20 m or Less

| Servo Motor Model | Name                                                                          | Length (L) | Order Number    |                                | Appearance                                                                            |
|-------------------|-------------------------------------------------------------------------------|------------|-----------------|--------------------------------|---------------------------------------------------------------------------------------|
|                   |                                                                               |            | Standard Cable  | Flexible Cable <sup>*1*2</sup> |                                                                                       |
| All SGMMV models  | Cables with Connectors on Both Ends (for incremental encoder)                 | 3 m        | JZSP-CMP00-03-E | JZSP-CMP10-03-E                |  |
|                   |                                                                               | 5 m        | JZSP-CMP00-05-E | JZSP-CMP10-05-E                |                                                                                       |
|                   |                                                                               | 10 m       | JZSP-CMP00-10-E | JZSP-CMP10-10-E                |                                                                                       |
|                   |                                                                               | 15 m       | JZSP-CMP00-15-E | JZSP-CMP10-15-E                |                                                                                       |
|                   |                                                                               | 20 m       | JZSP-CMP00-20-E | JZSP-CMP10-20-E                |                                                                                       |
|                   | Cables with Connectors on Both Ends (for absolute encoder: With Battery Case) | 3 m        | JZSP-CSP19-03-E | JZSP-CSP29-03-E                |  |
|                   |                                                                               | 5 m        | JZSP-CSP19-05-E | JZSP-CSP29-05-E                |                                                                                       |
|                   |                                                                               | 10 m       | JZSP-CSP19-10-E | JZSP-CSP29-10-E                |                                                                                       |
|                   |                                                                               | 15 m       | JZSP-CSP19-15-E | JZSP-CSP29-15-E                |                                                                                       |
|                   |                                                                               | 20 m       | JZSP-CSP19-20-E | JZSP-CSP29-20-E                |                                                                                       |

\*1. Use Flexible Cables for moving parts of machines, such as robots.

\*2. The recommended bending radius (R) is 68 mm or larger.

## Relay Encoder Cables of 30 m to 50 m

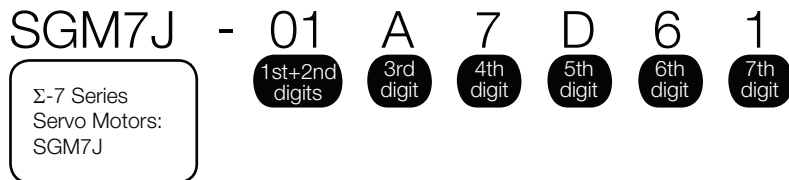
| Servo Motor Model | Name                                                                      | Length (L) | Order Number for Standard Cable | Appearance                                                                          |
|-------------------|---------------------------------------------------------------------------|------------|---------------------------------|-------------------------------------------------------------------------------------|
| All SGMMV models  | Cables with Connectors on Both Ends (for incremental or absolute encoder) | 30 m       | JZSP-UCMP00-30-E                |  |
|                   |                                                                           | 40 m       | JZSP-UCMP00-40-E                |                                                                                     |
|                   |                                                                           | 50 m       | JZSP-UCMP00-50-E                |                                                                                     |
|                   | Cable with a Battery Case (Required when an absolute encoder is used.)*   | 0.3 m      | JZSP-CSP12-E                    |  |

\*This Cable is not required if a battery is connected to the host controller.

## SGM7J

## SGM7J Servo Motors (without Gear Box)

## Model Designations



1st+2nd digits Rated Output

| Code | Specification         |
|------|-----------------------|
| A5   | 50 W                  |
| 01   | 100 W                 |
| C2   | 150 W                 |
| 02   | 200 W                 |
| 04   | 400 W                 |
| 06   | 600 W                 |
| 08   | 750 W                 |
| 15   | 1.5 kW (400 VAC Only) |

3rd digit Power Supply Voltage

| Code | Specification |
|------|---------------|
| A    | 200 VAC       |
| D    | 400 VAC       |

4th digit Serial Encoder

| Code | Specification               |
|------|-----------------------------|
| 6    | 24-bit batteryless absolute |
| 7    | 24-bit absolute             |
| F    | 24-bit incremental          |

5th digit Design Revision Order

A: Global design revision for batteryless absolute encoder (200 V)  
 D: Global design revision for battery type (200V)  
 F: Global design revision (400V)

6th digit Shaft End

| Code | Specification             |
|------|---------------------------|
| 2    | Straight without key      |
| 6    | Straight with key and tap |
| B    | With two flat seats       |

7th digit Options

| Code | Specification                            |
|------|------------------------------------------|
| 1    | Without options                          |
| C    | With holding brake (24 VDC)              |
| E    | With oil seal and holding brake (24 VDC) |
| S    | With oil seal                            |

■ Non Stock Items

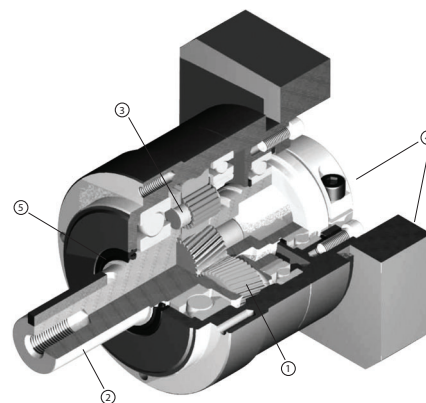
## SGM7J

## SGM7J Gear Motors

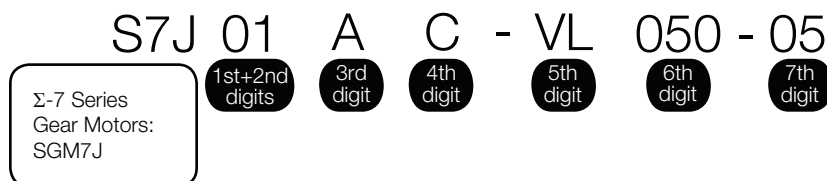
The SGM7J gear motor product family pairs SGM7J servo motors with high precision, low backlash inline planetary gear heads resulting in a portfolio of rotary actuators fit for a wide range of applications. The family of gear motors has been thoroughly tested and adheres to the high levels of quality and performance expected from Yaskawa.

The high precision gear heads offer a variety of application advantages:

- ① **Quiet operation** – helical cut gears contribute toward reduced vibration and noise
- ② **High precision** – a standard backlash of 5 arc-min make this gear head ideal for the most accurate applications
- ③ **High rigidity and torque capacity** – achieved with a design which incorporates uncaged needle roller bearings
- ④ **Optimized adapter bushing** – minimizes inertia allowing for more output torque to be realized
- ⑤ **No leakage through the seal** – high viscosity, anti-separation grease does not liquefy and does not migrate away from the gears
- **Maintenance-free** – no need to replace the grease for the life of the unit. The reducer can be positioned in any orientation



## Model Designations



**1st+2nd digits** Rated Output

| Code | Specification         |
|------|-----------------------|
| 01   | 100 W                 |
| 02   | 200 W                 |
| 04   | 400 W                 |
| 08   | 750 W                 |
| 15   | 1.5 kW (400 VAC only) |

**3rd digit** Power Supply Voltage

| Code | Specification            |
|------|--------------------------|
| A    | 200 VAC battery type     |
| B    | 200 VAC batteryless type |
| D    | 400 VAC battery type     |
| E    | 400 VAC batteryless type |

**4th digit** Brake Option

| Code  | Specification |
|-------|---------------|
| Blank | No brake      |
| C     | 24 V Brake    |

**5th digit** Gear box backlash

| Code | Specification      |
|------|--------------------|
| VL   | 5 arc-min backlash |

**6th digit** Gear head frame size

| Code | Specification |
|------|---------------|
| 050  | 50 mm         |
| 070  | 70 mm         |
| 090  | 90 mm         |
| 120  | 120 mm        |
| 155  | 155 mm        |

**7th digit** Gear Ratio

| Code | Specification |
|------|---------------|
| 03   | 3:1 Ratio     |
| 05   | 5:1 Ratio     |
| 10   | 10:1 Ratio    |
| 25   | 25:1 Ratio    |
| 50   | 50:1 Ratio    |

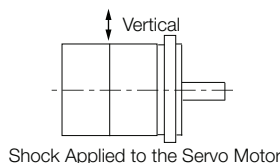
## Specifications and Ratings

### Specifications (200 V Models)

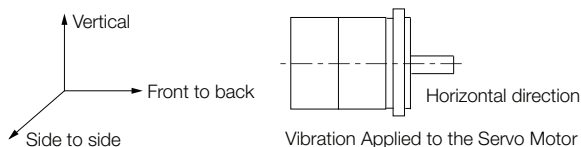
| Voltage                            |                                       | 200 V                                                                                                                                                                                                                                                                                                                                                                                                                     |      |                          |                                                  |            |         |
|------------------------------------|---------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------|--------------------------|--------------------------------------------------|------------|---------|
| Model SGM7J-                       |                                       | A5A                                                                                                                                                                                                                                                                                                                                                                                                                       | 01A  | C2A                      | 02A                                              | 04A        | 06A 08A |
| Time Rating                        |                                       | Continuous                                                                                                                                                                                                                                                                                                                                                                                                                |      |                          |                                                  |            |         |
| Thermal Class                      |                                       | UL: B, CE: B                                                                                                                                                                                                                                                                                                                                                                                                              |      |                          |                                                  |            |         |
| Insulation Resistance              |                                       | 500 VDC, 10 M $\Omega$ min.                                                                                                                                                                                                                                                                                                                                                                                               |      |                          |                                                  |            |         |
| Withstand Voltage                  |                                       | 1,500 VAC for 1 minute                                                                                                                                                                                                                                                                                                                                                                                                    |      |                          |                                                  |            |         |
| Excitation                         |                                       | Permanent magnet                                                                                                                                                                                                                                                                                                                                                                                                          |      |                          |                                                  |            |         |
| Mounting                           |                                       | Flange-mounted                                                                                                                                                                                                                                                                                                                                                                                                            |      |                          |                                                  |            |         |
| Drive Method                       |                                       | Direct drive                                                                                                                                                                                                                                                                                                                                                                                                              |      |                          |                                                  |            |         |
| Rotation Direction                 |                                       | Counterclockwise (CCW) for forward reference when viewed from the load side                                                                                                                                                                                                                                                                                                                                               |      |                          |                                                  |            |         |
| Vibration Class <sup>*1</sup>      |                                       | V15                                                                                                                                                                                                                                                                                                                                                                                                                       |      |                          |                                                  |            |         |
| Environmental Conditions           | Surrounding Air Temperature           | 0°C to 40°C (With derating, usage is possible between 40°C and 60°C.) <sup>*4</sup>                                                                                                                                                                                                                                                                                                                                       |      |                          |                                                  |            |         |
|                                    | Surrounding Air Humidity              | 20% to 80% relative humidity (with no condensation)                                                                                                                                                                                                                                                                                                                                                                       |      |                          |                                                  |            |         |
|                                    | Installation Site                     | <ul style="list-style-type: none"> <li>• Must be indoors and free of corrosive and explosive gases.</li> <li>• Must be well-ventilated and free of dust and moisture.</li> <li>• Must facilitate inspection and cleaning.</li> <li>• Must have an altitude of 1,000 m or less. (With derating, usage is possible between 1,000 m and 2,000 m.)<sup>*5</sup></li> <li>• Must be free of strong magnetic fields.</li> </ul> |      |                          |                                                  |            |         |
|                                    | Storage Environment                   | Store the Servo Motor in the following environment if you store it with the power cable disconnected.<br>Storage Temperature: -20°C to 60°C (with no freezing)<br>Storage Humidity: 20% to 80% relative humidity (with no condensation)                                                                                                                                                                                   |      |                          |                                                  |            |         |
| Shock Resistance <sup>*2</sup>     | Impact Acceleration Rate at Flange    | 490 m/s <sup>2</sup>                                                                                                                                                                                                                                                                                                                                                                                                      |      |                          |                                                  |            |         |
|                                    | Number of Impacts                     | 2 times                                                                                                                                                                                                                                                                                                                                                                                                                   |      |                          |                                                  |            |         |
| Vibration Resistance <sup>*3</sup> | Vibration Acceleration Rate at Flange | 49 m/s <sup>2</sup>                                                                                                                                                                                                                                                                                                                                                                                                       |      |                          |                                                  |            |         |
| Applicable SERVO-PACKs             | SGD7S-                                | R70A                                                                                                                                                                                                                                                                                                                                                                                                                      | R90A | 1R6A                     | 2R8A                                             | 5R5A       |         |
|                                    | SGD7W-                                | 1R6A <sup>*6</sup> , 2R8A <sup>*6</sup>                                                                                                                                                                                                                                                                                                                                                                                   |      | 1R6A, 2R8A <sup>*6</sup> | 2R8A<br>5R5A <sup>*6</sup><br>7R6A <sup>*6</sup> | 5R5A, 7R6A |         |

\*1. A vibration class of V15 indicates a vibration amplitude of 15  $\mu$ m maximum on the Servo Motor without a load at the rated motor speed.

\*2. The shock resistance for shock in the vertical direction when the Servo Motor is mounted with the shaft in a horizontal position is given in the above table.



- \*3. The vertical, side-to-side, and front-to-back vibration resistance for vibration in three directions when the Servo Motor is mounted with the shaft in a horizontal position is given in the above table. The strength of the vibration that the Servo Motor can withstand depends on the application. Always check the vibration acceleration rate that is applied to the Servo Motor with the actual equipment.



- \*4. If the surrounding air temperature will exceed 40°C, refer to the following section.

■ Applications Where the Surrounding Air Temperature of the Servo Motor Exceeds 40 °C (page 34)

- \*5. If the altitude will exceed 1,000 m, refer to the following section.

■ Applications Where the Altitude of the Servo Motor Exceeds 1,000 m (page 35)

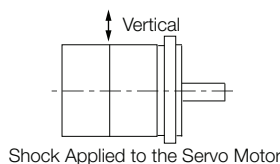
- \*6. If you use the Servo Motor together with a S-7W SERVOPACK, the control gain may not increase as much as with a  $\Sigma$ -7S SERVOPACK and other performances may be lower than those achieved with a  $\Sigma$ -7S SERVOPACK.

## Specifications (400 V Models)

| Voltage                            |                                       | 400 V                                                                                                                                                                                                                                                                                                                                                                                                                     |     |     |     |
|------------------------------------|---------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----|-----|-----|
| Model SGM7J-                       |                                       | 02D                                                                                                                                                                                                                                                                                                                                                                                                                       | 04D | 08D | 15D |
| Time Rating                        |                                       | Continuous                                                                                                                                                                                                                                                                                                                                                                                                                |     |     |     |
| Thermal Class                      |                                       | UL: B, CE: B                                                                                                                                                                                                                                                                                                                                                                                                              |     |     |     |
| Insulation Resistance              |                                       | 500 VDC, 10 M $\Omega$ min.                                                                                                                                                                                                                                                                                                                                                                                               |     |     |     |
| Withstand Voltage                  |                                       | 1,800 VAC for 1 minute                                                                                                                                                                                                                                                                                                                                                                                                    |     |     |     |
| Excitation                         |                                       | Permanent magnet                                                                                                                                                                                                                                                                                                                                                                                                          |     |     |     |
| Mounting                           |                                       | Flange-mounted                                                                                                                                                                                                                                                                                                                                                                                                            |     |     |     |
| Drive Method                       |                                       | Direct drive                                                                                                                                                                                                                                                                                                                                                                                                              |     |     |     |
| Rotation Direction                 |                                       | Counterclockwise (CCW) for forward reference when viewed from the load side                                                                                                                                                                                                                                                                                                                                               |     |     |     |
| Vibration Class <sup>*1</sup>      |                                       | V15                                                                                                                                                                                                                                                                                                                                                                                                                       |     |     |     |
| Environmental Conditions           | Surrounding Air Temperature           | 0°C to 40°C (With derating, usage is possible between 40°C and 60°C.) <sup>*4</sup>                                                                                                                                                                                                                                                                                                                                       |     |     |     |
|                                    | Surrounding Air Humidity              | 20% to 80% relative humidity (with no condensation)                                                                                                                                                                                                                                                                                                                                                                       |     |     |     |
|                                    | Installation Site                     | <ul style="list-style-type: none"> <li>• Must be indoors and free of corrosive and explosive gases.</li> <li>• Must be well-ventilated and free of dust and moisture.</li> <li>• Must facilitate inspection and cleaning.</li> <li>• Must have an altitude of 1,000 m or less. (With derating, usage is possible between 1,000 m and 2,000 m.)<sup>*5</sup></li> <li>• Must be free of strong magnetic fields.</li> </ul> |     |     |     |
|                                    | Storage Environment                   | Store the Servo Motor in the following environment if you store it with the power cable disconnected.<br>Storage Temperature: -20°C to 60°C (with no freezing)<br>Storage Humidity: 20% to 80% relative humidity (with no condensation)                                                                                                                                                                                   |     |     |     |
| Shock Resistance <sup>*2</sup>     | Impact Acceleration Rate at Flange    | 490 m/s <sup>2</sup>                                                                                                                                                                                                                                                                                                                                                                                                      |     |     |     |
|                                    | Number of Impacts                     | 2 times                                                                                                                                                                                                                                                                                                                                                                                                                   |     |     |     |
| Vibration Resistance <sup>*3</sup> | Vibration Acceleration Rate at Flange | 49 m/s <sup>2</sup>                                                                                                                                                                                                                                                                                                                                                                                                       |     |     |     |
| Applicable SERVO-PACKs             | SGDV--                                | 1r9                                                                                                                                                                                                                                                                                                                                                                                                                       |     | 3R5 | 5R4 |

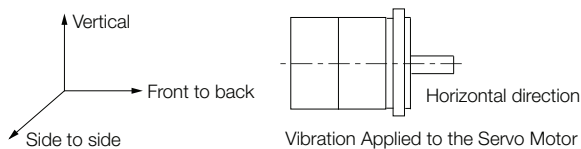
\*1. A vibration class of V15 indicates a vibration amplitude of 15  $\mu\text{m}$  maximum on the Servo Motor without a load at the rated motor speed.

\*2. The shock resistance for shock in the vertical direction when the Servo Motor is mounted with the shaft in a horizontal position is given in the above table.





- \*3. The vertical, side-to-side, and front-to-back vibration resistance for vibration in three directions when the Servo Motor is mounted with the shaft in a horizontal position is given in the above table. The strength of the vibration that the Servo Motor can withstand depends on the application. Always check the vibration acceleration rate that is applied to the Servo Motor with the actual equipment.



- \*4. If the surrounding air temperature will exceed 40°C, refer to the following section.

■ Applications Where the Surrounding Air Temperature of the Servo Motor Exceeds 40 °C (page 34)

- \*5. If the altitude will exceed 1,000 m, refer to the following section.

■ Applications Where the Altitude of the Servo Motor Exceeds 1,000 m (page 35).

# Ratings of Servo Motors (200 V Models)

| Voltage                                                          |                                |                                     | 200 V                               |                    |                    |                  |                  |                  |                  |  |
|------------------------------------------------------------------|--------------------------------|-------------------------------------|-------------------------------------|--------------------|--------------------|------------------|------------------|------------------|------------------|--|
| Model SGM7J-                                                     |                                |                                     | A5A                                 | 01A                | C2A                | 02A              | 04A              | 06A              | 08A              |  |
| Rated Output <sup>*1</sup>                                       |                                | W                                   | 50                                  | 100                | 150                | 200              | 400              | 600              | 750              |  |
| Rated Torque <sup>*1, *2</sup>                                   |                                | N•m                                 | 0.159                               | 0.318              | 0.477              | 0.637            | 1.27             | 1.91             | 2.39             |  |
| Instantaneous Maximum Torque <sup>*1</sup>                       |                                | N•m                                 | 0.557                               | 1.11               | 1.67               | 2.23             | 4.46             | 6.69             | 8.36             |  |
| Rated Current <sup>*1</sup>                                      |                                | Arms                                | 0.55                                | 0.85               | 1.6                | 1.6              | 2.5              | 4.2              | 4.4              |  |
| Instantaneous Maximum Current <sup>*1</sup>                      |                                | Arms                                | 2.0                                 | 3.1                | 5.7                | 5.8              | 9.3              | 15.3             | 16.9             |  |
| Rated Motor Speed <sup>*1</sup>                                  |                                | min <sup>-1</sup>                   | 3000                                |                    |                    |                  |                  |                  |                  |  |
| Maximum Motor Speed <sup>*1</sup>                                |                                | min <sup>-1</sup>                   | 6000                                |                    |                    |                  |                  |                  |                  |  |
| Torque Constant                                                  |                                | N•m/Arms                            | 0.316                               | 0.413              | 0.321              | 0.444            | 0.544            | 0.493            | 0.584            |  |
| Motor Moment of Inertia                                          | Absolute encoder with battery  | ×10 <sup>-4</sup> kg•m <sup>2</sup> | 0.0395<br>(0.0475)                  | 0.0659<br>(0.0739) | 0.0915<br>(0.0995) | 0.263<br>(0.333) | 0.486<br>(0.556) | 0.800<br>(0.870) | 1.59<br>(1.77)   |  |
|                                                                  | Batteryless absolute encoder   | ×10 <sup>-4</sup> kg•m <sup>2</sup> | 0.0410<br>(0.0490)                  | 0.0674<br>(0.0754) | 0.0930<br>(0.1010) | 0.264<br>(0.334) | 0.487<br>(0.557) | 0.801<br>(0.871) | 1.59<br>(1.77)   |  |
| Rated Power Rate <sup>*1</sup>                                   |                                | kW/s                                | 6.40<br>(5.32)                      | 15.3<br>(13.6)     | 24.8<br>(22.8)     | 15.4<br>(12.1)   | 33.1<br>(29.0)   | 45.6<br>(41.9)   | 35.9<br>(32.2)   |  |
| Rated Angular Acceleration Rate <sup>*1</sup>                    |                                | rad/s <sup>2</sup>                  | 40200<br>(33400)                    | 48200<br>(43000)   | 52100<br>(47900)   | 24200<br>(19100) | 26100<br>(22800) | 23800<br>(21900) | 15000<br>(13500) |  |
| Derating for Servo Motor with Oil Seal                           |                                | %                                   | 80                                  | 90                 |                    |                  | 95               |                  |                  |  |
| Heat Sink Size (Aluminum)                                        |                                | mm                                  | 200 × 200 × 6                       |                    |                    | 250 × 250 × 6    |                  |                  |                  |  |
| Protective Structure <sup>*3</sup>                               |                                |                                     | Totally enclosed, self-cooled, IP67 |                    |                    |                  |                  |                  |                  |  |
| Holding Brake Specifications <sup>*4</sup>                       | Rated Voltage                  | V                                   | 24 VDC±10%                          |                    |                    |                  |                  |                  |                  |  |
|                                                                  | Capacity                       | W                                   | 5.5                                 |                    |                    |                  | 6                |                  | 6.5              |  |
|                                                                  | Holding Torque                 | N•m                                 | 0.159                               | 0.318              | 0.477              | 0.637            | 1.27             | 1.91             | 2.39             |  |
|                                                                  | Coil Resistance                | Ω (at 20°C)                         | 104.8±10%                           |                    |                    | 96±10%           |                  | 88.6±10%         |                  |  |
|                                                                  | Rated Current                  | A (at 20°C)                         | 0.23                                |                    |                    | 0.25             |                  | 0.27             |                  |  |
|                                                                  | Time Required to Release Brake | ms                                  | 60                                  |                    |                    |                  |                  |                  | 80               |  |
|                                                                  | Time Required to Brake         | ms                                  | 100                                 |                    |                    |                  |                  |                  |                  |  |
| Allowable Load Moment of Inertia (Motor Moment of Inertia Ratio) |                                |                                     | 35 times                            |                    |                    | 15 times         | 10 times         | 20 times         | 12 times         |  |
| Allowable Shaft Loads <sup>*5</sup>                              | LF                             | mm                                  | 20                                  |                    |                    | 25               |                  |                  | 35               |  |
|                                                                  | Allowable Radial Load          | N                                   | 78                                  |                    |                    | 245              |                  |                  | 392              |  |
|                                                                  | Allowable Thrust Load          | N                                   | 54                                  |                    |                    | 74               |                  |                  | 147              |  |

Note: The values in parentheses are for Servo Motors with Holding Brakes.

\*1. These values are for operation in combination with a SERVOPACK when the temperature of the armature winding is 100°C. The values for other items are at 20°C. These are typical values.

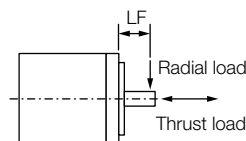
\*2. The rated torques are the continuous allowable torque values at a surrounding air temperature of 40°C with an aluminum heat sink of the dimensions given in the table.

\*3. This does not apply to the shaft opening. Protective structure specifications apply only when the special cable is used.

\*4. Observe the following precautions if you use a Servo Motor with a Holding Brake.

- The holding brake cannot be used to stop the Servo Motor.
- The time required to release the brake and the time required to brake depend on which discharge circuit is used. Confirm that the operation delay time is appropriate for the actual equipment.
- The 24-VDC power supply is not provided by Yaskawa.

\*5. The allowable shaft loads are illustrated in the following figure. Design the mechanical system so that the thrust and radial loads applied to the Servo Motor shaft end during operation do not exceed the values given in the table.



## Ratings of Servo Motors (400 V Models)

| Voltage                                                          |                                |                                     | 400 V                               |                  |                  |                 |
|------------------------------------------------------------------|--------------------------------|-------------------------------------|-------------------------------------|------------------|------------------|-----------------|
| Model SGM7J-                                                     |                                |                                     | 02D                                 | 04D              | 08D              | 15D             |
| Rated Output <sup>*1</sup>                                       |                                | W                                   | 200                                 | 400              | 750              | 1500            |
| Rated Torque <sup>*1, *2</sup>                                   |                                | N•m                                 | 0.637                               | 1.27             | 2.39             | 4.77            |
| Instantaneous Maximum Torque <sup>*1</sup>                       |                                | N•m                                 | 2.23                                | 4.46             | 8.36             | 14.3            |
| Rated Current <sup>*1</sup>                                      |                                | Arms                                | 1.5                                 | 1.4              | 2.2              | 4.5             |
| Instantaneous Maximum Current <sup>*1</sup>                      |                                | Arms                                | 5.5                                 | 5.3              | 8.2              | 14.0            |
| Rated Motor Speed <sup>*1</sup>                                  |                                | min <sup>-1</sup>                   | 3000                                |                  |                  |                 |
| Maximum Motor Speed <sup>*1</sup>                                |                                | min <sup>-1</sup>                   | 6000                                |                  |                  |                 |
| Torque Constant                                                  |                                | N•m/Arms                            | 0.461                               | 0.965            | 1.17             | 1.13            |
| Motor Moment of Inertia                                          |                                | ×10 <sup>-4</sup> kg•m <sup>2</sup> | 0.263<br>(0.333)                    | 0.486<br>(0.556) | 1.59<br>(1.77)   | 4.02<br>(4.90)  |
| Rated Power Rate <sup>*1</sup>                                   |                                | kW/s                                | 15.4 (12,1)                         | 33.1 (29.0)      | 35.9 (32.2)      | 56.6 (46.6)     |
| Rated Angular Acceleration Rate <sup>*1</sup>                    |                                | rad/s <sup>2</sup>                  | 24200<br>(19100)                    | 26100<br>(22800) | 15000<br>(13500) | 11900<br>(9700) |
| Heat Sink Size (Aluminum)                                        |                                | mm                                  | 250 × 250 × 6                       |                  |                  | 300 × 300 × 12  |
| Protective Structure <sup>*3</sup>                               |                                |                                     | Totally enclosed, self-cooled, IP67 |                  |                  |                 |
| Holding Brake Specifications <sup>*4</sup>                       | Rated Voltage                  | V                                   | 24 VDC±10%                          |                  |                  |                 |
|                                                                  | Capacity                       | W                                   | 6.0                                 |                  | 6.5              | 7.5             |
|                                                                  | Holding Torque                 | N•m                                 | 0.637                               | 1.27             | 2.39             | 4.77            |
|                                                                  | Coil Resistance                | Ω (at 20°C)                         | 96±10%                              |                  | 88.6±10%         | 76.8±10%        |
|                                                                  | Rated Current                  | A (at 20°C)                         | 0.25                                |                  | 0.27             | 0.31            |
|                                                                  | Time Required to Release Brake | ms                                  | 60                                  |                  | 80               |                 |
|                                                                  | Time Required to Brake         | ms                                  | 100                                 |                  |                  |                 |
| Allowable Load Moment of Inertia (Motor Moment of Inertia Ratio) |                                |                                     | 25 times                            |                  | 15 times         | 12 times        |
| Allowable Shaft Loads <sup>*5</sup>                              | LF                             | mm                                  | 25                                  |                  | 35               |                 |
|                                                                  | Allowable Radial Load          | N                                   | 245                                 |                  | 392              | 490             |
|                                                                  | Allowable Thrust Load          | N                                   | 74                                  |                  | 147              |                 |

Note: The values in parentheses are for Servo Motors with Holding Brakes.

\*1. These values are for operation in combination with a SERVOPACK when the temperature of the armature winding is 100°C. The values for other items are at 20°C. These are typical values.

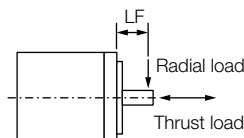
\*2. The rated torques are the continuous allowable torque values at a surrounding air temperature of 40°C with an aluminum heat sink of the dimensions given in the table.

\*3. This does not apply to the shaft opening. Protective structure specifications apply only when the special cable is used.

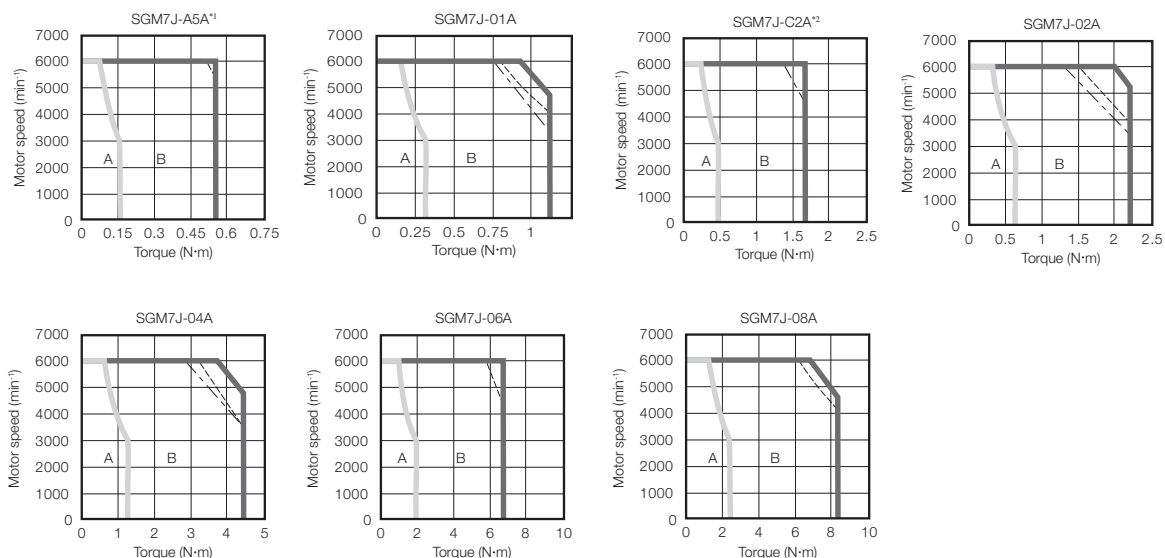
\*4. Observe the following precautions if you use a Servo Motor with a Holding Brake.

- The holding brake cannot be used to stop the Servo Motor.
- The time required to release the brake and the time required to brake depend on which discharge circuit is used. Confirm that the operation delay time is appropriate for the actual equipment.
- The 24-VDC power supply is not provided by Yaskawa.

\*5. The allowable shaft loads are illustrated in the following figure. Design the mechanical system so that the thrust and radial loads applied to the Servo Motor shaft end during operation do not exceed the values given in the table.



**A** : Continuous duty zone ——— (solid lines): With three-phase 200-V or single-phase 230-V input  
**B** : Intermittent duty zone ..... (dotted lines): With single-phase 200-V input  
                                   — · — · — (dashed-dotted lines): With single-phase 100-V input



Note: 1. These values are for operation in combination with a SERVOPACK when the temperature of the armature winding is 100°C. These are typical values.

2. The characteristics in the intermittent duty zone depend on the power supply voltage.
3. If the effective torque is within the allowable range for the rated torque, the Servo Motor can be used within the intermittent duty zone.
4. If you use a Servo Motor Main Circuit Cable that exceeds 20 m, the intermittent duty zone in the torque-motor speed characteristics will become smaller because the voltage drop increases.



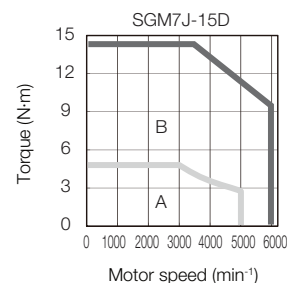
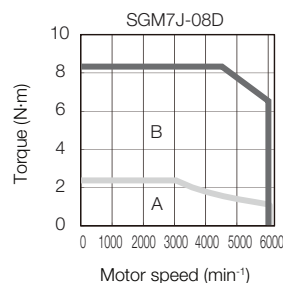
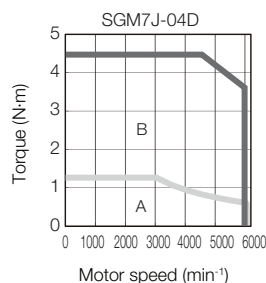
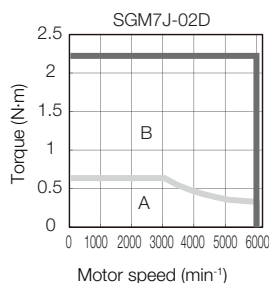
Contact your Yaskawa representative if you use a Servo Motor under these conditions.

Motor moment of inertia for a Servo Motor with a Holding Brake from *Ratings of Servo Motors (200 V Models)* (page 24) + Moment of inertia for the gear from the above table.

## Servo Motor Torque-Motor Speed Characteristics (400V Models)

**A** : Continuous duty zone

**B** : Intermittent duty zone



Note: 1. These values are for operation in combination with a SERVOPACK when the temperature of the armature winding is 100°C. These are typical values.

2. The characteristics in the intermittent duty zone depend on the power supply voltage. The intermittent duty zones in the graphs show the characteristics when a three-phase, 400-VAC power supply voltage is used.

3. If the effective torque is within the allowable range for the rated torque, the Servomotor can be used within the intermittent duty zone.

4. If you use a Servomotor Main Circuit Cable that exceeds 20 m, the intermittent duty zone in the torque-motor speed characteristics will become smaller because the voltage drop increases.

## Ratings of Gear Motors (200 V Models: Abs. Encoder with Battery)

| Gear Motor Model Number<br>S7J_____ | Base Servo Motor Model<br>SGM7J- | Gear Ratio | Gearing Efficiency<br>*1 | Rated Speed (RPM) | Max Speed (RPM) | Rated Torque (Nm)*2 | Peak Torque (Nm)*2 | Motor Inertia (x10 <sup>-4</sup> kg-m <sup>2</sup> ) | Gearhead Inertia (x10 <sup>-4</sup> kg-m <sup>2</sup> ) | Allowable Radial Load (N) | Allowable Axial Load (N) | Backlash (arc-min) | Class |      |      |
|-------------------------------------|----------------------------------|------------|--------------------------|-------------------|-----------------|---------------------|--------------------|------------------------------------------------------|---------------------------------------------------------|---------------------------|--------------------------|--------------------|-------|------|------|
| 01A□ -VL050-03                      | 01A7D6□                          | 3:1        | 95                       | 1000              | 2000            | 0.906               | 3.16               | 0.0659 (0.0739)                                      | 0.053                                                   | 240                       | 270                      | 5                  | IP65  |      |      |
| 01A□ -VL050-05                      |                                  | 5:1        |                          | 600               | 1200            | 1.51                | 5.27               |                                                      | 0.036                                                   | 290                       | 330                      |                    |       |      |      |
| 01A□ -VL050-10                      |                                  | 10:1       |                          | 300               | 600             | 3.02                | 10.5               |                                                      | 0.030                                                   | 360                       | 450                      |                    |       |      |      |
| 01A□ -VL050-25                      |                                  | 25:1       | 90                       | 120               | 240             | 7.16                | 18.0*3             |                                                      | 0.034                                                   | 490                       | 640                      | 7                  |       |      |      |
| 01A□ -VL070-50                      |                                  | 50:1       |                          | 60                | 120             | 14.3                | 50.0               |                                                      | 0.051                                                   | 1100                      | 1100                     | 5                  |       |      |      |
| 02A□ -VL050-03                      | 02A7D6□                          | 3:1        | 95                       | 1000              | 2000            | 1.82                | 6.36               | 0.263 (0.333)                                        | 0.17                                                    | 240                       | 270                      | IP65               |       |      |      |
| 02A□ -VL050-05                      |                                  | 5:1        |                          | 600               | 1200            | 3.03                | 10.6               |                                                      | 0.15                                                    | 290                       | 330                      |                    |       |      |      |
| 02A□ -VL050-10                      |                                  | 10:1       |                          | 300               | 600             | 6.00*3              | 12.0*3             |                                                      | 0.15                                                    | 360                       | 450                      |                    |       |      |      |
| 02A□ -VL070-25                      |                                  | 25:1       | 90                       | 120               | 240             | 14.3                | 50.0*3             |                                                      | 0.17                                                    | 870                       | 790                      |                    |       |      |      |
| 02A□ -VL070-50                      |                                  | 50:1       |                          | 60                | 120             | 27.0*3              | 50.0*3             |                                                      | 0.16                                                    | 1100                      | 1100                     |                    |       |      |      |
| 04A□ -VL050-03                      | 04A7D6□                          | 3:1        | 95                       | 1000              | 2000            | 3.62                | 12.0*3             | 0.486 (0.556)                                        | 0.17                                                    | 240                       | 270                      |                    |       | IP65 |      |
| 04A□ -VL050-05                      |                                  | 5:1        |                          | 600               | 1200            | 6.03                | 18.0*3             |                                                      | 0.15                                                    | 290                       | 330                      |                    |       |      |      |
| 04A□ -VL070-10                      |                                  | 10:1       |                          | 300               | 600             | 12.1                | 35.0*3             |                                                      | 0.17                                                    | 640                       | 530                      |                    |       |      |      |
| 04A□ -VL070-25                      |                                  | 25:1       | 90                       | 120               | 240             | 27.0*3              | 50.0*3             |                                                      | 0.17                                                    | 870                       | 790                      |                    |       |      |      |
| 04A□ -VL090-50                      |                                  | 50:1       |                          | 60                | 120             | 57.2                | 125*3              |                                                      | 0.27                                                    | 2100                      | 2200                     |                    |       |      |      |
| 08A□ -VL070-03                      | 08A7D6□                          | 3:1        | 95                       | 1000              | 2000            | 6.81                | 23.8               | 1.59 (1.77)                                          | 0.53                                                    | 430                       | 310                      |                    |       |      | IP65 |
| 08A□ -VL070-05                      |                                  | 5:1        |                          | 600               | 1200            | 11.4                | 39.7               |                                                      | 0.46                                                    | 510                       | 390                      |                    |       |      |      |
| 08A□ -VL090-10                      |                                  | 10:1       |                          | 300               | 600             | 22.7                | 79.4               |                                                      | 0.70                                                    | 1200                      | 1600                     |                    |       |      |      |
| 08A□ -VL090-25                      |                                  | 25:1       | 90                       | 120               | 240             | 53.8                | 125*3              |                                                      | 0.74                                                    | 1600                      | 2200                     |                    |       |      |      |
| 08A□ -VL120-50                      |                                  | 50:1       |                          | 60                | 120             | 108                 | 330*3              |                                                      | 0.76                                                    | 3400                      | 3900                     |                    |       |      |      |

Note: The values in parentheses are for Servo Motors with Holding Brakes (indicated by value of □ in model numbers).

\*1. The gear efficiency depends on operating conditions such as the output torque, motor speed, and temperature.

\*2. The gear motor output torque is expressed by the following formula: Output Torque = (Servo Motor Output Torque) x (Gearing Ratio) x (Gearing Efficiency). The values in the table are typical values for the rated torque, rated motor speed, and a surrounding air temperature of 25°C. They are reference values only.

\*3. The output torque of the gear motor is limited by the mechanical limit of the gear head. Operation above this limit could result in premature failure of the gear motor.



Important

During operation of the gear motor, losses due to inefficiencies of the gearing mechanism are generated. The losses vary as the conditions for gear motor torque and speed change. Temperature rise can vary based on the mechanical inefficiencies and the heat dissipation conditions. For heat dissipation conditions, check the gear and motor temperatures with the actual equipment. If operating temperatures are too high, implement the following measures.

- Decrease the load ratio.
- Change the heat dissipation conditions.
- Use forced-air cooling for the motor with a cooling fan or other means.
- Please refer to "Sigma-7 Gearmotor Temperature Test Data" (document number PN.GearMotors.01) on [yaskawa.com](http://yaskawa.com) for temperature test data.

## Ratings of Batteryless Gear Motors (200 V Models)

| Gear Motor Model Number<br>SJ7_____ | Base Servo Motor Model<br>SGM7J- | Gear Ratio | Gearing Efficiency<br>*1 | Rated Speed (RPM) | Max Speed (RPM)    | Rated Torque (Nm)*2 | Peak Torque (Nm)*2 | Motor Inertia (x10 <sup>-4</sup> kg-m <sup>2</sup> ) | Gearhead Inertia (x10 <sup>-4</sup> kg-m <sup>2</sup> ) | Allowable Radial Load (N) | Allowable Axial Load (N) | Backlash (arc-min) | Class |   |   |
|-------------------------------------|----------------------------------|------------|--------------------------|-------------------|--------------------|---------------------|--------------------|------------------------------------------------------|---------------------------------------------------------|---------------------------|--------------------------|--------------------|-------|---|---|
| 01B□ -VL050-03                      | 01A6A6□                          | 3:1        | 95                       | 1000              | 2000               | 0.906               | 3.16               | 0.0674 (0.0754)                                      | 0.053                                                   | 240                       | 270                      | 5                  | IP65  |   |   |
| 01B□ -VL050-05                      |                                  | 5:1        |                          | 600               | 1200               | 1.51                | 5.27               |                                                      | 0.036                                                   | 290                       | 330                      |                    |       |   |   |
| 01B□ -VL050-10                      |                                  | 10:1       |                          | 300               | 600                | 3.02                | 10.5               |                                                      | 0.030                                                   | 360                       | 450                      |                    |       |   |   |
| 01B□ -VL050-25                      |                                  | 90         | 120                      | 240               | 7.16               | 18.0 <sup>*3</sup>  | 0.034              |                                                      | 490                                                     | 640                       | 7                        |                    |       |   |   |
| 01B□ -VL070-50                      |                                  |            | 50:1                     | 60                | 120                | 14.3                | 50.0               |                                                      | 0.051                                                   | 1100                      | 1100                     | 5                  |       |   |   |
| 02B□ -VL050-03                      | 02A6A6□                          | 3:1        | 95                       | 1000              | 2000               | 1.82                | 6.36               | 0.264 (0.334)                                        | 0.17                                                    | 240                       | 270                      | 5                  |       |   |   |
| 02B□ -VL050-05                      |                                  | 5:1        |                          | 600               | 1200               | 3.03                | 10.6               |                                                      | 0.15                                                    | 290                       | 330                      |                    |       |   |   |
| 02B□ -VL050-10                      |                                  | 10:1       |                          | 300               | 600                | 6.00 <sup>*3</sup>  | 12.0 <sup>*3</sup> |                                                      | 0.15                                                    | 360                       | 450                      |                    |       |   |   |
| 02B□ -VL070-25                      |                                  | 90         | 120                      | 240               | 14.3               | 50.0 <sup>*3</sup>  | 0.17               |                                                      | 870                                                     | 790                       |                          |                    |       |   |   |
| 02B□ -VL070-50                      |                                  |            | 50:1                     | 60                | 120                | 27.0 <sup>*3</sup>  | 50.0 <sup>*3</sup> |                                                      | 0.16                                                    | 1100                      | 1100                     |                    |       |   |   |
| 04B□ -VL050-03                      | 04A6A6□                          | 3:1        | 95                       | 1000              | 2000               | 3.62                | 12.0 <sup>*3</sup> | 0.487 (0.557)                                        | 0.17                                                    | 240                       | 270                      |                    |       | 5 |   |
| 04B□ -VL050-05                      |                                  | 5:1        |                          | 600               | 1200               | 6.03                | 18.0 <sup>*3</sup> |                                                      | 0.15                                                    | 290                       | 330                      |                    |       |   |   |
| 04B□ -VL070-10                      |                                  | 10:1       |                          | 300               | 600                | 12.1                | 35.0 <sup>*3</sup> |                                                      | 0.17                                                    | 640                       | 530                      |                    |       |   |   |
| 04B□ -VL070-25                      |                                  | 90         | 120                      | 240               | 27.0 <sup>*3</sup> | 50.0 <sup>*3</sup>  | 0.17               |                                                      | 870                                                     | 790                       |                          |                    |       |   |   |
| 04B□ -VL090-50                      |                                  |            | 50:1                     | 60                | 120                | 57.2                | 125 <sup>*3</sup>  |                                                      | 0.27                                                    | 2100                      | 2200                     |                    |       |   |   |
| 08B□ -VL070-03                      | 08A6A6□                          | 3:1        | 95                       | 1000              | 2000               | 6.81                | 23.8               | 1.59 (1.77)                                          | 0.53                                                    | 430                       | 310                      |                    |       |   | 5 |
| 08B□ -VL070-05                      |                                  | 5:1        |                          | 600               | 1200               | 11.4                | 39.7               |                                                      | 0.46                                                    | 510                       | 390                      |                    |       |   |   |
| 08B□ -VL090-10                      |                                  | 10:1       |                          | 300               | 600                | 22.7                | 79.4               |                                                      | 0.70                                                    | 1200                      | 1600                     |                    |       |   |   |
| 08B□ -VL090-25                      |                                  | 90         | 120                      | 240               | 53.8               | 125 <sup>*3</sup>   | 0.74               |                                                      | 1600                                                    | 2200                      |                          |                    |       |   |   |
| 08B□ -VL120-50                      |                                  |            | 50:1                     | 60                | 120                | 108                 | 330 <sup>*3</sup>  |                                                      | 0.76                                                    | 3400                      | 3900                     |                    |       |   |   |

Note: The values in parentheses are for Servo Motors with Holding Brakes (indicated by value of □ in model numbers).

\*1. The gear efficiency depends on operating conditions such as the output torque, motor speed, and temperature.

\*2. The gear motor output torque is expressed by the following formula: Output Torque = (Servo Motor Output Torque) x (Gearing Ratio) x (Gearing Efficiency). The values in the table are typical values for the rated torque, rated motor speed, and a surrounding air temperature of 25°C. They are reference values only.

\*3. The output torque of the gear motor is limited by the mechanical limit of the gear head. Operation above this limit could result in premature failure of the gear motor.



Important

During operation of the gear motor, losses due to inefficiencies of the gearing mechanism are generated. The losses vary as the conditions for gear motor torque and speed change. Temperature rise can vary based on the mechanical inefficiencies and the heat dissipation conditions. For heat dissipation conditions, check the gear and motor temperatures with the actual equipment. If operating temperatures are too high, implement the following measures.

- Decrease the load ratio.
- Change the heat dissipation conditions.
- Use forced-air cooling for the motor with a cooling fan or other means.
- Please refer to "Sigma-7 Gearmotor Temperature Test Data" (document number PN.GearMotors.01) on [yaskawa.com](http://yaskawa.com) for temperature test data.

## Ratings of Gear Motors (400 V Models)

| Gear Motor Model Number S7J | Base Servo Motor Model SGM7J- | Gear Ratio | Gearing Efficiency <sup>*1</sup> | Rated Speed (RPM) | Max Speed (RPM)  | Rated Torque (Nm) <sup>*2</sup> | Peak Torque (Nm) <sup>*2</sup> | Motor Inertia (x10 <sup>-4</sup> kg-m <sup>2</sup> ) | Gearhead Inertia (x10 <sup>-4</sup> kg-m <sup>2</sup> ) | Allowable Radial Load (N) | Allowable Axial Load (N) | Backlash (arc-min) | Class |
|-----------------------------|-------------------------------|------------|----------------------------------|-------------------|------------------|---------------------------------|--------------------------------|------------------------------------------------------|---------------------------------------------------------|---------------------------|--------------------------|--------------------|-------|
| 02D□ -VL050-03              | 02D7F6□                       | 3:1        | 95                               | 1000              | 2000             | 1.82                            | 6.36                           | 0.263 (0.333)                                        | 0.17                                                    | 710                       | 640                      | 5                  | IP65  |
| 02D□ -VL050-05              |                               | 5:1        |                                  | 600               | 1200             | 3.03                            | 10.6                           |                                                      | 0.15                                                    |                           |                          |                    |       |
| 02D□ -VL050-10              |                               | 10:1       |                                  | 300               | 600              | 6.00 <sup>*3</sup>              | 12.0 <sup>*3</sup>             |                                                      | 0.15                                                    | 1200                      | 1100                     |                    |       |
| 02D□ -VL070-25              |                               | 25:1       | 90                               | 120               | 240              | 14.3                            | 50.0 <sup>*3</sup>             |                                                      | 0.17                                                    |                           |                          |                    |       |
| 02D□ -VL070-50              |                               | 50:1       |                                  | 60                | 120              | 27.0 <sup>*3</sup>              | 50.0 <sup>*3</sup>             |                                                      | 0.16                                                    |                           |                          |                    |       |
| 04D□ -VL050-03              | 04D7F6□                       | 3:1        | 95                               | 1000              | 2000             | 3.62                            | 12.0 <sup>*3</sup>             | 0.486 (0.556)                                        | 0.17                                                    | 710                       | 640                      |                    |       |
| 04D□ -VL050-05              |                               | 5:1        |                                  | 600               | 1200             | 6.03                            | 18.0 <sup>*3</sup>             |                                                      | 0.15                                                    |                           |                          |                    |       |
| 04D□ -VL070-10              |                               | 10:1       |                                  | 300               | 600              | 12.1                            | 35.0 <sup>*3</sup>             |                                                      | 0.17                                                    | 1200                      | 1100                     |                    |       |
| 04D□ -VL070-25              |                               | 25:1       | 90                               | 120               | 240              | 27.0 <sup>*3</sup>              | 50.0 <sup>*3</sup>             |                                                      | 0.17                                                    |                           |                          |                    |       |
| 04D□ -VL090-50              |                               | 50:1       |                                  | 60                | 120              | 57.2                            | 125 <sup>*3</sup>              |                                                      | 0.27                                                    | 2400                      | 2200                     |                    |       |
| 08D□ -VL070-03              | 08D7F6□                       | 3:1        | 95                               | 1000              | 2000             | 6.81                            | 23.8                           | 1.59 (1.77)                                          | 0.53                                                    | 1200                      | 1100                     |                    |       |
| 08D□ -VL070-05              |                               | 5:1        |                                  | 600               | 1200             | 11.4                            | 39.7                           |                                                      | 0.46                                                    |                           |                          |                    |       |
| 08D□ -VL090-10              |                               | 10:1       |                                  | 300               | 600              | 22.7                            | 79.4                           |                                                      | 0.70                                                    | 2400                      | 2200                     |                    |       |
| 08D□ -VL090-25              |                               | 25:1       | 90                               | 120               | 240              | 53.8                            | 125 <sup>*3</sup>              |                                                      | 0.74                                                    |                           |                          |                    |       |
| 08D□ -VL120-50              |                               | 50:1       |                                  | 40 <sup>*3</sup>  | 80 <sup>*3</sup> | 108                             | 330 <sup>*3</sup>              |                                                      | 0.76                                                    | 4300                      | 3900                     |                    |       |
| 15D□ -VL090-03              | 15D7F6□                       | 3:1        | 95                               | 1000              | 2000             | 13.60                           | 40.8                           | 4.02 (4.90)                                          | 1.10                                                    | 810                       | 930                      |                    |       |
| 15D□ -VL090-05              |                               | 5:1        |                                  | 600               | 1200             | 22.7                            | 67.9                           |                                                      | 0.80                                                    | 960                       | 1200                     |                    |       |
| 15D□ -VL090-10              |                               | 10:1       |                                  | 300               | 600              | 45.3                            | 80.0 <sup>*3</sup>             |                                                      | 0.70                                                    | 1200                      | 1600                     |                    |       |
| 15D□ -VL120-25              |                               | 25:1       | 90                               | 120               | 240              | 107.0                           | 322                            |                                                      | 1.10                                                    | 2700                      | 3700                     |                    |       |
| 15D□ -VL155-50              |                               | 50:1       |                                  | 40 <sup>*3</sup>  | 80 <sup>*3</sup> | 215                             | 644                            |                                                      | 1.10                                                    | 8100                      | 8200                     |                    |       |

Note: The values in parentheses are for Servo Motors with Holding Brakes (indicated by value of □ in model numbers).

\*1. The gear efficiency depends on operating conditions such as the output torque, motor speed, and temperature.

\*2. The gear motor output torque is expressed by the following formula: Output Torque = (Servo Motor Output Torque) x (Gearing Ratio) x (Gearing Efficiency). The values in the table are typical values for the rated torque, rated motor speed, and a surrounding air temperature of 25°C. They are reference values only.

\*3. The output torque of the gear motor is limited by the mechanical limit of the gear head. Operation above this limit could result in premature failure of the gear motor.



Important

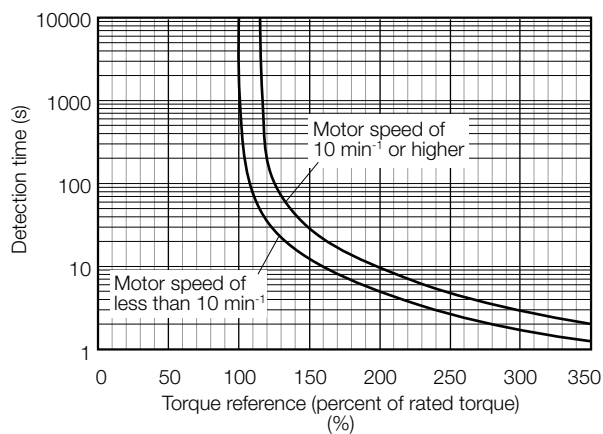
During operation of the gear motor, losses due to inefficiencies of the gearing mechanism are generated. The losses vary as the conditions for gear motor torque and speed change. Temperature rise can vary based on the mechanical inefficiencies and the heat dissipation conditions. For heat dissipation conditions, check the gear and motor temperatures with the actual equipment. If operating temperatures are too high, implement the following measures.

- Decrease the load ratio.
- Change the heat dissipation conditions.
- Use forced-air cooling for the motor with a cooling fan or other means.
- Please refer to "Sigma-7 Gearmotor Temperature Test Data" (document number PN.GearMotors.01) on [yaskawa.com](http://yaskawa.com) for temperature test data.



## Servo Motor Overload Protection Characteristics

The overload detection level is set for hot start conditions with a Servo Motor surrounding air temperature of 40°C.



Note: The above overload protection characteristics do not mean that you can perform continuous duty operation with an output of 100% or higher.

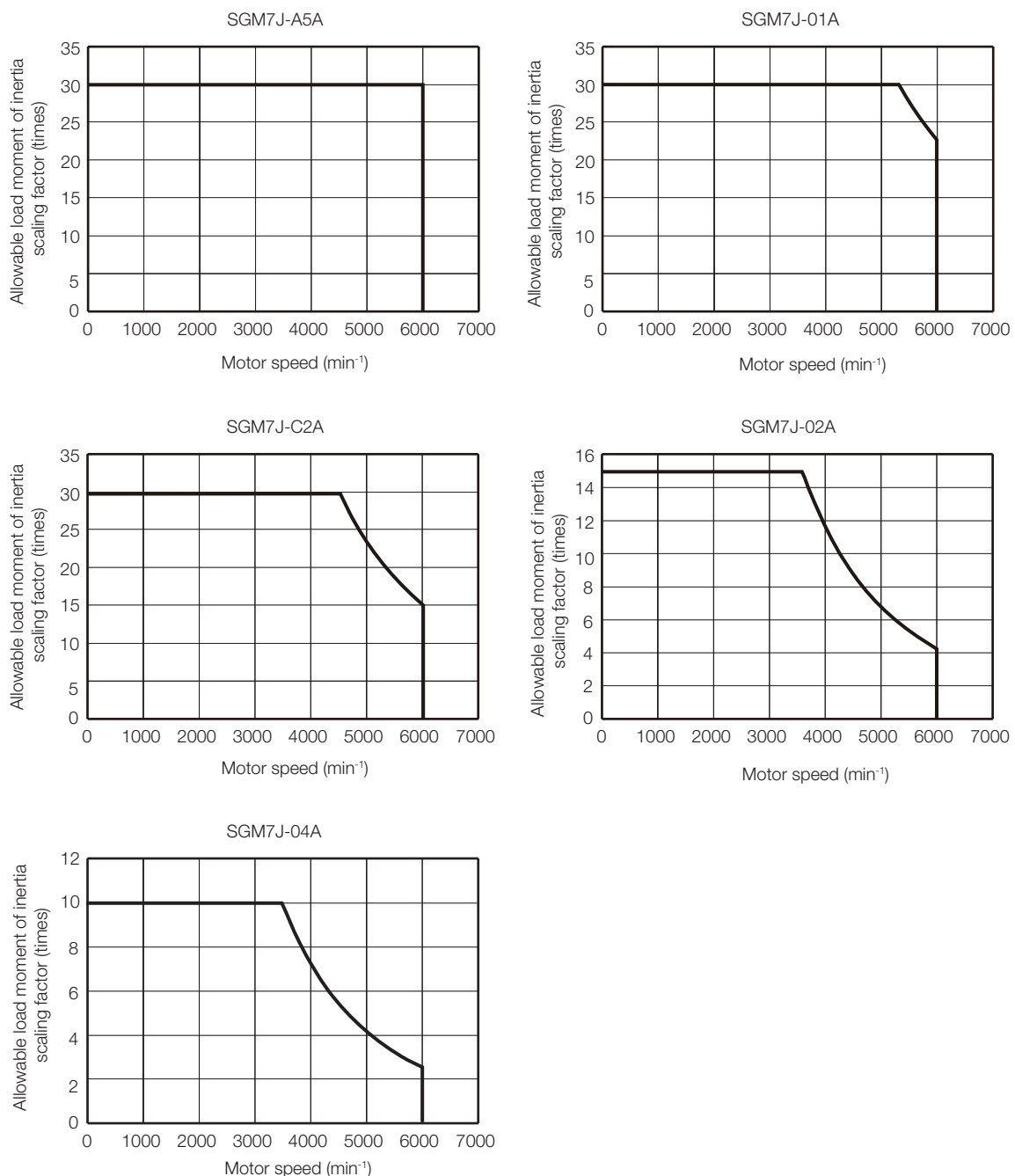
Use the Servo Motor so that the effective torque remains within the continuous duty zone given in *Ratings of Servo Motors (400 V Models)* on page 25.

## Allowable Load Moment of Inertia Scaling Factor for SERVOPACKs without Built-in Regenerative Resistors

The following graphs show the allowable load moment of inertia scaling factor of the motor speed for SERVOPACKs\* without built-in regenerative resistors when an External Regenerative Resistor is not connected.

If the Servo Motor exceeds the allowable load moment of inertia, an overvoltage alarm may occur in the SERVOPACK.

These graphs provide reference data for deceleration at the rated torque or higher with a 200-VAC power supply input.



\* Applicable SERVOPACK models: SGD7S-R70A, -R90A, -1R6A, or -2R8A

## Servo Motor Heat Dissipation Conditions

The Servo Motor ratings are the continuous allowable values at a surrounding air temperature of 40°C when a heat sink is installed on the Servo Motor. If the Servo Motor is mounted on a small device component, the Servo Motor temperature may rise considerably because the surface for heat dissipation becomes smaller. Refer to the following graphs for the relation between the heat sink size and derating rate.

When using Servo Motors with derating, change the detection timing of overload warnings and overload alarms by referring to the motor overload detection level described in the following manual.

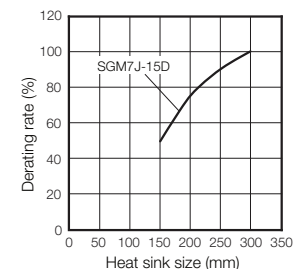
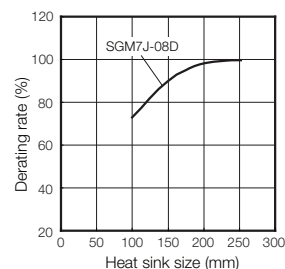
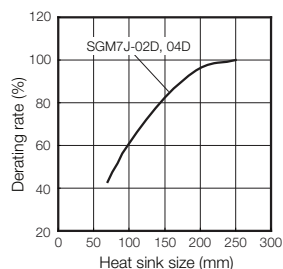
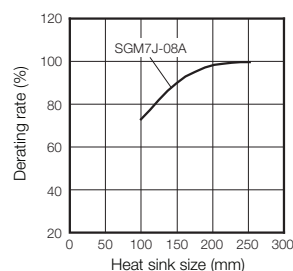
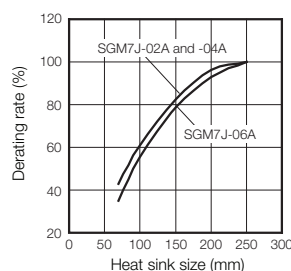
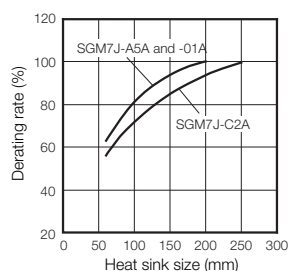
☞ *Σ-7-Series AC Servo Drive Rotary Servo Motor Product Manual* (Manual No.: SIEP S800001 36)

Note: The derating rates are applicable only when the average motor speed is less than or equal to the rated motor speed.  
If the average motor speed exceeds the rated motor speed, consult with your Yaskawa representative.



Important

The actual temperature rise depends on how the heat sink (i.e., the Servo Motor mounting section) is attached to the installation surface, what material is used for the Servo Motor mounting section, and the motor speed. Always check the Servo Motor temperature with the actual equipment.



## Applications Where the Surrounding Air Temperature of the Servo Motor Exceeds 40°C

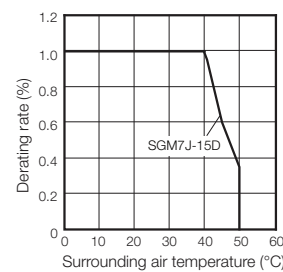
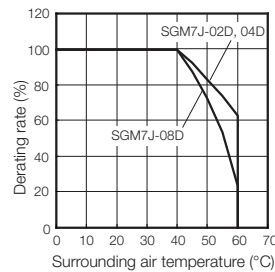
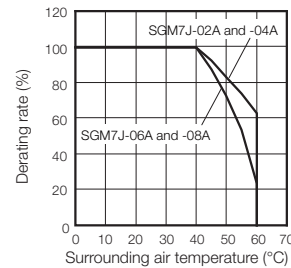
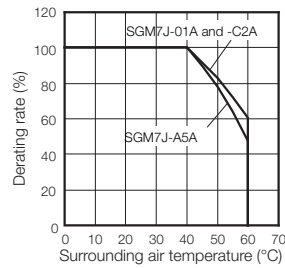
The Servo Motor ratings are the continuous allowable values at a surrounding air temperature of 40°C. If you use a Servo Motor at a surrounding air temperature that exceeds 40°C (60°C max.), apply a suitable derating rate from the following graphs.

When using Servo Motors with derating, change the detection timing of overload warnings and overload alarms by referring to the motor overload detection level described in the following manual.

☞ *Σ-7-Series AC Servo Drive Rotary Servo Motor Product Manual* (Manual No.: SIEP S800001 36)

Note: 1. Use the combination of the SERVOPACK and Servo Motor so that the derating conditions are satisfied for both the SERVOPACK and Servo Motor.

2. The derating rates are applicable only when the average motor speed is less than or equal to the rated motor speed. If the average motor speed exceeds the rated motor speed, consult with your Yaskawa representative.



## Applications Where the Altitude of the Servo Motor Exceeds 1,000 m

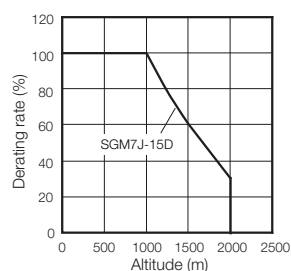
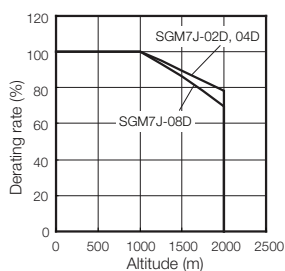
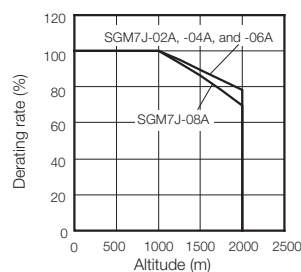
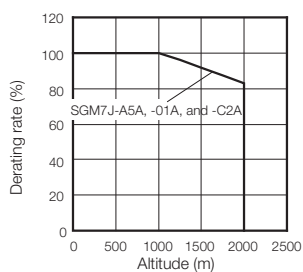
The Servo Motor ratings are the continuous allowable values at an altitude of 1,000 m or less. If you use a Servo Motor at an altitude that exceeds 1,000 m (2,000 m max.), the heat dissipation effect of the air is reduced. Apply the appropriate derating rate from the following graphs.

When using Servo Motors with derating, change the detection timing of overload warnings and overload alarms by referring to the motor overload detection level described in the following manual.

📖 *Σ-7-Series AC Servo Drive Rotary Servo Motor Product Manual* (Manual No.: SIEPS80000136)

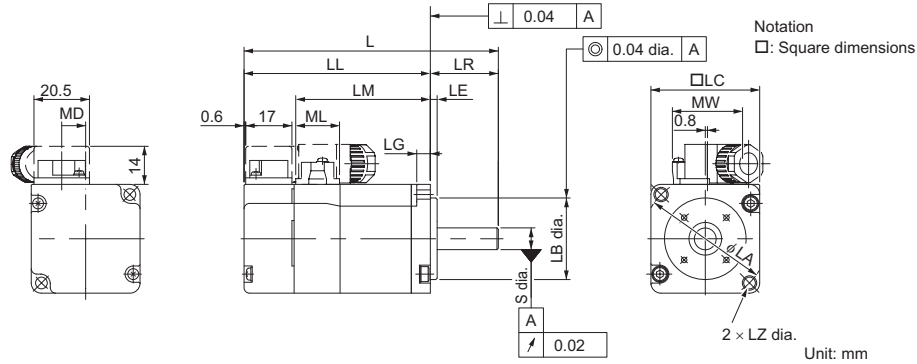
Note: 1. Use the combination of the SERVOPACK and Servo Motor so that the derating conditions are satisfied for both the SERVOPACK and Servo Motor.

2. The derating rates are applicable only when the average motor speed is less than or equal to the rated motor speed. If the average motor speed exceeds the rated motor speed, consult with your Yaskawa representative.



## External Dimensions

### ◆ 200 V Models: SGM7J-A5, -01, and -C2



| Model<br>SGM7J- | L                | LL              | LM   | Flange Dimensions |     |    |    |    |                                   |     | S                                |
|-----------------|------------------|-----------------|------|-------------------|-----|----|----|----|-----------------------------------|-----|----------------------------------|
|                 |                  |                 |      | LR                | LE  | LG | LC | LA | LB                                | LZ  |                                  |
| A5A□ A6□        | 81.5<br>(122)    | 56.5<br>(97)    | 37.9 | 25                | 2.5 | 5  | 40 | 46 | 30 <sup>0</sup> <sub>-0.021</sub> | 4.3 | 8 <sup>0</sup> <sub>-0.009</sub> |
| 01A□ A6□        | 93.5<br>(134)    | 68.5<br>(109)   | 49.9 | 25                | 2.5 | 5  | 40 | 46 | 30 <sup>0</sup> <sub>-0.021</sub> | 4.3 | 8 <sup>0</sup> <sub>-0.009</sub> |
| C2A□ A6□        | 105.5<br>(153.5) | 80.5<br>(128.5) | 61.9 | 25                | 2.5 | 5  | 40 | 46 | 30 <sup>0</sup> <sub>-0.021</sub> | 4.3 | 8 <sup>0</sup> <sub>-0.009</sub> |

| Model<br>SGM7J- | MD  | MW   | ML   | Approx. Mass<br>[kg] |
|-----------------|-----|------|------|----------------------|
| A5A□ A6□        | 8.8 | 25.8 | 16.1 | 0.3 (0.6)            |
| 01A□ A6□        | 8.8 | 25.8 | 16.1 | 0.4 (0.7)            |
| C2A□ A6□        | 8.8 | 25.8 | 16.1 | 0.5 (0.8)            |

Note: 1. The values in parentheses are for Servo Motors with Holding Brakes.

2. Refer to the following section for detailed shaft end specifications.

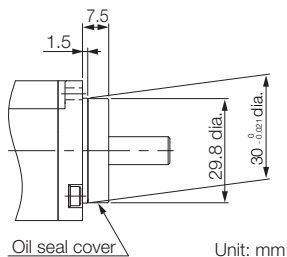
☞ **Shaft End Specifications (page 44)**

3. For models that have a batteryless absolute encoder, L and LL are 8 mm greater than the given value. Refer to the following section for the values for individual models.

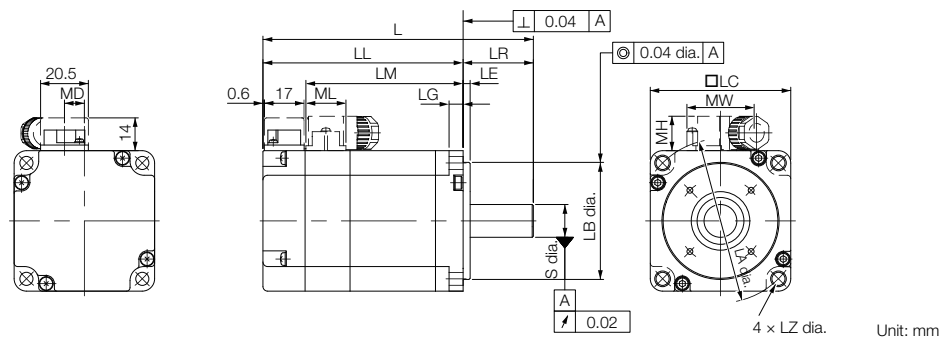
☞ **Dimensions of Servo Motors with Batteryless Encoders (page 38)**

### ■ Specifications of Options

#### • Oil Seal



## ◆ 200 V Models: SGM7J-02, -04, -06, and -08



| Model SGM7J- | L                | LL               | LM   | Flange Dimensions |    |    |    |    |                                   |     | S                                 |
|--------------|------------------|------------------|------|-------------------|----|----|----|----|-----------------------------------|-----|-----------------------------------|
|              |                  |                  |      | LR                | LE | LG | LC | LA | LB                                | LZ  |                                   |
| 02A□ A6□     | 99.5<br>(140)    | 69.5<br>(110)    | 51.2 | 30                | 3  | 6  | 60 | 70 | 50 <sup>0</sup> <sub>-0.025</sub> | 5.5 | 14 <sup>0</sup> <sub>-0.011</sub> |
| 04A□ A6□     | 115.5<br>(156)   | 85.5<br>(126)    | 67.2 | 30                | 3  | 6  | 60 | 70 | 50 <sup>0</sup> <sub>-0.025</sub> | 5.5 | 14 <sup>0</sup> <sub>-0.011</sub> |
| 06A□ A6□     | 137.5<br>(191.5) | 107.5<br>(161.5) | 89.2 | 30                | 3  | 6  | 60 | 70 | 50 <sup>0</sup> <sub>-0.025</sub> | 5.5 | 14 <sup>0</sup> <sub>-0.011</sub> |
| 08A□ A6□     | 137<br>(184)     | 97<br>(144)      | 78.5 | 40                | 3  | 8  | 80 | 90 | 70 <sup>0</sup> <sub>-0.030</sub> | 7   | 19 <sup>0</sup> <sub>-0.013</sub> |

| Model SGM7J- | MD   | MW   | MH   | ML   | Approx. Mass [kg] |
|--------------|------|------|------|------|-------------------|
| 02A□ A6□     | 8.5  | 28.7 | 14.7 | 17.1 | 0.8 (1.4)         |
| 04A□ A6□     | 8.5  | 28.7 | 14.7 | 17.1 | 1.1 (1.7)         |
| 06A□ A6□     | 8.5  | 28.7 | 14.7 | 17.1 | 1.6 (2.2)         |
| 08A□ A6□     | 13.6 | 38   | 14.7 | 19.3 | 2.2 (2.8)         |

Note: 1. The values in parentheses are for Servo Motors with Holding Brakes.

2. Refer to the following section for detailed shaft end specifications.

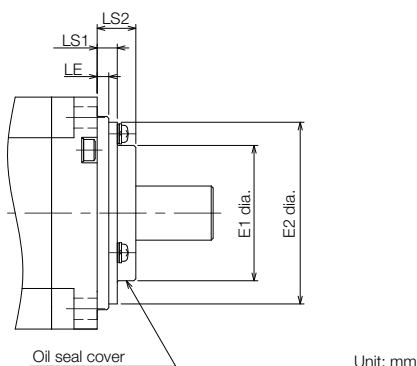
■ Shaft End Specifications (page 44)

3. For models that have a batteryless absolute encoder, L and LL are 8 mm greater than the given value. Refer to the following section for the values for individual models.

■ Dimensions of Servo Motors with Batteryless Encoders (page 38)

## ■ Specifications of Options

## • Oil Seal



| Model SGM7J-  | Dimensions with Oil Seal |    |     |     |
|---------------|--------------------------|----|-----|-----|
|               | E1                       | E2 | LS1 | LS2 |
| 02A, 04A, 06A | 35                       | 47 | 5.2 | 10  |
| 08A           | 47                       | 61 | 5.5 | 11  |

## ◆ Dimensions of Servo Motors with Batteryless Encoders

### ■ Servo Motors without Gears

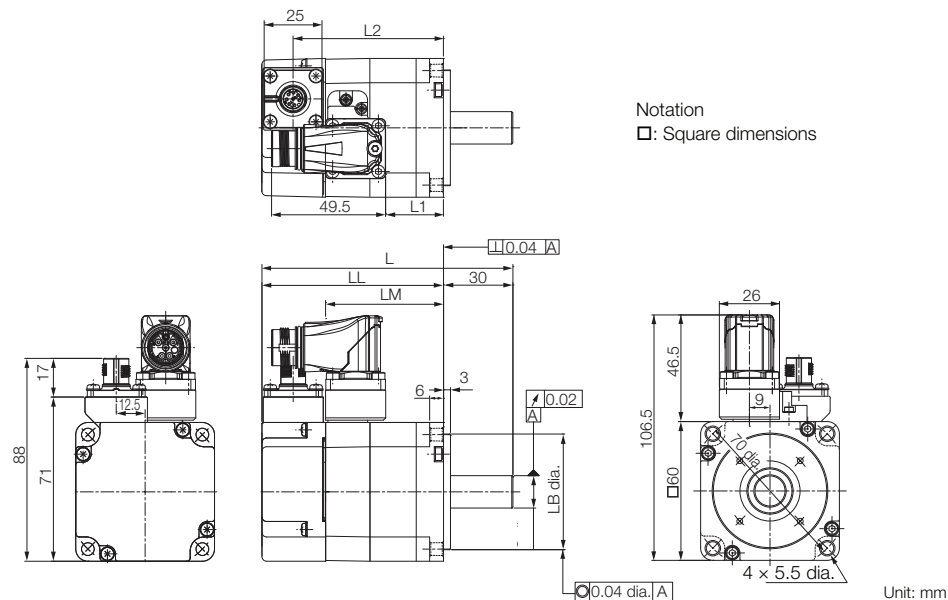
Note

| Model SGM7J- | Dimensions (mm)  |                  | Approximate mass (kg) |
|--------------|------------------|------------------|-----------------------|
|              | L                | LL               |                       |
| A5A6A□□      | 89.5<br>(130)    | 64.5<br>(105)    | 0.3<br>(0.6)          |
| 01A6A□□      | 101.5<br>(142)   | 76.5<br>(117)    | 0.4<br>(0.7)          |
| C2A6A□□      | 113.5<br>(161.5) | 88.5<br>(136.5)  | 0.5<br>(0.8)          |
| 02A6A□□      | 107.5<br>(148)   | 77.5<br>(118)    | 0.8<br>(1.4)          |
| 04A6A□□      | 123.5<br>(164)   | 93.5<br>(134)    | 1.1<br>(1.7)          |
| 06A6A□□      | 145.5<br>(199.5) | 115.5<br>(169.5) | 1.6<br>(2.2)          |
| 08A6A□□      | 145<br>(192)     | 105<br>(152)     | 2.3<br>(2.9)          |

Note: The values in parentheses are for Servo Motors with Holding Brakes



# ◆ 400 V Models: SGM7J-02, -04



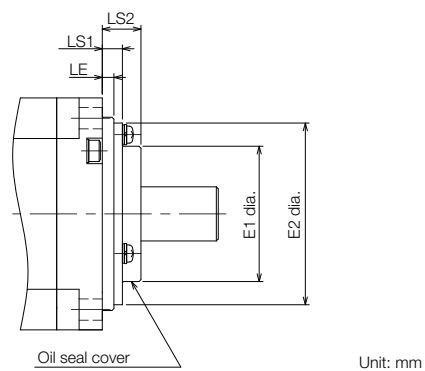
| Model<br>SGM7J- | L                | LL              | LM   | LB                                | S                                 | L1   | L2              | Approx. Mass<br>[kg] |
|-----------------|------------------|-----------------|------|-----------------------------------|-----------------------------------|------|-----------------|----------------------|
| 02D□ F6□        | 108.5<br>(148.5) | 78.5<br>(118.5) | 51.2 | 50 <sup>0</sup> <sub>-0.025</sub> | 14 <sup>0</sup> <sub>-0.011</sub> | 25   | 65<br>(105)     | 0.9<br>(1.5)         |
| 04A□ F6□        | 125<br>(165)     | 95<br>(135)     | 67.2 | 50 <sup>0</sup> <sub>-0.025</sub> | 14 <sup>0</sup> <sub>-0.011</sub> | 41.5 | 81.5<br>(121.5) | 1.2<br>(1.8)         |

Note: 1. Note: The values in parentheses are for Servo Motors with Holding Brakes

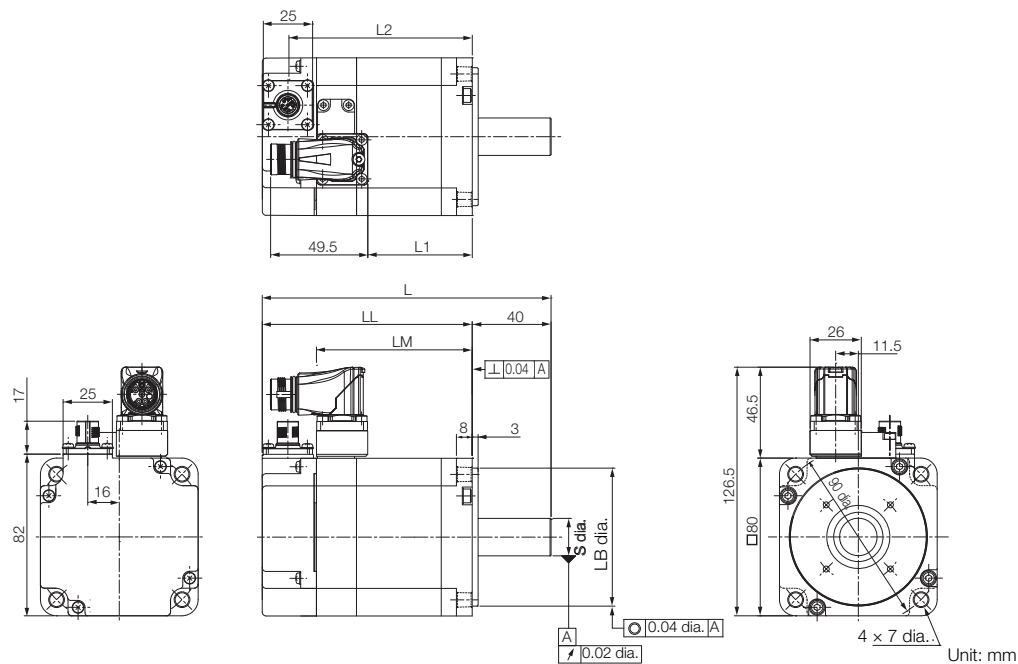
2. For 400V models 1kW and smaller that have a batteryless absolute encoder, L and LL are the same as the given value.

## ■ Specifications of Options

### • Oil Seal



◆ 400 V Model: SGM7J-08



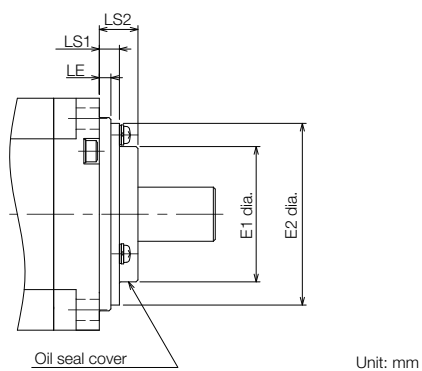
| Model<br>SGM7J- | L                | LL               | LM | LB                                | S                                 | L1 | L2            | Approx. Mass<br>[kg] |
|-----------------|------------------|------------------|----|-----------------------------------|-----------------------------------|----|---------------|----------------------|
| 08D□ F6□        | 146.5<br>(193.5) | 106.5<br>(153.5) | 79 | 70 <sup>0</sup> <sub>-0.030</sub> | 19 <sup>0</sup> <sub>-0.013</sub> | 53 | 93<br>(121.5) | 2.3<br>(2.9)         |

Note: 1. Note: The values in parentheses are for Servo Motors with Holding Brakes

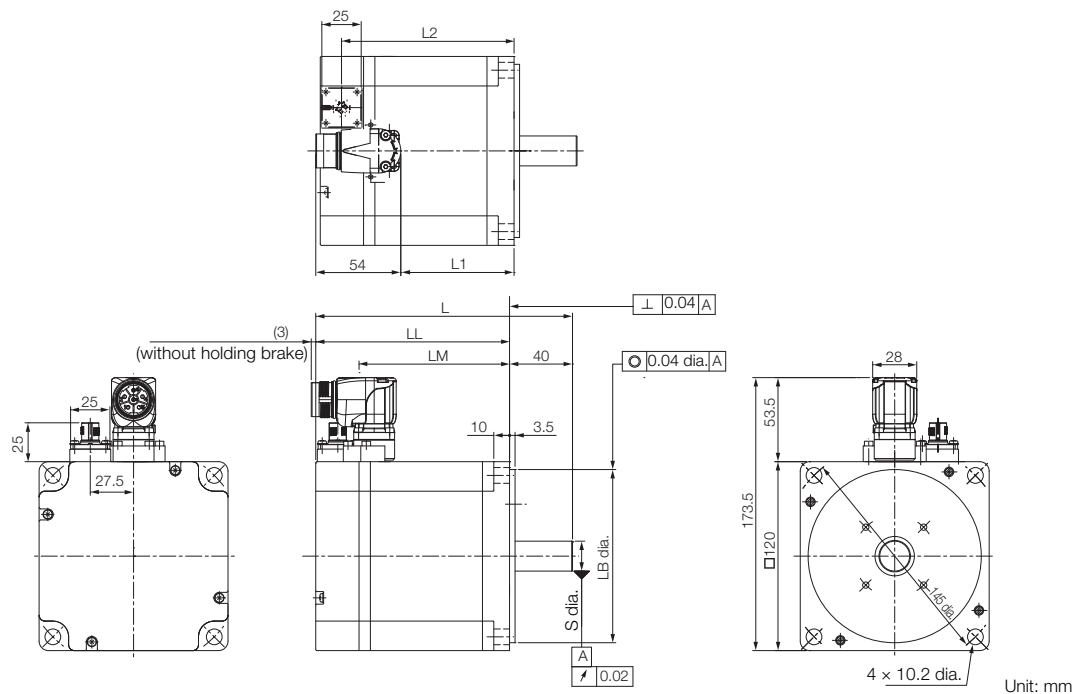
2. For 400V models 1kW and smaller that have a batteryless absolute encoder, L and LL are the same as the given value.

■ Specifications of Options

• Oil Seal



◆ 400 V Models: SGM7J-15

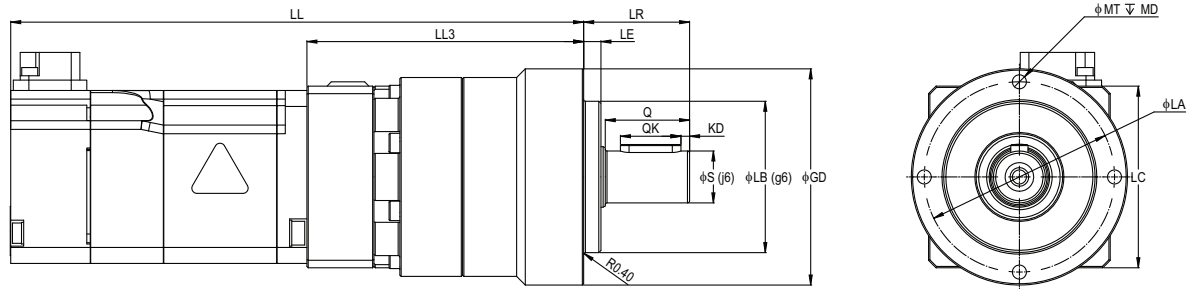


| Model<br>SGM7J- | L                | LL               | LM   | LB                                 | S                                 | L1 | L2           | Approx. Mass<br>[kg] |
|-----------------|------------------|------------------|------|------------------------------------|-----------------------------------|----|--------------|----------------------|
| 15D□ F6□        | 163.5<br>(196.5) | 123.5<br>(156.5) | 95.6 | 110 <sup>0</sup> <sub>-0.035</sub> | 19 <sup>0</sup> <sub>-0.013</sub> | 72 | 110<br>(143) | 6.4<br>(8.1)         |

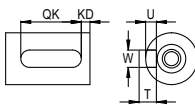
Note: 1. Note: The values in parentheses are for Servo Motors with Holding Brakes

2. For 400V models 1kW and smaller that have a batteryless absolute encoder, L and LL are the same as the given value.

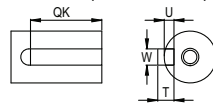
◆ Gear Motor Models: 100W, 200W, 400W (S7J01, S7J02, S7J04)



Shaft Detail (VL050 Models Only)



Shaft Detail (All Other Models)



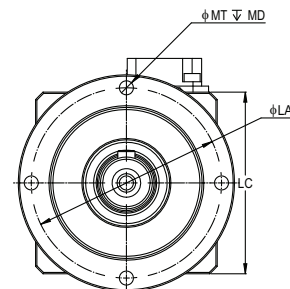
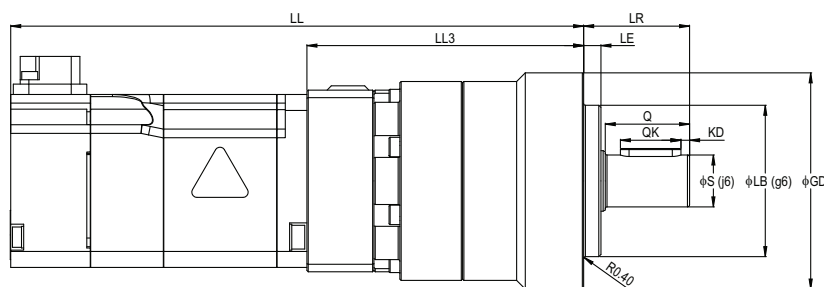
| Model S7J      |                | LL               | LL3  | LR   | LE | φS | φLB | φGD | LC | φLA | φMT | MD | Q    | QK | KD | W   | U   | T         | Mass (kg) |
|----------------|----------------|------------------|------|------|----|----|-----|-----|----|-----|-----|----|------|----|----|-----|-----|-----------|-----------|
| 100 W Models   |                |                  |      |      |    |    |     |     |    |     |     |    |      |    |    |     |     |           |           |
| 200 V          | 01A□ -VL050-03 | 133.5<br>(174)   | 65   | 24.5 | 4  | 12 | 35  | 50  | 42 | 44  | M4  | 8  | 19.5 | 14 | 2  | 4   | 2.5 | 4         | 1.1 (1.4) |
|                | 01A□ -VL050-05 |                  |      |      |    |    |     |     |    |     |     |    |      |    |    |     |     |           |           |
|                | 01A□ -VL050-10 |                  |      |      |    |    |     |     |    |     |     |    |      |    |    |     |     |           |           |
|                | 01A□ -VL050-25 | 150<br>(190.5)   | 81.5 | 36   | 5  | 16 | 52  | 70  | 52 | 62  | M5  | 10 | 28   | 22 | 0  | 5   | 3   | 5         | 1.2 (1.5) |
|                | 01A□ -VL070-50 | 163.5<br>(204)   | 95   |      |    |    |     |     |    |     |     |    |      |    |    |     |     |           | 2.1 (2.4) |
| 200 W Models   |                |                  |      |      |    |    |     |     |    |     |     |    |      |    |    |     |     |           |           |
| 200 V          | 02A□ -VL050-03 | 137.5<br>(178)   | 68   | 24.5 | 4  | 12 | 35  | 50  | 65 | 44  | M4  | 8  | 19.5 | 14 | 2  | 4   | 2.5 | 4         | 1.5 (2.1) |
|                | 02A□ -VL050-05 |                  |      |      |    |    |     |     |    |     |     |    |      |    |    |     |     |           |           |
|                | 02A□ -VL050-10 |                  |      |      |    |    |     |     |    |     |     |    |      |    |    |     |     |           |           |
|                | 02A□ -VL070-25 | 170.5<br>(211)   | 101  | 36   | 5  | 16 | 52  | 70  | 65 | 62  | M5  | 10 | 28   | 22 | 0  | 5   | 3   | 5         | 2.5 (3.1) |
|                | 02A□ -VL070-50 |                  |      |      |    |    |     |     |    |     |     |    |      |    |    |     |     |           |           |
| 400 V          | 02D□ -VL050-03 | 146.5<br>(186.5) | 68   | 24.5 | 4  | 12 | 35  | 50  | 65 | 44  | M4  | 8  | 19.5 | 14 | 2  | 4   | 2.5 | 4         | 1.6 (2.2) |
|                | 02D□ -VL050-05 |                  |      |      |    |    |     |     |    |     |     |    |      |    |    |     |     |           |           |
|                | 02D□ -VL050-10 |                  |      |      |    |    |     |     |    |     |     |    |      |    |    |     |     |           |           |
|                | 02D□ -VL070-25 | 179.5<br>(219.5) | 101  | 36   | 5  | 16 | 52  | 70  | 65 | 62  | M5  | 10 | 28   | 22 | 0  | 5   | 3   | 5         | 2.6 (3.2) |
|                | 02D□ -VL070-50 |                  |      |      |    |    |     |     |    |     |     |    |      |    |    |     |     |           |           |
| 400 W Models   |                |                  |      |      |    |    |     |     |    |     |     |    |      |    |    |     |     |           |           |
| 200 V          | 04A□ -VL050-03 | 153.5<br>(194)   | 68   | 24.5 | 4  | 12 | 35  | 50  | 65 | 44  | M4  | 8  | 19.5 | 14 | 2  | 4   | 2.5 | 4         | 1.8 (2.4) |
|                | 04A□ -VL050-05 |                  |      |      |    |    |     |     |    |     |     |    |      |    |    |     |     |           |           |
|                | 04A□ -VL070-10 |                  |      |      |    |    |     |     |    |     |     |    |      |    |    |     |     |           |           |
|                | 04A□ -VL070-25 | 165.5<br>(206)   | 80   | 36   | 5  | 16 | 52  | 70  | 65 | 62  | M5  | 10 | 28   | 22 | 0  | 5   | 3   | 5         | 2.6 (3.2) |
|                | 04A□ -VL090-50 | 186.5<br>(227)   | 101  |      |    |    |     |     |    |     |     |    |      |    |    |     |     |           |           |
| 04A□ -VL090-50 | 204.5<br>(245) | 119              | 46   | 7    | 22 | 68 | 90  | 65  | 80 | M6  | 12  | 36 | 28   | 0  | 6  | 3.5 | 6   | 5.1 (5.7) |           |
| 400 V          | 04D□ -VL050-03 | 163<br>(203)     | 68   | 24.5 | 4  | 12 | 35  | 50  | 65 | 44  | M4  | 8  | 19.5 | 14 | 2  | 4   | 2.5 | 4         | 1.9 (2.5) |
|                | 04D□ -VL050-05 |                  |      |      |    |    |     |     |    |     |     |    |      |    |    |     |     |           |           |
|                | 04D□ -VL070-10 |                  |      |      |    |    |     |     |    |     |     |    |      |    |    |     |     |           |           |
|                | 04D□ -VL070-25 | 175<br>(215)     | 80   | 36   | 5  | 16 | 52  | 70  | 65 | 62  | M5  | 10 | 28   | 22 | 0  | 5   | 3   | 5         | 2.7 (3.3) |
|                | 04D□ -VL090-50 | 196<br>(236)     | 101  |      |    |    |     |     |    |     |     |    |      |    |    |     |     |           |           |
| 04D□ -VL090-50 | 214<br>(254)   | 119              | 46   | 7    | 22 | 68 | 90  | 65  | 80 | M6  | 12  | 36 | 28   | 0  | 6  | 3.5 | 6   | 5.2 (5.8) |           |

Note: 1. The values in parentheses are for Servo Motors with Holding Brakes

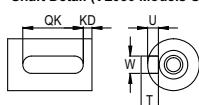
2. For 200 V models that have a batteryless absolute encoder, LL is 8 mm greater than the given value. Refer to the following section for the values for individual models.

📖 **Dimensions of Gear Motors with Batteryless Encoders (page 45)**

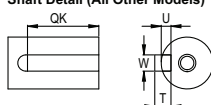
# ◆ Gear Motor Models: 750W (S7J08)



Shaft Detail (VL050 Models Only)



Shaft Detail (All Other Models)



| Model S7J     |                | LL       | LL3   | LR | LE | φS | φLB | φGD | LC  | φLA | φMT | MD | Q  | QK | KD | W  | U   | T | Mass kg     |
|---------------|----------------|----------|-------|----|----|----|-----|-----|-----|-----|-----|----|----|----|----|----|-----|---|-------------|
| 750 W Models  |                |          |       |    |    |    |     |     |     |     |     |    |    |    |    |    |     |   |             |
| 200 V         | 08A□ -VL070-03 | 191      | 94    | 36 | 5  | 16 | 52  | 70  | 80  | 62  | M5  | 10 | 28 | 22 | 0  | 5  | 3   | 5 | 3.7 (4.3)   |
|               | 08A□ -VL070-05 | (238)    |       |    |    |    |     |     |     |     |     |    |    |    |    |    |     |   |             |
|               | 08A□ -VL090-10 | 204      | 107   | 46 | 7  | 22 | 68  | 90  |     | 80  | M6  | 12 | 36 | 28 |    | 6  | 3.5 | 6 | 5.7 (6.3)   |
|               | 08A□ -VL090-25 | 226      | 129   |    |    |    |     |     |     |     |     |    |    |    |    |    |     |   | 6.2 (6.8)   |
|               | 08A□ -VL120-50 | 241.5    | 144.5 | 70 | 9  | 32 | 90  | 120 |     | 108 | M8  | 16 | 58 | 45 |    | 10 | 5   | 8 | 10.9 (11.5) |
| 400 V         | 08D□ -VL070-03 | 200.5    | 94    | 36 | 5  | 16 | 52  | 70  | 80  | 62  | M5  | 10 | 28 | 22 | 0  | 5  | 3   | 5 | 3.8 (4.4)   |
|               | 08D□ -VL070-05 | (247.5)  |       |    |    |    |     |     |     |     |     |    |    |    |    |    |     |   |             |
|               | 08D□ -VL090-10 | 213.5    | 107   | 46 | 7  | 22 | 68  | 90  |     | 80  | M6  | 12 | 36 | 28 |    | 6  | 3.5 | 6 | 5.8 (6.4)   |
|               | 08D□ -VL090-25 | 235.5    | 129   |    |    |    |     |     |     |     |     |    |    |    |    |    |     |   | 6.3 (6.9)   |
|               | 08D□ -VL120-50 | 251      | 144.5 | 70 | 9  | 32 | 90  | 120 |     | 108 | M8  | 16 | 58 | 45 |    | 10 | 5   | 8 | 11.0 (11.6) |
| 1.5 kW Models |                |          |       |    |    |    |     |     |     |     |     |    |    |    |    |    |     |   |             |
| 400 V         | 15D□ -VL090-03 | 230.5    | 107   | 46 | 7  | 22 | 68  | 90  | 130 | 80  | M6  | 12 | 36 | 28 | 0  | 6  | 3.5 | 6 | 9.9 (11.6)  |
|               | 15D□ -VL090-05 | (263.50) |       |    |    |    |     |     |     |     |     |    |    |    |    |    |     |   |             |
|               | 15D□ -VL090-10 |          |       |    |    |    |     |     |     |     |     |    |    |    |    |    |     |   |             |
|               | 15D□ -VL120-25 | 268      | 144.5 | 70 | 9  | 32 | 90  | 120 |     | 108 | M8  | 16 | 58 | 45 |    | 10 | 5   | 8 | 15.1 (16.8) |
|               | 15D□ -VL155-50 | 293      | 169.5 | 97 | 12 | 40 | 120 | 155 |     | 140 | M10 | 20 | 82 | 65 |    | 12 | 5   | 8 | 24.4 (26.1) |
|               |                | 93260    |       |    |    |    |     |     |     |     |     |    |    |    |    |    |     |   |             |

Note: 1. The values in parentheses are for Servo Motors with Holding Brakes

2. For 200 V models that have a batteryless absolute encoder, LL is 8 mm greater than the given value. Refer to the following section for the values for individual models.

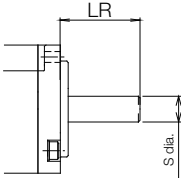
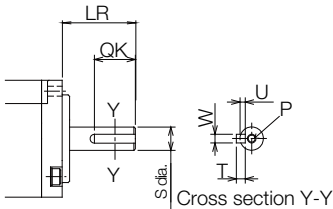
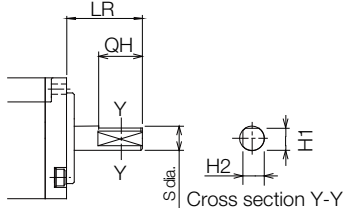
🔧 **Dimensions of Gear Motors with Batteryless Encoders (page 45)**

## Shaft End Specifications

## ◆ SGM7J-□□□□□□□□



| Code | Specification                                                                              |
|------|--------------------------------------------------------------------------------------------|
| 2    | Straight without key                                                                       |
| 6    | Straight with key and tap for one location<br>(Key slot is JIS B1301-1996 fastening type.) |
| B    | With two flat seats                                                                        |

| Shaft End Details                                                                   |    | Servo Motor Model SGM7J-         |                                   |     |     |                                   |                                   |                                   |     |     |     |     |
|-------------------------------------------------------------------------------------|----|----------------------------------|-----------------------------------|-----|-----|-----------------------------------|-----------------------------------|-----------------------------------|-----|-----|-----|-----|
|                                                                                     |    | A5A                              | 01A                               | C2A | 02A | 04A                               | 06A                               | 08A                               | 02D | 04D | 08D | 15D |
| Code: 2 (Straight without Key)                                                      |    |                                  |                                   |     |     |                                   |                                   |                                   |     |     |     |     |
|    | LR | 25                               | 30                                |     |     | 40                                | 30                                | 40                                |     |     |     |     |
|                                                                                     | S  | 8 <sup>0</sup> <sub>-0.009</sub> | 14 <sup>0</sup> <sub>-0.011</sub> |     |     | 19 <sup>0</sup> <sub>-0.013</sub> | 14 <sup>0</sup> <sub>-0.011</sub> | 19 <sup>0</sup> <sub>-0.013</sub> |     |     |     |     |
| Code: 6 (Straight with Key and Tap)                                                 |    |                                  |                                   |     |     |                                   |                                   |                                   |     |     |     |     |
|  | LR | 25                               | 30                                |     |     | 40                                | 30                                | 40                                |     |     |     |     |
|                                                                                     | QK | 14                               | 14                                |     |     | 22                                | 14                                | 22                                |     |     |     |     |
|                                                                                     | S  | 8 <sup>0</sup> <sub>-0.009</sub> | 14 <sup>0</sup> <sub>-0.011</sub> |     |     | 19 <sup>0</sup> <sub>-0.013</sub> | 14 <sup>0</sup> <sub>-0.011</sub> | 19 <sup>0</sup> <sub>-0.013</sub> |     |     |     |     |
|                                                                                     | W  | 3                                | 5                                 |     |     | 6                                 | 5                                 | 6                                 |     |     |     |     |
|                                                                                     | T  | 3                                | 5                                 |     |     | 6                                 | 5                                 | 6                                 |     |     |     |     |
|                                                                                     | U  | 1.8                              | 3                                 |     |     | 3.5                               | 3                                 | 3.5                               |     |     |     |     |
|                                                                                     | P  | M3 × 6L                          | M5 × 8L                           |     |     | M6 × 10L                          | M5 × 8L                           | M6 × 10L                          |     |     |     |     |
| Code: B (with Two Flat Seats)                                                       |    |                                  |                                   |     |     |                                   |                                   |                                   |     |     |     |     |
|  | LR | 25                               | 30                                |     |     | 40                                | N/A                               |                                   |     |     |     |     |
|                                                                                     | QH | 15                               | 15                                |     |     | 22                                |                                   |                                   |     |     |     |     |
|                                                                                     | S  | 8 <sup>0</sup> <sub>-0.009</sub> | 14 <sup>0</sup> <sub>-0.011</sub> |     |     | 19 <sup>0</sup> <sub>-0.013</sub> |                                   |                                   |     |     |     |     |
|                                                                                     | H1 | 7.5                              | 13                                |     |     | 18                                |                                   |                                   |     |     |     |     |
|                                                                                     | H2 | 7.5                              | 13                                |     |     | 18                                |                                   |                                   |     |     |     |     |

## ◆ Dimensions of Gear Motors with Batteryless Encoders

### ■ Servo Motors (200 V)

| Model S7J      | LL            | Mass (kg)   |
|----------------|---------------|-------------|
| 01B□ -VL050-03 | 141.5 (182)   | 1.1 (1.40)  |
| 01B□ -VL050-05 |               |             |
| 01B□ -VL050-10 |               |             |
| 01B□ -VL050-25 | 158 (198.5)   | 1.2 (1.5)   |
| 01B□ -VL070-50 | 171.5 (212)   | 2.1 (2.4)   |
| 02B□ -VL050-03 | 145.5 (186)   | 1.5 (2.1)   |
| 02B□ -VL050-05 |               |             |
| 02B□ -VL050-10 |               |             |
| 02B□ -VL070-25 | 178.5 (219)   | 2.5 (3.1)   |
| 02B□ -VL070-50 |               |             |
| 04B□ -VL050-03 | 161.5 (202)   | 1.8 (2.4)   |
| 04B□ -VL050-05 |               |             |
| 04B□ -VL070-10 | 173.5 (214)   | 2.6 (3.2)   |
| 04B□ -VL070-25 | 194.5 (235)   | 2.8 (3.4)   |
| 04B□ -VL090-50 | 212.5 (253)   | 5.1 (5.7)   |
| 08B□ -VL050-03 | 199 (246)     | 3.7 (4.3)   |
| 08B□ -VL050-05 |               |             |
| 08B□ -VL070-10 | 212 (259)     | 5.7 (6.3)   |
| 08B□ -VL070-25 | 234 (281)     | 6.2 (6.8)   |
| 08B□ -VL120-50 | 249.5 (296.5) | 10.9 (11.5) |

### ■ Servo Motors (400 V)

| Model S7J      | LL            | Mass (kg)   |
|----------------|---------------|-------------|
| 02E□ -VL050-03 | 146.5 (186.5) | 1.6 (1.2)   |
| 02E□ -VL050-05 |               |             |
| 02E□ -VL050-10 |               |             |
| 02E□ -VL070-25 | 179.5 (219.5) | 2.6 (3.2)   |
| 02E□ -VL070-50 |               |             |
| 04E□ -VL050-03 | 163 (203)     | 1.9 (2.5)   |
| 04E□ -VL050-05 |               |             |
| 04E□ -VL070-10 | 175 (215)     | 2.7 (3.3)   |
| 04E□ -VL070-25 | 196 (236)     | 2.9 (3.5)   |
| 04E□ -VL090-50 | 214 (254)     | 5.2 (5.8)   |
| 08E□ -VL070-03 | 200.5 (247.5) | 3.8 (4.4)   |
| 08E□ -VL070-05 |               |             |
| 08E□ -VL090-10 | 213.5 (260.5) | 5.8 (6.4)   |
| 08E□ -VL090-25 | 235.5 (282.5) | 6.3 (6.9)   |
| 08E□ -VL120-50 | 251 (298)     | 11.0 (11.6) |
| 15E□ -VL090-03 | 236.5 (269.5) | 9.9 (11.6)  |
| 15E□ -VL090-05 |               |             |
| 15E□ -VL090-10 |               |             |
| 15E□ -VL120-25 | 274 (307)     | 15.1 (16.8) |
| 15E□ -VL155-50 | 299 (332)     | 24.4 (26.1) |

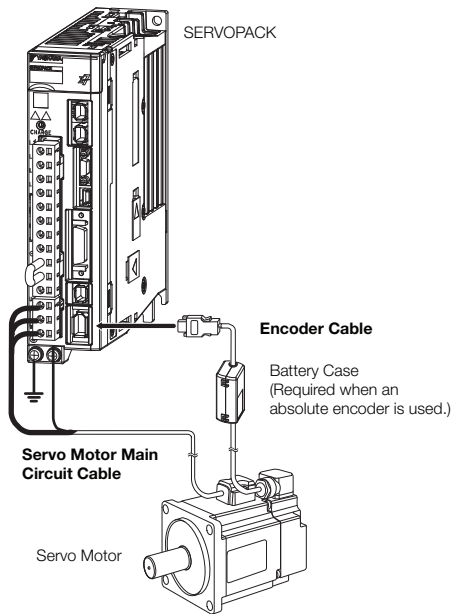
Note: The values in parentheses are for Servo Motors with Holding Brakes

## Selecting Cables

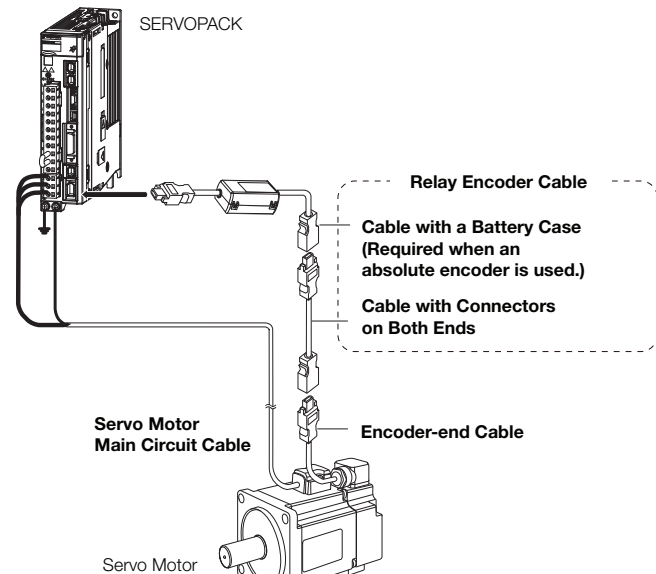
### ◆ Cable Configurations

The cables shown below are required to connect a Servo Motor to a SERVOPACK.

Encoder Cable of 20 m or Less



Encoder Cable of 30 m to 50 m (Relay Cable)



- Note: 1. Cables with connectors on both ends that are compliant with an IP67 protective structure and European Safety
2. If the cable length exceeds 20 m, be sure to use a Relay Encoder Cable.
3. If you use a Servo Motor Main Circuit Cable that exceeds 20 m, the intermittent duty zone in the torque-motor speed characteristics will become smaller because the voltage drop increases.
4. Refer to the following manual for the following information.
- Cable dimensional drawings and cable connection specifications
  - Order numbers and specifications of individual connectors for cables
  - Order numbers and specifications for wiring materials

📖 *Σ-7-Series AC Servo Drive Peripheral Device Selection Manual* (Manual No.: SIEP S800001 32)

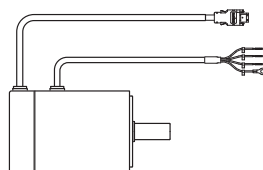


Important

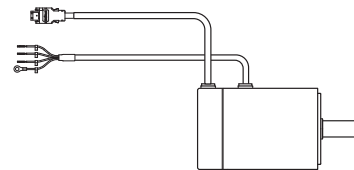
For the following Servo Motor models, there are different order numbers for the Servo Motor Main Circuit Cables and Encoder Cables depending on the cable installation direction. Confirm the order numbers before you order.

- All SGM7J models

Cable Installed toward Load

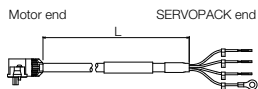
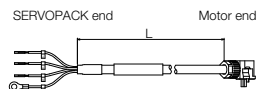


Cable Installed away from Load



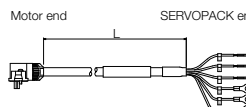
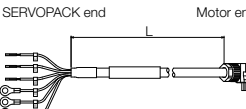


## Servo Motor Main Circuit Cables (200 V Models)

| Servo Motor Model                            | Name                                                                                      | Length (L) | Order Number     |                              |                                  | Appearance                                                                            |
|----------------------------------------------|-------------------------------------------------------------------------------------------|------------|------------------|------------------------------|----------------------------------|---------------------------------------------------------------------------------------|
|                                              |                                                                                           |            | Standard Cable   | Flexible Cable* <sup>1</sup> | Flexible/ Shielded* <sup>2</sup> |                                                                                       |
| SGM7J-A5 to -C2<br><br>50 W to 150 W (200V)  | Power cable for Servo Motors without Holding Brakes<br><br>Cable installed toward load    | 3 m        | JZSP-C7M10F-03-E | JZSP-C7M12F-03-E             | YAI-CSM21-03-P-E                 |    |
|                                              |                                                                                           | 5 m        | JZSP-C7M10F-05-E | JZSP-C7M12F-05-E             | YAI-CSM21-05-P-E                 |                                                                                       |
|                                              |                                                                                           | 10 m       | JZSP-C7M10F-10-E | JZSP-C7M12F-10-E             | YAI-CSM21-10-P-E                 |                                                                                       |
|                                              |                                                                                           | 15 m       | JZSP-C7M10F-15-E | JZSP-C7M12F-15-E             | YAI-CSM21-15-P-E                 |                                                                                       |
|                                              |                                                                                           | 20 m       | JZSP-C7M10F-20-E | JZSP-C7M12F-20-E             | YAI-CSM21-20-P-E                 |                                                                                       |
|                                              |                                                                                           | 30 m       | JZSP-C7M10F-30-E | JZSP-C7M12F-30-E             | YAI-CSM21-30-P-E                 |                                                                                       |
|                                              |                                                                                           | 40 m       | JZSP-C7M10F-40-E | JZSP-C7M12F-40-E             | YAI-CSM21-40-P-E                 |                                                                                       |
|                                              |                                                                                           | 50 m       | JZSP-C7M10F-50-E | JZSP-C7M12F-50-E             | YAI-CSM21-50-P-E                 |                                                                                       |
| SGM7J-02 to -06<br><br>200 W to 600 W (200V) |                                                                                           | 3 m        | JZSP-C7M20F-03-E | JZSP-C7M22F-03-E             | YAI-CSM22-03-P-E                 |                                                                                       |
|                                              |                                                                                           | 5 m        | JZSP-C7M20F-05-E | JZSP-C7M22F-05-E             | YAI-CSM22-05-P-E                 |                                                                                       |
|                                              |                                                                                           | 10 m       | JZSP-C7M20F-10-E | JZSP-C7M22F-10-E             | YAI-CSM22-10-P-E                 |                                                                                       |
|                                              |                                                                                           | 15 m       | JZSP-C7M20F-15-E | JZSP-C7M22F-15-E             | YAI-CSM22-15-P-E                 |                                                                                       |
|                                              |                                                                                           | 20 m       | JZSP-C7M20F-20-E | JZSP-C7M22F-20-E             | YAI-CSM22-20-P-E                 |                                                                                       |
|                                              |                                                                                           | 30 m       | JZSP-C7M20F-30-E | JZSP-C7M22F-30-E             | YAI-CSM22-30-P-E                 |                                                                                       |
|                                              |                                                                                           | 40 m       | JZSP-C7M20F-40-E | JZSP-C7M22F-40-E             | YAI-CSM22-40-P-E                 |                                                                                       |
|                                              |                                                                                           | 50 m       | JZSP-C7M20F-50-E | JZSP-C7M22F-50-E             | YAI-CSM22-50-P-E                 |                                                                                       |
| SGM7J-08<br><br>750 W (200V)                 |                                                                                           | 3 m        | JZSP-C7M30F-03-E | JZSP-C7M32F-03-E             | YAI-CSM23-03-P-E                 |                                                                                       |
|                                              |                                                                                           | 5 m        | JZSP-C7M30F-05-E | JZSP-C7M32F-05-E             | YAI-CSM23-05-P-E                 |                                                                                       |
|                                              |                                                                                           | 10 m       | JZSP-C7M30F-10-E | JZSP-C7M32F-10-E             | YAI-CSM23-10-P-E                 |                                                                                       |
|                                              |                                                                                           | 15 m       | JZSP-C7M30F-15-E | JZSP-C7M32F-15-E             | YAI-CSM23-15-P-E                 |                                                                                       |
|                                              |                                                                                           | 20 m       | JZSP-C7M30F-20-E | JZSP-C7M32F-20-E             | YAI-CSM23-20-P-E                 |                                                                                       |
|                                              |                                                                                           | 30 m       | JZSP-C7M30F-30-E | JZSP-C7M32F-30-E             | YAI-CSM23-30-P-E                 |                                                                                       |
|                                              |                                                                                           | 40 m       | JZSP-C7M30F-40-E | JZSP-C7M32F-40-E             | YAI-CSM23-40-P-E                 |                                                                                       |
|                                              |                                                                                           | 50 m       | JZSP-C7M30F-50-E | JZSP-C7M32F-50-E             | YAI-CSM23-50-P-E                 |                                                                                       |
| SGM7J-A5 to -C2<br><br>50 W to 150 W (200V)  | Power cable for Servo Motors without Holding Brakes<br><br>Cable installed away from load | 3 m        | JZSP-C7M10G-03-E | JZSP-C7M12G-03-E             | N/A                              |  |
|                                              |                                                                                           | 5 m        | JZSP-C7M10G-05-E | JZSP-C7M12G-05-E             |                                  |                                                                                       |
|                                              |                                                                                           | 10 m       | JZSP-C7M10G-10-E | JZSP-C7M12G-10-E             |                                  |                                                                                       |
|                                              |                                                                                           | 15 m       | JZSP-C7M10G-15-E | JZSP-C7M12G-15-E             |                                  |                                                                                       |
|                                              |                                                                                           | 20 m       | JZSP-C7M10G-20-E | JZSP-C7M12G-20-E             |                                  |                                                                                       |
|                                              |                                                                                           | 30 m       | JZSP-C7M10G-30-E | JZSP-C7M12G-30-E             |                                  |                                                                                       |
|                                              |                                                                                           | 40 m       | JZSP-C7M10G-40-E | JZSP-C7M12G-40-E             |                                  |                                                                                       |
|                                              |                                                                                           | 50 m       | JZSP-C7M10G-50-E | JZSP-C7M12G-50-E             |                                  |                                                                                       |
| SGM7J-02 to -06<br><br>200 W to 600 W (200V) |                                                                                           | 3 m        | JZSP-C7M20G-03-E | JZSP-C7M22G-03-E             |                                  |                                                                                       |
|                                              |                                                                                           | 5 m        | JZSP-C7M20G-05-E | JZSP-C7M22G-05-E             |                                  |                                                                                       |
|                                              |                                                                                           | 10 m       | JZSP-C7M20G-10-E | JZSP-C7M22G-10-E             |                                  |                                                                                       |
|                                              |                                                                                           | 15 m       | JZSP-C7M20G-15-E | JZSP-C7M22G-15-E             |                                  |                                                                                       |
|                                              |                                                                                           | 20 m       | JZSP-C7M20G-20-E | JZSP-C7M22G-20-E             |                                  |                                                                                       |
|                                              |                                                                                           | 30 m       | JZSP-C7M20G-30-E | JZSP-C7M22G-30-E             |                                  |                                                                                       |
|                                              |                                                                                           | 40 m       | JZSP-C7M20G-40-E | JZSP-C7M22G-40-E             |                                  |                                                                                       |
|                                              |                                                                                           | 50 m       | JZSP-C7M20G-50-E | JZSP-C7M22G-50-E             |                                  |                                                                                       |
| SGM7J-08<br><br>750 W (200V)                 |                                                                                           | 3 m        | JZSP-C7M30G-03-E | JZSP-C7M32G-03-E             |                                  |                                                                                       |
|                                              |                                                                                           | 5 m        | JZSP-C7M30G-05-E | JZSP-C7M32G-05-E             |                                  |                                                                                       |
|                                              |                                                                                           | 10 m       | JZSP-C7M30G-10-E | JZSP-C7M32G-10-E             |                                  |                                                                                       |
|                                              |                                                                                           | 15 m       | JZSP-C7M30G-15-E | JZSP-C7M32G-15-E             |                                  |                                                                                       |
|                                              |                                                                                           | 20 m       | JZSP-C7M30G-20-E | JZSP-C7M32G-20-E             |                                  |                                                                                       |
|                                              |                                                                                           | 30 m       | JZSP-C7M30G-30-E | JZSP-C7M32G-30-E             |                                  |                                                                                       |
|                                              |                                                                                           | 40 m       | JZSP-C7M30G-40-E | JZSP-C7M32G-40-E             |                                  |                                                                                       |
|                                              |                                                                                           | 50 m       | JZSP-C7M30G-50-E | JZSP-C7M32G-50-E             |                                  |                                                                                       |

# Rotary Servo Motors

## SGM7J

| Servo Motor Model                            | Name                                                                                | Length (L)                                                                             | Order Number     |                              |                                  | Appearance                                                                          |     |                                                                                       |
|----------------------------------------------|-------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------|------------------|------------------------------|----------------------------------|-------------------------------------------------------------------------------------|-----|---------------------------------------------------------------------------------------|
|                                              |                                                                                     |                                                                                        | Standard Cable   | Flexible Cable* <sup>1</sup> | Flexible/ Shielded* <sup>2</sup> |                                                                                     |     |                                                                                       |
| SGM7J-A5 to -C2<br><br>50 W to 150 W (200V)  | Power cable for Servo Motors with Holding Brakes<br><br>Cable installed toward load | 3 m                                                                                    | JZSP-C7M13F-03-E | JZSP-C7M14F-03-E             | YAI-CSM31-03-P-E                 |  |     |                                                                                       |
|                                              |                                                                                     | 5 m                                                                                    | JZSP-C7M13F-05-E | JZSP-C7M14F-05-E             | YAI-CSM31-05-P-E                 |                                                                                     |     |                                                                                       |
|                                              |                                                                                     | 10 m                                                                                   | JZSP-C7M13F-10-E | JZSP-C7M14F-10-E             | YAI-CSM31-10-P-E                 |                                                                                     |     |                                                                                       |
|                                              |                                                                                     | 15 m                                                                                   | JZSP-C7M13F-15-E | JZSP-C7M14F-15-E             | YAI-CSM31-15-P-E                 |                                                                                     |     |                                                                                       |
|                                              |                                                                                     | 20 m                                                                                   | JZSP-C7M13F-20-E | JZSP-C7M14F-20-E             | YAI-CSM31-20-P-E                 |                                                                                     |     |                                                                                       |
|                                              |                                                                                     | 30 m                                                                                   | JZSP-C7M13F-30-E | JZSP-C7M14F-30-E             | YAI-CSM31-30-P-E                 |                                                                                     |     |                                                                                       |
|                                              |                                                                                     | 40 m                                                                                   | JZSP-C7M13F-40-E | JZSP-C7M14F-40-E             | YAI-CSM31-40-P-E                 |                                                                                     |     |                                                                                       |
|                                              |                                                                                     | 50 m                                                                                   | JZSP-C7M13F-50-E | JZSP-C7M14F-50-E             | YAI-CSM31-50-P-E                 |                                                                                     |     |                                                                                       |
| SGM7J-02 to -06<br><br>200 W to 600 W (200V) |                                                                                     | 3 m                                                                                    | JZSP-C7M23F-03-E | JZSP-C7M24F-03-E             | YAI-CSM32-03-P-E                 |                                                                                     |     |                                                                                       |
|                                              |                                                                                     | 5 m                                                                                    | JZSP-C7M23F-05-E | JZSP-C7M24F-05-E             | YAI-CSM32-05-P-E                 |                                                                                     |     |                                                                                       |
|                                              |                                                                                     | 10 m                                                                                   | JZSP-C7M23F-10-E | JZSP-C7M24F-10-E             | YAI-CSM32-10-P-E                 |                                                                                     |     |                                                                                       |
|                                              |                                                                                     | 15 m                                                                                   | JZSP-C7M23F-15-E | JZSP-C7M24F-15-E             | YAI-CSM32-15-P-E                 |                                                                                     |     |                                                                                       |
|                                              |                                                                                     | 20 m                                                                                   | JZSP-C7M23F-20-E | JZSP-C7M24F-20-E             | YAI-CSM32-20-P-E                 |                                                                                     |     |                                                                                       |
|                                              |                                                                                     | 30 m                                                                                   | JZSP-C7M23F-30-E | JZSP-C7M24F-30-E             | YAI-CSM32-30-P-E                 |                                                                                     |     |                                                                                       |
|                                              |                                                                                     | 40 m                                                                                   | JZSP-C7M23F-40-E | JZSP-C7M24F-40-E             | YAI-CSM32-40-P-E                 |                                                                                     |     |                                                                                       |
|                                              |                                                                                     | 50 m                                                                                   | JZSP-C7M23F-50-E | JZSP-C7M24F-50-E             | YAI-CSM32-50-P-E                 |                                                                                     |     |                                                                                       |
| SGM7J-08<br><br>750 W (200V)                 |                                                                                     | 3 m                                                                                    | JZSP-C7M33F-03-E | JZSP-C7M34F-03-E             | YAI-CSM33-03-P-E                 |                                                                                     |     |                                                                                       |
|                                              |                                                                                     | 5 m                                                                                    | JZSP-C7M33F-05-E | JZSP-C7M34F-05-E             | YAI-CSM33-05-P-E                 |                                                                                     |     |                                                                                       |
|                                              |                                                                                     | 10 m                                                                                   | JZSP-C7M33F-10-E | JZSP-C7M34F-10-E             | YAI-CSM33-10-P-E                 |                                                                                     |     |                                                                                       |
|                                              |                                                                                     | 15 m                                                                                   | JZSP-C7M33F-15-E | JZSP-C7M34F-15-E             | YAI-CSM33-15-P-E                 |                                                                                     |     |                                                                                       |
|                                              |                                                                                     | 20 m                                                                                   | JZSP-C7M33F-20-E | JZSP-C7M34F-20-E             | YAI-CSM33-20-P-E                 |                                                                                     |     |                                                                                       |
|                                              |                                                                                     | 30 m                                                                                   | JZSP-C7M33F-30-E | JZSP-C7M34F-30-E             | YAI-CSM33-30-P-E                 |                                                                                     |     |                                                                                       |
|                                              |                                                                                     | 40 m                                                                                   | JZSP-C7M33F-40-E | JZSP-C7M34F-40-E             | YAI-CSM33-40-P-E                 |                                                                                     |     |                                                                                       |
|                                              |                                                                                     | 50 m                                                                                   | JZSP-C7M33F-50-E | JZSP-C7M34F-50-E             | YAI-CSM33-50-P-E                 |                                                                                     |     |                                                                                       |
| SGM7J-A5 to -C2<br><br>50 W to 150 W (200V)  |                                                                                     | Power cable for Servo Motors with Holding Brakes<br><br>Cable installed away from load | 3 m              | JZSP-C7M13G-03-E             | JZSP-C7M14G-03-E                 |                                                                                     | N/A |  |
|                                              |                                                                                     |                                                                                        | 5 m              | JZSP-C7M13G-05-E             | JZSP-C7M14G-05-E                 |                                                                                     |     |                                                                                       |
|                                              |                                                                                     |                                                                                        | 10 m             | JZSP-C7M13G-10-E             | JZSP-C7M14G-10-E                 |                                                                                     |     |                                                                                       |
|                                              |                                                                                     |                                                                                        | 15 m             | JZSP-C7M13G-15-E             | JZSP-C7M14G-15-E                 |                                                                                     |     |                                                                                       |
|                                              | 20 m                                                                                |                                                                                        | JZSP-C7M13G-20-E | JZSP-C7M14G-20-E             |                                  |                                                                                     |     |                                                                                       |
|                                              | 30 m                                                                                |                                                                                        | JZSP-C7M13G-30-E | JZSP-C7M14G-30-E             |                                  |                                                                                     |     |                                                                                       |
|                                              | 40 m                                                                                |                                                                                        | JZSP-C7M13G-40-E | JZSP-C7M14G-40-E             |                                  |                                                                                     |     |                                                                                       |
|                                              | 50 m                                                                                |                                                                                        | JZSP-C7M13G-50-E | JZSP-C7M14G-50-E             |                                  |                                                                                     |     |                                                                                       |
|                                              | SGM7J-02 to -06<br><br>200 W to 600 W (200V)                                        |                                                                                        | 3 m              | JZSP-C7M23G-03-E             | JZSP-C7M24G-03-E                 |                                                                                     |     |                                                                                       |
|                                              |                                                                                     |                                                                                        | 5 m              | JZSP-C7M23G-05-E             | JZSP-C7M24G-05-E                 |                                                                                     |     |                                                                                       |
| 10 m                                         |                                                                                     |                                                                                        | JZSP-C7M23G-10-E | JZSP-C7M24G-10-E             |                                  |                                                                                     |     |                                                                                       |
| 15 m                                         |                                                                                     |                                                                                        | JZSP-C7M23G-15-E | JZSP-C7M24G-15-E             |                                  |                                                                                     |     |                                                                                       |
| 20 m                                         |                                                                                     |                                                                                        | JZSP-C7M23G-20-E | JZSP-C7M24G-20-E             |                                  |                                                                                     |     |                                                                                       |
| 30 m                                         |                                                                                     |                                                                                        | JZSP-C7M23G-30-E | JZSP-C7M24G-30-E             |                                  |                                                                                     |     |                                                                                       |
| 40 m                                         |                                                                                     |                                                                                        | JZSP-C7M23G-40-E | JZSP-C7M24G-40-E             |                                  |                                                                                     |     |                                                                                       |
| 50 m                                         |                                                                                     |                                                                                        | JZSP-C7M23G-50-E | JZSP-C7M24G-50-E             |                                  |                                                                                     |     |                                                                                       |
| SGM7J-08<br><br>750 W (200V)                 | 3 m                                                                                 |                                                                                        | JZSP-C7M33G-03-E | JZSP-C7M34G-03-E             |                                  |                                                                                     |     |                                                                                       |
|                                              | 5 m                                                                                 |                                                                                        | JZSP-C7M33G-05-E | JZSP-C7M34G-05-E             |                                  |                                                                                     |     |                                                                                       |
|                                              | 10 m                                                                                |                                                                                        | JZSP-C7M33G-10-E | JZSP-C7M34G-10-E             |                                  |                                                                                     |     |                                                                                       |
|                                              | 15 m                                                                                |                                                                                        | JZSP-C7M33G-15-E | JZSP-C7M34G-15-E             |                                  |                                                                                     |     |                                                                                       |
|                                              | 20 m                                                                                |                                                                                        | JZSP-C7M33G-20-E | JZSP-C7M34G-20-E             |                                  |                                                                                     |     |                                                                                       |
|                                              | 30 m                                                                                |                                                                                        | JZSP-C7M33G-30-E | JZSP-C7M34G-30-E             |                                  |                                                                                     |     |                                                                                       |
|                                              | 40 m                                                                                |                                                                                        | JZSP-C7M33G-40-E | JZSP-C7M34G-40-E             |                                  |                                                                                     |     |                                                                                       |
|                                              | 50 m                                                                                |                                                                                        | JZSP-C7M33G-50-E | JZSP-C7M34G-50-E             |                                  |                                                                                     |     |                                                                                       |

\*1. Use Flexible Cables for moving parts of machines, such as robots.

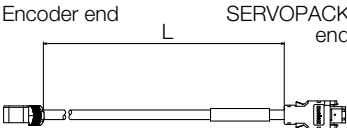
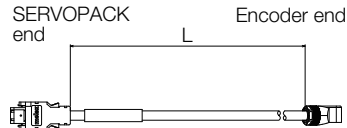
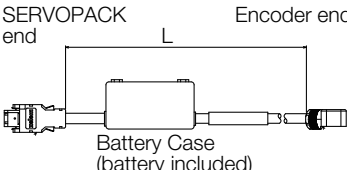
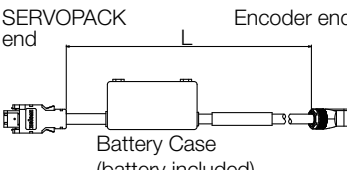
\*2. The protective structure will be IP65 for these cables.

## Servo Motor Main Circuit Cables (400 V Models)

| Servo Motor Model                       | Name                                                    | Length (L) | Order Number   |                 |                     | Appearance                                                                          |
|-----------------------------------------|---------------------------------------------------------|------------|----------------|-----------------|---------------------|-------------------------------------------------------------------------------------|
|                                         |                                                         |            | Standard Cable | Flexible Cable* | Flexible/Shielded   |                                                                                     |
| SGM7J-02 to -08<br>200W to 750 W (400V) | Power Cable with-out Brake. Cable installed toward load | 3 m        | N/A            | N/A             | JZSP-C7M143-03-E-G6 |  |
|                                         |                                                         | 5 m        | N/A            | N/A             | JZSP-C7M143-05-E-G6 |                                                                                     |
|                                         |                                                         | 10 m       | N/A            | N/A             | JZSP-C7M143-10-E-G6 |                                                                                     |
|                                         |                                                         | 15 m       | N/A            | N/A             | JZSP-C7M143-15-E-G6 |                                                                                     |
|                                         |                                                         | 20 m       | N/A            | N/A             | JZSP-C7M143-20-E-G6 |                                                                                     |
| SGM7J-15<br>1.5 kW (400V)               |                                                         | 3 m        | N/A            | N/A             | JZSP-C7M144-03-E-G6 |                                                                                     |
|                                         |                                                         | 5 m        | N/A            | N/A             | JZSP-C7M144-05-E-G6 |                                                                                     |
|                                         |                                                         | 10 m       | N/A            | N/A             | JZSP-C7M144-10-E-G6 |                                                                                     |
|                                         |                                                         | 15 m       | N/A            | N/A             | JZSP-C7M144-15-E-G6 |                                                                                     |
|                                         |                                                         | 20 m       | N/A            | N/A             | JZSP-C7M144-20-E-G6 |                                                                                     |
| SGM7J-02 to -08<br>200W to 750 W (400V) | Power Cable with Brake. Cable installed toward load     | 3 m        | N/A            | N/A             | JZSP-C7M343-03-E-G6 |  |
|                                         |                                                         | 5 m        | N/A            | N/A             | JZSP-C7M343-05-E-G6 |                                                                                     |
|                                         |                                                         | 10 m       | N/A            | N/A             | JZSP-C7M343-10-E-G6 |                                                                                     |
|                                         |                                                         | 15 m       | N/A            | N/A             | JZSP-C7M343-15-E-G6 |                                                                                     |
|                                         |                                                         | 20 m       | N/A            | N/A             | JZSP-C7M343-20-E-G6 |                                                                                     |
| SGM7J-15<br>1.5 kW (400V)               |                                                         | 3 m        | N/A            | N/A             | JZSP-C7M344-03-E-G6 |                                                                                     |
|                                         |                                                         | 5 m        | N/A            | N/A             | JZSP-C7M344-05-E-G6 |                                                                                     |
|                                         |                                                         | 10 m       | N/A            | N/A             | JZSP-C7M344-10-E-G6 |                                                                                     |
|                                         |                                                         | 15 m       | N/A            | N/A             | JZSP-C7M344-15-E-G6 |                                                                                     |
|                                         |                                                         | 20 m       | N/A            | N/A             | JZSP-C7M344-20-E-G6 |                                                                                     |

\* Use Flexible Cables for moving parts of machines, such as robots.

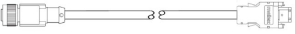
## Encoder Cables of 20 m or Less (200V Models)

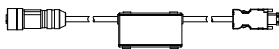
| Servo Motor Model                | Name                                                                            | Length (L) | Order Number     |                  | Appearance                                                                            |
|----------------------------------|---------------------------------------------------------------------------------|------------|------------------|------------------|---------------------------------------------------------------------------------------|
|                                  |                                                                                 |            | Standard Cable   | Flexible Cable*1 |                                                                                       |
| SGM7J-A5 to -08<br>50 W to 750 W | For incremental or batteryless absolute encoder: Cable installed toward load    | 3 m        | JZSP-C7PI0D-03-E | JZSP-C7PI2D-03-E |    |
|                                  |                                                                                 | 5 m        | JZSP-C7PI0D-05-E | JZSP-C7PI2D-05-E |                                                                                       |
|                                  |                                                                                 | 10 m       | JZSP-C7PI0D-10-E | JZSP-C7PI2D-10-E |                                                                                       |
|                                  |                                                                                 | 15 m       | JZSP-C7PI0D-15-E | JZSP-C7PI2D-15-E |                                                                                       |
|                                  |                                                                                 | 20 m       | JZSP-C7PI0D-20-E | JZSP-C7PI2D-20-E |                                                                                       |
|                                  | For incremental or batteryless absolute encoder: Cable installed away from load | 3 m        | JZSP-C7PI0E-03-E | JZSP-C7PI2E-03-E |    |
|                                  |                                                                                 | 5 m        | JZSP-C7PI0E-05-E | JZSP-C7PI2E-05-E |                                                                                       |
|                                  |                                                                                 | 10 m       | JZSP-C7PI0E-10-E | JZSP-C7PI2E-10-E |                                                                                       |
|                                  |                                                                                 | 15 m       | JZSP-C7PI0E-15-E | JZSP-C7PI2E-15-E |                                                                                       |
|                                  |                                                                                 | 20 m       | JZSP-C7PI0E-20-E | JZSP-C7PI2E-20-E |                                                                                       |
|                                  | For absolute encoder: With Battery Case*2<br>Cable installed toward load        | 3 m        | JZSP-C7PA0D-03-E | JZSP-C7PA2D-03-E |   |
|                                  |                                                                                 | 5 m        | JZSP-C7PA0D-05-E | JZSP-C7PA2D-05-E |                                                                                       |
|                                  |                                                                                 | 10 m       | JZSP-C7PA0D-10-E | JZSP-C7PA2D-10-E |                                                                                       |
|                                  |                                                                                 | 15 m       | JZSP-C7PA0D-15-E | JZSP-C7PA2D-15-E |                                                                                       |
|                                  |                                                                                 | 20 m       | JZSP-C7PA0D-20-E | JZSP-C7PA2D-20-E |                                                                                       |
|                                  | For absolute encoder: With Battery Case*2<br>Cable installed away from load     | 3 m        | JZSP-C7PA0E-03-E | JZSP-C7PA2E-03-E |  |
|                                  |                                                                                 | 5 m        | JZSP-C7PA0E-05-E | JZSP-C7PA2E-05-E |                                                                                       |
|                                  |                                                                                 | 10 m       | JZSP-C7PA0E-10-E | JZSP-C7PA2E-10-E |                                                                                       |
|                                  |                                                                                 | 15 m       | JZSP-C7PA0E-15-E | JZSP-C7PA2E-15-E |                                                                                       |
|                                  |                                                                                 | 20 m       | JZSP-C7PA0E-20-E | JZSP-C7PA2E-20-E |                                                                                       |

\*1. Use Flexible Cables for moving parts of machines, such as robots.

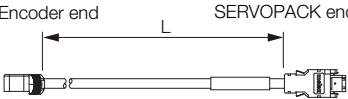
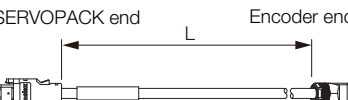
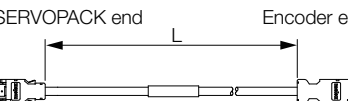
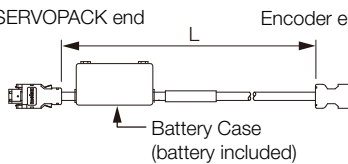
\*2. If a battery is connected to host controller, the Battery Case is not required. If so, use a cable for incremental encoders.

## Encoder Cables of 20 m or Less (400V Models)

| Servo Motor Model                  | Name                                                                                                             | Length (L) | Order Number        | Appearance                                                                            |
|------------------------------------|------------------------------------------------------------------------------------------------------------------|------------|---------------------|---------------------------------------------------------------------------------------|
| SGM7J-02 to -15<br>200 W to 1.5 kW | Flexible cable with connectors on both ends (for incremental or batteryless encoder) straight connector (M12)    | 3 m        | JZSP-C7PI2M-03-E-G6 |  |
|                                    |                                                                                                                  | 5 m        | JZSP-C7PI2M-05-E-G6 |                                                                                       |
|                                    |                                                                                                                  | 10 m       | JZSP-C7PI2M-10-E-G6 |                                                                                       |
|                                    |                                                                                                                  | 15 m       | JZSP-C7PI2M-15-E-G6 |                                                                                       |
|                                    |                                                                                                                  | 20 m       | JZSP-C7PI2M-20-E-G6 |                                                                                       |
| SGM7J-02 to -15<br>200 W to 1.5 kW | Flexible cable with connectors on both ends (for incremental or batteryless encoder) right angle connector (M12) | 3 m        | JZSP-C7PI2N-03-E-G6 |  |
|                                    |                                                                                                                  | 5 m        | JZSP-C7PI2N-05-E-G6 |                                                                                       |
|                                    |                                                                                                                  | 10 m       | JZSP-C7PI2N-10-E-G6 |                                                                                       |
|                                    |                                                                                                                  | 15 m       | JZSP-C7PI2N-15-E-G6 |                                                                                       |
|                                    |                                                                                                                  | 20 m       | JZSP-C7PI2N-20-E-G6 |                                                                                       |

| Servo Motor Model                  | Name                                                                                                             | Length (L) | Order Number        | Appearance                                                                          |
|------------------------------------|------------------------------------------------------------------------------------------------------------------|------------|---------------------|-------------------------------------------------------------------------------------|
| SGM7J-02 to -15<br>200 W to 1.5 kW | Flexible cable with connectors on both ends (for absolute encoder with battery case straight connector (M12))    | 3 m        | JZSP-C7PA2M-03-E-G6 |  |
|                                    |                                                                                                                  | 5 m        | JZSP-C7PA2M-05-E-G6 |                                                                                     |
|                                    |                                                                                                                  | 10 m       | JZSP-C7PA2M-10-E-G6 |                                                                                     |
|                                    |                                                                                                                  | 15 m       | JZSP-C7PA2M-15-E-G6 |                                                                                     |
|                                    |                                                                                                                  | 20 m       | JZSP-C7PA2M-20-E-G6 |                                                                                     |
| SGM7J-02 to -15<br>200 W to 1.5 kW | Flexible cable with connectors on both ends (for absolute encoder with battery case) right angle connector (M12) | 3 m        | JZSP-C7PA2N-03-E-G6 |  |
|                                    |                                                                                                                  | 5 m        | JZSP-C7PA2N-05-E-G6 |                                                                                     |
|                                    |                                                                                                                  | 10 m       | JZSP-C7PA2N-10-E-G6 |                                                                                     |
|                                    |                                                                                                                  | 15 m       | JZSP-C7PA2N-15-E-G6 |                                                                                     |

## Relay Encoder Cable of 30 m to 50 m (200V Models)

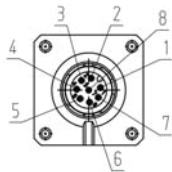
| Servo Motor Model                | Name                                                                                      | Length (L) | Order Number     | Appearance                                                                            |
|----------------------------------|-------------------------------------------------------------------------------------------|------------|------------------|---------------------------------------------------------------------------------------|
| SGM7J-A5 to -08<br>50 W to 750 W | Encoder-end Cable (for incremental or absolute encoder)<br>Cable installed toward load    | 0.3 m      | JZSP-C7PRCD-E    |    |
|                                  | Encoder-end Cable (for incremental or absolute encoder)<br>Cable installed away from load | 0.3 m      | JZSP-C7PRCE-E    |  |
|                                  | Cables with Connectors on Both Ends (for incremental or absolute encoder)                 | 30 m       | JZSP-UCMP00-30-E |  |
|                                  |                                                                                           | 40 m       | JZSP-UCMP00-40-E |                                                                                       |
|                                  |                                                                                           | 50 m       | JZSP-UCMP00-50-E |                                                                                       |
|                                  | Cable with a Battery Case (Required when an absolute encoder is used.*)                   | 0.3 m      | JZSP-CSP12-E     |  |

\* This Cable is not required for a batteryless encoder or if a battery is connected to the host controller.

# Connector Specifications (400V)

◆ SGM7J-02D to -15D

Encoder Connector Specifications

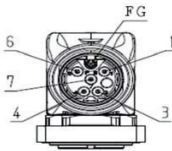


Receptacle  
Size: M12  
Part number: 1419959  
Model:  
SACC-MSQ-M12MS-25-3,2 SCO  
Manufacturer: Phoenix Contact

|         |          |
|---------|----------|
| 1       | PG 5V    |
| 2       | PG 0V    |
| 3       | FG       |
| 4       | BAT (+)  |
| 5       | BAT (-)  |
| 6       | Data (+) |
| 7       | Data (-) |
| 8       | Empty    |
| Housing | Shield   |

◆ SGM7J-02D to -08D

Servo Motor Connector Specifications

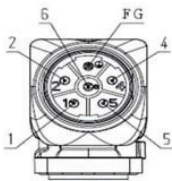


Receptacle  
Size: M17  
Part number: 1620448  
Model: ST-5EP1N8AA500S  
Manufacturer: Phoenix Contact

|         |         |
|---------|---------|
| 1       | (Brake) |
| 3       | U       |
| 4       | V       |
| 5       | Empty   |
| 6       | (Brake) |
| 7       | W       |
| FG      | FG      |
| Housing | Shield  |

◆ SGM7J-15D

Servo Motor Connector Specifications

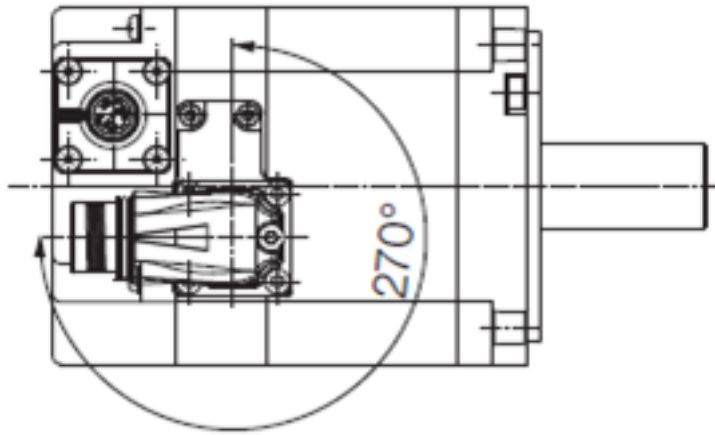


Receptacle  
Size: M23  
Part number: 1617905  
Model: ST-5EP1N8AAD00S  
Manufacturer: Phoenix Contact

|         |         |
|---------|---------|
| 1       | V       |
| 2       | (Brake) |
| 4       | (Brake) |
| 5       | U       |
| 6       | W       |
| FG      | FG      |
| Housing | Shield  |

## Servo Motor Connector Rotational Angle

### ◆ SGM7-02D to -15D

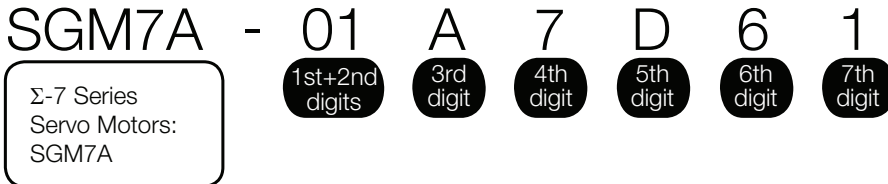


Allowable number of rotations: 10

## SGM7A

## SGM7A Servo Motors (without Gear Box)

## Model Designations



## 1st+2nd digits Rated Output

| Code | Specification |
|------|---------------|
| A5   | 50 W          |
| 01   | 100 W         |
| C2   | 150 W         |
| 02   | 200 W         |
| 04   | 400 W         |
| 06   | 600 W         |
| 08   | 750 W         |
| 10   | 1.0 kW        |
| 15   | 1.5 kW        |
| 20   | 2.0 kW        |
| 25   | 2.5 kW        |
| 30   | 3.0 kW        |
| 40   | 4.0 kW        |
| 50   | 5.0 kW        |
| 70   | 7.0 kW        |

## 3rd digit Power Supply Voltage

| Code | Specification |
|------|---------------|
| A    | 200 VAC       |
| D    | 400 VAC       |

## 4th digit Serial Encoder

| Code | Specification               |
|------|-----------------------------|
| 6    | 24-bit batteryless absolute |
| 7    | 24-bit absolute             |
| F    | 24-bit incremental          |

## 5th digit Design Revision Order

A: Global design revision for batteryless absolute encoder (200 V)  
 D: Global design revision for battery type (200V)  
 F: Global design revision (400V)

## 6th digit Shaft End

| Code | Specification             |
|------|---------------------------|
| 2    | Straight without key      |
| 6    | Straight with key and tap |
| B*   | With two flat seats       |

\* Code B is not supported for models with a rated output of 1.5 kW or higher.

## 7th digit Options

| Code | Specification                             |
|------|-------------------------------------------|
| 1    | Without options                           |
| C    | With holding brake (24 VDC)               |
| E    | With oil seal and holding brake (24 VDC)  |
| S    | With oil seal                             |
| F    | With dust seal                            |
| H    | With dust seal and holding brake (24 VDC) |

Note: SGM7A-70A Servo Motors with holding brakes are not available.

■ Non Stock Items



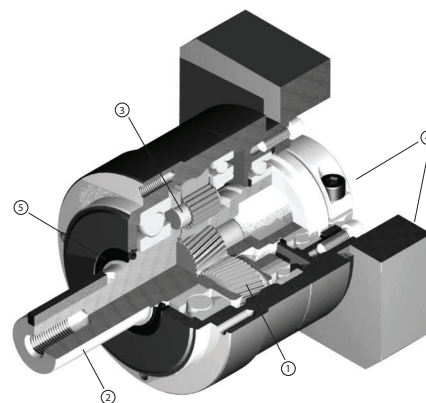
## SGM7A

## SGM7A Gear Motors

The SGM7A gear motor product family pairs SGM7A servo motors with high precision, low backlash inline planetary gear heads resulting in a portfolio of rotary actuators fit for a wide range of applications. The family of gear motors has been thoroughly tested and adheres to the high levels of quality and performance expected from Yaskawa.

The high precision gear heads offer a variety of application advantages:

- ❶ **Quiet operation** – helical cut gears contribute toward reduced vibration and noise
- ❷ **High precision** – a standard backlash of 5 arc-min make this gear head ideal for the most accurate applications
- ❸ **High rigidity and torque capacity** – achieved with a design which incorporates uncaged needle roller bearings
- ❹ **Optimized adapter bushing** – minimizes inertia allowing for more output torque to be realized
- ❺ **No leakage through the seal** – high viscosity, anti-separation grease does not liquefy and does not migrate away from the gears
- **Maintenance-free** – no need to replace the grease for the life of the unit. The reducer can be positioned in any orientation



## Model Designations

S7A 01 A C - VL 050 - 05

Σ-7 Series  
Gear Motors:  
SGM7A

1st+2nd  
digits

3rd  
digit

4th  
digit

5th  
digit

6th  
digit

7th  
digit

1st+2nd digits Rated Output

| Code | Specification |
|------|---------------|
| 01   | 100 W         |
| 02   | 200 W         |
| 04   | 400 W         |
| 08   | 750 W         |
| 10   | 1.0 kW        |
| 15   | 1.5 kW        |
| 20   | 2.0 kW        |
| 25   | 2.5 kW        |
| 30   | 3.0 kW        |
| 40   | 4.0 kW        |
| 50   | 5.0 kW        |
| 70   | 7.0 kW        |

3rd digit Power Supply Voltage

| Code | Specification            |
|------|--------------------------|
| A    | 200 VAC battery type     |
| B    | 200 VAC batteryless type |
| D    | 400 VAC battery type     |
| E    | 400 VAC batteryless type |

4th digit Brake Option

| Code  | Specification |
|-------|---------------|
| Blank | No brake      |
| C     | 24 V Brake    |

5th digit Gear box backlash

| Code | Specification      |
|------|--------------------|
| VL   | 5 arc-min backlash |

6th digit Gear head frame size

| Code | Specification |
|------|---------------|
| 050  | 50 mm         |
| 070  | 70 mm         |
| 090  | 90 mm         |
| 120  | 120 mm        |
| 155  | 155 mm        |
| 205  | 205mm         |
| 235  | 235mm         |

7th digit Gear Ratio

| Code | Specification |
|------|---------------|
| 03   | 3:1 Ratio     |
| 05   | 5:1 Ratio     |
| 10   | 10:1 Ratio    |
| 25   | 25:1 Ratio    |
| 50   | 50:1 Ratio    |

## Specifications and Ratings

### Specifications (200 V Models)

| Voltage                  |                                       | 200 V                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                 |
|--------------------------|---------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------|
| Model SGM7A-             |                                       | A5A to 70A                                                                                                                                                                                                                                                                                                                                                                                               |                                                                                 |
| Time Rating              |                                       | Continuous                                                                                                                                                                                                                                                                                                                                                                                               |                                                                                 |
| Thermal Class            |                                       | A5A to 10A                                                                                                                                                                                                                                                                                                                                                                                               | UL: B, CE: B                                                                    |
|                          |                                       | 15A to 70A                                                                                                                                                                                                                                                                                                                                                                                               | UL: F, CE: F                                                                    |
| Insulation Resistance    |                                       | 500 VDC, 10 MΩ min.                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                 |
| Withstand Voltage        |                                       | 1,500 VAC for 1 minute                                                                                                                                                                                                                                                                                                                                                                                   |                                                                                 |
| Excitation               |                                       | Permanent magnet                                                                                                                                                                                                                                                                                                                                                                                         |                                                                                 |
| Mounting                 |                                       | Flange-mounted                                                                                                                                                                                                                                                                                                                                                                                           |                                                                                 |
| Drive Method             |                                       | Direct drive                                                                                                                                                                                                                                                                                                                                                                                             |                                                                                 |
| Rotation Direction       |                                       | Counterclockwise (CCW) for forward reference when viewed from the load side                                                                                                                                                                                                                                                                                                                              |                                                                                 |
| Vibration Class*1        |                                       | V15                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                 |
| Environmental Conditions | Surrounding Air Temperature           | 0°C to 40°C (With derating, usage is possible between 40°C and 60°C.)*4                                                                                                                                                                                                                                                                                                                                  |                                                                                 |
|                          | Surrounding Air Humidity              | 20% to 80% relative humidity (with no condensation)                                                                                                                                                                                                                                                                                                                                                      |                                                                                 |
|                          | Installation Site                     | <ul style="list-style-type: none"><li>• Must be indoors and free of corrosive and explosive gases.</li><li>• Must be well-ventilated and free of dust and moisture.</li><li>• Must facilitate inspection and cleaning.</li><li>• Must have an altitude of 1,000 m or less. (With derating, usage is possible between 1,000 m and 2,000 m.)*5</li><li>• Must be free of strong magnetic fields.</li></ul> |                                                                                 |
|                          | Storage Environment                   | Store the Servo Motor in the following environment if you store it with the power cable disconnected.<br>Storage Temperature: -20°C to 60°C (with no freezing)<br>Storage Humidity: 20% to 80% relative humidity (with no condensation)                                                                                                                                                                  |                                                                                 |
| Shock Resistance*2       | Impact Acceleration Rate at Flange    | 490 m/s <sup>2</sup>                                                                                                                                                                                                                                                                                                                                                                                     |                                                                                 |
|                          | Number of Impacts                     | 2 times                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                                 |
| Vibration Resistance*3   | Vibration Acceleration Rate at Flange | A5A to 50A                                                                                                                                                                                                                                                                                                                                                                                               | 49 m/s <sup>2</sup><br>(Models 15A to 50A: 24.5 m/s <sup>2</sup> front to back) |
|                          |                                       | 70A                                                                                                                                                                                                                                                                                                                                                                                                      | 14.7 m/s                                                                        |
| Applicable SERVOPACKs    |                                       | Refer to the following section.<br> <b>S-7 Series Combination (page M-11)</b>                                                                                                                                                                                                                                         |                                                                                 |

\*1. A vibration class of V15 indicates a vibration amplitude of 15  $\mu$ m maximum on the Servo Motor without a load at the rated motor speed.

\*2. The shock resistance for shock in the vertical direction when the Servo Motor is mounted with the shaft in a horizontal position is given in the above table.

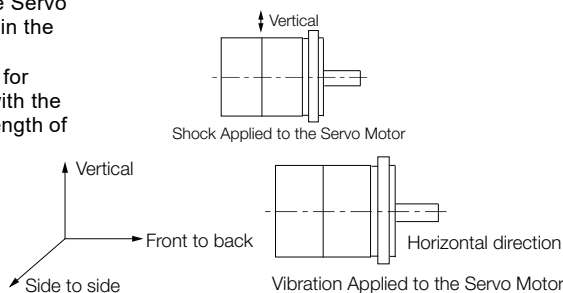
\*3. The vertical, side-to-side, and front-to-back vibration resistance for vibration in three directions when the Servo Motor is mounted with the shaft in a horizontal position is given in the above table. The strength of the vibration that the Servo Motor can withstand depends on the application. Always check the vibration acceleration rate that is applied to the Servo Motor with the actual equipment.

\*4. If the surrounding air temperature will exceed 40°C, refer to the following section.

 **Applications Where the Surrounding Air Temperature of the Servo Motor Exceeds 40°C (page 75)**

\*5. If the altitude will exceed 1,000 m, refer to the following section.

 **Applications Where the Altitude of the Servo Motor Exceeds 1,000 m (page 76)**



## Ratings of Servo Motors (200 V Models -A5A to -10A)

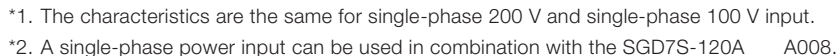
| Voltage                                                          |                                |                                     | 200 V                               |                 |                 |               |               |                              |               |                |
|------------------------------------------------------------------|--------------------------------|-------------------------------------|-------------------------------------|-----------------|-----------------|---------------|---------------|------------------------------|---------------|----------------|
| Model SGM7A-                                                     |                                |                                     | A5A                                 | 01A             | C2A             | 02A           | 04A           | 06A                          | 08A           | 10A            |
| Rated Output <sup>*1</sup>                                       |                                | W                                   | 50                                  | 100             | 150             | 200           | 400           | 600                          | 750           | 1000           |
| Rated Torque <sup>*1, *2</sup>                                   |                                | N•m                                 | 0.159                               | 0.318           | 0.477           | 0.637         | 1.27          | 1.91                         | 2.39          | 3.18           |
| Instantaneous Maximum Torque <sup>*1</sup>                       |                                | N•m                                 | 0.557                               | 1.11            | 1.67            | 2.23          | 4.46          | 6.69                         | 8.36          | 11.1           |
| Rated Current <sup>*1</sup>                                      |                                | Arms                                | 0.57                                | 0.89            | 1.5             | 1.5           | 2.4           | 4.5                          | 4.4           | 6.4            |
| Instantaneous Maximum Current <sup>*1</sup>                      |                                | Arms                                | 2.1                                 | 3.2             | 5.6             | 5.9           | 9.3           | 16.9                         | 16.8          | 23.2           |
| Rated Motor Speed <sup>*1</sup>                                  |                                | min <sup>-1</sup>                   | 3000                                |                 |                 |               |               |                              |               |                |
| Maximum Motor Speed <sup>*1</sup>                                |                                | min <sup>-1</sup>                   | 6000                                |                 |                 |               |               |                              |               |                |
| Torque Constant                                                  |                                | N•m/Arms                            | 0.304                               | 0.384           | 0.332           | 0.458         | 0.576         | 0.456                        | 0.584         | 0.541          |
| Motor Moment of Inertia                                          | Absolute Encoder with battery  | ×10 <sup>-4</sup> kg•m <sup>2</sup> | 0.0217 (0.0297)                     | 0.0337 (0.0417) | 0.0458 (0.0538) | 0.139 (0.209) | 0.216 (0.286) | 0.315 (0.385)                | 0.775 (0.955) | 0.971 (1.15)   |
|                                                                  | Batteryless Absolute Encoder   | ×10 <sup>-4</sup> kg•m <sup>2</sup> | 0.0232(0.0312)                      | 0.0352 (0.0432) | 0.0473 (0.0553) | 0.140 (0.210) | 0.217 (0.287) | 0.316 (0.386)                | 0.776 (0.956) | 0.972 (1.15)   |
| Rated Power Rate <sup>*1</sup>                                   |                                | kW/s                                | 11.7 (8.51)                         | 30.0 (24.2)     | 49.7 (42.2)     | 29.2 (19.4)   | 74.7 (56.3)   | 115 (94.7)                   | 73.7 (59.8)   | 104 (87.9)     |
| Rated Angular Acceleration Rate <sup>*1</sup>                    |                                | rad/s <sup>2</sup>                  | 73200 (53500)                       | 94300 (76200)   | 104000 (88600)  | 45800 (30400) | 58700 (44400) | 60600 (49600)                | 30800 (25000) | 32700 (27600)  |
| Derating Rate for Servo Motor with Oil Seal                      |                                | %                                   | 80                                  | 90              |                 |               | 95            |                              |               |                |
| Heat Sink Size (Aluminum)                                        |                                | mm                                  | 200 × 200 × 6                       |                 | 250 × 250 × 6   |               |               | 300 × 300 × 12 <sup>*7</sup> | 250 × 250 × 6 | 300 × 300 × 12 |
| Protective Structure <sup>*3</sup>                               |                                |                                     | Totally enclosed, self-cooled, IP67 |                 |                 |               |               |                              |               |                |
| Holding Brake Specifications <sup>*4</sup>                       | Rated Voltage                  | V                                   | 24 VDC±10%                          |                 |                 |               |               |                              |               |                |
|                                                                  | Capacity                       | W                                   | 5.5                                 |                 |                 | 6             |               | 6.5                          |               |                |
|                                                                  | Holding Torque                 | N•m                                 | 0.159                               | 0.318           | 0.477           | 0.637         | 1.27          | 1.91                         | 2.39          | 3.18           |
|                                                                  | Coil Resistance                | Ω (at 20°C)                         | 104.8±10%                           |                 |                 | 96±10%        |               | 88.6±10%                     |               |                |
|                                                                  | Rated Current                  | A (at 20°C)                         | 0.23                                |                 |                 | 0.25          |               | 0.27                         |               |                |
|                                                                  | Time Required to Release Brake | ms                                  | 60                                  |                 |                 |               |               | 80                           |               |                |
|                                                                  | Time Required to Brake         | ms                                  | 100                                 |                 |                 |               |               |                              |               |                |
| Allowable Load Moment of Inertia (Motor Moment of Inertia Ratio) |                                |                                     | 40 times                            |                 |                 | 30 times      | 20 times      |                              | 20 times      |                |
| Allowable Shaft Loads <sup>*5</sup>                              | LF                             | mm                                  | 20                                  |                 |                 | 25            |               |                              | 35            |                |
|                                                                  | Allowable Radial Load          | N                                   | 78                                  |                 |                 | 245           |               |                              | 392           |                |
|                                                                  | Allowable Thrust Load          | N                                   | 54                                  |                 |                 | 74            |               |                              | 147           |                |

Note: 1. The values in parentheses are for Servo Motors with Holding Brakes.

2. Refer to the following section for footnotes \*1 to \*5 and \*7.

■  Notes for Ratings of Servo Motor (page 60)

**A** : Continuous duty zone ——— (solid lines): With three-phase 200-V or single-phase 230-V input  
**B** : Intermittent duty zone ----- (dotted lines): With single-phase 200-V input  
                                       - - - (dashed-dotted lines): With single-phase 100-V input



2. The characteristics in the intermittent duty zone depend on the power supply voltage.
3. If the effective torque is within the allowable range for the rated torque, the Servo Motor can be used within the intermittent duty zone.
4. If you use a Servo Motor Main Circuit Cable that exceeds 20 m, the intermittent duty zone in the torque-motor speed characteristics will become smaller because the voltage drop increases.

## Servo Motor Ratings (200 V Models -15A to -70A)

| Voltage                                                          |                                |                                     | 200 V                               |                  |                  |                  |                  |                  |                                                      |
|------------------------------------------------------------------|--------------------------------|-------------------------------------|-------------------------------------|------------------|------------------|------------------|------------------|------------------|------------------------------------------------------|
| Model SGM7A-                                                     |                                |                                     | 15A                                 | 20A              | 25A              | 30A              | 40A              | 50A              | 70A                                                  |
| Rated Output <sup>*6</sup>                                       |                                | kW                                  | 1.5                                 | 2.0              | 2.5              | 3.0              | 4.0              | 5.0              | 7.0                                                  |
| Rated Torque <sup>*2, *6</sup>                                   |                                | N•m                                 | 4.90                                | 6.36             | 7.96             | 9.80             | 12.6             | 15.8             | 22.3                                                 |
| Instantaneous Maximum Torque <sup>*6</sup>                       |                                | N•m                                 | 14.7                                | 19.1             | 23.9             | 29.4             | 37.8             | 47.6             | 54.0                                                 |
| Rated Current <sup>*6</sup>                                      |                                | Arms                                | 9.3                                 | 12.1             | 15.6             | 17.9             | 25.4             | 27.6             | 38.3                                                 |
| Instantaneous Maximum Current <sup>*6</sup>                      |                                | Arms                                | 28                                  | 42               | 51               | 56               | 77               | 84               | 105                                                  |
| Rated Motor Speed <sup>*6</sup>                                  |                                | min <sup>-1</sup>                   | 3000                                |                  |                  |                  |                  |                  |                                                      |
| Maximum Motor Speed <sup>*6</sup>                                |                                | min <sup>-1</sup>                   | 6000 <sup>*8</sup>                  |                  |                  |                  |                  |                  |                                                      |
| Torque Constant                                                  |                                | N•m/Arms                            | 0.590                               | 0.561            | 0.538            | 0.582            | 0.519            | 0.604            | 0.604                                                |
| Motor Moment of Inertia                                          | Absolute Encoder with battery  | ×10 <sup>-4</sup> kg•m <sup>2</sup> | 2.00<br>(2.25)                      | 2.47<br>(2.72)   | 3.19<br>(3.44)   | 7.00<br>(9.20)   | 9.60<br>(11.8)   | 12.3<br>(14.5)   | 12.3<br>(N/A)                                        |
|                                                                  | Batteryless Absolute Encoder   |                                     | 2.00<br>(2.25)                      | 2.47<br>(2.72)   | 3.19<br>(3.44)   | 7.00<br>(9.20)   | 9.60<br>(11.8)   | 12.3<br>(14.5)   | 12.3<br>(N/A)                                        |
| Rated Power Rate <sup>*6</sup>                                   |                                | kW/s                                | 120<br>(106)                        | 164<br>(148)     | 199<br>(184)     | 137<br>(104)     | 165<br>(134)     | 203<br>(172)     | 404                                                  |
| Rated Angular Acceleration Rate <sup>*6</sup>                    |                                | rad/s <sup>2</sup>                  | 24500<br>(21700)                    | 25700<br>(23300) | 24900<br>(23100) | 14000<br>(10600) | 13100<br>(10600) | 12800<br>(10800) | 18100                                                |
| Heat Sink Size (Aluminum)                                        |                                | mm                                  | 300 × 300 × 12                      |                  |                  | 400 × 400 × 20   |                  |                  |                                                      |
| Protective Structure <sup>*3</sup>                               |                                |                                     | Totally enclosed, self-cooled, IP67 |                  |                  |                  |                  |                  | Totally enclosed, separately cooled (with fan), IP22 |
| Holding Brake Specifications <sup>*4</sup>                       | Rated Voltage                  | V                                   | 24 VDC <sup>+10%</sup> <sub>0</sub> |                  |                  |                  |                  | —                |                                                      |
|                                                                  | Capacity                       | W                                   | 12                                  |                  |                  | 10               |                  |                  |                                                      |
|                                                                  | Holding Torque                 | N•m                                 | 7.84                                | 10               | 20               |                  |                  |                  |                                                      |
|                                                                  | Coil Resistance                | Ω (at 20°C)                         | 48                                  |                  |                  | 59               |                  |                  |                                                      |
|                                                                  | Rated Current                  | A (at 20°C)                         | 0.5                                 |                  |                  | 0.41             |                  |                  |                                                      |
|                                                                  | Time Required to Release Brake | ms                                  | 170                                 |                  |                  | 100              |                  |                  |                                                      |
|                                                                  | Time Required to Brake         | ms                                  | 80                                  |                  |                  |                  |                  |                  |                                                      |
| Allowable Load Moment of Inertia (Motor Moment of Inertia Ratio) |                                |                                     | 10 times                            |                  |                  | 5 times          |                  |                  |                                                      |
| Allowable Shaft Loads <sup>*5</sup>                              | LF                             | mm                                  | 45                                  |                  |                  | 63               |                  |                  |                                                      |
|                                                                  | Allowable Radial Load          | N                                   | 686                                 |                  |                  | 980              | 1176             |                  |                                                      |
|                                                                  | Allowable Thrust Load          | N                                   | 196                                 |                  |                  | 392              |                  |                  |                                                      |

Note: 1. The values in parentheses are for Servo Motors with Holding Brakes.

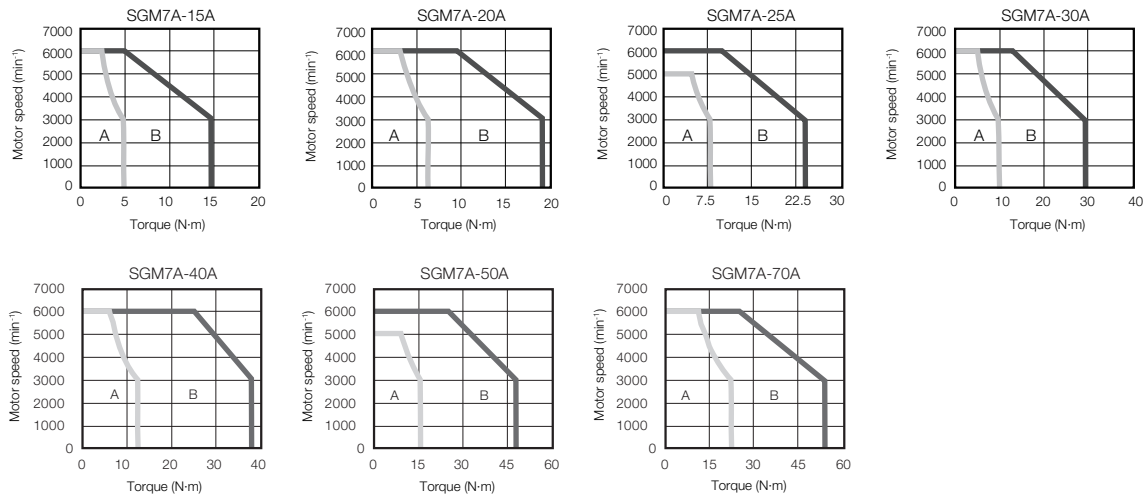
2. Refer to the following section for footnotes \*2 to \*6.

 **Notes for Ratings of Servo Motor (page 60)**

## Torque-Motor Speed Characteristics (200 V Models -15A to -70A)

**A** : Continuous duty zone

**B** : Intermittent duty zone



Note: 1. These values are for operation in combination with a SERVOPACK when the temperature of the armature winding is 20°C. These are typical values.

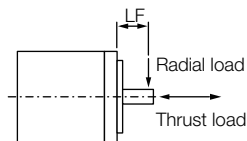
2. The characteristics in the intermittent duty zone depend on the power supply voltage.

3. If the effective torque is within the allowable range for the rated torque, the Servo Motor can be used within the intermittent duty zone.

4. If you use a Servo Motor Main Circuit Cable that exceeds 20 m, the intermittent duty zone in the torque-motor speed characteristics will become smaller because the voltage drop increases.

### ■ Notes for Ratings of Servo Motor

- \*1. These values are for operation in combination with a SERVOPACK when the temperature of the armature winding is 100°C. The values for other items are at 20°C. These are typical values.
- \*2. The rated torques are the continuous allowable torque values at a surrounding air temperature of 40°C with an aluminum heat sink of the dimensions given in the table.
- \*3. This does not apply to the shaft opening. Protective structure specifications apply only when the special cable is used.
- \*4. Observe the following precautions if you use a Servo Motor with a Holding Brake.
  - The holding brake cannot be used to stop the Servo Motor.
  - The time required to release the brake and the time required to brake depend on which discharge circuit is used. Confirm that the operation delay time is appropriate for the actual equipment.
  - The 24-VDC power supply is not provided by Yaskawa.
- \*5. The allowable shaft loads are illustrated in the following figure. Design the mechanical system so that the thrust and radial loads applied to the Servo Motor shaft end during operation do not exceed the values given in the table.



\*6. These values are for operation in combination with a SERVOPACK when the temperature of the armature winding is 20°C. These are typical values.

\*7. If the heat sink is 250 mm × 250 mm × 6 mm, the rated output is 550 W and the rated torque is 1.75 N·m. Refer to the following section for details.

#### 🔧 Servo Motor Heat Dissipation Conditions (page 74)

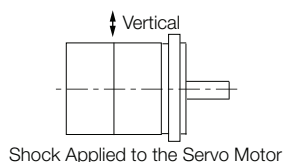
\*8. For the SGM7A-25A or SGM7A-50A, the maximum motor speed for the continuous duty zone is 5,000 min<sup>-1</sup>. Use the Servo Motor within the continuous duty zone for the average motor speed and effective torque.

## Specifications (400 V Models)

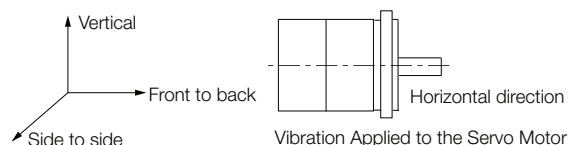
| Voltage                            |                                       | 400 V                                                                                                                                                                                                                                                                                                                                                                                                               |                                          |      |      |     |      |      |     |      |     |      |
|------------------------------------|---------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------|------|------|-----|------|------|-----|------|-----|------|
| Model SGM7A-                       |                                       | 02D                                                                                                                                                                                                                                                                                                                                                                                                                 | 04D                                      | 08D  | 10D  | 15D | 20D  | 25F  | 30D | 40D  | 50D | 70D  |
| Time Rating                        |                                       | Continuous                                                                                                                                                                                                                                                                                                                                                                                                          |                                          |      |      |     |      |      |     |      |     |      |
| Thermal Class                      |                                       | B                                                                                                                                                                                                                                                                                                                                                                                                                   |                                          |      |      |     | F    |      |     |      |     |      |
| Insulation Resistance              |                                       | 500 VDC, 10 MΩ min.                                                                                                                                                                                                                                                                                                                                                                                                 |                                          |      |      |     |      |      |     |      |     |      |
| Withstand Voltage                  |                                       | 1,800 VAC for 1 minute                                                                                                                                                                                                                                                                                                                                                                                              |                                          |      |      |     |      |      |     |      |     |      |
| Excitation                         |                                       | Permanent magnet                                                                                                                                                                                                                                                                                                                                                                                                    |                                          |      |      |     |      |      |     |      |     |      |
| Mounting                           |                                       | Flange-mounted                                                                                                                                                                                                                                                                                                                                                                                                      |                                          |      |      |     |      |      |     |      |     |      |
| Drive Method                       |                                       | Direct drive                                                                                                                                                                                                                                                                                                                                                                                                        |                                          |      |      |     |      |      |     |      |     |      |
| Rotation Direction                 |                                       | Counterclockwise (CCW) for forward reference when viewed from the load side                                                                                                                                                                                                                                                                                                                                         |                                          |      |      |     |      |      |     |      |     |      |
| Vibration Class <sup>*1</sup>      |                                       | V15                                                                                                                                                                                                                                                                                                                                                                                                                 |                                          |      |      |     |      |      |     |      |     |      |
| Environmental Conditions           | Surrounding Air Temperature           | 0°C to 40°C (With derating, usage is possible between 40°C and 60°C.) <sup>*4</sup>                                                                                                                                                                                                                                                                                                                                 |                                          |      |      |     |      |      |     |      |     |      |
|                                    | Surrounding Air Humidity              | 20% to 80% relative humidity (with no condensation)                                                                                                                                                                                                                                                                                                                                                                 |                                          |      |      |     |      |      |     |      |     |      |
|                                    | Installation Site                     | <ul style="list-style-type: none"><li>• Must be indoors and free of corrosive and explosive gases.</li><li>• Must be well-ventilated and free of dust and moisture.</li><li>• Must facilitate inspection and cleaning.</li><li>• Must have an altitude of 1,000 m or less. (With derating, usage is possible between 1,000 m and 2,000 m.)<sup>*5</sup></li><li>• Must be free of strong magnetic fields.</li></ul> |                                          |      |      |     |      |      |     |      |     |      |
|                                    | Storage Environment                   | Store the Servo Motor in the following environment if you store it with the power cable disconnected.<br>Storage Temperature: -20°C to 60°C (with no freezing)<br>Storage Humidity: 20% to 80% relative humidity (with no condensation)                                                                                                                                                                             |                                          |      |      |     |      |      |     |      |     |      |
| Shock Resistance <sup>*2</sup>     | Impact Acceleration Rate at Flange    | 490 m/s <sup>2</sup>                                                                                                                                                                                                                                                                                                                                                                                                |                                          |      |      |     |      |      |     |      |     |      |
|                                    | Number of Impacts                     | 2 times                                                                                                                                                                                                                                                                                                                                                                                                             |                                          |      |      |     |      |      |     |      |     |      |
| Vibration Resistance <sup>*3</sup> | Vibration Acceleration Rate at Flange | 49 m/s <sup>2</sup><br>(Models 15A to 50A: 24.5 m/s <sup>2</sup> front to back)                                                                                                                                                                                                                                                                                                                                     |                                          |      |      |     |      |      |     |      |     |      |
| Applicable SERVOPACKS              | SGD7S-                                | 1R9D                                                                                                                                                                                                                                                                                                                                                                                                                |                                          | 3R5D | 5R4D |     | 8R4D | 120D |     | 170D |     | 260D |
|                                    | SGD7W-                                | 2R6D <sup>*6</sup>                                                                                                                                                                                                                                                                                                                                                                                                  | 2R6D <sup>*6</sup> or 5R4D <sup>*6</sup> |      | 5R4D |     | N/A  |      |     |      |     |      |

\*1. A vibration class of V15 indicates a vibration amplitude of 15  $\mu$ m maximum on the Servo Motor without a load at the rated motor speed.

\*2. The shock resistance for shock in the vertical direction when the Servo Motor is mounted with the shaft in a horizontal position is given in the above table.



\*3. The vertical, side-to-side, and front-to-back vibration resistance for vibration in three directions when the Servo Motor is mounted with the shaft in a horizontal position is given in the above table. The strength of the vibration that the Servo Motor can withstand depends on the application. Always check the vibration acceleration rate that is applied to the Servo Motor with the actual equipment.



\*4. If the surrounding air temperature will exceed 40°C, refer to the following section.

🔧 **Applications Where the Surrounding Air Temperature of the Servo Motor Exceeds 40°C (page 75)**

\*5. If the altitude will exceed 1,000 m, refer to the following section.

🔧 **Applications Where the Altitude of the Servo Motor Exceeds 1,000 m (page 76)**

\*6. If you use this combination, performance may not be as good, e.g., the control gain may not increase, in comparison with using a Sigma-7 Single Axis SERVOPACK.

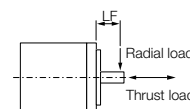
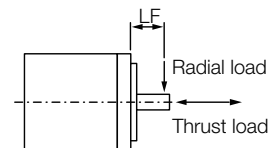
## Ratings of Servo Motors (400 V Models -02D to -15D)

| Voltage                                                          |                                                                          |             | 400 V                               |                    |                    |                    |                    |
|------------------------------------------------------------------|--------------------------------------------------------------------------|-------------|-------------------------------------|--------------------|--------------------|--------------------|--------------------|
| Model SGM7A-                                                     |                                                                          |             | 02D                                 | 04D                | 08D                | 10D                | 15D                |
| Rated Output* <sup>1</sup>                                       | W                                                                        |             | 200                                 | 400                | 750                | 1000               | 1500               |
| Rated Torque* <sup>1, *2</sup>                                   | N•m                                                                      |             | 0.637                               | 1.27               | 2.39               | 3.18               | 4.90               |
| Instantaneous Maximum Torque* <sup>1</sup>                       | N•m                                                                      |             | 2.23                                | 4.46               | 8.36               | 11.1               | 14.7               |
| Rated Current* <sup>1</sup>                                      | Arms                                                                     |             | 1.2                                 | 1.2                | 2.2                | 3.2                | 4.7                |
| Instantaneous Maximum Current* <sup>1</sup>                      | Arms                                                                     |             | 5.1                                 | 4.9                | 8.5                | 12                 | 14                 |
| Rated Motor Speed* <sup>1</sup>                                  | min <sup>-1</sup>                                                        |             | 3000                                |                    |                    |                    |                    |
| Maximum Motor Speed* <sup>1</sup>                                | min <sup>-1</sup>                                                        |             | 6000* <sup>6</sup>                  |                    |                    |                    |                    |
| Torque Constant                                                  | N•m/Arms                                                                 |             | 0.556                               | 1.11               | 1.16               | 1.07               | 1.23               |
| Motor Moment of Inertia                                          | ×10 <sup>-4</sup> kg•m <sup>2</sup>                                      |             | 0.139<br>(0.209)                    | 0.216<br>(0.286)   | 0.775<br>(0.955)   | 0.971<br>(1.15)    | 2.00<br>(2.25)     |
| Rated Power Rate* <sup>1</sup>                                   | kW/s                                                                     |             | 29.2<br>(19.4)                      | 74.7<br>(56.3)     | 73.7<br>(59.8)     | 104<br>(87.9)      | 120<br>(106)       |
| Rated Angular Acceleration Rate* <sup>1</sup>                    | rad/s <sup>2</sup>                                                       |             | 45,800<br>(30,400)                  | 58,700<br>(44,400) | 30,800<br>(25,000) | 32,700<br>(27,600) | 24,500<br>(21,700) |
| Derating Rate for Servo Motor with Oil Seal                      | %                                                                        |             | -                                   |                    |                    | 95                 | 100                |
| Heat Sink Size (Aluminum)                                        | mm                                                                       |             | 250 × 250 × 6                       |                    |                    | 300 × 300 × 12     |                    |
| Protective Structure* <sup>3</sup>                               |                                                                          |             | Totally enclosed, self-cooled, IP67 |                    |                    |                    |                    |
| Holding Brake Specifications* <sup>4</sup>                       | Rated Voltage                                                            | V           | 24 VDC±10%                          |                    |                    |                    |                    |
|                                                                  | Capacity                                                                 | W           | 6.0                                 |                    | 6.5                |                    | 12                 |
|                                                                  | Holding Torque                                                           | N•m         | 0.637                               | 1.27               | 2.39               | 3.18               | 7.84               |
|                                                                  | Coil Resistance                                                          | Ω (at 20°C) | 96±10%                              |                    | 88.6±10%           |                    | 48±10%             |
|                                                                  | Rated Current                                                            | A (at 20°C) | 0.25                                |                    | 0.27               |                    | 0.5                |
|                                                                  | Time Required to Release Brake                                           | ms          | 60                                  |                    | 80                 |                    | 170                |
|                                                                  | Time Required to Brake                                                   | ms          | 100                                 |                    |                    |                    |                    |
| Allowable Load Moment of Inertia (Motor Moment of Inertia Ratio) | Standard                                                                 |             | 30 times                            | 20 times           |                    | 10 times           |                    |
|                                                                  | With external regenerative resistor and dynamic brake resistor connected |             | 30 times                            | 20 times           | 30 times           |                    | 20 times           |
| Allowable Shaft Loads* <sup>5</sup>                              | LF                                                                       | mm          | 25                                  |                    | 35                 |                    | 45                 |
|                                                                  | Allowable Radial Load                                                    | N           | 245                                 |                    | 392                |                    | 686                |
|                                                                  | Allowable Thrust Load                                                    | N           | 74                                  |                    | 147                |                    | 196                |



Note: The values in parentheses are for Servo Motors with Holding Brakes.

- \*1. For the SGM7A-02D to SGM7A-10D, these values are for operation in combination with a SERVOPACK when the temperature of the armature winding is 100°C. The values for other items are at 20°C. For the SGM7A-15D to SGM7A-30D, these values are for operation in combination with a SERVOPACK when the temperature of the armature winding is 20°C. These are typical values.
- \*2. The rated torques are the continuous allowable torque values at a surrounding air temperature of 40°C with an aluminum heat sink of the dimensions given in the table.
- \*3. This does not apply to the shaft opening. Protective structure specifications apply only when the special cable is used.
- \*4. Observe the following precautions if you use a Servomotor with a Holding Brake.
  - The holding brake cannot be used to stop the Servomotor.
  - The time required to release the brake and the time required to brake depend on which discharge circuit is used. Confirm that the operation delay time is appropriate for the actual equipment.
  - The 24-VDC power supply is not provided by YASKAWA.
- \*5. The allowable shaft loads are illustrated in the following figure. Design the mechanical system so that the thrust and radial loads applied to the Servomotor shaft end during operation do not exceed the values given in the table
- \*6. For the SGM7A-25D, the maximum motor speed for the continuous duty zone is 5,000 min<sup>-1</sup>. Use the Servomotor within the continuous duty zone for the average motor speed and effective torque.



## Ratings of Servo Motors (400 V Models -20D to -70D)

| Voltage                                                          |                                                                          |                                     | 400 V                               |                    |                    |                    |                    |          |                                                                      |
|------------------------------------------------------------------|--------------------------------------------------------------------------|-------------------------------------|-------------------------------------|--------------------|--------------------|--------------------|--------------------|----------|----------------------------------------------------------------------|
| Model SGM7A-                                                     |                                                                          |                                     | 20D                                 | 25D                | 30D                | 40D                | 50D                | 70D      |                                                                      |
| Rated Output* <sup>1</sup>                                       |                                                                          | W                                   | 2000                                | 2500               | 3000               | 4000               | 5000               | 7000     |                                                                      |
| Rated Torque* <sup>1, *2</sup>                                   |                                                                          | N•m                                 | 6.36                                | 7.96               | 9.80               | 12.6               | 15.8               | 22.3     |                                                                      |
| Instantaneous Maximum Torque* <sup>1</sup>                       |                                                                          | N•m                                 | 19.1                                | 23.9               | 29.4               | 37.8               | 47.6               | 54.0     |                                                                      |
| Rated Current* <sup>1</sup>                                      |                                                                          | Arms                                | 6.1                                 | 7.4                | 8.9                | 12.5               | 13.8               | 19.2     |                                                                      |
| Instantaneous Maximum Current* <sup>1</sup>                      |                                                                          | Arms                                | 20                                  | 25                 | 28                 | 38                 | 42                 | 52.5     |                                                                      |
| Rated Motor Speed* <sup>1</sup>                                  |                                                                          | min <sup>-1</sup>                   | 3000                                |                    |                    |                    |                    |          |                                                                      |
| Maximum Motor Speed* <sup>1</sup>                                |                                                                          | min <sup>-1</sup>                   | 6000* <sup>6</sup>                  |                    |                    |                    |                    |          |                                                                      |
| Torque Constant                                                  |                                                                          | N•m/Arms                            | 1.18                                | 1.15               | 1.16               | 1.06               | 1.21               | 1.21     |                                                                      |
| Motor Moment of Inertia                                          |                                                                          | ×10 <sup>-4</sup> kg•m <sup>2</sup> | 2.47<br>(2.72)                      | 3.19<br>(3.44)     | 7.00<br>(9.20)     | 9.60<br>(11.8)     | 12.3<br>(14.5)     | 12.3     |                                                                      |
| Rated Power Rate* <sup>1</sup>                                   |                                                                          | kW/s                                | 164<br>(148)                        | 199<br>(184)       | 137<br>(104)       | 165<br>(134)       | 203<br>(172)       | 404      |                                                                      |
| Rated Angular Acceleration Rate* <sup>1</sup>                    |                                                                          | rad/s <sup>2</sup>                  | 25,700<br>(23,300)                  | 24,900<br>(23,100) | 14,000<br>(10,600) | 13,100<br>(10,600) | 12,800<br>(10,800) | 18100    |                                                                      |
| Derating Rate for Servo Motor with Oil Seal                      |                                                                          | %                                   | 100                                 |                    |                    |                    |                    |          |                                                                      |
| Heat Sink Size (Aluminum)                                        |                                                                          | mm                                  | 300 × 300 × 12                      |                    |                    | 400 × 400 × 20     |                    |          |                                                                      |
| Protective Structure* <sup>3</sup>                               |                                                                          |                                     | Totally enclosed, self-cooled, IP67 |                    |                    |                    |                    |          | Totally enclosed, separately cooled, (with fan), IP22 cooled (w/fan) |
| Holding Brake Specifications* <sup>4</sup>                       | Rated Voltage                                                            | V                                   | 24 VDC±10%                          |                    |                    |                    |                    |          | -                                                                    |
|                                                                  | Capacity                                                                 | W                                   | 12                                  |                    |                    | 10                 |                    |          | -                                                                    |
|                                                                  | Holding Torque                                                           | N•m                                 | 7.84                                | 10                 | 20                 |                    |                    | -        |                                                                      |
|                                                                  | Coil Resistance                                                          | Ω (at 20°C)                         | 48±10%                              |                    |                    | 59                 |                    |          | -                                                                    |
|                                                                  | Rated Current                                                            | A (at 20°C)                         | 0.5                                 |                    |                    | 0.41               |                    |          | -                                                                    |
|                                                                  | Time Required to Release Brake                                           | ms                                  | 170                                 |                    |                    | 100                |                    |          | -                                                                    |
|                                                                  | Time Required to Brake                                                   | ms                                  | 80                                  |                    |                    |                    |                    |          | -                                                                    |
| Allowable Load Moment of Inertia (Motor Moment of Inertia Ratio) | Standard                                                                 |                                     | 10 times                            |                    | 5 times            |                    |                    | 15 times |                                                                      |
|                                                                  | With external regenerative resistor and dynamic brake resistor connected |                                     | 20 times                            |                    | 15 times           |                    |                    |          |                                                                      |
| Allowable Shaft Loads* <sup>5</sup>                              | LF                                                                       | mm                                  | 45                                  |                    | 63                 |                    |                    |          |                                                                      |
|                                                                  | Allowable Radial Load                                                    | N                                   | 686                                 |                    | 890                | 1176               |                    |          |                                                                      |
|                                                                  | Allowable Thrust Load                                                    | N                                   | 196                                 |                    | 392                |                    |                    |          |                                                                      |

Note: The values in parentheses are for Servo Motors with Holding Brakes.

\*1. For the SGM7A-02D to SGM7A-10D, these values are for operation in combination with a SERVOPACK when the temperature of the armature winding is 100°C. The values for other items are at 20°C. For the SGM7A-15D to SGM7A-30D, these values are for operation in combination with a SERVOPACK when the temperature of the armature winding is 20°C. These are typical values.

\*2. The rated torques are the continuous allowable torque values at a surrounding air temperature of 40°C with an aluminum heat sink of the dimensions given in the table.

\*3. This does not apply to the shaft opening. Protective structure specifications apply only when the special cable is used.

\*4. Observe the following precautions if you use a Servomotor with a Holding Brake.

- The holding brake cannot be used to stop the Servomotor.
- The time required to release the brake and the time required to brake depend on which discharge circuit is used. Confirm that the operation delay time is appropriate for the actual equipment.
- The 24-VDC power supply is not provided by YASKAWA.

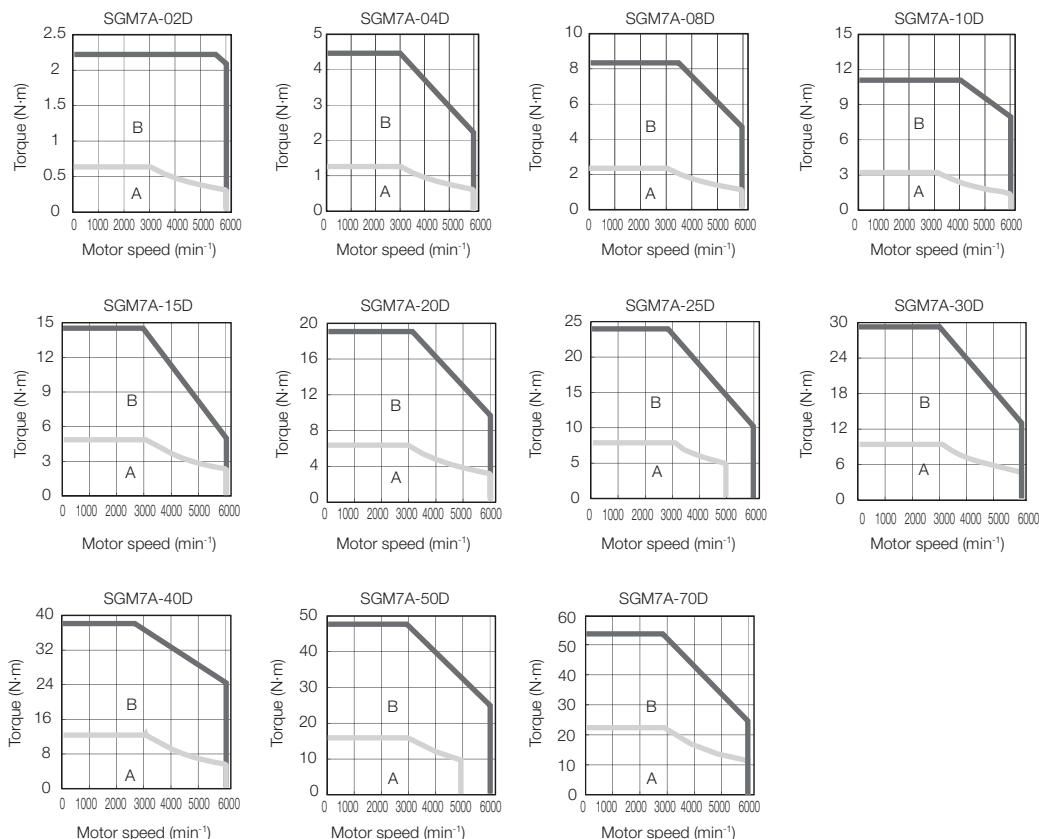
\*5. The allowable shaft loads are illustrated in the following figure. Design the mechanical system so that the thrust and radial loads applied to the Servomotor shaft end during operation do not exceed the values given in the table

\*6. For the SGM7A-25D, the maximum motor speed for the continuous duty zone is 5,000 min<sup>-1</sup>. Use the Servomotor within the continuous duty zone for the average motor speed and effective torque.

## Torque-Motor Speed Characteristics (400V Models)

**A** : Continuous duty zone

**B** : Intermittent duty zone



Note: 1. For the SGM7A-02D to SGM7A-10D, these values are for operation in combination with a SERVOPACK when the temperature of the armature winding is 100°C. For the SGM7A-15D to SGM7A-30D, these values are for operation in combination with a SERVOPACK when the temperature of the armature winding is 20°C. These are typical values.

2. The characteristics in the intermittent duty zone depend on the power supply voltage. The intermittent duty zones in the graphs show the characteristics when a three-phase, 400-VAC power supply voltage is used..
3. If the effective torque is within the allowable range for the rated torque, the Servomotor can be used within the intermittent duty zone.
4. If you use a Servomotor Main Circuit Cable that exceeds 20 m, the intermittent duty zone in the torque-motor speed characteristics will become smaller because the voltage drop increases.

## Ratings of Gear Motors (200 V Models: Abs. Encoder with Battery)

| Gear Motor Model Number S7A ____ | Base Servo Motor Model SGM7A- | Gear Ratio | Gear-ing Effi-ciency % <sup>1</sup> | Rated Speed (RPM) | Max Speed (RPM)   | Rated Torque (Nm) <sup>*2</sup> | Peak Torque (Nm) <sup>*2</sup> | Motor Inertia (x10 <sup>-4</sup> kg-m <sup>2</sup> ) | Gearhead Inertia (x10 <sup>-4</sup> kg-m <sup>2</sup> ) | Allow-able Radial Load (N) | Allow-able Axial Load (N) | Back-lash (arc-min) | Class |   |   |   |   |   |   |   |   |
|----------------------------------|-------------------------------|------------|-------------------------------------|-------------------|-------------------|---------------------------------|--------------------------------|------------------------------------------------------|---------------------------------------------------------|----------------------------|---------------------------|---------------------|-------|---|---|---|---|---|---|---|---|
| 01A□-VL050-03                    | 01A7D6□                       | 3:1        | 95                                  | 1000              | 2000              | 0.906                           | 3.16                           | 0.0337 (0.0447)                                      | 0.053                                                   | 240                        | 270                       | 5                   | IP65  |   |   |   |   |   |   |   |   |
| 01A□-VL050-05                    |                               | 5:1        |                                     | 600               | 1200              | 1.51                            | 5.27                           |                                                      | 0.036                                                   | 290                        | 330                       |                     |       |   |   |   |   |   |   |   |   |
| 01A□-VL050-10                    |                               | 10:1       |                                     | 300               | 600               | 3.02                            | 10.5                           |                                                      | 0.030                                                   | 360                        | 450                       |                     |       |   |   |   |   |   |   |   |   |
| 01A□-VL050-25                    |                               | 25:1       | 90                                  | 120               | 240               | 7.16                            | 18.0 <sup>*3</sup>             |                                                      | 0.034                                                   | 490                        | 640                       | 7                   |       |   |   |   |   |   |   |   |   |
| 01A□-VL070-50                    |                               | 50:1       |                                     | 60                | 120               | 14.3                            | 50.0                           |                                                      | 0.051                                                   | 1100                       | 1100                      |                     |       |   |   |   |   |   |   |   |   |
| 02A□-VL050-03                    | 02A7D6□                       | 3:1        | 95                                  | 1000              | 2000              | 1.82                            | 6.36                           | 0.139 (0.209)                                        | 0.17                                                    | 240                        | 270                       | 5                   |       |   |   |   |   |   |   |   |   |
| 02A□-VL050-05                    |                               | 5:1        |                                     | 600               | 1200              | 3.03                            | 10.6                           |                                                      | 0.15                                                    | 290                        | 330                       |                     |       |   |   |   |   |   |   |   |   |
| 02A□-VL070-10                    |                               | 10:1       |                                     | 300               | 600               | 6.06                            | 21.2                           |                                                      | 0.17                                                    | 640                        | 530                       |                     |       |   |   |   |   |   |   |   |   |
| 02A□-VL070-25                    |                               | 25:1       | 90                                  | 120               | 240               | 14.3                            | 50.0 <sup>*3</sup>             |                                                      | 0.17                                                    | 870                        | 790                       |                     |       |   |   |   |   |   |   |   |   |
| 02A□-VL070-50                    |                               | 50:1       |                                     | 60                | 120               | 27.0 <sup>*3</sup>              | 50.0 <sup>*3</sup>             |                                                      | 0.16                                                    | 1100                       | 1100                      |                     |       |   |   |   |   |   |   |   |   |
| 04A□-VL050-03                    | 04A7D6□                       | 3:1        | 95                                  | 1000              | 2000              | 3.62                            | 12.7                           | 0.216 (0.286)                                        | 0.17                                                    | 240                        | 270                       |                     |       | 5 |   |   |   |   |   |   |   |
| 04A□-VL050-05                    |                               | 5:1        |                                     | 600               | 1200              | 6.03                            | 18.0 <sup>*3</sup>             |                                                      | 0.15                                                    | 290                        | 330                       |                     |       |   |   |   |   |   |   |   |   |
| 04A□-VL070-10                    |                               | 10:1       |                                     | 300               | 600               | 12.1                            | 35.0 <sup>*3</sup>             |                                                      | 0.17                                                    | 640                        | 530                       |                     |       |   |   |   |   |   |   |   |   |
| 04A□-VL070-25                    |                               | 25:1       | 90                                  | 120               | 240               | 27.0 <sup>*3</sup>              | 50.0 <sup>*3</sup>             |                                                      | 0.17                                                    | 870                        | 790                       |                     |       |   |   |   |   |   |   |   |   |
| 04A□-VL090-50                    |                               | 50:1       |                                     | 60                | 120               | 57.2                            | 125 <sup>*3</sup>              |                                                      | 0.27                                                    | 2100                       | 2200                      |                     |       |   |   |   |   |   |   |   |   |
| 08A□-VL070-03                    | 08A7D6□                       | 3:1        | 95                                  | 1000              | 2000              | 6.81                            | 23.8                           | 0.775 (0.955)                                        | 0.53                                                    | 430                        | 310                       |                     |       |   | 5 |   |   |   |   |   |   |
| 08A□-VL070-05                    |                               | 5:1        |                                     | 600               | 1200              | 11.4                            | 39.7                           |                                                      | 0.46                                                    | 510                        | 390                       |                     |       |   |   |   |   |   |   |   |   |
| 08A□-VL090-10                    |                               | 10:1       |                                     | 300               | 600               | 22.7                            | 79.4                           |                                                      | 0.70                                                    | 1200                       | 1600                      |                     |       |   |   |   |   |   |   |   |   |
| 08A□-VL090-25                    |                               | 25:1       | 90                                  | 120               | 240               | 53.8                            | 125 <sup>*3</sup>              |                                                      | 0.74                                                    | 1600                       | 2200                      |                     |       |   |   |   |   |   |   |   |   |
| 08A□-VL120-50                    |                               | 50:1       |                                     | 60                | 120               | 108                             | 330 <sup>*3</sup>              |                                                      | 0.76                                                    | 3400                       | 3900                      |                     |       |   |   |   |   |   |   |   |   |
| 10A□-VL070-03                    | 10A7D6□                       | 3:1        | 95                                  | 1000              | 2000              | 9.06                            | 31.6                           | 0.971 (1.15)                                         | 0.53                                                    | 430                        | 310                       |                     |       |   |   | 5 |   |   |   |   |   |
| 10A□-VL070-05                    |                               | 5:1        |                                     | 600               | 1200              | 15.1                            | 50.0 <sup>*3</sup>             |                                                      | 0.46                                                    | 510                        | 390                       |                     |       |   |   |   |   |   |   |   |   |
| 10A□-VL090-10                    |                               | 10:1       |                                     | 300               | 600               | 30.2                            | 80.0 <sup>*3</sup>             |                                                      | 0.70                                                    | 1200                       | 1600                      |                     |       |   |   |   |   |   |   |   |   |
| 10A□-VL090-25                    |                               | 25:1       | 90                                  | 120               | 240               | 71.6                            | 125 <sup>*3</sup>              |                                                      | 0.74                                                    | 1600                       | 2200                      |                     |       |   |   |   |   |   |   |   |   |
| 10A□-VL120-50                    |                               | 50:1       |                                     | 60                | 120               | 143                             | 330 <sup>*3</sup>              |                                                      | 0.76                                                    | 3400                       | 3900                      |                     |       |   |   |   |   |   |   |   |   |
| 15A□-VL090-03                    | 15A7D6□                       | 3:1        | 95                                  | 1000              | 2000              | 14.0                            | 41.9                           | 2.00 (2.25)                                          | 2.9                                                     | 810                        | 930                       |                     |       |   |   |   | 5 |   |   |   |   |
| 15A□-VL090-05                    |                               | 5:1        |                                     | 600               | 1200              | 23.3                            | 69.8                           |                                                      | 2.6                                                     | 960                        | 1200                      |                     |       |   |   |   |   |   |   |   |   |
| 15A□-VL090-10                    |                               | 10:1       |                                     | 300               | 600               | 46.6                            | 80 <sup>*3</sup>               |                                                      | 2.5                                                     | 1200                       | 1600                      |                     |       |   |   |   |   |   |   |   |   |
| 15A□-VL120-25                    |                               | 25:1       | 90                                  | 120               | 240               | 110                             | 330 <sup>*3</sup>              |                                                      | 2.8                                                     | 2700                       | 3700                      |                     |       |   |   |   |   |   |   |   |   |
| 15A□-VL120-50                    |                               | 50:1       |                                     | 60                | 120               | 180 <sup>*3</sup>               | 330 <sup>*3</sup>              |                                                      | 2.5                                                     | 3400                       | 3900                      |                     |       |   |   |   |   |   |   |   |   |
| 20A□-VL090-03                    | 20A7D6□                       | 3:1        | 95                                  | 1000              | 2000              | 18.1                            | 54.4                           | 2.47 (2.72)                                          | 2.9                                                     | 810                        | 930                       |                     |       |   |   |   |   | 5 |   |   |   |
| 20A□-VL090-05                    |                               | 5:1        |                                     | 600               | 1200              | 30.2                            | 90.7                           |                                                      | 2.6                                                     | 960                        | 1200                      |                     |       |   |   |   |   |   |   |   |   |
| 20A□-VL120-10                    |                               | 10:1       |                                     | 300               | 600               | 60.4                            | 181                            |                                                      | 2.6                                                     | 2000                       | 2500                      |                     |       |   |   |   |   |   |   |   |   |
| 20A□-VL120-25                    |                               | 25:1       | 90                                  | 120               | 240               | 143 <sup>*3</sup>               | 330 <sup>*3</sup>              |                                                      | 2.8                                                     | 2700                       | 3700                      |                     |       |   |   |   |   |   |   |   |   |
| 20A□-VL155-50                    |                               | 50:1       |                                     | 40 <sup>*3</sup>  | 80 <sup>*3</sup>  | 286 <sup>*3</sup>               | 700 <sup>*3</sup>              |                                                      | 2.8                                                     | 8100                       | 8200                      |                     |       |   |   |   |   |   |   |   |   |
| 25A□-VL090-03                    | 25A7D6□                       | 3:1        | 95                                  | 1000              | 2000              | 22.7                            | 68.1                           | 3.19 (3.44)                                          | 2.9                                                     | 810                        | 930                       |                     |       |   |   |   |   |   | 5 |   |   |
| 25A□-VL090-05                    |                               | 5:1        |                                     | 600               | 1200              | 37.8                            | 114                            |                                                      | 2.6                                                     | 960                        | 1200                      |                     |       |   |   |   |   |   |   |   |   |
| 25A□-VL120-10                    |                               | 10:1       |                                     | 300               | 600               | 75.6                            | 225                            |                                                      | 2.6                                                     | 2000                       | 2500                      |                     |       |   |   |   |   |   |   |   |   |
| 25A□-VL120-25                    |                               | 25:1       | 90                                  | 120               | 240               | 179 <sup>*3</sup>               | 330 <sup>*3</sup>              |                                                      | 2.8                                                     | 2700                       | 3700                      |                     |       |   |   |   |   |   |   |   |   |
| 25A□-VL155-50                    |                               | 50:1       |                                     | 40 <sup>*3</sup>  | 80 <sup>*3</sup>  | 358 <sup>*3</sup>               | 700 <sup>*3</sup>              |                                                      | 2.8                                                     | 8100                       | 8200                      |                     |       |   |   |   |   |   |   |   |   |
| 30A□-VL090-03                    | 30A7D6□                       | 3:1        | 95                                  | 1000              | 2000              | 27.9                            | 80.0 <sup>*3</sup>             | 7.00 (9.20)                                          | 2.9                                                     | 810                        | 930                       |                     |       |   |   |   |   |   |   | 5 |   |
| 30A□-VL090-05                    |                               | 5:1        |                                     | 600               | 1200              | 46.6                            | 125 <sup>*3</sup>              |                                                      | 2.6                                                     | 960                        | 1200                      |                     |       |   |   |   |   |   |   |   |   |
| 30A□-VL120-10                    |                               | 10:1       |                                     | 300               | 600               | 93.1                            | 225 <sup>*3</sup>              |                                                      | 2.6                                                     | 2000                       | 2500                      |                     |       |   |   |   |   |   |   |   |   |
| 30A□-VL120-25                    |                               | 25:1       | 90                                  | 120               | 240               | 180 <sup>*3</sup>               | 330 <sup>*3</sup>              |                                                      | 2.8                                                     | 2700                       | 3700                      |                     |       |   |   |   |   |   |   |   |   |
| 30A□-VL155-50                    |                               | 50:1       |                                     | 40 <sup>*3</sup>  | 80 <sup>*3</sup>  | 360 <sup>*3</sup>               | 700 <sup>*3</sup>              |                                                      | 2.8                                                     | 8100                       | 8200                      |                     |       |   |   |   |   |   |   |   |   |
| 40A□-VL090-03                    | 40A7D6□                       | 3:1        | 95                                  | 1000              | 2000              | 35.9                            | 80.0 <sup>*3</sup>             | 9.60 (11.80)                                         | 2.9                                                     | 810                        | 930                       |                     |       |   |   |   |   |   |   |   | 5 |
| 40A□-VL090-05                    |                               | 5:1        |                                     | 600               | 1200              | 59.9                            | 125 <sup>*3</sup>              |                                                      | 2.6                                                     | 960                        | 1200                      |                     |       |   |   |   |   |   |   |   |   |
| 40A□-VL120-10                    |                               | 10:1       |                                     | 300               | 600               | 120                             | 225 <sup>*3</sup>              |                                                      | 2.6                                                     | 2000                       | 2500                      |                     |       |   |   |   |   |   |   |   |   |
| 40A□-VL155-25                    |                               | 25:1       | 90                                  | 80 <sup>*3</sup>  | 160 <sup>*3</sup> | 284                             | 700 <sup>*3</sup>              |                                                      | 4.1                                                     | 6400                       | 6100                      |                     |       |   |   |   |   |   |   |   |   |
| 40A□-VL205-50                    |                               | 50:1       |                                     | 30 <sup>*3</sup>  | 60 <sup>*3</sup>  | 567                             | 1400 <sup>*3</sup>             |                                                      | 3.8                                                     | 14000                      | 14000                     |                     |       |   |   |   |   |   |   |   |   |

| Gear Motor Model Number S7A_____ | Base Servo Motor Model SGM7A- | Gear Ratio | Gearing Efficiency *1 | Rated Speed (RPM) | Max Speed (RPM)   | Rated Torque (Nm)*2 | Peak Torque (Nm)*2 | Motor Inertia (x10 <sup>-4</sup> kg-m <sup>2</sup> ) | Gearhead Inertia (x10 <sup>-4</sup> kg-m <sup>2</sup> ) | Allowable Radial Load (N) | Allowable Axial Load (N) | Backlash (arc-min) | Class |
|----------------------------------|-------------------------------|------------|-----------------------|-------------------|-------------------|---------------------|--------------------|------------------------------------------------------|---------------------------------------------------------|---------------------------|--------------------------|--------------------|-------|
| 50A□-VL090-03                    | 50A7D6□                       | 3:1        | 95                    | 1000              | 2000              | 45.0                | 80 <sup>*3</sup>   | 12.30 (14.50)                                        | 2.9                                                     | 810                       | 930                      | 5                  | IP65  |
| 50A□-VL090-05                    |                               | 5:1        |                       | 600               | 1200              | 75.0 <sup>*3</sup>  | 125 <sup>*3</sup>  |                                                      | 2.6                                                     | 960                       | 1200                     |                    |       |
| 50A□-VL155-10                    |                               | 10:1       |                       | 200 <sup>*3</sup> | 400 <sup>*3</sup> | 150                 | 452                |                                                      | 3.2                                                     | 4700                      | 4100                     |                    |       |
| 50A□-VL155-25                    |                               | 25:1       | 90                    | 80 <sup>*3</sup>  | 160 <sup>*3</sup> | 356                 | 700 <sup>*3</sup>  |                                                      | 4.1                                                     | 6400                      | 6100                     |                    |       |
| 50A□-VL205-50                    |                               | 50:1       |                       | 30 <sup>*3</sup>  | 60 <sup>*3</sup>  | 711                 | 1400 <sup>*3</sup> |                                                      | 3.8                                                     | 14000                     | 14000                    |                    |       |
| 70A-VL120-03                     | 70A7D61                       | 3:1        | 95                    | 1000              | 2000              | 63.6                | 154                | 12.30                                                | 5.1                                                     | 1300                      | 1500                     |                    |       |
| 70A-VL120-05                     |                               | 5:1        |                       | 600               | 1200              | 106                 | 257                |                                                      | 3.1                                                     | 1600                      | 1900                     |                    |       |
| 70A-VL155-10                     |                               | 10:1       |                       | 200 <sup>*3</sup> | 400 <sup>*3</sup> | 212                 | 470 <sup>*3</sup>  |                                                      | 3.2                                                     | 4700                      | 4100                     |                    |       |
| 70A-VL205-25                     |                               | 25:1       | 90                    | 60 <sup>*3</sup>  | 120 <sup>*3</sup> | 502                 | 1215               |                                                      | 7.9                                                     | 11000                     | 11000                    |                    |       |
| 70A-VL235-50                     |                               | 50:1       | 92                    | 30 <sup>*3</sup>  | 60 <sup>*3</sup>  | 1026                | 2300 <sup>*3</sup> |                                                      | 4.7                                                     | 15000                     | 14000                    |                    |       |

Note: The values in parentheses are for Servo Motors with Holding Brakes (indicated by value of □ in model numbers).

\*1. The gear efficiency depends on operating conditions such as the output torque, motor speed, and temperature.

\*2. The gear motor output torque is expressed by the following formula: Output Torque = (Servo Motor Output Torque) x (Gearing Ratio) x (Gearing Efficiency). The values in the table are typical values for the rated torque, rated motor speed, and a surrounding air temperature of 25°C. They are reference values only.

\*3. The output torque of the gear motor is limited by the mechanical limit of the gear head. Operation above this limit could result in premature failure of the gear motor.



Important

During operation of the gear motor, losses due to inefficiencies of the gearing mechanism are generated. The losses vary as the conditions for gear motor torque and speed change. Temperature rise can vary based on the mechanical inefficiencies and the heat dissipation conditions. For heat dissipation conditions, check the gear and motor temperatures with the actual equipment. If operating temperatures are too high, implement the following measures.

- Decrease the load ratio.
- Change the heat dissipation conditions.
- Use forced-air cooling for the motor with a cooling fan or other means.
- Please refer to "Sigma-7 Gearmotor Temperature Test Data" (document number PN.GearMotors.01) on [yaskawa.com](http://yaskawa.com) for temperature test data.

## Ratings of Batteryless Gear Motors (200 V Models)

| Gear Motor Model Number S7A ____ | Base Servo Motor Model SGM7A- | Gear Ratio | Gear-ing Efficiency % <sup>1</sup> | Rated Speed (RPM) | Max Speed (RPM)   | Rated Torque (Nm) <sup>*2</sup> | Peak Torque (Nm) <sup>*2</sup> | Motor Inertia (x10 <sup>-4</sup> kg-m <sup>2</sup> ) | Gearhead Inertia (x10 <sup>-4</sup> kg-m <sup>2</sup> ) | Allow-able Radial Load (N) | Allow-able Axial Load (N) | Back-lash (arc-min) | Class |   |   |   |   |   |   |   |   |
|----------------------------------|-------------------------------|------------|------------------------------------|-------------------|-------------------|---------------------------------|--------------------------------|------------------------------------------------------|---------------------------------------------------------|----------------------------|---------------------------|---------------------|-------|---|---|---|---|---|---|---|---|
| 01B□-VL050-03                    | 01A6A6□                       | 3:1        | 95                                 | 1000              | 2000              | 0.906                           | 3.16                           | 0.0337 (0.0447)                                      | 0.053                                                   | 240                        | 270                       | 5                   | IP65  |   |   |   |   |   |   |   |   |
| 01B□-VL050-05                    |                               | 5:1        |                                    | 600               | 1200              | 1.51                            | 5.27                           |                                                      | 0.036                                                   | 290                        | 330                       |                     |       |   |   |   |   |   |   |   |   |
| 01B□-VL050-10                    |                               | 10:1       |                                    | 300               | 600               | 3.02                            | 10.5                           |                                                      | 0.030                                                   | 360                        | 450                       |                     |       |   |   |   |   |   |   |   |   |
| 01B□-VL050-25                    |                               | 25:1       | 90                                 | 120               | 240               | 7.16                            | 18.0 <sup>*3</sup>             |                                                      | 0.034                                                   | 490                        | 640                       | 7                   |       |   |   |   |   |   |   |   |   |
| 01B□-VL070-50                    |                               | 50:1       |                                    | 60                | 120               | 14.3                            | 50.0                           |                                                      | 0.051                                                   | 1100                       | 1100                      |                     |       |   |   |   |   |   |   |   |   |
| 02B□-VL050-03                    | 02A6A6□                       | 3:1        | 95                                 | 1000              | 2000              | 1.82                            | 6.36                           | 0.139 (0.209)                                        | 0.17                                                    | 240                        | 270                       | 5                   |       |   |   |   |   |   |   |   |   |
| 02B□-VL050-05                    |                               | 5:1        |                                    | 600               | 1200              | 3.03                            | 10.6                           |                                                      | 0.15                                                    | 290                        | 330                       |                     |       |   |   |   |   |   |   |   |   |
| 02B□-VL070-10                    |                               | 10:1       |                                    | 300               | 600               | 6.06                            | 21.2                           |                                                      | 0.17                                                    | 640                        | 530                       |                     |       |   |   |   |   |   |   |   |   |
| 02B□-VL070-25                    |                               | 25:1       | 90                                 | 120               | 240               | 14.3                            | 50.0 <sup>*3</sup>             |                                                      | 0.17                                                    | 870                        | 790                       |                     |       |   |   |   |   |   |   |   |   |
| 02B□-VL070-50                    |                               | 50:1       |                                    | 60                | 120               | 27.0 <sup>*3</sup>              | 50.0 <sup>*3</sup>             |                                                      | 0.16                                                    | 1100                       | 1100                      |                     |       |   |   |   |   |   |   |   |   |
| 04B□-VL050-03                    | 04A6A6□                       | 3:1        | 95                                 | 1000              | 2000              | 3.62                            | 12.7                           | 0.216 (0.286)                                        | 0.17                                                    | 240                        | 270                       |                     |       | 5 |   |   |   |   |   |   |   |
| 04B□-VL050-05                    |                               | 5:1        |                                    | 600               | 1200              | 6.03                            | 18.0 <sup>*3</sup>             |                                                      | 0.15                                                    | 290                        | 330                       |                     |       |   |   |   |   |   |   |   |   |
| 04B□-VL070-10                    |                               | 10:1       |                                    | 300               | 600               | 12.1                            | 35.0 <sup>*3</sup>             |                                                      | 0.17                                                    | 640                        | 530                       |                     |       |   |   |   |   |   |   |   |   |
| 04B□-VL070-25                    |                               | 25:1       | 90                                 | 120               | 240               | 27.0 <sup>*3</sup>              | 50.0 <sup>*3</sup>             |                                                      | 0.17                                                    | 870                        | 790                       |                     |       |   |   |   |   |   |   |   |   |
| 04B□-VL090-50                    |                               | 50:1       |                                    | 60                | 120               | 57.2                            | 125 <sup>*3</sup>              |                                                      | 0.27                                                    | 2100                       | 2200                      |                     |       |   |   |   |   |   |   |   |   |
| 08B□-VL070-03                    | 08A6A6□                       | 3:1        | 95                                 | 1000              | 2000              | 6.81                            | 23.8                           | 0.775 (0.955)                                        | 0.53                                                    | 430                        | 310                       |                     |       |   | 5 |   |   |   |   |   |   |
| 08B□-VL070-05                    |                               | 5:1        |                                    | 600               | 1200              | 11.4                            | 39.7                           |                                                      | 0.46                                                    | 510                        | 390                       |                     |       |   |   |   |   |   |   |   |   |
| 08B□-VL090-10                    |                               | 10:1       |                                    | 300               | 600               | 22.7                            | 79.4                           |                                                      | 0.70                                                    | 1200                       | 1600                      |                     |       |   |   |   |   |   |   |   |   |
| 08B□-VL090-25                    |                               | 25:1       | 90                                 | 120               | 240               | 53.8                            | 125 <sup>*3</sup>              |                                                      | 0.74                                                    | 1600                       | 2200                      |                     |       |   |   |   |   |   |   |   |   |
| 08B□-VL120-50                    |                               | 50:1       |                                    | 60                | 120               | 108                             | 330 <sup>*3</sup>              |                                                      | 0.76                                                    | 3400                       | 3900                      |                     |       |   |   |   |   |   |   |   |   |
| 10B□-VL070-03                    | 10A6A6□                       | 3:1        | 95                                 | 1000              | 2000              | 9.06                            | 31.6                           | 0.971 (1.15)                                         | 0.53                                                    | 430                        | 310                       |                     |       |   |   | 5 |   |   |   |   |   |
| 10B□-VL070-05                    |                               | 5:1        |                                    | 600               | 1200              | 15.1                            | 50.0 <sup>*3</sup>             |                                                      | 0.46                                                    | 510                        | 390                       |                     |       |   |   |   |   |   |   |   |   |
| 10B□-VL090-10                    |                               | 10:1       |                                    | 300               | 600               | 30.2                            | 80.0 <sup>*3</sup>             |                                                      | 0.70                                                    | 1200                       | 1600                      |                     |       |   |   |   |   |   |   |   |   |
| 10B□-VL090-25                    |                               | 25:1       | 90                                 | 120               | 240               | 71.6                            | 125 <sup>*3</sup>              |                                                      | 0.74                                                    | 1600                       | 2200                      |                     |       |   |   |   |   |   |   |   |   |
| 10B□-VL120-50                    |                               | 50:1       |                                    | 60                | 120               | 143                             | 330 <sup>*3</sup>              |                                                      | 0.76                                                    | 3400                       | 3900                      |                     |       |   |   |   |   |   |   |   |   |
| 15B□-VL090-03                    | 15A6A6□                       | 3:1        | 95                                 | 1000              | 2000              | 14.0                            | 41.9                           | 2.00 (2.25)                                          | 2.9                                                     | 810                        | 930                       |                     |       |   |   |   | 5 |   |   |   |   |
| 15B□-VL090-05                    |                               | 5:1        |                                    | 600               | 1200              | 23.3                            | 69.8                           |                                                      | 2.6                                                     | 960                        | 1200                      |                     |       |   |   |   |   |   |   |   |   |
| 15B□-VL090-10                    |                               | 10:1       |                                    | 300               | 600               | 46.6                            | 80 <sup>*3</sup>               |                                                      | 2.5                                                     | 1200                       | 1600                      |                     |       |   |   |   |   |   |   |   |   |
| 15B□-VL120-25                    |                               | 25:1       | 90                                 | 120               | 240               | 110                             | 330 <sup>*3</sup>              |                                                      | 2.8                                                     | 2700                       | 3700                      |                     |       |   |   |   |   |   |   |   |   |
| 15B□-VL120-50                    |                               | 50:1       |                                    | 60                | 120               | 180 <sup>*3</sup>               | 330 <sup>*3</sup>              |                                                      | 2.5                                                     | 3400                       | 3900                      |                     |       |   |   |   |   |   |   |   |   |
| 20B□-VL090-03                    | 20A6A6□                       | 3:1        | 95                                 | 1000              | 2000              | 18.1                            | 54.4                           | 2.47 (2.72)                                          | 2.9                                                     | 810                        | 930                       |                     |       |   |   |   |   | 5 |   |   |   |
| 20B□-VL090-05                    |                               | 5:1        |                                    | 600               | 1200              | 30.2                            | 90.7                           |                                                      | 2.6                                                     | 960                        | 1200                      |                     |       |   |   |   |   |   |   |   |   |
| 20B□-VL120-10                    |                               | 10:1       |                                    | 300               | 600               | 60.4                            | 181                            |                                                      | 2.6                                                     | 2000                       | 2500                      |                     |       |   |   |   |   |   |   |   |   |
| 20B□-VL120-25                    |                               | 25:1       | 90                                 | 120               | 240               | 143 <sup>*3</sup>               | 330 <sup>*3</sup>              |                                                      | 2.8                                                     | 2700                       | 3700                      |                     |       |   |   |   |   |   |   |   |   |
| 20B□-VL155-50                    |                               | 50:1       |                                    | 40 <sup>*3</sup>  | 80 <sup>*3</sup>  | 286 <sup>*3</sup>               | 700 <sup>*3</sup>              |                                                      | 2.8                                                     | 8100                       | 8200                      |                     |       |   |   |   |   |   |   |   |   |
| 25B□-VL090-03                    | 25A6A6□                       | 3:1        | 95                                 | 1000              | 2000              | 22.7                            | 68.1                           | 3.19 (3.44)                                          | 2.9                                                     | 810                        | 930                       |                     |       |   |   |   |   |   | 5 |   |   |
| 25B□-VL090-05                    |                               | 5:1        |                                    | 600               | 1200              | 37.8                            | 114                            |                                                      | 2.6                                                     | 960                        | 1200                      |                     |       |   |   |   |   |   |   |   |   |
| 25B□-VL120-10                    |                               | 10:1       |                                    | 300               | 600               | 75.6                            | 225                            |                                                      | 2.6                                                     | 2000                       | 2500                      |                     |       |   |   |   |   |   |   |   |   |
| 25B□-VL120-25                    |                               | 25:1       | 90                                 | 120               | 240               | 179 <sup>*3</sup>               | 330 <sup>*3</sup>              |                                                      | 2.8                                                     | 2700                       | 3700                      |                     |       |   |   |   |   |   |   |   |   |
| 25B□-VL155-50                    |                               | 50:1       |                                    | 40 <sup>*3</sup>  | 80 <sup>*3</sup>  | 358 <sup>*3</sup>               | 700 <sup>*3</sup>              |                                                      | 2.8                                                     | 8100                       | 8200                      |                     |       |   |   |   |   |   |   |   |   |
| 30B□-VL090-03                    | 30A6A6□                       | 3:1        | 95                                 | 1000              | 2000              | 27.9                            | 80.0 <sup>*3</sup>             | 7.00 (9.20)                                          | 2.9                                                     | 810                        | 930                       |                     |       |   |   |   |   |   |   | 5 |   |
| 30B□-VL090-05                    |                               | 5:1        |                                    | 600               | 1200              | 46.6                            | 125 <sup>*3</sup>              |                                                      | 2.6                                                     | 960                        | 1200                      |                     |       |   |   |   |   |   |   |   |   |
| 30B□-VL120-10                    |                               | 10:1       |                                    | 300               | 600               | 93.1                            | 225 <sup>*3</sup>              |                                                      | 2.6                                                     | 2000                       | 2500                      |                     |       |   |   |   |   |   |   |   |   |
| 30B□-VL120-25                    |                               | 25:1       | 90                                 | 120               | 240               | 180 <sup>*3</sup>               | 330 <sup>*3</sup>              |                                                      | 2.8                                                     | 2700                       | 3700                      |                     |       |   |   |   |   |   |   |   |   |
| 30B□-VL155-50                    |                               | 50:1       |                                    | 40 <sup>*3</sup>  | 80 <sup>*3</sup>  | 360 <sup>*3</sup>               | 700 <sup>*3</sup>              |                                                      | 2.8                                                     | 8100                       | 8200                      |                     |       |   |   |   |   |   |   |   |   |
| 40B□-VL090-03                    | 40A6A6□                       | 3:1        | 95                                 | 1000              | 2000              | 35.9                            | 80.0 <sup>*3</sup>             | 9.60 (11.80)                                         | 2.9                                                     | 810                        | 930                       |                     |       |   |   |   |   |   |   |   | 5 |
| 40B□-VL090-05                    |                               | 5:1        |                                    | 600               | 1200              | 59.9                            | 125 <sup>*3</sup>              |                                                      | 2.6                                                     | 960                        | 1200                      |                     |       |   |   |   |   |   |   |   |   |
| 40B□-VL120-10                    |                               | 10:1       |                                    | 300               | 600               | 120                             | 225 <sup>*3</sup>              |                                                      | 2.6                                                     | 2000                       | 2500                      |                     |       |   |   |   |   |   |   |   |   |
| 40B□-VL155-25                    |                               | 25:1       | 90                                 | 80 <sup>*3</sup>  | 160 <sup>*3</sup> | 284                             | 700 <sup>*3</sup>              |                                                      | 4.1                                                     | 6400                       | 6100                      |                     |       |   |   |   |   |   |   |   |   |
| 40B□-VL205-50                    |                               | 50:1       |                                    | 30 <sup>*3</sup>  | 60 <sup>*3</sup>  | 567                             | 1400 <sup>*3</sup>             |                                                      | 3.8                                                     | 14000                      | 14000                     |                     |       |   |   |   |   |   |   |   |   |

| Gear Motor Model Number S7A_____ | Base Servo Motor Model SGM7A- | Gear Ratio | Gearing Efficiency <sup>*1</sup> | Rated Speed (RPM) | Max Speed (RPM)   | Rated Torque (Nm) <sup>*2</sup> | Peak Torque (Nm) <sup>*2</sup> | Motor Inertia (x10 <sup>-4</sup> kg-m <sup>2</sup> ) | Gearhead Inertia (x10 <sup>-4</sup> kg-m <sup>2</sup> ) | Allowable Radial Load (N) | Allowable Axial Load (N) | Backlash (arc-min) | Class |
|----------------------------------|-------------------------------|------------|----------------------------------|-------------------|-------------------|---------------------------------|--------------------------------|------------------------------------------------------|---------------------------------------------------------|---------------------------|--------------------------|--------------------|-------|
| 50B□-VL090-03                    | 50A6A6□                       | 3:1        | 95                               | 1000              | 2000              | 45.0                            | 80 <sup>*3</sup>               | 12.30 (14.50)                                        | 2.9                                                     | 810                       | 930                      | 5                  | IP65  |
| 50B□-VL090-05                    |                               | 5:1        |                                  | 600               | 1200              | 75.0 <sup>*3</sup>              | 125 <sup>*3</sup>              |                                                      | 2.6                                                     | 960                       | 1200                     |                    |       |
| 50B□-VL155-10                    |                               | 10:1       |                                  | 200 <sup>*3</sup> | 400 <sup>*3</sup> | 150                             | 452                            |                                                      | 3.2                                                     | 4700                      | 4100                     |                    |       |
| 50B□-VL155-25                    |                               | 25:1       | 90                               | 80 <sup>*3</sup>  | 160 <sup>*3</sup> | 356                             | 700 <sup>*3</sup>              |                                                      | 4.1                                                     | 6400                      | 6100                     |                    |       |
| 50B□-VL205-50                    |                               | 50:1       |                                  | 30 <sup>*3</sup>  | 60 <sup>*3</sup>  | 711                             | 1400 <sup>*3</sup>             |                                                      | 3.8                                                     | 14000                     | 14000                    |                    |       |
| 70B-VL120-03                     | 70A6A61                       | 3:1        | 95                               | 1000              | 2000              | 63.6                            | 154                            | 12.30                                                | 5.1                                                     | 1300                      | 1500                     |                    |       |
| 70B-VL120-05                     |                               | 5:1        |                                  | 600               | 1200              | 106                             | 257                            |                                                      | 3.1                                                     | 1600                      | 1900                     |                    |       |
| 70B-VL155-10                     |                               | 10:1       |                                  | 200 <sup>*3</sup> | 400 <sup>*3</sup> | 212                             | 470 <sup>*3</sup>              |                                                      | 3.2                                                     | 4700                      | 4100                     |                    |       |
| 70B-VL205-25                     |                               | 25:1       | 90                               | 60 <sup>*3</sup>  | 120 <sup>*3</sup> | 502                             | 1215                           |                                                      | 7.9                                                     | 11000                     | 11000                    |                    |       |
| 70B-VL235-50                     |                               | 50:1       | 92                               | 30 <sup>*3</sup>  | 60 <sup>*3</sup>  | 1026                            | 2300 <sup>*3</sup>             |                                                      | 4.7                                                     | 15000                     | 14000                    |                    |       |

Note: The values in parentheses are for Servo Motors with Holding Brakes (indicated by value of □ in model numbers).

\*1. The gear efficiency depends on operating conditions such as the output torque, motor speed, and temperature.

\*2. The gear motor output torque is expressed by the following formula: Output Torque = (Servo Motor Output Torque) x (Gearing Ratio) x (Gearing Efficiency). The values in the table are typical values for the rated torque, rated motor speed, and a surrounding air temperature of 25°C. They are reference values only.

\*3. The output torque of the gear motor is limited by the mechanical limit of the gear head. Operation above this limit could result in premature failure of the gear motor.



Important

During operation of the gear motor, losses due to inefficiencies of the gearing mechanism are generated. The losses vary as the conditions for gear motor torque and speed change. Temperature rise can vary based on the mechanical inefficiencies and the heat dissipation conditions. For heat dissipation conditions, check the gear and motor temperatures with the actual equipment. If operating temperatures are too high, implement the following measures.

- Decrease the load ratio.
- Change the heat dissipation conditions.
- Use forced-air cooling for the motor with a cooling fan or other means.
- Please refer to "Sigma-7 Gearmotor Temperature Test Data" (document number PN.GearMotors.01) on [yaskawa.com](http://yaskawa.com) for temperature test data.

## Ratings of Gear Motors (400 V Models)

| Gear Motor Model Number S7A | Base Servo Motor Model SGM7A- | Gear Ratio | Gearing Efficiency % <sup>1</sup> | Rated Speed (RPM) | Max Speed (RPM) | Rated Torque (Nm) <sup>2</sup> | Peak Torque (Nm) <sup>2</sup> | Motor Inertia (x10 <sup>-4</sup> kg-m <sup>2</sup> ) | Gearhead Inertia (x10 <sup>-4</sup> kg-m <sup>2</sup> ) | Allowable Radial Load (N) | Allowable Axial Load (N) | Backlash (arc-min) | Class |
|-----------------------------|-------------------------------|------------|-----------------------------------|-------------------|-----------------|--------------------------------|-------------------------------|------------------------------------------------------|---------------------------------------------------------|---------------------------|--------------------------|--------------------|-------|
| 02D□-VL050-03               | 02D7F6□                       | 3:1        | 95                                | 1000              | 2000            | 1.82                           | 6.36                          | 0.139 (0.209)                                        | 0.17                                                    | 240                       | 270                      | 5                  | IP65  |
| 02D□-VL050-05               |                               | 5:1        |                                   | 600               | 1200            | 3.03                           | 10.6                          |                                                      | 0.15                                                    | 290                       | 330                      |                    |       |
| 02D□-VL070-10               |                               | 10:1       |                                   | 300               | 600             | 6.06                           | 21.2                          |                                                      | 0.17                                                    | 360                       | 450                      |                    |       |
| 02D□-VL070-25               |                               | 25:1       | 90                                | 120               | 240             | 14.3                           | 50.0 <sup>3</sup>             |                                                      | 0.17                                                    | 490                       | 640                      |                    |       |
| 02D□-VL070-50               |                               | 50:1       |                                   | 60                | 120             | 27.0 <sup>3</sup>              | 50.0 <sup>3</sup>             |                                                      | 0.16                                                    | 1100                      | 1100                     |                    |       |
| 04D□-VL050-03               | 04D7F6□                       | 3:1        | 95                                | 1000              | 2000            | 3.62                           | 12.7                          | 0.216 (0.286)                                        | 0.17                                                    | 240                       | 270                      |                    |       |
| 04D□-VL050-05               |                               | 5:1        |                                   | 600               | 1200            | 6.03                           | 18.0 <sup>3</sup>             |                                                      | 0.15                                                    | 290                       | 330                      |                    |       |
| 04D□-VL070-10               |                               | 10:1       |                                   | 300               | 600             | 12.1                           | 35.0 <sup>3</sup>             |                                                      | 0.17                                                    | 640                       | 530                      |                    |       |
| 04D□-VL070-25               |                               | 25:1       | 90                                | 120               | 240             | 27.0 <sup>3</sup>              | 50.0 <sup>3</sup>             |                                                      | 0.17                                                    | 870                       | 790                      |                    |       |
| 04D□-VL090-50               |                               | 50:1       |                                   | 60                | 120             | 57.2                           | 125 <sup>3</sup>              |                                                      | 0.27                                                    | 1100                      | 1100                     |                    |       |
| 08D□-VL070-03               | 08D7F6□                       | 3:1        | 95                                | 1000              | 2000            | 6.81                           | 23.8                          | 0.775 (0.955)                                        | 0.53                                                    | 240                       | 270                      |                    |       |
| 08D□-VL070-05               |                               | 5:1        |                                   | 600               | 1200            | 11.4                           | 39.7                          |                                                      | 0.46                                                    | 290                       | 330                      |                    |       |
| 08D□-VL090-10               |                               | 10:1       |                                   | 300               | 600             | 22.7                           | 79.4                          |                                                      | 0.70                                                    | 640                       | 530                      |                    |       |
| 08D□-VL090-25               |                               | 25:1       | 90                                | 120               | 240             | 53.8                           | 125 <sup>3</sup>              |                                                      | 0.74                                                    | 870                       | 790                      |                    |       |
| 08D□-VL120-50               |                               | 50:1       |                                   | 60                | 120             | 108                            | 330 <sup>3</sup>              |                                                      | 0.76                                                    | 2100                      | 2200                     |                    |       |
| 10D□-VL070-03               | 10A6A6□                       | 3:1        | 95                                | 1000              | 2000            | 9.06                           | 31.6                          | 0.971 (1.15)                                         | 0.53                                                    | 430                       | 310                      |                    |       |
| 10D□-VL070-05               |                               | 5:1        |                                   | 600               | 1200            | 15.1                           | 50.0 <sup>3</sup>             |                                                      | 0.46                                                    | 510                       | 390                      |                    |       |
| 10D□-VL090-10               |                               | 10:1       |                                   | 300               | 600             | 30.2                           | 80.0 <sup>3</sup>             |                                                      | 0.70                                                    | 1200                      | 1600                     |                    |       |
| 10D□-VL090-25               |                               | 25:1       | 90                                | 120               | 240             | 71.6                           | 125 <sup>3</sup>              |                                                      | 0.74                                                    | 1600                      | 2200                     |                    |       |
| 10D□-VL120-50               |                               | 50:1       |                                   | 60                | 120             | 143                            | 330 <sup>3</sup>              |                                                      | 0.76                                                    | 3400                      | 3900                     |                    |       |
| 15D□-VL090-03               | 15D7F6□                       | 3:1        | 95                                | 1000              | 2000            | 14.0                           | 41.9                          | 2.00 (2.25)                                          | 2.9                                                     | 430                       | 310                      |                    |       |
| 15D□-VL090-05               |                               | 5:1        |                                   | 600               | 1200            | 23.3                           | 69.8                          |                                                      | 2.6                                                     | 510                       | 390                      |                    |       |
| 15D□-VL090-10               |                               | 10:1       |                                   | 300               | 600             | 46.6                           | 80 <sup>3</sup>               |                                                      | 2.5                                                     | 1200                      | 1600                     |                    |       |
| 15D□-VL120-25               |                               | 25:1       | 90                                | 120               | 240             | 110                            | 330 <sup>3</sup>              |                                                      | 2.8                                                     | 1600                      | 2200                     |                    |       |
| 15D□-VL120-50               |                               | 50:1       |                                   | 60                | 120             | 180 <sup>3</sup>               | 330 <sup>3</sup>              |                                                      | 2.5                                                     | 3400                      | 3900                     |                    |       |
| 20D□-VL090-03               | 20D7F6□                       | 3:1        | 95                                | 1000              | 2000            | 18.1                           | 54.4                          | 2.47 (2.72)                                          | 2.9                                                     | 810                       | 930                      |                    |       |
| 20D□-VL090-05               |                               | 5:1        |                                   | 600               | 1200            | 30.2                           | 90.7                          |                                                      | 2.6                                                     | 960                       | 1200                     |                    |       |
| 20D□-VL120-10               |                               | 10:1       |                                   | 300               | 600             | 60.4                           | 181                           |                                                      | 2.6                                                     | 1200                      | 1600                     |                    |       |
| 20D□-VL120-25               |                               | 25:1       | 90                                | 120               | 240             | 143                            | 330 <sup>3</sup>              |                                                      | 2.8                                                     | 2700                      | 3700                     |                    |       |
| 20D□-VL155-50               |                               | 50:1       |                                   | 40 <sup>3</sup>   | 80 <sup>3</sup> | 286 <sup>+</sup>               | 700 <sup>3</sup>              |                                                      | 2.8                                                     | 3400                      | 3900                     |                    |       |
| 25D□-VL090-03               | 25D7F6□                       | 3:1        | 95                                | 1000              | 2000            | 22.7                           | 68.1                          | 3.19 (3.44)                                          | 2.9                                                     | 810                       | 930                      |                    |       |
| 25D□-VL090-05               |                               | 5:1        |                                   | 600               | 1200            | 37.8                           | 114                           |                                                      | 2.6                                                     | 960                       | 1200                     |                    |       |
| 25D□-VL120-10               |                               | 10:1       |                                   | 300               | 600             | 75.6                           | 225 <sup>3</sup>              |                                                      | 2.6                                                     | 2000                      | 2500                     |                    |       |
| 25D□-VL120-25               |                               | 25:1       | 90                                | 120               | 240             | 179                            | 330 <sup>3</sup>              |                                                      | 2.8                                                     | 2700                      | 3700                     |                    |       |
| 25D□-VL155-50               |                               | 50:1       |                                   | 40 <sup>3</sup>   | 80 <sup>3</sup> | 358                            | 700 <sup>3</sup>              |                                                      | 2.8                                                     | 8100                      | 8200                     |                    |       |
| 30D□-VL090-03               | 30D7F6□                       | 3:1        | 95                                | 1000              | 2000            | 27.9                           | 80.0 <sup>3</sup>             | 7.00 (9.20)                                          | 2.9                                                     | 810                       | 930                      |                    |       |
| 30D□-VL090-05               |                               | 5:1        |                                   | 600               | 1200            | 46.6                           | 125 <sup>3</sup>              |                                                      | 2.6                                                     | 960                       | 1200                     |                    |       |
| 30D□-VL120-10               |                               | 10:1       |                                   | 300               | 600             | 93.1                           | 225 <sup>3</sup>              |                                                      | 2.6                                                     | 2000                      | 2500                     |                    |       |
| 30D□-VL120-25               |                               | 25:1       | 90                                | 120               | 240             | 180 <sup>3</sup>               | 330 <sup>3</sup>              |                                                      | 2.8                                                     | 2700                      | 3700                     |                    |       |
| 30D□-VL155-50               |                               | 50:1       |                                   | 40 <sup>3</sup>   | 80 <sup>3</sup> | 360 <sup>3</sup>               | 700 <sup>3</sup>              |                                                      | 2.8                                                     | 8100                      | 8200                     |                    |       |



| Gear Motor Model Number S7A_____ | Base Servo Motor Model SGM7A- | Gear Ratio | Gearing Efficiency *1 | Rated Speed (RPM) | Max Speed (RPM)   | Rated Torque (Nm)*2 | Peak Torque (Nm)*2 | Motor Inertia (x10 <sup>-4</sup> kg-m <sup>2</sup> ) | Gearhead Inertia (x10 <sup>-4</sup> kg-m <sup>2</sup> ) | Allowable Radial Load (N) | Allowable Axial Load (N) | Backlash (arc-min) | Class |
|----------------------------------|-------------------------------|------------|-----------------------|-------------------|-------------------|---------------------|--------------------|------------------------------------------------------|---------------------------------------------------------|---------------------------|--------------------------|--------------------|-------|
| 40D□-VL090-03                    | 40D7F6□                       | 3:1        | 95                    | 1000              | 2000              | 35.9                | 80.0 <sup>*3</sup> | 9.60 (11.80)                                         | 2.9                                                     | 810                       | 930                      | 5                  | IP65  |
| 40D□-VL090-05                    |                               | 5:1        |                       | 600               | 1200              | 59.9                | 125 <sup>*3</sup>  |                                                      | 2.6                                                     | 960                       | 1200                     |                    |       |
| 40D□-VL120-10                    |                               | 10:1       |                       | 300               | 600               | 120                 | 225 <sup>*3</sup>  |                                                      | 2.6                                                     | 2000                      | 2500                     |                    |       |
| 40D□-VL155-25                    |                               | 25:1       | 90                    | 80 <sup>*3</sup>  | 160 <sup>*3</sup> | 284                 | 700 <sup>*3</sup>  |                                                      | 4.1                                                     | 2700                      | 3700                     |                    |       |
| 40D□-VL205-50                    |                               | 50:1       |                       | 30 <sup>*3</sup>  | 60 <sup>*3</sup>  | 567                 | 1400 <sup>*3</sup> |                                                      | 3.8                                                     | 8100                      | 8200                     |                    |       |
| 50D□-VL090-03                    | 50D7F6□                       | 3:1        | 95                    | 1000              | 2000              | 45.0                | 80 <sup>*3</sup>   | 12.30 (14.50)                                        | 2.9                                                     | 810                       | 930                      |                    |       |
| 50D□-VL090-05                    |                               | 5:1        |                       | 600               | 1200              | 75.0 <sup>*3</sup>  | 125 <sup>*3</sup>  |                                                      | 2.6                                                     | 960                       | 1200                     |                    |       |
| 50D□-VL155-10                    |                               | 10:1       |                       | 200 <sup>*3</sup> | 400 <sup>*3</sup> | 150                 | 452                |                                                      | 3.2                                                     | 4700                      | 4100                     |                    |       |
| 50D□-VL155-25                    |                               | 25:1       | 90                    | 80 <sup>*3</sup>  | 160 <sup>*3</sup> | 356                 | 700 <sup>*3</sup>  |                                                      | 4.1                                                     | 6400                      | 6100                     |                    |       |
| 50D□-VL205-50                    |                               | 50:1       |                       | 30 <sup>*3</sup>  | 60 <sup>*3</sup>  | 711                 | 1400 <sup>*3</sup> |                                                      | 3.8                                                     | 14000                     | 14000                    |                    |       |
| 70D-VL120-03                     | 70D7F6□                       | 3:1        | 95                    | 1000              | 2000              | 63.6                | 154                | 12.30 (14.50)                                        | 5.1                                                     | 1300                      | 1500                     |                    |       |
| 70D-VL120-05                     |                               | 5:1        |                       | 600               | 1200              | 106                 | 257                |                                                      | 3.1                                                     | 1600                      | 1900                     |                    |       |
| 70D-VL155-10                     |                               | 10:1       |                       | 200 <sup>*3</sup> | 400 <sup>*3</sup> | 212                 | 470 <sup>*3</sup>  |                                                      | 3.2                                                     | 4700                      | 4100                     |                    |       |
| 70D-VL205-25                     |                               | 25:1       | 90                    | 80 <sup>*3</sup>  | 160 <sup>*3</sup> | 502                 | 1215               |                                                      | 7.9                                                     | 11000                     | 11000                    |                    |       |
| 70D-VL235-50                     |                               | 50:1       | 92                    | 30 <sup>*3</sup>  | 60 <sup>*3</sup>  | 1500 <sup>*3</sup>  | 2300 <sup>*3</sup> |                                                      | 4.7                                                     | 15000                     | 14000                    |                    |       |

Note: The values in parentheses are for Servo Motors with Holding Brakes (indicated by value of □ in model numbers).

\*1. The gear efficiency depends on operating conditions such as the output torque, motor speed, and temperature.

\*2. The gear motor output torque is expressed by the following formula: Output Torque = (Servo Motor Output Torque) x (Gearing Ratio) x (Gearing Efficiency). The values in the table are typical values for the rated torque, rated motor speed, and a surrounding air temperature of 25°C. They are reference values only.

\*3. The output torque of the gear motor is limited by the mechanical limit of the gear head. Operation above this limit could result in premature failure of the gear motor.



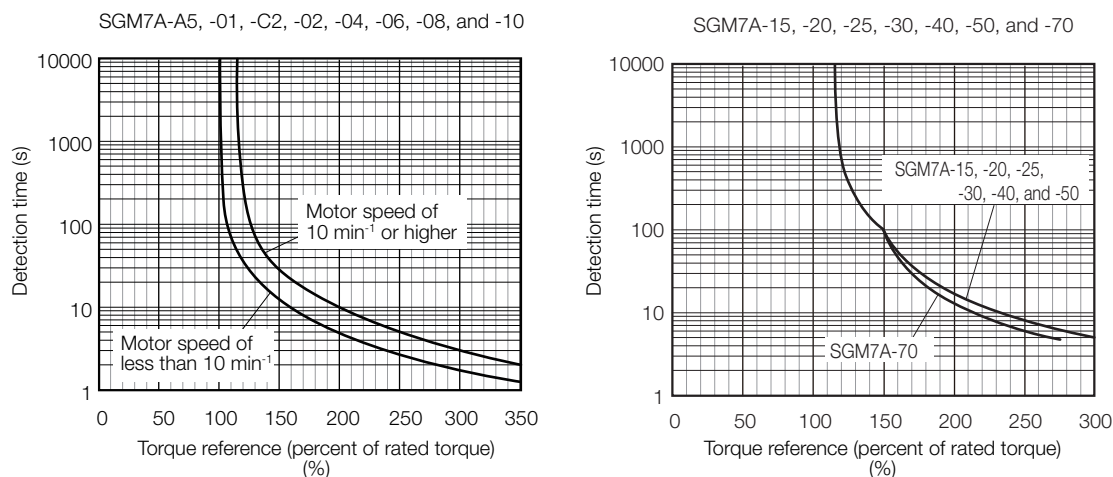
Important

During operation of the gear motor, losses due to inefficiencies of the gearing mechanism are generated. The losses vary as the conditions for gear motor torque and speed change. Temperature rise can vary based on the mechanical inefficiencies and the heat dissipation conditions. For heat dissipation conditions, check the gear and motor temperatures with the actual equipment. If operating temperatures are too high, implement the following measures.

- Decrease the load ratio.
- Change the heat dissipation conditions.
- Use forced-air cooling for the motor with a cooling fan or other means.
- Please refer to "Sigma-7 Gearmotor Temperature Test Data" (document number PN.GearMotors.01) on [yaskawa.com](http://yaskawa.com) for temperature test data.

## Servo Motor Overload Protection Characteristics

The overload detection level is set for hot start conditions with a Servo Motor surrounding air temperature of 40°C.



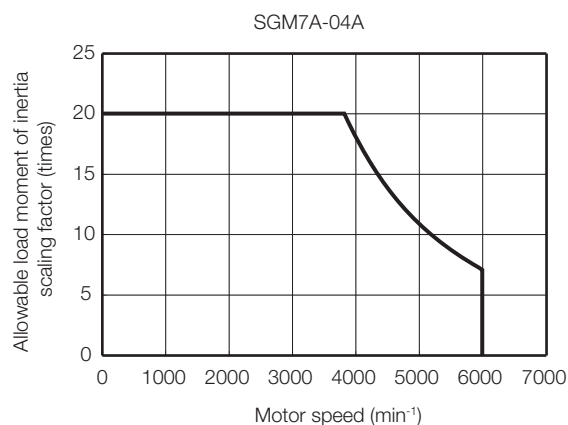
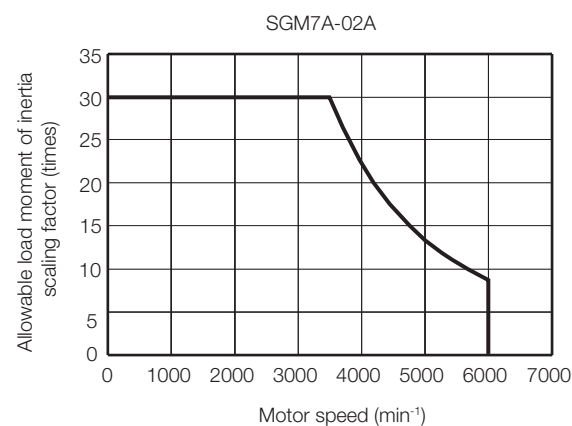
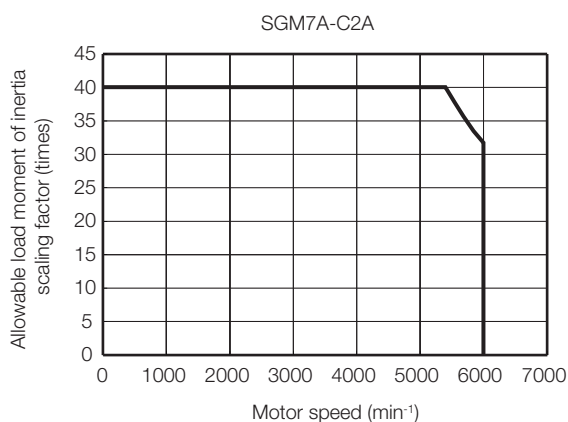
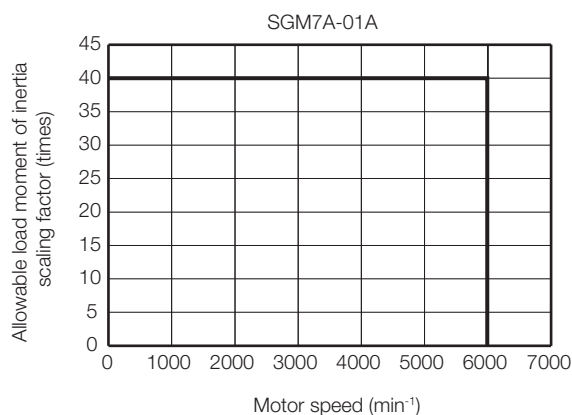
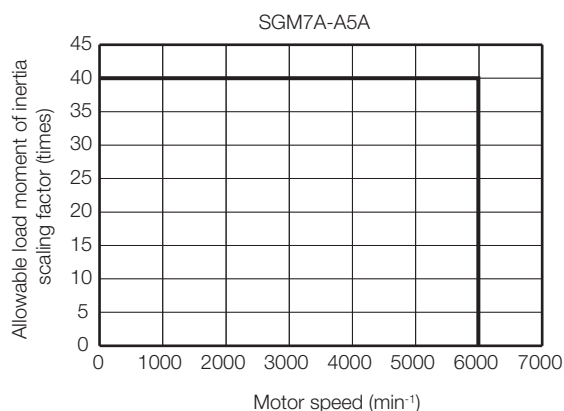
Note: The above overload protection characteristics do not mean that you can perform continuous duty operation with an output of 100% or higher. Use the Servo Motor so that the effective torque remains within the continuous duty zone given in *Torque-Motor Speed Characteristics (200 V Models -A5A to -10A)* on page 58 or in *Torque-Motor Speed Characteristics (200 V Models -15A to -70A)* on page 60.

## Allowable Load Moment of Inertia Scaling Factor for SERVOPACKs without Built-in Regenerative Resistors

The following graphs show the allowable load moment of inertia scaling factor of the motor speed for SERVOPACKs\* without built-in regenerative resistors when an External Regenerative Resistor is not connected.

If the Servo Motor exceeds the allowable load moment of inertia, an overvoltage alarm may occur in the SERVOPACK.

These graphs provide reference data for deceleration at the rated torque or higher with a 200-VAC power supply input.



\* Applicable SERVOPACK models: SGD7S-R70A, -R90A, -1R6A, or -2R8A

## Servo Motor Heat Dissipation Conditions

The Servo Motor ratings are the continuous allowable values at a surrounding air temperature of 40°C when a heat sink is installed on the Servo Motor. If the Servo Motor is mounted on a small device component, the Servo Motor temperature may rise considerably because the surface for heat dissipation becomes smaller. Refer to the following graphs for the relation between the heat sink size and derating rate.

When using Servo Motors with derating, change the detection timing of overload warnings and overload alarms by referring to the motor overload detection level described in the following manual.

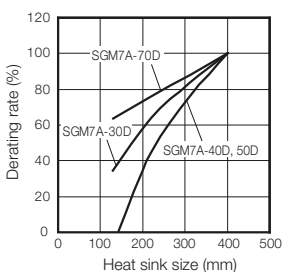
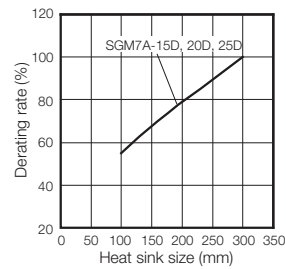
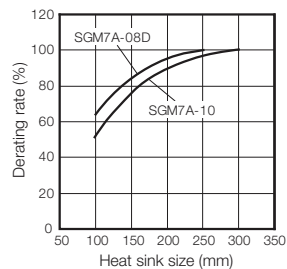
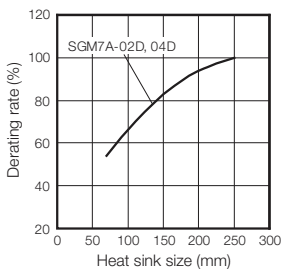
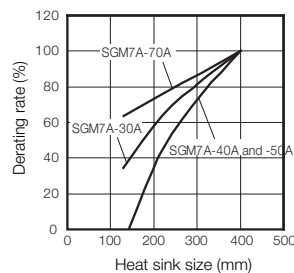
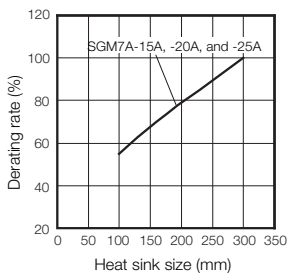
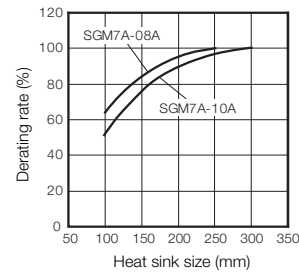
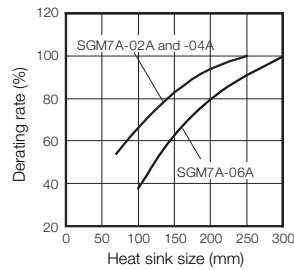
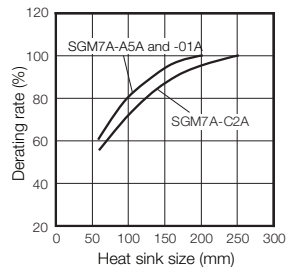
 *Σ-7-Series AC Servo Drive Rotary Servo Motor Product Manual* (Manual No.: SIEP S800001 36)

Note: The derating rates are applicable only when the average motor speed is less than or equal to the rated motor speed.  
If the average motor speed exceeds the rated motor speed, consult with your Yaskawa representative.



Important

The actual temperature rise depends on how the heat sink (i.e., the Servo Motor mounting section) is attached to the installation surface, what material is used for the Servo Motor mounting section, and the motor speed. Always check the Servo Motor temperature with the actual equipment.



## Applications Where the Surrounding Air Temperature of the Servo Motor Exceeds 40°C

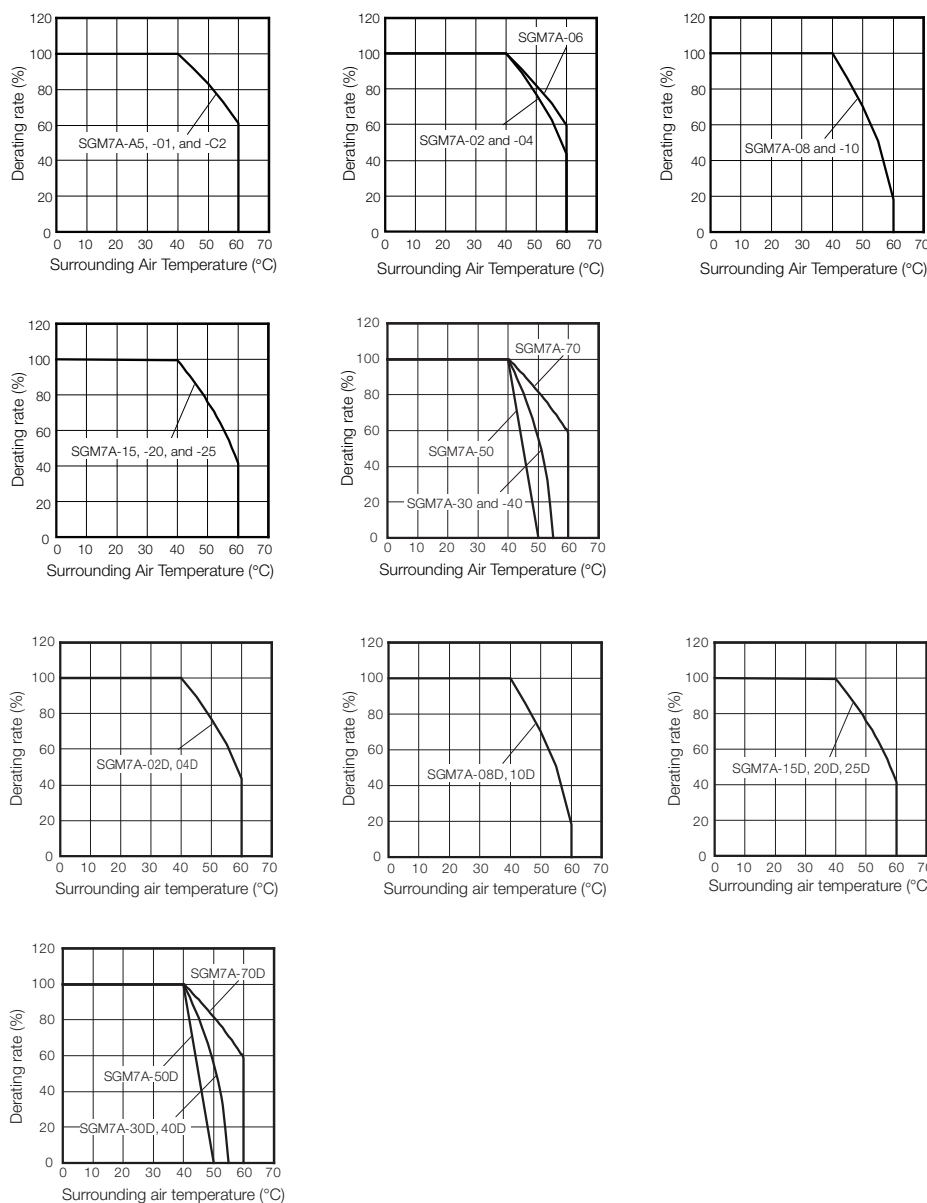
The Servo Motor ratings are the continuous allowable values at a surrounding air temperature of 40°C. If you use a Servo Motor at a surrounding air temperature that exceeds 40°C (60°C max.), apply a suitable derating rate from the following graphs.

When using Servo Motors with derating, change the detection timing of overload warnings and overload alarms by referring to the motor overload detection level described in the following manual.

📖 *Σ-7-Series AC Servo Drive Rotary Servo Motor Product Manual* (Manual No.: SIEP S800001 36)

Note: 1. Use the combination of the SERVOPACK and Servo Motor so that the derating conditions are satisfied for both the SERVOPACK and Servo Motor.

2. The derating rates are applicable only when the average motor speed is less than or equal to the rated motor speed. If the average motor speed exceeds the rated motor speed, consult with your Yaskawa representative.



## Applications Where the Altitude of the Servo Motor Exceeds 1,000 m

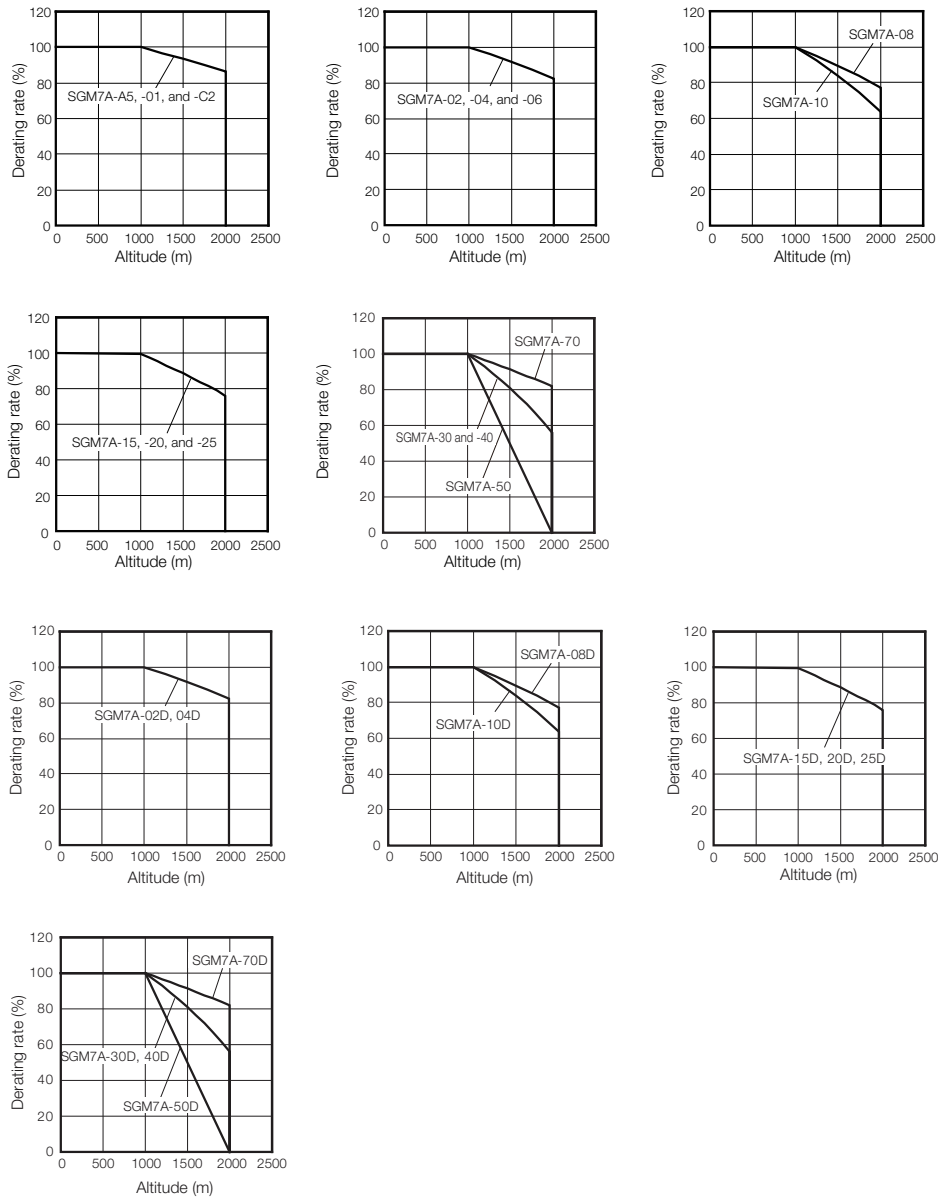
The Servo Motor ratings are the continuous allowable values at an altitude of 1,000 m or less. If you use a Servo Motor at an altitude that exceeds 1,000 m (2,000 m max.), the heat dissipation effect of the air is reduced. Apply the appropriate derating rate from the following graphs.

When using Servo Motors with derating, change the detection timing of overload warnings and overload alarms by referring to the motor overload detection level described in the following manual.

☞ *Σ-7-Series AC Servo Drive Rotary Servo Motor Product Manual* (Manual No.: SIEP S800001 36)

Note: 1. Use the combination of the SERVOPACK and Servo Motor so that the derating conditions are satisfied for both the SERVOPACK and Servo Motor.

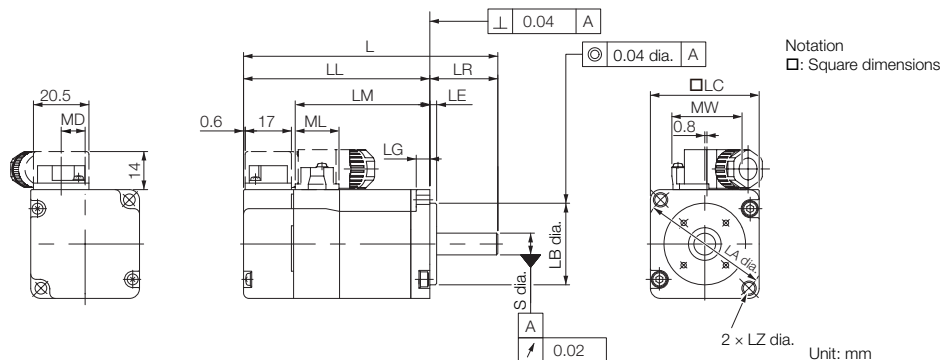
2. The derating rates are applicable only when the average motor speed is less than or equal to the rated motor speed. If the average motor speed exceeds the rated motor speed, consult with your Yaskawa representative.



## External Dimensions

### Servo Motors (200V)

#### ◆ SGM7A-A5A, -01A, and -C2A (200V Models)



| Model SGM7A- | L                | LL              | LM   | Flange Dimensions |     |    |    |    |                                   |     | S                                |
|--------------|------------------|-----------------|------|-------------------|-----|----|----|----|-----------------------------------|-----|----------------------------------|
|              |                  |                 |      | LR                | LE  | LG | LC | LA | LB                                | LZ  |                                  |
| A5A□ A6□     | 81.5<br>(122)    | 56.5<br>(97)    | 37.9 | 25                | 2.5 | 5  | 40 | 46 | 30 <sup>0</sup> <sub>-0.021</sub> | 4.3 | 8 <sup>0</sup> <sub>-0.009</sub> |
| 01A□ A6□     | 93.5<br>(134)    | 68.5<br>(109)   | 49.9 | 25                | 2.5 | 5  | 40 | 46 | 30 <sup>0</sup> <sub>-0.021</sub> | 4.3 | 8 <sup>0</sup> <sub>-0.009</sub> |
| C2A□ A6□     | 105.5<br>(153.5) | 80.5<br>(128.5) | 61.9 | 25                | 2.5 | 5  | 40 | 46 | 30 <sup>0</sup> <sub>-0.021</sub> | 4.3 | 8 <sup>0</sup> <sub>-0.009</sub> |

| Model SGM7A- | MD  | MW   | ML   | Approx. Mass [kg] |
|--------------|-----|------|------|-------------------|
| A5A□ A6□     | 8.8 | 25.8 | 16.1 | 0.3<br>(0.6)      |
| 01A□ A6□     | 8.8 | 25.8 | 16.1 | 0.4<br>(0.7)      |
| C2A□ A6□     | 8.8 | 25.8 | 16.1 | 0.5<br>(0.8)      |

Note: 1. The values in parentheses are for Servo Motors with Holding Brakes.

2. Refer to the following section for detailed shaft end specifications.

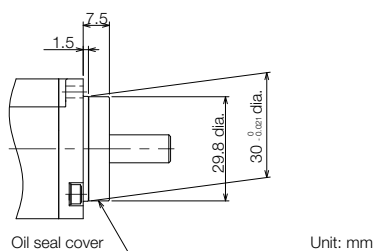
■ **Shaft End Specifications (page 80)**

3. For models that have a batteryless absolute encoder, L and LL are 8 mm greater than the given value. Refer to the following section for the values for individual models.

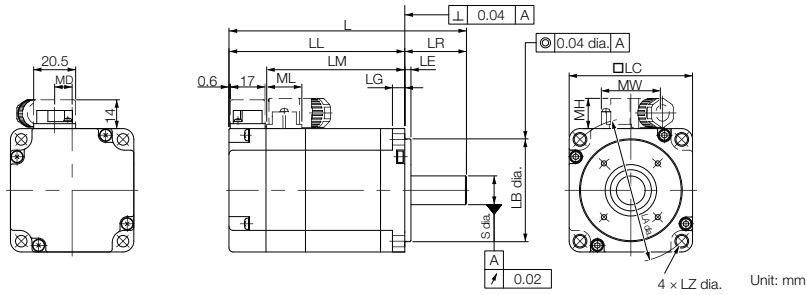
■ **Dimensions of Servomotors with Batteryless Absolute Encoders (page 95)**

#### ■ Specifications of Options

##### • Oil Seal



◆ SGM7A-02A to -06A (200 V Models)



| Model SGM7A- | L                | LL               | LM   | Flange Dimensions |    |    |    |    |                                   |     | S                                 |
|--------------|------------------|------------------|------|-------------------|----|----|----|----|-----------------------------------|-----|-----------------------------------|
|              |                  |                  |      | LR                | LE | LG | LC | LA | LB                                | LZ  |                                   |
| 02A□A6□      | 99.5<br>(140)    | 69.5<br>(110)    | 51.2 | 30                | 3  | 6  | 60 | 70 | 50 <sup>0</sup> <sub>-0.025</sub> | 5.5 | 14 <sup>0</sup> <sub>-0.011</sub> |
| 04A□A6□      | 115.5<br>(156)   | 85.5<br>(126)    | 67.2 | 30                | 3  | 6  | 60 | 70 | 50 <sup>0</sup> <sub>-0.025</sub> | 5.5 | 14 <sup>0</sup> <sub>-0.011</sub> |
| 06A□A6□      | 137.5<br>(191.5) | 107.5<br>(161.5) | 89.2 | 30                | 3  | 6  | 60 | 70 | 50 <sup>0</sup> <sub>-0.025</sub> | 5.5 | 14 <sup>0</sup> <sub>-0.011</sub> |

| Model SGM7A- | MD  | MW   | MH   | ML   | Approx. Mass [kg] |
|--------------|-----|------|------|------|-------------------|
| 02A□A6□      | 8.5 | 28.7 | 14.7 | 17.1 | 0.8 (1.4)         |
| 04A□A6□      | 8.5 | 28.7 | 14.7 | 17.1 | 1.2 (1.8)         |
| 06A□A6□      | 8.5 | 28.7 | 14.7 | 17.1 | 1.6 (2.2)         |

Note: 1. The values in parentheses are for Servo Motors with Holding Brakes.

2. Refer to the following section for detailed shaft end specifications.

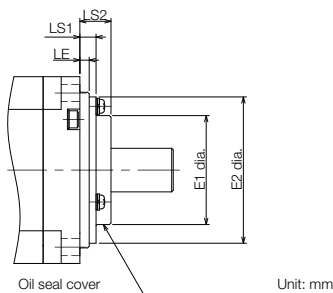
✎ Shaft End Specifications (page 80)

3. For models that have a batteryless absolute encoder, L and LL are 8 mm greater than the given value. Refer to the following section for the values for individual models.

✎ Dimensions of Servomotors with Batteryless Absolute Encoders (page 95)

■ Specifications of Options

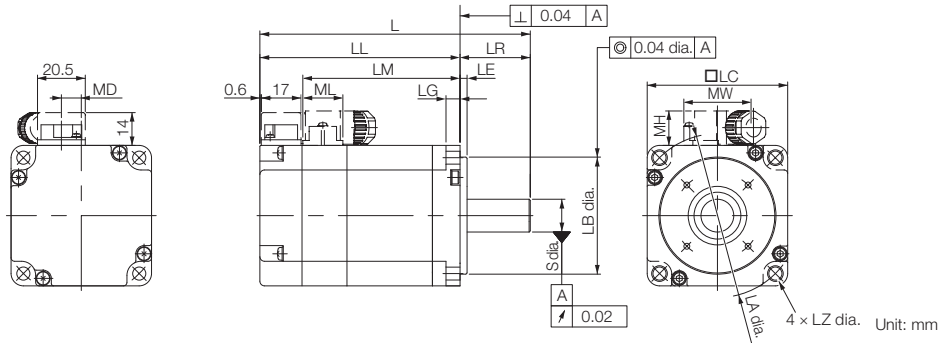
• Oil Seal



| Model SGM7A-  | Dimensions with Oil Seal |    |     |     |
|---------------|--------------------------|----|-----|-----|
|               | E1                       | E2 | LS1 | LS2 |
| 02A, 04A, 06A | 35                       | 47 | 5.2 | 10  |



## ◆ SGM7A-08 and -10



| Model<br>SGM7A- | L*           | LL*          | LM    | Flange Dimensions |    |    |    |    |                                   |    | S                                 | MD   | MW | MH   | ML   | Approx.<br>Mass*<br>[kg] |
|-----------------|--------------|--------------|-------|-------------------|----|----|----|----|-----------------------------------|----|-----------------------------------|------|----|------|------|--------------------------|
|                 |              |              |       | LR                | LE | LG | LC | LA | LB                                | LZ |                                   |      |    |      |      |                          |
| 08A□A6□         | 137<br>(184) | 97<br>(144)  | 78.5  | 40                | 3  | 8  | 80 | 90 | 70 <sup>0</sup> <sub>-0.030</sub> | 7  | 19 <sup>0</sup> <sub>-0.013</sub> | 13.6 | 38 | 14.7 | 19.3 | 2.3<br>(2.9)             |
| 10A□A6□         | 162<br>(209) | 122<br>(169) | 103.5 | 40                | 3  | 8  | 80 | 90 | 70 <sup>0</sup> <sub>-0.030</sub> | 7  | 19 <sup>0</sup> <sub>-0.013</sub> | 13.6 | 38 | 14.7 | 19.3 | 3.1<br>(3.7)             |

\* For models that have a batteryless absolute encoder, L and LL are 8 mm greater and the approximate mass is 0.1 kg greater than the given value. Refer to the following section for the values for individual models.

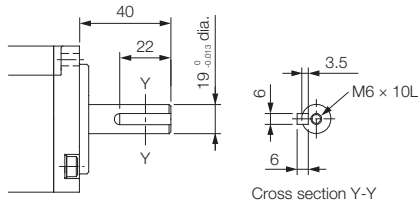
📏 **Dimensions of Servomotors with Batteryless Absolute Encoders (page 95)**

Note: 1. The values in parentheses are for Servomotors with Holding Brakes.

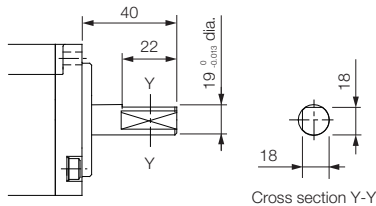
2. The values for a straight, without key specification are given. Refer to the information given below for other shaft end specifications and option specifications.

■ **Shaft End Specifications**

- Straight with Key and Tap

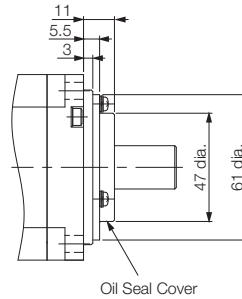


- With Two Flat Seats



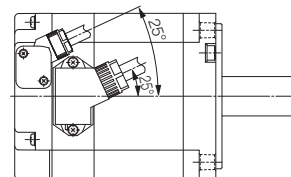
■ **Specifications of Options**

- Oil Seal

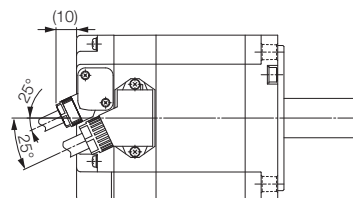


■ **Connector Mounting Dimensions**

- Cable Installed on Load Side



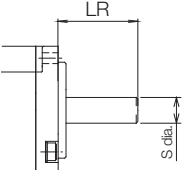
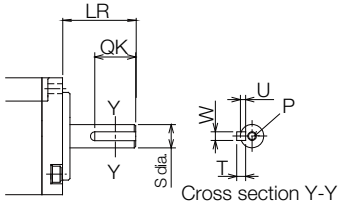
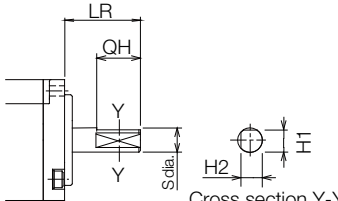
- Cable Installed on Non-load Side



## Shaft End Specifications

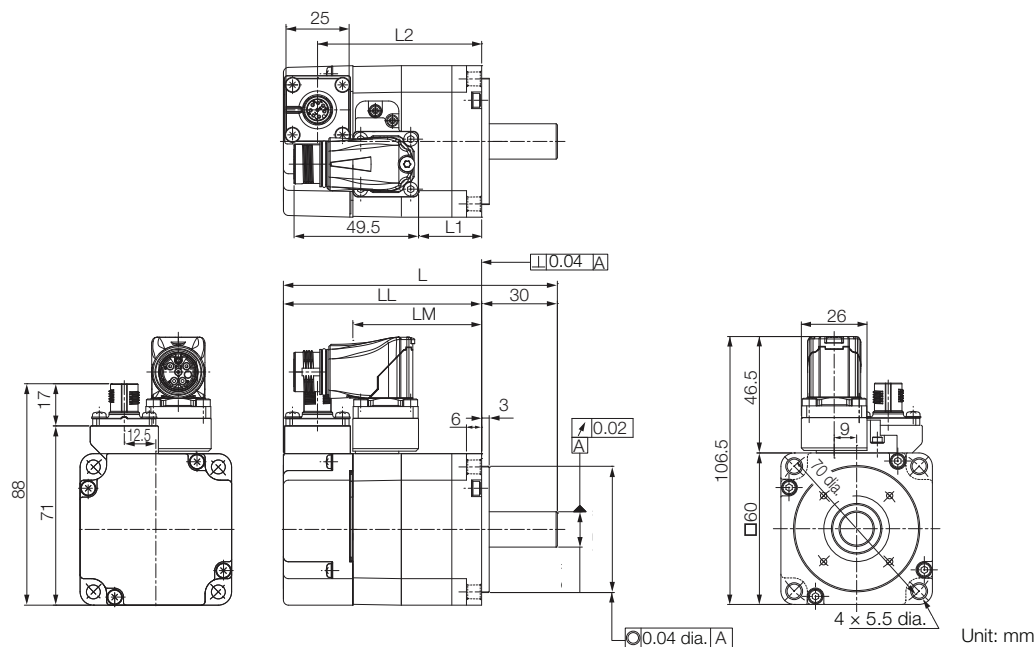
## ◆ SGM7A-□□□□□□□□

| Code | Specification                                                                              |
|------|--------------------------------------------------------------------------------------------|
| 2    | Straight without key                                                                       |
| 6    | Straight with key and tap for one location<br>(Key slot is JIS B1301-1996 fastening type.) |
| B    | With two flat seats                                                                        |

| Shaft End Details                                                                   |    | Servo Motor Model SGM7A- |                  |    |                   |    |                   |    |    |
|-------------------------------------------------------------------------------------|----|--------------------------|------------------|----|-------------------|----|-------------------|----|----|
|                                                                                     |    | A5                       | 01               | C2 | 02                | 04 | 06                | 08 | 10 |
| Code: 2 (Straight without Key)                                                      |    |                          |                  |    |                   |    |                   |    |    |
|    | LR |                          | 25               |    | 30                |    | 40                |    |    |
|                                                                                     | S  |                          | $8^{0}_{-0.009}$ |    | $14^{0}_{-0.011}$ |    | $19^{0}_{-0.013}$ |    |    |
| Code: 6 (Straight with Key and Tap)                                                 |    |                          |                  |    |                   |    |                   |    |    |
|   | LR |                          | 25               |    | 30                |    | 40                |    |    |
|                                                                                     | QK |                          | 14               |    | 14                |    | 22                |    |    |
|                                                                                     | S  |                          | $8^{0}_{-0.009}$ |    | $14^{0}_{-0.011}$ |    | $19^{0}_{-0.013}$ |    |    |
|                                                                                     | W  |                          | 3                |    | 5                 |    | 6                 |    |    |
|                                                                                     | T  |                          | 3                |    | 5                 |    | 6                 |    |    |
|                                                                                     | U  |                          | 1.8              |    | 3                 |    | 3.5               |    |    |
|                                                                                     | P  |                          | M3 × 6L          |    | M5 × 8L           |    | M6 × 10L          |    |    |
| Code: B (with Two Flat Seats)                                                       |    |                          |                  |    |                   |    |                   |    |    |
|  | LR |                          | 25               |    | 30                |    | 40                |    |    |
|                                                                                     | QH |                          | 15               |    | 15                |    | 22                |    |    |
|                                                                                     | S  |                          | $8^{0}_{-0.009}$ |    | $14^{0}_{-0.011}$ |    | $19^{0}_{-0.013}$ |    |    |
|                                                                                     | H1 |                          | 7.5              |    | 13                |    | 18                |    |    |
|                                                                                     | H2 |                          | 7.5              |    | 13                |    | 18                |    |    |

## Servo Motors (400V)

## ◆ SGM7A-02D to -04D (400 V Model)



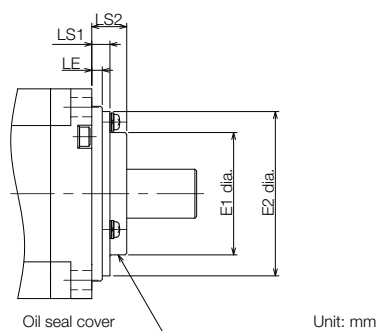
| Model SGM7A- | L              | LL              | LM   | LB                                | S                                 | L1   | L2              | Approx. Mass [kg] |
|--------------|----------------|-----------------|------|-----------------------------------|-----------------------------------|------|-----------------|-------------------|
| 02D□F6□      | 108<br>(141.5) | 78.5<br>(118.5) | 51.2 | 50 <sup>0</sup> <sub>-0.025</sub> | 14 <sup>0</sup> <sub>-0.011</sub> | 25   | 65<br>(105)     | 0.9<br>(1.5)      |
| 04D□F6□      | 125<br>(165)   | 95<br>(135)     | 67.2 | 50 <sup>0</sup> <sub>-0.025</sub> | 14 <sup>0</sup> <sub>-0.011</sub> | 41.5 | 81.5<br>(121.5) | 1.2<br>(1.8)      |

Note: 1. The values in parentheses are for Servo Motors with Holding Brakes.

2. For 400V models 1kW and smaller that have a batteryless absolute encoder, L and LL are the same as the given value.

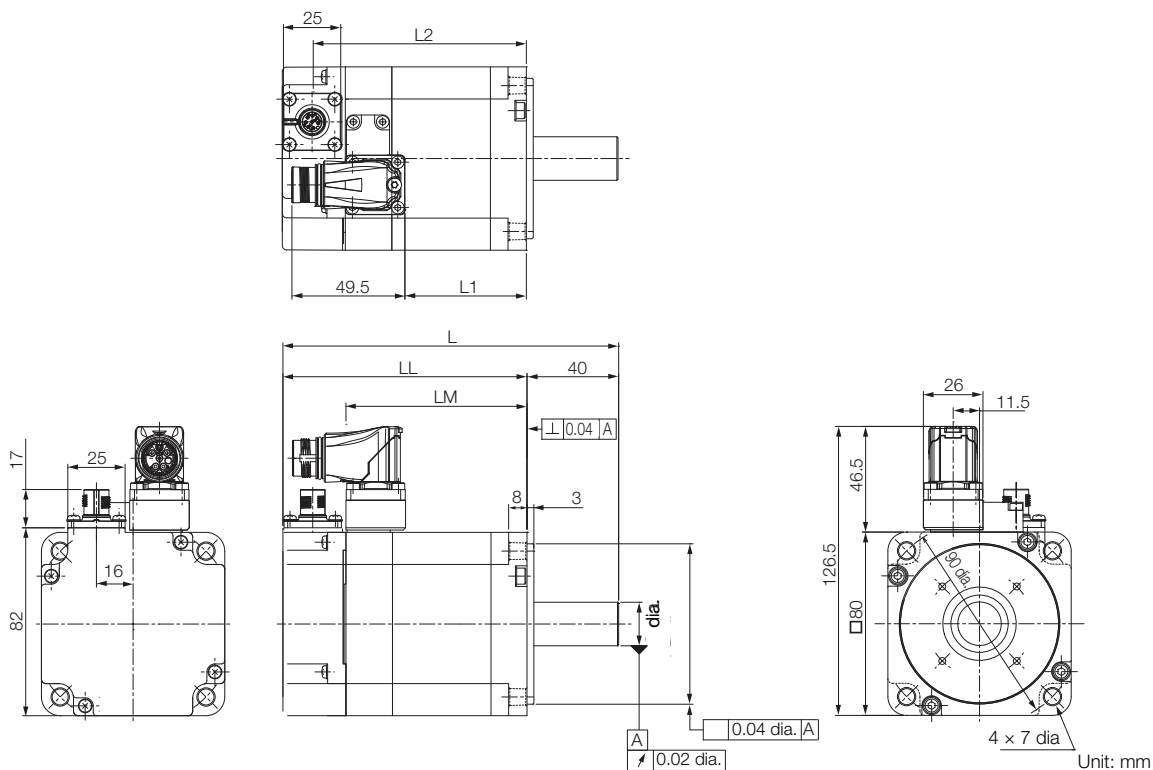
## ■ Specifications of Options

## • Oil Seal



| Model SGM7A- | Dimensions with Oil Seal |    |     |     |
|--------------|--------------------------|----|-----|-----|
|              | E1                       | E2 | LS1 | LS2 |
| 02D, 04D,    | 35                       | 47 | 5.2 | 10  |

◆ SGM7A-08D (400 V Model)



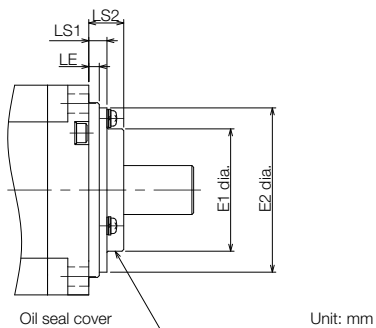
| Model SGM7A- | L                | LL               | LM | LB                                | S                                 | L1 | L2          | Approx. Mass [kg] |
|--------------|------------------|------------------|----|-----------------------------------|-----------------------------------|----|-------------|-------------------|
| 08D□F6□      | 146.5<br>(193.5) | 106.5<br>(153.5) | 79 | 70 <sup>0</sup> <sub>-0.030</sub> | 19 <sup>0</sup> <sub>-0.013</sub> | 53 | 93<br>(140) | 2.4<br>(3.0)      |

Note: 1. The values in parentheses are for Servo Motors with Holding Brakes.

2. For 400V models 1kW and smaller that have a batteryless absolute encoder, L and LL are the same as the given value.

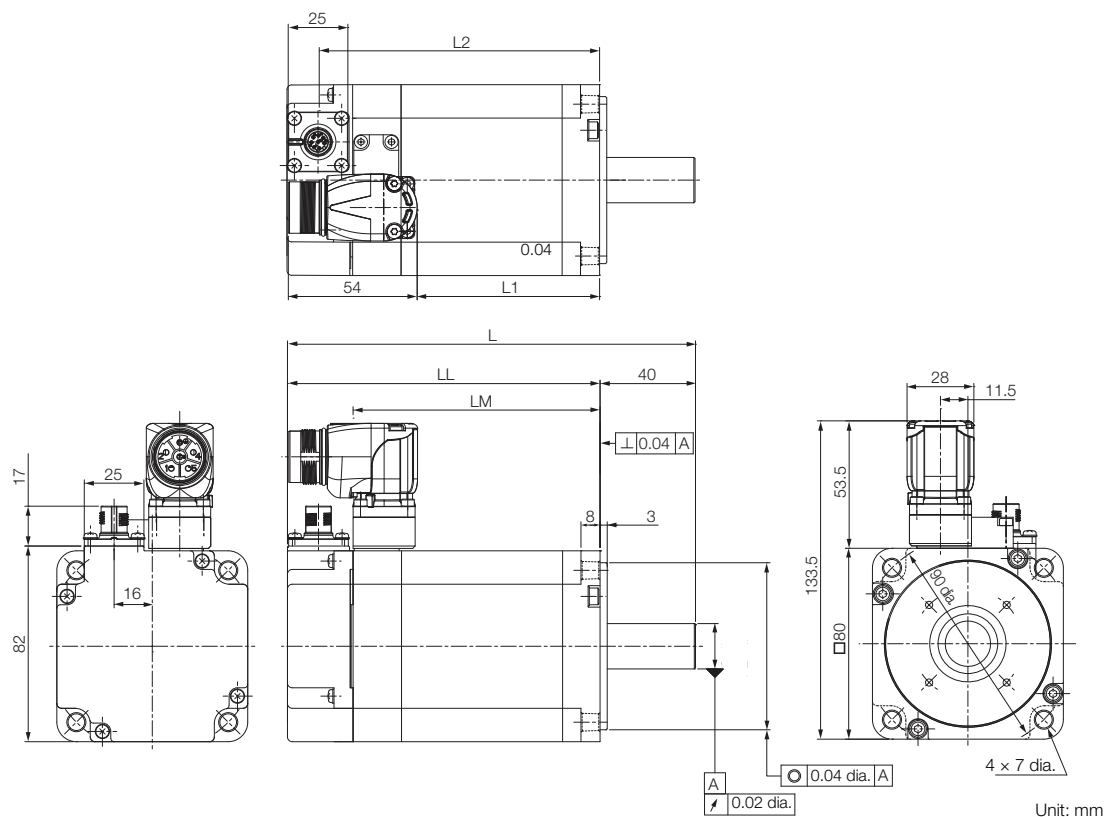
■ Specifications of Options

• Oil Seal



| Model SGM7A- | Dimensions with Oil Seal |    |     |     |
|--------------|--------------------------|----|-----|-----|
|              | E1                       | E2 | LS1 | LS2 |
| 08D          | 47                       | 61 | 5.5 | 11  |

# ◆ SGM7A-10D (400 V Model)



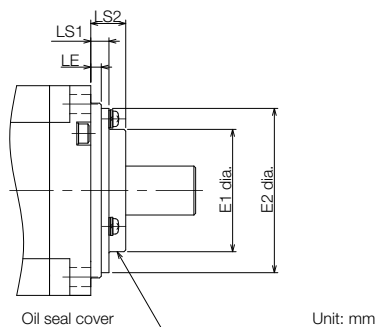
| Model SGM7A- | L            | LL           | LM    | LB                                | S                                 | L1 | L2               | Approx. Mass [kg] |
|--------------|--------------|--------------|-------|-----------------------------------|-----------------------------------|----|------------------|-------------------|
| 10D□F6□      | 171<br>(218) | 131<br>(178) | 103.5 | 70 <sup>0</sup> <sub>-0.030</sub> | 19 <sup>0</sup> <sub>-0.013</sub> | 77 | 117.5<br>(164.5) | 3.2<br>(3.8)      |

Note: 1. The values in parentheses are for Servo Motors with Holding Brakes.

2. For 400V models 1kW and smaller that have a batteryless absolute encoder, L and LL are the same as the given value.

## ■ Specifications of Options

### • Oil Seal

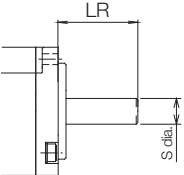
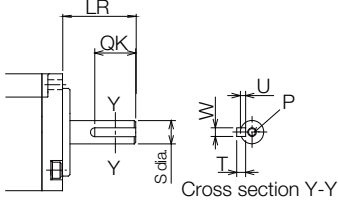


| Model SGM7A- | Dimensions with Oil Seal |    |     |     |
|--------------|--------------------------|----|-----|-----|
|              | E1                       | E2 | LS1 | LS2 |
| 10D          | 47                       | 61 | 5.5 | 11  |

## Shaft End Specifications for SGM7A-02 to -10 (400 V Models)

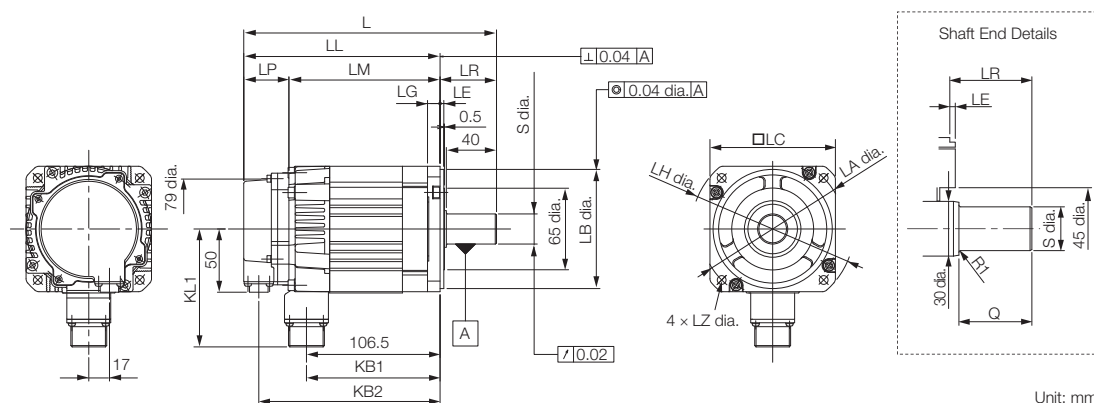
## ◆ SGM7A-□□□□□□□□

| Code | Specification                                                                              |
|------|--------------------------------------------------------------------------------------------|
| 2    | Straight without key                                                                       |
| 6    | Straight with key and tap for one location<br>(Key slot is JIS B1301-1996 fastening type.) |

| Shaft End Details                                                                  |    | Servo Motor Model SGM7A-          |    |                                   |    |
|------------------------------------------------------------------------------------|----|-----------------------------------|----|-----------------------------------|----|
|                                                                                    |    | 02                                | 04 | 08                                | 10 |
| Code: 2 (Straight without Key)                                                     |    |                                   |    |                                   |    |
|   | LR | 30                                |    | 40                                |    |
|                                                                                    | S  | 14 <sup>0</sup> <sub>-0.011</sub> |    | 19 <sup>0</sup> <sub>-0.013</sub> |    |
| Code: 6 (Straight with Key and Tap)                                                |    |                                   |    |                                   |    |
|  | LR | 30                                |    | 40                                |    |
|                                                                                    | QK | 14                                |    | 22                                |    |
|                                                                                    | S  | 14 <sup>0</sup> <sub>-0.011</sub> |    | 19 <sup>0</sup> <sub>-0.013</sub> |    |
|                                                                                    | W  | 5                                 |    | 6                                 |    |
|                                                                                    | T  | 5                                 |    | 6                                 |    |
|                                                                                    | U  | 3                                 |    | 3.5                               |    |
|                                                                                    | P  | M5 × 8L                           |    | M6 × 10L                          |    |

# Servomotors without Gears and without Holding Brakes

## ◆ SGM7A-15, -20, and -25



| Model SGM7A- | L*  | LL* | LM  | LP* | LR | KB1 | KB2* | KL1 |
|--------------|-----|-----|-----|-----|----|-----|------|-----|
| 15A□A61      | 202 | 157 | 121 | 36  | 45 | 107 | 145  | 94  |
| 20A□A61      | 218 | 173 | 137 | 36  | 45 | 123 | 161  | 94  |
| 25A□A61      | 241 | 196 | 160 | 36  | 45 | 146 | 184  | 94  |

| Model SGM7A- | Flange Dimensions |                                   |     |    |    |     |    | Shaft End Dimensions              |    | Approx. Mass [kg] |
|--------------|-------------------|-----------------------------------|-----|----|----|-----|----|-----------------------------------|----|-------------------|
|              | LA                | LB                                | LC  | LE | LG | LH  | LZ | S                                 | Q  |                   |
| 15A□A61      | 115               | 95 <sup>0</sup> <sub>-0.035</sub> | 100 | 3  | 10 | 130 | 7  | 24 <sup>0</sup> <sub>-0.013</sub> | 40 | 4.6               |
| 20A□A61      | 115               | 95 <sup>0</sup> <sub>-0.035</sub> | 100 | 3  | 10 | 130 | 7  | 24 <sup>0</sup> <sub>-0.013</sub> | 40 | 5.4               |
| 25A□A61      | 115               | 95 <sup>0</sup> <sub>-0.035</sub> | 100 | 3  | 10 | 130 | 7  | 24 <sup>0</sup> <sub>-0.013</sub> | 40 | 6.8               |

\* For models that have a batteryless absolute encoder, L, LL, LP, and KB2 are 8 mm greater than the given value. Refer to the following section for the values for individual models.

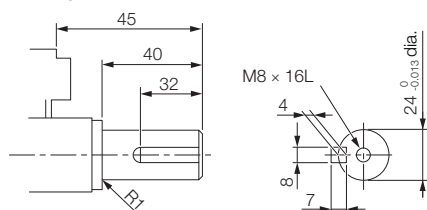
### 🔧 Dimensions of Servomotors with Batteryless Absolute Encoders (page 95)

Note: 1. The values in parentheses are for Servomotors with Holding Brakes.

2. The values for a straight, without key specification are given. Refer to the information given below for other shaft end specifications and option specifications.

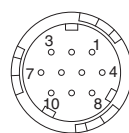
## ■ Shaft End Specifications

### • Straight with Key and Tap



## ■ Connector Specifications

### • Encoder Connector (24-bit Encoder)



|    |        |    |                   |
|----|--------|----|-------------------|
| 1  | PS     | 6* | BAT(+)            |
| 2  | /PS    | 7  | —                 |
| 3  | —      | 8  | —                 |
| 4  | PG5V   | 9  | PG0V              |
| 5* | BAT(-) | 10 | FG (frame ground) |

\* A battery is required only for an absolute encoder.

Receptacle: CM10-R10P-D

Applicable plug: Not provided by Yaskawa.

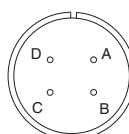
Plug: CM10-AP10S-□-D for Right-angle Plug

CM10-SP10S-□-D for Straight Plug

(□ depends on the applicable cable size.)

Manufacturer: DDK Ltd.

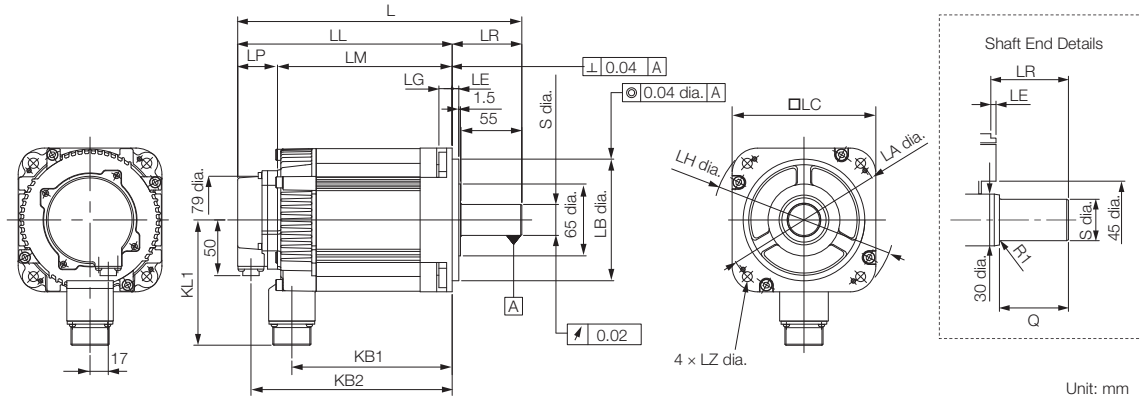
### • Servomotor Connector



|   |         |   |                   |
|---|---------|---|-------------------|
| A | Phase U | C | Phase W           |
| B | Phase V | D | FG (frame ground) |

Manufacturer: DDK Ltd.

## ◆ SGM7A-30, -40, and -50



| Model SGM7A- | L*  | LL* | LM  | LP* | LR | KB1 | KB2* | KL1 |
|--------------|-----|-----|-----|-----|----|-----|------|-----|
| 30A□A61      | 257 | 194 | 158 | 36  | 63 | 145 | 182  | 114 |
| 40A□A61      | 296 | 233 | 197 | 36  | 63 | 184 | 221  | 114 |
| 50A□A61      | 336 | 273 | 237 | 36  | 63 | 224 | 261  | 114 |

| Model SGM7A- | Flange Dimensions |                                    |     |    |    |     |    | Shaft End Dimensions              |    | Approx. Mass [kg] |
|--------------|-------------------|------------------------------------|-----|----|----|-----|----|-----------------------------------|----|-------------------|
|              | LA                | LB                                 | LC  | LE | LG | LH  | LZ | S                                 | Q  |                   |
| 30A□A61      | 145               | 110 <sup>0</sup> <sub>-0.035</sub> | 130 | 6  | 12 | 165 | 9  | 28 <sup>0</sup> <sub>-0.013</sub> | 55 | 10.5              |
| 40A□A61      | 145               | 110 <sup>0</sup> <sub>-0.035</sub> | 130 | 6  | 12 | 165 | 9  | 28 <sup>0</sup> <sub>-0.013</sub> | 55 | 13.5              |
| 50A□A61      | 145               | 110 <sup>0</sup> <sub>-0.035</sub> | 130 | 6  | 12 | 165 | 9  | 28 <sup>0</sup> <sub>-0.013</sub> | 55 | 16.5              |

\* For models that have a batteryless absolute encoder, L, LL, LP, and KB2 are 8 mm greater than the given value. Refer to the following section for the values for individual models.

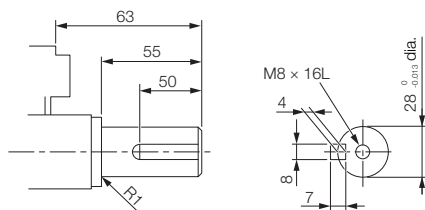
🔧 **Dimensions of Servomotors with Batteryless Absolute Encoders (page 95)**

Note: 1. The values in parentheses are for Servomotors with Holding Brakes.

2. The values for a straight, without key specification are given. Refer to the information given below for other shaft end specifications and option specifications.

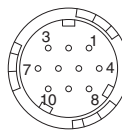
■ **Shaft End Specifications**

• **Straight with Key and Tap**



■ **Connector Specifications**

• **Encoder Connector (24-bit Encoder)**



|    |        |    |                   |
|----|--------|----|-------------------|
| 1  | PS     | 6* | BAT(+)            |
| 2  | /PS    | 7  | —                 |
| 3  | —      | 8  | —                 |
| 4  | PG5V   | 9  | PG0V              |
| 5* | BAT(—) | 10 | FG (frame ground) |

\* A battery is required only for an absolute encoder.

Receptacle: CM10-R10P-D

Applicable plug: Not provided by Yaskawa.

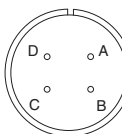
Plug: CM10-AP10S-□-D for Right-angle Plug

CM10-SP10S-□-D for Straight Plug

(□ depends on the applicable cable size.)

Manufacturer: DDK Ltd.

• **Servomotor Connector**

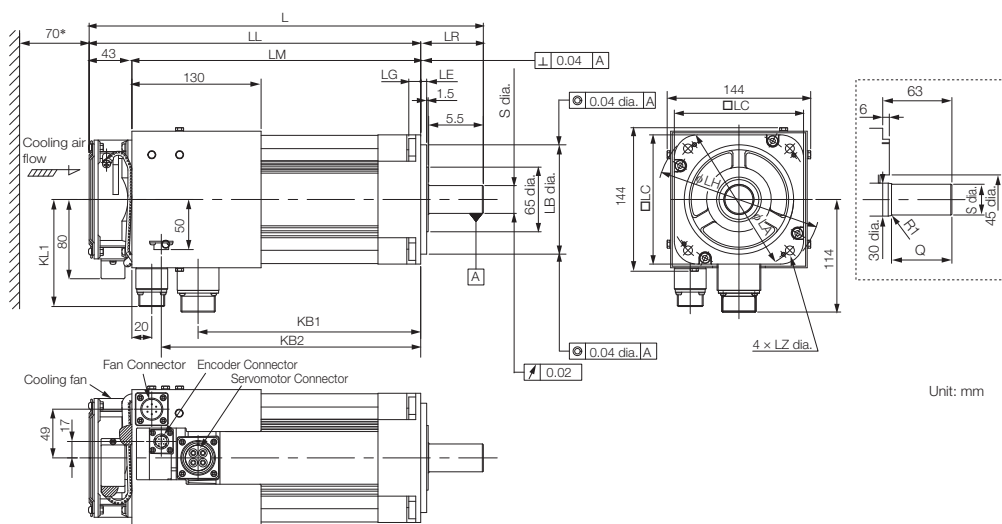


|   |         |   |                   |
|---|---------|---|-------------------|
| A | Phase U | C | Phase W           |
| B | Phase V | D | FG (frame ground) |

Manufacturer: DDK Ltd.



## ◆ SGM7A-70



\* Leave a minimum space of 70 mm around Servomotor from walls and other equipment to allow for a sufficient amount of cooling air.

| Model<br>SGM7A- | L   | LL  | LM  | LR | KB1 | KB2<br>* | KL1 | Flange Dimensions |                                    |     |    |    |     |    | Shaft End<br>Dimension<br>s       |    | Approx.<br>Mass<br>[kg] |
|-----------------|-----|-----|-----|----|-----|----------|-----|-------------------|------------------------------------|-----|----|----|-----|----|-----------------------------------|----|-------------------------|
|                 |     |     |     |    |     |          |     | LA                | LB                                 | LC  | LE | LG | LH  | LZ | S                                 | Q  |                         |
| 70A□A61         | 397 | 334 | 291 | 63 | 224 | 261      | 108 | 145               | 110 <sup>0</sup> <sub>-0.035</sub> | 130 | 6  | 12 | 165 | 9  | 28 <sup>0</sup> <sub>-0.013</sub> | 55 | 18.5                    |

\* For models that have a batteryless absolute encoder, KB is 8 mm greater than the given value. Refer to the following section for the values for individual models.

### ✎ Dimensions of Servomotors with Batteryless Absolute Encoders (page 95)

Note: 1. The values in parentheses are for Servomotors with Holding Brakes.

2. The values for a straight, without key specification are given. Refer to the information given below for other shaft end specifications and option specifications.

### ■ Cooling Fan Specifications

Single-phase, 220 V  
50/60 Hz  
17/15 W  
0.11/0.09 A

### ■ Specifications of Fan Operation Error Detector

Contact Capacity

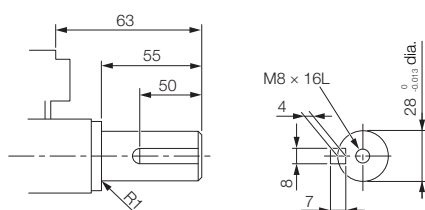
Maximum allowable voltage: 350 V (AC/DC)  
Maximum allowable current: 120 mA (AC/DC)  
Maximum controllable power: 360 mW

Alarm Contacts

ON for normal fan rotation.  
OFF at  $1,680 \pm 100 \text{ min}^{-1}$  max.  
OFF for 3 seconds at startup.

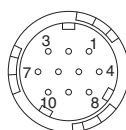
### ■ Shaft End Specifications

#### • Straight with Key and Tap



### ■ Connector Specifications

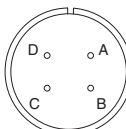
#### • Encoder Connector (24-bit Encoder)



|    |        |    |                   |
|----|--------|----|-------------------|
| 1  | PS     | 6* | BAT(+)            |
| 2  | /PS    | 7  | —                 |
| 3  | —      | 8  | —                 |
| 4  | PG5V   | 9  | PG0V              |
| 5* | BAT(-) | 10 | FG (frame ground) |

\* A battery is required only for an absolute encoder.  
Receptacle: CM10-R10P-D  
Applicable plug: Not provided by Yaskawa.  
Plug: CM10-AP10S-□-D for Right-angle Plug  
CM10-SP10S-□-D for Straight Plug  
(□ depends on the applicable cable size.)  
Manufacturer: DDK Ltd.

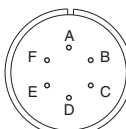
#### • Servomotor Connector



|   |         |  |                   |
|---|---------|--|-------------------|
| A | Phase U |  | Phase W           |
| B | Phase V |  | FG (frame ground) |

Manufacturer: DDK Ltd.

#### • Fan Connector



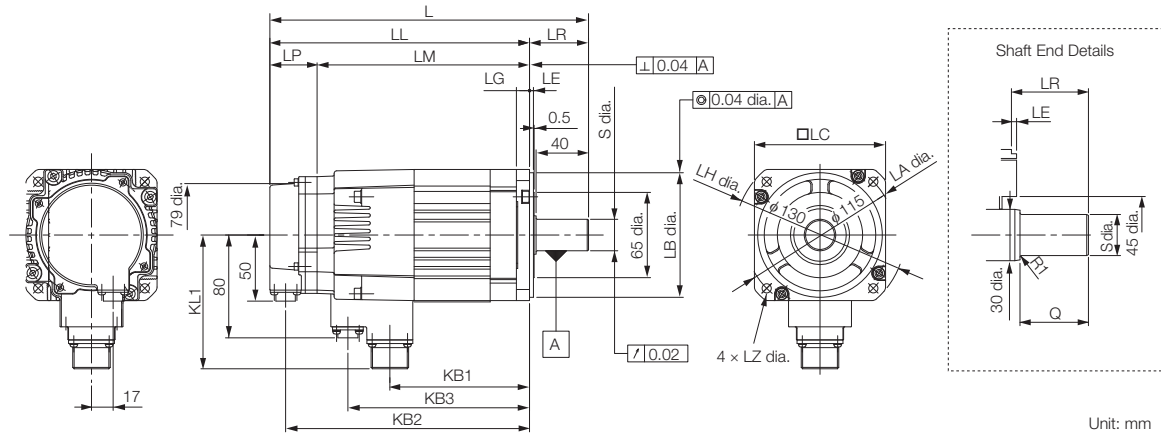
|  |           |   |                   |
|--|-----------|---|-------------------|
|  | Fan motor | D | Alarm pin         |
|  | Fan motor | E | Alarm pin         |
|  | —         | F | FG (frame ground) |

Receptacle: MS3102A14S-6P  
Applicable Plug (Available from Yaskawa Controls Co., Ltd.)  
Plug: MS3108B14S-6S  
Cable Clamp: MS3057-6A

Note: The Servomotor Connector (receptacle) is RoHS compliant.  
Contact the connector manufacturer for RoHS-compliant cable-side connectors (not provided by Yaskawa).

# Servomotors without Gears and with Holding Brakes

## ◆ SGM7A-15 to -25



| Model SGM7A- | L*  | LL* | LM  | LP* | LR | KB1 | KB2* | KB3 | KL1 |
|--------------|-----|-----|-----|-----|----|-----|------|-----|-----|
| 15A□A6C      | 243 | 198 | 162 | 36  | 45 | 107 | 186  | 139 | 102 |
| 20A□A6C      | 259 | 214 | 178 | 36  | 45 | 123 | 202  | 155 | 102 |
| 25A□A6C      | 292 | 247 | 211 | 36  | 45 | 156 | 235  | 188 | 102 |

| Model SGM7A- | Flange Dimensions |                                   |     |    |    |     |    | Shaft End Dimensions              |    | Approx. Mass [kg] |
|--------------|-------------------|-----------------------------------|-----|----|----|-----|----|-----------------------------------|----|-------------------|
|              | LA                | LB                                | LC  | LE | LG | LH  | LZ | S                                 | Q  |                   |
| 15A□A6C      | 115               | 95 <sup>0</sup> <sub>-0.035</sub> | 100 | 3  | 10 | 130 | 7  | 24 <sup>0</sup> <sub>-0.013</sub> | 40 | 6.0               |
| 20A□A6C      | 115               | 95 <sup>0</sup> <sub>-0.035</sub> | 100 | 3  | 10 | 130 | 7  | 24 <sup>0</sup> <sub>-0.013</sub> | 40 | 6.8               |
| 25A□A6C      | 115               | 95 <sup>0</sup> <sub>-0.035</sub> | 100 | 3  | 10 | 130 | 7  | 24 <sup>0</sup> <sub>-0.013</sub> | 40 | 8.7               |

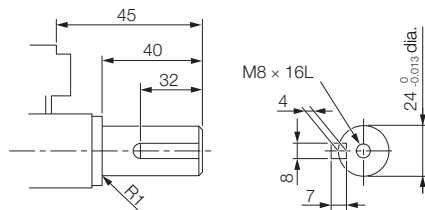
\* For models that have a batteryless absolute encoder, L, LL, LP, and KB2 are 8 mm greater than the given value. Refer to the following section for the values for individual models. **Dimensions of Servomotors with Batteryless Absolute Encoders** (page 95)

Note: 1. The values in parentheses are for Servomotors with Holding Brakes.

2. The values for a straight, without key specification are given. Refer to the information given below for other shaft end specifications and option specifications.

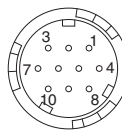
### ■ Shaft End Specifications

#### • Straight with Key and Tap



### ■ Connector Specifications

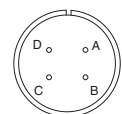
#### • Encoder Connector (24-bit Encoder)



|    |        |    |                   |
|----|--------|----|-------------------|
| 1  | PS     | 6* | BAT(+)            |
| 2  | /PS    | 7  | —                 |
| 3  | —      | 8  | —                 |
| 4  | PG5V   | 9  | PG0V              |
| 5* | BAT(-) | 10 | FG (frame ground) |

\* A battery is required only for an absolute encoder.  
 Receptacle: CM10-R10P-D  
 Applicable plug: Not provided by Yaskawa.  
 Plug: CM10-AP10S-□-D for Right-angle Plug  
 CM10-SP10S-□-D for Straight Plug  
 (□ depends on the applicable cable size.)  
 Manufacturer: DDK Ltd.

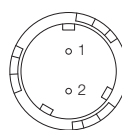
#### • Servomotor Connector



|   |         |   |                   |
|---|---------|---|-------------------|
| A | Phase U | C | Phase W           |
| B | Phase V | D | FG (frame ground) |

Manufacturer: DDK Ltd.

#### • Brake Connector

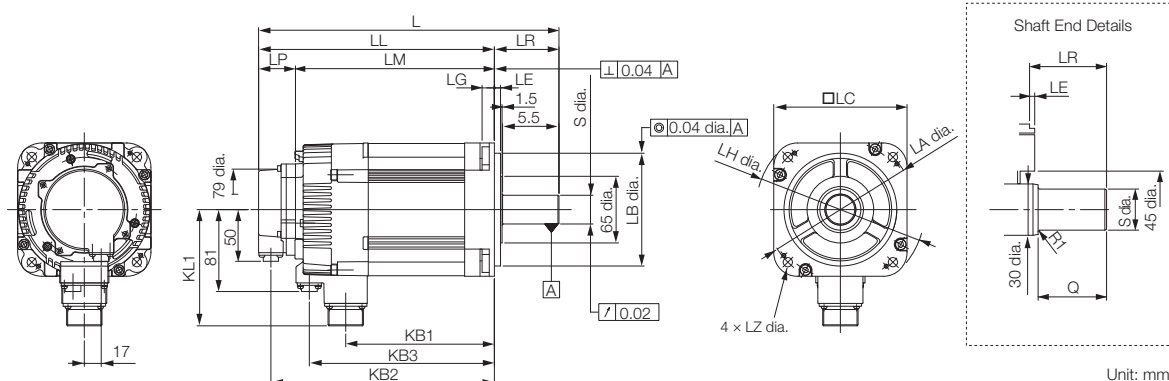


|   |                |
|---|----------------|
| 1 | Brake terminal |
| 2 | Brake terminal |

Note: There is no voltage polarity for the brake terminals.

Receptacle: CM10-R10P-D  
 Applicable plug: Not provided by Yaskawa.  
 Plug: CM10-AP2S-□-D for Right-angle Plug  
 CM10-SP2S-□-D for Straight Plug  
 (□ depends on the applicable cable size.)  
 Manufacturer: DDK Ltd.

## ◆ SGM7A-30 to -50



| Model<br>SGM7A- | L*  | LL* | LM  | LP* | LR | KB1 | KB2* | KB3 | KL1 |
|-----------------|-----|-----|-----|-----|----|-----|------|-----|-----|
| 30A□A6C         | 293 | 232 | 196 | 36  | 63 | 145 | 220  | 181 | 119 |
| 40A□A6C         | 332 | 269 | 233 | 36  | 63 | 184 | 257  | 220 | 119 |
| 50A□A6C         | 372 | 309 | 273 | 36  | 63 | 224 | 297  | 260 | 119 |

| Model<br>SGM7A- | Flange Dimensions |                                    |     |    |    |     |    | Shaft End Dimensions              |    | Approx.<br>Mass [kg] |
|-----------------|-------------------|------------------------------------|-----|----|----|-----|----|-----------------------------------|----|----------------------|
|                 | LA                | LB                                 | LC  | LE | LG | LH  | LZ | S                                 | Q  |                      |
| 30A□A6C         | 145               | 110 <sup>0</sup> <sub>-0.035</sub> | 130 | 6  | 12 | 165 | 9  | 28 <sup>0</sup> <sub>-0.013</sub> | 55 | 13                   |
| 40A□A6C         | 145               | 110 <sup>0</sup> <sub>-0.035</sub> | 130 | 6  | 12 | 165 | 9  | 28 <sup>0</sup> <sub>-0.013</sub> | 55 | 16                   |
| 50A□A6C         | 145               | 110 <sup>0</sup> <sub>-0.035</sub> | 130 | 6  | 12 | 165 | 9  | 28 <sup>0</sup> <sub>-0.013</sub> | 55 | 19                   |

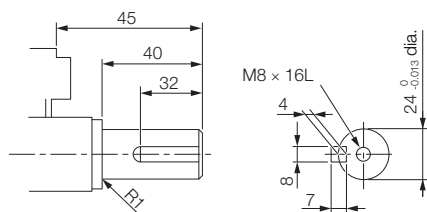
\* For models that have a batteryless absolute encoder, L, LL, LP, and KB2 are 8 mm greater than the given value. Refer to the following section for the values for individual models. **Dimensions of Servomotors with Batteryless Absolute Encoders** (page 95)

Note: 1. The values in parentheses are for Servomotors with Holding Brakes.

2. The values for a straight, without key specification are given. Refer to the information given below for other shaft end specifications and option specifications.

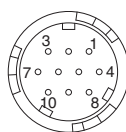
## ■ Shaft End Specifications

## • Straight with Key and Tap



## ■ Connector Specifications

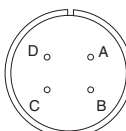
## • Encoder Connector (24-bit Encoder)



|    |        |    |                   |
|----|--------|----|-------------------|
| 1  | PS     | 6* | BAT(+)            |
| 2  | /PS    | 7  | —                 |
| 3  | —      | 8  | —                 |
| 4  | PG5V   | 9  | PG0V              |
| 5* | BAT(-) | 10 | FG (frame ground) |

\* A battery is required only for an absolute encoder.  
 Receptacle: CM10-R10P-D  
 Applicable plug: Not provided by Yaskawa.  
 Plug: CM10-AP10S-□-D for Right-angle Plug  
 CM10-SP10S-□-D for Straight Plug  
 (□ depends on the applicable cable size.)  
 Manufacturer: DDK Ltd.

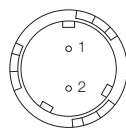
## • Servomotor Connector



|   |         |   |                   |
|---|---------|---|-------------------|
| A | Phase U | C | Phase W           |
| B | Phase V | D | FG (frame ground) |

Manufacturer: DDK Ltd.

## • Brake Connector



|   |                |
|---|----------------|
| 1 | Brake terminal |
| 2 | Brake terminal |

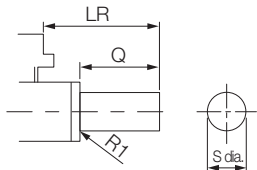
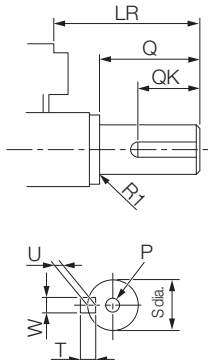
Note: There is no voltage polarity for the brake terminals.

Receptacle: CM10-R10P-D  
 Applicable plug: Not provided by Yaskawa.  
 Plug: CM10-AP2S-□-D for Right-angle Plug  
 CM10-SP2S-□-D for Straight Plug  
 (□ depends on the applicable cable size.)  
 Manufacturer: DDK Ltd.

## Shaft End Specifications for SGM7A-15A to -70A (200V)

## ◆ SGM7A-□□□□□□□□

| Code | Specification                                                                              |
|------|--------------------------------------------------------------------------------------------|
| 2    | Straight without key                                                                       |
| 6    | Straight with key and tap for one location<br>(Key slot is JIS B1301-1996 fastening type.) |

| Shaft End Details                                                                  |    | Servo Motor Model SGM7A-          |     |     |                                   |     |     |     |
|------------------------------------------------------------------------------------|----|-----------------------------------|-----|-----|-----------------------------------|-----|-----|-----|
|                                                                                    |    | 15A                               | 20A | 25A | 30A                               | 40A | 50A | 70A |
| Code: 2 (Straight without Key)                                                     |    |                                   |     |     |                                   |     |     |     |
|   | LR | 45                                |     |     | 63                                |     |     |     |
|                                                                                    | Q  | 40                                |     |     | 55                                |     |     |     |
|                                                                                    | S  | 24 <sup>0</sup> <sub>-0.013</sub> |     |     | 28 <sup>0</sup> <sub>-0.013</sub> |     |     |     |
| Code: 6 (Straight with Key and Tap)                                                |    |                                   |     |     |                                   |     |     |     |
|  | LR | 45                                |     |     | 63                                |     |     |     |
|                                                                                    | Q  | 40                                |     |     | 55                                |     |     |     |
|                                                                                    | QK | 32                                |     |     | 50                                |     |     |     |
|                                                                                    | S  | 24 <sup>0</sup> <sub>-0.013</sub> |     |     | 28 <sup>0</sup> <sub>-0.013</sub> |     |     |     |
|                                                                                    | W  | 8                                 |     |     |                                   |     |     |     |
|                                                                                    | T  | 7                                 |     |     |                                   |     |     |     |
|                                                                                    | U  | 4                                 |     |     |                                   |     |     |     |
|                                                                                    | P  | M8 screw, Depth: 16               |     |     |                                   |     |     |     |

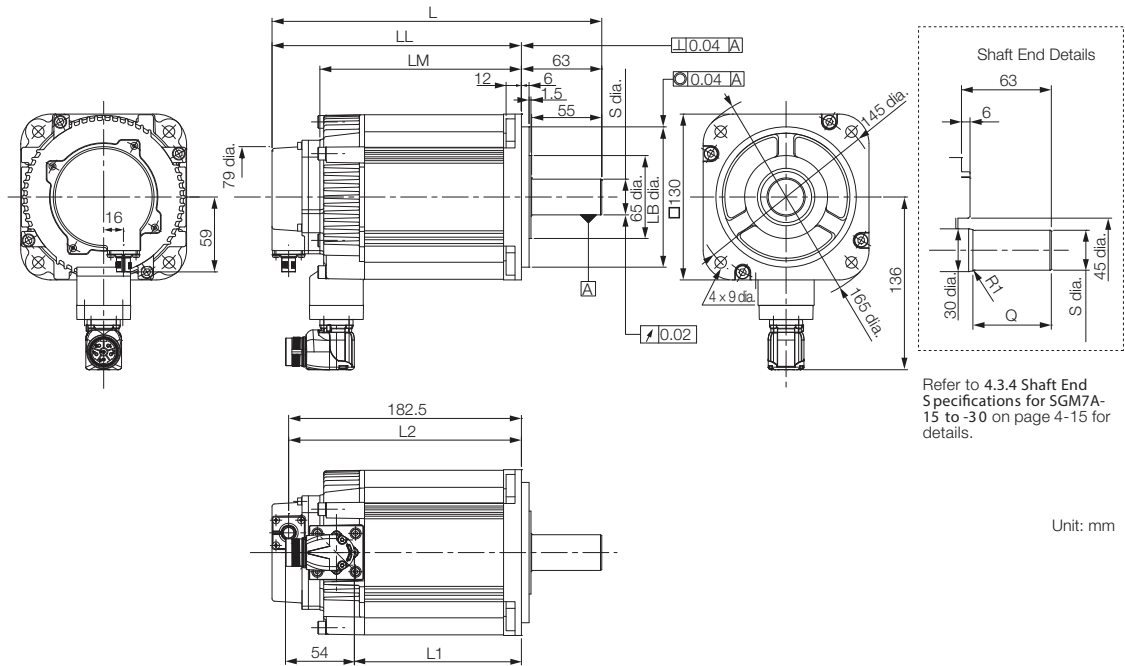
◆ SGM7A-15D to -25D (400 V Models)



Note: 1. The values in parentheses are for Servo Motors with Holding Brakes.

2. Servomotors with Dust Seals have the same dimensions.
3. Refer to Shaft End Specifications for SGM7A-15 to -70 for details.

◆ SGM7A-30D to -50D (400 V Models)



| Model SGM7A- | L            | LL           | LM           | L1  | L2           | LB                                 | Shaft End Dimensions              |    | Approx. Mass [kg] |
|--------------|--------------|--------------|--------------|-----|--------------|------------------------------------|-----------------------------------|----|-------------------|
|              |              |              |              |     |              |                                    | S                                 | Q  |                   |
| 30D□F6□      | 259<br>(295) | 196<br>(232) | 158<br>(194) | 131 | 183<br>(219) | 110 <sup>0</sup> <sub>-0.035</sub> | 28 <sup>0</sup> <sub>-0.013</sub> | 55 | 10.6<br>(13.1)    |
| 40D□F6□      | 298<br>(334) | 235<br>(271) | 197<br>(233) | 170 | 222<br>(258) | 110 <sup>0</sup> <sub>-0.035</sub> | 28 <sup>0</sup> <sub>-0.013</sub> | 55 | 14.0<br>(16.5)    |
| 50D□F6□      | 338<br>(374) | 275<br>(311) | 237<br>(273) | 210 | 262<br>(298) | 110 <sup>0</sup> <sub>-0.035</sub> | 28 <sup>0</sup> <sub>-0.013</sub> | 55 | 17.0<br>(19.5)    |

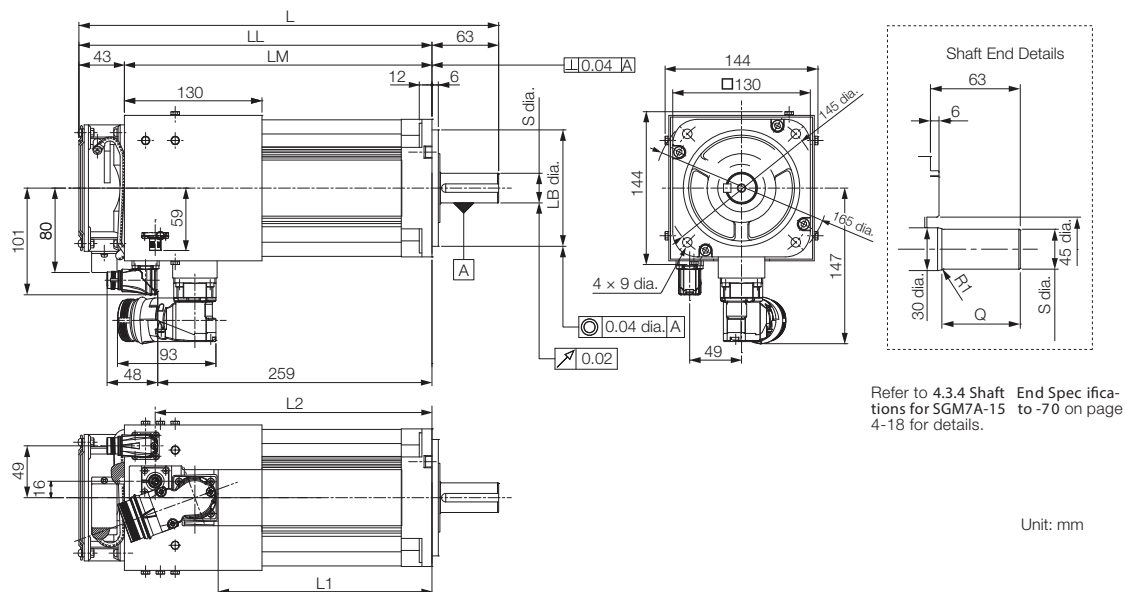
\* For 400V models larger than 1.0kW that have a batteryless absolute encoder, L and LL are 6mm greater than the given value.

Note: 1. The values in parentheses are for Servo Motors with Holding Brakes.

2. Servomotors with Dust Seals have the same dimensions.

3. Refer to Shaft End Specifications for SGM7A-15 to -70 for details.

## ◆ SGM7A-70D (400 V Model)



| Model SGM7A- | L   | LL  | LM  | L1  | L2  | LB                                 | Shaft End Dimensions              |    | Approx. Mass [kg] |
|--------------|-----|-----|-----|-----|-----|------------------------------------|-----------------------------------|----|-------------------|
|              |     |     |     |     |     |                                    | S                                 | Q  |                   |
| 70D□F6□      | 397 | 334 | 291 | 204 | 262 | 110 <sup>0</sup> <sub>-0.035</sub> | 28 <sup>0</sup> <sub>-0.013</sub> | 55 | 19                |

\* For 400V models larger than 1.0kW that have a batteryless absolute encoder, L and LL are 6mm greater than the given value.

Note: 1. The values in parentheses are for Servo Motors with Holding Brakes.

2. Servomotors with Dust Seals have the same dimensions.

3. Refer to Shaft End Specifications for SGM7A-15 to -70 for details.

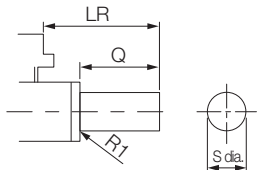
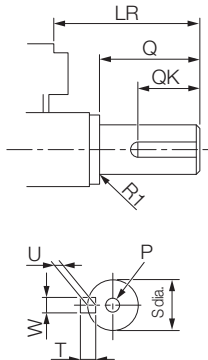
## ■ Cooling Fan Specification

- Single-Phase, 220V
- 50/60 Hz
- 17/15W
- 0.11/0.09 A

## Shaft End Specifications for SGM7A-15D to -70D (400V)

## ◆ SGM7A-□□□□□□□□

| Code | Specification                                                                              |
|------|--------------------------------------------------------------------------------------------|
| 2    | Straight without key                                                                       |
| 6    | Straight with key and tap for one location<br>(Key slot is JIS B1301-1996 fastening type.) |

| Shaft End Details                                                                  |    | Servo Motor Model SGM7A-          |     |     |                                   |     |     |     |
|------------------------------------------------------------------------------------|----|-----------------------------------|-----|-----|-----------------------------------|-----|-----|-----|
|                                                                                    |    | 15D                               | 20D | 25D | 30D                               | 40D | 50D | 70D |
| Code: 2 (Straight without Key)                                                     |    |                                   |     |     |                                   |     |     |     |
|   | LR | 45                                |     |     | 63                                |     |     |     |
|                                                                                    | Q  | 40                                |     |     | 55                                |     |     |     |
|                                                                                    | S  | 24 <sup>0</sup> <sub>-0.013</sub> |     |     | 28 <sup>0</sup> <sub>-0.013</sub> |     |     |     |
| Code: 6 (Straight with Key and Tap)                                                |    |                                   |     |     |                                   |     |     |     |
|  | LR | 45                                |     |     | 63                                |     |     |     |
|                                                                                    | Q  | 40                                |     |     | 55                                |     |     |     |
|                                                                                    | QK | 32                                |     |     | 50                                |     |     |     |
|                                                                                    | S  | 24 <sup>0</sup> <sub>-0.013</sub> |     |     | 28 <sup>0</sup> <sub>-0.013</sub> |     |     |     |
|                                                                                    | W  | 8                                 |     |     |                                   |     |     |     |
|                                                                                    | T  | 7                                 |     |     |                                   |     |     |     |
|                                                                                    | U  | 4                                 |     |     |                                   |     |     |     |
|                                                                                    | P  | M8 screw, Depth: 16               |     |     |                                   |     |     |     |



## Dimensions of Servomotors with Batteryless Absolute Encoders

### ◆ 200V Servomotors without Gears

| Model<br>SGM7A- | L                | LL               | LP         | KB2          | Approx.<br>Mass [kg] |
|-----------------|------------------|------------------|------------|--------------|----------------------|
| A5A6A□□         | 89.5<br>(130)    | 64.5<br>(105)    | —          | —            | 0.3<br>(0.6)         |
| 01A6A□□         | 101.5<br>(142)   | 76.5<br>(117)    | —          | —            | 0.4<br>(0.7)         |
| C2A6A□□         | 113.5<br>(161.5) | 88.5<br>(136.5)  | —          | —            | 0.5<br>(0.8)         |
| 02A6A□□         | 107.5<br>(148)   | 77.5<br>(118)    | —          | —            | 0.8<br>(1.4)         |
| 04A6A□□         | 123.5<br>(164)   | 93.5<br>(134)    | —          | —            | 1.2<br>(1.8)         |
| 06A6A□□         | 145.5<br>(199.5) | 115.5<br>(169.5) | —          | —            | 1.6<br>(2.2)         |
| 08A6A□□         | 145<br>(192)     | 105<br>(152)     | —          | —            | 2.4<br>(3.0)         |
| 10A6A□□         | 170<br>(217)     | 130<br>(177)     | —          | —            | 3.2<br>(3.8)         |
| 15A6A□□         | 210<br>(251)     | 165<br>(206)     | 44<br>(44) | 153<br>(194) | 4.6<br>(6.0)         |
| 20A6A□□         | 226<br>(267)     | 181<br>(222)     | 44<br>(44) | 169<br>(210) | 5.4<br>(6.8)         |
| 25A6A□□         | 249<br>(300)     | 204<br>(255)     | 44<br>(44) | 192<br>(243) | 6.8<br>(8.7)         |
| 30A6A□□         | 265<br>(301)     | 202<br>(240)     | 44<br>(44) | 190<br>(228) | 10.5<br>(13)         |
| 40A6A□□         | 304<br>(340)     | 241<br>(277)     | 44<br>(44) | 229<br>(265) | 13.5<br>(16)         |
| 50A6A□□         | 344<br>(380)     | 281<br>(317)     | 44<br>(44) | 269<br>(305) | 16.5<br>(19)         |
| 70A6A□□         | 397              | 334              | —          | 269          | 18.5                 |

Note: The values in parentheses are for Servomotors with Holding Brakes.

### ◆ 400V Servomotors without Gears

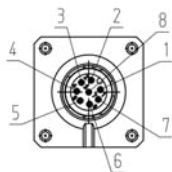
| Model<br>SGM7A- | L         | LL        | Mass (kg)   |
|-----------------|-----------|-----------|-------------|
| 15D6F□□         | 210 (251) | 165 (206) | 4.7 (6.1)   |
| 20D6F□□         | 226 (267) | 181 (222) | 5.5 (6.9)   |
| 25D6F□□         | 249 (300) | 204 (255) | 6.9 (8.8)   |
| 30D6F□□         | 265 (301) | 202 (238) | 10.6 (13.1) |
| 40D6F□□         | 304 (340) | 241 (277) | 14.0 (16.5) |
| 50D6F□□         | 344 (380) | 281 (317) | 17.0 (19.5) |
| 70D6F□□         | 403       | 340       | 19.0        |

Note: The values in parentheses are for Servomotors with Holding Brakes.

## Connector Specifications (400V)

### ◆ SGM7A-02D to -70D

#### Encoder Connector Specifications

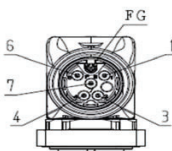


Receptacle  
Size: M12  
Part number: 1419959  
Model:  
SACC-MSQ-M12MS-25-3,2 SCO  
Manufacturer: Phoenix Contact

|         |          |
|---------|----------|
| 1       | PG 5V    |
| 2       | PG 0V    |
| 3       | FG       |
| 4       | BAT (+)  |
| 5       | BAT (-)  |
| 6       | Data (+) |
| 7       | Data (-) |
| 8       | Empty    |
| Housing | Shield   |

### ◆ SGM7-02D to -08D

#### Servo Motor Connector Specifications

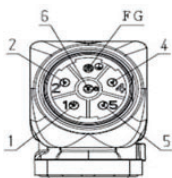


Receptacle  
Size: M17  
Part number: 1620448  
Model: ST-5EP1N8AA500S  
Manufacturer: Phoenix Contact

|         |         |
|---------|---------|
| 1       | (Brake) |
| 3       | U       |
| 4       | V       |
| 5       | Empty   |
| 6       | (Brake) |
| 7       | W       |
| FG      | FG      |
| Housing | Shield  |

### ◆ SGM7-10D to -50D

#### Servo Motor Connector Specifications

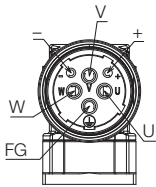


Receptacle  
Size: M23  
Part number: 1617905  
Model: ST-5EP1N8AAD00S  
Manufacturer: Phoenix Contact

|         |         |
|---------|---------|
| 1       | V       |
| 2       | (Brake) |
| 4       | (Brake) |
| 5       | U       |
| 6       | W       |
| FG      | FG      |
| Housing | Shield  |

◆ SGM7-70D

Servo Motor Connector Specifications

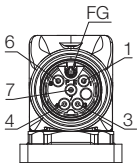


Receptacle  
Size: M40  
Part number: 1607927  
Model: SM-5EPWN8AAD00S  
Manufacturer: Phoenix Contact

|         |        |
|---------|--------|
| U       | U      |
| V       | V      |
| W       | W      |
| +       | Empty  |
| -       | Empty  |
| FG      | FG     |
| Housing | Shield |

◆ SGM7-70D

Fan Motor Connector Specifications

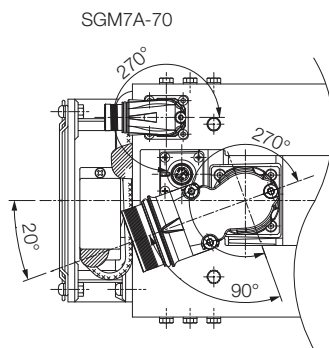
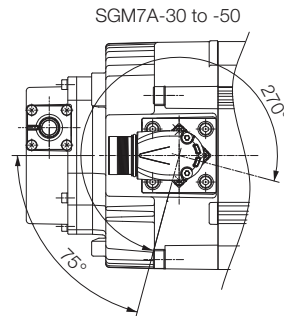
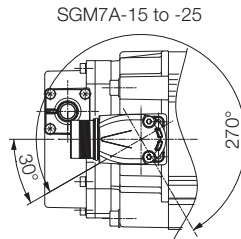
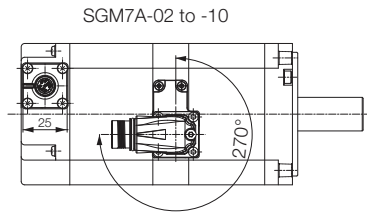


Receptacle  
Size: M17  
Part number: 1620448  
Model: ST-5EP1N8AA500S  
Manufacturer: Phoenix Contact

|         |                |
|---------|----------------|
| 1       | ALARM TERMINAL |
| 3       | FAN MOTOR      |
| 4       | FAN MOTOR      |
| 6       | ALARM TERMINAL |
| 7       | Empty          |
| FG      | FG             |
| Housing | Shield         |

## Servo Motor Connector Rotational Angle (400 V)

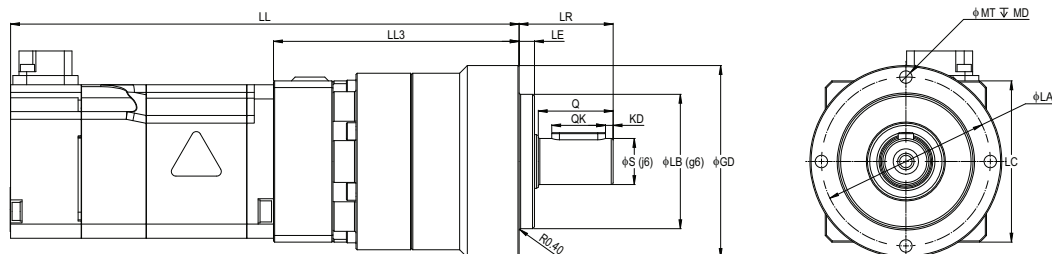
### ◆ SGM7-02D to -70D



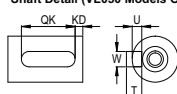
Allowable  
number of  
rotations: 10

## Gear Motors

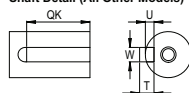
### ◆ Gear Motor Models: 100W, 200W, 400W (S7A01, S7A02, S7A04)



Shaft Detail (VL050 Models Only)



Shaft Detail (All Other Models)



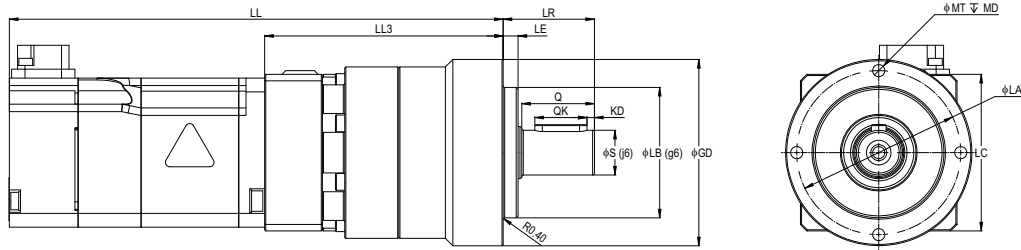
| Model S7A    |               | LL               | LL3  | LR   | LE | φS | φLB | φGD | LC | φLA | φMT | MD | Q    | QK | KD | W | U         | T                | Mass kg        |           |    |      |      |    |    |
|--------------|---------------|------------------|------|------|----|----|-----|-----|----|-----|-----|----|------|----|----|---|-----------|------------------|----------------|-----------|----|------|------|----|----|
| 100 W Models |               |                  |      |      |    |    |     |     |    |     |     |    |      |    |    |   |           |                  |                |           |    |      |      |    |    |
| 200 V        | 01A□-VL050-03 | 133.5<br>(174)   | 65   | 24.5 | 4  | 12 | 35  | 50  | 42 | 44  | M4  | 8  | 19.5 | 14 | 2  | 4 | 2.5       | 4                | 1.1 (1.4)      |           |    |      |      |    |    |
|              | 01A□-VL050-05 |                  |      |      |    |    |     |     |    |     |     |    |      |    |    |   |           |                  |                |           |    |      |      |    |    |
|              | 01A□-VL050-10 |                  |      |      |    |    |     |     |    |     |     |    |      |    |    |   |           |                  |                |           |    |      |      |    |    |
|              | 01A□-VL050-25 | 150<br>(190.5)   | 81.5 |      |    |    |     |     |    |     |     |    |      |    |    |   |           |                  | 1.2 (1.5)      |           |    |      |      |    |    |
|              | 01A□-VL070-50 | 163.5<br>(204)   | 95   | 36   | 5  | 16 | 52  | 70  | 52 | 62  | M5  | 10 | 28   | 22 | 0  | 5 | 3         | 5                |                | 2.1 (2.4) |    |      |      |    |    |
| 200 W Models |               |                  |      |      |    |    |     |     |    |     |     |    |      |    |    |   |           |                  |                |           |    |      |      |    |    |
| 200 V        | 02A□-VL050-03 | 137.5<br>(178)   | 68   | 24.5 | 4  | 12 | 35  | 50  | 65 | 44  | M4  | 8  | 19.5 | 14 | 2  | 4 | 2.5       | 4                | 1.5 (2.1)      |           |    |      |      |    |    |
|              | 02A□-VL050-05 | 80               | 36   | 5    | 16 | 52 | 70  | 62  |    | M5  | 10  | 28 | 22   | 0  | 5  | 3 | 5         | 2.3 (2.9)        |                |           |    |      |      |    |    |
|              | 02A□-VL070-10 |                  |      |      |    |    |     |     |    |     |     |    |      |    |    |   |           |                  | 149.5<br>(190) |           |    |      |      |    |    |
|              | 02A□-VL070-25 |                  |      |      |    |    |     |     |    |     |     |    |      |    |    |   |           |                  | 170.5<br>(211) |           |    |      |      |    |    |
|              | 02A□-VL070-50 | 101              |      |      |    |    |     |     |    |     |     |    |      |    |    |   |           | 2.5 (3.1)        |                |           |    |      |      |    |    |
| 400 V        | 02D□-VL050-03 | 146.5<br>(186.5) | 68   | 24.5 | 4  | 12 | 35  |     | 50 |     |     |    |      |    |    |   |           |                  | 65             | 44        | M4 | 8    | 19.5 | 14 | 2  |
|              | 02D□-VL050-05 | 80               | 36   | 5    | 16 | 52 | 70  | 62  | M5 | 10  | 28  | 22 | 0    | 5  | 3  | 5 | 2.4 (3.0) |                  |                |           |    |      |      |    |    |
|              | 02D□-VL070-10 |                  |      |      |    |    |     |     |    |     |     |    |      |    |    |   |           | 158.5<br>(198.5) |                |           |    |      |      |    |    |
|              | 02D□-VL070-25 |                  |      |      |    |    |     |     |    |     |     |    |      |    |    |   |           | 179.5<br>(219.5) |                |           |    |      |      |    |    |
|              | 02D□-VL070-50 | 101              |      |      |    |    |     |     |    |     |     |    |      |    |    |   | 2.6 (3.2) |                  |                |           |    |      |      |    |    |
| 400 W Models |               |                  |      |      |    |    |     |     |    |     |     |    |      |    |    |   |           |                  |                |           |    |      |      |    |    |
| 200 V        | 04A□-VL050-03 | 153.5<br>(194)   | 68   | 24.5 | 4  | 12 | 35  | 50  | 65 | 44  | M4  | 8  | 19.5 | 14 | 2  | 4 | 2.5       | 4                | 1.9 (2.5)      |           |    |      |      |    |    |
|              | 04A□-VL050-05 | 80               | 36   | 5    | 16 | 52 | 70  | 62  |    | M5  | 10  | 28 | 22   | 0  | 05 | 3 | 5         | 2.7 (3.3)        |                |           |    |      |      |    |    |
|              | 04A□-VL070-10 |                  |      |      |    |    |     |     |    |     |     |    |      |    |    |   |           |                  | 165.5<br>(206) |           |    |      |      |    |    |
|              | 04A□-VL070-25 |                  |      |      |    |    |     |     |    |     |     |    |      |    |    |   |           |                  | 186.5<br>(227) |           |    |      |      |    |    |
|              | 04A□-VL090-50 | 204.5<br>(245)   |      |      |    |    |     |     |    |     |     |    |      |    |    |   |           | 119              | 46             | 7         | 22 | 68   | 90   | 80 | M6 |
| 400 V        | 04D□-VL050-03 | 163<br>(203)     | 68   | 24.5 | 4  | 12 | 35  |     | 50 |     |     |    |      |    |    |   |           | 65               | 44             | M4        | 8  | 19.5 | 14   | 2  | 4  |
|              | 04D□-VL050-05 | 80               | 36   | 5    | 16 | 52 | 70  | 62  | M5 | 10  | 28  | 22 | 0    | 05 | 3  | 5 | 2.7 (3.3) |                  |                |           |    |      |      |    |    |
|              | 04D□-VL070-10 |                  |      |      |    |    |     |     |    |     |     |    |      |    |    |   |           |                  | 175<br>(215)   |           |    |      |      |    |    |
|              | 04D□-VL070-25 |                  |      |      |    |    |     |     |    |     |     |    |      |    |    |   |           |                  | 196<br>(236)   |           |    |      |      |    |    |
|              | 04D□-VL090-50 | 214<br>(254)     |      |      |    |    |     |     |    |     |     |    |      |    |    |   | 119       |                  | 46             | 7         | 22 | 68   | 90   | 80 | M6 |

Note: 1. The values in parentheses are for Servo Motors with Holding Brakes. 7.0kW motors not available with brake

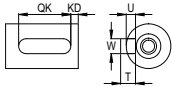
2. For 200 V models that have a batteryless absolute encoder, LL is 8 mm greater than the given value. Refer to the following section for the values for individual models.

■ Dimensions of Gear Motors with Batteryless Encoders (page 103)

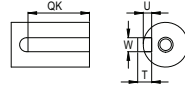
## ◆ Gear Motor Models: 750W, 1.5kW (S7A08, S7A15)



Shaft Detail (VL050 Models Only)



Shaft Detail (All Other Models)



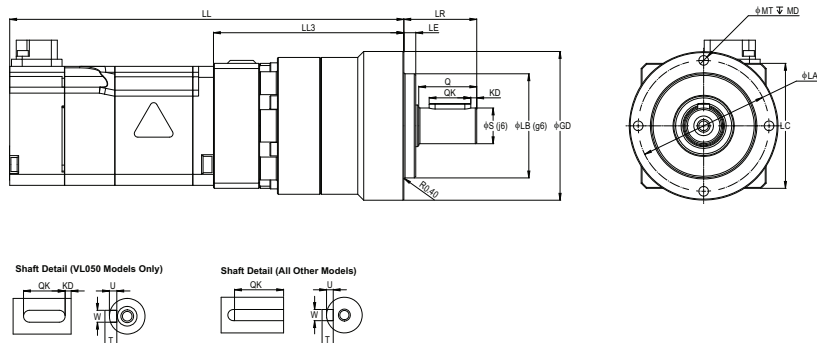
| Model S7A     |               | LL            | LL3   | LR | LE | φS | φLB | φGD | LC  | φLA | φMT | MD | Q  | QK | KD | W  | U   | T | Mass kg     |
|---------------|---------------|---------------|-------|----|----|----|-----|-----|-----|-----|-----|----|----|----|----|----|-----|---|-------------|
| 750 W Models  |               |               |       |    |    |    |     |     |     |     |     |    |    |    |    |    |     |   |             |
| 200 V         | 08A□-VL070-03 | 191 (238)     | 94    | 36 | 5  | 16 | 52  | 70  | 80  | 62  | M5  | 10 | 28 | 22 | 0  | 5  | 3   | 5 | 3.8 (4.4)   |
|               | 08A□-VL070-05 |               |       |    |    |    |     |     |     |     |     |    |    |    |    |    |     |   |             |
|               | 08A□-VL090-10 | 204 (251)     | 107   | 46 | 7  | 22 | 68  | 90  |     | 80  | M6  | 12 | 36 | 28 |    | 6  | 3.5 | 6 | 5.8 (6.4)   |
|               | 08A□-VL090-25 | 226 (273)     | 129   |    |    |    |     |     |     |     |     |    |    |    |    |    |     |   | 6.3 (6.9)   |
|               | 08A□-VL120-50 | 241.5 (288.5) | 144.5 | 70 | 9  | 32 | 90  | 120 |     | 108 | M8  | 16 | 58 | 45 |    | 10 | 5   | 8 | 11.0 (11.6) |
| 400 V         | 08D□-VL070-03 | 200.5 (247.5) | 94    | 36 | 5  | 16 | 52  | 70  | 80  | 62  | M5  | 10 | 28 | 22 | 0  | 5  | 3   | 5 | 3.9 (4.5)   |
|               | 08D□-VL070-05 |               |       |    |    |    |     |     |     |     |     |    |    |    |    |    |     |   |             |
|               | 08D□-VL090-10 | 213.5 (260.5) | 107   | 46 | 7  | 22 | 68  | 90  |     | 80  | M6  | 12 | 36 | 28 |    | 6  | 3.5 | 6 | 5.9 (6.5)   |
|               | 08D□-VL090-25 | 235.5 (282.5) | 129   |    |    |    |     |     |     |     |     |    |    |    |    |    |     |   | 6.4 (7.0)   |
|               | 08D□-VL120-50 | 251 (298)     | 144.5 | 70 | 9  | 32 | 90  | 120 |     | 108 | M8  | 16 | 58 | 45 |    | 10 | 5   | 8 | 11.1 (11.7) |
| 1 kW Models   |               |               |       |    |    |    |     |     |     |     |     |    |    |    |    |    |     |   |             |
| 200 V         | 10A□-VL070-03 | 216 (263)     | 94    | 36 | 5  | 16 | 52  | 70  | 80  | 62  | M5  | 10 | 28 | 22 | 0  | 5  | 3   | 5 | 4.6 (5.2)   |
|               | 10A□-VL070-05 |               |       |    |    |    |     |     |     |     |     |    |    |    |    |    |     |   |             |
|               | 10A□-VL090-10 | 229 (276)     | 107   | 46 | 7  | 22 | 68  | 90  |     | 80  | M6  | 12 | 36 | 28 |    | 6  | 3.5 | 6 | 6.6 (7.2)   |
|               | 10A□-VL090-25 | 251 (298)     | 129   |    |    |    |     |     |     |     |     |    |    |    |    |    |     |   | 7.1 (7.7)   |
|               | 10A□-VL120-50 | 266.5 (313.5) | 144.5 | 70 | 9  | 32 | 90  | 120 |     | 108 | M8  | 16 | 58 | 45 |    | 10 | 5   | 8 | 11.8 (12.4) |
| 400 V         | 10D□-VL070-03 | 225 (272)     | 94    | 36 | 5  | 16 | 52  | 70  | 80  | 62  | M5  | 10 | 28 | 22 | 0  | 5  | 3   | 5 | 4.7 (5.3)   |
|               | 10D□-VL070-05 |               |       |    |    |    |     |     |     |     |     |    |    |    |    |    |     |   |             |
|               | 10A□-VL090-10 | 238 (285)     | 107   | 46 | 7  | 22 | 68  | 90  |     | 80  | M6  | 12 | 36 | 28 |    | 6  | 3.5 | 6 | 6.7 (7.3)   |
|               | 10D□-VL090-25 | 260 (307)     | 129   |    |    |    |     |     |     |     |     |    |    |    |    |    |     |   | 7.2 (7.8)   |
|               | 10D□-VL120-50 | 275.5 (322.5) | 144.5 | 70 | 9  | 32 | 90  | 120 |     | 108 | M8  | 16 | 58 | 45 |    | 10 | 5   | 8 | 11.9 (12.5) |
| 1.5 kW Models |               |               |       |    |    |    |     |     |     |     |     |    |    |    |    |    |     |   |             |
| 200 V         | 15A□-VL090-03 | 276 (317)     | 119   | 46 | 7  | 22 | 68  | 90  | 100 | 80  | M6  | 12 | 36 | 28 | 0  | 6  | 3.5 | 6 | 8.1 (9.5)   |
|               | 15A□-VL090-05 |               |       |    |    |    |     |     |     |     |     |    |    |    |    |    |     |   |             |
|               | 15A□-VL090-10 | 313.5 (354.5) | 156.5 | 70 | 9  | 32 | 90  | 120 |     | 108 | M8  | 16 | 58 | 45 |    | 10 | 5   | 8 | 13.3 (14.7) |
|               | 15A□-VL120-25 |               |       |    |    |    |     |     |     |     |     |    |    |    |    |    |     |   |             |
|               | 15A□-VL120-50 |               |       |    |    |    |     |     |     |     |     |    |    |    |    |    |     |   |             |
| 400 V         | 15D□-VL090-03 | 278 (3190)    | 119   | 46 | 7  | 22 | 68  | 90  | 100 | 80  | m6  | 12 | 36 | 28 | 0  | 6  | 3.5 | 6 | 8.2 (9.6)   |
|               | 15D□-VL090-05 |               |       |    |    |    |     |     |     |     |     |    |    |    |    |    |     |   |             |
|               | 15D□-VL090-10 | 315.5 (356.5) | 156.5 | 70 | 9  | 32 | 90  | 120 |     | 108 | m8  | 16 | 58 | 45 |    | 10 | 5   | 8 | 13.4 (14.8) |
|               | 15D□-VL120-25 |               |       |    |    |    |     |     |     |     |     |    |    |    |    |    |     |   |             |
|               | 15D□-VL120-50 |               |       |    |    |    |     |     |     |     |     |    |    |    |    |    |     |   |             |

Note: 1. The values in parentheses are for Servo Motors with Holding Brakes. .70kW motors not available with brake

2. For 200 V models that have a batteryless absolute encoder, LL is 8 mm greater than the given value. Refer to the following section for the values for individual models.

■  Dimensions of Gear Motors with Batteryless Encoders (page 103)

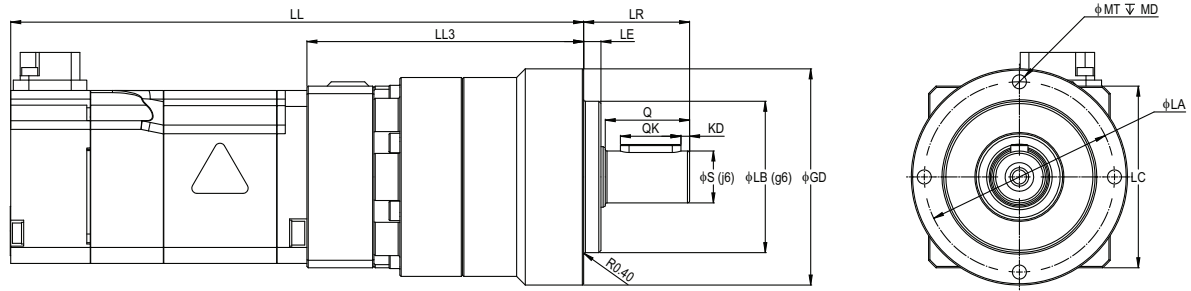
# ◆ Gear Motor Models: 2.0 to 4.4kW (S7A20, S7A25, S7A30, S7A40)



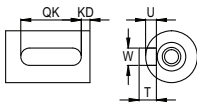
| Model S7A     |               | LL            | LL3   | LR  | LE | φS | φLB | φGD | LC  | φLA | φMT | MD | Q  | QK | KD | W  | U   | T  | Mass kg     |
|---------------|---------------|---------------|-------|-----|----|----|-----|-----|-----|-----|-----|----|----|----|----|----|-----|----|-------------|
| 2.0 kW Models |               |               |       |     |    |    |     |     |     |     |     |    |    |    |    |    |     |    |             |
| 200 V         | 20A□-VL090-03 | 292 (333)     | 119   | 46  | 7  | 22 | 68  | 90  | 100 | 80  | M6  | 12 | 36 | 28 | 0  | 6  | 3.5 | 6  | 8.9 (10.3)  |
|               | 20A□-VL090-05 |               |       |     |    |    |     |     |     |     |     |    |    |    |    |    |     |    |             |
|               | 20A□-VL120-10 | 302 (343)     | 129   | 70  | 9  | 32 | 90  | 120 |     | 108 | M8  | 16 | 58 | 45 |    | 10 | 5   | 8  | 13.2 (14.6) |
|               | 20A□-VL120-25 | 329 (370.5)   | 156.5 |     |    |    |     |     |     |     |     |    |    |    |    |    |     |    |             |
|               | 20A□-VL155-50 | 354.5 (395.5) | 181.5 | 97  | 12 | 40 | 120 | 155 |     | 140 | M10 | 20 | 82 | 65 |    | 12 | 5   | 8  | 23.4 (24.8) |
| 400 V         | 20D□-VL090-03 | 294 (3350)    | 119   | 46  | 7  | 22 | 68  | 90  | 100 | 80  | M6  | 12 | 36 | 28 | 0  | 6  | 4   | 6  | 9.0 (10.4)  |
|               | 20D□-VL090-05 |               |       |     |    |    |     |     |     |     |     |    |    |    |    |    |     |    |             |
|               | 20D□-VL120-10 | 304 (345)     | 129   | 70  | 9  | 32 | 90  | 120 |     | 108 | M8  | 16 | 58 | 45 |    | 10 | 5   | 8  | 13.3 (14.7) |
|               | 20D□-VL120-25 | 331.5 (372.5) | 156.5 |     |    |    |     |     |     |     |     |    |    |    |    |    |     |    |             |
|               | 20D□-VL155-50 | 356.5 (397.5) | 181.5 | 97  | 12 | 40 | 120 | 155 |     | 140 | M10 | 20 | 82 | 65 |    | 12 | 5   | 8  | 23.5 (24.9) |
| 2.5 kW Models |               |               |       |     |    |    |     |     |     |     |     |    |    |    |    |    |     |    |             |
| 200 V         | 25A□-VL090-03 | 315 (366)     | 119   | 46  | 7  | 22 | 68  | 90  | 100 | 80  | M6  | 12 | 36 | 28 | 0  | 6  | 3.5 | 6  | 10.3 (12.2) |
|               | 25A□-VL090-05 |               |       |     |    |    |     |     |     |     |     |    |    |    |    |    |     |    |             |
|               | 25A□-VL120-10 | 325 (376)     | 129   | 70  | 9  | 32 | 90  | 120 |     | 108 | M8  | 16 | 58 | 45 |    | 10 | 5   | 8  | 14.6 (16.5) |
|               | 25A□-VL120-25 | 352.5 (403.5) | 156.5 |     |    |    |     |     |     |     |     |    |    |    |    |    |     |    |             |
|               | 25A□-VL155-50 | 377.5 (428.5) | 181.5 | 97  | 12 | 40 | 120 | 155 |     | 140 | M10 | 20 | 82 | 65 |    | 12 |     |    | 24.8 (26.7) |
| 400 V         | 25D□-VL090-03 | 317 (368)     | 119   | 46  | 7  | 22 | 68  | 90  | 100 | 80  | M6  | 12 | 36 | 28 | 0  | 6  | 3.5 | 6  | 10.4 (12.3) |
|               | 25D□-VL090-05 |               |       |     |    |    |     |     |     |     |     |    |    |    |    |    |     |    |             |
|               | 25D□-VL120-10 | 327 (378)     | 129   | 70  | 9  | 32 | 90  | 120 |     | 108 | M8  | 16 | 58 | 45 |    | 10 | 5   | 8  | 14.7 (16.6) |
|               | 25D□-VL120-25 | 354.5 (405.5) | 156.5 |     |    |    |     |     |     |     |     |    |    |    |    |    |     |    |             |
|               | 25D□-VL155-50 | 377.5 (430.5) | 181.5 | 97  | 12 | 40 | 120 | 155 |     | 140 | M10 | 20 | 82 | 65 |    | 12 |     |    | 24.9 (26.6) |
| 3.0 kW Models |               |               |       |     |    |    |     |     |     |     |     |    |    |    |    |    |     |    |             |
| 200 V         | 30A□-VL090-03 | 318 (356)     | 124   | 46  | 7  | 22 | 68  | 90  | 130 | 80  | M6  | 12 | 36 | 28 | 0  | 6  | 3.5 | 6  | 14.0 (16.5) |
|               | 30A□-VL090-05 |               |       |     |    |    |     |     |     |     |     |    |    |    |    |    |     |    |             |
|               | 30A□-VL120-10 | 328 (366)     | 134   | 70  | 9  | 32 | 90  | 120 |     | 108 | M8  | 16 | 58 | 45 |    | 10 | 5   | 8  | 18.3 (20.8) |
|               | 30A□-VL120-25 | 355.5 (393.5) | 161.5 |     |    |    |     |     |     |     |     |    |    |    |    |    |     |    |             |
|               | 30A□-VL155-50 | 380.5 (418.5) | 186.5 | 97  | 12 | 40 | 120 | 155 |     | 140 | M10 | 20 | 82 | 65 |    | 12 |     |    | 28.5 (31.0) |
| 400 V         | 30D□-VL090-03 | 320 (356)     | 124   | 46  | 7  | 22 | 68  | 90  | 130 | 80  | M6  | 12 | 36 | 28 | 0  | 6  | 3.5 | 6  | 14.1 (16.6) |
|               | 30D□-VL090-05 |               |       |     |    |    |     |     |     |     |     |    |    |    |    |    |     |    |             |
|               | 30D□-VL120-10 | 330 (366)     | 134   | 70  | 9  | 32 | 90  | 120 |     | 108 | M8  | 16 | 58 | 45 |    | 10 | 5   | 8  | 18.4 (20.9) |
|               | 30D□-VL120-25 | 357.5 (393.5) | 161.5 |     |    |    |     |     |     |     |     |    |    |    |    |    |     |    |             |
|               | 30D□-VL155-50 | 382.5 (418.5) | 186.5 | 97  | 12 | 40 | 120 | 155 |     | 140 | M10 | 20 | 82 | 65 |    | 12 |     |    | 28.6 (31.1) |
| 4.0 kW Models |               |               |       |     |    |    |     |     |     |     |     |    |    |    |    |    |     |    |             |
| 200 V         | 40A□-VL090-03 | 357 (393)     | 124   | 46  | 7  | 22 | 68  | 90  | 130 | 80  | M6  | 12 | 36 | 28 | 0  | 6  | 3.5 | 6  | 17.0 (19.5) |
|               | 40A□-VL090-05 |               |       |     |    |    |     |     |     |     |     |    |    |    |    |    |     |    |             |
|               | 40A□-VL120-10 | 367 (403)     | 134   | 70  | 9  | 32 | 90  | 120 |     | 108 | M8  | 16 | 58 | 45 |    | 10 | 5   | 8  | 21.3 (23.8) |
|               | 40A□-VL155-25 | 419.5 (455.5) | 186.5 |     |    |    |     |     |     |     |     |    |    |    |    |    |     |    |             |
|               | 40A□-VL205-50 | 449 (485)     | 216   | 100 | 15 | 55 | 160 | 205 |     | 184 | M12 | 22 | 82 | 65 |    | 16 | 6   | 10 | 53.5 (56.0) |
| 400 V         | 40D□-VL090-03 | 359 (395)     | 124   | 46  | 7  | 22 | 68  | 90  | 130 | 80  | M6  | 12 | 36 | 28 | 0  | 6  | 3.5 | 6  | 17.5 (20.0) |
|               | 40D□-VL090-05 |               |       |     |    |    |     |     |     |     |     |    |    |    |    |    |     |    |             |
|               | 40D□-VL120-10 | 369 (405)     | 134   | 70  | 9  | 32 | 90  | 120 |     | 108 | M8  | 16 | 58 | 45 |    | 10 | 5   | 8  | 21.8 (24.4) |
|               | 40D□-VL155-25 | 421.5 (457.5) | 186.5 |     |    |    |     |     |     |     |     |    |    |    |    |    |     |    |             |
|               | 40D□-VL205-50 | 451 (487)     | 216   | 100 | 15 | 55 | 160 | 205 |     | 184 | M12 | 22 | 82 | 65 |    | 16 | 6   | 10 | 54.0 (56.6) |

Note: 1. The values in parentheses are for Servo Motors with Holding Brakes. .7.0kW motors not available with brake  
 2. For 200 V models that have a batteryless absolute encoder, LL is 8 mm greater than the given value. Refer to the following section for the values for individual models. ■=Dimensions of Gear Motors with Batteryless Encoders (page 103)

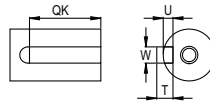
## ◆ Gear Motor Models: 5.0 to 7.0kW (S7A50, S7A70)



Shaft Detail (VL050 Models Only)



Shaft Detail (All Other Models)



| Model S7A     |               | LL    | LL3   | LR  | LE | φS | φLB | φGD | LC  | φLA | φMT | MD | Q   | QK | KD | W  | U           | T  | Mass kg     |
|---------------|---------------|-------|-------|-----|----|----|-----|-----|-----|-----|-----|----|-----|----|----|----|-------------|----|-------------|
| 5.0 kW Models |               |       |       |     |    |    |     |     |     |     |     |    |     |    |    |    |             |    |             |
| 200 V         | 50A□-VL090-03 | 397   | 124   | 46  | 7  | 22 | 68  | 90  | 130 | 80  | M6  | 12 | 36  | 28 | 0  | 6  | 3.5         | 6  | 20.0 (22.5) |
|               | 50A□-VL090-05 | (433) |       |     |    |    |     |     |     |     |     |    |     |    |    |    |             |    |             |
|               | 50A□-VL155-10 | 425   | 152   | 97  | 12 | 40 | 120 | 155 |     | 140 | M10 | 20 | 82  | 65 |    | 12 | 5           | 8  | 24.3 (26.8) |
|               | 50A□-VL155-25 | (461) |       |     |    |    |     |     |     |     |     |    |     |    |    |    |             |    |             |
|               | 50A□-VL205-50 | 489   | 216   | 100 | 15 | 55 | 160 | 205 |     | 184 | M12 | 22 | 16  | 6  |    | 10 | 56.5 (59.0) |    |             |
| 400 V         | 50D□-VL090-03 | 399   | 124   | 46  | 7  | 22 | 68  | 90  | 130 | 80  | M6  | 12 | 36  | 28 | 0  | 6  | 3.5         | 6  | 20.5 (23.0) |
|               | 50D□-VL090-05 | (435) |       |     |    |    |     |     |     |     |     |    |     |    |    |    |             |    |             |
|               | 50D□-VL155-10 | 427   | 152   | 97  | 12 | 40 | 120 | 155 |     | 140 | M10 | 20 | 82  | 65 |    | 12 | 5           | 8  | 33.0 (35.5) |
|               | 50D□-VL155-25 | (463) |       |     |    |    |     |     |     |     |     |    |     |    |    |    |             |    |             |
|               | 50D□-VL205-50 | 491   | 216   | 100 | 15 | 55 | 160 | 205 |     | 184 | M12 | 22 | 16  | 6  |    | 10 | 57.0 (59.5) |    |             |
| 7.0 kW Models |               |       |       |     |    |    |     |     |     |     |     |    |     |    |    |    |             |    |             |
| 200 V         | 70A□-VL120-03 | 468   | 134   | 70  | 9  | 32 | 90  | 120 | 130 | 108 | M8  | 16 | 58  | 45 | 0  | 10 | 5           | 8  | 26.3 (      |
|               | 70A□-VL120-05 |       |       |     |    |    |     |     |     |     |     |    |     |    |    |    |             |    |             |
|               | 70A□-VL155-10 | 486   | 152   | 97  | 12 | 40 | 120 | 155 |     | 140 | M10 | 20 | 82  | 65 |    | 12 | 6           | 10 | 34.5        |
|               | 70A□-VL205-25 | 550   | 216   | 100 | 15 | 55 | 160 | 205 |     | 184 | M12 | 22 |     |    |    | 16 |             |    | 58.5        |
|               | 70A□-VL235-50 | 559.5 | 225.5 | 126 | 18 | 75 | 180 | 235 |     | 210 | M16 | 28 | 105 | 85 |    | 20 | 7.5         | 12 | 67.5        |
| 400 V         | 70D□-VL120-03 | 468   | 134   | 70  | 9  | 32 | 90  | 120 | 130 | 108 | M8  | 16 | 58  | 45 | 0  | 10 | 5           | 8  | 26.8        |
|               | 70D□-VL120-05 |       |       |     |    |    |     |     |     |     |     |    |     |    |    |    |             |    |             |
|               | 70D□-VL155-10 | 486   | 152   | 97  | 12 | 40 | 120 | 155 |     | 140 | M10 | 20 | 82  | 65 |    | 12 | 6           | 10 | 35.0        |
|               | 70D□-VL205-25 | 550   | 216   | 100 | 15 | 55 | 160 | 205 |     | 184 | M12 | 22 |     |    |    | 16 |             |    | 59.0        |
|               | 70D□-VL235-50 | 559.5 | 225.5 | 126 | 18 | 75 | 180 | 235 |     | 210 | M16 | 28 | 105 | 85 |    | 20 | 7.5         | 12 | 76.0        |

Note: 1. The values in parentheses are for Servo Motors with Holding Brakes. 7.0kW motors not available with brake  
 2. For 200 V models that have a batteryless absolute encoder, LL is 8 mm greater than the given value. Refer to the following section for the values for individual models.

🔧 Dimensions of Gear Motors with Batteryless Encoders (page 103)



## ◆ Dimensions of Gear Motors with Batteryless Encoders

### ■ Servo Motors with Gears (200 V Models)

| Model S7A      | LL            | Mass (kg)   |
|----------------|---------------|-------------|
| 01B□ -VL050-03 | 141.5 (182)   | 1.1 (1.4)   |
| 01B□ -VL050-05 |               |             |
| 01B□ -VL050-10 |               |             |
| 01B□ -VL050-25 | 158 (198.5)   | 1.2 (1.5)   |
| 01B□ -VL070-50 | 171.5 (212)   | 2.1 (2.4)   |
| 02B□ -VL050-03 | 145.5 (186)   | 1.5 (2.1)   |
| 02B□ -VL050-05 |               |             |
| 02B□ -VL050-10 |               |             |
| 02B□ -VL070-25 | 157.5 (198)   | 2.3 (2.9)   |
| 02B□ -VL070-50 | 178.5 (219)   | 2.5 (3.1)   |
| 04B□ -VL050-03 | 161.5 (202)   | 1.9 (2.5)   |
| 04B□ -VL050-05 |               |             |
| 04B□ -VL070-10 |               |             |
| 04B□ -VL070-25 | 173.5 (214)   | 2.7 (3.3)   |
| 04B□ -VL070-50 | 194.5 (235)   | 2.9 (3.5)   |
| 04B□ -VL090-50 | 212.5 (253)   | 5.2 (5.8)   |
| 08B□ -VL070-03 | 199 (246)     | 3.8 (4.4)   |
| 08B□ -VL070-05 |               |             |
| 08B□ -VL090-10 |               |             |
| 08B□ -VL090-25 | 212 (259)     | 5.8 (6.4)   |
| 08B□ -VL090-50 | 234 (281)     | 6.3 (6.9)   |
| 08B□ -VL120-50 | 249.5 (296.5) | 11.0 (11.6) |

| Model S7A      | LL            | Mass (kg)   |
|----------------|---------------|-------------|
| 10B□ -VL070-03 | 224 (271)     | 4.6 (5.2)   |
| 10B□ -VL070-05 |               |             |
| 10B□ -VL090-10 |               |             |
| 10B□ -VL090-25 | 237 (284)     | 6.6 (7.2)   |
| 10B□ -VL090-50 | 259 (306)     | 7.1 (7.7)   |
| 10B□ -VL120-50 | 274.5 (321.5) | 11.8 (12.4) |
| 15B□ -VL090-03 | 284 (325)     | 8.1 (9.5)   |
| 15B□ -VL090-05 |               |             |
| 15B□ -VL090-10 |               |             |
| 15B□ -VL120-25 | 321.5 (362.5) | 13.3 (14.7) |
| 15B□ -VL120-50 |               |             |
| 20B□ -VL090-03 |               |             |
| 20B□ -VL090-05 | 300 (341)     | 8.9 (10.3)  |
| 20B□ -VL120-10 | 310 (351)     | 13.2 (14.6) |
| 20B□ -VL120-25 | 337 (378.5)   | 14.1 (15.5) |
| 20B□ -VL155-50 | 362.5 (403.5) | 23.4 (24.8) |
| 25B□ -VL090-03 | 323 (374)     | 10.3 (12.2) |
| 25B□ -VL090-05 |               |             |
| 25B□ -VL120-10 |               |             |
| 25B□ -VL120-25 | 333 (384)     | 14.6 (16.5) |
| 25B□ -VL120-50 | 360.5 (411.5) | 15.5 (17.4) |
| 25B□ -VL155-50 | 385.5 (436.5) | 24.8 (26.7) |

| Model S7A      | LL            | Mass (kg)   |
|----------------|---------------|-------------|
| 30B□ -VL090-03 | 326 (364)     | 14.0 (16.5) |
| 30B□ -VL090-05 |               |             |
| 30B□ -VL120-10 |               |             |
| 30B□ -VL120-25 | 336 (374)     | 18.3 (20.8) |
| 30B□ -VL120-50 | 363.5 (401.5) | 19.2 (21.7) |
| 30B□ -VL155-50 | 388.5 (426.5) | 28.5 (31.0) |
| 40B□ -VL090-03 | 365 (401)     | 17.0 (19.5) |
| 40B□ -VL090-05 |               |             |
| 40B□ -VL120-10 |               |             |
| 40B□ -VL155-25 | 375 (411)     | 21.3 (23.8) |
| 40B□ -VL155-50 | 427.5 (463.5) | 31.5 (34.0) |
| 40B□ -VL205-50 | 457 (493)     | 53.5 (56.0) |
| 50B□ -VL090-03 | 405 (441)     | 20.0 (22.5) |
| 50B□ -VL090-05 |               |             |
| 50B□ -VL155-10 |               |             |
| 50B□ -VL155-25 | 433 (469)     | 24.3 (26.8) |
| 50B□ -VL155-50 | 467.5 (503.5) | 34.5 (37.0) |
| 50B□ -VL205-50 | 497 (533)     | 56.5 (59.0) |
| 70B□ -VL120-03 | 476           | 26.3 ( )    |
| 70B□ -VL120-05 |               |             |
| 70B□ -VL155-10 |               |             |
| 70B□ -VL155-10 | 494           | 34.5        |
| 70B□ -VL205-25 | 558           | 58.5        |
| 70B□ -VL235-50 | 567.5         | 67.5        |

Note: The values in parentheses are for Servo Motors with Holding Brakes

### ■ Servo Motors with Gears (400 V Models)

| Model S7A      | LL            | Mass (kg)   |
|----------------|---------------|-------------|
| 02E□ -VL050-03 | 146.5 (186.5) | 1.6 (2.2)   |
| 02E□ -VL050-05 |               |             |
| 02E□ -VL050-10 |               |             |
| 02E□ -VL070-25 | 158.5 (198.5) | 2.4 (3.0)   |
| 02E□ -VL070-50 | 179.5 (219.5) | 2.6 (3.2)   |
| 04E□ -VL050-03 | 163 (203)     | 1.9 (2.5)   |
| 04E□ -VL050-05 |               |             |
| 04E□ -VL070-10 |               |             |
| 04E□ -VL070-25 | 175 (215)     | 2.7 (3.3)   |
| 04E□ -VL070-50 | 196 (236)     | 2.9 (3.5)   |
| 04E□ -VL090-50 | 214 (254)     | 5.2 (5.8)   |
| 08E□ -VL070-03 | 200.5 (247.5) | 3.9 (4.5)   |
| 08E□ -VL070-05 |               |             |
| 08E□ -VL090-10 |               |             |
| 08E□ -VL090-25 | 213.5 (260.5) | 5.9 (6.5)   |
| 08E□ -VL090-50 | 235.5 (282.5) | 6.4 (7.0)   |
| 08E□ -VL120-50 | 251 (298)     | 11.1 (11.7) |
| 10E□ -VL070-03 | 225 (272)     | 4.7 (5.3)   |
| 10E□ -VL070-05 |               |             |
| 10E□ -VL090-10 |               |             |
| 10E□ -VL090-25 | 238 (285)     | 6.7 (7.3)   |
| 10E□ -VL090-50 | 260 (307)     | 7.2 (7.8)   |
| 10E□ -VL120-50 | 275.5 (322.5) | 11.9 (12.5) |

| Model S7A      | LL            | Mass (kg)   |
|----------------|---------------|-------------|
| 15E□ -VL090-03 | 284 (325)     | 8.2 (9.6)   |
| 15E□ -VL090-05 |               |             |
| 15E□ -VL090-10 |               |             |
| 15E□ -VL120-25 | 321.5 (362.5) | 13.4 (14.8) |
| 15E□ -VL120-50 |               |             |
| 20E□ -VL090-03 |               |             |
| 20E□ -VL090-05 | 300 (341)     | 9.0 (10.4)  |
| 20E□ -VL120-10 | 310 (351)     | 13.3 (14.7) |
| 20E□ -VL120-25 | 337.5 (378.5) | 14.2 (15.6) |
| 20E□ -VL155-50 | 362.5 (403.5) | 23.5 (24.9) |
| 25E□ -VL090-03 | 323 (374)     | 10.4 (12.3) |
| 25E□ -VL090-05 |               |             |
| 25E□ -VL120-10 |               |             |
| 25E□ -VL120-25 | 333 (384)     | 14.7 (16.6) |
| 25E□ -VL120-50 | 360.5 (411.5) | 15.6 (17.5) |
| 25E□ -VL155-50 | 385.5 (436.5) | 24.9 (26.6) |
| 30E□ -VL090-03 | 326 (362)     | 14.1 (16.6) |
| 30E□ -VL090-05 |               |             |
| 30E□ -VL120-10 |               |             |
| 30E□ -VL120-25 | 336 (372)     | 18.4 (20.9) |
| 30E□ -VL120-50 | 363.5 (399.5) | 19.3 (21.8) |
| 30E□ -VL155-50 | 388.5 (424.5) | 28.6 (31.1) |

| Model S7A      | LL            | Mass (kg)   |
|----------------|---------------|-------------|
| 40E□ -VL090-03 | 365 (401)     | 17.5 (20.0) |
| 40E□ -VL090-05 |               |             |
| 40E□ -VL120-10 |               |             |
| 40E□ -VL155-25 | 375 (411)     | 21.8 (24.4) |
| 40E□ -VL155-50 | 427.5 (463.5) | 32.0 (34.5) |
| 40E□ -VL205-50 | 457 (493)     | 54.0 (56.6) |
| 50E□ -VL090-03 | 405 (441)     | 20.5 (23.0) |
| 50E□ -VL090-05 |               |             |
| 50E□ -VL155-10 |               |             |
| 50E□ -VL155-25 | 433 (469)     | 33.0 (35.5) |
| 50E□ -VL155-50 | 467.5 (503.5) | 35.0 (37.5) |
| 50E□ -VL205-50 | 497 (533)     | 57.0 (59.5) |
| 70E□ -VL120-03 | 474           | 26.8        |
| 70E□ -VL120-05 |               |             |
| 70E□ -VL155-10 |               |             |
| 70E□ -VL155-10 | 492           | 35.0        |
| 70E□ -VL205-25 | 556           | 59.0        |
| 70E□ -VL235-50 | 565.5         | 76.0        |

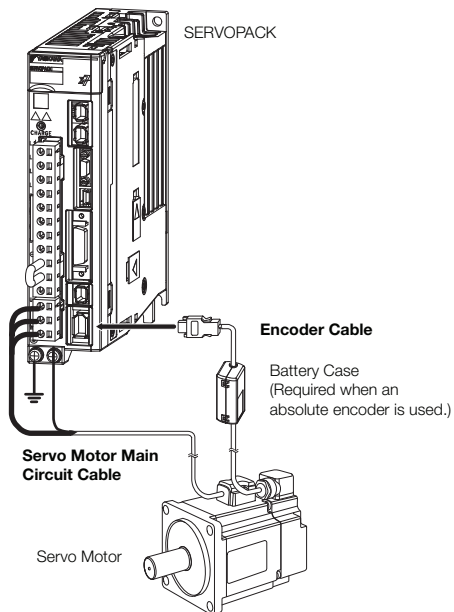
Note: The values in parentheses are for Servo Motors with Holding Brakes

## Selecting Cables

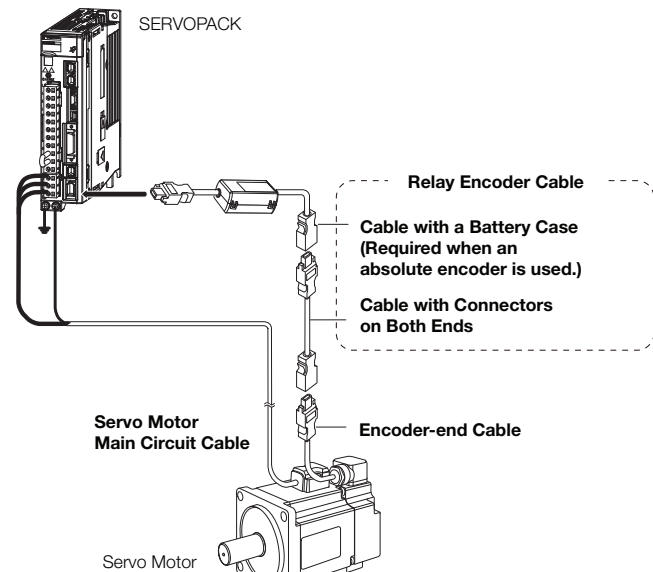
### ◆ Cable Configurations

The cables shown below are required to connect a Servo Motor to a SERVOPACK.

Encoder Cable of 20 m or Less



Encoder Cable of 30 m to 50 m (Relay Cable)



Note: 1. Cables with connectors on both ends that are compliant with an IP67 protective structure and European Safety Standards are not available from Yaskawa for the SGM7A-15A to SGM7A-30A Servo Motors. You must make such a cable yourself. Use the Connectors specified by Yaskawa for these Servo Motors. (These Connectors are compliant with the standards.) Yaskawa does not specify what wiring materials to use.

2. If the cable length exceeds 20 m, be sure to use a Relay Encoder Cable.
3. If you use a Servo Motor Main Circuit Cable that exceeds 20 m, the intermittent duty zone in the torque-motor speed characteristics will become smaller because the voltage drop increases.
4. Refer to the following manual for the following information.
  - Cable dimensional drawings and cable connection specifications
  - Order numbers and specifications of individual connectors for cables
  - Order numbers and specifications for wiring materials

📖 *Σ-7-Series AC Servo Drive Peripheral Device Selection Manual* (Manual No.: SIEP S800001 32)

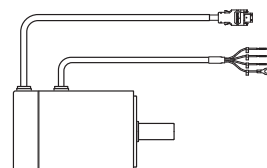


Important

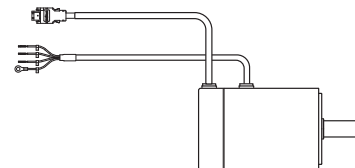
For the following Servo Motor models, there are different order numbers for the Servo Motor Main Circuit Cables and Encoder Cables depending on the cable installation direction. Confirm the order numbers before you order.

- SGM7A models SGM7A-A5 to SGM7A-10

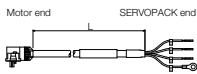
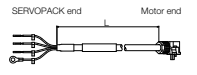
Cable Installed toward Load



Cable Installed away from Load

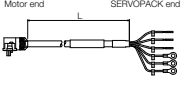
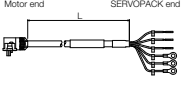
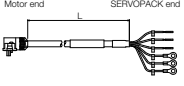
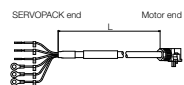


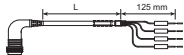
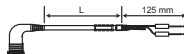
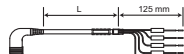
## Servo Motor Main Circuit Cables (200 V Models)

| Servo Motor Model                            | Name                                                | Length (L) | Order Number     |                              |                                 | Appearance                                                                            |
|----------------------------------------------|-----------------------------------------------------|------------|------------------|------------------------------|---------------------------------|---------------------------------------------------------------------------------------|
|                                              |                                                     |            | Standard Cable   | Flexible Cable* <sup>1</sup> | Flexible/Shielded* <sup>2</sup> |                                                                                       |
| SGM7A-A5 to -C2<br><br>50 W to 150 W (200V)  | Power cable for Servo Motors without Holding Brakes | 3 m        | JZSP-C7M10F-03-E | JZSP-C7M12F-03-E             | YAI-CSM21-03-P-E                |    |
|                                              |                                                     | 5 m        | JZSP-C7M10F-05-E | JZSP-C7M12F-05-E             | YAI-CSM21-05-P-E                |                                                                                       |
|                                              |                                                     | 10 m       | JZSP-C7M10F-10-E | JZSP-C7M12F-10-E             | YAI-CSM21-10-P-E                |                                                                                       |
|                                              |                                                     | 15 m       | JZSP-C7M10F-15-E | JZSP-C7M12F-15-E             | YAI-CSM21-15-P-E                |                                                                                       |
|                                              |                                                     | 20 m       | JZSP-C7M10F-20-E | JZSP-C7M12F-20-E             | YAI-CSM21-20-P-E                |                                                                                       |
|                                              |                                                     | 30 m       | JZSP-C7M10F-30-E | JZSP-C7M12F-30-E             | YAI-CSM21-30-P-E                |                                                                                       |
|                                              |                                                     | 40 m       | JZSP-C7M10F-40-E | JZSP-C7M12F-40-E             | YAI-CSM21-40-P-E                |                                                                                       |
|                                              |                                                     | 50 m       | JZSP-C7M10F-50-E | JZSP-C7M12F-50-E             | YAI-CSM21-50-P-E                |                                                                                       |
| SGM7A-02 to -06<br><br>200 W to 600 W (200V) | Cable installed toward load                         | 3 m        | JZSP-C7M20F-03-E | JZSP-C7M22F-03-E             | YAI-CSM22-03-P-E                |                                                                                       |
|                                              |                                                     | 5 m        | JZSP-C7M20F-05-E | JZSP-C7M22F-05-E             | YAI-CSM22-05-P-E                |                                                                                       |
|                                              |                                                     | 10 m       | JZSP-C7M20F-10-E | JZSP-C7M22F-10-E             | YAI-CSM22-10-P-E                |                                                                                       |
|                                              |                                                     | 15 m       | JZSP-C7M20F-15-E | JZSP-C7M22F-15-E             | YAI-CSM22-15-P-E                |                                                                                       |
|                                              |                                                     | 20 m       | JZSP-C7M20F-20-E | JZSP-C7M22F-20-E             | YAI-CSM22-20-P-E                |                                                                                       |
|                                              |                                                     | 30 m       | JZSP-C7M20F-30-E | JZSP-C7M22F-30-E             | YAI-CSM22-30-P-E                |                                                                                       |
|                                              |                                                     | 40 m       | JZSP-C7M20F-40-E | JZSP-C7M22F-40-E             | YAI-CSM22-40-P-E                |                                                                                       |
|                                              |                                                     | 50 m       | JZSP-C7M20F-50-E | JZSP-C7M22F-50-E             | YAI-CSM22-50-P-E                |                                                                                       |
| SGM7A-08 and -10<br><br>750 W, 1.0 kW (200V) | Cable installed toward load                         | 3 m        | JZSP-C7M30F-03-E | JZSP-C7M32F-03-E             | YAI-CSM23-03-P-E                |                                                                                       |
|                                              |                                                     | 5 m        | JZSP-C7M30F-05-E | JZSP-C7M32F-05-E             | YAI-CSM23-05-P-E                |                                                                                       |
|                                              |                                                     | 10 m       | JZSP-C7M30F-10-E | JZSP-C7M32F-10-E             | YAI-CSM23-10-P-E                |                                                                                       |
|                                              |                                                     | 15 m       | JZSP-C7M30F-15-E | JZSP-C7M32F-15-E             | YAI-CSM23-15-P-E                |                                                                                       |
|                                              |                                                     | 20 m       | JZSP-C7M30F-20-E | JZSP-C7M32F-20-E             | YAI-CSM23-20-P-E                |                                                                                       |
|                                              |                                                     | 30 m       | JZSP-C7M30F-30-E | JZSP-C7M32F-30-E             | YAI-CSM23-30-P-E                |                                                                                       |
|                                              |                                                     | 40 m       | JZSP-C7M30F-40-E | JZSP-C7M32F-40-E             | YAI-CSM23-40-P-E                |                                                                                       |
|                                              |                                                     | 50 m       | JZSP-C7M30F-50-E | JZSP-C7M32F-50-E             | YAI-CSM23-50-P-E                |                                                                                       |
| SGM7A-A5 to -C2<br><br>50 W to 150 W (200V)  | Power cable for Servo Motors without Holding Brakes | 3 m        | JZSP-C7M10G-03-E | JZSP-C7M12G-03-E             | N/A                             |  |
|                                              |                                                     | 5 m        | JZSP-C7M10G-05-E | JZSP-C7M12G-05-E             |                                 |                                                                                       |
|                                              |                                                     | 10 m       | JZSP-C7M10G-10-E | JZSP-C7M12G-10-E             |                                 |                                                                                       |
|                                              |                                                     | 15 m       | JZSP-C7M10G-15-E | JZSP-C7M12G-15-E             |                                 |                                                                                       |
|                                              |                                                     | 20 m       | JZSP-C7M10G-20-E | JZSP-C7M12G-20-E             |                                 |                                                                                       |
|                                              |                                                     | 30 m       | JZSP-C7M10G-30-E | JZSP-C7M12G-30-E             |                                 |                                                                                       |
|                                              |                                                     | 40 m       | JZSP-C7M10G-40-E | JZSP-C7M12G-40-E             |                                 |                                                                                       |
|                                              |                                                     | 50 m       | JZSP-C7M10G-50-E | JZSP-C7M12G-50-E             |                                 |                                                                                       |
| SGM7A-02 to -06<br><br>200 W to 600 W (200V) | Cable installed away from load                      | 3 m        | JZSP-C7M20G-03-E | JZSP-C7M22G-03-E             |                                 |                                                                                       |
|                                              |                                                     | 5 m        | JZSP-C7M20G-05-E | JZSP-C7M22G-05-E             |                                 |                                                                                       |
|                                              |                                                     | 10 m       | JZSP-C7M20G-10-E | JZSP-C7M22G-10-E             |                                 |                                                                                       |
|                                              |                                                     | 15 m       | JZSP-C7M20G-15-E | JZSP-C7M22G-15-E             |                                 |                                                                                       |
|                                              |                                                     | 20 m       | JZSP-C7M20G-20-E | JZSP-C7M22G-20-E             |                                 |                                                                                       |
|                                              |                                                     | 30 m       | JZSP-C7M20G-30-E | JZSP-C7M22G-30-E             |                                 |                                                                                       |
|                                              |                                                     | 40 m       | JZSP-C7M20G-40-E | JZSP-C7M22G-40-E             |                                 |                                                                                       |
|                                              |                                                     | 50 m       | JZSP-C7M20G-50-E | JZSP-C7M22G-50-E             |                                 |                                                                                       |
| SGM7A-08 and -10<br><br>750 W, 1.0 kW (200V) | Cable installed away from load                      | 3 m        | JZSP-C7M30G-03-E | JZSP-C7M32G-03-E             |                                 |                                                                                       |
|                                              |                                                     | 5 m        | JZSP-C7M30G-05-E | JZSP-C7M32G-05-E             |                                 |                                                                                       |
|                                              |                                                     | 10 m       | JZSP-C7M30G-10-E | JZSP-C7M32G-10-E             |                                 |                                                                                       |
|                                              |                                                     | 15 m       | JZSP-C7M30G-15-E | JZSP-C7M32G-15-E             |                                 |                                                                                       |
|                                              |                                                     | 20 m       | JZSP-C7M30G-20-E | JZSP-C7M32G-20-E             |                                 |                                                                                       |
|                                              |                                                     | 30 m       | JZSP-C7M30G-30-E | JZSP-C7M32G-30-E             |                                 |                                                                                       |
|                                              |                                                     | 40 m       | JZSP-C7M30G-40-E | JZSP-C7M32G-40-E             |                                 |                                                                                       |
|                                              |                                                     | 50 m       | JZSP-C7M30G-50-E | JZSP-C7M32G-50-E             |                                 |                                                                                       |

# Rotary Servo Motors

## SGM7A

| Servo Motor Model                            | Name                                             | Length (L) | Order Number     |                              |                                 | Appearance                                                                            |
|----------------------------------------------|--------------------------------------------------|------------|------------------|------------------------------|---------------------------------|---------------------------------------------------------------------------------------|
|                                              |                                                  |            | Standard Cable   | Flexible Cable* <sup>1</sup> | Flexible/Shielded* <sup>2</sup> |                                                                                       |
| SGM7A-A5 to -C2<br><br>50 W to 150 W (200V)  | Power cable for Servo Motors with Holding Brakes | 3 m        | JZSP-C7M13F-03-E | JZSP-C7M14F-03-E             | YAI-CSM31-03-P-E                |    |
|                                              |                                                  | 5 m        | JZSP-C7M13F-05-E | JZSP-C7M14F-05-E             | YAI-CSM31-05-P-E                |                                                                                       |
|                                              |                                                  | 10 m       | JZSP-C7M13F-10-E | JZSP-C7M14F-10-E             | YAI-CSM31-10-P-E                |                                                                                       |
|                                              |                                                  | 15 m       | JZSP-C7M13F-15-E | JZSP-C7M14F-15-E             | YAI-CSM31-15-P-E                |                                                                                       |
|                                              |                                                  | 20 m       | JZSP-C7M13F-20-E | JZSP-C7M14F-20-E             | YAI-CSM31-20-P-E                |                                                                                       |
|                                              |                                                  | 30 m       | JZSP-C7M13F-30-E | JZSP-C7M14F-30-E             | YAI-CSM31-30-P-E                |                                                                                       |
|                                              |                                                  | 40 m       | JZSP-C7M13F-40-E | JZSP-C7M14F-40-E             | YAI-CSM31-40-P-E                |                                                                                       |
|                                              |                                                  | 50 m       | JZSP-C7M13F-50-E | JZSP-C7M14F-50-E             | YAI-CSM31-50-P-E                |                                                                                       |
| SGM7A-02 to -06<br><br>200 W to 600 W (200V) | Cable installed toward load                      | 3 m        | JZSP-C7M23F-03-E | JZSP-C7M24F-03-E             | YAI-CSM32-03-P-E                |    |
|                                              |                                                  | 5 m        | JZSP-C7M23F-05-E | JZSP-C7M24F-05-E             | YAI-CSM32-05-P-E                |                                                                                       |
|                                              |                                                  | 10 m       | JZSP-C7M23F-10-E | JZSP-C7M24F-10-E             | YAI-CSM32-10-P-E                |                                                                                       |
|                                              |                                                  | 15 m       | JZSP-C7M23F-15-E | JZSP-C7M24F-15-E             | YAI-CSM32-15-P-E                |                                                                                       |
|                                              |                                                  | 20 m       | JZSP-C7M23F-20-E | JZSP-C7M24F-20-E             | YAI-CSM32-20-P-E                |                                                                                       |
|                                              |                                                  | 30 m       | JZSP-C7M23F-30-E | JZSP-C7M24F-30-E             | YAI-CSM32-30-P-E                |                                                                                       |
|                                              |                                                  | 40 m       | JZSP-C7M23F-40-E | JZSP-C7M24F-40-E             | YAI-CSM32-40-P-E                |                                                                                       |
|                                              |                                                  | 50 m       | JZSP-C7M23F-50-E | JZSP-C7M24F-50-E             | YAI-CSM32-50-P-E                |                                                                                       |
| SGM7A-08 and -10<br><br>750 W, 1.0 kW (200V) | Cable installed toward load                      | 3 m        | JZSP-C7M33F-03-E | JZSP-C7M34F-03-E             | YAI-CSM33-03-P-E                |    |
|                                              |                                                  | 5 m        | JZSP-C7M33F-05-E | JZSP-C7M34F-05-E             | YAI-CSM33-05-P-E                |                                                                                       |
|                                              |                                                  | 10 m       | JZSP-C7M33F-10-E | JZSP-C7M34F-10-E             | YAI-CSM33-10-P-E                |                                                                                       |
|                                              |                                                  | 15 m       | JZSP-C7M33F-15-E | JZSP-C7M34F-15-E             | YAI-CSM33-15-P-E                |                                                                                       |
|                                              |                                                  | 20 m       | JZSP-C7M33F-20-E | JZSP-C7M34F-20-E             | YAI-CSM33-20-P-E                |                                                                                       |
|                                              |                                                  | 30 m       | JZSP-C7M33F-30-E | JZSP-C7M34F-30-E             | YAI-CSM33-30-P-E                |                                                                                       |
|                                              |                                                  | 40 m       | JZSP-C7M33F-40-E | JZSP-C7M34F-40-E             | YAI-CSM33-40-P-E                |                                                                                       |
|                                              |                                                  | 50 m       | JZSP-C7M33F-50-E | JZSP-C7M34F-50-E             | YAI-CSM33-50-P-E                |                                                                                       |
| SGM7A-A5 to -C2<br><br>50 W to 150 W (200V)  | Power cable for Servo Motors with Holding Brakes | 3 m        | JZSP-C7M13G-03-E | JZSP-C7M14G-03-E             | N/A                             |  |
|                                              |                                                  | 5 m        | JZSP-C7M13G-05-E | JZSP-C7M14G-05-E             |                                 |                                                                                       |
|                                              |                                                  | 10 m       | JZSP-C7M13G-10-E | JZSP-C7M14G-10-E             |                                 |                                                                                       |
|                                              |                                                  | 15 m       | JZSP-C7M13G-15-E | JZSP-C7M14G-15-E             |                                 |                                                                                       |
|                                              |                                                  | 20 m       | JZSP-C7M13G-20-E | JZSP-C7M14G-20-E             |                                 |                                                                                       |
|                                              |                                                  | 30 m       | JZSP-C7M13G-30-E | JZSP-C7M14G-30-E             |                                 |                                                                                       |
|                                              |                                                  | 40 m       | JZSP-C7M13G-40-E | JZSP-C7M14G-40-E             |                                 |                                                                                       |
|                                              |                                                  | 50 m       | JZSP-C7M13G-50-E | JZSP-C7M14G-50-E             |                                 |                                                                                       |
| SGM7A-02 to -06<br><br>200 W to 600 W (200V) | Cable installed away from load                   | 3 m        | JZSP-C7M23G-03-E | JZSP-C7M24G-03-E             |                                 |                                                                                       |
|                                              |                                                  | 5 m        | JZSP-C7M23G-05-E | JZSP-C7M24G-05-E             |                                 |                                                                                       |
|                                              |                                                  | 10 m       | JZSP-C7M23G-10-E | JZSP-C7M24G-10-E             |                                 |                                                                                       |
|                                              |                                                  | 15 m       | JZSP-C7M23G-15-E | JZSP-C7M24G-15-E             |                                 |                                                                                       |
|                                              |                                                  | 20 m       | JZSP-C7M23G-20-E | JZSP-C7M24G-20-E             |                                 |                                                                                       |
|                                              |                                                  | 30 m       | JZSP-C7M23G-30-E | JZSP-C7M24G-30-E             |                                 |                                                                                       |
|                                              |                                                  | 40 m       | JZSP-C7M23G-40-E | JZSP-C7M24G-40-E             |                                 |                                                                                       |
|                                              |                                                  | 50 m       | JZSP-C7M23G-50-E | JZSP-C7M24G-50-E             |                                 |                                                                                       |
| SGM7A-08 and -10<br><br>750 W, 1.0 kW (200V) | Cable installed away from load                   | 3 m        | JZSP-C7M33G-03-E | JZSP-C7M34G-03-E             |                                 |                                                                                       |
|                                              |                                                  | 5 m        | JZSP-C7M33G-05-E | JZSP-C7M34G-05-E             |                                 |                                                                                       |
|                                              |                                                  | 10 m       | JZSP-C7M33G-10-E | JZSP-C7M34G-10-E             |                                 |                                                                                       |
|                                              |                                                  | 15 m       | JZSP-C7M33G-15-E | JZSP-C7M34G-15-E             |                                 |                                                                                       |
|                                              |                                                  | 20 m       | JZSP-C7M33G-20-E | JZSP-C7M34G-20-E             |                                 |                                                                                       |
|                                              |                                                  | 30 m       | JZSP-C7M33G-30-E | JZSP-C7M34G-30-E             |                                 |                                                                                       |
|                                              |                                                  | 40 m       | JZSP-C7M33G-40-E | JZSP-C7M34G-40-E             |                                 |                                                                                       |
|                                              |                                                  | 50 m       | JZSP-C7M33G-50-E | JZSP-C7M34G-50-E             |                                 |                                                                                       |

| Servo Motor Model                       | Name                                                                                           | Length (L) | Order Number   |                               |                                  | Appearance                                                                            |
|-----------------------------------------|------------------------------------------------------------------------------------------------|------------|----------------|-------------------------------|----------------------------------|---------------------------------------------------------------------------------------|
|                                         |                                                                                                |            | Standard Cable | Flexible Cable * <sup>1</sup> | Flexible/Shielded * <sup>2</sup> |                                                                                       |
| SGM7A-15 to -25<br>1.5 to 2.5 kW (200V) | Power cable for Servo Motors                                                                   | 3 m        | B1EV-03(A)-E   | N/A                           | B1EP-03(A)-E                     |    |
|                                         |                                                                                                | 5 m        | B1EV-05(A)-E   | N/A                           | B1EP-05(A)-E                     |                                                                                       |
|                                         |                                                                                                | 10 m       | B1EV-10(A)-E   | N/A                           | B1EP-10(A)-E                     |                                                                                       |
|                                         |                                                                                                | 15 m       | B1EV-15(A)-E   | N/A                           | B1EP-15(A)-E                     |                                                                                       |
|                                         |                                                                                                | 20 m       | B1EV-20(A)-E   | N/A                           | B1EP-20(A)-E                     |                                                                                       |
| SGM7A-30<br>3.0 kW (200V)               | Cable installed toward load                                                                    | 3 m        | B3EV-03(A)-E   | N/A                           | B3EP-03(A)-E                     |                                                                                       |
|                                         |                                                                                                | 5 m        | B3EV-05(A)-E   | N/A                           | B3EP-05(A)-E                     |                                                                                       |
|                                         |                                                                                                | 10 m       | B3EV-10(A)-E   | N/A                           | B3EP-10(A)-E                     |                                                                                       |
|                                         |                                                                                                | 15 m       | B3EV-15(A)-E   | N/A                           | B3EP-15(A)-E                     |                                                                                       |
|                                         |                                                                                                | 20 m       | B3EV-20(A)-E   | N/A                           | B3EP-20(A)-E                     |                                                                                       |
| SGM7A-40 to -70<br>4.0 to 7.0 kW (200V) | Cable installed toward load                                                                    | 3 m        | B4EV-03(A)-E   | N/A                           | B4EP-03(B)-E                     |                                                                                       |
|                                         |                                                                                                | 5 m        | B4EV-05(A)-E   | N/A                           | B4EP-05(B)-E                     |                                                                                       |
|                                         |                                                                                                | 10 m       | B4EV-10(A)-E   | N/A                           | B4EP-10(B)-E                     |                                                                                       |
|                                         |                                                                                                | 15 m       | B4EV-15(A)-E   | N/A                           | B4EP-15(B)-E                     |                                                                                       |
|                                         |                                                                                                | 20 m       | B4EV-20(A)-E   | N/A                           | B4EP-20(B)-E                     |                                                                                       |
| SGM7A-15 to -50<br>1.5 to 5.0 kW (200V) | Brake cable for Servo Motors with Holding Brakes<br>Cable installed toward load * <sup>3</sup> | 3 m        | BBEV-03(A)-E   | N/A                           | BBEP-03(A)-E                     |    |
|                                         |                                                                                                | 5 m        | BBEV-05(A)-E   | N/A                           | BBEP-05(A)-E                     |                                                                                       |
|                                         |                                                                                                | 10 m       | BBEV-10(A)-E   | N/A                           | BBEP-10(A)-E                     |                                                                                       |
|                                         |                                                                                                | 15 m       | BBEV-15(A)-E   | N/A                           | BBEP-15(A)-E                     |                                                                                       |
|                                         |                                                                                                | 20 m       | BBEV-20(A)-E   | N/A                           | BBEP-20(A)-E                     |                                                                                       |
| SGM7A-70 7.0kW<br>(200V)                | Fan Cable (required)                                                                           | 3 m        | BFEV-03(A)-E   | N/A                           | N/A                              |  |
|                                         |                                                                                                | 5 m        | BFEV-05(A)-E   | N/A                           | N/A                              |                                                                                       |
|                                         |                                                                                                | 10 m       | BFEV-10(A)-E   | N/A                           | N/A                              |                                                                                       |
|                                         |                                                                                                | 15 m       | BFEV-15(A)-E   | N/A                           | N/A                              |                                                                                       |
|                                         |                                                                                                | 20 m       | BFEV-20(A)-E   | N/A                           | N/A                              |                                                                                       |

\*1. Use Flexible Cables for moving parts of machines, such as robots.

\*2. The protective structure for model numbers beginning with "YA" will be IP65

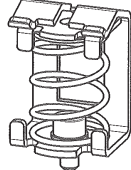
\*3. Both a power cable and a separate brake cable are required for motors with holding brakes. Use brake cable shown along with the power cables designated for motors without holding brakes.

## Servo Motor Main Circuit Cables (400 V Models)

| Servo Motor Model                          | Name                                                                    | Length<br>(L) | Order Number |          |                     | Appearance                                                                          |
|--------------------------------------------|-------------------------------------------------------------------------|---------------|--------------|----------|---------------------|-------------------------------------------------------------------------------------|
|                                            |                                                                         |               | Standard     | Flexible | Flexible/Shielded   |                                                                                     |
| SGM7A-02 to -08<br>200W to 750 W<br>(400V) | Power<br>Cable with-<br>out Brake.<br>Cable<br>installed<br>toward load | 3 m           | N/A          | N/A      | JZSP-C7M143-03-E-G6 |  |
|                                            |                                                                         | 5 m           | N/A          | N/A      | JZSP-C7M143-05-E-G6 |                                                                                     |
|                                            |                                                                         | 10 m          | N/A          | N/A      | JZSP-C7M143-10-E-G6 |                                                                                     |
|                                            |                                                                         | 15 m          | N/A          | N/A      | JZSP-C7M143-15-E-G6 |                                                                                     |
|                                            |                                                                         | 20 m          | N/A          | N/A      | JZSP-C7M143-20-E-G6 |                                                                                     |
| SGM7A-10 to -25<br>1.0 to 2.5kW (400V)     |                                                                         | 3 m           | N/A          | N/A      | JZSP-C7M144-03-E-G6 |                                                                                     |
|                                            |                                                                         | 5 m           | N/A          | N/A      | JZSP-C7M144-05-E-G6 |                                                                                     |
|                                            |                                                                         | 10 m          | N/A          | N/A      | JZSP-C7M144-10-E-G6 |                                                                                     |
|                                            |                                                                         | 15 m          | N/A          | N/A      | JZSP-C7M144-15-E-G6 |                                                                                     |
|                                            |                                                                         | 20 m          | N/A          | N/A      | JZSP-C7M144-20-E-G6 |                                                                                     |
| SGM7A-30<br>3.0kW (400V)                   |                                                                         | 3 m           | N/A          | N/A      | JZSP-C7M154-03-E-G6 |                                                                                     |
|                                            |                                                                         | 5 m           | N/A          | N/A      | JZSP-C7M154-05-E-G6 |                                                                                     |
|                                            |                                                                         | 10 m          | N/A          | N/A      | JZSP-C7M154-10-E-G6 |                                                                                     |
|                                            |                                                                         | 15 m          | N/A          | N/A      | JZSP-C7M154-15-E-G6 |                                                                                     |
|                                            |                                                                         | 20 m          | N/A          | N/A      | JZSP-C7M154-20-E-G6 |                                                                                     |
| SGM7A-40 to -50<br>4.0 to 5.0kW (400V)     |                                                                         | 3 m           | N/A          | N/A      | JZSP-C7M164-03-E-G6 |                                                                                     |
|                                            |                                                                         | 5 m           | N/A          | N/A      | JZSP-C7M164-05-E-G6 |                                                                                     |
|                                            |                                                                         | 10 m          | N/A          | N/A      | JZSP-C7M164-10-E-G6 |                                                                                     |
|                                            |                                                                         | 15 m          | N/A          | N/A      | JZSP-C7M164-15-E-G6 |                                                                                     |
|                                            |                                                                         | 20 m          | N/A          | N/A      | JZSP-C7M164-20-E-G6 |                                                                                     |
| SGM7A-70<br>7.0kW (400V)                   |                                                                         | 3 m           | N/A          | N/A      | JZSP-C7M175-03-E-G6 |                                                                                     |
|                                            |                                                                         | 5 m           | N/A          | N/A      | JZSP-C7M175-05-E-G6 |                                                                                     |
|                                            |                                                                         | 10 m          | N/A          | N/A      | JZSP-C7M175-10-E-G6 |                                                                                     |
|                                            |                                                                         | 15 m          | N/A          | N/A      | JZSP-C7M175-15-E-G6 |                                                                                     |
|                                            |                                                                         | 20 m          | N/A          | N/A      | JZSP-C7M175-20-E-G6 |                                                                                     |

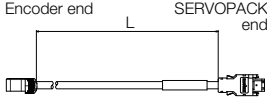
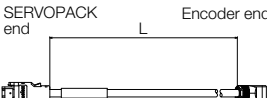
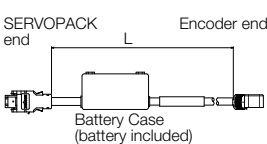
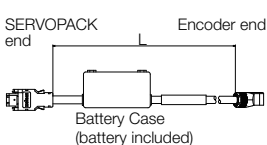
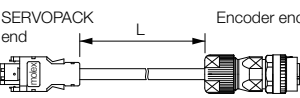
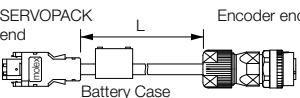
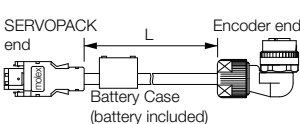
| Servo Motor Model                          | Name                                                               | Length<br>(L) | Order Number |          |                     | Appearance                                                                          |
|--------------------------------------------|--------------------------------------------------------------------|---------------|--------------|----------|---------------------|-------------------------------------------------------------------------------------|
|                                            |                                                                    |               | Standard     | Flexible | Flexible/Shielded   |                                                                                     |
| SGM7A-02 to -08<br>200W to 750 W<br>(400V) | Power<br>Cable with<br>Brake.<br>Cable<br>installed<br>toward load | 3 m           | N/A          | N/A      | JZSP-C7M343-03-E-G6 |  |
|                                            |                                                                    | 5 m           | N/A          | N/A      | JZSP-C7M343-05-E-G6 |                                                                                     |
|                                            |                                                                    | 10 m          | N/A          | N/A      | JZSP-C7M343-10-E-G6 |                                                                                     |
|                                            |                                                                    | 15 m          | N/A          | N/A      | JZSP-C7M343-15-E-G6 |                                                                                     |
|                                            |                                                                    | 20 m          | N/A          | N/A      | JZSP-C7M343-20-E-G6 |                                                                                     |
| SGM7A-10 to -25<br>1.0 to 2.5kW (400V)     |                                                                    | 3 m           | N/A          | N/A      | JZSP-C7M344-03-E-G6 |                                                                                     |
|                                            |                                                                    | 5 m           | N/A          | N/A      | JZSP-C7M344-05-E-G6 |                                                                                     |
|                                            |                                                                    | 10 m          | N/A          | N/A      | JZSP-C7M344-10-E-G6 |                                                                                     |
|                                            |                                                                    | 15 m          | N/A          | N/A      | JZSP-C7M344-15-E-G6 |                                                                                     |
|                                            |                                                                    | 20 m          | N/A          | N/A      | JZSP-C7M344-20-E-G6 |                                                                                     |
| SGM7A-30<br>3.0kW (400V)                   |                                                                    | 3 m           | N/A          | N/A      | JZSP-C7M354-03-E-G6 |                                                                                     |
|                                            |                                                                    | 5 m           | N/A          | N/A      | JZSP-C7M354-05-E-G6 |                                                                                     |
|                                            |                                                                    | 10 m          | N/A          | N/A      | JZSP-C7M354-10-E-G6 |                                                                                     |
|                                            |                                                                    | 15 m          | N/A          | N/A      | JZSP-C7M354-15-E-G6 |                                                                                     |
|                                            |                                                                    | 20 m          | N/A          | N/A      | JZSP-C7M354-20-E-G6 |                                                                                     |
| SGM7A-40 to -50<br>4.0 to 5.0kW (400V)     |                                                                    | 3 m           | N/A          | N/A      | JZSP-C7M364-03-E-G6 |                                                                                     |
|                                            |                                                                    | 5 m           | N/A          | N/A      | JZSP-C7M364-05-E-G6 |                                                                                     |
|                                            |                                                                    | 10 m          | N/A          | N/A      | JZSP-C7M364-10-E-G6 |                                                                                     |
|                                            |                                                                    | 15 m          | N/A          | N/A      | JZSP-C7M364-15-E-G6 |                                                                                     |
|                                            |                                                                    | 20 m          | N/A          | N/A      | JZSP-C7M364-20-E-G6 |                                                                                     |
| SGM7A-70<br>7.0kW (400V)                   |                                                                    | 3 m           | N/A          | N/A      | JZSP-C7M375-03-E-G6 |                                                                                     |
|                                            |                                                                    | 5 m           | N/A          | N/A      | JZSP-C7M375-05-E-G6 |                                                                                     |
|                                            |                                                                    | 10 m          | N/A          | N/A      | JZSP-C7M375-10-E-G6 |                                                                                     |
|                                            |                                                                    | 15 m          | N/A          | N/A      | JZSP-C7M375-15-E-G6 |                                                                                     |
|                                            |                                                                    | 20 m          | N/A          | N/A      | JZSP-C7M375-20-E-G6 |                                                                                     |
| SGM7A-70 7.0kW<br>(400V)                   | Fan Cable<br>(required)                                            | 3 m           | N/A          | N/A      | JZSP-C7M343-03-E-G6 |                                                                                     |
|                                            |                                                                    | 5 m           | N/A          | N/A      | JZSP-C7M343-05-E-G6 |                                                                                     |
|                                            |                                                                    | 10 m          | N/A          | N/A      | JZSP-C7M343-10-E-G6 |                                                                                     |
|                                            |                                                                    | 15 m          | N/A          | N/A      | JZSP-C7M343-15-E-G6 |                                                                                     |
|                                            |                                                                    | 20 m          | N/A          | N/A      | JZSP-C7M343-20-E-G6 |                                                                                     |

## Servo Motor Connection Shielding Clamp (400 V Models)

| Servo Motor Model                        | Name                            | Order Number    | Appearance                                                                            |
|------------------------------------------|---------------------------------|-----------------|---------------------------------------------------------------------------------------|
| SGM7A-02 to -30<br>200W to 3.0 kW (400V) | Shielding Clamp for Power Cable | KLBUE 4-13.5_SC |  |
| SGM7A-50 to -70<br>5.0 to 7.0kW (400V)   |                                 | KLBUE 10-20_SC  |                                                                                       |

Note: Reference PN.Sigma-7-03 for the shielding clamp installation and quick start guide.

## Encoder Cables of 20 m or Less (200V Models)

| Servo Motor Model                   | Name                                                                                    | Length (L) | Order Number     |                              | Appearance                                                                            |
|-------------------------------------|-----------------------------------------------------------------------------------------|------------|------------------|------------------------------|---------------------------------------------------------------------------------------|
|                                     |                                                                                         |            | Standard Cable   | Flexible Cable <sup>*1</sup> |                                                                                       |
| SGM7A-A5 to -10<br>50 W to 1.0 kW   | For incremental or batteryless absolute encoder.<br>Cable installed toward load         | 3 m        | JZSP-C7PI0D-03-E | JZSP-C7PI2D-03-E             |    |
|                                     |                                                                                         | 5 m        | JZSP-C7PI0D-05-E | JZSP-C7PI2D-05-E             |                                                                                       |
|                                     |                                                                                         | 10 m       | JZSP-C7PI0D-10-E | JZSP-C7PI2D-10-E             |                                                                                       |
|                                     |                                                                                         | 15 m       | JZSP-C7PI0D-15-E | JZSP-C7PI2D-15-E             |                                                                                       |
|                                     |                                                                                         | 20 m       | JZSP-C7PI0D-20-E | JZSP-C7PI2D-20-E             |                                                                                       |
|                                     | For incremental or batteryless absolute encoder. Cable installed away from load         | 3 m        | JZSP-C7PI0E-03-E | JZSP-C7PI2E-03-E             |    |
|                                     |                                                                                         | 5 m        | JZSP-C7PI0E-05-E | JZSP-C7PI2E-05-E             |                                                                                       |
|                                     |                                                                                         | 10 m       | JZSP-C7PI0E-10-E | JZSP-C7PI2E-10-E             |                                                                                       |
|                                     |                                                                                         | 15 m       | JZSP-C7PI0E-15-E | JZSP-C7PI2E-15-E             |                                                                                       |
|                                     |                                                                                         | 20 m       | JZSP-C7PI0E-20-E | JZSP-C7PI2E-20-E             |                                                                                       |
|                                     | For absolute encoder: With Battery Case <sup>*2</sup><br>Cable installed toward load    | 3 m        | JZSP-C7PA0D-03-E | JZSP-C7PA2D-03-E             |    |
|                                     |                                                                                         | 5 m        | JZSP-C7PA0D-05-E | JZSP-C7PA2D-05-E             |                                                                                       |
|                                     |                                                                                         | 10 m       | JZSP-C7PA0D-10-E | JZSP-C7PA2D-10-E             |                                                                                       |
|                                     |                                                                                         | 15 m       | JZSP-C7PA0D-15-E | JZSP-C7PA2D-15-E             |                                                                                       |
|                                     | For absolute encoder: With Battery Case <sup>*2</sup><br>Cable installed away from load | 3 m        | JZSP-C7PA0E-03-E | JZSP-C7PA2E-03-E             |   |
|                                     |                                                                                         | 5 m        | JZSP-C7PA0E-05-E | JZSP-C7PA2E-05-E             |                                                                                       |
|                                     |                                                                                         | 10 m       | JZSP-C7PA0E-10-E | JZSP-C7PA2E-10-E             |                                                                                       |
|                                     |                                                                                         | 15 m       | JZSP-C7PA0E-15-E | JZSP-C7PA2E-15-E             |                                                                                       |
|                                     |                                                                                         | 20 m       | JZSP-C7PA0E-20-E | JZSP-C7PA2E-20-E             |                                                                                       |
| SGM7A-15 to -70<br>1.5 kW to 7.0 kW | For incremental or batteryless absolute encoder <sup>*3</sup> .                         | 3 m        | JZSP-CVP01-03-E  | JZSP-CVP11-03-E              |  |
|                                     |                                                                                         | 5 m        | JZSP-CVP01-05-E  | JZSP-CVP11-05-E              |                                                                                       |
|                                     |                                                                                         | 10 m       | JZSP-CVP01-10-E  | JZSP-CVP11-10-E              |                                                                                       |
|                                     |                                                                                         | 15 m       | JZSP-CVP01-15-E  | JZSP-CVP11-15-E              |                                                                                       |
|                                     |                                                                                         | 20 m       | JZSP-CVP01-20-E  | JZSP-CVP11-20-E              |                                                                                       |
|                                     |                                                                                         | 3 m        | JZSP-CVP02-03-E  | JZSP-CVP12-03-E              |  |
|                                     |                                                                                         | 5 m        | JZSP-CVP02-05-E  | JZSP-CVP12-05-E              |                                                                                       |
|                                     |                                                                                         | 10 m       | JZSP-CVP02-10-E  | JZSP-CVP12-10-E              |                                                                                       |
|                                     |                                                                                         | 15 m       | JZSP-CVP02-15-E  | JZSP-CVP12-15-E              |                                                                                       |
|                                     |                                                                                         | 20 m       | JZSP-CVP02-20-E  | JZSP-CVP12-20-E              |                                                                                       |
|                                     | For absolute encoder: With Battery Case <sup>*2 *3</sup>                                | 3 m        | JZSP-CVP06-03-E  | JZSP-CVP26-03-E              |  |
|                                     |                                                                                         | 5 m        | JZSP-CVP06-05-E  | JZSP-CVP26-05-E              |                                                                                       |
|                                     |                                                                                         | 10 m       | JZSP-CVP06-10-E  | JZSP-CVP26-10-E              |                                                                                       |
|                                     |                                                                                         | 15 m       | JZSP-CVP06-15-E  | JZSP-CVP26-15-E              |                                                                                       |
|                                     |                                                                                         | 20 m       | JZSP-CVP06-20-E  | JZSP-CVP26-20-E              |                                                                                       |
|                                     |                                                                                         | 3 m        | JZSP-CVP07-03-E  | JZSP-CVP27-03-E              |  |
|                                     |                                                                                         | 5 m        | JZSP-CVP07-05-E  | JZSP-CVP27-05-E              |                                                                                       |
|                                     |                                                                                         | 10 m       | JZSP-CVP07-10-E  | JZSP-CVP27-10-E              |                                                                                       |
|                                     |                                                                                         | 15 m       | JZSP-CVP07-15-E  | JZSP-CVP27-15-E              |                                                                                       |
|                                     |                                                                                         | 20 m       | JZSP-CVP07-20-E  | JZSP-CVP27-20-E              |                                                                                       |

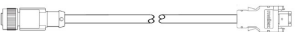
\*1. Use Flexible Cables for moving parts of machines, such as robots.

\*2. If a battery is connected to host controller, the Battery Case is not required. If so, use a cable for incremental encoders.

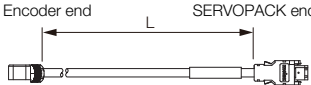
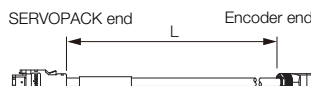
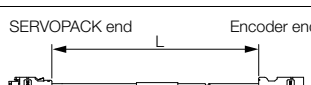
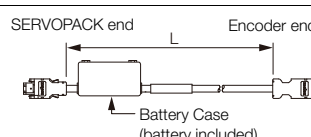
\*3. You cannot use a right-angle connector for the encoder of an SGM7A-70 (7.0 kW) servomotor. Use a straight connector

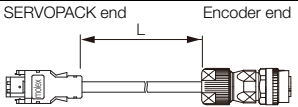
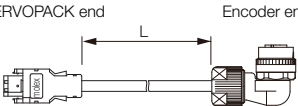
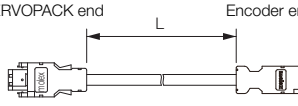
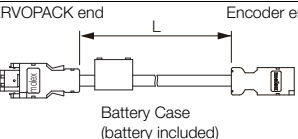


## Encoder Cables of 20 m or Less (400V Models)

| Servo Motor Model                  | Name                                                                                                              | Length (L) | Order Number        | Appearance                                                                          |
|------------------------------------|-------------------------------------------------------------------------------------------------------------------|------------|---------------------|-------------------------------------------------------------------------------------|
| SGM7A-02 to -70<br>200 W to 7.0 kW | Flexible cable with connectors on both ends (for incremental or batteryless encoder) straight connector (M12)     | 3 m        | JZSP-C7PI2M-03-E-G6 |  |
|                                    |                                                                                                                   | 5 m        | JZSP-C7PI2M-05-E-G6 |                                                                                     |
|                                    |                                                                                                                   | 10 m       | JZSP-C7PI2M-10-E-G6 |                                                                                     |
|                                    |                                                                                                                   | 15 m       | JZSP-C7PI2M-15-E-G6 |                                                                                     |
|                                    |                                                                                                                   | 20 m       | JZSP-C7PI2M-20-E-G6 |                                                                                     |
|                                    | Flexible cable with connectors on both ends (for incremental or batteryless encoder) right angle connector (M12)  | 3 m        | JZSP-C7PI2N-03-E-G6 |  |
|                                    |                                                                                                                   | 5 m        | JZSP-C7PI2N-05-E-G6 |                                                                                     |
|                                    |                                                                                                                   | 10 m       | JZSP-C7PI2N-10-E-G6 |                                                                                     |
|                                    |                                                                                                                   | 15 m       | JZSP-C7PI2N-15-E-G6 |                                                                                     |
|                                    |                                                                                                                   | 20 m       | JZSP-C7PI2N-20-E-G6 |                                                                                     |
|                                    | Flexible cable with connectors on both ends (for absolute endcode: with battery case) straight connector (M12)    | 3 m        | JZSP-C7PA2M-03-E-G6 |  |
|                                    |                                                                                                                   | 5 m        | JZSP-C7PA2M-05-E-G6 |                                                                                     |
|                                    |                                                                                                                   | 10 m       | JZSP-C7PA2M-10-E-G6 |                                                                                     |
|                                    |                                                                                                                   | 15 m       | JZSP-C7PA2M-15-E-G6 |                                                                                     |
|                                    |                                                                                                                   | 20 m       | JZSP-C7PA2M-20-E-G6 |                                                                                     |
|                                    | Flexible cable with connectors on both ends (for absolute endcode: with battery case) right angle connector (M12) | 3 m        | JZSP-C7PA2N-03-E-G6 |  |
|                                    |                                                                                                                   | 5 m        | JZSP-C7PA2N-05-E-G6 |                                                                                     |
|                                    |                                                                                                                   | 10 m       | JZSP-C7PA2N-10-E-G6 |                                                                                     |
|                                    |                                                                                                                   | 15 m       | JZSP-C7PA2N-15-E-G6 |                                                                                     |

## Relay Encoder Cable of 30 m to 50 m (200V Models)

| Servo Motor Model                 | Name                                                                                   | Length (L) | Order Number     | Appearance                                                                            |
|-----------------------------------|----------------------------------------------------------------------------------------|------------|------------------|---------------------------------------------------------------------------------------|
| SGM7A-A5 to -10<br>50 W to 1.0 kW | Encoder-end Cable (for incremental or absolute encoder). Cable installed toward load   | 0.3 m      | JZSP-C7PRCD-E    |  |
|                                   | Encoder-end Cable (for incremental or absolute encoder) Cable installed away from load | 0.3 m      | JZSP-C7PRCE-E    |  |
|                                   | Cables with Connectors on Both Ends (for incremental or absolute encoder)              | 30 m       | JZSP-UCMP00-30-E |  |
|                                   |                                                                                        | 40 m       | JZSP-UCMP00-40-E |                                                                                       |
|                                   |                                                                                        | 50 m       | JZSP-UCMP00-50-E |                                                                                       |
|                                   | Cable with a Battery Case (Required when an absolute encoder is used.*)                | 0.3 m      | JZSP-CSP12-E     |  |

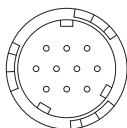
| Servo Motor Model                   | Name                                                                       | Length (L) | Order Number     | Appearance                                                                          |
|-------------------------------------|----------------------------------------------------------------------------|------------|------------------|-------------------------------------------------------------------------------------|
| SGM7A-15 to -70<br>1.5 kW to 7.0 kW | Encoder-end Cable<br>(for incremental or absolute encoder)                 | 0.3 m      | JZSP-CVP01-E     |  |
|                                     |                                                                            |            | JZSP-CVP02-E     |  |
|                                     | Cables with Connectors on Both Ends (for incremental or absolute encoder)  | 30 m       | JZSP-UCMP00-30-E |  |
|                                     |                                                                            | 40 m       | JZSP-UCMP00-40-E |                                                                                     |
|                                     |                                                                            | 50 m       | JZSP-UCMP00-50-E |                                                                                     |
|                                     | Cable with a Battery Case<br>(Required when an absolute encoder is used.*) | 0.3 m      | JZSP-CSP12-E     |  |

\* This Cable is not required if you use a servo motor with a batteryless absolute encoder or if you connect a battery to the host controller.

## Connector Specifications (200 V Models)

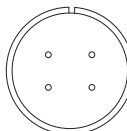
### ◆ SGM7A-15 to -50 without Holding Brakes

#### • Encoder Connector Specifications (24-bit Encoder)



Receptacle: CM10-R10P-D  
 Applicable plug: Not provided by Yaskawa.  
 Plug: CM10-AP10S-□ -D for Right-angle Plug  
 CM10-SP10S-□ -D for Straight Plug  
 (□ depends on the applicable cable size.)  
 Manufacturer: DDK Ltd.

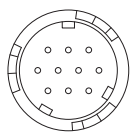
#### • Servo Motor Connector Specifications



Manufacturer: DDK Ltd.

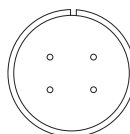
## ◆ SGM7A-70 without Holding Brakes

### • Encoder Connector Specifications (24-bit Encoder)



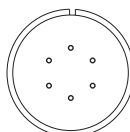
Receptacle: CM10-R10P-D  
 Applicable plug: Not provided by Yaskawa.  
 Plug: CM10-AP10S-□ -D for Right-angle Plug  
 CM10-SP10S-□ -D for Straight Plug  
 (□ depends on the applicable cable size.)  
 Manufacturer: DDK Ltd.

### • Servo Motor Connector Specifications



Manufacturer: DDK Ltd.

### • Fan Connector Specifications



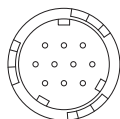
Receptacle: MS3102A14S-6P  
 Applicable Plug  
 Plug: MS3108B14S-6S  
 Cable Clamp: MS3057-6A

Note: The Servo Motor Connector (receptacle) is RoHS compliant.

Contact the connector manufacturer for RoHS-compliant cable-side connectors (not provided by Yaskawa).

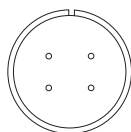
## ◆ SGM7A-15 to -50 with Holding Brakes

### • Encoder Connector Specifications (24-bit Encoder)



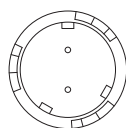
Receptacle: CM10-R10P-D  
 Applicable plug: Not provided by Yaskawa.  
 Plug: CM10-AP10S-□ -D for Right-angle Plug  
 CM10-SP10S-□ -D for Straight Plug  
 (□ depends on the applicable cable size.)  
 Manufacturer: DDK Ltd.

### • Servo Motor Connector Specifications



Manufacturer: DDK Ltd.

### • Brake Connector Specifications

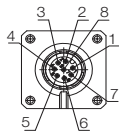


Receptacle: CM10-R2P-D  
 Applicable plug: Not provided by Yaskawa.  
 Plug: CM10-AP2S-□ -D for Right-angle Plug  
 CM10-SP2S-□ -D for Straight Plug  
 (□ depends on the applicable cable size.)  
 Manufacturer: DDK Ltd.

# Connector Specifications (400 V Models)

◆ SGM7A-02 to -50

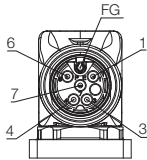
• Encoder Connector Specifications



Receptacle  
Size: M12  
Part number: 1419959  
Model: SACC-MSQ-M12MS-25-3,2 SCO  
Manufacturer: Phoenix Contact

|         |          |
|---------|----------|
| 1       | PG 5V    |
| 2       | PG 0V    |
| 3       | FG       |
| 4       | BAT (+)  |
| 5       | BAT (-)  |
| 6       | Data (+) |
| 7       | Data (-) |
| 8       | Empty    |
| Housing | Shield   |

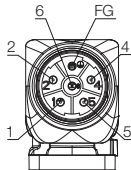
• Servo Motor Connector Specifications



Receptacle  
Size: M17  
Part number: 1620448  
Model: ST-5EP1N8AA500S  
Manufacturer: Phoenix Contact

|         |         |
|---------|---------|
| 1       | (Brake) |
| 3       | U       |
| 4       | V       |
| 5       | Empty   |
| 6       | (Brake) |
| 7       | W       |
| FG      | FG      |
| Housing | Shield  |

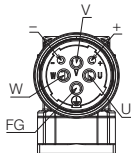
• Servo Motor Connector Specifications



Receptacle  
Size: M23  
Part number: 1617905  
Model: ST-5EP1N8AAD00S  
Manufacturer: Phoenix Contact

|         |         |
|---------|---------|
| 1       | V       |
| 2       | (Brake) |
| 4       | (Brake) |
| 5       | U       |
| 6       | W       |
| FG      | FG      |
| Housing | Shield  |

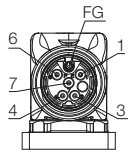
• Servo Motor Connector Specifications



Receptacle  
Size: M40  
Part number: 1607927  
Model: SM-5EPWN8AAD00S  
Manufacturer: Phoenix Contact

|         |        |
|---------|--------|
| U       | U      |
| V       | V      |
| W       | W      |
| +       | Empty  |
| -       | Empty  |
| FG      | FG     |
| Housing | Shield |

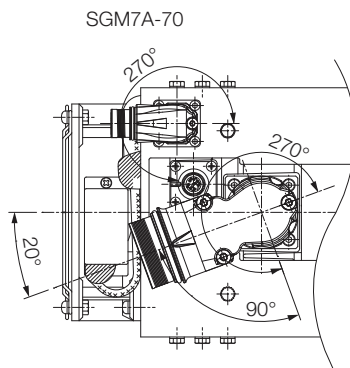
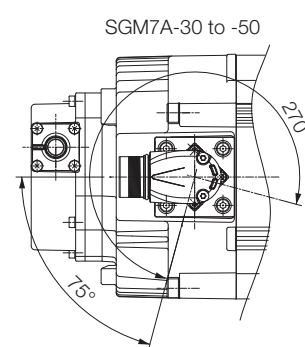
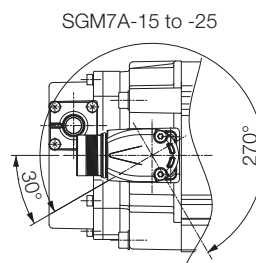
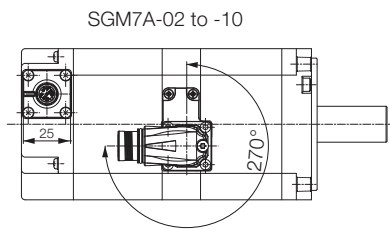
• Servo Motor Connector Specifications



Receptacle  
Size: M17  
Part number: 1620448  
Model: ST-5EP1N8AA500S  
Manufacturer: Phoenix Contact

|         |                |
|---------|----------------|
| 1       | ALARM TERMINAL |
| 3       | FAN MOTOR      |
| 4       | FAN MOTOR      |
| 6       | ALARM TERMINAL |
| 7       | Empty          |
| FG      | FG             |
| Housing | Shield         |

## Servo Motor Connector Rotational Angle (400 V)



Allowable  
number of  
rotations: 10

## SGM7P

## SGM7P Servo Motors (without Gear Box)

## Model Designations

SGM7P - 01 A 7 J 6 1 □

Σ-7 Series  
Servo Motors:  
SGM7P

1st+2nd  
digits3rd  
digit4th  
digit5th  
digit6th  
digit7th  
digit8th  
digit

## 1st+2nd digits Rated Output

| Code | Specification |
|------|---------------|
| 01   | 100 W         |
| 02   | 200 W         |
| 04   | 400 W         |
| 08   | 750 W         |
| 15   | 1.5 kW        |

## 3rd digit Power Supply Voltage

| Code | Specification |
|------|---------------|
| A    | 200 VAC       |

## 4th digit Serial Encoder

| Code | Specification      |
|------|--------------------|
| 7    | 24-bit absolute    |
| F    | 24-bit incremental |

## 5th digit Design Revision Order

| Code | Specification                |
|------|------------------------------|
| J    | IP67 (01, 02, and 04 Models) |
| E    | IP67 (08 and 15 Models)      |

## 6th digit Shaft End

| Code | Specification             |
|------|---------------------------|
| 2    | Straight without key      |
| 6    | Straight with key and tap |

## 7th digit Options

| Code | Specification                            |
|------|------------------------------------------|
| 1    | Without options                          |
| C    | With holding brake (24 VDC)              |
| E    | With oil seal and holding brake (24 VDC) |
| S    | With oil seal                            |

## 8th digit Connector Specification

| Code  | Specification                   |
|-------|---------------------------------|
| Blank | Standard (01, 02, 04 Models)    |
| D     | Interconnectron (08, 15 Models) |

■ Non Stock Items

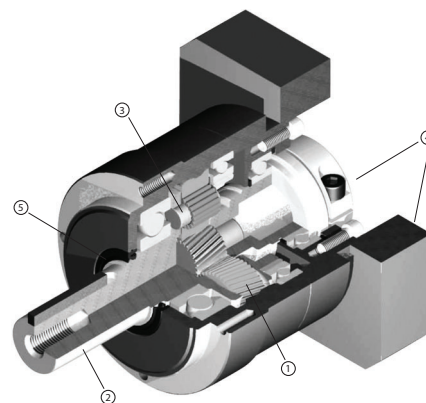
## SGM7P

## SGM7P Gear Motors

The SGM7P gear motor product family pairs SGM7P servo motors with high precision, low backlash inline planetary gear heads resulting in a portfolio of rotary actuators fit for a wide range of applications. The family of gear motors has been thoroughly tested and adheres to the high levels of quality and performance expected from Yaskawa.

The high precision gear heads offer a variety of application advantages:

- ① **Quiet operation** – helical cut gears contribute toward reduced vibration and noise
- ② **High precision** – a standard backlash of 5 arc-min make this gear head ideal for the most accurate applications
- ③ **High rigidity and torque capacity** – achieved with a design which incorporates uncaged needle roller bearings
- ④ **Optimized adapter bushing** – minimizes inertia allowing for more output torque to be realized
- ⑤ **No leakage through the seal** – high viscosity, anti-separation grease does not liquefy and does not migrate away from the gears
- **Maintenance-free** – no need to replace the grease for the life of the unit. The reducer can be positioned in any orientation



## Model Designations

S7P 01 A C - VL 050 - 05

Σ-7 Series  
Gear Motors:  
SGM7P

1st+2nd  
digits

A

3rd  
digit

C

4th  
digit

- VL

5th  
digit

050 - 05

6th  
digit

7th  
digit

1st+2nd digits Rated Output

| Code | Specification |
|------|---------------|
| 01   | 100 W         |
| 02   | 200 W         |
| 04   | 400 W         |
| 08   | 750 W         |
| 15   | 1.5 kW        |

3rd digit Power Supply Voltage

| Code | Specification |
|------|---------------|
| A    | 200 VAC       |

4th digit Brake Option

| Code  | Specification |
|-------|---------------|
| Blank | No brake      |
| C     | 24 V Brake    |

5th digit Gear box backlash

| Code | Specification      |
|------|--------------------|
| VL   | 5 arc-min backlash |

6th digit Gear head frame size

| Code | Specification |
|------|---------------|
| 050  | 50 mm         |
| 070  | 70 mm         |
| 090  | 90 mm         |
| 120  | 120 mm        |

7th digit Gear Ratio

| Code | Specification |
|------|---------------|
| 03   | 3:1 Ratio     |
| 05   | 5:1 Ratio     |
| 10   | 10:1 Ratio    |
| 25   | 25:1 Ratio    |
| 50   | 50:1 Ratio    |

## Specifications and Ratings

### Specifications

| Voltage                            |                                       | 200 V                                                                                                                                                                                                                                                                                                                                                                                                                     |                                               |            |      |     |
|------------------------------------|---------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------|------------|------|-----|
| Model SGM7P-                       |                                       | 01A                                                                                                                                                                                                                                                                                                                                                                                                                       | 02A                                           | 04A        | 08A  | 15A |
| Time Rating                        |                                       | Continuous                                                                                                                                                                                                                                                                                                                                                                                                                |                                               |            |      |     |
| Thermal Class                      |                                       | UL: B, CE: B                                                                                                                                                                                                                                                                                                                                                                                                              |                                               |            |      |     |
| Insulation Resistance              |                                       | 500 VDC, 10 M $\Omega$ min.                                                                                                                                                                                                                                                                                                                                                                                               |                                               |            |      |     |
| Withstand Voltage                  |                                       | 1,500 VAC for 1 minute                                                                                                                                                                                                                                                                                                                                                                                                    |                                               |            |      |     |
| Excitation                         |                                       | Permanent magnet                                                                                                                                                                                                                                                                                                                                                                                                          |                                               |            |      |     |
| Mounting                           |                                       | Flange-mounted                                                                                                                                                                                                                                                                                                                                                                                                            |                                               |            |      |     |
| Drive Method                       |                                       | Direct drive                                                                                                                                                                                                                                                                                                                                                                                                              |                                               |            |      |     |
| Rotation Direction                 |                                       | Counterclockwise (CCW) for forward reference when viewed from the load side                                                                                                                                                                                                                                                                                                                                               |                                               |            |      |     |
| Vibration Class* <sup>1</sup>      |                                       | V15                                                                                                                                                                                                                                                                                                                                                                                                                       |                                               |            |      |     |
| Environmental Conditions           | Surrounding Air Temperature           | 0°C to 40°C<br>(With derating, usage is possible between 40°C and 60°C.)* <sup>4</sup>                                                                                                                                                                                                                                                                                                                                    |                                               |            |      |     |
|                                    | Surrounding Air Humidity              | 20% to 80% relative humidity (with no condensation)                                                                                                                                                                                                                                                                                                                                                                       |                                               |            |      |     |
|                                    | Installation Site                     | <ul style="list-style-type: none"> <li>• Must be indoors and free of corrosive and explosive gases.</li> <li>• Must be well-ventilated and free of dust and moisture.</li> <li>• Must facilitate inspection and cleaning.</li> <li>• Must have an altitude of 1,000 m or less. (With derating, usage is possible between 1,000 m and 2,000 m.)*<sup>5</sup></li> <li>• Must be free of strong magnetic fields.</li> </ul> |                                               |            |      |     |
|                                    | Storage Environment                   | Store the Servo Motor in the following environment if you store it with the power cable disconnected.<br>Storage Temperature: -20°C to 60°C (with no freezing)<br>Storage Humidity: 20% to 80% relative humidity (with no condensation)                                                                                                                                                                                   |                                               |            |      |     |
| Shock Resistance* <sup>2</sup>     | Impact Acceleration Rate at Flange    | 490 m/s <sup>2</sup>                                                                                                                                                                                                                                                                                                                                                                                                      |                                               |            |      |     |
|                                    | Number of Impacts                     | 2 times                                                                                                                                                                                                                                                                                                                                                                                                                   |                                               |            |      |     |
| Vibration Resistance* <sup>3</sup> | Vibration Acceleration Rate at Flange | 49 m/s <sup>2</sup>                                                                                                                                                                                                                                                                                                                                                                                                       |                                               |            |      |     |
| Applicable SERVOPACKs              | SGD7S-                                | R90A                                                                                                                                                                                                                                                                                                                                                                                                                      | 2R8A                                          | 5R5A       | 120A |     |
|                                    | SGD7W-                                | 1R6A* <sup>6</sup> , 2R8A* <sup>6</sup>                                                                                                                                                                                                                                                                                                                                                                                   | 2R8A, 5R5A* <sup>6</sup> , 7R6A* <sup>6</sup> | 5R5A, 7R6A |      | —   |

\*1. A vibration class of V15 indicates a vibration amplitude of 15  $\mu$ m maximum on the Servo Motor without a load at the rated motor speed.

\*2. The shock resistance for shock in the vertical direction when the Servo Motor is mounted with the shaft in a horizontal position is given in the above table.

\*3. The vertical, side-to-side, and front-to-back vibration resistance for vibration in three directions when the Servo Motor is mounted with the shaft in a horizontal position is given in the above table. The strength of the vibration that the Servo Motor can withstand depends on the application. Always check the vibration acceleration rate that is applied to the Servo Motor with the actual equipment.

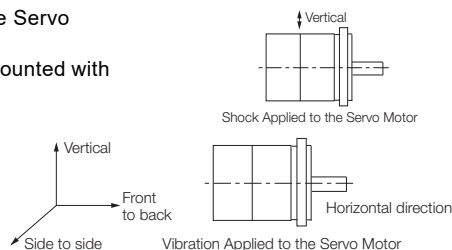
\*4. If the surrounding air temperature will exceed 40°C, refer to the following section.

 **Applications Where the Surrounding Air Temperature of the Servo Motor Exceeds 40°C (page 124)**

\*5. If the altitude will exceed 1,000 m, refer to the following section.

 **Applications Where the Altitude of the Servo Motor Exceeds 1,000 m (page 125)**

\*6. If you use the Servo Motor together with a S-7W SERVOPACK, the control gain may not increase as much as with a S-7S SERVOPACK and other performances may be lower than those achieved with a S-7S SERVOPACK.





## Ratings of Servo Motors

| Voltage                                                          |                                |                                     | 200 V                               |                  |                  |                 |                 |
|------------------------------------------------------------------|--------------------------------|-------------------------------------|-------------------------------------|------------------|------------------|-----------------|-----------------|
| Model SGM7P-                                                     |                                |                                     | 01A                                 | 02A              | 04A              | 08A             | 15A             |
| Rated Output <sup>*1</sup>                                       |                                | W                                   | 100                                 | 200              | 400              | 750             | 1500            |
| Rated Torque <sup>*1, *2</sup>                                   |                                | N•m                                 | 0.318                               | 0.637            | 1.27             | 2.39            | 4.77            |
| Instantaneous Maximum Torque <sup>*1</sup>                       |                                | N•m                                 | 0.955                               | 1.91             | 3.82             | 7.16            | 14.3            |
| Rated Current <sup>*1</sup>                                      |                                | Arms                                | 0.86                                | 2.0              | 2.6              | 5.4             | 9.2             |
| Instantaneous Maximum Current <sup>*1</sup>                      |                                | Arms                                | 2.8                                 | 6.4              | 8.4              | 16.5            | 28.0            |
| Rated Motor Speed <sup>*1</sup>                                  |                                | min <sup>-1</sup>                   | 3000                                |                  |                  |                 |                 |
| Maximum Motor Speed <sup>*1</sup>                                |                                | min <sup>-1</sup>                   | 6000                                |                  |                  |                 |                 |
| Torque Constant                                                  |                                | N•m/Arms                            | 0.401                               | 0.355            | 0.524            | 0.476           | 0.559           |
| Motor Moment of Inertia                                          |                                | ×10 <sup>-4</sup> kg•m <sup>2</sup> | 0.0592<br>(0.0892)                  | 0.263<br>(0.415) | 0.409<br>(0.561) | 2.10<br>(2.98)  | 4.02<br>(4.90)  |
| Rated Power Rate <sup>*1</sup>                                   |                                | kW/s                                | 17.1<br>(11.3)                      | 15.4<br>(9.7)    | 39.6<br>(28.8)   | 27.2<br>(19.1)  | 56.6<br>(46.4)  |
| Rated Angular Acceleration Rate <sup>*1</sup>                    |                                | rad/s <sup>2</sup>                  | 53700<br>(35600)                    | 24200<br>(15300) | 31100<br>(22600) | 11400<br>(8020) | 11900<br>(9730) |
| Derating Rate for Servo Motor with Oil Seal                      |                                | %                                   | 90                                  |                  | 95               |                 |                 |
| Heat Sink Size                                                   |                                | mm                                  | 250 × 250 × 6                       |                  |                  | 300 × 300 × 12  |                 |
| Protective Structure <sup>*3</sup>                               |                                |                                     | Totally enclosed, self-cooled, IP65 |                  |                  |                 |                 |
| Holding Brake Specifications <sup>*4</sup>                       | Rated Voltage                  | V                                   | 24 VDC ±10%                         |                  |                  |                 |                 |
|                                                                  | Capacity                       | W                                   | 6                                   | 7.4              |                  | 7.5             |                 |
|                                                                  | Holding Torque                 | N•m                                 | 0.318                               | 0.637            | 1.27             | 2.39            | 4.77            |
|                                                                  | Coil Resistance                | Ω (at 20°C)                         | 96                                  | 84.5             |                  | 76.8            |                 |
|                                                                  | Rated Current                  | A (at 20°C)                         | 0.25                                | 0.31             |                  | 0.31            |                 |
|                                                                  | Time Required to Release Brake | ms                                  | 80                                  |                  |                  |                 |                 |
|                                                                  | Time Required to Brake         | ms                                  | 100                                 |                  |                  |                 |                 |
| Allowable Load Moment of Inertia (Motor Moment of Inertia Ratio) |                                |                                     | 25 times                            | 15 times         | 10 times         | 5 times         |                 |
|                                                                  |                                |                                     |                                     |                  |                  |                 |                 |
| Allowable Shaft Loads <sup>*5</sup>                              | LF                             | mm                                  | 20                                  | 25               |                  | 35              |                 |
|                                                                  | Allowable Radial Load          | N                                   | 78                                  | 245              |                  | 392             | 490             |
|                                                                  | Allowable Thrust Load          | N                                   | 49                                  | 68               |                  | 147             |                 |

Note: The values in parentheses are for Servo Motors with Holding Brakes.

\*1. These values are for operation in combination with a SERVOPACK when the temperature of the armature winding is 100°C. The values for other items are at 20°C. These are typical values.

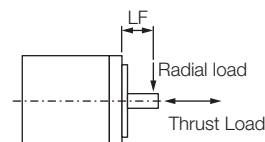
\*2. The rated torques are the continuous allowable torque values at a surrounding air temperature of 40°C with an aluminum heat sink of the dimensions given in the table.

\*3. This does not apply to the shaft opening. Protective structure specifications apply only when the special cable is used.

\*4. Observe the following precautions if you use a Servo Motor with a Holding Brake.

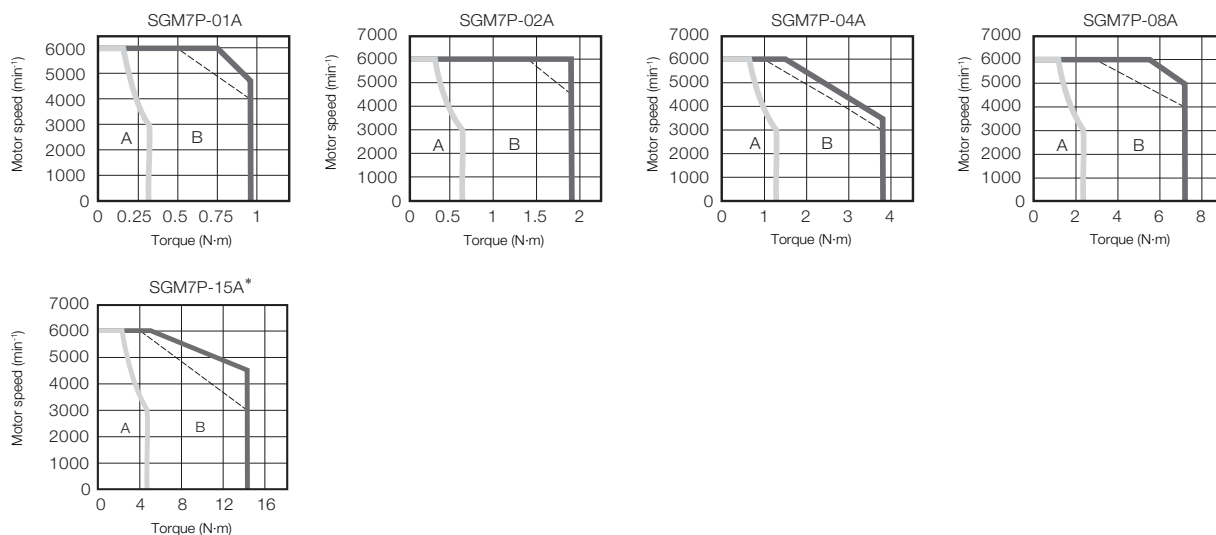
- The holding brake cannot be used to stop the Servo Motor.
- The time required to release the brake and the time required to brake depend on which discharge circuit is used. Confirm that the operation delay time is appropriate for the actual equipment.

\*5. The 24-VDC power supply is not provided by Yaskawa. The allowable shaft loads are illustrated in the following figure. Design the mechanical system so that the thrust and radial loads applied to the Servo Motor shaft end during operation do not exceed the values given in the table.



## Torque-Motor Speed Characteristics

A : Continuous duty zone      (solid lines): With three-phase 200-V or single-phase 230-V input  
B : Intermittent duty zone      (dotted lines): With single-phase 200-V input



\* A single-phase power input can be used in combination with the SGD7S-120A□□A008.

Note: 1. These values are for operation in combination with a SERVOPACK when the temperature of the armature winding is 100°C. These are typical values.

2. The characteristics in the intermittent duty zone depend on the power supply voltage.
3. If the effective torque is within the allowable range for the rated torque, the Servo Motor can be used within the intermittent duty zone.
4. If you use a Servo Motor Main Circuit Cable that exceeds 20 m, the intermittent duty zone in the torque-motor speed characteristics will become smaller because the voltage drop increases.

## Ratings of Gear Motors (200 V Models)

| Gear Motor Model Number S7P ____ | Base Servo Motor Model SGM7P- | Gear Ratio | Gearing Efficiency *1 | Rated Speed (RPM) | Max Speed (RPM) | Rated Torque (Nm)*2 | Peak Torque (Nm)*2 | Motor Inertia (x10 <sup>-4</sup> kg-m <sup>2</sup> ) | Gearhead Inertia (x10 <sup>-4</sup> kg-m <sup>2</sup> ) | Allowable Radial Load (N) | Allowable Axial Load (N) | Backlash (arc-min) | Class |   |   |   |
|----------------------------------|-------------------------------|------------|-----------------------|-------------------|-----------------|---------------------|--------------------|------------------------------------------------------|---------------------------------------------------------|---------------------------|--------------------------|--------------------|-------|---|---|---|
| 01A□-VL050-03                    | 01A7J6□                       | 3:1        | 95                    | 1000              | 2000            | 0.906               | 2.72               | 0.0592 (0.0892)                                      | 0.053                                                   | 240                       | 270                      | 5                  | IP65  |   |   |   |
| 01A□-VL050-05                    |                               | 5:1        |                       | 600               | 1200            | 1.51                | 4.54               |                                                      | 0.036                                                   | 290                       | 330                      |                    |       |   |   |   |
| 01A□-VL050-10                    |                               | 10:1       |                       | 300               | 600             | 3.02                | 9.07               |                                                      | 0.030                                                   | 360                       | 450                      |                    |       |   |   |   |
| 01A□-VL050-25                    |                               | 25:1       | 90                    | 120               | 240             | 7.16                | 18.0* <sup>3</sup> |                                                      | 0.034                                                   | 490                       | 640                      | 7                  |       |   |   |   |
| 01A□-VL070-50                    |                               | 50:1       |                       | 60                | 120             | 14.3                | 43.0               |                                                      | 0.051                                                   | 1100                      | 1100                     |                    |       |   |   |   |
| 02A□-VL070-03                    | 02A7J6□                       | 3:1        | 95                    | 1000              | 2000            | 1.82                | 5.44               | 0.263 (0.415)                                        | 0.25                                                    | 430                       | 310                      | 5                  |       |   |   |   |
| 02A□-VL070-05                    |                               | 5:1        |                       | 600               | 1200            | 3.03                | 9.07               |                                                      | 0.19                                                    | 510                       | 390                      |                    |       |   |   |   |
| 02A□-VL070-10                    |                               | 10:1       |                       | 300               | 600             | 6.05                | 18.1               |                                                      | 0.17                                                    | 640                       | 530                      |                    |       |   |   |   |
| 02A□-VL070-25                    |                               | 25:1       | 90                    | 120               | 240             | 14.3                | 43.0               |                                                      | 0.17                                                    | 870                       | 790                      |                    |       |   |   |   |
| 02A□-VL070-50                    |                               | 50:1       |                       | 60                | 120             | 27.0* <sup>3</sup>  | 50.0* <sup>3</sup> |                                                      | 0.16                                                    | 1100                      | 1100                     |                    |       |   |   |   |
| 04A□-VL070-03                    | 04A7J6□                       | 3:1        | 95                    | 1000              | 2000            | 3.62                | 10.9               | 0.409 (0.561)                                        | 0.25                                                    | 430                       | 310                      |                    |       | 5 |   |   |
| 04A□-VL070-05                    |                               | 5:1        |                       | 600               | 1200            | 6.03                | 18.1               |                                                      | 0.19                                                    | 510                       | 390                      |                    |       |   |   |   |
| 04A□-VL070-10                    |                               | 10:1       |                       | 300               | 600             | 12.1                | 35.0* <sup>3</sup> |                                                      | 0.17                                                    | 640                       | 530                      |                    |       |   |   |   |
| 04A□-VL070-25                    |                               | 25:1       | 90                    | 120               | 240             | 27.0* <sup>3</sup>  | 50.0* <sup>3</sup> |                                                      | 0.17                                                    | 870                       | 790                      |                    |       |   |   |   |
| 04A□-VL090-50                    |                               | 50:1       |                       | 60                | 120             | 57.2                | 125* <sup>3</sup>  |                                                      | 0.27                                                    | 2100                      | 2200                     |                    |       |   |   |   |
| 08A□-VL090-03                    | 08A7E6□                       | 3:1        | 95                    | 1000              | 2000            | 6.81                | 20.4               | 2.10 (2.98)                                          | 1.1                                                     | 810                       | 930                      |                    |       |   | 5 |   |
| 08A□-VL090-05                    |                               | 5:1        |                       | 600               | 1200            | 11.4                | 34.0               |                                                      | 0.80                                                    | 960                       | 1200                     |                    |       |   |   |   |
| 08A□-VL090-10                    |                               | 10:1       |                       | 300               | 600             | 22.7                | 68.0               |                                                      | 0.70                                                    | 1200                      | 1600                     |                    |       |   |   |   |
| 08A□-VL090-25                    |                               | 25:1       | 90                    | 120               | 240             | 53.8                | 125* <sup>3</sup>  |                                                      | 0.74                                                    | 1600                      | 2200                     |                    |       |   |   |   |
| 08A□-VL120-50                    |                               | 50:1       |                       | 60                | 120             | 108                 | 322                |                                                      | 0.76                                                    | 3400                      | 3900                     |                    |       |   |   |   |
| 15A□-VL090-03                    | 15A7E6□                       | 3:1        | 95                    | 1000              | 2000            | 13.59               | 40.8               | 4.02 (4.90)                                          | 1.1                                                     | 810                       | 930                      |                    |       |   |   | 5 |
| 15A□-VL090-05                    |                               | 5:1        |                       | 600               | 1200            | 22.7                | 67.9               |                                                      | 0.80                                                    | 960                       | 1200                     |                    |       |   |   |   |
| 15A□-VL090-10                    |                               | 10:1       |                       | 300               | 600             | 45.3                | 80.0* <sup>3</sup> |                                                      | 0.70                                                    | 1200                      | 1600                     |                    |       |   |   |   |
| 15A□-VL120-25                    |                               | 25:1       | 90                    | 120               | 240             | 107.3               | 322                |                                                      | 1.1                                                     | 2700                      | 3700                     |                    |       |   |   |   |
| 15A□-VL120-50                    |                               | 50:1       |                       | 60                | 120             | 180* <sup>3</sup>   | 330* <sup>3</sup>  |                                                      | 0.76                                                    | 3400                      | 3900                     |                    |       |   |   |   |

Note: The values in parentheses are for Servo Motors with Holding Brakes (indicated by value of □ in model numbers).

\*1. The gear efficiency depends on operating conditions such as the output torque, motor speed, and temperature.

\*2. The gear motor output torque is expressed by the following formula: Output Torque = (Servo Motor Output Torque) x (Gearing Ratio) x (Gearing Efficiency). The values in the table are typical values for the rated torque, rated motor speed, and a surrounding air temperature of 25°C. They are reference values only.

\*3. The output torque of the gear motor is limited by the mechanical limit of the gear head. Operation above this limit could result in premature failure of the gear motor.



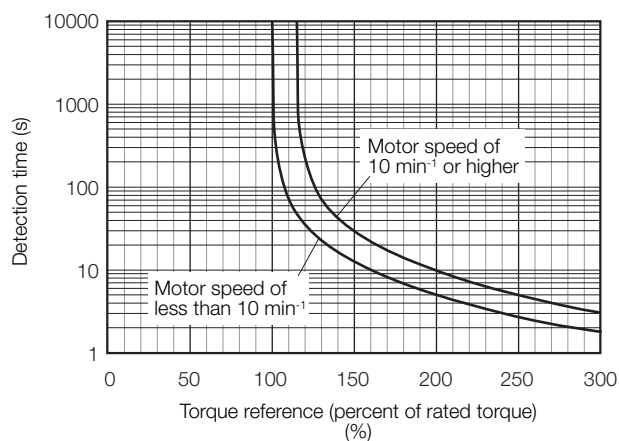
Important

During operation of the gear motor, losses due to inefficiencies of the gearing mechanism are generated. The losses vary as the conditions for gear motor torque and speed change. Temperature rise can vary based on the mechanical inefficiencies and the heat dissipation conditions. For heat dissipation conditions, check the gear and motor temperatures with the actual equipment. If operating temperatures are too high, implement the following measures.

- Decrease the load ratio.
- Change the heat dissipation conditions.
- Use forced-air cooling for the motor with a cooling fan or other means.
- Please refer to "Sigma-7 Gearmotor Temperature Test Data" (document number PN.GearMotors.01) on [yaskawa.com](http://yaskawa.com) for temperature test data.

## Servo Motor Overload Protection Characteristics

The overload detection level is set for hot start conditions with a Servo Motor surrounding air temperature of 40°C.



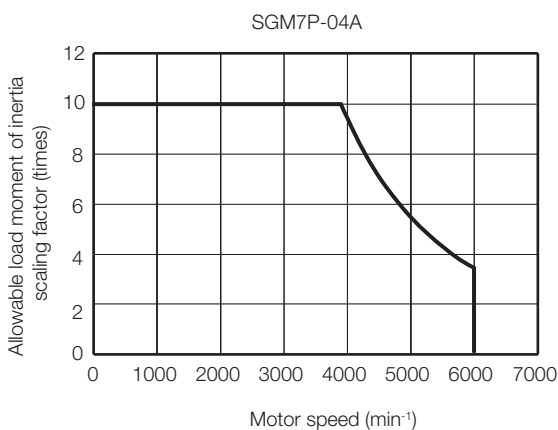
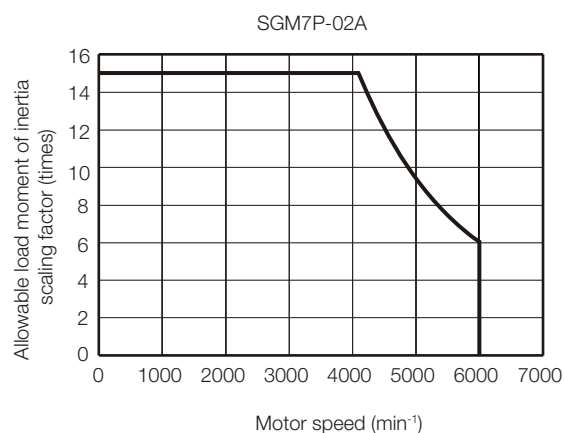
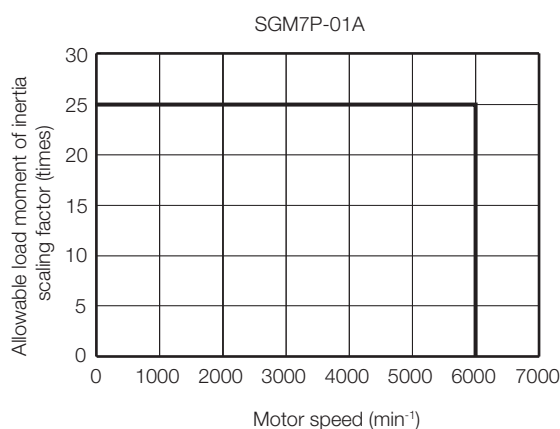
Note: The above overload protection characteristics do not mean that you can perform continuous duty operation with an output of 100% or higher. Use the Servo Motor so that the effective torque remains within the continuous duty zone given in *Torque-Motor Speed Characteristics* (page 120).

## Allowable Load Moment of Inertia Scaling Factor for SERVOPACKs without Built-in Regenerative Resistors

The following graphs show the allowable load moment of inertia scaling factor of the motor speed for SERVOPACKs\* without built-in regenerative resistors when an External Regenerative Resistor is not connected.

If the Servo Motor exceeds the allowable load moment of inertia, an overvoltage alarm may occur in the SERVOPACK.

These graphs provide reference data for deceleration at the rated torque or higher with a 200-VAC power supply input.



\* Applicable SERVOPACK models: SGD7S-R70A, -R90A, -1R6A, or -2R8A

## Servo Motor Heat Dissipation Conditions

The Servo Motor ratings are the continuous allowable values at a surrounding air temperature of 40°C when a heat sink is installed on the Servo Motor. If the Servo Motor is mounted on a small device component, the Servo Motor temperature may rise considerably because the surface for heat dissipation becomes smaller. Refer to the following graphs for the relation between the heat sink size and derating rate.

When using Servo Motors with derating, change the detection timing of overload warnings and overload alarms by referring to the motor overload detection level described in the following manual.

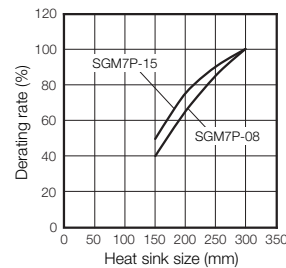
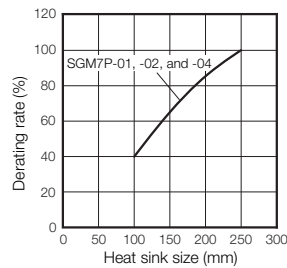
☞ *Σ-7-Series AC Servo Drive Rotary Servo Motor Product Manual* (Manual No.: SIEP S800001 36)

Note: The derating rates are applicable only when the average motor speed is less than or equal to the rated motor speed.  
If the average motor speed exceeds the rated motor speed, consult with your Yaskawa representative.



Important

The actual temperature rise depends on how the heat sink (i.e., the Servo Motor mounting section) is attached to the installation surface, what material is used for the Servo Motor mounting section, and the motor speed. Always check the Servo Motor temperature with the actual equipment.



## Applications Where the Surrounding Air Temperature of the Servo Motor Exceeds 40°C

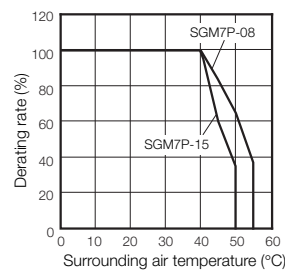
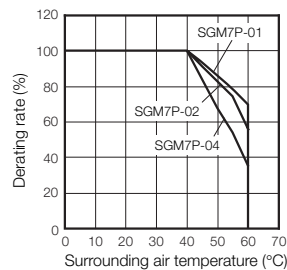
The Servo Motor ratings are the continuous allowable values at a surrounding air temperature of 40°C. If you use a Servo Motor at a surrounding air temperature that exceeds 40°C (60°C max.), apply a suitable derating rate from the following graphs.

When using Servo Motors with derating, change the detection timing of overload warnings and overload alarms by referring to the motor overload detection level described in the following manual.

☞ *Σ-7-Series AC Servo Drive Rotary Servo Motor Product Manual* (Manual No.: SIEP S800001 36)

Note: 1. Use the combination of the SERVOPACK and Servo Motor so that the derating conditions are satisfied for both the SERVOPACK and Servo Motor.

2. The derating rates are applicable only when the average motor speed is less than or equal to the rated motor speed. If the average motor speed exceeds the rated motor speed, consult with your Yaskawa representative.



## Applications Where the Altitude of the Servo Motor Exceeds 1,000 m

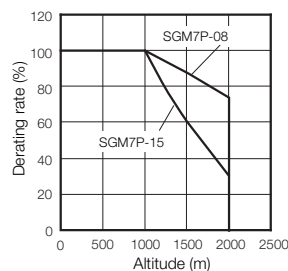
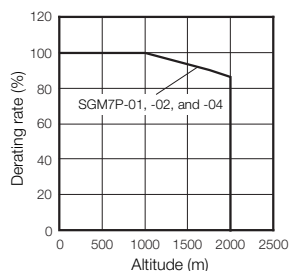
The Servo Motor ratings are the continuous allowable values at an altitude of 1,000 m or less. If you use a Servo Motor at an altitude that exceeds 1,000 m (2,000 m max.), the heat dissipation effect of the air is reduced. Apply the appropriate derating rate from the following graphs.

When using Servo Motors with derating, change the detection timing of overload warnings and overload alarms by referring to the motor overload detection level described in the following manual.

Σ-7-Series AC Servo Drive Rotary Servo Motor Product Manual (Manual No.: SIEP S800001 36)

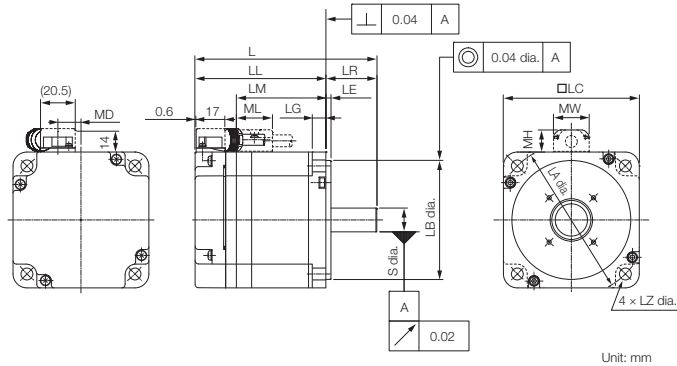
Note: 1. Use the combination of the SERVOPACK and Servo Motor so that the derating conditions are satisfied for both the SERVOPACK and Servo Motor.

2. The derating rates are applicable only when the average motor speed is less than or equal to the rated motor speed. If the average motor speed exceeds the rated motor speed, consult with your Yaskawa representative.



## External Dimensions

### ◆ SGM7P-01, -02, and -04



| Model SGM7P- | L           | LL         | LM | Flange Dimensions |    |    |    |    |                                   |     | S                                 |
|--------------|-------------|------------|----|-------------------|----|----|----|----|-----------------------------------|-----|-----------------------------------|
|              |             |            |    | LR                | LE | LG | LC | LA | LB                                | LZ  |                                   |
| 01A□ A6□     | 85 (115)    | 60 (90)    | 36 | 25                | 3  | 6  | 60 | 70 | 50 <sup>0</sup> <sub>-0.025</sub> | 5.5 | 8 <sup>0</sup> <sub>-0.009</sub>  |
| 02A□ A6□     | 97 (128.5)  | 67 (98.5)  | 43 | 30                | 3  | 8  | 80 | 90 | 70 <sup>0</sup> <sub>-0.030</sub> | 7   | 14 <sup>0</sup> <sub>-0.011</sub> |
| 04A□ A6□     | 107 (138.5) | 77 (108.5) | 53 | 30                | 3  | 8  | 80 | 90 | 70 <sup>0</sup> <sub>-0.030</sub> | 7   | 14 <sup>0</sup> <sub>-0.011</sub> |

| Model SGM7P- | MD   | MW | MH | ML | Approx. Mass [kg] |
|--------------|------|----|----|----|-------------------|
| 01A□ A6□     | 8.5  | 19 | 12 | 20 | 0.5 (0.7)         |
| 02A□ A6□     | 13.6 | 21 | 13 | 21 | 1.1 (1.6)         |
| 04A□ A6□     | 13.6 | 21 | 13 | 21 | 1.4 (1.9)         |

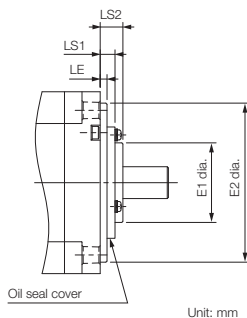
Note: 1. The values in parentheses are for Servo Motors with Holding Brakes.

2. Refer to the following section for detailed shaft end specifications.

🔧 Gearmotor Models: 100W to 750W (S7P01, S7P02, S7P04, S7P08) (page 128)

### ■ Specifications of Options

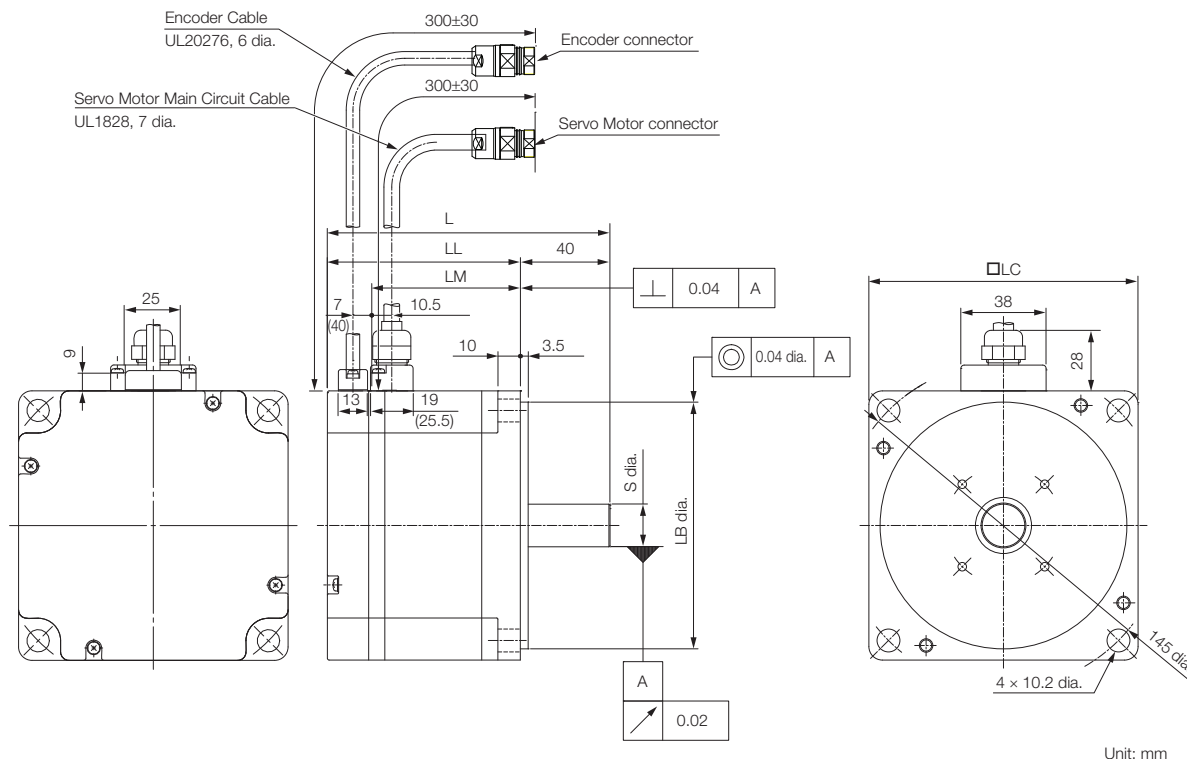
#### • Oil Seal



| Model SGM7P- | Dimensions with Oil Seal |    |     |     |     |
|--------------|--------------------------|----|-----|-----|-----|
|              | E1                       | E2 | LS1 | LS2 | LE  |
| 01A□ A6□     | 22                       | 39 | 4   | 7.5 | 1.5 |
| 02A□ A6□     | 35                       | 49 | 6.5 | 10  | 2.5 |
| 04A□ A6□     |                          |    |     |     |     |



# ◆ SGM7P-08 and -15



| Model SGM7P- | L                | LL               | LM   | LB                                 | LC  | S                                 | Approx. Mass [kg] |
|--------------|------------------|------------------|------|------------------------------------|-----|-----------------------------------|-------------------|
| 08A□ A6□     | 126.5<br>(160)   | 86.5<br>(120)    | 67.6 | 110 <sup>0</sup> <sub>-0.035</sub> | 120 | 19 <sup>0</sup> <sub>-0.013</sub> | 4.2<br>(5.7)      |
| 15A□ A6□     | 154.5<br>(187.5) | 114.5<br>(147.5) | 95.6 | 110 <sup>0</sup> <sub>-0.035</sub> | 120 | 19 <sup>0</sup> <sub>-0.013</sub> | 6.6<br>(8.1)      |

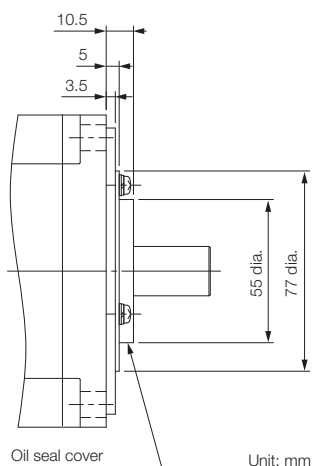
Note: 1. The values in parentheses are for Servo Motors with Holding Brakes.

2. Refer to the following section for detailed shaft end specifications.

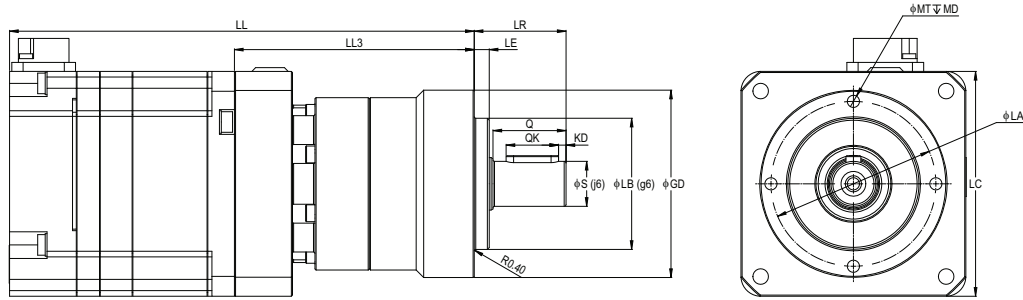
Gearmotor Models: 100W to 750W (S7P01, S7P02, S7P04, S7P08) (page 128)

## ■ Specifications of Options

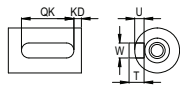
### • Oil Seal



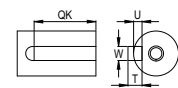
◆ Gearmotor Models: 100W to 750W (S7P01, S7P02, S7P04, S7P08)



Shaft Detail (VL050 Models Only)



Shaft Detail (All Other Models)



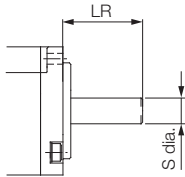
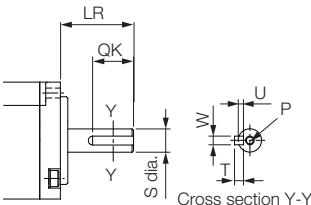
| Model S7P    |                | LL               | LL3   | LR   | LE | φS | φLB | φGD | LC        | φLA | φMT | MD | Q    | QK | KD | W   | U   | T           | Mass kg   |
|--------------|----------------|------------------|-------|------|----|----|-----|-----|-----------|-----|-----|----|------|----|----|-----|-----|-------------|-----------|
| 100 W Models |                |                  |       |      |    |    |     |     |           |     |     |    |      |    |    |     |     |             |           |
| 200 V        | 01A□ -VL050-03 | 124<br>(154)     | 64    | 24.5 | 4  | 12 | 35  | 50  | 60        | 44  | M4  | 8  | 19.5 | 14 | 2  | 4   | 2.5 | 4           | 1.2 (1.4) |
|              | 01A□ -VL050-05 |                  |       |      |    |    |     |     |           |     |     |    |      |    |    |     |     |             |           |
|              | 01A□ -VL050-10 |                  |       |      |    |    |     |     |           |     |     |    |      |    |    |     |     |             |           |
|              | 01A□ -VL050-25 | 140.5<br>(170.5) | 80.5  |      |    |    |     |     | 1.3 (1.5) |     |     |    |      |    |    |     |     |             |           |
|              | 01A□ -VL070-50 | 155<br>(185)     | 95    | 36   | 5  | 16 | 52  | 70  |           | 62  | M5  | 10 | 28   | 22 | 0  | 5   | 3   | 5           | 2.2 (2.4) |
| 200 W Models |                |                  |       |      |    |    |     |     |           |     |     |    |      |    |    |     |     |             |           |
| 200 V        | 02A□ -VL070-03 | 146<br>(177.5)   | 79    | 36   | 5  | 16 | 52  | 70  | 80        | 62  | M5  | 10 | 28   | 22 | 0  | 5   | 3   | 5           | 2.6 (3.1) |
|              | 02A□ -VL070-05 |                  |       |      |    |    |     |     |           |     |     |    |      |    |    |     |     |             |           |
|              | 02A□ -VL070-10 |                  |       |      |    |    |     |     |           |     |     |    |      |    |    |     |     |             |           |
|              | 02A□ -VL070-25 | 167<br>(198.5)   | 100   |      |    |    |     |     |           |     |     |    |      |    |    |     |     |             | 2.8 (3.3) |
|              | 02A□ -VL070-50 |                  |       |      |    |    |     |     |           |     |     |    |      |    |    |     |     |             |           |
| 400 W Models |                |                  |       |      |    |    |     |     |           |     |     |    |      |    |    |     |     |             |           |
| 200 V        | 04A□ -VL070-03 | 156<br>(187.5)   | 79    | 36   | 5  | 16 | 52  | 70  | 80        | 62  | M5  | 10 | 28   | 22 | 0  | 5   | 3   | 5           | 2.9 (3.4) |
|              | 04A□ -VL070-05 |                  |       |      |    |    |     |     |           |     |     |    |      |    |    |     |     |             |           |
|              | 04A□ -VL070-10 |                  |       |      |    |    |     |     |           |     |     |    |      |    |    |     |     |             |           |
|              | 04A□ -VL070-25 | 177<br>(208.5)   | 100   |      |    |    |     |     | 3.1 (3.6) |     |     |    |      |    |    |     |     |             |           |
|              | 04A□ -VL090-50 | 196<br>(227.5)   | 119   | 46   | 7  | 22 | 68  | 90  |           | 80  | M6  | 12 | 36   | 28 | 6  | 3.5 | 6   | 5.4 (5.9)   |           |
| 750 W Models |                |                  |       |      |    |    |     |     |           |     |     |    |      |    |    |     |     |             |           |
| 200 V        | 08A□ -VL090-03 | 193.5<br>(227)   | 107   | 46   | 7  | 22 | 68  | 90  | 130       | 80  | M6  | 12 | 36   | 28 | 0  | 6   | 3.5 | 6           | 7.7 (9.2) |
|              | 08A□ -VL090-05 |                  |       |      |    |    |     |     |           |     |     |    |      |    |    |     |     |             |           |
|              | 08A□ -VL090-10 |                  |       |      |    |    |     |     |           |     |     |    |      |    |    |     |     |             |           |
|              | 08A□ -VL090-25 | 215.5<br>(249)   | 129   |      |    |    |     |     | 8.2 (9.7) |     |     |    |      |    |    |     |     |             |           |
|              | 08A□ -VL120-50 | 231<br>(264.5)   | 144.5 | 70   | 9  | 32 | 90  | 120 |           | 108 | M8  | 16 | 58   | 45 | 10 | 5   | 8   | 12.9 (14.4) |           |

Note: The values in parentheses are for Servo Motors with Holding Brakes.

## Shaft End Specifications

### ◆ SGM7P-□□□□□□□□

| Code | Specification                                                                              |
|------|--------------------------------------------------------------------------------------------|
| 2    | Straight without key                                                                       |
| 6    | Straight with key and tap for one location<br>(Key slot is JIS B1301-1996 fastening type.) |

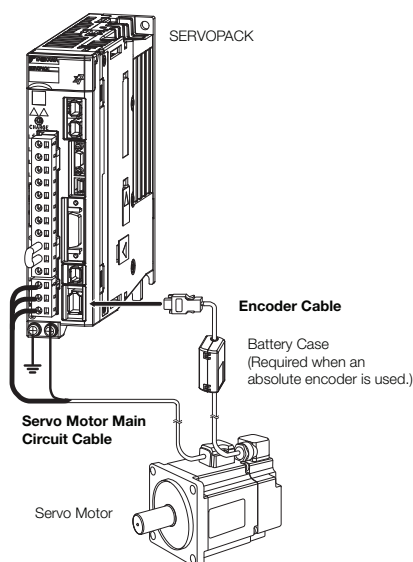
| Shaft End Details                                                                                       |    | Servo Motor Model SGM7P-         |                                   |                                   |    |    |
|---------------------------------------------------------------------------------------------------------|----|----------------------------------|-----------------------------------|-----------------------------------|----|----|
|                                                                                                         |    | 01                               | 02                                | 04                                | 08 | 15 |
| Code: 2 (Straight without Key)                                                                          |    |                                  |                                   |                                   |    |    |
|                        | LR | 25                               | 30                                | 40                                |    |    |
|                                                                                                         | S  | 8 <sup>0</sup> <sub>-0.009</sub> | 14 <sup>0</sup> <sub>-0.011</sub> | 19 <sup>0</sup> <sub>-0.013</sub> |    |    |
| Code: 6 (Straight with Key and Tap)                                                                     |    |                                  |                                   |                                   |    |    |
| <br>Cross section Y-Y | LR | 25                               | 30                                | 40                                |    |    |
|                                                                                                         | QK | 14                               | 14                                | 22                                |    |    |
|                                                                                                         | S  | 8 <sup>0</sup> <sub>-0.009</sub> | 14 <sup>0</sup> <sub>-0.011</sub> | 19 <sup>0</sup> <sub>-0.013</sub> |    |    |
|                                                                                                         | W  | 3                                | 5                                 | 6                                 |    |    |
|                                                                                                         | T  | 3                                | 5                                 | 6                                 |    |    |
|                                                                                                         | U  | 1.8                              | 3                                 | 3.5                               |    |    |
|                                                                                                         | P  | M3 × 6L                          | M5 × 8L                           | M6 × 10L                          |    |    |

## Selecting Cables

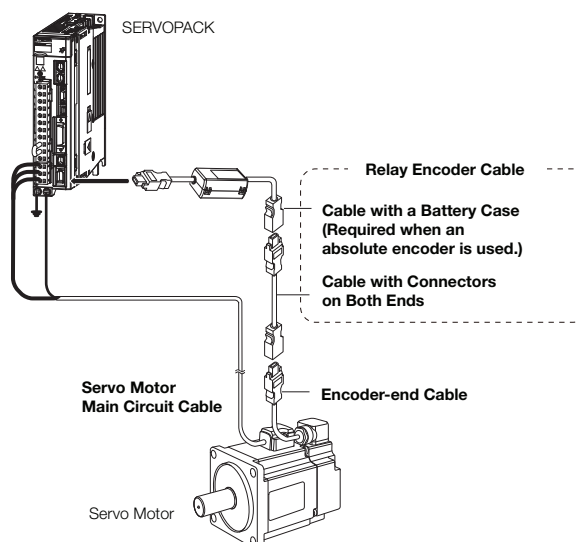
### ◆ Cable Configurations

The cables shown below are required to connect a Servo Motor to a SERVOPACK.

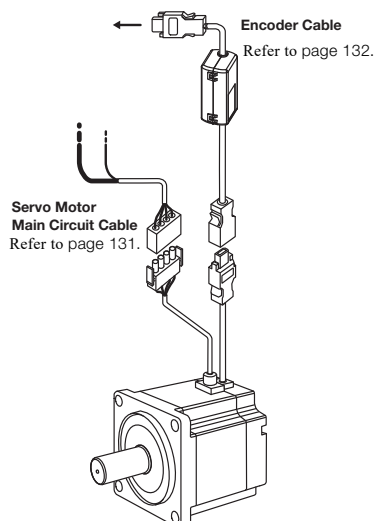
Encoder Cable of 20 m or Less



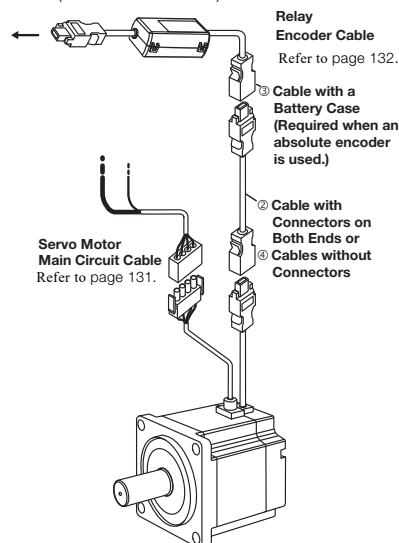
Encoder Cable of 30 m to 50 m (Relay Cable)



For SGM7P-08 or -15  
(750 W or 1.5 kW) Servo Motor



For SGM7P-08 or -15  
(750 W or 1.5 kW) Servo Motor



Note: 1. If the cable length exceeds 20 m, be sure to use a Relay Encoder Cable.

2. If you use a Servo Motor Main Circuit Cable that exceeds 20 m, the intermittent duty zone in the torque-motor speed characteristics will become smaller because the voltage drop increases.

3. Refer to the following manual for the following information.

- Cable dimensional drawings and cable connection specifications
- Order numbers and specifications of individual connectors for cables
- Order numbers and specifications for wiring materials

📖 *Σ-7-Series AC Servo Drive Peripheral Device Selection Manual* (Manual No.: SIEP S800001 32)

## Servo Motor Main Circuit Cables

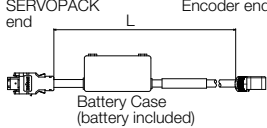
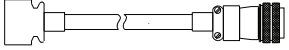
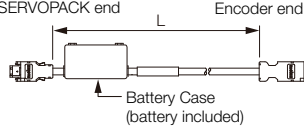
| Servo Motor Model                     | Name                                    | Length (L) | Order Number    |                              |                                     | Appearance                                                                            |
|---------------------------------------|-----------------------------------------|------------|-----------------|------------------------------|-------------------------------------|---------------------------------------------------------------------------------------|
|                                       |                                         |            | Standard Cable  | Flexible Cable* <sup>1</sup> | Flexible and Shielded* <sup>2</sup> |                                                                                       |
| SGM7P-01<br><br>100 W                 | For Servo Motors without Holding Brakes | 3 m        | JZSP-CSM01-03-E | JZSP-CSM21-03-E              | YAI-CSM21-03-P-E                    |  |
|                                       |                                         | 5 m        | JZSP-CSM01-05-E | JZSP-CSM21-05-E              | YAI-CSM21-05-P-E                    |                                                                                       |
|                                       |                                         | 10 m       | JZSP-CSM01-10-E | JZSP-CSM21-10-E              | YAI-CSM21-10-P-E                    |                                                                                       |
|                                       |                                         | 15 m       | JZSP-CSM01-15-E | JZSP-CSM21-15-E              | YAI-CSM21-15-P-E                    |                                                                                       |
|                                       |                                         | 20 m       | JZSP-CSM01-20-E | JZSP-CSM21-20-E              | YAI-CSM21-20-P-E                    |                                                                                       |
| SGM7P-02 and -04<br><br>200 W, 400 W  |                                         | 3 m        | JZSP-CSM02-03-E | JZSP-CSM22-03-E              | YAI-CSM22-03-P-E                    |                                                                                       |
|                                       |                                         | 5 m        | JZSP-CSM02-05-E | JZSP-CSM22-05-E              | YAI-CSM22-05-P-E                    |                                                                                       |
|                                       |                                         | 10 m       | JZSP-CSM02-10-E | JZSP-CSM22-10-E              | YAI-CSM22-10-P-E                    |                                                                                       |
|                                       |                                         | 15 m       | JZSP-CSM02-15-E | JZSP-CSM22-15-E              | YAI-CSM22-15-P-E                    |                                                                                       |
|                                       |                                         | 20 m       | JZSP-CSM02-20-E | JZSP-CSM22-20-E              | YAI-CSM22-20-P-E                    |                                                                                       |
| SGM7P-08<br><br>750 W * <sup>3</sup>  |                                         | 3 m        | N/A             | N/A                          | B4ICE-03(A)                         |                                                                                       |
|                                       |                                         | 5 m        | N/A             | N/A                          | B4ICE-05(A)                         |                                                                                       |
|                                       |                                         | 10 m       | N/A             | N/A                          | B4ICE-10(A)                         |                                                                                       |
|                                       |                                         | 15 m       | N/A             | N/A                          | B4ICE-15(A)                         |                                                                                       |
|                                       |                                         | 20 m       | N/A             | N/A                          | B4ICE-20(A)                         |                                                                                       |
| SGM7P-15<br><br>1.5 kW * <sup>3</sup> |                                         | 3 m        | N/A             | N/A                          | B5ICE-03(A)                         |                                                                                       |
|                                       |                                         | 5 m        | N/A             | N/A                          | B5ICE-05(A)                         |                                                                                       |
|                                       |                                         | 10 m       | N/A             | N/A                          | B5ICE-10(A)                         |                                                                                       |
|                                       |                                         | 15 m       | N/A             | N/A                          | B5ICE-15(A)                         |                                                                                       |
|                                       |                                         | 20 m       | N/A             | N/A                          | B5ICE-20(A)                         |                                                                                       |
| SGM7P-01<br><br>100 W                 | For Servo Motors with Holding Brakes    | 3 m        | JZSP-CSM11-03-E | JZSP-CSM31-03-E              | YAI-CSM31-03-P-E                    |                                                                                       |
|                                       |                                         | 5 m        | JZSP-CSM11-05-E | JZSP-CSM31-05-E              | YAI-CSM31-05-P-E                    |                                                                                       |
|                                       |                                         | 10 m       | JZSP-CSM11-10-E | JZSP-CSM31-10-E              | YAI-CSM31-10-P-E                    |                                                                                       |
|                                       |                                         | 15 m       | JZSP-CSM11-15-E | JZSP-CSM31-15-E              | YAI-CSM31-15-P-E                    |                                                                                       |
|                                       |                                         | 20 m       | JZSP-CSM11-20-E | JZSP-CSM31-20-E              | YAI-CSM31-20-P-E                    |                                                                                       |
| SGM7P-02 and -04<br><br>200 W, 400 W  |                                         | 3 m        | JZSP-CSM12-03-E | JZSP-CSM32-03-E              | YAI-CSM32-03-P-E                    |                                                                                       |
|                                       |                                         | 5 m        | JZSP-CSM12-05-E | JZSP-CSM32-05-E              | YAI-CSM32-05-P-E                    |                                                                                       |
|                                       |                                         | 10 m       | JZSP-CSM12-10-E | JZSP-CSM32-10-E              | YAI-CSM32-10-P-E                    |                                                                                       |
|                                       |                                         | 15 m       | JZSP-CSM12-15-E | JZSP-CSM32-15-E              | YAI-CSM32-15-P-E                    |                                                                                       |
|                                       |                                         | 20 m       | JZSP-CSM12-20-E | JZSP-CSM32-20-E              | YAI-CSM32-20-P-E                    |                                                                                       |
| SGM7P-08<br><br>750 W                 |                                         | 3 m        | N/A             | N/A                          | B4IBCE-03(A)                        |                                                                                       |
|                                       |                                         | 5 m        | N/A             | N/A                          | B4IBCE-05(A)                        |                                                                                       |
|                                       |                                         | 10 m       | N/A             | N/A                          | B4IBCE-10(A)                        |                                                                                       |
|                                       |                                         | 15 m       | N/A             | N/A                          | B4IBCE-15(A)                        |                                                                                       |
|                                       |                                         | 20 m       | N/A             | N/A                          | B4IBCE-20(A)                        |                                                                                       |
| SGM7P-15<br><br>1.5 kW                |                                         | 3 m        | N/A             | N/A                          | B5IBCE-03(A)                        |                                                                                       |
|                                       |                                         | 5 m        | N/A             | N/A                          | B5IBCE-05(A)                        |                                                                                       |
|                                       |                                         | 10 m       | N/A             | N/A                          | B5IBCE-10(A)                        |                                                                                       |
|                                       |                                         | 15 m       | N/A             | N/A                          | B5IBCE-15(A)                        |                                                                                       |
|                                       |                                         | 20 m       | N/A             | N/A                          | B5IBCE-20(A)                        |                                                                                       |

\*1. Use Flexible Cables for moving parts of machines, such as robots.

\*2. The IP Rating for cables order numbers beginning with "YAI" has not been evaluated.

\*3. Power Cables for 750 W and 1.5 kW models are non-RoHS.

## Encoder Cables of 20 m or Less

| Servo Motor Model                                            | Name                                                                                  | Length (L) | Order Number                                                        |                              | Appearance                                                                            |
|--------------------------------------------------------------|---------------------------------------------------------------------------------------|------------|---------------------------------------------------------------------|------------------------------|---------------------------------------------------------------------------------------|
|                                                              |                                                                                       |            | Standard Cable                                                      | Flexible Cable <sup>*1</sup> |                                                                                       |
| SGM7P-01, -02 and -04<br>100 W, 200 W, 400 W                 | For incremental encoder                                                               | 3 m        | JZSP-C7PI0D-03-E                                                    | JZSP-C7PI2D-03-E             |    |
|                                                              | Cable installed toward load                                                           | 5 m        | JZSP-C7PI0D-05-E                                                    | JZSP-C7PI2D-05-E             |                                                                                       |
|                                                              |                                                                                       | 10 m       | JZSP-C7PI0D-10-E                                                    | JZSP-C7PI2D-10-E             |                                                                                       |
|                                                              |                                                                                       | 15 m       | JZSP-C7PI0D-15-E                                                    | JZSP-C7PI2D-15-E             |                                                                                       |
|                                                              |                                                                                       | 20 m       | JZSP-C7PI0D-20-E                                                    | JZSP-C7PI2D-20-E             |                                                                                       |
| SGM7P-01, -02 and -04<br>100 W, 200 W, 400 W                 | For absolute encoder: With Battery Case <sup>*2</sup>                                 | 3 m        | JZSP-C7PA0D-03-E                                                    | JZSP-C7PA2D-03-E             |    |
|                                                              | Cable installed toward load                                                           | 5 m        | JZSP-C7PA0D-05-E                                                    | JZSP-C7PA2D-05-E             |                                                                                       |
|                                                              |                                                                                       | 10 m       | JZSP-C7PA0D-10-E                                                    | JZSP-C7PA2D-10-E             |                                                                                       |
|                                                              |                                                                                       | 15 m       | JZSP-C7PA0D-15-E                                                    | JZSP-C7PA2D-15-E             |                                                                                       |
|                                                              |                                                                                       | 20 m       | JZSP-C7PA0D-20-E                                                    | JZSP-C7PA2D-20-E             |                                                                                       |
| SGM7P-08 and -15<br>750 W, 1500 W<br>(Interconnection style) | For incremental encoder                                                               | 3 m        | N/A                                                                 | A1ICE-03(A)                  |    |
|                                                              | Cable installed upward <sup>*3</sup>                                                  | 5 m        | N/A                                                                 | A1ICE-05(A)                  |                                                                                       |
|                                                              |                                                                                       | 10 m       | N/A                                                                 | A1ICE-10(A)                  |                                                                                       |
|                                                              |                                                                                       | 15 m       | N/A                                                                 | A1ICE-15(A)                  |                                                                                       |
|                                                              |                                                                                       | 20 m       | N/A                                                                 | A1ICE-20(A)                  |                                                                                       |
| All SGM7P models                                             | Cable with a Battery Case (Required when an absolute encoder is used. <sup>*4</sup> ) | 0.3 m      | JZSP-CSP12-E<br>Note: this cable used with A1ICE cable listed above |                              |  |

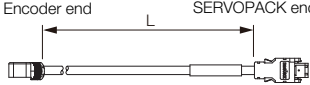
\*1. Use Flexible Cables for moving parts of machines, such as robots.

\*2. If a battery is connected to the host controller, the Battery Case is not required. If so, use a cable for incremental encoders

\*3. Non RoHS.

\*4. This cable is not required if a battery is connected to the host controller.

## Relay Encoder Cables of 30 m to 50 m

| Servo Motor Model                                          | Name                                                                      | Length (L) | Order Number     | Appearance                                                                            |
|------------------------------------------------------------|---------------------------------------------------------------------------|------------|------------------|---------------------------------------------------------------------------------------|
| SGM7P-01, -02 and -04<br>100 W, 200 W, 400 W, <sup>*</sup> | Encoder-end Cable (for incremental or absolute encoder)                   | 0.3 m      | JZSP-C7PRCD-E    |  |
|                                                            | Cable installed toward load                                               |            |                  |                                                                                       |
|                                                            | Cables with Connectors on Both Ends (for incremental or absolute encoder) | 30 m       | JZSP-UCMP00-30-E |  |
|                                                            |                                                                           | 40 m       | JZSP-UCMP00-40-E |                                                                                       |
|                                                            |                                                                           | 50 m       | JZSP-UCMP00-50-E |                                                                                       |

\* Note: Relay encoder cables not available for 750W and 1.5kW models.



## SGM7G

## SGM7G Servo Motors (without Gear Box)

## Model Designations

SGM7G - 03 A 7 D 6 1

1st+2nd digits 3rd digit 4th digit 5th digit 6th digit 7th digit

Σ-7 Series  
Servo Motors:  
SGM7G

## 1st+2nd digits Rated Output

| Code | Specification        |
|------|----------------------|
| 03   | 300 W                |
| 05   | 450 W                |
| 09   | 850 W                |
| 13   | 1.3 kW               |
| 20   | 1.8 kW               |
| 30   | 2.9 kW <sup>*1</sup> |
| 44   | 4.4 kW               |
| 55   | 5.5 kW               |
| 75   | 7.5 kW               |
| 1A   | 11 kW                |
| 1E   | 15 kW                |

□ Limited Stock Item  
■ Non Stock Items

## 3rd digit Power Supply Voltage

| Code | Specification       |
|------|---------------------|
| A    | Three-phase 200 VAC |
| D    | Three-phase 400 VAC |

## 4th digit Serial Encoder

| Code | Specification               |
|------|-----------------------------|
| 6    | 24-bit batteryless absolute |
| 7    | 24-bit absolute             |
| F    | 24-bit incremental          |

## 5th digit Design Revision Order

| Code | Specification                                                  |
|------|----------------------------------------------------------------|
| A    | Global Design Revision for Batteryless Absolute Encoder (200V) |
| D    | Global Design Revision (200V)                                  |
| B    | Low Speed Version (200V)                                       |
| F    | Global Design Revision (400V)                                  |
| R    | High Speed Version (400V)                                      |

## 6th digit Shaft End

| Code | Specification                                    |
|------|--------------------------------------------------|
| 2    | Straight without key                             |
| 6    | Straight with key and tap                        |
| S    | Straight without key (850 W, 1.3 kW)             |
| K    | Straight with key and tap (300 W, 850 W, 1.3 kW) |

## 7th digit Options

| Code | Specification                             |
|------|-------------------------------------------|
| 1    | Without options                           |
| C    | With holding brake (24 VDC)               |
| E    | With oil seal and holding brake (24 VDC)  |
| S    | With oil seal                             |
| H    | With dust seal and holding brake (24 VDC) |
| F    | With dust seal                            |

\*1. The rated output is 2.4 kW if you combine the SGM7G-30A with the SGD7S-200A.

\*2. Shaft end specification K is standard on -03, -09, and -13 Models

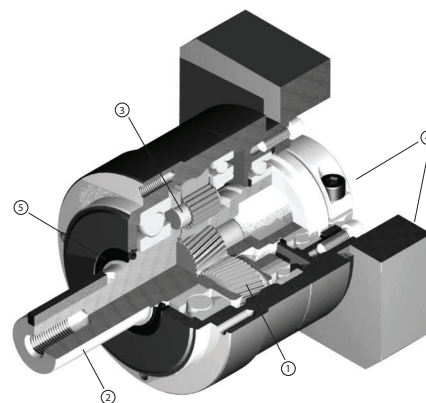


## SGM7G Gear Motors

The SGM7G gear motor product family pairs SGM7G servo motors with high precision, low backlash inline planetary gear heads resulting in a portfolio of rotary actuators fit for a wide range of applications. The family of gear motors has been thoroughly tested and adheres to the high levels of quality and performance expected from Yaskawa.

The high precision gear heads offer a variety of application advantages:

- ① **Quiet operation** – helical cut gears contribute toward reduced vibration and noise
- ② **High precision** – a standard backlash of 5 arc-min make this gear head ideal for the most accurate applications
- ③ **High rigidity and torque capacity** – achieved with a design which incorporates uncaged needle roller bearings
- ④ **Optimized adapter bushing** – minimizes inertia allowing for more output torque to be realized
- ⑤ **No leakage through the seal** – high viscosity, anti-separation grease does not liquefy and does not migrate away from the gears
- **Maintenance-free** – no need to replace the grease for the life of the unit. The reducer can be positioned in any orientation



## Model Designations

S7G 01 A C - VL 050 - 05

Σ-7 Series  
Gear Motors:  
SGM7G

1st+2nd  
digits

3rd  
digit

4th  
digit

5th  
digit

6th  
digit

7th  
digit

1st+2nd digits Rated Output

| Code | Specification |
|------|---------------|
| 05   | 450 W         |
| 09   | 850 W         |
| 13   | 1.3 kW        |
| 20   | 1.8 kW        |
| 30   | 2.9 kW        |
| 44   | 4.4 kW        |
| 55   | 5.5 kW        |
| 75   | 7.5 kW        |

3rd digit Power Supply Voltage

| Code | Specification            |
|------|--------------------------|
| A    | 200 VAC battery type     |
| B    | 200 VAC batteryless type |
| D    | 400 VAC battery type     |
| E    | 400 VAC batteryless type |

4th digit Brake Option

| Code  | Specification |
|-------|---------------|
| Blank | No brake      |
| C     | 24 V Brake    |

5th digit Gear box backlash

| Code | Specification      |
|------|--------------------|
| VL   | 5 arc-min backlash |

6th digit Gear head frame size

| Code | Specification |
|------|---------------|
| 070  | 70 mm         |
| 090  | 90 mm         |
| 120  | 120 mm        |
| 155  | 155 mm        |
| 205  | 205mm         |
| 235  | 235mm         |

7th digit Gear Ratio

| Code | Specification |
|------|---------------|
| 03   | 3:1 Ratio     |
| 05   | 5:1 Ratio     |
| 10   | 10:1 Ratio    |
| 25   | 25:1 Ratio    |
| 50   | 50:1 Ratio    |

## Specifications and Ratings

### Specifications (200V)

| Voltage                  |                                       | 200 V                                                                                                                                                                                                                                                                                                                                                                                                    |      |      |      |      |      |      |                       |      |     |     |
|--------------------------|---------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------|------|------|------|------|------|-----------------------|------|-----|-----|
| Model SGM7G-             |                                       | 03A                                                                                                                                                                                                                                                                                                                                                                                                      | 05A  | 09A  | 13A  | 20A  | 30A  | 44A  | 55A                   | 75A  | 1AA | 1EA |
| Time Rating              |                                       | Continuous                                                                                                                                                                                                                                                                                                                                                                                               |      |      |      |      |      |      |                       |      |     |     |
| Thermal Class            |                                       | UL: F, CE: F                                                                                                                                                                                                                                                                                                                                                                                             |      |      |      |      |      |      |                       |      |     |     |
| Insulation Resistance    |                                       | 500 VDC, 10 MΩ min.                                                                                                                                                                                                                                                                                                                                                                                      |      |      |      |      |      |      |                       |      |     |     |
| Withstand Voltage        |                                       | 1,500 VAC for 1 minute                                                                                                                                                                                                                                                                                                                                                                                   |      |      |      |      |      |      |                       |      |     |     |
| Excitation               |                                       | Permanent magnet                                                                                                                                                                                                                                                                                                                                                                                         |      |      |      |      |      |      |                       |      |     |     |
| Mounting                 |                                       | Flange-mounted                                                                                                                                                                                                                                                                                                                                                                                           |      |      |      |      |      |      |                       |      |     |     |
| Drive Method             |                                       | Direct drive                                                                                                                                                                                                                                                                                                                                                                                             |      |      |      |      |      |      |                       |      |     |     |
| Rotation Direction       |                                       | Counterclockwise (CCW) for forward reference when viewed from the load side                                                                                                                                                                                                                                                                                                                              |      |      |      |      |      |      |                       |      |     |     |
| Vibration Class*1        |                                       | V15                                                                                                                                                                                                                                                                                                                                                                                                      |      |      |      |      |      |      |                       |      |     |     |
| Environmental Conditions | Surrounding Air Temperature           | 0°C to 40°C (With derating, usage is possible between 40°C and 60°C.)*4                                                                                                                                                                                                                                                                                                                                  |      |      |      |      |      |      |                       |      |     |     |
|                          | Surrounding Air Humidity              | 20% to 80% relative humidity (with no condensation)                                                                                                                                                                                                                                                                                                                                                      |      |      |      |      |      |      |                       |      |     |     |
|                          | Installation Site                     | <ul style="list-style-type: none"><li>• Must be indoors and free of corrosive and explosive gases.</li><li>• Must be well-ventilated and free of dust and moisture.</li><li>• Must facilitate inspection and cleaning.</li><li>• Must have an altitude of 1,000 m or less. (With derating, usage is possible between 1,000 m and 2,000 m.)*5</li><li>• Must be free of strong magnetic fields.</li></ul> |      |      |      |      |      |      |                       |      |     |     |
|                          | Storage Environment                   | Store the Servo Motor in the following environment if you store it with the power cable disconnected.<br>Storage Temperature: -20°C to 60°C (with no freezing)<br>Storage Humidity: 20% to 80% relative humidity (with no condensation)                                                                                                                                                                  |      |      |      |      |      |      |                       |      |     |     |
| Shock Resistance*2       | Impact Acceleration Rate at Flange    | 490 m/s <sup>2</sup>                                                                                                                                                                                                                                                                                                                                                                                     |      |      |      |      |      |      |                       |      |     |     |
|                          | Number of Impacts                     | 2 times                                                                                                                                                                                                                                                                                                                                                                                                  |      |      |      |      |      |      |                       |      |     |     |
| Vibration Resistance*3   | Vibration Acceleration Rate at Flange | 49 m/s <sup>2</sup> (24.5 m/s <sup>2</sup> front to back)                                                                                                                                                                                                                                                                                                                                                |      |      |      |      |      |      | 24.5 m/s <sup>2</sup> |      |     |     |
| Applicable SERVOPACKs    | SGD7S-                                | 3R8A                                                                                                                                                                                                                                                                                                                                                                                                     | 7R6A | 120A | 180A | 330A | 470A | 550A | 590A                  | 780A |     |     |
|                          | SGD7W-                                | 5R5A*6<br>7R6A*6                                                                                                                                                                                                                                                                                                                                                                                         | 7A6A | —    |      |      |      |      |                       |      |     |     |

\*1. A vibration class of V15 indicates a vibration amplitude of 15 μm maximum on the Servo Motor without a load at the rated motor speed.

\*2. The shock resistance for shock in the vertical direction when the Servo Motor is mounted with the shaft in a horizontal position is given in the above table.

\*3. The vertical, side-to-side, and front-to-back vibration resistance for vibration in three directions when the Servo Motor is mounted with the shaft in a horizontal position is given in the above table. The strength of the vibration that the Servo Motor can withstand depends on the application. Always check the vibration acceleration rate that is applied to the Servo Motor with the actual equipment.

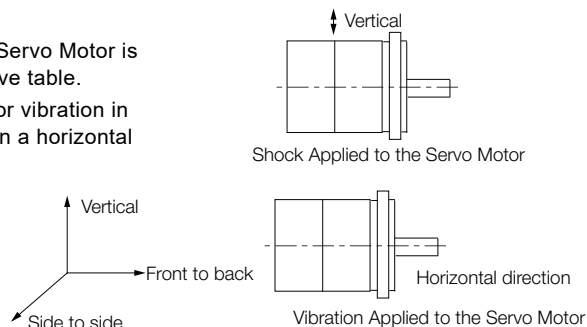
\*4. If the surrounding air temperature will exceed 40°C, refer to the following section.

☞ *Applications Where the Surrounding Air Temperature of the Servo Motor Exceeds 40°C* (page 158)

\*5. If the altitude will exceed 1,000 m, refer to the following section.

☞ *Applications Where the Altitude of the Servo Motor Exceeds 1,000 m* (page 159)

\*6. If you use a S-7W SERVOPACK, the control gain may not increase as much as with a S-7S SERVOPACK and other performances may be lower than those achieved with a S-7S SERVOPACK.



## Specifications (400V)

| Voltage                            |                             |                                       | 400 V                                                                                                                                                                                                                                                                                                                                                                                                               |      |      |      |      |      |      |                       |      |      |
|------------------------------------|-----------------------------|---------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------|------|------|------|------|------|-----------------------|------|------|
| Model SGM7G-                       |                             |                                       | 05D                                                                                                                                                                                                                                                                                                                                                                                                                 | 09D  | 13D  | 20D  | 30D  | 44D  | 55D  | 75D                   | 1AD  | 1ED  |
| Time Rating                        |                             |                                       | Continuous                                                                                                                                                                                                                                                                                                                                                                                                          |      |      |      |      |      |      |                       |      |      |
| Thermal Class                      |                             |                                       | UL: F, CE: F                                                                                                                                                                                                                                                                                                                                                                                                        |      |      |      |      |      |      |                       |      |      |
| Insulation Resistance              |                             |                                       | 500 VDC, 10 MΩ min.                                                                                                                                                                                                                                                                                                                                                                                                 |      |      |      |      |      |      |                       |      |      |
| Withstand Voltage                  |                             |                                       | 1,800 VAC for 1 minute                                                                                                                                                                                                                                                                                                                                                                                              |      |      |      |      |      |      |                       |      |      |
| Excitation                         |                             |                                       | Permanent magnet                                                                                                                                                                                                                                                                                                                                                                                                    |      |      |      |      |      |      |                       |      |      |
| Mounting                           |                             |                                       | Flange-mounted                                                                                                                                                                                                                                                                                                                                                                                                      |      |      |      |      |      |      |                       |      |      |
| Drive Method                       |                             |                                       | Direct drive                                                                                                                                                                                                                                                                                                                                                                                                        |      |      |      |      |      |      |                       |      |      |
| Rotation Direction                 |                             |                                       | Counterclockwise (CCW) for forward reference when viewed from the load side                                                                                                                                                                                                                                                                                                                                         |      |      |      |      |      |      |                       |      |      |
| Vibration Class <sup>*1</sup>      |                             |                                       | V15                                                                                                                                                                                                                                                                                                                                                                                                                 |      |      |      |      |      |      |                       |      |      |
| Environmental Conditions           |                             | Surrounding Air Temperature           | 0°C to 40°C (With derating, usage is possible between 40°C and 60°C.)* <sup>4</sup>                                                                                                                                                                                                                                                                                                                                 |      |      |      |      |      |      |                       |      |      |
|                                    |                             | Surrounding Air Humidity              | 20% to 80% relative humidity (with no condensation)                                                                                                                                                                                                                                                                                                                                                                 |      |      |      |      |      |      |                       |      |      |
|                                    |                             | Installation Site                     | <ul style="list-style-type: none"><li>• Must be indoors and free of corrosive and explosive gases.</li><li>• Must be well-ventilated and free of dust and moisture.</li><li>• Must facilitate inspection and cleaning.</li><li>• Must have an altitude of 1,000 m or less. (With derating, usage is possible between 1,000 m and 2,000 m.)*<sup>5</sup></li><li>• Must be free of strong magnetic fields.</li></ul> |      |      |      |      |      |      |                       |      |      |
|                                    |                             | Storage Environment                   | Store the Servo Motor in the following environment if you store it with the power cable disconnected.<br>Storage Temperature: -20°C to 60°C (with no freezing)<br>Storage Humidity: 20% to 80% relative humidity (with no condensation)                                                                                                                                                                             |      |      |      |      |      |      |                       |      |      |
| Shock Resistance <sup>*2</sup>     |                             | Impact Acceleration Rate at Flange    | 490 m/s <sup>2</sup>                                                                                                                                                                                                                                                                                                                                                                                                |      |      |      |      |      |      |                       |      |      |
|                                    |                             | Number of Impacts                     | 2 times                                                                                                                                                                                                                                                                                                                                                                                                             |      |      |      |      |      |      |                       |      |      |
| Vibration Resistance <sup>*3</sup> |                             | Vibration Acceleration Rate at Flange | 49 m/s <sup>2</sup> (24.5 m/s <sup>2</sup> front to back)                                                                                                                                                                                                                                                                                                                                                           |      |      |      |      |      |      | 24.5 m/s <sup>2</sup> |      |      |
| Applicable SERVOPACKs              | with standard Servo Motor   | SGD7S-                                | 1R9D                                                                                                                                                                                                                                                                                                                                                                                                                | 3R5D | 5R4D | 8R4D | 120D | 170D | 210D | 260D                  | 280D | 370D |
|                                    |                             | SGD7W-                                | 2R6D <sup>*6</sup><br>5R4D <sup>*6</sup>                                                                                                                                                                                                                                                                                                                                                                            |      | 5R4D | 5R4D | -    |      |      |                       |      |      |
|                                    | with high-speed servo motor | SGD7S-                                | 3R5D                                                                                                                                                                                                                                                                                                                                                                                                                | 5R4D | 8R4D | 120D | 170D | 210D | -    |                       |      |      |
|                                    |                             | SGD7W-                                | 2R6D <sup>*6</sup><br>5R4D <sup>*6</sup>                                                                                                                                                                                                                                                                                                                                                                            |      | 5R4D | -    |      |      |      |                       |      |      |

\*1. A vibration class of V15 indicates a vibration amplitude of 15 μm maximum on the Servo Motor without a load at the rated motor speed.

\*2. The shock resistance for shock in the vertical direction when the Servo Motor is mounted with the shaft in a horizontal position is given in the above table.

\*3. The vertical, side-to-side, and front-to-back vibration resistance for vibration in three directions when the Servo Motor is mounted with the shaft in a horizontal position is given in the above table. The strength of the vibration that the Servo Motor can withstand depends on the application. Always check the vibration acceleration rate that is applied to the Servo Motor with the actual equipment.

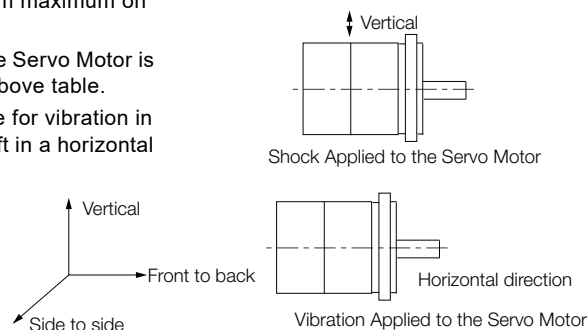
\*4. If the surrounding air temperature will exceed 40°C, refer to the following section.

☞ *Applications Where the Surrounding Air Temperature of the Servo Motor Exceeds 40°C* (page 158)

\*5. If the altitude will exceed 1,000 m, refer to the following section.

☞ *Applications Where the Altitude of the Servo Motor Exceeds 1,000 m* (page 159)

\*6. If you use a S-7W SERVOPACK, the control gain may not increase as much as with a S-7S SERVOPACK and other performances may be lower than those achieved with a S-7S SERVOPACK.



## Servo Motor Ratings (200 V Models -03A to -20A)

| Voltage                                                          |                                |                                     | 200 V                               |                |                           |                |                |
|------------------------------------------------------------------|--------------------------------|-------------------------------------|-------------------------------------|----------------|---------------------------|----------------|----------------|
| Model SGM7G-                                                     |                                |                                     | 03A                                 | 05A            | 09A                       | 13A            | 20A            |
| Rated Output <sup>*1</sup>                                       |                                | kW                                  | 0.3                                 | 0.45           | 0.85                      | 1.3            | 1.8            |
| Rated Torque <sup>*1, *2</sup>                                   |                                | N•m                                 | 1.96                                | 2.86           | 5.39                      | 8.34           | 11.5           |
| Instantaneous Maximum Torque <sup>*1</sup>                       |                                | N•m                                 | 5.88                                | 8.92           | 14.2                      | 23.3           | 28.7           |
| Rated Current <sup>*1</sup>                                      |                                | Arms                                | 2.8                                 | 3.8            | 6.9                       | 10.7           | 16.7           |
| Instantaneous Maximum Current <sup>*1</sup>                      |                                | Arms                                | 8.0                                 | 11             | 17                        | 28             | 42             |
| Rated Motor Speed <sup>*1</sup>                                  |                                | min <sup>-1</sup>                   | 1500                                |                |                           |                |                |
| Maximum Motor Speed <sup>*1</sup>                                |                                | min <sup>-1</sup>                   | 3000                                |                |                           |                |                |
| Torque Constant                                                  |                                | N•m/Arms                            | 0.776                               | 0.854          | 0.859                     | 0.891          | 0.748          |
| Motor Moment of Inertia                                          |                                | ×10 <sup>-4</sup> kg•m <sup>2</sup> | 2.48<br>(2.73)                      | 3.33<br>(3.58) | 13.9<br>(16.0)            | 19.9<br>(22.0) | 26.0<br>(28.1) |
| Rated Power Rate <sup>*1</sup>                                   |                                | kW/s                                | 15.5<br>(14.1)                      | 24.6<br>(22.8) | 20.9<br>(18.2)            | 35.0<br>(31.6) | 50.9<br>(47.1) |
| Rated Angular Acceleration Rate <sup>*1</sup>                    |                                | rad/s <sup>2</sup>                  | 7900<br>(7180)                      | 8590<br>(7990) | 3880<br>(3370)            | 4190<br>(3790) | 4420<br>(4090) |
| Heat Sink Size                                                   |                                | mm                                  | 250 × 250 × 6<br>(aluminum)         |                | 400 × 400 × 20<br>(steel) |                |                |
| Protective Structure <sup>*3</sup>                               |                                |                                     | Totally enclosed, self-cooled, IP67 |                |                           |                |                |
| Holding Brake Specifications <sup>*4</sup>                       | Rated Voltage                  | V                                   | 24 VDC <sup>+10%</sup> <sub>0</sub> |                |                           |                |                |
|                                                                  | Capacity                       | W                                   | 10                                  |                |                           |                |                |
|                                                                  | Holding Torque                 | N•m                                 | 4.5                                 |                | 12.7                      | 19.6           |                |
|                                                                  | Coil Resistance                | Ω (at 20°C)                         | 56                                  |                | 59                        |                |                |
|                                                                  | Rated Current                  | A (at 20°C)                         | 0.43                                |                | 0.41                      |                |                |
|                                                                  | Time Required to Release Brake | ms                                  | 100                                 |                |                           |                |                |
|                                                                  | Time Required to Brake         | ms                                  | 80                                  |                |                           |                |                |
| Allowable Load Moment of Inertia (Motor Moment of Inertia Ratio) |                                |                                     | 15 times                            | 15 times       | 5 times                   |                |                |
| Allowable Shaft Loads <sup>*5</sup>                              | LF                             | mm                                  | 40                                  |                | 58                        |                |                |
|                                                                  | Allowable Radial Load          | N                                   | 490                                 |                |                           | 686            | 980            |
|                                                                  | Allowable Thrust Load          | N                                   | 98                                  |                |                           | 343            | 392            |

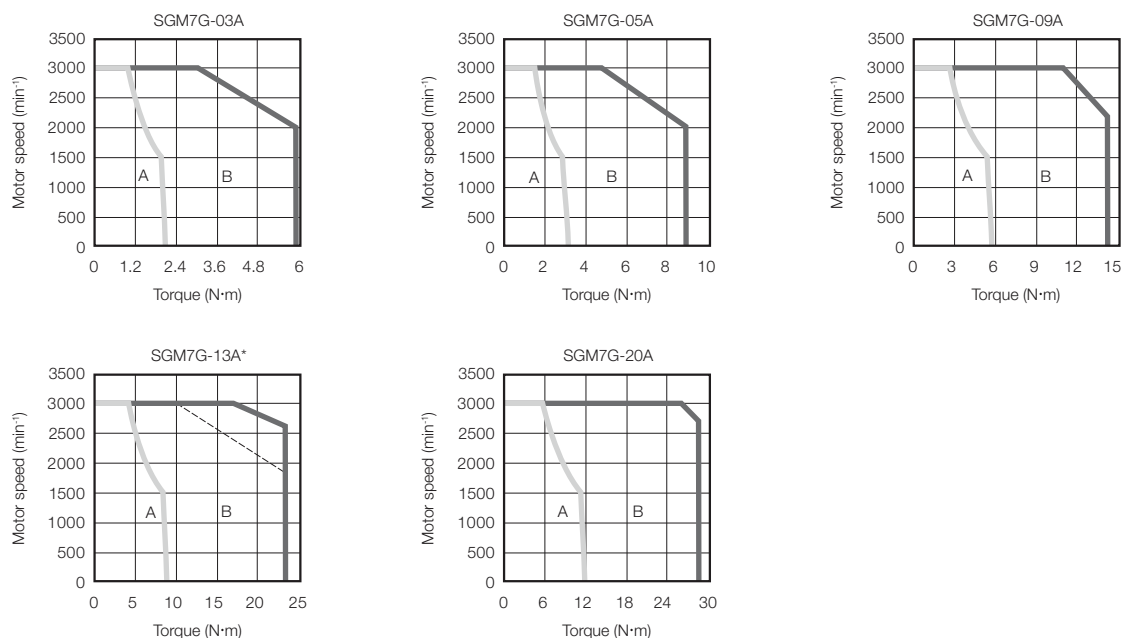
Note: 1. The values in parentheses are for Servo Motors with Holding Brakes.

2. Refer to the following section for footnotes \*1 to \*5.

■ Notes for the Servo Motor Ratings Tables (page 141)

## Torque-Motor Speed Characteristics (200 V Models -03A to -20A)

[A] : Continuous duty zone      — (solid lines): With three-phase 200-V or single-phase 230-V input  
 [B] : Intermittent duty zone      - - - (dotted lines): With single-phase 200-V input



\* A single-phase power input can be used in combination with the SGD7S-120A□□A008.

Note: 1. These values are for operation in combination with a SERVOPACK when the temperature of the armature winding is 20°C. These are typical values.

2. The characteristics in the intermittent duty zone depend on the power supply voltage.
3. If the effective torque is within the allowable range for the rated torque, the Servo Motor can be used within the intermittent duty zone.
4. If you use a Servo Motor Main Circuit Cable that exceeds 20 m, the intermittent duty zone in the torque-motor speed characteristics will become smaller because the voltage drop increases.

## Servo Motor Ratings (200 V Models -30A to -1EA)

| Voltage                                                          |                                |                                     | 200 V                               |                   |                |                |                |                           |                |
|------------------------------------------------------------------|--------------------------------|-------------------------------------|-------------------------------------|-------------------|----------------|----------------|----------------|---------------------------|----------------|
| Model SGM7G-                                                     |                                |                                     | 30A                                 | 30A <sup>*6</sup> | 44A            | 55A            | 75A            | 1AA                       | 1EA            |
| Rated Output <sup>*1</sup>                                       |                                | kW                                  | 2.9                                 | 2.4               | 4.4            | 5.5            | 7.5            | 11                        | 15             |
| Rated Torque <sup>*1, *2</sup>                                   |                                | N•m                                 | 18.6                                | 15.1              | 28.4           | 35.0           | 48.0           | 70.0                      | 95.4           |
| Instantaneous Maximum Torque <sup>*1</sup>                       |                                | N•m                                 | 54.0                                | 45.1              | 71.6           | 102            | 119            | 175                       | 224            |
| Rated Current <sup>*1</sup>                                      |                                | Arms                                | 23.8                                | 19.6              | 32.8           | 37.2           | 54.7           | 58.6                      | 78.0           |
| Instantaneous Maximum Current <sup>*1</sup>                      |                                | Arms                                | 70                                  | 56                | 84             | 110            | 130            | 140                       | 170            |
| Rated Motor Speed <sup>*1</sup>                                  |                                | min <sup>-1</sup>                   | 1500                                | 1500              | 1500           | 1500           | 1500           | 1500                      | 1500           |
| Maximum Motor Speed <sup>*1</sup>                                |                                | min <sup>-1</sup>                   | 3000                                | 3000              | 3000           | 3000           | 3000           | 2000                      | 2000           |
| Torque Constant                                                  |                                | N•m/Arms                            | 0.848                               | 0.848             | 0.934          | 1.00           | 0.957          | 1.38                      | 1.44           |
| Motor Moment of Inertia                                          |                                | ×10 <sup>-4</sup> kg•m <sup>2</sup> | 46.0<br>(53.9)                      | 46.0<br>(53.9)    | 67.5<br>(75.4) | 89.0<br>(96.9) | 125<br>(133)   | 242<br>(261)              | 303<br>(341)   |
| Rated Power Rate <sup>*1</sup>                                   |                                | kW/s                                | 75.2<br>(64.2)                      | 49.5<br>(42.2)    | 119<br>(107)   | 138<br>(126)   | 184<br>(173)   | 202<br>(188)              | 300<br>(267)   |
| Rated Angular Acceleration Rate <sup>*1</sup>                    |                                | rad/s <sup>2</sup>                  | 4040<br>(3450)                      | 3280<br>(2800)    | 4210<br>(3770) | 3930<br>(3610) | 3840<br>(3610) | 2890<br>(2680)            | 3150<br>(2800) |
| Heat Sink Size                                                   |                                | mm                                  | 550 × 550 × 30 (steel)              |                   |                |                |                | 650 × 650 × 35<br>(steel) |                |
| Protective Structure <sup>*3</sup>                               |                                |                                     | Totally enclosed, self-cooled, IP67 |                   |                |                |                |                           |                |
| Holding Brake Specifications <sup>*4</sup>                       | Rated Voltage                  | V                                   | 24 VDC <sup>+10%</sup> <sub>0</sub> |                   |                |                |                |                           |                |
|                                                                  | Capacity                       | W                                   | 18.5                                |                   |                | 25             |                | 32                        | 35             |
|                                                                  | Holding Torque                 | N•m                                 | 43.1                                |                   |                | 72.6           |                | 84.3                      | 114.6          |
|                                                                  | Coil Resistance                | Ω (at 20°C)                         | 31                                  |                   |                | 23             |                | 18                        | 17             |
|                                                                  | Rated Current                  | A (at 20°C)                         | 0.77                                |                   |                | 1.05           |                | 1.33                      | 1.46           |
|                                                                  | Time Required to Release Brake | ms                                  | 170                                 |                   |                |                |                |                           | 250            |
|                                                                  | Time Required to Brake         | ms                                  | 100                                 |                   |                | 80             |                |                           |                |
| Allowable Load Moment of Inertia (Motor Moment of Inertia Ratio) |                                |                                     | 5 times                             | 3 times           | 5 times        |                |                |                           |                |
|                                                                  |                                |                                     | 10 times                            | 7 times           | 10 times       |                |                |                           |                |
| Allowable Shaft Loads <sup>*5</sup>                              | LF                             | mm                                  | 79                                  |                   |                | 113            |                | 116                       |                |
|                                                                  | Allowable Radial Load          | N                                   | 1470                                |                   |                | 1764           |                |                           | 4998           |
|                                                                  | Allowable Thrust Load          | N                                   | 490                                 |                   |                | 588            |                |                           | 2156           |

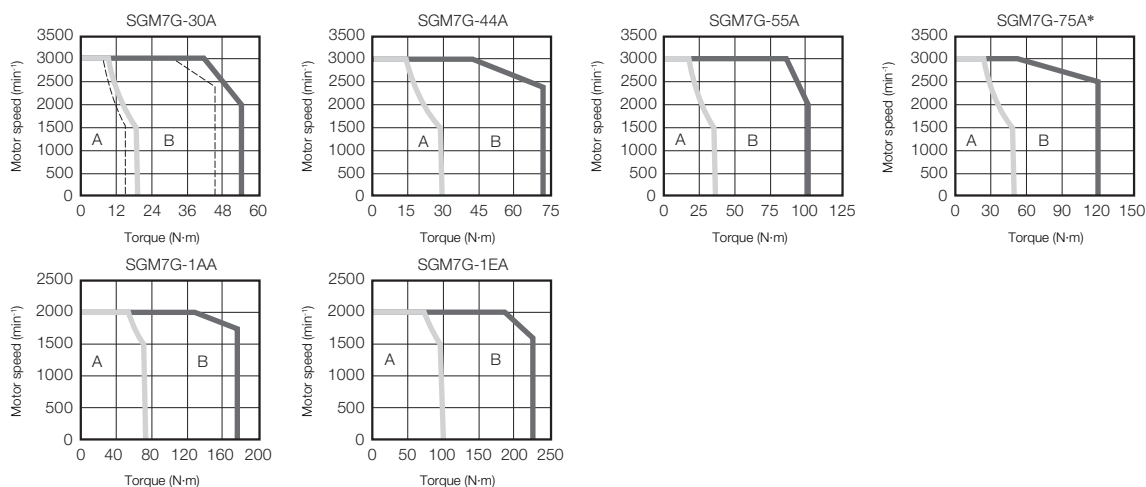
Note: 1. The values in parentheses are for Servo Motors with Holding Brakes.

2. Refer to the following section for footnotes \*1 to \*6.

■ ■ Notes for the Servo Motor Ratings Tables (page 141)

## Torque-Motor Speed Characteristics (200 V Models -30A to -1EA)

- A** : Continuous duty zone      — (solid lines): With three-phase 200-V input  
**B** : Intermittent duty zone      - - - (dotted lines): When combined with the SGD7S-200A



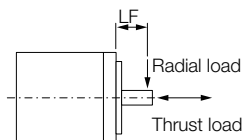
\* Use an SGM7G-75A Servo Motor with a Holding Brake with an output torque of 14.4 N·m (30% of the rated torque) or lower when using the Servo Motor in continuous operation at the maximum motor speed of 3,000 min<sup>-1</sup>.

Note: 1. These values are for operation in combination with a SERVOPACK when the temperature of the armature winding is 100°C. These are typical values.

2. The characteristics in the intermittent duty zone depend on the power supply voltage.
3. If the effective torque is within the allowable range for the rated torque, the Servo Motor can be used within the intermittent duty zone.
4. If you use a Servo Motor Main Circuit Cable that exceeds 20 m, the intermittent duty zone in the torque-motor speed characteristics will become smaller because the voltage drop increases.

### ■ Notes for the Servo Motor Ratings Tables

- \*1. These values are for operation in combination with a SERVOPACK when the temperature of the armature winding is 20°C. These are typical values.
- \*2. The rated torques are the continuous allowable torque values at a surrounding air temperature of 40°C with an aluminum or steel heat sink of the dimensions given in the table.
- \*3. This does not apply to the shaft opening. Protective structure specifications apply only when the special cable is used.
- \*4. Observe the following precautions if you use a Servo Motor with a Holding Brake.
  - The holding brake cannot be used to stop the Servo Motor.
  - The time required to release the brake and the time required to brake depend on which discharge circuit is used. Confirm that the operation delay time is appropriate for the actual equipment.
  - The 24-VDC power supply is not provided by Yaskawa.
- \*5. The allowable shaft loads are illustrated in the following figure. Design the mechanical system so that the thrust and radial loads applied to the Servo Motor shaft end during operation do not exceed the values given in the table.



- \*6. This is the value if you combine the SGM7G-30A with the SGD7S-200A.

## Servo Motor Ratings (200 V Low-Speed Models -03A to -55A)

| Voltage                                                             |                                        |                | 200 V                               |                     |                |                |                     |             |                |                  |  |
|---------------------------------------------------------------------|----------------------------------------|----------------|-------------------------------------|---------------------|----------------|----------------|---------------------|-------------|----------------|------------------|--|
| Model SGM7G-                                                        |                                        |                | 03A□B                               | 06A□B               | 09A□B          | 12A□B          | 20A□B               | 30A□B       | 40A□B          | 55A□B            |  |
| Rated Output* <sup>1</sup>                                          | kW                                     |                | 0.3                                 | 0.6                 | 0.9            | 1.2            | 2.0                 | 3.0 (2.3)   | 4.0            | 5.5              |  |
| Rated Torque* <sup>1, *2</sup>                                      | N•m                                    |                | 2.86                                | 5.68                | 8.62           | 11.5           | 19.1                | 28.4 (22.0) | 38.2           | 52.6             |  |
| Instantaneous Maximum Torque* <sup>1</sup>                          | N•m                                    |                | 7.17                                | 14.1                | 19.3           | 28             | 44.0                | 63.7        | 107            | 137              |  |
| Rated Current* <sup>1</sup>                                         | Arms                                   |                | 3.0                                 | 5.7                 | 7.6            | 11.6           | 18.5                | 24.8 (19.6) | 30.0           | 43.2             |  |
| Instantaneous Maximum Current* <sup>1</sup>                         | Arms                                   |                | 7.3                                 | 13.9                | 16.6           | 28.0           | 42.0                | 56.0        | 84.0           | 110              |  |
| Rated Motor Speed* <sup>1</sup>                                     | min <sup>-1</sup>                      |                | 1000                                |                     |                |                |                     |             |                |                  |  |
| Maximum Motor Speed* <sup>1</sup>                                   | min <sup>-1</sup>                      |                | 2000                                |                     |                |                |                     |             |                |                  |  |
| Torque Constant                                                     | N•m/<br>Arms                           |                | 1.05                                | 1.09                | 1.23           | 1.07           | 1.08                | 1.21        | 1.34           | 1.27             |  |
| Motor Moment of Inertia                                             | ×10 <sup>-4</sup><br>kg•m <sup>2</sup> |                | 3.33<br>(3.58)                      | 13.9<br>(16.0)      | 19.9<br>(22.0) | 26.0<br>(28.1) | 46.0<br>(53.9)      | 67.6 (75.4) | 89.0<br>(96.9) | 125.0<br>(132.9) |  |
| Rated Power Rate* <sup>1</sup>                                      | kW/s                                   |                | 24.6                                | 23.2                | 37.3           | 50.9           | 79.3                | 119 (71.7)  | 164            | 221              |  |
| Rated Angular Acceleration Rate* <sup>1</sup>                       | rad/s <sup>2</sup>                     |                | 8590                                | 4090                | 4330           | 4420           | 4150                | 4210 (3260) | 4290           | 4210             |  |
| Heat Sink Size                                                      | mm                                     |                | 250 x<br>250 x 6<br>alumi-<br>num   | 400 x 400 x 20 iron |                |                | 550 x 550 x 30 iron |             |                |                  |  |
| Protective Structure* <sup>3</sup>                                  |                                        |                | Totally enclosed, self-cooled, IP67 |                     |                |                |                     |             |                |                  |  |
| Applicable SERVOPACK                                                |                                        | SGD7S-         | 3R8A                                | 7R6A                |                | 120A           | 180A                | 330A (200A) | 330A           | 470A             |  |
| Holding Brake<br>Specifications* <sup>4</sup>                       | Rated Voltage                          | V              | 24 VDC                              |                     |                |                |                     |             |                |                  |  |
|                                                                     | Capacity                               | W              | 10                                  |                     |                |                |                     | 18.5        |                | 25               |  |
|                                                                     | Holding Torque                         | N•m            | 4.5                                 | 12.7                |                | 19.6           |                     | 43.1        |                | 72.6             |  |
|                                                                     | Coil Resistance                        | Ω (at<br>20°C) | 56                                  | 59                  |                |                |                     | 31          |                | 23               |  |
|                                                                     | Rated Current                          | A (at<br>20°C) | 0.43                                | 0.41                |                |                |                     | 0.77        |                | 1.05             |  |
|                                                                     | Time Required to<br>Release Brake      | ms             | 100                                 |                     |                |                |                     | 170         |                |                  |  |
|                                                                     | Time Required to<br>Brake              | ms             | 80                                  |                     |                |                |                     | 100         |                | 80               |  |
| Allowable Load Moment of Inertia<br>(Motor Moment of Inertia Ratio) |                                        |                | 15 times                            | 10<br>times         | 5 times        |                | 5 times (3 times)   |             | 5 times        |                  |  |
| Allowable Shaft<br>Loads* <sup>5</sup>                              | LF                                     | mm             | 40                                  | 58                  |                |                | 79                  |             | 113            |                  |  |
|                                                                     | Allowable Radial<br>Load               | N              | 490                                 |                     |                | 686            | 980                 | 1470        |                | 1764             |  |
|                                                                     | Allowable Thrust<br>Load               | N              | 98                                  |                     |                | 343            | 392                 | 490         |                | 588              |  |

Note: The values in parentheses are for Servo Motors with Holding Brakes.



## Ratings of Servo Motors (400 V Models -05D to -30D)

| Voltage                                                          |                                                                          |                                     | 400 V                               |                        |                  |                  |                        |      |
|------------------------------------------------------------------|--------------------------------------------------------------------------|-------------------------------------|-------------------------------------|------------------------|------------------|------------------|------------------------|------|
| Model SGM7G-                                                     |                                                                          |                                     | 05D                                 | 09D                    | 13D              | 20D              | 30D                    |      |
| Rated Output <sup>*1</sup>                                       |                                                                          | kW                                  | 0.45                                | 0.85                   | 1.3              | 1.8              | 2.9                    |      |
| Rated Torque <sup>*1, *2</sup>                                   |                                                                          | N•m                                 | 2.86                                | 5.39                   | 8.34             | 11.5             | 18.6                   |      |
| Instantaneous Maximum Torque <sup>*1</sup>                       |                                                                          | N•m                                 | 8.92                                | 13.8                   | 23.3             | 28.7             | 45.1                   |      |
| Rated Current <sup>*1</sup>                                      |                                                                          | Arms                                | 1.9                                 | 3.5                    | 5.4              | 8.4              | 11.9                   |      |
| Instantaneous Max. Current <sup>*1</sup>                         |                                                                          | Arms                                | 5.5                                 | 8.5                    | 14               | 20               | 28                     |      |
| Rated Motor Speed <sup>*1</sup>                                  |                                                                          | min <sup>-1</sup>                   | 1500                                |                        |                  |                  |                        |      |
| Maximum Motor Speed <sup>*1</sup>                                |                                                                          | min <sup>-1</sup>                   | 3000                                |                        |                  |                  |                        |      |
| Torque Constant                                                  |                                                                          | N•m/Arms                            | 1.71                                | 1.72                   | 1.78             | 1.50             | 1.70                   |      |
| Motor Moment of Inertia                                          |                                                                          | ×10 <sup>-4</sup> kg•m <sup>2</sup> | 3.33<br>(3.58)                      | 13.9<br>(16.0)         | 19.9<br>(22.0)   | 26.0<br>(28.1)   | 46.0<br>(53.9)         |      |
| Rated Power Rate <sup>*1</sup>                                   |                                                                          | kW/s                                | 24.6<br>(22.8)                      | 20.9<br>(18.2)         | 35.0<br>(31.6)   | 50.9<br>(47.1)   | 75.2<br>(64.2)         |      |
| Rated Angular Acceleration Rate <sup>*1</sup>                    |                                                                          | rad/s <sup>2</sup>                  | 8,590<br>(7,990)                    | 3,880<br>(3,370)       | 4,190<br>(3,790) | 4,420<br>(4,090) | 4,040<br>(3,450)       |      |
| Heat Sink Size                                                   |                                                                          | mm                                  | 250 × 250 × 6 (aluminum)            | 400 × 400 × 20 (steel) |                  |                  | 550 × 550 × 30 (steel) |      |
| Protective Structure <sup>*3</sup>                               |                                                                          |                                     | Totally enclosed, self-cooled, IP67 |                        |                  |                  |                        |      |
| Holding Brake Specifications <sup>*4</sup>                       | Rated Voltage                                                            | V                                   | 24 VDC±10%                          |                        |                  |                  |                        |      |
|                                                                  | Capacity                                                                 | W                                   | 10.0                                |                        |                  |                  | 18.5                   |      |
|                                                                  | Holding Torque                                                           | N•m                                 | 4.5                                 | 12.7                   | 19.6             |                  | 43.1                   |      |
|                                                                  | Coil Resistance                                                          | Ω (at 20°C)                         | 56                                  | 59                     |                  |                  | 31                     |      |
|                                                                  | Rated Current                                                            | A (at 20°C)                         | 0.43                                | 0.41                   |                  |                  | 0.77                   |      |
|                                                                  | Time Required to Release Brake                                           | ms                                  | 100                                 |                        |                  |                  | 170                    |      |
|                                                                  | Time Required to Brake                                                   | ms                                  | 80                                  |                        |                  |                  | 100                    |      |
| Allowable Load Moment of Inertia (Motor Moment of Inertia Ratio) | Standard                                                                 |                                     | 15 times                            | 5 times                |                  |                  |                        |      |
|                                                                  | With external regenerative resistor and dynamic brake resistor connected |                                     | 15 times                            | 10 times               |                  |                  |                        |      |
| Allowable Shaft Loads <sup>*5</sup>                              | LF                                                                       | mm                                  | 40                                  | 58                     |                  |                  | 79                     |      |
|                                                                  | Allowable Radial Load                                                    | N                                   | 490                                 |                        |                  | 686              | 980                    | 1470 |
|                                                                  | Allowable Thrust Load                                                    | N                                   | 98                                  |                        |                  | 343              | 392                    | 490  |

Note: The values in parentheses are for Servo Motors with Holding Brakes.

\*1. These values are for operation in combination with a SERVOPACK when the temperature of the armature winding is 20°C. These are typical values.

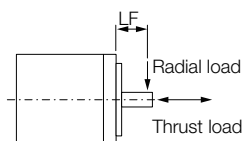
\*2. The rated torques are the continuous allowable torque values at a surrounding air temperature of 40°C with an aluminum or steel heat sink of the dimensions given in the table.

\*3. This does not apply to the shaft opening. Protective structure specifications apply only when the special cable is used.

\*4. Observe the following precautions if you use a Servomotor with a Holding Brake.

- The holding brake cannot be used to stop the Servomotor.
- The time required to release the brake and the time required to brake depend on which discharge circuit is used. Confirm that the operation delay time is appropriate for the actual equipment.
- The 24-VDC power supply is not provided by YASKAWA.

\*5. The allowable shaft loads are illustrated in the following figure. Design the mechanical system so that the thrust and radial loads applied to the Servo Motor shaft end during operation do not exceed the values given in the table.



## Ratings of Servo Motors (400 V Models -44D to -1ED)

| Voltage                                                          |                                                                          |                                     | 400 V                               |                  |                 |                        |                  |     |
|------------------------------------------------------------------|--------------------------------------------------------------------------|-------------------------------------|-------------------------------------|------------------|-----------------|------------------------|------------------|-----|
| Model SGM7G-                                                     |                                                                          |                                     | 44D                                 | 55D              | 75D             | 1AD                    | 1ED              |     |
| Rated Output* <sup>1</sup>                                       |                                                                          | kW                                  | 4.4                                 | 5.5              | 7.5             | 11                     | 15               |     |
| Rated Torque* <sup>1, *2</sup>                                   |                                                                          | N•m                                 | 28.4                                | 35.0             | 48.0            | 70.0                   | 95.4             |     |
| Instantaneous Maximum Torque* <sup>1</sup>                       |                                                                          | N•m                                 | 71.6                                | 87.6             | 119             | 175                    | 224              |     |
| Rated Current* <sup>1</sup>                                      |                                                                          | Arms                                | 16                                  | 20.8             | 25.7            | 28.1                   | 37.2             |     |
| Instantaneous Max.Current* <sup>1</sup>                          |                                                                          | Arms                                | 40.5                                | 52               | 65              | 70                     | 85               |     |
| Rated Motor Speed* <sup>1</sup>                                  |                                                                          | min <sup>-1</sup>                   | 1500                                |                  |                 |                        |                  |     |
| Maximum Motor Speed* <sup>1</sup>                                |                                                                          | min <sup>-1</sup>                   | 3000                                |                  |                 | 2000                   |                  |     |
| Torque Constant                                                  |                                                                          | N•m/Arms                            | 1.93                                | 1.80             | 1.92            | 2.76                   | 2.86             |     |
| Motor Moment of Inertia                                          |                                                                          | ×10 <sup>-4</sup> kg•m <sup>2</sup> | 67.5<br>(75.4)                      | 89<br>(96.9)     | 125<br>(133)    | 242<br>(261)           | 303<br>(341)     |     |
| Rated Power Rate* <sup>1</sup>                                   |                                                                          | kW/s                                | 119<br>(107)                        | 138<br>(126)     | 184<br>(173)    | 202<br>(188)           | 300<br>(267)     |     |
| Rated Angular Acceleration Rate* <sup>1</sup>                    |                                                                          | rad/s <sup>2</sup>                  | 4,210<br>(3,770)                    | 3,930<br>(3,610) | 3840<br>(3,610) | 2,890<br>(2,680)       | 3,150<br>(2,800) |     |
| Heat Sink Size                                                   |                                                                          | mm                                  | 550 × 550 × 30 (steel)              |                  |                 | 650 × 650 × 35 (steel) |                  |     |
| Protective Structure* <sup>3</sup>                               |                                                                          |                                     | Totally enclosed, self-cooled, IP67 |                  |                 |                        |                  |     |
| Holding Brake Specifications* <sup>4</sup>                       | Rated Voltage                                                            | V                                   | 24 VDC±10%                          |                  |                 |                        |                  |     |
|                                                                  | Capacity                                                                 | W                                   | 18.5                                | 25               |                 | 32                     | 35               |     |
|                                                                  | Holding Torque                                                           | N•m                                 | 43.1                                | 72.6             |                 | 84.3                   | 114.6            |     |
|                                                                  | Coil Resistance                                                          | Ω (at 20°C)                         | 31                                  | 23               |                 | 18                     | 17               |     |
|                                                                  | Rated Current                                                            | A (at 20°C)                         | 0.77                                | 1.05             |                 | 1.33                   | 1.46             |     |
|                                                                  | Time Required to Release Brake                                           | ms                                  | 170                                 |                  |                 |                        |                  | 250 |
|                                                                  | Time Required to Brake                                                   | ms                                  | 100                                 | 80               |                 |                        |                  |     |
| Allowable Load Moment of Inertia (Motor Moment of Inertia Ratio) | Standard                                                                 |                                     | 5 times                             | 10 times         |                 |                        |                  |     |
|                                                                  | With external regenerative resistor and dynamic brake resistor connected |                                     | 10 times                            |                  |                 |                        |                  |     |
| Allowable Shaft Loads* <sup>5</sup>                              | LF                                                                       | mm                                  | 79                                  | 113              |                 | 116                    |                  |     |
|                                                                  | Allowable Radial Load                                                    | N                                   | 1470                                | 1764             |                 |                        | 4998             |     |
|                                                                  | Allowable Thrust Load                                                    | N                                   | 490                                 | 588              |                 |                        | 2156             |     |

Note: The values in parentheses are for Servo Motors with Holding Brakes.

\*1. These values are for operation in combination with a SERVOPACK when the temperature of the armature winding is 20°C. These are typical values.

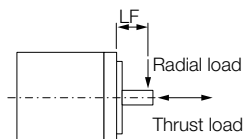
\*2. The rated torques are the continuous allowable torque values at a surrounding air temperature of 40°C with an aluminum or steel heat sink of the dimensions given in the table.

\*3. This does not apply to the shaft opening. Protective structure specifications apply only when the special cable is used.

\*4. Observe the following precautions if you use a Servomotor with a Holding Brake.

- The holding brake cannot be used to stop the Servomotor.
- The time required to release the brake and the time required to brake depend on which discharge circuit is used. Confirm that the operation delay time is appropriate for the actual equipment.
- The 24-VDC power supply is not provided by YASKAWA.

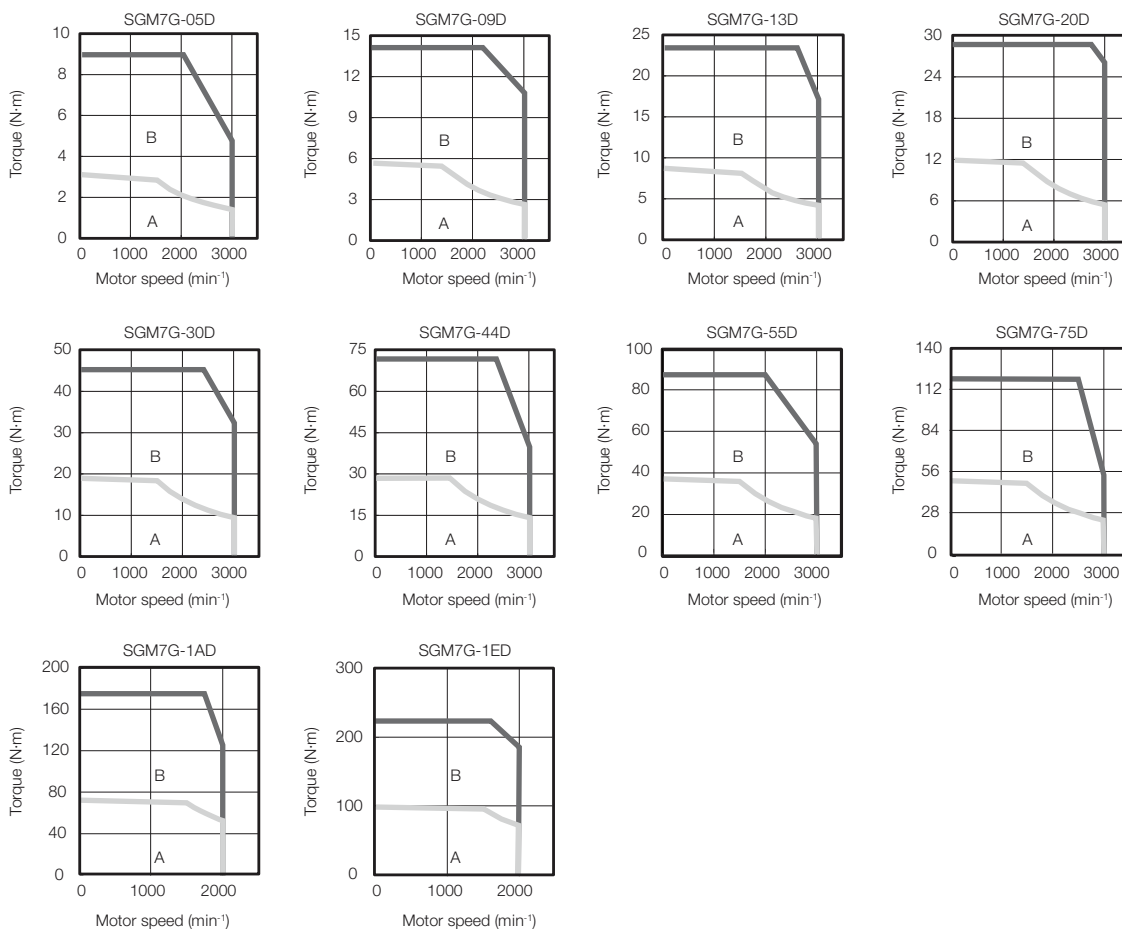
\*5. The allowable shaft loads are illustrated in the following figure. Design the mechanical system so that the thrust and radial loads applied to the Servo Motor shaft end during operation do not exceed the values given in the table.



## Torque-Motor Speed Characteristics (400 V Models -05D to -1ED)

**A** : Continuous duty zone

**B** : Intermittent duty zone



Note: 1. These values are for operation in combination with a SERVOPACK when the temperature of the armature winding is 20°C. These are typical values.

2. The characteristics in the intermittent duty zone depend on the power supply voltage. The intermittent duty zone in the graphs show the characteristics when a three-phase, 400-VAC power supply voltage is used.
3. If the effective torque is within the allowable range for the rated torque, the Servomotor can be used within the intermittent duty zone.
4. If you use a Servomotor Main Circuit Cable that exceeds 20 m, the intermittent duty zone in the torque-motor speed characteristics will become smaller because the voltage drop increases.

## Ratings of High Speed Servo Motors (400 V - NON-STOCK)

| Voltage                                                          |                                                                          |             | 400 V                               |                        |                  |                  |                  |                  |
|------------------------------------------------------------------|--------------------------------------------------------------------------|-------------|-------------------------------------|------------------------|------------------|------------------|------------------|------------------|
| Model SGM7G                                                      |                                                                          |             | 05D                                 | 09D                    | 13D              | 20D              | 30D              | 44D              |
| Rated Output <sup>*1</sup>                                       | kW                                                                       |             | 0.45                                | 0.85                   | 1.3              | 1.8              | 2.9              | 4.4              |
| Rated Torque <sup>*1, *2</sup>                                   | N•m                                                                      |             | 2.86                                | 5.39                   | 8.34             | 11.5             | 18.6             | 28.4             |
| Instantaneous Maximum Torque <sup>*1</sup>                       | N•m                                                                      |             | 8.8                                 | 15                     | 22               | 28.7             | 50               | 71.1             |
| Rated Current <sup>*1</sup>                                      | Arms                                                                     |             | 2.6                                 | 5.3                    | 8.3              | 10.1             | 14.4             | 19.3             |
| Instantaneous Max.Current <sup>*1</sup>                          | Arms                                                                     |             | 8.2                                 | 14                     | 21               | 24               | 40               | 50               |
| Rated Motor Speed <sup>*1</sup>                                  | min <sup>-1</sup>                                                        |             | 1500                                |                        |                  |                  |                  |                  |
| Maximum Motor Speed <sup>*1</sup>                                | min <sup>-1</sup>                                                        |             | 5000                                |                        |                  |                  | 4500             |                  |
| Allowable Continuous Motor Speed <sup>*1</sup>                   | min <sup>-1</sup>                                                        |             | 5000                                | 4000                   |                  |                  | 3300             | 3000             |
| Torque Constant                                                  | N•m/Arms                                                                 |             | 1.13                                | 1.12                   | 1.09             | 1.27             | 1.36             | 1.58             |
| Motor Moment of Inertia                                          | ×10 <sup>-4</sup> kg•m <sup>2</sup>                                      |             | 3.33<br>(3.58)                      | 13.9<br>(16.0)         | 19.9<br>(22.0)   | 26.0<br>(28.1)   | 46.0<br>(53.9)   | 67.5<br>(75.4)   |
| Rated Power Rate <sup>*1</sup>                                   | kW/s                                                                     |             | 24.6<br>(22.8)                      | 20.9<br>(18.2)         | 35.0<br>(31.6)   | 50.9<br>(47.1)   | 75.2<br>(64.2)   | 119<br>(107)     |
| Rated Angular Acceleration Rate <sup>*1</sup>                    | rad/s <sup>2</sup>                                                       |             | 8,590<br>(7,990)                    | 3,880<br>(3,370)       | 4,190<br>(3,790) | 4,420<br>(4,090) | 4,040<br>(3,450) | 4,210<br>(3,770) |
| Heat Sink Size                                                   | mm                                                                       |             | 250 × 250 × 6<br>(aluminum)         | 400 × 400 x 20 (steel) |                  |                  |                  |                  |
| Protective Structure <sup>*3</sup>                               |                                                                          |             | Totally enclosed, self-cooled, IP67 |                        |                  |                  |                  |                  |
| Holding Brake Specifications <sup>*4</sup>                       | Rated Voltage                                                            | V           | 24 VDC±10%                          |                        |                  |                  |                  |                  |
|                                                                  | Capacity                                                                 | W           | 10.0                                |                        |                  |                  | 18.5             |                  |
|                                                                  | Holding Torque                                                           | N•m         | 4.5                                 | 12.7                   | 19.6             |                  | 43.1             |                  |
|                                                                  | Coil Resistance                                                          | Ω (at 20°C) | 56                                  | 59                     |                  |                  | 31               |                  |
|                                                                  | Rated Current                                                            | A (at 20°C) | 0.43                                | 0.41                   |                  |                  | 0.77             |                  |
|                                                                  | Time Required to Release Brake                                           | ms          | 100                                 |                        |                  |                  | 170              |                  |
|                                                                  | Time Required to Brake                                                   | ms          | 80                                  |                        |                  |                  | 100              |                  |
| Allowable Load Moment of Inertia (Motor Moment of Inertia Ratio) | Standard                                                                 |             | 8 times                             | 2 times                | 4 times          | 3 times          | 2 times          | 5 times          |
|                                                                  | With external regenerative resistor and dynamic brake resistor connected |             | 15 times                            | 4 times                | 7 times          | 6 times          | 6 times          |                  |
| Allowable Shaft Loads <sup>*5</sup>                              | LF                                                                       | mm          | 40                                  | 58                     |                  |                  | 79               |                  |
|                                                                  | Allowable Radial Load                                                    | N           |                                     |                        |                  | 686              | 980              | 1470             |
|                                                                  | Allowable Thrust Load                                                    | N           | 98                                  |                        |                  | 343              | 392              | 490              |

Note: The values in parentheses are for Servo Motors with Holding Brakes.

\*1. These values are for operation in combination with a SERVOPACK when the temperature of the armature winding is 20°C. These are typical values.

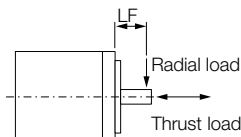
\*2. The rated torques are the continuous allowable torque values at a surrounding air temperature of 40°C with an aluminum or steel heat sink of the dimensions given in the table.

\*3. This does not apply to the shaft opening. Protective structure specifications apply only when the special cable is used.

\*4. Observe the following precautions if you use a Servomotor with a Holding Brake.

- The holding brake cannot be used to stop the Servomotor.
- The time required to release the brake and the time required to brake depend on which discharge circuit is used. Confirm that the operation delay time is appropriate for the actual equipment.
- The 24-VDC power supply is not provided by YASKAWA.

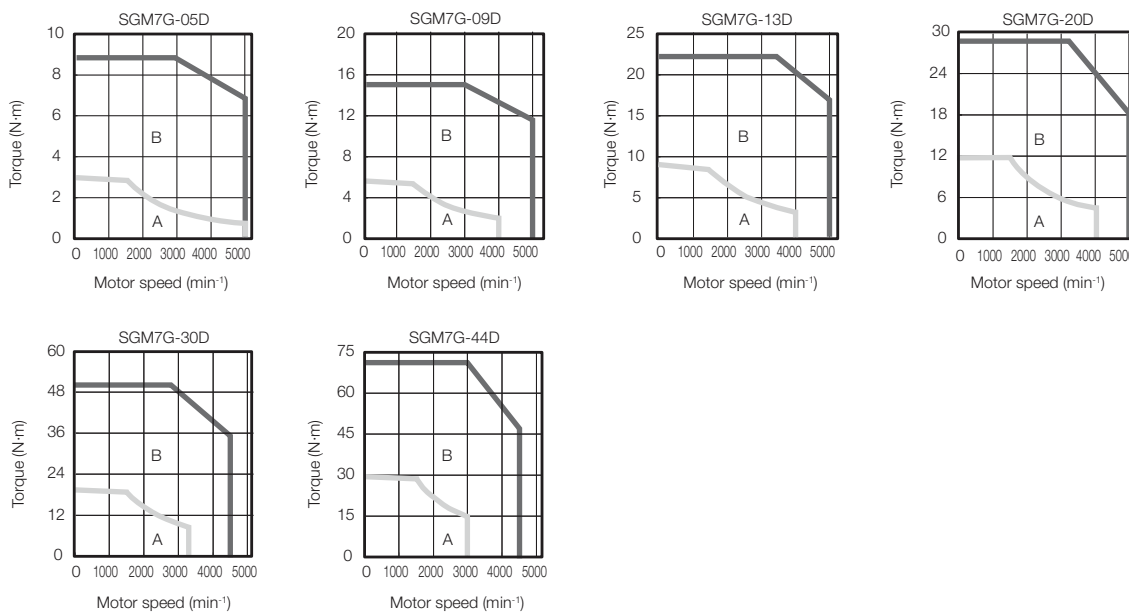
\*5. The allowable shaft loads are illustrated in the following figure. Design the mechanical system so that the thrust and radial loads applied to the Servo Motor shaft end during operation do not exceed the values given in the table.



## Torque-Motor Speed Characteristics (High Speed Models - 400V NON-STOCK)

Ⓐ : Continuous duty zone

Ⓑ : Intermittent duty zone



Note: 1. These values are for operation in combination with a SERVOPACK when the temperature of the armature winding is 20°C. These are typical values.

2. The characteristics in the intermittent duty zone depend on the power supply voltage. The intermittent duty zone in the graphs show the characteristics when a three-phase, 400-VAC power supply voltage is used.
3. If the effective torque is within the allowable range for the rated torque, the Servomotor can be used within the intermittent duty zone.
4. If you use a Servomotor Main Circuit Cable that exceeds 20 m, the intermittent duty zone in the torque-motor speed characteristics will become smaller because the voltage drop increases.

# Ratings of Gear Motors (200 V Models - Absolute Encoder with Battery)

| Gear Motor Model Number S7G | Base Servo Motor Model SGM7G- | Gear Ratio | Gearing Efficiency % <sup>1</sup> | Rated Speed (RPM) | Max Speed (RPM) | Rated Torque (Nm) <sup>2</sup> | Peak Torque (Nm) <sup>2</sup> | Motor Inertia (x10 <sup>-4</sup> kg-m <sup>2</sup> ) | Gearhead Inertia (x10 <sup>-4</sup> kg-m <sup>2</sup> ) | Allowable Radial Load (N) | Allowable Axial Load (N) | Backlash (arc-min) | Class |
|-----------------------------|-------------------------------|------------|-----------------------------------|-------------------|-----------------|--------------------------------|-------------------------------|------------------------------------------------------|---------------------------------------------------------|---------------------------|--------------------------|--------------------|-------|
| 05A□ -VL070-03              | 05A7D6□                       | 3:1        | 95                                | 500               | 1000            | 8.15                           | 25.4                          | 3.330 (3.580)                                        | 0.53                                                    | 430                       | 310                      | 5                  | IP65  |
| 05A□ -VL070-05              |                               | 5:1        |                                   | 300               | 600             | 13.6                           | 42.4                          |                                                      | 0.46                                                    | 510                       | 390                      |                    |       |
| 05A□ -VL090-10              |                               | 10:1       |                                   | 150               | 300             | 27.2                           | 80.0 <sup>3</sup>             |                                                      | 0.70                                                    | 1200                      | 1600                     |                    |       |
| 05A□ -VL090-25              |                               | 25:1       | 90                                | 60                | 120             | 64.4                           | 125 <sup>3</sup>              |                                                      | 0.74                                                    | 1600                      | 2200                     |                    |       |
| 05A□ -VL120-50              |                               | 50:1       |                                   | 30                | 60              | 129                            | 330 <sup>3</sup>              |                                                      | 0.76                                                    | 3400                      | 3900                     |                    |       |
| 09A□ -VL090-03              | 09A7DK□                       | 3:1        | 95                                | 500               | 1000            | 15.4                           | 40.5                          | 13.90 (16.00)                                        | 1.1                                                     | 810                       | 930                      |                    |       |
| 09A□ -VL090-05              |                               | 5:1        |                                   | 300               | 600             | 25.6                           | 67.5                          |                                                      | 0.80                                                    | 960                       | 1200                     |                    |       |
| 09A□ -VL090-10              |                               | 10:1       |                                   | 150               | 300             | 50.0 <sup>3</sup>              | 80.0 <sup>3</sup>             |                                                      | 0.70                                                    | 1200                      | 1600                     |                    |       |
| 09A□ -VL120-25              |                               | 25:1       | 90                                | 60                | 120             | 121                            | 320                           |                                                      | 1.1                                                     | 2700                      | 3700                     |                    |       |
| 09A□ -VL155-50              |                               | 50:1       |                                   | 30                | 60              | 243                            | 639                           |                                                      | 1.1                                                     | 8100                      | 8200                     |                    |       |
| 13A□ -VL090-03              | 13A7DK□                       | 3:1        | 95                                | 500               | 1000            | 23.8                           | 66.4                          | 19.90 (22.00)                                        | 2.9                                                     | 810                       | 930                      |                    |       |
| 13A□ -VL090-05              |                               | 5:1        |                                   | 300               | 600             | 39.6                           | 111                           |                                                      | 2.6                                                     | 960                       | 1200                     |                    |       |
| 13A□ -VL120-10              |                               | 10:1       |                                   | 150               | 300             | 79.2                           | 221                           |                                                      | 2.6                                                     | 2000                      | 2500                     |                    |       |
| 13A□ -VL120-25              |                               | 25:1       | 90                                | 60                | 120             | 180 <sup>3</sup>               | 330 <sup>3</sup>              |                                                      | 2.8                                                     | 2700                      | 3700                     |                    |       |
| 13A□ -VL155-50              |                               | 50:1       |                                   | 30                | 60              | 360 <sup>3</sup>               | 700 <sup>3</sup>              |                                                      | 2.8                                                     | 8100                      | 8200                     |                    |       |
| 20A□ -VL090-03              | 20A7D6□                       | 3:1        | 95                                | 500               | 1000            | 32.8                           | 80.0 <sup>3</sup>             | 26.00 (28.10)                                        | 2.9                                                     | 810                       | 930                      |                    |       |
| 20A□ -VL090-05              |                               | 5:1        |                                   | 300               | 600             | 54.6                           | 125 <sup>3</sup>              |                                                      | 2.6                                                     | 960                       | 1200                     |                    |       |
| 20A□ -VL120-10              |                               | 10:1       |                                   | 150               | 300             | 109                            | 225 <sup>3</sup>              |                                                      | 2.6                                                     | 2000                      | 2500                     |                    |       |
| 20A□ -VL155-25              |                               | 25:1       | 90                                | 60                | 120             | 259                            | 646                           |                                                      | 4.1                                                     | 6400                      | 6100                     |                    |       |
| 20A□ -VL205-50              |                               | 50:1       |                                   | 30                | 60              | 518                            | 1292                          |                                                      | 3.8                                                     | 14000                     | 14000                    |                    |       |
| 30A□ -VL120-03              | 30A7D6□                       | 3:1        | 95                                | 500               | 1000            | 53.0                           | 154                           | 46.00 (53.90)                                        | 12.0                                                    | 1300                      | 1500                     |                    |       |
| 30A□ -VL120-05              |                               | 5:1        |                                   | 300               | 600             | 88.4                           | 257                           |                                                      | 9.5                                                     | 1600                      | 1900                     |                    |       |
| 30A□ -VL155-10              |                               | 10:1       |                                   | 150               | 300             | 177                            | 470 <sup>3</sup>              |                                                      | 9.6                                                     | 4700                      | 4100                     |                    |       |
| 30A□ -VL155-25              |                               | 25:1       | 90                                | 60                | 120             | 360 <sup>3</sup>               | 700 <sup>3</sup>              |                                                      | 10.0                                                    | 6400                      | 6100                     |                    |       |
| 30A□ -VL205-50              |                               | 50:1       |                                   | 30                | 60              | 750 <sup>3</sup>               | 1400 <sup>3</sup>             |                                                      | 10.0                                                    | 14000                     | 14000                    |                    |       |
| 44A□ -VL120-03              | 44A7D6□                       | 3:1        | 95                                | 500               | 1000            | 80.9                           | 204                           | 67.50 (75.40)                                        | 12.0                                                    | 1300                      | 1500                     |                    |       |
| 44A□ -VL120-05              |                               | 5:1        |                                   | 300               | 600             | 135                            | 330 <sup>3</sup>              |                                                      | 9.5                                                     | 1600                      | 1900                     |                    |       |
| 44A□ -VL205-10              |                               | 10:1       |                                   | 150               | 300             | 270                            | 680                           |                                                      | 12.0                                                    | 8400                      | 7300                     |                    |       |
| 44A□ -VL205-25              |                               | 25:1       | 90                                | 60                | 120             | 639                            | 1400 <sup>3</sup>             |                                                      | 14.0                                                    | 11000                     | 11000                    |                    |       |
| 44A□ -VL235-50              |                               | 50:1       | 92                                | 20 <sup>3</sup>   | 40 <sup>3</sup> | 1306                           | 2300 <sup>3</sup>             |                                                      | 12.0                                                    | 15000                     | 14000                    |                    |       |
| 55A□ -VL155-03              | 55A7D6□                       | 3:1        | 95                                | 500               | 1000            | 99.8                           | 291                           | 89.00 (96.90)                                        | 35.0                                                    | 3200                      | 2400                     |                    |       |
| 55A□ -VL155-05              |                               | 5:1        |                                   | 300               | 600             | 166                            | 485                           |                                                      | 27.0                                                    | 3800                      | 3000                     |                    |       |
| 55A□ -VL205-10              |                               | 10:1       |                                   | 150               | 300             | 333                            | 969                           |                                                      | 27.0                                                    | 8400                      | 7300                     |                    |       |
| 55A□ -VL205-25              |                               | 25:1       | 90                                | 60                | 120             | 750 <sup>3</sup>               | 1400 <sup>3</sup>             |                                                      | 29.0                                                    | 11000                     | 1100                     |                    |       |
| 55A□ -VL235-50              |                               | 50:1       | 92                                | 20 <sup>3</sup>   | 40 <sup>3</sup> | 1500 <sup>3</sup>              | 2300 <sup>3</sup>             |                                                      | 26.0                                                    | 15000                     | 1400                     |                    |       |

| Gear Motor Model Number S7G ____ | Base Servo Motor Model SGM7G- | Gear Ratio | Gearing Efficiency *1 | Rated Speed (RPM) | Max Speed (RPM) | Rated Torque (Nm)*2 | Peak Torque (Nm)*2 | Motor Inertia (x10 <sup>-4</sup> kg-m <sup>2</sup> ) | Gearhead Inertia (x10 <sup>-4</sup> kg-m <sup>2</sup> ) | Allowable Radial Load (N) | Allowable Axial Load (N) | Backlash (arc-min) | Class |
|----------------------------------|-------------------------------|------------|-----------------------|-------------------|-----------------|---------------------|--------------------|------------------------------------------------------|---------------------------------------------------------|---------------------------|--------------------------|--------------------|-------|
| 75A□ -VL155-03                   | 75A7D6□                       | 3:1        | 95                    | 500               | 1000            | 137                 | 339                | 125.0 (133.0)                                        | 35.0                                                    | 3200                      | 2400                     | 5                  | IP65  |
| 75A□ -VL155-05                   |                               | 5:1        |                       | 300               | 600             | 228                 | 565                |                                                      | 27.0                                                    | 3800                      | 3000                     |                    |       |
| 75A□ -VL205-10                   |                               | 10:1       |                       | 150               | 300             | 456                 | 970*3              |                                                      | 27.0                                                    | 8400                      | 7300                     |                    |       |
| 75A□ -VL235-25                   |                               | 25:1       | 92                    | 40*3              | 80*3            | 1104                | 2300*3             |                                                      | 33.0                                                    | 12000                     | 14000                    |                    |       |
| 75A□ -VL235-50                   |                               | 50:1       |                       | 20*3              | 40*3            | 1500*3              | 2300*3             |                                                      | 26.0                                                    | 15000                     | 14000                    |                    |       |

Note: The values in parentheses are for Servo Motors with Holding Brakes (indicated by value of □ in model numbers).

\*1. The gear efficiency depends on operating conditions such as the output torque, motor speed, and temperature.

\*2. The gear motor output torque is expressed by the following formula: Output Torque = (Servo Motor Output Torque) x (Gearing Ratio) x (Gearing Efficiency). The values in the table are typical values for the rated torque, rated motor speed, and a surrounding air temperature of 25°C. They are reference values only.

\*3. The output torque of the gear motor is limited by the mechanical limit of the gear head. Operation above this limit could result in premature failure of the gear motor.



Important

During operation of the gear motor, losses due to inefficiencies of the gearing mechanism are generated. The losses vary as the conditions for gear motor torque and speed change. Temperature rise can vary based on the mechanical inefficiencies and the heat dissipation conditions. For heat dissipation conditions, check the gear and motor temperatures with the actual equipment. If operating temperatures are too high, implement the following measures.

- Decrease the load ratio.
- Change the heat dissipation conditions.
- Use forced-air cooling for the motor with a cooling fan or other means.
- Please refer to "Sigma-7 Gearmotor Temperature Test Data" (document number PN.GearMotors.01) on [yaskawa.com](http://yaskawa.com) for temperature test data.

## Ratings of Gear Motors (200 V Models - Batteryless Absolute Encoder)

| Gear Motor Model Number S7G | Base Servo Motor Model SGM7G- | Gear Ratio | Gearing Efficiency % <sup>1</sup> | Rated Speed (RPM) | Max Speed (RPM)  | Rated Torque (Nm) <sup>2</sup> | Peak Torque (Nm) <sup>2</sup> | Motor Inertia (x10 <sup>-4</sup> kg-m <sup>2</sup> ) | Gearhead Inertia (x10 <sup>-4</sup> kg-m <sup>2</sup> ) | Allowable Radial Load (N) | Allowable Axial Load (N) | Backlash (arc-min) | Class |
|-----------------------------|-------------------------------|------------|-----------------------------------|-------------------|------------------|--------------------------------|-------------------------------|------------------------------------------------------|---------------------------------------------------------|---------------------------|--------------------------|--------------------|-------|
| 05B□ -VL070-03              | 05A6A6□                       | 3:1        | 95                                | 500               | 1000             | 8.15                           | 25.4                          | 3.330 (3.580)                                        | 0.53                                                    | 430                       | 310                      | 5                  | IP65  |
| 05B□ -VL070-05              |                               | 5:1        |                                   | 300               | 600              | 13.6                           | 42.4                          |                                                      | 0.46                                                    | 510                       | 390                      |                    |       |
| 05B□ -VL090-10              |                               | 10:1       |                                   | 150               | 300              | 50.0 <sup>+3</sup>             | 80.0 <sup>+3</sup>            |                                                      | 0.70                                                    | 1200                      | 1600                     |                    |       |
| 05B□ -VL090-25              |                               | 25:1       | 90                                | 60                | 120              | 64.4                           | 125 <sup>+3</sup>             |                                                      | 0.74                                                    | 1600                      | 2200                     |                    |       |
| 05B□ -VL120-50              |                               | 50:1       |                                   | 30                | 60               | 129                            | 330 <sup>+3</sup>             |                                                      | 0.76                                                    | 3400                      | 3900                     |                    |       |
| 09B□ -VL090-03              | 09A6AK□                       | 3:1        | 95                                | 500               | 1000             | 15.4                           | 40.5                          | 13.90 (16.00)                                        | 1.1                                                     | 810                       | 930                      |                    |       |
| 09B□ -VL090-05              |                               | 5:1        |                                   | 300               | 600              | 25.6                           | 67.5                          |                                                      | 0.80                                                    | 960                       | 1200                     |                    |       |
| 09B□ -VL090-10              |                               | 10:1       |                                   | 150               | 300              | 50.0 <sup>+3</sup>             | 80.0 <sup>+3</sup>            |                                                      | 0.70                                                    | 1200                      | 1600                     |                    |       |
| 09B□ -VL120-25              |                               | 25:1       | 90                                | 60                | 120              | 121                            | 320                           |                                                      | 1.1                                                     | 2700                      | 3700                     |                    |       |
| 09B□ -VL155-50              |                               | 50:1       |                                   | 30                | 60               | 243                            | 639                           |                                                      | 1.1                                                     | 8100                      | 8200                     |                    |       |
| 13B□ -VL090-03              | 13A6AK□                       | 3:1        | 95                                | 500               | 1000             | 23.8                           | 66.4                          | 19.90 (22.00)                                        | 2.9                                                     | 810                       | 930                      |                    |       |
| 13B□ -VL090-05              |                               | 5:1        |                                   | 300               | 600              | 39.6                           | 111                           |                                                      | 2.6                                                     | 960                       | 1200                     |                    |       |
| 13B□ -VL120-10              |                               | 10:1       |                                   | 150               | 300              | 79.2                           | 221                           |                                                      | 2.6                                                     | 2000                      | 2500                     |                    |       |
| 13B□ -VL120-25              |                               | 25:1       | 90                                | 60                | 120              | 180 <sup>+3</sup>              | 330 <sup>+3</sup>             |                                                      | 2.8                                                     | 2700                      | 3700                     |                    |       |
| 13B□ -VL155-50              |                               | 50:1       |                                   | 30                | 60               | 360 <sup>+3</sup>              | 700 <sup>+3</sup>             |                                                      | 2.8                                                     | 8100                      | 8200                     |                    |       |
| 20B□ -VL090-03              | 20A6A6□                       | 3:1        | 95                                | 500               | 1000             | 32.8                           | 80.0 <sup>+3</sup>            | 26.00 (28.10)                                        | 2.9                                                     | 810                       | 930                      |                    |       |
| 20B□ -VL090-05              |                               | 5:1        |                                   | 300               | 600              | 54.6                           | 125 <sup>+3</sup>             |                                                      | 2.6                                                     | 960                       | 1200                     |                    |       |
| 20B□ -VL120-10              |                               | 10:1       |                                   | 150               | 300              | 109                            | 225 <sup>+3</sup>             |                                                      | 2.6                                                     | 2000                      | 2500                     |                    |       |
| 20B□ -VL155-25              |                               | 25:1       | 90                                | 60                | 120              | 259                            | 646                           |                                                      | 4.1                                                     | 6400                      | 6100                     |                    |       |
| 20B□ -VL205-50              |                               | 50:1       |                                   | 30                | 60               | 518                            | 1292                          |                                                      | 3.8                                                     | 14000                     | 14000                    |                    |       |
| 30B□ -VL120-03              | 30A6A6□                       | 3:1        | 95                                | 500               | 1000             | 53.0                           | 154                           | 46.00 (53.90)                                        | 12.0                                                    | 1300                      | 1500                     |                    |       |
| 30B□ -VL120-05              |                               | 5:1        |                                   | 300               | 600              | 88.4                           | 257                           |                                                      | 9.5                                                     | 1600                      | 1900                     |                    |       |
| 30B□ -VL155-10              |                               | 10:1       |                                   | 150               | 300              | 177                            | 470 <sup>+3</sup>             |                                                      | 9.6                                                     | 4700                      | 4100                     |                    |       |
| 30B□ -VL155-25              |                               | 25:1       | 90                                | 60                | 120              | 360 <sup>+3</sup>              | 700 <sup>+3</sup>             |                                                      | 10.0                                                    | 6400                      | 6100                     |                    |       |
| 30B□ -VL205-50              |                               | 50:1       |                                   | 30                | 60               | 750 <sup>+3</sup>              | 1400 <sup>+3</sup>            |                                                      | 10.0                                                    | 14000                     | 14000                    |                    |       |
| 44B□ -VL120-03              | 44A6A6□                       | 3:1        | 95                                | 500               | 1000             | 80.9                           | 204                           | 67.50 (75.40)                                        | 12.0                                                    | 1300                      | 1500                     |                    |       |
| 44B□ -VL120-05              |                               | 5:1        |                                   | 300               | 600              | 135                            | 330 <sup>+3</sup>             |                                                      | 9.5                                                     | 1600                      | 1900                     |                    |       |
| 44B□ -VL205-10              |                               | 10:1       |                                   | 150               | 300              | 270                            | 680                           |                                                      | 12.0                                                    | 8400                      | 7300                     |                    |       |
| 44B□ -VL205-25              |                               | 25:1       | 90                                | 60                | 120              | 639                            | 1400 <sup>+3</sup>            |                                                      | 14.0                                                    | 11000                     | 11000                    |                    |       |
| 44B□ -VL235-50              |                               | 50:1       | 92                                | 20 <sup>+3</sup>  | 40 <sup>+3</sup> | 1306                           | 2300 <sup>+3</sup>            |                                                      | 12.0                                                    | 15000                     | 14000                    |                    |       |
| 55B□ -VL155-03              | 55A6A6□                       | 3:1        | 95                                | 500               | 1000             | 99.8                           | 291                           | 89.00 (96.90)                                        | 35.0                                                    | 3200                      | 2400                     |                    |       |
| 55B□ -VL155-05              |                               | 5:1        |                                   | 300               | 600              | 166                            | 485                           |                                                      | 27.0                                                    | 3800                      | 3000                     |                    |       |
| 55B□ -VL205-10              |                               | 10:1       |                                   | 150               | 300              | 333                            | 969                           |                                                      | 27.0                                                    | 8400                      | 7300                     |                    |       |
| 55B□ -VL205-25              |                               | 25:1       | 90                                | 60                | 120              | 750 <sup>+3</sup>              | 1400 <sup>+3</sup>            |                                                      | 29.0                                                    | 11000                     | 1100                     |                    |       |
| 55B□ -VL235-50              |                               | 50:1       | 92                                | 20 <sup>+3</sup>  | 40 <sup>+3</sup> | 1500 <sup>+3</sup>             | 2300 <sup>+3</sup>            |                                                      | 26.0                                                    | 15000                     | 1400                     |                    |       |



| Gear Motor Model Number S7G ____ | Base Servo Motor Model SGM7G- | Gear Ratio | Gearing Efficiency *1 | Rated Speed (RPM) | Max Speed (RPM) | Rated Torque (Nm)*2 | Peak Torque (Nm)*2 | Motor Inertia (x10 <sup>-4</sup> kg-m <sup>2</sup> ) | Gearhead Inertia (x10 <sup>-4</sup> kg-m <sup>2</sup> ) | Allowable Radial Load (N) | Allowable Axial Load (N) | Backlash (arc-min) | Class |
|----------------------------------|-------------------------------|------------|-----------------------|-------------------|-----------------|---------------------|--------------------|------------------------------------------------------|---------------------------------------------------------|---------------------------|--------------------------|--------------------|-------|
| 75B□ -VL155-03                   | 75A6A6□                       | 3:1        | 95                    | 500               | 1000            | 137                 | 339                | 125.0 (133.0)                                        | 35.0                                                    | 3200                      | 2400                     | 5                  | IP65  |
| 75B□ -VL155-05                   |                               | 5:1        |                       | 300               | 600             | 228                 | 565                |                                                      | 27.0                                                    | 3800                      | 3000                     |                    |       |
| 75B□ -VL205-10                   |                               | 10:1       |                       | 150               | 300             | 456                 | 970*3              |                                                      | 27.0                                                    | 8400                      | 7300                     |                    |       |
| 75B□ -VL235-25                   |                               | 25:1       | 92                    | 40*3              | 80*3            | 1104                | 2300*3             |                                                      | 33.0                                                    | 12000                     | 14000                    |                    |       |
| 75B□ -VL235-50                   |                               | 50:1       |                       | 20*3              | 40*3            | 1500*3              | 2300*3             |                                                      | 26.0                                                    | 15000                     | 14000                    |                    |       |

Note: The values in parentheses are for Servo Motors with Holding Brakes (indicated by value of □ in model numbers).

\*1. The gear efficiency depends on operating conditions such as the output torque, motor speed, and temperature.

\*2. The gear motor output torque is expressed by the following formula: Output Torque = (Servo Motor Output Torque) x (Gearing Ratio) x (Gearing Efficiency). The values in the table are typical values for the rated torque, rated motor speed, and a surrounding air temperature of 25°C. They are reference values only.

\*3. The output torque of the gear motor is limited by the mechanical limit of the gear head. Operation above this limit could result in premature failure of the gear motor.



Important

During operation of the gear motor, losses due to inefficiencies of the gearing mechanism are generated. The losses vary as the conditions for gear motor torque and speed change. Temperature rise can vary based on the mechanical inefficiencies and the heat dissipation conditions. For heat dissipation conditions, check the gear and motor temperatures with the actual equipment. If operating temperatures are too high, implement the following measures.

- Decrease the load ratio.
- Change the heat dissipation conditions.
- Use forced-air cooling for the motor with a cooling fan or other means.
- Please refer to "Sigma-7 Gearmotor Temperature Test Data" (document number PN.GearMotors.01) on [yaskawa.com](http://yaskawa.com) for temperature test data.

## Ratings of Gear Motors (400 V Models)

| Gear Motor Model Number S7G | Base Servo Motor Model SGM7G- | Gear Ratio | Gearing Efficiency % <sup>1</sup> | Rated Speed (RPM) | Max Speed (RPM)  | Rated Torque (Nm) <sup>2</sup> | Peak Torque (Nm) <sup>2</sup> | Motor Inertia (x10 <sup>-4</sup> kg-m <sup>2</sup> ) | Gearhead Inertia (x10 <sup>-4</sup> kg-m <sup>2</sup> ) | Allowable Radial Load (N) | Allowable Axial Load (N) | Backlash (arc-min) | Class |
|-----------------------------|-------------------------------|------------|-----------------------------------|-------------------|------------------|--------------------------------|-------------------------------|------------------------------------------------------|---------------------------------------------------------|---------------------------|--------------------------|--------------------|-------|
| 05D□ -VL070-03              | 05D7F6□                       | 3:1        | 95                                | 500               | 1000             | 8.15                           | 25.4                          | 3.330 (3.580)                                        | 0.53                                                    | 430                       | 310                      | 5                  | IP65  |
| 05D□ -VL070-05              |                               | 5:1        |                                   | 300               | 600              | 13.6                           | 42.4                          |                                                      | 0.46                                                    | 510                       | 390                      |                    |       |
| 05D□ -VL090-10              |                               | 10:1       |                                   | 150               | 300              | 27.2                           | 80.0 <sup>*3</sup>            |                                                      | 0.70                                                    | 1200                      | 1600                     |                    |       |
| 05D□ -VL090-25              |                               | 25:1       | 90                                | 60                | 120              | 64.4                           | 125 <sup>*3</sup>             |                                                      | 0.74                                                    | 1600                      | 2200                     |                    |       |
| 05D□ -VL120-50              |                               | 50:1       |                                   | 30                | 60               | 129                            | 330 <sup>*3</sup>             |                                                      | 0.76                                                    | 3400                      | 3900                     |                    |       |
| 09D□ -VL090-03              | 09D7FK□                       | 3:1        | 95                                | 500               | 1000             | 15.4                           | 40.5                          | 13.90 (16.00)                                        | 1.1                                                     | 810                       | 930                      |                    |       |
| 09D□ -VL090-05              |                               | 5:1        |                                   | 300               | 600              | 25.6                           | 67.5                          |                                                      | 0.80                                                    | 960                       | 1200                     |                    |       |
| 09D□ -VL090-10              |                               | 10:1       |                                   | 150               | 300              | 50.0 <sup>*3</sup>             | 80.0 <sup>*3</sup>            |                                                      | 0.70                                                    | 1200                      | 1600                     |                    |       |
| 09D□ -VL120-25              |                               | 25:1       | 90                                | 60                | 120              | 121                            | 320                           |                                                      | 1.1                                                     | 2700                      | 3700                     |                    |       |
| 09D□ -VL155-50              |                               | 50:1       |                                   | 30                | 60               | 243                            | 639                           |                                                      | 1.1                                                     | 8100                      | 8200                     |                    |       |
| 13D□ -VL090-03              | 13D7FK□                       | 3:1        | 95                                | 500               | 1000             | 23.8                           | 66.4                          | 19.90 (22.00)                                        | 2.9                                                     | 810                       | 930                      |                    |       |
| 13D□ -VL090-05              |                               | 5:1        |                                   | 300               | 600              | 39.6                           | 111                           |                                                      | 2.6                                                     | 960                       | 1200                     |                    |       |
| 13D□ -VL120-10              |                               | 10:1       |                                   | 150               | 300              | 79.2                           | 221                           |                                                      | 2.6                                                     | 2000                      | 2500                     |                    |       |
| 13D□ -VL120-25              |                               | 25:1       | 90                                | 60                | 120              | 180 <sup>*3</sup>              | 330 <sup>*3</sup>             |                                                      | 2.8                                                     | 2700                      | 3700                     |                    |       |
| 13D□ -VL155-50              |                               | 50:1       |                                   | 30                | 60               | 360 <sup>*3</sup>              | 700 <sup>*3</sup>             |                                                      | 2.8                                                     | 8100                      | 8200                     |                    |       |
| 20D□ -VL090-03              | 20D7F6□                       | 3:1        | 95                                | 500               | 1000             | 32.8                           | 80.0 <sup>*3</sup>            | 26.00 (28.10)                                        | 2.9                                                     | 810                       | 930                      |                    |       |
| 20D□ -VL090-05              |                               | 5:1        |                                   | 300               | 600              | 54.6                           | 125 <sup>*3</sup>             |                                                      | 2.6                                                     | 960                       | 1200                     |                    |       |
| 20D□ -VL120-10              |                               | 10:1       |                                   | 150               | 300              | 109                            | 225 <sup>*3</sup>             |                                                      | 2.6                                                     | 2000                      | 2500                     |                    |       |
| 20D□ -VL155-25              |                               | 25:1       | 90                                | 60                | 120              | 259                            | 646                           |                                                      | 4.1                                                     | 6400                      | 6100                     |                    |       |
| 20D□ -VL205-50              |                               | 50:1       |                                   | 30                | 60               | 518                            | 1292                          |                                                      | 3.8                                                     | 14000                     | 14000                    |                    |       |
| 30D□ -VL120-03              | 30D7F6□                       | 3:1        | 95                                | 500               | 1000             | 53.0                           | 154                           | 46.00 (53.90)                                        | 12.0                                                    | 1300                      | 1500                     |                    |       |
| 30D□ -VL120-05              |                               | 5:1        |                                   | 300               | 600              | 88.4                           | 257                           |                                                      | 9.5                                                     | 1600                      | 1900                     |                    |       |
| 30D□ -VL155-10              |                               | 10:1       |                                   | 150               | 300              | 177                            | 470 <sup>*3</sup>             |                                                      | 9.6                                                     | 4700                      | 4100                     |                    |       |
| 30D□ -VL155-25              |                               | 25:1       | 90                                | 60                | 120              | 360 <sup>*3</sup>              | 700 <sup>*3</sup>             |                                                      | 10.0                                                    | 6400                      | 6100                     |                    |       |
| 30D□ -VL205-50              |                               | 50:1       |                                   | 30                | 60               | 750 <sup>*3</sup>              | 1400 <sup>*3</sup>            |                                                      | 10.0                                                    | 14000                     | 14000                    |                    |       |
| 44D□ -VL120-03              | 44D7F6□                       | 3:1        | 95                                | 500               | 1000             | 80.9                           | 204                           | 67.50 (75.40)                                        | 12.0                                                    | 1300                      | 1500                     |                    |       |
| 44D□ -VL120-05              |                               | 5:1        |                                   | 300               | 600              | 135                            | 330 <sup>*3</sup>             |                                                      | 9.5                                                     | 1600                      | 1900                     |                    |       |
| 44D□ -VL205-10              |                               | 10:1       |                                   | 150               | 300              | 270                            | 680                           |                                                      | 12.0                                                    | 8400                      | 7300                     |                    |       |
| 44D□ -VL205-25              |                               | 25:1       | 90                                | 60                | 120              | 639                            | 1400 <sup>*3</sup>            |                                                      | 14.0                                                    | 11000                     | 11000                    |                    |       |
| 44D□ -VL235-50              |                               | 50:1       | 92                                | 20 <sup>*3</sup>  | 40 <sup>*3</sup> | 1306                           | 2300 <sup>*3</sup>            |                                                      | 12.0                                                    | 15000                     | 14000                    |                    |       |
| 55D□ -VL155-03              | 55D7F6□                       | 3:1        | 95                                | 500               | 1000             | 99.8                           | 291                           | 89.00 (96.90)                                        | 35.0                                                    | 3200                      | 2400                     |                    |       |
| 55D□ -VL155-05              |                               | 5:1        |                                   | 300               | 600              | 166                            | 485                           |                                                      | 27.0                                                    | 3800                      | 3000                     |                    |       |
| 55D□ -VL205-10              |                               | 10:1       |                                   | 150               | 300              | 333                            | 969                           |                                                      | 27.0                                                    | 8400                      | 7300                     |                    |       |
| 55D□ -VL205-25              |                               | 25:1       | 90                                | 60                | 120              | 750 <sup>*3</sup>              | 1400 <sup>*3</sup>            |                                                      | 29.0                                                    | 11000                     | 1100                     |                    |       |
| 55D□ -VL235-50              |                               | 50:1       | 92                                | 20 <sup>*3</sup>  | 40 <sup>*3</sup> | 1500 <sup>*3</sup>             | 2300 <sup>*3</sup>            |                                                      | 26.0                                                    | 15000                     | 1400                     |                    |       |

| Gear Motor Model Number S7G ____ | Base Servo Motor Model SGM7G- | Gear Ratio | Gearing Efficiency *1 | Rated Speed (RPM) | Max Speed (RPM) | Rated Torque (Nm)*2 | Peak Torque (Nm)*2 | Motor Inertia (x10 <sup>-4</sup> kg-m <sup>2</sup> ) | Gearhead Inertia (x10 <sup>-4</sup> kg-m <sup>2</sup> ) | Allowable Radial Load (N) | Allowable Axial Load (N) | Backlash (arc-min) | Class |
|----------------------------------|-------------------------------|------------|-----------------------|-------------------|-----------------|---------------------|--------------------|------------------------------------------------------|---------------------------------------------------------|---------------------------|--------------------------|--------------------|-------|
| 75D□ -VL155-03                   | 75D7F6□                       | 3:1        | 95                    | 500               | 1000            | 137                 | 339                | 125.0 (133.0)                                        | 35.0                                                    | 3200                      | 2400                     | 5                  | IP65  |
| 75D□ -VL155-05                   |                               | 5:1        |                       | 300               | 600             | 228                 | 565                |                                                      | 27.0                                                    | 3800                      | 3000                     |                    |       |
| 75D□ -VL205-10                   |                               | 10:1       |                       | 150               | 300             | 456                 | 970*3              |                                                      | 27.0                                                    | 8400                      | 7300                     |                    |       |
| 75D□ -VL235-25                   |                               | 25:1       | 92                    | 40*3              | 80*3            | 1104                | 2300*3             |                                                      | 33.0                                                    | 12000                     | 14000                    |                    |       |
| 75D□ -VL235-50                   |                               | 50:1       |                       | 20*3              | 40*3            | 1500*3              | 2300*3             |                                                      | 26.0                                                    | 15000                     | 14000                    |                    |       |

Note: The values in parentheses are for Servo Motors with Holding Brakes (indicated by value of □ in model numbers).

\*1. The gear efficiency depends on operating conditions such as the output torque, motor speed, and temperature.

\*2. The gear motor output torque is expressed by the following formula: Output Torque = (Servo Motor Output Torque) x (Gearing Ratio) x (Gearing Efficiency). The values in the table are typical values for the rated torque, rated motor speed, and a surrounding air temperature of 25°C. They are reference values only.

\*3. The output torque of the gear motor is limited by the mechanical limit of the gear head. Operation above this limit could result in premature failure of the gear motor.



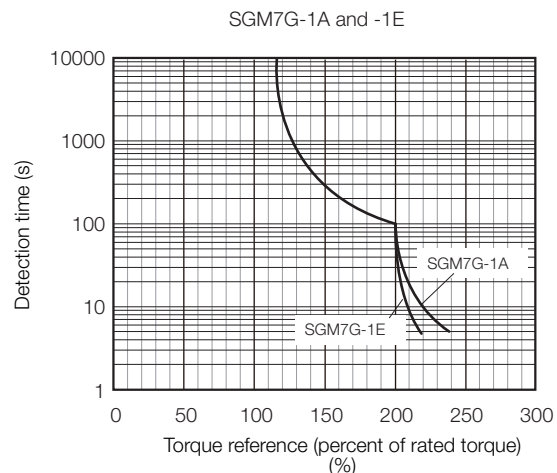
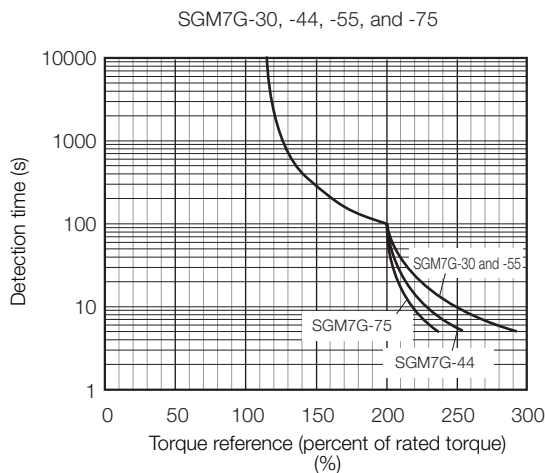
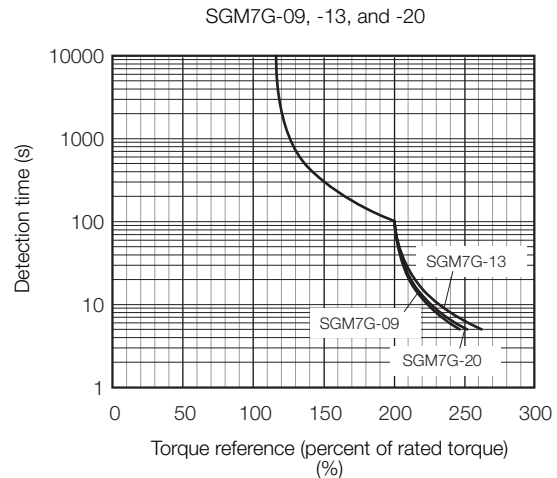
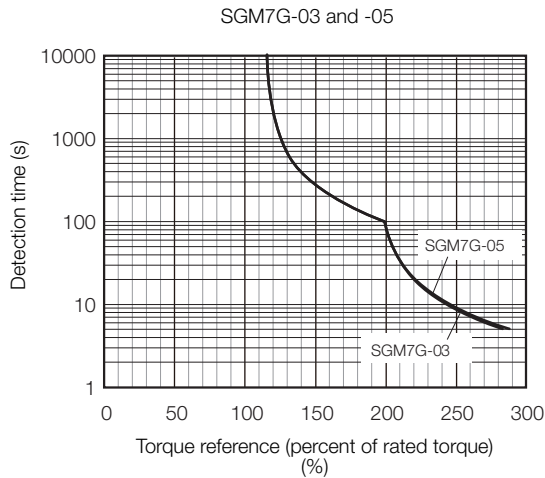
Important

During operation of the gear motor, losses due to inefficiencies of the gearing mechanism are generated. The losses vary as the conditions for gear motor torque and speed change. Temperature rise can vary based on the mechanical inefficiencies and the heat dissipation conditions. For heat dissipation conditions, check the gear and motor temperatures with the actual equipment. If operating temperatures are too high, implement the following measures.

- Decrease the load ratio.
- Change the heat dissipation conditions.
- Use forced-air cooling for the motor with a cooling fan or other means.
- Please refer to "Sigma-7 Gearmotor Temperature Test Data" (document number PN.GearMotors.01) on [yaskawa.com](http://yaskawa.com) for temperature test data.

## Servo Motor Overload Protection Characteristics (200 V Models)

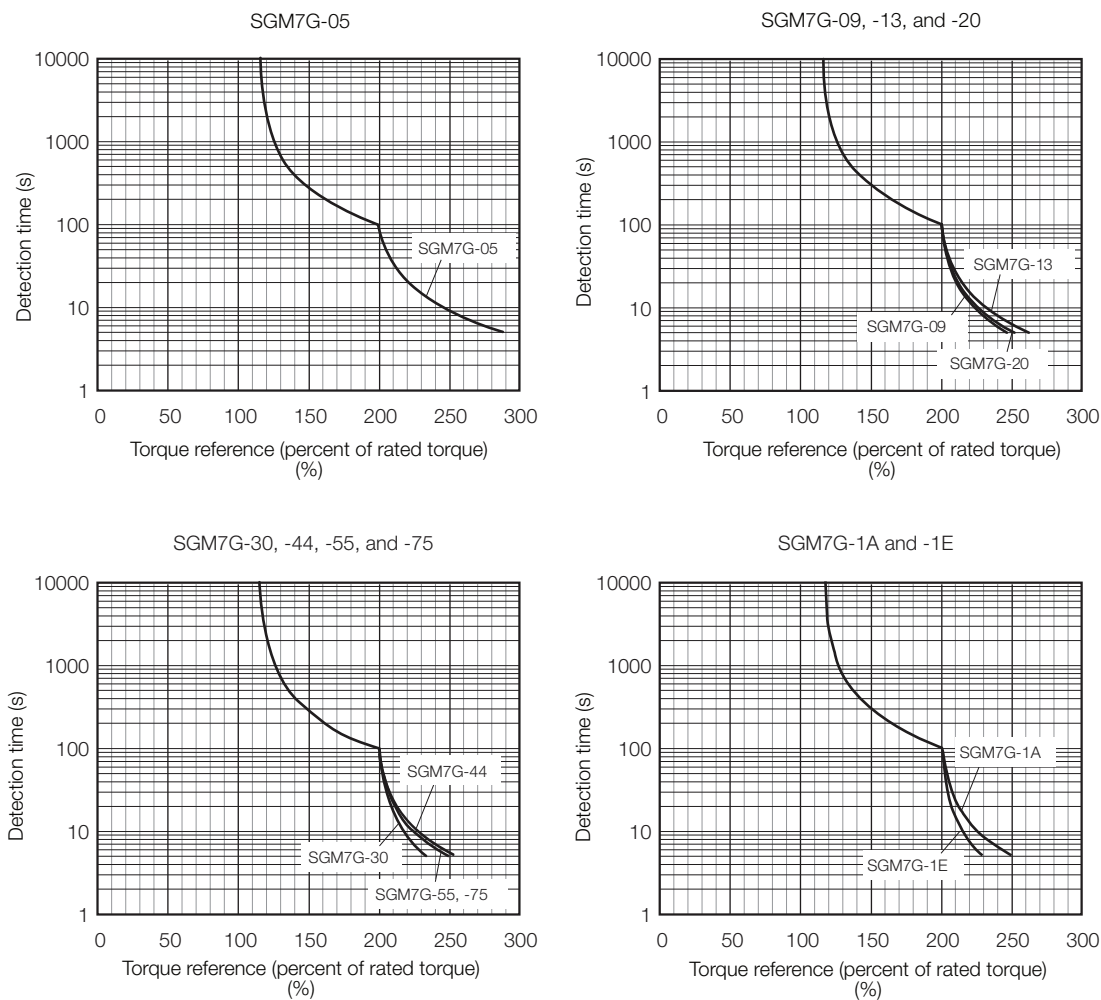
The overload detection level is set for hot start conditions with a Servo Motor surrounding air temperature of 40°C.



Note: The above overload protection characteristics do not mean that you can perform continuous duty operation with an output of 100% or higher. Use the Servo Motor so that the effective torque remains within the continuous duty zone given in *Torque-Motor Speed Characteristics (200 V Models -03A to -20A)* on page 139 and *Torque-Motor Speed Characteristics (200 V Models -30A to -1EA)* on page 141

## Servo Motor Overload Protection Characteristics (400 V Models)

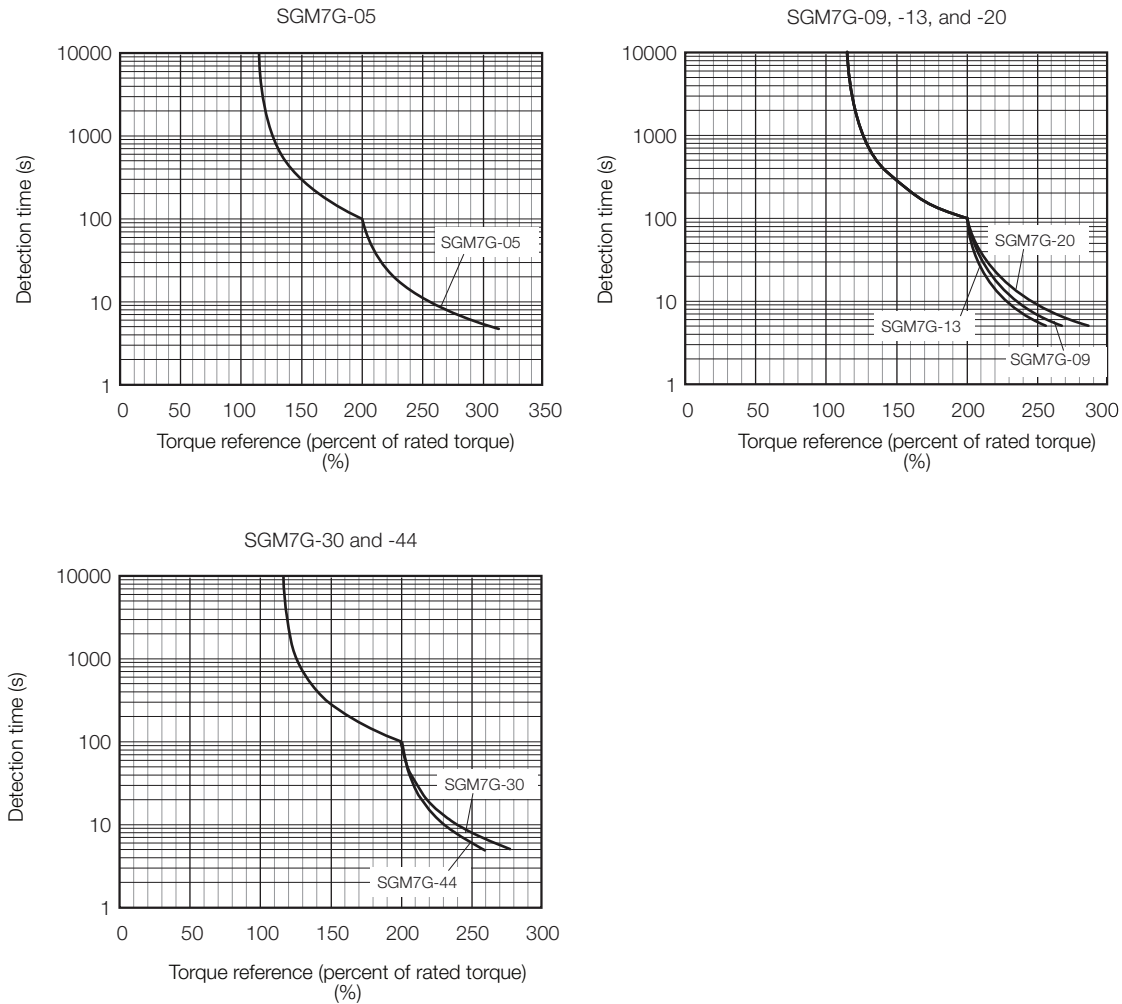
The overload detection level is set for hot start conditions with a Servo Motor surrounding air temperature of 40°C.



Note: The above overload protection characteristics do not mean that you can perform continuous duty operation with an output of 100% or higher. Use the Servo Motor so that the effective torque remains within the continuous duty zone given in *Torque-Motor Speed Characteristics (400 V Models -05D to -1ED)* on page 145.

## Servo Motor Overload Protection Characteristics (400 V High Speed Models)

The overload detection level is set for hot start conditions with a Servo Motor surrounding air temperature of 40°C.



Note: The above overload protection characteristics do not mean that you can perform continuous duty operation with an output of 100% or higher. Use the Servo Motor so that the effective torque remains within the continuous duty zone given in *Torque-Motor Speed Characteristics (High Speed Models - 400V NON-STOCK)* on page 147.

## Servo Motor Heat Dissipation Conditions

The Servo Motor ratings are the continuous allowable values at a surrounding air temperature of 40°C when a heat sink is installed on the Servo Motor. If the Servo Motor is mounted on a small device component, the Servo Motor temperature may rise considerably because the surface for heat dissipation becomes smaller. Refer to the following graphs for the relation between the heat sink size and derating rate.

When using Servo Motors with derating, change the detection timing of overload warnings and overload alarms by referring to the motor overload detection level described in the following manual.

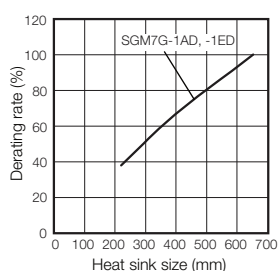
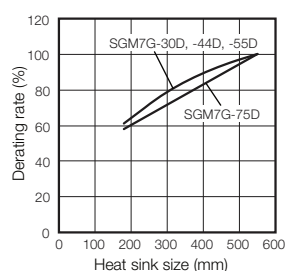
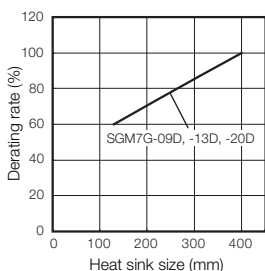
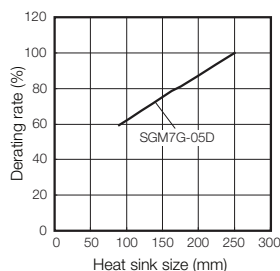
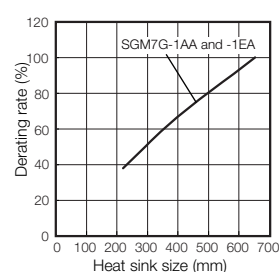
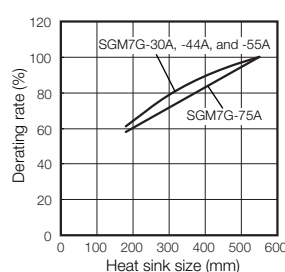
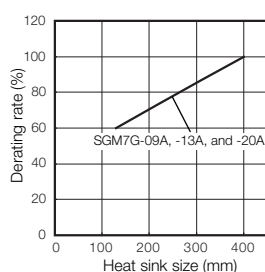
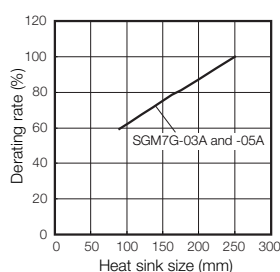
📖 *Σ-7-Series AC Servo Drive Rotary Servo Motor Product Manual* (Manual No.: SIEP S800001 36)

Note: The derating rates are applicable only when the average motor speed is less than or equal to the rated motor speed.  
If the average motor speed exceeds the rated motor speed, consult with your Yaskawa representative.



Important

The actual temperature rise depends on how the heat sink (i.e., the Servo Motor mounting section) is attached to the installation surface, what material is used for the Servo Motor mounting section, and the motor speed. Always check the Servo Motor temperature with the actual equipment.



## Applications Where the Surrounding Air Temperature of the Servo Motor Exceeds 40°C

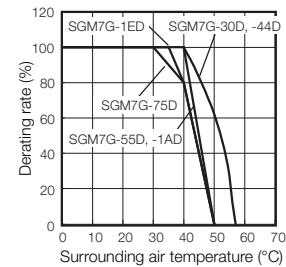
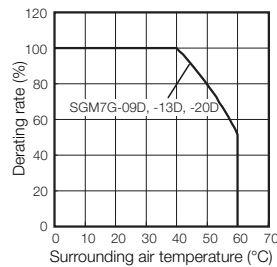
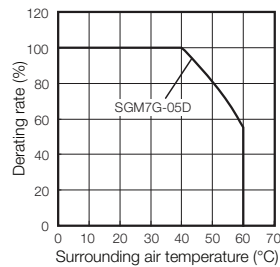
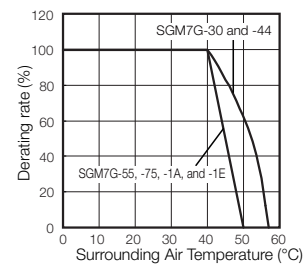
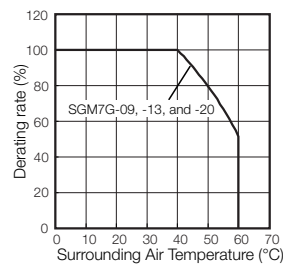
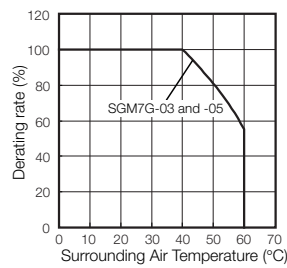
The Servo Motor ratings are the continuous allowable values at a surrounding air temperature of 40°C. If you use a Servo Motor at a surrounding air temperature that exceeds 40°C (60°C max.), apply a suitable derating rate from the following graphs.

When using Servo Motors with derating, change the detection timing of overload warnings and overload alarms by referring to the motor overload detection level described in the following manual.

☞ *Σ-7-Series AC Servo Drive Rotary Servo Motor Product Manual* (Manual No.: SIEP S800001 36)

Note: 1. Use the combination of the SERVOPACK and Servo Motor so that the derating conditions are satisfied for both the SERVOPACK and Servo Motor.

2. The derating rates are applicable only when the average motor speed is less than or equal to the rated motor speed. If the average motor speed exceeds the rated motor speed, consult with your Yaskawa representative.





## Applications Where the Altitude of the Servo Motor Exceeds 1,000 m

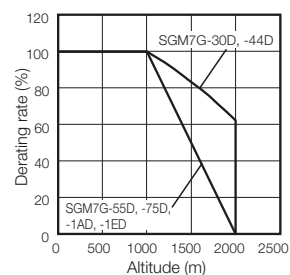
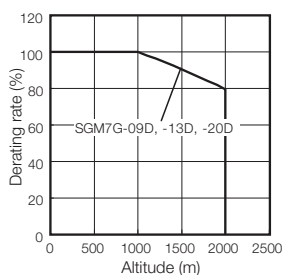
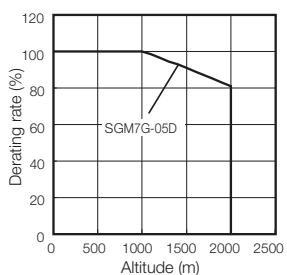
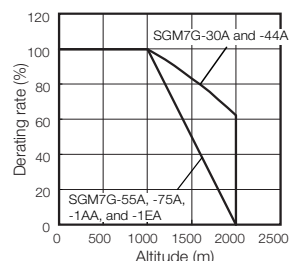
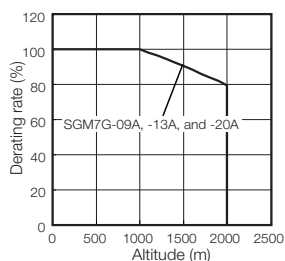
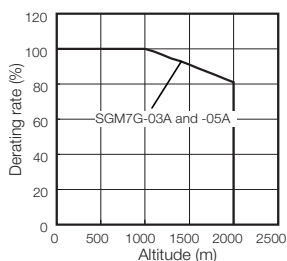
The Servo Motor ratings are the continuous allowable values at an altitude of 1,000 m or less. If you use a Servo Motor at an altitude that exceeds 1,000 m (2,000 m max.), the heat dissipation effect of the air is reduced. Apply the appropriate derating rate from the following graphs.

When using Servo Motors with derating, change the detection timing of overload warnings and overload alarms by referring to the motor overload detection level described in the following manual.

☞ *Σ-7-Series AC Servo Drive Rotary Servo Motor Product Manual* (Manual No.: SIEP S800001 36)

Note: 1. Use the combination of the SERVOPACK and Servo Motor so that the derating conditions are satisfied for both the SERVOPACK and Servo Motor.

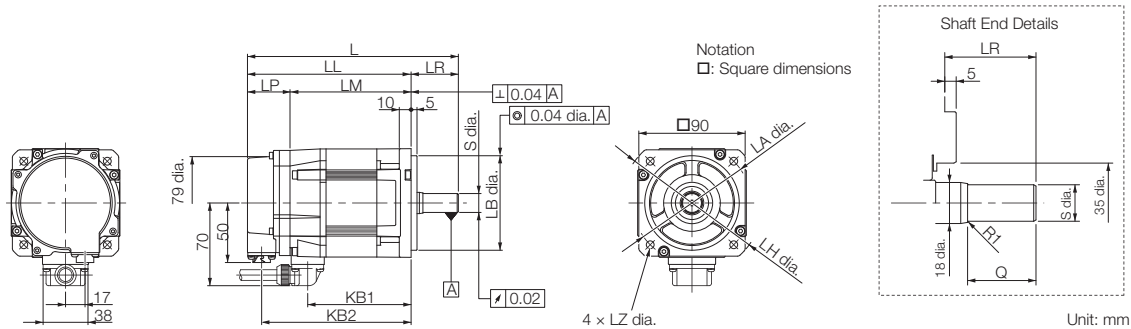
2. The derating rates are applicable only when the average motor speed is less than or equal to the rated motor speed. If the average motor speed exceeds the rated motor speed, consult with your Yaskawa representative.



## External Dimensions

### Servomotors without Holding Brakes

#### ◆ SGM7G-03 and -05



| Model<br>SGM7G- | L*1   | LL*1 | LM  | LP*1 | LR   | KB1 | KB2*1 | KL1 |
|-----------------|-------|------|-----|------|------|-----|-------|-----|
| 03A□AK1         | 166*2 | 126  | 90  | 36   | 40*2 | 75  | 114   | 70  |
| 05A□A61         | 179   | 139  | 103 | 36   | 40   | 88  | 127   | 70  |

| Model<br>SGM7G- | Flange Dimensions |                                   |    |    |    |     |     | Shaft End Dimensions                 |      | Approx.<br>Mass<br>[kg] |
|-----------------|-------------------|-----------------------------------|----|----|----|-----|-----|--------------------------------------|------|-------------------------|
|                 | LA                | LB                                | LC | LE | LG | LH  | LZ  | S                                    | Q    |                         |
| 03A□AK1         | 100               | 80 <sup>0</sup> <sub>-0.030</sub> | 90 | 5  | 10 | 120 | 6.6 | 14 <sup>0</sup> <sub>-0.011</sub> *2 | 30*2 | 2.6                     |
| 05A□A61         | 100               | 80 <sup>0</sup> <sub>-0.030</sub> | 90 | 5  | 10 | 120 | 6.6 | 16 <sup>0</sup> <sub>-0.011</sub>    | 30   | 3.2                     |

\*1. For models that have a batteryless absolute encoder, L, LL, LP, and KB2 are 8 mm greater than the given value. Refer to the following section for the values for individual models.

#### ■ Dimensions of Servomotors with Batteryless Absolute Encoders (page 174)

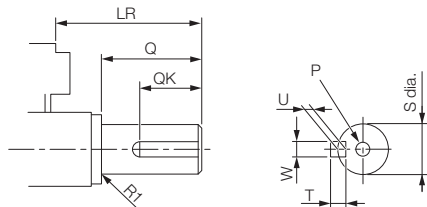
\*2. The L, LR, S, and Q dimensions of these Servomotors are different from those of the Σ-V-series SGMGV Servomotors. Models that have the same installation dimensions as the SGMGV Servomotors are also available. Contact your Yaskawa representative for details.

Note: 1. The values in parentheses are for Servomotors with Holding Brakes.

2. The values for a straight, without key specification are given. Refer to the information given below for other shaft end specifications and option specifications.

#### ■ Shaft End Specifications

##### • Straight with Key and Tap

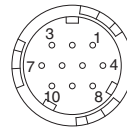


| Model<br>SGM7G- | LR  | Q   | QK  | S                                   | W | T | U | P      |
|-----------------|-----|-----|-----|-------------------------------------|---|---|---|--------|
| 03A□AK1         | 40* | 30* | 20* | 14 <sup>0</sup> <sub>-0.011</sub> * | 5 | 5 | 3 | M5×12L |
| 05A□A61         | 40  | 30  | 20  | 16 <sup>0</sup> <sub>-0.011</sub>   | 5 | 5 | 3 |        |

\* The shaft end dimensions of these Servomotors are different from those of the Σ-V-series SGMGV Servomotors. Models that have the same installation dimensions as the SGMGV Servomotors are also available. Contact your Yaskawa representative for details.

#### ■ Connector Specifications

##### • Encoder Connector (24-bit Encoder)



|    |        |    |                   |
|----|--------|----|-------------------|
| 1  | PS     | 6* | BAT(+)            |
| 2  | /PS    | 7  | —                 |
| 3  | —      | 8  | —                 |
| 4  | PG5V   | 9  | PG0V              |
| 5* | BAT(-) | 10 | FG (frame ground) |

\* A battery is required only for an absolute encoder.  
Receptacle: CM10-R10P-D

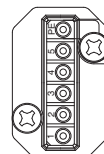
Applicable plug: Not provided by Yaskawa.

Plug: CM10-AP10S-□-D for Right-angle Plug

CM10-SP10S-□-D for Straight Plug  
(□ depends on the applicable cable size.)

Manufacturer: DDK Ltd.

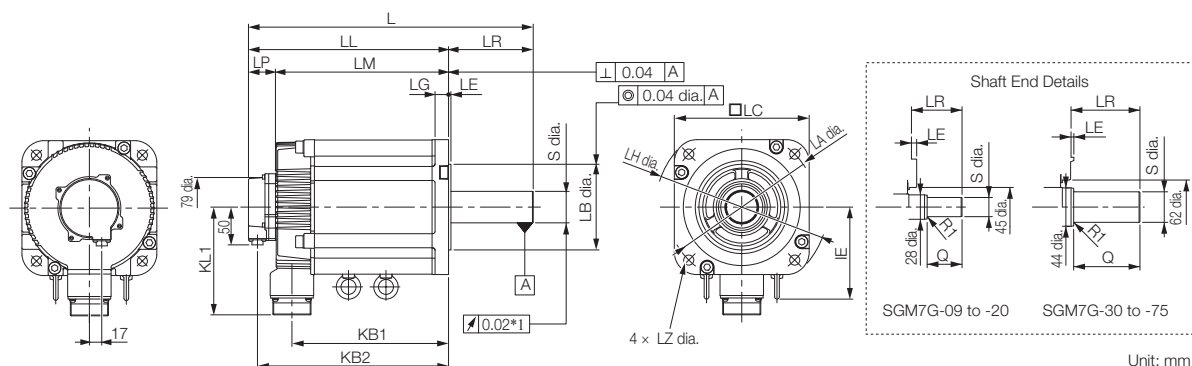
##### • Servomotor Connector



|    |                   |   |         |
|----|-------------------|---|---------|
| PE | FG (frame ground) | 3 | Phase U |
| 5  | —                 | 2 | Phase V |
| 4  | —                 | 1 | Phase W |

Manufacturer: Japan Aviation Electronics Industry, Ltd.

## ◆ SGM7G-09 to -75



| Model<br>SGM7G- | L*2 | LL*2 | LM  | LP*2 | LR  | KB1 | KB2*2 | IE  | KL1 | Flange Dimensions |                                      |     |     |    |     |      | Shaft End Dimensions                 |     | Approx. Mass [kg] |
|-----------------|-----|------|-----|------|-----|-----|-------|-----|-----|-------------------|--------------------------------------|-----|-----|----|-----|------|--------------------------------------|-----|-------------------|
|                 |     |      |     |      |     |     |       |     |     | LA                | LB                                   | LC  | LE  | LG | LH  | LZ   | S                                    | Q   |                   |
| 09A□AK1         | 195 | 137  | 101 | 36   | 58  | 83  | 125   | —   | 104 | 145               | 110 <sup>0</sup> <sub>-0.035</sub>   | 130 | 6   | 12 | 165 | 9    | 19 <sup>0</sup> <sub>-0.013</sub> *3 | 40  | 5.5               |
| 13A□AK1         | 211 | 153  | 117 | 36   | 58  | 99  | 141   | —   | 104 | 145               | 110 <sup>0</sup> <sub>-0.035</sub>   | 130 | 6   | 12 | 165 | 9    | 22 <sup>0</sup> <sub>-0.013</sub> *3 | 40  | 7.1               |
| 20A□A61         | 229 | 171  | 135 | 36   | 58  | 117 | 159   | —   | 104 | 145               | 110 <sup>0</sup> <sub>-0.035</sub>   | 130 | 6   | 12 | 165 | 9    | 24 <sup>0</sup> <sub>-0.013</sub>    | 40  | 8.6               |
| 30A□A61         | 239 | 160  | 124 | 36   | 79  | 108 | 148   | —   | 134 | 200               | 114.3 <sup>0</sup> <sub>-0.025</sub> | 180 | 3.2 | 18 | 230 | 13.5 | 35 <sup>+0.01</sup> <sub>0</sub>     | 76  | 13.5              |
| 44A□A61         | 263 | 184  | 148 | 36   | 79  | 132 | 172   | —   | 134 | 200               | 114.3 <sup>0</sup> <sub>-0.025</sub> | 180 | 3.2 | 18 | 230 | 13.5 | 35 <sup>+0.01</sup> <sub>0</sub>     | 76  | 17.5              |
| 55A□A61         | 334 | 221  | 185 | 36   | 113 | 163 | 209   | 123 | 144 | 200               | 114.3 <sup>0</sup> <sub>-0.025</sub> | 180 | 3.2 | 18 | 230 | 13.5 | 42 <sup>0</sup> <sub>-0.016</sub>    | 110 | 21.5              |
| 75A□A61         | 380 | 267  | 231 | 36   | 113 | 209 | 255   | 123 | 144 | 200               | 114.3 <sup>0</sup> <sub>-0.025</sub> | 180 | 3.2 | 18 | 230 | 13.5 | 42 <sup>0</sup> <sub>-0.016</sub>    | 110 | 29.5              |

\*1. This is 0.04 for the SGM7G-55 or SGM7G-75.

\*2. For models that have a batteryless absolute encoder, L, LL, LP, and KB2 are 8 mm greater than the given value. Refer to the following section for the values for individual models.

#### Dimensions of Servomotors with Batteryless Absolute Encoders (page 174)

\*3. The S dimensions of these Servomotors are different from those of the Σ-V-series SGMGV Servomotors.

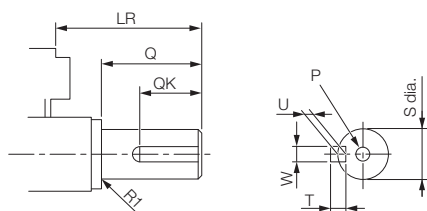
Models that have the same installation dimensions as the SGMGV Servomotors are also available. Contact your Yaskawa representative for details.

Note: 1. The values in parentheses are for Servomotors with Holding Brakes.

2. The values for a straight, without key specification are given. Refer to the information given below for other shaft end specifications and option specifications.

### Shaft End Specifications

#### Straight with Key and Tap

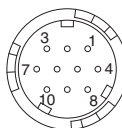


| Model<br>SGM7G- | LR  | Q   | QK | S                                   | W  | T  | U  | P       |
|-----------------|-----|-----|----|-------------------------------------|----|----|----|---------|
| 09A□AK1         | 58  | 40  | 25 | 19 <sup>0</sup> <sub>-0.013</sub> * | 8* | 7* | 4* | M5×12L  |
| 13A□AK1         | 58  | 40  | 25 | 22 <sup>0</sup> <sub>-0.013</sub> * | 8* | 7* | 4* |         |
| 20A□A61         | 58  | 40  | 25 | 24 <sup>0</sup> <sub>-0.013</sub>   | 8  | 7  | 4  |         |
| 30A□A61         | 79  | 76  | 60 | 35 <sup>+0.01</sup> <sub>0</sub>    | 10 | 8  | 5  | M12×25L |
| 44A□A61         | 79  | 76  | 60 | 35 <sup>+0.01</sup> <sub>0</sub>    | 10 | 8  | 5  |         |
| 55A□A61         | 113 | 110 | 90 | 42 <sup>0</sup> <sub>-0.016</sub>   | 12 | 8  | 5  | M16×32L |
| 75A□A61         | 113 | 110 | 90 | 42 <sup>0</sup> <sub>-0.016</sub>   | 12 | 8  | 5  |         |

\* The shaft end dimensions of these Servomotors are different from those of the Σ-V-series SGMGV Servomotors. Models that have the same installation dimensions as the SGMGV Servomotors are also available. Contact your Yaskawa representative for details.

### Connector Specifications

#### Encoder Connector (24-bit Encoder)



|    |        |    |                   |
|----|--------|----|-------------------|
| 1  | PS     | 6* | BAT(+)            |
| 2  | /PS    | 7  | —                 |
| 3  | —      | 8  | —                 |
| 4  | PG5V   | 9  | PG0V              |
| 5* | BAT(-) | 10 | FG (frame ground) |

\* A battery is required only for an absolute encoder.

Receptacle: CM10-R10P-D

Applicable plug: Not provided by Yaskawa.

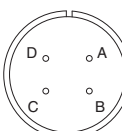
Plug: CM10-AP10S-□-D for Right-angle Plug

CM10-SP10S-□-D for Straight Plug

(□ depends on the applicable cable size.)

Manufacturer: DDK Ltd.

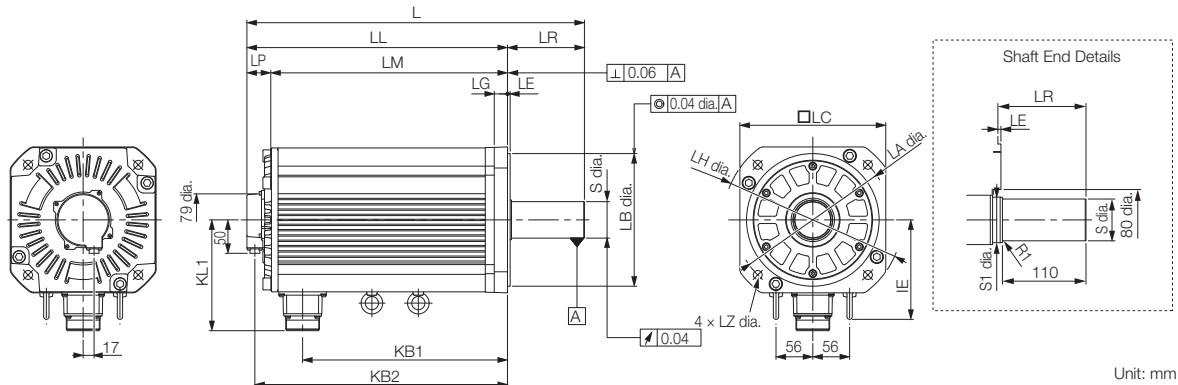
#### Servomotor Connector



|   |         |   |                   |
|---|---------|---|-------------------|
| A | Phase U | C | Phase W           |
| B | Phase V | D | FG (frame ground) |

Manufacturer: DDK Ltd.

## ◆ SGM7G-1A and -1E



| Model<br>SGM7G- | L*  | LL* | LM  | LP* | LR  | KB1 | KB2* | IE  | KL1 | Flange Dimensions |                                    |     |    |    |     |      | Shaft End Dimensions                   |    | Approx. Mass [kg] |
|-----------------|-----|-----|-----|-----|-----|-----|------|-----|-----|-------------------|------------------------------------|-----|----|----|-----|------|----------------------------------------|----|-------------------|
|                 |     |     |     |     |     |     |      |     |     | LA                | LB                                 | LC  | LE | LG | LH  | LZ   | S                                      | S1 |                   |
| 1AA□A61         | 447 | 331 | 295 | 36  | 116 | 247 | 319  | 150 | 168 | 235               | 200 <sup>0</sup> <sub>-0.046</sub> | 220 | 4  | 20 | 270 | 13.5 | 42 <sup>0</sup> <sub>-0.016</sub>      | 50 | 57                |
| 1EA□A61         | 509 | 393 | 357 | 36  | 116 | 309 | 381  | 150 | 168 | 235               | 200 <sup>0</sup> <sub>-0.046</sub> | 220 | 4  | 20 | 270 | 13.5 | 55 <sup>+0.030</sup> <sub>+0.011</sub> | 60 | 67                |

\* For models that have a batteryless absolute encoder, L, LL, LP, and KB2 are 8 mm greater than the given value. Refer to the following section for the values for individual models.

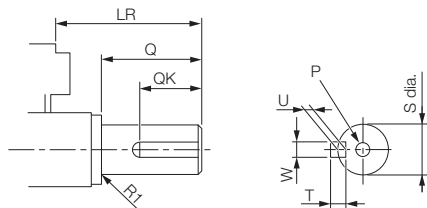
📖 **Dimensions of Servomotors with Batteryless Absolute Encoders (page 174)**

Note: 1. The values in parentheses are for Servomotors with Holding Brakes.

2. The values for a straight, without key specification are given. Refer to the information given below for other shaft end specifications and option specifications.

## ■ Shaft End Specifications

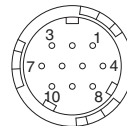
## • Straight with Key and Tap



| Model<br>SGM7G- | LR  | Q   | QK | S                                      | W  | T  | U | P       |
|-----------------|-----|-----|----|----------------------------------------|----|----|---|---------|
| 1AA□A61         | 116 | 110 | 90 | 42 <sup>0</sup> <sub>-0.016</sub>      | 12 | 8  | 5 | M16×32L |
| 1EA□A61         | 116 | 110 | 90 | 55 <sup>+0.030</sup> <sub>+0.011</sub> | 16 | 10 | 6 | M20×40L |

## ■ Connector Specifications

## • Encoder Connector (24-bit Encoder)



|    |        |    |                   |
|----|--------|----|-------------------|
| 1  | PS     | 6* | BAT(+)            |
| 2  | /PS    | 7  | —                 |
| 3  | —      | 8  | —                 |
| 4  | PG5V   | 9  | PG0V              |
| 5* | BAT(-) | 10 | FG (frame ground) |

\* A battery is required only for an absolute encoder.

Receptacle: CM10-R10P-D

Applicable plug: Not provided by Yaskawa.

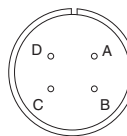
Plug: CM10-AP10S-□-D for Right-angle Plug

CM10-SP10S-□-D for Straight Plug

(□ depends on the applicable cable size.)

Manufacturer: DDK Ltd.

## • Servomotor Connector

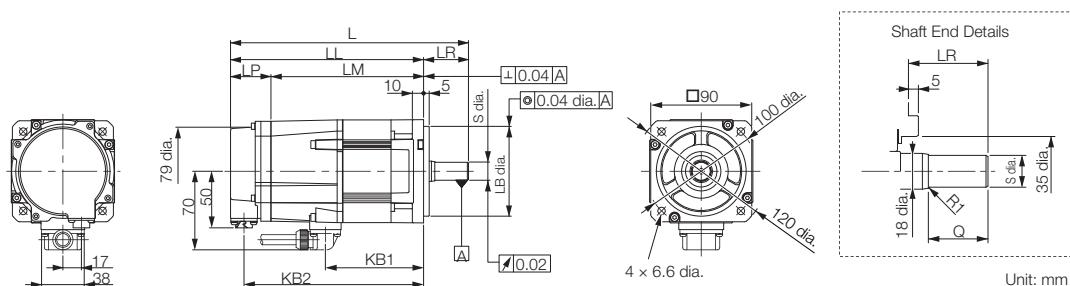


|   |         |   |                   |
|---|---------|---|-------------------|
| A | Phase U | C | Phase W           |
| B | Phase V | D | FG (frame ground) |

Manufacturer: DDK Ltd.

## 200V Servo Motors with Holding Brakes

## ◆ SGM7G-03 and -05



| Model<br>SGM7G- | L*1   | LL*1 | LM  | LP*1 | LR   | KB1 | KB2*1 | KL1 |
|-----------------|-------|------|-----|------|------|-----|-------|-----|
| 03A□AKC         | 199*2 | 159  | 123 | 36   | 40*2 | 75  | 147   | 70  |
| 05A□A6C         | 212   | 172  | 136 | 36   | 40   | 88  | 160   | 70  |

| Model<br>SGM7G- | Flange Dimensions |                                   |    |    |    |     |     | Shaft End Dimensions                 |      | Approx. Mass [kg] |
|-----------------|-------------------|-----------------------------------|----|----|----|-----|-----|--------------------------------------|------|-------------------|
|                 | LA                | LB                                | LC | LE | LG | LH  | LZ  | S                                    | Q    |                   |
| 03A□AKC         | 100               | 80 <sup>0</sup> <sub>-0.030</sub> | 90 | 5  | 10 | 120 | 6.6 | 14 <sup>0</sup> <sub>-0.011</sub> *2 | 30*2 | 3.6               |
| 05A□A6C         | 100               | 80 <sup>0</sup> <sub>-0.030</sub> | 90 | 5  | 10 | 120 | 6.6 | 16 <sup>0</sup> <sub>-0.011</sub>    | 30   | 4.2               |

\*1. For models that have a batteryless absolute encoder, L, LL, LP, and KB2 are 8 mm greater than the given value. Refer to the following section for the values for individual models.

#### 🔧 Dimensions of Servomotors with Batteryless Absolute Encoders (page 174)

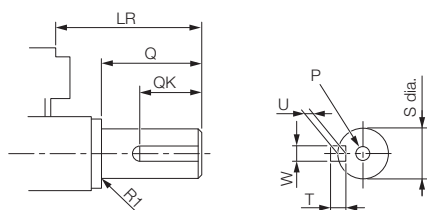
\*2. The L, LR, S, and Q dimensions of these Servomotors are different from those of the Σ-V-series SGMGV Servomotors. Models that have the same installation dimensions as the SGMGV Servomotors are also available. Contact your Yaskawa representative for details.

Note: 1. The values in parentheses are for Servomotors with Holding Brakes.

2. The values for a straight, without key specification are given. Refer to the information given below for other shaft end specifications and option specifications.

## ■ Shaft End Specifications

### • Straight with Key and Tap

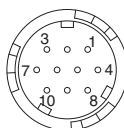


| Model<br>SGM7G- | LR  | Q   | QK  | S                                   | W | T | U | P      |
|-----------------|-----|-----|-----|-------------------------------------|---|---|---|--------|
| 03A□AKC         | 40* | 30* | 20* | 14 <sup>0</sup> <sub>-0.011</sub> * | 5 | 5 | 3 | M5×12L |
| 05A□A6C         | 40  | 30  | 20  | 16 <sup>0</sup> <sub>-0.011</sub>   | 5 | 5 | 3 |        |

\* The shaft end dimensions of these Servomotors are different from those of the Σ-V-series SGMGV Servomotors. Models that have the same installation dimensions as the SGMGV Servomotors are also available. Contact your Yaskawa representative for details.

## ■ Connector Specifications

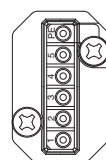
### • Encoder Connector (24-bit Encoder)



|    |        |    |                   |
|----|--------|----|-------------------|
| 1  | PS     | 6* | BAT(+)            |
| 2  | /PS    | 7  | -                 |
| 3  | -      | 8  | -                 |
| 4  | PG5V   | 9  | PG0V              |
| 5* | BAT(-) | 10 | FG (frame ground) |

\* A battery is required only for an absolute encoder.  
Receptacle: CM10-R10P-D  
Applicable plug: Not provided by Yaskawa.  
Plug: CM10-AP10S-□-D for Right-angle Plug  
CM10-SP10S-□-D for Straight Plug  
(□ depends on the applicable cable size.)  
Manufacturer: DDK Ltd.

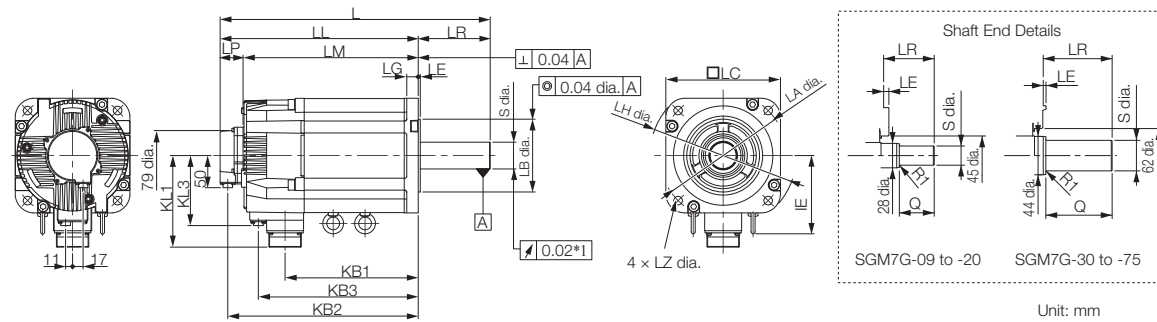
### • Servomotor Connector



|    |                   |   |         |
|----|-------------------|---|---------|
| PE | FG (frame ground) | 3 | Phase U |
| 5  | Brake             | 2 | Phase V |
| 4  | Brake             | 1 | Phase W |

Manufacturer: Japan Aviation Electronics Industry, Ltd.

## ◆ SGM7G-09 to -75



| Model<br>SGM7G- | L <sup>*2</sup> | LL <sup>*2</sup> | LM  | LP <sup>*2</sup> | LR  | KB1 | KB2 <sup>*2</sup> | KB3 | IE  | KL1 | KL3 | Flange Dimensions |                                      |     |     |    |     |      | Shaft End<br>Dimensions                         |     | Approx.<br>Mass [kg] |
|-----------------|-----------------|------------------|-----|------------------|-----|-----|-------------------|-----|-----|-----|-----|-------------------|--------------------------------------|-----|-----|----|-----|------|-------------------------------------------------|-----|----------------------|
|                 |                 |                  |     |                  |     |     |                   |     |     |     |     | LA                | LB                                   | LC  | LE  | LG | LH  | LZ   | S                                               | Q   |                      |
| 09A□AKC         | 231             | 173              | 137 | 36               | 58  | 83  | 161               | 115 | –   | 104 | 80  | 145               | 110 <sup>0</sup> <sub>-0.035</sub>   | 130 | 6   | 12 | 165 | 9    | 19 <sup>0</sup> <sub>-0.013</sub> <sup>*3</sup> | 40  | 7.5                  |
| 13A□AKC         | 247             | 189              | 153 | 36               | 58  | 99  | 177               | 131 | –   | 104 | 80  | 145               | 110 <sup>0</sup> <sub>-0.035</sub>   | 130 | 6   | 12 | 165 | 9    | 22 <sup>0</sup> <sub>-0.013</sub> <sup>*3</sup> | 40  | 9.0                  |
| 20A□A6C         | 265             | 207              | 171 | 36               | 58  | 117 | 195               | 149 | –   | 104 | 80  | 145               | 110 <sup>0</sup> <sub>-0.035</sub>   | 130 | 6   | 12 | 165 | 9    | 24 <sup>0</sup> <sub>-0.013</sub>               | 40  | 11.0                 |
| 30A□A6C         | 287             | 208              | 172 | 36               | 79  | 108 | 196               | 148 | –   | 134 | 110 | 200               | 114.3 <sup>0</sup> <sub>-0.025</sub> | 180 | 3.2 | 18 | 230 | 13.5 | 35 <sup>+0.01</sup> <sub>0</sub>                | 76  | 19.5                 |
| 44A□A6C         | 311             | 232              | 196 | 36               | 79  | 132 | 220               | 172 | –   | 134 | 110 | 200               | 114.3 <sup>0</sup> <sub>-0.025</sub> | 180 | 3.2 | 18 | 230 | 13.5 | 35 <sup>+0.01</sup> <sub>0</sub>                | 76  | 23.5                 |
| 55A□A6C         | 378             | 265              | 229 | 36               | 113 | 163 | 253               | 205 | 123 | 144 | 110 | 200               | 114.3 <sup>0</sup> <sub>-0.025</sub> | 180 | 3.2 | 18 | 230 | 13.5 | 42 <sup>0</sup> <sub>-0.016</sub>               | 110 | 27.5                 |
| 75A□A6C         | 424             | 311              | 275 | 36               | 113 | 209 | 299               | 251 | 123 | 144 | 110 | 200               | 114.3 <sup>0</sup> <sub>-0.025</sub> | 180 | 3.2 | 18 | 230 | 13.5 | 42 <sup>0</sup> <sub>-0.016</sub>               | 110 | 35.0                 |

\*1. This is 0.04 for the SGM7G-55 or SGM7G-75.

\*2. For models that have a batteryless absolute encoder, L, LL, LP, and KB2 are 8 mm greater than the given value. Refer to the following section for the values for individual models.

#### Dimensions of Servomotors with Batteryless Absolute Encoders (page 174)

\*3. The S dimensions of these Servomotors are different from those of the Σ-V-series SGMGV Servomotors.

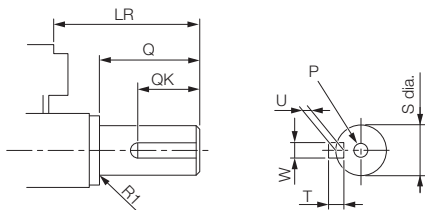
Models that have the same installation dimensions as the SGMGV Servomotors are also available. Contact your Yaskawa representative for details.

Note: 1. The values in parentheses are for Servomotors with Holding Brakes.

2. The values for a straight, without key specification are given. Refer to the information given below for other shaft end specifications and option specifications.

## Shaft End Specifications

### Straight with Key and Tap

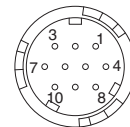


| Model<br>SGM7G- | LR  | Q   | QK | S                                              | W              | T              | U              | P       |
|-----------------|-----|-----|----|------------------------------------------------|----------------|----------------|----------------|---------|
| 09A□AKC         | 58  | 40  | 25 | 19 <sup>0</sup> <sub>-0.013</sub> <sup>*</sup> | 8 <sup>*</sup> | 7 <sup>*</sup> | 4 <sup>*</sup> | M5×12L  |
| 13A□AKC         | 58  | 40  | 25 | 22 <sup>0</sup> <sub>-0.013</sub> <sup>*</sup> | 8 <sup>*</sup> | 7 <sup>*</sup> | 4 <sup>*</sup> |         |
| 20A□A6C         | 58  | 40  | 25 | 24 <sup>0</sup> <sub>-0.013</sub>              | 8              | 7              | 4              |         |
| 30A□A6C         | 79  | 76  | 60 | 35 <sup>+0.01</sup> <sub>0</sub>               | 10             | 8              | 5              | M12×25L |
| 44A□A6C         | 79  | 76  | 60 | 35 <sup>+0.01</sup> <sub>0</sub>               | 10             | 8              | 5              |         |
| 55A□A6C         | 113 | 110 | 90 | 42 <sup>0</sup> <sub>-0.016</sub>              | 12             | 8              | 5              | M16×32L |
| 75A□A6C         | 113 | 110 | 90 | 42 <sup>0</sup> <sub>-0.016</sub>              | 12             | 8              | 5              |         |

\* The shaft end dimensions of these Servomotors are different from those of the Σ-V-series SGMGV Servomotors. Models that have the same installation dimensions as the SGMGV Servomotors are also available. Contact your Yaskawa representative for details.

## Connector Specifications

### Encoder Connector (24-bit Encoder)



|    |        |    |                   |
|----|--------|----|-------------------|
| 1  | PS     | 6* | BAT(+)            |
| 2  | /PS    | 7  | —                 |
| 3  | —      | 8  | —                 |
| 4  | PG5V   | 9  | PG0V              |
| 5* | BAT(-) | 10 | FG (frame ground) |

\* A battery is required only for an absolute encoder.

Receptacle: CM10-R10P-D

Applicable plug: Not provided by Yaskawa.

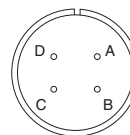
Plug: CM10-AP10S-□-D for Right-angle Plug

CM10-SP10S-□-D for Straight Plug

(□ depends on the applicable cable size.)

Manufacturer: DDK Ltd.

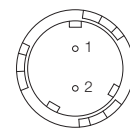
### Servomotor Connector



|   |         |   |                   |
|---|---------|---|-------------------|
| A | Phase U | C | Phase W           |
| B | Phase V | D | FG (frame ground) |

Manufacturer: DDK Ltd.

### Brake Connector



|   |                |
|---|----------------|
| 1 | Brake terminal |
| 2 | Brake terminal |

Note: There is no voltage polarity for the brake terminals.

Receptacle: CM10-R10P-D

Applicable plug: Not provided by Yaskawa.

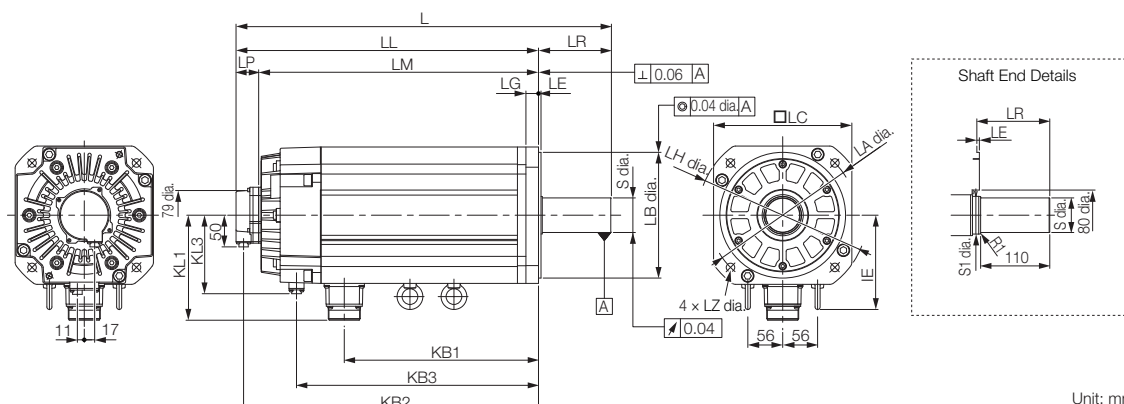
Plug: CM10-AP2S-□-D for Right-angle Plug

CM10-SP2S-□-D for Straight Plug

(□ depends on the applicable cable size.)

Manufacturer: DDK Ltd.

## ◆ SGM7G-1A, 1E



Unit: mm

| Model<br>SGM7G- | L*  | LL* | LM  | LP* | LR  | KB1 | KB2* | KB3 | IE  | KL1 | KL3 | Flange Dimensions |                                    |     |    |    |     |      | Shaft End Dimensions                   |    | Approx.<br>Mass [kg] |
|-----------------|-----|-----|-----|-----|-----|-----|------|-----|-----|-----|-----|-------------------|------------------------------------|-----|----|----|-----|------|----------------------------------------|----|----------------------|
|                 |     |     |     |     |     |     |      |     |     |     |     | LA                | LB                                 | LC  | LE | LG | LH  | LZ   | S                                      | S1 |                      |
| 1AA□A6C         | 498 | 382 | 346 | 36  | 116 | 247 | 370  | 315 | 150 | 168 | 125 | 235               | 200 <sup>0</sup> <sub>-0.046</sub> | 220 | 4  | 20 | 270 | 13.5 | 42 <sup>0</sup> <sub>-0.016</sub>      | 50 | 65                   |
| 1EA□A6C         | 598 | 482 | 446 | 36  | 116 | 309 | 470  | 385 | 150 | 168 | 125 | 235               | 200 <sup>0</sup> <sub>-0.046</sub> | 220 | 4  | 20 | 270 | 13.5 | 55 <sup>+0.030</sup> <sub>+0.011</sub> | 60 | 85                   |

\* For models that have a batteryless absolute encoder, L, LL, LP, and KB2 are 8 mm greater than the given value. Refer to the following section for the values for individual models.

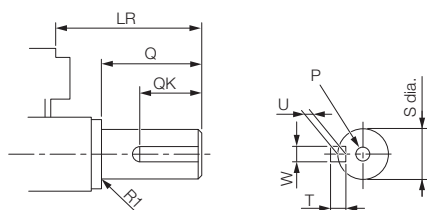
**Dimensions of Servomotors with Batteryless Absolute Encoders (page 174)**

Note: 1. The values in parentheses are for Servomotors with Holding Brakes.

2. The values for a straight, without key specification are given. Refer to the information given below for other shaft end specifications and option specifications.

## ■ Shaft End Specifications

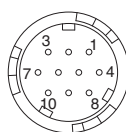
## • Straight with Key and Tap



| Model<br>SGM7G- | LR  | Q   | QK | S                                      | W  | T  | U | P       |
|-----------------|-----|-----|----|----------------------------------------|----|----|---|---------|
| 1AA□A6C         | 116 | 110 | 90 | 42 <sup>0</sup> <sub>-0.016</sub>      | 12 | 8  | 5 | M16×32L |
| 1EA□A6C         | 116 | 110 | 90 | 55 <sup>+0.030</sup> <sub>+0.011</sub> | 16 | 10 | 6 | M20×40L |

## ■ Connector Specifications

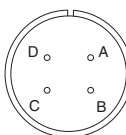
## • Encoder Connector (24-bit Encoder)



|    |        |    |                   |
|----|--------|----|-------------------|
| 1  | PS     | 6* | BAT(+)            |
| 2  | /PS    | 7  | —                 |
| 3  | —      | 8  | —                 |
| 4  | PG5V   | 9  | PG0V              |
| 5* | BAT(—) | 10 | FG (frame ground) |

\* A battery is required only for an absolute encoder.  
Receptacle: CM10-R10P-D  
Applicable plug: Not provided by Yaskawa.  
Plug: CM10-AP10S-□-D for Right-angle Plug  
CM10-SP10S-□-D for Straight Plug  
(□ depends on the applicable cable size.)  
Manufacturer: DDK Ltd.

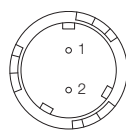
## • Servomotor Connector



|   |         |   |                   |
|---|---------|---|-------------------|
| A | Phase U | C | Phase W           |
| B | Phase V | D | FG (frame ground) |

Manufacturer: DDK Ltd.

## • Brake Connector

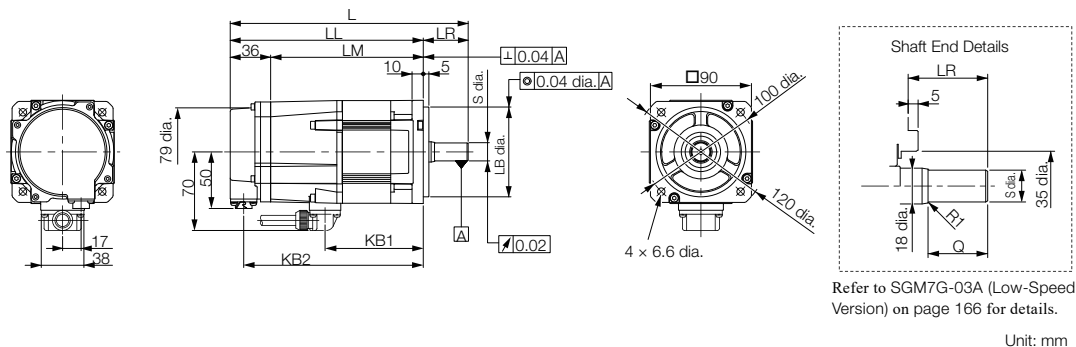


|   |                |
|---|----------------|
| 1 | Brake terminal |
| 2 | Brake terminal |

Note: There is no voltage polarity for the brake terminals.

Receptacle: CM10-R10P-D  
Applicable plug: Not provided by Yaskawa.  
Plug: CM10-AP2S-□-D for Right-angle Plug  
CM10-SP2S-□-D for Straight Plug  
(□ depends on the applicable cable size.)  
Manufacturer: DDK Ltd.

◆ SGM7G-03A (Low-Speed Version)

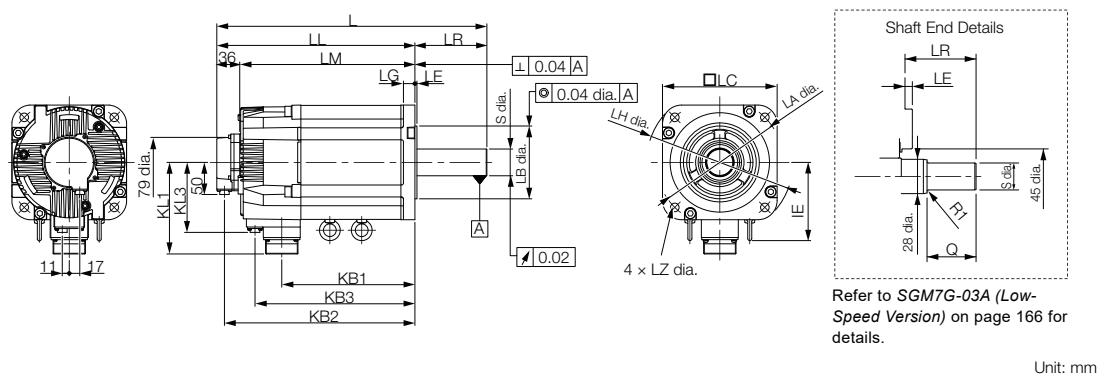


| Model<br>SGM7G- | L   | LL  | LM  | LR | KB1 | KB2 | KL1 | Flange Dimensions |                                   |    |    |
|-----------------|-----|-----|-----|----|-----|-----|-----|-------------------|-----------------------------------|----|----|
|                 |     |     |     |    |     |     |     | LA                | LB                                | LC | LE |
| 03A7BK1         | 179 | 139 | 103 | 40 | 88  | 127 | 70  | 100               | 80 <sup>0</sup> <sub>-0.030</sub> | 90 | 5  |
| 03A7BKC         | 212 | 172 | 136 | 40 | 88  | 160 | 70  | 100               | 80 <sup>0</sup> <sub>-0.030</sub> | 90 | 5  |

| Model<br>SGM7G- | Flange Dimensions |     |     | Shaft End Dimensions              |    | Approx.<br>Mass [kg] |
|-----------------|-------------------|-----|-----|-----------------------------------|----|----------------------|
|                 | LG                | LH  | LZ  | S                                 | Q  |                      |
| 03A7BK1         | 10                | 120 | 6.6 | 16 <sup>0</sup> <sub>-0.011</sub> | 30 | 3.2                  |
| 03A7BKC         | 10                | 120 | 6.6 | 16 <sup>0</sup> <sub>-0.011</sub> | 30 | 4.2                  |



## ◆ SGM7G-09A to -75A (Low-Speed Version)



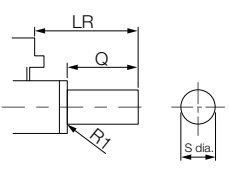
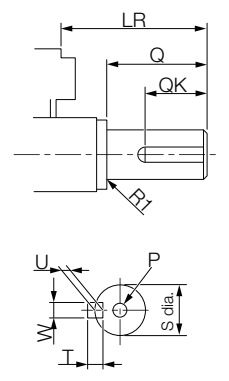
| Model SGM7G- | L   | LL  | LM  | LR  | KB1 | KB2 | KB3 | IE  | KL1 | KL3 | Flange Dimensions |       |     |     |
|--------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-------------------|-------|-----|-----|
|              |     |     |     |     |     |     |     |     |     |     | LA                | LB    | LC  | LE  |
| 06A7B61      | 195 | 137 | 101 | 58  | 83  | 125 | N/A | N/A | 104 | N/A | 145               | 110   | 130 | 6   |
| 09A7BK1      | 211 | 153 | 117 | 58  | 99  | 141 | N/A | N/A | 104 | N/A | 145               | 110   | 130 | 6   |
| 09A7BKC      | 247 | 189 | 153 | 58  | 99  | 177 | 131 | N/A | 104 | 80  | 145               | 110   | 130 | 6   |
| 12A7B61      | 229 | 171 | 135 | 58  | 117 | 159 | N/A | N/A | 104 | N/A | 145               | 110   | 130 | 6   |
| 12A7B6C      | 265 | 207 | 171 | 58  | 117 | 195 | 149 | N/A | 104 | 80  | 145               | 110   | 130 | 6   |
| 20A7B61      | 239 | 160 | 124 | 79  | 108 | 148 | N/A | N/A | 134 | N/A | 200               | 114.3 | 180 | 3.2 |
| 20A7B6C      | 287 | 208 | 172 | 79  | 108 | 196 | 148 | N/A | 134 | 110 | 200               | 114.3 | 180 | 3.2 |
| 30A7B61      | 263 | 184 | 148 | 79  | 132 | 172 | N/A | N/A | 134 | N/A | 200               | 114.3 | 180 | 3.2 |
| 30A7B6C      | 311 | 232 | 196 | 79  | 132 | 220 | 172 | N/A | 134 | 110 | 200               | 114.3 | 180 | 3.2 |
| 40A7B61      | 334 | 221 | 185 | 113 | 163 | 209 | N/A | 123 | 144 | N/A | 200               | 114.3 | 180 | 3.2 |
| 40A7B6C      | 378 | 265 | 229 | 113 | 163 | 253 | 205 | 123 | 144 | 110 | 200               | 114.3 | 180 | 3.2 |
| 55A7B61      | 380 | 267 | 231 | 113 | 209 | 255 | N/A | 123 | 144 | N/A | 200               | 114.3 | 180 | 3.2 |
| 55A7B6C      | 424 | 311 | 275 | 113 | 209 | 299 | 251 | 123 | 144 | 110 | 200               | 114.3 | 180 | 3.2 |

| Model SGM7G- | Flange Dimensions |     |      | Shaft End Dimensions |     | Approx. Mass [kg] |
|--------------|-------------------|-----|------|----------------------|-----|-------------------|
|              | LG                | LH  | LZ   | S                    | Q   |                   |
| 06A7B61      | 12                | 165 | 9    | 24                   | 40  | 5.5               |
| 09A7BK1      | 12                | 165 | 9    | 24                   | 40  | 7.1               |
| 09A7BKC      | 12                | 165 | 9    | 24                   | 40  | 9.0               |
| 12A7B61      | 12                | 165 | 9    | 24                   | 40  | 8.6               |
| 12A7B6C      | 12                | 165 | 9    | 24                   | 40  | 11.0              |
| 20A7B61      | 18                | 230 | 13.5 | 35                   | 76  | 13.5              |
| 20A7B6C      | 18                | 230 | 13.5 | 35                   | 76  | 19.5              |
| 30A7B61      | 18                | 230 | 13.5 | 35                   | 76  | 17.5              |
| 30A7B6C      | 18                | 230 | 13.5 | 35                   | 76  | 23.5              |
| 40A7B61      | 18                | 230 | 13.5 | 42                   | 110 | 21.5              |
| 40A7B6C      | 18                | 230 | 13.5 | 42                   | 110 | 27.5              |
| 55A7B61      | 18                | 230 | 13.5 | 42                   | 110 | 29.5              |
| 55A7B6C      | 18                | 230 | 13.5 | 42                   | 110 | 35.0              |

## Shaft End Specifications (200V Models)

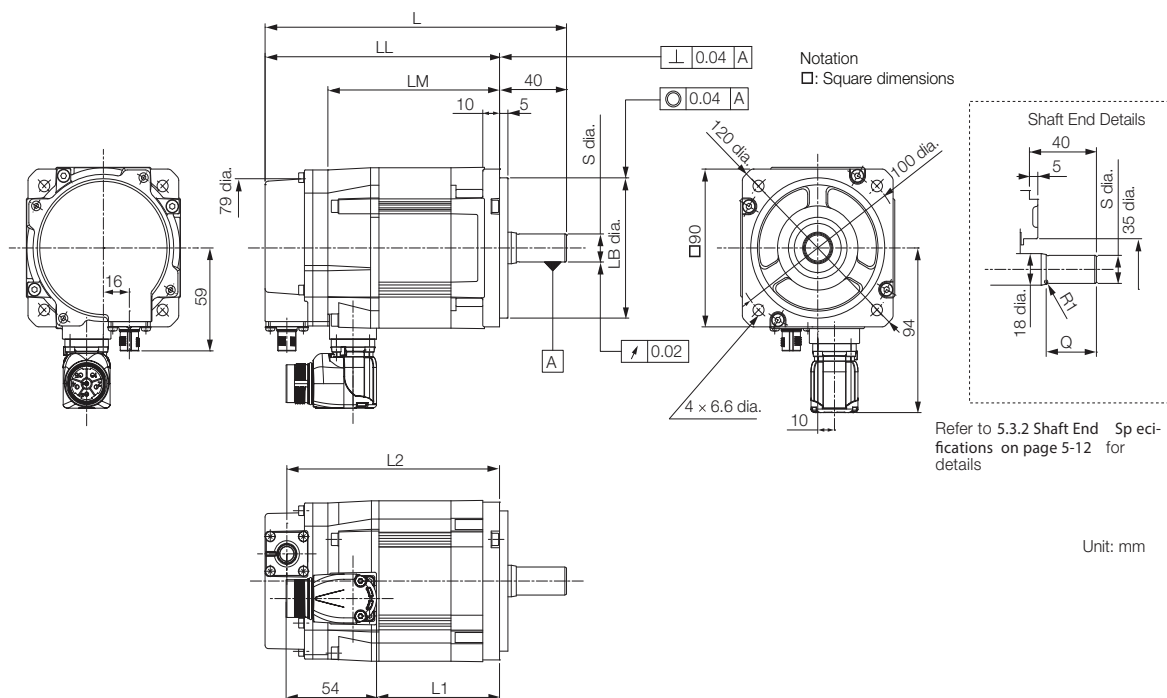
## ◆ SGM7G-□□□□□□□□

| Code | Specification                                                                                        |
|------|------------------------------------------------------------------------------------------------------|
| 2    | Straight without key                                                                                 |
| 6    | Straight with key and tap for one location<br>(Key slot is JIS B1301-1996 fastening type.)           |
| K    | Straight with key and tap with same shaft diameter as Sigma-5 equivalent (for models 03, 09, and 13) |

| Shaft End Details                                                                   |               | Servo Motor Model SGM7G-          |                                   |                                   |                                   |                                   |                                  |                                  |                                   |                                   |                                   |                                        |
|-------------------------------------------------------------------------------------|---------------|-----------------------------------|-----------------------------------|-----------------------------------|-----------------------------------|-----------------------------------|----------------------------------|----------------------------------|-----------------------------------|-----------------------------------|-----------------------------------|----------------------------------------|
|                                                                                     |               | 03                                | 05                                | 09                                | 13                                | 20                                | 30                               | 44                               | 55                                | 75                                | 1A                                | 1E                                     |
| Code: 2 (Straight without Key)                                                      |               |                                   |                                   |                                   |                                   |                                   |                                  |                                  |                                   |                                   |                                   |                                        |
|    | LR            | 40                                | 40                                | 58                                | 58                                | 58                                | 79                               | 79                               | 113                               | 113                               | 116                               | 116                                    |
|                                                                                     | Q             | 30                                | 30                                | 40                                | 40                                | 40                                | 76                               | 76                               | 110                               | 110                               | 110                               | 110                                    |
|                                                                                     | S             | 16 <sup>0</sup> <sub>-0.011</sub> | 16 <sup>0</sup> <sub>-0.011</sub> | 24 <sup>0</sup> <sub>-0.013</sub> | 24 <sup>0</sup> <sub>-0.013</sub> | 24 <sup>0</sup> <sub>-0.013</sub> | 35 <sup>+0.01</sup> <sub>0</sub> | 35 <sup>+0.01</sup> <sub>0</sub> | 42 <sup>0</sup> <sub>-0.016</sub> | 42 <sup>0</sup> <sub>-0.016</sub> | 42 <sup>0</sup> <sub>-0.016</sub> | 55 <sup>+0.030</sup> <sub>+0.011</sub> |
| Code: 6 or K (Straight with Key and Tap)                                            |               |                                   |                                   |                                   |                                   |                                   |                                  |                                  |                                   |                                   |                                   |                                        |
|  | LR            | 40                                | 40                                | 58                                | 58                                | 58                                | 79                               | 79                               | 113                               | 113                               | 116                               | 116                                    |
|                                                                                     | Q             | 30                                | 30                                | 40                                | 40                                | 40                                | 76                               | 76                               | 110                               | 110                               | 110                               | 110                                    |
|                                                                                     | QK            | 20                                | 20                                | 25                                | 25                                | 25                                | 60                               | 60                               | 90                                | 90                                | 90                                | 90                                     |
|                                                                                     | S<br>(Code 6) | 16 <sup>0</sup> <sub>-0.011</sub> | 16 <sup>0</sup> <sub>-0.011</sub> | 24 <sup>0</sup> <sub>-0.013</sub> | 24 <sup>0</sup> <sub>-0.013</sub> | 24 <sup>0</sup> <sub>-0.013</sub> | 35 <sup>+0.01</sup> <sub>0</sub> | 35 <sup>+0.01</sup> <sub>0</sub> | 42 <sup>0</sup> <sub>-0.016</sub> | 42 <sup>0</sup> <sub>-0.016</sub> | 42 <sup>0</sup> <sub>-0.016</sub> | 55 <sup>+0.030</sup> <sub>+0.011</sub> |
|                                                                                     | S<br>(Code K) | 14 <sup>0</sup> <sub>-0.011</sub> | N/A                               | 19 <sup>0</sup> <sub>-0.013</sub> | 22 <sup>0</sup> <sub>-0.013</sub> | N/A                               | N/A                              | N/A                              | N/A                               | N/A                               | N/A                               | N/A                                    |
|                                                                                     | W             | 5                                 | 5                                 | 5                                 | 6                                 | 8                                 | 10                               | 10                               | 12                                | 12                                | 12                                | 16                                     |
|                                                                                     | T             | 5                                 | 5                                 | 5                                 | 6                                 | 7                                 | 8                                | 8                                | 8                                 | 8                                 | 8                                 | 10                                     |
|                                                                                     | U             | 3                                 | 3                                 | 3                                 | 3.5                               | 4                                 | 5                                | 5                                | 5                                 | 5                                 | 5                                 | 6                                      |
|                                                                                     | P             | M5 screw, Depth: 12               |                                   |                                   |                                   |                                   | M12 screw, Depth: 25             |                                  | M16 screw, Depth: 32              |                                   |                                   | M20 screw, Depth: 40                   |

## 400V Servo Motors

## ◆ SGM7G-05D



| Model<br>SGM7G- | L            | LL           | LM           | L1 | L2           | LB                                | Shaft End<br>Dimensions           |    | Approx.<br>Mass [kg] |
|-----------------|--------------|--------------|--------------|----|--------------|-----------------------------------|-----------------------------------|----|----------------------|
|                 |              |              |              |    |              |                                   | S                                 | Q  |                      |
| 05D□ F6□        | 181<br>(214) | 141<br>(174) | 103<br>(136) | 74 | 127<br>(161) | 80 <sup>0</sup> <sub>-0.030</sub> | 16 <sup>0</sup> <sub>-0.011</sub> | 30 | 3.3<br>(4.3)         |

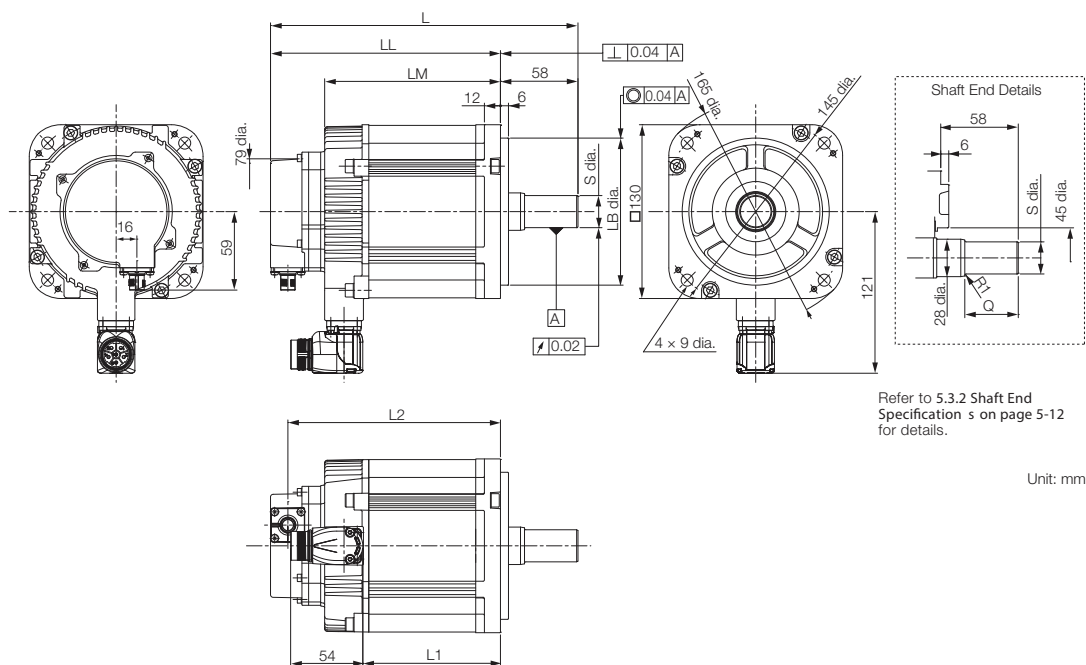
\* For 400V models 1kW and smaller that have a batteryless absolute encoder, L and LL are the same as the given value.

Note: Servo Motors with Oil Seals have the same dimensions. Values in parentheses are for motors with holding brakes.

Refer to the following section for information on connectors.

◆ SGM7G-03A and -05A with Holding Brakes (page 186)

◆ SGM7G-09D, -13D, -20D



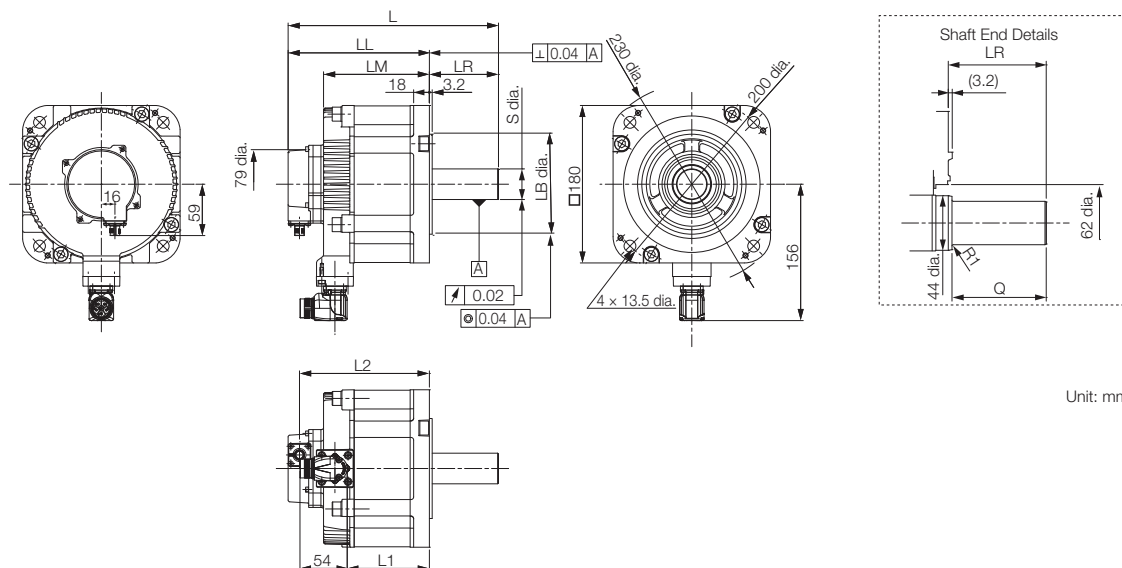
| Model<br>SGM7G- | L            | LL           | LM           | L1  | L2           | LB                                 | Shaft End<br>Dimensions           |    | Approx.<br>Mass [kg] |
|-----------------|--------------|--------------|--------------|-----|--------------|------------------------------------|-----------------------------------|----|----------------------|
|                 |              |              |              |     |              |                                    | S                                 | Q  |                      |
| 09D□ FK□        | 197<br>(233) | 139<br>(175) | 101<br>(137) | 69  | 125<br>(161) | 110 <sup>0</sup> <sub>-0.035</sub> | 19 <sup>0</sup> <sub>-0.013</sub> | 40 | 5.6<br>(7.6)         |
| 13D□ FK□        | 213<br>(249) | 155<br>(191) | 117<br>(153) | 85  | 141<br>(177) | 110 <sup>0</sup> <sub>-0.035</sub> | 22 <sup>0</sup> <sub>-0.013</sub> | 40 | 7.2<br>(9.1)         |
| 20D□ F6□        | 231<br>(267) | 173<br>(209) | 135<br>(171) | 103 | 159<br>(195) | 110 <sup>0</sup> <sub>-0.035</sub> | 24 <sup>0</sup> <sub>-0.013</sub> | 40 | 8.7<br>(11.1)        |

\* For 400V models 1kW and smaller that have a batteryless absolute encoder, L and LL are the same as the given value. For 400V models larger than 1.0kW that have a batteryless absolute encoder, L and LL are 6mm greater than the given value.

Note: Servo Motors with Oil Seals have the same dimensions. Values in parentheses are for motors with holding brakes.  
Refer to the following section for information on connectors.

◆ SGM7G-03A and -05A with Holding Brakes (page 186)

◆ SGM7G-30D, -44D, -55D, -75



Unit: mm

| Model<br>SGM7G- | L            | LL           | LM           | L1  | L2           | LR  | LB                                   | Shaft End<br>Dimensions           |     | Approx.<br>Mass [kg] |
|-----------------|--------------|--------------|--------------|-----|--------------|-----|--------------------------------------|-----------------------------------|-----|----------------------|
|                 |              |              |              |     |              |     |                                      | S                                 | Q   |                      |
| 30D□ F6□        | 241<br>(289) | 162<br>(210) | 124<br>(172) | 94  | 149<br>(197) | 79  | 114.3 <sup>0</sup> <sub>-0.035</sub> | 35 <sup>+0.01</sup> <sub>-0</sub> | 76  | 13.6<br>(19.6)       |
| 44D□ F6□        | 265<br>(313) | 186<br>(234) | 148<br>(196) | 118 | 173<br>(221) | 79  | 114.3 <sup>0</sup> <sub>-0.025</sub> | 35 <sup>+0.01</sup> <sub>-0</sub> | 76  | 18.0<br>(24.0)       |
| 44D□ R6□        | 265<br>(313) | 186<br>(234) | 148<br>(196) | 112 | 173<br>(221) | 79  | 114.3 <sup>0</sup> <sub>-0.025</sub> | 35 <sup>+0.01</sup> <sub>-0</sub> | 76  | 18.0<br>(24.0)       |
| 55D□ F6□        | 336<br>(380) | 223<br>(267) | 185<br>(229) | 143 | 210<br>(254) | 113 | 114.3 <sup>0</sup> <sub>-0.025</sub> | 42 <sup>0</sup> <sub>-0.016</sub> | 76  | 22.0<br>(28.0)       |
| 75D□ F6□        | 382<br>(426) | 269<br>(313) | 231<br>(275) | 189 | 256<br>(300) | 113 | 114.3 <sup>0</sup> <sub>-0.025</sub> | 42 <sup>0</sup> <sub>-0.016</sub> | 110 | 30.0<br>(35.5)       |

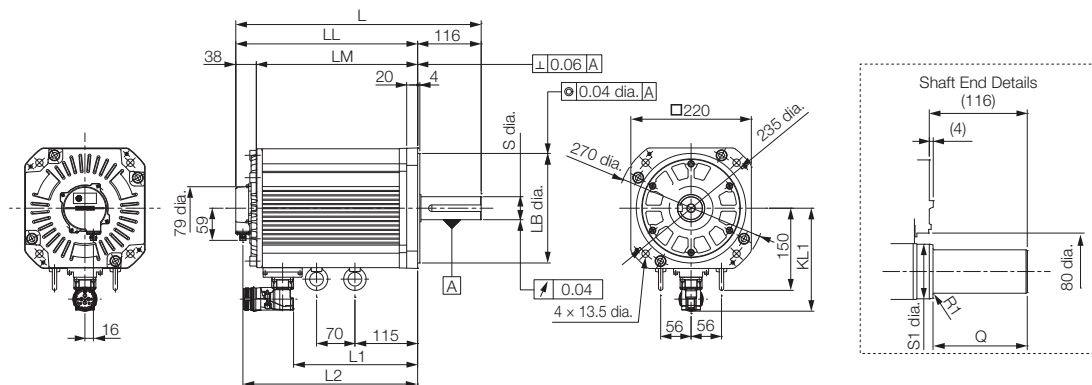
\* For 400V models larger than 1.0kW that have a batteryless absolute encoder, L and LL are 6mm greater than the given value.

Note: Servo Motors with Oil Seals have the same dimensions. Values in parentheses are for motors with holding brakes.

Refer to the following section for information on connectors.

◆ SGM7G-03A and -05A with Holding Brakes (page 186)

◆ SGM7G-1AD, -1ED



Unit: mm

| Model<br>SGM7G- | L            | LL           | LM           | L1  | L2           | LB                                   | Shaft End<br>Dimensions                |     | Approx.<br>Mass [kg] |
|-----------------|--------------|--------------|--------------|-----|--------------|--------------------------------------|----------------------------------------|-----|----------------------|
|                 |              |              |              |     |              |                                      | S                                      | Q   |                      |
| 1AD□ F6□        | 449<br>(500) | 333<br>(384) | 295<br>(346) | 227 | 319<br>(371) | 200 <sup>0</sup> <sub>-0.046</sub> * | 42 <sup>0</sup> <sub>-0.016</sub>      | 110 | 50                   |
| 1ED□ F6□        | 511<br>(600) | 395<br>(484) | 357<br>(446) | 289 | 382<br>(470) | 200 <sup>0</sup> <sub>-0.046</sub> * | 55 <sup>+0.030</sup> <sub>+0.011</sub> | 110 | 60                   |

\* For 400V models larger than 1.0kW that have a batteryless absolute encoder, L and LL are 6mm greater than the given value.

Note: Servo Motors with Oil Seals have the same dimensions. Values in parentheses are for motors with holding brakes.

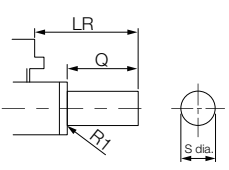
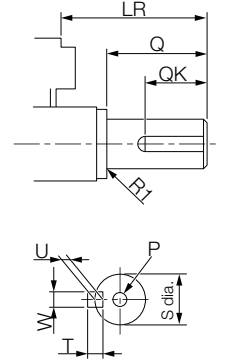
Refer to the following section for information on connectors.

◆ SGM7G-03A and -05A with Holding Brakes (page 186)

## Shaft End Specifications (400V Models)

## ◆ SGM7G-□□□□□□□□

| Code   | Specification                                                                              |
|--------|--------------------------------------------------------------------------------------------|
| 2 or S | Straight without key                                                                       |
| 6 or K | Straight with key and tap for one location<br>(Key slot is JIS B1301-1996 fastening type.) |

| Shaft End Details                                                                   |               | Servo Motor Model SGM7G-          |                                   |                                   |                                   |                                  |                                  |                                   |                                   |                                   |                                        |
|-------------------------------------------------------------------------------------|---------------|-----------------------------------|-----------------------------------|-----------------------------------|-----------------------------------|----------------------------------|----------------------------------|-----------------------------------|-----------------------------------|-----------------------------------|----------------------------------------|
|                                                                                     |               | 05                                | 09                                | 13                                | 20                                | 30                               | 44                               | 55                                | 75                                | 1A                                | 1E                                     |
| Code: 2 or S* (Straight without Key)                                                |               |                                   |                                   |                                   |                                   |                                  |                                  |                                   |                                   |                                   |                                        |
|    | LR            | 40                                | 58                                | 58                                | 58                                | 79                               | 79                               | 113                               | 113                               | 116                               | 116                                    |
|                                                                                     | Q             | 30                                | 40                                | 40                                | 40                                | 76                               | 76                               | 110                               | 110                               | 110                               | 110                                    |
|                                                                                     | S             | 16 <sup>0</sup> <sub>-0.011</sub> | 19 <sup>0</sup> <sub>-0.013</sub> | 22 <sup>0</sup> <sub>-0.013</sub> | 24 <sup>0</sup> <sub>-0.013</sub> | 35 <sup>+0.01</sup> <sub>0</sub> | 35 <sup>+0.01</sup> <sub>0</sub> | 42 <sup>0</sup> <sub>-0.016</sub> | 42 <sup>0</sup> <sub>-0.016</sub> | 42 <sup>0</sup> <sub>-0.016</sub> | 55 <sup>+0.030</sup> <sub>+0.011</sub> |
| Code: 6 or K* (Straight with Key and Tap)                                           |               |                                   |                                   |                                   |                                   |                                  |                                  |                                   |                                   |                                   |                                        |
|  | LR            | 40                                | 58                                | 58                                | 58                                | 79                               | 79                               | 113                               | 113                               | 116                               | 116                                    |
|                                                                                     | Q             | 30                                | 40                                | 40                                | 40                                | 76                               | 76                               | 110                               | 110                               | 110                               | 110                                    |
|                                                                                     | QK            | 20                                | 25                                | 25                                | 25                                | 60                               | 60                               | 90                                | 90                                | 90                                | 90                                     |
|                                                                                     | S<br>(Code 6) | 16 <sup>0</sup> <sub>-0.011</sub> | 24 <sup>0</sup> <sub>-0.013</sub> | 24 <sup>0</sup> <sub>-0.013</sub> | 24 <sup>0</sup> <sub>-0.013</sub> | 35 <sup>+0.01</sup> <sub>0</sub> | 35 <sup>+0.01</sup> <sub>0</sub> | 42 <sup>0</sup> <sub>-0.016</sub> | 42 <sup>0</sup> <sub>-0.016</sub> | 42 <sup>0</sup> <sub>-0.016</sub> | 55 <sup>+0.030</sup> <sub>+0.011</sub> |
|                                                                                     | S<br>(Code K) | N/A                               | 19 <sup>0</sup> <sub>-0.013</sub> | 22 <sup>0</sup> <sub>-0.013</sub> | N/A                               | N/A                              | N/A                              | N/A                               | N/A                               | N/A                               | N/A                                    |
|                                                                                     | W             | 5                                 | 5                                 | 6                                 | 8                                 | 10                               | 10                               | 12                                | 12                                | 12                                | 16                                     |
|                                                                                     | T             | 5                                 | 5                                 | 6                                 | 7                                 | 8                                | 8                                | 8                                 | 8                                 | 8                                 | 10                                     |
|                                                                                     | U             | 3                                 | 3                                 | 3.5                               | 4                                 | 5                                | 5                                | 5                                 | 5                                 | 5                                 | 6                                      |
|                                                                                     | P             | M5 screw, Depth: 12               |                                   |                                   |                                   | M12 screw, Depth: 25             |                                  | M16 screw, Depth: 32              |                                   |                                   | M20 screw, Depth: 40                   |
|                                                                                     |               |                                   |                                   |                                   |                                   |                                  |                                  |                                   |                                   |                                   |                                        |

\* The code for the shaft end depends on the model:

SGM7G-05, -20, -30, -44, -55, -75, -1A, or -1E: 2 or 6

SGM7G-09 or -13: S or K

## Dimensions of Servomotors with Batteryless Absolute Encoders

### ◆ 200 V Servomotors without Gears

| Model<br>SGM7G- | L            | LL           | LP | KB2          | Approx.<br>Mass [kg] |
|-----------------|--------------|--------------|----|--------------|----------------------|
| 03A6A□□         | 174<br>(207) | 134<br>(167) | 44 | 122<br>(155) | 2.6<br>(3.6)         |
| 05A6A□□         | 187<br>(220) | 147<br>(180) | 44 | 135<br>(168) | 3.2<br>(4.2)         |
| 09A6A□□         | 203<br>(239) | 145<br>(181) | 44 | 133<br>(169) | 5.5<br>(7.5)         |
| 13A6A□□         | 219<br>(255) | 161<br>(197) | 44 | 149<br>(185) | 7.1<br>(9.0)         |
| 20A6A□□         | 237<br>(273) | 179<br>(215) | 44 | 167<br>(203) | 8.6<br>(11)          |
| 30A6A□□         | 247<br>(295) | 168<br>(216) | 44 | 156<br>(204) | 13.5<br>(19.5)       |
| 44A6A□□         | 271<br>(319) | 192<br>(240) | 44 | 180<br>(228) | 17.5<br>(23.5)       |
| 55A6A□□         | 342<br>(386) | 229<br>(273) | 44 | 217<br>(261) | 21.5<br>(27.5)       |
| 75A6A□□         | 388<br>(432) | 275<br>(319) | 44 | 263<br>(307) | 29.5<br>(35.0)       |
| 1AA6A□□         | 455<br>(506) | 339<br>(390) | 44 | 327<br>(378) | 57<br>(65)           |
| 1EA6A□□         | 514<br>(606) | 401<br>(490) | 44 | 389<br>(478) | 67<br>(85)           |

Note: The values in parentheses are for Servomotors with Holding Brakes.

### ◆ 400 V Servomotors without Gears

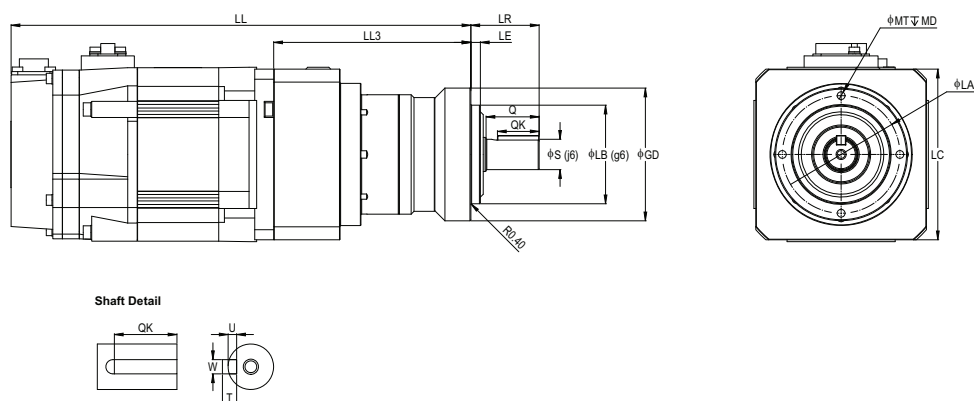
| Model<br>SGM7G- | L         | LL        | Approx. Mass<br>[kg] |
|-----------------|-----------|-----------|----------------------|
| 13D6F□□         | 219 (255) | 161 (197) | 7.2 (9.1)            |
| 20D6F□□         | 237 (273) | 179 (215) | 8.7 (11.1)           |
| 30D6F□□         | 247 (295) | 168 (216) | 13.6 (19.6)          |
| 44D6F□□         | 271 (319) | 192 (240) | 18.0 (24.0)          |
| 55D6F□□         | 342 (386) | 229 (273) | 22.0 (28.0)          |
| 75D6F□□         | 388 (432) | 275 (319) | 30.0 (35.5)          |
| 1AD6F□□         | 455 (506) | 339 (390) | 57.5 (65.5)          |
| 1ED6F□□         | 517 (606) | 401 (490) | 67.5 (85.5)          |

Note: The values in parentheses are for Servomotors with Holding Brakes.



## Gear Motors

## ◆ Gear Motor Models: 450 W to 850 W (S7G05, S7G09)



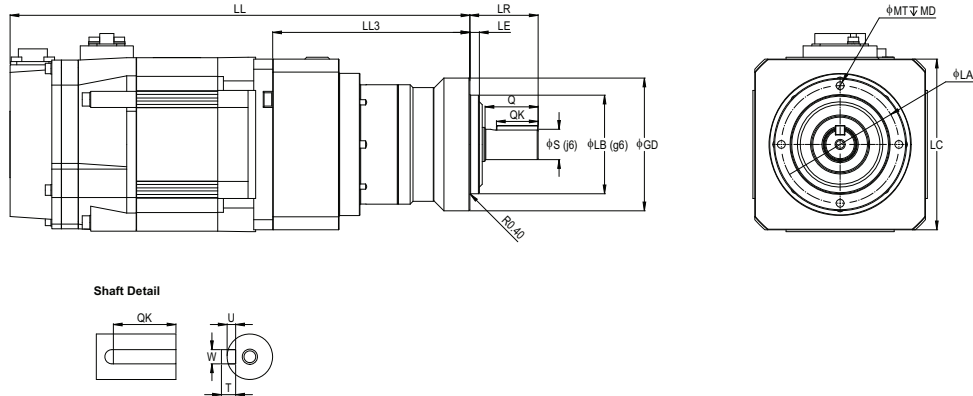
| Model S7G    |                | LL      | LL3   | LR | LE | φS | φLB | φGD | LC  | φLA | φMT | MD | Q  | QK | KD | W   | U           | T         | Mass kg     |
|--------------|----------------|---------|-------|----|----|----|-----|-----|-----|-----|-----|----|----|----|----|-----|-------------|-----------|-------------|
| 450 W Models |                |         |       |    |    |    |     |     |     |     |     |    |    |    |    |     |             |           |             |
| 200 V        | 05A□ -VL070-03 | 243     | 104   | 36 | 5  | 16 | 52  | 70  | 90  | 62  | M5  | 10 | 28 | 22 | 0  | 5   | 3           | 5         | 4.7 (5.7)   |
|              | 05A□ -VL070-05 | (276)   |       |    |    |    |     |     |     |     |     |    |    |    |    |     |             |           |             |
|              | 05A□ -VL090-10 | 256     | 46    | 7  | 22 | 68 | 90  | 80  |     | M6  | 12  | 36 | 28 | 6  |    | 3.5 | 6           | 6.7 (7.7) |             |
|              | 05A□ -VL090-25 | 278     |       |    |    |    |     |     |     |     |     |    |    |    |    |     |             |           |             |
|              | 05A□ -VL120-50 | 293.5   |       |    |    |    |     |     |     |     |     |    |    |    |    |     |             |           |             |
|              |                | (326.5) | 154.5 | 70 | 9  | 32 | 90  | 120 | 108 | M8  | 16  | 58 | 45 | 10 | 5  | 8   | 7.2 (8.2)   |           |             |
| 400 V        | 05D□ -VL070-03 | 243     | 104   | 36 | 5  | 16 | 52  | 70  | 90  | 62  | M5  | 10 | 28 | 22 | 0  | 5   | 3           | 5         | 4.7 (5.7)   |
|              | 05D□ -VL070-05 | (276)   |       |    |    |    |     |     |     |     |     |    |    |    |    |     |             |           |             |
|              | 05D□ -VL090-10 | 256     | 46    | 7  | 22 | 68 | 90  | 80  |     | M6  | 12  | 36 | 28 | 6  |    | 3.5 | 6           | 6.7 (7.7) |             |
|              | 05D□ -VL090-25 | 278     |       |    |    |    |     |     |     |     |     |    |    |    |    |     |             |           |             |
|              | 05D□ -VL120-50 | 293.5   |       |    |    |    |     |     |     |     |     |    |    |    |    |     |             |           |             |
|              |                | (326.5) | 154.5 | 70 | 9  | 32 | 90  | 120 | 108 | M8  | 16  | 58 | 45 | 10 | 5  | 8   | 7.2 (8.2)   |           |             |
| 850 W Models |                |         |       |    |    |    |     |     |     |     |     |    |    |    |    |     |             |           |             |
| 200 V        | 09A□ -VL090-03 | 259     | 122   | 46 | 7  | 22 | 68  | 90  | 130 | 80  | M6  | 12 | 36 | 28 | 0  | 6   | 3.5         | 6         | 9.0 (11.0)  |
|              | 09A□ -VL090-05 |         |       |    |    |    |     |     |     |     |     |    |    |    |    |     |             |           | (295)       |
|              | 09A□ -VL090-10 | 296.5   | 159.5 | 70 | 9  | 32 | 90  | 120 |     | 108 | M8  | 16 | 58 | 45 |    | 10  | 5           | 8         | 14.2 (16.2) |
|              | 09A□ -VL120-25 | (332.5) |       |    |    |    |     |     |     |     |     |    |    |    |    |     |             |           |             |
|              | 09A□ -VL155-50 | 321.5   |       |    |    |    |     |     |     |     |     |    |    |    |    |     |             |           |             |
|              |                | (357.5) | 184.5 | 97 | 12 | 40 | 120 | 155 | 140 | M10 | 20  | 82 | 65 | 12 |    |     | 23.5 (25.5) |           |             |
| 400 V        | 09D□ -VL090-03 | 259     | 122   | 46 | 7  | 22 | 68  | 90  | 130 | 80  | M6  | 12 | 36 | 28 | 0  | 6   | 3.5         | 6         | 9.0 (11.0)  |
|              | 09D□ -VL090-05 |         |       |    |    |    |     |     |     |     |     |    |    |    |    |     |             |           | (295)       |
|              | 09D□ -VL090-10 | 296.5   | 159.5 | 70 | 9  | 32 | 90  | 120 |     | 108 | M8  | 16 | 58 | 45 |    | 10  | 5           | 8         | 14.2 (16.2) |
|              | 09D□ -VL120-25 | (332.5) |       |    |    |    |     |     |     |     |     |    |    |    |    |     |             |           |             |
|              | 09D□ -VL155-50 | 321.5   |       |    |    |    |     |     |     |     |     |    |    |    |    |     |             |           |             |
|              |                | (357.5) | 184.5 | 97 | 12 | 40 | 120 | 155 | 140 | M10 | 20  | 82 | 65 | 12 |    |     | 23.5 (25.5) |           |             |

Note: 1. The values in parentheses are for Servo Motors with Holding Brakes. 7.0kW motors not available with brake.

2. For models that have a batteryless absolute encoder, L is 8 mm greater than the given value. Refer to the following section for the values for individual models:

🔧 Dimensions of Gear Motors with Batteryless Encoders (page 179)

## ◆ Gear Motor Models: 1.3 kW to 1.8 kW (S7G13, S7G20)



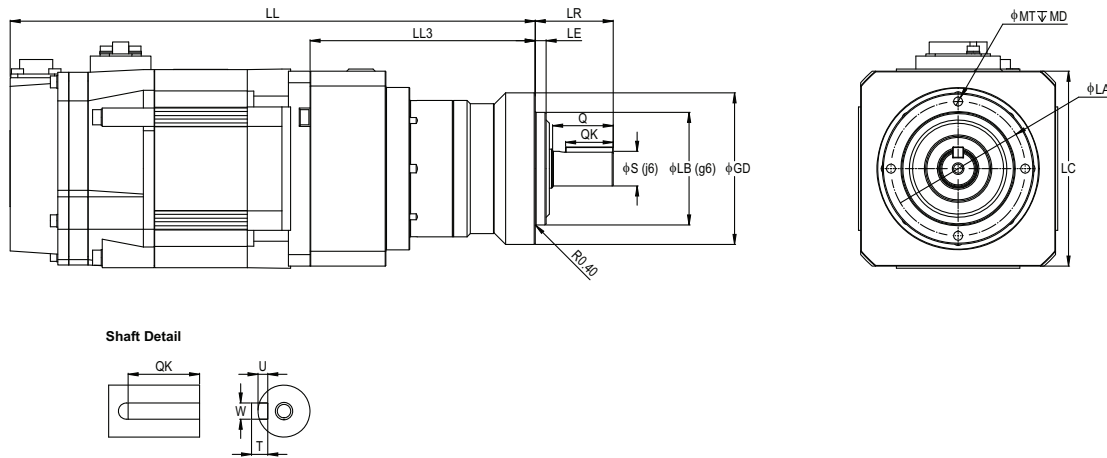
| Model S7G     |                | LL               | LL3   | LR  | LE | φS | φLB | φGD | LC  | φLA | φMT | MD  | Q  | QK | KD | W           | U   | T  | Mass kg     |
|---------------|----------------|------------------|-------|-----|----|----|-----|-----|-----|-----|-----|-----|----|----|----|-------------|-----|----|-------------|
| 1.3 kW Models |                |                  |       |     |    |    |     |     |     |     |     |     |    |    |    |             |     |    |             |
| 200 V         | 13A□ -VL090-03 | 287<br>(323)     | 134   | 46  | 7  | 22 | 68  | 90  | 130 | 80  | M6  | 12  | 36 | 28 | 0  | 6           | 3.5 | 6  | 10.6 (12.5) |
|               | 13A□ -VL090-05 |                  |       |     |    |    |     |     |     |     |     |     |    |    |    |             |     |    |             |
|               | 13A□ -VL120-10 | 297<br>(333)     | 144   | 70  | 9  | 32 | 90  | 120 |     | 108 | M8  | 16  | 58 | 45 |    | 10          | 5   | 8  | 14.9 (16.8) |
|               | 13A□ -VL120-25 | 324.5<br>(360.5) | 171.5 |     |    |    |     |     |     |     |     |     |    |    |    | 15.8 (17.7) |     |    |             |
|               | 13A□ -VL155-50 | 349.5<br>(385.5) | 196.5 |     | 97 | 12 | 40  | 120 |     | 155 | 140 | M10 | 20 | 82 |    | 65          |     |    | 25.1 (27.0) |
| 400 V         | 13D□ -VL090-03 | 287<br>(323)     | 134   | 46  | 7  | 22 | 68  | 90  | 130 | 80  | M6  | 12  | 36 | 28 | 0  | 6           | 3.5 | 6  | 10.6 (12.5) |
|               | 13D□ -VL090-05 |                  |       |     |    |    |     |     |     |     |     |     |    |    |    |             |     |    |             |
|               | 13D□ -VL120-10 | 297<br>(333)     | 144   | 70  | 9  | 32 | 90  | 120 |     | 108 | M8  | 16  | 58 | 45 |    | 10          | 5   | 8  | 14.9 (16.8) |
|               | 13D□ -VL120-25 | 324.5<br>(360.5) | 171.5 |     |    |    |     |     |     |     |     |     |    |    |    | 15.8 (17.7) |     |    |             |
|               | 13D□ -VL155-50 | 349.5<br>(385.5) | 196.5 |     | 97 | 12 | 40  | 120 |     | 155 | 140 | M10 | 20 | 82 |    | 65          |     |    | 25.1 (27.0) |
| 1.8 kW Models |                |                  |       |     |    |    |     |     |     |     |     |     |    |    |    |             |     |    |             |
| 200 V         | 20A□ -VL090-03 | 305<br>(341)     | 134   | 46  | 7  | 22 | 68  | 90  | 130 | 80  | M6  | 12  | 36 | 28 | 0  | 6           | 3.5 | 6  | 12.1 (14.5) |
|               | 20A□ -VL090-05 |                  |       |     |    |    |     |     |     |     |     |     |    |    |    |             |     |    |             |
|               | 20A□ -VL120-10 | 315<br>(351)     | 144   | 70  | 9  | 32 | 90  | 120 |     | 108 | M8  | 16  | 58 | 45 |    | 10          | 5   | 8  | 16.3 (18.8) |
|               | 20A□ -VL155-25 | 367.5<br>(403.5) | 196.5 | 97  | 12 | 40 | 120 | 155 |     | 140 | M10 | 20  | 82 | 65 |    | 12          |     |    | 26.6 (29.0) |
|               | 20A□ -VL205-50 | 397<br>(433)     | 226   | 100 | 15 | 55 | 160 | 205 |     | 184 | M12 | 22  |    |    |    | 16          | 6   | 10 | 48.6 (51.0) |
| 400 V         | 20D□ -VL090-03 | 305<br>(341)     | 134   | 46  | 7  | 22 | 68  | 90  | 130 | 80  | M6  | 12  | 36 | 28 | 0  | 6           | 3.5 | 6  | 12.1 (14.5) |
|               | 20D□ -VL090-05 |                  |       |     |    |    |     |     |     |     |     |     |    |    |    |             |     |    |             |
|               | 20D□ -VL120-10 | 315<br>(351)     | 144   | 70  | 9  | 32 | 90  | 120 |     | 108 | M8  | 16  | 58 | 45 |    | 10          | 5   | 8  | 16.3 (18.8) |
|               | 20D□ -VL155-25 | 367.5<br>(403.5) | 196.5 | 97  | 12 | 40 | 120 | 155 |     | 140 | M10 | 20  | 82 | 65 |    | 12          |     |    | 26.6 (29.0) |
|               | 20D□ -VL205-50 | 397<br>(433)     | 226   | 100 | 15 | 55 | 160 | 205 |     | 184 | M12 | 22  |    |    |    | 16          | 6   | 10 | 48.6 (51.0) |

Note: 1. The values in parentheses are for Servo Motors with Holding Brakes. 7.0kW motors not available with brake.

2. For models that have a batteryless absolute encoder, L is 8 mm greater than the given value. Refer to the following section for the values for individual models:

Ⓛ Dimensions of Gear Motors with Batteryless Encoders (page 179)

◆ Gear Motor Models: 2.9 kW to 4.4 kW (S7G30, S7G44)



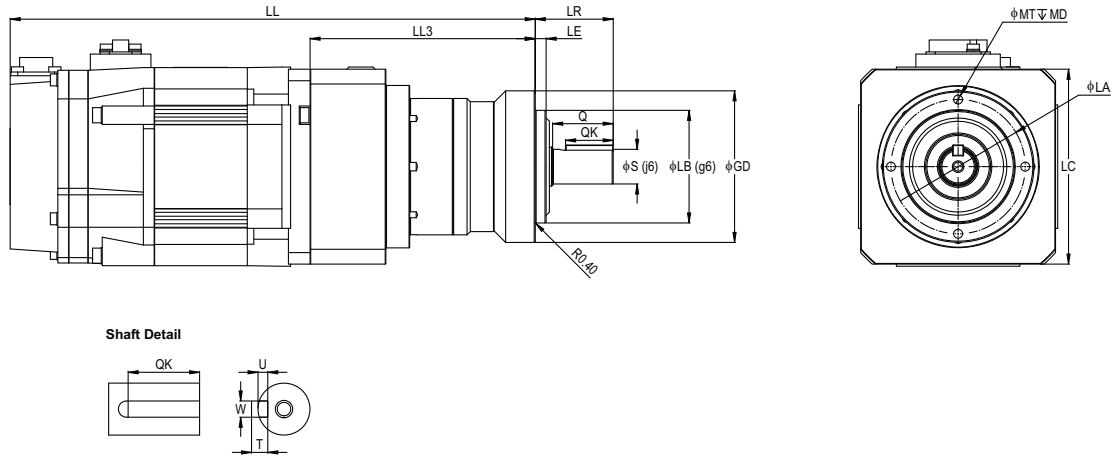
| Model S7G     |                | LL    | LL3     | LR  | LE | φS | φLB | φGD | LC  | φLA | φMT | MD  | Q   | QK  | KD | W   | U   | T   | Mass kg     |     |             |
|---------------|----------------|-------|---------|-----|----|----|-----|-----|-----|-----|-----|-----|-----|-----|----|-----|-----|-----|-------------|-----|-------------|
| 2.9 kW Models |                |       |         |     |    |    |     |     |     |     |     |     |     |     |    |     |     |     |             |     |             |
| 200 V         | 30A□ -VL120-03 | 285   | 155     | 70  | 9  | 32 | 90  | 120 | 180 | 108 | M8  | 16  | 58  | 45  | 0  | 10  | 5   | 8   | 21.3 (27.3) |     |             |
|               | 30A□ -VL120-05 | (363) |         |     |    |    |     |     |     |     |     |     |     |     |    |     |     |     |             |     |             |
|               | 30A□ -VL155-10 | 297   | 167     | 97  | 12 | 40 | 120 | 155 |     | 140 | M10 | 20  | 82  | 65  |    | 12  |     |     | 29.5 (35.5) |     |             |
|               | 30A□ -VL155-25 | 331.5 | 201.5   |     |    |    |     |     |     |     |     |     |     |     |    |     |     |     |             |     |             |
|               | 30A□ -VL205-50 | (375) | (409.5) |     |    |    |     |     |     | 361 | 231 | 100 |     |     |    | 15  | 55  | 160 | 205         | 184 | M12         |
| 400 V         | 30D□ -VL120-03 | 285   | 155     | 70  | 9  | 32 | 90  | 120 | 180 | 108 | M8  | 16  | 58  | 45  | 0  | 10  | 5   | 8   | 21.3 (27.3) |     |             |
|               | 30D□ -VL120-05 | (363) |         |     |    |    |     |     |     |     |     |     |     |     |    |     |     |     |             |     |             |
|               | 30D□ -VL155-10 | 297   | 167     | 97  | 12 | 40 | 120 | 155 |     | 140 | M10 | 20  | 82  | 65  |    | 12  |     |     | 29.5 (35.5) |     |             |
|               | 30D□ -VL155-25 | 331.5 | 201.5   |     |    |    |     |     |     |     |     |     |     |     |    |     |     |     |             |     |             |
|               | 30D□ -VL205-50 | (375) | (409.5) |     |    |    |     |     |     | 361 | 231 | 100 |     |     |    | 15  | 55  | 160 | 205         | 184 | M12         |
| 4.4 kW Models |                |       |         |     |    |    |     |     |     |     |     |     |     |     |    |     |     |     |             |     |             |
| 200 V         | 44A□ -VL120-03 | 339   | 155     | 70  | 9  | 32 | 90  | 120 | 180 | 108 | M8  | 16  | 58  | 45  | 0  | 10  | 5   | 8   | 25.3 (31.3) |     |             |
|               | 44A□ -VL120-05 | (387) |         |     |    |    |     |     |     |     |     |     |     |     |    |     |     |     |             |     |             |
|               | 44A□ -VL205-10 | 370.5 | 186.5   | 100 | 15 | 55 | 160 | 205 |     | 184 | M12 | 22  | 82  | 65  |    | 16  |     |     | 6           | 10  | 56.5 (62.5) |
|               | 44A□ -VL205-25 | 415   | 231     |     |    |    |     |     |     |     |     |     |     |     |    |     |     |     |             |     |             |
|               | 44A□ -VL235-50 | (463) | 240.5   |     |    |    |     |     |     | 126 | 18  | 75  | 180 | 235 |    | 210 | M16 | 28  | 105         | 85  | 20          |
| 400 V         | 44D□ -VL120-03 | 339   | 155     | 70  | 9  | 32 | 90  | 120 | 180 | 108 | M8  | 16  | 58  | 45  | 0  | 10  | 5   | 8   | 25.3 (31.3) |     |             |
|               | 44D□ -VL120-05 | (387) |         |     |    |    |     |     |     |     |     |     |     |     |    |     |     |     |             |     |             |
|               | 44D□ -VL205-10 | 370.5 | 186.5   | 100 | 15 | 55 | 160 | 205 |     | 184 | M12 | 22  | 82  | 65  |    | 16  |     |     | 6           | 10  | 56.5 (62.5) |
|               | 44D□ -VL205-25 | 415   | 231     |     |    |    |     |     |     |     |     |     |     |     |    |     |     |     |             |     |             |
|               | 44D□ -VL235-50 | (463) | 240.5   |     |    |    |     |     |     | 126 | 18  | 75  | 180 | 235 |    | 210 | M16 | 28  | 105         | 85  | 20          |

Note: 1. The values in parentheses are for Servo Motors with Holding Brakes. 7.0kW motors not available with brake.

2. For models that have a batteryless absolute encoder, L is 8 mm greater than the given value. Refer to the following section for the values for individual models:

■ Dimensions of Gear Motors with Batteryless Encoders (page 179)

## ◆ Gear Motor Models: 5.5 kW to 7.5 kW (S7G55, S7G75)



| Model S7G     |                | LL               | LL3   | LR  | LE | φS | φLB | φGD | LC  | φLA | φMT | MD | Q   | QK  | KD | W   | U   | T   | Mass kg     |             |    |             |
|---------------|----------------|------------------|-------|-----|----|----|-----|-----|-----|-----|-----|----|-----|-----|----|-----|-----|-----|-------------|-------------|----|-------------|
| 5.5 kW Models |                |                  |       |     |    |    |     |     |     |     |     |    |     |     |    |     |     |     |             |             |    |             |
| 200 V         | 55A□ -VL155-03 | 429<br>(473)     | 208   | 97  | 12 | 40 | 120 | 155 | 180 | 140 | M10 | 20 | 82  | 65  | 0  | 12  | 5   | 8   | 37.5 (43.5) |             |    |             |
|               | 55A□ -VL155-05 |                  |       |     |    |    |     |     |     |     |     |    |     |     |    |     |     |     |             |             |    |             |
|               | 55A□ -VL205-10 | 443.5<br>(487.5) | 222.5 | 100 | 15 | 55 | 160 | 205 |     | 184 | M12 | 22 |     |     |    |     | 16  | 6   | 10          | 60.5 (66.5) |    |             |
|               | 55A□ -VL205-25 | 488<br>(532)     |       |     |    |    |     |     |     | 267 |     |    |     |     |    |     |     |     |             |             |    |             |
|               | 55A□ -VL235-50 | 497.5<br>(541.5) | 277   | 126 | 18 | 75 | 180 | 235 |     | 210 | M16 | 28 | 105 | 85  |    |     |     |     | 20          | 7.5         | 12 | 78.5 (84.5) |
| 400 V         | 55A□ -VL155-03 | 429<br>(473)     | 208   | 97  | 12 | 40 | 120 | 155 | 180 | 140 | M10 | 20 | 82  | 65  | 0  | 12  | 5   | 8   | 37.5 (43.5) |             |    |             |
|               | 55D□ -VL155-05 |                  |       |     |    |    |     |     |     |     |     |    |     |     |    |     |     |     |             |             |    |             |
|               | 55D□ -VL205-10 | 443.5<br>(487.5) | 222.5 | 100 | 15 | 55 | 160 | 205 |     | 184 | M12 | 22 |     |     |    |     | 16  | 6   | 10          | 60.5 (66.5) |    |             |
|               | 55D□ -VL205-25 | 488<br>(532)     |       |     |    |    |     |     |     | 267 |     |    |     |     |    |     |     |     |             |             |    |             |
|               | 55D□ -VL235-50 | 497.5<br>(541.5) | 277   | 126 | 18 | 75 | 180 | 235 |     | 210 | M16 | 28 | 105 | 85  |    |     |     |     | 20          | 7.5         | 12 | 78.5 (84.5) |
| 7.5 kW Models |                |                  |       |     |    |    |     |     |     |     |     |    |     |     |    |     |     |     |             |             |    |             |
| 200 V         | 75A□ -VL155-03 | 475<br>(519)     | 208   | 97  | 12 | 40 | 120 | 155 | 180 | 140 | M10 | 20 | 82  | 65  | 0  | 12  | 5   | 8   | 45.5 (51.0) |             |    |             |
|               | 75A□ -VL155-05 |                  |       |     |    |    |     |     |     |     |     |    |     |     |    |     |     |     |             |             |    |             |
|               | 75A□ -VL205-10 | 489.5<br>(533.5) | 222.5 | 100 | 15 | 55 | 160 | 205 |     | 184 | M12 | 22 |     |     |    |     | 16  | 6   | 10          | 68.5 (74.0) |    |             |
|               | 75A□ -VL235-25 | 544<br>(588)     |       |     |    |    |     |     |     | 277 | 126 | 18 | 75  | 180 |    | 235 | 210 | M16 | 28          | 105         | 85 |             |
|               | 75A□ -VL235-50 |                  |       |     |    |    |     |     |     |     |     |    |     |     |    |     |     |     |             |             |    |             |
| 400 V         | 75D□ -VL155-03 | 475<br>(519)     | 208   | 97  | 12 | 40 | 120 | 155 | 180 | 140 | M10 | 20 | 82  | 65  | 0  | 12  | 5   | 8   | 45.5 (51.0) |             |    |             |
|               | 75D□ -VL155-05 |                  |       |     |    |    |     |     |     |     |     |    |     |     |    |     |     |     |             |             |    |             |
|               | 75D□ -VL205-10 | 489.5<br>(533.5) | 222.5 | 100 | 15 | 55 | 160 | 205 |     | 184 | M12 | 22 |     |     |    |     | 16  | 6   | 10          | 68.5 (74.0) |    |             |
|               | 75D□ -VL235-25 | 544<br>(588)     |       |     |    |    |     |     |     | 277 | 126 | 18 | 75  | 180 |    | 235 | 210 | M16 | 28          | 105         | 85 |             |
|               | 75D□ -VL235-50 |                  |       |     |    |    |     |     |     |     |     |    |     |     |    |     |     |     |             |             |    |             |

Note: 1. The values in parentheses are for Servo Motors with Holding Brakes. 7.0kW motors not available with brake.

2. For models that have a batteryless absolute encoder, L is 8 mm greater than the given value. Refer to the following section for the values for individual models:

Dimensions of Gear Motors with Batteryless Encoders (page 179)

## Dimensions of Gear Motors with Batteryless Encoders

### ■ Servo Motors with Gears

| Model S7G      | LL            | Mass kg     |
|----------------|---------------|-------------|
| 05B□ -VL070-03 | 251 (284)     | 4.7 (5.7)   |
| 05B□ -VL070-05 |               |             |
| 05B□ -VL090-10 | 264 (297)     | 6.7 (7.2)   |
| 05B□ -VL090-25 | 286 (319)     | 7.2 (8.2)   |
| 05B□ -VL120-50 | 301.5 (334.5) | 11.9 (12.9) |
| 09B□ -VL090-03 | 267 (303)     | 9.0 (11.0)  |
| 09B□ -VL090-05 |               |             |
| 09B□ -VL090-10 |               |             |
| 09B□ -VL120-25 | 304.5 (340.5) | 14.2 (16.2) |
| 09B□ -VL155-50 | 329.5 (365.5) | 23.5 (25.5) |
| 13B□ -VL090-03 | 295 (331)     | 10.6 (12.5) |
| 13B□ -VL090-05 |               |             |
| 13B□ -VL120-10 | 305 (341)     | 14.9 (16.8) |
| 13B□ -VL120-25 | 332.5 (368.5) | 15.8 (17.7) |
| 13B□ -VL155-50 | 357.5 (393.5) | 25.1 (27.0) |
| 20B□ -VL090-03 | 313 (349)     | 12.1 (14.5) |
| 20B□ -VL090-05 |               |             |
| 20B□ -VL120-10 | 323 (359)     | 16.4 (18.8) |
| 20B□ -VL155-25 | 375.5 (411.5) | 26.6 (29.0) |
| 20B□ -VL205-50 | 405 (441)     | 48.6 (51.0) |
| 30B□ -VL120-03 | 293 (371)     | 21.3 (27.3) |
| 30B□ -VL120-05 |               |             |
| 30B□ -VL155-10 | 305 (383)     | 29.5 (35.5) |
| 30B□ -VL155-25 | 339.5 (417.5) | 31.5 (37.5) |
| 30B□ -VL205-50 | 369 (447)     | 53.5 (59.5) |
| 44B□ -VL120-03 | 347 (395)     | 25.3 (31.3) |
| 44B□ -VL120-05 |               |             |
| 44B□ -VL205-10 | 378.5 (426.5) | 56.5 (62.5) |
| 44B□ -VL205-25 | 423 (471)     | 57.5 (63.5) |
| 44B□ -VL235-50 | 432.5 (480.5) | 74.5 (80.5) |
| 55B□ -VL155-03 | 437 (481)     | 37.5 (43.5) |
| 55B□ -VL155-05 |               |             |
| 55B□ -VL205-10 | 451.5 (495.5) | 60.5 (66.5) |
| 55B□ -VL205-25 | 496 (540)     | 61.5 (67.5) |
| 55B□ -VL235-50 | 505.5 (549.5) | 78.5 (84.5) |
| 75B□ -VL155-03 | 483 (527)     | 45.5 (51.5) |
| 75B□ -VL155-05 |               |             |
| 75B□ -VL205-10 | 497.5 (541.5) | 68.5 (74.0) |
| 75B□ -VL235-25 | 552 (596)     | 86.5 (92)   |
| 75B□ -VL235-50 |               |             |

| Model S7G      | LL            | Mass kg     |
|----------------|---------------|-------------|
| 05E□ -VL070-03 | 251 (284)     | 4.8 (5.8)   |
| 05E□ -VL070-05 |               |             |
| 05E□ -VL090-10 | 264 (297)     | 6.8 (7.8)   |
| 05E□ -VL090-25 | 286 (319)     | 7.3 (8.3)   |
| 05E□ -VL120-50 | 301.5 (334.5) | 12.0 (13.0) |
| 09E□ -VL090-03 | 267 (303)     | 9.1 (11.1)  |
| 09E□ -VL090-05 |               |             |
| 09E□ -VL090-10 |               |             |
| 09E□ -VL120-25 | 304.5 (340.5) | 14.3 (16.3) |
| 09E□ -VL155-50 | 329.5 (365.5) | 23.6 (25.6) |
| 13E□ -VL090-03 | 295 (331)     | 10.7 (12.6) |
| 13E□ -VL090-05 |               |             |
| 13E□ -VL120-10 | 305 (341)     | 15.0 (16.9) |
| 13E□ -VL120-25 | 332.5 (368.5) | 15.9 (17.8) |
| 13E□ -VL155-50 | 357.5 (393.5) | 25.2 (27.1) |
| 20E□ -VL090-03 | 313 (349)     | 12.2 (14.6) |
| 20E□ -VL090-05 |               |             |
| 20E□ -VL120-10 | 323 (359)     | 16.5 (18.9) |
| 20E□ -VL155-25 | 375.5 (411.5) | 26.7 (29.1) |
| 20E□ -VL205-50 | 405 (441)     | 48.7 (51.7) |
| 30E□ -VL120-03 | 293 (371)     | 21.4 (27.4) |
| 30E□ -VL120-05 |               |             |
| 30E□ -VL155-10 | 305 (383)     | 29.6 (35.6) |
| 30E□ -VL155-25 | 339.5 (417.5) | 31.6 (37.6) |
| 30E□ -VL205-50 | 369 (447)     | 53.6 (59.6) |
| 44E□ -VL120-03 | 347 (395)     | 25.8 (31.8) |
| 44E□ -VL120-05 |               |             |
| 44E□ -VL205-10 | 378.5 (426.5) | 57.0 (63.0) |
| 44E□ -VL205-25 | 423 (471)     | 58.0 (64.0) |
| 44E□ -VL235-50 | 432.5 (480.5) | 75.0 (81.0) |
| 55E□ -VL155-03 | 437 (481)     | 38.0 (44.0) |
| 55E□ -VL155-05 |               |             |
| 55E□ -VL205-10 | 451.5 (495.5) | 61.0 (67.0) |
| 55E□ -VL205-25 | 496 (540)     | 62.0 (68.0) |
| 55E□ -VL235-50 | 505.5 (549.5) | 79.0 (85.0) |
| 75E□ -VL155-03 | 483 (527)     | 46.0 (51.5) |
| 75E□ -VL155-05 |               |             |
| 75E□ -VL205-10 | 497.5 (541.5) | 69.0 (74.5) |
| 75E□ -VL235-25 | 552 (596)     | 87.0 (92.5) |
| 75E□ -VL235-50 |               |             |

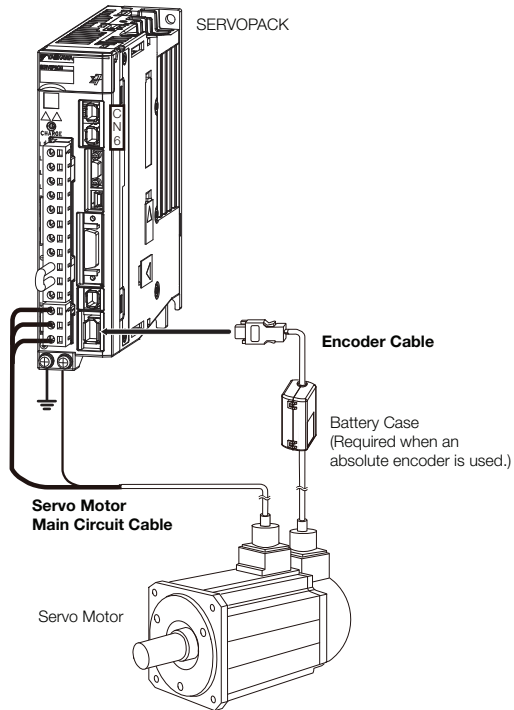
Note: The values in parentheses are for Servo Motors with Holding Brakes

## Selecting Cables

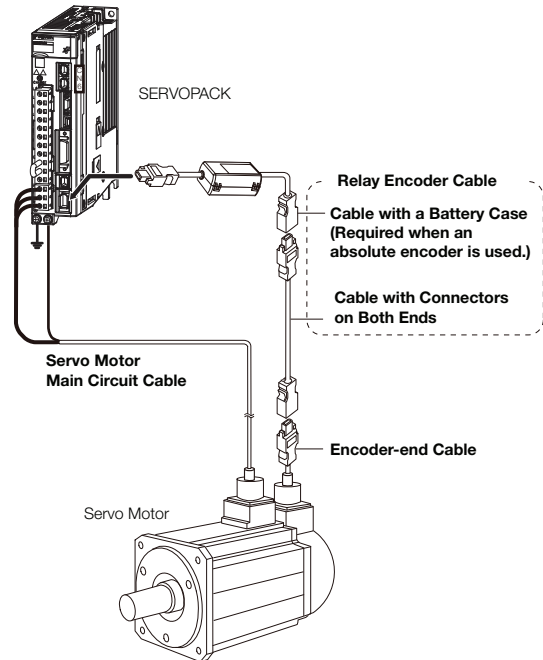
### ◆ Cable Configurations

The cables shown below are required to connect a Servo Motor to a SERVOPACK.

Encoder Cable of 20 m or Less



Encoder Cable of 30 m to 50 m (Relay Cable)



Note: 1. Cables with connectors on both ends that are compliant with an IP67 protective structure and European Safety Standards are not available from Yaskawa for the SGM7G Servo Motors. You must make such a cable yourself. Use the Connectors specified by Yaskawa for these Servo Motors. (These Connectors are compliant with the standards.) Yaskawa does not specify what wiring materials to use.

2. If the cable length exceeds 20 m, be sure to use a Relay Encoder Cable.

3. If you use a Servo Motor Main Circuit Cable that exceeds 20 m, the intermittent duty zone in the torque-motor speed characteristics will become smaller because the voltage drop increases.

4. Refer to the following manual for the following information.

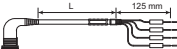
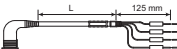
- Cable dimensional drawings and cable connection specifications
- Order numbers and specifications of individual connectors for cables
- Order numbers and specifications for wiring materials

📖 *Σ-7-Series AC Servo Drive Peripheral Device Selection Manual* (Manual No.: SIEP S800001 32)

## Servo Motor Main Circuit Cables (200 V)

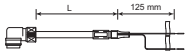
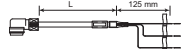
| Servo Motor Model                    | Name                                                | Length (L) | Order Number   |                 |                   | Appearance |
|--------------------------------------|-----------------------------------------------------|------------|----------------|-----------------|-------------------|------------|
|                                      |                                                     |            | Standard Cable | Flexible Cable* | Flexible/Shielded |            |
| SGM7G-03 and -05<br><br>300 W, 450 W | Power Cable for Servo Motors without Holding Brakes | 3 m        | N/A            | JZSP-CVM21-03-E | YEA-CVM21-03(A)-E |            |
|                                      |                                                     | 5 m        | N/A            | JZSP-CVM21-05-E | YEA-CVM21-05(A)-E |            |
|                                      |                                                     | 10 m       | N/A            | JZSP-CVM21-10-E | YEA-CVM21-10(A)-E |            |
|                                      |                                                     | 15 m       | N/A            | JZSP-CVM21-15-E | YEA-CVM21-15(A)-E |            |
|                                      |                                                     | 20 m       | N/A            | JZSP-CVM21-20-E | YEA-CVM21-20(A)-E |            |
|                                      | Power Cable for Servo Motors with Holding Brakes    | 3 m        | N/A            | JZSP-CVM41-03-E | YEA-CVM41-03(A)-E |            |
|                                      |                                                     | 5 m        | N/A            | JZSP-CVM41-05-E | YEA-CVM41-05(A)-E |            |
|                                      |                                                     | 10 m       | N/A            | JZSP-CVM41-10-E | YEA-CVM41-10(A)-E |            |
|                                      |                                                     | 15 m       | N/A            | JZSP-CVM41-15-E | YEA-CVM41-15(A)-E |            |
|                                      |                                                     | 20 m       | N/A            | JZSP-CVM41-20-E | YEA-CVM41-20(A)-E |            |

\* Flexible cables are provided as a standard feature

| Servo Motor Model            | Name           | Length (L) | Order Number   |                |                   | Appearance                                                                            |
|------------------------------|----------------|------------|----------------|----------------|-------------------|---------------------------------------------------------------------------------------|
|                              |                |            | Standard Cable | Flexible Cable | Flexible/Shielded |                                                                                       |
| 200V SGM7G-850 W, 1.3 kW     | Power Cable *1 | 3 m        | B1EV-03(A)-E   | N/A            | B1EP-03(A)-E      |  |
|                              |                | 5 m        | B1EV-05(A)-E   | N/A            | B1EP-05(A)-E      |                                                                                       |
|                              |                | 10 m       | B1EV-10(A)-E   | N/A            | B1EP-10(A)-E      |                                                                                       |
|                              |                | 15 m       | B1EV-15(A)-E   | N/A            | B1EP-15(A)-E      |                                                                                       |
|                              |                | 20 m       | B1EV-20(A)-E   | N/A            | B1EP-20(A)-E      |                                                                                       |
| 200V SGM7G-2.0 kW            |                | 3 m        | B2EV-03(A)-E   | N/A            | B2EP-03(A)-E      |                                                                                       |
|                              |                | 5 m        | B2EV-05(A)-E   | N/A            | B2EP-05(A)-E      |                                                                                       |
|                              |                | 10 m       | B2EV-10(A)-E   | N/A            | B2EP-10(A)-E      |                                                                                       |
|                              |                | 15 m       | B2EV-15(A)-E   | N/A            | B2EP-15(A)-E      |                                                                                       |
|                              |                | 20 m       | B2EV-20(A)-E   | N/A            | B2EP-20(A)-E      |                                                                                       |
| 200V SGM7G-3.0 kW, to 4.4 kW |                | 3 m        | B4EV-03(A)-E   | N/A            | B4EP-03(B)-E      |                                                                                       |
|                              |                | 5 m        | B4EV-05(A)-E   | N/A            | B4EP-05(B)-E      |                                                                                       |
|                              |                | 10 m       | B4EV-10(A)-E   | N/A            | B4EP-10(B)-E      |                                                                                       |
|                              |                | 15 m       | B4EV-15(A)-E   | N/A            | B4EP-15(B)-E      |                                                                                       |
|                              |                | 20 m       | B4EV-20(A)-E   | N/A            | B4EP-20(B)-E      |                                                                                       |
| 200V SGM7G-5.5 kW, to 7.5 kW |                | 3 m        | B6EV-03(A)-E   | N/A            | B6EP-03(A)-E      |                                                                                       |
|                              |                | 5 m        | B6EV-05(A)-E   | N/A            | B6EP-05(A)-E      |                                                                                       |
|                              |                | 10 m       | B6EV-10(A)-E   | N/A            | B6EP-10(A)-E      |                                                                                       |
|                              |                | 15 m       | B6EV-15(A)-E   | N/A            | B6EP-15(A)-E      |                                                                                       |
|                              |                | 20 m       | B6EV-20(A)-E   | N/A            | B6EP-20(A)-E      |                                                                                       |
| 200V SGM7G-11kW, to 15 kW    |                | 3 m        | B7EV-03(A)-E   | N/A            | B7EP-03(A)-E      |  |
|                              |                | 5 m        | B7EV-05(A)-E   | N/A            | B7EP-05(A)-E      |                                                                                       |
|                              |                | 10 m       | B7EV-10(A)-E   | N/A            | B7EP-10(A)-E      |                                                                                       |
|                              |                | 15 m       | B7EV-15(A)-E   | N/A            | B7EP-15(A)-E      |                                                                                       |
|                              |                | 20 m       | B7EV-20(A)-E   | N/A            | B7EP-20(A)-E      |                                                                                       |

## Rotary Servo Motors

### SGM7G

| Servo Motor Model         | Name                | Length (L) | Order Number   |                |                   | Appearance                                                                          |
|---------------------------|---------------------|------------|----------------|----------------|-------------------|-------------------------------------------------------------------------------------|
|                           |                     |            | Standard Cable | Flexible Cable | Flexible/Shielded |                                                                                     |
| 200V SGM7G-850 W to 15 kW | Holding Brake Cable | 3 m        | BBEV-03(A)-E   | N/A            | N/A               |  |
|                           |                     | 5 m        | BBEV-05(A)-E   | N/A            | N/A               |                                                                                     |
|                           |                     | 10 m       | BBEV-10(A)-E   | N/A            | N/A               |                                                                                     |
|                           |                     | 15 m       | BBEV-15(A)-E   | N/A            | N/A               |                                                                                     |
|                           |                     | 20 m       | BBEV-20(A)-E   | N/A            | N/A               |                                                                                     |
|                           |                     | 3 m        | N/A            | N/A            | BBEP-03(A)-E      |  |
|                           |                     | 5 m        | N/A            | N/A            | BBEP-05(A)-E      |                                                                                     |
|                           |                     | 10 m       | N/A            | N/A            | BBEP-10(A)-E      |                                                                                     |
|                           |                     | 15 m       | N/A            | N/A            | BBEP-15(A)-E      |                                                                                     |
|                           |                     | 20 m       | N/A            | N/A            | BBEP-20(A)-E      |                                                                                     |

\*1. Servo Motors with holding brakes require a holding brake cable in addition to a power cable..

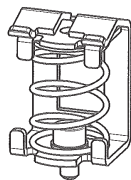
## Servo Motor Main Circuit Cables (400 V Models)

| Servo Motor Model                                                                                 | Name                                                                        | Length<br>(L) | Order Number |                     |                     | Appearance                                                                            |
|---------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------|---------------|--------------|---------------------|---------------------|---------------------------------------------------------------------------------------|
|                                                                                                   |                                                                             |               | Standard     | Flexible            | Flexible/Shielded   |                                                                                       |
| SGM7G-05 to -20<br>0.45 to 1.8kW (400V)<br>SGM7G-05 to -09<br>0.45 to 0.85kW (400V<br>High Speed) | Power<br>Cable with-<br>out Brake.<br><br>Cable<br>installed<br>toward load | 3 m           | N/A          | N/A                 | JZSP-C7M144-03-E-G6 |  |
|                                                                                                   |                                                                             | 5 m           | N/A          | N/A                 | JZSP-C7M144-05-E-G6 |                                                                                       |
|                                                                                                   |                                                                             | 10 m          | N/A          | N/A                 | JZSP-C7M144-10-E-G6 |                                                                                       |
|                                                                                                   |                                                                             | 15 m          | N/A          | N/A                 | JZSP-C7M144-15-E-G6 |                                                                                       |
|                                                                                                   |                                                                             | 20 m          | N/A          | N/A                 | JZSP-C7M144-20-E-G6 |                                                                                       |
| SGM7G-30<br>3.0kW (400V)<br>SGM7G-13 to -20<br>1.3 to 1.8kW (400V<br>High Speed)                  |                                                                             | 3 m           | N/A          | N/A                 | JZSP-C7M154-03-E-G6 |                                                                                       |
|                                                                                                   |                                                                             | 5 m           | N/A          | N/A                 | JZSP-C7M154-05-E-G6 |                                                                                       |
|                                                                                                   |                                                                             | 10 m          | N/A          | N/A                 | JZSP-C7M154-10-E-G6 |                                                                                       |
|                                                                                                   |                                                                             | 15 m          | N/A          | N/A                 | JZSP-C7M154-15-E-G6 |                                                                                       |
|                                                                                                   |                                                                             | 20 m          | N/A          | N/A                 | JZSP-C7M154-20-E-G6 |                                                                                       |
| SGM7G-44<br>4.4kW (400V)<br>SGM7G-30<br>2.9kW (400V High<br>Speed)                                |                                                                             | 3 m           | N/A          | N/A                 | JZSP-C7M164-03-E-G6 |                                                                                       |
|                                                                                                   |                                                                             | 5 m           | N/A          | N/A                 | JZSP-C7M164-05-E-G6 |                                                                                       |
|                                                                                                   |                                                                             | 10 m          | N/A          | N/A                 | JZSP-C7M164-10-E-G6 |                                                                                       |
|                                                                                                   |                                                                             | 15 m          | N/A          | N/A                 | JZSP-C7M164-15-E-G6 |                                                                                       |
|                                                                                                   |                                                                             | 20 m          | N/A          | N/A                 | JZSP-C7M164-20-E-G6 |                                                                                       |
| SGM7G-55 to -75<br>5.5 to 7.5kW (400V)<br>SGM7G-44<br>4.4kW (400V High<br>Speed)                  |                                                                             | 3 m           | N/A          | N/A                 | JZSP-C7M175-03-E-G6 |                                                                                       |
|                                                                                                   |                                                                             | 5 m           | N/A          | N/A                 | JZSP-C7M175-05-E-G6 |                                                                                       |
|                                                                                                   |                                                                             | 10 m          | N/A          | N/A                 | JZSP-C7M175-10-E-G6 |                                                                                       |
|                                                                                                   |                                                                             | 15 m          | N/A          | N/A                 | JZSP-C7M175-15-E-G6 |                                                                                       |
|                                                                                                   |                                                                             | 20 m          | N/A          | N/A                 | JZSP-C7M175-20-E-G6 |                                                                                       |
| SGM7G-1A to -1E<br>11 to 15kW (400V)                                                              |                                                                             | 3 m           | N/A          | N/A                 | JZSP-C7M185-03-E-G6 |                                                                                       |
|                                                                                                   |                                                                             | 5 m           | N/A          | N/A                 | JZSP-C7M185-05-E-G6 |                                                                                       |
|                                                                                                   |                                                                             | 10 m          | N/A          | N/A                 | JZSP-C7M185-10-E-G6 |                                                                                       |
|                                                                                                   |                                                                             | 15 m          | N/A          | N/A                 | JZSP-C7M185-15-E-G6 |                                                                                       |
|                                                                                                   | 20 m                                                                        | N/A           | N/A          | JZSP-C7M185-20-E-G6 |                     |                                                                                       |



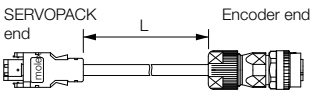
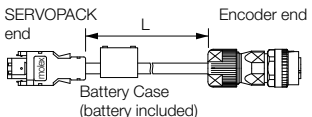
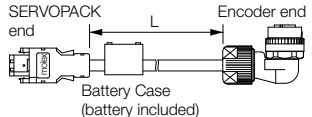
| Servo Motor Model                                                                                 | Name                                                               | Length<br>(L) | Order Number |          |                     | Appearance                                                                          |
|---------------------------------------------------------------------------------------------------|--------------------------------------------------------------------|---------------|--------------|----------|---------------------|-------------------------------------------------------------------------------------|
|                                                                                                   |                                                                    |               | Standard     | Flexible | Flexible/Shielded   |                                                                                     |
| SGM7G-05 to -20<br>0.45 to 1.8kW (400V)<br>SGM7G-05 to -09<br>0.45 to 0.85kW (400V<br>High Speed) | Power<br>Cable with<br>Brake.<br>Cable<br>installed<br>toward load | 3 m           | N/A          | N/A      | JZSP-C7M344-03-E-G6 |  |
|                                                                                                   |                                                                    | 5 m           | N/A          | N/A      | JZSP-C7M344-05-E-G6 |                                                                                     |
|                                                                                                   |                                                                    | 10 m          | N/A          | N/A      | JZSP-C7M344-10-E-G6 |                                                                                     |
|                                                                                                   |                                                                    | 15 m          | N/A          | N/A      | JZSP-C7M344-15-E-G6 |                                                                                     |
|                                                                                                   |                                                                    | 20 m          | N/A          | N/A      | JZSP-C7M344-20-E-G6 |                                                                                     |
| SGM7G-30<br>3.0kW (400V)<br>SGM7G-13 to -20<br>1.3 to 1.8kW (400V<br>High Speed)                  |                                                                    | 3 m           | N/A          | N/A      | JZSP-C7M354-03-E-G6 |                                                                                     |
|                                                                                                   |                                                                    | 5 m           | N/A          | N/A      | JZSP-C7M354-05-E-G6 |                                                                                     |
|                                                                                                   |                                                                    | 10 m          | N/A          | N/A      | JZSP-C7M354-10-E-G6 |                                                                                     |
|                                                                                                   |                                                                    | 15 m          | N/A          | N/A      | JZSP-C7M354-15-E-G6 |                                                                                     |
|                                                                                                   |                                                                    | 20 m          | N/A          | N/A      | JZSP-C7M354-20-E-G6 |                                                                                     |
| SGM7G-44<br>4.4kW (400V)<br>SGM7G-30<br>2.9kW (400V High<br>Speed)                                |                                                                    | 3 m           | N/A          | N/A      | JZSP-C7M364-03-E-G6 |                                                                                     |
|                                                                                                   |                                                                    | 5 m           | N/A          | N/A      | JZSP-C7M364-05-E-G6 |                                                                                     |
|                                                                                                   |                                                                    | 10 m          | N/A          | N/A      | JZSP-C7M364-10-E-G6 |                                                                                     |
|                                                                                                   |                                                                    | 15 m          | N/A          | N/A      | JZSP-C7M364-15-E-G6 |                                                                                     |
|                                                                                                   |                                                                    | 20 m          | N/A          | N/A      | JZSP-C7M364-20-E-G6 |                                                                                     |
| SGM7G-55 to -75<br>5.5 to 7.5kW (400V)<br>SGM7G-44<br>4.4kW (400V High<br>Speed)                  |                                                                    | 3 m           | N/A          | N/A      | JZSP-C7M375-03-E-G6 |                                                                                     |
|                                                                                                   |                                                                    | 5 m           | N/A          | N/A      | JZSP-C7M375-05-E-G6 |                                                                                     |
|                                                                                                   |                                                                    | 10 m          | N/A          | N/A      | JZSP-C7M375-10-E-G6 |                                                                                     |
|                                                                                                   |                                                                    | 15 m          | N/A          | N/A      | JZSP-C7M375-15-E-G6 |                                                                                     |
|                                                                                                   |                                                                    | 20 m          | N/A          | N/A      | JZSP-C7M375-20-E-G6 |                                                                                     |
| SGM7G-1A to -1E<br>11 to 15kW (400V)                                                              |                                                                    | 3 m           | N/A          | N/A      | JZSP-C7M385-03-E-G6 |                                                                                     |
|                                                                                                   |                                                                    | 5 m           | N/A          | N/A      | JZSP-C7M385-05-E-G6 |                                                                                     |
|                                                                                                   |                                                                    | 10 m          | N/A          | N/A      | JZSP-C7M385-10-E-G6 |                                                                                     |
|                                                                                                   |                                                                    | 15 m          | N/A          | N/A      | JZSP-C7M385-15-E-G6 |                                                                                     |
|                                                                                                   |                                                                    | 20 m          | N/A          | N/A      | JZSP-C7M385-20-E-G6 |                                                                                     |

## Servo Motor Connection Shielding Clamp (400 V Models)

| Servo Motor Model                       | Name                            | Order Number    | Appearance                                                                            |
|-----------------------------------------|---------------------------------|-----------------|---------------------------------------------------------------------------------------|
| SGM7G-05 to -30<br>200W to 2.9kW (400V) | Shielding Clamp for Power Cable | KLBUE 4-13.5_SC |  |
| SGM7G-44 to -75<br>4.4 to 7.5kW (400V)  |                                 | KLBUE 10-20_SC  |                                                                                       |
| SGM7G-1A to -1E<br>11 to 15kW (400V)    |                                 | KLBUE 15-32_SC  |                                                                                       |

Note: Reference PN.Sigma-7-03 for the shielding clamp installation and quick start guide.

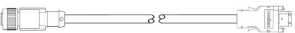
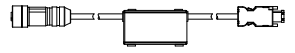
## Encoder Cables of 20 m or Less (200 V)

| Servo Motor Model      | Name                                                                                  | Length (L) | Order Number    |                 | Appearance                                                                           |
|------------------------|---------------------------------------------------------------------------------------|------------|-----------------|-----------------|--------------------------------------------------------------------------------------|
|                        |                                                                                       |            | Standard Cable  | Flexible Cable* |                                                                                      |
| All 200 V SGM7G models | Cables with Connectors on Both Ends (for incremental or batteryless absolute encoder) | 3 m        | JZSP-CVP01-03-E | JZSP-CVP11-03-E |   |
|                        |                                                                                       | 5 m        | JZSP-CVP01-05-E | JZSP-CVP11-05-E |                                                                                      |
|                        |                                                                                       | 10 m       | JZSP-CVP01-10-E | JZSP-CVP11-10-E |                                                                                      |
|                        |                                                                                       | 15 m       | JZSP-CVP01-15-E | JZSP-CVP11-15-E |                                                                                      |
|                        |                                                                                       | 20 m       | JZSP-CVP01-20-E | JZSP-CVP11-20-E |                                                                                      |
|                        |                                                                                       | 3 m        | JZSP-CVP02-03-E | JZSP-CVP12-03-E |   |
|                        |                                                                                       | 5 m        | JZSP-CVP02-05-E | JZSP-CVP12-05-E |                                                                                      |
|                        |                                                                                       | 10 m       | JZSP-CVP02-10-E | JZSP-CVP12-10-E |                                                                                      |
|                        |                                                                                       | 15 m       | JZSP-CVP02-15-E | JZSP-CVP12-15-E |                                                                                      |
|                        |                                                                                       | 20 m       | JZSP-CVP02-20-E | JZSP-CVP12-20-E |                                                                                      |
|                        | Cables with Connectors on Both Ends (for absolute encoder: With Battery Case)         | 3 m        | JZSP-CVP06-03-E | JZSP-CVP26-03-E |   |
|                        |                                                                                       | 5 m        | JZSP-CVP06-05-E | JZSP-CVP26-05-E |                                                                                      |
|                        |                                                                                       | 10 m       | JZSP-CVP06-10-E | JZSP-CVP26-10-E |                                                                                      |
|                        |                                                                                       | 15 m       | JZSP-CVP06-15-E | JZSP-CVP26-15-E |                                                                                      |
|                        |                                                                                       | 20 m       | JZSP-CVP06-20-E | JZSP-CVP26-20-E |                                                                                      |
|                        |                                                                                       | 3 m        | JZSP-CVP07-03-E | JZSP-CVP27-03-E |  |
|                        |                                                                                       | 5 m        | JZSP-CVP07-05-E | JZSP-CVP27-05-E |                                                                                      |
|                        |                                                                                       | 10 m       | JZSP-CVP07-10-E | JZSP-CVP27-10-E |                                                                                      |
|                        |                                                                                       | 15 m       | JZSP-CVP07-15-E | JZSP-CVP27-15-E |                                                                                      |
|                        |                                                                                       | 20 m       | JZSP-CVP07-20-E | JZSP-CVP27-20-E |                                                                                      |

\* Use Flexible Cables for moving parts of machines, such as robots.

NOTE: Shaded items are non-stock items.

## Encoder Cables of 20 m or Less (400V Models)

| Servo Motor Model                 | Name                                                                                                              | Length (L) | Order Number        | Appearance                                                                            |
|-----------------------------------|-------------------------------------------------------------------------------------------------------------------|------------|---------------------|---------------------------------------------------------------------------------------|
| SGM7G-05 to -1E<br>450 W to 15 kW | Flexible cable with connectors on both ends (for incremental or batteryless encoder) straight connector (M12)     | 3 m        | JZSP-C7PI2M-03-E-G6 |  |
|                                   |                                                                                                                   | 5 m        | JZSP-C7PI2M-05-E-G6 |                                                                                       |
|                                   |                                                                                                                   | 10 m       | JZSP-C7PI2M-10-E-G6 |                                                                                       |
|                                   |                                                                                                                   | 15 m       | JZSP-C7PI2M-15-E-G6 |                                                                                       |
|                                   |                                                                                                                   | 20 m       | JZSP-C7PI2M-20-E-G6 |                                                                                       |
|                                   | Flexible cable with connectors on both ends (for incremental or batteryless encoder) right angle connector (M12)  | 3 m        | JZSP-C7PI2N-03-E-G6 |  |
|                                   |                                                                                                                   | 5 m        | JZSP-C7PI2N-05-E-G6 |                                                                                       |
|                                   |                                                                                                                   | 10 m       | JZSP-C7PI2N-10-E-G6 |                                                                                       |
|                                   |                                                                                                                   | 15 m       | JZSP-C7PI2N-15-E-G6 |                                                                                       |
|                                   |                                                                                                                   | 20 m       | JZSP-C7PI2N-20-E-G6 |                                                                                       |
|                                   | Flexible cable with connectors on both ends (for absolute endocoe: with battery case) straight connector (M12)    | 3 m        | JZSP-C7PA2M-03-E-G6 |  |
|                                   |                                                                                                                   | 5 m        | JZSP-C7PA2M-05-E-G6 |                                                                                       |
|                                   |                                                                                                                   | 10 m       | JZSP-C7PA2M-10-E-G6 |                                                                                       |
|                                   |                                                                                                                   | 15 m       | JZSP-C7PA2M-15-E-G6 |                                                                                       |
|                                   |                                                                                                                   | 20 m       | JZSP-C7PA2M-20-E-G6 |                                                                                       |
|                                   | Flexible cable with connectors on both ends (for absolute endocoe: with battery case) right angle connector (M12) | 3 m        | JZSP-C7PA2N-03-E-G6 |  |
|                                   |                                                                                                                   | 5 m        | JZSP-C7PA2N-05-E-G6 |                                                                                       |
|                                   |                                                                                                                   | 10 m       | JZSP-C7PA2N-10-E-G6 |                                                                                       |
|                                   |                                                                                                                   | 15 m       | JZSP-C7PA2N-15-E-G6 |                                                                                       |
|                                   |                                                                                                                   | 20 m       | JZSP-C7PA2N-20-E-G6 |                                                                                       |

## Relay Encoder Cables of 30 m to 50 m (200 V)

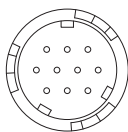
| Servo Motor Model | Name                                                                      | Length (L) | Order Number for Standard Cable | Appearance |
|-------------------|---------------------------------------------------------------------------|------------|---------------------------------|------------|
| All SGM7G models  | Encoder-end Cable (for incremental or absolute encoder)                   | 0.3 m      | JZSP-CVP01-E                    |            |
|                   |                                                                           |            | JZSP-CVP02-E                    |            |
|                   | Cables with Connectors on Both Ends (for incremental or absolute encoder) | 30 m       | JZSP-UCMP00-30-E                |            |
|                   |                                                                           | 40 m       | JZSP-UCMP00-40-E                |            |
|                   |                                                                           | 50 m       | JZSP-UCMP00-50-E                |            |
|                   | Cable with a Battery Case (Required when an absolute encoder is used.)*   | 0.3 m      | JZSP-CSP12-E                    |            |

\* This Cable is not required if you use a servo motor with a batteryless absolute encoder or if you connect a battery to the host controller.

## Connector Specifications (200 V)

### ◆ SGM7G-03A and -05A without Holding Brakes

- Encoder Connector Specifications (24-bit Encoder)



Receptacle: CM10-R10P-D

Applicable plug: Not provided by Yaskawa.

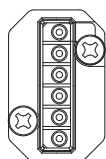
Plug: CM10-AP10S-□-D for Right-angle Plug

CM10-SP10S-□-D for Straight Plug

(□ depends on the applicable cable size.)

Manufacturer: DDK Ltd.

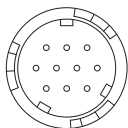
- Servo Motor Connector Specifications



Manufacturer: Japan Aviation Electronics Industry, Ltd.

### ◆ SGM7G-09A to -1EA without Holding Brakes

- Encoder Connector Specifications (24-bit Encoder)



Receptacle: CM10-R10P-D

Applicable plug: Not provided by Yaskawa.

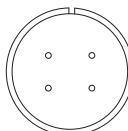
Plug: CM10-AP10S-□-D for Right-angle Plug

CM10-SP10S-□-D for Straight Plug

(□ depends on the applicable cable size.)

Manufacturer: DDK Ltd.

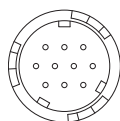
- Servo Motor Connector Specifications



Manufacturer: DDK Ltd.

### ◆ SGM7G-03A and -05A with Holding Brakes

- Encoder Connector Specifications (24-bit Encoder)



Receptacle: CM10-R10P-D

Applicable plug: Not provided by Yaskawa.

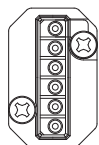
Plug: CM10-AP10S-□-D for Right-angle Plug

CM10-SP10S-□-D for Straight Plug

(□ depends on the applicable cable size.)

Manufacturer: DDK Ltd.

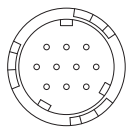
- Servo Motor Connector Specifications



Manufacturer: Japan Aviation Electronics Industry, Ltd.

### ◆ SGM7G-09A to -1EA with Holding Brakes

#### • Encoder Connector Specifications (24-bit Encoder)



Receptacle: CM10-R10P-D

Applicable plug: Not provided by Yaskawa.

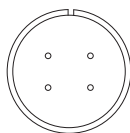
Plug: CM10-AP10S-□-D for Right-angle Plug

CM10-SP10S-□-D for Straight Plug

(□ depends on the applicable cable size.)

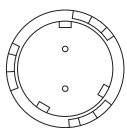
Manufacturer: DDK Ltd.

#### • Servo Motor Connector Specifications



Manufacturer: DDK Ltd.

#### • Brake Connector Specifications



Receptacle: CM10-R2P-D

Applicable plug: Not provided by Yaskawa.

Plug: CM10-AP2S-□-D for Right-angle Plug

CM10-SP2S-□-D for Straight Plug

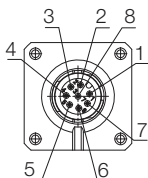
(□ depends on the applicable cable size.)

Manufacturer: DDK Ltd.

## Connector Specifications (400V)

### ◆ SGM7G-05D□ F to -44D□ F and SGM7G-05D□ R to -30D□ R

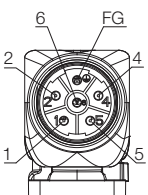
#### Encoder Connector Specifications



Receptacle  
Size: M12  
Part number: 1419959  
Model: SACC-MSQ-M12MS-25-3,2 SCO  
Manufacturer: Phoenix Contact

|         |          |
|---------|----------|
| 1       | PG 5V    |
| 2       | PG 0V    |
| 3       | FG       |
| 4       | BAT (+)  |
| 5       | BAT (-)  |
| 6       | Data (+) |
| 7       | Data (-) |
| 8       | Empty    |
| Housing | Shield   |

#### Servo Motor Connector Specifications

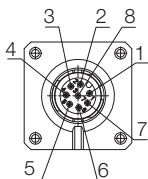


Receptacle  
Size: M23  
Part number: 1617905  
Model: ST-5EP1N8AAD00S  
Manufacturer: Phoenix Contact

|         |         |
|---------|---------|
| 1       | V       |
| 2       | (Brake) |
| 4       | (Brake) |
| 5       | U       |
| 6       | W       |
| FG      | FG      |
| Housing | Shield  |

### ◆ SGM7G-55D□ F to -1ED□ F and SGM7G-44D□ R

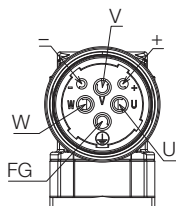
#### Encoder Connector Specifications



Receptacle  
Size: M12  
Part number: 1419959  
Model: SACC-MSQ-M12MS-25-3,2 SCO  
Manufacturer: Phoenix Contact

|         |          |
|---------|----------|
| 1       | PG 5V    |
| 2       | PG 0V    |
| 3       | FG       |
| 4       | BAT (+)  |
| 5       | BAT (-)  |
| 6       | Data (+) |
| 7       | Data (-) |
| 8       | Empty    |
| Housing | Shield   |

#### Servo Motor Connector Specifications



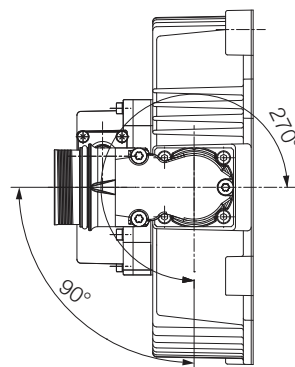
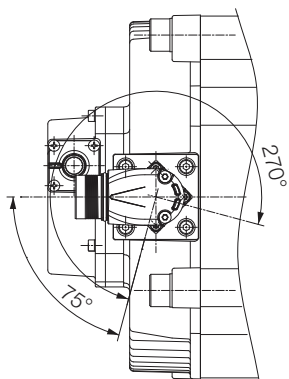
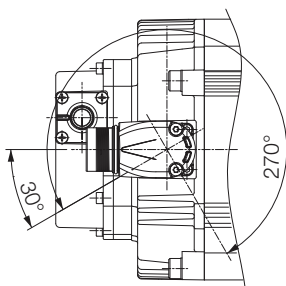
Receptacle  
Size: M40  
Part number: 1607927  
Model: SM-5EPWN8AAD00S  
Manufacturer: Phoenix Contact

|         |         |
|---------|---------|
| U       | U       |
| V       | V       |
| W       | W       |
| +       | (Brake) |
| 7       | (Brake) |
| FG      | FG      |
| Housing | Shield  |

## Servo Motor Connector Rotational Angle (400 V)

SGM7G-05D□□ to -20D□□

SGM7G-30D□□ to -44D□F

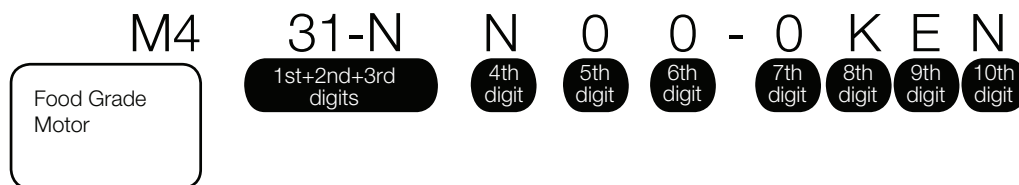
SGM7G-44D□R, -55D□F,  
-75D□F, -1AD□F, -1ED□F

Allowable  
number of  
rotations: 10

## Food Grade

## Food Grade Servo Motors

## Model Designations



## 1st+2nd+3rd digits Winding Options

| Code | Specification      |
|------|--------------------|
| 31-N | 1.4 Nm continuous  |
| 33-M | 3.7 Nm continuous  |
| 43-K | 5.5 Nm continuous  |
| 65-G | 24.8 Nm continuous |

## 4th digit Shaft/Mounting

| Code | Specification |
|------|---------------|
| N    | Standard      |

## 5th digit Finish/Shaft Material

| Code | Specification                                             |
|------|-----------------------------------------------------------|
| 0    | FDA Food Grade white epoxy / stainless steel shaft (17-4) |

## 6th digit Holding Brake

| Code | Specification                      |
|------|------------------------------------|
| 0    | Without brake                      |
| B    | With 24 V brake                    |
| C    | With 24 V brake (65-N models only) |

## 7th digit Winding Voltage

| Code | Specification |
|------|---------------|
| 0    | 200 V         |
| 2    | 400 V         |

## 8th digit Feedback

| Code | Specification     |
|------|-------------------|
| K    | Hiperface encoder |

## 9th digit Optional Sealing

| Code | Specification                       |
|------|-------------------------------------|
| E    | Front-face O-ring groove and O-ring |

## 10th digit Connectors

| Code | Specification                |
|------|------------------------------|
| N    | Intercontec / SpeedTec (M23) |



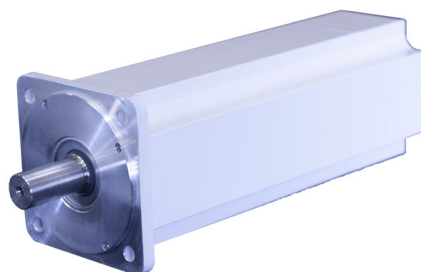
## Food Grade

## Food Grade Servo Motors

Yaskawa has partnered with Elwood Corporation to offer a wide range of food grade servo motors that integrate seamlessly with the Sigma-7 line of SERVOPACKs. These FDA approved white epoxy painted high performance motors are ideal for food packaging equipment. They are capable of withstanding repeated high pressure wash down and they have a smooth housing to minimize entrapment areas.

### Features:

- FDA approved white epoxy coating
- Finless extruded aluminum housing
- IP66 sealing (high pressure wash down)
- UL (cRUus), CE, RoHS
- Stainless steel shaft
- Four frame sizes
- 200V / 400V windings
- 24V holding brake option
- 1.3 to 24Nm of continuous torque



| Yaskawa Motor Model | Yaskawa SERVOPACK Models |                    |                    |                     |
|---------------------|--------------------------|--------------------|--------------------|---------------------|
|                     | MECHATROLINK-III         | EtherCAT           | Sigma-7Siec        | SigmaLogic7 Compact |
| M431-NN00-0KEN      | SGD7S5R5A30AY20002       | SGD7S5R5AA0AY20002 | SGD7S5R5AM0AY20002 | SGD7S5R5AQ0AY20002  |
| M431-NN0B-0KEN      | SGD7S5R5A30AY20003       | SGD7S5R5AA0AY20003 | SGD7S5R5AM0AY20003 | SGD7S5R5AQ0AY20003  |
| M431-NN00-2KEN      | SGD7S3R5D30BY20004       | SGD7S3R5DA0BY20004 | SGD7S3R5DM0BY20004 | SGD7S3R5DQ0BY20004  |
| M431-NN0B-2KEN      | SGD7S3R5D30BY20005       | SGD7S3R5DA0BY20005 | SGD7S3R5DM0BY20005 | SGD7S3R5DQ0BY20005  |
| M433-MN00-0KEN      | SGD7S120A30AY20006       | SGD7S120AA0AY20006 | SGD7S120AM0AY20006 | SGD7S120AQ0AY20006  |
| M433-MN0B-0KEN      | SGD7S180A30AY20007       | SGD7S180AA0AY20007 | SGD7S180AM0AY20007 | SGD7S180AQ0AY20007  |
| M433-MN0B-0KEN      | SGD7S120A30AY20008       | SGD7S120AA0AY20008 | SGD7S120AM0AY20008 | SGD7S120AQ0AY20008  |
| M433-MN0B-0KEN      | SGD7S180A30AY20009       | SGD7S180AA0AY20009 | SGD7S180AM0AY20009 | SGD7S180AQ0AY20009  |
| M433-MN00-2KEN      | SGD7S5R4D30BY20010       | SGD7S5R4DA0BY20010 | SGD7S5R4DM0BY20010 | SGD7S5R4DQ0BY20010  |
| M433-MN0B-2KEN      | SGD7S8R4D30BY20011       | SGD7S8R4DA0BY20011 | SGD7S8R4DM0BY20011 | SGD7S8R4DQ0BY20011  |
| M433-MN0B-2KEN      | SGD7S5R4D30BY20012       | SGD7S5R4DA0BY20012 | SGD7S5R4DM0BY20012 | SGD7S5R4DQ0BY20012  |
| M433-MN0B-2KEN      | SGD7S8R4D30BY20013       | SGD7S8R4DA0BY20013 | SGD7S8R4DM0BY20013 | SGD7S8R4DQ0BY20013  |
| M443-KN00-0KEN      | SGD7S330A30AY20014       | SGD7S330AA0AY20014 | SGD7S330AM0AY20014 | SGD7S330AQ0AY20014  |
| M443-KN0B-0KEN      | SGD7S330A30AY20015       | SGD7S330AA0AY20015 | SGD7S330AM0AY20015 | SGD7S330AQ0AY20015  |
| M443-KN00-2KEN      | SGD7S170D30BY20016       | SGD7S170DA0BY20016 | SGD7S170DM0BY20016 | SGD7S170DQ0BY20016  |
| M443-KN0B-2KEN      | SGD7S170D30BY20017       | SGD7S170DA0BY20017 | SGD7S170DM0BY20017 | SGD7S170DQ0BY20017  |
| M465-GN00-0KEN      | SGD7S470A30AY20018       | SGD7S470AA0AY20018 | SGD7S470AM0AY20018 | SGD7S470AQ0AY20018  |
| M465-GN0C-0KEN      | SGD7S470A30AY20019       | SGD7S470AA0AY20019 | SGD7S470AM0AY20019 | SGD7S470AQ0AY20019  |
| M465-GN00-2KEN      | SGD7S210D30BY20020       | SGD7S210DA0BY20020 | SGD7S210DM0BY20020 | SGD7S210DQ0BY20020  |
| M465-GN0C-2KEN      | SGD7S210D30BY20021       | SGD7S210DA0BY20021 | SGD7S210DM0BY20021 | SGD7S210DQ0BY20021  |

Each of these motors is paired with a unique SERVOPACK as shown in this table. The motors will only function properly when paired with its corresponding SERVOPACK.

## Model Specifications and Ratings

### Specifications (200V)

| Voltage                                             |                |                                     | 200 V <sup>*1</sup>                                              |                  |                  |                  |
|-----------------------------------------------------|----------------|-------------------------------------|------------------------------------------------------------------|------------------|------------------|------------------|
| Model                                               |                |                                     | M431-NN0□ - 0KEN                                                 | M433-MN0□ - 0KEN | M443-KN0□ - 0KEN | M465-GN0□ - 0KEN |
| Continuous Torque <sup>*4, *5</sup>                 | Maximum        | Nm                                  | 1.38                                                             | 3.72             | 5.50             | 24.85            |
|                                                     | at Rated Speed | Nm                                  | 1.03                                                             | 2.29             | 3.75             | 18.5             |
| Peak Torque <sup>*4</sup>                           | Maximum        | Nm                                  | 4.00                                                             | 10.75            | 15.50            | 70.00            |
|                                                     | at Rated Speed | Nm                                  | 3.6                                                              | 9.6              | 13.7             | 56.1             |
| Continuous Current                                  |                | Arms                                | 3.1                                                              | 8.3              | 10.7             | 28.9             |
| Peak Current                                        |                | Arms                                | 9.0                                                              | 23.8             | 30.1             | 81.0             |
| Rated Power                                         |                | kW                                  | 0.6                                                              | 1.2              | 1.8              | 5.8              |
| Rotor Moment of Inertia                             |                | x10 <sup>-4</sup> kg-m <sup>2</sup> | 0.7                                                              | 1.7              | 5.1              | 44.0             |
| Rotor Moment of Inertia (with brake)                |                | x10 <sup>-4</sup> kg-m <sup>2</sup> | 0.87                                                             | 1.8              | 5.3              | 54.0             |
| Motor Shipping Weight                               |                | kg                                  | 3.9                                                              | 5.5              | 8.9              | 23.6             |
| Motor Shipping Weight (with brake)                  |                | kg                                  | 6.7                                                              | 6.7              | 10.1             | 25.9             |
| Friction Torque                                     |                | Nm                                  | 0.06                                                             | 0.06             | 0.15             | 0.56             |
| Rated Speed <sup>*4</sup>                           |                | rpm                                 | 5500                                                             | 2500   5000      | 4500             | 3000             |
| Max Speed <sup>*4</sup>                             |                | rpm                                 | 6200                                                             | 2500   5000      | 5700             | 3700             |
| Number of Poles                                     |                |                                     | 6                                                                | 6                | 6                | 6                |
| Sine Wave KT Torque Constant <sup>*2</sup>          |                | Nm/A                                | 0.45                                                             | 0.45             | 0.5              | 0.9              |
| KE Voltage Constant <sup>*3</sup>                   |                | V/krpm                              | 35.0                                                             | 35.0             | 35.8             | 55.2             |
| Winding Resistance Phase to Phase at 25°C ±5 °C     |                | Ω ± 15%                             | 5.5                                                              | 1.1              | 0.63             | 0.245            |
| Winding Inductance Phase to Phase                   |                | mH                                  | 7.6                                                              | 2.5              | 2.0              | 3.2              |
| Dielectric Rating                                   |                |                                     | Power Leads (R,S,T) to Ground: 1500 VACrms 50/60 Hz for 1 minute |                  |                  |                  |
| Applicable SERVOPACKS                               |                | SGD7S                               | 5R5A                                                             | 120A   180A      | 330A             | 470A             |
| Allowable load to rotor inertia ratio <sup>*6</sup> |                |                                     | 21                                                               | 94   32          | 19               | 7                |
| Heat sink size (aluminum)                           |                | mm                                  | 250 x 250 x 6                                                    |                  |                  | 450 x 450 x 20   |

\*1. Specifications are at 25°C unless otherwise noted

\*2. Peak value of per phase sine wave Amperes

\*3. Peak value of sinusoidal phase to phase Volts

\*4. These values are for operation in combination with a SERVOPACK when the temperature of the armature winding is 20°C

\*5. The continuous torques are the continuous allowable torque values with an aluminum heat sink with the dimensions given in the table

\*6. Exceeding this ratio may result in an overload of the dynamic brake circuit

### Storage and Operating Conditions

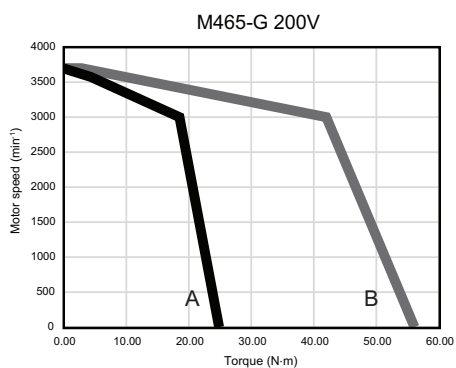
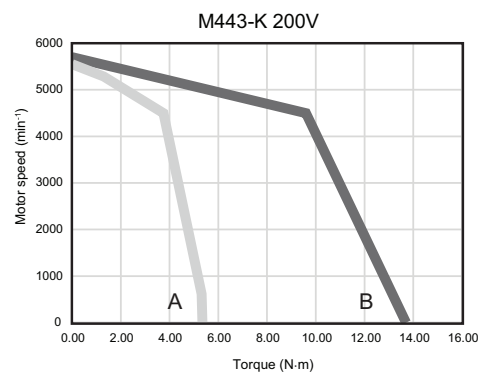
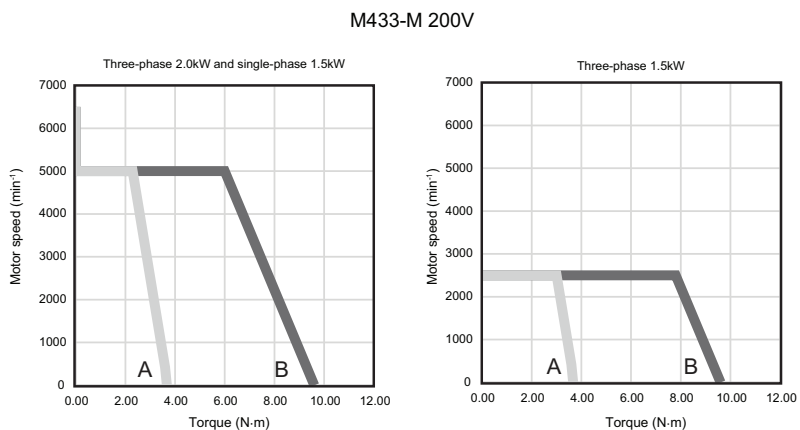
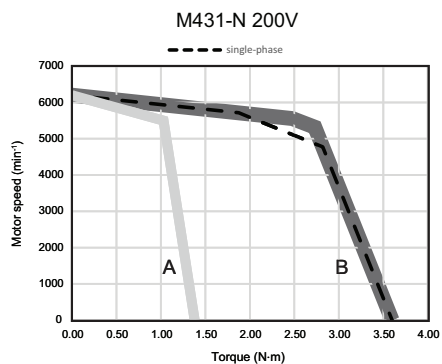
|                     |                             |
|---------------------|-----------------------------|
| Ambient Temperature | Operating: 0 °C to 40 °C    |
|                     | Storage: -30 °C to 70 deg C |
| Relative Humidity   | 5% to 95% non-condensing    |

## Cables

| Power Cables |                                 |                           | Encoder Cables |                                       |
|--------------|---------------------------------|---------------------------|----------------|---------------------------------------|
| Cable Length | Cable Part Number<br>M43x, M44x | Cable Part Number<br>M46x | Cable Length   | Cable Part Number<br>M43x, M44x, M46x |
| 3 m          | 141-W7P010-01                   | 141-W7P010-02             | 3 m            | 141-W7F010-04                         |
| 5 m          | 141-W7P017-01                   | 141-W7P017-02             | 5 m            | 141-W7F017-04                         |
| 10 m         | 141-W7P033-01                   | 141-W7P033-02             | 10 m           | 141-W7F033-04                         |
| 15 m         | 141-W7P050-01                   | 141-W7P050-02             | 15 m           | 141-W7F050-04                         |
| 20 m         | 141-W7P066-01                   | 141-W7P066-02             | 20 m           | 141-W7F066-04                         |

## Speed/Torque Curves

**A** Continuous duty zone    **B** Intermittent duty zone



## Specifications (400V)

| Voltage                                             |                |                                     | 400 V <sup>*1</sup>                                              |                  |                  |                  |
|-----------------------------------------------------|----------------|-------------------------------------|------------------------------------------------------------------|------------------|------------------|------------------|
| Model                                               |                |                                     | M431-NN0□ - 2KEN                                                 | M433-MN0□ - 2KEN | M443-KN0□ - 2KEN | M465-GN0□ - 2KEN |
| Continuous Torque <sup>*4, *5</sup>                 | Maximum        | Nm                                  | 1.38                                                             | 3.72             | 5.52             | 24.00            |
|                                                     | at Rated Speed | Nm                                  | 1.03                                                             | 2.29             | 3.75             | 18.5             |
| Peak Torque <sup>*4</sup>                           | Maximum        | Nm                                  | 4.00                                                             | 10.75            | 15.50            | 70.00            |
|                                                     | at Rated Speed | Nm                                  | 3.6                                                              | 9.6              | 13.5             | 55.7             |
| Continuous Current                                  |                | Arms                                | 1.6                                                              | 4.3              | 5.4              | 14.0             |
| Peak Current                                        |                | Arms                                | 4.5                                                              | 12.4             | 15.1             | 40.8             |
| Rated Power                                         |                | kW                                  | 0.6                                                              | 1.2              | 1.7              | 5.8              |
| Rotor Moment of Inertia                             |                | x10 <sup>-4</sup> kg-m <sup>2</sup> | 0.7                                                              | 1.7              | 5.1              | 44.0             |
| Rotor Moment of Inertia (with brake)                |                | x10 <sup>-4</sup> kg-m <sup>2</sup> | 0.87                                                             | 1.8              | 5.25             | 54.0             |
| Motor Shipping Weight                               |                | kg                                  | 3.9                                                              | 5.5              | 8.9              | 23.6             |
| Motor Shipping Weight (with brake)                  |                | kg                                  | 6.7                                                              | 6.7              | 10.1             | 25.9             |
| Friction Torque                                     |                | Nm                                  | 0.06                                                             | 0.06             | 0.15             | 0.56             |
| Rated Speed <sup>*4</sup>                           |                | rpm                                 | 5500                                                             | 3500 5000        | 4500             | 3000             |
| Max Speed <sup>*4</sup>                             |                | rpm                                 | 6500                                                             | 3500 6500        | 5700             | 3700             |
| Number of Poles                                     |                |                                     | 6                                                                | 6                | 6                | 6                |
| Sine Wave KT Torque Constant <sup>*2</sup>          |                | Nm/A                                | 0.89                                                             | 0.86             | 1.0              | 1.6              |
| KE Voltage Constant <sup>*3</sup>                   |                | V/krpm                              | 68.0                                                             | 69.0             | 71.6             | 110.4            |
| Winding Resistance Phase to Phase at 25°C ±5°C      |                | Ω ± 15%                             | 27.2                                                             | 4.68             | 2.7              | 0.99             |
| Winding Inductance Phase to Phase                   |                | mH                                  | 30.4                                                             | 13.6             | 8.0              | 13.0             |
| Dielectric Rating                                   |                |                                     | Power Leads (R,S,T) to Ground: 1500 VACrms 50/60 Hz for 1 minute |                  |                  |                  |
| Applicable SERVOPACKS                               |                | SGD7S                               | 3R5D                                                             | 5R4D12 0A        | 8R4D             | 170D             |
| Allowable load to rotor inertia ratio <sup>*6</sup> |                |                                     | 23                                                               | 47               | 31               | 19               |
| Heat sink size (aluminum)                           |                | mm                                  | 250 x 250 x 6                                                    |                  |                  | 450 x 450 x 20   |

\*1. Specifications are at 25 deg C unless otherwise noted

\*2. Peak value of per phase sine wave Amperes

\*3. Peak value of sinusoidal phase to phase Volts

\*4. These values are for operation in combination with a SERVOPACK when the temperature of the armature winding is 20°C

\*5. The continuous torques are the continuous allowable torque values with an aluminum heat sink with the dimensions given in the table

\*6. Exceeding this ration may result in an overload of the dynamic brake circuit

## Storage and Operating Conditions

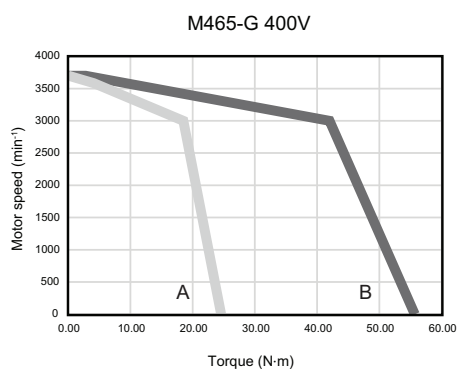
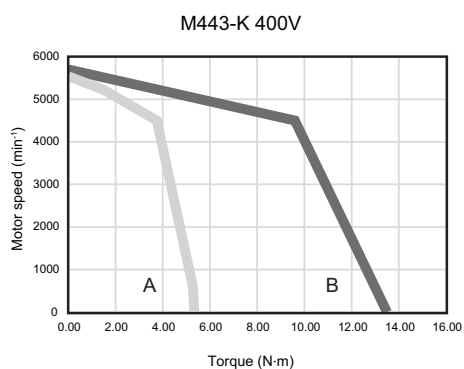
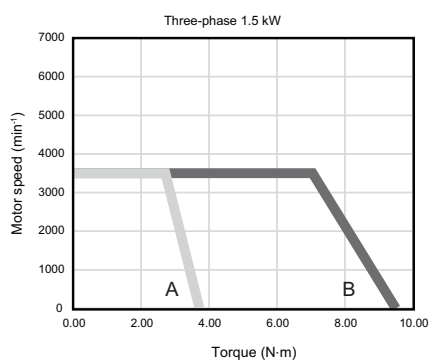
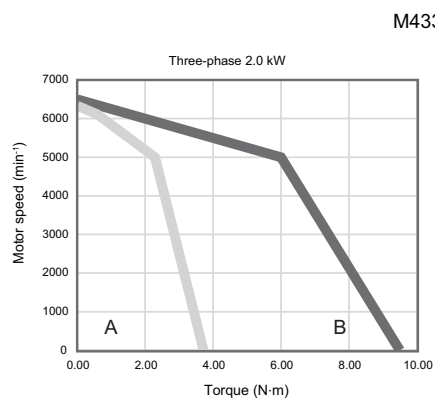
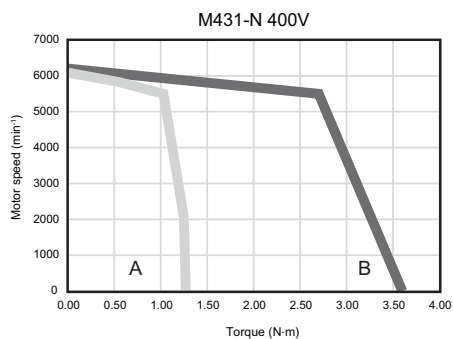
|                     |                             |
|---------------------|-----------------------------|
| Ambient Temperature | Operating: 0 °C to 40 °C    |
|                     | Storage: -30 °C to 70 deg C |
| Relative Humidity   | 5% to 95% non-condensing    |

## Cables

| Power Cables |                                 |                           | Encoder Cables |                                       |
|--------------|---------------------------------|---------------------------|----------------|---------------------------------------|
| Cable Length | Cable Part Number<br>M43x, M44x | Cable Part Number<br>M46x | Cable Length   | Cable Part Number<br>M43x, M44x, M46x |
| 3 m          | 141-W7P010-01                   | 141-W7P010-02             | Cable Length   | 141-W7F010-04                         |
| 5 m          | 141-W7P017-01                   | 141-W7P017-02             | Cable Length   | 141-W7F017-04                         |
| 10 m         | 141-W7P033-01                   | 141-W7P033-02             | Cable Length   | 141-W7F033-04                         |
| 15 m         | 141-W7P050-01                   | 141-W7P050-02             | Cable Length   | 141-W7F050-04                         |
| 20 m         | 141-W7P066-01                   | 141-W7P066-02             | Cable Length   | 141-W7F066-04                         |

## Speed/Torque Curves

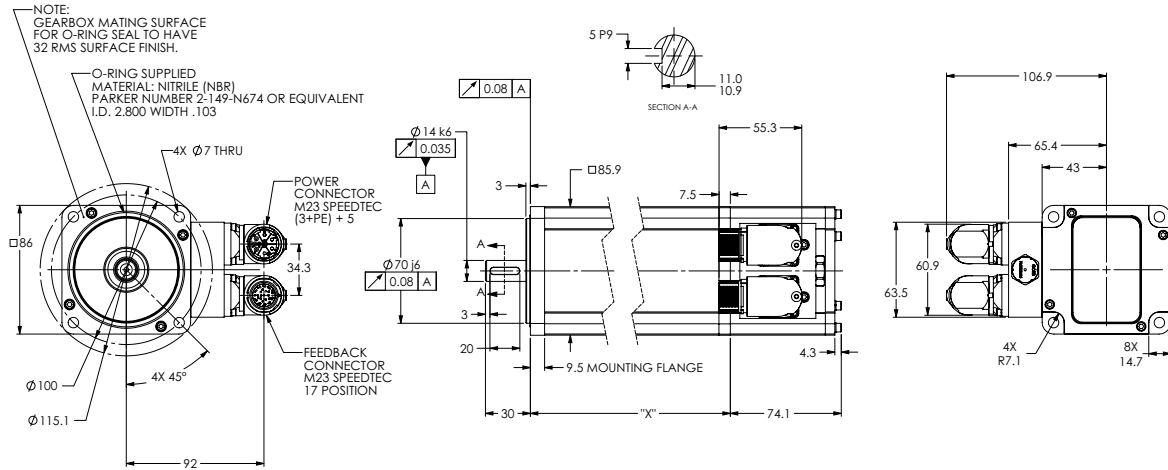
**A** Continuous duty zone    **B** Intermittent duty zone



## External Dimensions

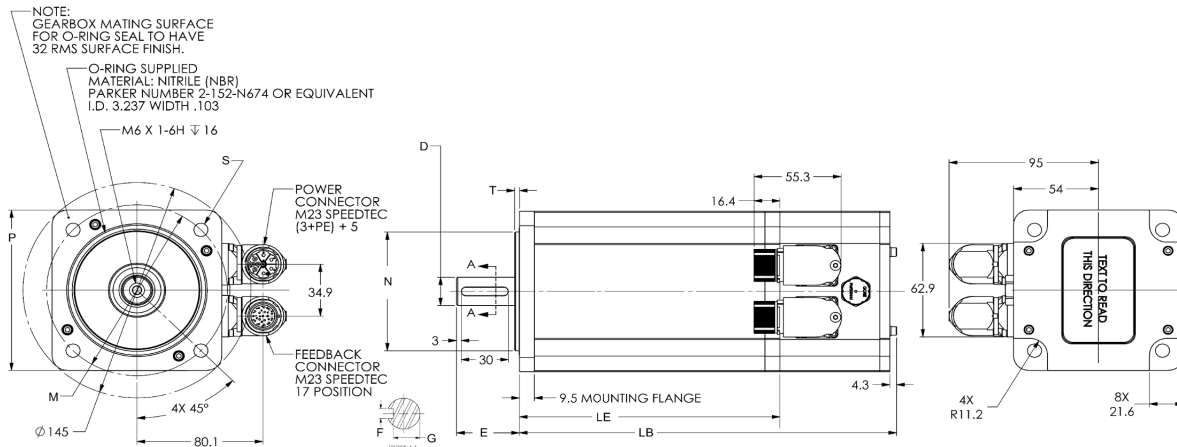
### Food Grade Motors

#### ◆ Model M431 and M433



| Data        | Units | M431 Model |       | M433 Model |       |
|-------------|-------|------------|-------|------------|-------|
|             |       | No Brake   | Brake | No Brake   | Brake |
| X Dimension | mm    | 137.4      | 198.8 | 213.6      | 275   |

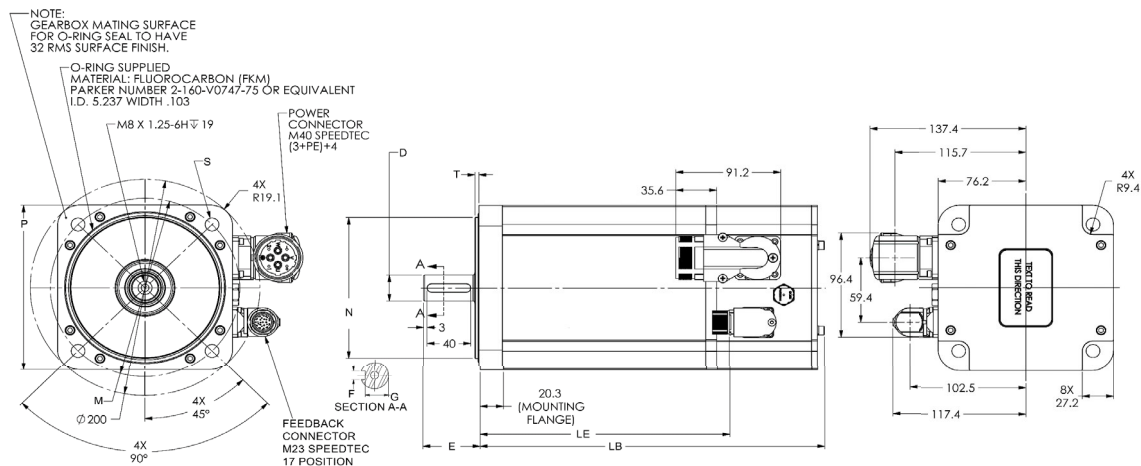
#### ◆ Model M443



| Model          | Shaft Dia. | Shaft Ext. | Keyway | Keyway Depth | Mounting Bolt Circle | Pilot Dia. | Flange (Sq) | Mounting Hole | Overall Length | Length to Lead Exit | Pilot Height |
|----------------|------------|------------|--------|--------------|----------------------|------------|-------------|---------------|----------------|---------------------|--------------|
|                | ØD         | E          | F      | G            | ØM                   | ØN         | P           | ØS            | LB             | LE                  | T            |
| M443-KN00-0KEN | 19 k6      | 40         | 6x30   | 15.5         | 115                  | 80 j6      | 109         | 9             | 302.2          | 228.1               | 3.0          |
| M443-KN00-2KEN | 19 k6      | 40         | 6x30   | 15.5         | 115                  | 80 j6      | 109         | 9             | 302.2          | 228.1               | 3.0          |
| M443-KN0B-0KEN | 19 k6      | 40         | 6x30   | 15.5         | 115                  | 80 j6      | 109         | 9             | 357.6          | 283.5               | 3.0          |
| M443-KN0B-2KEN | 19 k6      | 40         | 6x30   | 15.5         | 115                  | 80 j6      | 109         | 9             | 357.6          | 283.5               | 3.0          |

All dimensions in mm.

# ◆ Model M465



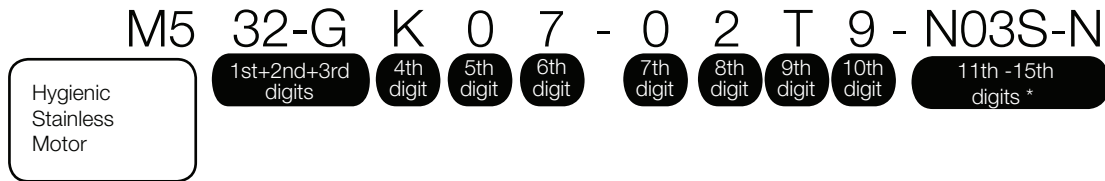
| Model          | Shaft Dia. | Shaft Ext. | Keyway | Keyway Depth | Mounting Bolt Circle | Pilot Dia. | Flange (Sq) | Mounting Hole | Overall Length | Length to Lead Exit | Pilot Height |
|----------------|------------|------------|--------|--------------|----------------------|------------|-------------|---------------|----------------|---------------------|--------------|
|                | ØD         | E          | F      | G            | ØM                   | ØN         | P           | ØS            | LB             | LE                  | T            |
| M465-GN00-0KEN | 24 k6      | 50         | 8x40   | 20           | 165                  | 130        | 152         | 12            | 424.5          | 334.5               | 3.5          |
| M465-GN0C-2KEN | 24 k6      | 50         | 8x40   | 20           | 165                  | 130        | 152         | 12            | 424.5          | 334.5               | 3.5          |
| M465-GN00-0KEN | 24 k6      | 50         | 8x40   | 20           | 165                  | 130        | 152         | 12            | 468.9          | 378.9               | 3.5          |
| M465-GN0C-2KEN | 24 k6      | 50         | 8x40   | 20           | 165                  | 130        | 152         | 12            | 468.9          | 378.9               | 3.5          |

All dimensions in mm.

## Hygienic Stainless

## Hygienic Stainless Servo Motors

## Model Designations



## 1st+2nd+3rd digits   Winding Options

| Code | Specification     |
|------|-------------------|
| 32-G | 2.4 Nm continuous |
| 42-G | 3.2 Nm continuous |

## 6th digit   Exterior Finish/Shaft Material

| Code | Specification                                    |
|------|--------------------------------------------------|
| 7    | 316/316L stainless (RA < 0.8) / 17-4PH Stainless |

## 9th digit   Feedback

| Code | Specification     |
|------|-------------------|
| T    | Hiperface encoder |

## 4th digit   Shaft/Mounting

| Code | Specification |
|------|---------------|
| K    | Standard      |

## 7th digit   Holding Brake

| Code | Specification   |
|------|-----------------|
| 0    | Without brake   |
| 1    | With 24 V brake |

## 10th digit   Sealing

| Code | Specification                               |
|------|---------------------------------------------|
| 9    | Strain relief high pressure (IP66 and IP69) |

## 5th digit   Shaft Seal

| Code | Specification   |
|------|-----------------|
| 0    | Hygienic (PTFE) |

## 8th digit   Winding Voltage

| Code | Specification |
|------|---------------|
| 2    | 200 V         |
| 4    | 400 V         |

## 11th - 15th digits   Other Standard Options \*

| Code | Specification          |
|------|------------------------|
| N    | No air purge           |
| 03   | No air purge           |
| S    | Laser stain (hygienic) |
| N    | SpeedTec connectors    |

\* The -N03S-N suffix in on the motor nameplate but is not included in the ordering number. Hygienic stainless servo motors are equipped with 3m power and encoder cables that are terminated with cylindrical IP69 SpeedTec connectors.



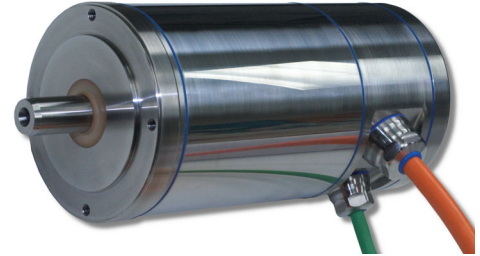
## Hygienic Stainless

### Hygienic Stainless Servo Motors

Yaskawa has partnered with Elwood Corporation to offer a wide range of hygienic stainless servo motors that integrate seamlessly with the Sigma-7 line of SERVOPACKs. These all stainless steel motors are designed for demanding wash down environments and are ideal for application in food and beverage processing equipment. They adhere to the EHEDG hygienic standard.

#### Features:

- 316/316L stainless steel housing, max corrosion resistance
- Smooth finish with no sharp inside corners
- IP66 for continuous flood while in operation and complete protection from dust
- IP69/IP69k for high pressure, high temperature while not in operation
- EHEDG, UL (cRUus), CE, RoHS
- Stainless steel shaft
- Two frame sizes
- 200V / 400V windings
- 24V holding brake option
- 2.4 to 3.2Nm of continuous torque



| Yaskawa Motor Model | Yaskawa SERVOPACK Models |                    |                    |                     |
|---------------------|--------------------------|--------------------|--------------------|---------------------|
|                     | MECHATROLINK-III         | EtherCAT           | Sigma-7Siec        | SigmaLogic7 Compact |
| M532-GK07-02T9      | SGD7S5R5A30AY20022       | SGD7S5R5AA0AY20022 | SGD7S5R5AM0AY20022 | SGD7S5R5AQ0AY20022  |
| M532-GK07-04T9      | SGD7S5R4D30BY20023       | SGD7S5R4DA0BY20023 | SGD7S5R4DM0BY20023 | SGD7S5R4DQ0BY20023  |
| M532-GK07-12T9      | SGD7S5R5A30AY20024       | SGD7S5R5AA0AY20024 | SGD7S5R5AM0AY20024 | SGD7S5R5AQ0AY20024  |
| M532-GK07-14T9      | SGD7S5R4D30BY20025       | SGD7S5R4DA0BY20025 | SGD7S5R4DM0BY20025 | SGD7S5R4DQ0BY20025  |
| M542-GK07-02T9      | SGD7S7R6A30AY20026       | SGD7S7R6AA0AY20026 | SGD7S7R6AM0AY20026 | SGD7S7R6AQ0AY20026  |
| M542-GK07-04T9      | SGD7S3R5D30BY20027       | SGD7S3R5DA0BY20027 | SGD7S3R5DM0BY20027 | SGD7S3R5DQ0BY20027  |
| M542-GK07-12T9      | SGD7S7R6A30AY20028       | SGD7S7R6AA0AY20028 | SGD7S7R6AM0AY20028 | SGD7S7R6AQ0AY20028  |
| M542-GK07-14T9      | SGD7S3R5D30BY20029       | SGD7S3R5DA0BY20029 | SGD7S3R5DM0BY20029 | SGD7S3R5DQ0BY20029  |

Each of these motors is paired with a unique SERVOPACK as shown in this table. The motors will only function properly when paired with its corresponding SERVOPACK.

## Model Specifications and Ratings

### Specifications (200V)

| Voltage                                              |                |                                    | 200 V *1                                                         |                 |
|------------------------------------------------------|----------------|------------------------------------|------------------------------------------------------------------|-----------------|
| Model                                                |                |                                    | M532-GK07-□ 2K9                                                  | M542-GK07-□ 2K9 |
| Continuous Torque *4, *5                             | Maximum        | Nm                                 | 2.4                                                              | 3.2             |
|                                                      | at Rated Speed | Nm                                 | 1.86                                                             | 2.75            |
| Peak Torque *4                                       | Maximum        | Nm                                 | 7.2                                                              | 8.8             |
|                                                      | at Rated Speed | Nm                                 | 6.41                                                             | 8.8             |
| Continuous Current                                   |                | Arms                               | 5.5                                                              | 4.2             |
| Peak Current                                         |                | Arms                               | 15.3                                                             | 12.4            |
| Rated Power                                          |                | kW                                 | 0.60                                                             | 0.91            |
| Rotor Moment of Inertia                              |                | $\times 10^{-4}$ kg-m <sup>2</sup> | 1.16                                                             | 2.62            |
| Rotor Moment of Inertia (with brake)                 |                | $\times 10^{-4}$ kg-m <sup>2</sup> | 1.24                                                             | 2.80            |
| Motor Shipping Weight                                |                | kg                                 |                                                                  |                 |
| Motor Shipping Weight (with brake)                   |                | kg                                 |                                                                  |                 |
| Friction Torque                                      |                | Nm                                 |                                                                  |                 |
| Rated Speed*4                                        |                | rpm                                | 3000                                                             | 3000            |
| Max Speed*4                                          |                | rpm                                | 6000                                                             | 4000            |
| Number of Poles                                      |                |                                    | 10                                                               | 10              |
| Sine Wave KT Torque Constant *2                      |                | Nm/A                               | 0.43                                                             | 0.79            |
| KE Voltage Constant *3                               |                | V/krpm                             | 30                                                               | 52              |
| Winding Resistance Phase to Phase at 25°C $\pm 5$ °C |                | $\Omega \pm 15\%$                  | 0.88                                                             | 1.80            |
| Winding Inductance Phase to Phase                    |                | mH                                 | 5.8                                                              | 9.1             |
| Dielectric Rating                                    |                |                                    | Power Leads (R,S,T) to Ground: 1500 VACrms 50/60 Hz for 1 minute |                 |
| Applicable SERVOPACKS                                |                | SGD7S                              | 5R5A                                                             | 7R6A            |
| Allowable load to rotor inertia ratio*6              |                |                                    | 15                                                               | 15              |
| Heat sink size (aluminum)                            |                | mm                                 | 250 x 250 x 6                                                    |                 |

\*1. Specifications are at 25°C unless otherwise noted

\*2. Peak value of per phase sine wave Amperes

\*3. Peak value of sinusoidal phase to phase Volts

\*4. These values are for operation in combination with a SERVOPACK when the temperature of the armature winding is 20°C

\*5. The continuous torques are the continuous allowable torque values with an aluminum heat sink with the dimensions given in the table

\*6. Exceeding this ratio may result in an overload of the dynamic brake circuit

### Storage and Operating Conditions

|                     |                             |
|---------------------|-----------------------------|
| Ambient Temperature | Operating: 0 °C to 40 °C    |
|                     | Storage: -30 °C to 70 deg C |
| Relative Humidity   | 5% to 95% non-condensing    |

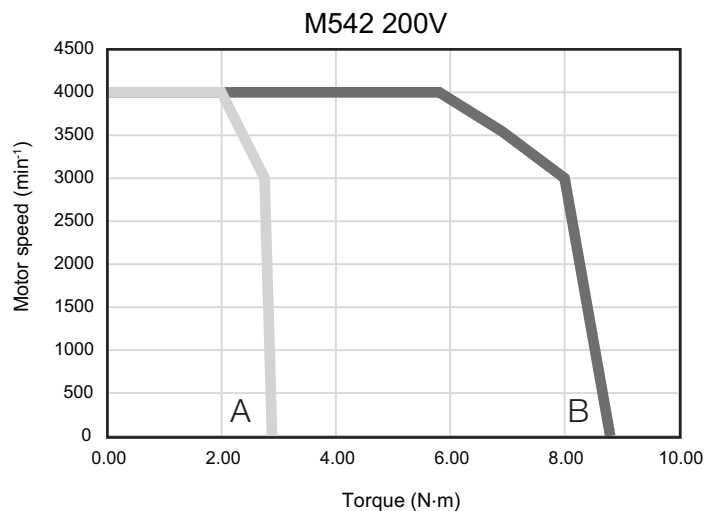
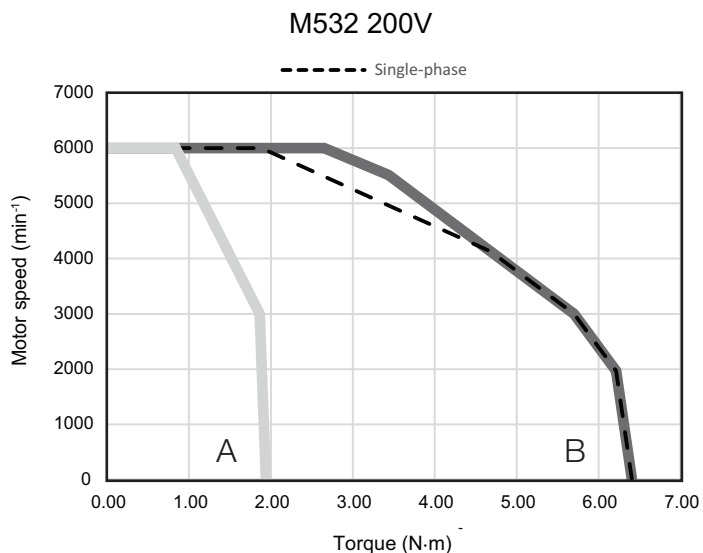
## Cables

| Power Cables |                                 | Encoder Cables |                                 |
|--------------|---------------------------------|----------------|---------------------------------|
| Cable Length | Cable Part Number<br>M53x, M54x | Cable Length   | Cable Part Number<br>M53x, M45x |
| 3 m          | 141-W7P010-01                   | 3 m            | 141-W7F010-04                   |
| 5 m          | 141-W7P017-01                   | 5 m            | 141-W7F017-04                   |
| 10 m         | 141-W7P033-01                   | 10 m           | 141-W7F033-04                   |
| 15 m         | 141-W7P050-01                   | 15 m           | 141-W7F050-04                   |
| 20 m         | 141-W7P066-01                   | 20 m           | 141-W7F066-04                   |

NOTE: These are extension cables. The motor side of these cables connect to the 3m power and encoder cables that are built into the motor. The SERVOPACK side of these connectors have connectors that directly interface with Sigma-7 SERVOPACKs.

## Speed/Torque Curves

**A** Continuous duty zone    **B** Intermittent duty zone



## Specifications (400V)

| Voltage                                             |                |                                     | 400 V <sup>*1</sup>                                              |                 |
|-----------------------------------------------------|----------------|-------------------------------------|------------------------------------------------------------------|-----------------|
| Model                                               |                |                                     | M532-GK07-□ 4K9                                                  | M542-GK07-□ 4K9 |
| Continuous Torque <sup>*4, *5</sup>                 | Maximum        | Nm                                  | 2.4                                                              | 3.2             |
|                                                     | at Rated Speed | Nm                                  | 1.9                                                              | 2.58            |
| Peak Torque <sup>*4</sup>                           | Maximum        | Nm                                  | 7.2                                                              | 8.8             |
|                                                     | at Rated Speed | Nm                                  | 6.63                                                             | 8.8             |
| Continuous Current                                  |                | Arms                                | 3.3                                                              | 2.4             |
| Peak Current                                        |                | Arms                                | 9.5                                                              | 7.2             |
| Rated Power                                         |                | kW                                  | 0.60                                                             | 0.84            |
| Rotor Moment of Inertia                             |                | x10 <sup>-4</sup> kg-m <sup>2</sup> | 1.16                                                             | 2.62            |
| Rotor Moment of Inertia (with brake)                |                | x10 <sup>-4</sup> kg-m <sup>2</sup> | 1.24                                                             | 2.80            |
| Motor Shipping Weight                               |                | kg                                  |                                                                  |                 |
| Motor Shipping Weight (with brake)                  |                | kg                                  |                                                                  |                 |
| Friction Torque                                     |                | Nm                                  |                                                                  |                 |
| Rated Speed <sup>*4</sup>                           |                | rpm                                 | 3000                                                             | 3000            |
| Max Speed <sup>*4</sup>                             |                | rpm                                 | 6000                                                             | 4000            |
| Number of Poles                                     |                |                                     | 10                                                               | 10              |
| Sine Wave KT Torque Constant <sup>*2</sup>          |                | Nm/A                                | 0.71                                                             | 1.35            |
| KE Voltage Constant <sup>*3</sup>                   |                | V/krpm                              | 50                                                               | 96              |
| Winding Resistance Phase to Phase at 25°C ±5 °C     |                | Ω ± 15%                             | 2.57                                                             | 5.18            |
| Winding Inductance Phase to Phase                   |                | mH                                  | 17.4                                                             | 24.4            |
| Dielectric Rating                                   |                |                                     | Power Leads (R,S,T) to Ground: 1500 VACrms 50/60 Hz for 1 minute |                 |
| Applicable SERVOPACKS                               |                | SGD7S                               | 5R4D                                                             | 7R6A            |
| Allowable load to rotor inertia ratio <sup>*6</sup> |                |                                     | 23                                                               | 19              |
| Heat sink size (aluminum)                           |                | mm                                  | 250 x 250 x 6                                                    |                 |

\*1. Specifications are at 25 deg C unless otherwise noted

\*2. Peak value of per phase sine wave Amperes

\*3. Peak value of sinusoidal phase to phase Volts

\*4. These values are for operation in combination with a SERVOPACK when the temperature of the armature winding is 20°C

\*5. The continuous torques are the continuous allowable torque values with an aluminum heat sink with the dimensions given in the table

\*6. Exceeding this ratio may result in an overload of the dynamic brake circuit

## Storage and Operating Conditions

|                     |                             |
|---------------------|-----------------------------|
| Ambient Temperature | Operating: 0 °C to 40 °C    |
|                     | Storage: -30 °C to 70 deg C |
| Relative Humidity   | 5% to 95% non-condensing    |

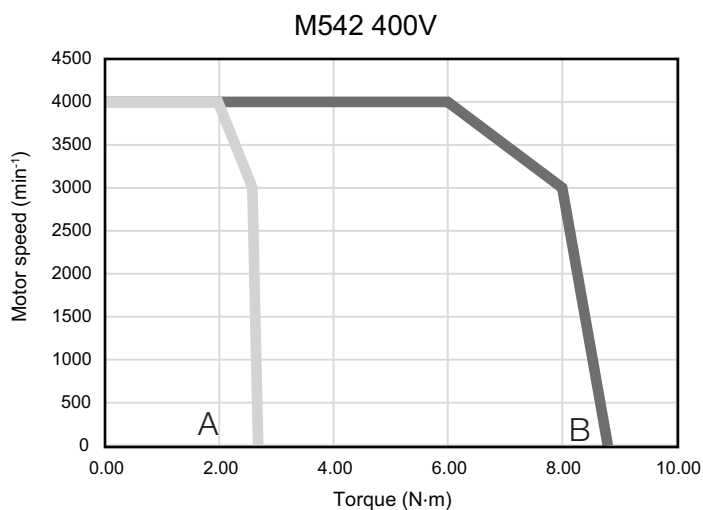
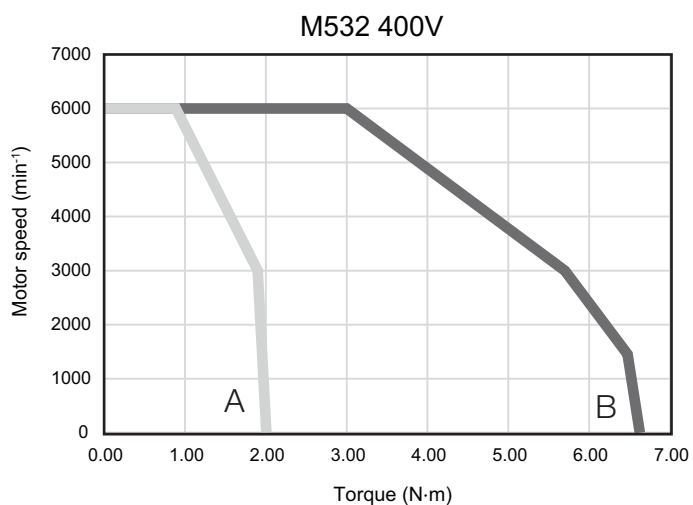
## Cables

| Power Cables |                                 | Encoder Cables |                                 |
|--------------|---------------------------------|----------------|---------------------------------|
| Cable Length | Cable Part Number<br>M53x, M54x | Cable Length   | Cable Part Number<br>M53x, M45x |
| 3 m          | 141-W7P010-01                   | 3 m            | 141-W7F010-01                   |
| 5 m          | 141-W7P017-01                   | 5 m            | 141-W7F017-01                   |
| 10 m         | 141-W7P033-01                   | 10 m           | 141-W7F033-01                   |
| 15 m         | 141-W7P050-01                   | 15 m           | 141-W7F050-01                   |
| 20 m         | 141-W7P066-01                   | 20 m           | 141-W7F066-01                   |

NOTE: These are extension cables. The motor side of these cables connect to the 3m power and encoder cables that are built into the motor. The SERVOPACK side of these connectors have connectors that directly interface with Sigma-7 SERVOPACKs.

## Speed/Torque Curves

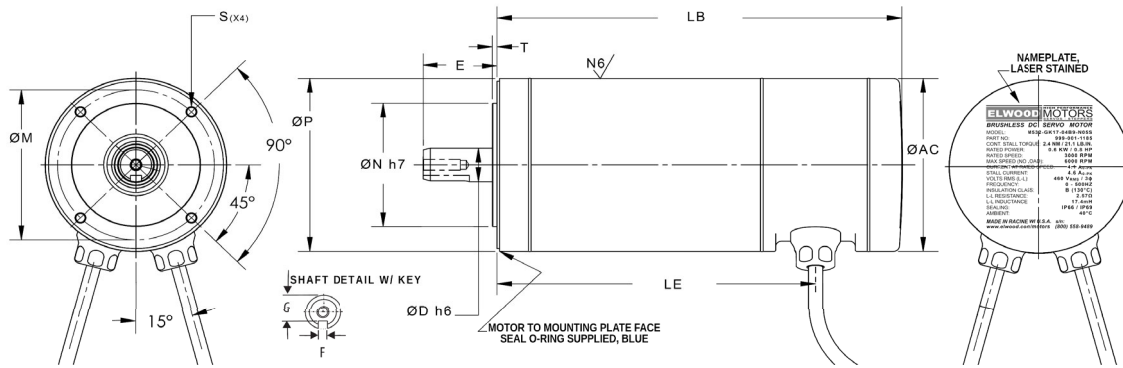
**A** Continuous duty zone    **B** Intermittent duty zone



## External Dimensions

### Hygienic Motors

#### ◆ M532 and M542 Models



Note: Hygienic stainless servo motors are equipped with 3m power and encoder cables that are terminated with cylindrical IP69 SpeedTec connectors

| Model          | Shaft Dia. | Shaft Ext. | Keyway | Keyway Depth | Mounting Bolt Circle | Pilot Dia. |
|----------------|------------|------------|--------|--------------|----------------------|------------|
|                | ØD         | E          | F      | G            | ØM                   | ØN         |
| M532-GK07-02K9 | 19 h6      | 40         | 6x6x25 | 15.5         | 85                   | 70 h7      |
| M532-GK07-12K9 | 19 h6      | 40         | 6x6x25 | 15.5         | 85                   | 70 h7      |
| M532-GK07-04K9 | 19 h6      | 40         | 6x6x25 | 15.5         | 85                   | 70 h7      |
| M532-GK07-14K9 | 19 h6      | 40         | 6x6x25 | 15.5         | 85                   | 70 h7      |
| M542-GK07-02K9 | 19 h6      | 40         | 6x6x25 | 15.5         | 100                  | 80 h7      |
| M542-GK07-12K9 | 19 h6      | 40         | 6x6x25 | 15.5         | 100                  | 80 h7      |
| M542-GK07-04K9 | 19 h6      | 40         | 6x6x25 | 15.5         | 100                  | 80 h7      |
| M542-GK07-14K9 | 19 h6      | 40         | 6x6x25 | 15.5         | 100                  | 80 h7      |

| Model          | Flange (Sq) | Mounting Hole Thread | Overall Length | Length to Lead Exit | Housing Diameter | Pilot Height |
|----------------|-------------|----------------------|----------------|---------------------|------------------|--------------|
|                | ØP          | S                    | LB             | LE                  | ØAC              | T            |
| M532-GK07-02K9 | 98.1        | M6-1.0-6H b9         | 220.5          | 173.4               | 98.1             | 2.5          |
| M532-GK07-12K9 | 98.1        | M6-1.0-6H b9         | 267.3          | 220.6               | 98.1             | 2.5          |
| M532-GK07-04K9 | 98.1        | M6-1.0-6H b9         | 220.5          | 173.4               | 98.1             | 2.5          |
| M532-GK07-14K9 | 98.1        | M6-1.0-6H b9         | 267.3          | 267.3               | 98.1             | 2.5          |
| M542-GK07-02K9 | 113         | M6-1.0-6H b9         | 221.5          | 173.9               | 111              | 2.5          |
| M542-GK07-12K9 | 98.1        | M6-1.0-6H b9         | 273.6          | 225.9               | 111              | 2.5          |
| M542-GK07-04K9 | 98.1        | M6-1.0-6H b9         | 221.5          | 173.9               | 111              | 2.5          |
| M542-GK07-14K9 | 98.1        | M6-1.0-6H b9         | 273.6          | 225.9               | 111              | 2.5          |

All dimensions in mm.

# Direct Drive Servo Motors

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|                                                                         |     |
|-------------------------------------------------------------------------|-----|
| SGM7F (With Core, Inner Rotor) .....                                    | 204 |
| SGM7E (Coreless, Inner Rotor) .....                                     | 226 |
| SGM7D (With Core, Outer Rotor) .....                                    | 242 |
| SGMCS (Small Capacity, Coreless or Medium<br>Capacity, with Core) ..... | 270 |

# SGM7F (With Core, Inner Rotor)

## Model Designations

SGM7F - 02 A 7 A 1 1

1st+2nd digits 3rd digit 4th digit 5th digit 6th digit 7th digit

Direct Drive  
Servomotors:  
SGM7F

### 1st+2nd digits Rated Output

#### • Small-Capacity

| Code | Specification |
|------|---------------|
| 02   | 2.00 N·m      |
| 04   | 4.00 N·m      |
| 05   | 5.00 N·m      |
| 08   | 8.00 N·m      |
| 10   | 10.0 N·m      |
| 14   | 14.0 N·m      |
| 16   | 16.0 N·m      |
| 17   | 17.0 N·m      |
| 25   | 25.0 N·m      |
| 35   | 35.0 N·m      |

#### • Medium-Capacity

| Code | Specification |
|------|---------------|
| 45   | 45.0 N·m      |
| 80   | 80.0 N·m      |
| 1A   | 110 N·m       |
| 1E   | 150 N·m       |
| 2Z   | 200 N·m       |

### 3rd digit Servomotor Outer Diameter

| Code | Specification |
|------|---------------|
| A    | 100-mm dia.   |
| B    | 135-mm dia.   |
| C    | 175-mm dia.   |
| D    | 230-mm dia.   |
| M    | 280-mm dia.   |
| N    | 360-mm dia.   |

### 4th digit Serial Encoder

| Code | Specification                      |
|------|------------------------------------|
| 7    | 24-bit multiturn absolute encoder* |
| F    | 24-bit incremental encoder*        |

\* Both multiturn absolute encoder and incremental encoder can be used as a single-turn absolute encoder by setting parameters.

### 5th digit Design Revision Order

M: Small Capacity  
A: Medium Capacity

### 6th digit Flange

| Code | Mounting                           | Servomotor Outer Diameter Code (3rd Digit) |   |   |   |   |   |
|------|------------------------------------|--------------------------------------------|---|---|---|---|---|
|      |                                    | A                                          | B | C | D | M | N |
| 1    | Non-load side                      | ✓                                          | ✓ | ✓ | ✓ | — | — |
|      | Load side                          | —                                          | — | — | — | ✓ | ✓ |
| 3    | Non-load side                      | —                                          | — | — | — | ✓ | ✓ |
| 4    | Non-load side (with cable on side) | ✓                                          | ✓ | ✓ | ✓ | — | — |

✓ : Applicable models.

### 7th digit Options

| Code | Specification                                                                        |
|------|--------------------------------------------------------------------------------------|
| 1    | Without options                                                                      |
| 2    | High machine precision (runout at end of shaft and runout of shaft surface: 0.01 mm) |

■ Non Stock Items

Note: 1. Direct Drive Servomotors are not available with holding brakes.

2. This information is provided to explain model numbers. It is not meant to imply that models are available for all combinations of codes.

## ◆ Manufactured Models

| Rated Torque<br>N·m | Servomotor Outer Diameter |                    |                    |                    |                    |                    |
|---------------------|---------------------------|--------------------|--------------------|--------------------|--------------------|--------------------|
|                     | A<br>(100-mm dia.)        | B<br>(135-mm dia.) | C<br>(175-mm dia.) | D<br>(230-mm dia.) | M<br>(280-mm dia.) | N<br>(360-mm dia.) |
| 2.00                | SGM7F-02A                 | —                  | —                  | —                  | —                  | —                  |
| 4.00                | —                         | SGM7F-04B          | —                  | —                  | —                  | —                  |
| 5.00                | SGM7F-05A                 | —                  | —                  | —                  | —                  | —                  |
| 8.00                | —                         | —                  | SGM7F-08C          | —                  | —                  | —                  |
| 10.0                | —                         | SGM7F-10B          | —                  | —                  | —                  | —                  |
| 14.0                | —                         | SGM7F-14B          | —                  | —                  | —                  | —                  |
| 16.0                | —                         | —                  | —                  | SGM7F-16D          | —                  | —                  |
| 17.0                | —                         | —                  | SGM7F-17C          | —                  | —                  | —                  |
| 25.0                | —                         | —                  | SGM7F-25C          | —                  | —                  | —                  |
| 35.0                | —                         | —                  | —                  | SGM7F-35D          | —                  | —                  |
| 45.0                | —                         | —                  | —                  | —                  | SGM7F-45M          | —                  |
| 80.0                | —                         | —                  | —                  | —                  | SGM7F-80M          | SGM7F-80N          |
| 110                 | —                         | —                  | —                  | —                  | SGM7F-1AM          | —                  |
| 150                 | —                         | —                  | —                  | —                  | —                  | SGM7F-1EN          |
| 200                 | —                         | —                  | —                  | —                  | —                  | SGM7F-2ZN          |

Note: The above table shows combinations of the rated torque and outer diameter. The fourth through seventh digits have been omitted.

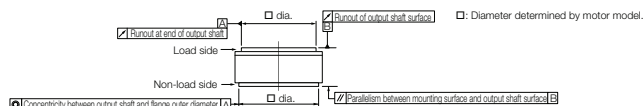


## Specifications and Ratings: Small Capacity

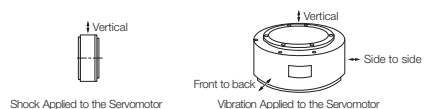
### Specifications

| Voltage                  |                                                               |  | 200 V                                                                                                                                                                                                                                                                                                                                  |                                               |     |            |     |      |            |      |      |      |              |
|--------------------------|---------------------------------------------------------------|--|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------|-----|------------|-----|------|------------|------|------|------|--------------|
| Model SGM7F-             |                                                               |  | 02A                                                                                                                                                                                                                                                                                                                                    | 05A                                           | 04B | 10B        | 14B | 08C  | 17C        | 25C  | 16D  | 35D  |              |
| Time Rating              |                                                               |  | Continuous                                                                                                                                                                                                                                                                                                                             |                                               |     |            |     |      |            |      |      |      |              |
| Thermal Class            |                                                               |  | A                                                                                                                                                                                                                                                                                                                                      |                                               |     |            |     |      |            |      |      |      |              |
| Insulation Resistance    |                                                               |  | 500 VDC, 10 MΩ min.                                                                                                                                                                                                                                                                                                                    |                                               |     |            |     |      |            |      |      |      |              |
| Withstand Voltage        |                                                               |  | 1,500 VAC for 1 minute                                                                                                                                                                                                                                                                                                                 |                                               |     |            |     |      |            |      |      |      |              |
| Excitation               |                                                               |  | Permanent magnet                                                                                                                                                                                                                                                                                                                       |                                               |     |            |     |      |            |      |      |      |              |
| Mounting                 |                                                               |  | Flange-mounted                                                                                                                                                                                                                                                                                                                         |                                               |     |            |     |      |            |      |      |      |              |
| Drive Method             |                                                               |  | Direct drive                                                                                                                                                                                                                                                                                                                           |                                               |     |            |     |      |            |      |      |      |              |
| Rotation Direction       |                                                               |  | Counterclockwise (CCW) for forward reference when viewed from the load side                                                                                                                                                                                                                                                            |                                               |     |            |     |      |            |      |      |      |              |
| Vibration Class*1        |                                                               |  | V15                                                                                                                                                                                                                                                                                                                                    |                                               |     |            |     |      |            |      |      |      |              |
| Absolute Accuracy        |                                                               |  | ±15 arcsec                                                                                                                                                                                                                                                                                                                             |                                               |     |            |     |      |            |      |      |      |              |
| Repeatability            |                                                               |  | ±1.3 arcsec                                                                                                                                                                                                                                                                                                                            |                                               |     |            |     |      |            |      |      |      |              |
| Protective Structure*2   |                                                               |  | Totally enclosed, self-cooled, IP42 (The protective structure is IP40 for CE Marking.)                                                                                                                                                                                                                                                 |                                               |     |            |     |      |            |      |      |      |              |
| Environmental Conditions | Surrounding Air Temperature                                   |  | 0°C to 40°C (with no freezing)                                                                                                                                                                                                                                                                                                         |                                               |     |            |     |      |            |      |      |      |              |
|                          | Surrounding Air Humidity                                      |  | 20% to 80% relative humidity (with no condensation)                                                                                                                                                                                                                                                                                    |                                               |     |            |     |      |            |      |      |      |              |
|                          | Installation Site                                             |  | <ul style="list-style-type: none"><li>• Must be indoors and free of corrosive and explosive gases.</li><li>• Must be well-ventilated and free of dust and moisture.</li><li>• Must facilitate inspection and cleaning.</li><li>• Must have an altitude of 1,000 m or less.</li><li>• Must be free of strong magnetic fields.</li></ul> |                                               |     |            |     |      |            |      |      |      |              |
|                          | Storage Environment                                           |  | Store the Servomotor in the following environment if you store it with the power cable disconnected.<br>Storage Temperature: -20°C to 60°C (with no freezing)<br>Storage Humidity: 20% to 80% relative humidity (with no condensation)                                                                                                 |                                               |     |            |     |      |            |      |      |      |              |
| Mechanical Tolerances*3  | Runout of Output Shaft Surface                                |  | mm                                                                                                                                                                                                                                                                                                                                     | 0.02 (0.01 for high machine precision option) |     |            |     |      |            |      |      |      |              |
|                          | Runout at End of Output Shaft                                 |  | mm                                                                                                                                                                                                                                                                                                                                     | 0.04 (0.01 for high machine precision option) |     |            |     |      |            |      |      |      |              |
|                          | Parallelism between Mounting Surface and Output Shaft Surface |  | mm                                                                                                                                                                                                                                                                                                                                     | 0.07                                          |     |            |     |      |            |      |      |      |              |
|                          | Concentricity between Output Shaft and Flange Outer Diameter  |  | mm                                                                                                                                                                                                                                                                                                                                     | 0.07                                          |     |            |     |      |            |      |      |      |              |
| Shock Resistance*4       | Impact Acceleration Rate at Flange                            |  | 490 m/s <sup>2</sup>                                                                                                                                                                                                                                                                                                                   |                                               |     |            |     |      |            |      |      |      |              |
|                          | Number of Impacts                                             |  | 2 times                                                                                                                                                                                                                                                                                                                                |                                               |     |            |     |      |            |      |      |      |              |
| Vibration Resistance*4   | Vibration Acceleration Rate at Flange                         |  | 49 m/s <sup>2</sup>                                                                                                                                                                                                                                                                                                                    |                                               |     |            |     |      |            |      |      |      |              |
| Applicable SERVOPACKs    |                                                               |  | SGD7S-                                                                                                                                                                                                                                                                                                                                 | 2R8A, 2R1F                                    |     | 2R8A, 2R8F |     | 5R5A | 2R8A, 2R8F | 5R5A | 7R6A | 5R5A | 7R6A*5, 120A |
|                          |                                                               |  | SGD7W-                                                                                                                                                                                                                                                                                                                                 | 2R8A                                          |     |            |     |      | 2R8A       |      |      |      | 7R6A*5       |

- \*1. A vibration class of V15 indicates a vibration amplitude of 15  $\mu$ m maximum on the Servomotor without a load at the rated motor speed.  
 \*2. The hollow hole section, motor mounting surface, output shaft surface, and gap around the rotating part of the shaft are excluded. Protective structure specifications apply only when the special cable is used.  
 \*3. Refer to the following figure for the relevant locations on the Servomotor. Refer to the dimensional drawings of the individual Servomotors for more information on tolerances.



- \*4. The given values are for when the Servomotor shaft is mounted horizontally and shock or vibration is applied in the directions shown in the following figures. The strength of the vibration that the Servomotor can withstand depends on the application. Check the vibration acceleration rate.



- \*5. Use derated values for this combination. Refer to the following section for information on derating values.

## Ratings

| Voltage                                                          |                                                                                       |                | 200 V    |                |          |          |                |          |          |                |                                |
|------------------------------------------------------------------|---------------------------------------------------------------------------------------|----------------|----------|----------------|----------|----------|----------------|----------|----------|----------------|--------------------------------|
| Model SGM7F-                                                     |                                                                                       | 02A            | 05A      | 04B            | 10B      | 14B      | 08C            | 17C      | 25C      | 16D            | 35D                            |
| Rated Output* <sup>1</sup>                                       | W                                                                                     | 63             | 157      | 126            | 314      | 440      | 251            | 534      | 785      | 503            | 1100<br>1000<br>* <sup>5</sup> |
| Rated Torque* <sup>1, *2</sup>                                   | N·m                                                                                   | 2.00           | 5.00     | 4.00           | 10.0     | 14.0     | 8.00           | 17.0     | 25.0     | 16.0           | 35.0                           |
| Instantaneous Maximum Torque* <sup>1</sup>                       | N·m                                                                                   | 6.00           | 15.0     | 12.0           | 30.0     | 42.0     | 24.0           | 51.0     | 75.0     | 48.0           | 105                            |
| Stall Torque* <sup>1</sup>                                       | N·m                                                                                   | 2.00           | 5.00     | 4.00           | 10.0     | 14.0     | 8.00           | 17.0     | 25.0     | 16.0           | 35.0                           |
| Rated Current* <sup>1</sup>                                      | Arms                                                                                  | 1.7            | 1.8      | 2.0            | 2.8      | 4.6      | 2.4            | 4.5      |          | 5.0            |                                |
| Instantaneous Maximum Current* <sup>1</sup>                      | Arms                                                                                  | 5.1            | 5.4      | 6.4            | 8.9      | 14.1     | 8.6            | 14.7     | 13.9     | 16.9           | 16.0                           |
| Rated Motor Speed* <sup>1</sup>                                  | min <sup>-1</sup>                                                                     | 300            |          | 300            |          |          | 300            |          |          |                | 300<br>270* <sup>5</sup>       |
| Maximum Motor Speed* <sup>1</sup>                                | min <sup>-1</sup>                                                                     | 600            |          | 600            |          |          | 600            |          | 500      | 600            | 400                            |
| Torque Constant                                                  | N·m/Arms                                                                              | 1.28           | 3.01     | 2.21           | 3.81     | 3.27     | 3.52           | 4.04     | 6.04     | 3.35           | 7.33                           |
| Motor Moment of Inertia                                          | ×10 <sup>-4</sup> kg·m <sup>2</sup>                                                   | 8.04           | 14.5     | 16.2           | 25.2     | 36.9     | 56.5           | 78.5     | 111      | 178            | 276                            |
| Rated Power Rate* <sup>1</sup>                                   | kW/s                                                                                  | 4.98           | 17.2     | 9.88           | 39.7     | 53.1     | 11.3           | 36.8     | 56.3     | 14.4           | 44.4                           |
| Rated Angular Acceleration Rate* <sup>1</sup>                    | rad/s <sup>2</sup>                                                                    | 2490           | 3450     | 2470           | 3970     | 3790     | 1420           | 2170     | 2250     | 899            | 1270                           |
| Heat Sink Size                                                   | mm                                                                                    | 300 × 300 × 12 |          | 350 × 350 × 12 |          |          | 450 × 450 × 12 |          |          | 550 × 550 × 12 |                                |
| Allowable Load Moment of Inertia (Motor Moment of Inertia Ratio) |                                                                                       | 25 times       | 35 times | 25 times       | 40 times | 45 times | 15 times       | 25 times | 25 times | 10 times       | 15 times                       |
|                                                                  | With External Regenerative Resistor and External Dynamic Brake Resistor* <sup>3</sup> | 25 times       | 35 times | 25 times       | 40 times | 45 times | 15 times       | 25 times | 25 times | 10 times       | 15 times                       |
| Allowable Load* <sup>4</sup>                                     | Allowable Thrust Load                                                                 | N              | 1100     | 1100           | 1500     |          |                | 3300     |          |                | 4000                           |
|                                                                  | Allowable Moment Load                                                                 | N·m            | 22       | 24             | 45       | 55       | 65             | 92       | 98       | 110            | 210                            |

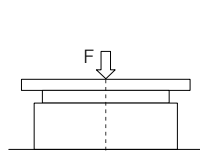
\*1. These values are for operation in combination with a SERVOPACK when the temperature of the armature winding is 100°C. The values for other items are at 20°C. These are typical values.

\*2. The rated torques are the continuous allowable torque values at a surrounding air temperature of 40°C with a steel heat sink of the dimensions given in the table.

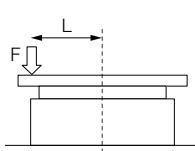
\*3. To externally connect dynamic brake resistor, select hardware option specification 020 for the SERVOPACK. However, you cannot externally connect dynamic brake resistor if you use the following SERVOPACKs (maximum applicable motor capacity: 400 W).

- SGD7S-R70□ □ □ A020 to -2R8□ □ □ A020
- SGD7W-1R6A20A020 to -2R8A20A020

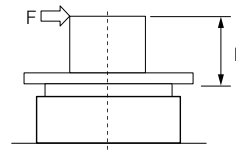
\*4. The thrust loads and moment loads that are applied while a Servomotor is operating are roughly classified into the following patterns. Design the machine so that the thrust loads or moment loads will not exceed the values given in the table.



Where F is the external force,  
Thrust load = F + Load mass  
Moment load = 0



Where F is the external force,  
Thrust load = F + Load mass  
Moment load = F × L

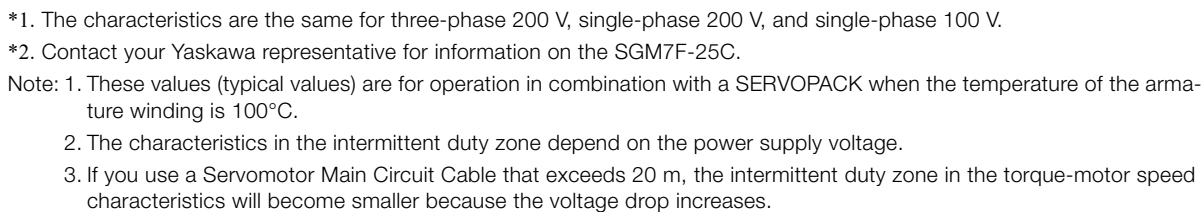


Where F is the external force,  
Thrust load = Load mass  
Moment load = F × L

\*5. If you use an SGD7S-7R6A SERVOPACK and SGM7F-35D Servomotor together, use this value (a derated value).

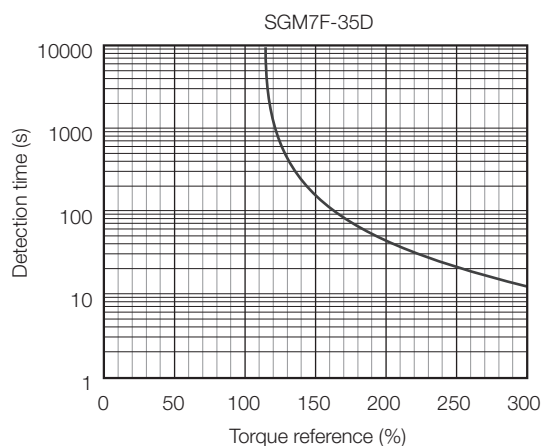
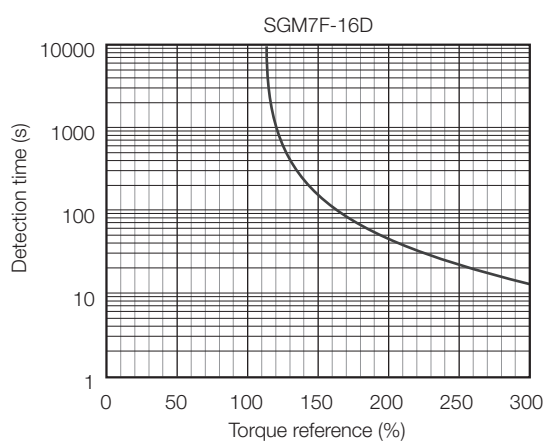
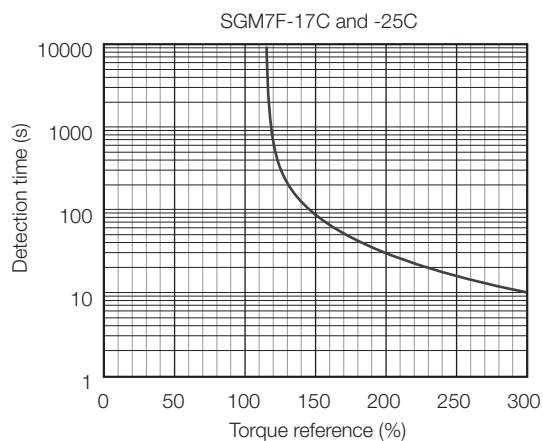
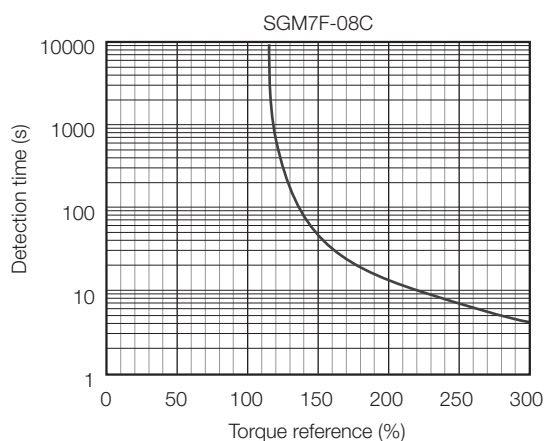
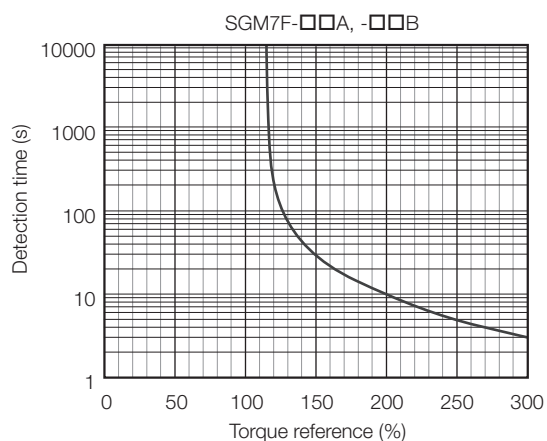
Note: For the bearings used in these Servomotors, the loss depends on the bearing temperature. The amount of heat loss is higher at low temperatures.

**A** : Continuous duty zone ——— (solid lines): With three-phase 200-V or single-phase 230-V input  
**B** : Intermittent duty zone ----- (dotted lines): With single-phase 200-V input  
                                          — — — (dashed-dotted lines): With single-phase 100-V input



## Servomotor Overload Protection Characteristics

The overload detection level is set for hot start conditions with a Servomotor surrounding air temperature of 40°C.



Note: The above overload protection characteristics do not mean that you can perform continuous duty operation with an output of 100% or higher. Use the Servomotor so that the effective torque remains within the continuous duty zone given in Torque-Motor Speed Characteristics on page 207.

## Allowable Load Moment of Inertia

The allowable load moments of inertia (motor moment of inertia ratios) for the Servomotors are given in the Ratings (page 206). The values are determined by the regenerative energy processing capacity of the SERVOPACK and are also affected by the drive conditions of the Servomotor. Perform the required Steps for each of the following cases.

Use the SigmaSize+ AC Servo Drive Capacity Selection Program to check the driving conditions. Contact your Yaskawa representative for information on this program.

### ◆ Exceeding the Allowable Load Moment of Inertia

Use one of the following measures to adjust the load moment of inertia to within the allowable value.

- Reduce the torque limit.
- Reduce the deceleration rate.
- Reduce the maximum motor speed.

If the above steps is not possible, install an external regenerative resistor.

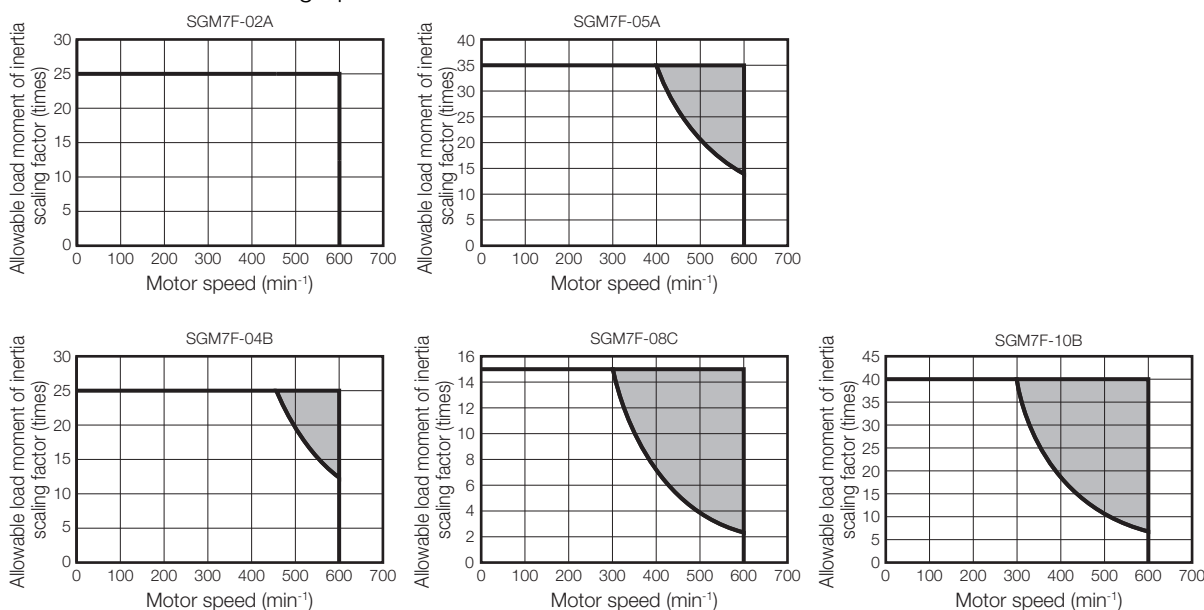
#### Information

An Overvoltage Alarm (A.400) is likely to occur during deceleration if the load moment of inertia exceeds the allowable load moment of inertia. SERVOPACKs with a built-in regenerative resistor may generate a Regenerative Overload Alarm (A.320). Refer to External Regenerative Resistors (200 V Models) (page 609) for the regenerative power (W) that can be processed by the SERVOPACKs.

Install an External Regenerative Resistor when the built-in regenerative resistor cannot process all of the regenerative power.

### ◆ SERVOPACKs without Built-in Regenerative Resistors

The following graph shows the allowable load moment of inertia scaling factor of the motor speed (reference values for deceleration operation at or above the rated torque). Application is possible without an external regenerative resistor within the allowable value. However, an External Regenerative Resistor is required in the shaded areas of the graphs.



Note: Applicable SERVOPACK models: SGD7S-2R8A and -2R8F

### ◆ When an External Regenerative Resistor Is Required

Install the External Regenerative Resistor. Refer to the following section for the recommended products.

**External Regenerative Resistors (200 V Models) (page 609)**

## Specifications and Ratings: Medium Capacity

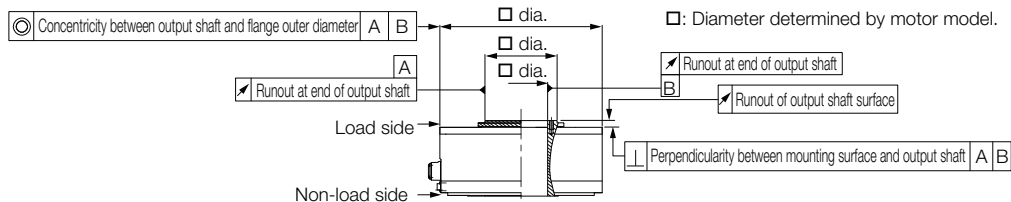
### Specifications

| Voltage                  |                                                               |  | 200 V                                                                                                                                                                                                                                                                                                                                  |                                               |      |      |      |       |
|--------------------------|---------------------------------------------------------------|--|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------|------|------|------|-------|
| Model SGM7F-             |                                                               |  | 45M                                                                                                                                                                                                                                                                                                                                    | 80M                                           | 1AM  | 80N  | 1EN  | 2ZN   |
| Time Rating              |                                                               |  | Continuous                                                                                                                                                                                                                                                                                                                             |                                               |      |      |      |       |
| Thermal Class            |                                                               |  | F                                                                                                                                                                                                                                                                                                                                      |                                               |      |      |      |       |
| Insulation Resistance    |                                                               |  | 500 VDC, 10 MΩ min.                                                                                                                                                                                                                                                                                                                    |                                               |      |      |      |       |
| Withstand Voltage        |                                                               |  | 1,500 VAC for 1 minute                                                                                                                                                                                                                                                                                                                 |                                               |      |      |      |       |
| Excitation               |                                                               |  | Permanent magnet                                                                                                                                                                                                                                                                                                                       |                                               |      |      |      |       |
| Mounting                 |                                                               |  | Flange-mounted                                                                                                                                                                                                                                                                                                                         |                                               |      |      |      |       |
| Drive Method             |                                                               |  | Direct drive                                                                                                                                                                                                                                                                                                                           |                                               |      |      |      |       |
| Rotation Direction       |                                                               |  | Counterclockwise (CCW) for forward reference when viewed from the load side                                                                                                                                                                                                                                                            |                                               |      |      |      |       |
| Vibration Class*1        |                                                               |  | V15                                                                                                                                                                                                                                                                                                                                    |                                               |      |      |      |       |
| Absolute Accuracy        |                                                               |  | ±15 arcsec                                                                                                                                                                                                                                                                                                                             |                                               |      |      |      |       |
| Repeatability            |                                                               |  | ±1.3 arcsec                                                                                                                                                                                                                                                                                                                            |                                               |      |      |      |       |
| Protective Structure*2   |                                                               |  | Totally enclosed, self-cooled, IP44                                                                                                                                                                                                                                                                                                    |                                               |      |      |      |       |
| Environmental Conditions | Surrounding Air Temperature                                   |  | 0°C to 40°C (with no freezing)                                                                                                                                                                                                                                                                                                         |                                               |      |      |      |       |
|                          | Surrounding Air Humidity                                      |  | 20% to 80% relative humidity (with no condensation)                                                                                                                                                                                                                                                                                    |                                               |      |      |      |       |
|                          | Installation Site                                             |  | <ul style="list-style-type: none"><li>• Must be indoors and free of corrosive and explosive gases.</li><li>• Must be well-ventilated and free of dust and moisture.</li><li>• Must facilitate inspection and cleaning.</li><li>• Must have an altitude of 1,000 m or less.</li><li>• Must be free of strong magnetic fields.</li></ul> |                                               |      |      |      |       |
|                          | Storage Environment                                           |  | Store the Servomotor in the following environment if you store it with the power cable disconnected.<br>Storage Temperature: -20°C to 60°C (with no freezing)<br>Storage Humidity: 20% to 80% relative humidity (with no condensation)                                                                                                 |                                               |      |      |      |       |
| Mechanical Tolerances*3  | Runout of Output Shaft Surface                                |  | mm                                                                                                                                                                                                                                                                                                                                     | 0.02 (0.01 for high machine precision option) |      |      |      |       |
|                          | Runout at End of Output Shaft                                 |  | mm                                                                                                                                                                                                                                                                                                                                     | 0.04 (0.01 for high machine precision option) |      |      |      |       |
|                          | Parallelism between Mounting Surface and Output Shaft Surface |  | mm                                                                                                                                                                                                                                                                                                                                     | —                                             |      |      |      |       |
|                          | Concentricity between Output Shaft and Flange Outer Diameter  |  | mm                                                                                                                                                                                                                                                                                                                                     | 0.08                                          |      |      |      |       |
|                          | Perpendicularity between Mounting Surface and Output Shaft    |  | mm                                                                                                                                                                                                                                                                                                                                     | 0.08                                          |      |      |      |       |
| Shock Resistance*4       | Impact Acceleration Rate at Flange                            |  | 490 m/s <sup>2</sup>                                                                                                                                                                                                                                                                                                                   |                                               |      |      |      |       |
|                          | Number of Impacts                                             |  | 2 times                                                                                                                                                                                                                                                                                                                                |                                               |      |      |      |       |
| Vibration Resistance*4   | Vibration Acceleration Rate at Flange                         |  | 24.5 m/s <sup>2</sup>                                                                                                                                                                                                                                                                                                                  |                                               |      |      |      |       |
| Applicable SERVOPACKs    |                                                               |  | SGD7S-                                                                                                                                                                                                                                                                                                                                 | 7R6A                                          | 120A | 180A | 120A | 200 A |
|                          |                                                               |  | SGD7W-                                                                                                                                                                                                                                                                                                                                 | 7R6A                                          |      |      | —    |       |

\*1. A vibration class of V15 indicates a vibration amplitude of 15 μm maximum on the Servomotor without a load at the rated motor speed.

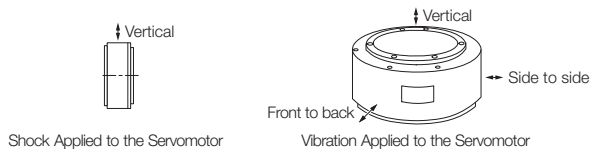
\*2. This does not apply to the shaft opening. Protective structure specifications apply only when the special cable is used.

\*3. Refer to the following figure for the relevant locations on the Servomotor. Refer to the dimensional drawings of the individual Servomotors for more information on tolerances.



\*4. The given values are for when the Servomotor shaft is mounted horizontally and shock or vibration is applied in the directions shown in the following figures.

The strength of the vibration that the Servomotor can withstand depends on the application. Check the vibration acceleration rate.



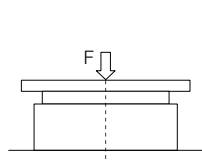
## Ratings

| Voltage                                                                    |                                     | 200 V          |      |      |      |       |      |
|----------------------------------------------------------------------------|-------------------------------------|----------------|------|------|------|-------|------|
| Model SGM7F-                                                               |                                     | 45M            | 80M  | 1AM  | 80N  | 1EN   | 2ZN  |
| Rated Output <sup>*1</sup>                                                 | W                                   | 707            | 1260 | 1730 | 1260 | 2360  | 3140 |
| Rated Torque <sup>*1, *2</sup>                                             | N·m                                 | 45.0           | 80.0 | 110  | 80.0 | 150   | 200  |
| Instantaneous Maximum Torque <sup>*1</sup>                                 | N·m                                 | 135            | 240  | 330  | 240  | 450   | 600  |
| Stall Torque <sup>*1</sup>                                                 | N·m                                 | 45.0           | 80.0 | 110  | 80.0 | 150   | 200  |
| Rated Current <sup>*1</sup>                                                | Arms                                | 5.8            | 9.7  | 13.4 | 9.4  | 17.4  | 18.9 |
| Instantaneous Maximum Current <sup>*1</sup>                                | Arms                                | 17.0           | 28.0 | 42.0 | 28.0 | 56.0  | 56.0 |
| Rated Motor Speed <sup>*1</sup>                                            | min <sup>-1</sup>                   | 150            |      |      | 150  |       |      |
| Maximum Motor Speed <sup>*1</sup>                                          | min <sup>-1</sup>                   | 300            |      |      | 300  | 250   |      |
| Torque Constant                                                            | N·m/Arms                            | 8.39           | 8.91 | 8.45 | 9.08 | 9.05  | 11.5 |
| Motor Moment of Inertia                                                    | ×10 <sup>-4</sup> kg·m <sup>2</sup> | 388            | 627  | 865  | 1360 | 2470  | 3060 |
| Rated Power Rate <sup>*1</sup>                                             | kW/s                                | 52.2           | 102  | 140  | 47.1 | 91.1  | 131  |
| Rated Angular Acceleration Rate <sup>*1</sup>                              | rad/s <sup>2</sup>                  | 1160           | 1280 | 1270 | 588  | 607   | 654  |
| Heat Sink Size                                                             | mm                                  | 750 × 750 × 45 |      |      |      |       |      |
| Allowable Load Moment of Inertia<br>(Motor Moment of Inertia Ratio)        |                                     | 3 times        |      |      |      |       |      |
| With External Regenerative Resistor and<br>External Dynamic Brake Resistor |                                     | 3 times        |      |      |      |       |      |
| Allowable<br>Load <sup>*3</sup>                                            | A                                   | mm             | 33   |      |      | 37.5  |      |
|                                                                            | Allowable Thrust Load               | N              | 9000 |      |      | 16000 |      |
|                                                                            | Allowable Moment Load               | N·m            | 180  |      |      | 350   |      |

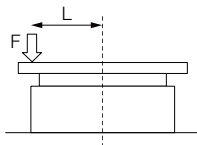
\*1. These values are for operation in combination with a SERVOPACK when the temperature of the armature winding is 20°C. These are typical values.

\*2. The rated torques are the continuous allowable torque values at a surrounding air temperature of 40°C with a steel heat sink of the dimensions given in the table.

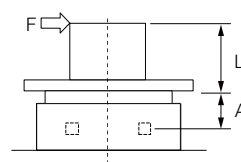
\*3. The thrust loads and moment loads that are applied while a Servomotor is operating are roughly classified into the following patterns. Design the machine so that the thrust loads or moment loads will not exceed the values given in the table.



Where F is the external force,  
Thrust load = F + Load mass  
Moment load = 0



Where F is the external force,  
Thrust load = F + Load mass  
Moment load = F × L



Where F is the external force,  
Thrust load = Load mass  
Moment load = F × (L + A)

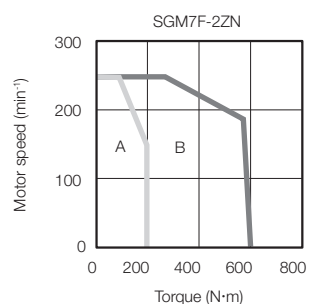
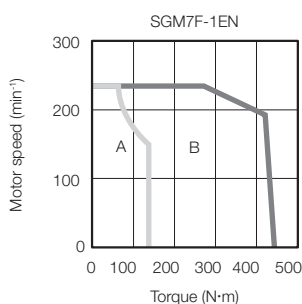
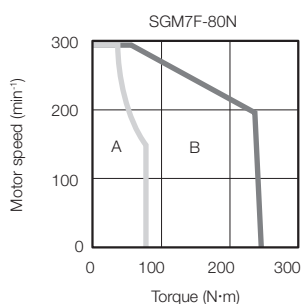
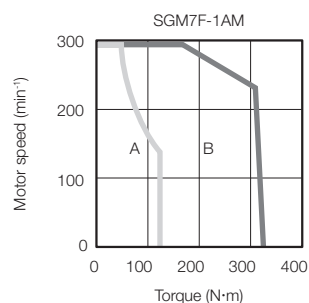
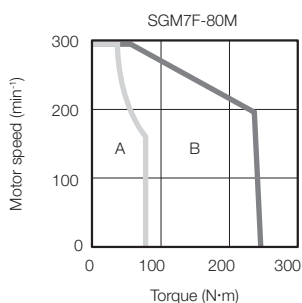
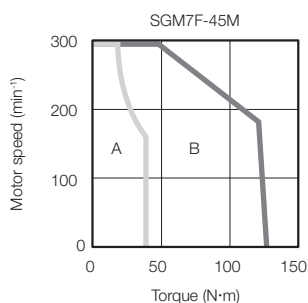
A (Refer to the  
values in the  
table.)

Note: For the bearings used in these Servomotors, the loss depends on the bearing temperature. The amount of heat loss is higher at low temperatures.

## Torque-Motor Speed Characteristics

**A** : Continuous duty zone

**B** : Intermittent duty zone



Note: 1. These values (typical values) are for operation in combination with a SERVOPACK when the temperature of the armature winding is 20°C.

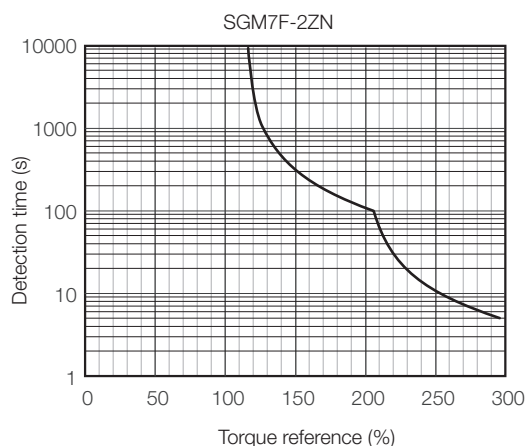
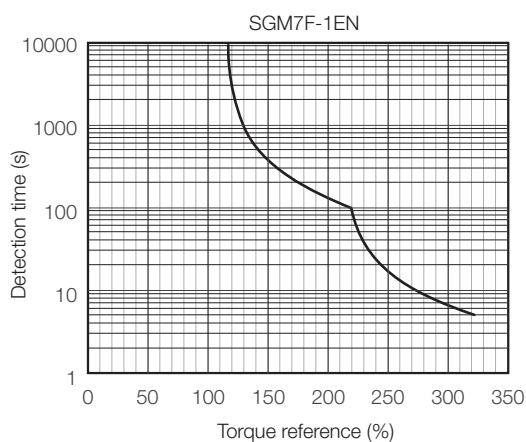
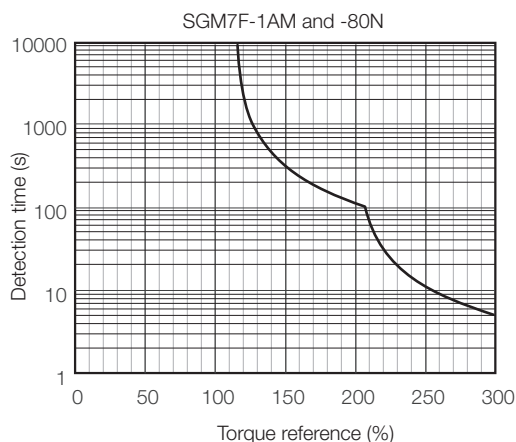
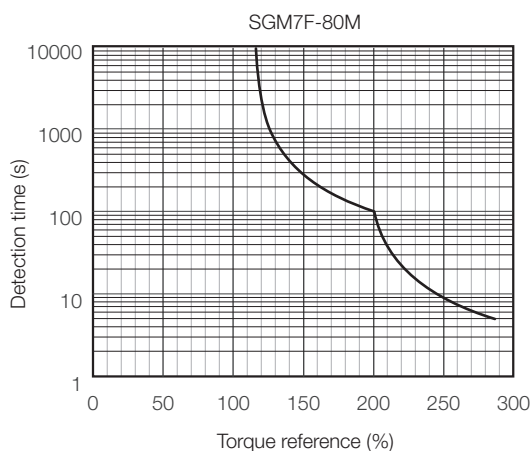
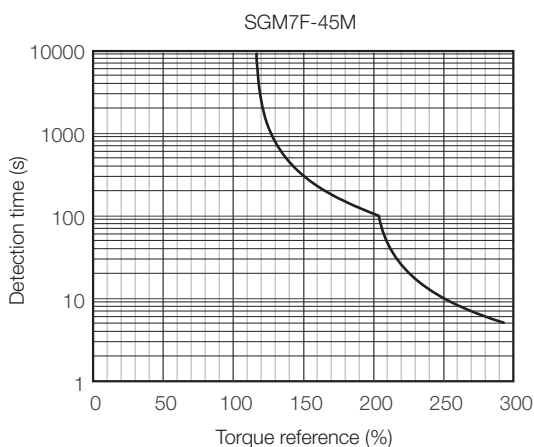
2. If the effective torque is within the allowable range for the rated torque, the Servomotor can be used within the intermittent duty zone.

3. If you use a Servomotor Main Circuit Cable that exceeds 20 m, the intermittent duty zone in the torque-motor speed characteristics will become smaller because the voltage drop increases.



## Servomotor Overload Protection Characteristics

The overload detection level is set for hot start conditions with a Servomotor surrounding air temperature of 40°C.



Note: The above overload protection characteristics do not mean that you can perform continuous duty operation with an output of 100% or higher. Use the Servomotor so that the effective torque remains within the continuous duty zone given in Torque-Motor Speed Characteristics on page 212.

## Allowable Load Moment of Inertia

The allowable load moments of inertia (motor moment of inertia ratios) for the Servomotors are given in the Ratings (page 211). The values are determined by the regenerative energy processing capacity of the SERVOPACK and are also affected by the drive conditions of the Servomotor. Perform the required Steps for each of the following cases.

Use the SigmaSize+ AC Servo Drive Capacity Selection Program to check the driving conditions. Contact your Yaskawa representative for information on this program.

### ◆ Exceeding the Allowable Load Moment of Inertia

Use one of the following measures to adjust the load moment of inertia to within the allowable value.

- Reduce the torque limit.
- Reduce the deceleration rate.
- Reduce the maximum motor speed.

If the above steps is not possible, install an external regenerative resistor.

#### Information

An Overvoltage Alarm (A.400) is likely to occur during deceleration if the load moment of inertia exceeds the allowable load moment of inertia. SERVOPACKs with a built-in regenerative resistor may generate a Regenerative Overload Alarm (A.320). Refer to Built-In Regenerative Resistor (page 492) for the regenerative power (W) that can be processed by the SERVO-PACKs.

Install an External Regenerative Resistor when the built-in regenerative resistor cannot process all of the regenerative power.

### ◆ When an External Regenerative Resistor Is Required

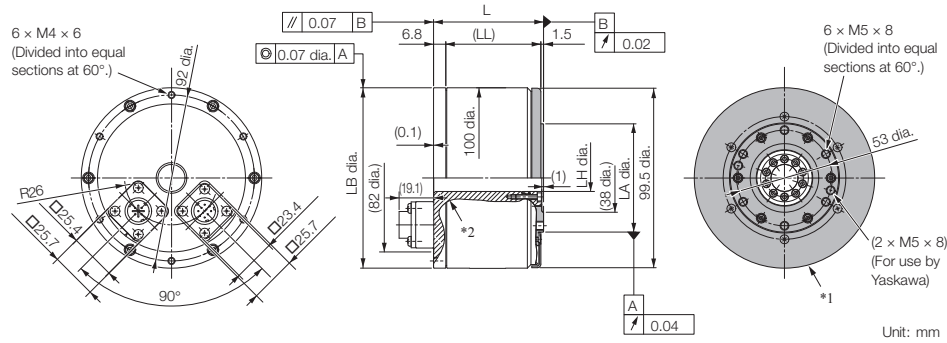
Install the External Regenerative Resistor. Refer to the following section for the recommended products.

 **External Regenerative Resistors (page 492)**

## External Dimensions

### ◆ SGM7F-□ □ A

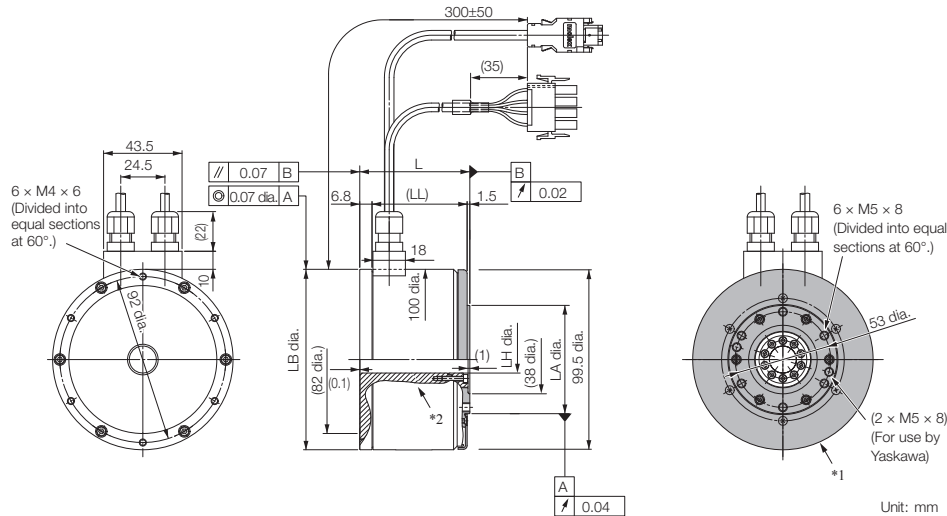
#### • Flange Specification 1



- \*1. The shaded section indicates the rotating parts.  
\*2. The hatched section indicates the non-rotating parts.  
Note: Values in parentheses are reference dimensions.

| Model SGM7F- | L  | (LL)   | LB                                 | LH                              | LA                                | Approx. Mass [kg] |
|--------------|----|--------|------------------------------------|---------------------------------|-----------------------------------|-------------------|
| 02A□ A11     | 61 | (52.7) | 100 <sup>0</sup> <sub>-0.035</sub> | 15 <sup>+0.4</sup> <sub>0</sub> | 60 <sup>0</sup> <sub>-0.030</sub> | 2.5               |
| 05A□ A11     | 96 | (87.7) | 100 <sup>0</sup> <sub>-0.035</sub> | 15 <sup>+0.4</sup> <sub>0</sub> | 60 <sup>0</sup> <sub>-0.030</sub> | 5.0               |

#### • Flange Specification 4



- \*1. The shaded section indicates the rotating parts.  
\*2. The hatched section indicates the non-rotating parts.  
Note: Values in parentheses are reference dimensions.

| Model SGM7F- | L  | (LL)   | LB                                 | LH                              | LA                                | Approx. Mass [kg] |
|--------------|----|--------|------------------------------------|---------------------------------|-----------------------------------|-------------------|
| 02A□ A41     | 61 | (52.7) | 100 <sup>0</sup> <sub>-0.035</sub> | 15 <sup>+0.4</sup> <sub>0</sub> | 60 <sup>0</sup> <sub>-0.030</sub> | 2.5               |
| 05A□ A41     | 96 | (87.7) | 100 <sup>0</sup> <sub>-0.035</sub> | 15 <sup>+0.4</sup> <sub>0</sub> | 60 <sup>0</sup> <sub>-0.030</sub> | 5.0               |

Refer to the following section for information on connectors.

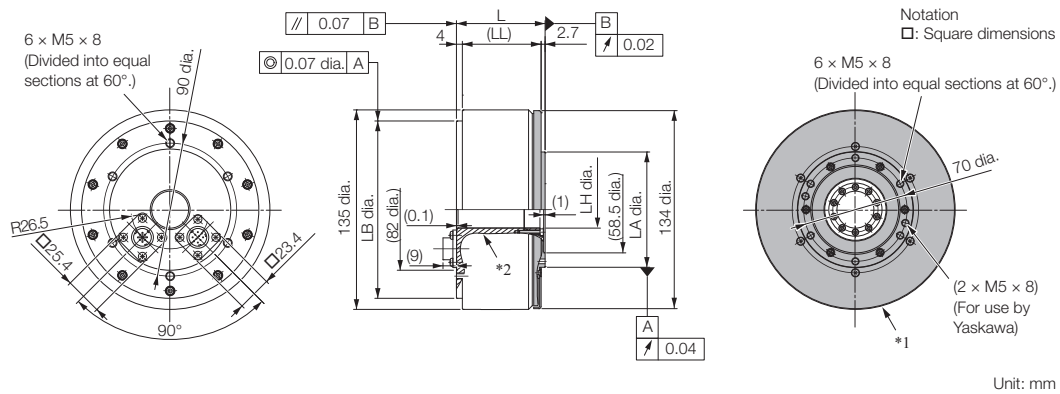
📖 **Connector Specifications (page 221)**

## Direct Drive Servo Motors

### SGM7F (With Core, Inner Rotor)

## ◆ SGM7F-□ □ B

### • Flange Specification 1



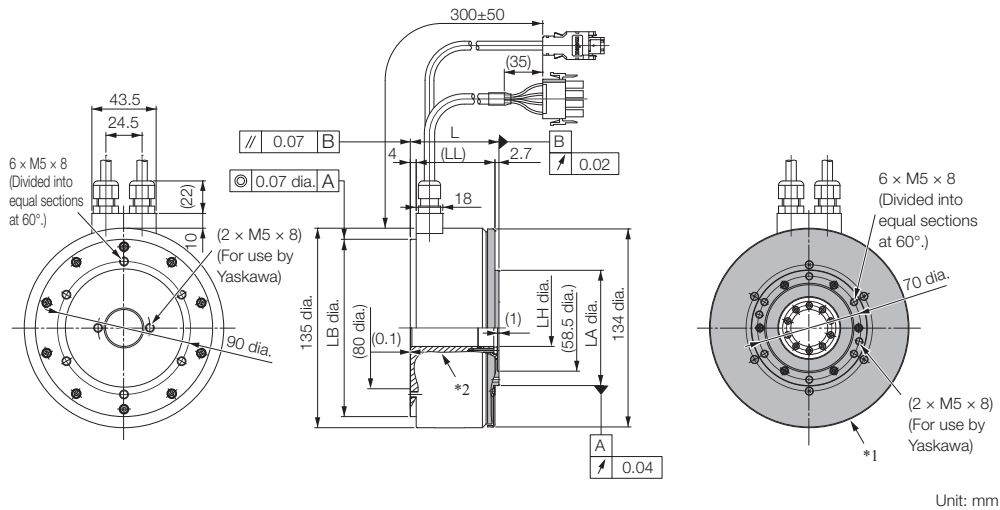
\*1. The shaded section indicates the rotating parts.

\*2. The hatched section indicates the non-rotating parts.

Note: Values in parentheses are reference dimensions.

| Model SGM7F- | L   | (LL)  | LB                                 | LH                                 | LA                                | Approx. Mass [kg] |
|--------------|-----|-------|------------------------------------|------------------------------------|-----------------------------------|-------------------|
| 04B□ A11     | 60  | 53.3  | 120 <sup>0</sup> <sub>-0.035</sub> | 25 <sup>+0.3</sup> <sub>+0.1</sub> | 78 <sup>0</sup> <sub>-0.030</sub> | 5.0               |
| 10B□ A11     | 85  | 78.3  | 120 <sup>0</sup> <sub>-0.035</sub> | 25 <sup>+0.3</sup> <sub>+0.1</sub> | 78 <sup>0</sup> <sub>-0.030</sub> | 6.5               |
| 14B□ A11     | 115 | 108.3 | 120 <sup>0</sup> <sub>-0.035</sub> | 25 <sup>+0.3</sup> <sub>+0.1</sub> | 78 <sup>0</sup> <sub>-0.030</sub> | 9.0               |

### • Flange Specification 4



\*1. The shaded section indicates the rotating parts.

\*2. The hatched section indicates the non-rotating parts.

Note: Values in parentheses are reference dimensions.

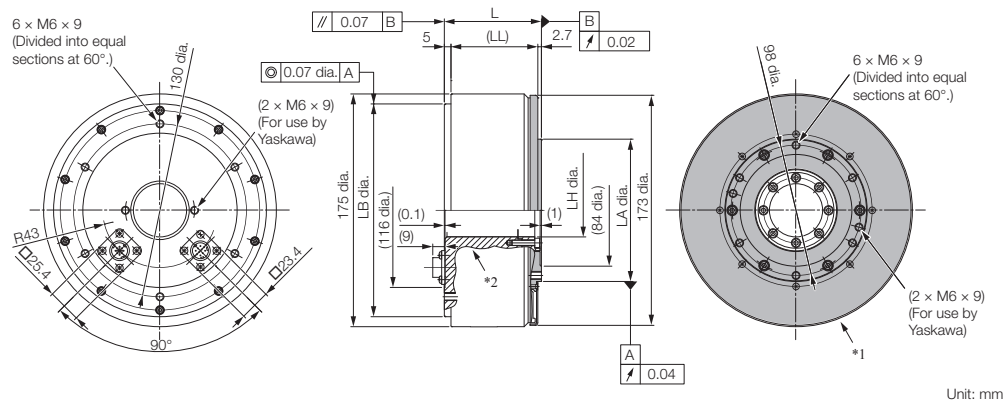
| Model SGM7F- | L   | (LL)  | LB                                 | LH                                 | LA                                | Approx. Mass [kg] |
|--------------|-----|-------|------------------------------------|------------------------------------|-----------------------------------|-------------------|
| 04B□ A41     | 60  | 53.3  | 120 <sup>0</sup> <sub>-0.035</sub> | 25 <sup>+0.3</sup> <sub>+0.1</sub> | 78 <sup>0</sup> <sub>-0.030</sub> | 5.0               |
| 10B□ A41     | 85  | 78.3  | 120 <sup>0</sup> <sub>-0.035</sub> | 25 <sup>+0.3</sup> <sub>+0.1</sub> | 78 <sup>0</sup> <sub>-0.030</sub> | 6.5               |
| 14B□ A41     | 115 | 108.3 | 120 <sup>0</sup> <sub>-0.035</sub> | 25 <sup>+0.3</sup> <sub>+0.1</sub> | 78 <sup>0</sup> <sub>-0.030</sub> | 9.0               |

Refer to the following section for information on connectors.

🔌 **Connector Specifications (page 221)**

## ◆ SGM7F-□ □ C

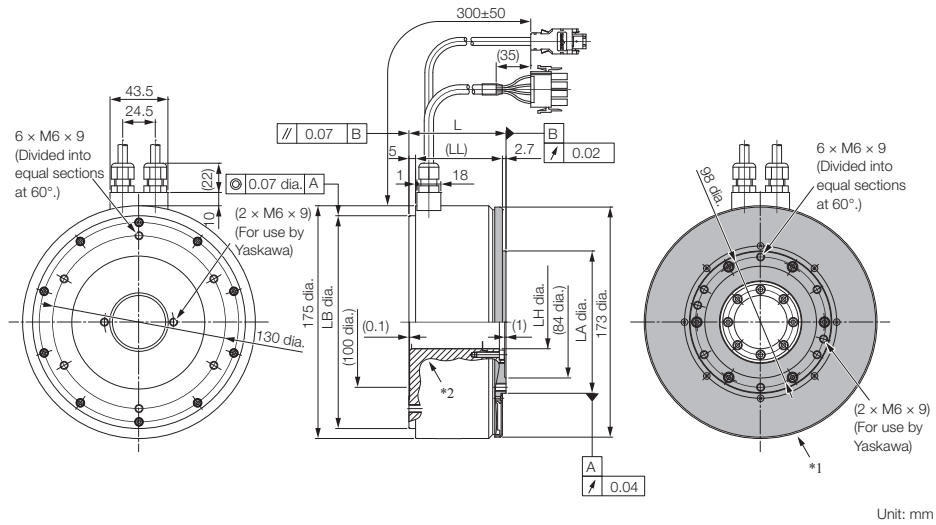
### • Flange Specification 1



- \*1. The shaded section indicates the rotating parts.  
\*2. The hatched section indicates the non-rotating parts.  
Note: Values in parentheses are reference dimensions.

| Model SGM7F- | L   | (LL)  | LB                                 | LH                                 | LA                                 | Approx. Mass [kg] |
|--------------|-----|-------|------------------------------------|------------------------------------|------------------------------------|-------------------|
| 08C□ A11     | 73  | 65.3  | 160 <sup>0</sup> <sub>-0.040</sub> | 40 <sup>+0.3</sup> <sub>+0.1</sub> | 107 <sup>0</sup> <sub>-0.035</sub> | 9.0               |
| 17C□ A11     | 87  | 79.3  | 160 <sup>0</sup> <sub>-0.040</sub> | 40 <sup>+0.3</sup> <sub>+0.1</sub> | 107 <sup>0</sup> <sub>-0.035</sub> | 11.0              |
| 25C□ A11     | 117 | 109.3 | 160 <sup>0</sup> <sub>-0.040</sub> | 40 <sup>+0.3</sup> <sub>+0.1</sub> | 107 <sup>0</sup> <sub>-0.035</sub> | 15.0              |

### • Flange Specification 4



- \*1. The shaded section indicates the rotating parts.  
\*2. The hatched section indicates the non-rotating parts.  
Note: Values in parentheses are reference dimensions.

| Model SGM7F- | L   | (LL)  | LB                                 | LH                                 | LA                                 | Approx. Mass [kg] |
|--------------|-----|-------|------------------------------------|------------------------------------|------------------------------------|-------------------|
| 08C□ A41     | 73  | 65.3  | 160 <sup>0</sup> <sub>-0.040</sub> | 40 <sup>+0.3</sup> <sub>+0.1</sub> | 107 <sup>0</sup> <sub>-0.035</sub> | 9.0               |
| 17C□ A41     | 87  | 79.3  | 160 <sup>0</sup> <sub>-0.040</sub> | 40 <sup>+0.3</sup> <sub>+0.1</sub> | 107 <sup>0</sup> <sub>-0.035</sub> | 11.0              |
| 25C□ A41     | 117 | 109.3 | 160 <sup>0</sup> <sub>-0.040</sub> | 40 <sup>+0.3</sup> <sub>+0.1</sub> | 107 <sup>0</sup> <sub>-0.035</sub> | 15.0              |

Refer to the following section for information on connectors.

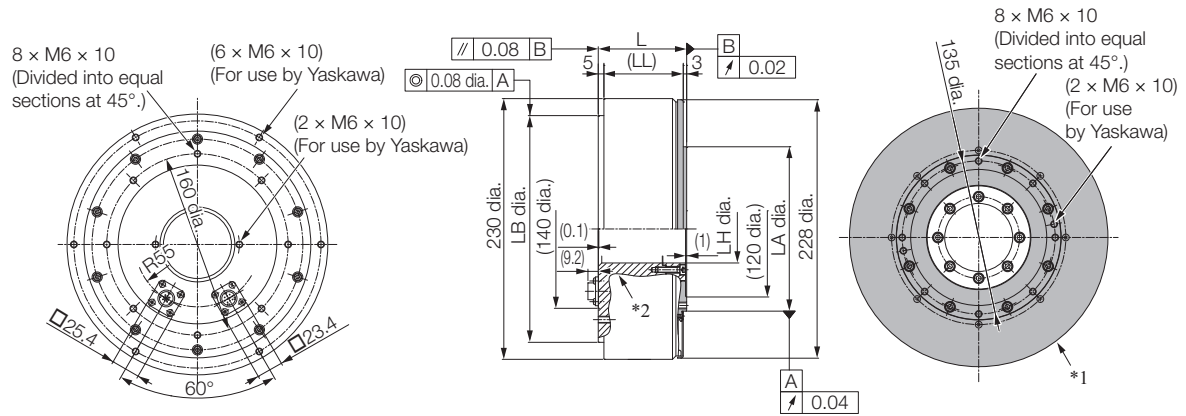
🔌 **Connector Specifications (page 221)**

## Direct Drive Servo Motors

### SGM7F (With Core, Inner Rotor)

#### ◆ SGM7F-□ □ D

##### • Flange Specification 1



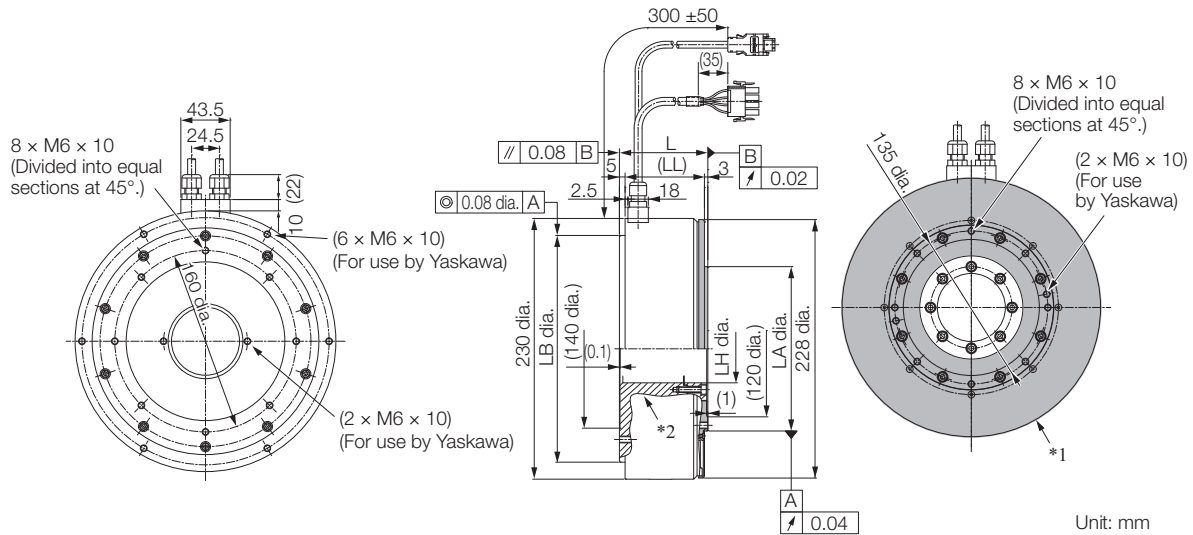
\*1. The shaded section indicates the rotating parts.

\*2. The hatched section indicates the non-rotating parts.

Note: Values in parentheses are reference dimensions.

| Model SGM7F- | L   | (LL) | LB                                 | LH                              | LA                                 | Approx. Mass [kg] |
|--------------|-----|------|------------------------------------|---------------------------------|------------------------------------|-------------------|
| 16D□ A11     | 78  | 70   | 200 <sup>0</sup> <sub>-0.046</sub> | 60 <sup>+0.4</sup> <sub>0</sub> | 145 <sup>0</sup> <sub>-0.040</sub> | 16.0              |
| 35D□ A11     | 107 | 99   | 200 <sup>0</sup> <sub>-0.046</sub> | 60 <sup>+0.4</sup> <sub>0</sub> | 145 <sup>0</sup> <sub>-0.040</sub> | 25.0              |

##### • Flange Specification 4



\*1. The shaded section indicates the rotating parts.

\*2. The hatched section indicates the non-rotating parts.

Note: Values in parentheses are reference dimensions.

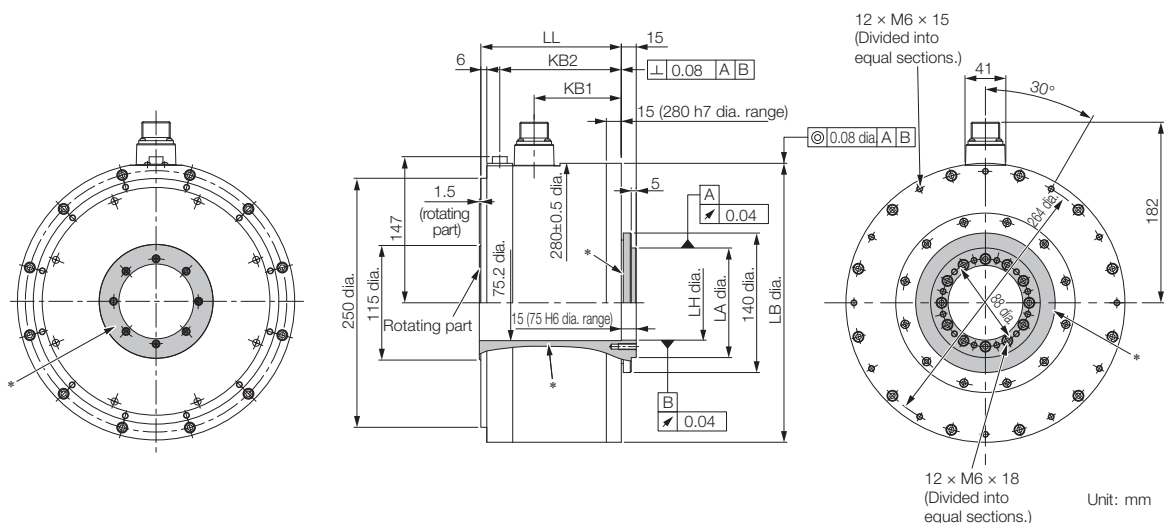
| Model SGM7F- | L   | (LL) | LB                                 | LH                              | LA                                 | Approx. Mass [kg] |
|--------------|-----|------|------------------------------------|---------------------------------|------------------------------------|-------------------|
| 16D□ A41     | 78  | 70   | 200 <sup>0</sup> <sub>-0.046</sub> | 60 <sup>+0.4</sup> <sub>0</sub> | 145 <sup>0</sup> <sub>-0.040</sub> | 16.0              |
| 35D□ A41     | 107 | 99   | 200 <sup>0</sup> <sub>-0.046</sub> | 60 <sup>+0.4</sup> <sub>0</sub> | 145 <sup>0</sup> <sub>-0.040</sub> | 25.0              |

Refer to the following section for information on connectors.

📖 **Connector Specifications (page 221)**

## ◆ SGM7F-□□M

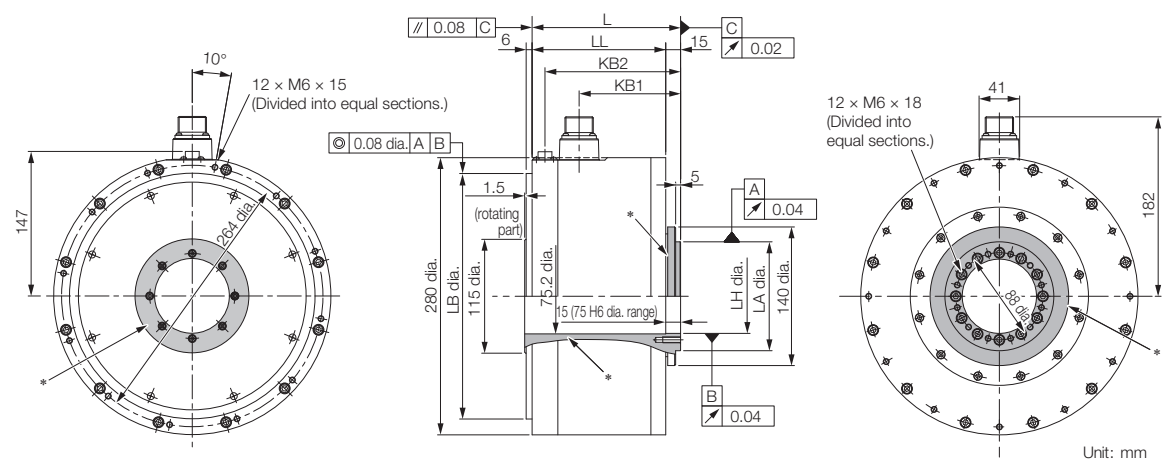
### • Flange Specification 1



\* The shaded section indicates the rotating parts.

| Model SGM7F- | LL  | KB1   | KB2 | LB                                 | LH                                | LA                                 | Approx. Mass [kg] |
|--------------|-----|-------|-----|------------------------------------|-----------------------------------|------------------------------------|-------------------|
| 45M□A11      | 141 | 87.5  | 122 | 280 <sup>0</sup> <sub>-0.052</sub> | 75 <sup>+0.019</sup> <sub>0</sub> | 110 <sup>0</sup> <sub>-0.035</sub> | 38                |
| 80M□A11      | 191 | 137.5 | 172 | 280 <sup>0</sup> <sub>-0.052</sub> | 75 <sup>+0.019</sup> <sub>0</sub> | 110 <sup>0</sup> <sub>-0.035</sub> | 45                |
| 1AM□A11      | 241 | 187.5 | 222 | 280 <sup>0</sup> <sub>-0.052</sub> | 75 <sup>+0.019</sup> <sub>0</sub> | 110 <sup>0</sup> <sub>-0.035</sub> | 51                |

### • Flange Specification 3



\* The shaded section indicates the rotating parts.

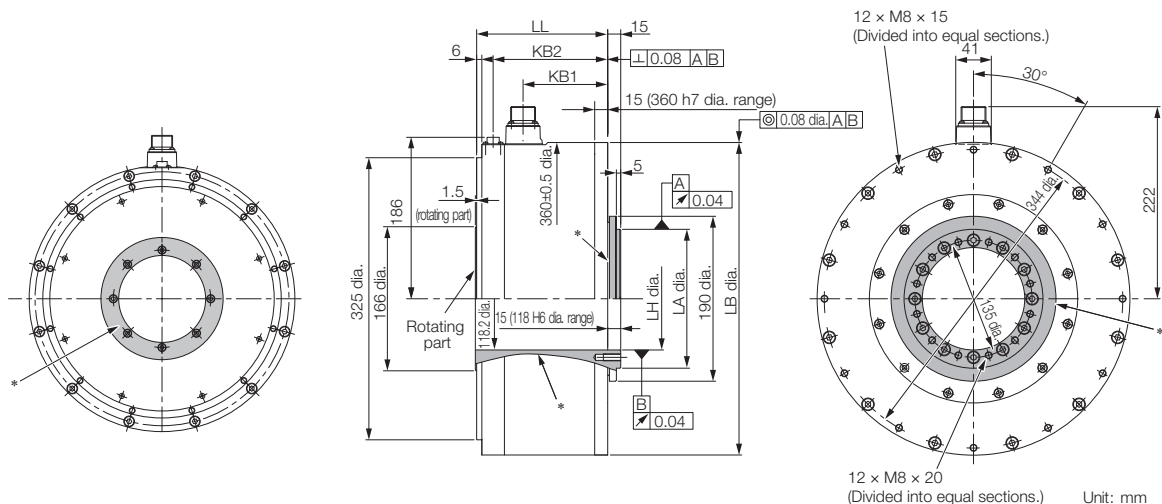
| Model SGM7F- | L   | LL  | KB1   | KB2 | LB                                 | LH                                | LA                                 | Approx. Mass [kg] |
|--------------|-----|-----|-------|-----|------------------------------------|-----------------------------------|------------------------------------|-------------------|
| 45M□A31      | 150 | 135 | 102.5 | 137 | 248 <sup>0</sup> <sub>-0.046</sub> | 75 <sup>+0.019</sup> <sub>0</sub> | 110 <sup>0</sup> <sub>-0.035</sub> | 38                |
| 80M□A31      | 200 | 185 | 152.5 | 187 | 248 <sup>0</sup> <sub>-0.046</sub> | 75 <sup>+0.019</sup> <sub>0</sub> | 110 <sup>0</sup> <sub>-0.035</sub> | 45                |
| 1AM□A31      | 250 | 235 | 202.5 | 237 | 248 <sup>0</sup> <sub>-0.046</sub> | 75 <sup>+0.019</sup> <sub>0</sub> | 110 <sup>0</sup> <sub>-0.035</sub> | 51                |

Refer to the following section for information on connectors.

✎ Connector Specifications (page 221)

## ◆ SGM7F-□□□

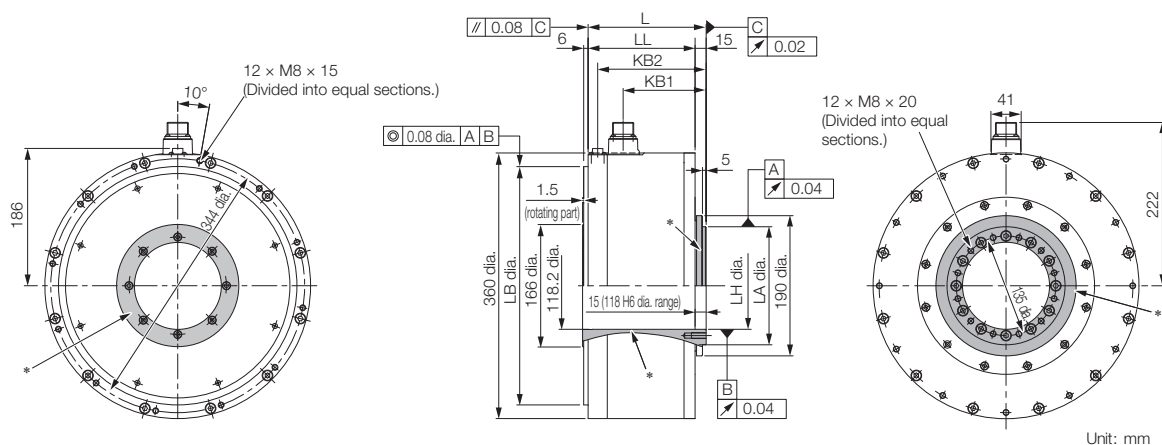
### • Flange Specification 1



\* The shaded section indicates the rotating parts.

| Model SGM7F- | LL  | KB1 | KB2 | LB                                 | LH                                 | LA                                 | Approx. Mass [kg] |
|--------------|-----|-----|-----|------------------------------------|------------------------------------|------------------------------------|-------------------|
| 80N□A11      | 151 | 98  | 132 | 360 <sup>0</sup> <sub>-0.057</sub> | 118 <sup>+0.022</sup> <sub>0</sub> | 160 <sup>0</sup> <sub>-0.040</sub> | 50                |
| 1EN□A11      | 201 | 148 | 182 | 360 <sup>0</sup> <sub>-0.057</sub> | 118 <sup>+0.022</sup> <sub>0</sub> | 160 <sup>0</sup> <sub>-0.040</sub> | 68                |
| 2ZN□A11      | 251 | 198 | 232 | 360 <sup>0</sup> <sub>-0.057</sub> | 118 <sup>+0.022</sup> <sub>0</sub> | 160 <sup>0</sup> <sub>-0.040</sub> | 86                |

### • Flange Specification 3



\* The shaded section indicates the rotating parts.

| Model SGM7F- | L   | LL  | KB1 | KB2 | LB                                 | LH                                 | LA                                 | Approx. Mass [kg] |
|--------------|-----|-----|-----|-----|------------------------------------|------------------------------------|------------------------------------|-------------------|
| 80N□A31      | 160 | 145 | 113 | 147 | 323 <sup>0</sup> <sub>-0.057</sub> | 118 <sup>+0.022</sup> <sub>0</sub> | 160 <sup>0</sup> <sub>-0.040</sub> | 50                |
| 1EN□A31      | 210 | 195 | 163 | 197 | 323 <sup>0</sup> <sub>-0.057</sub> | 118 <sup>+0.022</sup> <sub>0</sub> | 160 <sup>0</sup> <sub>-0.040</sub> | 68                |
| 2ZN□A31      | 260 | 245 | 213 | 247 | 323 <sup>0</sup> <sub>-0.057</sub> | 118 <sup>+0.022</sup> <sub>0</sub> | 160 <sup>0</sup> <sub>-0.040</sub> | 86                |

Refer to the following section for information on connectors.

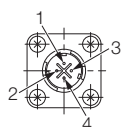
📖 **Connector Specifications (page 221)**



## Connector Specifications

### ◆ SGM7F-□□A, -□□B, -□□C, or -□□D: Flange Specification 1

#### • Servomotor Connector

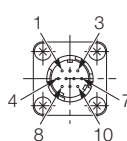


|   |                   |
|---|-------------------|
| 1 | Phase U           |
| 2 | Phase V           |
| 3 | Phase W           |
| 4 | FG (frame ground) |

**Model:** JN1AS04MK2R  
Manufacturer: Japan Aviation Electronics Industry, Ltd.

**Mating connector:** JN1DS04FK1  
(Not provided by Yaskawa.)

#### • Encoder Connector



|    |                   |
|----|-------------------|
| 1  | PS                |
| 2  | /PS               |
| 3  | —                 |
| 4  | PG5V              |
| 5* | BAT0              |
| 6  | —                 |
| 7  | FG (frame ground) |
| 8* | BAT               |
| 9  | PG0V              |
| 10 | —                 |

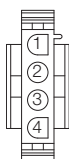
\* Only absolute-value models with multiturn data.

**Model:** JN1AS10ML1-R  
Manufacturer: Japan Aviation Electronics Industry, Ltd.

**Mating connector:** JN1DS10SL1  
(Not provided by Yaskawa.)

### ◆ SGM7F-□□A, -□□B, -□□C, or -□□D: Flange Specification 4

#### • Servomotor Connector



|   |                   |                |
|---|-------------------|----------------|
| 1 | Phase U           | Red            |
| 2 | Phase V           | White          |
| 3 | Phase W           | Blue           |
| 4 | FG (frame ground) | Green (yellow) |

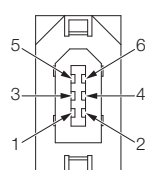
#### Models

- Plug: 350779-1
- Pins: 350561-3 or 350690-3 (No. 1 to 3)
- Ground pin: 350654-1 or 350669-1 (No. 4)
- Manufacturer: Tyco Electronics Japan G.K.

#### Mating Connector

- Cap: 350780-1
- Socket: 350570-3 or 350689-3

#### • Encoder Connector



|                |                   |
|----------------|-------------------|
| 1              | PG5V              |
| 2              | PG0V              |
| 3*             | BAT               |
| 4*             | BAT0              |
| 5              | PS                |
| 6              | /PS               |
| Connector case | FG (frame ground) |

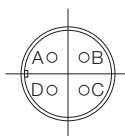
\* Only absolute-value models with multiturn data.

**Model:** 55102-0600  
Manufacturer: Molex Japan LLC

**Mating connector:** 54280-0609

### ◆ SGM7F-□□M or -□□N with Flange Specification 1 or 3

#### • Servomotor Connector



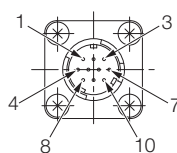
|   |                   |
|---|-------------------|
| A | Phase U           |
| B | Phase V           |
| C | Phase W           |
| D | FG (frame ground) |

**Model:** CE05-2A18-10PD  
Manufacturer: DDK Ltd.

#### Mating Connector

- Plug: CE05-6A18-10SD-B-BSS
- Cable clamp: CE3057-10A-□(D265)

#### • Encoder Connector



|    |                   |
|----|-------------------|
| 1  | PS                |
| 2  | /PS               |
| 3  | —                 |
| 4  | PG5V              |
| 5* | BAT0              |
| 6  | —                 |
| 7  | FG (frame ground) |
| 8* | BAT               |
| 9  | PG0V              |
| 10 | —                 |

\* Only absolute-value models with multiturn data.

**Model:** JN1AS10ML1  
Manufacturer: Japan Aviation Electronics Industry, Ltd.

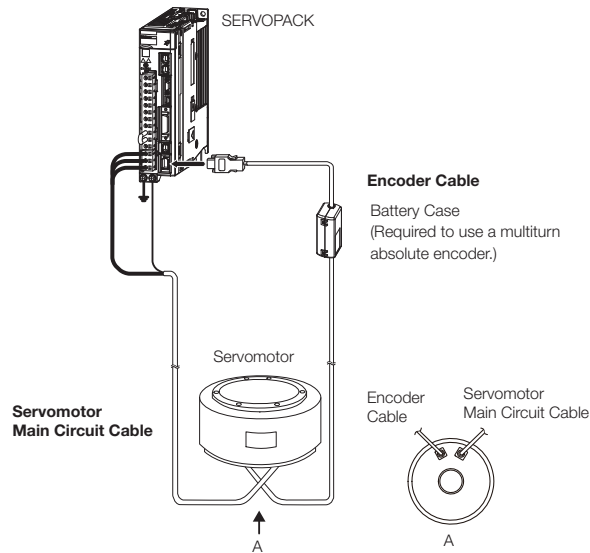
**Mating connector:** JN1DS10SL1

## Selecting Cables

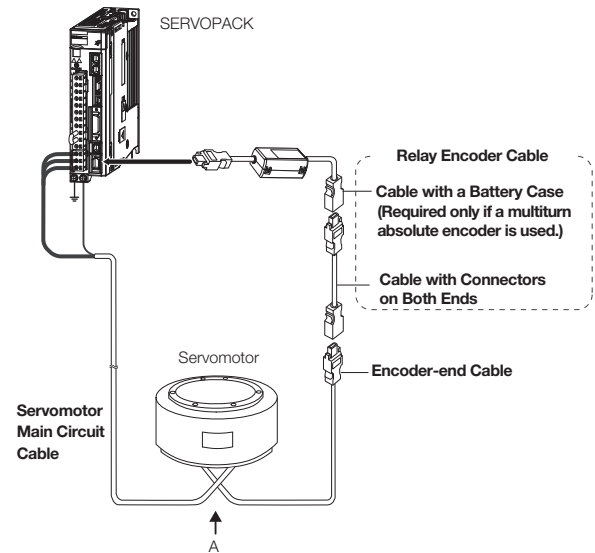
### ◆ Cable Configurations

The cables shown below are required to connect a Servomotor to a SERVOPACK.

Encoder Cable of 20 m or Less



Encoder Cable of 30 m to 50 m (Relay Cable)



Note: 1. If the Encoder Cable length exceeds 20 m, be sure to use a Relay Encoder Cable.

2. If you use a Servomotor Main Circuit Cable that exceeds 20 m, the intermittent duty zone in the torque-motor speed characteristics will become smaller because the voltage drop increases.

3. Refer to the following manual for the following information.

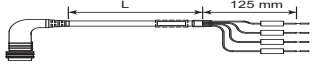
- Cable dimensional drawings and cable connection specifications
- Order numbers and specifications of individual connectors for cables
- Order numbers and specifications for wiring materials

📖 **Σ-7-Series AC Servo Drive Peripheral Device Selection Manual (Manual No.: SIEP S800001 32)**

### ◆ Servomotor Main Circuit Cables

| Servomotor Model                                                                | Length (L) | Order Number    |                   | Appearance |
|---------------------------------------------------------------------------------|------------|-----------------|-------------------|------------|
|                                                                                 |            | Standard Cable  | Flexible Cable*1  |            |
| SGM7F-□□A<br>SGM7F-□□B<br>SGM7F-□□C<br>SGM7F-□□D                                | 3 m        | JZSP-CMM60-03-E | JZSP-C7MDN23-03-E |            |
| Flange specification*2:<br>1<br>Non-load side installation                      | 5 m        | JZSP-CMM60-05-E | JZSP-C7MDN23-05-E |            |
|                                                                                 | 10 m       | JZSP-CMM60-10-E | JZSP-C7MDN23-10-E |            |
|                                                                                 | 15 m       | JZSP-CMM60-15-E | JZSP-C7MDN23-15-E |            |
|                                                                                 | 20 m       | JZSP-CMM60-20-E | JZSP-C7MDN23-20-E |            |
| SGM7F-□□A<br>SGM7F-□□B<br>SGM7F-□□C<br>SGM7F-□□D                                | 3 m        | JZSP-CMM00-03-E | JZSP-C7MDS23-03-E |            |
| Flange specification*2:<br>4<br>Non-load side installation (with cable on side) | 5 m        | JZSP-CMM00-05-E | JZSP-C7MDS23-05-E |            |
|                                                                                 | 10 m       | JZSP-CMM00-10-E | JZSP-C7MDS23-10-E |            |
|                                                                                 | 15 m       | JZSP-CMM00-15-E | JZSP-C7MDS23-15-E |            |
|                                                                                 | 20 m       | JZSP-CMM00-20-E | JZSP-C7MDS23-20-E |            |

Continued from previ-

| Servomotor Model                                     | Length (L) | Order Number   |                              | Appearance                                                                          |
|------------------------------------------------------|------------|----------------|------------------------------|-------------------------------------------------------------------------------------|
|                                                      |            | Standard Cable | Flexible Cable <sup>*1</sup> |                                                                                     |
| SGM7F-□□M<br>SGM7F-□□N<br>□□: 45<br>□□: 80<br>□□: 1A | 3 m        | B1EV-03(A)-E   | B1EP-03(A)-E                 |  |
|                                                      | 5 m        | B1EV-05(A)-E   | B1EP-05(A)-E                 |                                                                                     |
|                                                      | 10 m       | B1EV-10(A)-E   | B1EP-10(A)-E                 |                                                                                     |
|                                                      | 15 m       | B1EV-15(A)-E   | B1EP-15(A)-E                 |                                                                                     |
|                                                      | 20 m       | B1EV-20(A)-E   | B1EP-20(A)-E                 |                                                                                     |
| SGM7F-□□M<br>SGM7F-□□N<br>□□: 1E<br>□□: 2Z           | 3 m        | B2EV-03(A)-E   | B2EP-03(A)-E                 |                                                                                     |
|                                                      | 5 m        | B2EV-05(A)-E   | B2EP-05(A)-E                 |                                                                                     |
|                                                      | 10 m       | B2EV-10(A)-E   | B2EP-10(A)-E                 |                                                                                     |
|                                                      | 15 m       | B2EV-15(A)-E   | B2EP-15(A)-E                 |                                                                                     |
|                                                      | 20 m       | B2EV-20(A)-E   | B2EP-20(A)-E                 |                                                                                     |

\*1. Use Flexible Cables for moving parts of machines, such as robots. The recommended bending radius of the Flexible Cables are given in the following table.

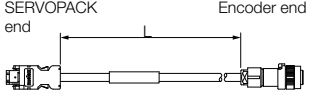
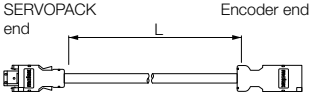
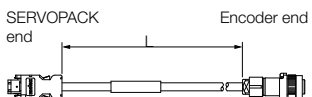
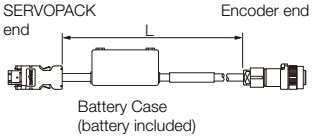
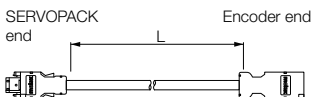
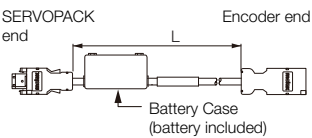
| Order Number      | Recommended Bending Radius (R) | Order Number     | Recommended Bending Radius (R) |
|-------------------|--------------------------------|------------------|--------------------------------|
| JZSP-C7MDN23-□□-E | 90 mm min.                     | JZSP-USA321-□□-E | 113 mm min.                    |
| JZSP-C7MDS23-□□-E |                                | JZSP-USA322-□□-E |                                |
| JZSP-USA121-□□-E  | 96 mm min.                     | JZSP-USA521-□□-E | 150 mm min.                    |
| JZSP-USA122-□□-E  |                                | JZSP-USA522-□□-E |                                |

Refer to the following section for the flange specifications.

 **Model Designations (page 204)**

Note: Direct Drive Servomotors are not available with holding brakes.

## ◆ Encoder Cables of 20 m or Less

| Servomotor Model                                                                               | Name                                                                  | Length (L) | Order Number     |                              | Appearance                                                                            |
|------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------|------------|------------------|------------------------------|---------------------------------------------------------------------------------------|
|                                                                                                |                                                                       |            | Standard Cable   | Flexible Cable <sup>*1</sup> |                                                                                       |
| SGM7F-□□□F<br>Flange specification <sup>*2</sup> : 1 or 3                                      | For incremental encoder                                               | 3 m        | JZSP-CMP60-03-E  | JZSP-CSP60-03-E              |    |
|                                                                                                |                                                                       | 5 m        | JZSP-CMP60-05-E  | JZSP-CSP60-05-E              |                                                                                       |
|                                                                                                |                                                                       | 10 m       | JZSP-CMP60-10-E  | JZSP-CSP60-10-E              |                                                                                       |
|                                                                                                |                                                                       | 15 m       | JZSP-CMP60-15-E  | JZSP-CSP60-15-E              |                                                                                       |
|                                                                                                |                                                                       | 20 m       | JZSP-CMP60-20-E  | JZSP-CSP60-20-E              |                                                                                       |
| SGM7F-□□AF<br>SGM7F-□□BF<br>SGM7F-□□CF<br>SGM7F-□□DF<br>Flange specification <sup>*2</sup> : 4 | For incremental encoder                                               | 3 m        | JZSP-CMP00-03-E  | JZSP-CMP10-03-E              |    |
|                                                                                                |                                                                       | 5 m        | JZSP-CMP00-05-E  | JZSP-CMP10-05-E              |                                                                                       |
|                                                                                                |                                                                       | 10 m       | JZSP-CMP00-10-E  | JZSP-CMP10-10-E              |                                                                                       |
|                                                                                                |                                                                       | 15 m       | JZSP-CMP00-15-E  | JZSP-CMP10-15-E              |                                                                                       |
|                                                                                                |                                                                       | 20 m       | JZSP-CMP00-20-E  | JZSP-CMP10-20-E              |                                                                                       |
| SGM7F-□□□7<br>Flange specification <sup>*2</sup> : 1 or 3                                      | For multi-turn absolute encoder (without Battery Case <sup>*3</sup> ) | 3 m        | JZSP-C7PI00-03-E | JZSP-C7PI20-03-E             |    |
|                                                                                                |                                                                       | 5 m        | JZSP-C7PI00-05-E | JZSP-C7PI20-05-E             |                                                                                       |
|                                                                                                |                                                                       | 10 m       | JZSP-C7PI00-10-E | JZSP-C7PI20-10-E             |                                                                                       |
|                                                                                                |                                                                       | 15 m       | JZSP-C7PI00-15-E | JZSP-C7PI20-15-E             |                                                                                       |
|                                                                                                |                                                                       | 20 m       | JZSP-C7PI00-20-E | JZSP-C7PI20-20-E             |                                                                                       |
|                                                                                                | For multi-turn absolute encoder (with Battery Case)                   | 3 m        | JZSP-C7PA00-03-E | JZSP-C7PA20-03-E             |   |
|                                                                                                |                                                                       | 5 m        | JZSP-C7PA00-05-E | JZSP-C7PA20-05-E             |                                                                                       |
|                                                                                                |                                                                       | 10 m       | JZSP-C7PA00-10-E | JZSP-C7PA20-10-E             |                                                                                       |
|                                                                                                |                                                                       | 15 m       | JZSP-C7PA00-15-E | JZSP-C7PA20-15-E             |                                                                                       |
|                                                                                                |                                                                       | 20 m       | JZSP-C7PA00-20-E | JZSP-C7PA20-20-E             |                                                                                       |
| SGM7F-□□A7<br>SGM7F-□□B7<br>SGM7F-□□C7<br>SGM7F-□□D7<br>Flange specification <sup>*2</sup> : 4 | For multi-turn absolute encoder (without Battery Case <sup>*3</sup> ) | 3 m        | JZSP-CMP00-03-E  | JZSP-CMP10-03-E              |  |
|                                                                                                |                                                                       | 5 m        | JZSP-CMP00-05-E  | JZSP-CMP10-05-E              |                                                                                       |
|                                                                                                |                                                                       | 10 m       | JZSP-CMP00-10-E  | JZSP-CMP10-10-E              |                                                                                       |
|                                                                                                |                                                                       | 15 m       | JZSP-CMP00-15-E  | JZSP-CMP10-15-E              |                                                                                       |
|                                                                                                |                                                                       | 20 m       | JZSP-CMP00-20-E  | JZSP-CMP10-20-E              |                                                                                       |
|                                                                                                | For multi-turn absolute encoder (with Battery Case)                   | 3 m        | JZSP-CSP19-03-E  | JZSP-CSP29-03-E              |  |
|                                                                                                |                                                                       | 5 m        | JZSP-CSP19-05-E  | JZSP-CSP29-05-E              |                                                                                       |
|                                                                                                |                                                                       | 10 m       | JZSP-CSP19-10-E  | JZSP-CSP29-10-E              |                                                                                       |
|                                                                                                |                                                                       | 15 m       | JZSP-CSP19-15-E  | JZSP-CSP29-15-E              |                                                                                       |
|                                                                                                |                                                                       | 20 m       | JZSP-CSP19-20-E  | JZSP-CSP29-20-E              |                                                                                       |

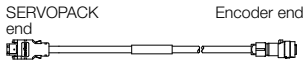
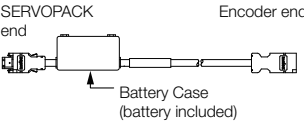
\*1. Use Flexible Cables for moving parts of machines, such as robots. The recommended bending radius (R) is 68 mm or larger.

\*2. Refer to the following section for the flange specifications.

 **Model Designations (page 204)**

\*3. Use one of these Cables if a battery is connected to the host controller.

# ◆ Relay Encoder Cables of 30 m to 50 m

| Servomotor Model                                                   | Name                                                                                          | Length (L) | Order Number*1   | Appearance                                                                          |
|--------------------------------------------------------------------|-----------------------------------------------------------------------------------------------|------------|------------------|-------------------------------------------------------------------------------------|
| SGM7F-□□□F<br>SGM7F-□□□7<br>Flange specifica-<br>tion*2: 1 or 3    | Encoder-end Cable<br>(for single-turn/multi-<br>turn absolute encoder)                        | 0.3 m      | JZSP-C7PRC0-E    |  |
| SGM7F-□□□F<br>SGM7F-□□□7<br>Flange specifica-<br>tion*2: 1, 3 or 4 | Cables with Connec-<br>tors on Both Ends<br>(for single-turn/multi-<br>turn absolute encoder) | 30 m       | JZSP-UCMP00-30-E |  |
|                                                                    |                                                                                               | 40 m       | JZSP-UCMP00-40-E |                                                                                     |
|                                                                    |                                                                                               | 50 m       | JZSP-UCMP00-50-E |                                                                                     |
| SGM7F-□□□7<br>Flange specifica-<br>tion*2: 1, 3 or 4               | Cable with a Battery<br>Case<br>(for multiturn absolute<br>encoder)*3                         | 0.3 m      | JZSP-CSP12-E     |  |

\*1. Flexible Cables are not available.

\*2. Refer to the following section for the flange specifications.

 **Model Designations (page 204)**

\*3. Use one of these Cables if a battery is connected to the host controller.

# SGM7E (Coreless, Inner Rotor)

## Model Designations

SGM7E - 02 B 7 A 1 1

Direct Drive Servomotors: SGM7E

1st+2nd digits 3rd digit 4th digit 5th digit 6th digit 7th digit

1st+2nd digits Rated Output 3rd digit Servomotor Outer Diameter 5th digit Design Revision Order

| Code | Specification |
|------|---------------|
| 02   | 2.00 N·m      |
| 04   | 4.00 N·m      |
| 05   | 5.00 N·m      |
| 07   | 7.00 N·m      |
| 08   | 8.00 N·m      |
| 10   | 10.0 N·m      |
| 14   | 14.0 N·m      |
| 16   | 16.0 N·m      |
| 17   | 17.0 N·m      |
| 25   | 25.0 N·m      |
| 35   | 35.0 N·m      |

| Code | Specification |
|------|---------------|
| B    | 135-mm dia.   |
| C    | 175-mm dia.   |
| D    | 230-mm dia.   |
| E    | 290-mm dia.   |

4th digit Serial Encoder

| Code | Specification                      |
|------|------------------------------------|
| 7    | 24-bit multiturn absolute encoder* |
| F    | 24-bit incremental encoder*        |

\* Both multiturn absolute encoder and incremental encoder can be used as a single-turn absolute encoder by setting parameters.

5th digit Design Revision Order

A

6th digit Flange

| Code | Mounting                           |
|------|------------------------------------|
| 1    | Non-load side                      |
| 4    | Non-load side (with cable on side) |

7th digit Options

| Code | Specification                                                                        |
|------|--------------------------------------------------------------------------------------|
| 1    | Without options                                                                      |
| 2    | High machine precision (runout at end of shaft and runout of shaft surface: 0.01 mm) |

■ Non Stock Items

Note: 1. Direct Drive Servomotors are not available with holding brakes.

2. This information is provided to explain model numbers. It is not meant to imply that models are available for all combinations of codes.

## ◆ Manufactured Models

| Rated Torque N·m | Servomotor Outer Diameter |                 |                 |                 |
|------------------|---------------------------|-----------------|-----------------|-----------------|
|                  | B (135-mm dia.)           | C (175-mm dia.) | D (230-mm dia.) | E (290-mm dia.) |
| 2.00             | SGM7E-02B                 | —               | —               | —               |
| 4.00             | —                         | SGM7E-04C       | —               | —               |
| 5.00             | SGM7E-05B                 | —               | —               | —               |
| 7.00             | SGM7E-07B                 | —               | —               | —               |
| 8.00             | —                         | —               | SGM7E-08D       | —               |
| 10.0             | —                         | SGM7E-10C       | —               | —               |
| 14.0             | —                         | SGM7E-14C       | —               | —               |
| 16.0             | —                         | —               | —               | SGM7E-16E       |
| 17.0             | —                         | —               | SGM7E-17D       | —               |
| 25.0             | —                         | —               | SGM7E-25D       | —               |
| 35.0             | —                         | —               | —               | SGM7E-35E       |

Note: The above table shows combinations of the rated torque and outer diameter. The fourth through seventh digits have been omitted.

# Specifications and Ratings

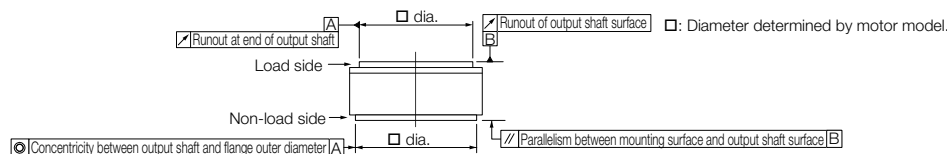
## Specifications

| Voltage                  |                                                               |        | 200 V                                                                                                                                                                                                                                                                                                                                  |     |     |     |            |     |      |     |     |      |     |
|--------------------------|---------------------------------------------------------------|--------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----|-----|-----|------------|-----|------|-----|-----|------|-----|
| Model SGM7E-             |                                                               |        | 02B                                                                                                                                                                                                                                                                                                                                    | 05B | 07B | 04C | 10C        | 14C | 08D  | 17D | 25D | 16E  | 35E |
| Time Rating              |                                                               |        | Continuous                                                                                                                                                                                                                                                                                                                             |     |     |     |            |     |      |     |     |      |     |
| Thermal Class            |                                                               |        | A                                                                                                                                                                                                                                                                                                                                      |     |     |     |            |     |      |     |     |      |     |
| Insulation Resistance    |                                                               |        | 500 VDC, 10 MΩ min.                                                                                                                                                                                                                                                                                                                    |     |     |     |            |     |      |     |     |      |     |
| Withstand Voltage        |                                                               |        | 1,500 VAC for 1 minute                                                                                                                                                                                                                                                                                                                 |     |     |     |            |     |      |     |     |      |     |
| Excitation               |                                                               |        | Permanent magnet                                                                                                                                                                                                                                                                                                                       |     |     |     |            |     |      |     |     |      |     |
| Mounting                 |                                                               |        | Flange-mounted                                                                                                                                                                                                                                                                                                                         |     |     |     |            |     |      |     |     |      |     |
| Drive Method             |                                                               |        | Direct drive                                                                                                                                                                                                                                                                                                                           |     |     |     |            |     |      |     |     |      |     |
| Rotation Direction       |                                                               |        | Counterclockwise (CCW) for forward reference when viewed from the load side                                                                                                                                                                                                                                                            |     |     |     |            |     |      |     |     |      |     |
| Vibration Class*1        |                                                               |        | V15                                                                                                                                                                                                                                                                                                                                    |     |     |     |            |     |      |     |     |      |     |
| Absolute Accuracy        |                                                               |        | ±15 arcsec                                                                                                                                                                                                                                                                                                                             |     |     |     |            |     |      |     |     |      |     |
| Repeatability            |                                                               |        | ±1.3 arcsec                                                                                                                                                                                                                                                                                                                            |     |     |     |            |     |      |     |     |      |     |
| Protective Structure*2   |                                                               |        | Totally enclosed, self-cooled, IP42 (The protective structure is IP40 for CE Marking.)                                                                                                                                                                                                                                                 |     |     |     |            |     |      |     |     |      |     |
| Environmental Conditions | Surrounding Air Temperature                                   |        | 0°C to 40°C (with no freezing)                                                                                                                                                                                                                                                                                                         |     |     |     |            |     |      |     |     |      |     |
|                          | Surrounding Air Humidity                                      |        | 20% to 80% relative humidity (with no condensation)                                                                                                                                                                                                                                                                                    |     |     |     |            |     |      |     |     |      |     |
|                          | Installation Site                                             |        | <ul style="list-style-type: none"><li>• Must be indoors and free of corrosive and explosive gases.</li><li>• Must be well-ventilated and free of dust and moisture.</li><li>• Must facilitate inspection and cleaning.</li><li>• Must have an altitude of 1,000 m or less.</li><li>• Must be free of strong magnetic fields.</li></ul> |     |     |     |            |     |      |     |     |      |     |
|                          | Storage Environment                                           |        | Store the Servomotor in the following environment if you store it with the power cable disconnected.<br>Storage Temperature: -20°C to 60°C (with no freezing)<br>Storage Humidity: 20% to 80% relative humidity (with no condensation)                                                                                                 |     |     |     |            |     |      |     |     |      |     |
| Mechanical Tolerances*3  | Runout of Output Shaft Surface                                | mm     | 0.02 (0.01 for high machine precision option)                                                                                                                                                                                                                                                                                          |     |     |     |            |     |      |     |     |      |     |
|                          | Runout at End of Output Shaft                                 | mm     | 0.04 (0.01 for high machine precision option)                                                                                                                                                                                                                                                                                          |     |     |     |            |     |      |     |     |      |     |
|                          | Parallelism between Mounting Surface and Output Shaft Surface | mm     | 0.07                                                                                                                                                                                                                                                                                                                                   |     |     |     |            |     | 0.08 |     |     |      |     |
|                          | Concentricity between Output Shaft and Flange Outer Diameter  | mm     | 0.07                                                                                                                                                                                                                                                                                                                                   |     |     |     |            |     | 0.08 |     |     |      |     |
| Shock Resistance*4       | Impact Acceleration Rate at Flange                            |        | 490 m/s <sup>2</sup>                                                                                                                                                                                                                                                                                                                   |     |     |     |            |     |      |     |     |      |     |
|                          | Number of Impacts                                             |        | 2 times                                                                                                                                                                                                                                                                                                                                |     |     |     |            |     |      |     |     |      |     |
| Vibration Resistance*4   | Vibration Acceleration Rate at Flange                         |        | 49 m/s <sup>2</sup>                                                                                                                                                                                                                                                                                                                    |     |     |     |            |     |      |     |     |      |     |
| Applicable SERVOPACKs    |                                                               | SGD7S- | 2R8A, 2R1F                                                                                                                                                                                                                                                                                                                             |     |     |     | 2R8A, 2R8F |     |      |     |     | 5R5A |     |
|                          |                                                               | SGD7W- | 2R8A                                                                                                                                                                                                                                                                                                                                   |     |     |     |            |     |      |     |     |      |     |

\*1. A vibration class of V15 indicates a vibration amplitude of 15 μm maximum on the Servomotor without a load at the rated motor speed.

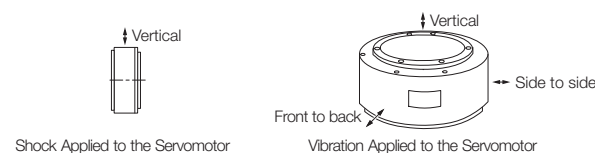
\*2. The hollow hole section, motor mounting surface, output shaft surface, and gap around the rotating part of the shaft are excluded. Protective structure specifications apply only when the special cable is used.

\*3. Refer to the following figure for the relevant locations on the Servomotor. Refer to the dimensional drawings of the individual Servomotors for more information on tolerances.



\*4. The given values are for when the Servomotor shaft is mounted horizontally and shock or vibration is applied in the directions shown in the following figures.

The strength of the vibration that the Servomotor can withstand depends on the application. Check the vibration acceleration rate.



## Ratings

| Voltage                                                          |                                                                                       |                | 200 V |      |                |         |      |                |      |      |                |       |     |
|------------------------------------------------------------------|---------------------------------------------------------------------------------------|----------------|-------|------|----------------|---------|------|----------------|------|------|----------------|-------|-----|
| Model SGM7E-                                                     |                                                                                       | 02B            | 05B   | 07B  | 04C            | 10C     | 14C  | 08D            | 17D  | 25D  | 16E            | 35E   |     |
| Rated Output <sup>*1</sup>                                       | W                                                                                     | 42             | 105   | 147  | 84             | 209     | 293  | 168            | 356  | 393  | 335            | 550   |     |
| Rated Torque <sup>*1, *2</sup>                                   | N·m                                                                                   | 2.00           | 5.00  | 7.00 | 4.00           | 10.0    | 14.0 | 8.00           | 17.0 | 25.0 | 16.0           | 35.0  |     |
| Instantaneous Maximum Torque <sup>*1</sup>                       | N·m                                                                                   | 6.00           | 15.0  | 21.0 | 12.0           | 30.0    | 42.0 | 24.0           | 51.0 | 75.0 | 48.0           | 105   |     |
| Stall Torque <sup>*1</sup>                                       | N·m                                                                                   | 2.05           | 5.15  | 7.32 | 4.09           | 10.1    | 14.2 | 8.23           | 17.4 | 25.4 | 16.5           | 35.6  |     |
| Rated Current <sup>*1</sup>                                      | Arms                                                                                  | 1.8            | 1.7   | 1.4  | 2.2            |         | 2.8  | 1.9            | 2.5  | 2.6  | 3.3            | 3.5   |     |
| Instantaneous Maximum Current <sup>*1</sup>                      | Arms                                                                                  | 5.4            | 5.1   | 4.1  | 7.0            |         | 8.3  | 5.6            | 7.5  | 8.0  | 9.4            | 10.0  |     |
| Rated Motor Speed <sup>*1</sup>                                  | min <sup>-1</sup>                                                                     | 200            |       |      | 200            |         |      | 200            |      | 150  | 200            | 150   |     |
| Maximum Motor Speed <sup>*1</sup>                                | min <sup>-1</sup>                                                                     | 500            |       |      | 500            | 400     | 300  | 500            | 350  | 250  | 500            | 250   |     |
| Torque Constant                                                  | N·m/Arms                                                                              | 1.18           | 3.17  | 5.44 | 2.04           | 5.05    | 5.39 | 5.10           | 7.79 | 10.8 | 5.58           | 11.1  |     |
| Motor Moment of Inertia                                          | ×10 <sup>-4</sup> kg·m <sup>2</sup>                                                   | 28.0           | 51.0  | 77.0 | 77.0           | 140     | 220  | 285            | 510  | 750  | 930            | 1430  |     |
| Rated Power Rate <sup>*1</sup>                                   | kW/s                                                                                  | 1.43           | 4.90  | 6.36 | 2.08           | 7.14    | 8.91 | 2.25           | 5.67 | 8.33 | 2.75           | 8.57  |     |
| Rated Angular Acceleration Rate <sup>*1</sup>                    | rad/s <sup>2</sup>                                                                    | 710            | 980   | 910  | 520            | 710     | 640  | 280            | 330  |      | 170            | 240   |     |
| Heat Sink Size                                                   | mm                                                                                    | 350 × 350 × 12 |       |      | 450 × 450 × 12 |         |      | 550 × 550 × 12 |      |      | 650 × 650 × 12 |       |     |
| Allowable Load Moment of Inertia (Motor Moment of Inertia Ratio) |                                                                                       | 10 times       |       |      |                | 5 times |      | 3 times        |      |      |                |       |     |
|                                                                  | With External Regenerative Resistor and External Dynamic Brake Resistor <sup>*3</sup> | 10 times       |       |      |                | 5 times |      | 3 times        |      |      |                |       |     |
| Allow-able Load <sup>*4</sup>                                    | Allowable Thrust Load                                                                 | N              | 1500  |      |                | 3300    |      |                | 4000 |      |                | 11000 |     |
|                                                                  | Allowable Moment Load                                                                 | N·m            | 40    | 50   | 64             | 70      | 75   | 90             | 93   | 103  | 135            | 250   | 320 |

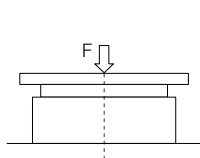
\*1. These values are for operation in combination with a SERVOPACK when the temperature of the armature winding is 100°C. The values for other items are at 20°C. These are typical values.

\*2. The rated torques are the continuous allowable torque values at a surrounding air temperature of 40°C with a steel heat sink of the dimensions given in the table.

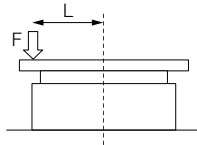
\*3. To externally connect dynamic brake resistor, select hardware option specification 020 for the SERVOPACK. However, you cannot externally connect dynamic brake resistor if you use the following SERVOPACKs (maximum applicable motor capacity: 400 W).

- SGD7S-R70□□□A020 to -2R8□□□A020
- SGD7W-1R6A20A020 to -2R8A20A020

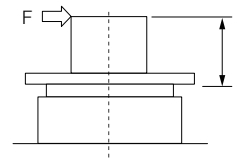
\*4. The thrust loads and moment loads that are applied while a Servomotor is operating are roughly classified into the following patterns. Design the machine so that the thrust loads or moment loads will not exceed the values given in the table.



Where F is the external force,  
Thrust load = F + Load mass  
Moment load = 0



Where F is the external force,  
Thrust load = F + Load mass  
Moment load = F × L



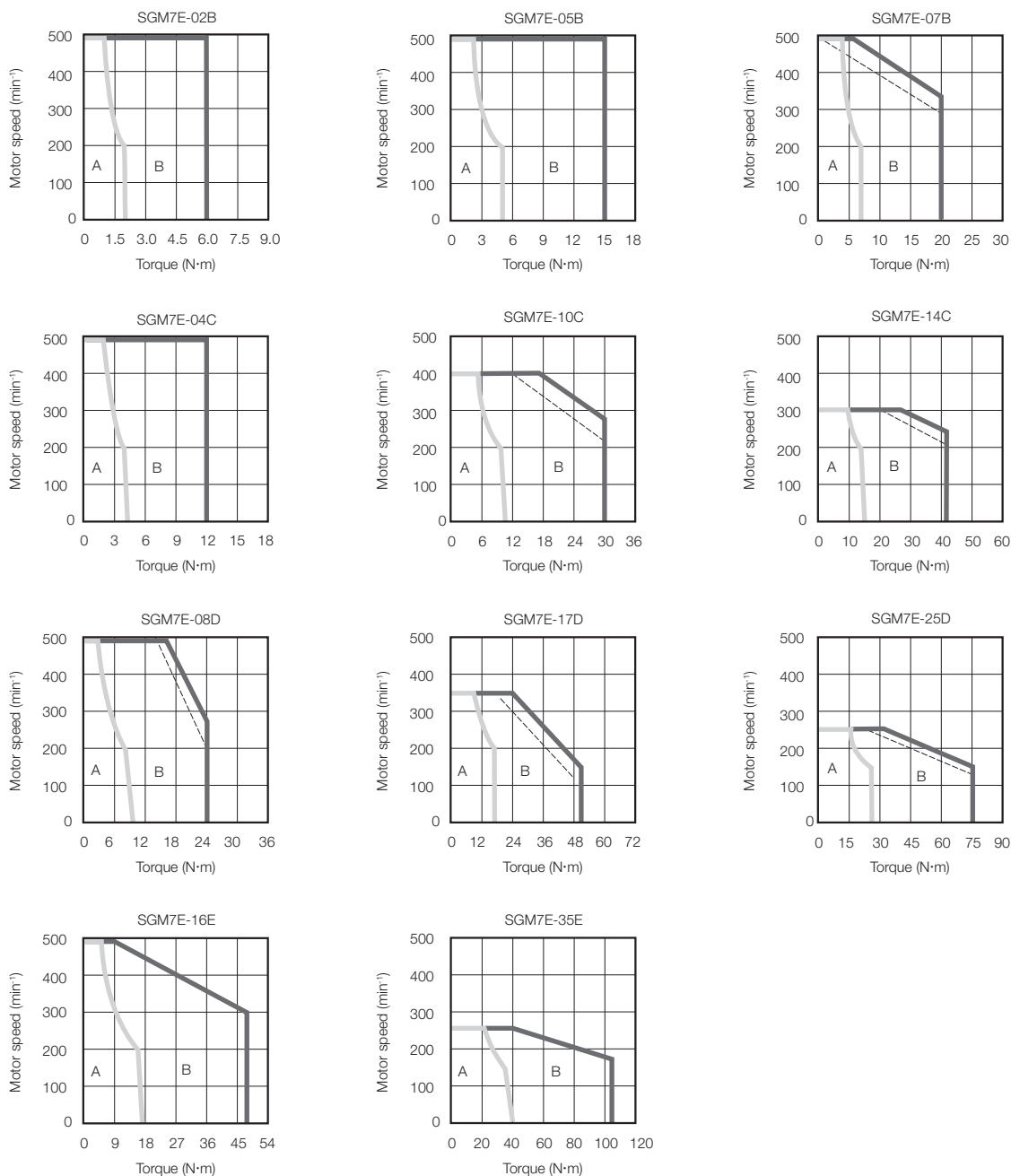
Where F is the external force,  
Thrust load = Load mass  
Moment load = F × L

Note: For the bearings used in these Servomotors, the loss depends on the bearing temperature. The amount of heat loss is higher at low temperatures.



## Torque-Motor Speed Characteristics

**A** : Continuous duty zone — (solid lines): With three-phase 200-V input  
**B** : Intermittent duty zone - - - (dotted lines): With single-phase 100-V input

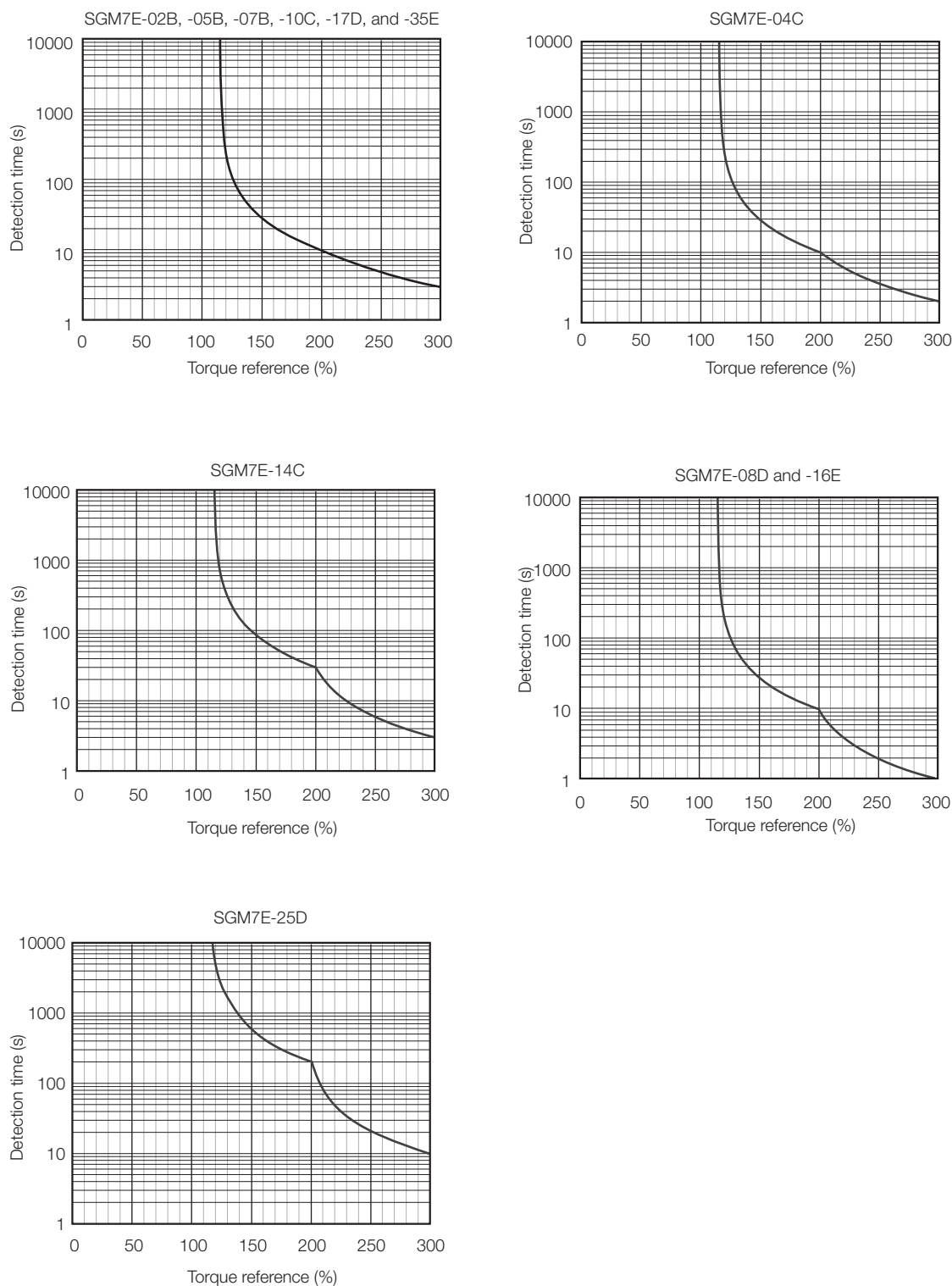


Note: 1. These values (typical values) are for operation in combination with a SERVOPACK when the temperature of the armature winding is 100°C.

2. The characteristics in the intermittent duty zone depend on the power supply voltage.
3. If the effective torque is within the allowable range for the rated torque, the Servomotor can be used within the intermittent duty zone.
4. If you use a Servomotor Main Circuit Cable that exceeds 20 m, the intermittent duty zone in the torque-motor speed characteristics will become smaller because the voltage drop increases.

## Servomotor Overload Protection Characteristics

The overload detection level is set for hot start conditions with a Servomotor surrounding air temperature of 40°C.



Note: The above overload protection characteristics do not mean that you can perform continuous duty operation with an output of 100% or higher. Use the Servomotor so that the effective torque remains within the continuous duty zone given in Torque-Motor Speed Characteristics on page 229.

## Allowable Load Moment of Inertia

The allowable load moments of inertia (motor moment of inertia ratios) for the Servomotors are given in the Ratings (page 228). The values are determined by the regenerative energy processing capacity of the SERVOPACK and are also affected by the drive conditions of the Servomotor. Perform the required Steps for each of the following cases.

Use the SigmaSize+ AC Servo Drive Capacity Selection Program to check the driving conditions. Contact your Yaskawa representative for information on this program.

### ◆ Exceeding the Allowable Load Moment of Inertia

Use one of the following measures to adjust the load moment of inertia to within the allowable value.

- Reduce the torque limit.
- Reduce the deceleration rate.
- Reduce the maximum motor speed.

If the above steps is not possible, install an external regenerative resistor.

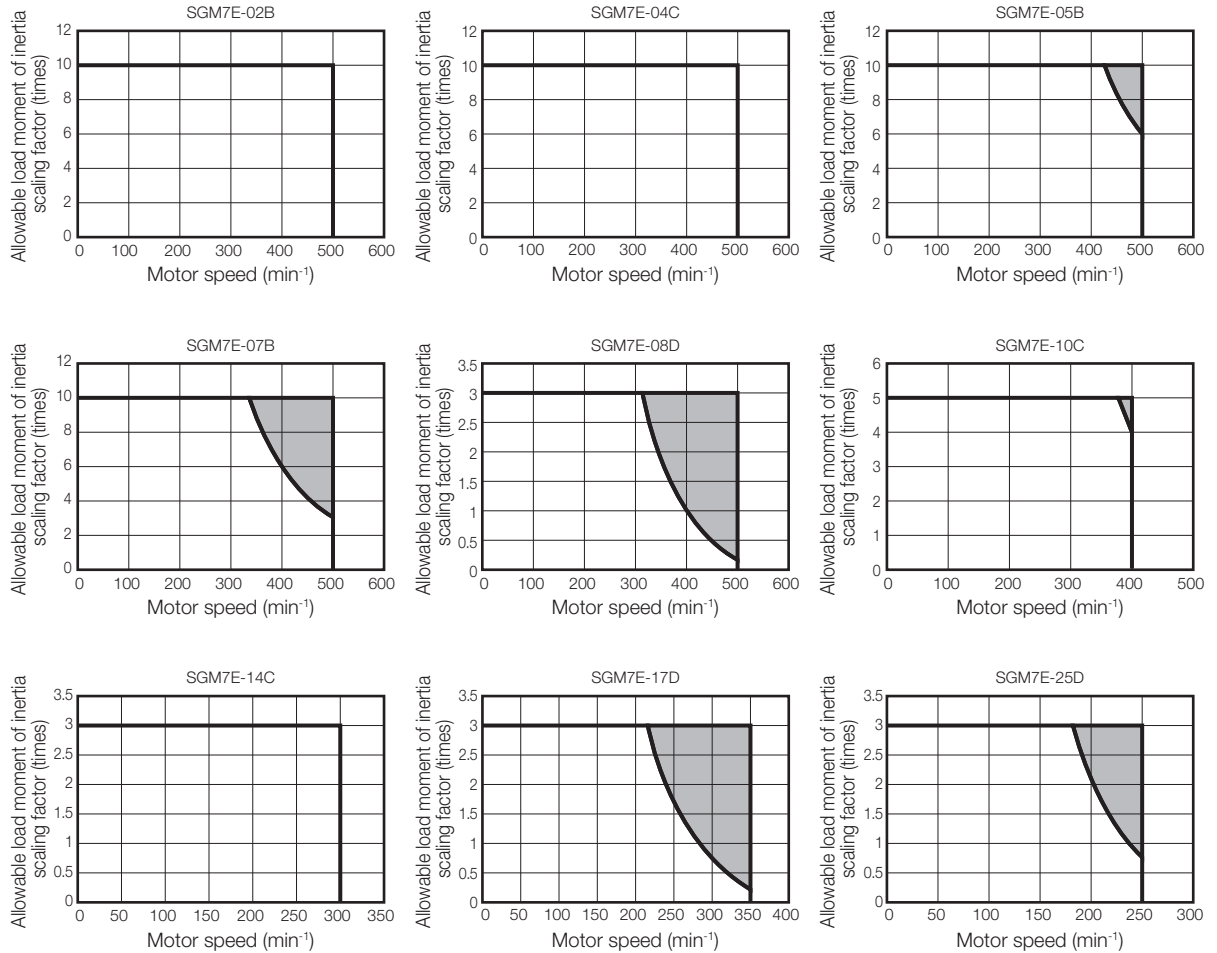
#### Information

An Overvoltage Alarm (A.400) is likely to occur during deceleration if the load moment of inertia exceeds the allowable load moment of inertia. SERVOPACKs with a built-in regenerative resistor may generate a Regenerative Overload Alarm (A.320). Refer to Built-In Regenerative Resistor (page 492) for the regenerative power (W) that can be processed by the SERVO-PACKs.

Install an External Regenerative Resistor when the built-in regenerative resistor cannot process all of the regenerative power.

### ◆ SERVOPACKs without Built-in Regenerative Resistors

The following graph shows the allowable load moment of inertia scaling factor of the motor speed (reference values for deceleration operation at or above the rated torque). Application is possible without an external regenerative resistor within the allowable value. However, an External Regenerative Resistor is required in the shaded areas of the graphs.



Note: Applicable SERVOPACK models: SGD7S-2R8A and -2R8F

### ◆ When an External Regenerative Resistor Is Required

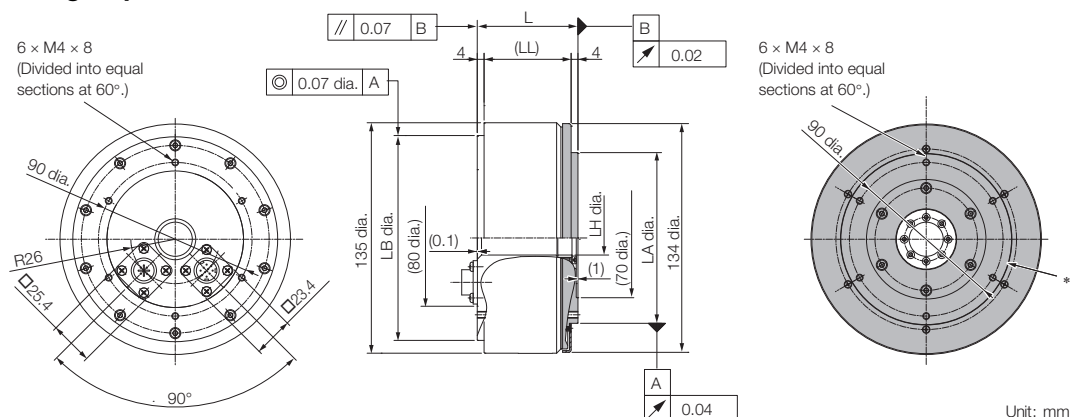
Install the External Regenerative Resistor. Refer to the following section for the recommended products.

 **External Regenerative Resistors (page 492)**

## External Dimensions

### ◆ SGM7E-□□B

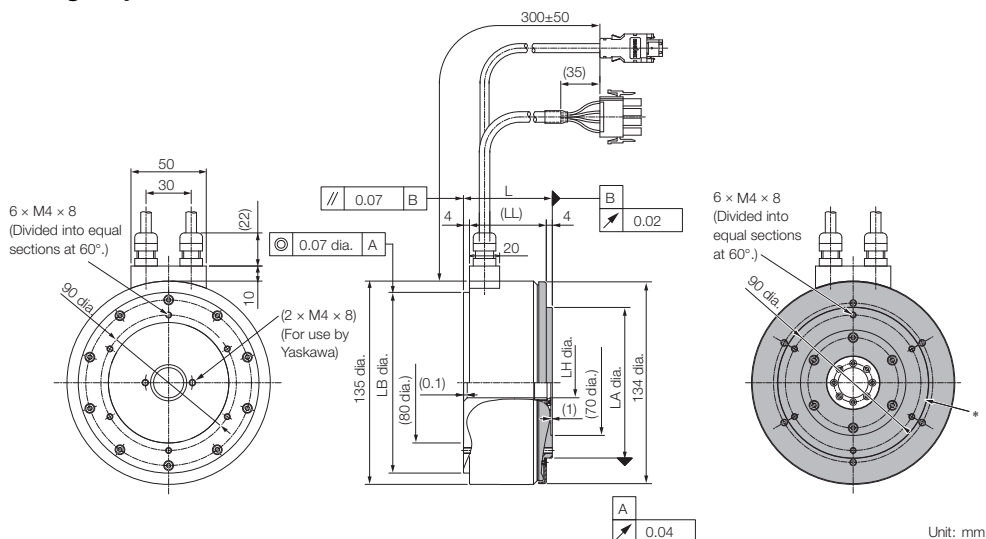
#### • Flange Specification 1



\* The shaded section indicates the rotating parts.  
Note: Values in parentheses are reference dimensions.

| Model SGM7E- | L   | (LL) | LB                                 | LH                              | LA                                 | Approx. Mass [kg] |
|--------------|-----|------|------------------------------------|---------------------------------|------------------------------------|-------------------|
| 02B□A11      | 59  | 51   | 120 <sup>0</sup> <sub>-0.035</sub> | 20 <sup>+0.4</sup> <sub>0</sub> | 100 <sup>0</sup> <sub>-0.035</sub> | 4.8               |
| 05B□A11      | 88  | 80   | 120 <sup>0</sup> <sub>-0.035</sub> | 20 <sup>+0.4</sup> <sub>0</sub> | 100 <sup>0</sup> <sub>-0.035</sub> | 5.8               |
| 07B□A11      | 128 | 120  | 120 <sup>0</sup> <sub>-0.035</sub> | 20 <sup>+0.4</sup> <sub>0</sub> | 100 <sup>0</sup> <sub>-0.035</sub> | 8.2               |

#### • Flange Specification 4



\* The shaded section indicates the rotating parts.  
Note: Values in parentheses are reference dimensions.

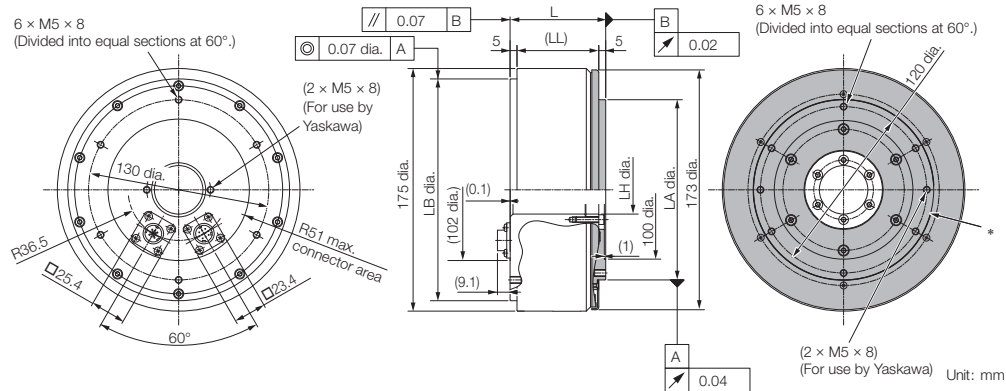
| Model SGM7E- | L   | (LL) | LB                                 | LH                              | LA                                 | Approx. Mass [kg] |
|--------------|-----|------|------------------------------------|---------------------------------|------------------------------------|-------------------|
| 02B□A41      | 59  | 51   | 120 <sup>0</sup> <sub>-0.035</sub> | 20 <sup>+0.4</sup> <sub>0</sub> | 100 <sup>0</sup> <sub>-0.035</sub> | 4.8               |
| 05B□A41      | 88  | 80   | 120 <sup>0</sup> <sub>-0.035</sub> | 20 <sup>+0.4</sup> <sub>0</sub> | 100 <sup>0</sup> <sub>-0.035</sub> | 5.8               |
| 07B□A41      | 128 | 120  | 120 <sup>0</sup> <sub>-0.035</sub> | 20 <sup>+0.4</sup> <sub>0</sub> | 100 <sup>0</sup> <sub>-0.035</sub> | 8.2               |

Refer to the following section for information on connectors.

🔌 **Connector Specifications (page 237)**

## ◆ SGM7E-□□C

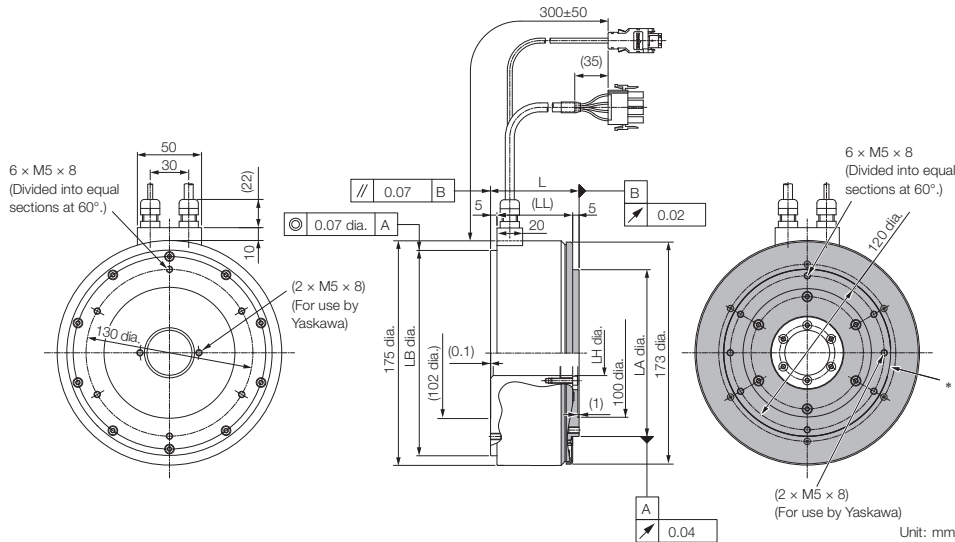
### • Flange Specification 1



\* The shaded section indicates the rotating parts.  
Note: Values in parentheses are reference dimensions.

| Model SGM7E- | L   | (LL) | LB                                 | LH                              | LA                                 | Approx. Mass [kg] |
|--------------|-----|------|------------------------------------|---------------------------------|------------------------------------|-------------------|
| 04C□A11      | 69  | 59   | 160 <sup>0</sup> <sub>-0.040</sub> | 35 <sup>+0.4</sup> <sub>0</sub> | 130 <sup>0</sup> <sub>-0.040</sub> | 7.2               |
| 10C□A11      | 90  | 80   | 160 <sup>0</sup> <sub>-0.040</sub> | 35 <sup>+0.4</sup> <sub>0</sub> | 130 <sup>0</sup> <sub>-0.040</sub> | 10.2              |
| 14C□A11      | 130 | 120  | 160 <sup>0</sup> <sub>-0.040</sub> | 35 <sup>+0.4</sup> <sub>0</sub> | 130 <sup>0</sup> <sub>-0.040</sub> | 14.2              |

### • Flange Specification 4



\* The shaded section indicates the rotating parts.  
Note: Values in parentheses are reference dimensions.

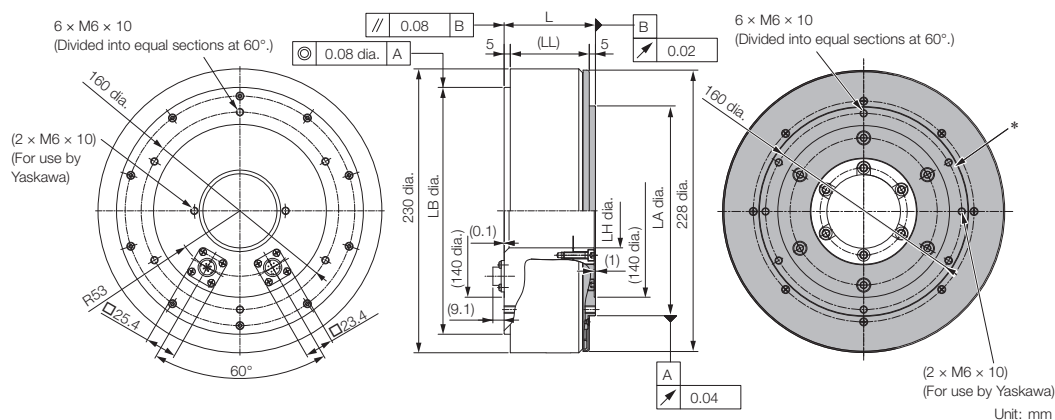
| Model SGM7E- | L   | (LL) | LB                                 | LH                              | LA                                 | Approx. Mass [kg] |
|--------------|-----|------|------------------------------------|---------------------------------|------------------------------------|-------------------|
| 04C□A41      | 69  | 59   | 160 <sup>0</sup> <sub>-0.040</sub> | 35 <sup>+0.4</sup> <sub>0</sub> | 130 <sup>0</sup> <sub>-0.040</sub> | 7.2               |
| 10C□A41      | 90  | 80   | 160 <sup>0</sup> <sub>-0.040</sub> | 35 <sup>+0.4</sup> <sub>0</sub> | 130 <sup>0</sup> <sub>-0.040</sub> | 10.2              |
| 14C□A41      | 130 | 120  | 160 <sup>0</sup> <sub>-0.040</sub> | 35 <sup>+0.4</sup> <sub>0</sub> | 130 <sup>0</sup> <sub>-0.040</sub> | 14.2              |

Refer to the following section for information on connectors.

🔌 **Connector Specifications (page 237)**

## ◆ SGM7E-□□D

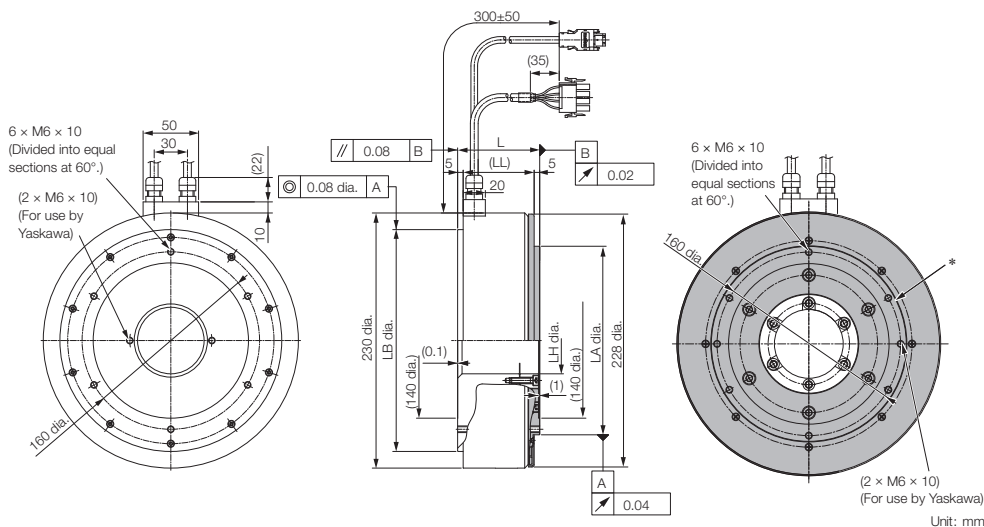
### • Flange Specification 1



\* The shaded section indicates the rotating parts.  
Note: Values in parentheses are reference dimensions.

| Model SGM7E- | L   | (LL) | LB                                 | LH                              | LA                                 | Approx. Mass [kg] |
|--------------|-----|------|------------------------------------|---------------------------------|------------------------------------|-------------------|
| 08D□A11      | 74  | 64   | 200 <sup>0</sup> <sub>-0.046</sub> | 60 <sup>+0.4</sup> <sub>0</sub> | 170 <sup>0</sup> <sub>-0.040</sub> | 14.0              |
| 17D□A11      | 110 | 100  | 200 <sup>0</sup> <sub>-0.046</sub> | 60 <sup>+0.4</sup> <sub>0</sub> | 170 <sup>0</sup> <sub>-0.040</sub> | 22.0              |
| 25D□A11      | 160 | 150  | 200 <sup>0</sup> <sub>-0.046</sub> | 60 <sup>+0.4</sup> <sub>0</sub> | 170 <sup>0</sup> <sub>-0.040</sub> | 29.7              |

### • Flange Specification 4



\* The shaded section indicates the rotating parts. Values in parentheses are reference dimensions.

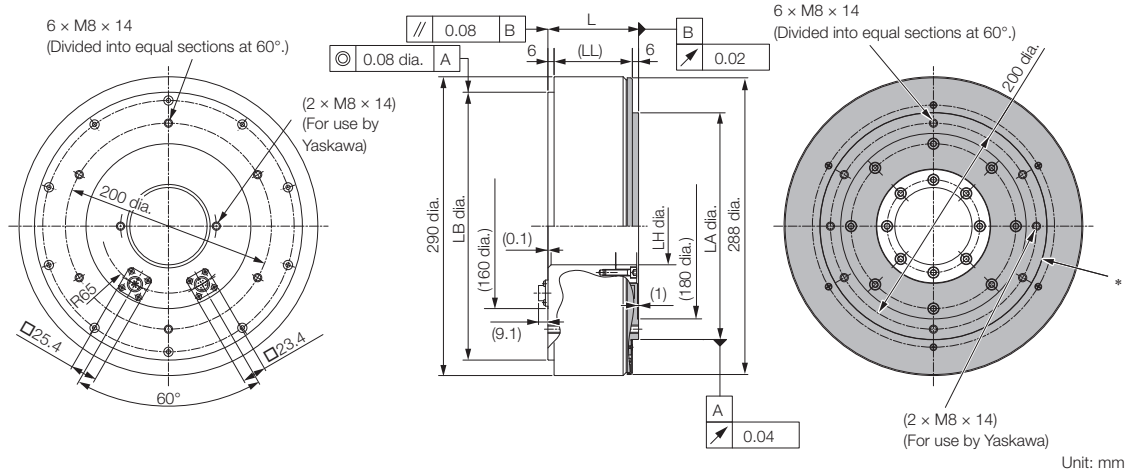
| Model SGM7E- | L   | (LL) | LB                                 | LH                              | LA                                 | Approx. Mass [kg] |
|--------------|-----|------|------------------------------------|---------------------------------|------------------------------------|-------------------|
| 08D□A41      | 74  | 64   | 200 <sup>0</sup> <sub>-0.046</sub> | 60 <sup>+0.4</sup> <sub>0</sub> | 170 <sup>0</sup> <sub>-0.040</sub> | 14.0              |
| 17D□A41      | 110 | 100  | 200 <sup>0</sup> <sub>-0.046</sub> | 60 <sup>+0.4</sup> <sub>0</sub> | 170 <sup>0</sup> <sub>-0.040</sub> | 22.0              |
| 25D□A41      | 160 | 150  | 200 <sup>0</sup> <sub>-0.046</sub> | 60 <sup>+0.4</sup> <sub>0</sub> | 170 <sup>0</sup> <sub>-0.040</sub> | 29.7              |

Refer to the following section for information on connectors.

🔌 **Connector Specifications (page 237)**

## ◆ SGM7E-□□E

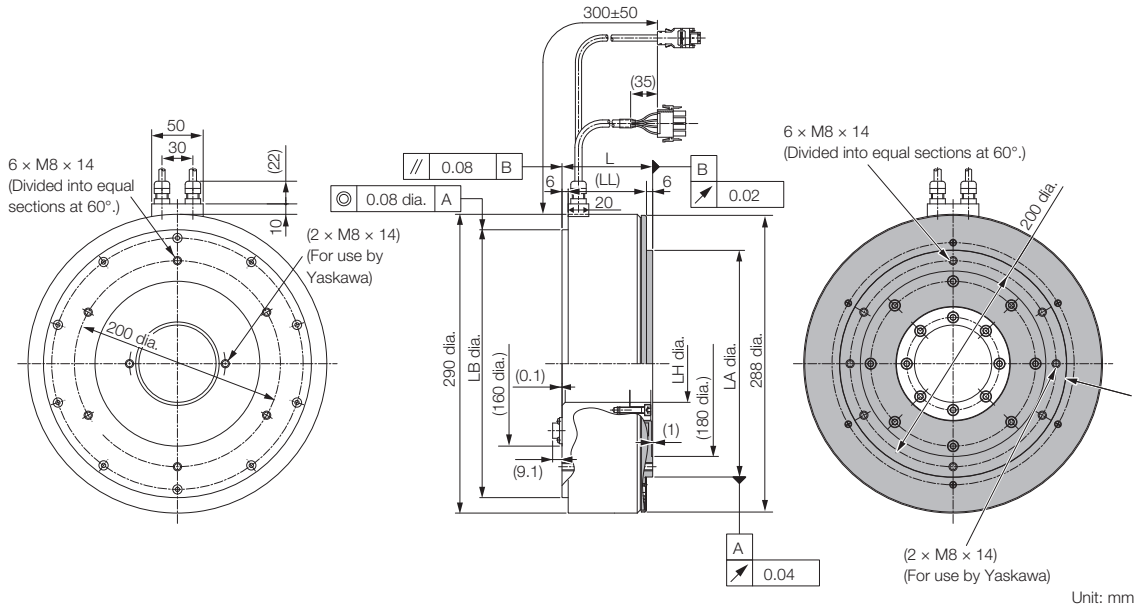
### • Flange Specification 1



\* The shaded section indicates the rotating parts.  
 Note: Values in parentheses are reference dimensions.

| Model SGM7E- | L   | (LL) | LB                                 | LH                              | LA                                 | Approx. Mass [kg] |
|--------------|-----|------|------------------------------------|---------------------------------|------------------------------------|-------------------|
| 16E□A11      | 88  | 76   | 260 <sup>0</sup> <sub>-0.052</sub> | 75 <sup>+0.4</sup> <sub>0</sub> | 220 <sup>0</sup> <sub>-0.046</sub> | 26.0              |
| 35E□A11      | 112 | 100  | 260 <sup>0</sup> <sub>-0.052</sub> | 75 <sup>+0.4</sup> <sub>0</sub> | 220 <sup>0</sup> <sub>-0.046</sub> | 34.0              |

### • Flange Specification 4



\* The shaded section indicates the rotating parts.  
 Note: Values in parentheses are reference dimensions.

| Model SGM7E- | L   | (LL) | LB                                 | LH                              | LA                                 | Approx. Mass [kg] |
|--------------|-----|------|------------------------------------|---------------------------------|------------------------------------|-------------------|
| 16E□A41      | 88  | 76   | 260 <sup>0</sup> <sub>-0.052</sub> | 75 <sup>+0.4</sup> <sub>0</sub> | 220 <sup>0</sup> <sub>-0.046</sub> | 26.0              |
| 35E□A41      | 112 | 100  | 260 <sup>0</sup> <sub>-0.052</sub> | 75 <sup>+0.4</sup> <sub>0</sub> | 220 <sup>0</sup> <sub>-0.046</sub> | 34.0              |

Refer to the following section for information on connectors.

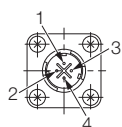
🔌 **Connector Specifications (page 237)**



## Connector Specifications

### ◆ Flange Specification 1

#### • Servomotor Connector

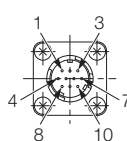


|   |                   |
|---|-------------------|
| 1 | Phase U           |
| 2 | Phase V           |
| 3 | Phase W           |
| 4 | FG (frame ground) |

**Model:** JN1AS04MK2R  
Manufacturer: Japan Aviation Electronics Industry, Ltd.

**Mating connector:** JN1DS04FK1  
(Not provided by Yaskawa.)

#### • Encoder Connector



|    |                   |
|----|-------------------|
| 1  | PS                |
| 2  | /PS               |
| 3  | –                 |
| 4  | PG5V              |
| 5* | BAT0              |
| 6  | –                 |
| 7  | FG (frame ground) |
| 8* | BAT               |
| 9  | PG0V              |
| 10 | –                 |

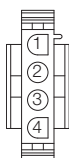
\* Only absolute-value models with multiturn data.

**Model:** JN1AS10ML1-R  
Manufacturer: Japan Aviation Electronics Industry, Ltd.

**Mating connector:** JN1DS10SL1  
(Not provided by Yaskawa.)

### ◆ Flange Specification 4

#### • Servomotor Connector



|   |                   |                |
|---|-------------------|----------------|
| 1 | Phase U           | Red            |
| 2 | Phase V           | White          |
| 3 | Phase W           | Blue           |
| 4 | FG (frame ground) | Green (yellow) |

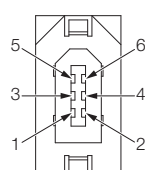
#### Models

- Plug: 350779-1
  - Pins: 350561-3 or 350690-3 (No. 1 to 3)
  - Ground pin: 350654-1 or 350669-1 (No. 4)
- Manufacturer: Tyco Electronics Japan G.K.

#### Mating Connector

- Cap: 350780-1
- Socket: 350570-3 or 350689-3

#### • Encoder Connector



|                       |                   |
|-----------------------|-------------------|
| 1                     | PG5V              |
| 2                     | PG0V              |
| 3*                    | BAT               |
| 4*                    | BAT0              |
| 5                     | PS                |
| 6                     | /PS               |
| <b>Connector case</b> | FG (frame ground) |

\* Only absolute-value models with multiturn data.

**Model:** 55102-0600  
Manufacturer: Molex Japan LLC

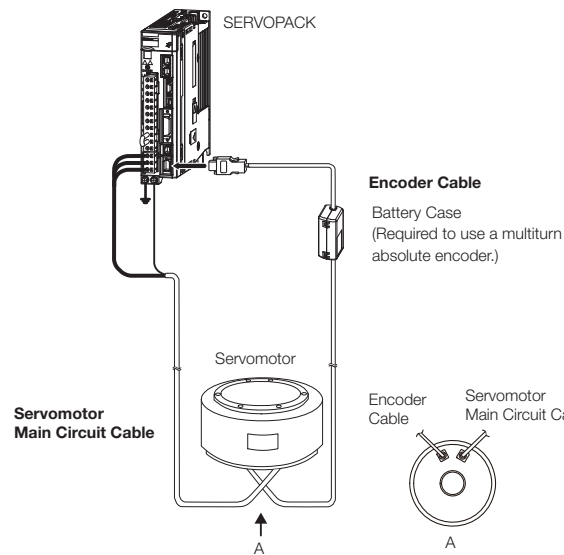
**Mating connector:** 54280-0609

## Selecting Cables

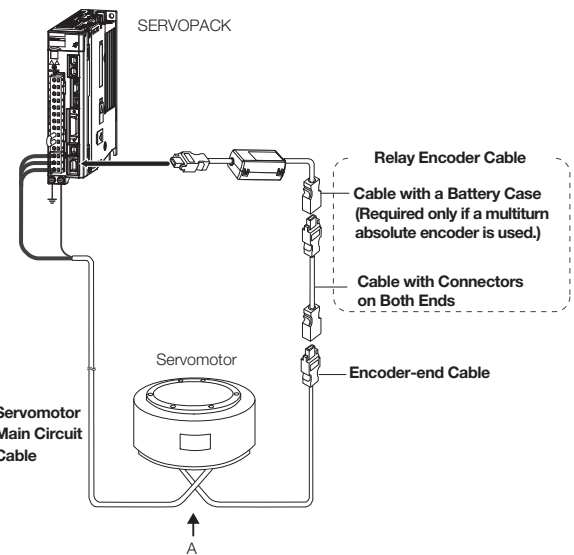
### ◆ Cable Configurations

The cables shown below are required to connect a Servomotor to a SERVOPACK.

Encoder Cable of 20 m or Less



Encoder Cable of 30 m to 50 m (Relay Cable)



Note: 1. If the Encoder Cable length exceeds 20 m, be sure to use a Relay Encoder Cable.

2. If you use a Servomotor Main Circuit Cable that exceeds 20 m, the intermittent duty zone in the torque-motor speed characteristics will become smaller because the voltage drop increases.

3. Refer to the following manual for the following information.

- Cable dimensional drawings and cable connection specifications
- Order numbers and specifications of individual connectors for cables
- Order numbers and specifications for wiring materials

📖 **7-Series AC Servo Drive Peripheral Device Selection Manual (Manual No.: S1EP S800001 32)**

### ◆ Servomotor Main Circuit Cables

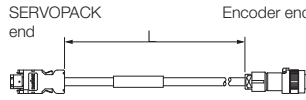
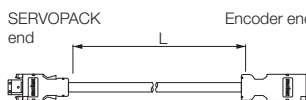
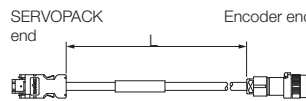
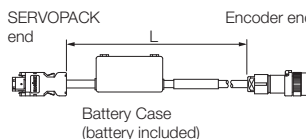
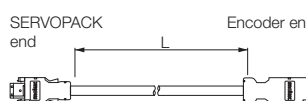
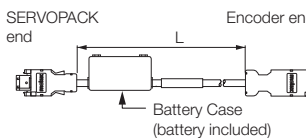
| Servomotor Model                                                                                           | Length (L) | Order Number    |                              | Appearance |
|------------------------------------------------------------------------------------------------------------|------------|-----------------|------------------------------|------------|
|                                                                                                            |            | Standard Cable  | Flexible Cable <sup>*1</sup> |            |
| SGM7E-□□□□<br>Flange specification <sup>*2</sup> : 1<br>Non-load side installation                         | 3 m        | JZSP-CMM60-03-E | JZSP-C7MDN23-03-E            |            |
|                                                                                                            | 5 m        | JZSP-CMM60-05-E | JZSP-C7MDN23-05-E            |            |
|                                                                                                            | 10 m       | JZSP-CMM60-10-E | JZSP-C7MDN23-10-E            |            |
|                                                                                                            | 15 m       | JZSP-CMM60-15-E | JZSP-C7MDN23-15-E            |            |
|                                                                                                            | 20 m       | JZSP-CMM60-20-E | JZSP-C7MDN23-20-E            |            |
| SGM7E-□□□□<br>Flange specification <sup>*2</sup> : 4<br>Non-load side installation<br>(with cable on side) | 3 m        | JZSP-CMM00-03-E | JZSP-C7MDS23-03-E            |            |
|                                                                                                            | 5 m        | JZSP-CMM00-05-E | JZSP-C7MDS23-05-E            |            |
|                                                                                                            | 10 m       | JZSP-CMM00-10-E | JZSP-C7MDS23-10-E            |            |
|                                                                                                            | 15 m       | JZSP-CMM00-15-E | JZSP-C7MDS23-15-E            |            |
|                                                                                                            | 20 m       | JZSP-CMM00-20-E | JZSP-C7MDS23-20-E            |            |

\*1. Use Flexible Cables for moving parts of machines, such as robots. The recommended bending radius (R) is 90 mm or larger.

\*2. Refer to the following section for the flange specifications.

📖 **Model Designations (page 226), Direct Drive Servomotors are not available with holding brakes.**

# ◆ Encoder Cables of 20 m or Less

| Servomotor Model                        | Name                                                     | Length (L) | Order Number     |                  | Appearance                                                                            |
|-----------------------------------------|----------------------------------------------------------|------------|------------------|------------------|---------------------------------------------------------------------------------------|
|                                         |                                                          |            | Standard Cable   | Flexible Cable*1 |                                                                                       |
| SGM7E-□□□F<br>Flange specification*2: 1 | For incremental encoder                                  | 3 m        | JZSP-CMP60-03-E  | JZSP-CSP60-03-E  |    |
|                                         |                                                          | 5 m        | JZSP-CMP60-05-E  | JZSP-CSP60-05-E  |                                                                                       |
|                                         |                                                          | 10 m       | JZSP-CMP60-10-E  | JZSP-CSP60-10-E  |                                                                                       |
|                                         |                                                          | 15 m       | JZSP-CMP60-15-E  | JZSP-CSP60-15-E  |                                                                                       |
|                                         |                                                          | 20 m       | JZSP-CMP60-20-E  | JZSP-CSP60-20-E  |                                                                                       |
| SGM7E-□□□F<br>Flange specification*2: 4 |                                                          | 3 m        | JZSP-CMP00-03-E  | JZSP-CMP10-03-E  |    |
|                                         |                                                          | 5 m        | JZSP-CMP00-05-E  | JZSP-CMP10-05-E  |                                                                                       |
|                                         |                                                          | 10 m       | JZSP-CMP00-10-E  | JZSP-CMP10-10-E  |                                                                                       |
|                                         |                                                          | 15 m       | JZSP-CMP00-15-E  | JZSP-CMP10-15-E  |                                                                                       |
|                                         |                                                          | 20 m       | JZSP-CMP00-20-E  | JZSP-CMP10-20-E  |                                                                                       |
| SGM7E-□□□7<br>Flange specification*2: 1 | For multi-turn absolute encoder (without Battery Case*3) | 3 m        | JZSP-C7PI00-03-E | JZSP-C7PI20-03-E |    |
|                                         |                                                          | 5 m        | JZSP-C7PI00-05-E | JZSP-C7PI20-05-E |                                                                                       |
|                                         |                                                          | 10 m       | JZSP-C7PI00-10-E | JZSP-C7PI20-10-E |                                                                                       |
|                                         |                                                          | 15 m       | JZSP-C7PI00-15-E | JZSP-C7PI20-15-E |                                                                                       |
|                                         |                                                          | 20 m       | JZSP-C7PI00-20-E | JZSP-C7PI20-20-E |                                                                                       |
|                                         | For multi-turn absolute encoder (with Battery Case)      | 3 m        | JZSP-C7PA00-03-E | JZSP-C7PA20-03-E |   |
|                                         |                                                          | 5 m        | JZSP-C7PA00-05-E | JZSP-C7PA20-05-E |                                                                                       |
|                                         |                                                          | 10 m       | JZSP-C7PA00-10-E | JZSP-C7PA20-10-E |                                                                                       |
|                                         |                                                          | 15 m       | JZSP-C7PA00-15-E | JZSP-C7PA20-15-E |                                                                                       |
|                                         |                                                          | 20 m       | JZSP-C7PA00-20-E | JZSP-C7PA20-20-E |                                                                                       |
| SGM7E-□□□7<br>Flange specification*2: 4 | For multi-turn absolute encoder (without Battery Case*3) | 3 m        | JZSP-CMP00-03-E  | JZSP-CMP10-03-E  |  |
|                                         |                                                          | 5 m        | JZSP-CMP00-05-E  | JZSP-CMP10-05-E  |                                                                                       |
|                                         |                                                          | 10 m       | JZSP-CMP00-10-E  | JZSP-CMP10-10-E  |                                                                                       |
|                                         |                                                          | 15 m       | JZSP-CMP00-15-E  | JZSP-CMP10-15-E  |                                                                                       |
|                                         |                                                          | 20 m       | JZSP-CMP00-20-E  | JZSP-CMP10-20-E  |                                                                                       |
|                                         | For multi-turn absolute encoder (with Battery Case)      | 3 m        | JZSP-CSP19-03-E  | JZSP-CSP29-03-E  |  |
|                                         |                                                          | 5 m        | JZSP-CSP19-05-E  | JZSP-CSP29-05-E  |                                                                                       |
|                                         |                                                          | 10 m       | JZSP-CSP19-10-E  | JZSP-CSP29-10-E  |                                                                                       |
|                                         |                                                          | 15 m       | JZSP-CSP19-15-E  | JZSP-CSP29-15-E  |                                                                                       |
|                                         |                                                          | 20 m       | JZSP-CSP19-20-E  | JZSP-CSP29-20-E  |                                                                                       |

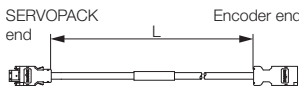
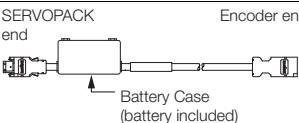
\*1. Use Flexible Cables for moving parts of machines, such as robots. The recommended bending radius (R) is 68 mm or larger.

\*2. Refer to the following section for the flange specifications.

 **Model Designations (page 226)**

\*3. Use one of these Cables if a battery is connected to the host controller.

### ◆ Relay Encoder Cables of 30 m to 50 m

| Servomotor Model                                           | Name                                                                                 | Length (L) | Order Number*1   | Appearance                                                                          |
|------------------------------------------------------------|--------------------------------------------------------------------------------------|------------|------------------|-------------------------------------------------------------------------------------|
| SGM7E-□□□F<br>SGM7E-□□□7<br>Flange specification*2: 1      | Encoder-end Cable<br>(for single-turn/multi-turn absolute encoder)                   | 0.3 m      | JZSP-C7PRC0-E    |  |
| SGM7E-□□□F<br>SGM7E-□□□7<br>Flange specification*2: 1 or 4 | Cables with Connectors on Both Ends<br>(for single-turn/multi-turn absolute encoder) | 30 m       | JZSP-UCMP00-30-E |  |
|                                                            |                                                                                      | 40 m       | JZSP-UCMP00-40-E |                                                                                     |
|                                                            |                                                                                      | 50 m       | JZSP-UCMP00-50-E |                                                                                     |
| SGM7E-□□□7<br>Flange specification*2: 1 or 4               | Cable with a Battery Case<br>(for multiturn absolute encoder)*3                      | 0.3 m      | JZSP-CSP12-E     |  |

\*1. Flexible Cables are not available.

\*2. Refer to the following section for the flange specifications.

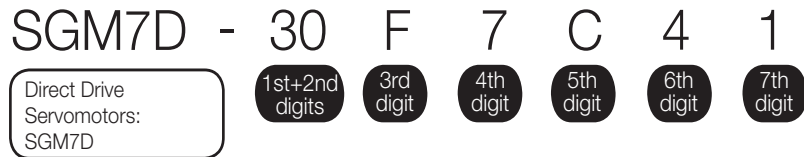
 **Model Designations (page 226)**

\*3. Use one of these Cables if a battery is connected to the host controller.



# SGM7D (With Core, Outer Rotor)

## Model Designations



1st+2nd digits Rated Torque

| Code | Specification | Code | Specification | Code | Specification |
|------|---------------|------|---------------|------|---------------|
| 01   | 1.30 N·m      | 18   | 18.0 N·m      | 58   | 58.0 N·m      |
| 02   | 2.06 N·m      | 20   | 20.0 N·m      | 70   | 70.0 N·m      |
| 03   | 3.00 N·m      | 24   | 24.0 N·m      | 90   | 90.0 N·m      |
| 05   | 5.00 N·m      | 28   | 28.0 N·m      | 1Z   | 100 N·m       |
| 06   | 6.00 N·m      | 30   | 30.0 N·m      | 1A   | 110 N·m       |
| 08   | 8.00 N·m      | 34   | 34.0 N·m      | 1C   | 130 N·m       |
| 09   | 9.00 N·m      | 38   | 38.0 N·m      | 2B   | 220 N·m       |
| 12   | 12.0 N·m      | 45   | 45.0 N·m      | 2D   | 240 N·m       |

3rd digit Servomotor Outer Diameter

| Code | Specification | Code | Specification   |
|------|---------------|------|-----------------|
| F    | 264-mm dia.   | J    | 150-mm dia.     |
| G    | 160-mm dia.   | K    | 107-mm dia.     |
| H    | 116-mm dia.   | L    | 224 mm × 224 mm |
| I    | 264-mm dia.   |      |                 |

- Note: 1. Direct Drive Servomotors are not available with holding brakes.  
 2. This information is provided to explain model numbers.  
 It is not meant to imply that models are available for all combinations of codes.

4th digit Serial Encoder

| Code | Specification                      |
|------|------------------------------------|
| 7    | 24-bit multiturn absolute encoder* |
| F    | 24-bit incremental encoder*        |

\* Both multiturn absolute encoder and incremental encoder can be used as a single-turn absolute encoder by setting parameters.

5th digit Design Revision Order

C

6th digit Flange

| Code | Mounting      | Servomotor Outer Diameter Code (3rd Digit) |   |    |   |   |   |   |
|------|---------------|--------------------------------------------|---|----|---|---|---|---|
|      |               | F                                          | G | H  | I | J | K | L |
| 4    | Non-load side | With cable on side                         | ✓ | ✓  | ✓ | - | - | - |
| 5    | Non-load side | With cable on bottom                       | ✓ | ✓* | - | ✓ | ✓ | ✓ |

✓: Applicable models.

\* SGM7D-01G and -05G are not available with a cable extending from the bottom.

7th digit Options

| Code | Specification                 |
|------|-------------------------------|
| 1    | Standard mechanical precision |
| 2    | High mechanical precision*    |

\* The SGM7D-01G, -05G, and -03H are available only with high mechanical precision.

# SGM7D (With Core, Outer Rotor)

## Manufactured Models

| Rated Torque<br>N·m | Servomotor Outer Diameter |                       |                       |                       |                       |                       |                        |
|---------------------|---------------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|------------------------|
|                     | F<br>(264-mm<br>dia.)     | G<br>(160-mm<br>dia.) | H<br>(116-mm<br>dia.) | I<br>(264-mm<br>dia.) | J<br>(150-mm<br>dia.) | K<br>(107-mm<br>dia.) | L (224 mm ×<br>224 mm) |
| 1.30                | —                         | SGM7D-01G             | —                     | —                     | —                     | —                     | —                      |
| 2.06                | —                         | —                     | —                     | —                     | —                     | SGM7D-02K             | —                      |
| 3.00                | —                         | —                     | SGM7D-03H             | —                     | —                     | —                     | —                      |
| 5.00                | —                         | SGM7D-05G             | —                     | —                     | —                     | —                     | —                      |
| 6.00                | —                         | —                     | —                     | —                     | SGM7D-06J             | SGM7D-06K             | SGM7D-06L              |
| 8.00                | —                         | SGM7D-08G             | —                     | —                     | —                     | SGM7D-08K             | —                      |
| 9.00                | —                         | —                     | —                     | —                     | SGM7D-09J             | —                     | —                      |
| 12.0                | —                         | —                     | —                     | —                     | —                     | —                     | SGM7D-12L              |
| 18.0                | —                         | SGM7D-18G             | —                     | —                     | SGM7D-18J             | —                     | —                      |
| 20.0                | —                         | —                     | —                     | —                     | SGM7D-20J             | —                     | —                      |
| 24.0                | —                         | SGM7D-24G             | —                     | —                     | —                     | —                     | —                      |
| 28.0                | —                         | —                     | —                     | SGM7D-28I             | —                     | —                     | —                      |
| 30.0                | SGM7D-30F                 | —                     | —                     | —                     | —                     | —                     | SGM7D-30L              |
| 34.0                | —                         | SGM7D-34G             | —                     | —                     | —                     | —                     | —                      |
| 38.0                | —                         | —                     | —                     | —                     | SGM7D-38J             | —                     | —                      |
| 45.0                | —                         | SGM7D-45G             | —                     | —                     | —                     | —                     | —                      |
| 58.0                | SGM7D-58F                 | —                     | —                     | —                     | —                     | —                     | —                      |
| 70.0                | —                         | —                     | —                     | SGM7D-70I             | —                     | —                     | —                      |
| 90.0                | SGM7D-90F                 | —                     | —                     | —                     | —                     | —                     | —                      |
| 100                 | —                         | —                     | —                     | SGM7D-1ZI             | —                     | —                     | —                      |
| 110                 | SGM7D-1AF                 | —                     | —                     | —                     | —                     | —                     | —                      |
| 130                 | —                         | —                     | —                     | SGM7D-1CI             | —                     | —                     | —                      |
| 220                 | —                         | —                     | —                     | SGM7D-2BI             | —                     | —                     | —                      |
| 240                 | —                         | —                     | —                     | SGM7D-2DI             | —                     | —                     | —                      |

Note: The above table shows combinations of the rated torque and outer diameter. The fourth through seventh digits have been omitted.

## Specifications and Ratings

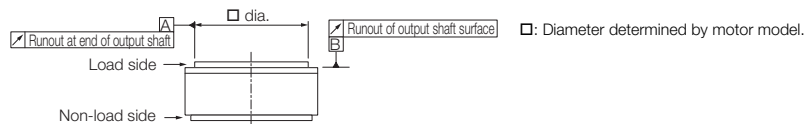
### Specifications

#### ◆ SGM7D-□□ F, -□□ G, and -□□ H

| Voltage                  |                                                              |                               |    | 200 V                                                                                                                                                                                                                                                                                                                                  |     |     |     |                                     |     |                                     |     |      |     |                                     |     |
|--------------------------|--------------------------------------------------------------|-------------------------------|----|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----|-----|-----|-------------------------------------|-----|-------------------------------------|-----|------|-----|-------------------------------------|-----|
| Model SGM7D-             |                                                              |                               |    | 30F                                                                                                                                                                                                                                                                                                                                    | 58F | 90F | 1AF | 01G                                 | 05G | 08G                                 | 18G | 24G  | 34G | 45G                                 | 03H |
| Time Rating              |                                                              |                               |    | Continuous                                                                                                                                                                                                                                                                                                                             |     |     |     |                                     |     |                                     |     |      |     |                                     |     |
| Thermal Class            |                                                              |                               |    | F                                                                                                                                                                                                                                                                                                                                      |     |     |     |                                     |     |                                     |     |      |     |                                     |     |
| Insulation Resistance    |                                                              |                               |    | 500 VDC, 10 MΩ min.                                                                                                                                                                                                                                                                                                                    |     |     |     |                                     |     |                                     |     |      |     |                                     |     |
| Withstand Voltage        |                                                              |                               |    | 1,500 VAC for 1 minute                                                                                                                                                                                                                                                                                                                 |     |     |     |                                     |     |                                     |     |      |     |                                     |     |
| Excitation               |                                                              |                               |    | Three-phase                                                                                                                                                                                                                                                                                                                            |     |     |     |                                     |     |                                     |     |      |     |                                     |     |
| Mounting                 |                                                              |                               |    | Flange-mounted                                                                                                                                                                                                                                                                                                                         |     |     |     |                                     |     |                                     |     |      |     |                                     |     |
| Drive Method             |                                                              |                               |    | Direct drive                                                                                                                                                                                                                                                                                                                           |     |     |     |                                     |     |                                     |     |      |     |                                     |     |
| Rotation Direction       |                                                              |                               |    | Counterclockwise (CCW) for forward reference when viewed from the load side                                                                                                                                                                                                                                                            |     |     |     |                                     |     |                                     |     |      |     |                                     |     |
| Absolute Accuracy        |                                                              |                               |    | ±15 arcsec                                                                                                                                                                                                                                                                                                                             |     |     |     |                                     |     |                                     |     |      |     |                                     |     |
| Repeatability            |                                                              |                               |    | ±1.3 arcsec                                                                                                                                                                                                                                                                                                                            |     |     |     |                                     |     |                                     |     |      |     |                                     |     |
| Protective Structure*1   |                                                              |                               |    | Totally enclosed, self-cooled, IP20                                                                                                                                                                                                                                                                                                    |     |     |     | Totally enclosed, self-cooled, IP30 |     | Totally enclosed, self-cooled, IP20 |     |      |     | Totally enclosed, self-cooled, IP30 |     |
| Environmental Conditions | Surrounding Air Temperature                                  |                               |    | 0°C to 40°C (with no freezing)                                                                                                                                                                                                                                                                                                         |     |     |     |                                     |     |                                     |     |      |     |                                     |     |
|                          | Surrounding Air Humidity                                     |                               |    | 20% to 80% relative humidity (with no condensation)                                                                                                                                                                                                                                                                                    |     |     |     |                                     |     |                                     |     |      |     |                                     |     |
|                          | Installation Site                                            |                               |    | <ul style="list-style-type: none"><li>• Must be indoors and free of corrosive and explosive gases.</li><li>• Must be well-ventilated and free of dust and moisture.</li><li>• Must facilitate inspection and cleaning.</li><li>• Must have an altitude of 1,000 m or less.</li><li>• Must be free of strong magnetic fields.</li></ul> |     |     |     |                                     |     |                                     |     |      |     |                                     |     |
|                          | Storage Environment                                          |                               |    | Store the Servomotor in the following environment if you store it with the power cable disconnected.<br>Storage Temperature: -20°C to 60°C (with no freezing)<br>Storage Humidity: 20% to 80% relative humidity (with no condensation)                                                                                                 |     |     |     |                                     |     |                                     |     |      |     |                                     |     |
| Mechanical Tolerances*2  | Runout of Output Shaft Surface/Runout at End of Output Shaft | Standard Mechanical Precision | mm | 0.1                                                                                                                                                                                                                                                                                                                                    |     |     |     | —                                   |     | 0.1                                 |     | 0.1  |     | —                                   |     |
|                          |                                                              | High Mechanical Precision     | mm | 0.005                                                                                                                                                                                                                                                                                                                                  |     |     |     | 0.01                                |     | 0.005                               |     | 0.01 |     |                                     |     |
| Applicable SERVOPACKs    |                                                              | SGD7S-                        |    | 120A*3                                                                                                                                                                                                                                                                                                                                 |     |     |     | 2R8A*3, 2R8F*3                      |     | 120A*3                              |     |      |     | 2R8A*3, 2R8F*3                      |     |
|                          |                                                              | SGD7W-                        |    | —                                                                                                                                                                                                                                                                                                                                      |     |     |     |                                     |     |                                     |     |      |     |                                     |     |

\*1. The hollow hole section, motor mounting surface, and gap around the rotating part on non-load side are excluded. Protective structure specifications apply only when the special cable is used.

\*2. Refer to the following figure for the relevant locations on the Servomotor. Refer to the dimensional drawings of the individual Servomotors for more information on tolerances.



\*3. An SGM7D Servomotor is used together with an FT-specification SERVOPACK. The following SERVOPACK models can be used.

- SGD7S-□□□□□□A □□□F82 □
- SGD7S-□□□□□□A □□□F83 □

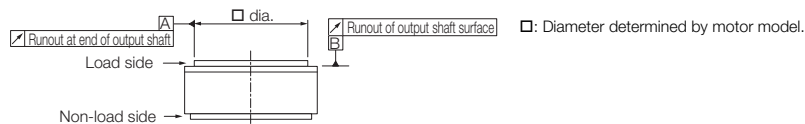


◆ SGM7D-□□ I and -□□ J

| Voltage                  |                                                                  |                               |    | 200 V                                                                                                                                                                                                                                                                                                                                  |     |      |     |       |     |     |     |      |     |     |
|--------------------------|------------------------------------------------------------------|-------------------------------|----|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----|------|-----|-------|-----|-----|-----|------|-----|-----|
| Model SGM7D-             |                                                                  |                               |    | 28I                                                                                                                                                                                                                                                                                                                                    | 70I | 1ZI  | 1CI | 2BI   | 2DI | 06J | 09J | 18J  | 20J | 38J |
| Time Rating              |                                                                  |                               |    | Continuous                                                                                                                                                                                                                                                                                                                             |     |      |     |       |     |     |     |      |     |     |
| Thermal Class            |                                                                  |                               |    | F                                                                                                                                                                                                                                                                                                                                      |     |      |     |       |     |     |     |      |     |     |
| Insulation Resistance    |                                                                  |                               |    | 500 VDC, 10 MΩ min.                                                                                                                                                                                                                                                                                                                    |     |      |     |       |     |     |     |      |     |     |
| Withstand Voltage        |                                                                  |                               |    | 1,500 VAC for 1 minute                                                                                                                                                                                                                                                                                                                 |     |      |     |       |     |     |     |      |     |     |
| Excitation               |                                                                  |                               |    | Three-phase                                                                                                                                                                                                                                                                                                                            |     |      |     |       |     |     |     |      |     |     |
| Mounting                 |                                                                  |                               |    | Flange-mounted                                                                                                                                                                                                                                                                                                                         |     |      |     |       |     |     |     |      |     |     |
| Drive Method             |                                                                  |                               |    | Direct drive                                                                                                                                                                                                                                                                                                                           |     |      |     |       |     |     |     |      |     |     |
| Rotation Direction       |                                                                  |                               |    | Counterclockwise (CCW) for forward reference when viewed from the load side                                                                                                                                                                                                                                                            |     |      |     |       |     |     |     |      |     |     |
| Absolute Accuracy        |                                                                  |                               |    | ±15 arcsec                                                                                                                                                                                                                                                                                                                             |     |      |     |       |     |     |     |      |     |     |
| Repeatability            |                                                                  |                               |    | ±1.3 arcsec                                                                                                                                                                                                                                                                                                                            |     |      |     |       |     |     |     |      |     |     |
| Protective Structure*1   |                                                                  |                               |    | Totally enclosed, self-cooled, IP30                                                                                                                                                                                                                                                                                                    |     |      |     |       |     |     |     |      |     |     |
| Environmental Conditions | Surrounding Air Temperature                                      |                               |    | 0°C to 40°C (with no freezing)                                                                                                                                                                                                                                                                                                         |     |      |     |       |     |     |     |      |     |     |
|                          | Surrounding Air Humidity                                         |                               |    | 20% to 80% relative humidity (with no condensation)                                                                                                                                                                                                                                                                                    |     |      |     |       |     |     |     |      |     |     |
|                          | Installation Site                                                |                               |    | <ul style="list-style-type: none"><li>• Must be indoors and free of corrosive and explosive gases.</li><li>• Must be well-ventilated and free of dust and moisture.</li><li>• Must facilitate inspection and cleaning.</li><li>• Must have an altitude of 1,000 m or less.</li><li>• Must be free of strong magnetic fields.</li></ul> |     |      |     |       |     |     |     |      |     |     |
|                          | Storage Environment                                              |                               |    | Store the Servomotor in the following environment if you store it with the power cable disconnected.<br>Storage Temperature: -20°C to 60°C (with no freezing)<br>Storage Humidity: 20% to 80% relative humidity (with no condensation)                                                                                                 |     |      |     |       |     |     |     |      |     |     |
| Mechanical Tolerances*2  | Runout of Output Shaft Surface/<br>Runout at End of Output Shaft | Standard Mechanical Precision | mm | 0.1                                                                                                                                                                                                                                                                                                                                    |     |      |     |       |     |     |     |      |     |     |
|                          |                                                                  | High Mechanical Precision     | mm | 0.005                                                                                                                                                                                                                                                                                                                                  |     | 0.02 |     | 0.005 |     |     |     | 0.01 |     |     |
| Applicable SERVOPACKs    |                                                                  | SGD7S-                        |    | 120A*3                                                                                                                                                                                                                                                                                                                                 |     |      |     |       |     |     |     |      |     |     |
|                          |                                                                  | SGD7W-                        |    | —                                                                                                                                                                                                                                                                                                                                      |     |      |     |       |     |     |     |      |     |     |

\*1. The hollow hole section, motor mounting surface, and gap around the rotating part on non-load side are excluded. Protective structure specifications apply only when the special cable is used.

\*2. Refer to the following figure for the relevant locations on the Servomotor. Refer to the dimensional drawings of the individual Servomotors for more information on tolerances.



\*3. An SGM7D Servomotor is used together with an FT-specification SERVOPACK. The following SERVOPACK models can be used.

- SGD7S-□□□□□□A □□□F82 □
- SGD7S-□□□□□□A □□□F83 □

## Direct Drive Servo Motors

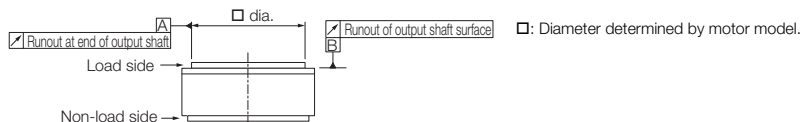
SGM7D (With Core, Outer Rotor)

### ◆ SGM7D-□□ K and -□□ L

| Voltage                             |                                                                  |                               |    | 200 V                                                                                                                                                                                                                                                                                                                                  |     |     |       |     |     |                    |
|-------------------------------------|------------------------------------------------------------------|-------------------------------|----|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----|-----|-------|-----|-----|--------------------|
| Model SGM7D-                        |                                                                  |                               |    | 02K                                                                                                                                                                                                                                                                                                                                    | 06K | 08K | 06L   | 12L | 30L |                    |
| Time Rating                         |                                                                  |                               |    | Continuous                                                                                                                                                                                                                                                                                                                             |     |     |       |     |     |                    |
| Thermal Class                       |                                                                  |                               |    | F                                                                                                                                                                                                                                                                                                                                      |     |     |       |     |     |                    |
| Insulation Resistance               |                                                                  |                               |    | 500 VDC, 10 MΩ min.                                                                                                                                                                                                                                                                                                                    |     |     |       |     |     |                    |
| Withstand Voltage                   |                                                                  |                               |    | 1,500 VAC for 1 minute                                                                                                                                                                                                                                                                                                                 |     |     |       |     |     |                    |
| Excitation                          |                                                                  |                               |    | Three-phase                                                                                                                                                                                                                                                                                                                            |     |     |       |     |     |                    |
| Mounting                            |                                                                  |                               |    | Flange-mounted                                                                                                                                                                                                                                                                                                                         |     |     |       |     |     |                    |
| Drive Method                        |                                                                  |                               |    | Direct drive                                                                                                                                                                                                                                                                                                                           |     |     |       |     |     |                    |
| Rotation Direction                  |                                                                  |                               |    | Counterclockwise (CCW) for forward reference when viewed from the load side                                                                                                                                                                                                                                                            |     |     |       |     |     |                    |
| Absolute Accuracy                   |                                                                  |                               |    | ±15 arcsec                                                                                                                                                                                                                                                                                                                             |     |     |       |     |     |                    |
| Repeatability                       |                                                                  |                               |    | ±1.3 arcsec                                                                                                                                                                                                                                                                                                                            |     |     |       |     |     |                    |
| Protective Structure* <sup>1</sup>  |                                                                  |                               |    | Totally enclosed, self-cooled, IP30                                                                                                                                                                                                                                                                                                    |     |     |       |     |     |                    |
| Environmental Conditions            | Surrounding Air Temperature                                      |                               |    | 0°C to 40°C (with no freezing)                                                                                                                                                                                                                                                                                                         |     |     |       |     |     |                    |
|                                     | Surrounding Air Humidity                                         |                               |    | 20% to 80% relative humidity (with no condensation)                                                                                                                                                                                                                                                                                    |     |     |       |     |     |                    |
|                                     | Installation Site                                                |                               |    | <ul style="list-style-type: none"><li>• Must be indoors and free of corrosive and explosive gases.</li><li>• Must be well-ventilated and free of dust and moisture.</li><li>• Must facilitate inspection and cleaning.</li><li>• Must have an altitude of 1,000 m or less.</li><li>• Must be free of strong magnetic fields.</li></ul> |     |     |       |     |     |                    |
|                                     | Storage Environment                                              |                               |    | Store the Servomotor in the following environment if you store it with the power cable disconnected.<br>Storage Temperature: -20°C to 60°C (with no freezing)<br>Storage Humidity: 20% to 80% relative humidity (with no condensation)                                                                                                 |     |     |       |     |     |                    |
| Mechanical Tolerances* <sup>2</sup> | Runout of Output Shaft Surface/<br>Runout at End of Output Shaft | Standard Mechanical Precision | mm | 0.1                                                                                                                                                                                                                                                                                                                                    |     |     | 0.05  |     |     |                    |
|                                     |                                                                  | High Mechanical Precision     | mm | 0.01                                                                                                                                                                                                                                                                                                                                   |     |     | 0.005 |     |     |                    |
| Applicable SERVOPACKs               |                                                                  | SGD7S-                        |    | 2R8A* <sup>3</sup> , 2R8F* <sup>3</sup>                                                                                                                                                                                                                                                                                                |     |     |       |     |     | 120A* <sup>3</sup> |
|                                     |                                                                  | SGD7W-                        |    | —                                                                                                                                                                                                                                                                                                                                      |     |     |       |     |     |                    |

\*1. The hollow hole section, motor mounting surface, and gap around the rotating part on non-load side are excluded. Protective structure specifications apply only when the special cable is used.

\*2. Refer to the following figure for the relevant locations on the Servomotor. Refer to the dimensional drawings of the individual Servomotors for more information on tolerances.



\*3. An SGM7D Servomotor is used together with an FT-specification SERVOPACK. The following SERVOPACK models can be used.

- SGD7S-□□□□□A □□□F82 □
- SGD7S-□□□□□A □□□F83 □

## Ratings

### ◆ SGM7D-□□ F, -□□ G, and -□□ H

| Voltage                                                             |                                                                                             |                                        | 200 V                     |                          |                          |                          |       |      |                           |                          |                          |                          |                          |                           |  |
|---------------------------------------------------------------------|---------------------------------------------------------------------------------------------|----------------------------------------|---------------------------|--------------------------|--------------------------|--------------------------|-------|------|---------------------------|--------------------------|--------------------------|--------------------------|--------------------------|---------------------------|--|
| Model SGM7D-                                                        |                                                                                             |                                        | 30F                       | 58F                      | 90F                      | 1AF                      | 01G   | 05G  | 08G                       | 18G                      | 24G                      | 34G                      | 45G                      | 03H                       |  |
| Rated Output                                                        |                                                                                             | W                                      | 188                       | 364                      | 565                      | 691                      | 16    | 63   | 101                       | 226                      | 302                      | 320                      | 565                      | 38                        |  |
| Rated Torque <sup>*1</sup>                                          |                                                                                             | N·m                                    | 30.0                      | 58.0                     | 90.0                     | 110                      | 1.30  | 5.00 | 8.00                      | 18.0                     | 24.0                     | 34.0                     | 45.0                     | 3.00                      |  |
| Rated Intermittent Torque <sup>*2</sup>                             |                                                                                             | N·m                                    | —                         | —                        | —                        | —                        | —     | —    | —                         | —                        | 27.0                     | 40.0                     | 52.0                     | —                         |  |
| Instantaneous Maximum Torque                                        |                                                                                             | N·m                                    | 50.0                      | 100                      | 150                      | 200                      | 4.00  | 6.00 | 15.0                      | 30.0                     | 45.0                     | 60.0                     | 75.0                     | 4.00                      |  |
| Stall Torque                                                        |                                                                                             | N·m                                    | 30.0                      | 58.0                     | 90.0                     | 110                      | 1.30  | 5.00 | 8.00                      | 18.0                     | 24.0                     | 34.0                     | 45.0                     | 3.00                      |  |
| Rated Current                                                       |                                                                                             | Arms                                   | 5.7                       | 6.4                      | 5.9                      | 5.0                      | 1.7   | 1.6  | 3.4                       | 3.4                      | 3.1                      | 3.3                      | 4.8                      | 1.1                       |  |
| Instantaneous Maximum Current                                       |                                                                                             | Arms                                   | 14.1                      |                          |                          |                          | 4.2   | 3.5  | 10.6                      |                          |                          |                          | 3.5                      |                           |  |
| Rated Motor Speed                                                   |                                                                                             | min <sup>-1</sup>                      | 60                        |                          |                          |                          | 120   |      |                           |                          |                          | 90                       | 120                      | 120                       |  |
| Maximum Motor Speed                                                 |                                                                                             | min <sup>-1</sup>                      | 72                        |                          |                          |                          | 150   |      | 144                       |                          |                          |                          |                          | 150                       |  |
| Torque Constant                                                     |                                                                                             | N·m/<br>Arms                           | 6.25                      | 12.5                     | 17.8                     | 24.5                     | 1.09  | 3.84 | 2.82                      | 5.76                     | 8.57                     | 11.2                     | 10.2                     | 3.01                      |  |
| Motor Moment of Inertia                                             |                                                                                             | ×10 <sup>-4</sup><br>kg·m <sup>2</sup> | 960                       | 1190                     | 1420                     | 1670                     | 55.0  | 75.0 | 120                       | 150                      | 190                      | 230                      | 270                      | 25.0                      |  |
| Rated Power Rate                                                    |                                                                                             | kW/s                                   | 9.38                      | 28.3                     | 57.0                     | 72.5                     | 0.307 | 3.33 | 5.33                      | 21.6                     | 30.3                     | 50.3                     | 75.0                     | 3.60                      |  |
| Rated Angular Acceleration Rate                                     |                                                                                             | rad/s <sup>2</sup>                     | 313                       | 487                      | 634                      | 659                      | 236   | 667  | 667                       | 1200                     | 1260                     | 1480                     | 1670                     | 1200                      |  |
| Heat Sink Size                                                      |                                                                                             | mm                                     | 550 × 550 × 30 (aluminum) |                          |                          |                          |       |      |                           |                          |                          |                          |                          | 350 × 350<br>× 20 (steel) |  |
| Allowable Load Moment of Inertia<br>(Motor Moment of Inertia Ratio) |                                                                                             | times                                  | 200<br>500 <sup>*4</sup>  | 150<br>400 <sup>*4</sup> | 150<br>350 <sup>*4</sup> | 130<br>300 <sup>*4</sup> | 130   | 300  | 400<br>1000 <sup>*4</sup> | 350<br>900 <sup>*4</sup> | 300<br>750 <sup>*4</sup> | 250<br>650 <sup>*4</sup> | 200<br>450 <sup>*4</sup> | 600                       |  |
|                                                                     | With External Regenerative<br>Resistor and External Dynamic<br>Brake Resistor <sup>*3</sup> | times                                  | 2500                      | 3500                     | 4000                     | 5000                     | 130   | 300  | 2000                      | 3000                     | 4000                     | 4000                     | 4000                     | 600                       |  |
| Allowable<br>Loads <sup>*5</sup>                                    | Allowable Thrust<br>Load                                                                    | Forward                                | N                         | 4 × 10 <sup>4</sup>      |                          |                          |       | 50   | 200                       | 3 × 10 <sup>4</sup>      |                          |                          |                          | 50                        |  |
|                                                                     |                                                                                             | Reverse                                | N                         | 2 × 10 <sup>4</sup>      |                          |                          |       | 50   | 200                       | 1 × 10 <sup>4</sup>      |                          |                          |                          | 50                        |  |
|                                                                     | Allowable Moment Load                                                                       | N·m                                    | 400                       |                          |                          |                          | —     | 50   | 200                       |                          |                          |                          | —                        |                           |  |
| Rigidities                                                          | Thrust<br>Displacement<br>Rigidity                                                          | Forward                                | mm/N                      | 2 × 10 <sup>-6</sup>     |                          |                          |       | —    |                           | 2.5 × 10 <sup>-6</sup>   |                          |                          |                          | —                         |  |
|                                                                     |                                                                                             | Reverse                                | mm/N                      | 3 × 10 <sup>-6</sup>     |                          |                          |       | —    |                           | 3 × 10 <sup>-6</sup>     |                          |                          |                          | —                         |  |
|                                                                     | Moment<br>Displacement Rigidity                                                             | rad/<br>N·m                            | 4 × 10 <sup>-7</sup>      |                          |                          |                          | —     |      | 1 × 10 <sup>-6</sup>      |                          |                          |                          | —                        |                           |  |

\*1. The rated torques are the continuous allowable torque values at a surrounding air temperature of 40°C with an aluminum or steel heat sink of the dimensions given in the table.

\*2. The rated intermittent torque is the value for 60% ED.

\*3. To externally connect dynamic brake resistance, select hardware option specification 020 for the SERVOPACK.

However, you cannot externally connect dynamic brake resistance if you use the following SERVOPACKs (maximum applicable motor capacity: 400 W).

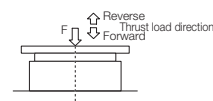
- SGD7S-2R8□□□A020F82□
- SGD7S-2R8□□00A020F83□

\*4. If you use an SGD7S-120A008 SERVOPACK and SGM7D Servomotor together, use the ratios given on the bottom line.

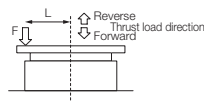
\*5. The thrust loads and moment loads that are applied while a Servomotor is operating are roughly classified into the following patterns. Design the machine so that the thrust loads or moment loads will not exceed the values given in the table.

The allowable load is for a static load in one direction. When designing the system, multiply the allowable load by the following safety coefficient depending on the type of load.

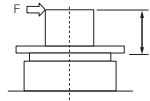
- Smooth load with no shock: 1/3
- Light repetitive load: 1/5
- Shock load: 1/10



Where F is the external force,  
Thrust load = F + Load mass  
Moment load = 0



Where F is the external force,  
Thrust load = F + Load mass  
Moment load = F × L



Where F is the external force,  
Thrust load = Load mass  
Moment load = F × L

Note: 1. These values are for operation in combination with a SERVOPACK when the temperature of the armature winding is 20°C. These are typical values.

2. For the bearings used in these Servomotors, the loss depends on the bearing temperature. The amount of heat loss is higher at low temperatures.

## Direct Drive Servo Motors

SGM7D (With Core, Outer Rotor)

### ◆ SGM7D-□□ I, and -□□ J

| Voltage                                                          |                                                                                       | 200 V                   |                          |                         |                         |      |      |                          |                          |                          |                          |                          |
|------------------------------------------------------------------|---------------------------------------------------------------------------------------|-------------------------|--------------------------|-------------------------|-------------------------|------|------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|
| Model SGM7D-                                                     |                                                                                       | 28I                     | 70I                      | 1ZI                     | 1CI                     | 2BI  | 2DI  | 06J                      | 09J                      | 18J                      | 20J                      | 38J                      |
| Rated Output                                                     | W                                                                                     | 264                     | 440                      | 628                     | 817                     | 691  | 754  | 75                       | 113                      | 226                      | 251                      | 358                      |
| Rated Torque* <sup>1</sup>                                       | N·m                                                                                   | 28.0                    | 70.0                     | 100                     | 130                     | 220  | 240  | 6.00                     | 9.00                     | 18.0                     | 20.0                     | 38.0                     |
| Instantaneous Maximum Torque                                     | N·m                                                                                   | 50.0                    | 100                      | 150                     | 200                     | 300  | 400  | 8.00                     | 15.0                     | 30.0                     | 45.0                     | 60.0                     |
| Stall Torque                                                     | N·m                                                                                   | 28.0                    | 70.0                     | 100                     | 130                     | 220  | 240  | 6.00                     | 9.00                     | 18.0                     | 20.0                     | 38.0                     |
| Rated Current                                                    | Arms                                                                                  | 5.2                     | 5.6                      | 5.5                     | 5.0                     | 5.6  | 4.8  | 4.0                      | 3.4                      | 3.0                      | 2.2                      | 3.1                      |
| Instantaneous Maximum Current                                    | Arms                                                                                  | 14.1                    |                          |                         |                         |      |      | 10.6                     |                          |                          |                          |                          |
| Rated Motor Speed                                                | min <sup>-1</sup>                                                                     | 90                      | 60                       |                         |                         | 30   |      | 120                      |                          |                          |                          | 90                       |
| Maximum Motor Speed                                              | min <sup>-1</sup>                                                                     | 108                     | 72                       |                         |                         | 60   | 48   | 144                      |                          |                          |                          |                          |
| Torque Constant                                                  | N·m/Arms                                                                              | 6.90                    | 13.9                     | 20.8                    | 27.8                    | 41.5 | 54.4 | 1.71                     | 3.29                     | 6.62                     | 9.88                     | 13.3                     |
| Motor Moment of Inertia                                          | ×10 <sup>-4</sup> kg·m <sup>2</sup>                                                   | 1800                    | 2000                     | 2300                    | 2850                    | 3400 | 4000 | 150                      | 210                      | 240                      | 260                      | 330                      |
| Rated Power Rate                                                 | kW/s                                                                                  | 4.36                    | 24.5                     | 43.5                    | 59.3                    | 142  | 144  | 2.40                     | 3.86                     | 13.5                     | 15.4                     | 43.8                     |
| Rated Angular Acceleration Rate                                  | rad/s <sup>2</sup>                                                                    | 156                     | 350                      | 435                     | 456                     | 647  | 600  | 400                      | 429                      | 750                      | 769                      | 1150                     |
| Heat Sink Size                                                   | mm                                                                                    | 550 × 550 × 30          |                          |                         |                         |      |      |                          |                          |                          |                          |                          |
| Allowable Load Moment of Inertia (Motor Moment of Inertia Ratio) | times                                                                                 | 50<br>125* <sup>2</sup> | 100<br>250* <sup>2</sup> | 90<br>230* <sup>2</sup> | 80<br>200* <sup>2</sup> | 100  | 150  | 350<br>700* <sup>2</sup> | 250<br>600* <sup>2</sup> | 240<br>550* <sup>2</sup> | 220<br>550* <sup>2</sup> | 180<br>450* <sup>2</sup> |
| Allowable Loads* <sup>3</sup>                                    | With External Regenerative Resistor and External Dynamic Brake Resistor* <sup>3</sup> | times                   | 800                      | 2000                    | 2500                    | 3000 | 100  | 150                      | 700                      | 900                      | 2500                     | 2000                     |
|                                                                  | Thrust Load                                                                           | Forward                 | N                        |                         |                         |      |      | 4 × 10 <sup>4</sup>      |                          |                          |                          |                          |
|                                                                  |                                                                                       | Reverse                 | N                        |                         |                         |      |      | 2 × 10 <sup>4</sup>      |                          |                          |                          |                          |
|                                                                  | Allowable Moment Load                                                                 | N·m                     | 400                      |                         |                         |      |      | 200                      |                          |                          |                          |                          |
| Rigidities                                                       | Thrust Displacement Rigidity                                                          | Forward                 | mm/N                     |                         |                         |      |      | 2 × 10 <sup>-6</sup>     |                          |                          |                          |                          |
|                                                                  |                                                                                       | Reverse                 | mm/N                     |                         |                         |      |      | 3 × 10 <sup>-6</sup>     |                          |                          |                          |                          |
|                                                                  | Moment Displacement Rigidity                                                          | rad/N·m                 | 4 × 10 <sup>-7</sup>     |                         |                         |      |      | 2 × 10 <sup>-6</sup>     |                          |                          |                          |                          |

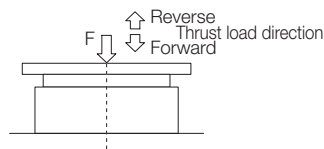
\*1. The rated torques are the continuous allowable torque values at a surrounding air temperature of 40°C with an aluminum heat sink of the dimensions given in the table.

\*2. If you use an SGD7S-120A008 SERVOPACK and SGM7D Servomotor together, use the ratios given on the bottom line.

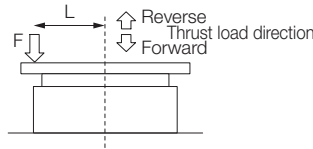
\*3. The thrust loads and moment loads that are applied while a Servomotor is operating are roughly classified into the following patterns. Design the machine so that the thrust loads or moment loads will not exceed the values given in the table. The allowable load is for a static load in one direction.

When designing the system, multiply the allowable load by the following safety coefficient depending on the type of load.

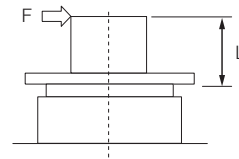
- Smooth load with no shock: 1/3
- Light repetitive load: 1/5
- Shock load: 1/10



Where F is the external force,  
Thrust load = F + Load mass  
Moment load = 0



Where F is the external force,  
Thrust load = F + Load mass  
Moment load = F × L



Where F is the external force,  
Thrust load = Load mass  
Moment load = F × L

Note: 1. These values are for operation in combination with a SERVOPACK when the temperature of the armature winding is 20°C. These are typical values.

2. For the bearings used in these Servomotors, the loss depends on the bearing temperature. The amount of heat loss is higher at low temperatures.

◆ SGM7D-□□ K, and -□□ L

| Voltage                                                             |                                                                                          |         | 200 V          |                      |      |                |      |                         |
|---------------------------------------------------------------------|------------------------------------------------------------------------------------------|---------|----------------|----------------------|------|----------------|------|-------------------------|
| Model SGM7D-                                                        |                                                                                          |         | 02K            | 06K                  | 08K  | 06L            | 12L  | 30L                     |
| Rated Output                                                        | W                                                                                        |         | 52             | 151                  | 201  | 113            | 226  | 565                     |
| Rated Torque * <sup>1</sup>                                         | N·m                                                                                      |         | 2.06           | 6.00                 | 8.00 | 6.00           | 12.0 | 30.0                    |
| Repetitive Rated Torque * <sup>2</sup>                              | N·m                                                                                      |         | —              | 6.90                 | —    | —              | —    | —                       |
| Instantaneous Maximum Torque                                        | N·m                                                                                      |         | 5.00           | 10.0                 | 15.0 | 10.0           | 20.0 | 40.0                    |
| Stall Torque                                                        | N·m                                                                                      |         | 2.06           | 6.00                 | 8.00 | 6.00           | 12.0 | 30.0                    |
| Rated Current                                                       | Arms                                                                                     |         | 1.6            | 1.8                  | 1.6  | 1.7            | 2.1  | 8.1                     |
| Instantaneous Maximum Current                                       | Arms                                                                                     |         | 4.2            |                      |      | 4.2            | 4.2  | 14.1                    |
| Rated Motor Speed                                                   | min <sup>-1</sup>                                                                        |         | 240            |                      |      | 180            |      |                         |
| Maximum Motor Speed                                                 | min <sup>-1</sup>                                                                        |         | 360            |                      |      | 216            |      |                         |
| Torque Constant                                                     | N·m/Arms                                                                                 |         | 1.83           | 3.67                 | 5.50 | 4.13           | 6.59 | 3.95                    |
| Motor Moment of Inertia                                             | ×10 <sup>-4</sup> kg·m <sup>2</sup>                                                      |         | 60.0           | 70.0                 | 80.0 | 220            | 220  | 370                     |
| Rated Power Rate                                                    | kW/s                                                                                     |         | 0.707          | 5.14                 | 8.00 | 1.64           | 6.55 | 24.3                    |
| Rated Angular Acceleration Rate                                     | rad/s <sup>2</sup>                                                                       |         | 343            | 857                  | 1000 | 273            | 545  | 811                     |
| Heat Sink Size                                                      | mm                                                                                       |         | 550 × 550 × 30 |                      |      | 650 × 650 × 30 |      |                         |
| Allowable Load Moment of Inertia<br>(Motor Moment of Inertia Ratio) | times                                                                                    |         | 200            | 350                  | 25   | 450            | 20   | 60<br>130* <sup>4</sup> |
|                                                                     | With External Regenerative Resistor and<br>External Dynamic Brake Resistor* <sup>3</sup> | times   | 200            | 350                  | 25   | 450            | 20   | 3500                    |
| Allowable<br>Loads* <sup>5</sup>                                    | Allowable<br>Thrust Load                                                                 | Forward | N              | 5 × 10 <sup>3</sup>  |      |                | 2000 |                         |
|                                                                     |                                                                                          | Reverse | N              | 3 × 10 <sup>3</sup>  |      |                | 1000 |                         |
|                                                                     | Allowable Moment Load                                                                    |         | N·m            | 20                   |      |                | 100  |                         |
| Rigidities                                                          | Thrust Displace-<br>ment Rigidity                                                        | Forward | mm/N           | 4 × 10 <sup>-6</sup> |      |                | —    |                         |
|                                                                     |                                                                                          | Reverse | mm/N           | 8 × 10 <sup>-6</sup> |      |                | —    |                         |
|                                                                     | Moment Displacement Rigidity                                                             |         | rad/N·m        | 8 × 10 <sup>-6</sup> |      |                | —    |                         |

\*1. The rated torques are the continuous allowable torque values at a surrounding air temperature of 40°C with an aluminum heat sink of the dimensions given in the table.

\*2. The rated intermittent torque is the value for 60% ED.

\*3. To externally connect dynamic brake resistance, select hardware option specification 020 for the SERVOPACK. However, you cannot externally connect dynamic brake resistance if you use the following SERVOPACKs (maximum applicable motor capacity: 400 W).

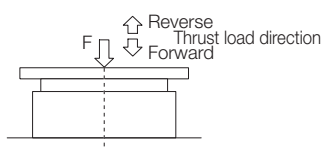
- SGD7S-2R8□□□A020F82□
- SGD7S-2R8□□0A020F83□

\*4. If you use an SGD7S-120A008 SERVOPACK and SGM7D Servomotor together, use the ratios given on the bottom line.

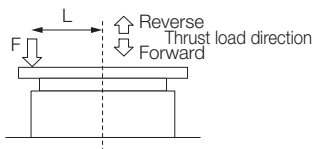
\*5. The thrust loads and moment loads that are applied while a Servomotor is operating are roughly classified into the following patterns. Design the machine so that the thrust loads or moment loads will not exceed the values given in the table. The allowable load is for a static load in one direction.

When designing the system, multiply the allowable load by the following safety coefficient depending on the type of load.

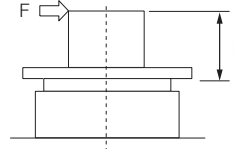
- Smooth load with no shock: 1/3
- Light repetitive load: 1/5
- Shock load: 1/10



Where F is the external force,  
Thrust load = F + Load mass  
Moment load = 0



Where F is the external force,  
Thrust load = F + Load mass  
Moment load = F × L



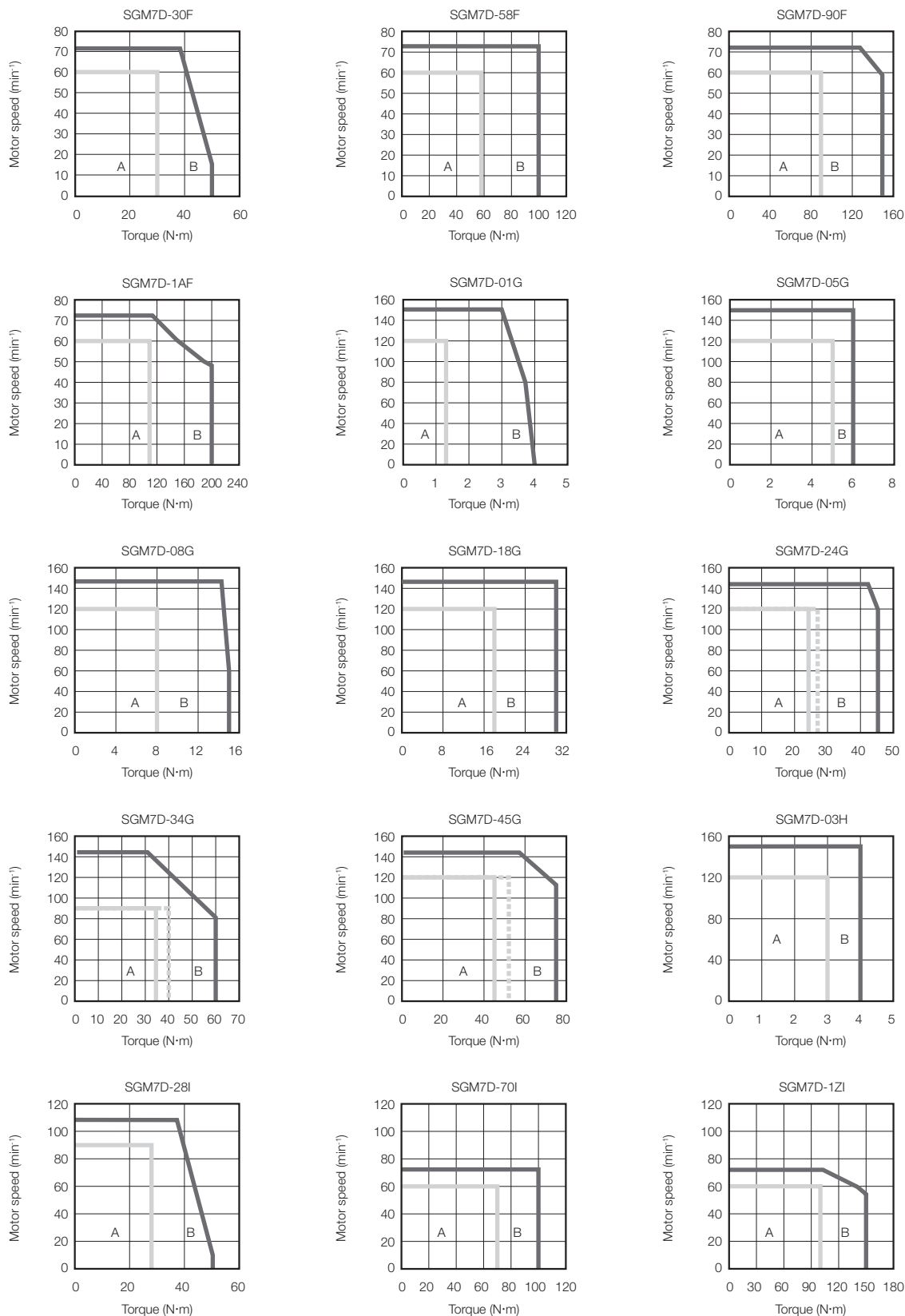
Where F is the external force,  
Thrust load = Load mass  
Moment load = F × L

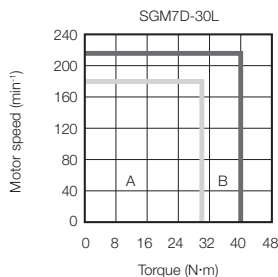
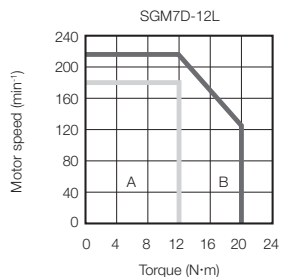
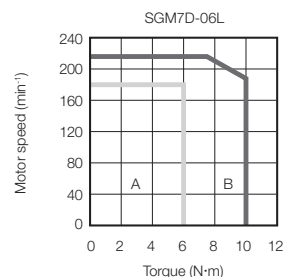
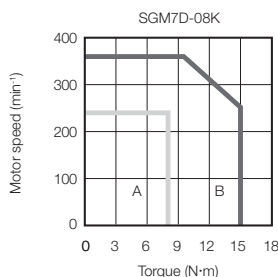
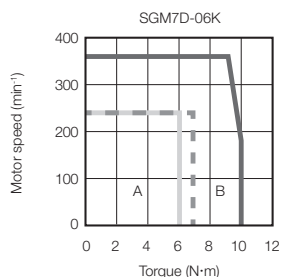
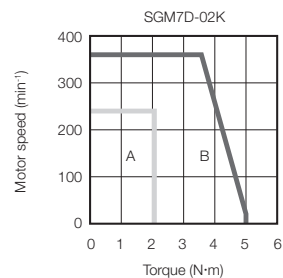
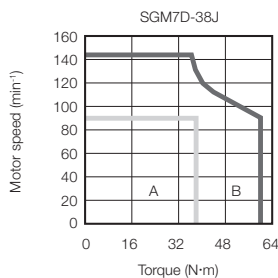
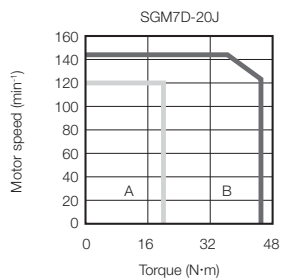
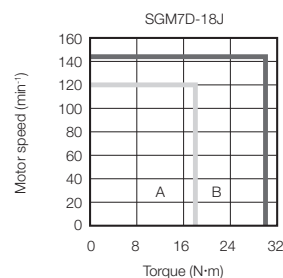
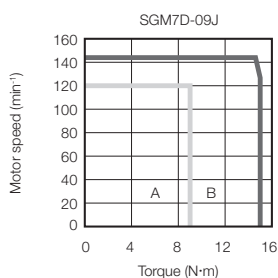
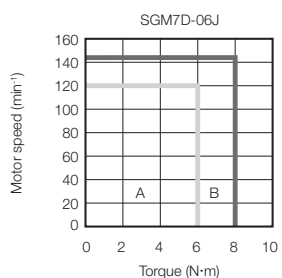
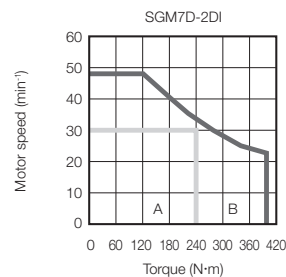
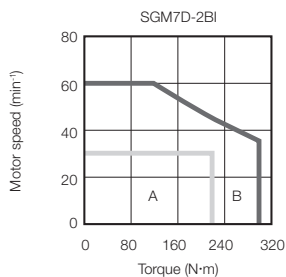
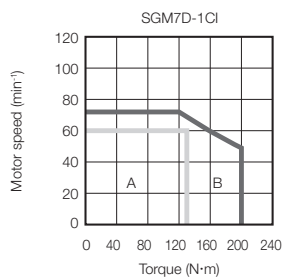
Note: 1. These values are for operation in combination with a SERVOPACK when the temperature of the armature winding is 20°C. These are typical values.

2. For the bearings used in these Servomotors, the loss depends on the bearing temperature. The amount of heat loss is higher at low temperatures.

## Torque-Motor Speed Characteristics

**A** : Continuous duty zone      (dotted lines): With 60%ED 10 min. duty factor  
**B** : Intermittent duty zone\*      (solid lines): With three-phase 200-V, single-phase 230-V, and single-phase 200-V input





\* The characteristics are the same for three-phase 200 V and single-phase 200 V input.

Contact your Yaskawa representative for information on the characteristics for single-phase 100 V input.

Note: 1. These values (typical values) are for operation in combination with a SERVOPACK when the temperature of the armature winding is 20°C.

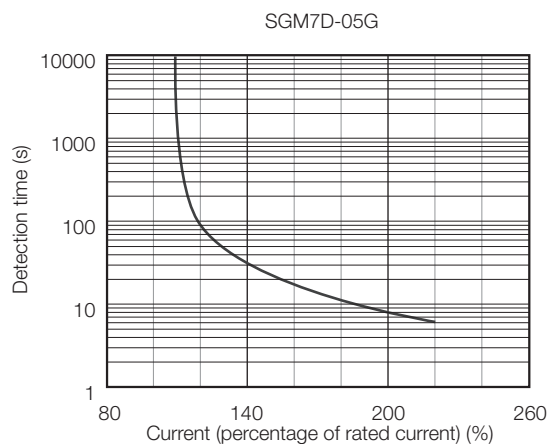
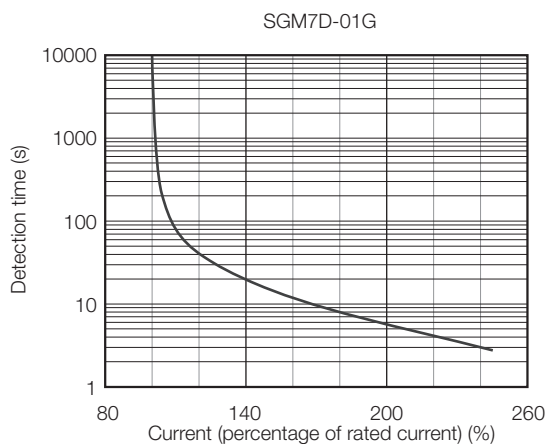
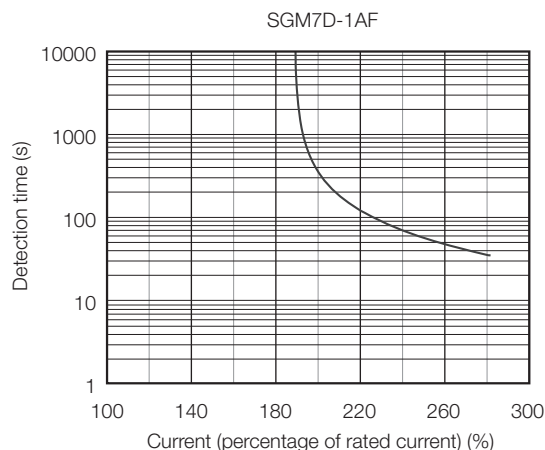
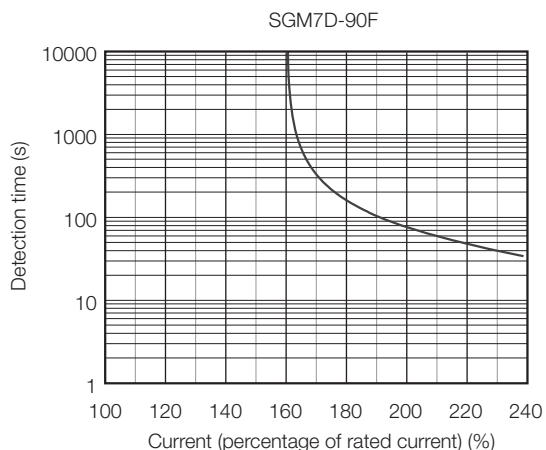
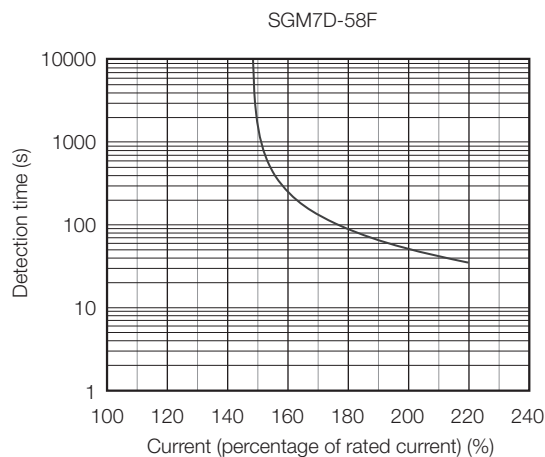
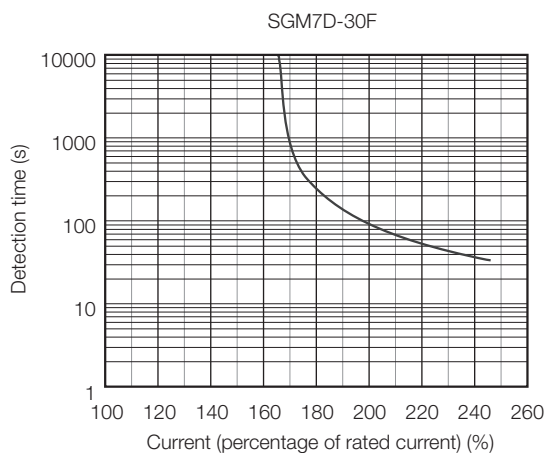
2. The characteristics in the intermittent duty zone depend on the power supply voltage.

3. If the effective torque is within the allowable range for the rated torque, the Servomotor can be used within the intermittent duty zone.

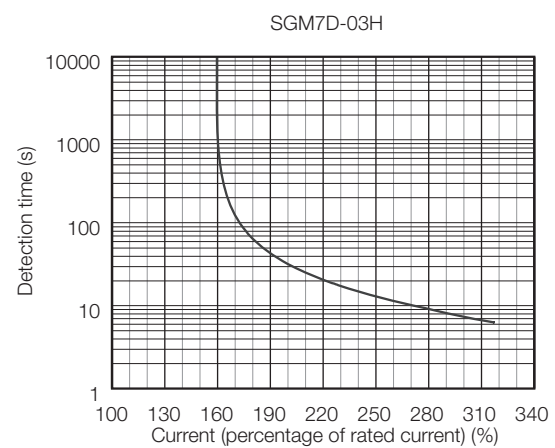
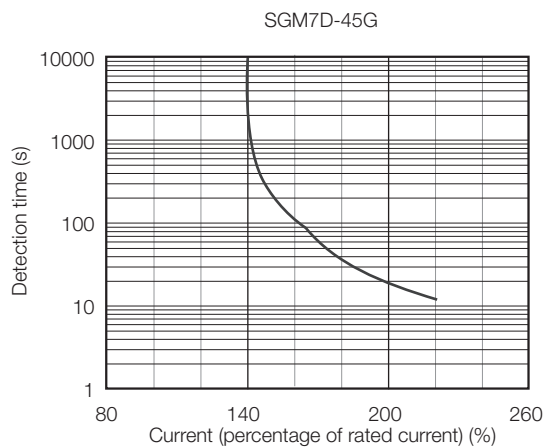
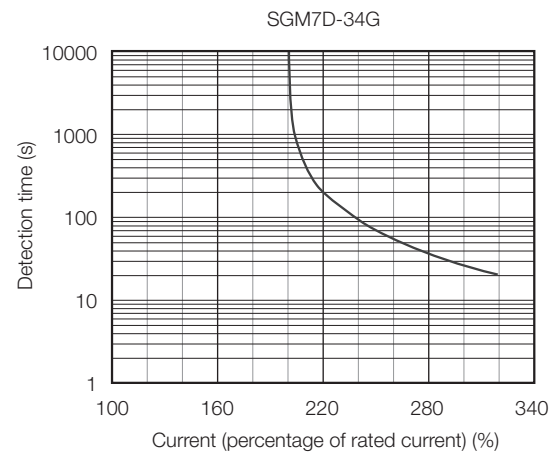
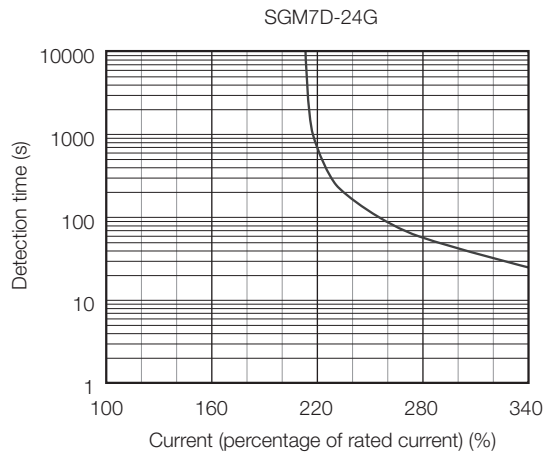
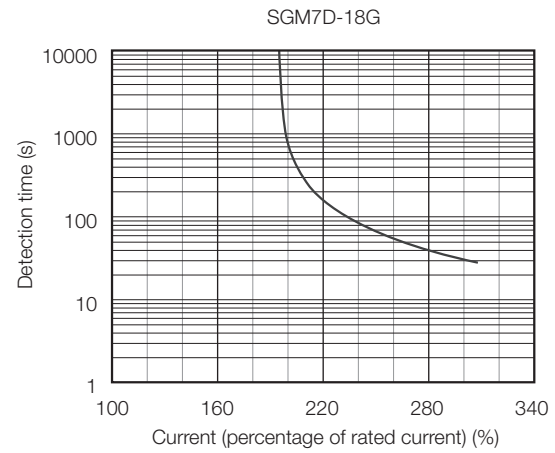
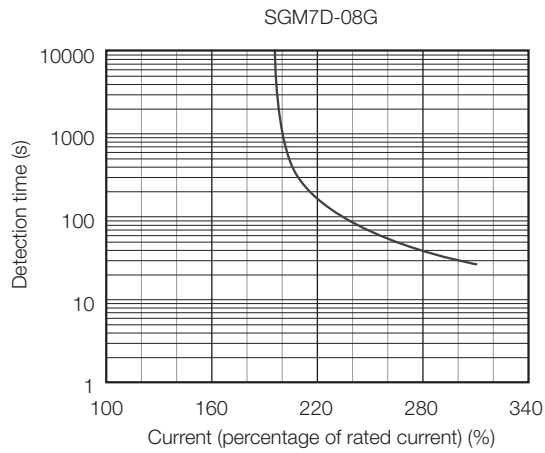
4. If you use a Servomotor Main Circuit Cable that exceeds 20 m, the intermittent duty zone in the torque-motor speed characteristics will become smaller because the voltage drop increases.

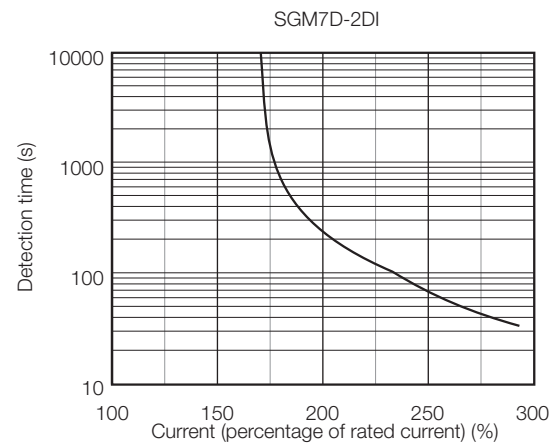
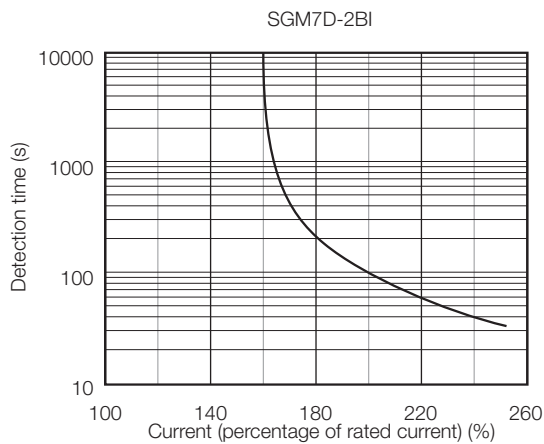
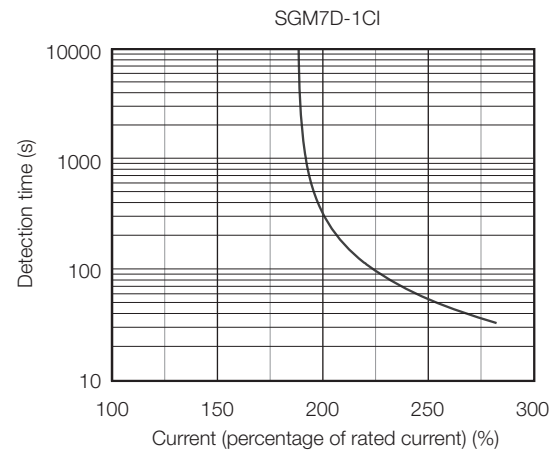
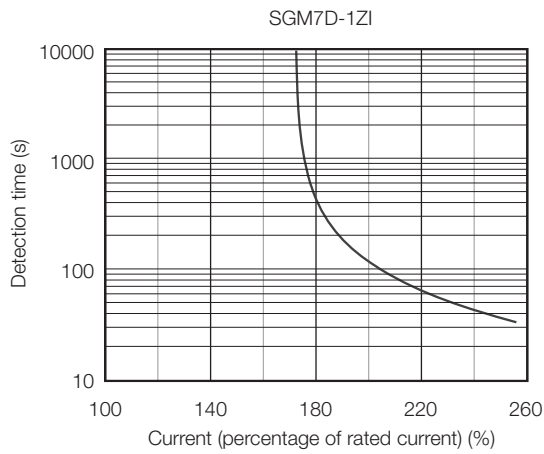
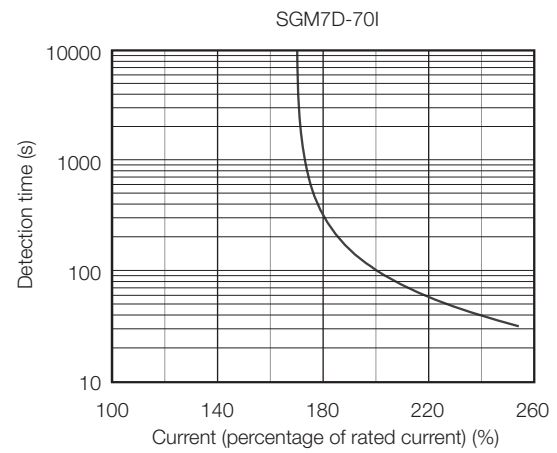
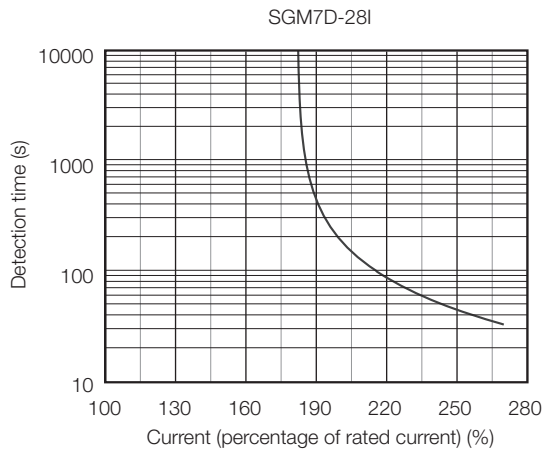
## Servomotor Overload Protection Characteristics

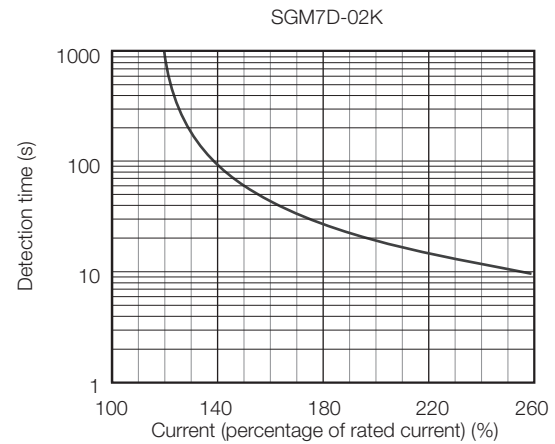
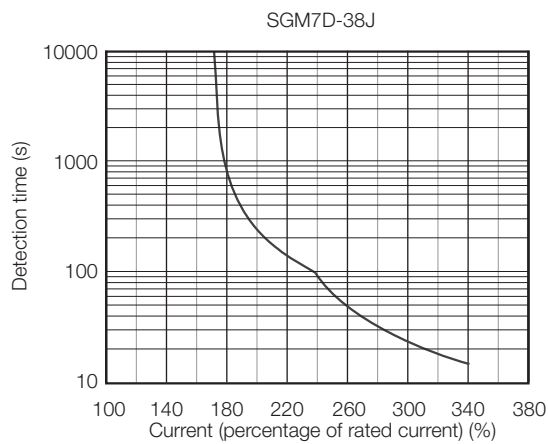
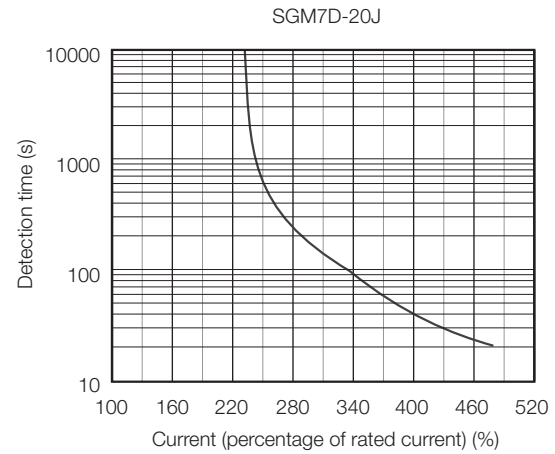
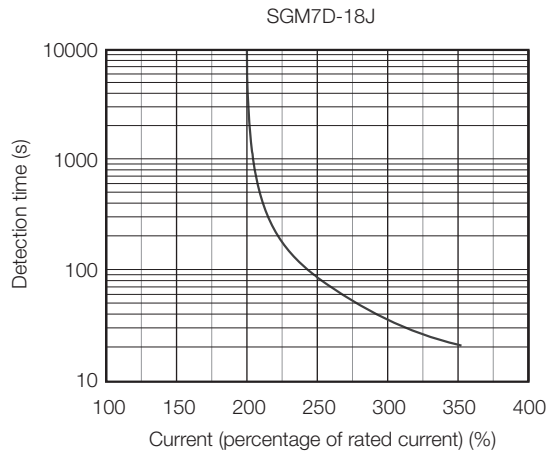
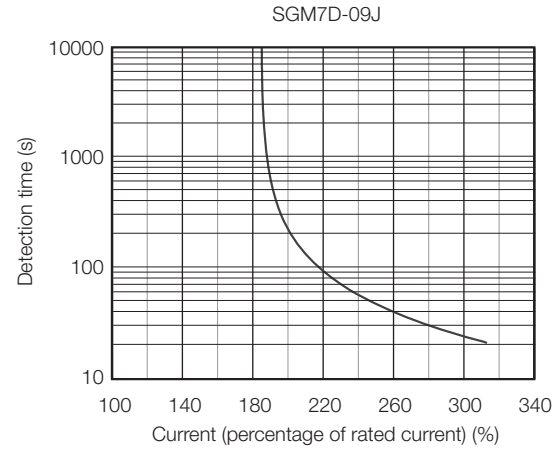
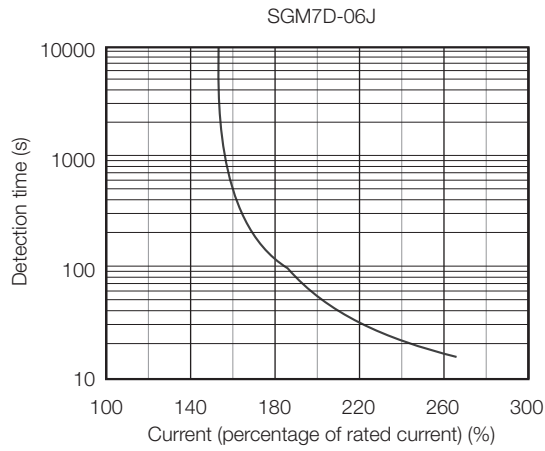
The overload detection level is set for hot start conditions with a Servomotor surrounding air temperature of 40°C.





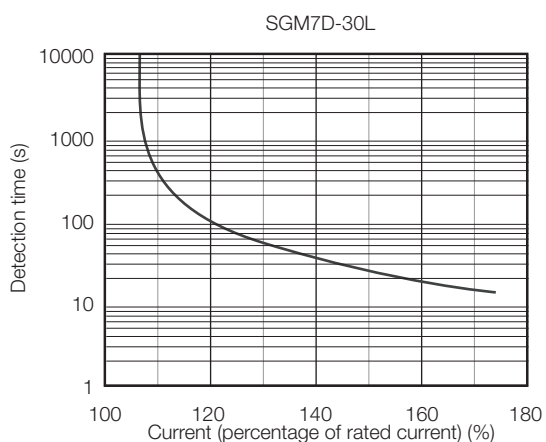
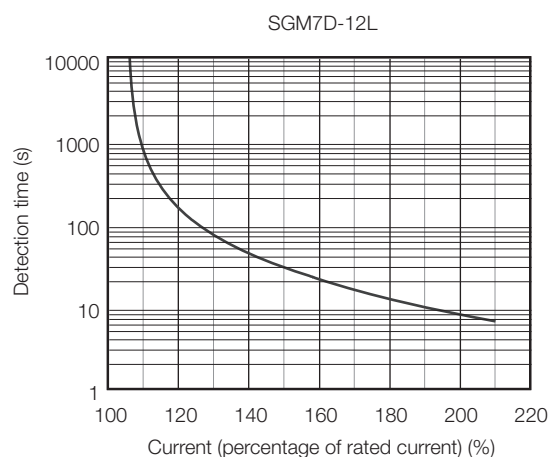
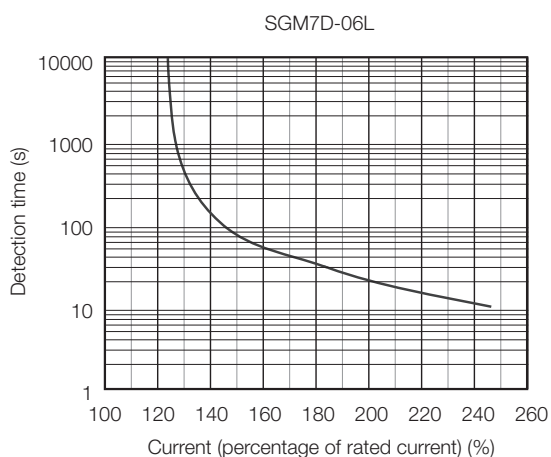
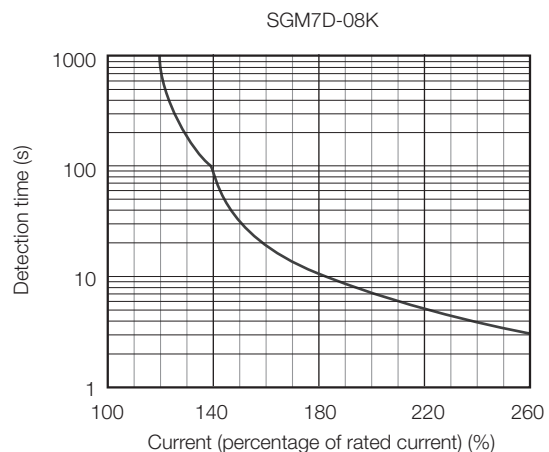
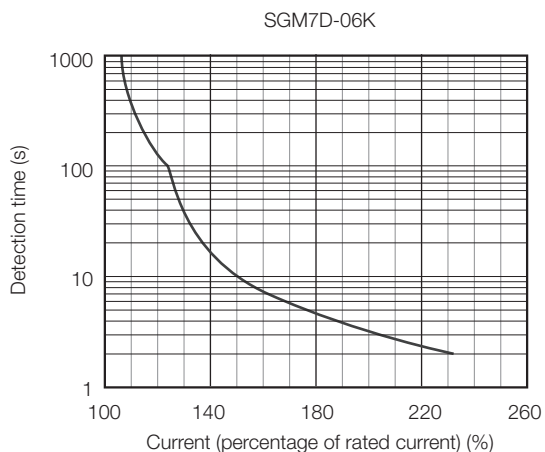






## Direct Drive Servo Motors

### SGM7D (With Core, Outer Rotor)



Note: The above overload protection characteristics do not mean that you can perform continuous duty operation with an output of 100% or higher.

Use the Servomotor so that the effective force remains within the continuous duty zone. Refer to the following section for details on the effective torque.

 **Torque-Motor Speed Characteristics (page 250)**

## Allowable Load Moment of Inertia

The allowable load moments of inertia (motor moment of inertia ratios) for the Servomotors are given in the Ratings (pages 247 to 249). The values are determined by the regenerative energy processing capacity of the SERVOPACK and are also affected by the drive conditions of the Servomotor. Perform the required Steps for each of the following cases.

Use the SigmaSize+ AC Servo Drive Capacity Selection Program to check the driving conditions. Contact your Yaskawa representative for information on this program.

### ◆ Exceeding the Allowable Load Moment of Inertia

Use one of the following measures to adjust the load moment of inertia to within the allowable value.

- Reduce the torque limit.
- Reduce the deceleration rate.
- Reduce the maximum motor speed.

If the above steps is not possible, install an external regenerative resistor.

#### Information

An Overvoltage Alarm (A.400) is likely to occur during deceleration if the load moment of inertia exceeds the allowable load moment of inertia. SERVOPACKs with a built-in regenerative resistor may generate a Regenerative Overload Alarm (A.320). Refer to Built-In Regenerative Resistor (page 609) for the regenerative power (W) that can be processed by the SERVO-PACKs.

Install an External Regenerative Resistor when the built-in regenerative resistor cannot process all of the regenerative power.

### ◆ When an External Regenerative Resistor Is Required

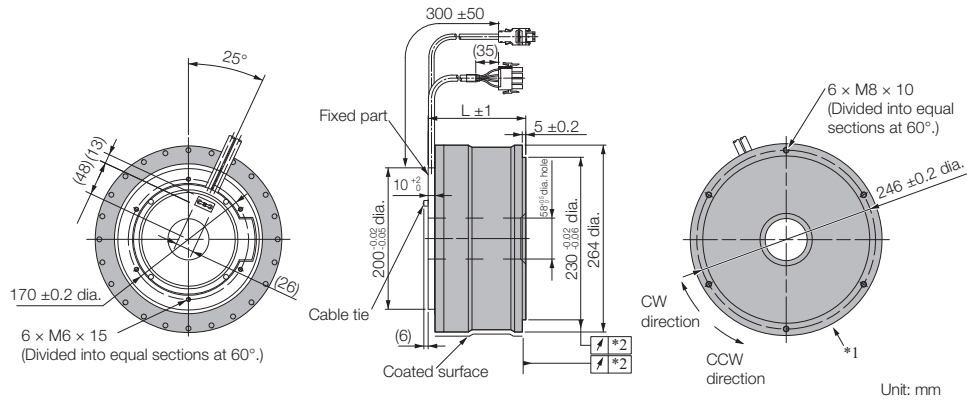
Install the External Regenerative Resistor. Refer to the following section for the recommended products.

 **External Regenerative Resistors (200 V Models) (page 609)**

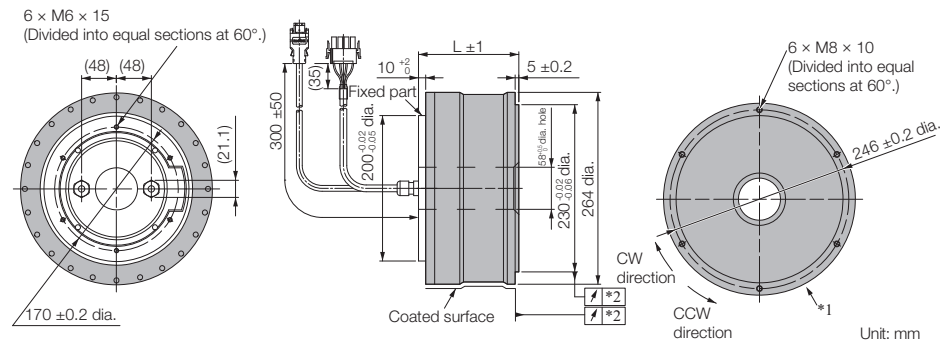
## External Dimensions

### ◆ SGM7D-□□F

#### • Servomotors with the Cable on the Side



#### • Servomotors with the Cable on the Bottom



\*1. The shaded section indicates the rotating parts.

\*2. The precision depends on the option specification. Refer to the following section for details.

#### 🔧 Specifications (page 244)

Note: Values in parentheses are reference dimensions.

| Model SGM7D- | L       | Approx. Mass [kg] |
|--------------|---------|-------------------|
| 30F□ C□ □    | 113 ± 1 | 14.5              |
| 58F□ C□ □    | 138 ± 1 | 19                |
| 90F□ C□ □    | 163 ± 1 | 24                |
| 1AF□ C□ □    | 188 ± 1 | 29                |

### ■ Connector Specifications

#### • Servomotor Connector



|   |                   |                |
|---|-------------------|----------------|
| 1 | Phase U           | Red            |
| 2 | Phase V           | Gray           |
| 3 | Phase W           | Blue           |
| 4 | FG (frame ground) | Green (yellow) |

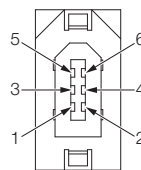
#### Models

- Plug: 350779-1
- Pins: 350218-3 or 350547-3 (No.1 to 3)
- Ground pin: 350654-1 or 350669-1 (No. 4)
- Manufacturer: Tyco Electronics Japan G.K.

#### Mating Connector

- Cap: 350780-1
- Socket: 350536-3 or 350550-3

#### • Encoder Connector



|    |      |
|----|------|
| 1  | PG5V |
| 2  | PG0V |
| 3* | BAT  |
| 4* | BAT0 |
| 5  | PS   |
| 6  | /PS  |

Connector case FG (frame ground)

\* Only absolute-value models with multiturn data.

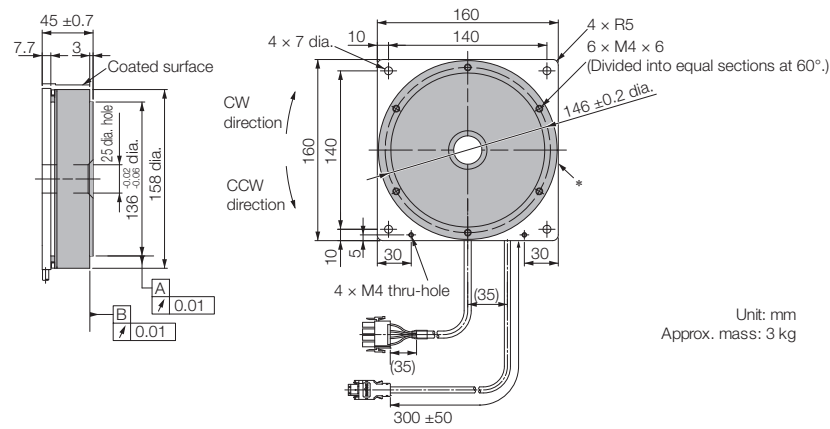
Model: 55102-0600

Manufacturer: Molex Japan LLC

Mating connector: 54280-0609

## ◆ SGM7D-01G

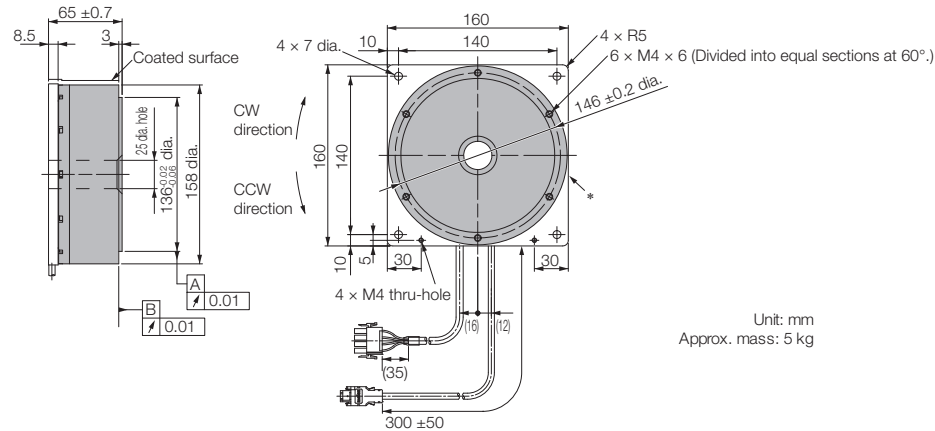
### • Servomotors with the Cable on the Side



\* The shaded section indicates the rotating parts.  
Note: Values in parentheses are reference dimensions.

## ◆ SGM7D-05G

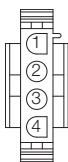
### • Servomotors with the Cable on the Side



\* The shaded section indicates the rotating parts.  
Note: Values in parentheses are reference dimensions.

## ■ Connector Specifications

### • Servomotor Connector



|   |                   |       |
|---|-------------------|-------|
| 1 | Phase U           | Red   |
| 2 | Phase V           | Gray  |
| 3 | Phase W           | Blue  |
| 4 | FG (frame ground) | Green |

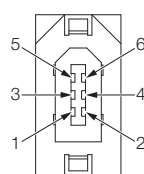
#### Models

- Plug: 350779-1
- Pins: 350561-3 or 350690-3 (No.1 to 3)
- Ground pin: 350654-1 or 350669-1 (No. 4)
- Manufacturer: Tyco Electronics Japan G.K.

#### Mating Connector

- Cap: 350780-1
- Socket: 350570-3 or 350689-3

### • Encoder Connector



|                |                   |
|----------------|-------------------|
| 1              | PG5V              |
| 2              | PG0V              |
| 3*             | BAT               |
| 4*             | BAT0              |
| 5              | PS                |
| 6              | /PS               |
| Connector case | FG (frame ground) |

\* Only absolute-value models with multitrack data.

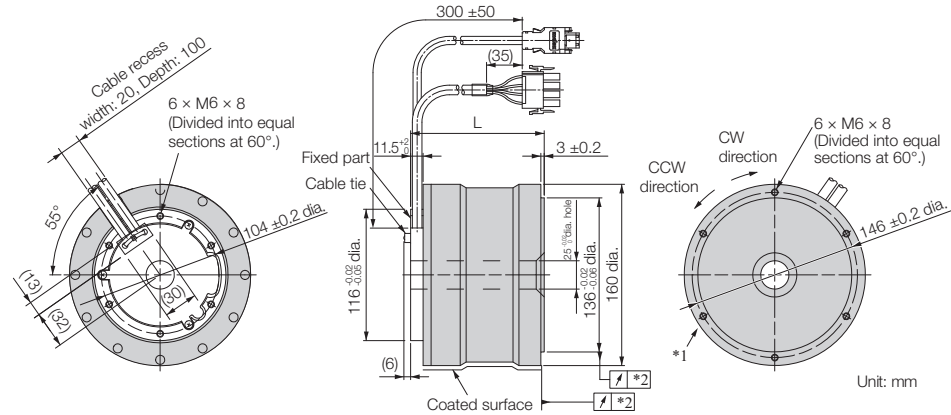
Model: 55102-0600

Manufacturer: Molex Japan LLC

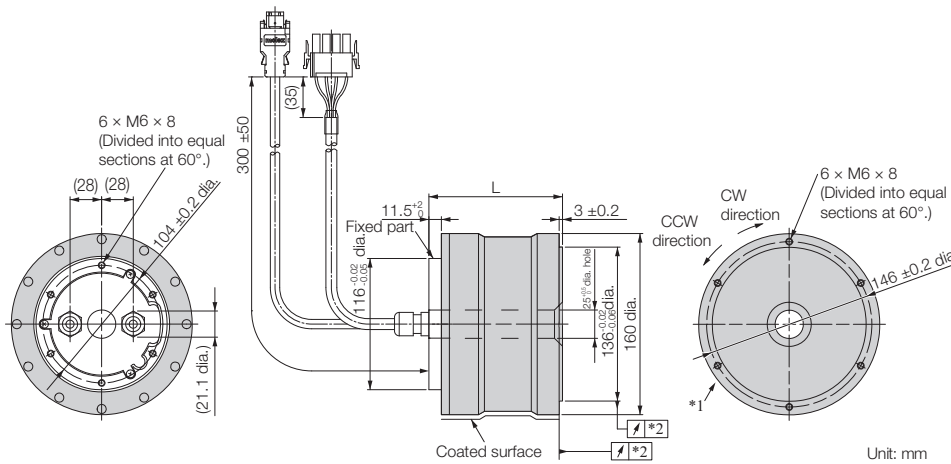
Mating connector: 54280-0609

## ◆ SGM7D-08G, -18G, -24G, -34G, and -45G

### • Servomotors with the Cable on the Bottom



### • Servomotors with the Cable on the Bottom



\*1. The shaded section indicates the rotating parts.

\*2. The precision depends on the option specification. Refer to the following section for details.

#### Specifications (page 244)

Note: Values in parentheses are reference dimensions.

| Model SGM7D- | L       | Approx. Mass [kg] |
|--------------|---------|-------------------|
| 08G□ C□ □    | 92.5 ±1 | 5.5               |
| 18G□ C□ □    | 118 ±1  | 7.5               |
| 24G□ C□ □    | 143 ±1  | 9.5               |
| 34G□ C□ □    | 168 ±1  | 12                |
| 45G□ C□ □    | 194 ±1  | 14                |

## ■ Connector Specifications

### • Servomotor Connector



|   |                   |                |
|---|-------------------|----------------|
| 1 | Phase U           | Red            |
| 2 | Phase V           | Gray           |
| 3 | Phase W           | Blue           |
| 4 | FG (frame ground) | Green (yellow) |

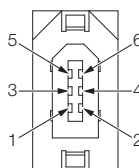
#### Models

- Plug: 350779-1
  - Pins: 350218-3 or 350547-3 (No.1 to 3)
  - Ground pin: 350654-1 or 350669-1 (No. 4)
- Manufacturer: Tyco Electronics Japan G.K.

#### Mating Connector

- Cap: 350780-1
- Socket: 350536-3 or 350550-3

### • Encoder Connector



|    |      |
|----|------|
| 1  | PG5V |
| 2  | PG0V |
| 3* | BAT  |
| 4* | BAT0 |
| 5  | PS   |
| 6  | /PS  |

Connector case FG (frame ground)

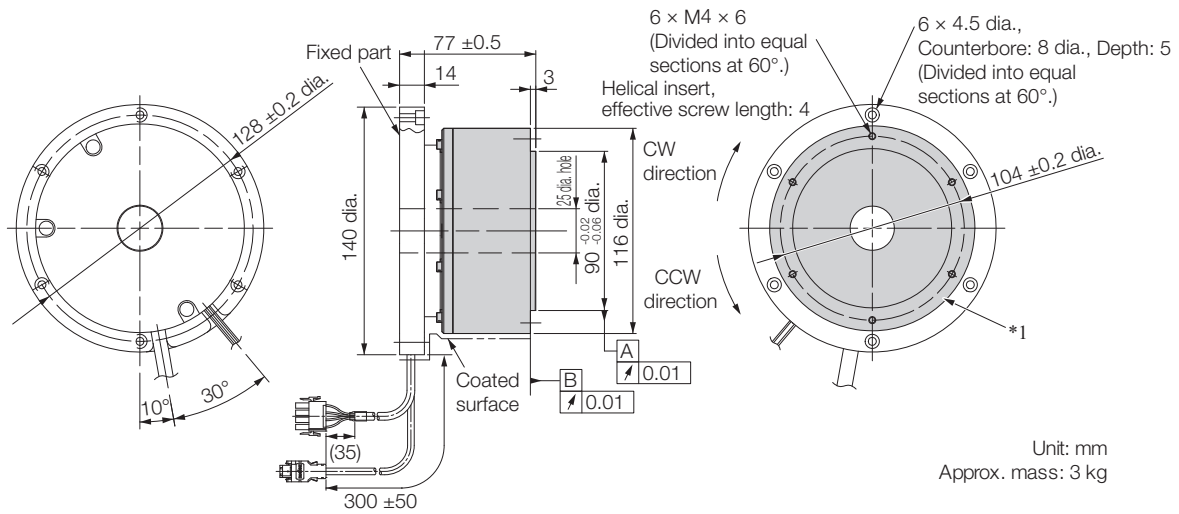
\* Only absolute-value models with multiturn data.

Model: 55102-0600 Mfg: Molex Japan LLC

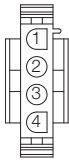
Mating connector: 54280-0609



◆ SGM7D-03H



## ■ Connector Specifications



## Models

## Mating Connector



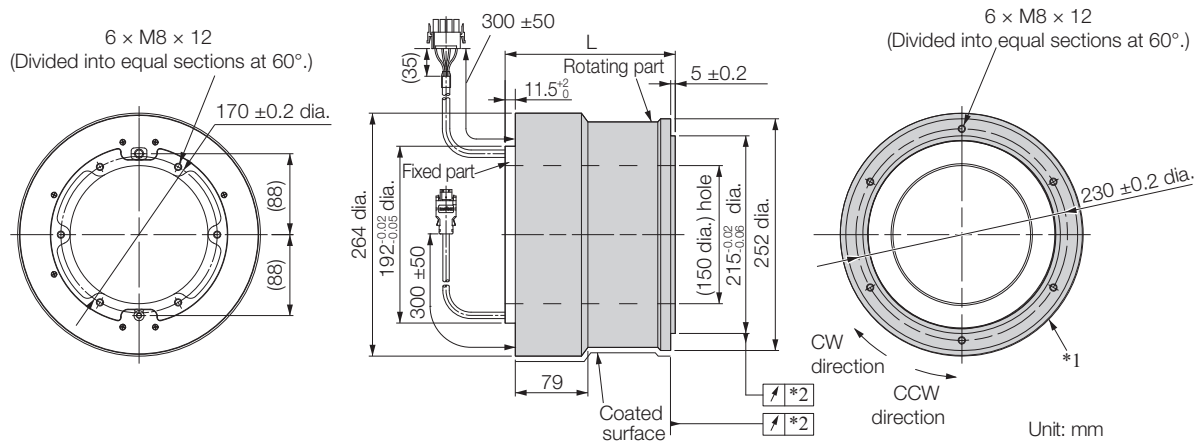
|                       |                   |
|-----------------------|-------------------|
| <b>1</b>              | PG5V              |
| <b>2</b>              | PG0V              |
| <b>3*</b>             | BAT               |
| <b>4*</b>             | BAT0              |
| <b>5</b>              | PS                |
| <b>6</b>              | /PS               |
| <b>Connector case</b> | FG (frame ground) |

**Model:** 55102-0600

**Mating connector:** 54280-0609

## ◆ SGM7D-□□ I

### • Servomotors with the Cable on the Bottom



\*1. The shaded section indicates the rotating parts.

\*2. The precision depends on the option specification. Refer to the following section for details.

#### 🔧 Specifications (page 244)

Note: Values in parentheses are reference dimensions.

| Model SGM7D- | L      | Approx. Mass [kg] |
|--------------|--------|-------------------|
| 28I□ C5□     | 158 ±1 | 23                |
| 70I□ C5□     | 185 ±1 | 28                |
| 1ZI□ C5□     | 212 ±1 | 33                |
| 1CI□ C5□     | 250 ±1 | 45                |
| 2BI□ C5□     | 304 ±1 | 55                |
| 2DI□ C5□     | 358 ±1 | 65                |

### ■ Connector Specifications

#### • Servomotor Connector



|   |                   |                |
|---|-------------------|----------------|
| 1 | Phase U           | Red            |
| 2 | Phase V           | Gray           |
| 3 | Phase W           | Blue           |
| 4 | FG (frame ground) | Green (yellow) |

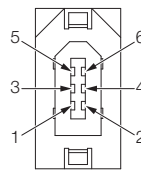
#### Models

- Plug: 350779-1
- Pins: 350218-3 or 350547-3 (No. 1 to 3)
- Ground pin: 350654-1 or 350669-1 (No. 4)
- Manufacturer: Tyco Electronics Japan G.K.

#### Mating Connector

- Cap: 350780-1
- Socket: 350536-3 or 350550-3

#### • Encoder Connector



|                |                   |
|----------------|-------------------|
| 1              | PG5V              |
| 2              | PG0V              |
| 3*             | BAT               |
| 4*             | BAT0              |
| 5              | PS                |
| 6              | /PS               |
| Connector case | FG (frame ground) |

\* Only absolute-value models with multiturn data.

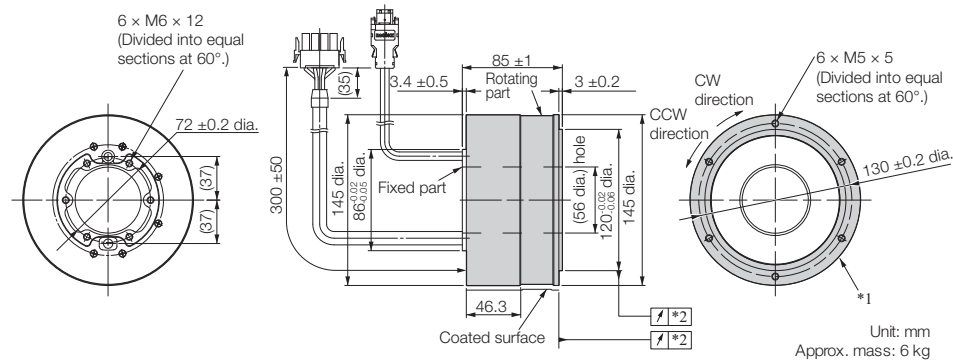
Model: 55102-0600

Manufacturer: Molex Japan LLC

Mating connector: 54280-0609

## ◆ SGM7D-06J

### • Servomotors with the Cable on the Bottom



\*1. The shaded section indicates the rotating parts.

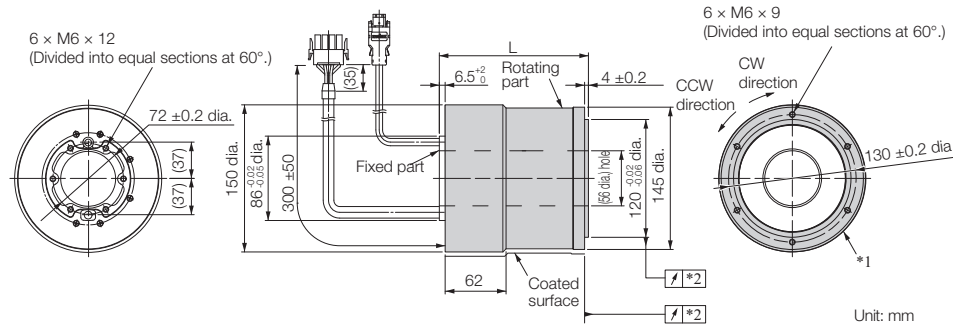
\*2. The precision depends on the option specification. Refer to the following section for details.

#### 📖 Specifications (page 244)

Note: Values in parentheses are reference dimensions.

## ◆ SGM7D-09J, -18J, -20J, and -38J

### • Servomotors with the Cable on the Bottom



\*1. The shaded section indicates the rotating parts.

\*2. The precision depends on the option specification. Refer to the following section for details.

#### 📖 Specifications (page 244)

Note: Values in parentheses are reference dimensions.

| Model SGM7D- | L      | Approx. Mass [kg] |
|--------------|--------|-------------------|
| 09J □ C5 □   | 123 ±1 | 8.0               |
| 18J □ C5 □   | 151 ±1 | 11.0              |
| 20J □ C5 □   | 179 ±1 | 13.0              |
| 38J □ C5 □   | 207 ±1 | 15.5              |

## ■ Connector Specifications

### • Servomotor Connector



|   |                   |                |
|---|-------------------|----------------|
| 1 | Phase U           | Red            |
| 2 | Phase V           | Gray           |
| 3 | Phase W           | Blue           |
| 4 | FG (frame ground) | Green (yellow) |

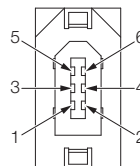
#### Models

- Plug: 350779-1
- Pins: 350218-3 or 350547-3 (No.1 to 3)
- Ground pin: 350654-1 or 350669-1 (No. 4)
- Manufacturer: Tyco Electronics Japan G.K.

#### Mating Connector

- Cap: 350780-1
- Socket: 350536-3 or 350550-3

### • Encoder Connector



|                |                   |
|----------------|-------------------|
| 1              | PG5V              |
| 2              | PG0V              |
| 3*             | BAT               |
| 4*             | BAT0              |
| 5              | PS                |
| 6              | /PS               |
| Connector case | FG (frame ground) |

\* Only absolute-value models with multiturn data.

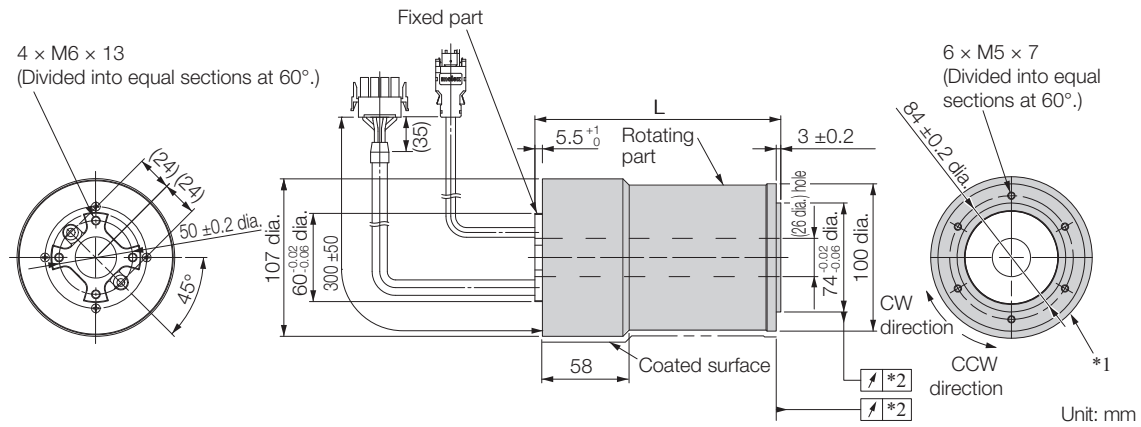
Model: 55102-0600

Manufacturer: Molex Japan LLC

Mating connector: 54280-0609

## ◆ SGM7D-□□ K

### • Servomotors with the Cable on the Bottom



\*1. The shaded section indicates the rotating parts.

\*2. The precision depends on the option specification. Refer to the following section for details.

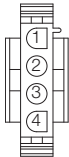
#### 📖 Specifications (page 244)

Note: Values in parentheses are reference dimensions.

| Model SGM7D- | L       | Approx. Mass [kg] |
|--------------|---------|-------------------|
| 02K□ C5□     | 113 ± 1 | 4.0               |
| 06K□ C5□     | 140 ± 1 | 5.0               |
| 08K□ C5□     | 167 ± 1 | 6.5               |

## ■ Connector Specifications

### • Servomotor Connector



|   |                   |       |
|---|-------------------|-------|
| 1 | Phase U           | Red   |
| 2 | Phase V           | Gray  |
| 3 | Phase W           | Blue  |
| 4 | FG (frame ground) | Green |

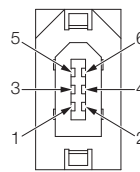
#### Models

- Plug: 350779-1
- Pins: 350561-3 or 350690-3 (No.1 to 3)
- Ground pin: 350654-1 or 350669-1 (No. 4)
- Manufacturer: Tyco Electronics Japan G.K.

#### Mating Connector

- Cap: 350780-1
- Socket: 350570-3 or 350689-3

### • Encoder Connector



|                |                   |
|----------------|-------------------|
| 1              | PG5V              |
| 2              | PG0V              |
| 3*             | BAT               |
| 4*             | BAT0              |
| 5              | PS                |
| 6              | /PS               |
| Connector case | FG (frame ground) |

\* Only absolute-value models with multiturn data.

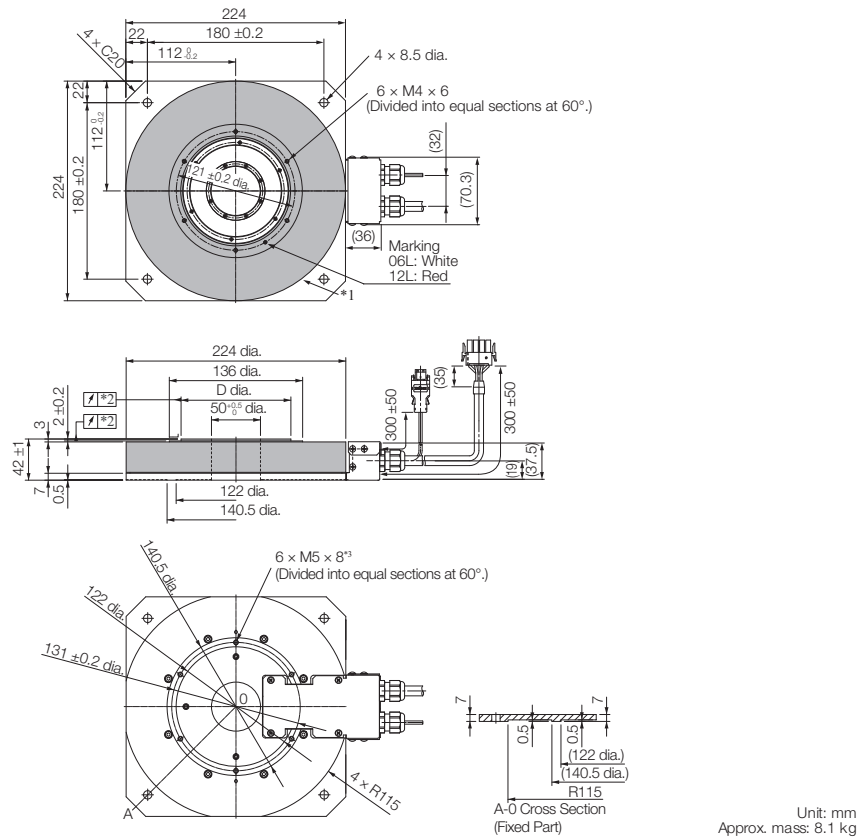
Model: 55102-0600

Manufacturer: Molex Japan LLC

Mating connector: 54280-0609

## ◆ SGM7D-06L and -12L

### • Servomotors with the Cable on the Side



\*1. The shaded section indicates the rotating parts.

\*2. The precision depends on the option specification. Refer to the following section for details.

#### ☞ Specifications (page 244)

- \*3. In the following cases, rigidity is required in the Servomotor. Therefore, secure the Servomotor with these holes.
- There is a fluctuating vertical load on the Servomotor.
  - There is a moment load on the Servomotor.
  - The Servomotor is used hanging upside down.

Note: Values in parentheses are reference dimensions.

| Model SGM7D-                                   | D                                         |
|------------------------------------------------|-------------------------------------------|
| □ □ L □ C41<br>(Standard mechanical precision) | 112 <sup>-0.02</sup> / <sub>-0.06</sub>   |
| □ □ L □ C42<br>(High mechanical precision)     | 111.9 <sup>-0.02</sup> / <sub>-0.06</sub> |

### ■ Connector Specifications • Servomotor Connector



|   |                   |                |
|---|-------------------|----------------|
| 1 | Phase U           | Red            |
| 2 | Phase V           | Gray           |
| 3 | Phase W           | Blue           |
| 4 | FG (frame ground) | Green (yellow) |

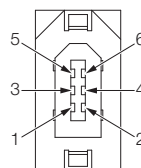
#### Models

- Plug: 350779-1
- Pins: 350218-3 or 350547-3 (No.1 to 3)
- Ground pin: 350654-1 or 350669-1 (No. 4)
- Manufacturer: Tyco Electronics Japan G.K.

#### Mating Connector

- Cap: 350780-1
- Socket: 350536-3 or 350550-3

### • Encoder Connector



|                |                   |
|----------------|-------------------|
| 1              | PG5V              |
| 2              | PG0V              |
| 3*             | BAT               |
| 4*             | BAT0              |
| 5              | PS                |
| 6              | /PS               |
| Connector case | FG (frame ground) |

\* Only absolute-value models with multiturn data.

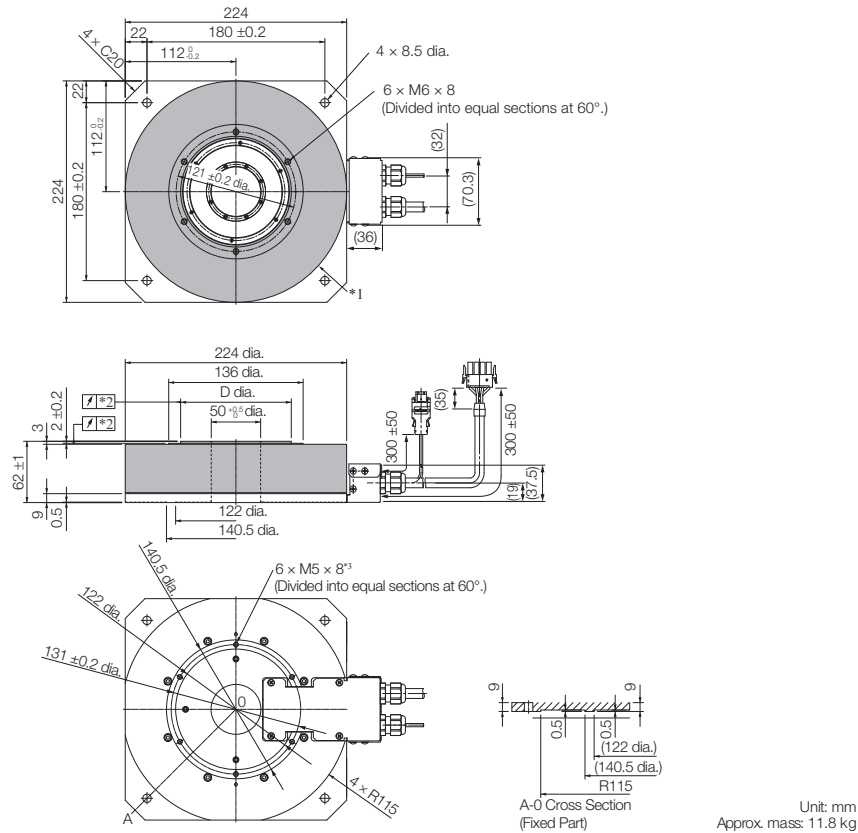
Model: 55102-0600

Manufacturer: Molex Japan LLC

Mating connector: 54280-0609

## ◆ SGM7D-30L

### • Servomotors with the Cable on the Side



- \*1. The shaded section indicates the rotating parts.  
\*2. The precision depends on the option specification.  
Refer to the following section for details.

#### 🔧 Specifications (page 244)

- \*3. In the following cases, rigidity is required in the Servomotor. Therefore, secure the Servomotor with these holes.
- There is a fluctuating vertical load on the Servomotor.
  - There is a moment load on the Servomotor.
  - The Servomotor is used hanging upside down.

Note: Values in parentheses are reference dimensions.

| Model SGM7D-                                | D                                         |
|---------------------------------------------|-------------------------------------------|
| 30L□ C41<br>(Standard mechanical precision) | 112 <sup>-0.02</sup> / <sub>-0.06</sub>   |
| 30L□ C42<br>(High mechanical precision)     | 111.9 <sup>-0.02</sup> / <sub>-0.06</sub> |

### ■ Connector Specifications • Servomotor Connector



|   |                   |                |
|---|-------------------|----------------|
| 1 | Phase U           | Red            |
| 2 | Phase V           | Gray           |
| 3 | Phase W           | Blue           |
| 4 | FG (frame ground) | Green (yellow) |

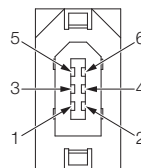
#### Models

- Plug: 350779-1
- Pins: 350218-3 or 350547-3 (No.1 to 3)
- Ground pin: 350654-1 or 350669-1 (No. 4)
- Manufacturer: Tyco Electronics Japan G.K.

#### Mating Connector

- Cap: 350780-1
- Socket: 350536-3 or 350550-3

### • Encoder Connector



|                |                   |
|----------------|-------------------|
| 1              | PG5V              |
| 2              | PG0V              |
| 3*             | BAT               |
| 4*             | BAT0              |
| 5              | PS                |
| 6              | /PS               |
| Connector case | FG (frame ground) |

\* Only absolute-value models with multiturn data.

Model: 55102-0600

Manufacturer: Molex Japan LLC

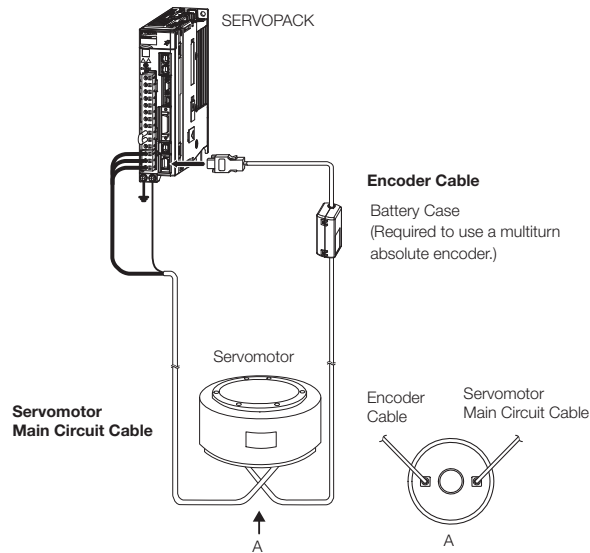
Mating connector: 54280-0609

## Selecting Cables

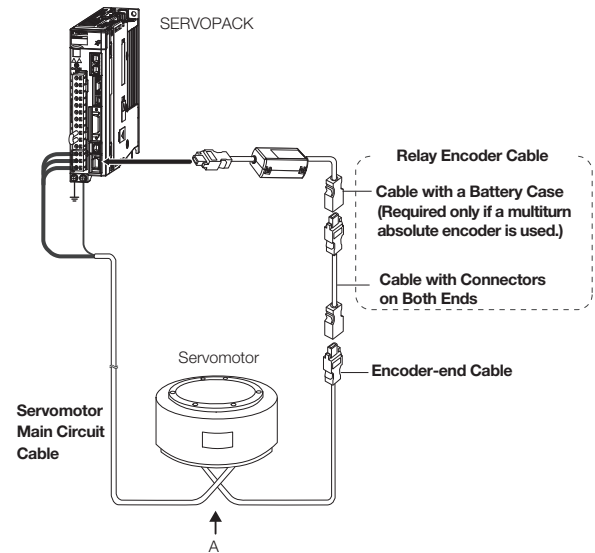
### ◆ Cable Configurations

The cables shown below are required to connect a Servomotor to a SERVOPACK.

Encoder Cable of 20 m or Less



Encoder Cable of 30 m to 50 m (Relay Cable)



Note: 1. If the Encoder Cable length exceeds 20 m, be sure to use a Relay Encoder Cable.

2. If you use a Servomotor Main Circuit Cable that exceeds 20 m, the intermittent duty zone in the torque-motor speed characteristics will become smaller because the voltage drop increases.

3. Refer to the following manual for the following information.

- Cable dimensional drawings and cable connection specifications
- Order numbers and specifications of individual connectors for cables
- Order numbers and specifications for wiring materials

📖 **Σ-7-Series AC Servo Drive Peripheral Device Selection Manual (Manual No.: SIEP S800001 32)**

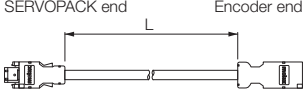
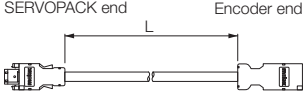
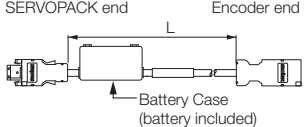
### ◆ Servomotor Main Circuit Cables

| Servomotor Model                                                          | Length (L) | Order Number    |                  | Appearance |
|---------------------------------------------------------------------------|------------|-----------------|------------------|------------|
|                                                                           |            | Standard Cable  | Flexible Cable*  |            |
| SGM7D-□□ F<br>SGM7D-08G to -45G<br>SGM7D-□□ I<br>SGM7D-□□ J<br>SGM7D-□□ L | 3 m        | JZSP-CMM00-03-E | JZSP-C7DM21-03-E |            |
|                                                                           | 5 m        | JZSP-CMM00-05-E | JZSP-C7DM21-05-E |            |
|                                                                           | 10 m       | JZSP-CMM00-10-E | JZSP-C7DM21-10-E |            |
|                                                                           | 15 m       | JZSP-CMM00-15-E | JZSP-C7DM21-15-E |            |
|                                                                           | 20 m       | JZSP-CMM00-20-E | JZSP-C7DM21-20-E |            |
| SGM7D-01G or -05G<br>SGM7D-□□ H<br>SGM7D-□□ K                             | 3 m        | JZSP-CMM00-03-E | JZSP-CMM01-03-E  |            |
|                                                                           | 5 m        | JZSP-CMM00-05-E | JZSP-CMM01-05-E  |            |
|                                                                           | 10 m       | JZSP-CMM00-10-E | JZSP-CMM01-10-E  |            |
|                                                                           | 15 m       | JZSP-CMM00-15-E | JZSP-CMM01-15-E  |            |
|                                                                           | 20 m       | JZSP-CMM00-20-E | JZSP-CMM01-20-E  |            |

\* Use Flexible Cables for moving parts of machines, such as robots. The recommended bending radius (R) is 90 mm or larger.

Note: Direct Drive Servomotors are not available with holding brakes.

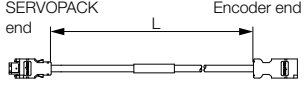
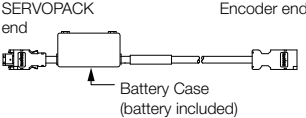
### ◆ Encoder Cables of 20 m or Less

| Servomotor Model | Name                                                                   | Length (L) | Order Number    |                              | Appearance                                                                          |
|------------------|------------------------------------------------------------------------|------------|-----------------|------------------------------|-------------------------------------------------------------------------------------|
|                  |                                                                        |            | Standard Cable  | Flexible Cable* <sup>1</sup> |                                                                                     |
| All SGM7D models | For incremental encoder:<br>Without Battery Case                       | 3 m        | JZSP-CMP00-03-E | JZSP-CMP10-03-E              |  |
|                  |                                                                        | 5 m        | JZSP-CMP00-05-E | JZSP-CMP10-05-E              |                                                                                     |
|                  |                                                                        | 10 m       | JZSP-CMP00-10-E | JZSP-CMP10-10-E              |                                                                                     |
|                  |                                                                        | 15 m       | JZSP-CMP00-15-E | JZSP-CMP10-15-E              |                                                                                     |
|                  |                                                                        | 20 m       | JZSP-CMP00-20-E | JZSP-CMP10-20-E              |                                                                                     |
|                  | For multi-turn absolute encoder:<br>Without Battery Case* <sup>2</sup> | 3 m        | JZSP-CMP00-03-E | JZSP-CMP10-03-E              |  |
|                  |                                                                        | 5 m        | JZSP-CMP00-05-E | JZSP-CMP10-05-E              |                                                                                     |
|                  |                                                                        | 10 m       | JZSP-CMP00-10-E | JZSP-CMP10-10-E              |                                                                                     |
|                  |                                                                        | 15 m       | JZSP-CMP00-15-E | JZSP-CMP10-15-E              |                                                                                     |
|                  |                                                                        | 20 m       | JZSP-CMP00-20-E | JZSP-CMP10-20-E              |                                                                                     |
|                  | For multi-turn absolute encoder:<br>With Battery Case                  | 3 m        | JZSP-CSP19-03-E | JZSP-CSP29-03-E              |  |
|                  |                                                                        | 5 m        | JZSP-CSP19-05-E | JZSP-CSP29-05-E              |                                                                                     |
|                  |                                                                        | 10 m       | JZSP-CSP19-10-E | JZSP-CSP29-10-E              |                                                                                     |
|                  |                                                                        | 15 m       | JZSP-CSP19-15-E | JZSP-CSP29-15-E              |                                                                                     |
|                  |                                                                        | 20 m       | JZSP-CSP19-20-E | JZSP-CSP29-20-E              |                                                                                     |

\*1. Use Flexible Cables for moving parts of machines, such as robots. The recommended bending radius (R) is 68 mm or larger.

\*2. Use one of these Cables if a battery is connected to the host controller.

### ◆ Relay Encoder Cables of 30 m to 50 m

| Servomotor Model | Name                                                                                    | Length (L) | Order Number* <sup>1</sup> | Appearance                                                                            |
|------------------|-----------------------------------------------------------------------------------------|------------|----------------------------|---------------------------------------------------------------------------------------|
| All SGM7D models | Cables with Connectors on Both Ends<br>(for incremental or multi-turn absolute encoder) | 30 m       | JZSP-UCMP00-30-E           |  |
|                  |                                                                                         | 40 m       | JZSP-UCMP00-40-E           |                                                                                       |
|                  |                                                                                         | 50 m       | JZSP-UCMP00-50-E           |                                                                                       |
|                  | Cable with a Battery Case<br>(for multi-turn absolute encoder)* <sup>2</sup>            | 0.3 m      | JZSP-CSP12-E               |  |

\*1. Flexible Cables are not available.

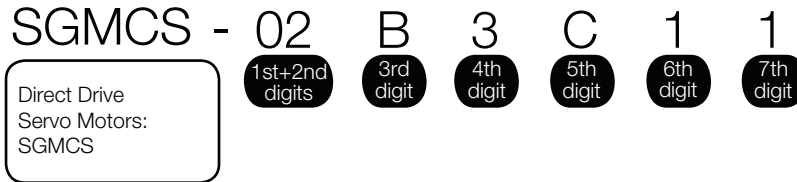
\*2. This Cable is not required if a battery is connected to the host controller.





# SGMCS (Small Capacity, Coreless or Medium Capacity, with Core)

## Model Designations



### 1st+2nd digits Rated Output

#### ● Small-Capacity, Coreless

| Code | Specification |
|------|---------------|
| 02   | 2 N·m         |
| 04   | 4 N·m         |
| 05   | 5 N·m         |
| 07   | 7 N·m         |
| 08   | 8 N·m         |
| 10   | 10 N·m        |
| 14   | 14 N·m        |
| 16   | 16 N·m        |
| 17   | 17 N·m        |
| 25   | 25 N·m        |
| 35   | 35 N·m        |

#### ● Medium-Capacity, with Core

| Code | Specification |
|------|---------------|
| 45   | 45 N·m        |
| 80   | 80 N·m        |
| 1A   | 110 N·m       |
| 1E   | 150 N·m       |
| 2Z   | 200 N·m       |

### 3rd digit Servo Motor Outer Diameter

| Code | Specification |
|------|---------------|
| B    | 135-mm dia.   |
| C    | 175-mm dia.   |
| D    | 230-mm dia.   |
| E    | 290-mm dia.   |
| M    | 280-mm dia.   |
| N    | 360-mm dia.   |

### 4th digit Serial Encoder

| Code | Specification                       |
|------|-------------------------------------|
| 3    | 20-bit single-turn absolute encoder |
| D    | 20-bit incremental encoder          |

### 5th digit Design Revision Order

| Code | Specification                                         |
|------|-------------------------------------------------------|
| A    | Model with servo Motor outer diameter code M or N     |
| B    | Model with servo Motor outer diameter code E          |
| C    | Model with servo Motor outer diameter code B, C, or D |

### 6th digit Flange

| Code | Mounting                           | Servo Motor Outer Diameter Code (3rd Digit) |   |   |   |   |   |
|------|------------------------------------|---------------------------------------------|---|---|---|---|---|
|      |                                    | B                                           | C | D | E | M | N |
| 1    | Non-load side                      | ✓                                           | ✓ | ✓ | ✓ | — | — |
|      | Load side                          | —                                           | — | — | — | ✓ | ✓ |
| 3    | Non-load side                      | —                                           | — | — | — | ✓ | ✓ |
| 4    | Non-load side (with cable on side) | ✓                                           | ✓ | ✓ | ✓ | — | — |

✓ : Applicable models.

■ Non Stock Items

### 7th digit Options

| Code | Specification   |
|------|-----------------|
| 1    | Without options |

Note: Direct Drive Servo Motors are not available with holding brakes.

## Specifications and Ratings

### Small-Capacity, Coreless Servo Motors: Specifications

| Voltage                  |                                                               |        | 200 V                                                                                                                                                                                                                                                                                                                                  |     |     |     |     |     |      |     |     |      |     |
|--------------------------|---------------------------------------------------------------|--------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----|-----|-----|-----|-----|------|-----|-----|------|-----|
| Model SGMCS-             |                                                               |        | 02B                                                                                                                                                                                                                                                                                                                                    | 05B | 07B | 04C | 10C | 14C | 08D  | 17D | 25D | 16E  | 35E |
| Time Rating              |                                                               |        | Continuous                                                                                                                                                                                                                                                                                                                             |     |     |     |     |     |      |     |     |      |     |
| Thermal Class            |                                                               |        | A                                                                                                                                                                                                                                                                                                                                      |     |     |     |     |     |      |     |     |      |     |
| Insulation Resistance    |                                                               |        | 500 VDC, 10 MΩ min.                                                                                                                                                                                                                                                                                                                    |     |     |     |     |     |      |     |     |      |     |
| Withstand Voltage        |                                                               |        | 1,500 VAC for 1 minute                                                                                                                                                                                                                                                                                                                 |     |     |     |     |     |      |     |     |      |     |
| Excitation               |                                                               |        | Permanent magnet                                                                                                                                                                                                                                                                                                                       |     |     |     |     |     |      |     |     |      |     |
| Mounting                 |                                                               |        | Flange-mounted                                                                                                                                                                                                                                                                                                                         |     |     |     |     |     |      |     |     |      |     |
| Drive Method             |                                                               |        | Direct drive                                                                                                                                                                                                                                                                                                                           |     |     |     |     |     |      |     |     |      |     |
| Rotation Direction       |                                                               |        | Counterclockwise (CCW) for forward reference when viewed from the load side                                                                                                                                                                                                                                                            |     |     |     |     |     |      |     |     |      |     |
| Vibration Class*1        |                                                               |        | V15                                                                                                                                                                                                                                                                                                                                    |     |     |     |     |     |      |     |     |      |     |
| Absolute Accuracy        |                                                               |        | ±15 s                                                                                                                                                                                                                                                                                                                                  |     |     |     |     |     |      |     |     |      |     |
| Repeatability            |                                                               |        | ±1.3 s                                                                                                                                                                                                                                                                                                                                 |     |     |     |     |     |      |     |     |      |     |
| Protective Structure*2   |                                                               |        | Totally enclosed, self-cooled, IP42                                                                                                                                                                                                                                                                                                    |     |     |     |     |     |      |     |     |      |     |
| Environmental Conditions | Surrounding Air Temperature                                   |        | 0°C to 40°C (with no freezing)                                                                                                                                                                                                                                                                                                         |     |     |     |     |     |      |     |     |      |     |
|                          | Surrounding Air Humidity                                      |        | 20% to 80% relative humidity (with no condensation)                                                                                                                                                                                                                                                                                    |     |     |     |     |     |      |     |     |      |     |
|                          | Installation Site                                             |        | <ul style="list-style-type: none"><li>• Must be indoors and free of corrosive and explosive gases.</li><li>• Must be well-ventilated and free of dust and moisture.</li><li>• Must facilitate inspection and cleaning.</li><li>• Must have an altitude of 1,000 m or less.</li><li>• Must be free of strong magnetic fields.</li></ul> |     |     |     |     |     |      |     |     |      |     |
|                          | Storage Environment                                           |        | Store the Servo Motor in the following environment if you store it with the power cable disconnected.<br>Storage Temperature: -20°C to 60°C (with no freezing)<br>Storage Humidity: 20% to 80% relative humidity (with no condensation)                                                                                                |     |     |     |     |     |      |     |     |      |     |
| Mechanical Tolerances*3  | Runout of Output Shaft Surface                                | mm     | 0.02                                                                                                                                                                                                                                                                                                                                   |     |     |     |     |     |      |     |     |      |     |
|                          | Runout at End of Output Shaft                                 | mm     | 0.04                                                                                                                                                                                                                                                                                                                                   |     |     |     |     |     |      |     |     |      |     |
|                          | Parallelism between Mounting Surface and Output Shaft Surface | mm     | 0.07                                                                                                                                                                                                                                                                                                                                   |     |     |     |     |     | 0.08 |     |     |      |     |
|                          | Concentricity between Output Shaft and Flange Outer Diameter  | mm     | 0.07                                                                                                                                                                                                                                                                                                                                   |     |     |     |     |     | 0.08 |     |     |      |     |
| Shock Resistance*4       | Impact Acceleration Rate at Flange                            |        | 490 m/s <sup>2</sup>                                                                                                                                                                                                                                                                                                                   |     |     |     |     |     |      |     |     |      |     |
|                          | Number of Impacts                                             |        | 2 times                                                                                                                                                                                                                                                                                                                                |     |     |     |     |     |      |     |     |      |     |
| Vibration Resistance*5   | Vibration Acceleration Rate at Flange                         |        | 49 m/s <sup>2</sup>                                                                                                                                                                                                                                                                                                                    |     |     |     |     |     |      |     |     |      |     |
| Applicable SERVOPACKs    |                                                               | SGD7S- | 2R8A                                                                                                                                                                                                                                                                                                                                   |     |     |     |     |     |      |     |     | 5R5A |     |
|                          |                                                               | SGD7W- |                                                                                                                                                                                                                                                                                                                                        |     |     |     |     |     |      |     |     |      |     |

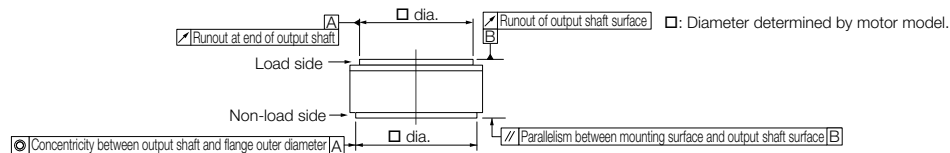
\*1. A vibration class of V15 indicates a vibration amplitude of 15 μm maximum on the Servo Motor without a load at the rated motor speed.

\*2. The hollow hole section, motor mounting surface, output shaft surface, and gap around the rotating part of the shaft are excluded. Protective structure specifications apply only when the special cable is used.

## Direct Drive Servo Motors

### SGMCS (Small Capacity, Coreless or Medium Capacity, with Core)

- \*3. Refer to the following figure for the relevant locations on the Servo Motor. Refer to the dimensional drawings of the individual Servo Motors for more information on tolerances.

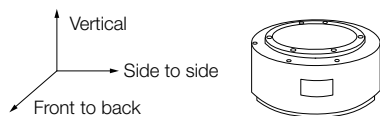


- \*4. The shock resistance for shock in the vertical direction when the Servo Motor is mounted with the shaft in a horizontal position is given in the above table.



Shock Applied to the Servo Motor

- \*5. The vertical, side-to-side, and front-to-back vibration resistance for vibration in three directions when the Servo Motor is mounted with the shaft in a horizontal position is given in the above table. The strength of the vibration that the Servo Motor can withstand depends on the application. Always confirm the vibration acceleration rate.



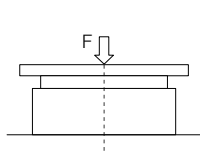
## Small-Capacity, Coreless Servo Motors: Ratings

| Voltage                                       |                       |                                     | 200 V          |      |      |                |      |      |                |      |      |                |      |
|-----------------------------------------------|-----------------------|-------------------------------------|----------------|------|------|----------------|------|------|----------------|------|------|----------------|------|
| Model SGMCS-                                  |                       |                                     | 02B            | 05B  | 07B  | 04C            | 10C  | 14C  | 08D            | 17D  | 25D  | 16E            | 35E  |
| Rated Output* <sup>1</sup>                    |                       | W                                   | 42             | 105  | 147  | 84             | 209  | 293  | 168            | 356  | 393  | 335            | 550  |
| Rated Torque* <sup>1</sup> , * <sup>2</sup>   |                       | N•m                                 | 2.00           | 5.00 | 7.00 | 4.00           | 10.0 | 14.0 | 8.00           | 17.0 | 25.0 | 16.0           | 35.0 |
| Instantaneous Maximum Torque* <sup>1</sup>    |                       | N•m                                 | 6.00           | 15.0 | 21.0 | 12.0           | 30.0 | 42.0 | 24.0           | 51.0 | 75.0 | 48.0           | 105  |
| Stall Torque* <sup>1</sup>                    |                       | N•m                                 | 2.05           | 5.15 | 7.32 | 4.09           | 10.1 | 14.2 | 8.23           | 17.4 | 25.4 | 16.5           | 35.6 |
| Rated Current* <sup>1</sup>                   |                       | Arms                                | 1.8            | 1.7  | 1.4  | 2.2            |      | 2.8  | 1.9            | 2.5  | 2.6  | 3.3            | 3.5  |
| Instantaneous Maximum Current* <sup>1</sup>   |                       | Arms                                | 5.4            | 5.1  | 4.1  | 7.0            |      | 8.3  | 5.6            | 7.5  | 8.0  | 9.4            | 10.0 |
| Rated Motor Speed* <sup>1</sup>               |                       | min <sup>-1</sup>                   | 200            |      |      | 200            |      |      | 200            |      | 150  | 200            | 150  |
| Maximum Motor Speed* <sup>1</sup>             |                       | min <sup>-1</sup>                   | 500            |      |      | 500            | 400  | 300  | 500            | 350  | 250  | 500            | 250  |
| Torque Constant                               |                       | N•m/Arms                            | 1.18           | 3.17 | 5.44 | 2.04           | 5.05 | 5.39 | 5.10           | 7.79 | 10.8 | 5.58           | 11.1 |
| Motor Moment of Inertia                       |                       | ×10 <sup>-4</sup> kg•m <sup>2</sup> | 28.0           | 51.0 | 77.0 | 77.0           | 140  | 220  | 285            | 510  | 750  | 930            | 1430 |
| Rated Power Rate* <sup>1</sup>                |                       | kW/s                                | 1.43           | 4.90 | 6.36 | 2.08           | 7.14 | 8.91 | 2.25           | 5.67 | 8.33 | 2.75           | 8.57 |
| Rated Angular Acceleration Rate* <sup>1</sup> |                       | rad/s <sup>2</sup>                  | 710            | 980  | 910  | 520            | 710  | 640  | 280            | 330  |      | 170            | 240  |
| Heat Sink Size                                |                       | mm                                  | 350 × 350 × 12 |      |      | 450 × 450 × 12 |      |      | 550 × 550 × 12 |      |      | 650 × 650 × 12 |      |
| Allowable Load* <sup>3</sup>                  | Allowable Thrust Load | N                                   | 1500           |      |      | 3300           |      |      | 4000           |      |      | 11000          |      |
|                                               | Allowable Moment Load | N•m                                 | 40             | 50   | 64   | 70             | 75   | 90   | 93             | 103  | 135  | 250            | 320  |

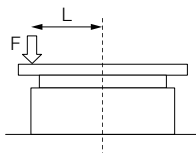
\*1. These values are for operation in combination with a SERVOPACK when the temperature of the armature winding is 100°C. The values for other items are at 20°C. These are typical values.

\*2. The rated torques are the continuous allowable torque values at a surrounding air temperature of 40°C with a steel heat sink of the dimensions given in the table.

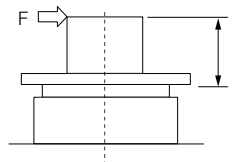
\*3. The thrust loads and moment loads that are applied while a Servo Motor is operating are roughly classified into the following patterns. Design the machine so that the thrust loads or moment loads will not exceed the values given in the table.



Where F is the external force,  
Thrust load = F + Load mass  
Moment load = 0



Where F is the external force,  
Thrust load = F + Load mass  
Moment load = F × L

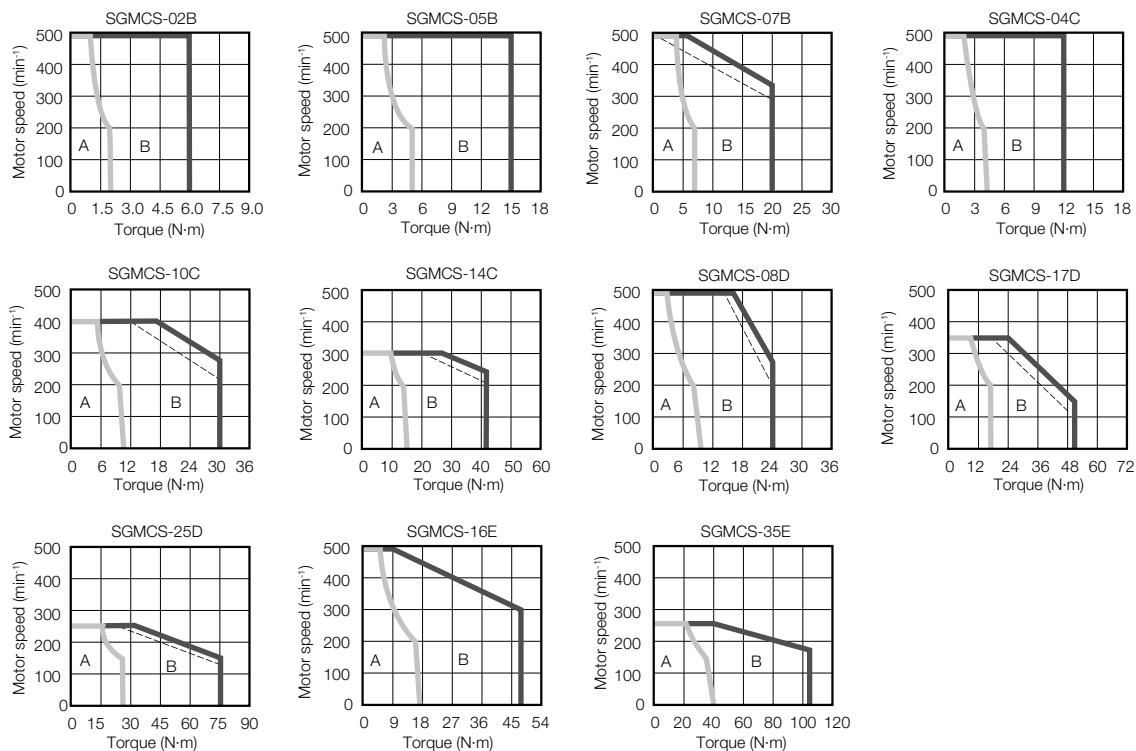


Where F is the external force  
Thrust load = Load mass  
Moment load = F × L

Note: For the bearings used in these Servo Motors, the loss depends on the bearing temperature. The amount of heat loss is higher at low temperatures.

## Small-Capacity, Coreless Servo Motors: Torque-Motor Speed Characteristics

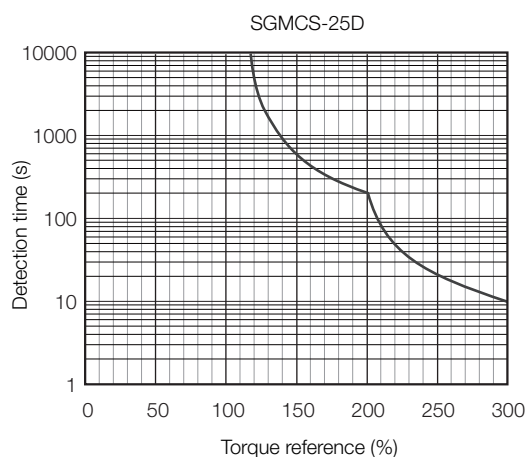
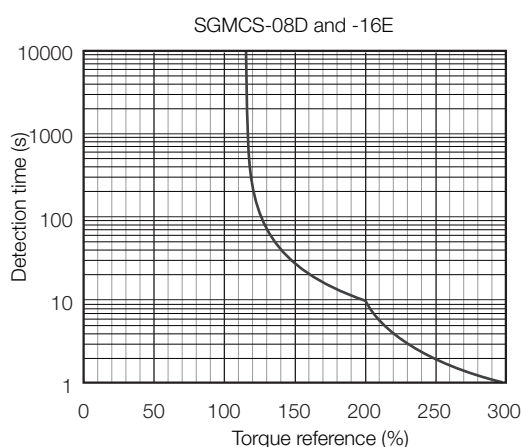
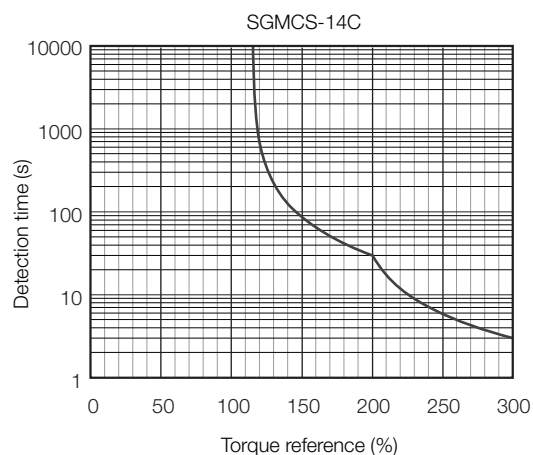
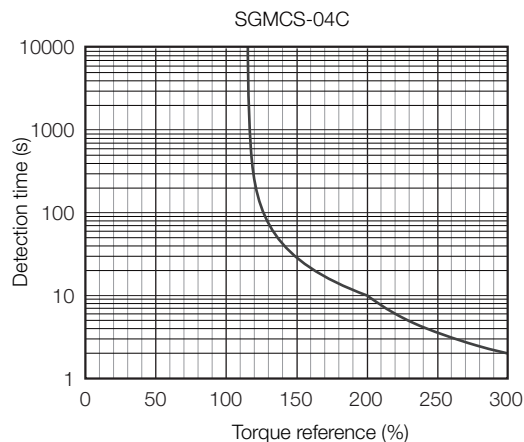
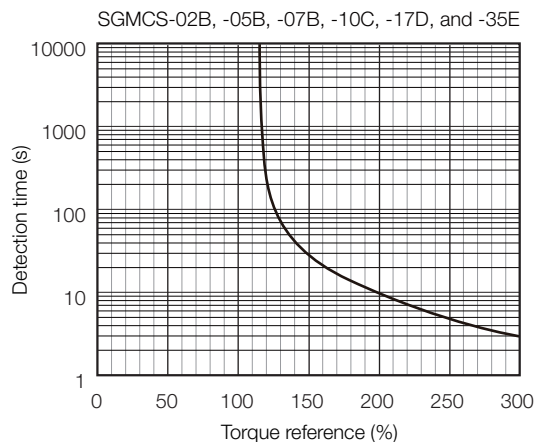
A : Continuous duty zone      — (solid lines): With three-phase 200-V input  
B : Intermittent duty zone      - - - (dotted lines): With single-phase 100-V input



- Note: 1. These values are for operation in combination with a SERVOPACK when the temperature of the armature winding is 100°C. These are typical values.
2. The characteristics in the intermittent duty zone depend on the power supply voltage.
3. If the effective torque is within the allowable range for the rated torque, the Servo Motor can be used within the intermittent duty zone.
4. If you use a Servo Motor Main Circuit Cable that exceeds 20 m, the intermittent duty zone in the torque-motor speed characteristics will become smaller because the voltage drop increases.

## Small-Capacity, Coreless Servo Motors: Servo Motor Overload Protection Characteristics

The overload detection level is set for hot start conditions with a Servo Motor surrounding air temperature of 40°C.



Note: The above overload protection characteristics do not mean that you can perform continuous duty operation with an output of 100% or higher. Use the Servo Motor so that the effective torque remains within the continuous duty zone given in *Small-Capacity, Coreless Servo Motors: Torque-Motor Speed Characteristics* on page 274.

## Medium-Capacity Servo Motors with Cores: Specifications

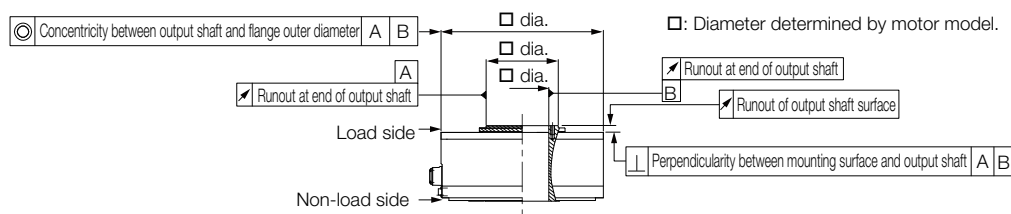
| Voltage                  |                                                               |    | 200 V                                                                                                                                                                                                                                                                                                                                  |      |      |      |       |     |
|--------------------------|---------------------------------------------------------------|----|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------|------|------|-------|-----|
| Model SGMCS-             |                                                               |    | 45M                                                                                                                                                                                                                                                                                                                                    | 80M  | 1AM  | 80N  | 1EN   | 2ZN |
| Time Rating              |                                                               |    | Continuous                                                                                                                                                                                                                                                                                                                             |      |      |      |       |     |
| Thermal Class            |                                                               |    | F                                                                                                                                                                                                                                                                                                                                      |      |      |      |       |     |
| Insulation Resistance    |                                                               |    | 500 VDC, 10 MΩ min.                                                                                                                                                                                                                                                                                                                    |      |      |      |       |     |
| Withstand Voltage        |                                                               |    | 1,500 VAC for 1 minute                                                                                                                                                                                                                                                                                                                 |      |      |      |       |     |
| Excitation               |                                                               |    | Permanent magnet                                                                                                                                                                                                                                                                                                                       |      |      |      |       |     |
| Mounting                 |                                                               |    | Flange-mounted                                                                                                                                                                                                                                                                                                                         |      |      |      |       |     |
| Drive Method             |                                                               |    | Direct drive                                                                                                                                                                                                                                                                                                                           |      |      |      |       |     |
| Rotation Direction       |                                                               |    | Counterclockwise (CCW) for forward reference when viewed from the load side                                                                                                                                                                                                                                                            |      |      |      |       |     |
| Vibration Class*1        |                                                               |    | V15                                                                                                                                                                                                                                                                                                                                    |      |      |      |       |     |
| Absolute Accuracy        |                                                               |    | ±15 s                                                                                                                                                                                                                                                                                                                                  |      |      |      |       |     |
| Repeatability            |                                                               |    | ±1.3 s                                                                                                                                                                                                                                                                                                                                 |      |      |      |       |     |
| Protective Structure*2   |                                                               |    | Totally enclosed, self-cooled, IP44                                                                                                                                                                                                                                                                                                    |      |      |      |       |     |
| Environmental Conditions | Surrounding Air Temperature                                   |    | 0°C to 40°C (with no freezing)                                                                                                                                                                                                                                                                                                         |      |      |      |       |     |
|                          | Surrounding Air Humidity                                      |    | 20% to 80% relative humidity (with no condensation)                                                                                                                                                                                                                                                                                    |      |      |      |       |     |
|                          | Installation Site                                             |    | <ul style="list-style-type: none"><li>• Must be indoors and free of corrosive and explosive gases.</li><li>• Must be well-ventilated and free of dust and moisture.</li><li>• Must facilitate inspection and cleaning.</li><li>• Must have an altitude of 1,000 m or less.</li><li>• Must be free of strong magnetic fields.</li></ul> |      |      |      |       |     |
|                          | Storage Environment                                           |    | Store the Servo Motor in the following environment if you store it with the power cable disconnected.<br>Storage Temperature: -20°C to 60°C (with no freezing)<br>Storage Humidity: 20% to 80% relative humidity (with no condensation)                                                                                                |      |      |      |       |     |
| Mechanical Tolerances*3  | Runout of Output Shaft Surface                                | mm | 0.02                                                                                                                                                                                                                                                                                                                                   |      |      |      |       |     |
|                          | Runout at End of Output Shaft                                 | mm | 0.04                                                                                                                                                                                                                                                                                                                                   |      |      |      |       |     |
|                          | Parallelism between Mounting Surface and Output Shaft Surface | mm | —                                                                                                                                                                                                                                                                                                                                      |      |      |      |       |     |
|                          | Concentricity between Output Shaft and Flange Outer Diameter  | mm | 0.08                                                                                                                                                                                                                                                                                                                                   |      |      |      |       |     |
|                          | Perpendicularity between Mounting Surface and Output Shaft    | mm | 0.08                                                                                                                                                                                                                                                                                                                                   |      |      |      |       |     |
| Shock Resistance*4       | Impact Acceleration Rate at Flange                            |    | 490 m/s <sup>2</sup>                                                                                                                                                                                                                                                                                                                   |      |      |      |       |     |
|                          | Number of Impacts                                             |    | 2 times                                                                                                                                                                                                                                                                                                                                |      |      |      |       |     |
| Vibration Resistance*5   | Vibration Acceleration Rate at Flange                         |    | 24.5 m/s <sup>2</sup>                                                                                                                                                                                                                                                                                                                  |      |      |      |       |     |
| Applicable SERVO-PACKs   | SGD7S-                                                        |    | 7R6A                                                                                                                                                                                                                                                                                                                                   | 120A | 180A | 120A | 200 A |     |
|                          | SGD7W-                                                        |    | 7R6A                                                                                                                                                                                                                                                                                                                                   | —    |      |      |       |     |

\*1. A vibration class of V15 indicates a vibration amplitude of 15  $\mu$ m maximum on the Servo Motor without a load at the rated motor speed.

\*2. This does not apply to the shaft opening. Protective structure specifications apply only when the special cable is used.



- \*3. Refer to the following figure for the relevant locations on the Servo Motor. Refer to the dimensional drawings of the individual Servo Motors for more information on tolerances.

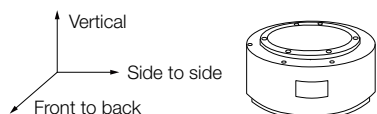


- \*4. The shock resistance for shock in the vertical direction when the Servo Motor is mounted with the shaft in a horizontal position is given in the above table.



Shock Applied to the Servo Motor

- \*5. The vertical, side-to-side, and front-to-back vibration resistance for vibration in three directions when the Servo Motor is mounted with the shaft in a horizontal position is given in the above table. The strength of the vibration that the Servo Motor can withstand depends on the application. Always confirm the vibration acceleration rate.



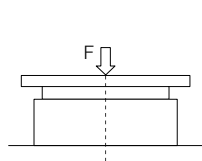
## Medium-Capacity Servo Motors with Cores: Ratings

| Voltage                                       |                                    | 200 V          |      |      |      |       |      |
|-----------------------------------------------|------------------------------------|----------------|------|------|------|-------|------|
| Model SGMCS-                                  |                                    | 45M            | 80M  | 1AM  | 80N  | 1EN   | 2ZN  |
| Rated Output <sup>*1</sup>                    | W                                  | 707            | 1260 | 1730 | 1260 | 2360  | 3140 |
| Rated Torque <sup>*1, *2</sup>                | N•m                                | 45.0           | 80.0 | 110  | 80.0 | 150   | 200  |
| Instantaneous Maximum Torque <sup>*1</sup>    | N•m                                | 135            | 240  | 330  | 240  | 450   | 600  |
| Stall Torque <sup>*1</sup>                    | N•m                                | 45.0           | 80.0 | 110  | 80.0 | 150   | 200  |
| Rated Current <sup>*1</sup>                   | Arms                               | 5.8            | 9.7  | 13.4 | 9.4  | 17.4  | 18.9 |
| Instantaneous Maximum Current <sup>*1</sup>   | Arms                               | 17.0           | 28.0 | 42.0 | 28.0 | 56.0  | 56.0 |
| Rated Motor Speed <sup>*1</sup>               | min <sup>-1</sup>                  | 150            |      |      | 150  |       |      |
| Maximum Motor Speed <sup>*1</sup>             | min <sup>-1</sup>                  | 300            |      |      | 300  | 250   |      |
| Torque Constant                               | N•m/Arms                           | 8.39           | 8.91 | 8.45 | 9.08 | 9.05  | 11.5 |
| Motor Moment of Inertia                       | $\times 10^{-4}$ kg•m <sup>2</sup> | 388            | 627  | 865  | 1360 | 2470  | 3060 |
| Rated Power Rate <sup>*1</sup>                | kW/s                               | 52.2           | 102  | 140  | 47.1 | 91.1  | 131  |
| Rated Angular Acceleration Rate <sup>*1</sup> | rad/s <sup>2</sup>                 | 1160           | 1280 | 1270 | 588  | 607   | 654  |
| Heat Sink Size                                | mm                                 | 750 × 750 × 45 |      |      |      |       |      |
| Allowable Load <sup>*3</sup>                  | A                                  | mm             | 33   |      |      | 37.5  |      |
|                                               | Allowable Thrust Load              | N              | 9000 |      |      | 16000 |      |
|                                               | Allowable Moment Load              | N•m            | 180  |      |      | 350   |      |

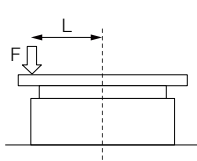
\*1. These values are for operation in combination with a SERVOPACK when the temperature of the armature winding is 20°C. These are typical values.

\*2. The rated torques are the continuous allowable torque values at a surrounding air temperature of 40°C with a steel heat sink of the dimensions given in the table.

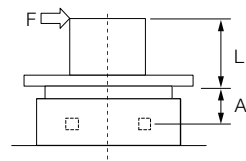
\*3. The thrust loads and moment loads that are applied while a Servo Motor is operating are roughly classified into the following patterns. Design the machine so that the thrust loads or moment loads will not exceed the values given in the table.



Where F is the external force,  
Thrust load = F + Load mass  
Moment load = 0



Where F is the external force,  
Thrust load = F + Load mass  
Moment load = F × L



Where F is the external force,  
Thrust load = Load mass  
Moment load = F × (L + A)

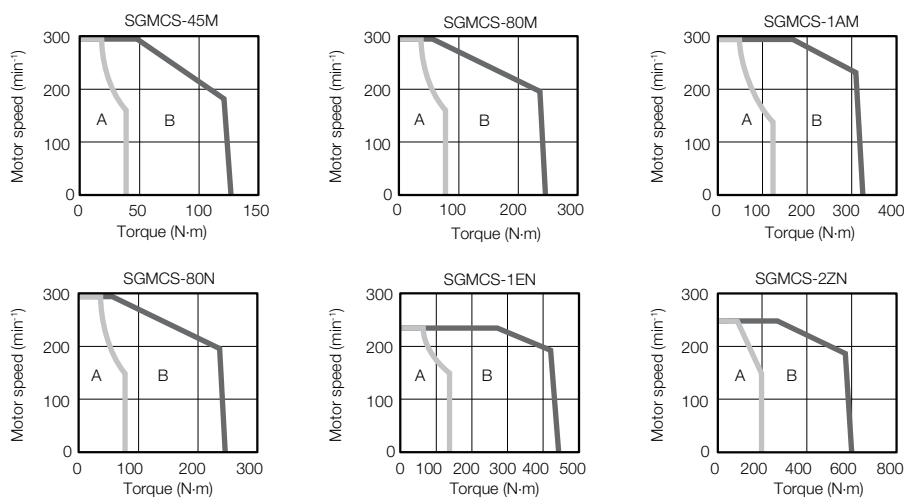
A (Refer to the values in the table.)

Note: For the bearings used in these Servo Motors, the loss depends on the bearing temperature. The amount of heat loss is higher at low temperatures.

## Medium-Capacity Servo Motors with Cores: Torque-Motor Speed Characteristics

**A** : Continuous duty zone

**B** : Intermittent duty zone

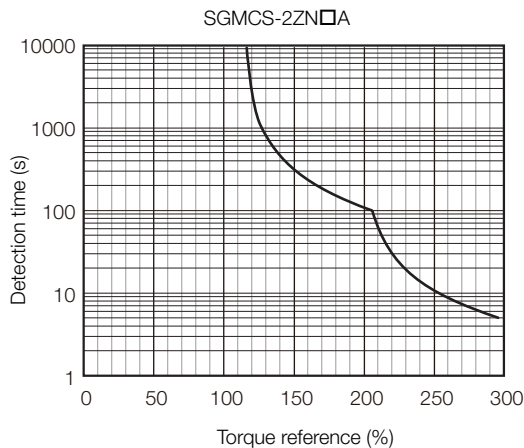
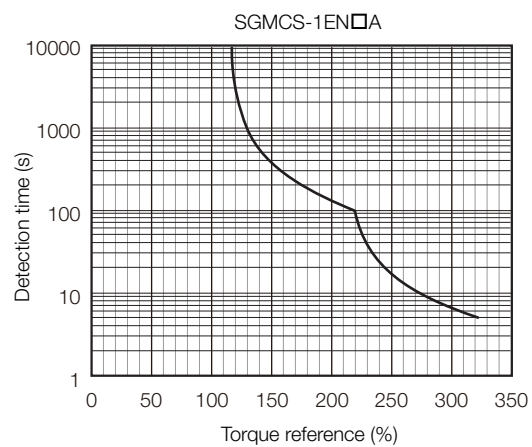
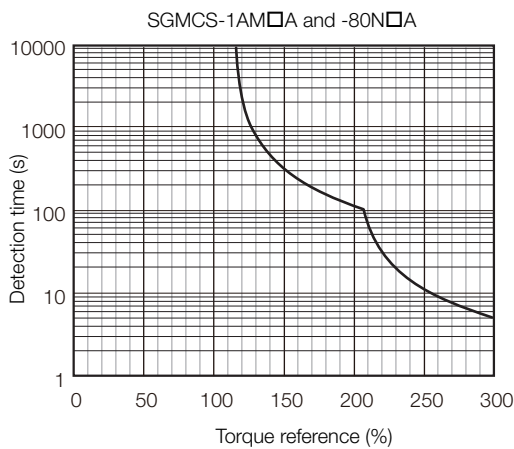
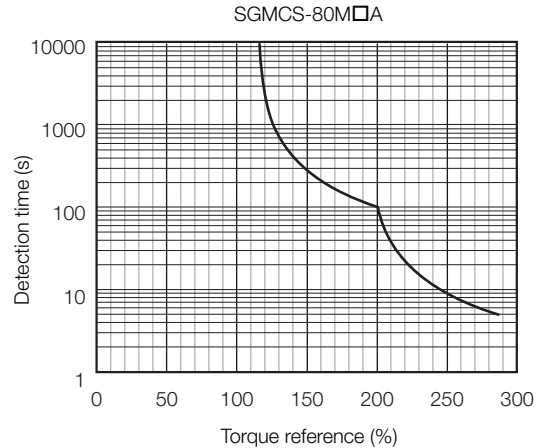
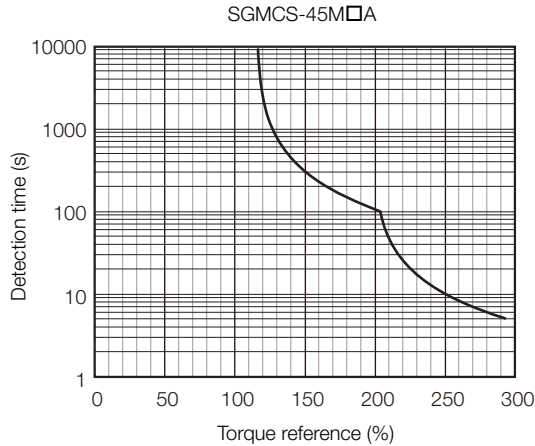


Note: 1. These values are for operation in combination with a SERVOPACK when the temperature of the armature winding is 20°C. These are typical values.

2. If the effective torque is within the allowable range for the rated torque, the Servo Motor can be used within the intermittent duty zone.
3. If you use a Servo Motor Main Circuit Cable that exceeds 20 m, the intermittent duty zone in the torque-motor speed characteristics will become smaller because the voltage drop increases.

## Medium-Capacity Servo Motors with Cores: Servo Motor Overload Protection Characteristics

The overload detection level is set for hot start conditions with a Servo Motor surrounding air temperature of 40°C.



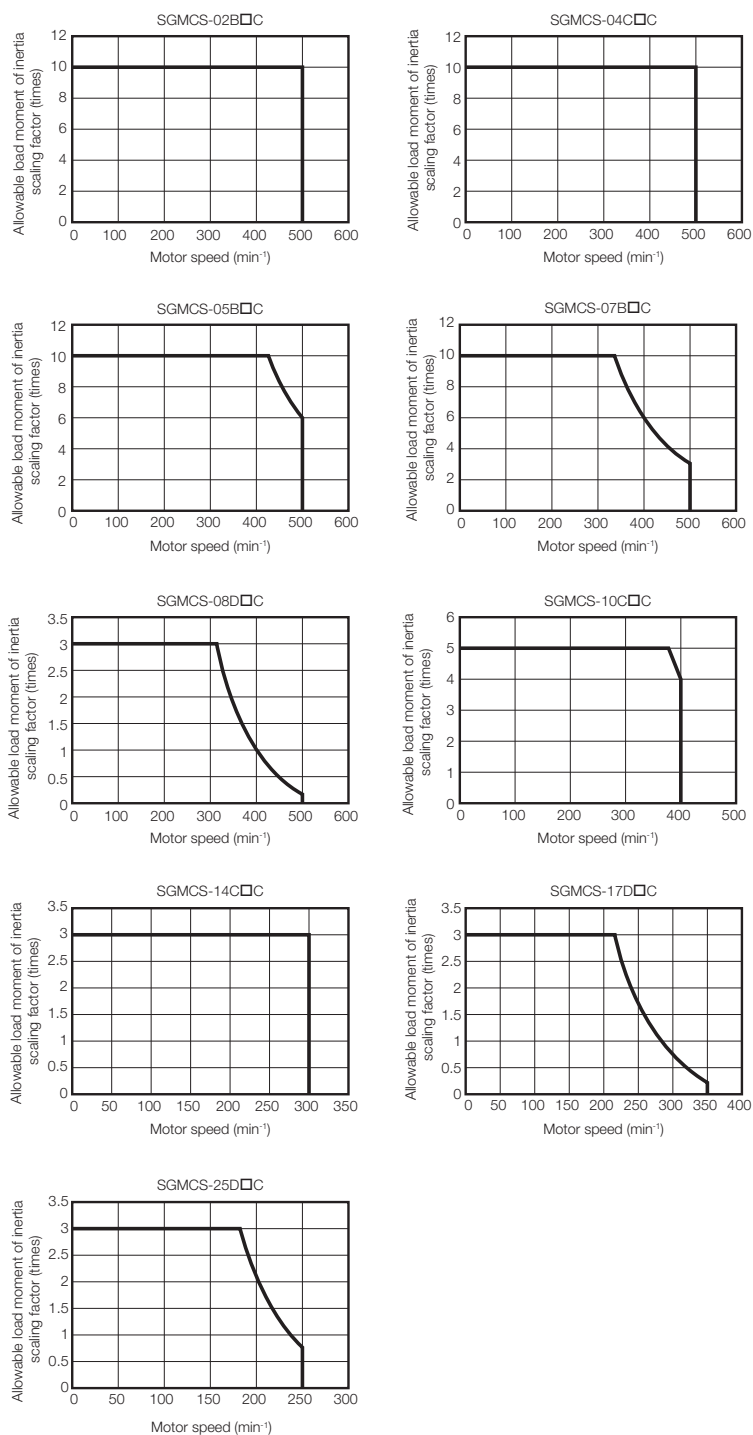
Note: The above overload protection characteristics do not mean that you can perform continuous duty operation with an output of 100% or higher. Use the Servo Motor so that the effective torque remains within the continuous duty zone given in *Medium-Capacity Servo Motors with Cores: Torque-Motor Speed Characteristics* on page 279.

## Allowable Load Moment of Inertia Scaling Factor for SERVOPACKs without Built-in Regenerative Resistors

The following graphs show the allowable load moment of inertia scaling factor of the motor speed for SERVOPACKs without built-in regenerative resistors when an External Regenerative Resistor is not connected (applicable SERVOPACK: SGD7S-2R8A).

If the Servo Motor exceeds the allowable load moment of inertia, an overvoltage alarm may occur in the SERVOPACK.

These graphs provide reference data for deceleration at the rated torque or higher with a 200-VAC power supply input.

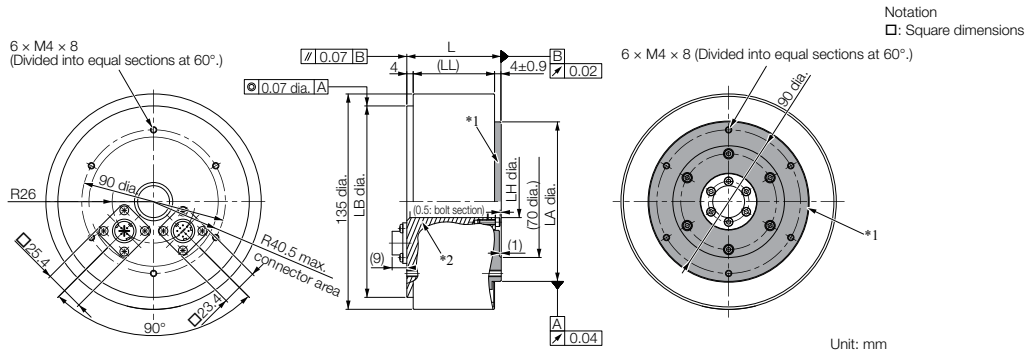


## External Dimensions

### Small-Capacity, Coreless Servo Motors

#### ◆ SGMCS-□□ B

##### • Flange Specification 1



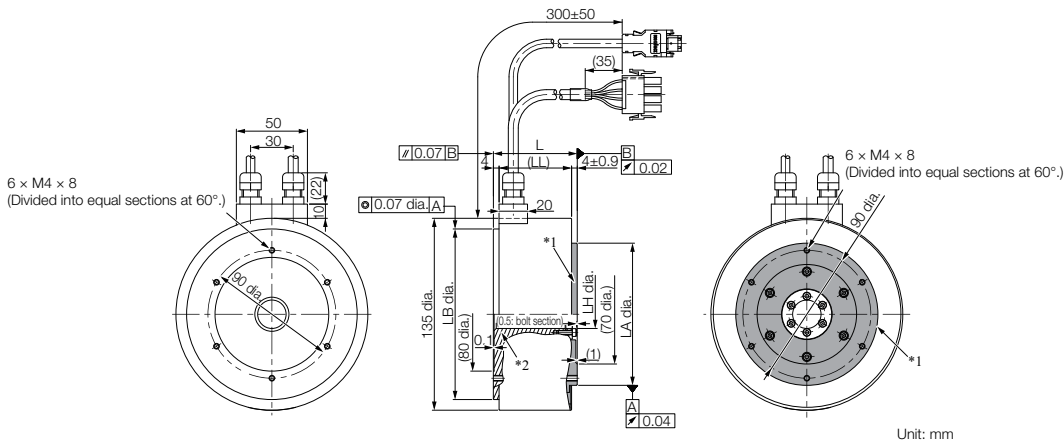
\*1. The shaded section indicates the rotating parts.

\*2. The hatched section indicates the non-rotating parts.

Note: Values in parentheses are reference dimensions.

| Model SGMCS- | L   | (LL) | LB                                 | LH                              | LA                                 | Approx. Mass [kg] |
|--------------|-----|------|------------------------------------|---------------------------------|------------------------------------|-------------------|
| 02B□ C11     | 59  | 51   | 120 <sup>0</sup> <sub>-0.035</sub> | 20 <sup>+0.4</sup> <sub>0</sub> | 100 <sup>0</sup> <sub>-0.035</sub> | 4.8               |
| 05B□ C11     | 88  | 80   | 120 <sup>0</sup> <sub>-0.035</sub> | 20 <sup>+0.4</sup> <sub>0</sub> | 100 <sup>0</sup> <sub>-0.035</sub> | 5.8               |
| 07B□ C11     | 128 | 120  | 120 <sup>0</sup> <sub>-0.035</sub> | 20 <sup>+0.4</sup> <sub>0</sub> | 100 <sup>0</sup> <sub>-0.035</sub> | 8.2               |

##### • Flange Specification 4



\*1. The shaded section indicates the rotating parts.

\*2. The hatched section indicates the non-rotating parts.

Note: Values in parentheses are reference dimensions.

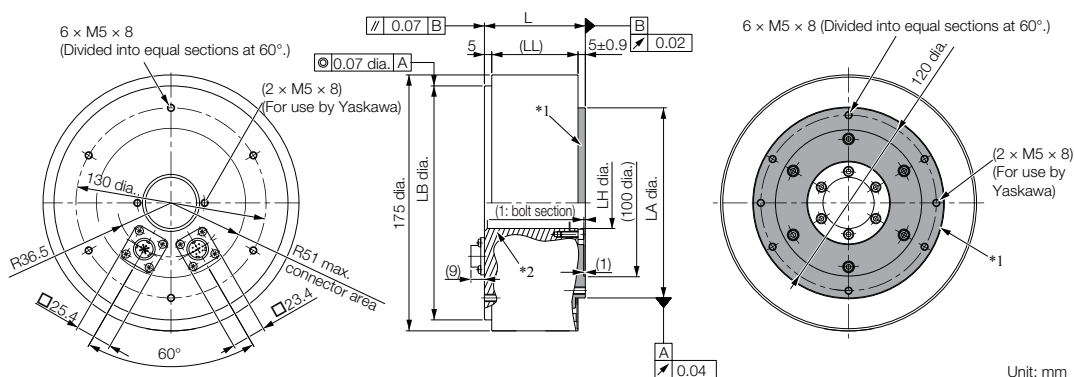
| Model SGMCS- | L   | (LL) | LB                                 | LH                              | LA                                 | Approx. Mass [kg] |
|--------------|-----|------|------------------------------------|---------------------------------|------------------------------------|-------------------|
| 02B□C41      | 59  | 51   | 120 <sup>0</sup> <sub>-0.035</sub> | 20 <sup>+0.4</sup> <sub>0</sub> | 100 <sup>0</sup> <sub>-0.035</sub> | 4.8               |
| 05B□C41      | 88  | 80   | 120 <sup>0</sup> <sub>-0.035</sub> | 20 <sup>+0.4</sup> <sub>0</sub> | 100 <sup>0</sup> <sub>-0.035</sub> | 5.8               |
| 07B□C41      | 128 | 120  | 120 <sup>0</sup> <sub>-0.035</sub> | 20 <sup>+0.4</sup> <sub>0</sub> | 100 <sup>0</sup> <sub>-0.035</sub> | 8.2               |

Refer to the following section for information on connectors.

See Connector Specifications Page 288

## ◆ SGMCS-□□ C

## • Flange Specification 1



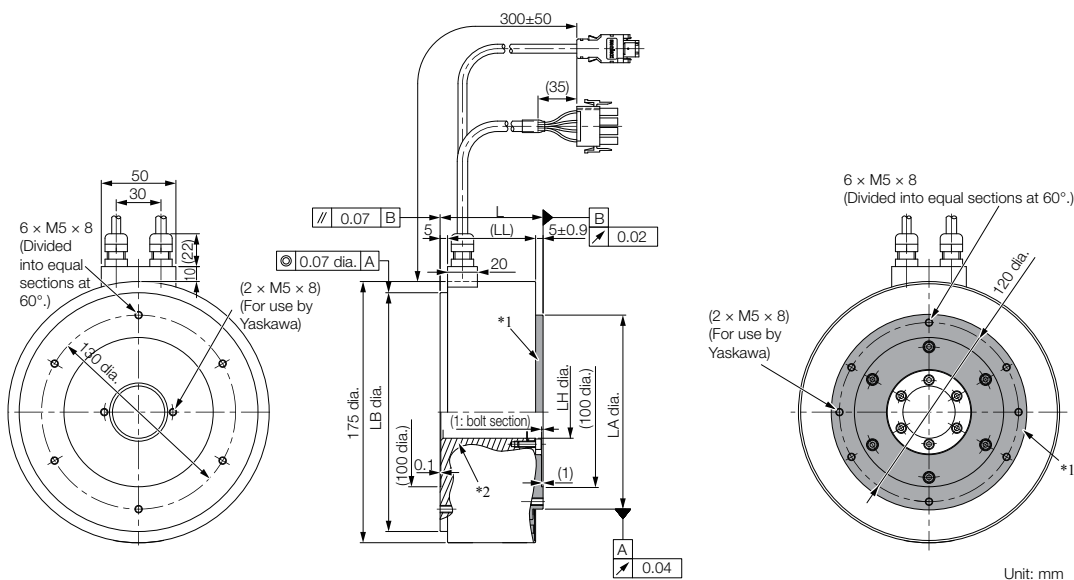
\*1. The shaded section indicates the rotating parts.

\*2. The hatched section indicates the non-rotating parts.

Note: Values in parentheses are reference dimensions.

| Model SGMCS- | L   | (LL) | LB                                 | LH                              | LA                                 | Approx. Mass [kg] |
|--------------|-----|------|------------------------------------|---------------------------------|------------------------------------|-------------------|
| 04C□ C11     | 69  | 59   | 160 <sup>0</sup> <sub>-0.040</sub> | 35 <sup>+0.4</sup> <sub>0</sub> | 130 <sup>0</sup> <sub>-0.040</sub> | 7.2               |
| 10C□ C11     | 90  | 80   | 160 <sup>0</sup> <sub>-0.040</sub> | 35 <sup>+0.4</sup> <sub>0</sub> | 130 <sup>0</sup> <sub>-0.040</sub> | 10.2              |
| 14C□ C11     | 130 | 120  | 160 <sup>0</sup> <sub>-0.040</sub> | 35 <sup>+0.4</sup> <sub>0</sub> | 130 <sup>0</sup> <sub>-0.040</sub> | 14.2              |

## • Flange Specification 4



\*1. The shaded section indicates the rotating parts.

\*2. The hatched section indicates the non-rotating parts.

Note: Values in parentheses are reference dimensions.

| Model SGMCS- | L   | (LL) | LB                                 | LH                              | LA                                 | Approx. Mass [kg] |
|--------------|-----|------|------------------------------------|---------------------------------|------------------------------------|-------------------|
| 04C□ C41     | 69  | 59   | 160 <sup>0</sup> <sub>-0.040</sub> | 35 <sup>+0.4</sup> <sub>0</sub> | 130 <sup>0</sup> <sub>-0.040</sub> | 7.2               |
| 10C□ C41     | 90  | 80   | 160 <sup>0</sup> <sub>-0.040</sub> | 35 <sup>+0.4</sup> <sub>0</sub> | 130 <sup>0</sup> <sub>-0.040</sub> | 10.2              |
| 14C□ C41     | 130 | 120  | 160 <sup>0</sup> <sub>-0.040</sub> | 35 <sup>+0.4</sup> <sub>0</sub> | 130 <sup>0</sup> <sub>-0.040</sub> | 14.2              |

Refer to the following section for information on connectors.

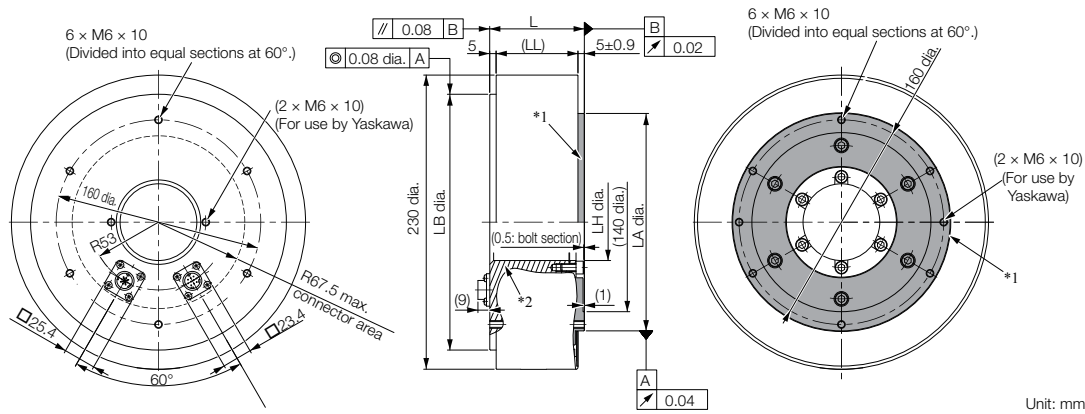
See Connector Specifications Page 288

## Direct Drive Servo Motors

### SGMCS (Small Capacity, Coreless or Medium Capacity, with Core)

#### ◆ SGMCS-□□ D

##### • Flange Specification 1



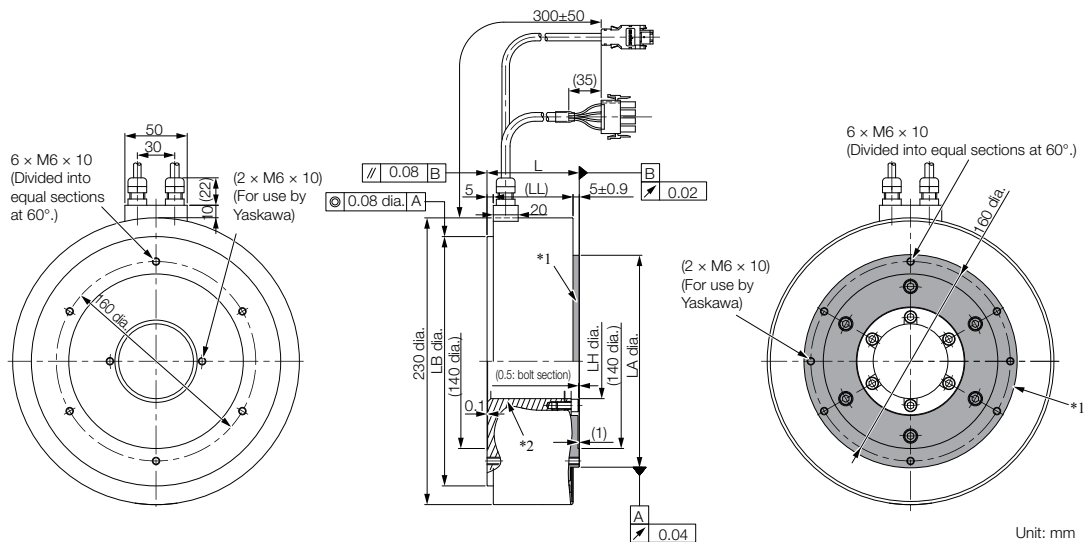
\*1. The shaded section indicates the rotating parts.

\*2. The hatched section indicates the non-rotating parts.

Note: Values in parentheses are reference dimensions.

| Model SGMCS- | L   | (LL) | LB                                 | LH                              | LA                                 | Approx. Mass [kg] |
|--------------|-----|------|------------------------------------|---------------------------------|------------------------------------|-------------------|
| 08D□ C11     | 74  | 64   | 200 <sup>0</sup> <sub>-0.046</sub> | 60 <sup>+0.4</sup> <sub>0</sub> | 170 <sup>0</sup> <sub>-0.040</sub> | 14.0              |
| 17D□ C11     | 110 | 100  | 200 <sup>0</sup> <sub>-0.046</sub> | 60 <sup>+0.4</sup> <sub>0</sub> | 170 <sup>0</sup> <sub>-0.040</sub> | 22.0              |
| 25D□ C11     | 160 | 150  | 200 <sup>0</sup> <sub>-0.046</sub> | 60 <sup>+0.4</sup> <sub>0</sub> | 170 <sup>0</sup> <sub>-0.040</sub> | 29.7              |

##### • Flange Specification 4



\*1. The shaded section indicates the rotating parts.

\*2. The hatched section indicates the non-rotating parts.

Note: Values in parentheses are reference dimensions.

| Model SGMCS- | L   | (LL) | LB                                 | LH                              | LA                                 | Approx. Mass [kg] |
|--------------|-----|------|------------------------------------|---------------------------------|------------------------------------|-------------------|
| 08D□ C41     | 74  | 64   | 200 <sup>0</sup> <sub>-0.046</sub> | 60 <sup>+0.4</sup> <sub>0</sub> | 170 <sup>0</sup> <sub>-0.040</sub> | 14.0              |
| 17D□ C41     | 110 | 100  | 200 <sup>0</sup> <sub>-0.046</sub> | 60 <sup>+0.4</sup> <sub>0</sub> | 170 <sup>0</sup> <sub>-0.040</sub> | 22.0              |
| 25D□ C41     | 160 | 150  | 200 <sup>0</sup> <sub>-0.046</sub> | 60 <sup>+0.4</sup> <sub>0</sub> | 170 <sup>0</sup> <sub>-0.040</sub> | 29.7              |

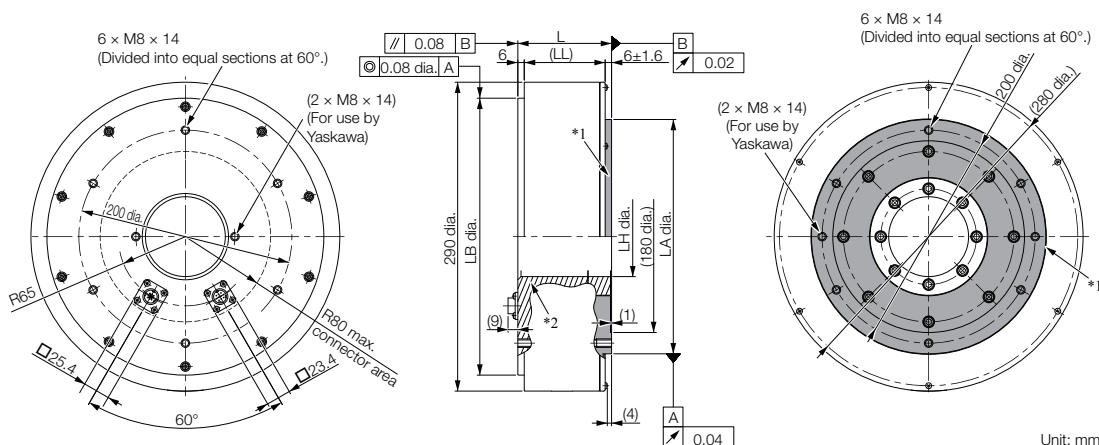
Refer to the following section for information on connectors.

See Connector Specifications Page 288



## ◆ SGMCS-□□E

## • Flange Specification 1



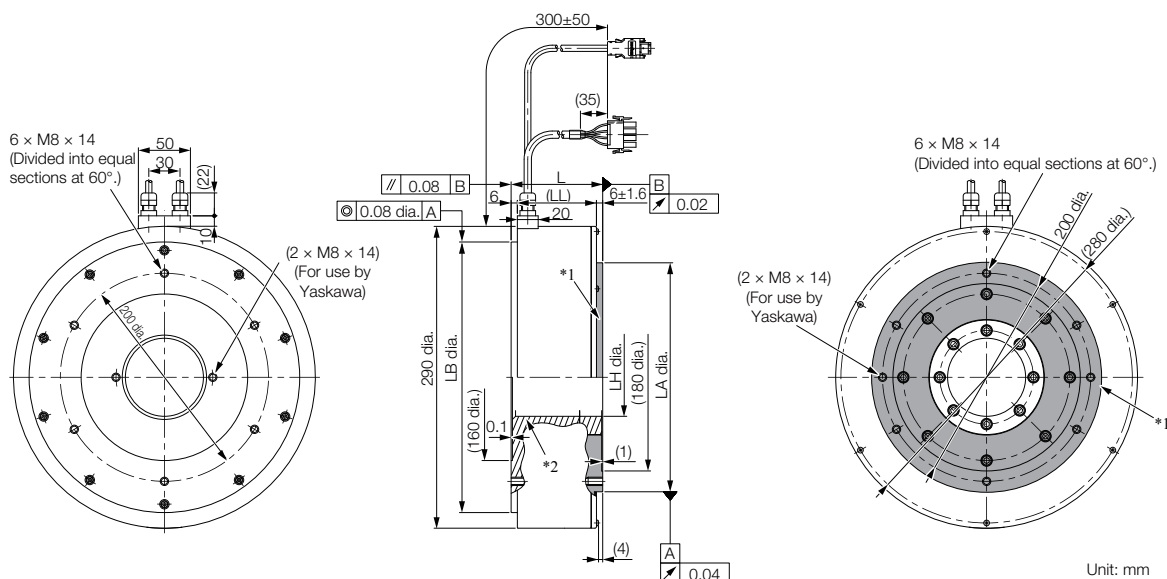
\*1. The shaded section indicates the rotating parts.

\*2. The hatched section indicates the non-rotating parts.

Note: Values in parentheses are reference dimensions.

| Model SGMCS- | L   | (LL) | LB                                 | LH                              | LA                                 | Approx. Mass [kg] |
|--------------|-----|------|------------------------------------|---------------------------------|------------------------------------|-------------------|
| 16E□ B11     | 88  | 76   | 260 <sup>0</sup> <sub>-0.052</sub> | 75 <sup>+0.4</sup> <sub>0</sub> | 220 <sup>0</sup> <sub>-0.046</sub> | 26.0              |
| 35E□ B11     | 112 | 100  | 260 <sup>0</sup> <sub>-0.052</sub> | 75 <sup>+0.4</sup> <sub>0</sub> | 220 <sup>0</sup> <sub>-0.046</sub> | 34.0              |

## • Flange Specification 4



\*1. The shaded section indicates the rotating parts.

\*2. The hatched section indicates the non-rotating parts.

Note: Values in parentheses are reference dimensions.

| Model SGMCS- | L   | (LL) | LB                                 | LH                              | LA                                 | Approx. Mass [kg] |
|--------------|-----|------|------------------------------------|---------------------------------|------------------------------------|-------------------|
| 16E□ B41     | 88  | 76   | 260 <sup>0</sup> <sub>-0.052</sub> | 75 <sup>+0.4</sup> <sub>0</sub> | 220 <sup>0</sup> <sub>-0.046</sub> | 26.0              |
| 35E□ B41     | 112 | 100  | 260 <sup>0</sup> <sub>-0.052</sub> | 75 <sup>+0.4</sup> <sub>0</sub> | 220 <sup>0</sup> <sub>-0.046</sub> | 34.0              |

Refer to the following section for information on connectors.

See Connector Specifications Page 288

◆ SGMCS-□□ M

[illegible]

\* The shaded section indicates the rotating parts.

| Model SGMCS- | LL  | KB1   | KB2 | LB                                 | LH                                | LA                                 | Approx. Mass [kg] |
|--------------|-----|-------|-----|------------------------------------|-----------------------------------|------------------------------------|-------------------|
| 45M□ A11     | 141 | 87.5  | 122 | 280 <sup>0</sup> <sub>-0.052</sub> | 75 <sup>+0.019</sup> <sub>0</sub> | 110 <sup>0</sup> <sub>-0.035</sub> | 38                |
| 80M□ A11     | 191 | 137.5 | 172 | 280 <sup>0</sup> <sub>-0.052</sub> | 75 <sup>+0.019</sup> <sub>0</sub> | 110 <sup>0</sup> <sub>-0.035</sub> | 45                |
| 1AM□ A11     | 241 | 187.5 | 222 | 280 <sup>0</sup> <sub>-0.052</sub> | 75 <sup>+0.019</sup> <sub>0</sub> | 110 <sup>0</sup> <sub>-0.035</sub> | 51                |

[illegible]

\* The shaded section indicates the rotating parts.

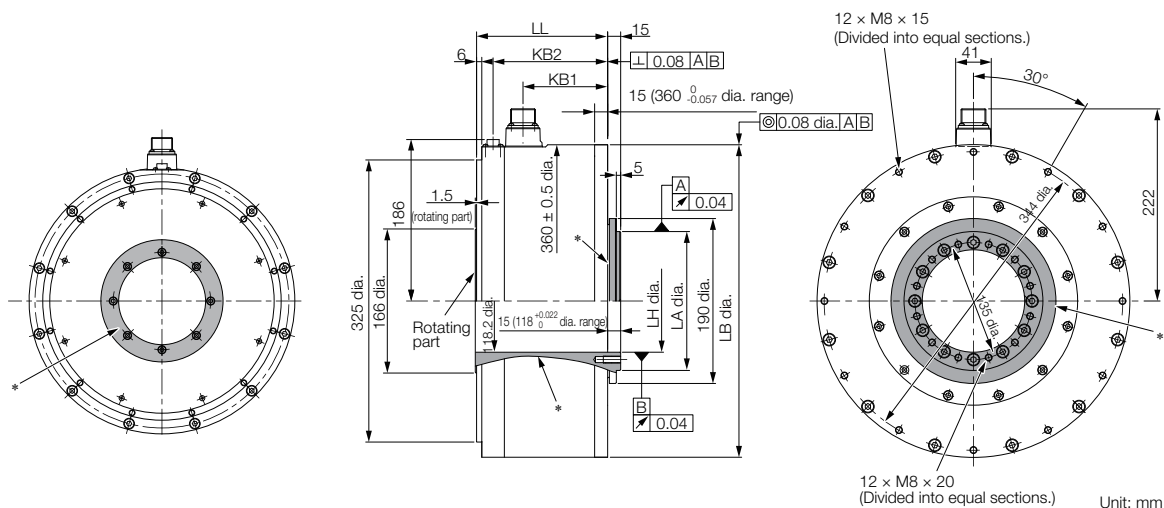
| Model SGMCS- | L   | LL  | KB1   | KB2 | LB                                 | LH                                | LA                                 | Approx. Mass [kg] |
|--------------|-----|-----|-------|-----|------------------------------------|-----------------------------------|------------------------------------|-------------------|
| 45M□ A31     | 150 | 135 | 102.5 | 137 | 248 <sup>0</sup> <sub>-0.046</sub> | 75 <sup>+0.019</sup> <sub>0</sub> | 110 <sup>0</sup> <sub>-0.035</sub> | 38                |
| 80M□ A31     | 200 | 185 | 152.5 | 187 | 248 <sup>0</sup> <sub>-0.046</sub> | 75 <sup>+0.019</sup> <sub>0</sub> | 110 <sup>0</sup> <sub>-0.035</sub> | 45                |
| 1AM□ A31     | 250 | 235 | 202.5 | 237 | 248 <sup>0</sup> <sub>-0.046</sub> | 75 <sup>+0.019</sup> <sub>0</sub> | 110 <sup>0</sup> <sub>-0.035</sub> | 51                |

Refer to the following section for information on connectors.

 See Connector Specifications Page 288

## ◆ SGMCS-□□ N

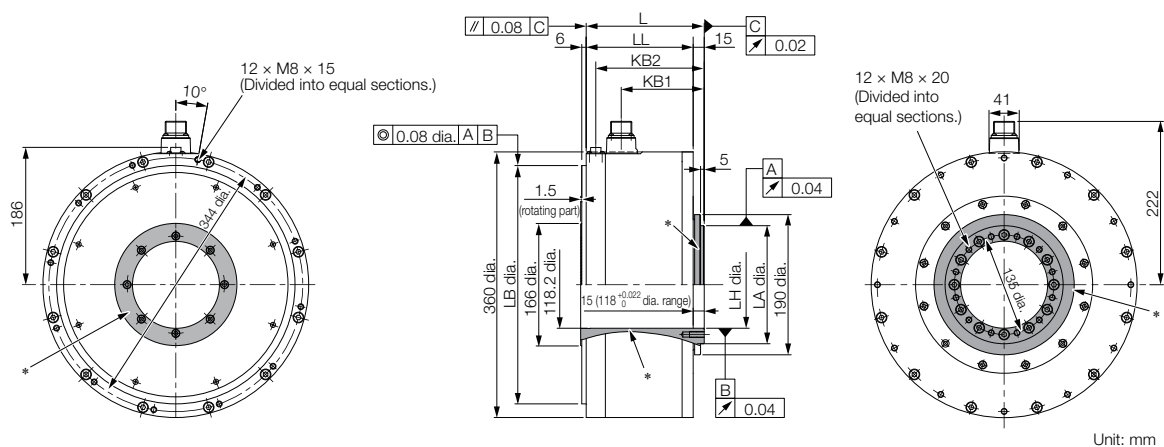
## • Flange Specification 1



\* The shaded section indicates the rotating parts.

| Model SGMCS- | LL  | KB1 | KB2 | LB                                 | LH                                 | LA                                 | Approx. Mass [kg] |
|--------------|-----|-----|-----|------------------------------------|------------------------------------|------------------------------------|-------------------|
| 80N□ A11     | 151 | 98  | 132 | 360 <sup>0</sup> <sub>-0.057</sub> | 118 <sup>+0.022</sup> <sub>0</sub> | 160 <sup>0</sup> <sub>-0.040</sub> | 50                |
| 1EN□ A11     | 201 | 148 | 182 | 360 <sup>0</sup> <sub>-0.057</sub> | 118 <sup>+0.022</sup> <sub>0</sub> | 160 <sup>0</sup> <sub>-0.040</sub> | 68                |
| 2ZN□ A11     | 251 | 198 | 232 | 360 <sup>0</sup> <sub>-0.057</sub> | 118 <sup>+0.022</sup> <sub>0</sub> | 160 <sup>0</sup> <sub>-0.040</sub> | 86                |

## • Flange Specification 3



\* The shaded section indicates the rotating parts.

| Model SGMCS- | L   | LL  | KB1 | KB2 | LB                                 | LH                                 | LA                                 | Approx. Mass [kg] |
|--------------|-----|-----|-----|-----|------------------------------------|------------------------------------|------------------------------------|-------------------|
| 80N□ A31     | 160 | 145 | 113 | 147 | 323 <sup>0</sup> <sub>-0.057</sub> | 118 <sup>+0.022</sup> <sub>0</sub> | 160 <sup>0</sup> <sub>-0.040</sub> | 50                |
| 1EN□ A31     | 210 | 195 | 163 | 197 | 323 <sup>0</sup> <sub>-0.057</sub> | 118 <sup>+0.022</sup> <sub>0</sub> | 160 <sup>0</sup> <sub>-0.040</sub> | 68                |
| 2ZN□ A31     | 260 | 245 | 213 | 247 | 323 <sup>0</sup> <sub>-0.057</sub> | 118 <sup>+0.022</sup> <sub>0</sub> | 160 <sup>0</sup> <sub>-0.040</sub> | 86                |

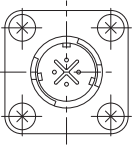
Refer to the following section for information on connectors.

☞ See Connector Specifications Page 288

## Connector Specifications

### ◆ SGMCS-□□ B, -□□ C, -□□ D, or -□□ E with Flange Specification 1

#### • Servo Motor Connector Specifications

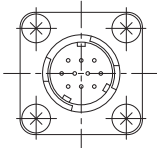


Model: JN1AS04MK2R

Manufacturer: Japan Aviation Electronics Industry, Ltd.

Mating connector: JN1DS04FK1  
(Not provided by Yaskawa.)

#### • Encoder Connector Specifications



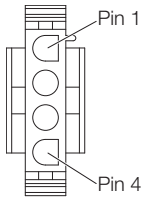
Model: JN1AS10ML1-R

Manufacturer: Japan Aviation Electronics Industry, Ltd.

Mating connector: JN1DS10SL1  
(Not provided by Yaskawa.)

### ◆ SGMCS-□□ B, -□□ C, -□□ D, or -□□ E with Flange Specification 4

#### • Servo Motor Connector Specifications



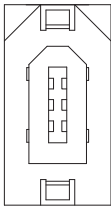
Model

- Plug: 350779-1
  - Pins: 350561-3 or 350690-3 (No.1 to 3)
  - Ground pin: 350654-1 or 350669-1 (No. 4)
- Manufacturer: Tyco Electronics Japan G.K.

Mating Connector

- Cap: 350780-1
- Socket: 350570-3 or 350689-3

#### • Encoder Connector Specifications



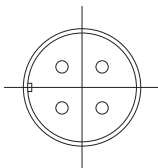
Model: 55102-0600

Manufacturer: Molex Japan Co., Ltd.

Mating connector: 54280-0609

# ◆ SGMCS-□□ M or -□□ N with Flange Specification 1 or 3

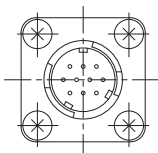
## • Servo Motor Connector Specifications



Model: CE05-2A18-10PD  
Manufacturer: DDK Ltd.

Mating Connector  
Plug: CE05-6A18-10SD-B-BSS  
Cable clamp: CE3057-10A-□(D265)

## • Encoder Connector Specifications



Model: JN1AS10ML1  
Manufacturer: Japan Aviation Electronics Industry, Ltd.

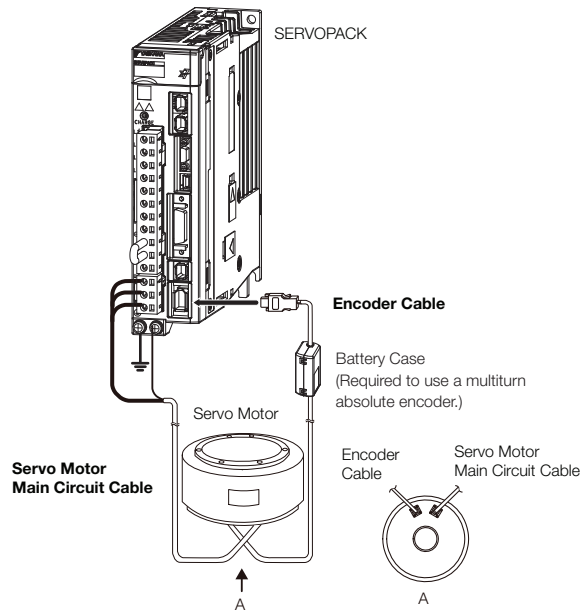
Mating connector: JN1DS10SL1

## Selecting Cables

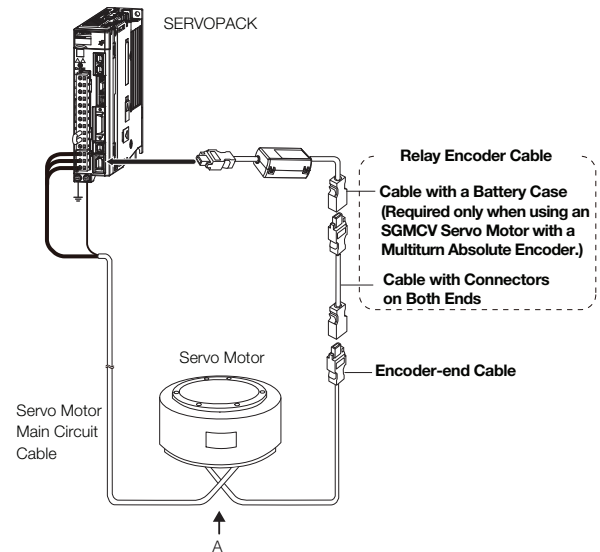
### ◆ Cable Configurations

The cables shown below are required to connect a Servo Motor to a SERVOPACK.

Encoder Cable of 20 m or Less



Encoder Cable of 30 m to 50 m (Relay Cable)



Note: 1. If the cable length exceeds 20 m, be sure to use a Relay Encoder Cable.

2. If you use a Servo Motor Main Circuit Cable that exceeds 20 m, the intermittent duty zone in the torque-motor speed characteristics will become smaller because the voltage drop increases.

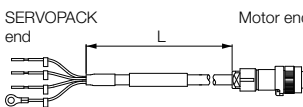
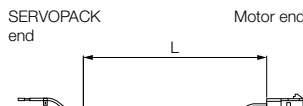
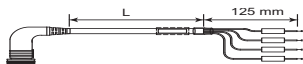
3. Refer to the following manual for the following information.

- Cable dimensional drawings and cable connection specifications
- Order numbers and specifications of individual connectors for cables
- Order numbers and specifications for wiring materials

📖 *Σ-7-Series AC Servo Drive Peripheral Device Selection Manual* (Manual No.: SIEP S800001 32)

## Servo Motor Main Circuit Cables

### ◆ SGMCS-□□

| Servo Motor Model                                                               | Length (L) | Order Number    |                  | Appearance                                                                            |
|---------------------------------------------------------------------------------|------------|-----------------|------------------|---------------------------------------------------------------------------------------|
|                                                                                 |            | Standard Cable  | Flexible Cable*1 |                                                                                       |
| SGMCS-□□B<br>SGMCS-□□C<br>SGMCS-□□D<br>SGMCS-□□E                                | 3 m        | JZSP-CMM60-03-E | JZSP-CSM60-03-E  |    |
| Flange specification*2: 1<br>Non-load side installation                         | 5 m        | JZSP-CMM60-05-E | JZSP-CSM60-05-E  |                                                                                       |
|                                                                                 | 10 m       | JZSP-CMM60-10-E | JZSP-CSM60-10-E  |                                                                                       |
|                                                                                 | 15 m       | JZSP-CMM60-15-E | JZSP-CSM60-15-E  |                                                                                       |
|                                                                                 | 20 m       | JZSP-CMM60-20-E | JZSP-CSM60-20-E  |                                                                                       |
| SGMCS-□□B<br>SGMCS-□□C<br>SGMCS-□□D<br>SGMCS-□□E                                | 3 m        | JZSP-CMM00-03-E | JZSP-CMM01-03-E  |    |
| Flange specification*2: 4<br>Non-load side installation<br>(with cable on side) | 5 m        | JZSP-CMM00-05-E | JZSP-CMM01-05-E  |                                                                                       |
|                                                                                 | 10 m       | JZSP-CMM00-10-E | JZSP-CMM01-10-E  |                                                                                       |
|                                                                                 | 15 m       | JZSP-CMM00-15-E | JZSP-CMM01-15-E  |                                                                                       |
|                                                                                 | 20 m       | JZSP-CMM00-20-E | JZSP-CMM01-20-E  |                                                                                       |
| SGMCS-□□M<br>SGMCS-□□N<br>□□ : 45, 80, 1A                                       | 3 m        | B1EV-03(A)-E    | B1EP-03(A)-E     |  |
|                                                                                 | 5 m        | B1EV-05(A)-E    | B1EP-05(A)-E     |                                                                                       |
|                                                                                 | 10 m       | B1EV-10(A)-E    | B1EP-10(A)-E     |                                                                                       |
|                                                                                 | 15 m       | B1EV-15(A)-E    | B1EP-15(A)-E     |                                                                                       |
|                                                                                 | 20 m       | B1EV-20(A)-E    | B1EP-20(A)-E     |                                                                                       |
| SGMCS-□□N<br>□□ : 1E, 2Z                                                        | 3 m        | B2EV-03(A)-E    | B2EP-03(A)-E     |                                                                                       |
|                                                                                 | 5 m        | B2EV-05(A)-E    | B2EP-05(A)-E     |                                                                                       |
|                                                                                 | 10 m       | B2EV-10(A)-E    | B2EP-10(A)-E     |                                                                                       |
|                                                                                 | 15 m       | B2EV-15(A)-E    | B2EP-15(A)-E     |                                                                                       |
|                                                                                 | 20 m       | B2EV-20(A)-E    | B2EP-20(A)-E     |                                                                                       |

\*1. Use Flexible Cables for moving parts of machines, such as robots.

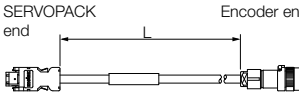
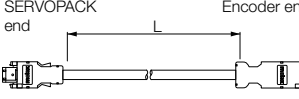
\*2. Refer to the following section for the flange specifications.

See Flange Specifications Page 293

Note: Direct Drive Servo Motors are not available with holding brakes.

## Encoder Cables of 20 m or Less

### ◆ SGMCS-□□

| Servo Motor Model                                        | Name                             | Length (L) | Order Number    |                              | Appearance                                                                          |
|----------------------------------------------------------|----------------------------------|------------|-----------------|------------------------------|-------------------------------------------------------------------------------------|
|                                                          |                                  |            | Standard Cable  | Flexible Cable* <sup>1</sup> |                                                                                     |
| SGMCS-□ □<br>Flange specification* <sup>2</sup> : 1 or 3 | For incremental/absolute encoder | 3 m        | JZSP-CMP60-03-E | JZSP-CSP60-03-E              |  |
|                                                          |                                  | 5 m        | JZSP-CMP60-05-E | JZSP-CSP60-05-E              |                                                                                     |
|                                                          |                                  | 10 m       | JZSP-CMP60-10-E | JZSP-CSP60-10-E              |                                                                                     |
|                                                          |                                  | 15 m       | JZSP-CMP60-15-E | JZSP-CSP60-15-E              |                                                                                     |
|                                                          |                                  | 20 m       | JZSP-CMP60-20-E | JZSP-CSP60-20-E              |                                                                                     |
| SGMCS-□ □<br>Flange Specification* <sup>2</sup> : 4      | For incremental/absolute encoder | 3 m        | JZSP-CMP00-03-E | JZSP-CMP10-03-E              |  |
|                                                          |                                  | 5 m        | JZSP-CMP00-05-E | JZSP-CMP10-05-E              |                                                                                     |
|                                                          |                                  | 10 m       | JZSP-CMP00-10-E | JZSP-CMP10-10-E              |                                                                                     |
|                                                          |                                  | 15 m       | JZSP-CMP00-15-E | JZSP-CMP10-15-E              |                                                                                     |
|                                                          |                                  | 20 m       | JZSP-CMP00-20-E | JZSP-CMP10-20-E              |                                                                                     |

\*1. Use Flexible Cables for moving parts of machines, such as robots.

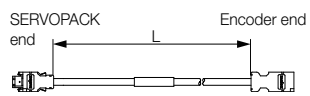
\*2. Refer to the following section for the flange specifications.

■ See Flange Specifications Page 293



## Relay Encoder Cables of 30 m to 50 m

### ◆ SGMCS-□□

| Servo Motor Model                               | Name                                                                      | Length (L) | Order Number*1   | Appearance                                                                          |
|-------------------------------------------------|---------------------------------------------------------------------------|------------|------------------|-------------------------------------------------------------------------------------|
| SGMCS-□ □<br>Flange specification*2: 1 or 3     | Encoder-end Cable (for incremental or absolute encoder)                   | 0.3 m      | JZSP-CSP15-E     |  |
| SGMCS-□ □<br>Flange specification*2: 1, 3, or 4 | Cables with Connectors on Both Ends (for incremental or absolute encoder) | 30 m       | JZSP-UCMP00-30-E |  |
|                                                 |                                                                           | 40 m       | JZSP-UCMP00-40-E |                                                                                     |
|                                                 |                                                                           | 50 m       | JZSP-UCMP00-50-E |                                                                                     |

\*1. Flexible Cables are not available.

\*2. Refer to the following section for the flange specifications.

■ See Flange Specifications Page 293

## Flange Specifications

### ◆ SGMCS-□□

| Flange Specification Code (6th Digit) | Flange Location                    | Servo Motor Outer Diameter Code (3rd Digit) |   |   |   |   |   |
|---------------------------------------|------------------------------------|---------------------------------------------|---|---|---|---|---|
|                                       |                                    | B                                           | C | D | E | M | N |
| 1                                     | Non-load side                      | ✓                                           | ✓ | ✓ | ✓ | — | — |
|                                       | Load-side                          | —                                           | — | — | — | ✓ | ✓ |
| 3                                     | Non-load side                      | —                                           | — | — | — | ✓ | ✓ |
| 4                                     | Non-load side (with cable on side) | ✓                                           | ✓ | ✓ | ✓ | — | — |

✓: Applicable models

## **Direct Drive Servo Motors**

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SGMCS (Small Capacity, Coreless or Medium Capacity, with Core)

# Linear Servo Motors

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|                                                   |     |
|---------------------------------------------------|-----|
| SGLFW2 (Models with F-type Iron Cores, 200V) ..   | 296 |
| SGLFW2 (Models with F-type Iron Cores, 400V) ..   | 324 |
| SGLG (Coreless Models) .....                      | 344 |
| SGLT (Models with T-type Iron Cores) .....        | 374 |
| Recommended Linear Encoders and Cables .....      | 404 |
| SGLFW (Earlier Models with F-type Iron Cores) ... | 428 |

# SGLFW2 (Models with F-type Iron Cores, 200V)

## Model Designations

### ◆ Moving Coil

S G L F W 2 - 30 A 070 A S 1 □

Linear  $\Sigma$  Series  
Linear Servomotors

1st digit 2nd digit 3rd+4th digits 5th digit 6th+7th+8th digits 9th digit 10th digit 11th digit 12th digit

1st digit Servomotor Type

| Code | Specification         |
|------|-----------------------|
| F    | With F-type iron core |

5th digit Power Supply Voltage

| Code | Specification |
|------|---------------|
| A    | 200 VAC       |

10th digit Sensor Specification

| Code | Specification                                   |
|------|-------------------------------------------------|
| S    | With polarity sensor and Thermal Protector      |
| T    | Without polarity sensor, with thermal protector |

2nd digit Moving Coil/Magnetic Way

| Code | Specification |
|------|---------------|
| W    | Moving Coil   |

6th+7th+8th digits Length of Moving Coil

| Code | Specification |
|------|---------------|
| 070  | 70 mm         |
| 120  | 125 mm        |
| 200  | 205 mm        |
| 230  | 230 mm        |
| 380  | 384 mm        |
| 560  | 563 mm        |

3rd+4th digits Magnet Height

| Code | Specification |
|------|---------------|
| 30   | 30 mm         |
| 45   | 45 mm         |
| 90   | 90 mm         |
| 1D   | 135 mm        |

11th digit Cooling Method

| Code | Specification |
|------|---------------|
| 1    | Self-cooled   |
| L    | Water-cooled  |

12th digit Cooling Method

| Code | Specification                                      |
|------|----------------------------------------------------|
| None | Connector from Tyco Electronics Japan G.K., 300 mm |
| F    | Loose lead wires with no connector, 300 mm         |
| G    | Loose lead wires with no connector, 500 mm         |
| H    | Connector from Tyco Electronics Japan G.K., 500 mm |

9th digit Design Revision Order

A

■ Non Stock Items

Note: This information is provided to explain model numbers. It is not meant to imply that models are available for all combinations of codes.

\* Contact your Yaskawa representative for information on water-cooled models.

### ◆ Magnetic Way

S G L F M 2 - 30 270 A

Linear  $\Sigma$  Series  
Linear Servomotors

1st digit 2nd digit 3rd+4th digits 5th+6th+7th digits 8th digit

1st digit Servomotor Type

(Same as for the Moving Coil.)

5th+6th+7th digits Length of Magnetic Way

| Code | Specification |
|------|---------------|
| 270  | 270 mm        |
| 306  | 306 mm        |
| 450  | 450 mm        |
| 510  | 510 mm        |
| 630  | 630 mm        |
| 714  | 714 mm        |

2nd digit Moving Coil/Magnetic Way

| Code | Specification |
|------|---------------|
| M    | Magnetic Way  |

3rd+4th digits Magnet Height

(Same as for the Moving Coil.)

8th digit Design Revision Order

A

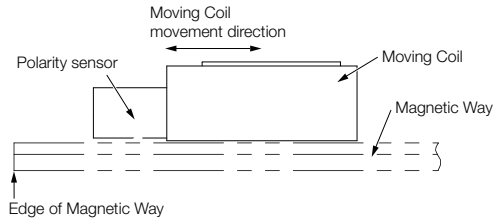
## Precautions on Moving Coils with Polarity Sensors



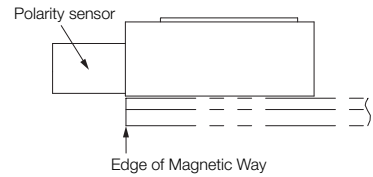
When you use a Moving Coil with a Polarity Sensor, the Magnetic Way must cover the bottom of the polarity sensor. Refer to the example that shows the correct installation.

When determining the length of the Moving Coil's stroke or the length of the Magnetic Way, consider the total length (L) of the Moving Coil and the polarity sensor. Refer to the following table.

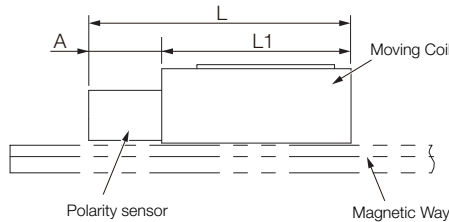
### Correct Installation



### Incorrect Installation



### ◆ Total Length of Moving Coil with Polarity Sensor



| Moving Coil Model<br>SGLFW2- | Length of Moving Coil,<br>L1 [mm] | Length of Polarity Sensor,<br>A [mm] | Total Length,<br>L [mm] |
|------------------------------|-----------------------------------|--------------------------------------|-------------------------|
| 30A070AS                     | 70                                | 29                                   | 97                      |
| 30A120AS                     | 125                               |                                      | 152                     |
| 30A230AS                     | 230                               |                                      | 257                     |
| 45A200AS                     | 205                               | 34                                   | 237                     |
| 45A380AS                     | 384                               |                                      | 416                     |
| 90A200AS                     | 205                               | 34                                   | 237                     |
| 90A380AS                     | 384                               |                                      | 416                     |
| 90A560AS                     | 563                               |                                      | 595                     |
| 1DA380AS                     | 384                               | 32                                   | 416                     |
| 1DA560AS                     | 563                               |                                      | 595                     |

## Specifications and Ratings

### Specifications

| Linear Servomotor Moving<br>Coil Model SGLFW2- |                                  | 30A                                                                                                                                                                                                                                                                                                                                          |       |       | 45A   |       | 90A   |       |       | 1DA   |       |
|------------------------------------------------|----------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
|                                                |                                  | 070A□                                                                                                                                                                                                                                                                                                                                        | 120A□ | 230A□ | 200A□ | 380A□ | 200A□ | 380A□ | 560A□ | 380A□ | 560A□ |
| Time Rating                                    |                                  | Continuous                                                                                                                                                                                                                                                                                                                                   |       |       |       |       |       |       |       |       |       |
| Thermal Class                                  |                                  | B                                                                                                                                                                                                                                                                                                                                            |       |       |       |       |       |       |       |       |       |
| Insulation Resistance                          |                                  | 500 VDC, 10 MΩ min.                                                                                                                                                                                                                                                                                                                          |       |       |       |       |       |       |       |       |       |
| Withstand Voltage                              |                                  | 1,500 VAC for 1 minute                                                                                                                                                                                                                                                                                                                       |       |       |       |       |       |       |       |       |       |
| Excitation                                     |                                  | Permanent magnet                                                                                                                                                                                                                                                                                                                             |       |       |       |       |       |       |       |       |       |
| Cooling Method                                 |                                  | Self-cooled and water-cooled*                                                                                                                                                                                                                                                                                                                |       |       |       |       |       |       |       |       |       |
| Protective Structure                           |                                  | IP00                                                                                                                                                                                                                                                                                                                                         |       |       |       |       |       |       |       |       |       |
| Environmental<br>Condi-<br>tions               | Surrounding Air Tem-<br>perature | 0°C to 40°C (with no freezing)                                                                                                                                                                                                                                                                                                               |       |       |       |       |       |       |       |       |       |
|                                                | Surrounding Air<br>Humidity      | 20% to 80% relative humidity (with no condensation)                                                                                                                                                                                                                                                                                          |       |       |       |       |       |       |       |       |       |
|                                                | Installation Site                | <ul style="list-style-type: none"> <li>• Must be indoors and free of corrosive and explosive gases.</li> <li>• Must be well-ventilated and free of dust and moisture.</li> <li>• Must facilitate inspection and cleaning.</li> <li>• Must have an altitude of 1,000 m or less.</li> <li>• Must be free of strong magnetic fields.</li> </ul> |       |       |       |       |       |       |       |       |       |
| Shock<br>Resis-<br>tance                       | Impact Acceleration Rate         | 196 m/s <sup>2</sup>                                                                                                                                                                                                                                                                                                                         |       |       |       |       |       |       |       |       |       |
|                                                | Number of Impacts                | 2 times                                                                                                                                                                                                                                                                                                                                      |       |       |       |       |       |       |       |       |       |
| Vibra-<br>tion<br>Resis-<br>tance              | Vibration Accelera-<br>tion Rate | 49 m/s <sup>2</sup> (the vibration resistance in three directions, vertical, side-to-side, and front-to-back)                                                                                                                                                                                                                                |       |       |       |       |       |       |       |       |       |

\* Contact your Yaskawa representative for information on water-cooled models.

## Ratings

| Linear Servomotor Moving Coil<br>Model SGLFW2-                                                                           |                          | 30A        |       |       |               | 45A    |       |      |
|--------------------------------------------------------------------------------------------------------------------------|--------------------------|------------|-------|-------|---------------|--------|-------|------|
|                                                                                                                          |                          | 070A□      | 120A□ | 230A□ |               | 200A□  | 380A□ |      |
| Rated Motor Speed<br>(Reference Speed during<br>Speed Control)*1                                                         | m/s                      | 4.0        | 4.0   | 4.0   | 4.0           | 4.0    | 4.0   |      |
| Maximum Speed*1                                                                                                          | m/s                      | 5.0        | 5.0   | 5.0   |               | 4.5    | 4.5   |      |
| Rated Force*1, *2                                                                                                        | N                        | 45         | 90    | 180   | 170           | 280    | 560   |      |
| Maximum Force*1                                                                                                          | N                        | 135        | 270   | 540   | 500           | 840    | 1680  | 1500 |
| Rated Current*1                                                                                                          | Arms                     | 1.4        | 1.5   | 2.9   | 2.8           | 4.4    | 8.7   |      |
| Maximum Current*1                                                                                                        | Arms                     | 5.3        | 5.2   | 10.5  | 9.3           | 16.4   | 32.7  | 27.5 |
| Moving Coil Mass                                                                                                         | kg                       | 0.50       | 0.90  | 1.7   |               | 2.9    | 5.5   |      |
| Force Constant                                                                                                           | N/Arms                   | 33.3       | 64.5  | 64.5  |               | 67.5   | 67.5  |      |
| BEMF Constant                                                                                                            | Vrms/<br>(m/s)/<br>phase | 11.1       | 21.5  | 21.5  |               | 22.5   | 22.5  |      |
| Motor Constant                                                                                                           | N/√W                     | 11.3       | 17.3  | 24.4  |               | 36.9   | 52.2  |      |
| Electrical Time Constant                                                                                                 | ms                       | 7.6        | 7.3   | 7.3   |               | 19     | 19    |      |
| Mechanical Time<br>Constant                                                                                              | ms                       | 3.9        | 3.0   | 2.9   |               | 2.1    | 2.0   |      |
| Thermal Resistance<br>(with Heat Sink)                                                                                   | K/W                      | 2.62       | 1.17  | 0.79  |               | 0.60   | 0.44  |      |
| Thermal Resistance<br>(without Heat Sink)                                                                                | K/W                      | 11.3       | 4.43  | 2.55  |               | 2.64   | 1.49  |      |
| Magnetic Attraction                                                                                                      | N                        | 200        | 630   | 1260  |               | 2120   | 4240  |      |
| Maximum Allowable<br>Payload                                                                                             | kg                       | 5.6        | 9.4   | 34    | 10            | 58     | 110   | 95   |
| Maximum Allowable<br>Payload<br>(With External Regenera-<br>tive Resistor and External<br>Dynamic Brake Resis-<br>tor*3) | kg                       | 5.6        | 11    | 34    | 20            | 64     | 110   | 110  |
| Combined Magnetic Way,<br>SGLFM2-                                                                                        |                          | 30□□□A     |       |       |               | 45□□□A |       |      |
| Combined Serial Converter Unit,<br>JZDP-□□□□-                                                                            |                          | 628        | 629   | 630   |               | 631    | 632   |      |
| Applicable<br>SERVOPACKs                                                                                                 | SGD7S-                   | 1R6A, 2R1F |       | 3R8A  | 2R8A,<br>2R8F | 5R5A   | 180A  | 120A |
|                                                                                                                          | SGD7W-<br>SGD7C-         | 1R6A       |       | —     | 2R8A          | 5R5A   | —     |      |

\*1. These values are for operation in combination with a SERVOPACK when the temperature of the armature winding is 100°C. The values for other items are at 20°C. These are typical values.

\*2. The rated forces are the continuous allowable force values at a surrounding air temperature of 40°C with an aluminum heat sink of the dimensions given in the following table.

- Heat Sink Dimensions
  - 150 mm × 100 mm × 10 mm: SGLFW2-30A070A
  - 254 mm × 254 mm × 25 mm: SGLFW2-30A120A and -30A230A
  - 400 mm × 500 mm × 25 mm: SGLFW2-45A200A and -45A380A

\*3. To externally connect dynamic brake resistor, select hardware option specification 020 for the SERVOPACK. However, you cannot externally connect dynamic brake resistor if you use the following SERVOPACKs (maximum applicable motor capacity: 400 W).

- SGD7S-R70□□□A020 to -2R8□□□A020
- SGD7W-1R6A20A020 to -2R8A20A020
- SGD7C-1R6AMAA020 to -2R8AMAA020

## Ratings

| Linear Servomotor Moving Coil<br>Model SGLFW2-                                                                         |                          | 90A    |       |       | 1DA    |       |
|------------------------------------------------------------------------------------------------------------------------|--------------------------|--------|-------|-------|--------|-------|
|                                                                                                                        |                          | 200A□  | 380A□ | 560A□ | 380A□  | 560A□ |
| Rated Motor Speed<br>(Reference Speed during<br>Speed Control)* <sup>1</sup>                                           | m/s                      | 4.0    | 4.0   | 4.0   | 2.0    | 2.0   |
| Maximum Speed* <sup>1</sup>                                                                                            | m/s                      | 4.0    | 4.0   | 4.0   | 2.5    | 2.5   |
| Rated Force* <sup>1, *2</sup>                                                                                          | N                        | 560    | 1120  | 1680  | 1680   | 2520  |
| Maximum Force* <sup>1</sup>                                                                                            | N                        | 1680   | 3360  | 5040  | 5040   | 7560  |
| Rated Current* <sup>1</sup>                                                                                            | Arms                     | 7.2    | 14.4  | 21.6  | 14.4   | 21.6  |
| Maximum Current* <sup>1</sup>                                                                                          | Arms                     | 26.9   | 53.9  | 80.8  | 53.9   | 80.8  |
| Moving Coil Mass                                                                                                       | kg                       | 5.3    | 10.1  | 14.9  | 14.6   | 21.5  |
| Force Constant                                                                                                         | N/Arms                   | 82.0   | 82.0  | 82.0  | 123    | 123   |
| BEMF Constant                                                                                                          | Vrms/<br>(m/s)/<br>phase | 27.3   | 27.3  | 27.3  | 41.0   | 41.0  |
| Motor Constant                                                                                                         | N/√W                     | 58.1   | 82.2  | 101   | 105    | 129   |
| Electrical Time Constant                                                                                               | ms                       | 24     | 23    | 24    | 25     | 25    |
| Mechanical Time<br>Constant                                                                                            | ms                       | 1.6    | 1.5   | 1.5   | 1.3    | 1.3   |
| Thermal Resistance<br>(with Heat Sink)                                                                                 | K/W                      | 0.45   | 0.21  | 0.18  | 0.18   | 0.12  |
| Thermal Resistance<br>(without Heat Sink)                                                                              | K/W                      | 1.81   | 1.03  | 0.72  | 0.79   | 0.55  |
| Magnetic Attraction                                                                                                    | N                        | 4240   | 8480  | 12700 | 12700  | 19100 |
| Maximum Allowable<br>Payload                                                                                           | kg                       | 130    | 160   | 360   | 690    | 1000  |
| Maximum Allowable<br>Payload<br>(With External Regenera-<br>tive Resistor and Exter-<br>nal Dynamic Brake<br>Resistor) | kg                       | 140    | 290   | 440   | 710    | 1000  |
| Combined Magnetic Way,<br>SGLFM2-                                                                                      |                          | 90□□□A |       |       | 1D□□□A |       |
| Combined Serial Converter Unit,<br>JZDP-□□□□-                                                                          |                          | 633    | 634   | 648   | 649    | 650   |
| Applicable<br>SERVOPACKs                                                                                               | SGD7S-                   | 120A   | 200A  | 330A  | 200A   | 330A  |
|                                                                                                                        | SGD7W-<br>SGD7C-         | —      |       |       |        |       |

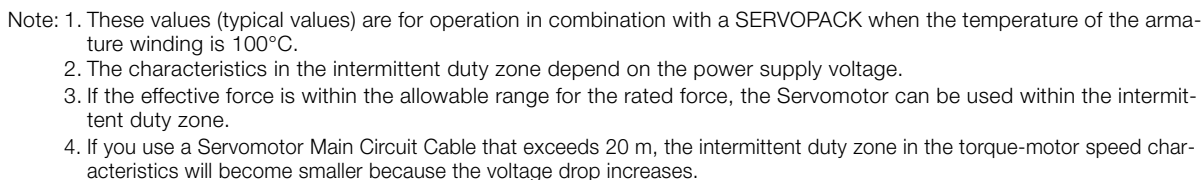
\*1. These values are for operation in combination with a SERVOPACK when the temperature of the armature winding is 100°C. The values for other items are at 20°C. These are typical values.

\*2. The rated forces are the continuous allowable force values at a surrounding air temperature of 40°C with an aluminum heat sink of the dimensions given in the following table.

- Heat Sink Dimensions
  - 400 mm × 500 mm × 25 mm: SGLFW2-90A200A
  - 609 mm × 762 mm × 40 mm: SGLFW2-90A380A
  - 900 mm × 762 mm × 40 mm: SGLFW2-90A560A and -1DA380A
  - 1,400 mm × 900 mm × 40 mm: SGLFW2-1DA560A

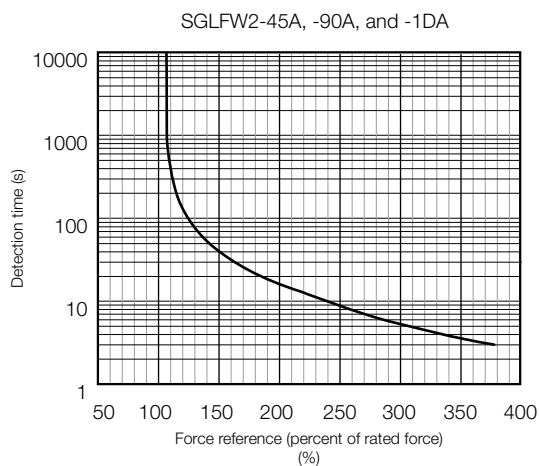
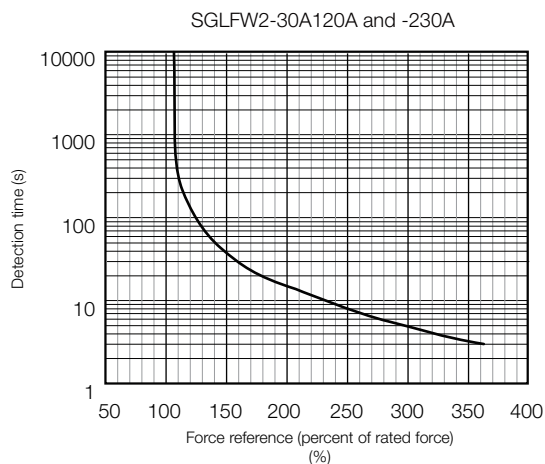
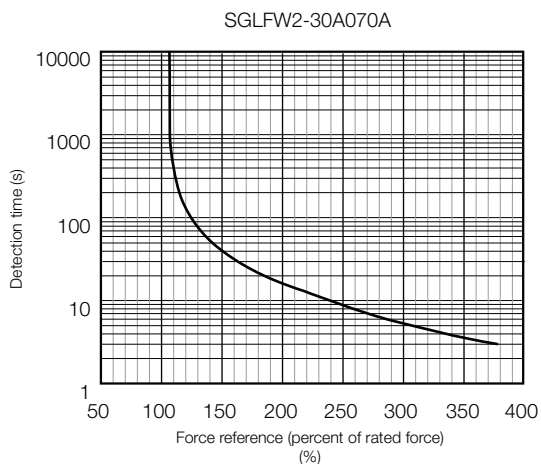


**A** : Continuous duty zone ————— (solid lines): With three-phase 200-V input  
**B** : Intermittent duty zone - - - - - (dotted lines): With single-phase 200-V input  
                                           — — — (dashed-dotted lines): With single-phase 100-V input



## Servomotor Overload Protection Characteristics

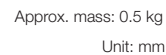
The overload detection level is set for hot start conditions with a Servomotor surrounding air temperature of 40°C.



Note: The above overload protection characteristics do not mean that you can perform continuous duty operation with an output of 100% or higher. Use the Servomotor so that the effective force remains within the continuous duty zone given in Force-Motor Speed Characteristics on page 301.

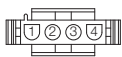
**SGLFW2-30**

### ◆ Moving Coil with Polarity Sensor: SGLFW2-30A070AS



### ■ Connector Specifications

#### • Servomotor Connector



|   |         |       |
|---|---------|-------|
| 1 | Phase U | Red   |
| 2 | Phase V | White |
| 3 | Phase W | Black |
| 4 | FG      | Green |

Plug: 350779-1

Pins: 350218-3 or 350547-3 (No.1 to 3)

350654-1 or 350669-1 (No. 4)

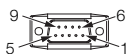
From Tyco Electronics Japan G.K.

#### **Mating Connector**

Cap: 350780-1

Socket: 350536-3 or 350550-3

#### • Polarity Sensor and Thermal Protector Connector



|   |                                               |   |                   |
|---|-----------------------------------------------|---|-------------------|
| 1 | +5 V (thermal protector), +5 V (power supply) |   |                   |
| 2 | Su                                            | 6 | Not used          |
| 3 | Sv                                            | 7 |                   |
| 4 | Sw                                            | 8 |                   |
| 5 | 0 V (power supply)                            | 9 | Thermal protector |

Pin connector: 17JE-23090-02 (D8C) -CG

From DDK Ltd.

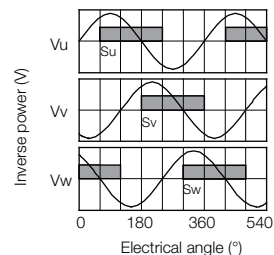
#### **Mating Connector**

Socket connector: 17JE-13090-02 (D8C) A-CG

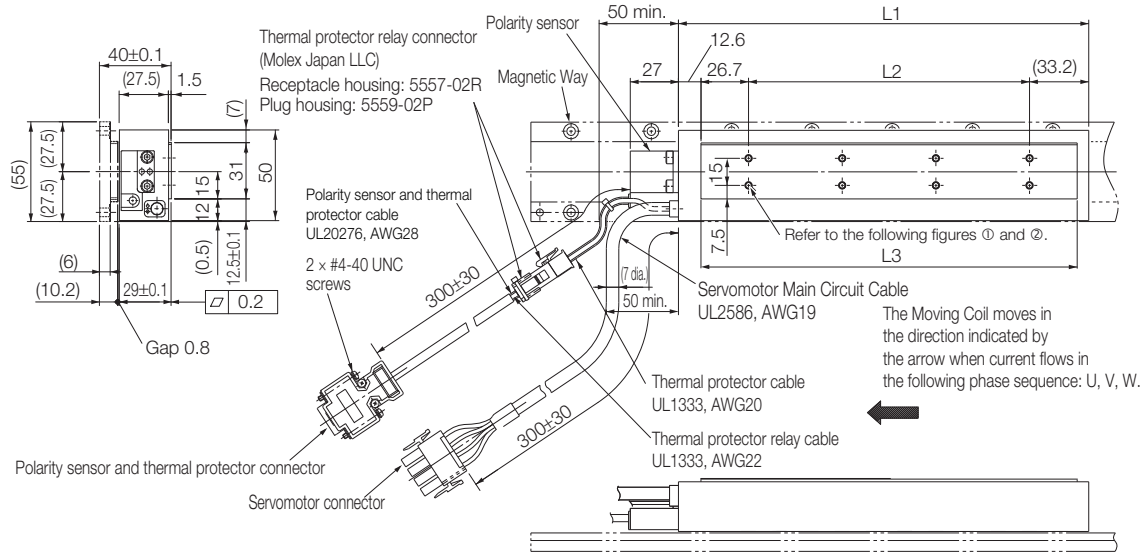
Studs: 17L-002C or 17L-002C1

### ■ Polarity Sensor Output Signal

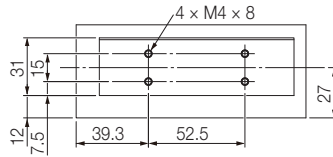
The figure on the right shows the relationship between the Su, Sv, and Sw polarity sensor output signals and the inverse power of each motor phase Vu, Vv, and Vw when the Moving Coil moves in the direction indicated by the arrow in the dimensional drawings of the Moving Coil.



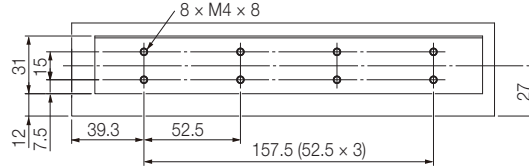
# ◆ Moving Coils with Polarity Sensors: SGLFW2-30A□□□AS



①SGLFW2-30A120AS



②SGLFW2-30A230AS



Unit: mm

| Moving Coil Model SGLFW2- | L1  | L2    | L3    | Approx. Mass [kg] |
|---------------------------|-----|-------|-------|-------------------|
| 30A120AS                  | 125 | 52.5  | 105.9 | 0.9               |
| 30A230AS                  | 230 | 157.5 | 210.9 | 1.7               |

## ■ Connector Specifications

### • Servomotor Connector



|   |         |       |
|---|---------|-------|
| 1 | Phase U | Red   |
| 2 | Phase V | White |
| 3 | Phase W | Black |
| 4 | FG      | Green |

Plug: 350779-1

Pins: 350218-3 or 350547-3 (No.1 to 3)

350654-1 or 350669-1 (No. 4)

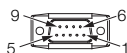
From Tyco Electronics Japan G.K.

#### Mating Connector

Cap: 350780-1

Socket: 350536-3 or 350550-3

### • Polarity Sensor and Thermal Protector Connector



|   |                                               |   |                   |
|---|-----------------------------------------------|---|-------------------|
| 1 | +5 V (thermal protector), +5 V (power supply) |   |                   |
| 2 | Su                                            | 6 | Not used          |
| 3 | Sv                                            | 7 |                   |
| 4 | Sw                                            | 8 |                   |
| 5 | 0 V (power supply)                            | 9 | Thermal protector |

Pin connector: 17JE-23090-02 (D8C) -CG

From DDK Ltd.

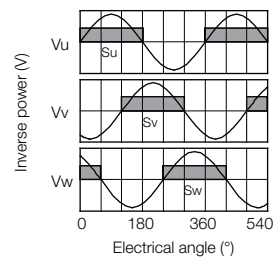
#### Mating Connector

Socket connector: 17JE-13090-02 (D8C) A-CG

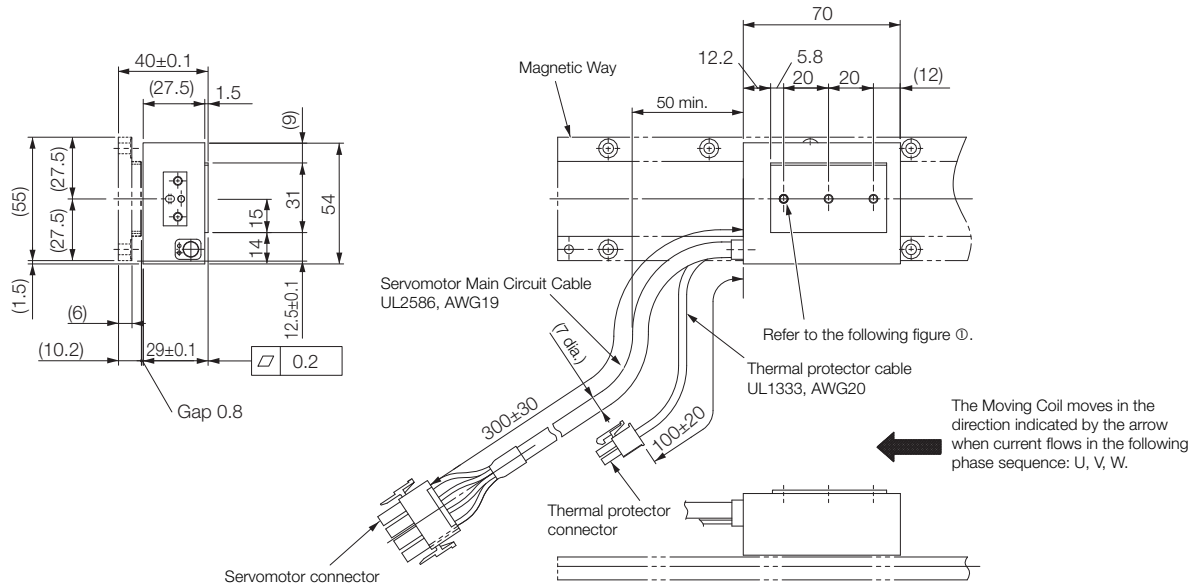
Studs: 17L-002C or 17L-002C1

## ■ Polarity Sensor Output Signal

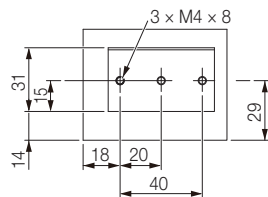
The figure on the right shows the relationship between the Su, Sv, and Sw polarity sensor output signals and the inverse power of each motor phase Vu, Vv, and Vw when the Moving Coil moves in the direction indicated by the arrow in the dimensional drawings of the Moving Coil.



## ◆ Moving Coil without Polarity Sensor: SGLFW2-30A070AT



①SGLFW2-30A070AT



Approx. mass: 0.5 kg

Unit: mm

## ■ Connector Specifications

### • Servomotor Connector



|   |         |       |
|---|---------|-------|
| 1 | Phase U | Red   |
| 2 | Phase V | White |
| 3 | Phase W | Black |
| 4 | FG      | Green |

Plug: 350779-1

Pins: 350218-3 or 350547-3 (No.1 to 3)  
350654-1 or 350669-1 (No. 4)

From Tyco Electronics Japan G.K.

#### Mating Connector

Cap: 350780-1

Socket: 350536-3 or 350550-3

### • Thermal Protector Connector



|   |                   |
|---|-------------------|
| 1 | Thermal protector |
| 2 | Thermal protector |

Receptacle housing: 5557-02R

Terminals: 5556T or 5556TL

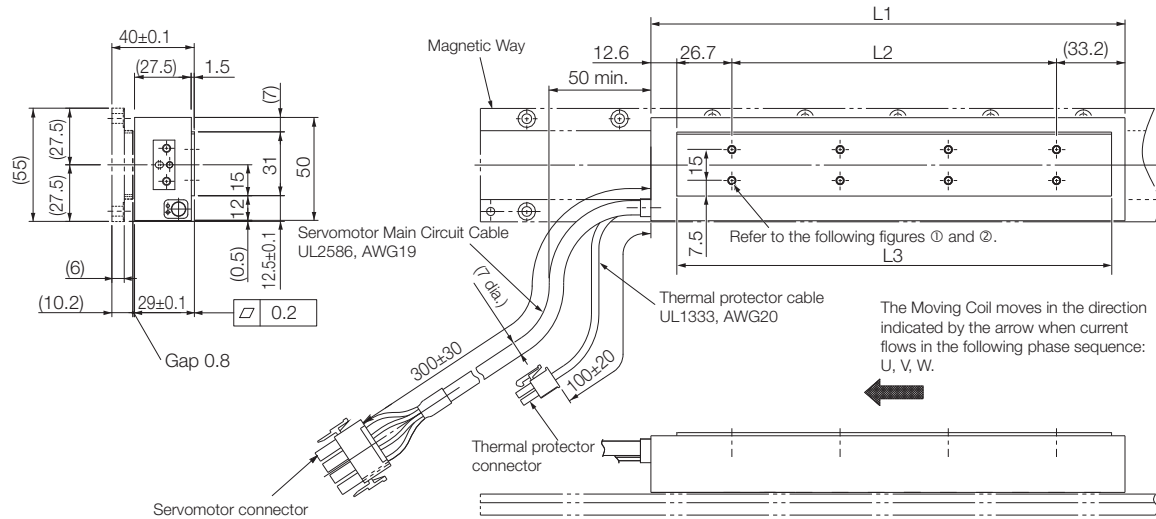
From Molex Japan LLC

#### Mating Connector

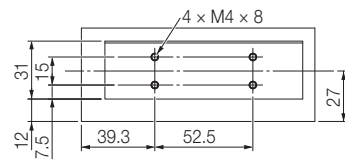
Plug housing: 5559-02P

Terminals: 5558T or 5558TL

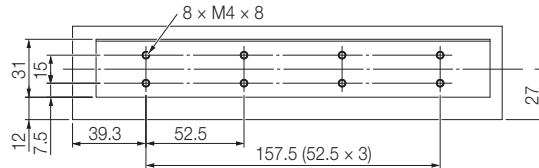
## ◆ Moving Coils without Polarity Sensors: SGLFW2-30A□□□AT



①SGLFW2-30A120AT



②SGLFW2-30A230AT



Unit: mm

| Moving Coil Model SGLFW2- | L1  | L2    | L3    | Approx. Mass [kg] |
|---------------------------|-----|-------|-------|-------------------|
| 30A120AT                  | 125 | 52.5  | 105.9 | 0.9               |
| 30A230AT                  | 230 | 157.5 | 210.9 | 1.7               |

## ■ Connector Specifications

### • Servomotor Connector



|   |         |       |
|---|---------|-------|
| 1 | Phase U | Red   |
| 2 | Phase V | White |
| 3 | Phase W | Black |
| 4 | FG      | Green |

Plug: 350779-1

Pins: 350218-3 or 350547-3 (No.1 to 3)

350654-1 or 350669-1 (No. 4)

From Tyco Electronics Japan G.K.

### Mating Connector

Cap: 350780-1

Socket: 350536-3 or 350550-3

### • Thermal Protector Connector



|   |                   |
|---|-------------------|
| 1 | Thermal protector |
| 2 | Thermal protector |

Receptacle housing: 5557-02R

Terminals: 5556T or 5556TL

From Molex Japan LLC

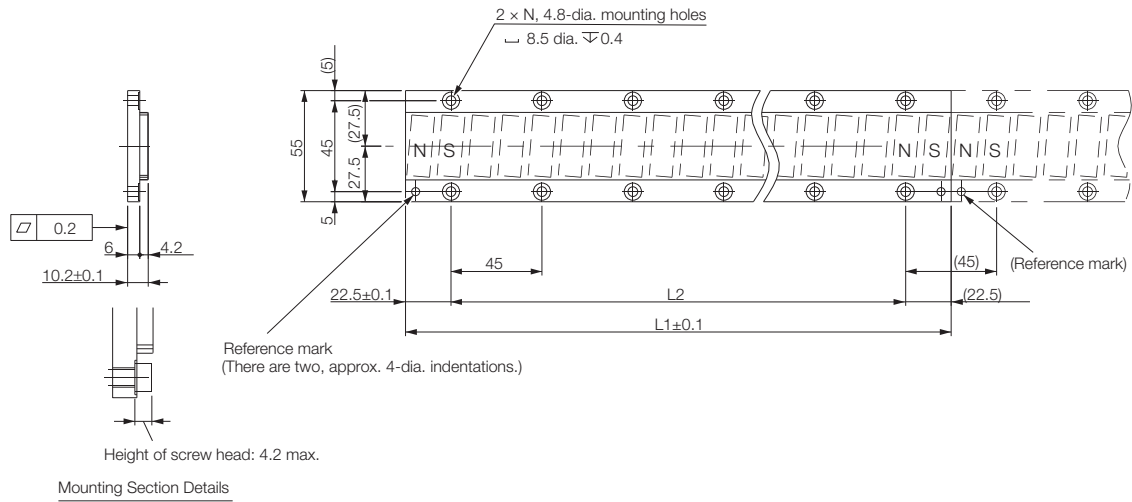
### Mating Connector

Plug housing: 5559-02P

Terminals: 5558T or 5558TL



## ◆ Magnetic Ways: SGLFM2-30□□□A



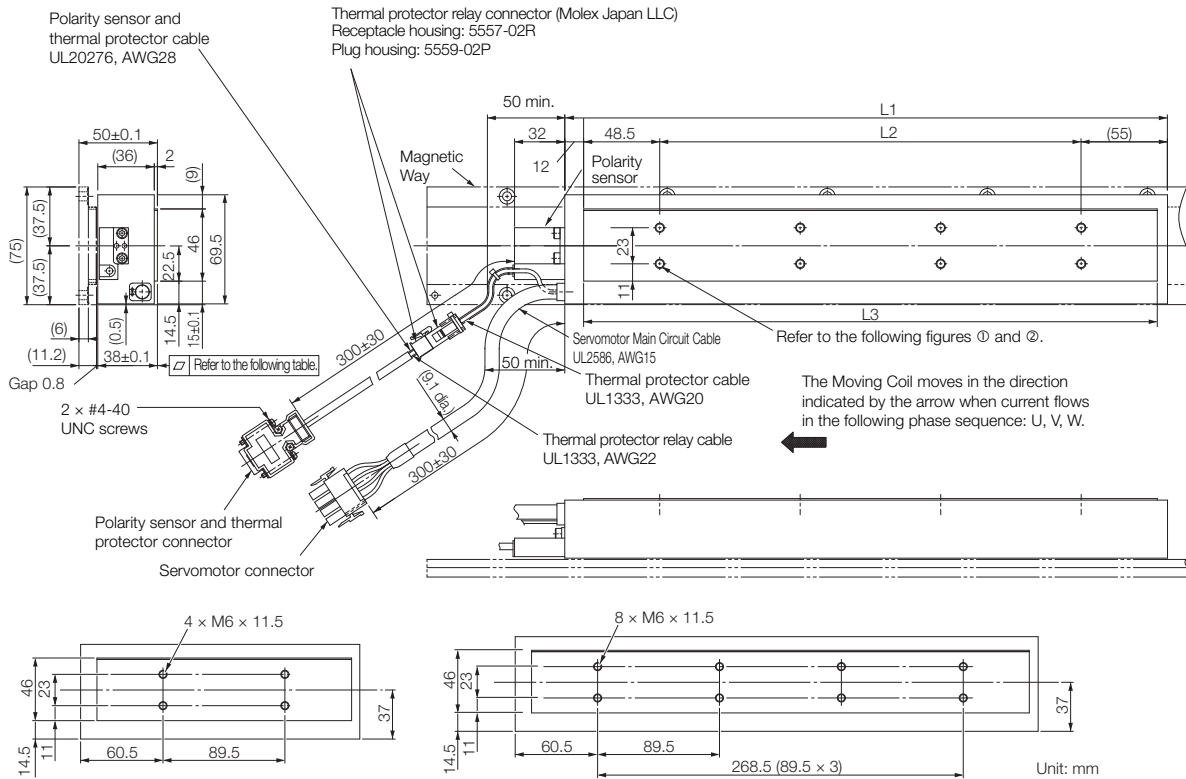
Unit: mm

Note: More than one Magnetic Way can be connected. Connect the Magnetic Ways so that the reference marks on them are aligned in the same direction as shown in the figure.

| Magnetic Way Model<br>SGLFM2- | L1 ± 0.1 | L2            | N  | Approx. Mass<br>[kg] |
|-------------------------------|----------|---------------|----|----------------------|
| 30270A                        | 270      | 225 (45 × 5)  | 6  | 0.9                  |
| 30450A                        | 450      | 405 (45 × 9)  | 10 | 1.5                  |
| 30630A                        | 630      | 585 (45 × 13) | 14 | 2.0                  |

## SGLFW2-45

### ◆ Moving Coils with Polarity Sensors: SGLFW2-45A□□□AS



| Moving Coil Model SGLFW2- | L1  | L2    | L3    | Flatness | Approx. Mass [kg] |
|---------------------------|-----|-------|-------|----------|-------------------|
| 45A200AS                  | 205 | 89.5  | 187   | 0.2      | 2.9               |
| 45A380AS                  | 384 | 268.5 | 365.5 | 0.3      | 5.5               |

## ■ Connector Specifications

### • Servomotor Connector



|          |         |       |
|----------|---------|-------|
| <b>1</b> | Phase U | Red   |
| <b>2</b> | Phase V | White |
| <b>3</b> | Phase W | Black |
| <b>4</b> | FG      | Green |

Plug: 350779-1

Pins: 350218-3 or 350547-3 (No.1 to 3)  
350654-1 or 350669-1 (No. 4)

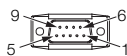
From Tyco Electronics Japan G.K.

#### Mating Connector

Cap: 350780-1

Socket: 350536-3 or 350550-3

### • Polarity Sensor and Thermal Protector Connector



|          |                                               |          |                   |
|----------|-----------------------------------------------|----------|-------------------|
| <b>1</b> | +5 V (thermal protector), +5 V (power supply) | <b>6</b> | Not used          |
| <b>2</b> | Su                                            | <b>7</b> |                   |
| <b>3</b> | Sv                                            | <b>8</b> |                   |
| <b>4</b> | Sw                                            | <b>9</b> | Thermal protector |
| <b>5</b> | 0 V (power supply)                            |          |                   |

Pin connector: 17JE-23090-02 (D8C) -CG

From DDK Ltd.

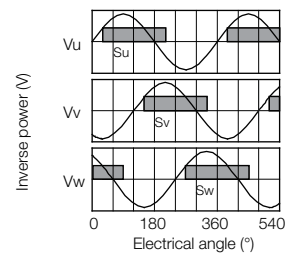
#### Mating Connector

Socket connector: 17JE-13090-02 (D8C) A-CG

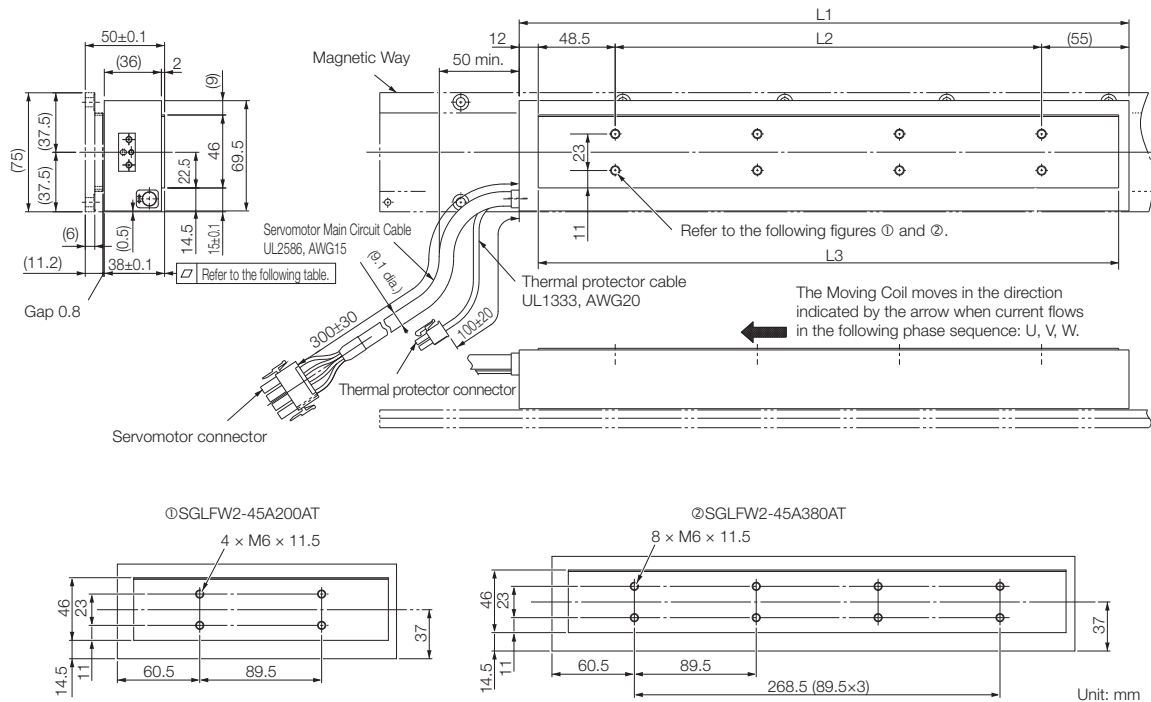
Studs: 17L-002C or 17L-002C1

## ■ Polarity Sensor Output Signal

The figure on the right shows the relationship between the Su, Sv, and Sw polarity sensor output signals and the inverse power of each motor phase Vu, Vv, and Vw when the Moving Coil moves in the direction indicated by the arrow in the dimensional drawings of the Moving Coil.



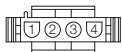
## ◆ Moving Coils without Polarity Sensors: SGLFW2-45A□□□AT



| Moving Coil Model SGLFW2- | L1  | L2    | L3    | Flatness | Approx. Mass [kg] |
|---------------------------|-----|-------|-------|----------|-------------------|
| 45A200AT                  | 205 | 89.5  | 187   | 0.2      | 2.9               |
| 45A380AT                  | 384 | 268.5 | 365.5 | 0.3      | 5.5               |

### ■ Connector Specifications

#### • Servomotor Connector



|   |         |       |
|---|---------|-------|
| 1 | Phase U | Red   |
| 2 | Phase V | White |
| 3 | Phase W | Black |
| 4 | FG      | Green |

Plug: 350779-1

Pins: 350218-3 or 350547-3 (No.1 to 3)

350654-1 or 350669-1 (No. 4)

From Tyco Electronics Japan G.K.

#### Mating Connector

Cap: 350780-1

Socket: 350536-3 or 350550-3

#### • Thermal Protector Connector



|   |                   |
|---|-------------------|
| 1 | Thermal protector |
| 2 | Thermal protector |

Receptacle housing: 5557-02R

Terminals: 5556T or 5556TL

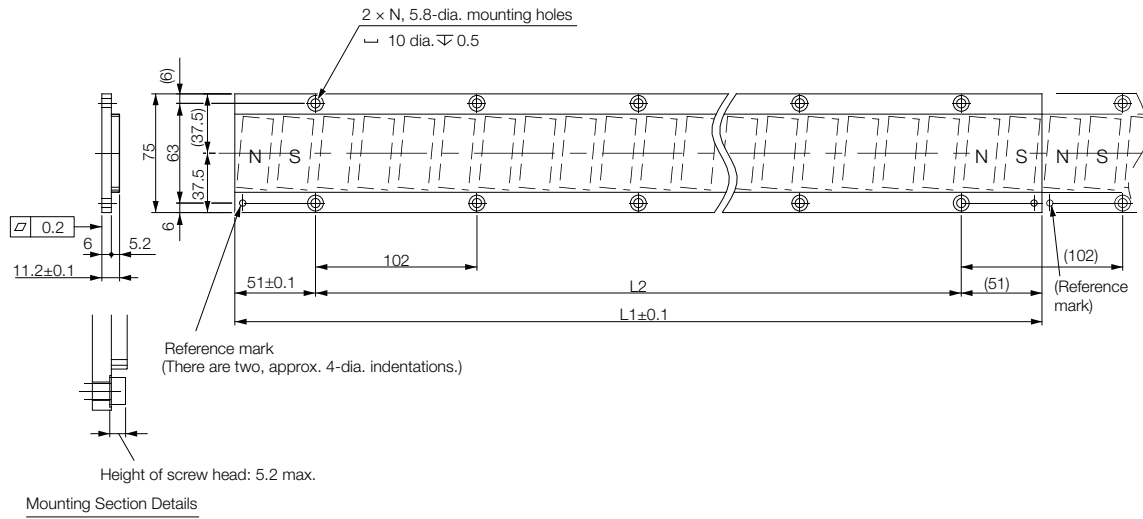
From Molex Japan LLC

#### Mating Connector

Plug housing: 5559-02P

Terminals: 5558T or 5558TL

# ◆ Magnetic Ways: SGLFM2-45□□□A

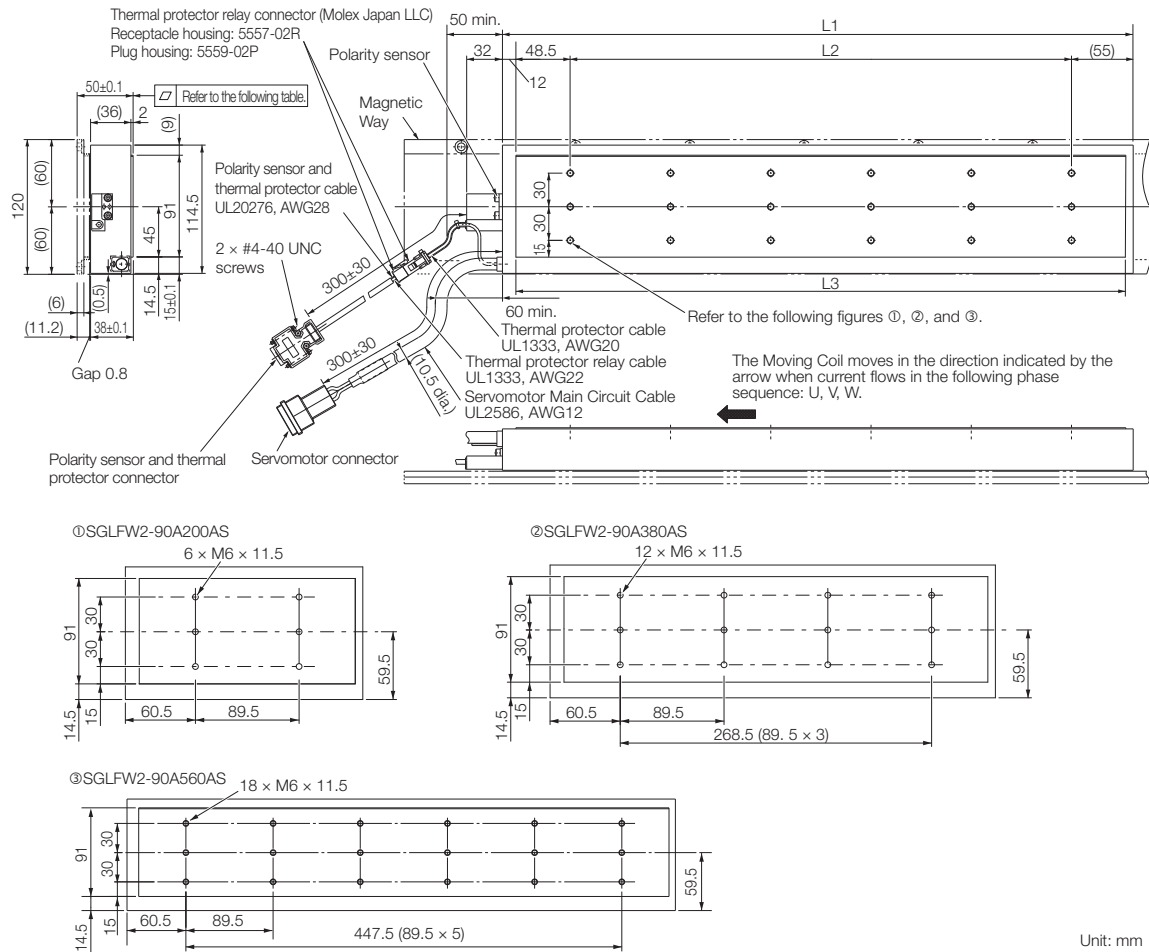


Note: More than one Magnetic Way can be connected. Connect the Magnetic Ways so that the reference marks on them are aligned in the same direction as shown in the figure.

| Magnetic Way Model<br>SGLFM2- | L1 ± 0.1 | L2            | N | Approx. Mass<br>[kg] |
|-------------------------------|----------|---------------|---|----------------------|
| 45306A                        | 306      | 204 (102 × 2) | 3 | 1.5                  |
| 45510A                        | 510      | 408 (102 × 4) | 5 | 2.5                  |
| 45714A                        | 714      | 612 (102 × 6) | 7 | 3.4                  |

## SGLFW2-90

### ◆ Moving Coils with Polarity Sensors: SGLFW2-90A□□□AS



| Moving Coil Model SGLFW2- | L1  | L2    | L3    | Flatness | Approx. Mass [kg] |
|---------------------------|-----|-------|-------|----------|-------------------|
| 90A200AS                  | 205 | 89.5  | 187   | 0.2      | 5.3               |
| 90A380AS                  | 384 | 268.5 | 365.5 | 0.3      | 10.1              |
| 90A560AS                  | 563 | 447.5 | 544   | 0.3      | 14.9              |

## ■ Connector Specifications

### • Servomotor Connector



|           |         |       |
|-----------|---------|-------|
| <b>A1</b> | Phase U | Red   |
| <b>A2</b> | Phase V | White |
| <b>B1</b> | Phase W | Black |
| <b>B2</b> | FG      | Green |

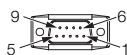
Tab housing: 1-917808-2  
Contacts: 917803-2 (A1, A2, and B1)  
84695-1 (B2)

From Tyco Electronics Japan G.K.

#### **Mating Connector**

Receptacle housing: 1-917807-2  
Contacts: 179956-2

### • Polarity Sensor and Thermal Protector Connector



|          |                                               |          |                   |
|----------|-----------------------------------------------|----------|-------------------|
| <b>1</b> | +5 V (thermal protector), +5 V (power supply) |          |                   |
| <b>2</b> | Su                                            | <b>6</b> | Not used          |
| <b>3</b> | Sv                                            | <b>7</b> |                   |
| <b>4</b> | Sw                                            | <b>8</b> |                   |
| <b>5</b> | 0 V (power supply)                            | <b>9</b> | Thermal protector |

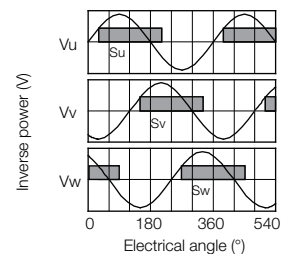
Pin connector: 17JE-23090-02 (D8C) -CG  
From DDK Ltd.

#### **Mating Connector**

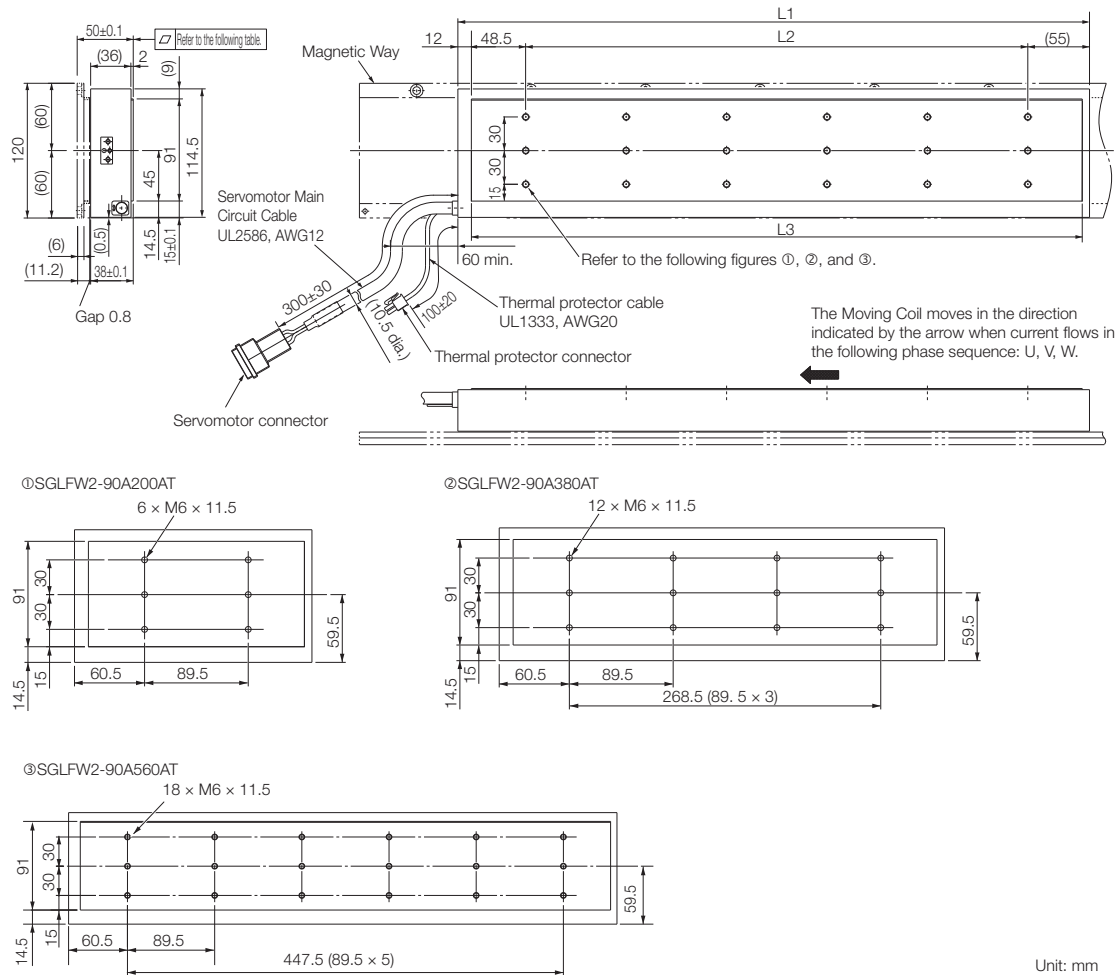
Socket connector: 17JE-13090-02 (D8C) A-CG  
Studs: 17L-002C or 17L-002C1

## ■ Polarity Sensor Output Signal

The figure on the right shows the relationship between the Su, Sv, and Sw polarity sensor output signals and the inverse power of each motor phase Vu, Vv, and Vw when the Moving Coil moves in the direction indicated by the arrow in the dimensional drawings of the Moving Coil.



# ◆ Moving Coils without Polarity Sensors: SGLFW2-90A□□□AT



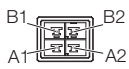
Unit: mm

| Moving Coil Model SGLFW2- | L1  | L2    | L3    | Flatness | Approx. Mass [kg] |
|---------------------------|-----|-------|-------|----------|-------------------|
| 90A200AT                  | 205 | 89.5  | 187   | 0.2      | 5.3               |
| 90A380AT                  | 384 | 268.5 | 365.5 | 0.3      | 10.1              |
| 90A560AT                  | 563 | 447.5 | 544   | 0.3      | 14.9              |



## ■ Connector Specifications

### • Servomotor Connector



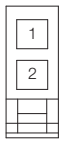
|           |         |       |
|-----------|---------|-------|
| <b>A1</b> | Phase U | Red   |
| <b>A2</b> | Phase V | White |
| <b>B1</b> | Phase W | Black |
| <b>B2</b> | FG      | Green |

Tab housing: 1-917808-2  
Contacts: 917803-2 (A1, A2, and B1)  
84695-1 (B2)  
From Tyco Electronics Japan G.K.

#### Mating Connector

Receptacle housing: 1-917807-2  
Contacts: 179956-2

### • Thermal Protector Connector



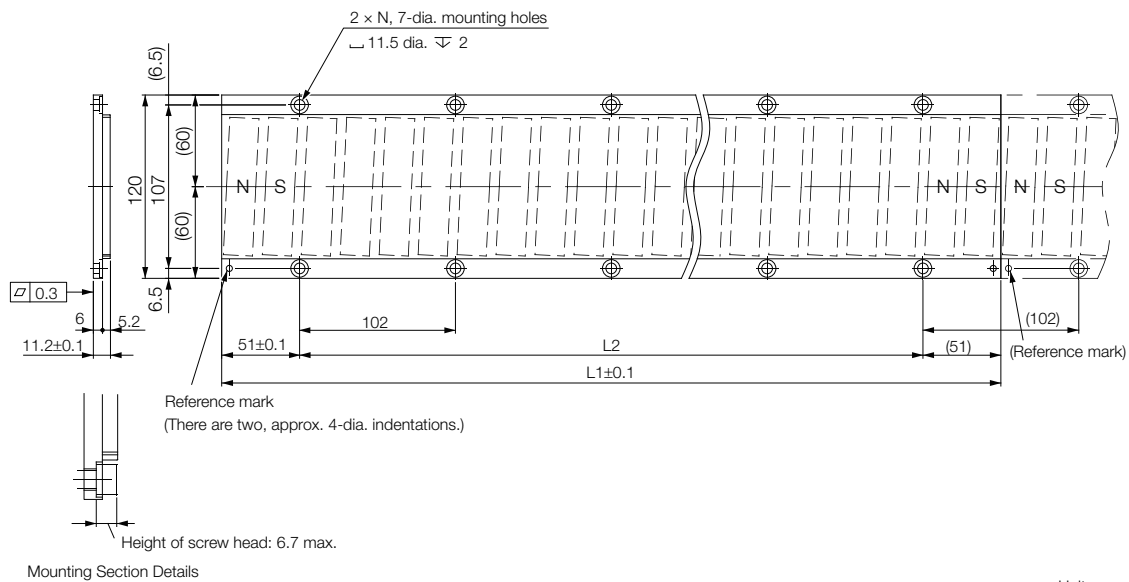
|          |                   |
|----------|-------------------|
| <b>1</b> | Thermal protector |
| <b>2</b> | Thermal protector |

Receptacle housing: 5557-02R  
Terminals: 5556T or 5556TL  
From Molex Japan LLC

#### Mating Connector

Plug housing: 5559-02P  
Terminals: 5558T or 5558TL

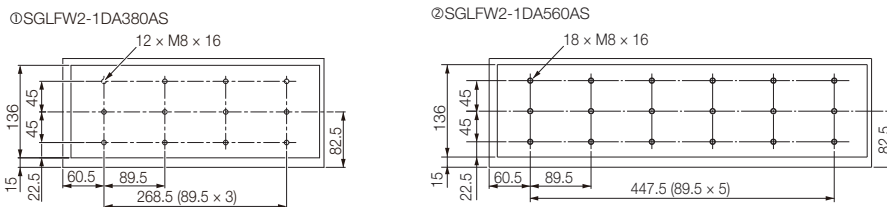
## ◆ Magnetic Ways: SGLFM2-90□□□A



Note: More than one Magnetic Way can be connected. Connect the Magnetic Ways so that the reference marks on them are aligned in the same direction as shown in the figure.

| Magnetic Way Model<br>SGLFM2- | L1±0.1 | L2            | N | Approx. Mass<br>[kg] |
|-------------------------------|--------|---------------|---|----------------------|
| 90306A                        | 306    | 204 (102 × 2) | 3 | 2.6                  |
| 90510A                        | 510    | 408 (102 × 4) | 5 | 4.2                  |
| 90714A                        | 714    | 612 (102 × 6) | 7 | 5.9                  |

### ◆ Moving Coil with Polarity Sensor: SGLFW2-1DA□□□AS



Unit: mm

| Moving Coil Model SGLFW2- | L1  | L2    | L3    | Flatness | Approx. Mass [kg] |
|---------------------------|-----|-------|-------|----------|-------------------|
| 1DA380AS                  | 384 | 268.5 | 365.5 | 0.3      | 14.6              |
| 1DA560AS                  | 563 | 447.5 | 544   | 0.3      | 21.5              |

## ■ Connector Specifications

### • Servomotor Connector



|           |         |       |
|-----------|---------|-------|
| <b>A1</b> | Phase U | Red   |
| <b>A2</b> | Phase V | White |
| <b>B1</b> | Phase W | Black |
| <b>B2</b> | FG      | Green |

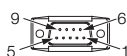
Tab housing: 1-917808-2  
Contacts: 917803-2 (A1, A2, and B1)  
84695-1 (B2)

From Tyco Electronics Japan G.K.

#### Mating Connector

Receptacle housing: 1-917807-2  
Contacts: 179956-2

### • Polarity Sensor and Thermal Protector Connector



|          |                                               |          |                   |
|----------|-----------------------------------------------|----------|-------------------|
| <b>1</b> | +5 V (thermal protector), +5 V (power supply) | <b>6</b> | Not used          |
| <b>2</b> | Su                                            | <b>7</b> |                   |
| <b>3</b> | Sv                                            | <b>8</b> |                   |
| <b>4</b> | Sw                                            | <b>9</b> | Thermal protector |
| <b>5</b> | 0 V (power supply)                            |          |                   |

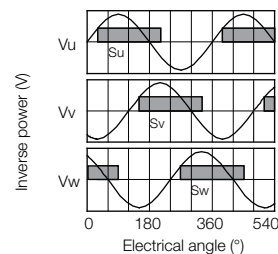
Pin connector: 17JE-23090-02 (D8C) -CG  
From DDK Ltd.

#### Mating Connector

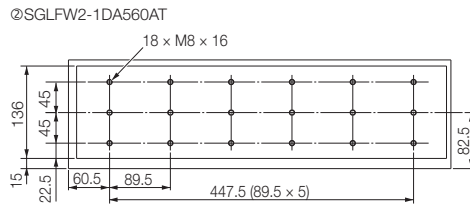
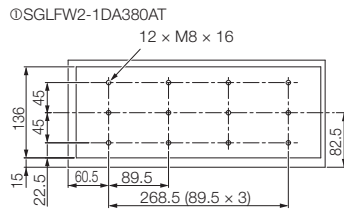
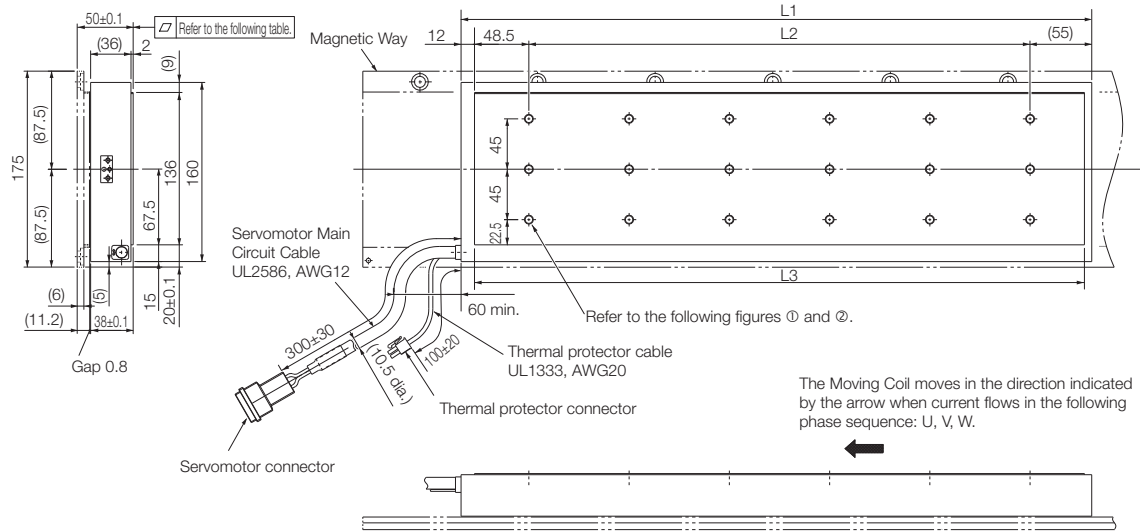
Socket connector: 17JE-13090-02 (D8C) A-CG  
Studs: 17L-002C or 17L-002C1

## ■ Polarity Sensor Output Signal

The figure on the right shows the relationship between the Su, Sv, and Sw polarity sensor output signals and the inverse power of each motor phase Vu, Vv, and Vw when the Moving Coil moves in the direction indicated by the arrow in the dimensional drawings of the Moving Coil.



## ◆ Moving Coil without Polarity Sensor: SGLFW2-1DA□□□AT



Unit: mm

| Moving Coil Model<br>SGLFW2- | L1  | L2    | L3    | Flatness | Approx. Mass<br>[kg] |
|------------------------------|-----|-------|-------|----------|----------------------|
| 1DA380AT                     | 384 | 268.5 | 365.5 | 0.3      | 14.6                 |
| 1DA560AT                     | 563 | 447.5 | 544   | 0.3      | 21.5                 |

### ■ Connector Specifications

#### • Servomotor Connector



|           |         |       |
|-----------|---------|-------|
| <b>A1</b> | Phase U | Red   |
| <b>A2</b> | Phase V | White |
| <b>B1</b> | Phase W | Black |
| <b>B2</b> | FG      | Green |

Tab housing: 1-917808-2

Contacts: 917803-2 (A1, A2, and B1)

84695-1 (B2)

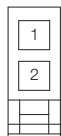
From Tyco Electronics Japan G.K.

#### Mating Connector

Receptacle housing: 1-917807-2

Contacts: 179956-2

#### • Thermal Protector Connector



|          |                   |
|----------|-------------------|
| <b>1</b> | Thermal protector |
| <b>2</b> | Thermal protector |

Receptacle housing: 5557-02R

Terminals: 5556T or 5556TL

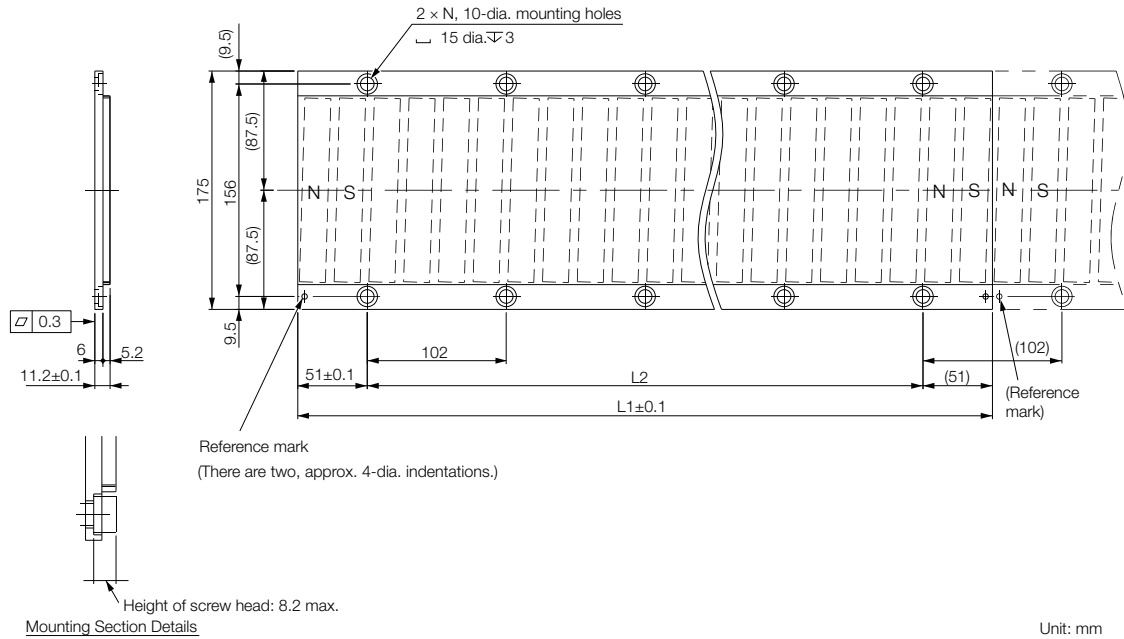
From Molex Japan LLC

#### Mating Connector

Plug housing: 5559-02P

Terminals: 5558T or 5558TL

# ◆ Magnetic Ways: SGLFM2-1D□□□A



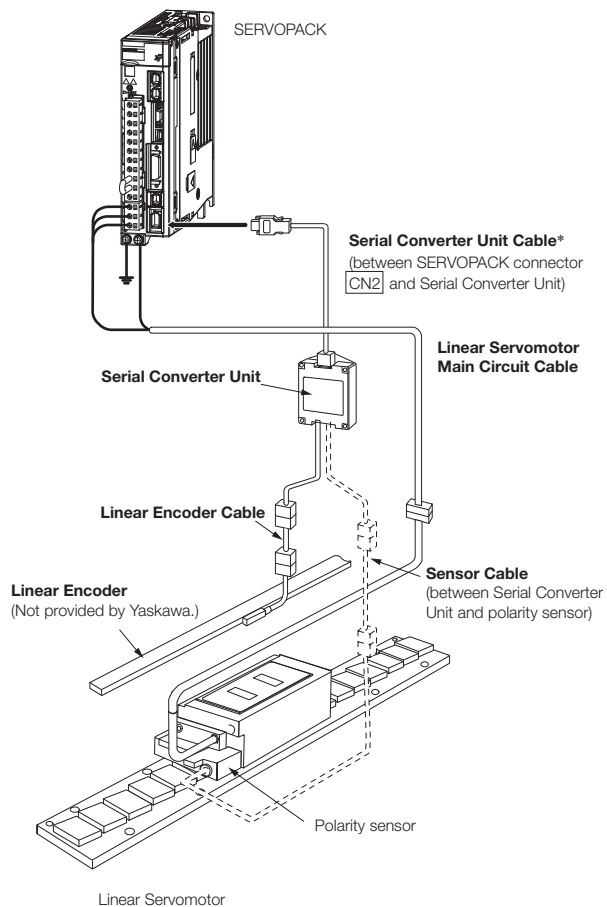
Note: More than one Magnetic Way can be connected. Connect the Magnetic Ways so that the reference marks on them are aligned in the same direction as shown in the figure.

| Magnetic Way Model<br>SGLFM2- | L1±0.1 | L2            | N | Approx. Mass<br>[kg] |
|-------------------------------|--------|---------------|---|----------------------|
| 1D306A                        | 306    | 204 (102 × 2) | 3 | 3.7                  |
| 1D510A                        | 510    | 408 (102 × 4) | 5 | 6.2                  |
| 1D714A                        | 714    | 612 (102 × 6) | 7 | 8.6                  |

## Selecting Cables

### ◆ Cable Configurations

To select a Linear Encoder, use Recommended Linear Encoders and Cables (page 404). Prepare the cable required for the encoder.



\* You can connect directly to an absolute linear encoder.

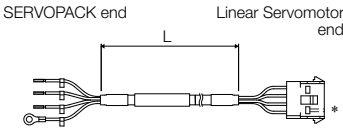
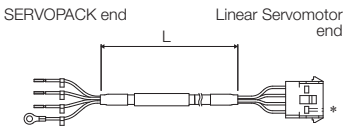
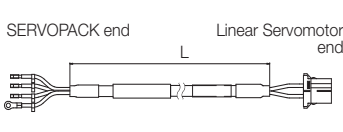
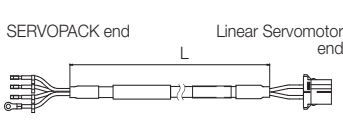
Note: Refer to the following manual for the following information.

- Cable dimensional drawings and cable connection specifications
- Order numbers and specifications of individual connectors for cables
- Order numbers and specifications for wiring materials



**Σ-7-Series AC Servo Drive Peripheral Device Selection Manual (Manual No.: SIEP S800001 32)**

◆ **Linear Servomotor Main Circuit Cables**

| Linear Servomotor Model                               | Length (L) | Order Number      | Appearance                                                                            |
|-------------------------------------------------------|------------|-------------------|---------------------------------------------------------------------------------------|
| SGLFW2-30A070A□<br>SGLFW2-30A120A□<br>SGLFW2-30A230A□ | 1 m        | JZSP-CL2N703-01-E |    |
|                                                       | 3 m        | JZSP-CL2N703-03-E |                                                                                       |
|                                                       | 5 m        | JZSP-CL2N703-05-E |                                                                                       |
|                                                       | 10 m       | JZSP-CL2N703-10-E |                                                                                       |
|                                                       | 15 m       | JZSP-CL2N703-15-E |                                                                                       |
|                                                       | 20 m       | JZSP-CL2N703-20-E |                                                                                       |
| SGLFW2-45A200A□<br>SGLFW2-45A380A□                    | 1 m        | JZSP-CL2N603-01-E |    |
|                                                       | 3 m        | JZSP-CL2N603-03-E |                                                                                       |
|                                                       | 5 m        | JZSP-CL2N603-05-E |                                                                                       |
|                                                       | 10 m       | JZSP-CL2N603-10-E |                                                                                       |
|                                                       | 15 m       | JZSP-CL2N603-15-E |                                                                                       |
|                                                       | 20 m       | JZSP-CL2N603-20-E |                                                                                       |
| SGLFW2-90A200A□<br>SGLFW2-90A380A□                    | 1 m        | JZSP-CL2N803-01-E |    |
|                                                       | 3 m        | JZSP-CL2N803-03-E |                                                                                       |
|                                                       | 5 m        | JZSP-CL2N803-05-E |                                                                                       |
|                                                       | 10 m       | JZSP-CL2N803-10-E |                                                                                       |
|                                                       | 15 m       | JZSP-CL2N803-15-E |                                                                                       |
|                                                       | 20 m       | JZSP-CL2N803-20-E |                                                                                       |
| SGLFW2-90A560A□<br>SGLFW2-1DA380A□<br>SGLFW2-1DA560A□ | 1 m        | JZSP-CL2N503-01-E |  |
|                                                       | 3 m        | JZSP-CL2N503-03-E |                                                                                       |
|                                                       | 5 m        | JZSP-CL2N503-05-E |                                                                                       |
|                                                       | 10 m       | JZSP-CL2N503-10-E |                                                                                       |
|                                                       | 15 m       | JZSP-CL2N503-15-E |                                                                                       |
|                                                       | 20 m       | JZSP-CL2N503-20-E |                                                                                       |

\* Connector from Tyco Electronics Japan G.K.

Note: Estimates are available for models other than those listed above (SGLFW2-90A□□□A□L and SGLFW2-1D□□□A□L).

# SGLFW2 (Models with F-type Iron Cores, 400V)

## Model Designations

### ◆ Moving Coil

S G L F W 2 - 30 A 070 A S □ E

Linear  $\Sigma$  Series  
Linear Servomotors

1st  
digit

2nd  
digit

3rd+4th  
digits

5th  
digit

6th+7th+8th  
digits

9th  
digit

10th  
digit

11th  
digit

12th  
digit

1st digit Servomotor Type

| Code | Specification         |
|------|-----------------------|
| F    | With F-type iron core |

5th digit Power Supply Voltage

| Code | Specification |
|------|---------------|
| D    | 400 VAC       |

10th digit Sensor Specification

| Code | Specification                                   |
|------|-------------------------------------------------|
| S    | With polarity sensor and Thermal Protector      |
| T    | Without polarity sensor, with thermal protector |

2nd digit Moving Coil/Magnetic Way

| Code | Specification |
|------|---------------|
| W2   | Moving Coil   |

6th+7th+8th digits Length of Moving Coil

| Code | Specification |
|------|---------------|
| 070  | 70 mm         |
| 120  | 125 mm        |
| 200  | 205 mm        |
| 230  | 230 mm        |
| 380  | 384 mm        |
| 560  | 563 mm        |

11th digit Cooling Method

| Code | Specification |
|------|---------------|
| 1    | Self-cooled   |
| L    | Water-cooled* |

3rd+4th digits Magnet Height

| Code | Specification |
|------|---------------|
| 30   | 30 mm         |
| 45   | 45 mm         |
| 90   | 90 mm         |
| 1D   | 135 mm        |

11th digit Cooling Method

| Code | Specification                   |
|------|---------------------------------|
| E    | Metal round connector (Phoenix) |

9th digit Design Revision Order

A

■ Non Stock Items

Note: This information is provided to explain model numbers. It is not meant to imply that models are available for all combinations of codes.

\* Contact your Yaskawa representative for information on water-cooled models.

### ◆ Magnetic Way

S G L F M 2 - 30 270 A

Linear  $\Sigma$  Series  
Linear Servomotors

1st  
digit

2nd  
digit

3rd+4th  
digits

5th+6th+7th  
digits

8th  
digit

1st digit Servomotor Type  
(Same as for the Moving Coil.)

5th+6th+7th digits Length of Magnetic Way

| Code | Specification |
|------|---------------|
| 270  | 270 mm        |
| 306  | 306 mm        |
| 450  | 450 mm        |
| 510  | 510 mm        |
| 630  | 630 mm        |
| 714  | 714 mm        |

2nd digit Moving Coil/Magnetic Way

| Code | Specification |
|------|---------------|
| M2   | Magnetic Way  |

3rd+4th digits Magnet Height  
(Same as for the Moving Coil.)

8th digit Design Revision Order

A



## Precautions on Moving Coils with Polarity Sensors

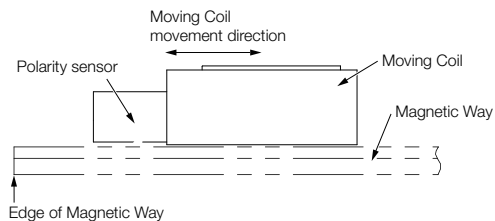


Note

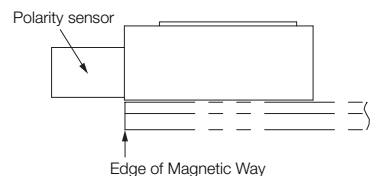
When you use a Moving Coil with a Polarity Sensor, the Magnetic Way must cover the bottom of the polarity sensor. Refer to the example that shows the correct installation.

When determining the length of the Moving Coil's stroke or the length of the Magnetic Way, consider the total length (L) of the Moving Coil and the polarity sensor. Refer to the following table.

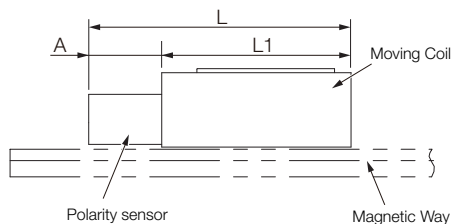
### Correct Installation



### Incorrect Installation



### ◆ Total Length of Moving Coil with Polarity Sensor



| Moving Coil Model<br>SGLFW2- | Length of Moving Coil,<br>L1 [mm] | Length of Polarity Sensor,<br>A [mm] | Total Length,<br>L [mm] |
|------------------------------|-----------------------------------|--------------------------------------|-------------------------|
| 30D070AS                     | 70                                | 27                                   | 97                      |
| 30D120AS                     | 125                               |                                      | 152                     |
| 30D230AS                     | 230                               |                                      | 257                     |
| 45D200AS                     | 205                               | 32                                   | 237                     |
| 45D380AS                     | 384                               |                                      | 416                     |
| 90D200AS                     | 205                               |                                      | 237                     |
| 90D380AS                     | 384                               |                                      | 416                     |

## Specifications and Ratings

### Specifications

| Linear Servomotor Moving<br>Coil Model SGLFW2- |                                  | 30D                                                                                                                                                                                                                                                                                                                                          |       |       | 45D   |       | 90D   |       | 1DD   |       |
|------------------------------------------------|----------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------|-------|-------|-------|-------|-------|-------|-------|
|                                                |                                  | 070A□                                                                                                                                                                                                                                                                                                                                        | 120A□ | 230A□ | 200A□ | 380A□ | 200A□ | 380A□ | 380A□ | 560A□ |
| Time Rating                                    |                                  | Continuous                                                                                                                                                                                                                                                                                                                                   |       |       |       |       |       |       |       |       |
| Thermal Class                                  |                                  | B                                                                                                                                                                                                                                                                                                                                            |       |       |       |       |       |       |       |       |
| Insulation Resistance                          |                                  | 500 VDC, 10 MΩ min.                                                                                                                                                                                                                                                                                                                          |       |       |       |       |       |       |       |       |
| Withstand Voltage                              |                                  | 1,800 VAC for 1 minute                                                                                                                                                                                                                                                                                                                       |       |       |       |       |       |       |       |       |
| Excitation                                     |                                  | Permanent magnet                                                                                                                                                                                                                                                                                                                             |       |       |       |       |       |       |       |       |
| Cooling Method                                 |                                  | Self-cooled and water-cooled*                                                                                                                                                                                                                                                                                                                |       |       |       |       |       |       |       |       |
| Protective Structure                           |                                  | IP00                                                                                                                                                                                                                                                                                                                                         |       |       |       |       |       |       |       |       |
| Environmental<br>Condi-<br>tions               | Surrounding Air Tem-<br>perature | 0°C to 40°C (with no freezing)                                                                                                                                                                                                                                                                                                               |       |       |       |       |       |       |       |       |
|                                                | Surrounding Air<br>Humidity      | 20% to 80% relative humidity (with no condensation)                                                                                                                                                                                                                                                                                          |       |       |       |       |       |       |       |       |
|                                                | Installation Site                | <ul style="list-style-type: none"> <li>• Must be indoors and free of corrosive and explosive gases.</li> <li>• Must be well-ventilated and free of dust and moisture.</li> <li>• Must facilitate inspection and cleaning.</li> <li>• Must have an altitude of 1,000 m or less.</li> <li>• Must be free of strong magnetic fields.</li> </ul> |       |       |       |       |       |       |       |       |
| Shock<br>Resis-<br>tance                       | Impact Acceleration Rate         | 196 m/s <sup>2</sup>                                                                                                                                                                                                                                                                                                                         |       |       |       |       |       |       |       |       |
|                                                | Number of Impacts                | 2 times                                                                                                                                                                                                                                                                                                                                      |       |       |       |       |       |       |       |       |
| Vibra-<br>tion<br>Resis-<br>tance              | Vibration Accelera-<br>tion Rate | 49 m/s <sup>2</sup> (the vibration resistance in three directions, vertical, side-to-side, and front-to-back)                                                                                                                                                                                                                                |       |       |       |       |       |       |       |       |

\* Contact your Yaskawa representative for information on water-cooled models.

## Ratings

| Linear Servomotor Moving Coil<br>Model SGLFW2-                               |                          | 30D    |       |       | 45D    |             |
|------------------------------------------------------------------------------|--------------------------|--------|-------|-------|--------|-------------|
|                                                                              |                          | 070A□  | 120A□ | 230A□ | 200A□  | 380A□       |
| Rated Motor Speed<br>(Reference Speed during<br>Speed Control)* <sup>1</sup> | m/s                      | 4.0    | 4.0   | 4.0   | 4.0    | 4.0         |
| Maximum Speed* <sup>1</sup>                                                  | m/s                      | 5.0    | 5.0   | 5.0   | 4.5    | 4.5         |
| Rated Force* <sup>1, *2</sup>                                                | N                        | 45     | 90    | 180   | 280    | 560         |
| Maximum Force* <sup>1</sup>                                                  | N                        | 135    | 270   | 540   | 840    | 1500   1680 |
| Rated Current* <sup>1</sup>                                                  | Arms                     | 1.4    | 1.5   | 1.5   | 2.2    | 4.3         |
| Maximum Current* <sup>1</sup>                                                | Arms                     | 5.3    | 5.2   | 5.1   | 8.1    | 13.6   16.2 |
| Moving Coil Mass                                                             | kg                       | 0.50   | 0.90  | 1.7   | 2.9    | 5.4         |
| Force Constant                                                               | N/Arms                   | 33.3   | 64.5  | 129.0 | 137.0  | 136.7       |
| BEMF Constant                                                                | Vrms/<br>(m/s)/<br>phase | 11.1   | 21.5  | 43    | 45.6   | 45.6        |
| Motor Constant                                                               | N/√W                     | 11.3   | 17.3  | 24.4  | 37.9   | 53.2        |
| Electrical Time Constant                                                     | ms                       | 7.6    | 7.3   | 7.3   | 20     | 19.6        |
| Mechanical Time<br>Constant                                                  | ms                       | 3.9    | 3.0   | 2.9   | 2.1    | 1.9         |
| Thermal Resistance<br>(with Heat Sink)                                       | K/W                      | 2.62   | 1.17  | 0.79  | 0.60   | 0.44        |
| Thermal Resistance<br>(without Heat Sink)                                    | K/W                      | 11.3   | 4.43  | 2.55  | 2.64   | 1.49        |
| Magnetic Attraction                                                          | N                        | 200    | 630   | 1260  | 2120   | 4240        |
| Combined Magnetic Way,<br>SGLFM2-                                            |                          | 30□□□A |       |       | 45□□□A |             |
| Combined Serial Converter Unit,<br>JZDP-□□□□-                                |                          | 651    | 652   | 653   | 654    | 655         |
| Applicable<br>SERVOPACKs                                                     | SGD7S-                   | 1R9D   |       |       | 3R5D   | 5R4D   8R4D |
|                                                                              | SGD7W-                   | 2R6D   |       |       | 2R6D   | 5R4D   -    |

\*1. These values are for operation in combination with a SERVOPACK when the temperature of the armature winding is 100°C. The values for other items are at 20°C. These are typical values.

\*2. The rated forces are the continuous allowable force values at a surrounding air temperature of 40°C with an aluminum heat sink of the dimensions given in the following table.

- Heat Sink Dimensions
  - 150 mm × 100 mm × 10 mm: SGLFW2-30D070A
  - 254 mm × 254 mm × 25 mm: SGLFW2-30D120A and -30D230A
  - 400 mm × 500 mm × 25 mm: SGLFW2-45D200A and -45D380A

## Ratings

| Linear Servomotor Moving Coil<br>Model SGLFW2-                               |                          | 90D    |       |       | 1DD    |       |
|------------------------------------------------------------------------------|--------------------------|--------|-------|-------|--------|-------|
|                                                                              |                          | 200A□  | 380A□ | 560A□ | 380A□  | 560A□ |
| Rated Motor Speed<br>(Reference Speed during<br>Speed Control)* <sup>1</sup> | m/s                      | 4.0    | 4.0   | 4.0   | 3.5    | 3.5   |
| Maximum Speed* <sup>1</sup>                                                  | m/s                      | 4.0    | 4.0   | 4.0   | 3.5    | 3.5   |
| Rated Force* <sup>1</sup> , * <sup>2</sup>                                   | N                        | 560    | 1120  | 1680  | 1680   | 2520  |
| Maximum Force* <sup>1</sup>                                                  | N                        | 1680   | 3360  | 5040  | 5040   | 7560  |
| Rated Current* <sup>1</sup>                                                  | Arms                     | 3.8    | 7.7   | 11.5  | 10.9   | 16.3  |
| Maximum Current* <sup>1</sup>                                                | Arms                     | 14.0   | 28.0  | 42.0  | 39.7   | 59.6  |
| Moving Coil Mass                                                             | kg                       | 5.3    | 10.1  | 14.9  | 14.6   | 21.5  |
| Force Constant                                                               | N/Arms                   | 154.0  | 154.0 | 154.0 | 163.0  | 163.0 |
| BEMF Constant                                                                | Vrms/<br>(m/s)/<br>phase | 51.3   | 51.3  | 51.3  | 54.3   | 54.3  |
| Motor Constant                                                               | N/√W                     | 59.2   | 83.7  | 102   | 103    | 126   |
| Electrical Time Constant                                                     | ms                       | 24     | 24    | 24    | 25     | 25    |
| Mechanical Time<br>Constant                                                  | ms                       | 1.5    | 1.4   | 1.4   | 1.4    | 1.3   |
| Thermal Resistance<br>(with Heat Sink)                                       | K/W                      | 0.45   | 0.21  | 0.18  | 0.18   | 0.12  |
| Thermal Resistance<br>(without Heat Sink)                                    | K/W                      | 1.81   | 1.03  | 0.72  | 0.79   | 0.55  |
| Magnetic Attraction                                                          | N                        | 4240   | 8480  | 12700 | 12700  | 19100 |
| Combined Magnetic Way,<br>SGLFM2-                                            |                          | 90□□□A |       |       | 1D□□□A |       |
| Combined Serial Converter Unit,<br>JZDP-□□□□-                                |                          | 657    | 658   | 659   | 660    | 661   |
| Applicable<br>SERVOPACKs                                                     | SGD7S-                   | 5R4D   | 120D  | 170D  | 170D   | 260D  |

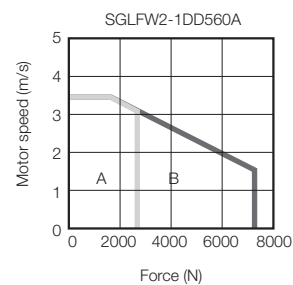
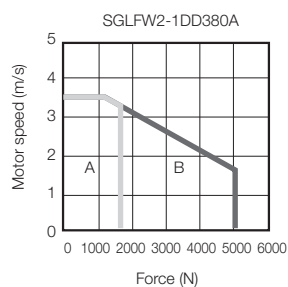
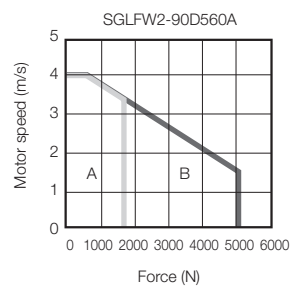
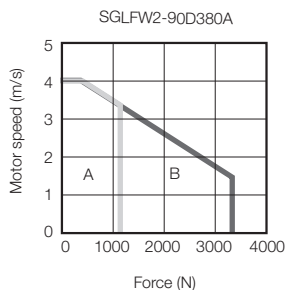
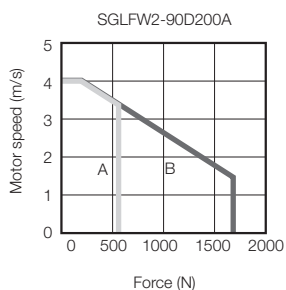
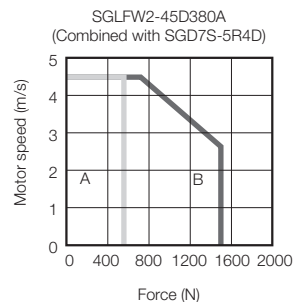
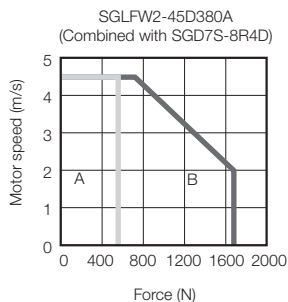
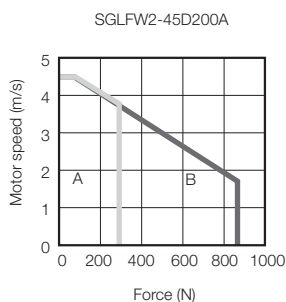
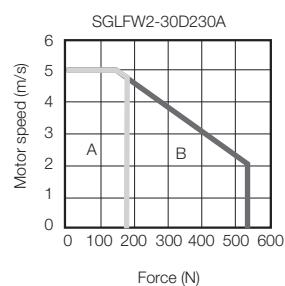
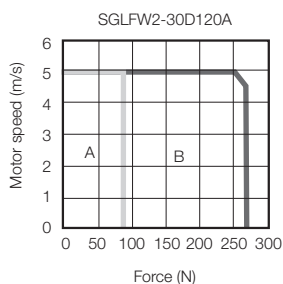
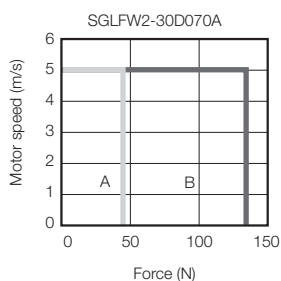
\*1. These values are for operation in combination with a SERVOPACK when the temperature of the armature winding is 100°C. The values for other items are at 20°C. These are typical values.

\*2. The rated forces are the continuous allowable force values at a surrounding air temperature of 40°C with an aluminum heat sink of the dimensions given in the following table.

- Heat Sink Dimensions
  - 400 mm × 500 mm × 25 mm: SGLFW2-90D200A
  - 609 mm × 762 mm × 40 mm: SGLFW2-90D380A
  - 900 mm × 762 mm × 40 mm: SGLFW2-90D560A and -1DD380A
  - 1,400 mm × 900 mm × 40 mm: SGLFW2-1DD560A

## Force-Motor Speed Characteristics

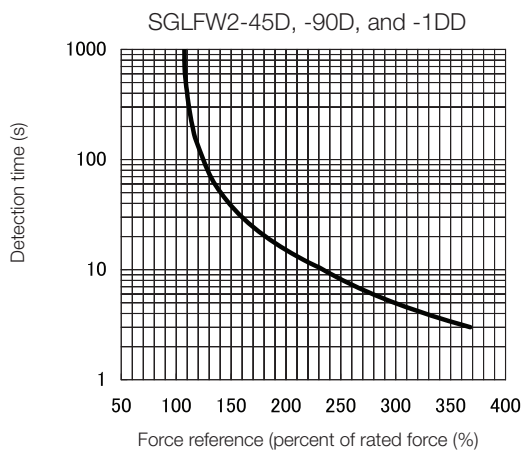
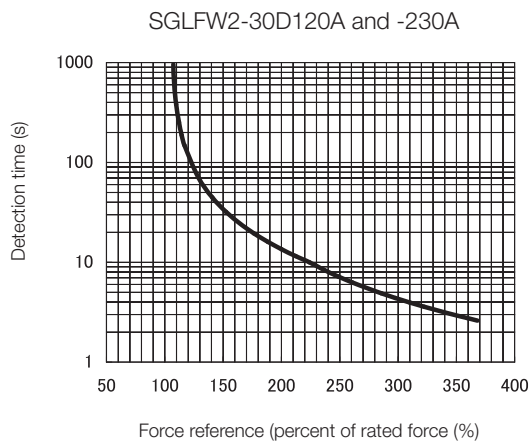
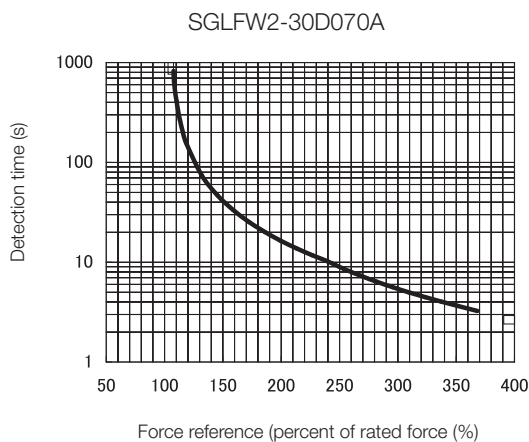
A : Continuous duty zone — (solid lines): With three-phase 400-V input  
B : Intermittent duty zone - - - (dotted lines): With single-phase 400-V input



- Note: 1. These values (typical values) are for operation in combination with a SERVOPACK when the temperature of the armature winding is 100°C.  
2. The characteristics in the intermittent duty zone depend on the power supply voltage.  
3. If the effective force is within the allowable range for the rated force, the Servomotor can be used within the intermittent duty zone.  
4. If you use a Servomotor Main Circuit Cable that exceeds 20 m, the intermittent duty zone in the torque-motor speed characteristics will become smaller because the voltage drop increases.

## Servomotor Overload Protection Characteristics

The overload detection level is set for hot start conditions with a Servomotor surrounding air temperature of 40°C.

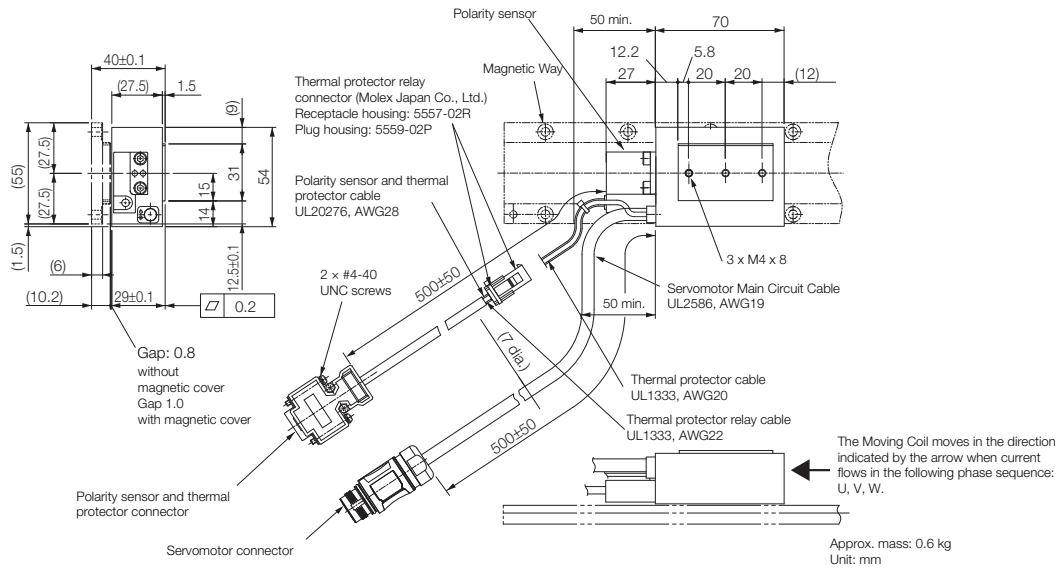


Note: The above overload protection characteristics do not mean that you can perform continuous duty operation with an output of 100% or higher. Use the Servomotor so that the effective force remains within the continuous duty zone given in Force-Motor Speed Characteristics on page 301.

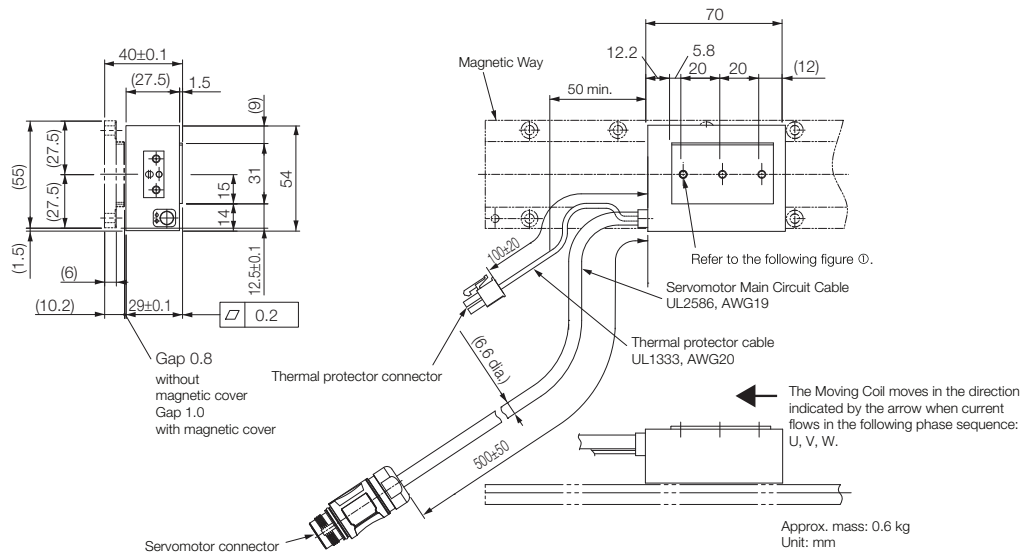
## External Dimensions

### SGLFW2-30

#### ◆ Moving Coil with Polarity Sensor: SGLFW2-30D070AS



#### ◆ Moving Coil without Polarity Sensor: SGLFW2-30D070AT



| Moving Coil Model<br>SGLFW2 | L1 | L2 | L3   | Approx Mass (kg) |
|-----------------------------|----|----|------|------------------|
| 30D070AS                    | 70 | 40 | 54.6 | 0.6              |
| 30D070AT                    |    |    |      |                  |

Refer to the following section for the connector specifications for the Sensor Cable and Servomotor Main Circuit Cable or Moving Coils with Polarity Sensors: SGLFW2-30 and -45.

Figure 1: Dimensions of the Servomotor

Dimensions (mm):

- 40±0.1
- 27.5
- 1.5
- 7
- 50
- 31
- 12.5±0.1
- 0.2
- 29±0.1
- 10.2
- 6
- 27.5
- 5.5
- 12.6
- 26.7
- 27
- 50 min.
- 33.2
- 15
- 7.5
- 8 x M4 x 8
- L1
- L2
- L3
- 50 min.

Labels:

- Thermal protector relay connector (Molex Japan Co., Ltd.)
- Receptacle housing: 5557-02R
- Plug housing: 5559-02P
- Polarity sensor and thermal protector cable UL20276, AWG28
- 2 x #4-40 UNC screws
- 500±50
- 500±50
- 50 min.
- Servomotor Main Circuit Cable UL2586, AWG19
- Thermal protector cable UL1333, AWG20
- Thermal protector relay cable UL1333, AWG22
- Polarity sensor
- Magnetic Way
- Servomotor connector
- Gap 0.8
- without magnetic cover
- Gap 1.0
- with magnetic cover
- Polarity sensor and thermal protector connector

Note: The Moving Coil moves in the direction indicated by the arrow when current flows in the following phase sequence: U, V, W.

Unit: mm

Technical drawing of the Servomotor Main Circuit Cable (UL2586, AWG19) showing dimensions and connections.

**Dimensions:**

- 40±0.1
- 27.5
- 1.5
- 7
- 50
- 12.5±0.1
- 0.2
- 29±0.1
- 10.2
- 6
- 5.5
- 12.6
- 50 min.
- 26.7
- 33.2
- 15
- 7.5
- 10±0.2

**Labels:**

- Magnetic Way
- Servomotor Main Circuit Cable UL2586, AWG19
- Thermal protector cable UL1333, AWG20
- Servomotor connector
- Thermal protector connector
- Gap 0.8 without magnetic cover
- Gap 1.0 with magnetic cover

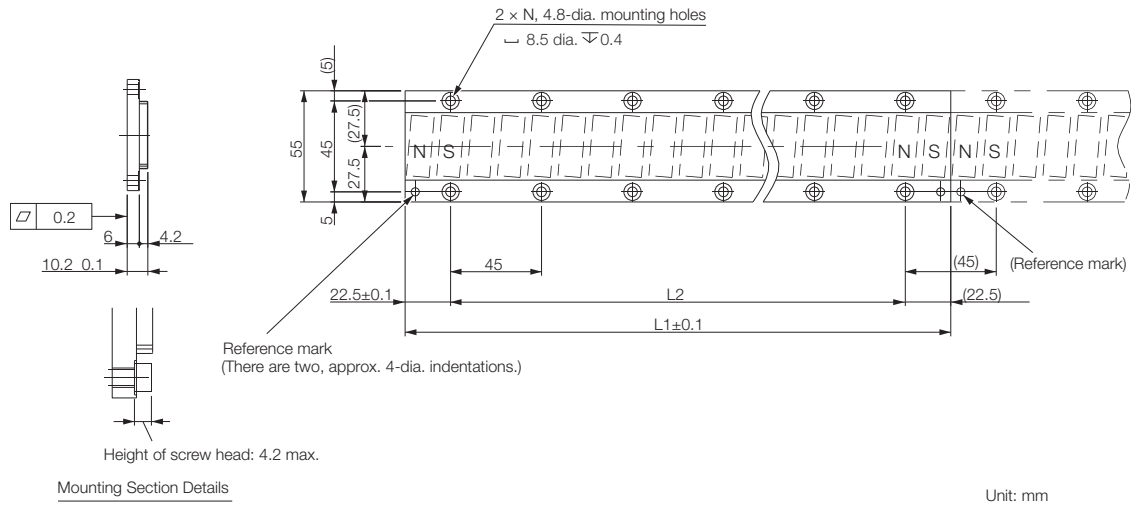
**Note:** The Moving Coil moves in the direction indicated by the arrow when current flows in the following phase sequence: U, V, W.

**Unit:** mm

Refer to the following section for the connector specifications for the Sensor Cable and Servomotor Main Circuit Cable or Moving Coils with Polarity Sensors: SGLFW2-30 and -45.



## ◆ Magnetic Ways: SGLFM2-30□□□A



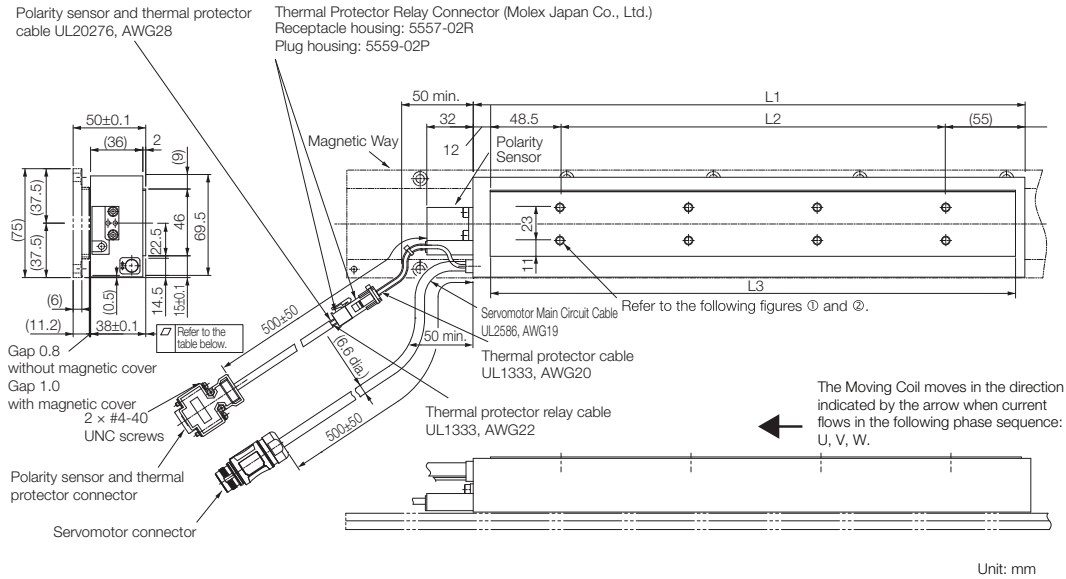
| Magnetic Way Model<br>SGLFM2 | L1  | L2            | L3 | Approx Mass (kg) |
|------------------------------|-----|---------------|----|------------------|
| 30270A                       | 270 | 225 (45 × 5)  | 6  | 0.9              |
| 30450A                       | 450 | 405 (45 × 9)  | 10 | 1.5              |
| 30630A                       | 630 | 585 (45 × 13) | 14 | 2.0              |

Note:

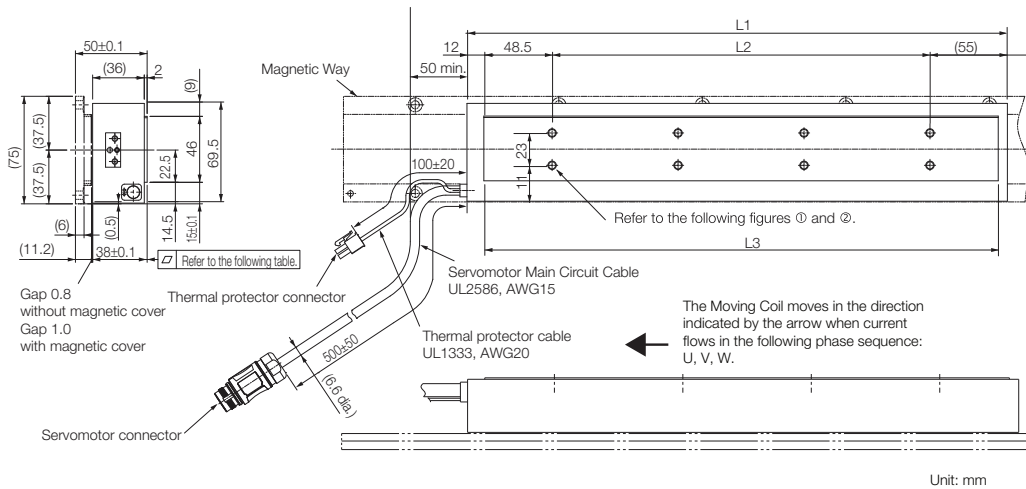
More than one Magnetic Way can be connected. Connect the Magnetic Ways so that the reference marks on them are aligned in the same direction as shown in the figure

## SGLFW2-45

### ◆ Moving Coils with Polarity Sensors: SGLFW2-45D□□□AS



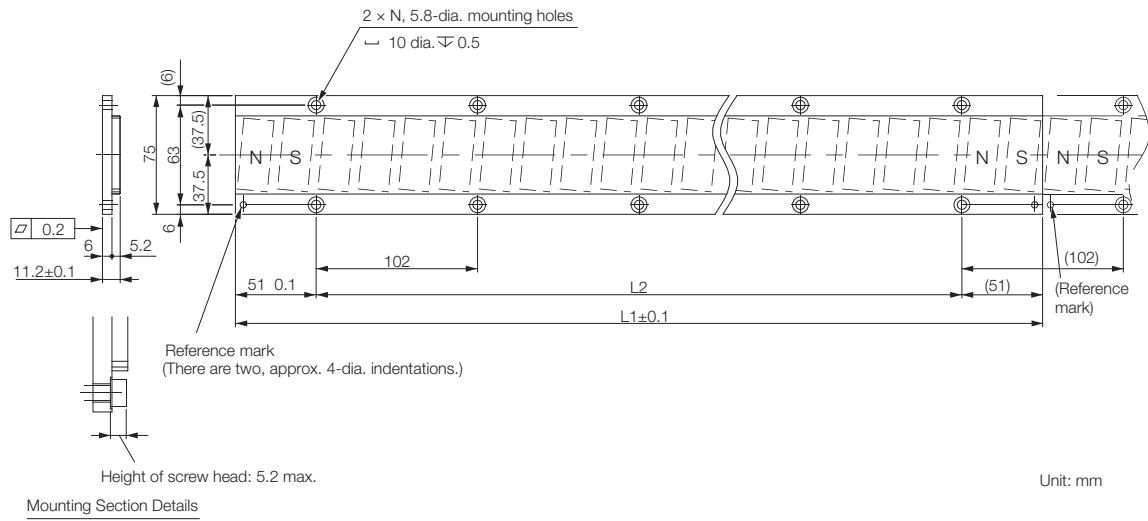
### ◆ Moving Coils without Polarity Sensors: SGLFW2-45D□□□AT



| Moving Coil Model<br>SGLFW2 | L1  | L2    | L3    | Flatness | Approx Mass (kg) |
|-----------------------------|-----|-------|-------|----------|------------------|
| 45D200AS                    | 205 | 89.5  | 187   | 0.2      | 2.9              |
| 45D380AS                    | 384 | 268.5 | 365.5 | 0.3      | 5.5              |
| 45D200AT                    | 205 | 89.5  | 187   | 0.2      | 2.9              |
| 45D380AT                    | 384 | 268.5 | 365.5 | 0.3      | 5.5              |

Refer to the following section for the connector specifications for the Sensor Cable and Servomotor Main Circuit Cable or Moving Coils with Polarity Sensors: SGLFW2-30 and -45.

# ◆ Magnetic Ways: SGLFM2-45□□□A

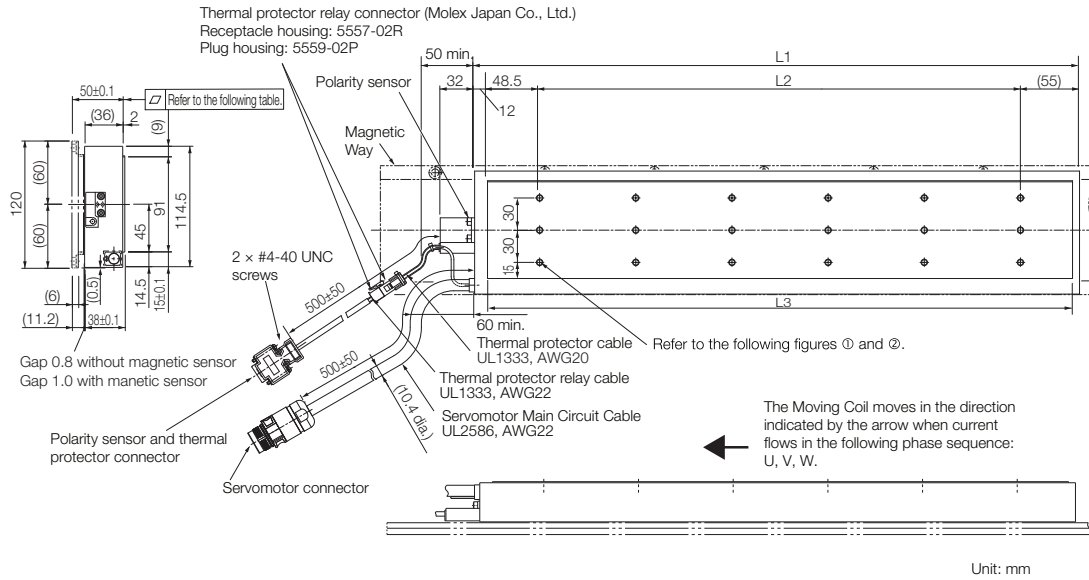


Note: More than one Magnetic Way can be connected. Connect the Magnetic Ways so that the reference marks on them are aligned in the same direction as shown in the figure.

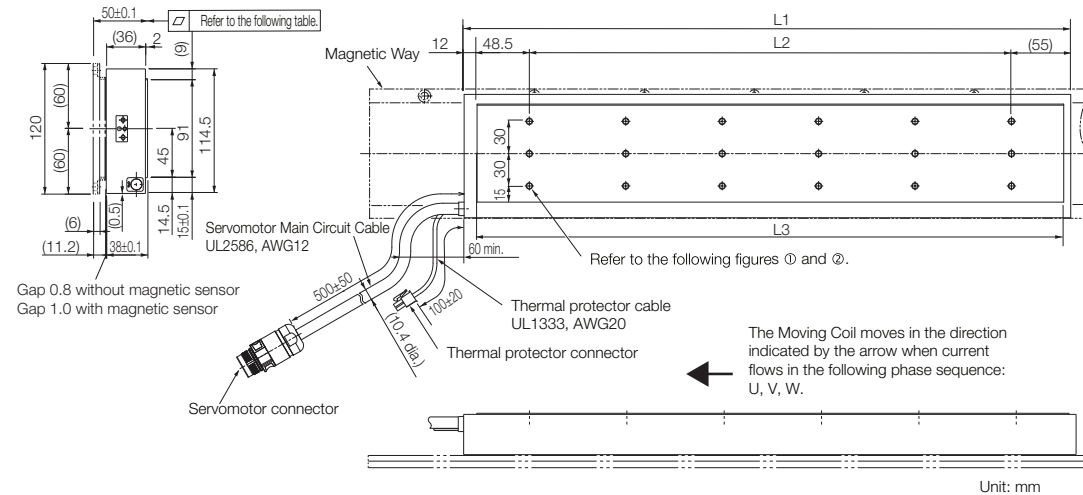
| Magnetic Way Model<br>SGLFM2- | $L1 \pm 0.1$ | $L2$          | N | Approx. Mass<br>[kg] |
|-------------------------------|--------------|---------------|---|----------------------|
| 45306A                        | 306          | 204 (102 × 2) | 3 | 1.5                  |
| 45510A                        | 510          | 408 (102 × 4) | 5 | 2.5                  |
| 45714A                        | 714          | 612 (102 × 6) | 7 | 3.4                  |

## SGLFW2-90

### ◆ Moving Coils with Polarity Sensors: SGLFW2-90D□□□AS



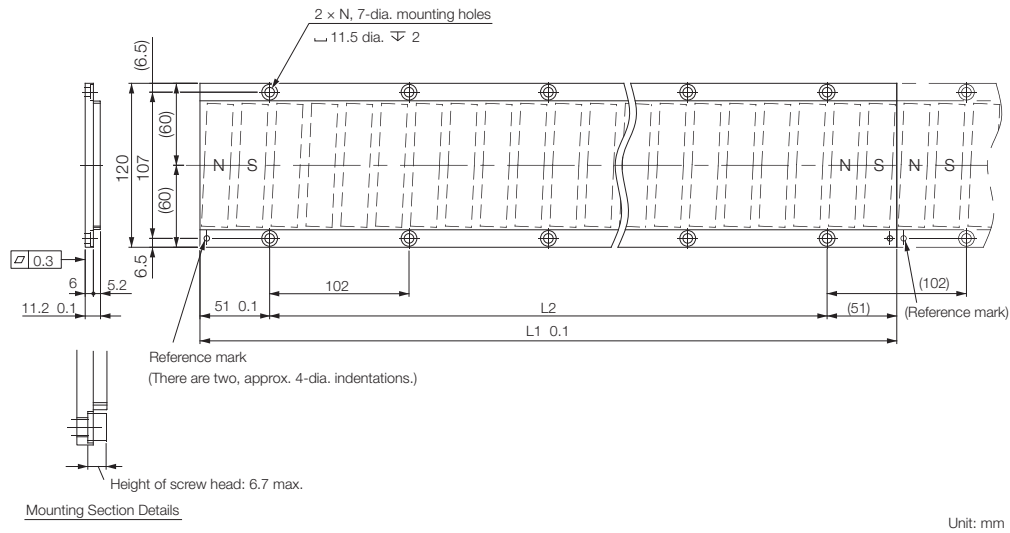
### ◆ Moving Coils without Polarity Sensors: SGLFW2-90D□□□AT



| Moving Coil Model<br>SGLFW2 | L1  | L2    | L3    | Flatness | Approx Mass (kg) |
|-----------------------------|-----|-------|-------|----------|------------------|
| 90D200AS                    | 205 | 89.5  | 187   | 0.2      | 5.3              |
| 90D380AS                    | 384 | 268.5 | 365.5 | 0.3      | 10.1             |
| 90D560AS                    | 563 | 447.5 | 544   | 0.3      | 14.9             |
| 90D200AT                    | 205 | 89.5  | 187   | 0.2      | 5.3              |
| 90D380AT                    | 384 | 268.5 | 365.5 | 0.3      | 10.1             |

Refer to the following section for the connector specifications for the Sensor Cable and Servomotor Main Circuit Cable or Moving Coils with Polarity Sensors: SGLFW2-90 and -1D.

# ◆ Magnetic Ways: SGLFM2-90□□□A

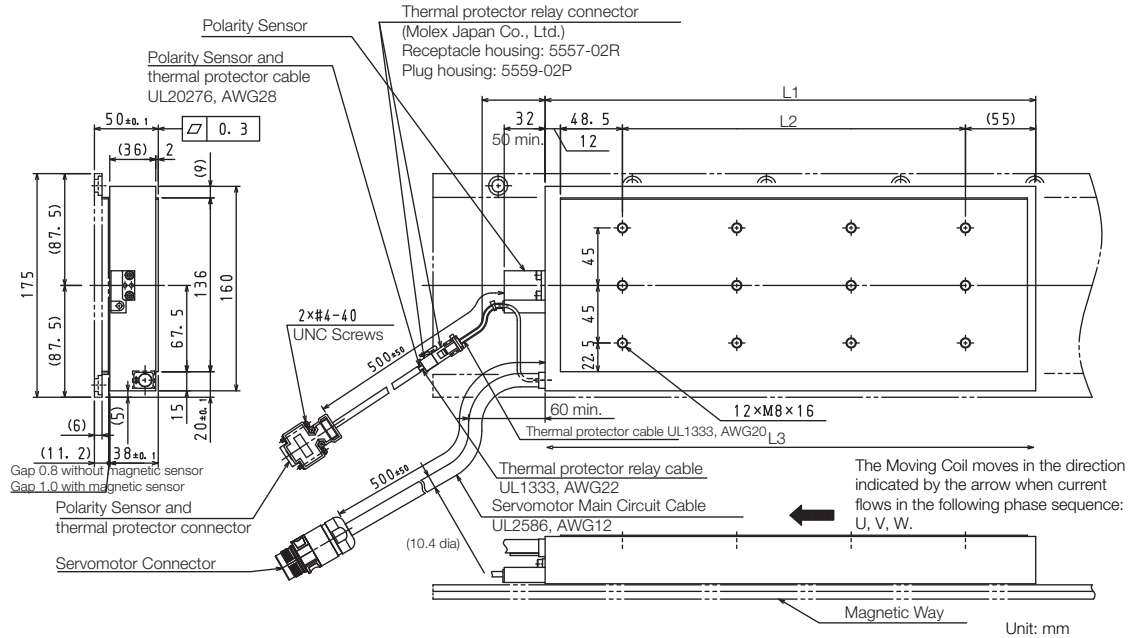


Note: More than one Magnetic Way can be connected. Connect the Magnetic Ways so that the reference marks on them are aligned in the same direction as shown in the figure.

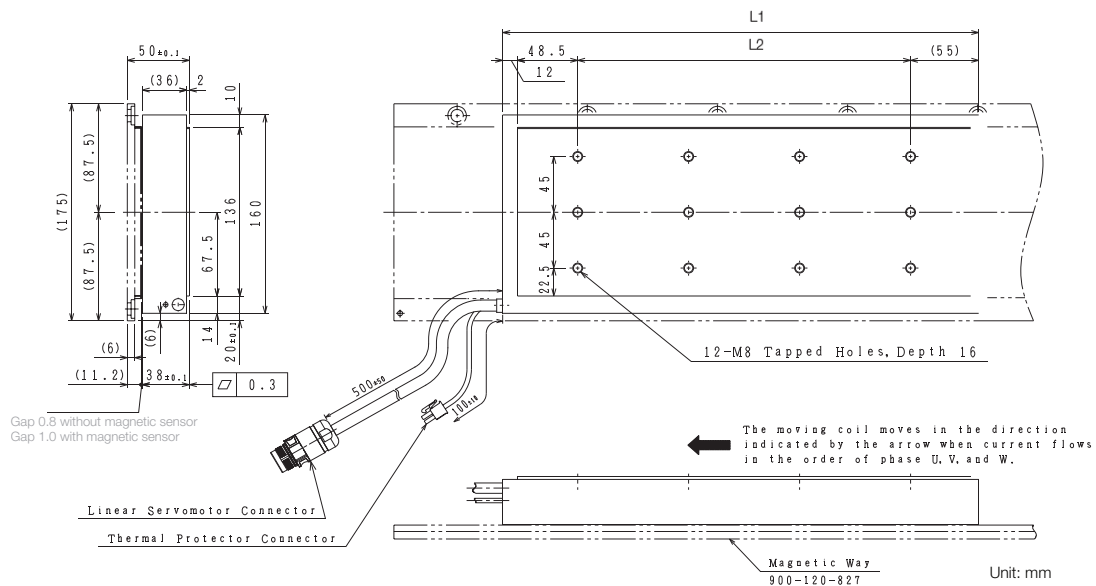
| Magnetic Way Model<br>SGLFM2- | L1 ± 0.1 | L2            | N | Approx. Mass<br>[kg] |
|-------------------------------|----------|---------------|---|----------------------|
| 90306A                        | 306      | 204 (102 × 2) | 3 | 1.5                  |
| 90510A                        | 510      | 408 (102 × 4) | 5 | 2.5                  |
| 90714A                        | 714      | 612 (102 × 6) | 7 | 3.4                  |

## SGLFW2-1D

### ◆ Moving Coils with Polarity Sensors: SGLFW2-1DD□□□AS



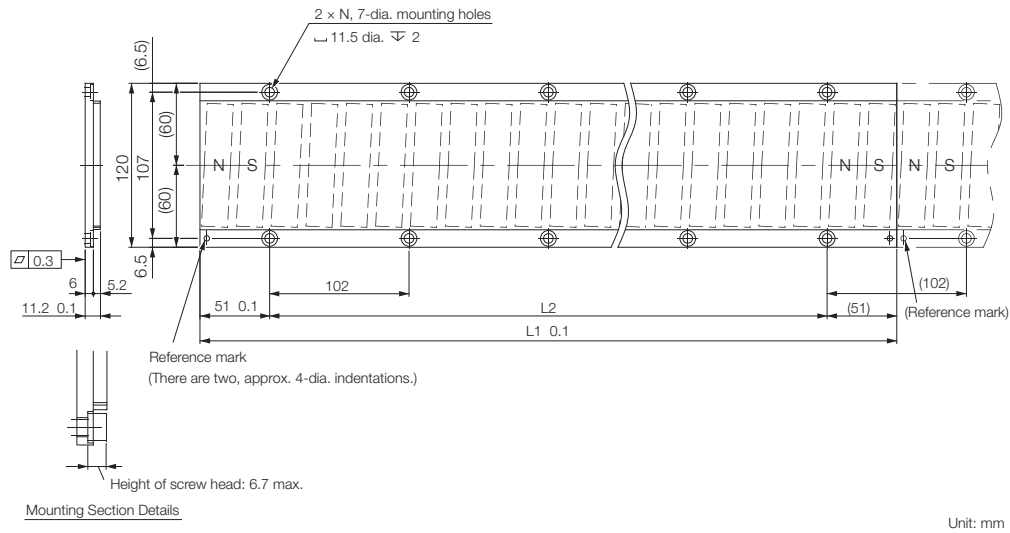
### ◆ Moving Coils without Polarity Sensors: SGLFW2-1DD□□□AT



| Moving Coil Model<br>SGLFW2 | L1  | L2    | L3    | Flatness | Approx Mass (kg) |
|-----------------------------|-----|-------|-------|----------|------------------|
| 1DD380A□                    | 384 | 268.5 | 365.5 | 0.3      | 14.6             |
| 1DD560A□                    | 563 | 447.5 | 544   | 0.3      | 21.5             |

Refer to the following section for the connector specifications for the Sensor Cable and Servomotor Main Circuit Cable or Moving Coils with Polarity Sensors: SGLFW2-90 and -1D.

# ◆ Magnetic Ways: SGLFM2-1D□□□A



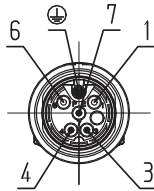
Note: More than one Magnetic Way can be connected. Connect the Magnetic Ways so that the reference marks on them are aligned in the same direction as shown in the figure.

| Magnetic Way Model<br>SGLFM2- | L1 $\pm 0.1$ | L2                   | N | Approx. Mass<br>[kg] |
|-------------------------------|--------------|----------------------|---|----------------------|
| 1D306A                        | 306          | 204 (102 $\times$ 2) | 3 | 3.7                  |
| 1D510A                        | 510          | 408 (102 $\times$ 4) | 5 | 6.2                  |
| 1D714A                        | 714          | 612 (102 $\times$ 6) | 7 | 8.6                  |

## Connector Specifications

### ◆ Moving Coils with Polarity Sensors: SGLFW2-30 and -45

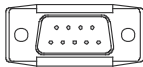
#### ■ Servomotor Connector



|        |         |
|--------|---------|
| 1      | -       |
| 3      | Phase U |
| 4      | Phase V |
| 6      | -       |
| 7      | Phase W |
| Ground | FG      |
| Case   | Shield  |

Connector: ST-5EP1N8A9003S (1607706)  
Contact: ST-10KP030 (1618261)  
From Phoenix Contact GmbH & Co. KG

#### ■ Polarity Sensor and Thermal Protector Connector



|   |                                               |   |
|---|-----------------------------------------------|---|
| 1 | +5 V (thermal protector), +5 V (power supply) |   |
| 2 | Su                                            | 6 |
| 3 | Sv                                            | 7 |
| 4 | Sw                                            | 8 |
| 5 | 0 V (power supply)                            | 9 |

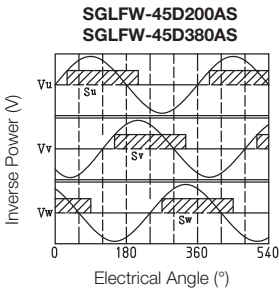
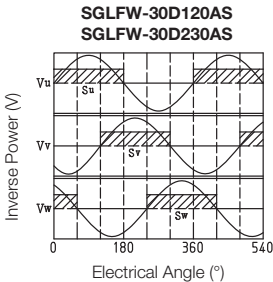
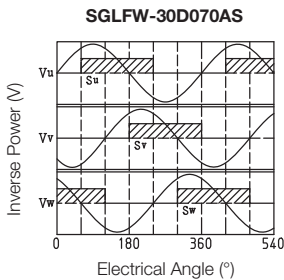
Pin connector: 17JE-23090-02 (D8C) -CG  
From DDK Ltd.

#### Mating Connector

Socket connector: 17JE-13090-02 (D8C) A-CG  
Studs: 17L-002C or 17L-002C1

#### ■ Polarity Sensor Output Signal

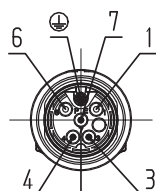
The figure on the right shows the relationship between the Su, Sv, and Sw polarity sensor output signals and the inverse power of each motor phase Vu, Vv, and Vw when the Moving Coil moves in the direction indicated by the arrow in the dimensional drawings of the Moving Coil.





## ◆ Moving Coils without Polarity Sensors: SGLFW2-30 and -45

### ■ Servomotor Connector



|        |         |
|--------|---------|
| 1      | -       |
| 3      | Phase U |
| 4      | Phase V |
| 6      | -       |
| 7      | Phase W |
| Ground | FG      |
| Case   | Shield  |

Connector: ST-5EP1N8A9003S (1607706)

Contact: ST-10KP030 (1618261)

From Phoenix Contact GmbH & Co. KG

### ■ Thermostat Connector



|   |                   |
|---|-------------------|
| 1 | Thermal protector |
| 2 | Thermal protector |

Receptacle housing: 5557-02R

Terminals: 5556T or 5556TL

From Molex Japan Co., Ltd.

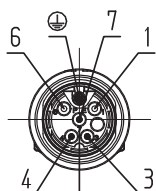
Mating Connector

Plug housing: 5559-02P

Terminals: 5558T or 5558TL

## ◆ Moving Coils with Polarity Sensors: SGLFW2-90 and -1D

### ■ Servomotor Connector



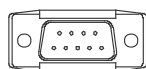
|        |         |
|--------|---------|
| 1      | Phase V |
| 3      | -       |
| 4      | -       |
| 6      | Phase U |
| 7      | Phase W |
| Ground | FG      |
| Case   | Shield  |

Connector: ST-5EP1N8A9003S (1607706)

Contact: ST-10KP030 (1618261)

From Phoenix Contact GmbH & Co. KG

### ■ Thermostat Connector



|   |                                               |   |                   |
|---|-----------------------------------------------|---|-------------------|
| 1 | +5 V (thermal protector), +5 V (power supply) |   |                   |
| 2 | Su                                            | 6 | Not used          |
| 3 | Sv                                            | 7 |                   |
| 4 | Sw                                            | 8 |                   |
| 5 | 0 V (power supply)                            | 9 | Thermal protector |

Pin connector: 17JE-23090-02 (D8C) -CG

From DDK Ltd.

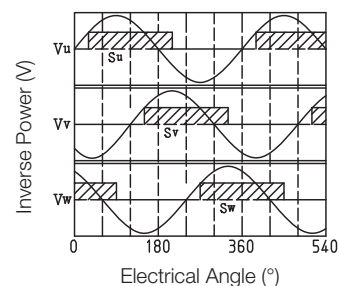
#### Mating Connector

Socket connector: 17JE-13090-02 (D8C) A-CG

Studs: 17L-002C or 17L-002C1

### ■ Polarity Sensor Output Signal

The figure on the right shows the relationship between the Su, Sv, and Sw polarity sensor output signals and the inverse power of each motor phase Vu, Vv, and Vw when the Moving Coil moves in the direction indicated by the arrow in the dimensional drawings of the Moving Coil.



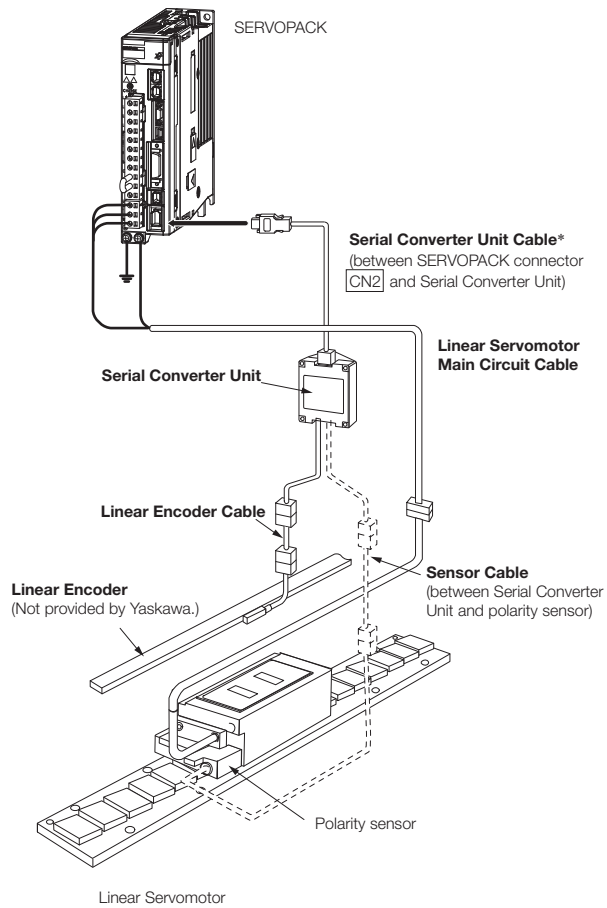
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# Selecting Cables

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## ◆ Cable Configurations

To select a Linear Encoder, use Recommended Linear Encoders and Cables (pages 404). Prepare the cable required for the encoder.



\* You can connect directly to an absolute linear encoder.

Note: Refer to the following manual for the following information.

- Cable dimensional drawings and cable connection specifications
- Order numbers and specifications of individual connectors for cables
- Order numbers and specifications for wiring materials

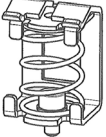


Σ-7-Series AC Servo Drive Peripheral Device Selection Manual (Manual No.: SIEP S800001 32)

## ◆ Linear Servomotor Main Circuit Cables

| Linear Servomotor Model              | Cable & Connector Type                                               | Length (L) | Order Number        | Appearance                                                                          |
|--------------------------------------|----------------------------------------------------------------------|------------|---------------------|-------------------------------------------------------------------------------------|
| SGLFW2-30D070<br>to<br>SGLFW2-45D380 | Flexible Power cable<br>4 x 1.5mm <sup>2</sup> with<br>M17 connector | 3 m        | JZSP-C7M143-03-E-G6 |  |
|                                      |                                                                      | 5 m        | JZSP-C7M143-05-E-G6 |                                                                                     |
|                                      |                                                                      | 10 m       | JZSP-C7M143-10-E-G6 |                                                                                     |
|                                      |                                                                      | 15 m       | JZSP-C7M143-15-E-G6 |                                                                                     |
|                                      |                                                                      | 20 m       | JZSP-C7M143-20-E-G6 |                                                                                     |
| SGLFW2-90D200<br>to<br>SGLFW2-1DD380 | Flexible Power cable<br>4 x 2.5mm <sup>2</sup> with<br>M23 connector | 3 m        | JZSP-C7M154-03-E-G6 |                                                                                     |
|                                      |                                                                      | 5 m        | JZSP-C7M154-05-E-G6 |                                                                                     |
|                                      |                                                                      | 10 m       | JZSP-C7M154-10-E-G6 |                                                                                     |
|                                      |                                                                      | 15 m       | JZSP-C7M154-15-E-G6 |                                                                                     |
|                                      |                                                                      | 20 m       | JZSP-C7M154-20-E-G6 |                                                                                     |
| SGLFW2-1DD560                        | Flexible Power cable<br>4 x 4mm <sup>2</sup> with M23<br>connector   | 3 m        | JZSP-C7M164-03-E-G6 |                                                                                     |
|                                      |                                                                      | 5 m        | JZSP-C7M164-05-E-G6 |                                                                                     |
|                                      |                                                                      | 10 m       | JZSP-C7M164-10-E-G6 |                                                                                     |
|                                      |                                                                      | 15 m       | JZSP-C7M164-15-E-G6 |                                                                                     |
|                                      |                                                                      | 20 m       | JZSP-C7M164-20-E-G6 |                                                                                     |

## ◆ Motor Connection Shielding Clamp

| SERVOPACK Model                      | Order Number     | Appearance                                                                           |
|--------------------------------------|------------------|--------------------------------------------------------------------------------------|
| Sigma-7 400V up to 3.0kW             | KLBLUE 4-13.5_SC |  |
| Sigma-7 400V<br>from 5kW up to 7.5kW | KLBLUE 10-20_SC  |                                                                                      |
| Sigma-7 400V<br>for 11kW & 15kW      | KLBLUE 15-32_SC  |                                                                                      |

Note: Reference PN.Sigma-7-03 for the shielding clamp installation and quick start guide.

## SGLG (Coreless Models)

## Model Designations

## Moving Coil



1st digit Servo Motor Type

| Code | Specification  |
|------|----------------|
| G    | Coreless model |

5th digit Power Supply Voltage

| Code | Specification |
|------|---------------|
| A    | 200 VAC       |

10th digit Sensor Specification and Cooling Method

| Code | Specifications  |                | Applicable Models         |
|------|-----------------|----------------|---------------------------|
|      | Polarity Sensor | Cooling Method |                           |
| None | None            | Self-cooled    | All models                |
| C    | None            | Air-cooled     | SGLGW<br>-40A, -60A, -90A |
| H    | Yes             | Air-cooled     |                           |
| P    | Yes             | Self-cooled    | All models                |

2nd digit Moving Coil/Magnetic Way

| Code | Specification |
|------|---------------|
| W    | Moving Coil   |

6th+7th+8th digits Length of Moving Coil

| Code | Specification |
|------|---------------|
| 050  | 50 mm         |
| 080  | 80 mm         |
| 140  | 140 mm        |
| 200  | 199 mm        |
| 253  | 252.5 mm      |
| 365  | 365 mm        |
| 370  | 367 mm        |
| 535  | 535 mm        |

3rd+4th digits Magnet Height

| Code | Specification |
|------|---------------|
| 30   | 30 mm         |
| 40   | 40 mm         |
| 60   | 60 mm         |
| 90   | 86 mm         |

11th digit Connector for Servo Motor Main Circuit Cable

| Code | Specification                              | Applicable Models         |
|------|--------------------------------------------|---------------------------|
| None | Connector from Tyco Electronics Japan G.K. | All models                |
| D    | Connector from Interconnectron GmbH        | SGLGW<br>-30A, -40A, -60A |

9th digit Design Revision Order

A, B...

■ Non Stock Items

Note: This information is provided to explain model numbers. It is not meant to imply that models are available for all combinations of codes.

## Magnetic Way



1st digit Servo Motor Type

(Same as for the Moving Coil.)

5th+6th+7th digits Length of Magnetic Way

| Code | Specification |
|------|---------------|
| 090  | 90 mm         |
| 108  | 108 mm        |
| 216  | 216 mm        |
| 225  | 225 mm        |
| 252  | 252 mm        |
| 360  | 360 mm        |
| 405  | 405 mm        |
| 432  | 432 mm        |
| 450  | 450 mm        |
| 504  | 504 mm        |

9th digit Options

| Code | Specification  | Applicable Models |
|------|----------------|-------------------|
| None | Standard-force | All models        |
| -M   | High-force     | SGLGM-40, -60     |

2nd digit Moving Coil/Magnetic Way

| Code | Specification |
|------|---------------|
| M    | Magnetic Way  |

3rd+4th digits Magnet Height

(Same as for the Moving Coil.)

■ Non Stock Items

8th digit Design Revision Order

A, B, C\*...

\* The SGLGM-40 and SGLGM-60 also have a CT code.

- C = Without mounting holes on the bottom
- CT = With mounting holes on the bottom

Note: This information is provided to explain model numbers. It is not meant to imply that models are available for all combinations of codes.

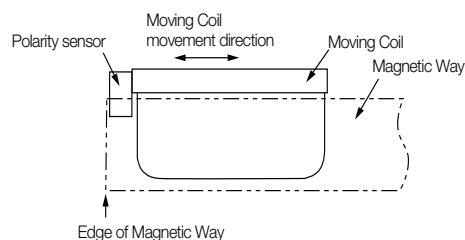
## Precautions on Moving Coils with Polarity Sensors



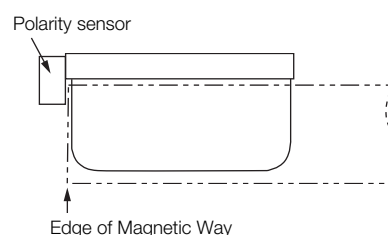
Note

When you use a Moving Coil with a Polarity Sensor, the Magnetic Way must cover the bottom of the polarity sensor. Refer to the example that shows the correct installation. When determining the length of the Moving Coil's stroke or the length of the Magnetic Way, consider the total length (L) of the Moving Coil and the polarity sensor. Refer to the following table.

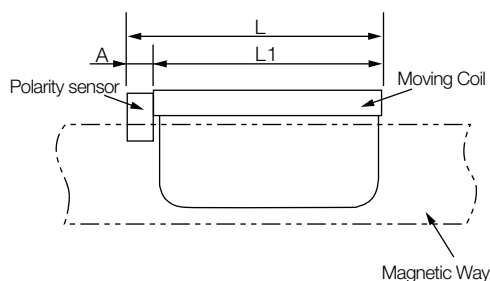
### Correct Installation



### Incorrect Installation



### ◆ Total Length of Moving Coil with Polarity Sensor



| Moving Coil Model<br>SGLGW- | Length of Moving Coil,<br>L1 [mm] | Length of Polarity Sensor,<br>A [mm]     | Total Length, L [mm] |
|-----------------------------|-----------------------------------|------------------------------------------|----------------------|
| 30A050□ P□                  | 50                                | 0                                        | 50                   |
| 30A080□ P□                  | 80                                | (Included in the length of Moving Coil.) | 80                   |
| 40A140□ H□<br>40A140□ P□    | 140                               | 16                                       | 156                  |
| 40A253□ H□<br>40A253□ P□    | 252.5                             |                                          | 268.5                |
| 40A365□ H□<br>40A365□ P□    | 365                               |                                          | 381                  |
| 60A140□ H□<br>60A140□ P□    | 140                               | 16                                       | 156                  |
| 60A253□ H□<br>60A253□ P□    | 252.5                             |                                          | 268.5                |
| 60A365□ H□<br>60A365□ P□    | 365                               |                                          | 381                  |
| 90A200□ H□<br>90A200□ P□    | 199                               | 0                                        | 199                  |
| 90A370□ H□<br>90A370□ P□    | 367                               |                                          | 367                  |
| 90A535□ H□<br>90A535□ P□    | 535                               |                                          | 535                  |
|                             |                                   |                                          |                      |

## Specifications and Ratings

### Specifications: With Standard-Force Magnetic Way

| Linear Servo Motor<br>Moving Coil Model<br>SGLGW- |                                     | 30A                                                                                                                                                                                                                                                                                                                                          |      | 40A  |      |      | 60A  |      |      | 90A  |      |      |
|---------------------------------------------------|-------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------|------|------|------|------|------|------|------|------|------|
|                                                   |                                     | 050C                                                                                                                                                                                                                                                                                                                                         | 080C | 140C | 253C | 365C | 140C | 253C | 365C | 200C | 370C | 535C |
| Time Rating                                       |                                     | Continuous                                                                                                                                                                                                                                                                                                                                   |      |      |      |      |      |      |      |      |      |      |
| Thermal Class                                     |                                     | B                                                                                                                                                                                                                                                                                                                                            |      |      |      |      |      |      |      |      |      |      |
| Insulation Resistance                             |                                     | 500 VDC, 10 M $\Omega$ min.                                                                                                                                                                                                                                                                                                                  |      |      |      |      |      |      |      |      |      |      |
| Withstand Voltage                                 |                                     | 1,500 VAC for 1 minute                                                                                                                                                                                                                                                                                                                       |      |      |      |      |      |      |      |      |      |      |
| Excitation                                        |                                     | Permanent magnet                                                                                                                                                                                                                                                                                                                             |      |      |      |      |      |      |      |      |      |      |
| Cooling Method                                    |                                     | Self-cooled or air-cooled<br>(Only self-cooled models are available for the SGLGW-30A.)                                                                                                                                                                                                                                                      |      |      |      |      |      |      |      |      |      |      |
| Protective Structure                              |                                     | IP00                                                                                                                                                                                                                                                                                                                                         |      |      |      |      |      |      |      |      |      |      |
| Environmental<br>Condi-<br>tions                  | Surrounding<br>Air Tempera-<br>ture | 0°C to 40°C (with no freezing)                                                                                                                                                                                                                                                                                                               |      |      |      |      |      |      |      |      |      |      |
|                                                   | Surrounding<br>Air Humidity         | 20% to 80% relative humidity (with no condensation)                                                                                                                                                                                                                                                                                          |      |      |      |      |      |      |      |      |      |      |
|                                                   | Installation<br>Site                | <ul style="list-style-type: none"> <li>• Must be indoors and free of corrosive and explosive gases.</li> <li>• Must be well-ventilated and free of dust and moisture.</li> <li>• Must facilitate inspection and cleaning.</li> <li>• Must have an altitude of 1,000 m or less.</li> <li>• Must be free of strong magnetic fields.</li> </ul> |      |      |      |      |      |      |      |      |      |      |
| Shock<br>Resis-<br>tance                          | Impact Accel-<br>eration Rate       | 196 m/s <sup>2</sup>                                                                                                                                                                                                                                                                                                                         |      |      |      |      |      |      |      |      |      |      |
|                                                   | Number of<br>Impacts                | 2 times                                                                                                                                                                                                                                                                                                                                      |      |      |      |      |      |      |      |      |      |      |
| Vibration<br>Resis-<br>tance                      | Vibration<br>Acceleration<br>Rate   | 49 m/s <sup>2</sup> (the vibration resistance in three directions, vertical, side-to-side, and front-to-back)                                                                                                                                                                                                                                |      |      |      |      |      |      |      |      |      |      |

## Ratings: With Standard-Force Magnetic Way

| Linear Servo Motor<br>Moving Coil Model<br>SGLGW-                      |                  | 30A       |      | 40A        |      |      | 60A        |      |      | 90A       |      |      |
|------------------------------------------------------------------------|------------------|-----------|------|------------|------|------|------------|------|------|-----------|------|------|
|                                                                        |                  | 050C      | 080C | 140C       | 253C | 365C | 140C       | 253C | 365C | 200C      | 370C | 535C |
| Rated Motor Speed (Reference Speed during Speed Control)* <sup>1</sup> | m/s              | 1.5       | 1.5  | 2.0        | 2.0  | 2.0  | 2.3        | 2.3  | 2.3  | 1.8       | 1.5  | 1.5  |
| Maximum Speed* <sup>1</sup>                                            | m/s              | 5.0       | 5.0  | 5.0        | 5.0  | 5.0  | 4.8        | 4.8  | 4.8  | 4.0       | 4.0  | 4.0  |
| Rated Force* <sup>1</sup> , * <sup>2</sup>                             | N                | 12.5      | 25   | 47         | 93   | 140  | 70         | 140  | 210  | 325       | 550  | 750  |
| Maximum Force* <sup>1</sup>                                            | N                | 40        | 80   | 140        | 280  | 420  | 220        | 440  | 660  | 1300      | 2200 | 3000 |
| Rated Current* <sup>1</sup>                                            | Arms             | 0.51      | 0.79 | 0.80       | 1.6  | 2.4  | 1.2        | 2.2  | 3.3  | 4.4       | 7.5  | 10.2 |
| Maximum Current* <sup>1</sup>                                          | Arms             | 1.6       | 2.5  | 2.4        | 4.9  | 7.3  | 3.5        | 7.0  | 10.5 | 17.6      | 30.0 | 40.8 |
| Moving Coil Mass                                                       | kg               | 0.10      | 0.15 | 0.34       | 0.60 | 0.87 | 0.42       | 0.76 | 1.1  | 2.2       | 3.6  | 4.9  |
| Force Constant                                                         | N/Arms           | 26.4      | 33.9 | 61.5       | 61.5 | 61.5 | 66.6       | 66.6 | 66.6 | 78.0      | 78.0 | 78.0 |
| BEMF Constant                                                          | Vrms/(m/s)/phase | 8.80      | 11.3 | 20.5       | 20.5 | 20.5 | 22.2       | 22.2 | 22.2 | 26.0      | 26.0 | 26.0 |
| Motor Constant                                                         | N/√W             | 3.66      | 5.63 | 7.79       | 11.0 | 13.5 | 11.1       | 15.7 | 19.2 | 26.0      | 36.8 | 45.0 |
| Electrical Time Constant                                               | ms               | 0.19      | 0.41 | 0.43       | 0.43 | 0.43 | 0.45       | 0.45 | 0.45 | 1.4       | 1.4  | 1.4  |
| Mechanical Time Constant                                               | ms               | 7.5       | 4.7  | 5.6        | 5.0  | 4.8  | 3.4        | 3.1  | 3.0  | 3.3       | 2.7  | 2.4  |
| Thermal Resistance (with Heat Sink)                                    | K/W              | 5.19      | 3.11 | 1.67       | 0.87 | 0.58 | 1.56       | 0.77 | 0.51 | 0.39      | 0.26 | 0.22 |
| Thermal Resistance (without Heat Sink)                                 | K/W              | 8.13      | 6.32 | 3.02       | 1.80 | 1.23 | 2.59       | 1.48 | 1.15 | 1.09      | 0.63 | 0.47 |
| Magnetic Attraction                                                    | N                | 0         | 0    | 0          | 0    | 0    | 0          | 0    | 0    | 0         | 0    | 0    |
| Combined Magnetic Way, SGLGM-                                          |                  | 30□ □ □ A |      | 40□ □ □ C□ |      |      | 60□ □ □ C□ |      |      | 90□ □ □ A |      |      |
| Combined Serial Converter Unit, JZDP-□ □ □ □                           |                  | 250       | 251  | 252        | 253  | 254  | 258        | 259  | 260  | 264       | 265  | 266  |
| Applicable SERVOPACKs                                                  | SGD7S-           | R70A      | R90A | R90A       | 1R6A | 2R8A | 1R6A       | 2R8A | 5R5A | 120A      | 180A | 200A |
|                                                                        | SGD7W-           | 1R6A      | 1R6A | 1R6A       | 1R6A | 2R8A | 1R6A       | 2R8A | 5R5A | —         | —    | —    |

\*1. These values are for operation in combination with a SERVOPACK when the temperature of the armature winding is 100°C. The values for other items are at 20°C. These are typical values.

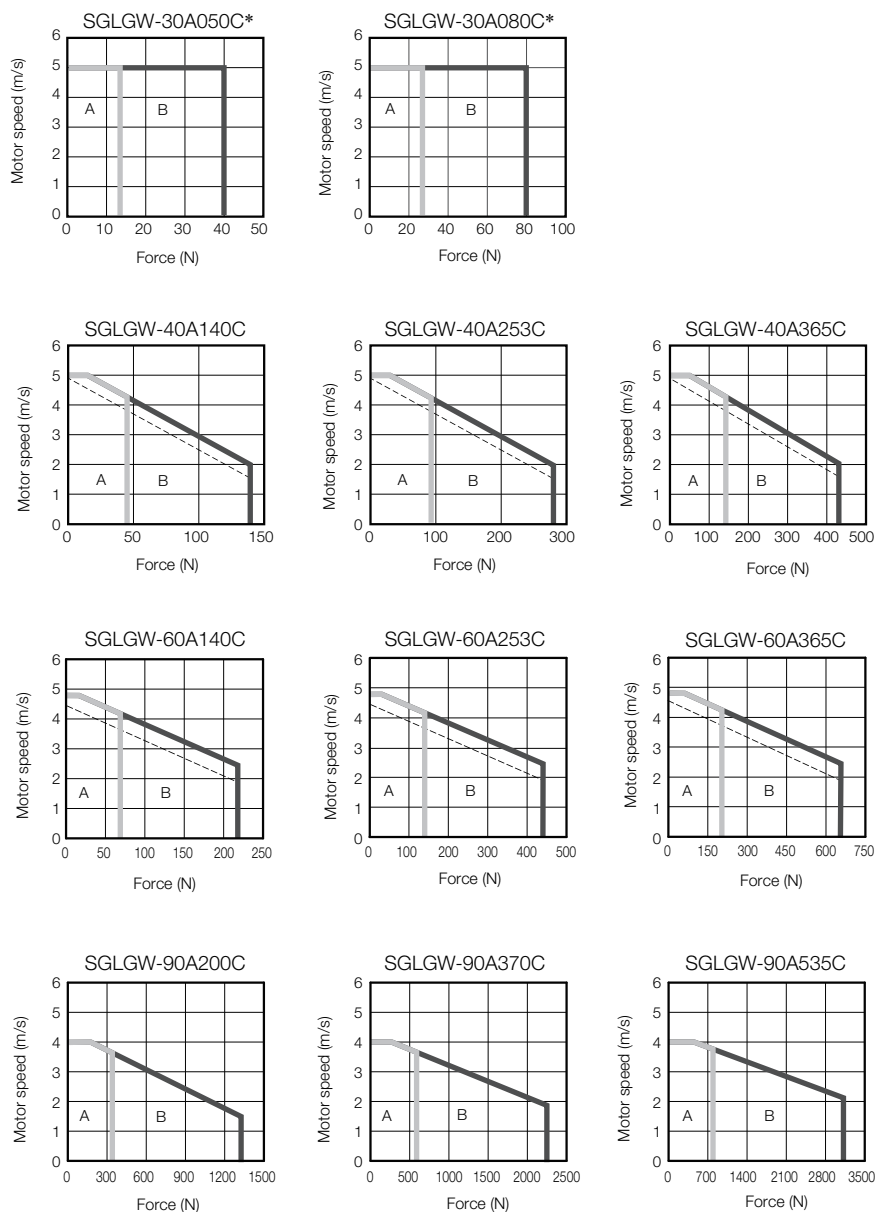
\*2. The rated forces are the continuous allowable force values at a surrounding air temperature of 40°C with an aluminum heat sink of the dimensions given in the following table.

• Heat Sink Dimensions

- 200 mm × 300 mm × 12 mm: SGLGW-30A050C, -30A080C, -40A140C, and -60A140C
- 300 mm × 400 mm × 12 mm: SGLGW-40A253C and -60A253C
- 400 mm × 500 mm × 12 mm: SGLGW-40A365C and -60A365C
- 800 mm × 900 mm × 12 mm: SGLGW-90A200C, -90A370C, and -90A535C

## Force-Motor Speed Characteristics

A : Continuous duty zone ——— (solid lines): With three-phase 200-V input  
B : Intermittent duty zone - - - - - (dotted lines): With single-phase 200-V input



\* The characteristics are the same for three-phase 200 V and single-phase 200 V.

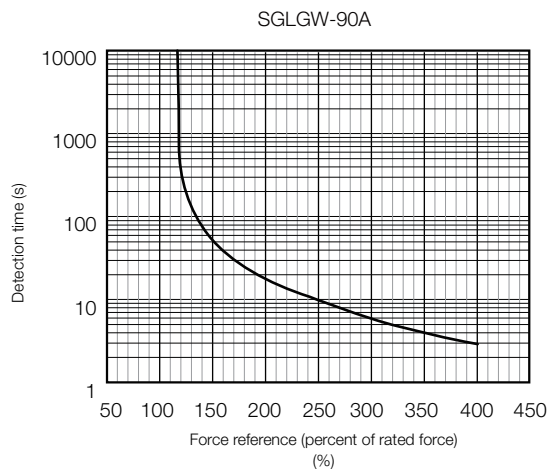
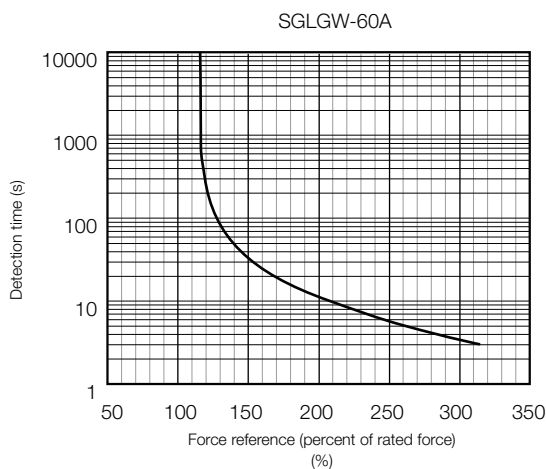
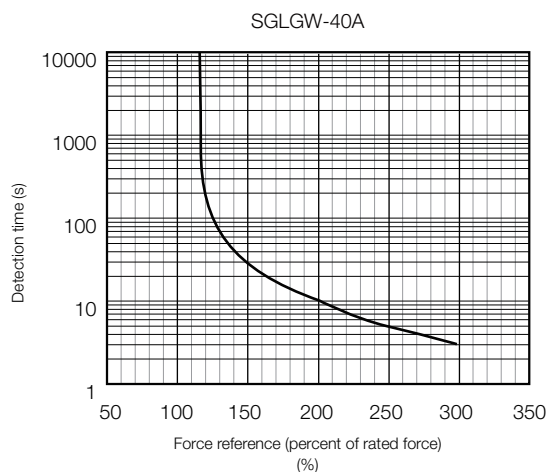
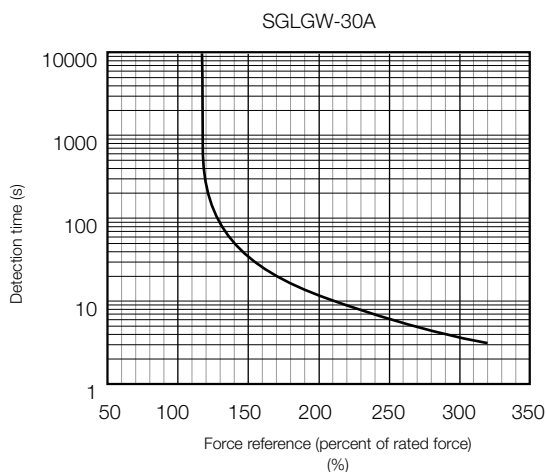
Note: 1. These values are for operation in combination with a SERVOPACK when the temperature of the armature winding is 100°C. These are typical values.

2. The characteristics in the intermittent duty zone depend on the power supply voltage.
3. If the effective force is within the allowable range for the rated force, the Servo Motor can be used within the intermittent duty zone.
4. If you use a Servo Motor Main Circuit Cable that exceeds 20 m, the intermittent duty zone in the torque-motor speed characteristics will become smaller because the voltage drop increases.



## Servo Motor Overload Protection Characteristics

The overload detection level is set for hot start conditions with a Servo Motor surrounding air temperature of 40°C.



Note: The above overload protection characteristics do not mean that you can perform continuous duty operation with an output of 100% or higher. Use the Servo Motor so that the effective force remains within the continuous duty zone given in *Force-Motor Speed Characteristics* on page 348.

## Specifications: With High-Force Magnetic Way

| Linear Servo Motor Moving Coil Model<br>SGLGW- |                             | 40A                                                                                                                                                                                                                                                                                                                                          |      |      | 60A  |      |      |
|------------------------------------------------|-----------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------|------|------|------|------|
|                                                |                             | 140C                                                                                                                                                                                                                                                                                                                                         | 253C | 365C | 140C | 253C | 365C |
| Time Rating                                    |                             | Continuous                                                                                                                                                                                                                                                                                                                                   |      |      |      |      |      |
| Thermal Class                                  |                             | B                                                                                                                                                                                                                                                                                                                                            |      |      |      |      |      |
| Insulation Resistance                          |                             | 500 VDC, 10 M $\Omega$ min.                                                                                                                                                                                                                                                                                                                  |      |      |      |      |      |
| Withstand Voltage                              |                             | 1,500 VAC for 1 minute                                                                                                                                                                                                                                                                                                                       |      |      |      |      |      |
| Excitation                                     |                             | Permanent magnet                                                                                                                                                                                                                                                                                                                             |      |      |      |      |      |
| Cooling Method                                 |                             | Self-cooled or air-cooled                                                                                                                                                                                                                                                                                                                    |      |      |      |      |      |
| Protective Structure                           |                             | IP00                                                                                                                                                                                                                                                                                                                                         |      |      |      |      |      |
| Environmental<br>Conditions                    | Surrounding Air Temperature | 0°C to 40°C (with no freezing)                                                                                                                                                                                                                                                                                                               |      |      |      |      |      |
|                                                | Surrounding Air Humidity    | 20% to 80% relative humidity (with no condensation)                                                                                                                                                                                                                                                                                          |      |      |      |      |      |
|                                                | Installation Site           | <ul style="list-style-type: none"> <li>• Must be indoors and free of corrosive and explosive gases.</li> <li>• Must be well-ventilated and free of dust and moisture.</li> <li>• Must facilitate inspection and cleaning.</li> <li>• Must have an altitude of 1,000 m or less.</li> <li>• Must be free of strong magnetic fields.</li> </ul> |      |      |      |      |      |
| Shock<br>Resistance                            | Impact Acceleration Rate    | 196 m/s <sup>2</sup>                                                                                                                                                                                                                                                                                                                         |      |      |      |      |      |
|                                                | Number of Impacts           | 2 times                                                                                                                                                                                                                                                                                                                                      |      |      |      |      |      |
| Vibration<br>Resistance                        | Vibration Acceleration Rate | 49 m/s <sup>2</sup> (the vibration resistance in three directions, vertical, side-to-side, and front-to-back)                                                                                                                                                                                                                                |      |      |      |      |      |

## Ratings: With High-Force Magnetic Way

| Linear Servo Motor Moving Coil Model<br>SGLGW-             |                      | 40A      |      |      | 60A      |      |      |
|------------------------------------------------------------|----------------------|----------|------|------|----------|------|------|
|                                                            |                      | 140C     | 253C | 365C | 140C     | 253C | 365C |
| Rated Motor Speed (Reference Speed during Speed Control)*1 | m/s                  | 1.0      | 1.0  | 1.0  | 1.0      | 1.0  | 1.0  |
| Maximum Speed*1                                            | m/s                  | 4.2      | 4.2  | 4.2  | 4.2      | 4.2  | 4.2  |
| Rated Force*1, *2                                          | N                    | 57       | 114  | 171  | 85       | 170  | 255  |
| Maximum Force*1                                            | N                    | 230      | 460  | 690  | 360      | 720  | 1080 |
| Rated Current*1                                            | Arms                 | 0.80     | 1.6  | 2.4  | 1.2      | 2.2  | 3.3  |
| Maximum Current*1                                          | Arms                 | 3.2      | 6.5  | 9.7  | 5.0      | 10.0 | 14.9 |
| Moving Coil Mass                                           | kg                   | 0.34     | 0.60 | 0.87 | 0.42     | 0.76 | 1.1  |
| Force Constant                                             | N/Arms               | 76.0     | 76.0 | 76.0 | 77.4     | 77.4 | 77.4 |
| BEMF Constant                                              | Vrms/(m/s)/<br>phase | 25.3     | 25.3 | 25.3 | 25.8     | 25.8 | 25.8 |
| Motor Constant                                             | N/√W                 | 9.62     | 13.6 | 16.7 | 12.9     | 18.2 | 22.3 |
| Electrical Time Constant                                   | ms                   | 0.43     | 0.43 | 0.43 | 0.45     | 0.45 | 0.45 |
| Mechanical Time Constant                                   | ms                   | 3.7      | 3.2  | 3.1  | 2.5      | 2.3  | 2.2  |
| Thermal Resistance (with Heat Sink)                        | K/W                  | 1.67     | 0.87 | 0.58 | 1.56     | 0.77 | 0.51 |
| Thermal Resistance (without Heat Sink)                     | K/W                  | 3.02     | 1.80 | 1.23 | 2.59     | 1.48 | 1.15 |
| Magnetic Attraction                                        | N                    | 0        | 0    | 0    | 0        | 0    | 0    |
| Combined Magnetic Way, SGLGM-                              |                      | 40□□□□-M |      |      | 60□□□□-M |      |      |
| Combined Serial Converter Unit, JZDP-□□□□-                 |                      | 255      | 256  | 257  | 261      | 262  | 263  |
| Applicable SERVOPACKs                                      | SGD7S-               | 1R6A     | 2R8A | 3R8A | 1R6A     | 3R8A | 7R6A |
|                                                            | SGD7W-               | 1R6A     | 2R8A | 5R5A | 1R6A     | 5R5A | 7R6A |

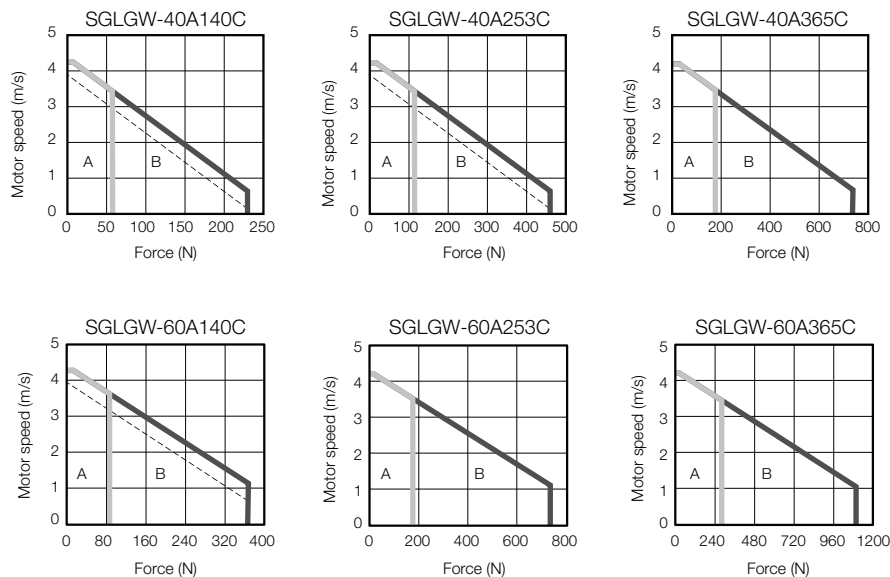
\*1. These values are for operation in combination with a SERVOPACK when the temperature of the armature winding is 100°C. The values for other items are at 20°C. These are typical values.

\*2. The rated forces are the continuous allowable force values at a surrounding air temperature of 40°C with an aluminum heat sink of the dimensions given in the following table.

- Heat Sink Dimensions
  - 200 mm × 300 mm × 12 mm: SGLGW-40A140C and -60A140C
  - 300 mm × 400 mm × 12 mm: SGLGW-40A253C and -60A253C
  - 400 mm × 500 mm × 12 mm: SGLGW-40A365C and -60A365C

## Force-Motor Speed Characteristics

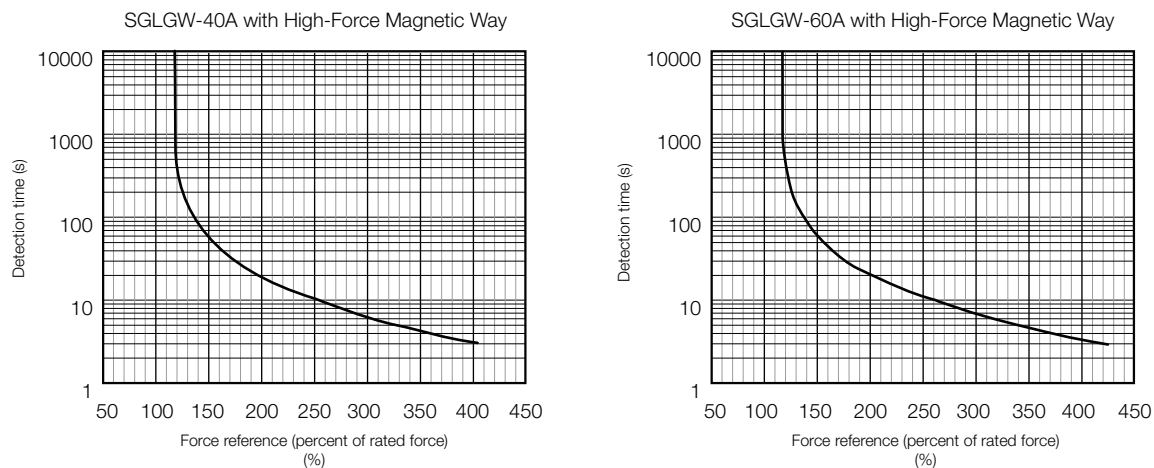
**A** : Continuous duty zone ——— (solid lines): With three-phase 200-V input  
**B** : Intermittent duty zone - - - - - (dotted lines): With single-phase 200-V input



- Note: 1. These values are for operation in combination with a SERVOPACK when the temperature of the armature winding is 100°C. These are typical values.  
2. The characteristics in the intermittent duty zone depend on the power supply voltage.  
3. If the effective force is within the allowable range for the rated force, the Servo Motor can be used within the intermittent duty zone.  
4. If you use a Servo Motor Main Circuit Cable that exceeds 20 m, the intermittent duty zone in the torque-motor speed characteristics will become smaller because the voltage drop increases.

## Servo Motor Overload Protection Characteristics

The overload detection level is set for hot start conditions with a Servo Motor surrounding air temperature of 40°C.

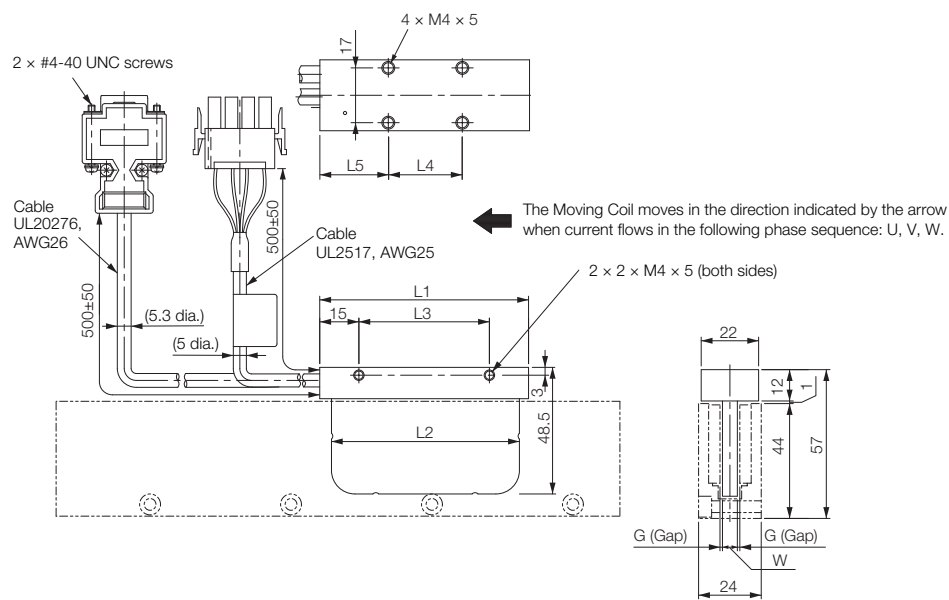


Note: The above overload protection characteristics do not mean that you can perform continuous duty operation with an output of 100% or higher. Use the Servo Motor so that the effective force remains within the continuous duty zone given in *Force-Motor Speed Characteristics* on page 352.

## External Dimensions

### SGLGW-30

#### ◆ Moving Coils: SGLGW-30A□□□C□



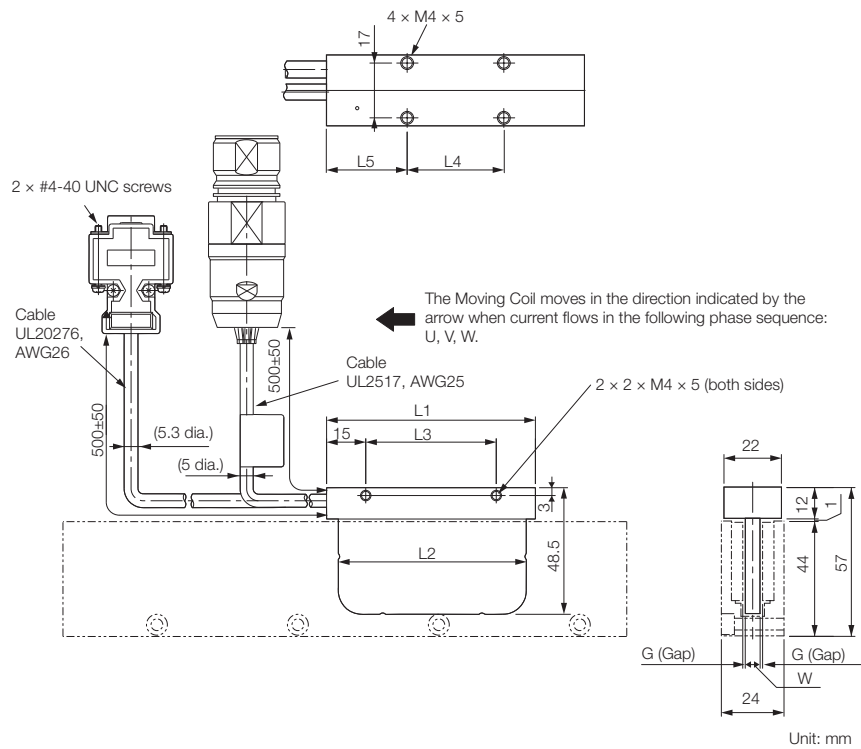
| Moving Coil Model<br>SGLGW- | L1 | L2 | L3 | L4 | L5 | W   | G (Gap) | Approx.<br>Mass* [kg] |
|-----------------------------|----|----|----|----|----|-----|---------|-----------------------|
| 30A050C□                    | 50 | 48 | 30 | 20 | 20 | 5.9 | 0.85    | 0.14                  |
| 30A080C□                    | 80 | 72 | 50 | 30 | 25 | 5.7 | 0.95    | 0.19                  |

\* The mass is for a Moving Coil with a Polarity Sensor.

Refer to the following section for the connector specifications for the Sensor Cable and Servo Motor Main Circuit Cable.

SGLGW-30A□□□C□ Moving Coils Page 366

## ◆ Moving Coils: SGLGW-30A□□□C□D

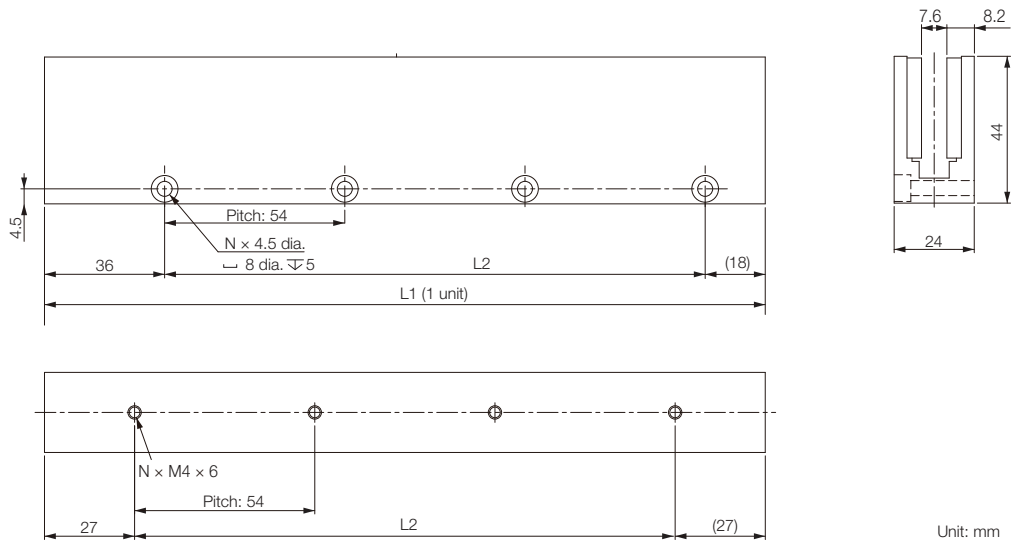


| Moving Coil Model<br>SGLGW- | L1 | L2 | L3 | L4 | L5 | W   | G (Gap) | Approx.<br>Mass* [kg] |
|-----------------------------|----|----|----|----|----|-----|---------|-----------------------|
| 30A050C□D                   | 50 | 48 | 30 | 20 | 20 | 5.9 | 0.85    | 0.14                  |
| 30A080C□D                   | 80 | 72 | 50 | 30 | 25 | 5.7 | 0.95    | 0.19                  |

\* The mass is for a Moving Coil with a Polarity Sensor.

Refer to the following section for the connector specifications for the Sensor Cable and Servo Motor Main Circuit Cable.

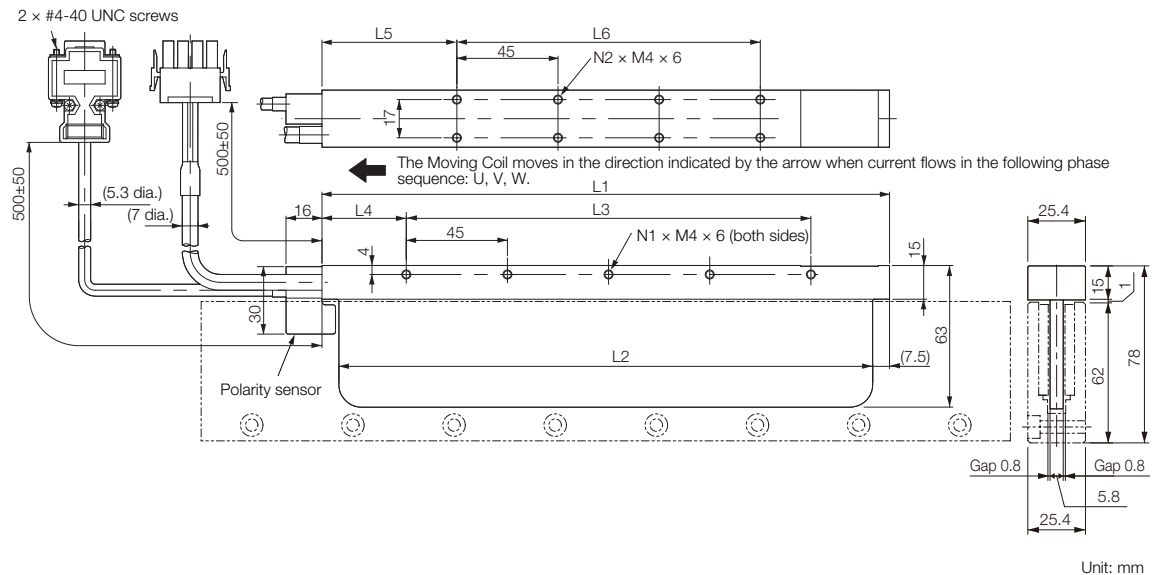
◆ Standard-Force Magnetic Ways: SGLGM-30□□□A



| Magnetic Way Model<br>SGLGM- | L1                                  | L2  | N | Approx. Mass [kg] |
|------------------------------|-------------------------------------|-----|---|-------------------|
| 30108A                       | 108 <sup>+0.1</sup> <sub>-0.1</sub> | 54  | 2 | 0.6               |
| 30216A                       | 216 <sup>+0.1</sup> <sub>-0.1</sub> | 162 | 4 | 1.1               |
| 30432A                       | 432 <sup>+0.1</sup> <sub>-0.1</sub> | 378 | 8 | 2.3               |

## SGLGW-40

### ◆ Moving Coils: SGLGW-40A□□□C□



| Moving Coil Model SGLGW- | L1    | L2    | L3  | L4   | L5   | L6  | N1 | N2 | Approx. Mass* [kg] |
|--------------------------|-------|-------|-----|------|------|-----|----|----|--------------------|
| 40A140C□                 | 140   | 125   | 90  | 30   | 52.5 | 45  | 3  | 4  | 0.40               |
| 40A253C□                 | 252.5 | 237.5 | 180 | 37.5 | 60   | 135 | 5  | 8  | 0.66               |
| 40A365C□                 | 365   | 350   | 315 | 30   | 52.5 | 270 | 8  | 14 | 0.93               |

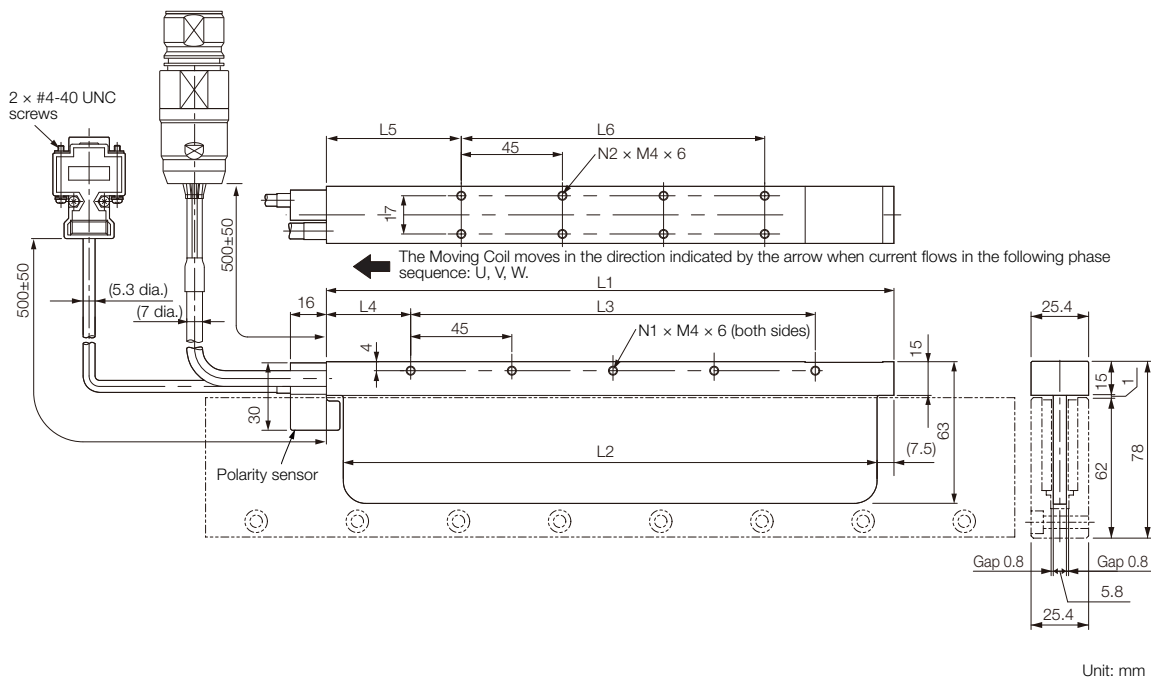
\* The mass is for a Moving Coil with a Polarity Sensor.

Refer to the following section for the connector specifications for the Sensor Cable and Servo Motor Main Circuit Cable.

📖 SGLGW-40A□□□C□ and -60A□□□C□ Moving Coils Page 368



◆ Moving Coils: SGLGW-40A□□□C□D



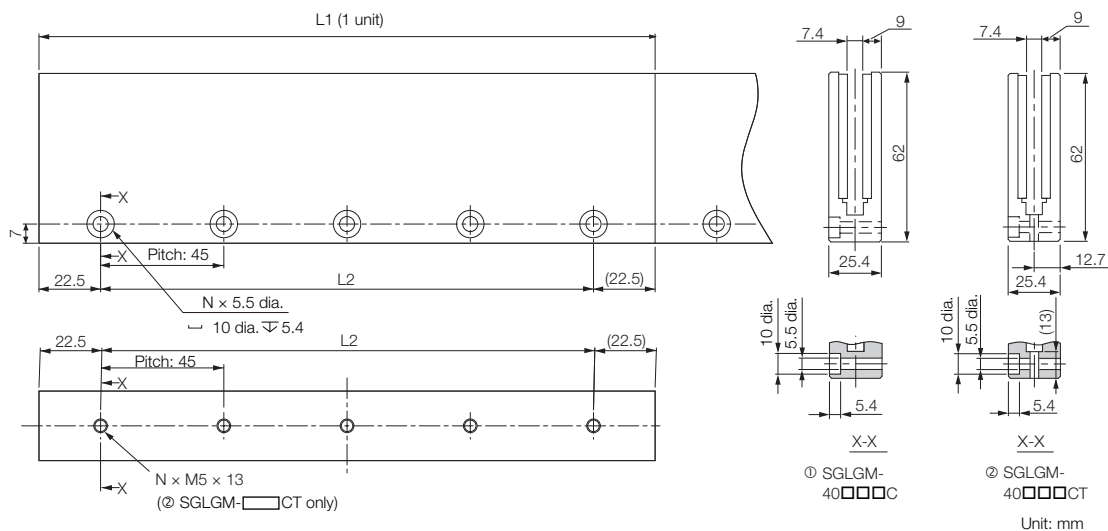
| Moving Coil Model SGLGW- | L1    | L2    | L3  | L4   | L5   | L6  | N1 | N2 | Approx. Mass* [kg] |
|--------------------------|-------|-------|-----|------|------|-----|----|----|--------------------|
| 40A140C□D                | 140   | 125   | 90  | 30   | 52.5 | 45  | 3  | 4  | 0.40               |
| 40A253C□D                | 252.5 | 237.5 | 180 | 37.5 | 60   | 135 | 5  | 8  | 0.66               |
| 40A365C□D                | 365   | 350   | 315 | 30   | 52.5 | 270 | 8  | 14 | 0.93               |

\* The mass is for a Moving Coil with a Polarity Sensor.

Refer to the following section for the connector specifications for the Sensor Cable and Servo Motor Main Circuit Cable.

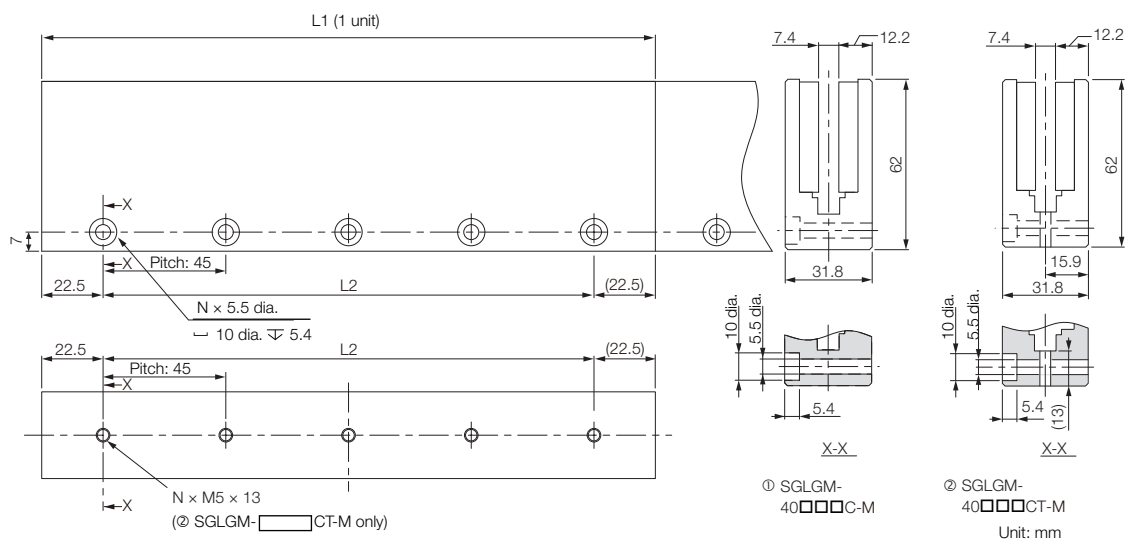
☞ SGLGW-40A□□□C□D and -60A□□□C□D Moving Coils Page 369

◆ **Standard-Force Magnetic Ways:**  
SGLGM-40□□□C (without Mounting Holes on the Bottom)  
SGLGM-40□□□CT (with Mounting Holes on the Bottom)



| Type           | Magnetic Way Model SGLGM- | L1                                  | L2  | N  | Approx. Mass [kg] |
|----------------|---------------------------|-------------------------------------|-----|----|-------------------|
| Standard-Force | 40090C or 40090CT         | 90 <sup>-0.1</sup> <sub>-0.3</sub>  | 45  | 2  | 0.8               |
|                | 40225C or 40225CT         | 225 <sup>-0.1</sup> <sub>-0.3</sub> | 180 | 5  | 2.0               |
|                | 40360C or 40360CT         | 360 <sup>-0.1</sup> <sub>-0.3</sub> | 315 | 8  | 3.1               |
|                | 40405C or 40405CT         | 405 <sup>-0.1</sup> <sub>-0.3</sub> | 360 | 9  | 3.5               |
|                | 40450C or 40450CT         | 450 <sup>-0.1</sup> <sub>-0.3</sub> | 405 | 10 | 3.9               |

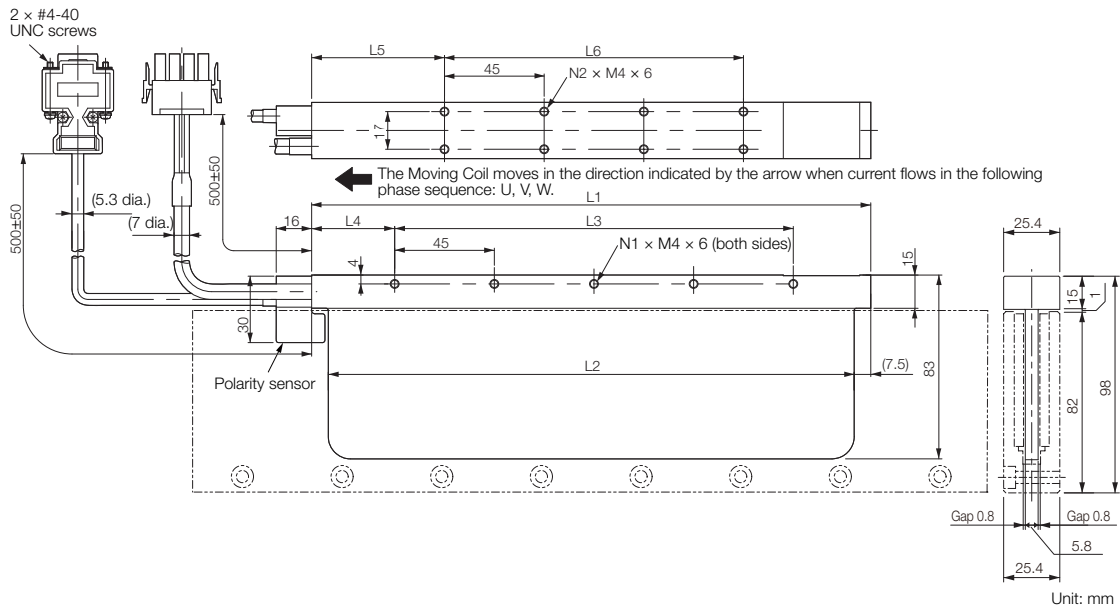
◆ High-Force Magnetic Ways:  
SGLGM-40□□□C-M (without Mounting Holes on the Bottom)  
SGLGM-40□□□CT-M (with Mounting Holes on the Bottom)



| Type       | Magnetic Way Model SGLGM- | L1                                  | L2  | N  | Approx. Mass [kg] |
|------------|---------------------------|-------------------------------------|-----|----|-------------------|
| High-Force | 40090C-M or 40090CT-M     | 90 <sup>-0.1</sup> <sub>-0.3</sub>  | 45  | 2  | 1.0               |
|            | 40225C-M or 40225CT-M     | 225 <sup>-0.1</sup> <sub>-0.3</sub> | 180 | 5  | 2.6               |
|            | 40360C-M or 40360CT-M     | 360 <sup>-0.1</sup> <sub>-0.3</sub> | 315 | 8  | 4.1               |
|            | 40405C-M or 40405CT-M     | 405 <sup>-0.1</sup> <sub>-0.3</sub> | 360 | 9  | 4.6               |
|            | 40450C-M or 40450CT-M     | 450 <sup>-0.1</sup> <sub>-0.3</sub> | 405 | 10 | 5.1               |

## SGLGW-60

### ◆ Moving Coils: SGLGW-60A□□□C□



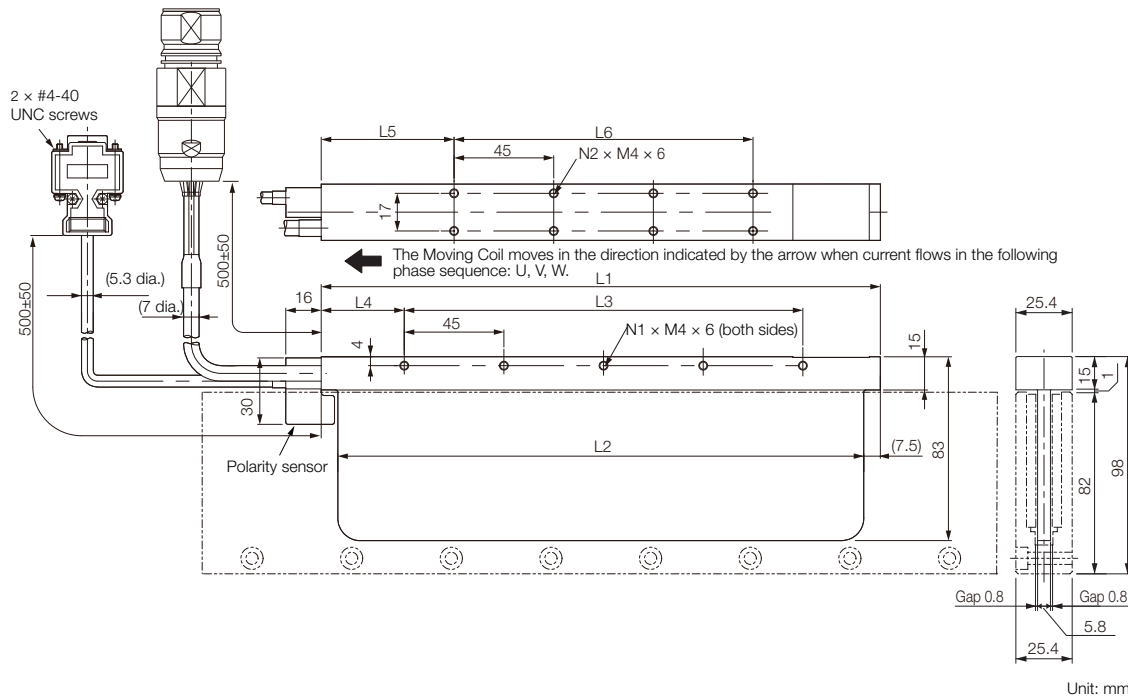
| Moving Coil Model<br>SGLGW- | L1    | L2    | L3  | L4   | L5   | L6  | N1 | N2 | Approx.<br>Mass* [kg] |
|-----------------------------|-------|-------|-----|------|------|-----|----|----|-----------------------|
| 60A140C□                    | 140   | 125   | 90  | 30   | 52.5 | 45  | 3  | 4  | 0.48                  |
| 60A253C□                    | 252.5 | 237.5 | 180 | 37.5 | 60   | 135 | 5  | 8  | 0.82                  |
| 60A365C□                    | 365   | 350   | 315 | 30   | 52.5 | 270 | 8  | 14 | 1.16                  |

\* The mass is for a Moving Coil with a Polarity Sensor.

Refer to the following section for the connector specifications for the Sensor Cable and Servo Motor Main Circuit Cable.

📖 SGLGW-40A□□□C□ and -60A□□□C□ Moving Coils Page 368

◆ Moving Coils: SGLGW-60A□□□C□D



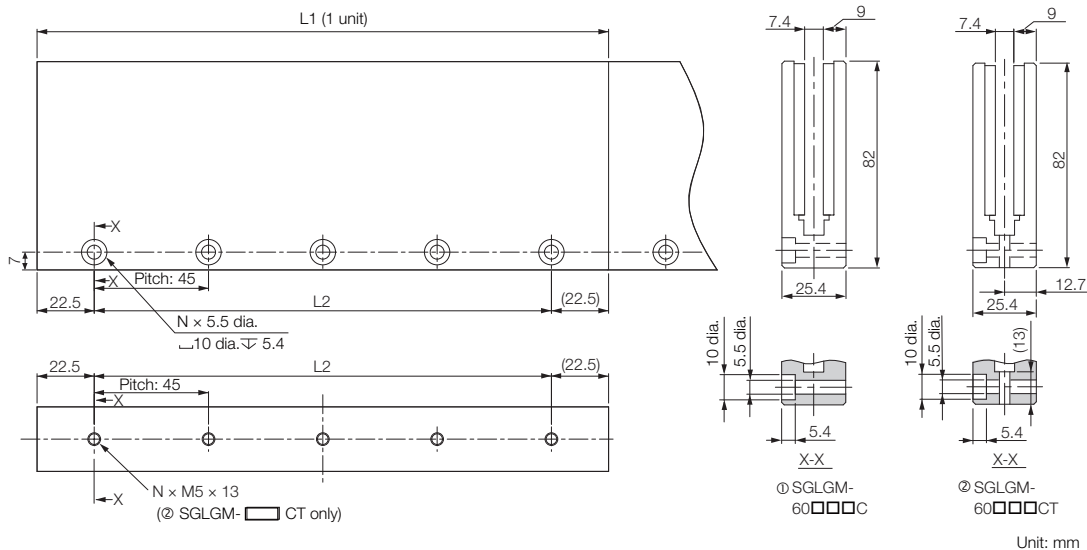
| Moving Coil Model<br>SGLGW- | L1    | L2    | L3  | L4   | L5   | L6  | N1 | N2 | Approx.<br>Mass* [kg] |
|-----------------------------|-------|-------|-----|------|------|-----|----|----|-----------------------|
| 60A140C□D                   | 140   | 125   | 90  | 30   | 52.5 | 45  | 3  | 4  | 0.48                  |
| 60A253C□D                   | 252.5 | 237.5 | 180 | 37.5 | 60   | 135 | 5  | 8  | 0.82                  |
| 60A365C□D                   | 365   | 350   | 315 | 30   | 52.5 | 270 | 8  | 14 | 1.16                  |

\* The mass is for a Moving Coil with a Polarity Sensor.

Refer to the following section for the connector specifications for the Sensor Cable and Servo Motor Main Circuit Cable.

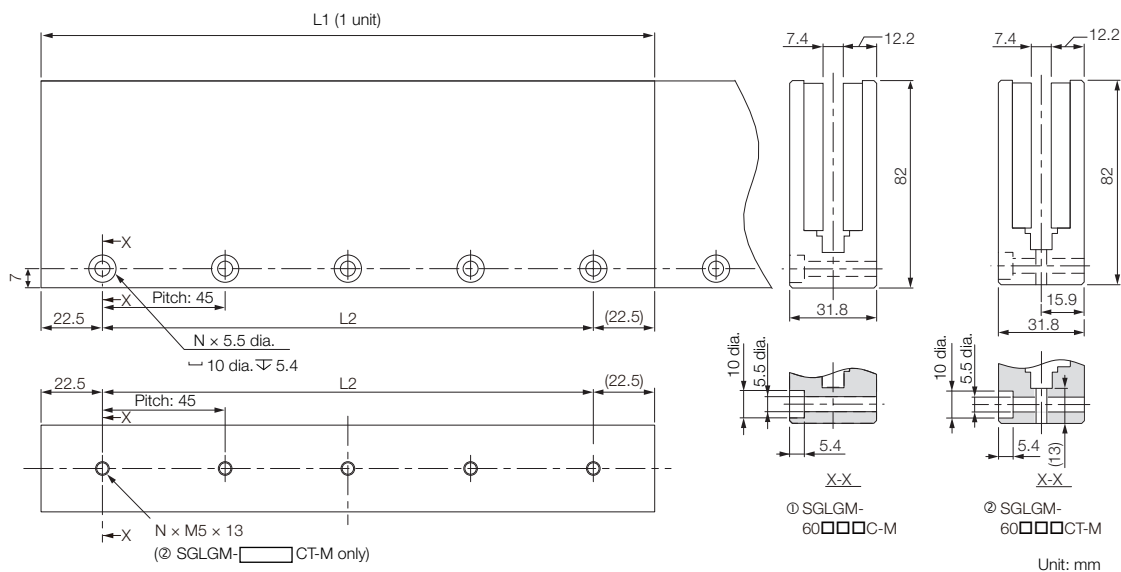
👉 SGLGW-40A□□□C□D and -60A□□□C□D Moving Coils Page 369

◆ **Standard-Force Magnetic Ways:**  
SGLGM-60□□□C (without Mounting Holes on the Bottom)  
SGLGM-60□□□CT (with Mounting Holes on the Bottom)



| Type           | Magnetic Way Model SGLGM- | L1                                  | L2  | N  | Approx. Mass [kg] |
|----------------|---------------------------|-------------------------------------|-----|----|-------------------|
| Standard-Force | 60090C or 60090CT         | 90 <sup>-0.1</sup> <sub>-0.3</sub>  | 45  | 2  | 1.1               |
|                | 60225C or 60225CT         | 225 <sup>-0.1</sup> <sub>-0.3</sub> | 180 | 5  | 2.6               |
|                | 60360C or 60360CT         | 360 <sup>-0.1</sup> <sub>-0.3</sub> | 315 | 8  | 4.1               |
|                | 60405C or 60405CT         | 405 <sup>-0.1</sup> <sub>-0.3</sub> | 360 | 9  | 4.6               |
|                | 60450C or 60450CT         | 450 <sup>-0.1</sup> <sub>-0.3</sub> | 405 | 10 | 5.1               |

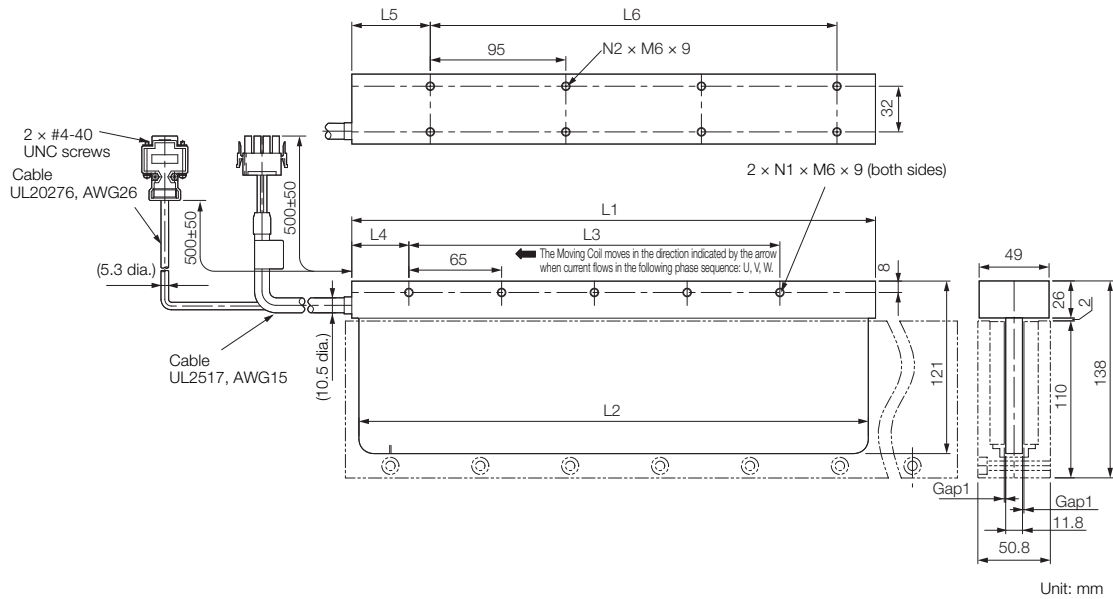
◆ High-Force Magnetic Ways:  
SGLGM-60□□□C-M (without Mounting Holes on the Bottom)  
SGLGM-60□□□CT-M (with Mounting Holes on the Bottom)



| Type       | Magnetic Way Model SGLGM- | L1                                  | L2  | N  | Approx. Mass [kg] |
|------------|---------------------------|-------------------------------------|-----|----|-------------------|
| High-Force | 60090C-M or 60090CT-M     | 90 <sup>-0.1</sup> <sub>-0.3</sub>  | 45  | 2  | 1.3               |
|            | 60225C-M or 60225CT-M     | 225 <sup>-0.1</sup> <sub>-0.3</sub> | 180 | 5  | 3.3               |
|            | 60360C-M or 60360CT-M     | 360 <sup>-0.1</sup> <sub>-0.3</sub> | 315 | 8  | 5.2               |
|            | 60405C-M or 60405CT-M     | 405 <sup>-0.1</sup> <sub>-0.3</sub> | 360 | 9  | 5.9               |
|            | 60450C-M or 60450CT-M     | 450 <sup>-0.1</sup> <sub>-0.3</sub> | 405 | 10 | 6.6               |

## SGLGW-90

### ◆ Moving Coils: SGLGW-90A□□□C□



| Moving Coil Model<br>SGLGW- | L1  | L2  | L3  | L4 | L5 | L6  | N1 | N2 | Approx.<br>Mass* [kg] |
|-----------------------------|-----|-----|-----|----|----|-----|----|----|-----------------------|
| 90A200C□                    | 199 | 189 | 130 | 40 | 60 | 95  | 3  | 4  | 2.2                   |
| 90A370C□                    | 367 | 357 | 260 | 40 | 55 | 285 | 5  | 8  | 3.65                  |
| 90A535C□                    | 535 | 525 | 455 | 40 | 60 | 380 | 8  | 10 | 4.95                  |

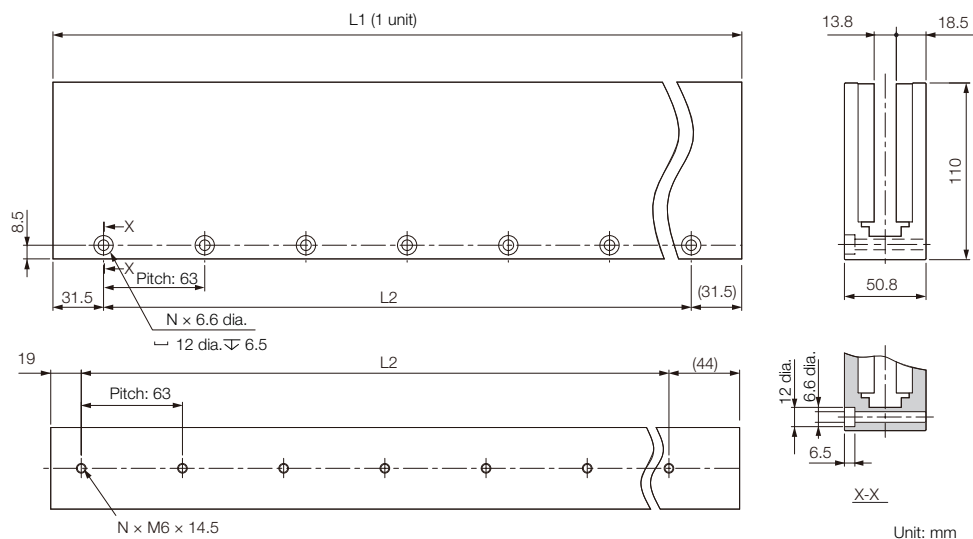
\* The mass is for a Moving Coil with a Polarity Sensor.

Refer to the following section for the connector specifications for the Sensor Cable and Servo Motor Main Circuit Cable.

📖 SGLGW-90A□□□C□ Moving Coils Page 370



◆ Standard-Force Magnetic Ways: SGLGM-90□□□A



| Magnetic Way Model<br>SGLGM- | L1                                  | L2  | N | Approx. Mass [kg] |
|------------------------------|-------------------------------------|-----|---|-------------------|
| 90252A                       | 252 <sup>-0.1</sup> <sub>-0.3</sub> | 189 | 4 | 7.3               |
| 90504A                       | 504 <sup>-0.1</sup> <sub>-0.3</sub> | 441 | 8 | 14.7              |

## Connector Specifications

### ◆ SGLGW-30A□□□C□ Moving Coils

- Servo Motor Connector



Plug: 350779-1  
Pins: 350924-1 or 770672-1  
Tyco Electronics Japan G.K.

Mating Connector  
Cap: 350780-1  
Socket: 350925-1 or 770673-1

- Polarity Sensor Connector

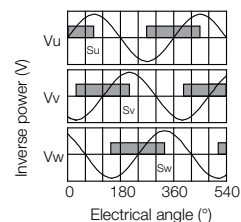


Pin connector: 17JE-23090-02 (D8C) -CG  
From DDK Ltd.

Mating Connector  
Socket connector: 17JE-13090-02 (D8C) A-CG  
Studs: 17L-002C or 17L-002C1

- Polarity Sensor Output Signal

The figure on the right shows the relationship between the Su, Sv, and Sw polarity sensor output signals and the inverse power of each motor phase Vu, Vv, and Vw when the Moving Coil moves in the direction indicated by the arrow in the dimensional drawings of the Moving Coil.



## ◆ SGLGW-30A□□□C□D Moving Coils

### • Servo Motor Connector



Extension: SROC06JMSCN169  
Pins: 021.423.1020  
From Interconnectron GmbH

Mating Connector  
Plug: SPUC06KFSDN236  
Socket: 020.030.1020

### • Polarity Sensor Connector

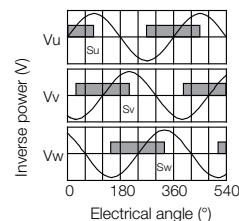


Pin connector: 17JE-23090-02 (D8C) -CG  
From DDK Ltd.

Mating Connector  
Socket connector: 17JE-13090-02 (D8C) A-CG  
Studs: 17L-002C or 17L-002C1

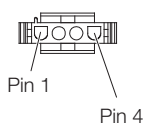
### • Polarity Sensor Output Signal

The figure on the right shows the relationship between the Su, Sv, and Sw polarity sensor output signals and the inverse power of each motor phase Vu, Vv, and Vw when the Moving Coil moves in the direction indicated by the arrow in the dimensional drawings of the Moving Coil.



## ◆ SGLGW-40A□□□C□ and -60A□□□C□ Moving Coils

### • Servo Motor Connector



Plug: 350779-1  
Pins: 350561-3 or 350690-3 (No.1 to 3)  
350654-1 or 350669-1 (No. 4)  
Tyco Electronics Japan G.K.

Mating Connector  
Cap: 350780-1  
Socket: 350570-3 or 350689-3

### • Polarity Sensor Connector

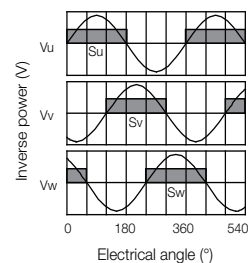


Pin connector: 17JE-23090-02 (D8C) -CG  
From DDK Ltd.

Mating Connector  
Socket connector: 17JE-13090-02 (D8C) A-CG  
Studs: 17L-002C or 17L-002C1

### • Polarity Sensor Output Signal

The figure on the right shows the relationship between the Su, Sv, and Sw polarity sensor output signals and the inverse power of each motor phase Vu, Vv, and Vw when the Moving Coil moves in the direction indicated by the arrow in the dimensional drawings of the Moving Coil.



## ◆ SGLGW-40A□□□C□D and -60A□□□C□D Moving Coils

### • Servo Motor Connector



Extension: SROC06JMSCN169  
Pins: 021.423.1020  
From Interconnectron GmbH

Mating Connector  
Plug: SPUC06KFSDN236  
Socket: 020.030.1020

### • Polarity Sensor Connector

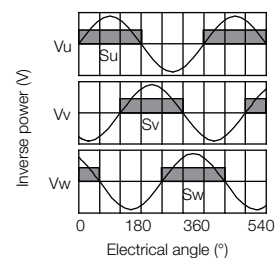


Pin connector: 17JE-23090-02 (D8C) -CG  
From DDK Ltd.

Mating Connector  
Socket connector: 17JE-13090-02 (D8C) A-CG  
Studs: 17L-002C or 17L-002C1

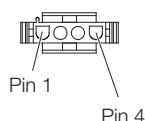
### • Polarity Sensor Output Signal

The figure on the right shows the relationship between the Su, Sv, and Sw polarity sensor output signals and the inverse power of each motor phase Vu, Vv, and Vw when the Moving Coil moves in the direction indicated by the arrow in the dimensional drawings of the Moving Coil.



## ◆ SGLGW-90A□□□C□ Moving Coils

### • Servo Motor Connector



Plug: 350779-1  
Pins: 350218-3 or 350547-3 (No.1 to 3)  
350654-1 or 350669-1 (No. 4)  
Tyco Electronics Japan G.K.

Mating Connector  
Cap: 350780-1  
Socket: 350537-3 or 350550-3

### • Polarity Sensor Connector

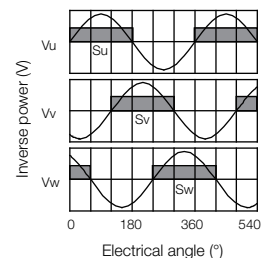


Pin connector: 17JE-23090-02 (D8C) -CG  
From DDK Ltd.

Mating Connector  
Socket connector: 17JE-13090-02 (D8C) A-CG  
Stud: 17L-002C or 17L-002C1

### • Polarity Sensor Output Signal

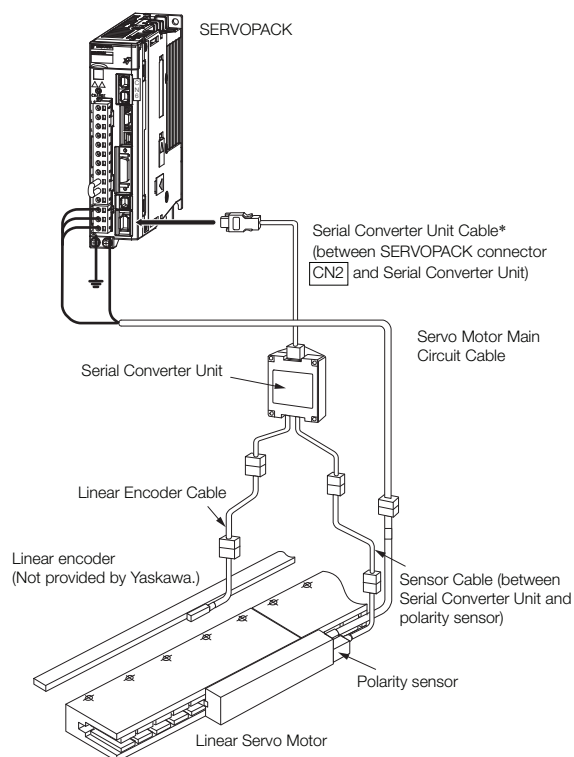
The figure on the right shows the relationship between the Su, Sv, and Sw polarity sensor output signals and the inverse power of each motor phase Vu, Vv, and Vw when the Moving Coil moves in the direction indicated by the arrow in the dimensional drawings of the Moving Coil.



## Selecting Cables

### ◆ Cable Configurations

Example: SGLG Coreless Servo Motors



\* You can connect directly to an absolute linear encoder.

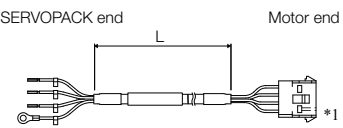
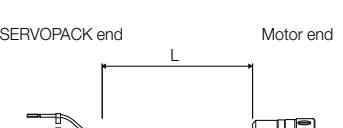
Note: 1. The above system configurations are for SGLG Coreless Servo Motors. Refer to the manual for the Linear Servo Motor for configurations with other models.

2. Refer to the following manual for the following information.

- Cable dimensional drawings and cable connection specifications
- Order numbers and specifications of individual connectors for cables
- Order numbers and specifications for wiring materials

📖 *Σ-7-Series AC Servo Drive Peripheral Device Selection Manual* (Manual No.: SIEP S800001 32)

## Servo Motor Main Circuit Cables

| Servo Motor Model                                       | Length (L) | Order Number    | Appearance                                                                          |
|---------------------------------------------------------|------------|-----------------|-------------------------------------------------------------------------------------|
| SGLGW-30A, -40A, -60A                                   | 1 m        | JZSP-CLN11-01-E |  |
|                                                         | 3 m        | JZSP-CLN11-03-E |                                                                                     |
|                                                         | 5 m        | JZSP-CLN11-05-E |                                                                                     |
|                                                         | 10 m       | JZSP-CLN11-10-E |                                                                                     |
|                                                         | 15 m       | JZSP-CLN11-15-E |                                                                                     |
|                                                         | 20 m       | JZSP-CLN11-20-E |                                                                                     |
| SGLGW-90A                                               | 1 m        | JZSP-CLN21-01-E |  |
|                                                         | 3 m        | JZSP-CLN21-03-E |                                                                                     |
|                                                         | 5 m        | JZSP-CLN21-05-E |                                                                                     |
|                                                         | 10 m       | JZSP-CLN21-10-E |                                                                                     |
|                                                         | 15 m       | JZSP-CLN21-15-E |                                                                                     |
|                                                         | 20 m       | JZSP-CLN21-20-E |                                                                                     |
| SGLGW-<br>30A□□□□□D<br>-<br>40A□□□□□D<br>-<br>60A□□□□□D | 1 m        | JZSP-CLN14-01-E |  |
|                                                         | 3 m        | JZSP-CLN14-03-E |                                                                                     |
|                                                         | 5 m        | JZSP-CLN14-05-E |                                                                                     |
|                                                         | 10 m       | JZSP-CLN14-10-E |                                                                                     |
|                                                         | 15 m       | JZSP-CLN14-15-E |                                                                                     |
|                                                         | 20 m       | JZSP-CLN14-20-E |                                                                                     |

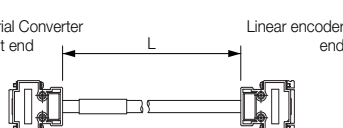
Note: Shaded model numbers are non-stock items

\*1. Connector from Tyco Electronics Japan G.K.

\*2. Connector from Interconnectron GmbH

\*3. A connector is not provided on the Linear Servo Motor end. Obtain a connector according to your specifications. Refer to the next page for information on connectors.

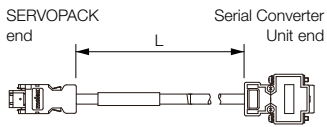
## Linear Encoder Cables

| Name                                           | Servo Motor Model | Length* (L) | Order Number    | Appearance                                                                            |
|------------------------------------------------|-------------------|-------------|-----------------|---------------------------------------------------------------------------------------|
| For linear encoder from Renishaw PLC           | All Models        | 1 m         | JZSP-CLL00-01-E |  |
|                                                |                   | 3 m         | JZSP-CLL00-03-E |                                                                                       |
|                                                |                   | 5 m         | JZSP-CLL00-05-E |                                                                                       |
|                                                |                   | 10 m        | JZSP-CLL00-10-E |                                                                                       |
|                                                |                   | 15 m        | JZSP-CLL00-15-E |                                                                                       |
| For linear encoder from Heidenhain Corporation |                   | 1 m         | JZSP-CLL30-01-E |                                                                                       |
|                                                |                   | 3 m         | JZSP-CLL30-03-E |                                                                                       |
|                                                |                   | 5 m         | JZSP-CLL30-05-E |                                                                                       |
|                                                |                   | 10 m        | JZSP-CLL30-10-E |                                                                                       |
|                                                |                   | 15 m        | JZSP-CLL30-15-E |                                                                                       |

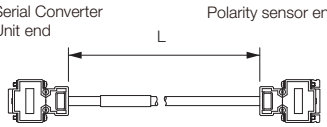
\* When using a JZDP-J00□-□□□-E Serial Converter Unit, do not exceed a cable length of 3 m.



## Serial Converter Unit Cables

| Servo Motor Model | Length (L) | Order Number    | Appearance                                                                          |
|-------------------|------------|-----------------|-------------------------------------------------------------------------------------|
| All Models        | 1 m        | JZSP-CLP70-01-E |  |
|                   | 3 m        | JZSP-CLP70-03-E |                                                                                     |
|                   | 5 m        | JZSP-CLP70-05-E |                                                                                     |
|                   | 10 m       | JZSP-CLP70-10-E |                                                                                     |
|                   | 15 m       | JZSP-CLP70-15-E |                                                                                     |
|                   | 20 m       | JZSP-CLP70-20-E |                                                                                     |

## Sensor Cables

| Servo Motor Model | Length (L) | Order Number    | Appearance                                                                          |
|-------------------|------------|-----------------|-------------------------------------------------------------------------------------|
| SGLGW-□ □ A       | 1 m        | JZSP-CLL10-01-E |  |
|                   | 3 m        | JZSP-CLL10-03-E |                                                                                     |
|                   | 5 m        | JZSP-CLL10-05-E |                                                                                     |
|                   | 10 m       | JZSP-CLL10-10-E |                                                                                     |
|                   | 15 m       | JZSP-CLL10-15-E |                                                                                     |

# SGLT (Models with T-type Iron Cores)

## Model Designations

### Moving Coil



1st digit Servo Motor Type

| Code | Specification         |
|------|-----------------------|
| T    | With T-type iron core |

5th digit Power Supply Voltage

| Code | Specification |
|------|---------------|
| A    | 200 VAC       |

10th digit Sensor Specification and Cooling Method

| Code | Specifications  |                | Applicable Models |
|------|-----------------|----------------|-------------------|
|      | Polarity Sensor | Cooling Method |                   |
| None | None            | Self-cooled    | All models        |
| C*   | None            | Water-cooled   | SGLTW-40, -80     |
| H*   | Yes             | Water-cooled   |                   |
| P    | Yes             | Self-cooled    | All models        |

2nd digit Moving Coil/Magnetic Way

| Code | Specification |
|------|---------------|
| W    | Moving Coil   |

6th+7th+8th digits Length of Moving Coil

| Code | Specification |
|------|---------------|
| 170  | 170 mm        |
| 320  | 315 mm        |
| 400  | 394.2 mm      |
| 460  | 460 mm        |
| 600  | 574.2 mm      |

3rd+4th digits Magnet Height

| Code | Specification |
|------|---------------|
| 20   | 20 mm         |
| 35   | 36 mm         |
| 40   | 40 mm         |
| 50   | 51 mm         |
| 80   | 76.5 mm       |

9th digit Design Revision Order

A, B ...  
H: High-efficiency model

11th digit Connector for Servo Motor Main Circuit Cable

| Code | Specification                              | Applicable Models             |
|------|--------------------------------------------|-------------------------------|
| None | Connector from Tyco Electronics Japan G.K. | SGLTW-20A□□□□□, -35A□□□□□     |
|      | MS connector                               | SGLTW-40A□□□□□, -80A□□□□□     |
|      | Loose lead wires with no connector         | SGLTW-35A□□□□□H□, -50A□□□□□H□ |

■ Non Stock Items

\* Contact your Yaskawa representative for the characteristics, dimensions, and other details on Servo Motors with these specifications.

Note: This information is provided to explain model numbers. It is not meant to imply that models are available for all combinations of codes.

### Magnetic Way



1st digit Servo Motor Type

(Same as for the Moving Coil.)

2nd digit Moving Coil/Magnetic Way

| Code | Specification |
|------|---------------|
| M    | Magnetic Way  |

3rd+4th digits Magnet Height

(Same as for the Moving Coil.)

5th+6th+7th digits Length of Magnetic Way

| Code | Specification |
|------|---------------|
| 324  | 324 mm        |
| 405  | 405 mm        |
| 540  | 540 mm        |
| 675  | 675 mm        |
| 756  | 756 mm        |
| 945  | 945 mm        |

8th digit Design Revision Order

A, B ...  
H: High-efficiency model

9th digit Options

| Code | Specification              | Applicable Models        |
|------|----------------------------|--------------------------|
| None | Without options            | —                        |
| C    | With magnet cover          | All models               |
| Y    | With base and magnet cover | SGLTM-20, -35*, -40, -80 |

■ Non Stock Items

\* The SGLTM-35□□□ H (high-efficiency models) do not support this specification.

Note: This information is provided to explain model numbers. It is not meant to imply that models are available for all combinations of codes.

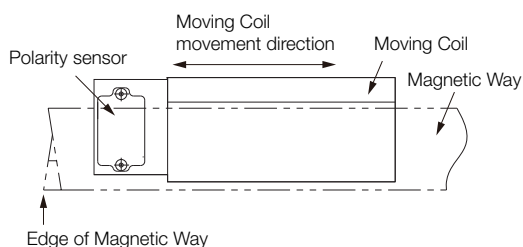
## Precautions on Moving Coils with Polarity Sensors



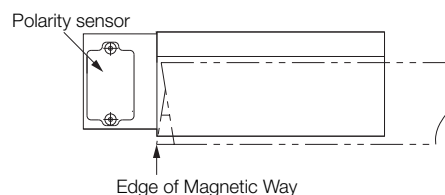
Note

When you use a Moving Coil with a Polarity Sensor, the Magnetic Way must cover the bottom of the polarity sensor. Refer to the example that shows the correct installation. When determining the length of the Moving Coil's stroke or the length of the Magnetic Way, consider the total length of the Moving Coil and the polarity sensor. Refer to the following table.

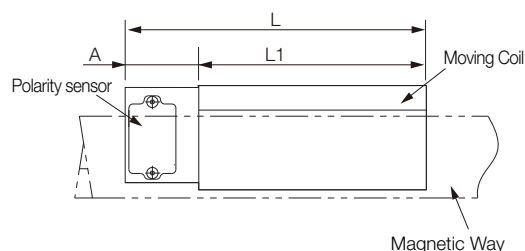
### Correct Installation



### Incorrect Installation



### ◆ Total Length of Moving Coil with Polarity Sensor



| Moving Coil Model<br>SGLTW- | Length of Moving Coil,<br>L1 [mm] | Length of Polarity Sensor,<br>A [mm] | Total Length,<br>L [mm] |
|-----------------------------|-----------------------------------|--------------------------------------|-------------------------|
| 20A170AP□                   | 170                               | 34                                   | 204                     |
| 20A320AP□                   | 315                               |                                      | 349                     |
| 20A460AP□                   | 460                               |                                      | 494                     |
| 35A170AP□                   | 170                               | 34                                   | 204                     |
| 35A320AP□                   | 315                               |                                      | 349                     |
| 35A460AP□                   | 460                               |                                      | 494                     |
| 35A170HP□                   | 170                               | 34                                   | 204                     |
| 35A320HP□                   | 315                               |                                      | 349                     |
| 50A170HP□                   | 170                               | 34                                   | 204                     |
| 50A320HP□                   | 315                               |                                      | 349                     |
| 40A400BH□<br>40A400BP□      | 394.2                             | 26                                   | 420.2                   |
| 40A600BH□<br>40A600BP□      | 574.2                             | 26                                   | 600.2                   |
| 80A400BH□<br>80A400BP□      | 394.2                             | 26                                   | 420.2                   |
| 80A600BH□<br>80A600BP□      | 574.2                             | 26                                   | 600.2                   |

## Specifications and Ratings

### Specifications

| Linear Servo Motor<br>Moving Coil Model<br>SGLTW- |                                     | Standard Models                                                                                                                                                                                                                                                                                                                        |      |      |      |      |      |      |      |      |      | High-efficiency<br>Models |      |      |      |
|---------------------------------------------------|-------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------|------|------|------|------|------|------|------|------|---------------------------|------|------|------|
|                                                   |                                     | 20A                                                                                                                                                                                                                                                                                                                                    |      |      | 35A  |      |      | 40A  |      | 80A  |      | 35A                       |      | 50A  |      |
|                                                   |                                     | 170A                                                                                                                                                                                                                                                                                                                                   | 320A | 460A | 170A | 320A | 460A | 400B | 600B | 400B | 600B | 170H                      | 320H | 170H | 320H |
| Time Rating                                       |                                     | Continuous                                                                                                                                                                                                                                                                                                                             |      |      |      |      |      |      |      |      |      |                           |      |      |      |
| Thermal Class                                     |                                     | B                                                                                                                                                                                                                                                                                                                                      |      |      |      |      |      |      |      |      |      |                           |      |      |      |
| Insulation Resistance                             |                                     | 500 VDC, 10 MΩ min.                                                                                                                                                                                                                                                                                                                    |      |      |      |      |      |      |      |      |      |                           |      |      |      |
| Withstand Voltage                                 |                                     | 1,500 VAC for 1 minute                                                                                                                                                                                                                                                                                                                 |      |      |      |      |      |      |      |      |      |                           |      |      |      |
| Excitation                                        |                                     | Permanent magnet                                                                                                                                                                                                                                                                                                                       |      |      |      |      |      |      |      |      |      |                           |      |      |      |
| Cooling Method                                    |                                     | Self-cooled                                                                                                                                                                                                                                                                                                                            |      |      |      |      |      |      |      |      |      |                           |      |      |      |
| Protective Structure                              |                                     | IP00                                                                                                                                                                                                                                                                                                                                   |      |      |      |      |      |      |      |      |      |                           |      |      |      |
| Environ-<br>mental<br>Condi-<br>tions             | Surrounding<br>Air Tempera-<br>ture | 0°C to 40°C (with no freezing)                                                                                                                                                                                                                                                                                                         |      |      |      |      |      |      |      |      |      |                           |      |      |      |
|                                                   | Surrounding<br>Air Humidity         | 20% to 80% relative humidity (with no condensation)                                                                                                                                                                                                                                                                                    |      |      |      |      |      |      |      |      |      |                           |      |      |      |
|                                                   | Installation<br>Site                | <ul style="list-style-type: none"><li>• Must be indoors and free of corrosive and explosive gases.</li><li>• Must be well-ventilated and free of dust and moisture.</li><li>• Must facilitate inspection and cleaning.</li><li>• Must have an altitude of 1,000 m or less.</li><li>• Must be free of strong magnetic fields.</li></ul> |      |      |      |      |      |      |      |      |      |                           |      |      |      |
| Shock<br>Resis-<br>tance                          | Impact Accel-<br>eration Rate       | 196 m/s <sup>2</sup>                                                                                                                                                                                                                                                                                                                   |      |      |      |      |      |      |      |      |      |                           |      |      |      |
|                                                   | Number of<br>Impacts                | 2 times                                                                                                                                                                                                                                                                                                                                |      |      |      |      |      |      |      |      |      |                           |      |      |      |
| Vibra-<br>tion<br>Resis-<br>tance                 | Vibration<br>Acceleration<br>Rate   | 49 m/s <sup>2</sup> (the vibration resistance in three directions, vertical, side-to-side, and front-to-back)                                                                                                                                                                                                                          |      |      |      |      |      |      |      |      |      |                           |      |      |      |

## Ratings

| Linear Servo Motor Moving Coil Model SGLTW-                               |                          | Standard Models |          |          |          |          |          |          |          |          |       | High-efficiency Models |          |          |          |
|---------------------------------------------------------------------------|--------------------------|-----------------|----------|----------|----------|----------|----------|----------|----------|----------|-------|------------------------|----------|----------|----------|
|                                                                           |                          | 20A             |          |          | 35A      |          |          | 40A      |          | 80A      |       | 35A                    |          | 50A      |          |
|                                                                           |                          | 170A            | 320A     | 460A     | 170A     | 320A     | 460A     | 400B     | 600B     | 400B     | 600B  | 170H                   | 320H     | 170H     | 320H     |
| Rated Motor Speed<br>(Reference Speed during Speed Control)* <sup>1</sup> |                          | 3.0             | 3.0      | 3.0      | 2.5      | 2.5      | 2.5      | 1.5      | 2.0      | 2.0      | 2.0   | 2.5                    | 2.0      | 2.0      | 2.0      |
| Maximum Speed* <sup>1</sup>                                               | m/s                      | 5.0             | 5.0      | 5.0      | 5.0      | 5.0      | 5.0      | 3.1      | 3.1      | 2.5      | 2.5   | 4.8                    | 4.8      | 3.2      | 3.1      |
| Rated Force* <sup>1, *2</sup>                                             | N                        | 130             | 250      | 380      | 220      | 440      | 670      | 670      | 1000     | 1300     | 2000  | 300                    | 600      | 450      | 900      |
| Maximum Force* <sup>1</sup>                                               | N                        | 380             | 760      | 1140     | 660      | 1320     | 2000     | 2600     | 4000     | 5000     | 7500  | 600                    | 1200     | 900      | 1800     |
| Rated Current* <sup>1</sup>                                               | Arms                     | 2.3             | 4.4      | 6.7      | 3.5      | 7.0      | 10.7     | 7.3      | 10.9     | 11.1     | 17.1  | 5.1                    | 10.1     | 5.1      | 10.2     |
| Maximum Current* <sup>1</sup>                                             | Arms                     | 7.7             | 15.4     | 23.2     | 12.1     | 24.2     | 36.7     | 39.4     | 60.6     | 57.9     | 86.9  | 11.9                   | 23.9     | 11.8     | 23.6     |
| Moving Coil Mass                                                          | kg                       | 2.5             | 4.6      | 6.7      | 3.7      | 6.8      | 10       | 15       | 23       | 24       | 35    | 4.9                    | 8.8      | 6.0      | 11       |
| Force Constant                                                            | N/<br>Arms               | 61              | 61.0     | 61.0     | 67.5     | 67.5     | 67.5     | 99.1     | 99.1     | 126      | 126   | 64.0                   | 64.0     | 95.2     | 95.2     |
| BEMF Constant                                                             | Vrms/<br>(m/s)/<br>phase | 20.3            | 20.3     | 20.3     | 22.5     | 22.5     | 22.5     | 33.0     | 33.0     | 42.0     | 42.0  | 21.3                   | 21.3     | 31.7     | 31.7     |
| Motor Constant                                                            | N/√W                     | 18.7            | 26.5     | 32.3     | 26.7     | 37.5     | 46.4     | 61.4     | 75.2     | 94.7     | 116   | 37.4                   | 52.9     | 48.6     | 68.7     |
| Electrical Time Constant                                                  | ms                       | 5.9             | 5.9      | 5.9      | 6.9      | 6.8      | 6.9      | 15       | 15       | 17       | 17    | 15                     | 16       | 16       | 17       |
| Mechanical Time Constant                                                  | ms                       | 7.1             | 6.6      | 6.4      | 5.2      | 4.8      | 4.6      | 4.0      | 4.1      | 2.7      | 2.6   | 3.5                    | 3.1      | 2.5      | 2.4      |
| Thermal Resistance<br>(with Heat Sink)                                    | K/W                      | 1.01            | 0.49     | 0.38     | 0.76     | 0.44     | 0.32     | 0.24     | 0.20     | 0.22     | 0.18  | 0.76                   | 0.40     | 0.61     | 0.30     |
| Thermal Resistance<br>(without Heat Sink)                                 | K/W                      | 1.82            | 1.11     | 0.74     | 1.26     | 0.95     | 0.61     | 0.57     | 0.40     | 0.47     | 0.33  | 1.26                   | 0.83     | 0.97     | 0.80     |
| Magnetic Attraction* <sup>3</sup>                                         | N                        | 0               | 0        | 0        | 0        | 0        | 0        | 0        | 0        | 0        | 0     | 0                      | 0        | 0        | 0        |
| Magnetic Attraction on One Side* <sup>4</sup>                             | N                        | 800             | 1590     | 2380     | 1400     | 2780     | 4170     | 3950     | 5890     | 7650     | 11400 | 1400                   | 2780     | 2000     | 3980     |
| Combined Magnetic Way,<br>SGLTM-                                          |                          | 20□□□A□         |          |          | 35□□□A□  |          |          | 40□□□A□  |          | 80□□□A□  |       | 35□□□H□                |          | 50□□□H□  |          |
| Combined Serial Converter<br>Unit, JZDP-□□□□ -                            |                          | 011             | 012      | 013      | 014      | 015      | 016      | 185      | 186      | 187      | 188   | 105                    | 106      | 108      | 109      |
| Applicable<br>SERVOPACKs                                                  | SGD7<br>S-               | 3R8<br>A        | 7R6<br>A | 120<br>A | 5R5<br>A | 120<br>A | 180<br>A | 180<br>A | 330<br>A | 330<br>A | 550A  | 5R5A                   | 120<br>A | 5R5<br>A | 120<br>A |
|                                                                           | SGD7<br>W-               | 5R5<br>A        | 7R6<br>A | —        | 5R5<br>A | —        | —        | —        | —        | —        | —     | 5R5A                   | —        | 5R5<br>A | —        |

\*1. These values are for operation in combination with a SERVOPACK when the temperature of the armature winding is 100°C. The values for other items are at 20°C. These are typical values.

\*2. The rated forces are the continuous allowable force values at a surrounding air temperature of 40°C with an aluminum heat sink of the dimensions given in the following table.

• Heat Sink Dimensions

- 254 mm × 254 mm × 25 mm: SGLTW-20A170A and -35A170A
- 400 mm × 500 mm × 40 mm: SGLTW-20A320A, -20A460A, -35A170H, -35A320A, -35A320H, -35A460A, and -50A170H
- 609 mm × 762 mm × 50 mm: SGLTW-40A400B, -40A600B, -50A320H, -80A400B, and -80A600B

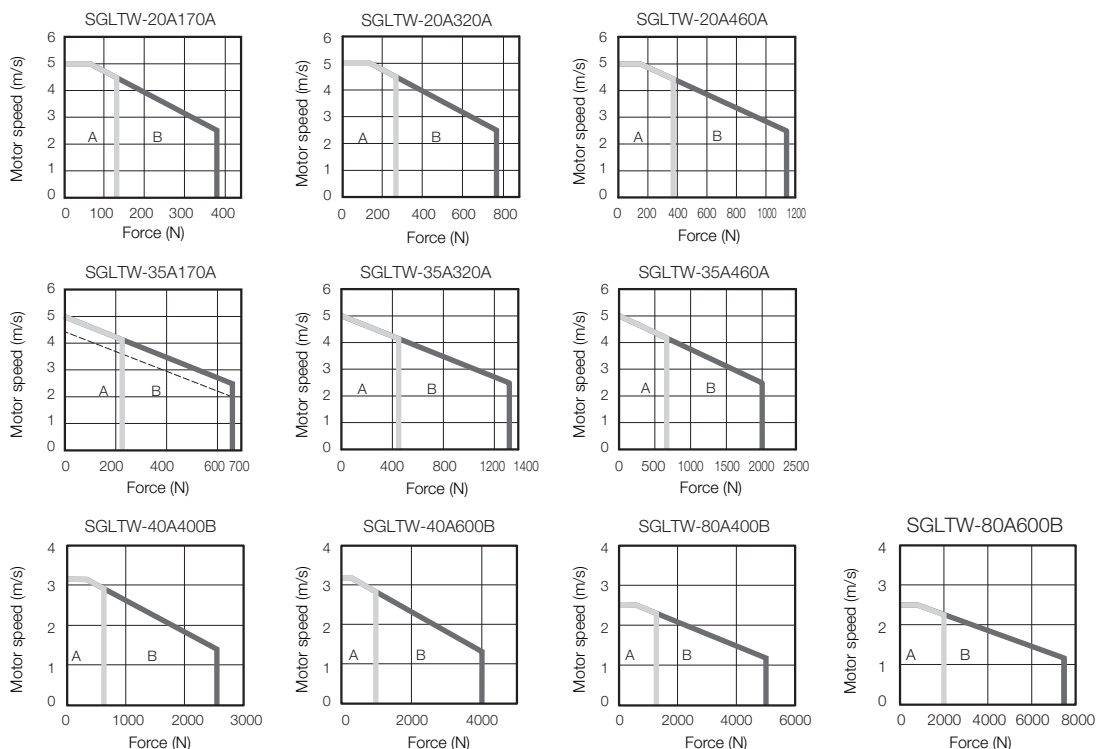
\*3. The unbalanced magnetic gap that results from the Moving Coil installation condition causes a magnetic attraction on the Moving Coil.

\*4. The value that is given is the magnetic attraction that is generated on one side of the Magnetic Way.

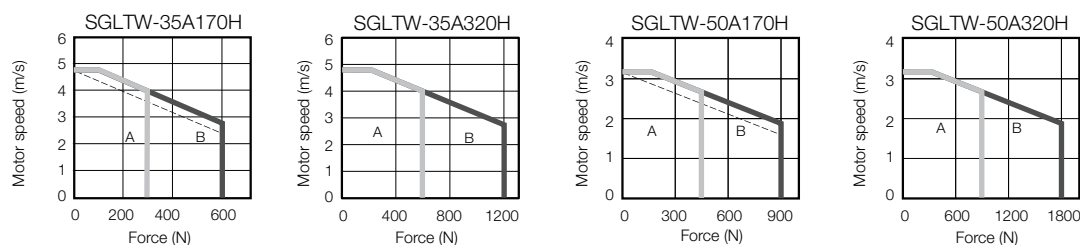
## Force-Motor Speed Characteristics

A : Continuous duty zone — (solid lines): With three-phase 200-V input  
B : Intermittent duty zone - - - (dotted lines): With single-phase 200-V input

### Standard Models



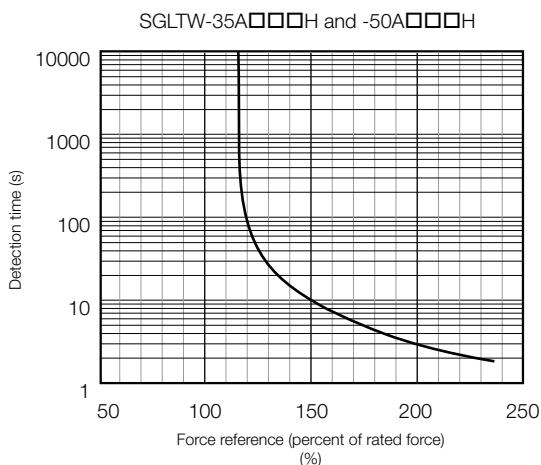
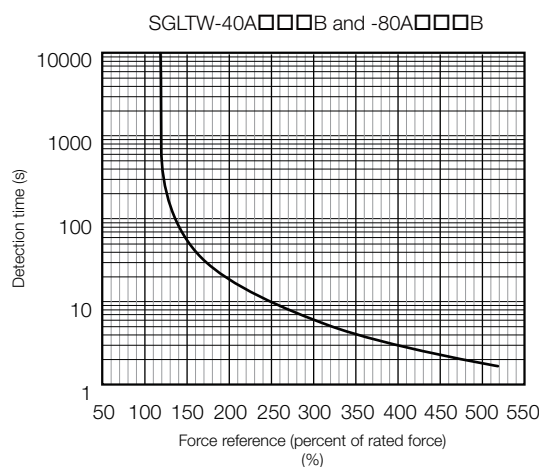
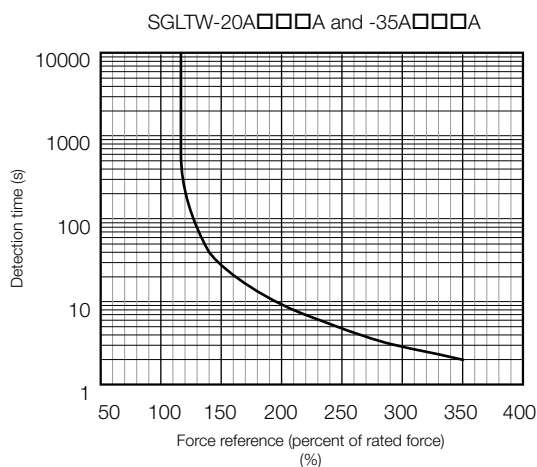
### High-efficiency Models



- Note: 1. These values are for operation in combination with a SERVOPACK when the temperature of the armature winding is 100°C. These are typical values.
2. The characteristics in the intermittent duty zone depend on the power supply voltage.
3. If the effective force is within the allowable range for the rated force, the Servo Motor can be used within the intermittent duty zone.
4. If you use a Servo Motor Main Circuit Cable that exceeds 20 m, the intermittent duty zone in the torque-motor speed characteristics will become smaller because the voltage drop increases.

## Servo Motor Overload Protection Characteristics

The overload detection level is set for hot start conditions with a Servo Motor surrounding air temperature of 40°C.



Note: The above overload protection characteristics do mean that you can perform continuous duty operation with an output of 100% or higher. Use the Servo Motor so that the effective force remains within the continuous duty zone given in *Force-Motor Speed Characteristics* on page 378.

## SGLTW-20: Standard Models

Technical drawing of the M6-12 probe assembly, showing front, side, and detail views with dimensions and labels.

**Front View Dimensions:**

- Overall width: 55
- Top flange width: 51
- Top flange height: 47.5
- Top flange thickness: 12
- Bottom flange height: 60
- Bottom flange thickness: 20
- Bottom flange width: 60
- Overall height: 100
- Mounting hole diameter: 19.2 (with magnet cover), 19 (without magnet cover)
- Gap: 0.8 (with magnet cover), 1 (without magnet cover)

**Side View Dimensions:**

- Top flange thickness: 10
- Top flange width: 50
- Top flange height: 48
- Bottom flange height: 80
- Overall height: 100
- Overall width: 55

**Detail View Dimensions:**

- Overall width: 50
- Top flange thickness: 10
- Top flange width: 48
- Bottom flange height: 80
- Overall height: 100
- Overall width: 55

**Labels:**

- Magnetic Way
- Polarity sensor
- 2 x #4-40 UNC screws
- N x M6 x 12
- The Moving Coil moves in the direction indicated by the arrow when current flows in the following phase sequence: U, V, W.

**Unit: mm**

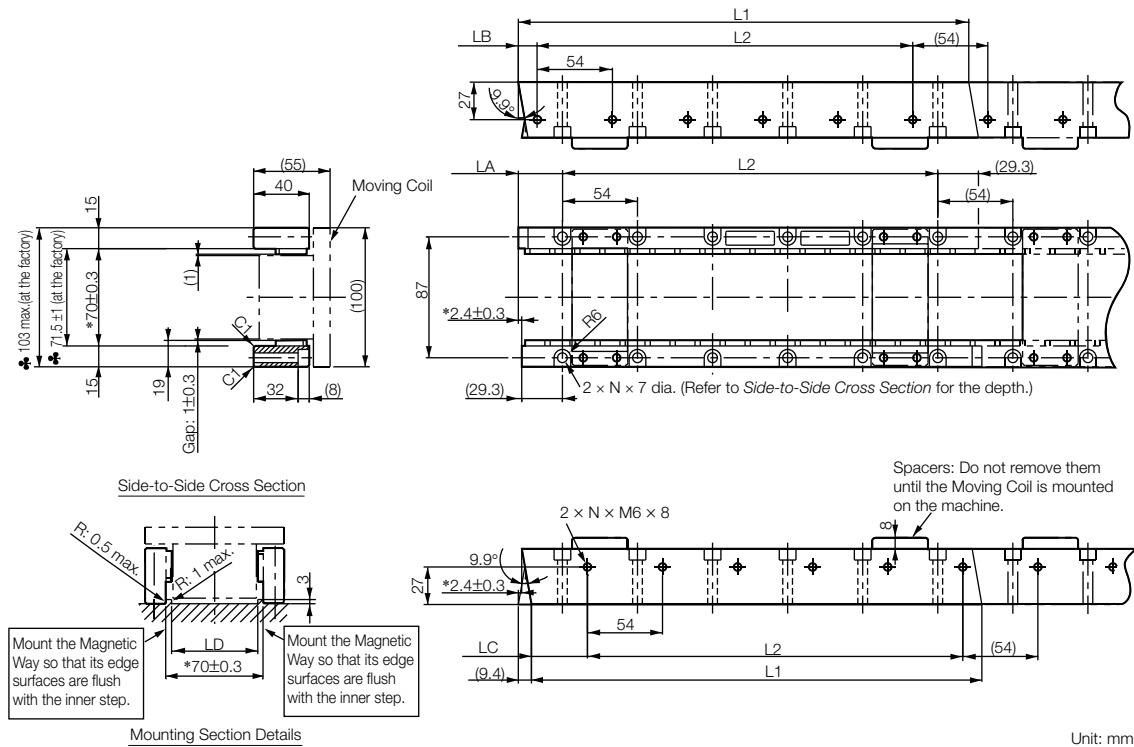
| Moving Coil Model<br>SGLTW- | L1  | L2           | (L3) | N  | Approx. Mass<br>[kg] |
|-----------------------------|-----|--------------|------|----|----------------------|
| 20A170A□                    | 170 | 144 (48 × 3) | (16) | 8  | 2.5                  |
| 20A320A□                    | 315 | 288 (48 × 6) | (17) | 14 | 4.6                  |
| 20A460A□                    | 460 | 432 (48 × 9) | (18) | 20 | 6.7                  |

Refer to the following section for the connector specifications for the Sensor Cable and Servo Motor Main Circuit Cable.

 SGLTW-20A□□□A□ and -35A□□□A□ Moving Coils (page 396)



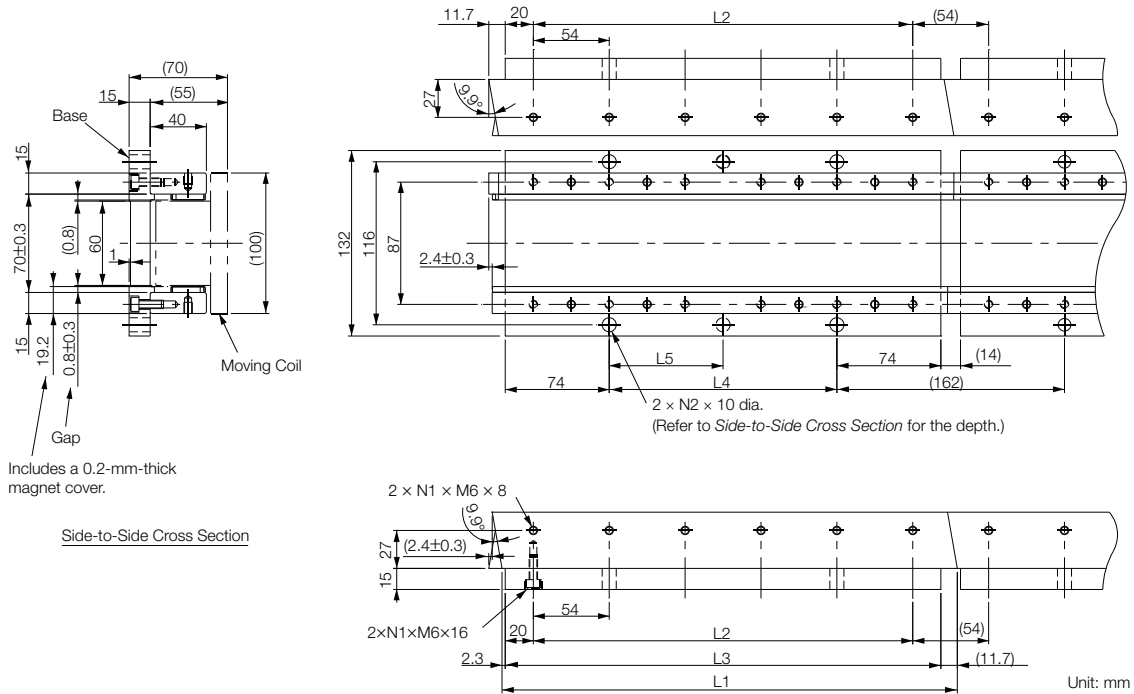
# ◆ Magnetic Ways: SGLTM-20□□□A



- Note: 1. Two Magnetic Way tracks are used together as a set. For safety, when they are shipped, the two tracks are secured to a mounting spacer made from aluminum.
2. More than one Magnetic Way can be connected.
3. Dimensions with asterisks are the distances between the Magnetic Way tracks. Install the tracks according to the specified dimensions. Observe the dimensions given in Mounting Section Details after installation. Dimensions when the Magnetic Way is shipped from the factory are indicated by ♣.
4. Use socket head screws of strength class 10.9 or higher for the Magnetic Way mounting screws. (Do not use stainless steel screws.)

| Magnetic Way Model SGLTM- | L1                                  | L2            | LA                                | LB                                | LC                                | LD                              | N  | Approx. Mass [kg] |
|---------------------------|-------------------------------------|---------------|-----------------------------------|-----------------------------------|-----------------------------------|---------------------------------|----|-------------------|
| 20324A□                   | 324 <sup>-0.1</sup> <sub>-0.3</sub> | 270 (54 × 5)  | 31.7 <sup>0</sup> <sub>-0.2</sub> | 13.7 <sup>0</sup> <sub>-0.2</sub> | 40.3 <sup>0</sup> <sub>-0.2</sub> | 62 <sup>+0.6</sup> <sub>0</sub> | 6  | 3.4               |
| 20540A□                   | 540 <sup>-0.1</sup> <sub>-0.3</sub> | 486 (54 × 9)  | 31.7 <sup>0</sup> <sub>-0.2</sub> | 13.7 <sup>0</sup> <sub>-0.2</sub> | 40.3 <sup>0</sup> <sub>-0.2</sub> | 62 <sup>+0.6</sup> <sub>0</sub> | 10 | 5.7               |
| 20756A□                   | 756 <sup>-0.1</sup> <sub>-0.3</sub> | 702 (54 × 13) | 31.7 <sup>0</sup> <sub>-0.2</sub> | 13.7 <sup>0</sup> <sub>-0.2</sub> | 40.3 <sup>0</sup> <sub>-0.2</sub> | 62 <sup>+0.6</sup> <sub>0</sub> | 14 | 7.9               |

# ◆ Magnetic Ways with Bases: SGLTM-20□□□AY

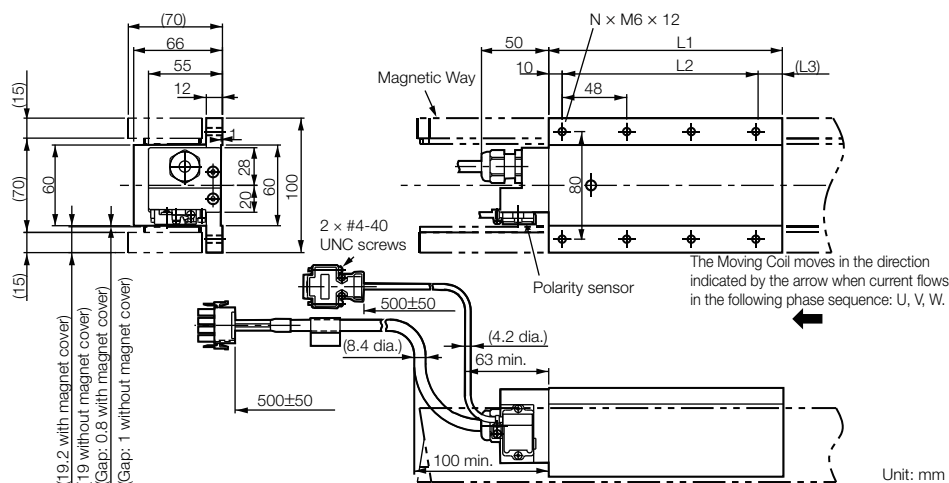


Note: Two Magnetic Way tracks are used together as a set. More than one Magnetic Way can be connected.

| Magnetic Way Model<br>SGLTM- | L1                           | L2  | L3  | L4  | L5  | N1 | N2 | Approx.<br>Mass [kg] |
|------------------------------|------------------------------|-----|-----|-----|-----|----|----|----------------------|
| 20324AY                      | 324 <sup>-0.1<br/>-0.3</sup> | 270 | 310 | 162 | 162 | 6  | 2  | 5.1                  |
| 20540AY                      | 540 <sup>-0.1<br/>-0.3</sup> | 486 | 526 | 378 | 189 | 10 | 3  | 8.5                  |
| 20756AY                      | 756 <sup>-0.1<br/>-0.3</sup> | 702 | 742 | 594 | 198 | 14 | 4  | 12                   |

## SGLTW-35: Standard Models

### ◆ Moving Coils: SGLTW-35A□□□□□

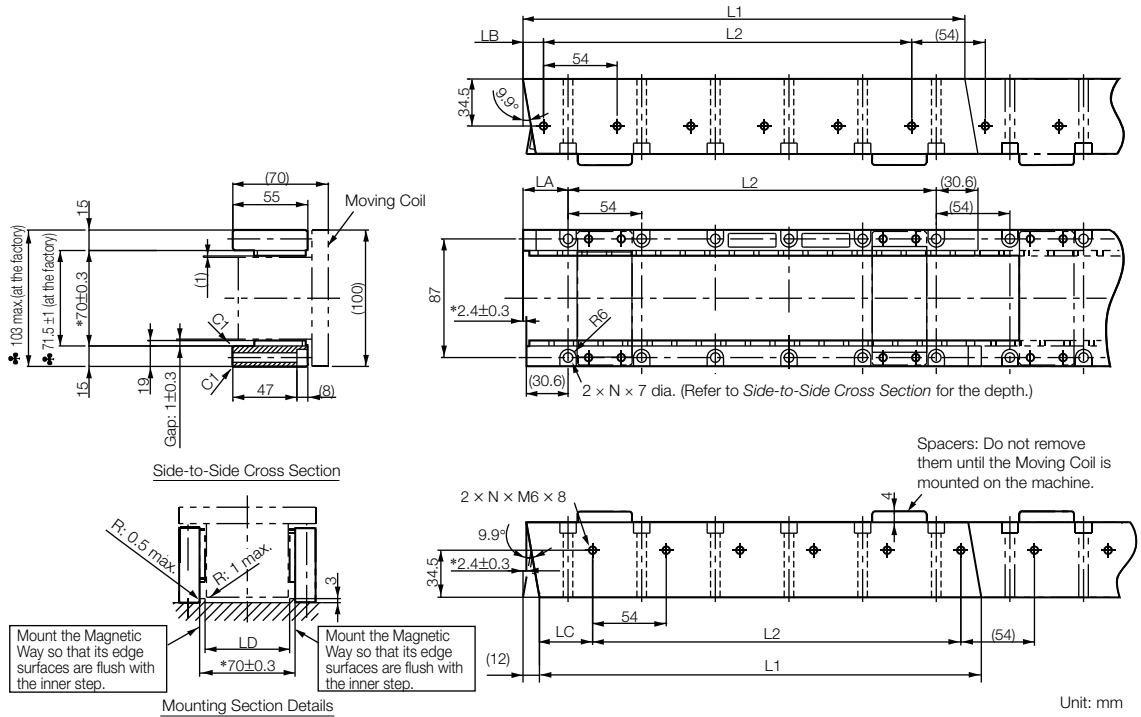


| Moving Coil Model<br>SGLTW- | L1  | L2           | (L3) | N  | Approx. Mass<br>[kg] |
|-----------------------------|-----|--------------|------|----|----------------------|
| 35A170A□                    | 170 | 144 (48 × 3) | (16) | 8  | 3.7                  |
| 35A320A□                    | 315 | 288 (48 × 6) | (17) | 14 | 6.8                  |
| 35A460A□                    | 460 | 432 (48 × 9) | (18) | 20 | 10                   |

Refer to the following section for the connector specifications for the Sensor Cable and Servo Motor Main Circuit Cable.

🔌 SGLTW-20A□□□□□ and -35A□□□□□ Moving Coils (page 396)

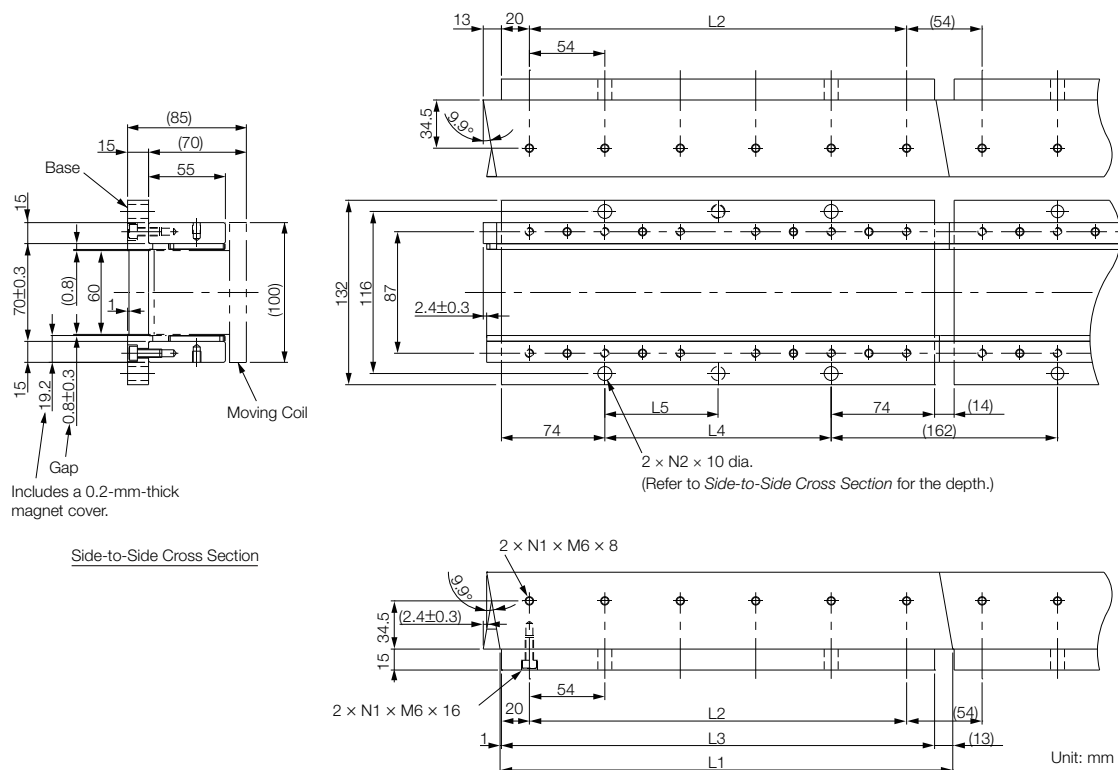
# ◆ Magnetic Ways: SGLTM-35□□□A□



- Note: 1. Two Magnetic Way tracks are used together as a set. For safety, when they are shipped, the two tracks are secured to a mounting spacer made from aluminum.
2. More than one Magnetic Way can be connected.
3. Dimensions with asterisks are the distances between the Magnetic Way tracks. Install the tracks according to the specified dimensions. Observe the dimensions given in Mounting Section Details after installation. Dimensions when the Magnetic Way is shipped from the factory are indicated by ♣.
4. Use socket head screws of strength class 10.9 or higher for the Magnetic Way mounting screws. (Do not use stainless steel screws.)

| Magnetic Way Model<br>SGLTM- | L1                                  | L2            | LA                              | LB                              | LC                              | LD                              | N  | Approx.<br>Mass [kg] |
|------------------------------|-------------------------------------|---------------|---------------------------------|---------------------------------|---------------------------------|---------------------------------|----|----------------------|
| 35324A□                      | 324 <sup>-0.1</sup> <sub>-0.3</sub> | 270 (54 × 5)  | 33 <sup>0</sup> <sub>-0.2</sub> | 15 <sup>0</sup> <sub>-0.2</sub> | 39 <sup>0</sup> <sub>-0.2</sub> | 62 <sup>+0.6</sup> <sub>0</sub> | 6  | 4.8                  |
| 35540A□                      | 540 <sup>-0.1</sup> <sub>-0.3</sub> | 486 (54 × 9)  | 33 <sup>0</sup> <sub>-0.2</sub> | 15 <sup>0</sup> <sub>-0.2</sub> | 39 <sup>0</sup> <sub>-0.2</sub> | 62 <sup>+0.6</sup> <sub>0</sub> | 10 | 8                    |
| 35756A□                      | 756 <sup>-0.1</sup> <sub>-0.3</sub> | 702 (54 × 13) | 33 <sup>0</sup> <sub>-0.2</sub> | 15 <sup>0</sup> <sub>-0.2</sub> | 39 <sup>0</sup> <sub>-0.2</sub> | 62 <sup>+0.6</sup> <sub>0</sub> | 14 | 11                   |

# ◆ Magnetic Ways with Bases: SGLTM-35□□□AY

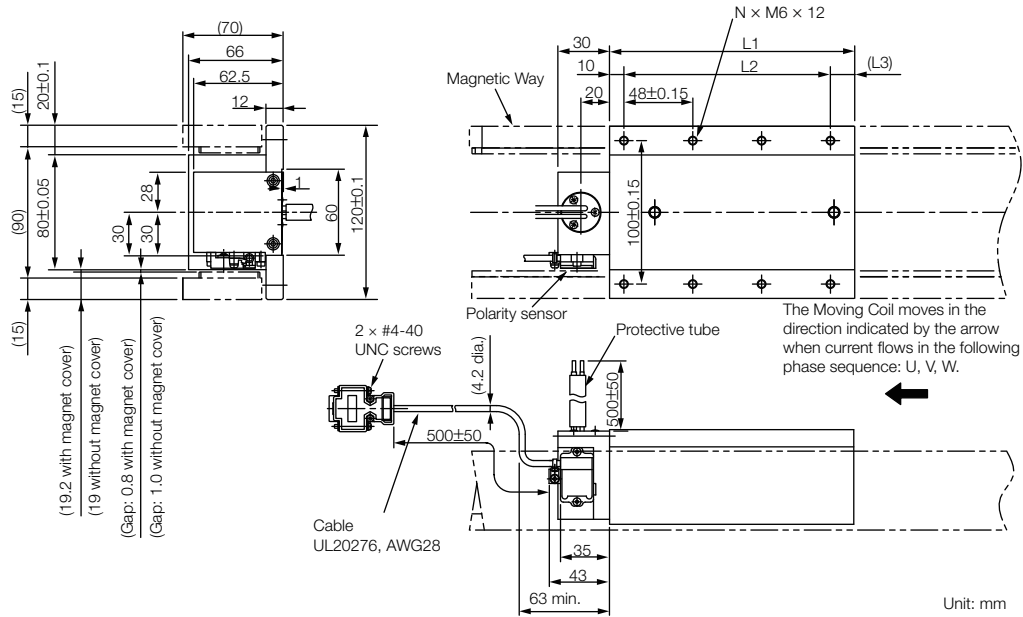


Note: Two Magnetic Way tracks are used together as a set. More than one Magnetic Way can be connected.

| Magnetic Way Model<br>SGLTM- | L1                           | L2  | L3  | L4  | L5  | N1 | N2 | Approx.<br>Mass [kg] |
|------------------------------|------------------------------|-----|-----|-----|-----|----|----|----------------------|
| 35324AY                      | 324 <sup>-0.1<br/>-0.3</sup> | 270 | 310 | 162 | 162 | 6  | 2  | 6.4                  |
| 35540AY                      | 540 <sup>-0.1<br/>-0.3</sup> | 486 | 526 | 378 | 189 | 10 | 3  | 11                   |
| 35756AY                      | 756 <sup>-0.1<br/>-0.3</sup> | 702 | 742 | 594 | 198 | 14 | 4  | 15                   |

## SGLTW-35□□□□H□ : High-Efficiency Models

### ◆ Moving Coils: SGLTW-35A□□□□H□

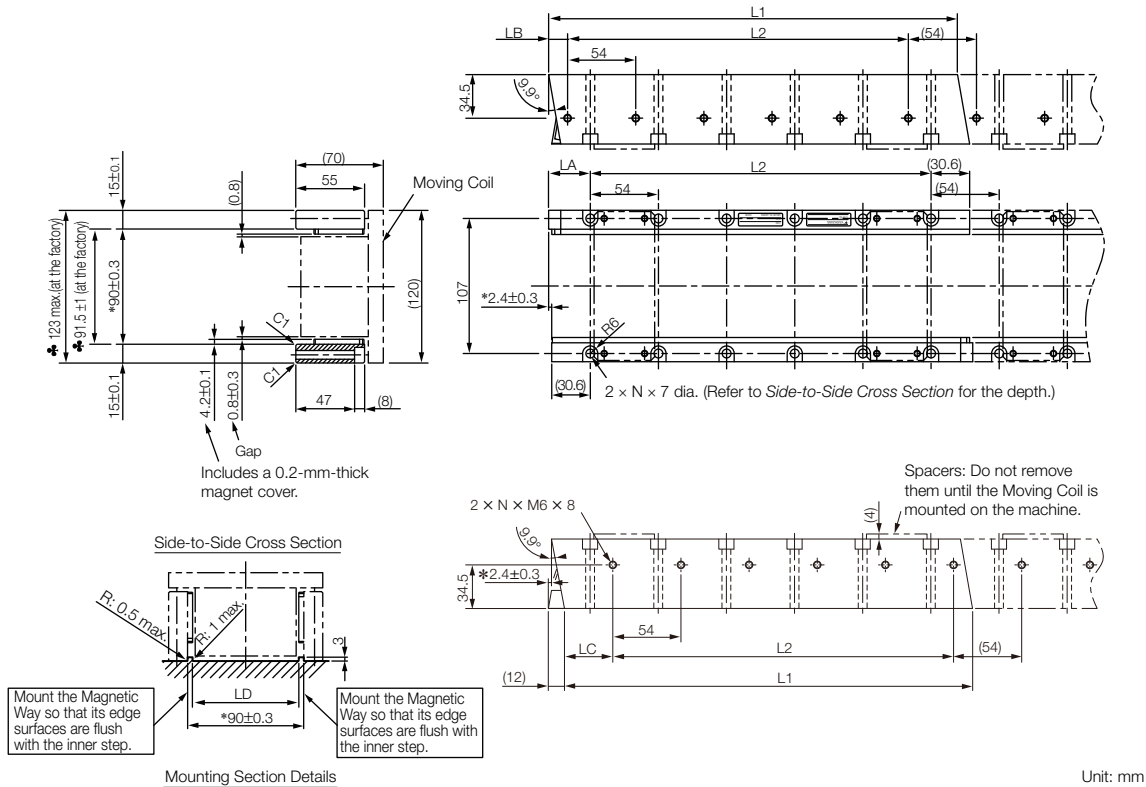


| Moving Coil Model<br>SGLTW- | L1  | L2           | L3   | N  | Approx. Mass<br>[kg] |
|-----------------------------|-----|--------------|------|----|----------------------|
| 35A170H□                    | 170 | 144 (48 × 3) | (16) | 8  | 4.7                  |
| 35A320H□                    | 315 | 288 (48 × 6) | (17) | 14 | 8.8                  |

Refer to the following section for the connector specifications for the Sensor Cable and Servo Motor Main Circuit Cable.

🔧 SGLTW-35A□□□□H□ and -50A□□□□H□ Moving Coils (page 398)

# ◆ Magnetic Ways: SGLTM-35□□□H□

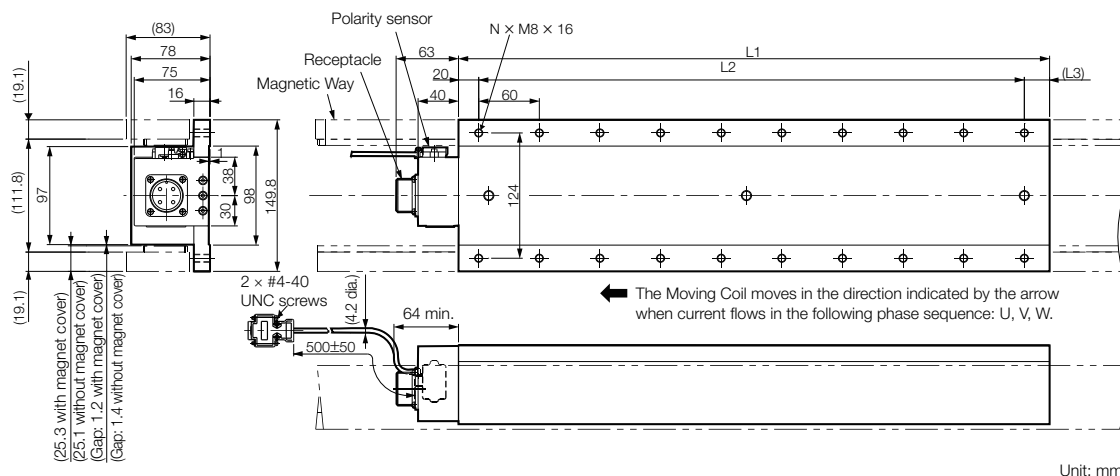


- Note: 1. Two Magnetic Way tracks are used together as a set. For safety, when they are shipped, the two tracks are secured to a mounting spacer made from aluminum.
2. More than one Magnetic Way can be connected.
3. Dimensions with asterisks are the distances between the Magnetic Way tracks. Install the tracks according to the specified dimensions. Observe the dimensions given in Mounting Section Details after installation. Dimensions when the Magnetic Way is shipped from the factory are indicated by ♣.
4. Use socket head screws of strength class 10.9 or higher for the Magnetic Way mounting screws. (Do not use stainless steel screws.)

| Magnetic Way Model<br>SGLTM- | L1                                  | L2            | LA                              | LB                              | LC                              | LD                              | N  | Approx.<br>Mass [kg] |
|------------------------------|-------------------------------------|---------------|---------------------------------|---------------------------------|---------------------------------|---------------------------------|----|----------------------|
| 35324H□                      | 324 <sup>-0.1</sup> <sub>-0.3</sub> | 270 (54 × 5)  | 33 <sup>0</sup> <sub>-0.2</sub> | 15 <sup>0</sup> <sub>-0.2</sub> | 39 <sup>0</sup> <sub>-0.2</sub> | 82 <sup>+0.6</sup> <sub>0</sub> | 6  | 4.8                  |
| 35540H□                      | 540 <sup>-0.1</sup> <sub>-0.3</sub> | 486 (54 × 9)  | 33 <sup>0</sup> <sub>-0.2</sub> | 15 <sup>0</sup> <sub>-0.2</sub> | 39 <sup>0</sup> <sub>-0.2</sub> | 82 <sup>+0.6</sup> <sub>0</sub> | 10 | 8                    |
| 35756H□                      | 756 <sup>-0.1</sup> <sub>-0.3</sub> | 702 (54 × 13) | 33 <sup>0</sup> <sub>-0.2</sub> | 15 <sup>0</sup> <sub>-0.2</sub> | 39 <sup>0</sup> <sub>-0.2</sub> | 82 <sup>+0.6</sup> <sub>0</sub> | 14 | 11                   |

## SGLTW-40: Standard Models

### ◆ Moving Coils: SGLTW-40A□□□B□



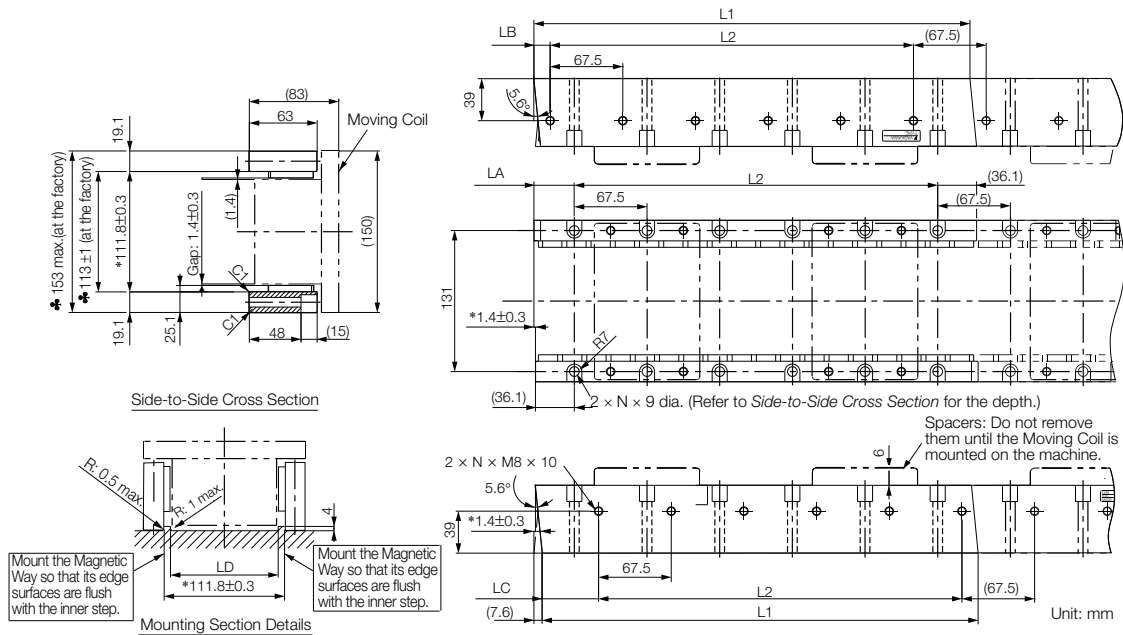
| Moving Coil Model<br>SGLTW- | L1    | L2           | (L3) | N  | Approx. Mass<br>[kg] |
|-----------------------------|-------|--------------|------|----|----------------------|
| 40A400B□                    | 394.2 | 360 (60 × 6) | (15) | 14 | 15                   |
| 40A600B□                    | 574.2 | 540 (60 × 9) | (15) | 20 | 22                   |

Refer to the following section for the connector specifications for the Sensor Cable and Servo Motor Main Circuit Cable.

☞ SGLTW-40A□□□B□ and -80A□□□B□ Moving Coils (page 397)



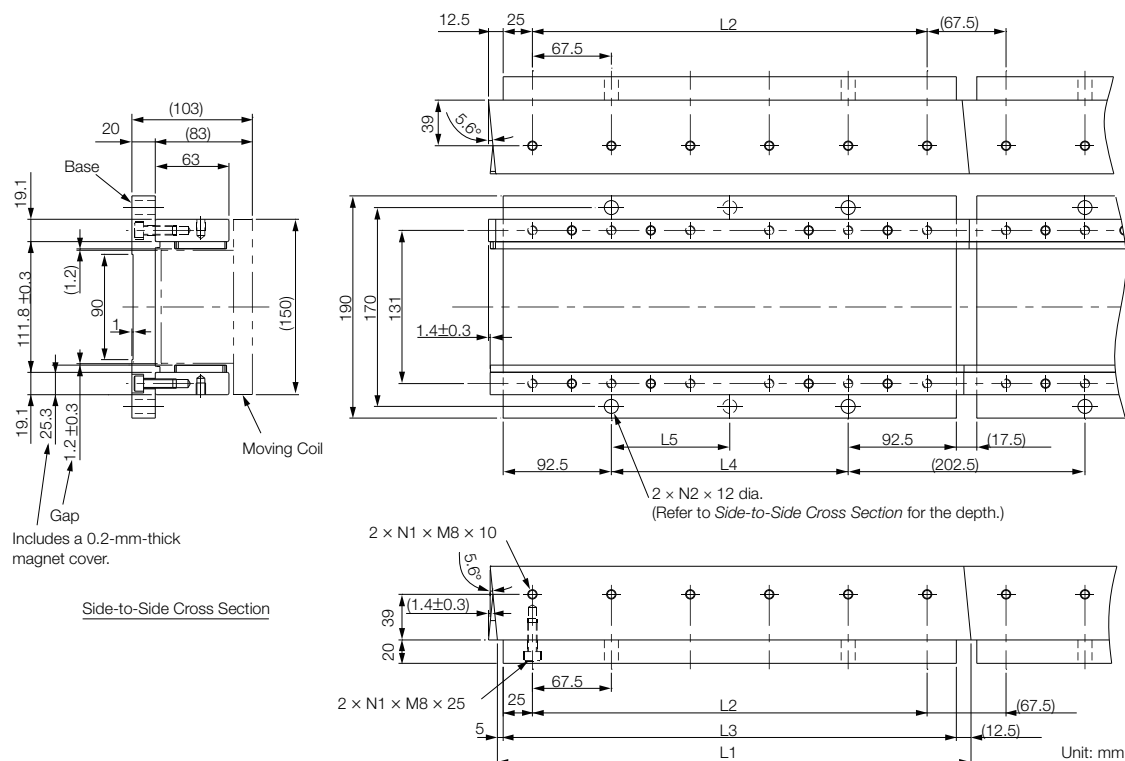
# ◆ Magnetic Ways: SGLTM-40□□□A□



- Note: 1. Two Magnetic Way tracks are used together as a set. For safety, when they are shipped, the two tracks are secured to a mounting spacer made from aluminum.
2. More than one Magnetic Way can be connected.
3. Dimensions with asterisks are the distances between the Magnetic Way tracks. Install the tracks according to the specified dimensions. Observe the dimensions given in Mounting Section Details after installation. Dimensions when the Magnetic Way is shipped from the factory are indicated by ♣.
4. Use socket head screws of strength class 10.9 or higher for the Magnetic Way mounting screws. (Do not use stainless steel screws.)

| Magnetic Way Model<br>SGLTM- | L1                                  | L2                | LA                                | LB                              | LC                                | LD                               | N  | Approx.<br>Mass [kg] |
|------------------------------|-------------------------------------|-------------------|-----------------------------------|---------------------------------|-----------------------------------|----------------------------------|----|----------------------|
| 40405A□                      | 405 <sup>-0.1</sup> <sub>-0.3</sub> | 337.5 (67.5 × 5)  | 37.5 <sup>0</sup> <sub>-0.2</sub> | 15 <sup>0</sup> <sub>-0.2</sub> | 52.5 <sup>0</sup> <sub>-0.2</sub> | 100 <sup>+0.6</sup> <sub>0</sub> | 6  | 9                    |
| 40675A□                      | 675 <sup>-0.1</sup> <sub>-0.3</sub> | 607.5 (67.5 × 9)  | 37.5 <sup>0</sup> <sub>-0.2</sub> | 15 <sup>0</sup> <sub>-0.2</sub> | 52.5 <sup>0</sup> <sub>-0.2</sub> | 100 <sup>+0.6</sup> <sub>0</sub> | 10 | 15                   |
| 40945A□                      | 945 <sup>-0.1</sup> <sub>-0.3</sub> | 877.5 (67.5 × 13) | 37.5 <sup>0</sup> <sub>-0.2</sub> | 15 <sup>0</sup> <sub>-0.2</sub> | 52.5 <sup>0</sup> <sub>-0.2</sub> | 100 <sup>+0.6</sup> <sub>0</sub> | 14 | 21                   |

◆ Magnetic Ways with Bases: SGLTM-40□□□AY

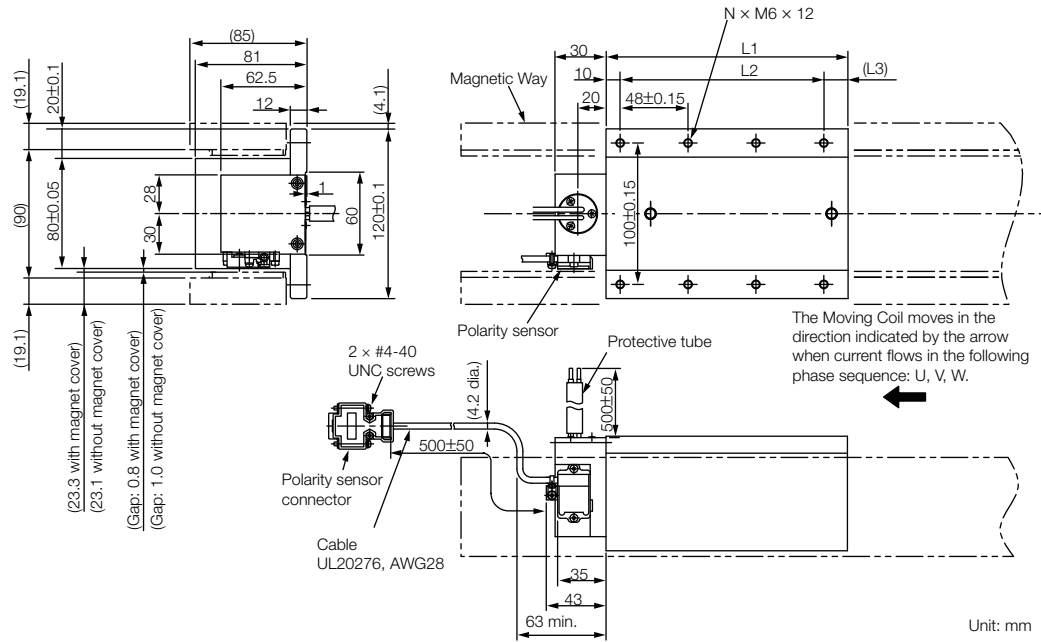


Note: Two Magnetic Way tracks are used together as a set. More than one Magnetic Way can be connected.

| Magnetic Way Model<br>SGLTM- | L1                           | L2    | L3    | L4    | L5     | N1 | N2 | Approx.<br>Mass [kg] |
|------------------------------|------------------------------|-------|-------|-------|--------|----|----|----------------------|
| 40405AY                      | 405 <sup>-0.1<br/>-0.3</sup> | 337.5 | 387.5 | 202.5 | 202.5  | 6  | 2  | 13                   |
| 40675AY                      | 675 <sup>-0.1<br/>-0.3</sup> | 607.5 | 657.5 | 472.5 | 236.25 | 10 | 3  | 21                   |
| 40945AY                      | 945 <sup>-0.1<br/>-0.3</sup> | 877.5 | 927.5 | 742.5 | 247.5  | 14 | 4  | 30                   |

## SGLTW-50: High-Efficiency Models

### ◆ Moving Coils: SGLTW-50A□□□H□

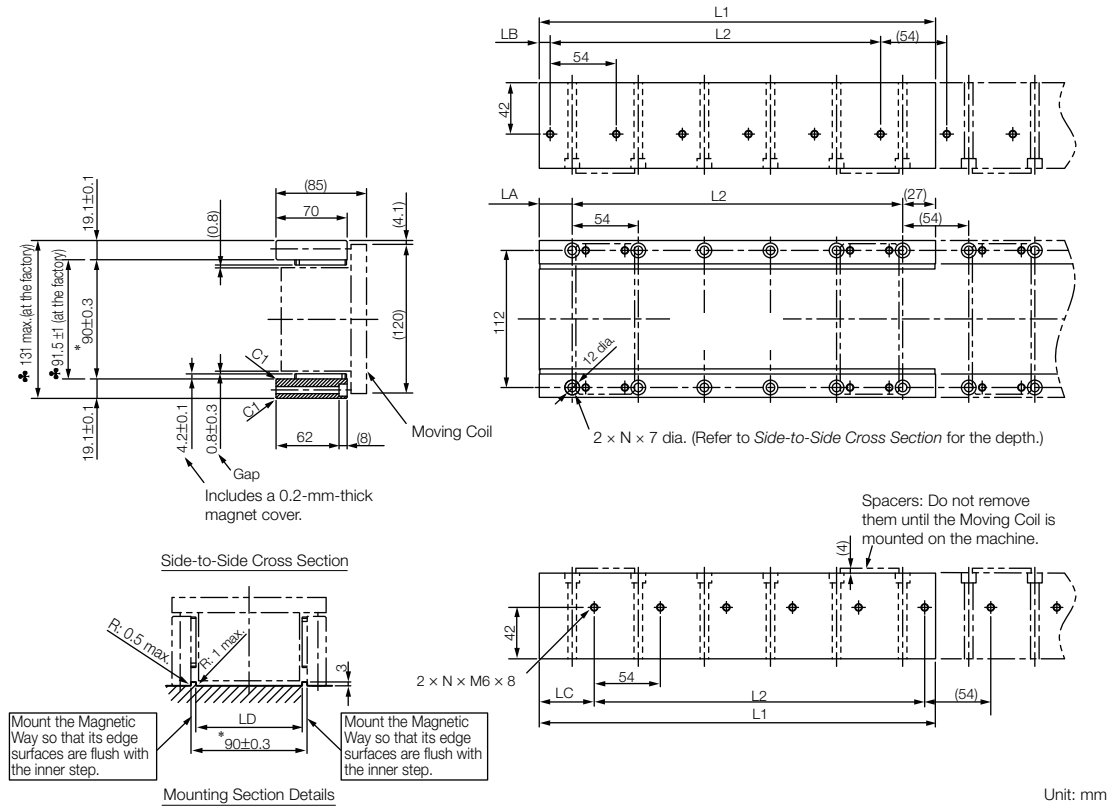


| Moving Coil Model<br>SGLTW- | L1  | L2           | (L3) | N  | Approx. Mass<br>[kg] |
|-----------------------------|-----|--------------|------|----|----------------------|
| 50A170H□                    | 170 | 144 (48 × 3) | (16) | 8  | 6                    |
| 50A320H□                    | 315 | 288 (48 × 6) | (17) | 14 | 11                   |

Refer to the following section for the connector specifications for the Sensor Cable and Servo Motor Main Circuit Cable.

☞ SGLTW-35A□□□H□ and -50A□□□H□ Moving Coils (page 398)

# ◆ Magnetic Ways: SGLTM-50□□□H□

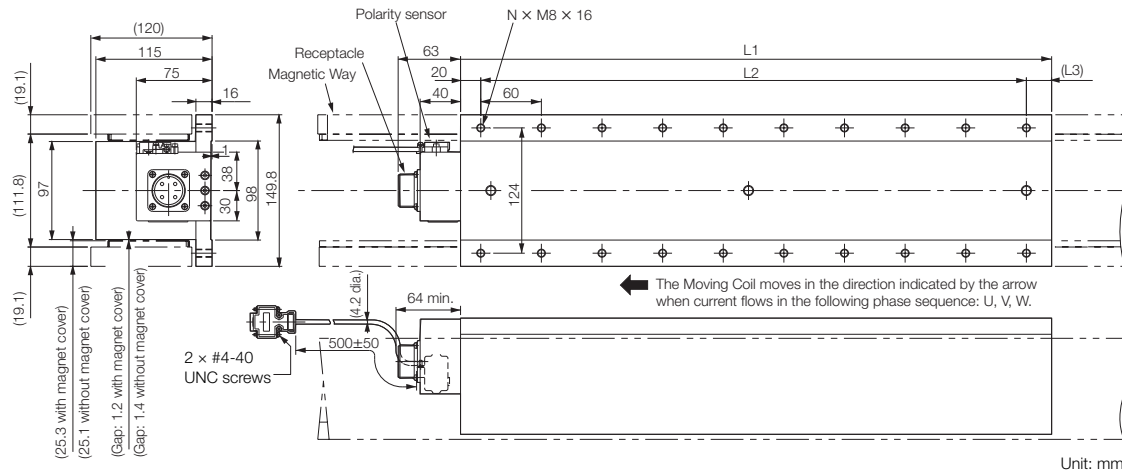


- Note: 1. Two Magnetic Way tracks are used together as a set. For safety, when they are shipped, the two tracks are secured to a mounting spacer made from aluminum.
2. More than one Magnetic Way can be connected.
3. Dimensions with asterisks are the distances between the Magnetic Way tracks. Install the tracks according to the specified dimensions. Observe the dimensions given in Mounting Section Details after installation. Dimensions when the Magnetic Way is shipped from the factory are indicated by ♣.
4. Use socket head screws of strength class 10.9 or higher for the Magnetic Way mounting screws. (Do not use stainless steel screws.)

| Magnetic Way Model<br>SGLTM- | L1                                  | L2            | LA                              | LB                             | LC                              | LD                              | N  | Approx.<br>Mass [kg] |
|------------------------------|-------------------------------------|---------------|---------------------------------|--------------------------------|---------------------------------|---------------------------------|----|----------------------|
| 50324H□                      | 324 <sup>-0.1</sup> <sub>-0.3</sub> | 270 (54 × 5)  | 27 <sup>0</sup> <sub>-0.2</sub> | 9 <sup>0</sup> <sub>-0.2</sub> | 45 <sup>0</sup> <sub>-0.2</sub> | 82 <sup>+0.6</sup> <sub>0</sub> | 6  | 8                    |
| 50540H□                      | 540 <sup>-0.1</sup> <sub>-0.3</sub> | 486 (54 × 9)  | 27 <sup>0</sup> <sub>-0.2</sub> | 9 <sup>0</sup> <sub>-0.2</sub> | 45 <sup>0</sup> <sub>-0.2</sub> | 82 <sup>+0.6</sup> <sub>0</sub> | 10 | 13                   |
| 50756H□                      | 756 <sup>-0.1</sup> <sub>-0.3</sub> | 702 (54 × 13) | 27 <sup>0</sup> <sub>-0.2</sub> | 9 <sup>0</sup> <sub>-0.2</sub> | 45 <sup>0</sup> <sub>-0.2</sub> | 82 <sup>+0.6</sup> <sub>0</sub> | 14 | 18                   |

## SGLTW-80: Standard Models

### ◆ Moving Coils: SGLTW-80A□□□B□

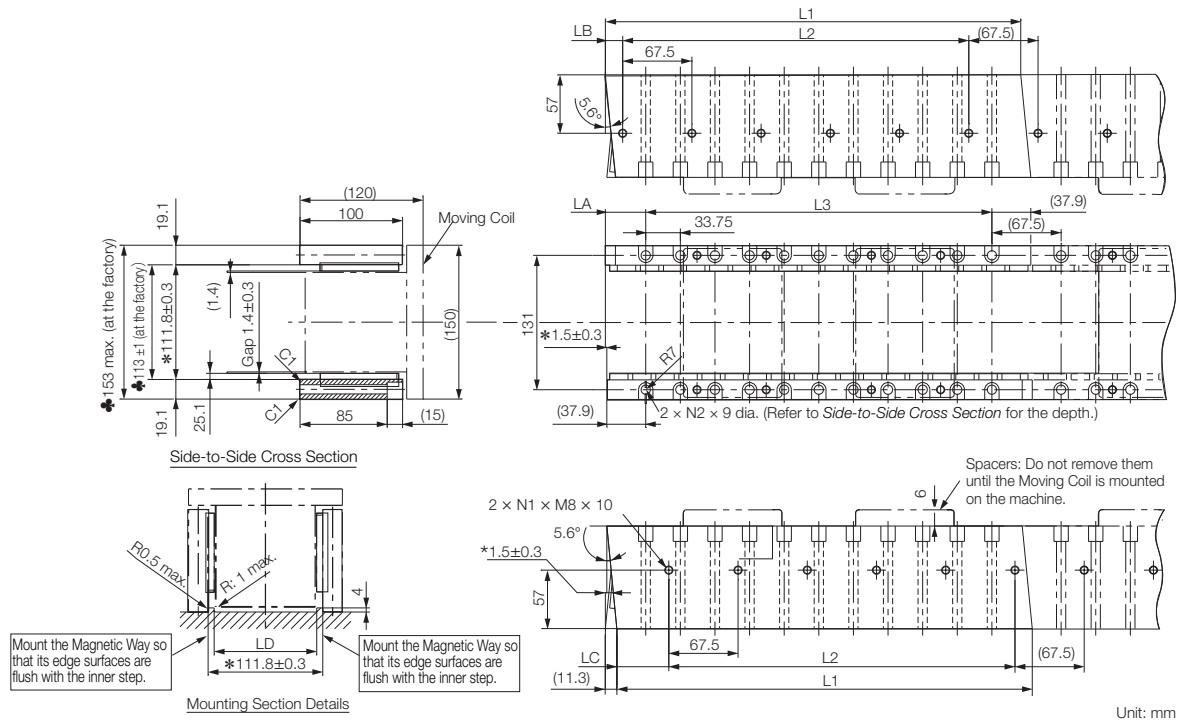


| Moving Coil Model<br>SGLTW- | L1    | L2           | (L3) | N  | Approx. Mass<br>[kg] |
|-----------------------------|-------|--------------|------|----|----------------------|
| 80A400B□                    | 394.2 | 360 (60 × 6) | (15) | 14 | 24                   |
| 80A600B□                    | 574.2 | 540 (60 × 9) | (15) | 20 | 35                   |

Refer to the following section for the connector specifications for the Sensor Cable and Servo Motor Main Circuit Cable.

☞ SGLTW-40A□□□B□ and -80A□□□B□ Moving Coils (page 397)

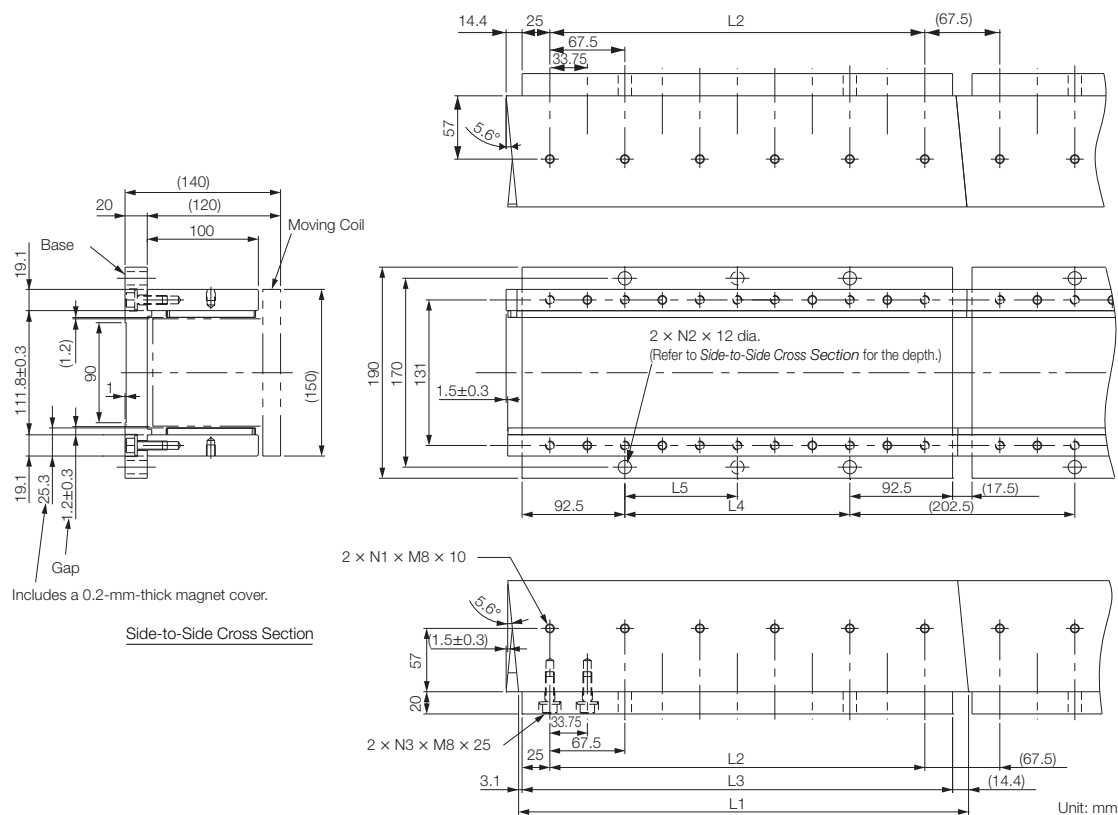
# ◆ Magnetic Ways: SGLTM-80□□□A□



- Note: 1. Two Magnetic Way tracks are used together as a set. For safety, when they are shipped, the two tracks are secured to a mounting spacer made from aluminum.
2. More than one Magnetic Way can be connected.
3. Dimensions with asterisks are the distances between the Magnetic Way tracks. Install the tracks according to the specified dimensions. Observe the dimensions given in Mounting Section Details after installation. Dimensions when the Magnetic Way is shipped from the factory are indicated by ♣.
4. Use socket head screws of strength class 10.9 or higher for the Magnetic Way mounting screws. (Do not use stainless steel screws.)

| Magnetic Way Model SGLTM- | L1                                  | L2                   | L3                    | LA                                | LB                                | LC                                | LD                               | N1 | N2 | Approx. Mass [kg] |
|---------------------------|-------------------------------------|----------------------|-----------------------|-----------------------------------|-----------------------------------|-----------------------------------|----------------------------------|----|----|-------------------|
| 80405A□                   | 405 <sup>-0.1</sup> <sub>-0.3</sub> | 337.5<br>(67.5 × 5)  | 337.5<br>(33.75 × 10) | 39.4 <sup>0</sup> <sub>-0.2</sub> | 16.9 <sup>0</sup> <sub>-0.2</sub> | 50.6 <sup>0</sup> <sub>-0.2</sub> | 100 <sup>+0.6</sup> <sub>0</sub> | 6  | 11 | 14                |
| 80675A□                   | 675 <sup>-0.1</sup> <sub>-0.3</sub> | 607.5<br>(67.5 × 9)  | 607.5<br>(33.75 × 18) | 39.4 <sup>0</sup> <sub>-0.2</sub> | 16.9 <sup>0</sup> <sub>-0.2</sub> | 50.6 <sup>0</sup> <sub>-0.2</sub> | 100 <sup>+0.6</sup> <sub>0</sub> | 10 | 19 | 24                |
| 80945A□                   | 945 <sup>-0.1</sup> <sub>-0.3</sub> | 877.5<br>(67.5 × 13) | 887.5<br>(33.75 × 26) | 39.4 <sup>0</sup> <sub>-0.2</sub> | 16.9 <sup>0</sup> <sub>-0.2</sub> | 50.6 <sup>0</sup> <sub>-0.2</sub> | 100 <sup>+0.6</sup> <sub>0</sub> | 14 | 27 | 34                |

# ◆ Magnetic Ways with Bases: SGLTM-80□□□AY



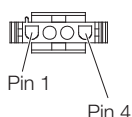
Note: Two Magnetic Way tracks are used together as a set. More than one Magnetic Way can be connected.

| Magnetic Way Model SGLTM- | L1                                  | L2    | L3    | L4    | L5     | N1 | N2 | N3 | Approx. Mass [kg] |
|---------------------------|-------------------------------------|-------|-------|-------|--------|----|----|----|-------------------|
| 80405AY                   | 405 <sup>+0.1</sup> <sub>-0.3</sub> | 337.5 | 387.5 | 202.5 | 202.5  | 6  | 2  | 11 | 18                |
| 80675AY                   | 675 <sup>+0.1</sup> <sub>-0.3</sub> | 607.5 | 657.5 | 472.5 | 236.25 | 10 | 3  | 19 | 31                |
| 80945AY                   | 945 <sup>+0.1</sup> <sub>-0.3</sub> | 877.5 | 927.5 | 742.5 | 247.5  | 14 | 4  | 27 | 43                |

## Connector Specifications

### ◆ SGLTW-20A□□□A□ and -35A□□□A□ Moving Coils

#### • Servo Motor Connector



Plug: 350779-1  
 Pins: 350218-3 or 350547-3 (No.1 to 3)  
 350654-1 or 350669-1 (No. 4)  
 Tyco Electronics Japan G.K.

Mating Connector  
 Cap: 350780-1  
 Socket: 350537-3 or 350550-3

#### • Polarity Sensor Connector

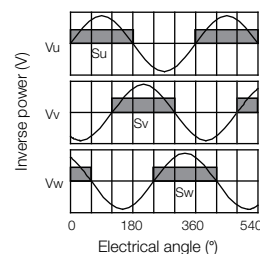


Pin connector: 17JE-23090-02 (D8C) -CG  
 From DDK Ltd.

Mating Connector  
 Socket connector: 17JE-13090-02 (D8C) A-CG  
 Studs: 17L-002C or 17L-002C1

#### • Polarity Sensor Output Signal

The figure on the right shows the relationship between the Su, Sv, and Sw polarity sensor output signals and the inverse power of each motor phase Vu, Vv, and Vw when the Moving Coil moves in the direction indicated by the arrow in the dimensional drawings of the Moving Coil.





## ◆ SGLTW-40A□□□B□ and -80A□□□B□ Moving Coils

### • Servo Motor Connector



Receptacle: MS3102A-22-22P  
From DDK Ltd.

Mating Connector  
Right-angle plug: MS3108B22-22S  
Straight plug: MS3106B22-22S  
Cable clamp: MS3057-12A

### • Polarity Sensor Connector

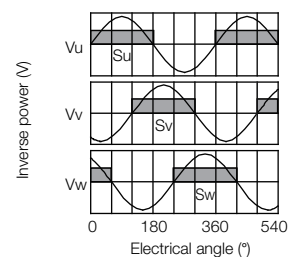


Pin connector: 17JE-23090-02 (D8C) -CG  
From DDK Ltd.

Mating Connector  
Socket connector: 17JE-13090-02 (D8C) A-CG  
Studs: 17L-002C or 17L-002C1

### • Polarity Sensor Output Signal

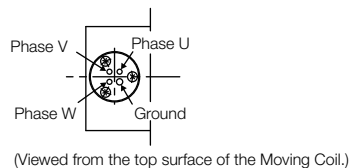
The figure on the right shows the relationship between the Su, Sv, and Sw polarity sensor output signals and the inverse power of each motor phase Vu, Vv, and Vw when the Moving Coil moves in the direction indicated by the arrow in the dimensional drawings of the Moving Coil.



#### ◆ SGLTW-35A□□□H□ and -50A□□□H□ Moving Coils

##### • Moving Coil Lead

Secure the lead from the Moving Coil of the Linear Servo Motor so that it moves together with the Moving Coil.



##### • Polarity Sensor Connector



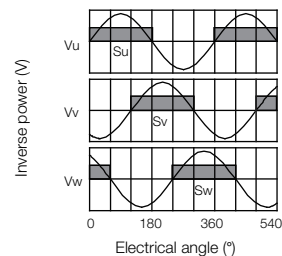
Pin connector: 17JE-23090-02 (D8C) -CG  
From DDK Ltd.

Mating Connector

Socket connector: 17JE-13090-02 (D8C) A-CG  
Studs: 17L-002C or 17L-002C1

##### • Polarity Sensor Output Signal

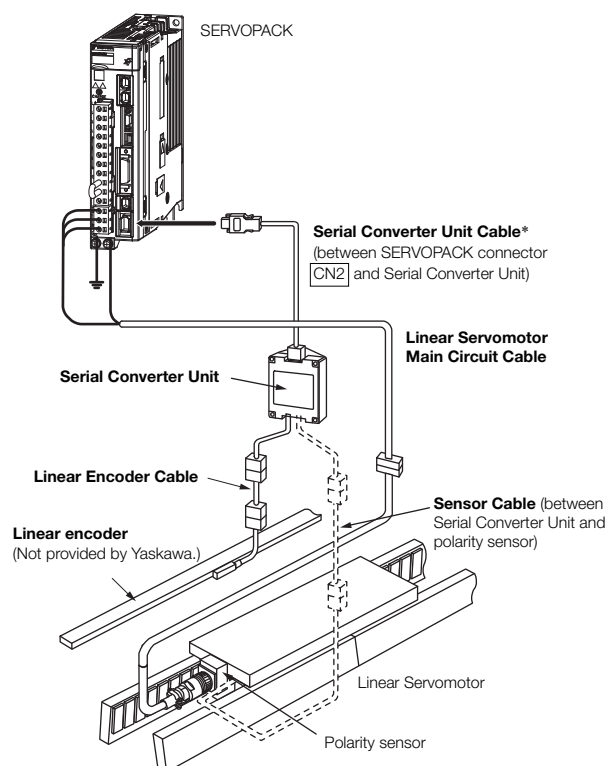
The figure on the right shows the relationship between the  $S_u$ ,  $S_v$ , and  $S_w$  polarity sensor output signals and the inverse power of each motor phase  $V_u$ ,  $V_v$ , and  $V_w$  when the Moving Coil moves in the direction indicated by the arrow in the dimensional drawings of the Moving Coil.



## Cables for Linear Servo Motors

### ◆ System Configurations

Example: SGLTW Servo Motors with T-type Iron Cores



\* You can connect directly to an absolute linear encoder.

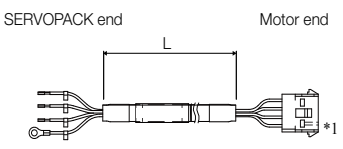
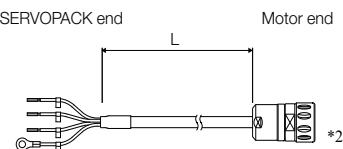
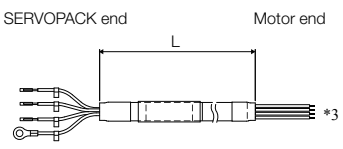
Note: 1. The above system configurations are for SGLTW Servo Motors with T-type Iron Cores. Refer to the manual for the Linear Servo Motor for configurations with other models.

2. Refer to the following manual for the following information.

- Cable dimensional drawings and cable connection specifications
- Order numbers and specifications of individual connectors for cables
- Order numbers and specifications for wiring materials

📖 *Σ-7-Series AC Servo Drive Peripheral Device Selection Manual* (Manual No.: SIEP S800001 32)

## Servo Motor Main Circuit Cables

| Servo Motor Model                     | Length (L) | Order Number    | Appearance                                                                           |
|---------------------------------------|------------|-----------------|--------------------------------------------------------------------------------------|
| SGLTW-20A, -35A                       | 1 m        | JZSP-CLN21-01-E |   |
|                                       | 3 m        | JZSP-CLN21-03-E |                                                                                      |
|                                       | 5 m        | JZSP-CLN21-05-E |                                                                                      |
|                                       | 10 m       | JZSP-CLN21-10-E |                                                                                      |
|                                       | 15 m       | JZSP-CLN21-15-E |                                                                                      |
|                                       | 20 m       | JZSP-CLN21-20-E |                                                                                      |
| SGLTW-<br>□ □ A □ □ □ □ □ D           | 1 m        | JZSP-CLN14-01-E |   |
|                                       | 3 m        | JZSP-CLN14-03-E |                                                                                      |
|                                       | 5 m        | JZSP-CLN14-05-E |                                                                                      |
|                                       | 10 m       | JZSP-CLN14-10-E |                                                                                      |
|                                       | 15 m       | JZSP-CLN14-15-E |                                                                                      |
|                                       | 20 m       | JZSP-CLN14-20-E |                                                                                      |
| SGLTW-40□ □ □ □ B □<br>-80□ □ □ □ B □ | 1 m        | JZSP-CLN39-01-E |  |
|                                       | 3 m        | JZSP-CLN39-03-E |                                                                                      |
|                                       | 5 m        | JZSP-CLN39-05-E |                                                                                      |
|                                       | 10 m       | JZSP-CLN39-10-E |                                                                                      |
|                                       | 15 m       | JZSP-CLN39-15-E |                                                                                      |
|                                       | 20 m       | JZSP-CLN39-20-E |                                                                                      |

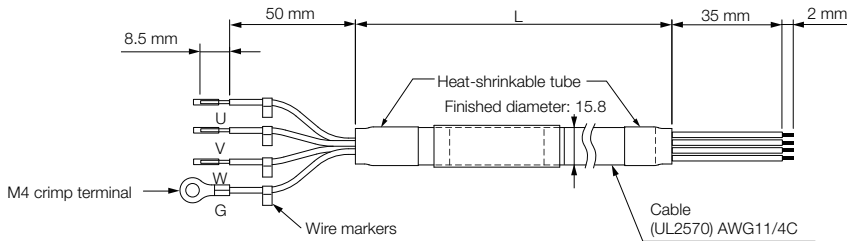
Note: Shaded model numbers are non-stock items

\*1. Connector from Tyco Electronics Japan G.K.

\*2. Connector from Interconnectron GmbH

\*3. A connector is not provided on the Linear Servo Motor end. Obtain a connector according to your specifications. Refer to the next page for information on connectors.

## JZSP-CLN39-□ □ -E Cables



### ◆ Wiring Specifications

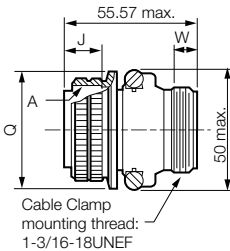
| SERVOPACK Leads |         | Servo Motor Connector |     |
|-----------------|---------|-----------------------|-----|
| Wire Color      | Signal  | Signal                | Pin |
| Red             | Phase U | Phase U               | A   |
| White           | Phase V | Phase V               | B   |
| Blue            | Phase W | Phase W               | C   |
| Green/yellow    | FG      | FG                    | D   |

### ◆ JZSP-CLN39 Cable Connectors

| Applicable Servo Motor | Connector Provided with Servo Motor | Plug                           |               | Cable Clamp |
|------------------------|-------------------------------------|--------------------------------|---------------|-------------|
|                        |                                     | Straight                       | Right-angle   |             |
| SGLTW-40 and -80       | MS3102A22-22P                       | MS3106B22-22S or MS3106A22-22S | MS3108B22-22S | MS3057-12A  |

### ◆ MS3106B22-2S: Straight Plug with Two-piece Shell

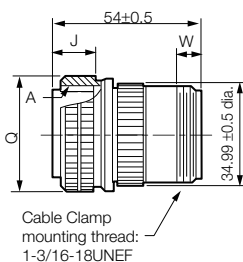
Unit: mm



| Shell Size | Joint Thread A | Length of Joint J $\pm 0.12$ | Joint Nut Outer Diameter Q $^{+0}_{-0.38}$ | Effective Thread Length W min. |
|------------|----------------|------------------------------|--------------------------------------------|--------------------------------|
| 22         | 1-3/8-18UNEF   | 18.26                        | 40.48                                      | 9.53                           |

### ◆ MS3106A22-2S: Straight Plug with Solid Shell

Unit: mm



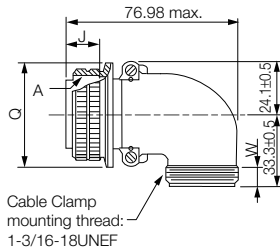
| Shell Size | Joint Thread A | Length of Joint J $\pm 0.12$ | Joint Nut Outer Diameter Q $^{+0}_{-0.38}$ | Effective Thread Length W min. |
|------------|----------------|------------------------------|--------------------------------------------|--------------------------------|
| 22         | 1-3/8-18UNEF   | 18.26                        | 40.48                                      | 9.53                           |

## Linear Servo Motors

SGLT (Models with T-type Iron Cores)

### ◆ MS3108B22-2S: Right-angle Plug with Two-piece Shell

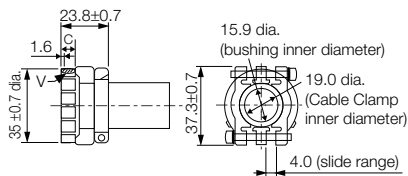
Unit: mm



| Shell Size | Joint Thread A | Length of Joint $J \pm 0.12$ | Joint Nut Outer Diameter $Q \begin{smallmatrix} +0 \\ -0.38 \end{smallmatrix}$ | Effective Thread Length W min. |
|------------|----------------|------------------------------|--------------------------------------------------------------------------------|--------------------------------|
| 22         | 1-3/8-18UNEF   | 18.26                        | 40.48                                                                          | 9.53                           |

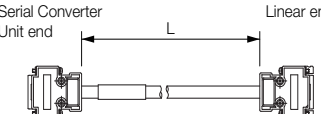
### ◆ Dimensional Drawings: MS3057-12A Cable Clamp with Rubber Bushing

Unit: mm



| Applicable Connector Shell Size | Effective Thread Length C | Mounting Thread V | Attached Bushing |
|---------------------------------|---------------------------|-------------------|------------------|
| 20.22                           | 10.3                      | 1-3/16-18UNEF     | AN3420-12        |

## Linear Encoder Cables

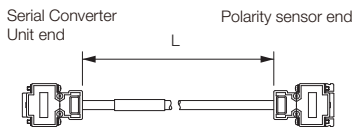
| Name                                           | Servo Motor Model | Length* (L) | Order Number    | Appearance                                                                            |
|------------------------------------------------|-------------------|-------------|-----------------|---------------------------------------------------------------------------------------|
| For linear encoder from Renishaw PLC           | All Models        | 1 m         | JZSP-CLL00-01-E |  |
|                                                |                   | 3 m         | JZSP-CLL00-03-E |                                                                                       |
|                                                |                   | 5 m         | JZSP-CLL00-05-E |                                                                                       |
|                                                |                   | 10 m        | JZSP-CLL00-10-E |                                                                                       |
|                                                |                   | 15 m        | JZSP-CLL00-15-E |                                                                                       |
| For linear encoder from Heidenhain Corporation |                   | 1 m         | JZSP-CLL30-01-E |                                                                                       |
|                                                |                   | 3 m         | JZSP-CLL30-03-E |                                                                                       |
|                                                |                   | 5 m         | JZSP-CLL30-05-E |                                                                                       |
|                                                |                   | 10 m        | JZSP-CLL30-10-E |                                                                                       |
|                                                |                   | 15 m        | JZSP-CLL30-15-E |                                                                                       |

\* When using a JZDP-J00□ -□ □ □ -E Serial Converter Unit, do not exceed a cable length of 3 m.

## Serial Converter Unit Cables

| Servo Motor Model | Length (L) | Order Number    | Appearance |
|-------------------|------------|-----------------|------------|
| All Models        | 1 m        | JZSP-CLP70-01-E |            |
|                   | 3 m        | JZSP-CLP70-03-E |            |
|                   | 5 m        | JZSP-CLP70-05-E |            |
|                   | 10 m       | JZSP-CLP70-10-E |            |
|                   | 15 m       | JZSP-CLP70-15-E |            |
|                   | 20 m       | JZSP-CLP70-20-E |            |

## Sensor Cables

| Servo Motor Model | Length (L) | Order Number    | Appearance                                                                                                                                             |
|-------------------|------------|-----------------|--------------------------------------------------------------------------------------------------------------------------------------------------------|
| SGLTW-□ □ A       | 1 m        | JZSP-CLL10-01-E |  <p>Serial Converter Unit end      Polarity sensor end</p> <p>L</p> |
|                   | 3 m        | JZSP-CLL10-03-E |                                                                                                                                                        |
|                   | 5 m        | JZSP-CLL10-05-E |                                                                                                                                                        |
|                   | 10 m       | JZSP-CLL10-10-E |                                                                                                                                                        |
|                   | 15 m       | JZSP-CLL10-15-E |                                                                                                                                                        |

# Recommended Linear Encoders and Cables

## Recommended Linear Encoders

### Incremental Linear Encoders

#### ◆ 1 Vp-p Analog Voltage

You must also use a Yaskawa Serial Converter Unit. The output signal will be multiplied by 8 bits (256 divisions) or 12 bits (4,096 divisions) in the Serial Converter Unit.

| Manufacturer               | Linear Encoder Type | Model   |             |                                                                 | Linear Encoder Pitch [μm] | Resolution [nm] | Maximum Speed <sup>*1</sup> [m/s] | Support for Polarity Sensor Input | Application to Linear Servomotors | Application to Fully-Closed Loop Control | Reference |
|----------------------------|---------------------|---------|-------------|-----------------------------------------------------------------|---------------------------|-----------------|-----------------------------------|-----------------------------------|-----------------------------------|------------------------------------------|-----------|
|                            |                     | Scale   | Sensor Head | Relay Device between SERVOPACK and Linear Encoder <sup>*3</sup> |                           |                 |                                   |                                   |                                   |                                          |           |
| Heidenhain Corporation     | Exposed             | LIDA48□ |             | JZDP-H003/-H006                                                 | 20                        | 78.1            | 5                                 | ✓                                 | ✓                                 | ✓                                        | page 407  |
|                            |                     |         |             | JZDP-J003/-J006                                                 |                           | 4.9             | 2                                 | ✓                                 | ✓                                 | *4                                       | page 408  |
|                            |                     | LIF48□  |             | JZDP-H003/-H006                                                 | 4                         | 15.6            | 1                                 | ✓                                 | ✓                                 | ✓                                        | page 407  |
|                            |                     |         |             | JZDP-J003/-J006                                                 |                           | 1.0             | 0.4                               | ✓                                 | *4                                | *4                                       | page 408  |
| Renishaw plc <sup>*2</sup> | Exposed             | RGS20   | RGH22B      | JZDP-H005/-H008                                                 | 20                        | 78.1            | 5                                 | ✓                                 | ✓                                 | ✓                                        | page 411  |
|                            |                     |         |             | JZDP-J005/-J008                                                 |                           | 4.9             | 2                                 | ✓                                 | ✓                                 | *4                                       | page 412  |

✓: Applicable

\*1. The maximum speeds given in the above table are the maximum applicable speeds of the encoders when combined with a Yaskawa SERVOPACK. The actual speed will be restricted by either the maximum speed of the Linear Servomotor or the maximum speed of the Linear Encoder (given above).

\*2. If you use the origin signals with a Linear Encoder from Renishaw plc, the origin may sometimes be falsely detected. If that occurs, use the BID/DIR signal to output the origin signal only in one direction.

\*3. These are the models of Serial Converter Units.

\*4. Contact your Yaskawa representative.

Note: Confirm detailed specifications, such as the tolerances, dimensions, and operating environment, with the manufacturer of the Linear Encoder before you use it.



### ◆ Encoder for Yaskawa's Serial Interface

The multiplier (number of divisions) depends on the Linear Encoder. Also, you must write the Servomotor constant file to the Linear Encoder in advance.

| Manufac-<br>turer       | Linear<br>Encoder<br>Type | Model                      |                        |                                                         | Linear<br>Encoder<br>r Pitch<br>[μm] | Resolution<br>[nm] | Maximum<br>Speed <sup>*1</sup><br>[m/s] | Support for<br>Polarity Sensor<br>Input | Application to<br>Linear<br>Servomotors | Application to<br>Fully-Closed<br>Loop Control | Refer-<br>ence |
|-------------------------|---------------------------|----------------------------|------------------------|---------------------------------------------------------|--------------------------------------|--------------------|-----------------------------------------|-----------------------------------------|-----------------------------------------|------------------------------------------------|----------------|
|                         |                           | Scale                      | Sen-<br>sor<br>Head    | Relay Device between<br>SERVOPACK and<br>Linear Encoder |                                      |                    |                                         |                                         |                                         |                                                |                |
| Magnescale<br>Co., Ltd. | Exposed                   | SL7□0                      | PL101-RY <sup>*2</sup> |                                                         | 800                                  | 97.7               | 10                                      | —                                       | ✓                                       | ✓                                              | page 415       |
|                         |                           |                            | PL101                  | MJ620-T13 <sup>*3</sup>                                 |                                      |                    |                                         | ✓                                       | ✓                                       | *4                                             | page 416       |
|                         |                           | SQ10                       | PQ10                   | MQ10-FLA                                                | 400                                  | 48.83              | 3                                       | —                                       | ✓                                       | ✓                                              | page 419       |
|                         |                           |                            |                        | MQ10-GLA                                                |                                      |                    |                                         | ✓                                       | ✓                                       | —                                              |                |
|                         |                           | BL57-□□□RED <sup>*4</sup>  |                        | BD96-Y1051LC                                            | 0.4                                  | 0.78               | 0.8                                     | ✓                                       | ✓                                       | —                                              | —              |
|                         |                           |                            |                        | BD96-Y1025LC                                            | 0.4                                  | 1.56               | 1.0                                     | ✓                                       | ✓                                       | —                                              | —              |
|                         |                           |                            |                        | BD96-Y2051LC                                            | 0.4                                  | 0.78               | 0.8                                     | ✓                                       | ✓                                       | —                                              | —              |
|                         |                           |                            |                        | BD96-Y2025LC                                            | 0.4                                  | 1.56               | 1.0                                     | ✓                                       | ✓                                       | —                                              | —              |
|                         |                           |                            |                        | BD96-YJ051LC                                            | 0.4                                  | 0.78               | 0.8                                     | ✓                                       | ✓                                       | —                                              | —              |
|                         |                           |                            |                        | BD96-YJ025LC                                            | 0.4                                  | 1.56               | 1.0                                     | ✓                                       | ✓                                       | —                                              | —              |
|                         |                           | BF1-□□□RY□□□ <sup>*4</sup> |                        |                                                         | 0.25                                 | 0.49               | 1.77                                    | ✓                                       | ✓                                       | ✓                                              | —              |
|                         |                           | BF1-□□□RY□□□ <sup>*4</sup> |                        |                                                         | 0.25                                 | 0.98               | 1.8                                     | ✓                                       | ✓                                       | ✓                                              | —              |
|                         | Sealed                    | SR75-□□□□□LF               | —                      |                                                         | 80                                   | 9.8                | 3.33                                    | —                                       | ✓                                       | ✓                                              | page 421       |
|                         |                           | SR75-□□□□□MF               | —                      |                                                         | 80                                   | 78.1               | 3.33                                    | —                                       | ✓                                       | ✓                                              |                |
|                         |                           | SR85-□□□□□LF               | —                      |                                                         | 80                                   | 9.8                | 3.33                                    | —                                       | ✓                                       | ✓                                              |                |
|                         |                           | SR85-□□□□□MF               | —                      |                                                         | 80                                   | 78.1               | 3.33                                    | —                                       | ✓                                       | ✓                                              |                |

✓: Applicable

\*1. The maximum speeds given in the above table are the maximum applicable speeds of the encoders when combined with a Yaskawa SERVOPACK.

The actual speed will be restricted by either the maximum speed of the Linear Servomotor or the maximum speed of the Linear Encoder (given above).

\*2. This is the model of the Sensor Head with Interpolator.

\*3. This is the model of the Interpolator.

\*4. Contact your Yaskawa representative.

Note: Confirm detailed specifications, such as the tolerances, dimensions, and operating environment, with the manufacturer of the Linear Encoder before you use it.

# Absolute Linear Encoders

## ◆ Encoder for Yaskawa's Serial Interface

The multiplier (number of divisions) depends on the Linear Encoder. Also, you must write the Servomotor constant file to the Linear Encoder in advance.

| Manufac-<br>turer         | Linear<br>Encoder<br>Type | Model                |             |                                                         | Linear<br>Encode<br>r Pitch <sup>*1</sup><br>[μm] | Resolution<br>[nm] | Maximum<br>Speed <sup>*1</sup><br>[m/s] | Support for<br>Polarity Sensor<br>Input | Application to<br>Linear<br>Servomotors | Application to<br>Fully-Closed<br>Loop Control | Refer-<br>ence |
|---------------------------|---------------------------|----------------------|-------------|---------------------------------------------------------|---------------------------------------------------|--------------------|-----------------------------------------|-----------------------------------------|-----------------------------------------|------------------------------------------------|----------------|
|                           |                           | Scale                | Sensor Head | Relay Device<br>between SERVOPACK and<br>Linear Encoder |                                                   |                    |                                         |                                         |                                         |                                                |                |
| Magnescale<br>Co., Ltd.   | Exposed                   | SQ47-□□□□S□F□□□      |             | —                                                       | 20.48                                             | 5                  | 3.33                                    | —                                       | ✓                                       | ✓                                              | page 422       |
|                           |                           | SQ47-□□□□T□F□□□      |             |                                                         |                                                   |                    |                                         |                                         |                                         |                                                |                |
|                           |                           | SQ47-□□□□A□F□□□      |             | —                                                       | 40.96                                             | 10                 | 3.33                                    | —                                       | ✓                                       | ✓                                              |                |
|                           |                           | SQ47-□□□□F□F□□□      |             |                                                         |                                                   |                    |                                         |                                         |                                         |                                                |                |
|                           |                           | SQ57-□□□□S□F□□□      |             | —                                                       | 20.48                                             | 5                  | 3.33                                    | —                                       | ✓                                       | ✓                                              |                |
|                           |                           | SQ57-□□□□T□F□□□      |             |                                                         |                                                   |                    |                                         |                                         |                                         |                                                |                |
|                           |                           | SQ57-□□□□A□F□□□      |             | —                                                       | 40.96                                             | 10                 | 3.33                                    | —                                       | ✓                                       | ✓                                              |                |
|                           | SQ57-□□□□F□F□□□           |                      |             |                                                         |                                                   |                    |                                         |                                         |                                         |                                                |                |
|                           | Sealed                    | SR77-□□□□LF          |             | —                                                       | 80                                                | 9.8                | 3.33                                    | —                                       | ✓                                       | ✓                                              | page 421       |
|                           |                           | SR77-□□□□MF          |             | —                                                       | 80                                                | 78.1               | 3.33                                    | —                                       | ✓                                       | ✓                                              |                |
|                           |                           | SR87-□□□□LF          |             | —                                                       | 80                                                | 9.8                | 3.33                                    | —                                       | ✓                                       | ✓                                              |                |
|                           |                           | SR87-□□□□MF          |             | —                                                       | 80                                                | 78.1               | 3.33                                    | —                                       | ✓                                       | ✓                                              |                |
| Mitutoyo<br>Corporation   | Exposed                   | ST781A               |             | —                                                       | 256                                               | 500                | 5                                       | —                                       | ✓                                       | ✓                                              | page 423       |
|                           |                           | ST782A               |             | —                                                       | 256                                               | 500                | 5                                       | —                                       | ✓                                       | ✓                                              |                |
|                           |                           | ST783A               |             | —                                                       | 51.2                                              | 100                | 5                                       | —                                       | ✓                                       | ✓                                              |                |
|                           |                           | ST784A               |             | —                                                       | 51.2                                              | 100                | 5                                       | —                                       | ✓                                       | ✓                                              |                |
|                           |                           | ST788A               |             | —                                                       | 51.2                                              | 100                | 5                                       | —                                       | ✓                                       | ✓                                              |                |
|                           |                           | ST789A <sup>*3</sup> |             | —                                                       | 25.6                                              | 50                 | 5                                       | —                                       | ✓                                       | ✓                                              |                |
|                           |                           | ST1381               |             | —                                                       | 5.12                                              | 10                 | 8                                       | —                                       | ✓                                       | ✓                                              |                |
|                           |                           | ST1382               |             | —                                                       | 0.512                                             | 1                  | 3.6 <sup>*4</sup>                       | —                                       | ✓                                       | ✓                                              |                |
| Heidenhain<br>Corporation | Exposed                   | LIC4100 Series       |             | EIB3391Y <sup>*5</sup>                                  | 20.48                                             | 5                  | 10                                      | —                                       | ✓                                       | ✓                                              | page 410       |
|                           |                           | LIC2100 Series       |             |                                                         | 204.8                                             | 50                 | 10                                      | —                                       | ✓                                       | ✓                                              |                |
|                           | Sealed                    | LC115                |             |                                                         | 409.6                                             | 100                | 10                                      | —                                       | ✓                                       | ✓                                              |                |
|                           |                           | LC415                |             |                                                         | 40.96                                             | 10                 | 3                                       | —                                       | ✓                                       | ✓                                              |                |
|                           |                           | LC415                |             |                                                         | 40.96                                             | 10                 | 3                                       | —                                       | ✓                                       | ✓                                              |                |
| Renishaw plc              | Exposed                   | EL36Y-□□050F□□□      |             | —                                                       | 12.8                                              | 50                 | 100                                     | —                                       | ✓                                       | ✓                                              | page 414       |
|                           |                           | EL36Y-□□100F□□□      |             | —                                                       | 25.6                                              | 100                | 100                                     | —                                       | ✓                                       | ✓                                              |                |
|                           |                           | EL36Y-□□500F□□□      |             | —                                                       | 128                                               | 500                | 100                                     | —                                       | ✓                                       | ✓                                              |                |
|                           |                           | RL36Y-□□050□□□       |             | —                                                       | 12.8                                              | 50                 | 100                                     | —                                       | ✓                                       | ✓                                              |                |
|                           |                           | RL36Y-□□001□□□       |             | —                                                       | 0.256                                             | 1                  | 3.6                                     | —                                       | ✓                                       | ✓                                              |                |

✓: Applicable

\*1. These are reference values for setting SERVOPACK parameters. Contact the manufacturer for actual linear encoder scale pitches.

\*2. The maximum speeds given in the above table are the maximum applicable speeds of the encoders when combined with a Yaskawa SERVOPACK.

The actual speed will be restricted by either the maximum speed of the Linear Servomotor or the maximum speed of the Linear Encoder (given above).

\*3. Contact Mitutoyo Corporation for details on the Linear Encoders.

\*4. The speed is restricted for some SERVOPACKs.

\*5. This is the model of the Interpolator.

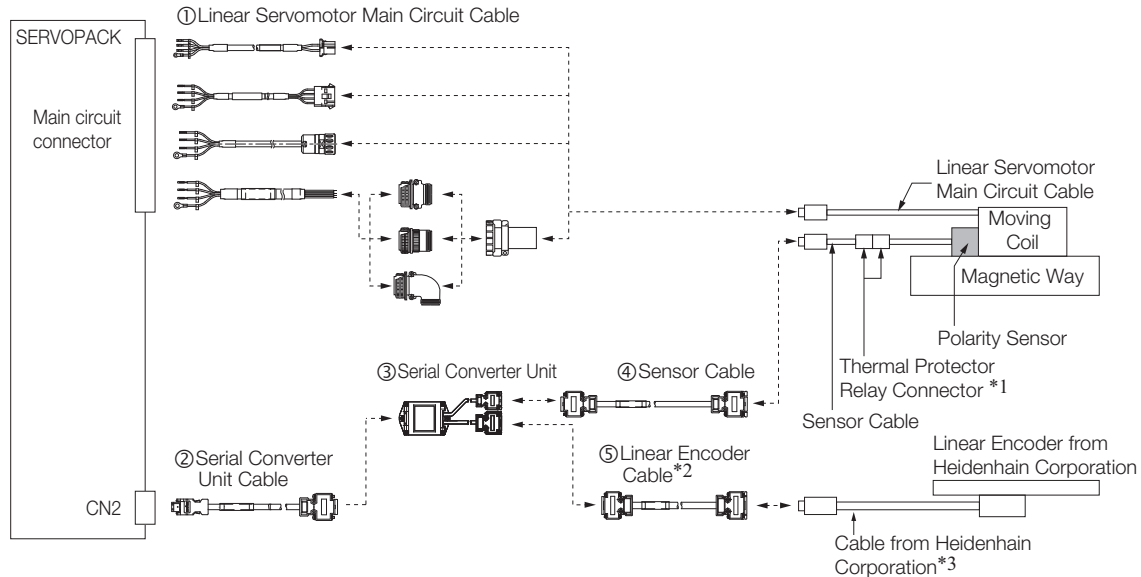
Note: Confirm detailed specifications, such as the tolerances, dimensions, and operating environment, with the manufacturer of the Linear Encoder before you use it.

## Connections to Linear Encoder from Heidenhain Corporation

### ◆ Connections for a 1 Vp-p Analog Voltage Output Signal

You must make the connections through a Yaskawa Serial Converter Unit. The output signal will be multiplied by 8 bits (256 divisions) or 12 bits (4,096 divisions) in the Serial Converter Unit.

### ■ Connecting to a Linear Servomotor with a Polarity Sensor



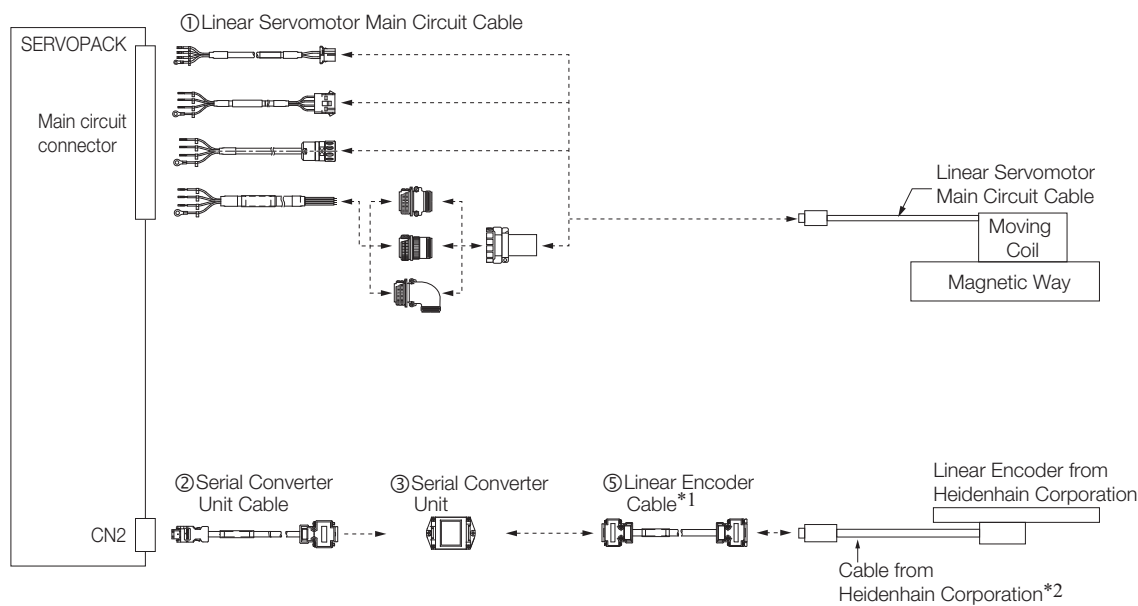
\*1. Only SGLFW2 Servomotors come equipped with Thermal Protector Relay Connectors.

\*2. When using a JZDP-J00□-□□□ Serial Converter Unit, do not use a Yaskawa Linear Encoder Cable that is longer than 3 m.

\*3. Contact Heidenhain Corporation for details on cables (analog 1 Vp-p output, D-sub 15-pin, male) from Heidenhain Corporation.

### ■ Connecting to a Linear Servomotor without a Polarity Sensor

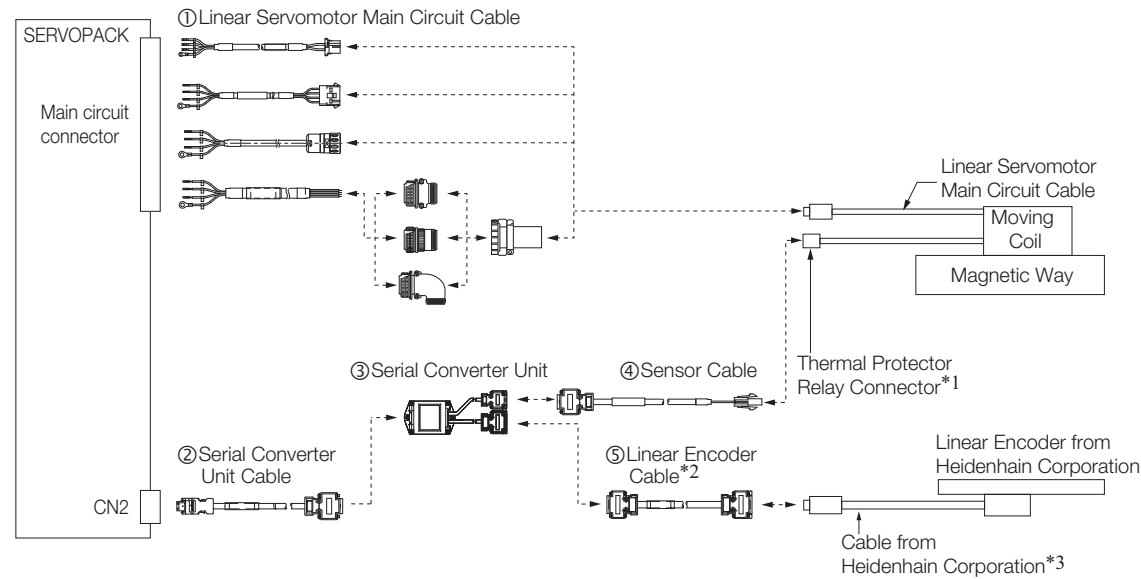
#### Servomotors Other Than the SGLFW2



\*1. When using a JZDP-J00□-□□□ Serial Converter Unit, do not use a Yaskawa Linear Encoder Cable that is longer than 3 m.

\*2. Contact Heidenhain Corporation for details on cables (analog 1 Vp-p output, D-sub 15-pin, male) from Heidenhain Corporation.

SGLFW2 Servomotors



\*1. Only SGLFW2 Servomotors come equipped with Thermal Protector Relay Connectors.

\*2. When using a JZDP-J00□-□□□ Serial Converter Unit, do not use a Yaskawa Linear Encoder Cable that is longer than 3 m.

\*3. Contact Heidenhain Corporation for details on cables (analog 1 Vp-p output, D-sub 15-pin, male) from Heidenhain Corporation.

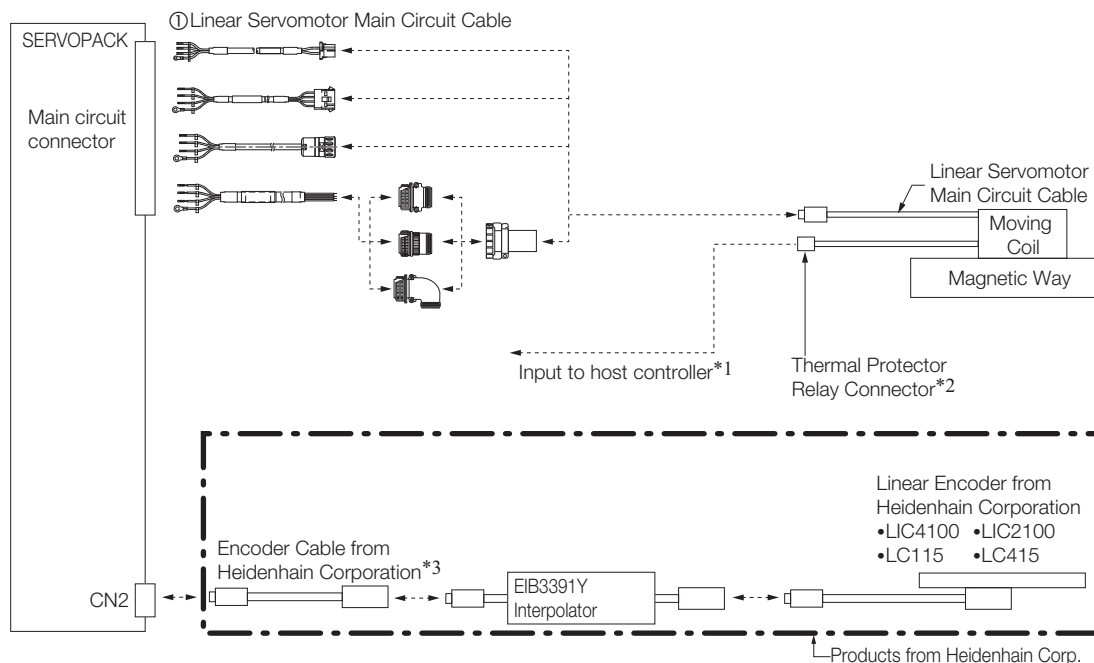
| No. | Cable Type                           | Reference |          |          |
|-----|--------------------------------------|-----------|----------|----------|
|     |                                      | SGLG      | SGLF     | SGLT     |
| ①   | Linear Servomotor Main Circuit Cable | page 255  | page 280 | page 303 |
| ②   | Serial Converter Unit Cable          | page 425  |          |          |
| ③   | Serial Converter Unit                | page 424  |          |          |
| ④   | Sensor Cable                         | page 425  |          |          |
| ⑤   | Linear Encoder Cable                 | page 426  |          |          |

# ◆ LIC4100, LIC2100, LC115, or LC415 Linear Encoder with EIB3391Y Interpolator



Important

1. You cannot use an LIC4100, LIC2100, LC115, or LC415 Linear Encoder together with a Linear Servomotor with a Polarity Sensor.
2. If you use an SGLFW2 Servomotor, input the thermal protector signal from the Linear Servomotor to the host controller. The thermal protector signal is closed when the temperature is normal and open when the thermal protector is activated. Do not exceed 3 A or 30 V.



\*1. Cables to connect to the host controller are not provided by Yaskawa.

Refer to the following manual for information on connector models.

Σ-7-Series AC Servo Drive Peripheral Device Selection Manual (Manual No.: SIEP S800001 32)

\*2. Only SGLFW2 Servomotors come equipped with Thermal Protector Relay Connectors.

\*3. Use an Encoder Cable from Heidenhain Corporation. Contact Heidenhain Corporation for detailed Encoder Cable specifications.

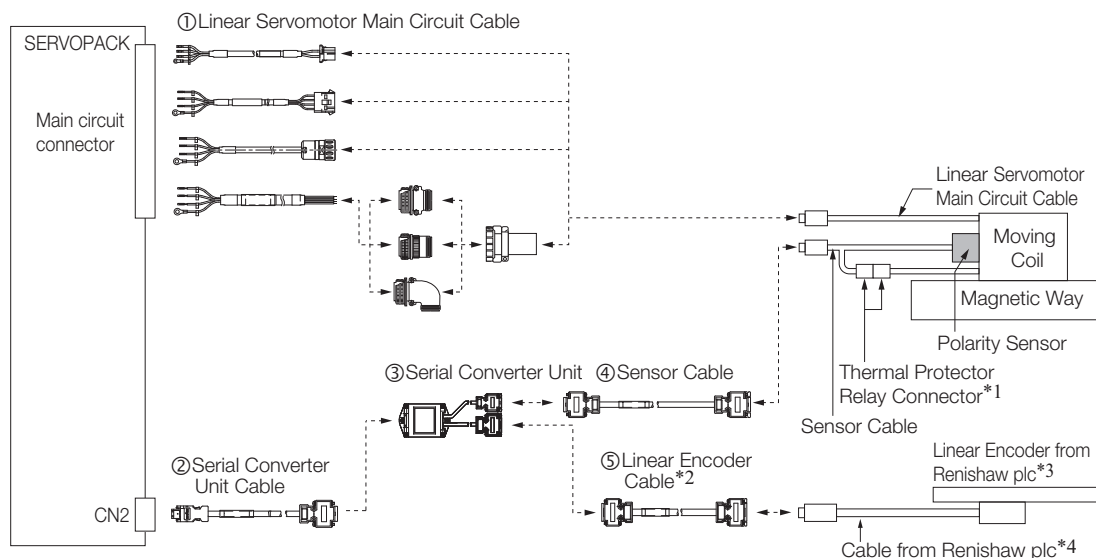
| No. | Cable Type                           | Reference |          |          |
|-----|--------------------------------------|-----------|----------|----------|
|     |                                      | SGLG      | SGLF     | SGLT     |
| ①   | Linear Servomotor Main Circuit Cable | page 255  | page 280 | page 303 |

## Connections to Linear Encoder from Renishaw plc

### ◆ Connections for a 1 Vp-p Analog Voltage Output Signal

You must make the connections through a Yaskawa Serial Converter Unit. The output signal will be multiplied by 8 bits (256 divisions) or 12 bits (4,096 divisions) in the Serial Converter Unit.

### ■ Connecting to a Linear Servomotor with a Polarity Sensor



\*1. Only SGLFW2 Servomotors come equipped with Thermal Protector Relay Connectors.

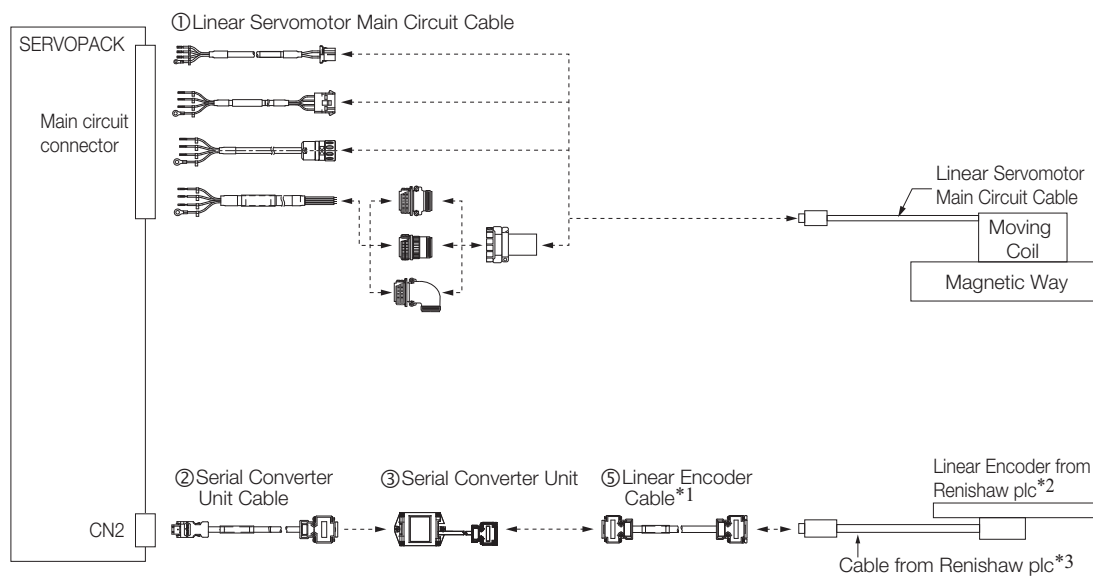
\*2. When using a JZDP-J00□-□□□ Serial Converter Unit, do not use a Yaskawa Linear Encoder Cable that is longer than 3 m.

\*3. If you use the origin signals with a Linear Encoder from Renishaw plc, the origin may sometimes be falsely detected. If that occurs, use the BID/DIR signal to output the origin signal only in one direction.

\*4. Contact Renishaw plc for details on cables (analog 1 Vp-p output, D-sub 15-pin, male) from Renishaw plc. However, the BID and DIR signals are not connected.

### ■ Connecting to a Linear Servomotor without a Polarity Sensor

#### Servomotors Other Than the SGLFW2



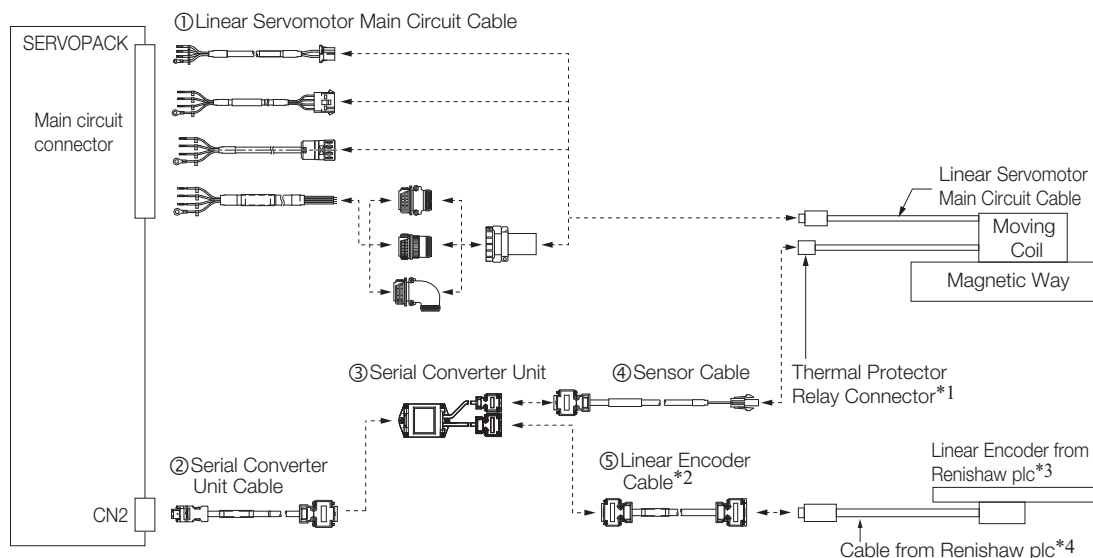
\*1. When using a JZDP-J00□-□□□ Serial Converter Unit, do not use a Yaskawa Linear Encoder Cable that is longer than 3 m.

\*2. If you use the origin signals with a Linear Encoder from Renishaw plc, the origin may sometimes be falsely detected. If that occurs, use the BID/DIR signal to output the origin signal only in one direction.

\*3. Contact Renishaw plc for details on cables (analog 1 Vp-p output, D-sub 15-pin, male) from Renishaw plc. However, the BID and DIR signals are not connected.



## SGLFW2 Servomotors



\*1. Only SGLFW2 Servomotors come equipped with Thermal Protector Relay Connectors.

\*2. When using a JZDP-J00□-□□□ Serial Converter Unit, do not use a Yaskawa Linear Encoder Cable that is longer than 3 m.

\*3. If you use the origin signals with a Linear Encoder from Renishaw plc, the origin may sometimes be falsely detected. If that occurs, use the BID/DIR signal to output the origin signal only in one direction.

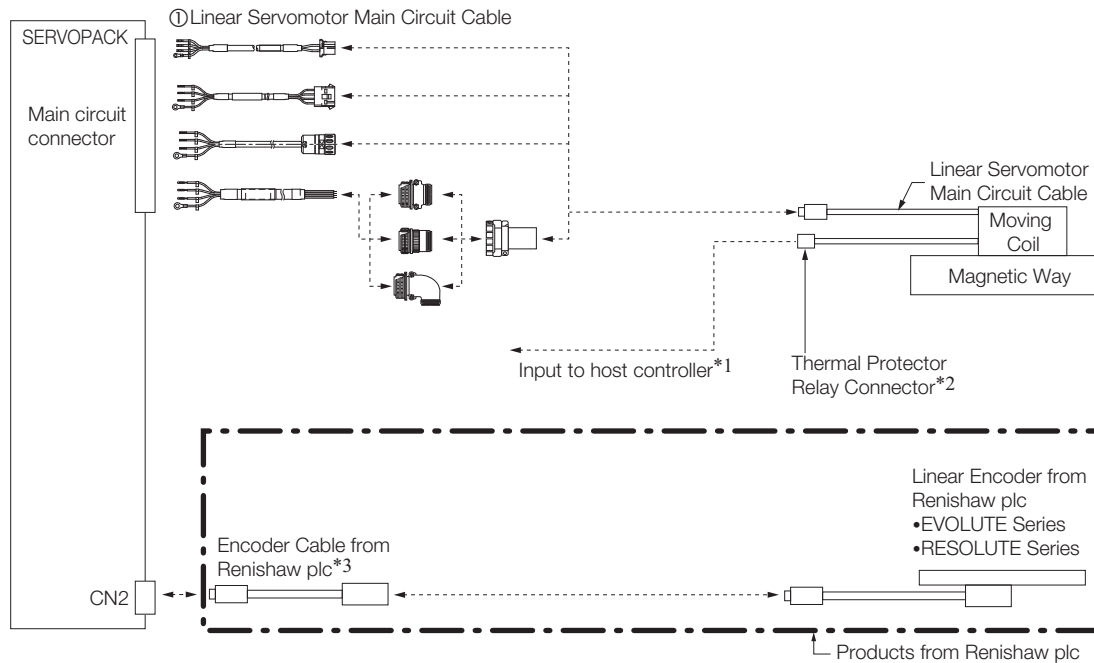
\*4. Contact Renishaw plc for details on cables (analog 1 Vp-p output, D-sub 15-pin, male) from Renishaw plc. However, the BID and DIR signals are not connected.

| No. | Cable Type                           | Reference |          |          |
|-----|--------------------------------------|-----------|----------|----------|
|     |                                      | SGLG      | SGLF     | SGLT     |
| ①   | Linear Servomotor Main Circuit Cable | page 255  | page 280 | page 303 |
| ②   | Serial Converter Unit Cable          |           | page 425 |          |
| ③   | Serial Converter Unit                |           | page 424 |          |
| ④   | Sensor Cable                         |           | page 425 |          |
| ⑤   | Linear Encoder Cable                 |           | page 426 |          |

◆ **EVOLUTE Series Linear Encoder (model: EL36Y-□□□□□□□□□), RESOLUTE Series Linear Encoder (model: RL36Y-□□□□□□□□□)**



1. You cannot use an EVOLUTE Series or RESOLUTE Series Linear Encoder together with a Linear Servomotor with a Polarity Sensor.
2. If you use an SGLFW2 Servomotor, input the thermal protector signal from the Linear Servomotor to the host controller. The thermal protector signal is closed when the temperature is normal and open when the thermal protector is activated. Do not exceed 3 A or 30 V.



\*1. Cables to connect to the host controller are not provided by Yaskawa.

Refer to the following manual for information on connector models.

📖 **Σ-7-Series AC Servo Drive Peripheral Device Selection Manual (Manual No.: SIEP S800001 32)**

\*2. Only SGLFW2 Servomotors come equipped with Thermal Protector Relay Connectors.

\*3. Use an Encoder Cable from Renishaw plc. Contact Renishaw plc for detailed Encoder Cable specifications.

| No. | Cable Type                           | Reference |          |          |
|-----|--------------------------------------|-----------|----------|----------|
|     |                                      | SGLG      | SGLF     | SGLT     |
| ①   | Linear Servomotor Main Circuit Cable | page 255  | page 280 | page 303 |

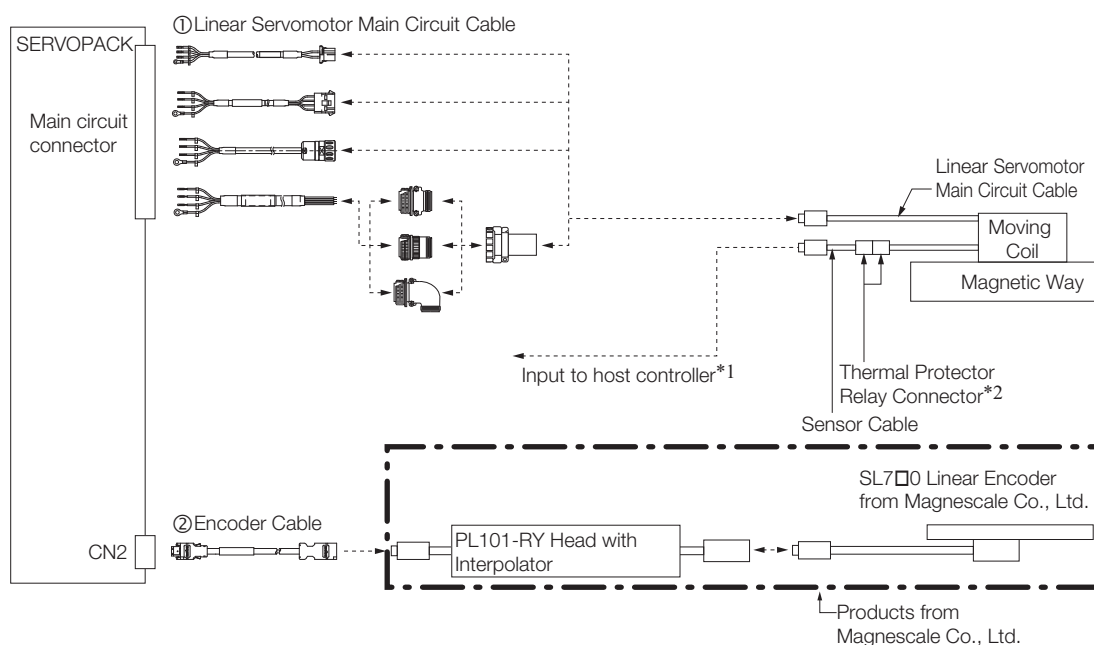
## Connections to Linear Encoder from Magescale Co., Ltd.

### ◆ SL7□0 Linear Encoder and PL101-RY Sensor Head with Interpolator



Important

1. You cannot use a PL101-RY Sensor Head with an Interpolator together with a Linear Servomotor with a Polarity Sensor.
2. If you use an SGLFW2 Servomotor, input the thermal protector signal from the Linear Servomotor to the host controller. The thermal protector signal is closed when the temperature is normal and open when the thermal protector is activated. Do not exceed 3 A or 30 V.



\*1. Cables to connect to the host controller are not provided by Yaskawa.

Refer to the following manual for information on connector models.

Σ-7-Series AC Servo Drive Peripheral Device Selection Manual (Manual No.: SIEP S800001 32)

\*2. Only SGLFW2 Servomotors come equipped with Thermal Protector Relay Connectors.

| No. | Cable Type                           | Reference           |          |          |
|-----|--------------------------------------|---------------------|----------|----------|
|     |                                      | SGLG                | SGLF     | SGLT     |
| ①   | Linear Servomotor Main Circuit Cable | page 255            | page 280 | page 303 |
| ②   | Encoder Cable                        | Refer to the below. |          |          |

#### ■ Encoder Cable

| Name                               | Length (L) | Order Number    |                 | Appearance |
|------------------------------------|------------|-----------------|-----------------|------------|
|                                    |            | Standard Cable  | Flexible Cable* |            |
| Cable with Connectors on Both Ends | 3 m        | JZSP-CMP00-03-E | JZSP-CMP10-03-E |            |
|                                    | 5 m        | JZSP-CMP00-05-E | JZSP-CMP10-05-E |            |
|                                    | 10 m       | JZSP-CMP00-10-E | JZSP-CMP10-10-E |            |
|                                    | 15 m       | JZSP-CMP00-15-E | JZSP-CMP10-15-E |            |
|                                    | 20 m       | JZSP-CMP00-20-E | JZSP-CMP10-20-E |            |

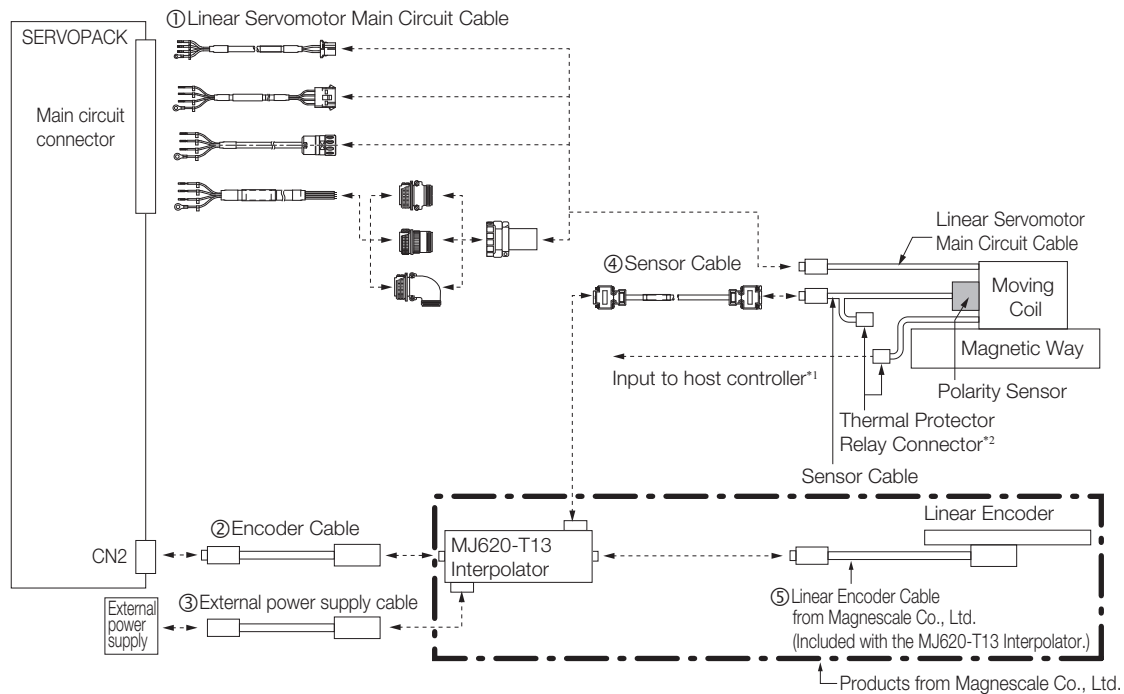
\* Use Flexible Cables for moving parts of machines, such as robots.  
The recommended bending radius (R) is 68 mm or larger.

# ◆ SL7□0 Linear Encoder, PL101 Sensor Head, and MJ620-T13 Interpolator



Important

1. A 5-VDC power supply is required for the MJ620-T13. (The 5-VDC power supply is not provided by Yaskawa.)
2. Refer to the MJ620-T13 specifications from Magnescale Co., Ltd. for the current consumption of the MJ620-T13.
3. If you use an SGLFW2 Servomotor, remove the thermal protector relay connector and input the thermal protector signal from the Linear Servomotor to the host controller. The thermal protector signal is closed when the temperature is normal and open when the thermal protector is activated. Do not exceed 3 A or 30 V.



\*1. Cables to connect to the host controller are not provided by Yaskawa.

Refer to the following manual for information on connector models.

📖 **Σ-7-Series AC Servo Drive Peripheral Device Selection Manual (Manual No.: SIEP S800001 32)**

\*2. Only SGLFW2 Servomotors come equipped with Thermal Protector Relay Connectors.

| No. | Cable Type                           | Reference                                                                                                                          |          |          |
|-----|--------------------------------------|------------------------------------------------------------------------------------------------------------------------------------|----------|----------|
|     |                                      | SGLG                                                                                                                               | SGLF     | SGLT     |
| ①   | Linear Servomotor Main Circuit Cable | page 255                                                                                                                           | page 280 | page 303 |
| ②   | Encoder Cable                        | These cables are not provided by Yaskawa.                                                                                          |          |          |
| ③   | External power supply cable          |                                                                                                                                    |          |          |
| ④   | Sensor Cable                         | page 425                                                                                                                           |          |          |
| ⑤   | Linear Encoder Cable                 | Use the cables that come with the MJ620-T13 Interpolator. For details, refer to the specifications for the MJ620-T13 Interpolator. |          |          |

## ■ Encoder Cables

These cables are not provided by Yaskawa. Use a shielded cable. Refer to the following tables for the pin layouts.

### SERVOPACK End of Cable (CN2)

- Plug Connector: 55100-0670 (Molex Japan LLC)
- Connector order number: JZSP-CMP9-1-E (SERVOPACK Connector Kit)

| Pin   | Signal | Function                  |
|-------|--------|---------------------------|
| 1     | PG5 V  | Encoder power supply +5 V |
| 2     | PG0 V  | Encoder power supply 0 V  |
| 3     | –      | –                         |
| 4     | –      | –                         |
| 5     | PS     | Serial data               |
| 6     | /PS    |                           |
| Shell | Shield | –                         |

### MJ620-T13 End of Cable

For details, refer to the specifications for the MJ620-T13 from Magnescale Co., Ltd..

- Receptacle: PCR-E20LMD+ (Honda Tsushin Kogyo Co., Ltd.)
- Plug: PCR-E20FS+ (Honda Tsushin Kogyo Co., Ltd.)
- Shell: PCS-E20L□ (Honda Tsushin Kogyo Co., Ltd.)

| Pin | Signal          | Function    | Pin   | Signal          | Function |
|-----|-----------------|-------------|-------|-----------------|----------|
| 1   | Do not connect. | –           | 12    | 0 V             | 0 V      |
| 2   | Do not connect. | –           | 13    | Do not connect. | –        |
| 3   | Do not connect. | –           | 14    | 0 V             | 0 V      |
| 4   | Do not connect. | –           | 15    | Do not connect. | –        |
| 5   | SD              | Serial data | 16    | 0 V             | 0 V      |
| 6   | /SD             |             | 17    | Do not connect. | –        |
| 7   | Do not connect. | –           | 18    | Do not connect. | –        |
| 8   | Do not connect. | –           | 19    | Do not connect. | –        |
| 9   | Do not connect. | –           | 20    | Do not connect. | –        |
| 10  | Do not connect. | –           | Shell | Shield          | –        |
| 11  | Do not connect. | –           |       |                 |          |

### Cables without Connectors

| Name                      | Length (L) | Order Number    |                 |
|---------------------------|------------|-----------------|-----------------|
|                           |            | Standard Cable  | Flexible Cable  |
| Cables without Connectors | 5 m        | JZSP-CMP09-05-E | JZSP-CSP39-05-E |
|                           | 10 m       | JZSP-CMP09-10-E | JZSP-CSP39-10-E |
|                           | 15 m       | JZSP-CMP09-15-E | JZSP-CSP39-15-E |
|                           | 20 m       | JZSP-CMP09-20-E | JZSP-CSP39-20-E |

Note: We recommend that you use Flexible Cables.

**■ External Power Supply Cables**

This cable is not provided by Yaskawa. Refer to the table on the right for the pin layout.

For details, refer to the specifications for the MJ620-T13 from Magnescale Co., Ltd..

- Connector Header: MC1.5/2-GF-3.81 (Phoenix Contact)
- Connector Plug: MC1.5/2-STF-3.81 (Phoenix Contact)

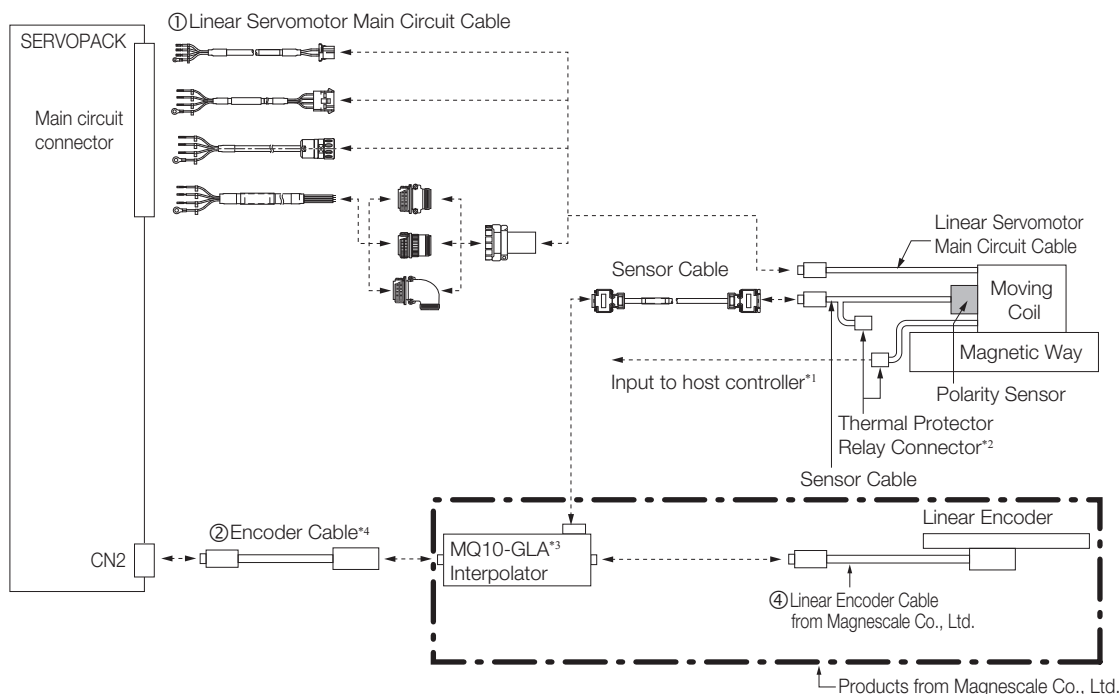
| Pin | Signal | Function |
|-----|--------|----------|
| 1   | +5 V   | +5 V     |
| 2   | 0 V    | 0 V      |

## ◆ SmartSCALE Linear Encoder (SQ10 Scale + MQ10-□LA Interpolator)



Important

If you use an SGLFW2 Servomotor, remove the thermal protector relay connector and input the thermal protector signal from the Linear Servomotor to the host controller. The thermal protector signal is closed when the temperature is normal and open when the thermal protector is activated. Do not exceed 3 A or 30 V.



\*1. Cables to connect to the host controller are not provided by Yaskawa.

Refer to the following manual for information on connector models.

📖 **Σ-7-Series AC Servo Drive Peripheral Device Selection Manual (Manual No.: SIEP S800001 32)**

\*2. Only SGLFW2 Servomotors come equipped with Thermal Protector Relay Connectors.

\*3. This cable configurations shown above is the connection when you use the MQ10-GLA interpolator with polarity sensor.

\*4. The maximum length of the Serial Converter Unit Cable is 15 m.

| No. | Cable Type                           | Reference                                                                                                                        |          |          |
|-----|--------------------------------------|----------------------------------------------------------------------------------------------------------------------------------|----------|----------|
|     |                                      | SGLG                                                                                                                             | SGLF     | SGLT     |
| ①   | Linear Servomotor Main Circuit Cable | page 255                                                                                                                         | page 280 | page 303 |
| ②   | Encoder Cable                        | page 420                                                                                                                         |          |          |
| ③   | Sensor Cable                         | page 425                                                                                                                         |          |          |
| ④   | Linear Encoder Cable                 | Use the cables that come with the MQ10-□LA Interpolator. For details, refer to the specifications for the MQ10-□LA Interpolator. |          |          |

## **Encoder Cables**

These cables are not provided by Yaskawa. Use a shielded cable. Refer to the following tables for the pin layouts.

### **SERVOPACK End of Cable (CN2)**

- Plug Connector: 55100-0670 (Molex Japan LLC)
- Connector order number: JZSP-CMP9-1-E (SERVOPACK Connector Kit)

| Pin   | Signal | Function                  |
|-------|--------|---------------------------|
| 1     | PG5 V  | Encoder power supply +5 V |
| 2     | PG0 V  | Encoder power supply 0 V  |
| 3     | –      | –                         |
| 4     | –      | –                         |
| 5     | PS     | Serial data               |
| 6     | /PS    |                           |
| Shell | Shield | –                         |

### **MQ10-□LA End of Cable**

For details, refer to the specifications for the MQ10-□LA from Magnescale Co., Ltd..

### **Cables without Connectors**

| Name                      | Length (L) | Order Number    |                 |
|---------------------------|------------|-----------------|-----------------|
|                           |            | Standard Cable  | Flexible Cable  |
| Cables without Connectors | 5 m        | JZSP-CMP09-05-E | JZSP-CSP39-05-E |
|                           | 10 m       | JZSP-CMP09-10-E | JZSP-CSP39-10-E |
|                           | 15 m       | JZSP-CMP09-15-E | JZSP-CSP39-15-E |

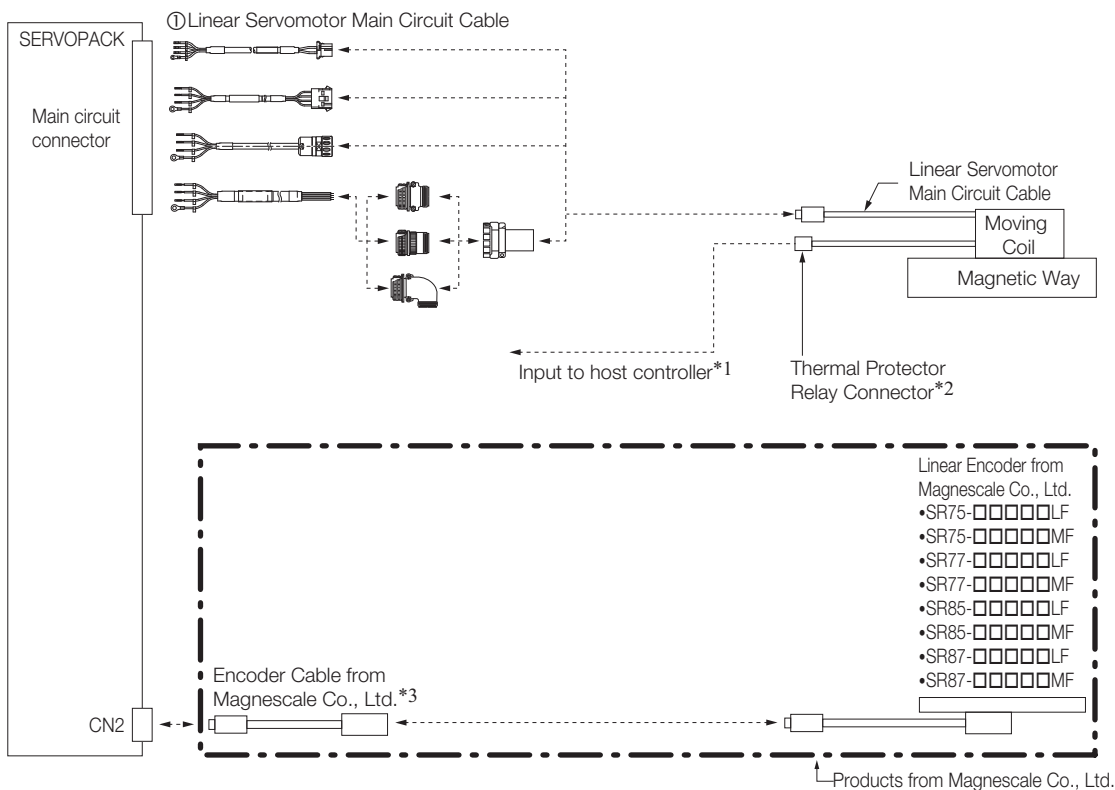
Note: We recommend that you use Flexible Cables.



◆ SR-75, SR-77, SR-85, and SR-87 Linear Encoders



1. You cannot use an SR-75, SR-77, SR-85, or SR-87 Linear Encoder with a Linear Servomotor with a Polarity Sensor.
2. If you use an SGLFW2 Servomotor, input the thermal protector signal from the Linear Servomotor to the host controller. The thermal protector signal is closed when the temperature is normal and open when the thermal protector is activated. Do not exceed 3 A or 30 V.



\*1. Cables to connect to the host controller are not provided by Yaskawa.  
Refer to the following manual for information on connector models.

📖 **Σ-7-Series AC Servo Drive Peripheral Device Selection Manual (Manual No.: SIEP S800001 32)**

\*2. Only SGLFW2 Servomotors come equipped with Thermal Protector Relay Connectors.

\*3. Use an Encoder Cable from Magescale Co., Ltd. Contact Magescale Co., Ltd. for detailed Encoder Cable specifications.

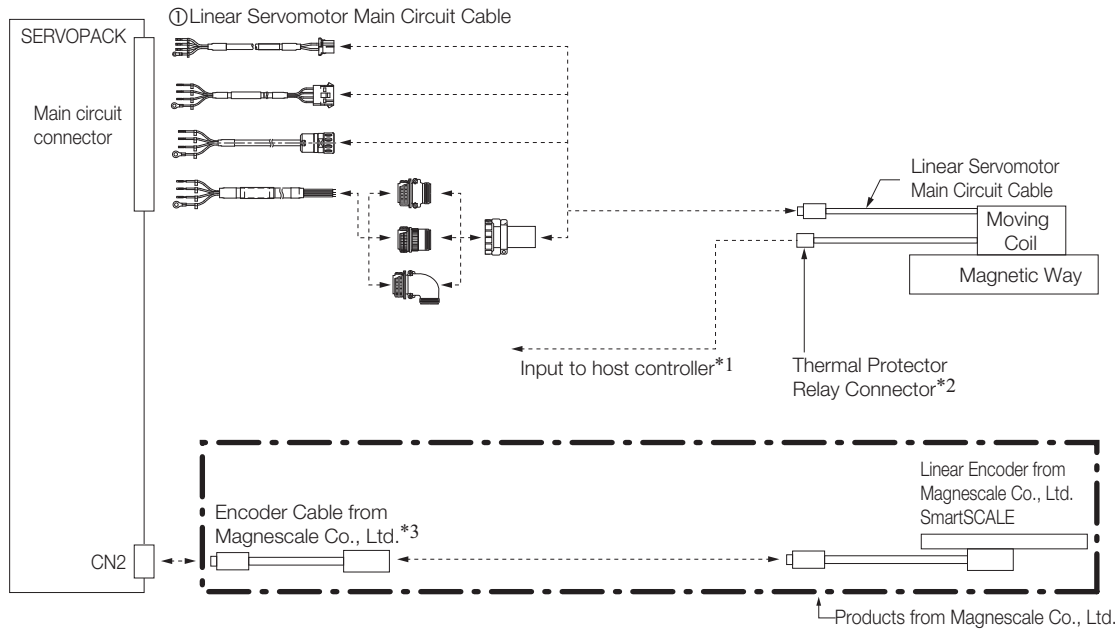
| No. | Cable Type                           | Reference |          |          |
|-----|--------------------------------------|-----------|----------|----------|
|     |                                      | SGLG      | SGLF     | SGLT     |
| ①   | Linear Servomotor Main Circuit Cable | page 255  | page 280 | page 303 |

## ◆ SmartSCALE (SQ47/SQ57) Linear Encoders



Important

1. You cannot use an SQ47 or SQ57 Linear Encoder with a Linear Servomotor with a Polarity Sensor.
2. If you use an SGLFW2 Servomotor, input the thermal protector signal from the Linear Servomotor to the host controller. The thermal protector signal is closed when the temperature is normal and open when the thermal protector is activated. Do not exceed 3 A or 30 V.



\*1. Cables to connect to the host controller are not provided by Yaskawa.  
Refer to the following manual for information on connector models.

📖 **Σ-7-Series AC Servo Drive Peripheral Device Selection Manual (Manual No.: SIEP S800001 32)**

\*2. Only SGLFW2 Servomotors come equipped with Thermal Protector Relay Connectors.

\*3. Use an Encoder Cable from Magnescale Co., Ltd. Contact Magnescale Co., Ltd. for detailed Encoder Cable specifications.

| No. | Cable Type                           | Reference |          |          |
|-----|--------------------------------------|-----------|----------|----------|
|     |                                      | SGLG      | SGLF     | SGLT     |
| ①   | Linear Servomotor Main Circuit Cable | page 255  | page 280 | page 303 |

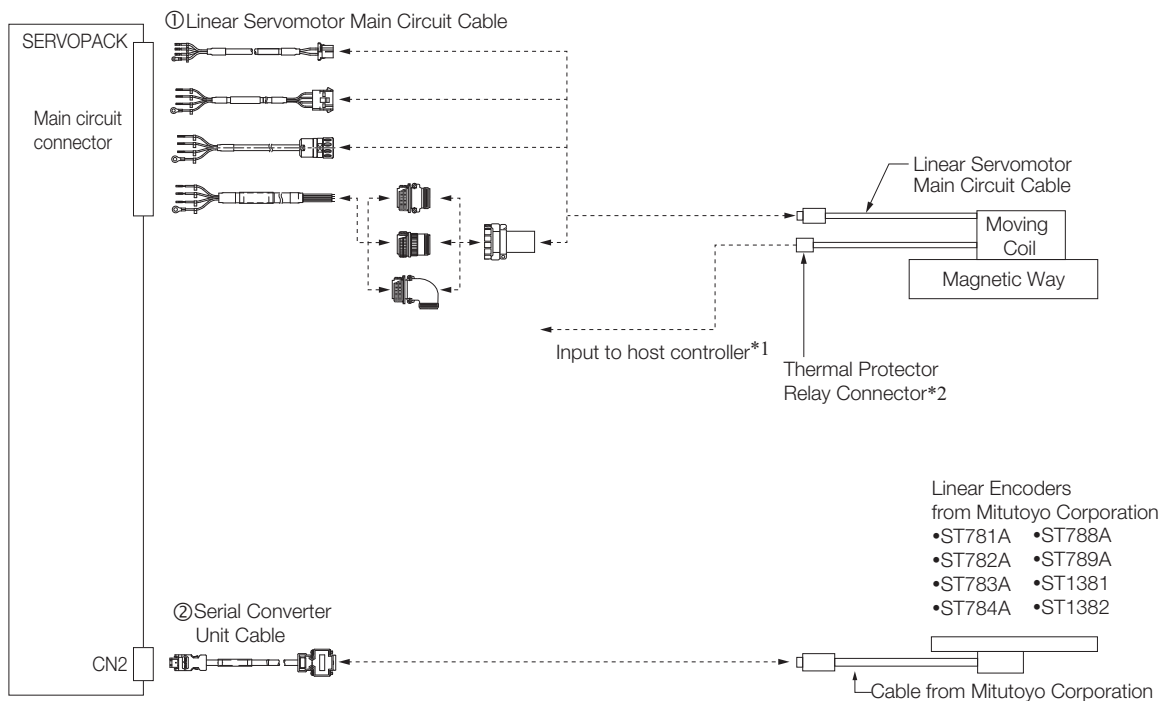
# Connections to Linear Encoders from Mitutoyo Corporation

## ◆ ST78□A/ST13□□ Linear Encoders



Important

1. You cannot use a ST78□A Linear Encoder together with a Linear Servomotor with a Polarity Sensor.
2. If you use an SGLFW2 Servomotor, input the thermal protector signal from the Linear Servomotor to the host controller. The thermal protector signal is closed when the temperature is normal and open when the thermal protector is activated. Do not exceed 3 A or 30 V.



\*1. Cables to connect to the host controller are not provided by Yaskawa.  
Refer to the following manual for information on connector models.

📖 **Σ-7-Series AC Servo Drive Peripheral Device Selection Manual (Manual No.: SIEP S800001 32)**

\*2. Only SGLFW2 Servomotors come equipped with Thermal Protector Relay Connectors.

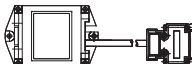
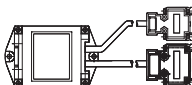
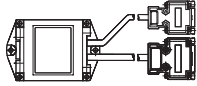
| No. | Cable Type                           | Reference |          |          |
|-----|--------------------------------------|-----------|----------|----------|
|     |                                      | SGLG      | SGLF     | SGLT     |
| ①   | Linear Servomotor Main Circuit Cable | page 255  | page 280 | page 303 |
| ②   | Serial Converter Unit Cable          | page 426  |          |          |

## Serial Converter Units

### Order Number

Use the following tables to select the Serial Converter Unit.

JZDP -     -

| Serial Converter Unit Model                                                                                                                                           |                                                                                    |                           |                 |                   | Applicable Linear Servomotor                                       |         |         |                                                   |         |      |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------|---------------------------|-----------------|-------------------|--------------------------------------------------------------------|---------|---------|---------------------------------------------------|---------|------|
| Code                                                                                                                                                                  | Appearance                                                                         | Applicable Linear Encoder | Polarity Sensor | Thermal Protector | Servomotor Model                                                   |         | Code    | Servomotor Model                                  |         | Code |
| H003<br>J003                                                                                                                                                          |   | From Heidenhain Corp.     | None            | None              | SGLGW -<br>(coreless models)<br>For Standard-force<br>Magnetic Way | 30A050C | 250     | SGLFW2-<br>(models with F-type iron cores - 200V) | 30A070A | 628  |
| H005<br>J005                                                                                                                                                          |   | From Renishaw PLC         | None            | None              |                                                                    | 30A080C | 251     |                                                   | 30A120A | 629  |
|                                                                                                                                                                       |                                                                                    |                           |                 |                   |                                                                    | 40A140C | 252     |                                                   | 30A230A | 630  |
| H006<br>J006                                                                                                                                                          |   | From Heidenhain Corp.     | Yes             | Yes               |                                                                    | 40A253C | 253     |                                                   | 45A200A | 631  |
|                                                                                                                                                                       |                                                                                    |                           |                 |                   |                                                                    | 40A365C | 254     |                                                   | 45A380A | 632  |
| H008<br>J008                                                                                                                                                          |  | From Renishaw PLC         | Yes             | Yes               |                                                                    | 60A140C | 258     |                                                   | 90A200A | 633  |
|                                                                                                                                                                       |                                                                                    |                           |                 |                   |                                                                    | 60A253C | 259     |                                                   | 90A380A | 634  |
| SGLGW -<br>+<br>SGLGM -<br> -M<br>(coreless models)<br>For High-force Magnetic Way |                                                                                    |                           |                 |                   |                                                                    | 90A560A | 648     |                                                   | 90A560A | 648  |
|                                                                                                                                                                       |                                                                                    |                           |                 |                   |                                                                    | 1DA380A | 649     | 1DA380A                                           | 649     |      |
|                                                                                                                                                                       |                                                                                    |                           |                 |                   |                                                                    | 1DA560A | 650     | 1DA560A                                           | 650     |      |
|                                                                                                                                                                       |                                                                                    |                           |                 |                   | SGLFW2-<br>(models with F-type iron cores - 400V)                  | 30D070A | 651     | 30D070A                                           | 651     |      |
|                                                                                                                                                                       |                                                                                    |                           |                 |                   |                                                                    | 30D120A | 652     | 30D120A                                           | 652     |      |
|                                                                                                                                                                       |                                                                                    |                           |                 |                   |                                                                    | 30D230A | 653     | 30D230A                                           | 653     |      |
|                                                                                                                                                                       |                                                                                    |                           |                 |                   |                                                                    | 45D200A | 654     | 45D200A                                           | 654     |      |
|                                                                                                                                                                       |                                                                                    |                           |                 |                   |                                                                    | 45D380A | 655     | 45D380A                                           | 655     |      |
|                                                                                                                                                                       |                                                                                    |                           |                 |                   |                                                                    | 90D200A | 657     | 90D200A                                           | 657     |      |
|                                                                                                                                                                       |                                                                                    |                           |                 |                   |                                                                    | 90D380A | 658     | 90D380A                                           | 658     |      |
|                                                                                                                                                                       |                                                                                    |                           |                 |                   |                                                                    | 90D560A | 659     | 90D560A                                           | 659     |      |
|                                                                                                                                                                       |                                                                                    |                           |                 |                   | 1DD380A                                                            | 660     | 1DD380A | 660                                               |         |      |
|                                                                                                                                                                       |                                                                                    |                           |                 |                   | 1DD560A                                                            | 661     | 1DD560A | 661                                               |         |      |
| SGLTW-<br>(models with T-type iron cores)                                                                                                                             | 20A170A                                                                            | 011                       | 20A170A         | 011               |                                                                    |         |         |                                                   |         |      |
|                                                                                                                                                                       | 20A320A                                                                            | 012                       | 20A320A         | 012               |                                                                    |         |         |                                                   |         |      |
|                                                                                                                                                                       | 20A460A                                                                            | 013                       | 20A460A         | 013               |                                                                    |         |         |                                                   |         |      |
|                                                                                                                                                                       | 35A170A                                                                            | 014                       | 35A170A         | 014               |                                                                    |         |         |                                                   |         |      |
|                                                                                                                                                                       | 35A320A                                                                            | 015                       | 35A320A         | 015               |                                                                    |         |         |                                                   |         |      |
|                                                                                                                                                                       | 35A460A                                                                            | 016                       | 35A460A         | 016               |                                                                    |         |         |                                                   |         |      |
|                                                                                                                                                                       | 35A170H                                                                            | 105                       | 35A170H         | 105               |                                                                    |         |         |                                                   |         |      |
|                                                                                                                                                                       | 35A320H                                                                            | 106                       | 35A320H         | 106               |                                                                    |         |         |                                                   |         |      |
|                                                                                                                                                                       | 50A170H                                                                            | 108                       | 50A170H         | 108               |                                                                    |         |         |                                                   |         |      |
|                                                                                                                                                                       | 50A320H                                                                            | 109                       | 50A320H         | 109               |                                                                    |         |         |                                                   |         |      |
| SGLFW-<br>(Earlier models with F-type iron cores)                                                                                                                     | 40A400B                                                                            | 185                       | 40A400B         | 185               |                                                                    |         |         |                                                   |         |      |
|                                                                                                                                                                       | 40A600B                                                                            | 186                       | 40A600B         | 186               |                                                                    |         |         |                                                   |         |      |
|                                                                                                                                                                       | 80A400B                                                                            | 187                       | 80A400B         | 187               |                                                                    |         |         |                                                   |         |      |
|                                                                                                                                                                       | 80A600B                                                                            | 188                       | 80A600B         | 188               |                                                                    |         |         |                                                   |         |      |
|                                                                                                                                                                       |                                                                                    |                           |                 |                   |                                                                    |         |         |                                                   |         |      |
|                                                                                                                                                                       |                                                                                    |                           |                 |                   |                                                                    |         |         |                                                   |         |      |

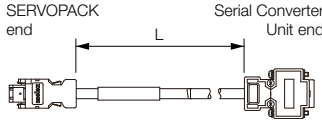
Note: 1. Code H for 8 bit interpolation, Code J for 12 bit interpolation

2. Refer to the following manual for detailed specifications of the Serial Converter Units.

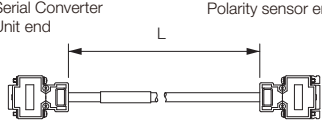
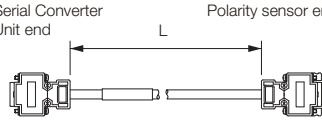
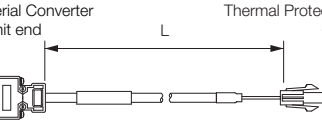
 **Σ-7-Series AC Servo Drive Peripheral Device Selection Manual (Manual No.: SIEP S800001 32)**

3. Contact your Yaskawa representative for information on the water cooling specifications of the SGLFW2.

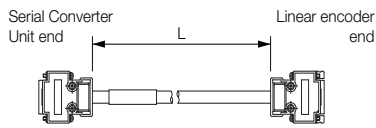
## Serial Converter Unit Cables

| Linear Servomotor Model | Length (L) | Order Number    | Appearance                                                                          |
|-------------------------|------------|-----------------|-------------------------------------------------------------------------------------|
| All Models              | 1 m        | JZSP-CLP70-01-E |  |
|                         | 3 m        | JZSP-CLP70-03-E |                                                                                     |
|                         | 5 m        | JZSP-CLP70-05-E |                                                                                     |
|                         | 10 m       | JZSP-CLP70-10-E |                                                                                     |
|                         | 15 m       | JZSP-CLP70-15-E |                                                                                     |
|                         | 20 m       | JZSP-CLP70-20-E |                                                                                     |

## Sensor Cables

| Linear Servomotor Model                       | Length (L) | Order Number      | Appearance                                                                            |
|-----------------------------------------------|------------|-------------------|---------------------------------------------------------------------------------------|
| SGLGW-□□A<br>SGLFW-□□A<br>SGLTW-□□A           | 1 m        | JZSP-CLL10-01-E   |   |
|                                               | 3 m        | JZSP-CLL10-03-E   |                                                                                       |
|                                               | 5 m        | JZSP-CLL10-05-E   |                                                                                       |
|                                               | 10 m       | JZSP-CLL10-10-E   |                                                                                       |
|                                               | 15 m       | JZSP-CLL10-15-E   |                                                                                       |
| SGLFW2-□□A□□□AS□<br>(With Polarity Sensor)    | 1 m        | JZSP-CL2L100-01-E |  |
|                                               | 3 m        | JZSP-CL2L100-03-E |                                                                                       |
|                                               | 5 m        | JZSP-CL2L100-05-E |                                                                                       |
|                                               | 10 m       | JZSP-CL2L100-10-E |                                                                                       |
|                                               | 15 m       | JZSP-CL2L100-15-E |                                                                                       |
| SGLFW2-□□A□□□AT□<br>(Without Polarity Sensor) | 1 m        | JZSP-CL2TH00-01-E |  |
|                                               | 3 m        | JZSP-CL2TH00-03-E |                                                                                       |
|                                               | 5 m        | JZSP-CL2TH00-05-E |                                                                                       |
|                                               | 10 m       | JZSP-CL2TH00-10-E |                                                                                       |
|                                               | 15 m       | JZSP-CL2TH00-15-E |                                                                                       |

## Linear Encoder Cables

| Name                                           | Linear Servomotor Model | Length * (L) | Order Number    | Appearance                                                                          |
|------------------------------------------------|-------------------------|--------------|-----------------|-------------------------------------------------------------------------------------|
| For linear encoder from Renishaw PLC           | All Models              | 1 m          | JZSP-CLL00-01-E |  |
|                                                |                         | 3 m          | JZSP-CLL00-03-E |                                                                                     |
|                                                |                         | 5 m          | JZSP-CLL00-05-E |                                                                                     |
|                                                |                         | 10 m         | JZSP-CLL00-10-E |                                                                                     |
|                                                |                         | 15 m         | JZSP-CLL00-15-E |                                                                                     |
| For linear encoder from Heidenhain Corporation |                         | 1 m          | JZSP-CLL30-01-E |                                                                                     |
|                                                |                         | 3 m          | JZSP-CLL30-03-E |                                                                                     |
|                                                |                         | 5 m          | JZSP-CLL30-05-E |                                                                                     |
|                                                |                         | 10 m         | JZSP-CLL30-10-E |                                                                                     |
|                                                |                         | 15 m         | JZSP-CLL30-15-E |                                                                                     |

\* When using a JZDP-J00□-□□□-E Serial Converter Unit, do not exceed a cable length of 3 m.



# SGLFW (Earlier Models with F-type Iron Cores)

## Model Designations

### SGLFW Models

#### ◆ Moving Coil

S G L F W - 20 A 090 A P □

Linear  $\Sigma$  Series  
Linear Servo Motors

1st  
digit

2nd  
digit

3rd+4th  
digits

5th  
digit

6th+7th+8th  
digits

9th  
digit

10th  
digit

11th  
digit

1st digit Servo Motor Type

| Code | Specification         |
|------|-----------------------|
| F    | With F-type iron core |

5th digit Voltage

| Code | Specification |
|------|---------------|
| A    | 200 VAC       |

10th digit Sensor Specification

| Code | Specification           |
|------|-------------------------|
| P    | With polarity sensor    |
| None | Without polarity sensor |

2nd digit Moving Coil/Magnetic Way

| Code | Specification |
|------|---------------|
| W    | Moving Coil   |

6th+7th+8th digits Length of Moving Coil

| Code | Specification |
|------|---------------|
| 090  | 91 mm         |
| 120  | 127 mm        |
| 200  | 215 mm        |
| 230  | 235 mm        |
| 380  | 395 mm        |

11th digit Connector for Servo Motor Main Circuit Cable

| Code | Specification                              | Applicable Models       |
|------|--------------------------------------------|-------------------------|
| None | Connector from Tyco Electronics Japan G.K. | All models              |
| D    | Connector from Interconnectron GmbH        | SGLFW-35, -50, -1Z□200B |

3rd+4th digits Magnet Height

| Code | Specification |
|------|---------------|
| 20   | 20 mm         |
| 35   | 36 mm         |
| 50   | 47.5 mm       |
| 1Z   | 95 mm         |

9th digit Design Revision Order

A, B ...

■ Non Stock Items

Note: This information is provided to explain model numbers. It is not meant to imply that models are available for all combinations of codes.

#### ◆ Magnetic Way

S G L F M - 20 324 A □

Linear  $\Sigma$  Series  
Linear Servo Motors

1st  
digit

2nd  
digit

3rd+4th  
digits

5th+6th+7th  
digits

8th  
digit

9th  
digit

1st digit Servo Motor Type

(Same as for the Moving Coil.)

5th+6th+7th digits Length of Magnetic Way

| Code | Specification |
|------|---------------|
| 324  | 324 mm        |
| 405  | 405 mm        |
| 540  | 540 mm        |
| 675  | 675 mm        |
| 756  | 756 mm        |
| 945  | 945 mm        |

9th digit Options

| Code | Specification     |
|------|-------------------|
| None | Without options   |
| C    | With magnet cover |

■ Non Stock Items

2nd digit Moving Coil/Magnetic Way

| Code | Specification |
|------|---------------|
| M    | Magnetic Way  |

3rd+4th digits Magnet Height

(Same as for the Moving Coil.)

8th digit Design Revision Order

A, B ...



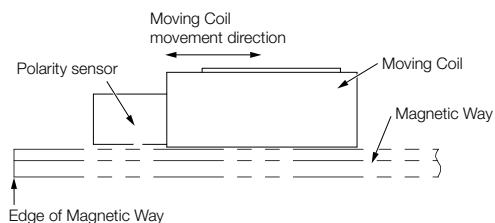
## Precautions on Moving Coils with Polarity Sensors



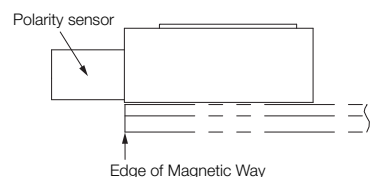
Note

When you use a Moving Coil with a Polarity Sensor, the Magnetic Way must cover the bottom of the polarity sensor. Refer to the example that shows the correct installation. When determining the length of the Moving Coil's stroke or the length of the Magnetic Way, consider the total length (L) of the Moving Coil and the polarity sensor. Refer to the following table.

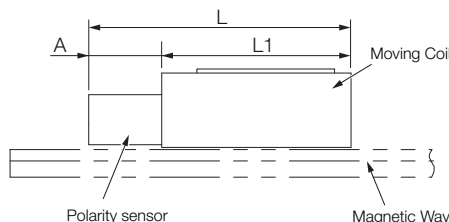
### Correct Installation



### Incorrect Installation



### ◆ Total Length of Moving Coil with Polarity Sensor



| Moving Coil Model<br>SGLFW- | Length of Moving Coil,<br>L1 [mm] | Length of Polarity Sensor,<br>A [mm] | Total Length,<br>L [mm] |
|-----------------------------|-----------------------------------|--------------------------------------|-------------------------|
| 20A090AP                    | 91                                | 22                                   | 113                     |
| 20A120AP                    | 127                               |                                      | 149                     |
| 35A120AP□                   | 127                               | 22                                   | 149                     |
| 35A230AP□                   | 235                               |                                      | 257                     |
| 50A200BP□                   | 215                               | 22                                   | 237                     |
| 50A380BP□                   | 395                               |                                      | 417                     |
| 1ZA200BP□                   | 215                               | 22                                   | 237                     |
| 1ZA380BP                    | 395                               |                                      | 417                     |

## Specifications and Ratings: SGLFW Models

### Specifications

| Linear Servo Motor Moving Coil Model<br>SGLFW- |                             | 20A                                                                                                                                                                                                                                                                                                                                          |      | 35A  |      | 50A  |      | 1ZA  |      |
|------------------------------------------------|-----------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------|------|------|------|------|------|------|
|                                                |                             | 090A                                                                                                                                                                                                                                                                                                                                         | 120A | 120A | 230A | 200B | 380B | 200B | 380B |
| Time Rating                                    |                             | Continuous                                                                                                                                                                                                                                                                                                                                   |      |      |      |      |      |      |      |
| Thermal Class                                  |                             | B                                                                                                                                                                                                                                                                                                                                            |      |      |      |      |      |      |      |
| Insulation Resistance                          |                             | 500 VDC, 10 MΩ min.                                                                                                                                                                                                                                                                                                                          |      |      |      |      |      |      |      |
| Withstand Voltage                              |                             | 1,500 VAC for 1 minute                                                                                                                                                                                                                                                                                                                       |      |      |      |      |      |      |      |
| Excitation                                     |                             | Permanent magnet                                                                                                                                                                                                                                                                                                                             |      |      |      |      |      |      |      |
| Cooling Method                                 |                             | Self-cooled                                                                                                                                                                                                                                                                                                                                  |      |      |      |      |      |      |      |
| Protective Structure                           |                             | IP00                                                                                                                                                                                                                                                                                                                                         |      |      |      |      |      |      |      |
| Environmental Conditions                       | Surrounding Air Temperature | 0°C to 40°C (with no freezing)                                                                                                                                                                                                                                                                                                               |      |      |      |      |      |      |      |
|                                                | Surrounding Air Humidity    | 20% to 80% relative humidity (with no condensation)                                                                                                                                                                                                                                                                                          |      |      |      |      |      |      |      |
|                                                | Installation Site           | <ul style="list-style-type: none"> <li>• Must be indoors and free of corrosive and explosive gases.</li> <li>• Must be well-ventilated and free of dust and moisture.</li> <li>• Must facilitate inspection and cleaning.</li> <li>• Must have an altitude of 1,000 m or less.</li> <li>• Must be free of strong magnetic fields.</li> </ul> |      |      |      |      |      |      |      |
| Shock Resistance                               | Impact Acceleration Rate    | 196 m/s <sup>2</sup>                                                                                                                                                                                                                                                                                                                         |      |      |      |      |      |      |      |
|                                                | Number of Impacts           | 2 times                                                                                                                                                                                                                                                                                                                                      |      |      |      |      |      |      |      |
| Vibration Resistance                           | Vibration Acceleration Rate | 49 m/s <sup>2</sup> (the vibration resistance in three directions, vertical, side-to-side, and front-to-back)                                                                                                                                                                                                                                |      |      |      |      |      |      |      |

## Ratings

| Linear Servo Motor Moving Coil Model<br>SGLFW-                            |                      | 20A        |      | 35A        |      | 50A        |      | 1ZA        |      |
|---------------------------------------------------------------------------|----------------------|------------|------|------------|------|------------|------|------------|------|
|                                                                           |                      | 090A       | 120A | 120A       | 230A | 200B       | 380B | 200B       | 380B |
| Rated Motor Speed<br>(Reference Speed during Speed Control)* <sup>1</sup> | m/s                  | 5.0        | 3.5  | 2.5        | 3.0  | 1.5        | 1.5  | 1.5        | 1.5  |
| Maximum Speed* <sup>1</sup>                                               | m/s                  | 5.0        | 5.0  | 5.0        | 5.0  | 5.0        | 5.0  | 4.9        | 4.9  |
| Rated Force* <sup>1</sup> , * <sup>2</sup>                                | N                    | 25         | 40   | 80         | 160  | 280        | 560  | 560        | 1120 |
| Maximum Force* <sup>1</sup>                                               | N                    | 86         | 125  | 220        | 440  | 600        | 1200 | 1200       | 2400 |
| Rated Current* <sup>1</sup>                                               | Arms                 | 0.70       | 0.80 | 1.4        | 2.8  | 5.0        | 10.0 | 8.7        | 17.5 |
| Maximum Current* <sup>1</sup>                                             | Arms                 | 3.0        | 2.9  | 4.4        | 8.8  | 12.4       | 25.0 | 21.6       | 43.6 |
| Moving Coil Mass                                                          | kg                   | 0.70       | 0.90 | 1.3        | 2.3  | 3.5        | 6.9  | 6.4        | 12   |
| Force Constant                                                            | N/Arms               | 36.0       | 54.0 | 62.4       | 62.4 | 60.2       | 60.2 | 69.0       | 69.0 |
| BEMF Constant                                                             | Vrms/(m/s)/<br>phase | 12.0       | 18.0 | 20.8       | 20.8 | 20.1       | 20.1 | 23.0       | 23.0 |
| Motor Constant                                                            | N/ $\sqrt{W}$        | 7.95       | 9.81 | 14.4       | 20.4 | 34.3       | 48.5 | 52.4       | 74.0 |
| Electrical Time Constant                                                  | ms                   | 3.2        | 3.3  | 3.6        | 3.6  | 16         | 16   | 18         | 18   |
| Mechanical Time Constant                                                  | ms                   | 11         | 9.4  | 6.3        | 5.5  | 3.0        | 2.9  | 2.3        | 2.1  |
| Thermal Resistance<br>(with Heat Sink)                                    | K/W                  | 4.35       | 3.19 | 1.57       | 0.96 | 0.56       | 0.38 | 0.47       | 0.20 |
| Thermal Resistance<br>(without Heat Sink)                                 | K/W                  | 7.69       | 5.02 | 4.10       | 1.94 | 1.65       | 0.95 | 1.30       | 0.73 |
| Magnetic Attraction                                                       | N                    | 310        | 460  | 810        | 1590 | 1650       | 3260 | 3300       | 6520 |
| Combined Magnetic Way, SGLFM-                                             |                      | 20□ □ □ A□ |      | 35□ □ □ A□ |      | 35□ □ □ A□ |      | 35□ □ □ A□ |      |
| Combined Serial Converter Unit,<br>JZDP-□ □ □ □                           |                      | 017        | 018  | 019        | 020  | 181        | 182  | 183        | 184  |
| Applicable<br>SERVOPACKs                                                  | SGD7S-               | 1R6A       | 1R6A | 1R6A       | 3R8A | 5R5A       | 120A | 120A       | 200A |
|                                                                           | SGD7W-               | 1R6A       | 1R6A | 1R6A       | 5R5A | 5R5A       | —    | —          | —    |

\*1. These values are for operation in combination with a SERVOPACK when the temperature of the armature winding is 100°C. The values for other items are at 20°C. These are typical values.

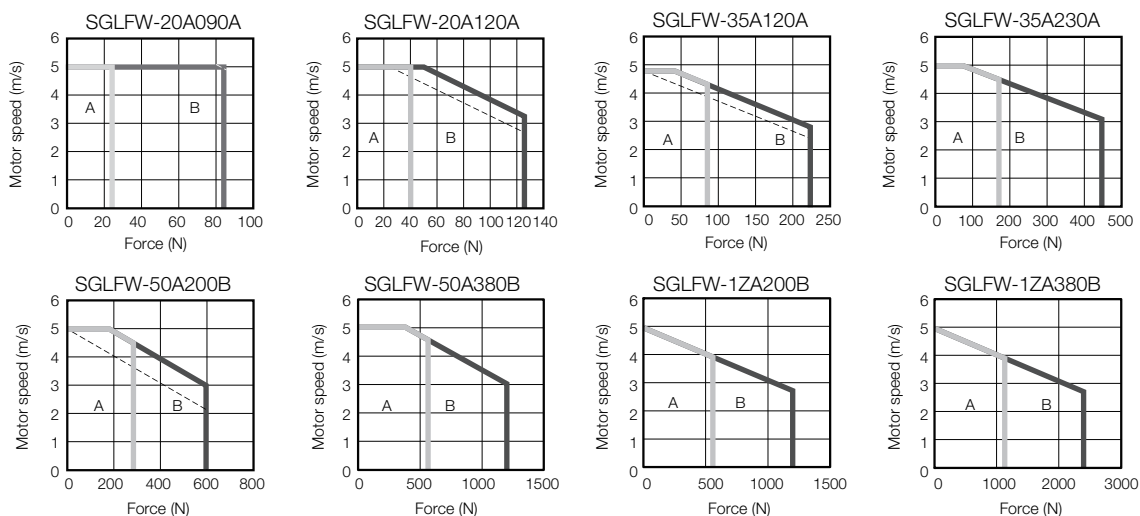
\*2. The rated forces are the continuous allowable force values at a surrounding air temperature of 40°C with an aluminum heat sink of the dimensions given in the following table.

• Heat Sink Dimensions

- 125 mm × 125 mm × 13 mm: SGLFW-20A090A and -20A120A
- 254 mm × 254 mm × 25 mm: SGLFW-35A120A and -35A230A
- 400 mm × 500 mm × 40 mm: SGLFW-50A200B, 50A380B, and -1ZA200B
- 600 mm × 762 mm × 50 mm: SGLFW-1ZA380B

## Force-Motor Speed Characteristics

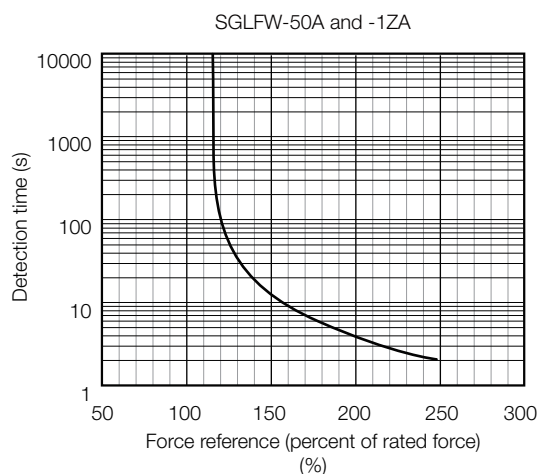
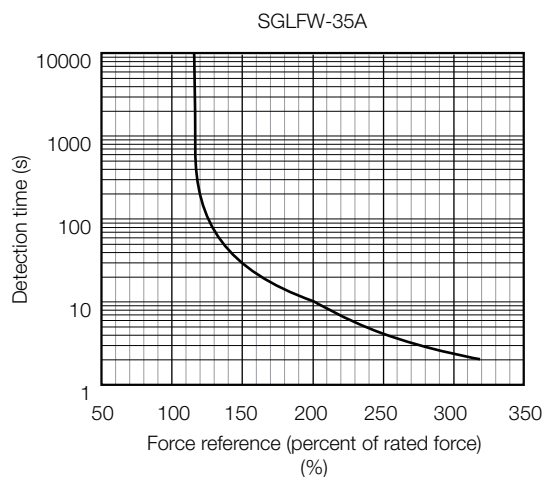
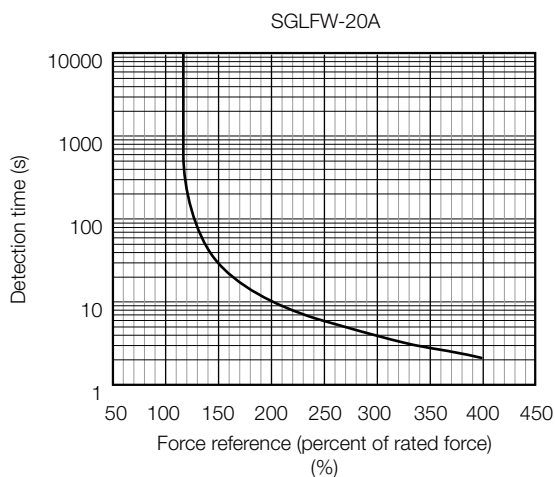
[A] : Continuous duty zone — (solid lines): With three-phase 200-V input  
 [B] : Intermittent duty zone - - - (dotted lines): With single-phase 200-V input



- Note: 1. These values are for operation in combination with a SERVOPACK when the temperature of the armature winding is 100°C. These are typical values.
2. The characteristics in the intermittent duty zone depend on the power supply voltage.
3. If the effective force is within the allowable range for the rated force, the Servo Motor can be used within the intermittent duty zone.
4. If you use a Servo Motor Main Circuit Cable that exceeds 20 m, the intermittent duty zone in the torque-motor speed characteristics will become smaller because the voltage drop increases.

## Servo Motor Overload Protection Characteristics

The overload detection level is set for hot start conditions with a Servo Motor surrounding air temperature of 40°C.

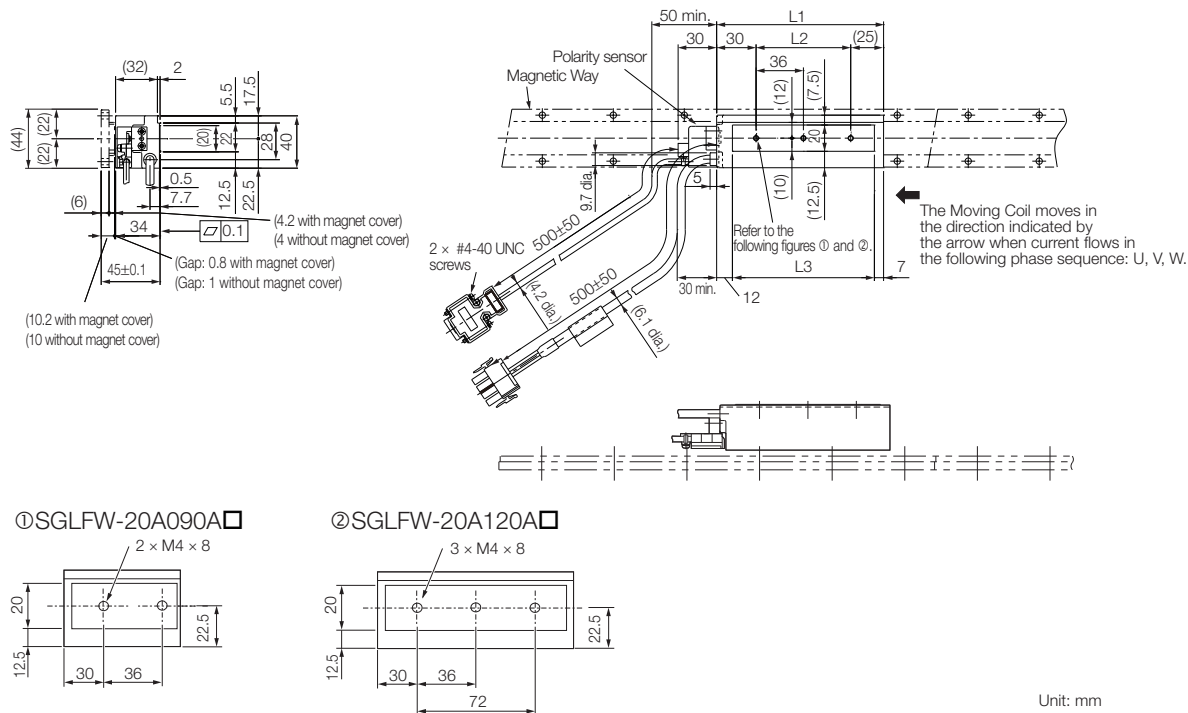


Note: The above overload protection characteristics do not mean that you can perform continuous duty operation with an output of 100% or higher. Use the Servo Motor so that the effective force remains within the continuous duty zone given in *Force-Motor Speed Characteristics* on page 432.

## External Dimensions

### SGLFW-20

#### ◆ Moving Coils: SGLFW-20A□□□A□



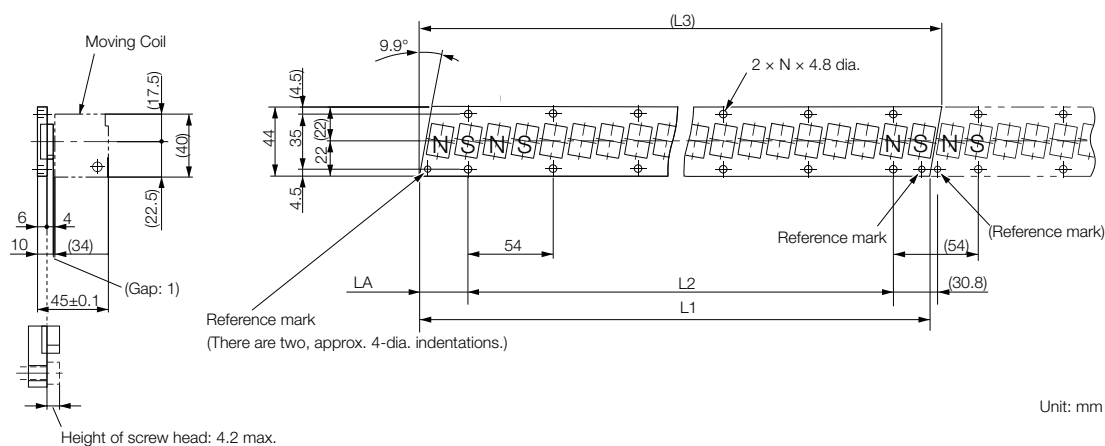
| Moving Coil Model SGLFW- | L1  | L2 | L3  | Approx. Mass [kg] |
|--------------------------|-----|----|-----|-------------------|
| 20A090A□                 | 91  | 36 | 72  | 0.7               |
| 20A120A□                 | 127 | 72 | 108 | 0.9               |

Note: The above dimensional drawing gives the dimensions for both models with polarity sensors and models without polarity sensors.

Refer to the following section for the connector specifications for the Sensor Cable and Servo Motor Main Circuit Cable.

🔌 SGLFW-20A□□□A□ and -35A□□□A□ Moving Coils (page 445)

# ◆ Magnetic Ways: SGLFM-20□□□A



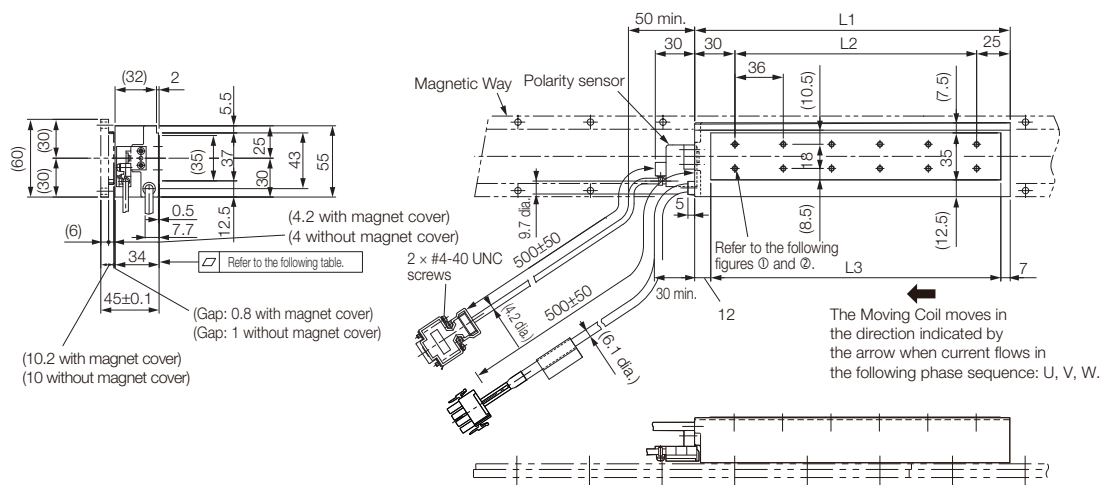
Mounting Section Details

Note: More than one Magnetic Way can be connected. Connect the Magnetic Ways so that the reference marks on them are aligned in the same direction as shown in the figure.

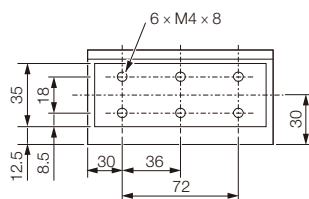
| Magnetic Way Model SGLFM- | L1                                  | L2            | (L3)    | LA                                | N  | Approx. Mass [kg] |
|---------------------------|-------------------------------------|---------------|---------|-----------------------------------|----|-------------------|
| 20324A                    | 324 <sup>+0.1</sup> <sub>-0.3</sub> | 270 (54 × 5)  | (331.6) | 30.8 <sup>0</sup> <sub>-0.2</sub> | 6  | 0.9               |
| 20540A                    | 540 <sup>+0.1</sup> <sub>-0.3</sub> | 486 (54 × 9)  | (547.6) | 30.8 <sup>0</sup> <sub>-0.2</sub> | 10 | 1.4               |
| 20756A                    | 756 <sup>+0.1</sup> <sub>-0.3</sub> | 702 (54 × 13) | (763.6) | 30.8 <sup>0</sup> <sub>-0.2</sub> | 14 | 2                 |

## SGLFW-35

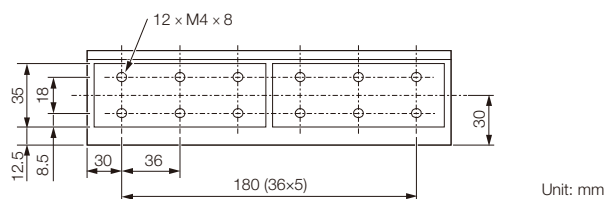
### ◆ Moving Coils: SGLFW-35A□□□□□



① SGLFW-35A120A□



② SGLFW-35A230A□



| Moving Coil Model SGLFW- | L1  | L2  | L3  | Approx. Mass [kg] |
|--------------------------|-----|-----|-----|-------------------|
| 35A120A□                 | 127 | 72  | 108 | 1.3               |
| 35A230A□                 | 235 | 180 | 216 | 2.3               |

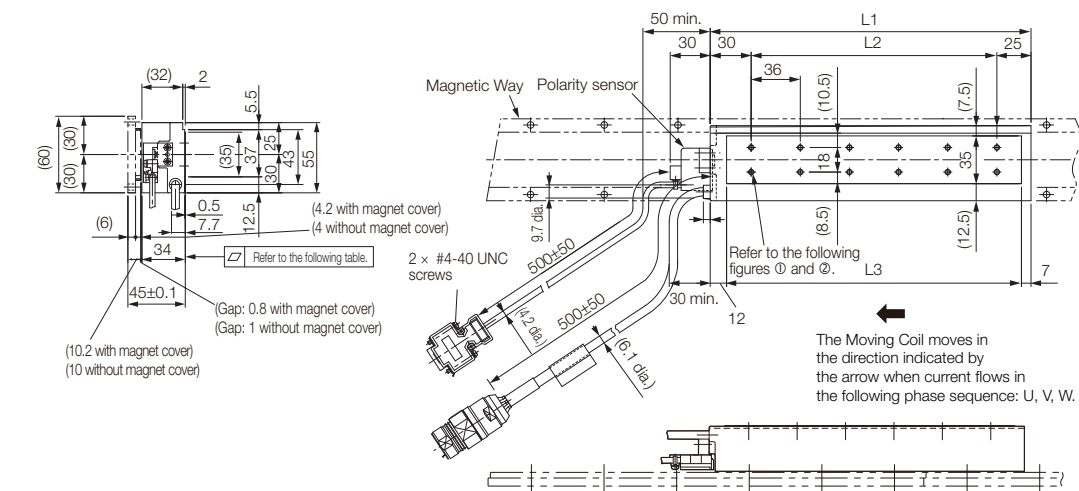
Note: The above dimensional drawing gives the dimensions for both models with polarity sensors and models without polarity sensors.

Refer to the following section for the connector specifications for the Sensor Cable and Servo Motor Main Circuit Cable.

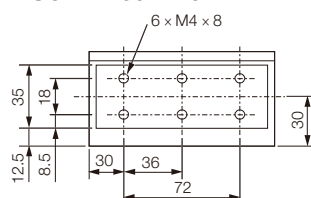
☞ SGLFW-20A□□□□□ and -35A□□□□□ Moving Coils (page 445)



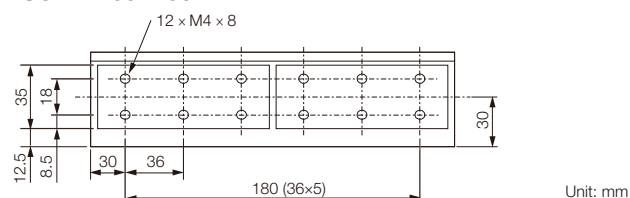
# ◆ Moving Coils: SGLFW-35A□□□A□D



① SGLFW-35A120A□D



② SGLFW-35A230A□D



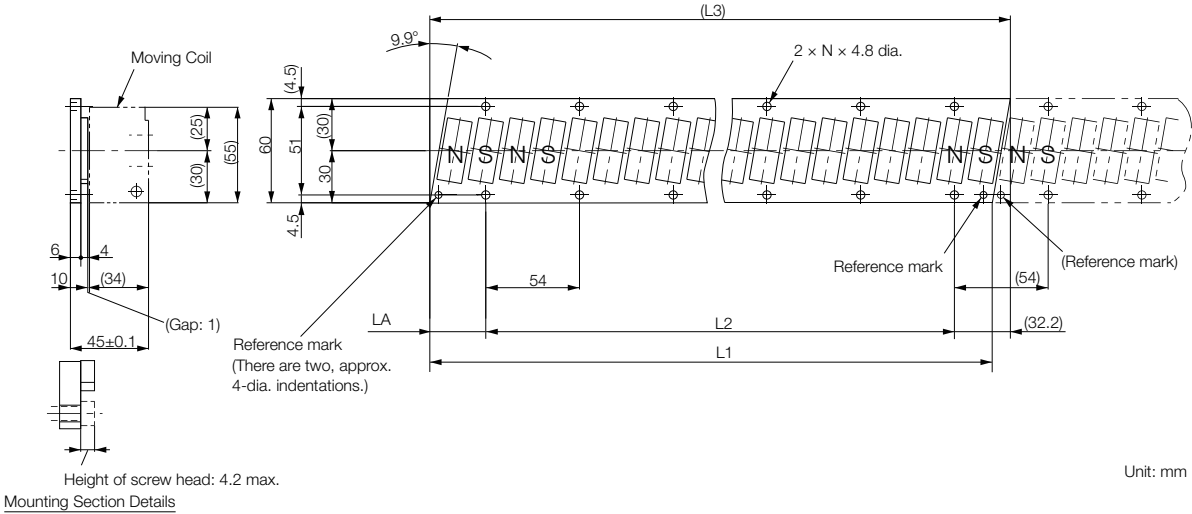
| Moving Coil Model SGLFW- | L1  | L2  | L3  | Approx. Mass [kg] |
|--------------------------|-----|-----|-----|-------------------|
| 35A120A□D                | 127 | 72  | 108 | 1.3               |
| 35A230A□D                | 235 | 180 | 216 | 2.3               |

Note: The above dimensional drawing gives the dimensions for both models with polarity sensors and models without polarity sensors.

Refer to the following section for the connector specifications for the Sensor Cable and Servo Motor Main Circuit Cable.

🔧 SGLFW-35A□□□A□D and -50A□□□B□D Moving Coils (page 446)

◆ Magnetic Ways: SGLFM-35□□□A



Note: More than one Magnetic Way can be connected. Connect the Magnetic Ways so that the reference marks on them are aligned in the same direction as shown in the figure.

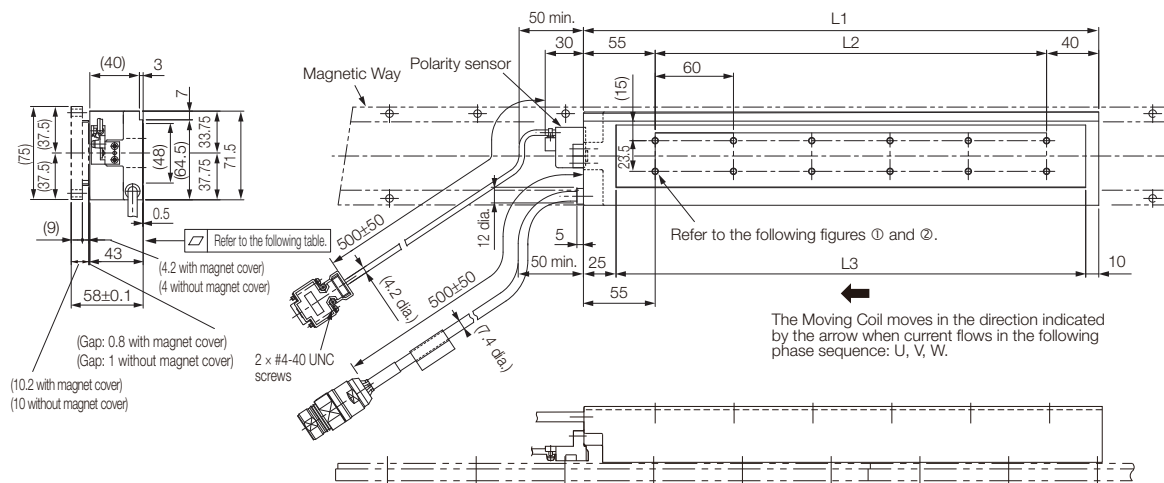
| Magnetic Way Model SGLFM- | L1                                  | L2            | (L3)    | LA                                | N  | Approx. Mass [kg] |
|---------------------------|-------------------------------------|---------------|---------|-----------------------------------|----|-------------------|
| 35324A                    | 324 <sup>-0.1</sup> <sub>-0.3</sub> | 270 (54 × 5)  | (334.4) | 32.2 <sup>0</sup> <sub>-0.2</sub> | 6  | 1.2               |
| 35540A                    | 540 <sup>-0.1</sup> <sub>-0.3</sub> | 486 (54 × 9)  | (550.4) | 32.2 <sup>0</sup> <sub>-0.2</sub> | 10 | 2                 |
| 35756A                    | 756 <sup>-0.1</sup> <sub>-0.3</sub> | 702 (54 × 13) | (766.4) | 32.2 <sup>0</sup> <sub>-0.2</sub> | 14 | 2.9               |



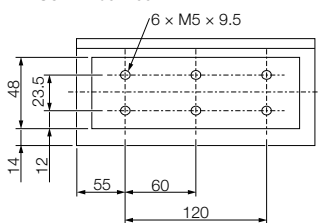
## Linear Servo Motors

SGLFW (Earlier Models with F-type Iron Cores)

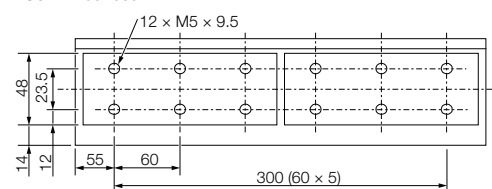
### ◆ Moving Coils: SGLFW-50A□□□B□D



① SGLFW-50A200B□D



② SGLFW-50A380B□D



Unit: mm

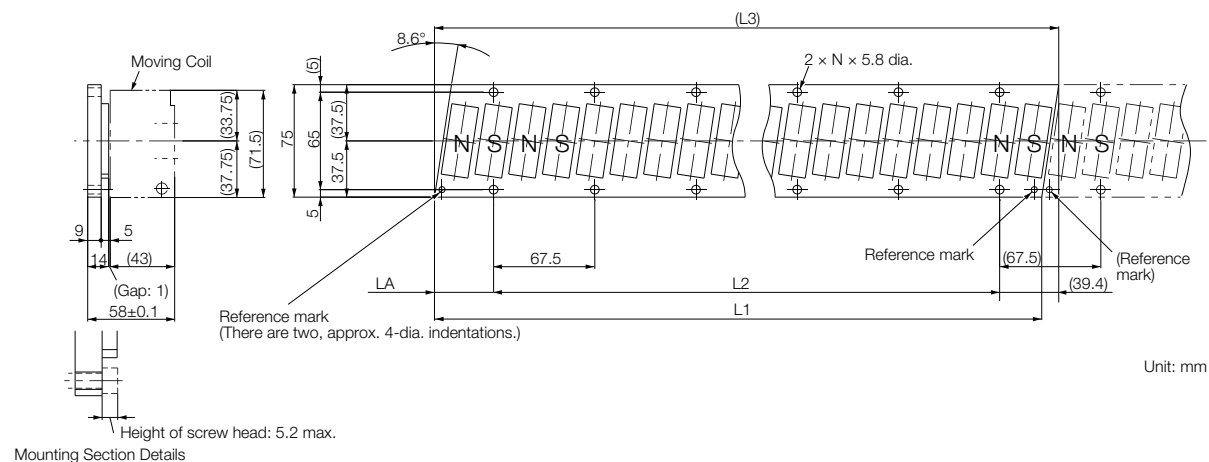
| Moving Coil Model<br>SGLFW- | L1  | L2  | L3  | Flatness | Approx. Mass [kg] |
|-----------------------------|-----|-----|-----|----------|-------------------|
| 50A200B□D                   | 215 | 120 | 180 | 0.2      | 3.5               |
| 50A380B□D                   | 395 | 300 | 360 | 0.3      | 6.9               |

Note: The above dimensional drawing gives the dimensions for both models with polarity sensors and models without polarity sensors.

Refer to the following section for the connector specifications for the Sensor Cable and Servo Motor Main Circuit Cable.

🔧 SGLFW-35A□□□A□D and -50A□□□B□D Moving Coils (page 446)

# ◆ Magnetic Ways: SGLFM-50□□□A

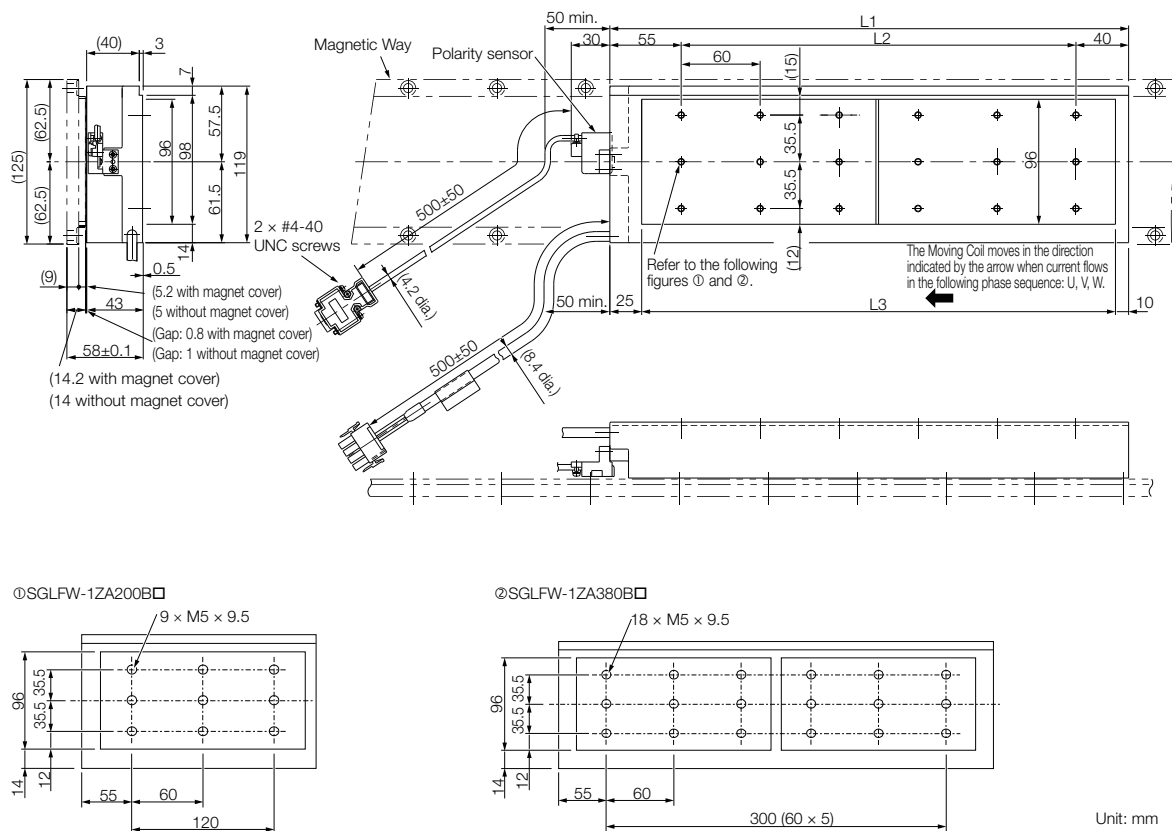


Note: More than one Magnetic Way can be connected. Connect the Magnetic Ways so that the reference marks on them are aligned in the same direction as shown in the figure.

| Magnetic Way Model SGLFM- | L1                                  | L2                | (L3)    | LA                                | N  | Approx. Mass [kg] |
|---------------------------|-------------------------------------|-------------------|---------|-----------------------------------|----|-------------------|
| 50405A                    | 405 <sup>-0.1</sup> <sub>-0.3</sub> | 337.5 (67.5 × 5)  | (416.3) | 39.4 <sup>0</sup> <sub>-0.2</sub> | 6  | 2.8               |
| 50675A                    | 675 <sup>-0.1</sup> <sub>-0.3</sub> | 607.5 (67.5 × 9)  | (686.3) | 39.4 <sup>0</sup> <sub>-0.2</sub> | 10 | 4.6               |
| 50945A                    | 945 <sup>-0.1</sup> <sub>-0.3</sub> | 877.5 (67.5 × 13) | (956.3) | 39.4 <sup>0</sup> <sub>-0.2</sub> | 14 | 6.5               |

## SGLFW-1Z

### ◆ Moving Coils: SGLFW-1ZA□□□□



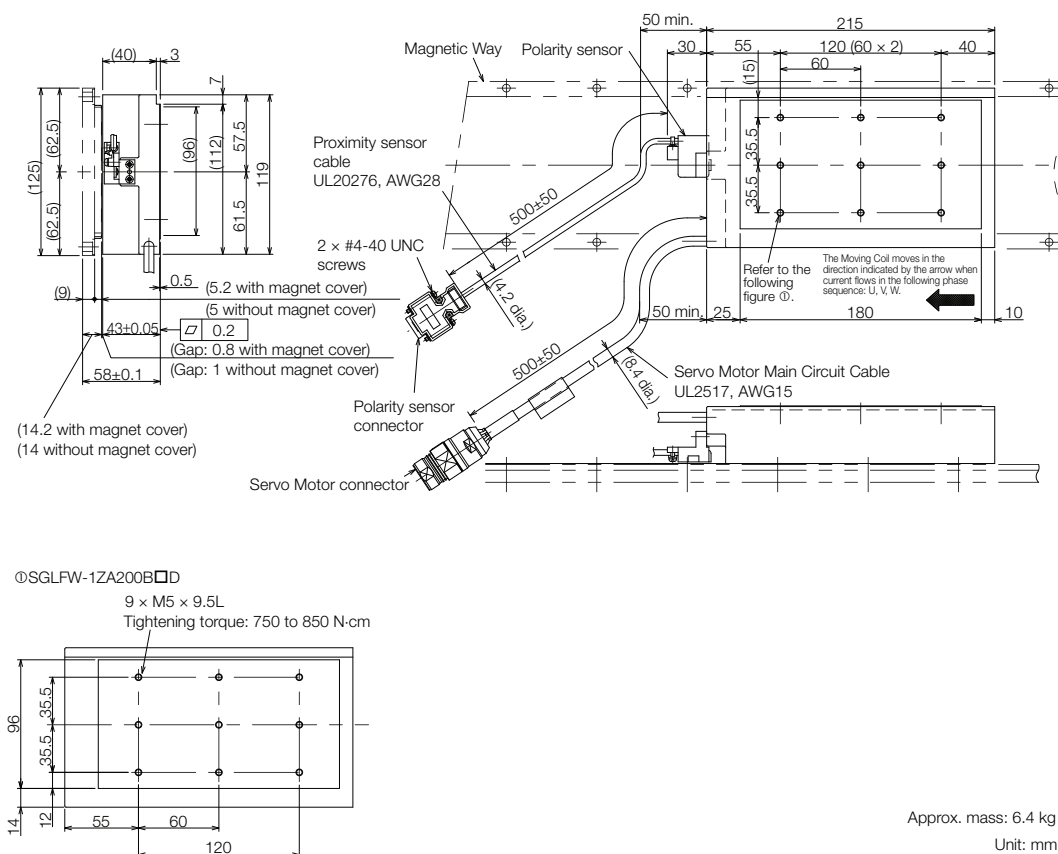
| Moving Coil Model SGLFW- | L1  | L2  | L3  | Approx. Mass [kg] |
|--------------------------|-----|-----|-----|-------------------|
| 1ZA200B□                 | 215 | 120 | 180 | 6.4               |
| 1ZA380B□                 | 395 | 300 | 360 | 11.5              |

Note: The above dimensional drawing gives the dimensions for both models with polarity sensors and models without polarity sensors.

Refer to the following section for the connector specifications for the Sensor Cable and Servo Motor Main Circuit Cable.

🔧 SGLFW-1ZA□□□□□ Moving Coils (page 448)

# ◆ Moving Coils: SGLFW-1ZA200B□D

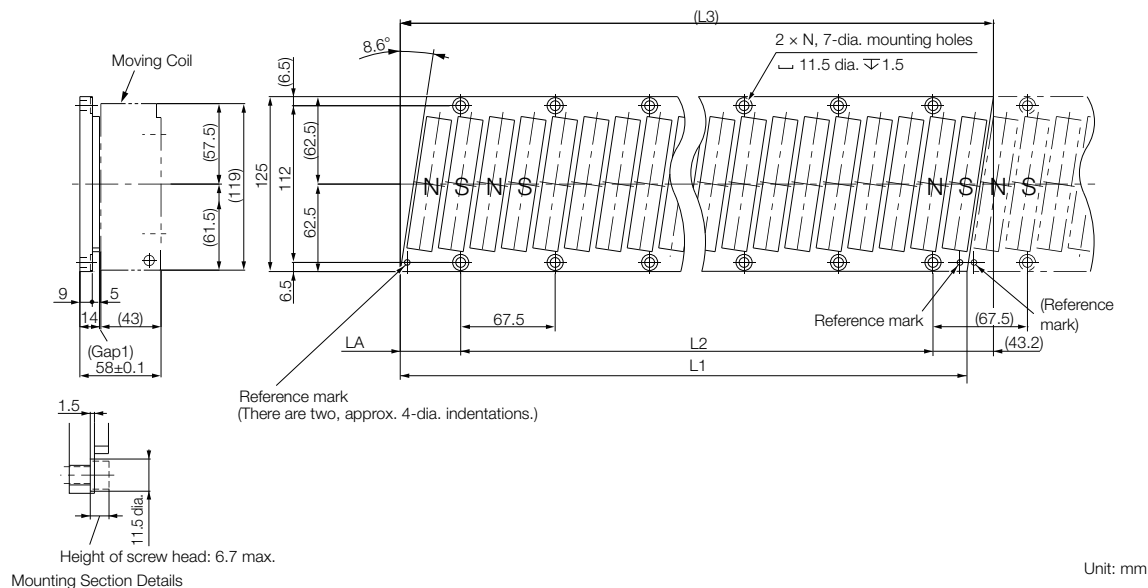


Note: The above dimensional drawing gives the dimensions for both models with polarity sensors and models without polarity sensors.

Refer to the following section for the connector specifications for the Sensor Cable and Servo Motor Main Circuit Cable.

📖 SGLFW-1ZA200B□D Moving Coils (page 449)

# ◆ Magnetic Ways: SGLFM-1Z□□□A



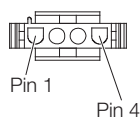
Note: More than one Magnetic Way can be connected. Connect the Magnetic Ways so that the reference marks on them are aligned in the same direction as shown in the figure.

| Magnetic Way Model SGLFM- | L1                                  | L2                | (L3)    | LA                                | N  | Approx. Mass [kg] |
|---------------------------|-------------------------------------|-------------------|---------|-----------------------------------|----|-------------------|
| 1Z405A                    | 405 <sup>-0.1</sup> <sub>-0.3</sub> | 337.5 (67.5 × 5)  | (423.9) | 43.2 <sup>0</sup> <sub>-0.2</sub> | 6  | 5                 |
| 1Z675A                    | 675 <sup>-0.1</sup> <sub>-0.3</sub> | 607.5 (67.5 × 9)  | (693.9) | 43.2 <sup>0</sup> <sub>-0.2</sub> | 10 | 8.3               |
| 1Z945A                    | 945 <sup>-0.1</sup> <sub>-0.3</sub> | 877.5 (67.5 × 13) | (963.9) | 43.2 <sup>0</sup> <sub>-0.2</sub> | 14 | 12                |



# ◆ SGLFW-20A□□□A□ and -35A□□□A□ Moving Coils

## • Servo Motor Connector

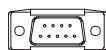


Plug: 350779-1  
 Pins: 350218-3 or 350547-3 (No.1 to 3)  
 350654-1 or 350669-1 (No. 4)  
 Tyco Electronics Japan G.K.

### Mating Connector

Cap: 350780-1  
 Socket: 350536-3 or 350550-3

## • Polarity Sensor Connector



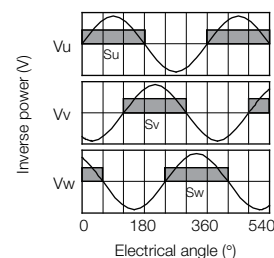
Pin connector: 17JE-23090-02 (D8C) -CG  
 From DDK Ltd.

### Mating Connector

Socket connector: 17JE-13090-02 (D8C) A-CG  
 Studs: 17L-002C or 17L-002C1

## • Polarity Sensor Output Signal

The figure on the right shows the relationship between the Su, Sv, and Sw polarity sensor output signals and the inverse power of each motor phase Vu, Vv, and Vw when the Moving Coil moves in the direction indicated by the arrow in the dimensional drawings of the Moving Coil.



### ◆ SGLFW-35A□□□A□D and -50A□□□B□D Moving Coils

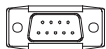
- Servo Motor Connector



Extension: ARRA06AMRPN182  
Pins: 021.279.1020  
From Interconnectron GmbH

Mating Connector  
Plug: APRA06BFRDN170  
Socket: 020.105.1020

- Polarity Sensor Connector

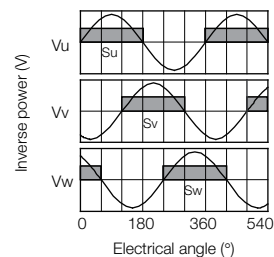


Pin connector: 17JE-23090-02 (D8C) -CG  
From DDK Ltd.

Mating Connector  
Socket connector: 17JE-13090-02 (D8C) A-CG  
Studs: 17L-002C or 17L-002C1

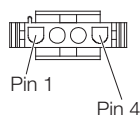
- Polarity Sensor Output Signal

The figure on the right shows the relationship between the Su, Sv, and Sw polarity sensor output signals and the inverse power of each motor phase Vu, Vv, and Vw when the Moving Coil moves in the direction indicated by the arrow in the dimensional drawings of the Moving Coil.



## ◆ SGLFW-50A□□□B□ Moving Coils

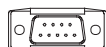
### • Servo Motor Connector



Plug: 350779-1  
 Pins: 350218-3 or 350547-3 (No.1 to 3)  
 350654-1 or 350669-1 (No. 4)  
 Tyco Electronics Japan G.K.

Mating Connector  
 Cap: 350780-1  
 Socket: 350537-3 or 350550-3

### • Polarity Sensor Connector

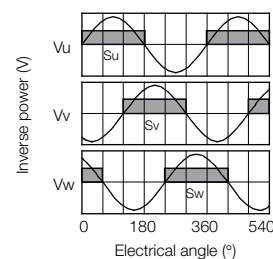


Pin connector: 17JE-23090-02 (D8C) -CG  
 From DDK Ltd.

Mating Connector  
 Socket connector: 17JE-13090-02 (D8C) A-CG  
 Studs: 17L-002C or 17L-002C1

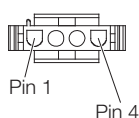
### • Polarity Sensor Output Signal

The figure on the right shows the relationship between the Su, Sv, and Sw polarity sensor output signals and the inverse power of each motor phase Vu, Vv, and Vw when the Moving Coil moves in the direction indicated by the arrow in the dimensional drawings of the Moving Coil.



### ◆ SGLFW-1ZA□□□B□ Moving Coils

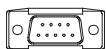
#### • Servo Motor Connector



Plug: 350779-1  
 Pins: 350218-3 or 350547-3 (No. 1 to 3)  
 350654-1 or 350669-1 (No. 4)  
 Tyco Electronics Japan G.K.

Mating Connector  
 Cap: 350780-1  
 Socket: 350537-3 or 350550-3

#### • Polarity Sensor Connector

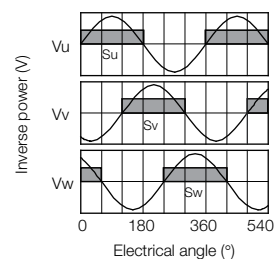


Pin connector: 17JE-23090-02 (D8C) -CG  
 From DDK Ltd.

Mating Connector  
 Socket connector: 17JE-13090-02 (D8C) A-CG  
 Studs: 17L-002C or 17L-002C1

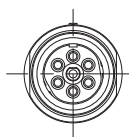
#### • Polarity Sensor Output Signal

The figure on the right shows the relationship between the Su, Sv, and Sw polarity sensor output signals and the inverse power of each motor phase Vu, Vv, and Vw when the Moving Coil moves in the direction indicated by the arrow in the dimensional drawings of the Moving Coil.



## ◆ SGLFW-1ZA200B□D Moving Coils

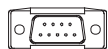
### • Servo Motor Connector



Extension: SROC06JMSCN169  
Pins: 021.423.1020  
From Interconnectron GmbH

Mating Connector  
Plug: SPUC06KFSDN236  
Socket: 020.030.1020

### • Polarity Sensor Connector

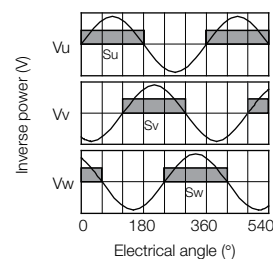


Pin connector: 17JE-23090-02 (D8C) -CG  
From DDK Ltd.

Mating Connector  
Socket connector: 17JE-13090-02 (D8C) A-CG  
Studs: 17L-002C or 17L-002C1

### • Polarity Sensor Output Signal

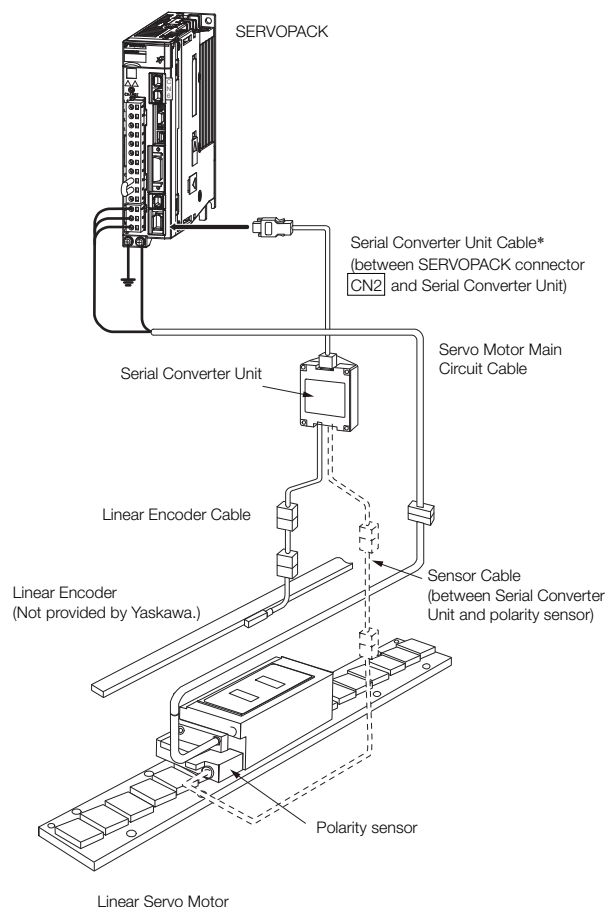
The figure on the right shows the relationship between the Su, Sv, and Sw polarity sensor output signals and the inverse power of each motor phase Vu, Vv, and Vw when the Moving Coil moves in the direction indicated by the arrow in the dimensional drawings of the Moving Coil.



## Selecting Cables

### ◆ System Configurations

Example: SGLFW Servo Motors with F-type Iron Cores



\* You can connect directly to an absolute linear encoder.

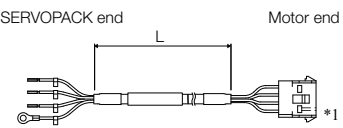
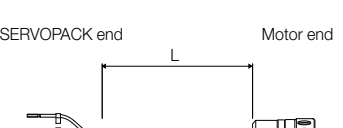
Note: 1. The above system configurations are for SGLFW Servo Motors with F-type Iron Cores. Refer to the manual for the Linear Servo Motor for configurations with other models.

2. Refer to the following manual for the following information.

- Cable dimensional drawings and cable connection specifications
- Order numbers and specifications of individual connectors for cables
- Order numbers and specifications for wiring materials

📖 *Σ-7-Series AC Servo Drive Peripheral Device Selection Manual* (Manual No.: SIEP S800001 32)

## Servo Motor Main Circuit Cables

| Servo Motor Model     | Length (L) | Order Number    | Appearance                                                                          |
|-----------------------|------------|-----------------|-------------------------------------------------------------------------------------|
| SGLFW-20A, -35A       | 1 m        | JZSP-CLN11-01-E |  |
|                       | 3 m        | JZSP-CLN11-03-E |                                                                                     |
|                       | 5 m        | JZSP-CLN11-05-E |                                                                                     |
|                       | 10 m       | JZSP-CLN11-10-E |                                                                                     |
|                       | 15 m       | JZSP-CLN11-15-E |                                                                                     |
|                       | 20 m       | JZSP-CLN11-20-E |                                                                                     |
| SGLFW-50A, -1ZA       | 1 m        | JZSP-CLN21-01-E |  |
|                       | 3 m        | JZSP-CLN21-03-E |                                                                                     |
|                       | 5 m        | JZSP-CLN21-05-E |                                                                                     |
|                       | 10 m       | JZSP-CLN21-10-E |                                                                                     |
|                       | 15 m       | JZSP-CLN21-15-E |                                                                                     |
|                       | 20 m       | JZSP-CLN21-20-E |                                                                                     |
| SGLFW-<br>□□A □□□□□□D | 1 m        | JZSP-CLN14-01-E |  |
|                       | 3 m        | JZSP-CLN14-03-E |                                                                                     |
|                       | 5 m        | JZSP-CLN14-05-E |                                                                                     |
|                       | 10 m       | JZSP-CLN14-10-E |                                                                                     |
|                       | 15 m       | JZSP-CLN14-15-E |                                                                                     |
|                       | 20 m       | JZSP-CLN14-20-E |                                                                                     |

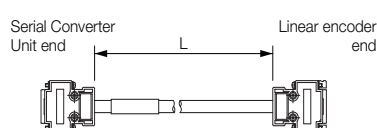
Note: Shaded model numbers are non-stock items

\*1. Connector from Tyco Electronics Japan G.K.

\*2. Connector from Interconnectron GmbH

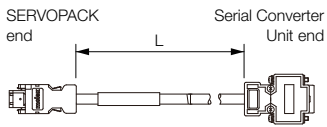
\*3. A connector is not provided on the Linear Servo Motor end. Obtain a connector according to your specifications. Refer to the next page for information on connectors.

## Linear Encoder Cables

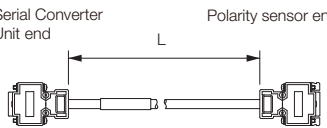
| Name                                           | Servo Motor Model | Length* (L) | Order Number    | Appearance                                                                           |
|------------------------------------------------|-------------------|-------------|-----------------|--------------------------------------------------------------------------------------|
| For linear encoder from Renishaw PLC           | All Models        | 1 m         | JZSP-CLL00-01-E |  |
|                                                |                   | 3 m         | JZSP-CLL00-03-E |                                                                                      |
|                                                |                   | 5 m         | JZSP-CLL00-05-E |                                                                                      |
|                                                |                   | 10 m        | JZSP-CLL00-10-E |                                                                                      |
|                                                |                   | 15 m        | JZSP-CLL00-15-E |                                                                                      |
| For linear encoder from Heidenhain Corporation |                   | 1 m         | JZSP-CLL30-01-E |                                                                                      |
|                                                |                   | 3 m         | JZSP-CLL30-03-E |                                                                                      |
|                                                |                   | 5 m         | JZSP-CLL30-05-E |                                                                                      |
|                                                |                   | 10 m        | JZSP-CLL30-10-E |                                                                                      |
|                                                |                   | 15 m        | JZSP-CLL30-15-E |                                                                                      |

\* When using a JZDP-J00□ - □□□ - E Serial Converter Unit, do not exceed a cable length of 3 m.

## Serial Converter Unit Cables

| Servo Motor Model | Length (L) | Order Number    | Appearance                                                                          |
|-------------------|------------|-----------------|-------------------------------------------------------------------------------------|
| All Models        | 1 m        | JZSP-CLP70-01-E |  |
|                   | 3 m        | JZSP-CLP70-03-E |                                                                                     |
|                   | 5 m        | JZSP-CLP70-05-E |                                                                                     |
|                   | 10 m       | JZSP-CLP70-10-E |                                                                                     |
|                   | 15 m       | JZSP-CLP70-15-E |                                                                                     |
|                   | 20 m       | JZSP-CLP70-20-E |                                                                                     |

## Sensor Cables

| Servo Motor Model | Length (L) | Order Number    | Appearance                                                                          |
|-------------------|------------|-----------------|-------------------------------------------------------------------------------------|
| SGLFW-□□ A        | 1 m        | JZSP-CLL10-01-E |  |
|                   | 3 m        | JZSP-CLL10-03-E |                                                                                     |
|                   | 5 m        | JZSP-CLL10-05-E |                                                                                     |
|                   | 10 m       | JZSP-CLL10-10-E |                                                                                     |
|                   | 15 m       | JZSP-CLL10-15-E |                                                                                     |



# Sigma Trac II Linear Stages

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|                                        |     |
|----------------------------------------|-----|
| ST2F Sigma Trac II Linear Stages ..... | 454 |
|----------------------------------------|-----|

# ST2F Sigma Trac II Linear Stages

## Model Designations

ST2 F - A1 A 1375 - A 1 L B

Sigma Trac II  
Sigma-7 Series  
Linear Stage

1st  
digit

2nd+3rd  
digits

4th  
digit

5th-8th  
digits

9th  
digit

10th  
digit

11th  
digit

12th  
digit

1st digit Motor Type

| Code | Specification   |
|------|-----------------|
| F    | SGLF2 Iron Core |

2nd+3rd digits Motor Size

| Code | Specification |
|------|---------------|
| A1   | SGLF2-30□070  |
| A2   | SGLF2-30□120  |
| A3   | SGLF2-30□230  |
| C1   | SGLF2-90□200  |
| C2   | SGLF2-90□380  |
| C3   | SGLF2-90□560  |

4th digit Voltage

| Code | Specification |
|------|---------------|
| A    | 200 VAC       |
| D    | 400 VAC       |

5th-8th digits Base Length

| SGLF2-30 Models |               | SGLF2-90 Models |               |
|-----------------|---------------|-----------------|---------------|
| Code            | Specification | Code            | Specification |
| 0390            | 390 mm        | 0800            | 800 mm        |
| 0565            | 565 mm        | 0900            | 900 mm        |
| 0655            | 655 mm        | 1000            | 1000 mm       |
| 0745            | 745 mm        | 1105            | 1105 mm       |
| 0835            | 835 mm        | 1205            | 1205 mm       |
| 0925            | 925 mm        | 1310            | 1310 mm       |
| 1015            | 1015 mm       | 1410            | 1410 mm       |
| 1105            | 1105 mm       | 1510            | 1510 mm       |
| 1195            | 1195 mm       | 1615            | 1615 mm       |
| 1285            | 1285 mm       | 1715            | 1715 mm       |
| 1375            | 1375 mm       | 1815            | 1815 mm       |
| 1465            | 1465 mm       | 1920            | 1920 mm       |
| 1555            | 1555 mm       |                 |               |

9th digit Base Plate

| Code | Specification       |
|------|---------------------|
| A    | Standard Base Plate |
| B    | Thick Base Plate    |

10th digit Feedback Device

| Code | Specification                           |
|------|-----------------------------------------|
| 1    | Fagor Optical Absolute (9.765 nm)       |
| 2    | Heidenhain Optical Absolute (5 nm)      |
| 9    | Heidenhain EnDat 2.2 Optical ABS (5 nm) |

11th digit Cable Carrier

| Code | Specification |
|------|---------------|
| L    | Left Side     |
| R    | Right Side    |

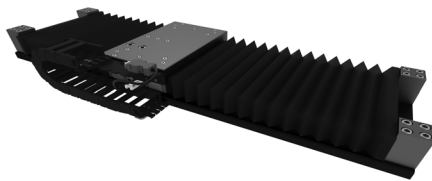
12th digit Bellows and Brake

| Code | Specification                  |
|------|--------------------------------|
| B    | Without Brake, With Bellows    |
| N    | Without Brake, Without Bellows |
| K    | With Brake, With Bellows       |
| Q    | With Brake, Without Bellows    |

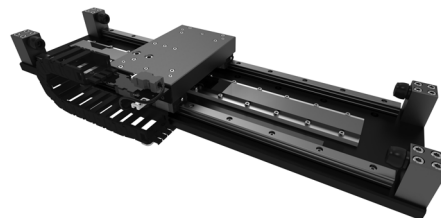
■ Non Stock Items

This information is provided to explain model numbers. It is not meant to imply that models are available for all combinations of codes

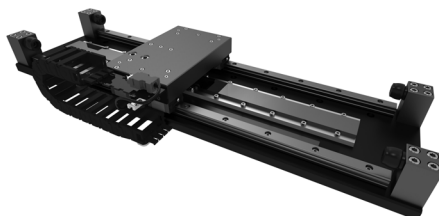
### With Bellows



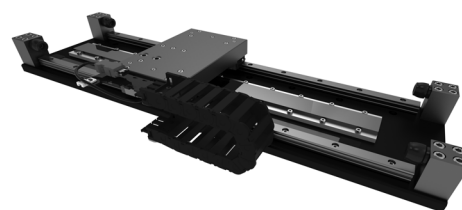
### Left Side Cable Carrier



### Without Bellows



### Right Side Cable Carrier



## Specifications and Ratings

### Specifications

| Linear Stage Model       | ST2F-                       | A1A                                                                                                                                                                                                                                                                                                                            | A2A    | A3A    | C1A    | C2A    | C3A    | A1D    | A2D                    | A3D    | C1D    | C2D    | C3D    |
|--------------------------|-----------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------|--------|--------|--------|--------|--------|------------------------|--------|--------|--------|--------|
| Mounted Lin. Motor       | SGLFW2-                     | 30A070                                                                                                                                                                                                                                                                                                                         | 30A120 | 30A230 | 90A200 | 90A380 | 90A560 | 30D070 | 30D120                 | 30D230 | 90D200 | 90D380 | 90D560 |
| Time Rating              |                             | Continuous                                                                                                                                                                                                                                                                                                                     |        |        |        |        |        |        |                        |        |        |        |        |
| Thermal Class            |                             | B                                                                                                                                                                                                                                                                                                                              |        |        |        |        |        |        |                        |        |        |        |        |
| Insulation Resistance    |                             | 500 VDC, 10 MΩ min.                                                                                                                                                                                                                                                                                                            |        |        |        |        |        |        |                        |        |        |        |        |
| Withstand Voltage        |                             | 1,500 VAC for 1 minute                                                                                                                                                                                                                                                                                                         |        |        |        |        |        |        | 1,800 VAC for 1 minute |        |        |        |        |
| Excitation               |                             | Permanent Magnet                                                                                                                                                                                                                                                                                                               |        |        |        |        |        |        |                        |        |        |        |        |
| Cooling Method           |                             | Self-Cooled                                                                                                                                                                                                                                                                                                                    |        |        |        |        |        |        |                        |        |        |        |        |
| Protective Structure     |                             | IP00                                                                                                                                                                                                                                                                                                                           |        |        |        |        |        |        |                        |        |        |        |        |
| Environmental Conditions | Surrounding Air Temp.       | 0°C to 40°C (with no freezing)                                                                                                                                                                                                                                                                                                 |        |        |        |        |        |        |                        |        |        |        |        |
|                          | Surrounding Air Humidity    | 20% to 80% relative humidity (with no condensation)                                                                                                                                                                                                                                                                            |        |        |        |        |        |        |                        |        |        |        |        |
|                          | Installation Site           | <ul style="list-style-type: none"><li>•Must be indoors and free of corrosive and explosive gases.</li><li>•Must be well-ventilated and free of dust and moisture</li><li>•Must facilitate inspection and cleaning</li><li>•Must have an altitude of 1,000 m or less</li><li>•Must be free of strong magnetic fields.</li></ul> |        |        |        |        |        |        |                        |        |        |        |        |
| Shock Resistance         | Impact Acceleration Rate    | 196 m/s <sup>2</sup>                                                                                                                                                                                                                                                                                                           |        |        |        |        |        |        |                        |        |        |        |        |
|                          | Number of Impacts           | 2 times                                                                                                                                                                                                                                                                                                                        |        |        |        |        |        |        |                        |        |        |        |        |
| Vibration Resistance     | Vibration Acceleration Rate | 49 m/s <sup>2</sup> (vertical, side-to-side, and front-to-back)                                                                                                                                                                                                                                                                |        |        |        |        |        |        |                        |        |        |        |        |

### Ratings

| Linear Stage Model   | ST2F-              | A1A           | A2A    | A3A    |            | A1D    | A2D    | A3D    | C1A    | C2A    | C3A    | C1D    | C2D    | C3D    |
|----------------------|--------------------|---------------|--------|--------|------------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| Mounted Linear Motor | SGLFW2-            | 30A070        | 30A120 | 30A230 |            | 30D070 | 30D120 | 30D230 | 90A200 | 90A380 | 90A560 | 90D200 | 90D380 | 90D560 |
| Power Supply         | V                  | 100 V / 200 V |        |        |            | 400 V  |        |        | 200 V  |        |        | 400 V  |        |        |
| Rated Speed *1       | m/s                | 4.0           | 4.0    | 4.0    |            | 4.0    | 4.0    | 4.0    | 4.0    | 4.0    | 4.0    | 4.0    | 4.0    | 4.0    |
| Max. Speed *1        | m/s                | 5.0           |        |        |            |        |        |        | 4.0    |        |        |        |        |        |
| Rated Force *1,2     | N                  | 45            | 90     | 180    | 170        | 45     | 90     | 180    | 560    | 1120   | 1680   | 560    | 1120   | 1680   |
| Max. Force *1        | N                  | 135           | 270    | 540    | 500        | 135    | 270    | 540    | 1680   | 3360   | 5040   | 1680   | 3360   | 5040   |
| Force Constant       | N/A <sub>rms</sub> | 33.3          | 64.5   | 64.5   |            | 33.3   | 64.5   | 129.0  | 82     | 82     | 82     | 154    | 154    | 154    |
| Motor Constant       | N/√W               | 11.3          | 17.3   | 24.4   |            | 11.3   | 17.3   | 24.4   | 58.1   | 82.2   | 101    | 59.2   | 83.7   | 102    |
| Magnetic Attraction  | N                  | 200           | 630    | 1260   |            | 200    | 650    | 1260   | 4240   | 8480   | 12700  | 4240   | 8480   | 12700  |
| Maximum Payload (kg) | w/o Brake          | 3.8           | 6.7    | 30.4   | 6.4        | 3.8    | 6.7    | 30.4   | 121.8  | 147.3  | 341.9  | 121.8  | 147.3  | 341.9  |
|                      | with brake         | 3.0           | 5.9    | 30.4   | 6.4        | 3.0    | 5.9    | 30.4   | 119.8  | 145.8  | 339.3  | 119.8  | 145.8  | 339.3  |
| Moving Mass          | w/o Brake          | 2.3           | 3.6    | 5.3    |            | 2.3    | 3.6    | 5.3    | 13.5   | 22.8   | 33.0   | 13.5   | 22.8   | 33.0   |
|                      | with brake         | 3.1           | 4.4    | 5.3    |            | 3.1    | 4.4    | 5.3    | 15.5   | 24.3   | 35.6   | 15.5   | 24.3   | 35.6   |
| Applicable SERVOPACK | SGD7S-             | 1R6A, 2R1F    |        | 3R8A   | 2R8A, 2R8F | 1R9D   |        |        | 120A   | 200A   | 330A   | 5R4D   | 120D   | 170D   |
|                      | SGD7W-             | 1R6A          |        | -      | 2R8A, 2R8F | 2R6D   |        |        | -      | -      | -      | 5R4D   | -      | -      |
| Repeatability*3      | μm                 | ±2            |        |        |            |        |        |        |        |        |        |        |        |        |

\*1. These values are for operation in combination with a SERVOPACK when the temperature of the armature winding is 100°C. The values for the other items are at 20°C. These are typical values..

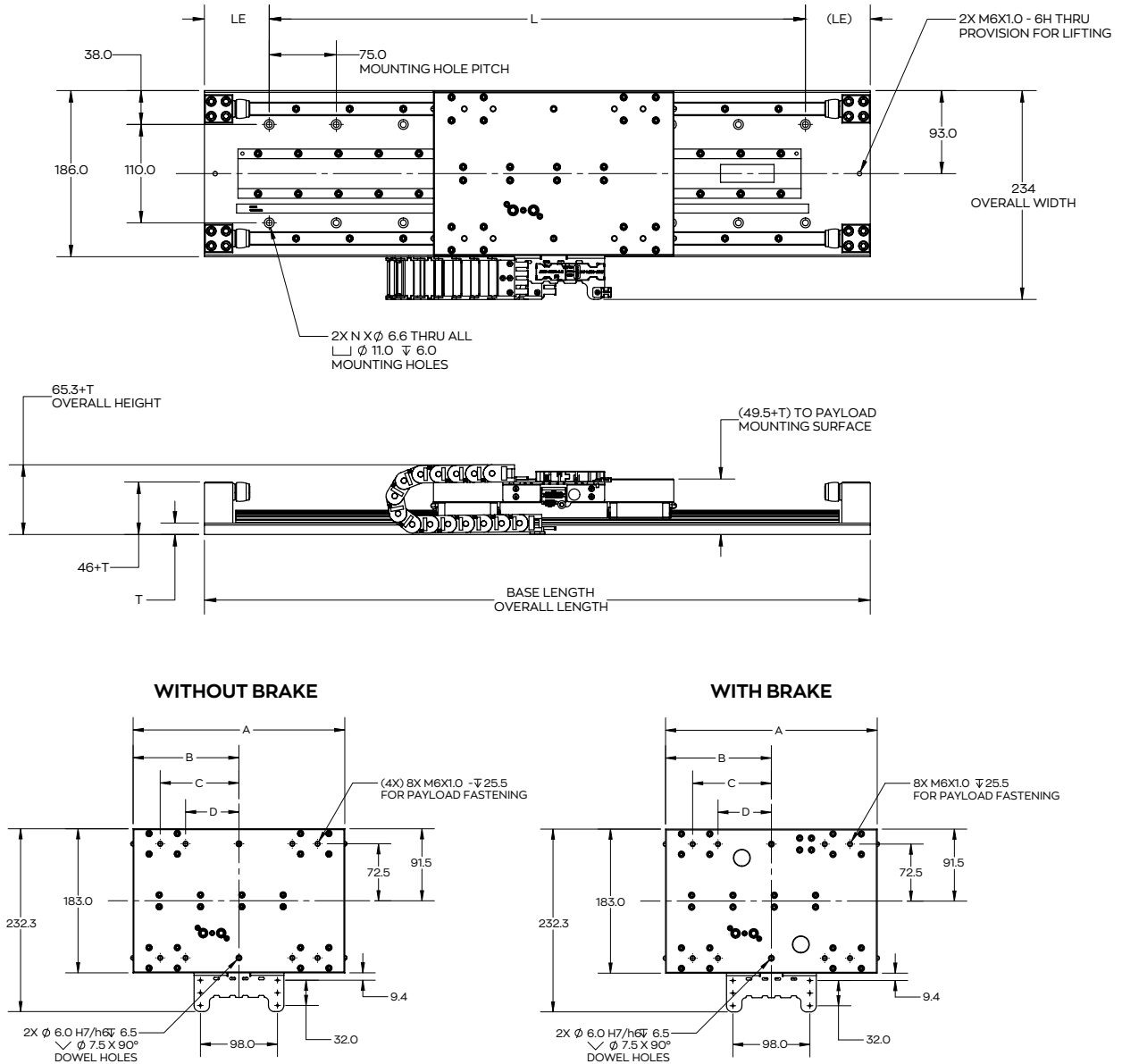
\*2. The rated forces are the continuous allowable force values at a surrounding air temperature of 40°C with an aluminum heat sink of the following dimensions:

- 150 mm x 100 mm x 10 mm: ST2F-A1A and ST2F-A1D
- 254 mm x 254 mm x 25 mm: ST2F-A2A, ST2F-A2D, ST2F-A3A, and ST2F-A3D
- 400 mm x 500 mm x 25 mm: ST2F-C1A and ST2F-C1D
- 609 mm x 762 mm x 40 mm: ST2F-C2A and ST2F-C2D
- 900 mm x 762 mm x 40 mm: ST2F-C3A and ST2F-C

\*3. Units are assembled and tested fully restrained on a granite surface with a maximum surface accuracy of 15 $\mu$ m at 70°F. Performance of the installed unit may vary with mounting surface quality and temperature

## External Dimensions

### STF-A1/A2/A3 Models



## Base Dimensions and Stroke

| Base Dimensions |      |      |       |              | Stroke         |             |              |           |                     |             |              |           |                     |             |              |           |                     |
|-----------------|------|------|-------|--------------|----------------|-------------|--------------|-----------|---------------------|-------------|--------------|-----------|---------------------|-------------|--------------|-----------|---------------------|
| Base Length     | L    | LE   | N     | T            |                | S2TF-A1     |              |           |                     | ST2F-A2     |              |           |                     | ST2F-A3     |              |           |                     |
|                 |      |      |       | Std Base (A) | Thick Base (B) | No Opt. (N) | Bel-lows (B) | Brake (Q) | Bellows + Brake (K) | No Opt. (N) | Bel-lows (B) | Brake (Q) | Bellows + Brake (K) | No Opt. (N) | Bel-lows (B) | Brake (Q) | Bellows + Brake (K) |
| mm              | mm   | mm   | holes | mm           | mm             | mm          | mm           | mm        | mm                  | mm          | mm           | mm        | mm                  | mm          | mm           | mm        | mm                  |
| 390             | 300  | 45   | 5     | 12.7         | 38.1           | 170         | 150          | 120       | 100                 | 110         | 105          | -         | -                   | -           | -            | -         | -                   |
| 565             | 450  | 57.5 | 7     | 12.7         | 38.1           | 345         | 295          | 295       | 255                 | 285         | 240          | 235       | 200                 | 190         | 170          | 190       | 170                 |
| 655             | 525  | 65   | 8     | 12.7         | 38.1           | 435         | 370          | 385       | 330                 | 375         | 320          | 325       | 270                 | 280         | 245          | 280       | 245                 |
| 745             | 600  | 72.5 | 9     | 12.7         | 38.1           | 525         | 445          | 475       | 405                 | 465         | 390          | 415       | 350                 | 370         | 315          | 370       | 320                 |
| 835             | 750  | 42.5 | 11    | 12.7         | 38.1           | 615         | 520          | 565       | 480                 | 555         | 470          | 505       | 420                 | 460         | 390          | 460       | 395                 |
| 925             | 825  | 50   | 12    | 12.7         | 38.1           | 705         | 595          | 655       | 555                 | 645         | 540          | 595       | 500                 | 550         | 465          | 550       | 465                 |
| 1015            | 900  | 57.5 | 13    | 12.7         | 38.1           | 795         | 670          | 745       | 630                 | 735         | 615          | 685       | 570                 | 640         | 540          | 640       | 540                 |
| 1105            | 975  | 65   | 14    | 12.7         | 38.1           | 885         | 740          | 835       | 690                 | 825         | 690          | 775       | 645                 | 730         | 615          | 730       | 615                 |
| 1195            | 1050 | 72.5 | 15    | 12.7         | 38.1           | 975         | 815          | 925       | 775                 | 915         | 760          | 865       | 715                 | 820         | 690          | 820       | 690                 |
| 1285            | 1200 | 42.5 | 17    | 12.7         | 38.1           | 1065        | 890          | 1015      | 850                 | 1005        | 835          | 955       | 790                 | 910         | 760          | 910       | 765                 |
| 1375            | 1275 | 50   | 18    | 12.7         | 38.1           | 1155        | 960          | 1105      | 920                 | 1095        | 910          | 1045      | 865                 | 1000        | 835          | 1000      | 840                 |
| 1465            | 1350 | 57.5 | 19    | 12.7         | 38.1           | 1245        | 1040         | 1195      | 1000                | 1185        | 985          | 1135      | 940                 | 1090        | 905          | 1090      | 905                 |
| 1555            | 1425 | 65   | 20    | 12.7         | 38.1           | 1335        | 1110         | 1285      | 1070                | 1275        | 1060         | 1225      | 1015                | 1180        | 985          | 1180      | 985                 |

## Carriage Dimensions and Moving Mass

### Without Brake

| Linear Stage Model | A     | B     | C      | D     | Moving Mass |
|--------------------|-------|-------|--------|-------|-------------|
|                    | mm    | mm    | mm     | mm    | kg          |
| STF-A1             | 114.0 | 57.0  | 42.00  | -     | 2.3         |
| STF-A2             | 176.0 | 88.0  | 67.85  | -     | 3.6         |
| STF-A3             | 269.0 | 134.5 | 100.00 | 67.85 | 5.3         |

### With Brake

| Linear Stage Model | A     | B     | C      | D     | Moving Mass |
|--------------------|-------|-------|--------|-------|-------------|
|                    | mm    | mm    | mm     | mm    | kg          |
| STF-A1             | 164.0 | 82.0  | 59.70  | 42.00 | 3.1         |
| STF-A2             | 226.0 | 113.0 | 92.80  | 67.85 | 4.4         |
| STF-A3             | 269.0 | 134.5 | 100.00 | 67.85 | 5.3         |

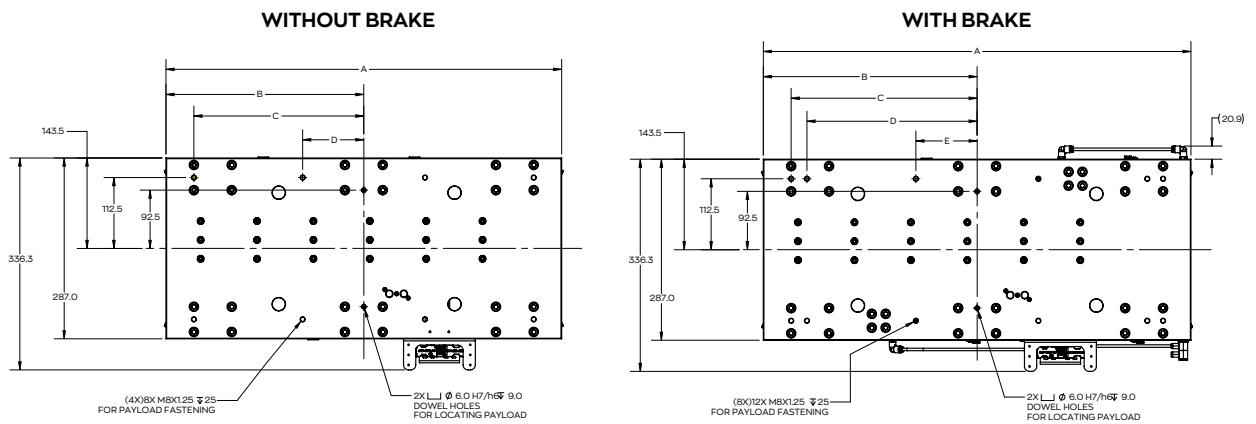
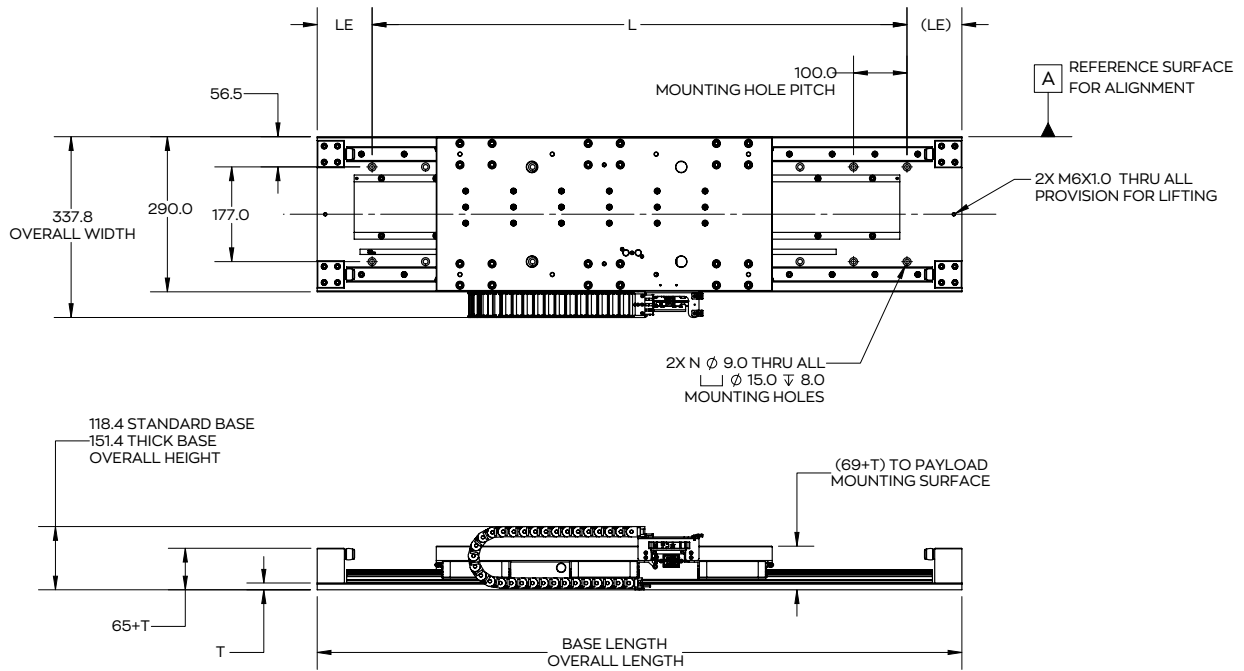
Note: 1. Brake is only for holding the Sigma Trac II in static load. Not designed for stopping.

2. Brake air supply should be clean and dry (no oil in the lines). Required pressure is 5.5 bar (79 psi) to 6.5 bar (94 psi). Ø4 mm O.D. air hose supplied without connector.

3. The center pair of mounting holes on the base are inaccessible on the following models. Removal of the carriage to gain access to these holes may cause serious injury and damage to the unit

- ST2F-A2-0390- \_\_\_\_\_
- ST2F-A3-0565- \_\_\_\_\_

## STF-C1/C2/C3 Models



## Base Dimensions and Stroke

| Base Dimensions |      |       |       |              |                | Stroke      |              |           |                     |             |              |           |                     |             |              |           |                     |
|-----------------|------|-------|-------|--------------|----------------|-------------|--------------|-----------|---------------------|-------------|--------------|-----------|---------------------|-------------|--------------|-----------|---------------------|
| Base Length     | L    | LE    | N     | T            |                | S2TF-C1     |              |           |                     | ST2F-C2     |              |           |                     | ST2F-C3     |              |           |                     |
|                 |      |       |       | Std Base (A) | Thick Base (B) | No Opt. (N) | Bel-lows (B) | Brake (Q) | Bellows + Brake (K) | No Opt. (N) | Bel-lows (B) | Brake (Q) | Bellows + Brake (K) | No Opt. (N) | Bel-lows (B) | Brake (Q) | Bellows + Brake (K) |
| mm              | mm   | mm    | holes | mm           | mm             | mm          | mm           | mm        | mm                  | mm          | mm           | mm        | mm                  | mm          | mm           | mm        | mm                  |
| 800             | 600  | 100   | 7     | 12.7         | 38.1           | 385         | 335          | 330       | 290                 | 210         | 185          | 210       | 185                 | -           | -            | -         | -                   |
| 900             | 700  | 100   | 8     | 12.7         | 38.1           | 485         | 415          | 430       | 370                 | 310         | 265          | 310       | 265                 | -           | -            | -         | -                   |
| 1000            | 800  | 100   | 9     | 12.7         | 38.1           | 585         | 505          | 530       | 455                 | 410         | 350          | 410       | 350                 | 230         | 200          | -         | -                   |
| 1105            | 900  | 102.5 | 10    | 12.7         | 38.1           | 690         | 590          | 635       | 540                 | 515         | 435          | 515       | 435                 | 335         | 290          | 285       | 245                 |
| 1205            | 1000 | 102.5 | 11    | 12.7         | 38.1           | 790         | 675          | 735       | 630                 | 615         | 520          | 615       | 520                 | 435         | 370          | 385       | 335                 |
| 1310            | 1100 | 105   | 12    | 12.7         | 38.1           | 895         | 760          | 840       | 715                 | 720         | 610          | 720       | 610                 | 540         | 460          | 490       | 420                 |
| 1410            | 1200 | 105   | 13    | 12.7         | 38.1           | 995         | 850          | 940       | 800                 | 820         | 695          | 820       | 695                 | 640         | 540          | 590       | 505                 |
| 1510            | 1300 | 105   | 14    | 12.7         | 38.1           | 1095        | 930          | 1040      | 880                 | 920         | 780          | 920       | 780                 | 740         | 630          | 690       | 585                 |
| 1615            | 1400 | 107.5 | 15    | 12.7         | 38.1           | 1200        | 1020         | 1145      | 970                 | 1025        | 865          | 1025      | 865                 | 845         | 715          | 795       | 675                 |
| 1715            | 1500 | 107.5 | 16    | 12.7         | 38.1           | 1300        | 1100         | 1245      | 1050                | 1125        | 950          | 1125      | 950                 | 945         | 800          | 895       | 750                 |
| 1815            | 1600 | 107.5 | 17    | 12.7         | 38.1           | 1400        | 1185         | 1345      | 1140                | 1225        | 1035         | 1225      | 1035                | 1045        | 880          | 995       | 845                 |
| 1920            | 1700 | 110   | 18    | 12.7         | 38.1           | 1505        | 1270         | 1450      | 1215                | 1330        | 1120         | 1330      | 1120                | 1150        | 975          | 1100      | 930                 |

## Carriage Dimensions and Moving Mass

### Without Brake

| Linear Stage Model | A     | B     | C      | D     | Moving Mass |
|--------------------|-------|-------|--------|-------|-------------|
|                    | mm    | mm    | mm     | mm    | kg          |
| STF-C1             | 270.0 | 135.0 | 97.10  | -     | 13.5        |
| STF-C2             | 449.0 | 224.5 | 180.00 | 97.10 | 22.8        |
| STF-C3             | 628.0 | 314.0 | 269.75 | 97.10 | 33.0        |

### With Brake

| Linear Stage Model | A     | B     | C      | D      | E     | Moving Mass |
|--------------------|-------|-------|--------|--------|-------|-------------|
|                    | mm    | mm    | mm     | mm     | mm    | kg          |
| STF-C1             | 325.0 | 162.5 | 124.60 | 97.10  | -     | 15.5        |
| STF-C2             | 449.0 | 224.5 | 180.00 | 97.10  | -     | 24.3        |
| STF-C3             | 678.0 | 339.0 | 294.75 | 269.75 | 97.10 | 35.6        |

Note: 1. Brake is only for holding the Sigma Trac II in static load. Not designed for stopping.

2. Brake air supply should be clean and dry (no oil in the lines). Required pressure is 5.5 bar (79 psi) to 6.5 bar (94 psi).  
Ø4 mm O.D. air hose supplied without connector.

## Sigma Trac II Linear Stages

ST2F Sigma Trac II Linear Stages

# Mass (STF-A1/A2/A3)

## Standard Base

| Base Length | S2TF-A1       |             |           |                     | ST2F-A2       |             |           |                     | ST2F-A3       |             |           |                     |
|-------------|---------------|-------------|-----------|---------------------|---------------|-------------|-----------|---------------------|---------------|-------------|-----------|---------------------|
|             | No Option (N) | Bellows (B) | Brake (Q) | Bellows + Brake (K) | No Option (N) | Bellows (B) | Brake (Q) | Bellows + Brake (K) | No Option (N) | Bellows (B) | Brake (Q) | Bellows + Brake (K) |
| mm          | kg            | kg          | kg        | kg                  | kg            | kg          | kg        | kg                  | kg            | kg          | kg        | kg                  |
| 390         | 7.6           | 8.0         | 8.4       | 8.7                 | 8.9           | 9.2         | -         | -                   | -             | -           | -         | -                   |
| 565         | 9.9           | 10.3        | 10.7      | 11.1                | 11.2          | 11.6        | 12.0      | 12.4                | 12.9          | 13.3        | 13.0      | 13.3                |
| 655         | 11.1          | 11.5        | 11.8      | 12.2                | 12.4          | 12.8        | 13.1      | 13.5                | 14.1          | 14.5        | 14.1      | 14.5                |
| 745         | 12.3          | 12.8        | 13.1      | 13.5                | 13.6          | 14.1        | 14.4      | 14.8                | 15.3          | 15.8        | 15.3      | 15.8                |
| 835         | 13.5          | 14.0        | 14.2      | 14.7                | 14.8          | 15.3        | 15.5      | 16.0                | 16.5          | 17.0        | 16.5      | 17.0                |
| 925         | 14.7          | 15.2        | 15.4      | 15.9                | 16.0          | 16.5        | 16.7      | 17.2                | 17.7          | 18.2        | 17.7      | 18.2                |
| 1015        | 15.8          | 16.4        | 16.6      | 17.1                | 17.1          | 17.7        | 17.9      | 18.4                | 18.8          | 19.4        | 18.8      | 19.4                |
| 1105        | 17.0          | 17.6        | 17.7      | 18.4                | 18.3          | 18.9        | 19.0      | 19.6                | 20.0          | 20.6        | 20.0      | 20.6                |
| 1195        | 18.1          | 18.8        | 18.9      | 19.5                | 19.4          | 20.1        | 20.2      | 20.8                | 21.2          | 21.8        | 21.2      | 21.8                |
| 1285        | 19.3          | 20.0        | 20.0      | 20.7                | 20.6          | 21.3        | 21.3      | 22.0                | 22.3          | 22.9        | 22.3      | 22.9                |
| 1375        | 20.4          | 21.2        | 21.2      | 21.9                | 21.7          | 22.5        | 22.5      | 23.2                | 23.4          | 24.1        | 23.5      | 24.1                |
| 1465        | 21.7          | 22.5        | 22.4      | 23.2                | 23.0          | 23.8        | 23.8      | 24.6                | 24.7          | 25.4        | 24.7      | 25.4                |
| 1555        | 22.9          | 23.7        | 23.6      | 24.4                | 24.2          | 25.0        | 24.9      | 25.7                | 25.9          | 26.7        | 25.9      | 26.7                |

## Thick Base

| Base Length | S2TF-A1       |             |           |                     | ST2F-A2       |             |           |                     | ST2F-A3       |             |           |                     |
|-------------|---------------|-------------|-----------|---------------------|---------------|-------------|-----------|---------------------|---------------|-------------|-----------|---------------------|
|             | No Option (N) | Bellows (B) | Brake (Q) | Bellows + Brake (K) | No Option (N) | Bellows (B) | Brake (Q) | Bellows + Brake (K) | No Option (N) | Bellows (B) | Brake (Q) | Bellows + Brake (K) |
| mm          | kg            | kg          | kg        | kg                  | kg            | kg          | kg        | kg                  | kg            | kg          | kg        | kg                  |
| 390         | 12.6          | 13.0        | 13.4      | 13.7                | 13.9          | 14.2        | -         | -                   | -             | -           | -         | -                   |
| 565         | 17.1          | 17.5        | 17.9      | 18.3                | 18.4          | 18.8        | 19.2      | 19.6                | 20.2          | 20.5        | 20.1      | 20.5                |
| 655         | 19.3          | 19.8        | 20.0      | 20.5                | 20.6          | 21.0        | 21.4      | 21.8                | 22.3          | 22.7        | 22.3      | 22.7                |
| 745         | 21.9          | 22.3        | 22.6      | 23.1                | 23.2          | 23.6        | 23.9      | 24.4                | 24.9          | 25.3        | 24.9      | 25.3                |
| 835         | 24.2          | 24.7        | 24.9      | 25.4                | 25.5          | 26.0        | 26.2      | 26.7                | 27.2          | 27.6        | 27.2      | 27.6                |
| 925         | 26.5          | 27.1        | 27.2      | 27.8                | 27.8          | 28.3        | 28.5      | 29.1                | 29.5          | 30.0        | 29.5      | 30.0                |
| 1015        | 28.8          | 29.4        | 29.5      | 30.1                | 30.1          | 30.7        | 30.8      | 31.4                | 31.8          | 32.3        | 31.8      | 32.3                |
| 1105        | 31.1          | 31.7        | 31.8      | 32.5                | 32.4          | 33.0        | 33.1      | 33.7                | 34.1          | 34.7        | 34.1      | 34.7                |
| 1195        | 33.3          | 34.0        | 34.1      | 34.7                | 34.6          | 35.3        | 35.4      | 36.0                | 36.4          | 37.0        | 36.3      | 37.0                |
| 1285        | 35.5          | 36.3        | 36.3      | 37.0                | 36.9          | 37.6        | 37.6      | 38.3                | 38.6          | 39.2        | 38.5      | 39.2                |
| 1375        | 37.8          | 38.6        | 38.5      | 39.3                | 39.1          | 39.8        | 39.8      | 40.6                | 40.8          | 41.5        | 40.3      | 41.5                |
| 1465        | 40.4          | 41.2        | 41.1      | 41.9                | 41.7          | 42.5        | 42.4      | 43.3                | 43.4          | 44.1        | 43.4      | 44.1                |
| 1555        | 42.8          | 43.6        | 43.5      | 44.3                | 44.1          | 44.9        | 44.8      | 45.6                | 45.8          | 46.6        | 45.8      | 46.6                |



## Mass (STF-C1/C2/C3)

### Standard Base

| Base Length | S2TF-C1       |             |           |                     | ST2F-C2       |             |           |                     | ST2F-C3       |             |           |                     |
|-------------|---------------|-------------|-----------|---------------------|---------------|-------------|-----------|---------------------|---------------|-------------|-----------|---------------------|
|             | No Option (N) | Bellows (B) | Brake (Q) | Bellows + Brake (K) | No Option (N) | Bellows (B) | Brake (Q) | Bellows + Brake (K) | No Option (N) | Bellows (B) | Brake (Q) | Bellows + Brake (K) |
|             | kg            | kg          | kg        | kg                  | kg            | kg          | kg        | kg                  | kg            | kg          | kg        | kg                  |
| 800         | 36.7          | 37.4        | 38.6      | 39.3                | 45.9          | 46.5        | 47.4      | 47.9                | -             | -           | -         | -                   |
| 900         | 39.5          | 40.3        | 41.5      | 42.3                | 48.7          | 49.4        | 50.2      | 50.9                | -             | -           | -         | -                   |
| 1000        | 42.4          | 43.3        | 44.4      | 45.3                | 51.7          | 52.4        | 53.1      | 53.9                | 62.0          | 62.6        | -         | -                   |
| 1105        | 45.4          | 46.4        | 47.4      | 48.4                | 54.6          | 55.5        | 56.1      | 57.0                | 65.0          | 65.7        | 67.4      | 68.1                |
| 1205        | 48.3          | 49.4        | 50.2      | 51.3                | 57.5          | 57.8        | 59.0      | 60.0                | 67.9          | 68.7        | 70.3      | 71.0                |
| 1310        | 51.3          | 52.5        | 53.2      | 54.4                | 60.5          | 61.6        | 62.0      | 63.1                | 70.9          | 71.8        | 73.3      | 74.1                |
| 1410        | 54.2          | 55.5        | 56.1      | 57.4                | 63.4          | 64.6        | 64.9      | 66.0                | 73.8          | 74.8        | 76.2      | 77.1                |
| 1510        | 57.1          | 58.5        | 59.0      | 60.4                | 66.3          | 67.5        | 67.8      | 69.0                | 76.6          | 77.7        | 79.0      | 80.0                |
| 1615        | 60.0          | 61.5        | 62.0      | 63.5                | 69.3          | 70.6        | 70.8      | 72.1                | 79.6          | 80.8        | 82.0      | 83.1                |
| 1715        | 62.9          | 64.5        | 64.9      | 66.5                | 72.2          | 73.6        | 73.6      | 75.1                | 82.5          | 83.8        | 84.9      | 86.2                |
| 1815        | 65.9          | 67.5        | 67.8      | 69.5                | 75.1          | 76.6        | 76.6      | 78.1                | 85.5          | 86.8        | 87.8      | 89.1                |
| 1920        | 68.8          | 70.5        | 70.8      | 72.4                | 78.0          | 79.7        | 79.5      | 81.2                | 88.4          | 89.8        | 90.8      | 92.2                |

### Thick Base

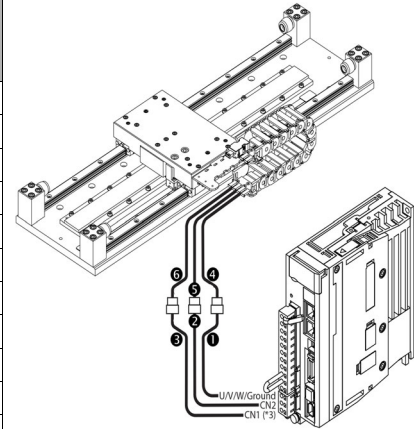
| Base Length | S2TF-C1       |             |           |                     | ST2F-C2       |             |           |                     | ST2F-C3       |             |           |                     |
|-------------|---------------|-------------|-----------|---------------------|---------------|-------------|-----------|---------------------|---------------|-------------|-----------|---------------------|
|             | No Option (N) | Bellows (B) | Brake (Q) | Bellows + Brake (K) | No Option (N) | Bellows (B) | Brake (Q) | Bellows + Brake (K) | No Option (N) | Bellows (B) | Brake (Q) | Bellows + Brake (K) |
|             | kg            | kg          | kg        | kg                  | kg            | kg          | kg        | kg                  | kg            | kg          | kg        | kg                  |
| 800         | 52.9          | 53.7        | 54.9      | 55.6                | 62.1          | 62.6        | 63.6      | 64.2                | -             | -           | -         | -                   |
| 900         | 57.6          | 58.4        | 59.6      | 60.4                | 66.7          | 67.4        | 68.3      | 69.0                | -             | -           | -         | -                   |
| 1000        | 62.6          | 63.6        | 64.6      | 65.5                | 71.8          | 72.6        | 73.3      | 74.1                | 82.0          | 82.6        | -         | -                   |
| 1105        | 67.7          | 68.7        | 69.6      | 70.6                | 76.8          | 77.7        | 78.4      | 79.3                | 87.1          | 87.8        | 89.6      | 90.3                |
| 1205        | 72.6          | 73.7        | 74.6      | 75.6                | 81.7          | 82.7        | 83.3      | 84.2                | 92.0          | 92.8        | 94.5      | 95.3                |
| 1310        | 77.7          | 78.9        | 79.7      | 80.8                | 86.8          | 87.9        | 88.4      | 89.5                | 97.1          | 98.0        | 99.7      | 100.5               |
| 1410        | 82.6          | 83.9        | 84.6      | 85.8                | 91.7          | 92.9        | 93.3      | 94.5                | 102.0         | 103.0       | 104.6     | 105.5               |
| 1510        | 87.5          | 88.9        | 89.4      | 90.8                | 96.6          | 97.9        | 98.2      | 99.4                | 106.9         | 108.0       | 109.4     | 110.4               |
| 1615        | 92.6          | 94.0        | 94.5      | 96.0                | 101.7         | 103.1       | 103.3     | 104.6               | 112.0         | 113.2       | 114.5     | 115.6               |
| 1715        | 97.5          | 99.0        | 99.4      | 101.0               | 106.6         | 108.1       | 108.2     | 109.6               | 116.9         | 118.1       | 119.4     | 120.7               |
| 1815        | 102.5         | 104.1       | 104.4     | 106.1               | 111.6         | 113.1       | 113.2     | 114.7               | 121.9         | 123.3       | 124.4     | 125.7               |
| 1920        | 107.4         | 109.1       | 109.4     | 111.1               | 116.6         | 118.3       | 118.1     | 119.8               | 126.8         | 128.3       | 129.4     | 130.8               |

## Selecting Cables

### Cable Configurations

The cables shown below are required to connect a Servomotor to a SERVOPACK.

| Figure Number | Type                                                               | Linear Stage Model                           | Length      | Order Number      |
|---------------|--------------------------------------------------------------------|----------------------------------------------|-------------|-------------------|
| ❶             | Power Cable Extension (High Flex)                                  | ST2F-A□A<br>ST2F-A□D                         | 1 m         | JZSP-CL2N703-01-E |
|               |                                                                    |                                              | 3 m         | JZSP-CL2N703-03-E |
|               |                                                                    |                                              | 5 m         | JZSP-CL2N703-05-E |
|               |                                                                    |                                              | 10 m        | JZSP-CL2N703-10-E |
|               |                                                                    |                                              | 15 m        | JZSP-CL2N703-15-E |
|               |                                                                    |                                              | 20 m        | JZSP-CL2N703-20-E |
|               |                                                                    | ST2F-C1A<br>ST2F-C2A<br>ST2F-C1D<br>ST2F-C2D | 1 m         | JZSP-CL2N803-01-E |
|               |                                                                    |                                              | 3 m         | JZSP-CL2N803-03-E |
|               |                                                                    |                                              | 5 m         | JZSP-CL2N803-05-E |
|               |                                                                    |                                              | 10 m        | JZSP-CL2N803-10-E |
|               |                                                                    |                                              | 15 m        | JZSP-CL2N803-15-E |
|               |                                                                    |                                              | 20 m        | JZSP-CL2N803-20-E |
|               |                                                                    | ST2F-C3A<br>ST2F-C3D                         | 1 m         | JZSP-CL2N503-01-E |
|               |                                                                    |                                              | 3 m         | JZSP-CL2N503-03-E |
|               |                                                                    |                                              | 5 m         | JZSP-CL2N503-05-E |
|               |                                                                    |                                              | 10 m        | JZSP-CL2N503-10-E |
|               |                                                                    |                                              | 15 m        | JZSP-CL2N503-15-E |
|               |                                                                    |                                              | 20 m        | JZSP-CL2N503-20-E |
| ❷             | Encoder Cable Extension (Standard)                                 | ST2F-A□A<br>ST2F-A□D<br>ST2F-C□A<br>ST2F-C□D | 3 m         | JZSP-CMP00-03-E   |
|               |                                                                    |                                              | 5 m         | JZSP-CMP00-05-E   |
|               |                                                                    |                                              | 10 m        | JZSP-CMP00-10-E   |
|               |                                                                    |                                              | 15 m        | JZSP-CMP00-15-E   |
|               |                                                                    |                                              | 20 m        | JZSP-CMP00-20-E   |
|               | Encoder Cable Extension (High Flex)                                |                                              | 3 m         | JZSP-CMP10-03-E   |
|               |                                                                    |                                              | 5 m         | JZSP-CMP10-05-E   |
|               |                                                                    |                                              | 10 m        | JZSP-CMP10-10-E   |
|               |                                                                    |                                              | 15 m        | JZSP-CMP10-15-E   |
|               |                                                                    |                                              | 20 m        | JZSP-CMP10-20-E   |
| ❸             | Thermal Cable Extension (High Flex) <sup>*3</sup>                  |                                              | 3 m         | ST2TCBL1-03       |
|               |                                                                    |                                              | 5 m         | ST2TCBL1-05       |
|               |                                                                    |                                              | 10 m        | ST2TCBL1-10       |
|               |                                                                    | 15 m                                         | ST2TCBL1-15 |                   |
|               |                                                                    | 20 m                                         | ST2TCBL1-20 |                   |
| ❹             | Internal Power Cable (High Flex, Small Radius) <sup>*1, *2</sup>   | ST2F-A□A<br>ST2F-A□D                         | 2820 mm     | ST2IPCBL1         |
|               |                                                                    | ST2F-C□A<br>ST2F-C□D                         |             | ST2IPCBL3         |
| ❺             | Internal Encoder Cable (High Flex, Small Radius) <sup>*1, *2</sup> | ST2F-A□A<br>ST2F-A□D                         | 2750 mm     | ST2IECBL1         |
| ❻             | Internal Thermal Cable (High Flex, Small Radius) <sup>*1, *2</sup> | ST2F-C□A<br>ST2F-C□D                         | 2800 mm     | ST2ITCBL1         |



\*1. This cable is included with the linear stage and is offered as a replacement part

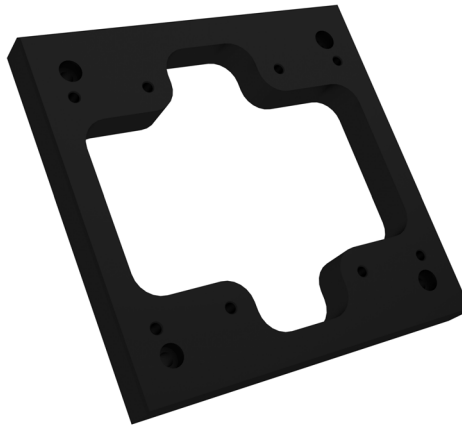
\*2. Cable length is measured from connector to connector. The amount of cable extending beyond the cable carrier depends on stroke length

\*3. This cable has flying leads at the SERVOPACK end. Connect to SERVOPACK CN1 via terminal block or I/O cable

## Accessories

### Optional Accessories

| Type            | Linear Stage Models                                                                                          | Order Number |
|-----------------|--------------------------------------------------------------------------------------------------------------|--------------|
| X-Y Adapter Kit | Fixed Axis: ST2F-A2, ST2F-A3<br>Moving Axis: ST2F-A1, ST2F-A2, ST2F-A3                                       | ST2-XYA      |
|                 | Base Axis: ST2F-C1, ST2F-C2, ST2F-C3<br>Moving Axis: ST2F-A1, ST2F-A2, ST2F-A3,<br>ST2F-C1, ST2F-C2, ST2F-C3 | ST2F-XYC     |



X-Y Adapter Kit: ST2-XYA

## **Sigma Trac II Linear Stages**

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ST2F Sigma Trac II Linear Stages

# SERVOPACKs

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Reference SERVOPACKs .....466

$\Sigma$ -7S Single-axis MECHATROLINK-III Communications  
Reference SERVOPACKs .....476

$\Sigma$ -7S Single-axis EtherCAT  
Communications Reference SERVOPACKs .....490

$\Sigma$ -7W Two-axis MECHATROLINK-III  
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$\Sigma$ -7W Two-axis EtherCAT Communications Reference  
SERVOPACKs .....520

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# Σ-7S Single-axis Analog Voltage/Pulse Train Reference SERVOPACKs

## Model Designations

SGD7S - R70 A 00 A

Σ-7 Series  
Σ-7S SERVOPACKs

1st+2nd+3rd digits

4th digit

5th+6th digits

7th digit

1st+2nd+3rd digits Maximum Applicable Motor Capacity

| Voltage               | Code              | Specification |
|-----------------------|-------------------|---------------|
| Three-phase, 200 VAC  | R70* <sup>1</sup> | 0.05 kW       |
|                       | R90* <sup>1</sup> | 0.1 kW        |
|                       | 1R6* <sup>1</sup> | 0.2 kW        |
|                       | 2R8* <sup>1</sup> | 0.4 kW        |
|                       | 3R8               | 0.5 kW        |
|                       | 5R5* <sup>1</sup> | 0.75 kW       |
|                       | 7R6               | 1.0 kW        |
|                       | 120* <sup>3</sup> | 1.5 kW        |
|                       | 180               | 2.0 kW        |
|                       | 200               | 3.0 kW        |
|                       | 330               | 5.0 kW        |
|                       | 470               | 6.0 kW        |
|                       | 550               | 7.5 kW        |
|                       | 590               | 11 kW         |
|                       | 780               | 15 kW         |
| Single-phase, 100 VAC | R70               | 0.05 kW       |
|                       | R90               | 0.1 kW        |
|                       | 2R1               | 0.2 kW        |
|                       | 2R8               | 0.4 kW        |

4th digit Voltage

| Code | Specification |
|------|---------------|
| A    | 200 VAC       |
| F    | 100 VAC       |

5th+6th digits Interface\*<sup>2</sup>

| Code | Specification                        |
|------|--------------------------------------|
| 00   | Analog voltage/pulse train reference |

7th digit Design Revision Order

A

\*1. You can use these models with either a single-phase or three-phase power supply input.

\*2. The same SERVOPACKs are used for both Rotary Servo Motors and Linear Servo Motors.

\*3. A model with a single-phase, 200-VAC power supply input is available as a hardware option (model: SGD7S-120A00A008).

## Ratings and Specifications

### Ratings

#### ◆ Single-phase, 100 VAC

| Model SGD7S-                                |                                           | R70F                                       | R90F | 2R1F | 2R8F |
|---------------------------------------------|-------------------------------------------|--------------------------------------------|------|------|------|
| Maximum Applicable Motor Capacity [kW]      |                                           | 0.05                                       | 0.1  | 0.2  | 0.4  |
| Continuous Output Current [Arms]            |                                           | 0.66                                       | 0.91 | 2.1  | 2.8  |
| Instantaneous Maximum Output Current [Arms] |                                           | 2.1                                        | 3.2  | 6.5  | 9.3  |
| Main Circuit                                | Power Supply                              | 100 VAC to 120 VAC, -15% to +10%, 50/60 Hz |      |      |      |
|                                             | Input Current [Arms]*                     | 1.5                                        | 2.5  | 5    | 10   |
| Control Power Supply                        |                                           | 100 VAC to 120 VAC, -15% to +10%, 50/60 Hz |      |      |      |
| Power Supply Capacity [kVA]*                |                                           | 0.2                                        | 0.3  | 0.6  | 1.4  |
| Power Loss*                                 | Main Circuit Power Loss [W]               | 5.3                                        | 7.8  | 14.2 | 26.2 |
|                                             | Control Circuit Power Loss [W]            | 12                                         | 12   | 12   | 12   |
|                                             | Total Power Loss [W]                      | 17.3                                       | 19.8 | 26.2 | 38.2 |
| Regenerative Resistor                       | Minimum Allowable External Resistance [Ω] | 40                                         | 40   | 40   | 40   |
| Overvoltage Category                        |                                           | III                                        |      |      |      |

\* This is the net value at the rated load.

#### ◆ Three-phase, 200 VAC

| Model SGD7S-                                |                                               | R70A                                          | R90A | 1R6A | 2R8A | 3R8A | 5R5A | 7R6A | 120A | 180A  | 200A  | 330A  |
|---------------------------------------------|-----------------------------------------------|-----------------------------------------------|------|------|------|------|------|------|------|-------|-------|-------|
| Maximum Applicable Motor Capacity [kW]      |                                               | 0.05                                          | 0.1  | 0.2  | 0.4  | 0.5  | 0.75 | 1.0  | 1.5  | 2.0   | 3.0   | 5.0   |
| Continuous Output Current [Arms]            |                                               | 0.66                                          | 0.91 | 1.6  | 2.8  | 3.8  | 5.5  | 7.6  | 11.6 | 18.5  | 19.6  | 32.9  |
| Instantaneous Maximum Output Current [Arms] |                                               | 2.1                                           | 3.2  | 5.9  | 9.3  | 11   | 16.9 | 17   | 28   | 42    | 56    | 84.0  |
| Main Circuit                                | Power Supply                                  | 200 VAC to 240 VAC, -15% to +10%, 50 Hz/60 Hz |      |      |      |      |      |      |      |       |       |       |
|                                             | Input Current [Arms]*                         | 0.4                                           | 0.8  | 1.3  | 2.5  | 3.0  | 4.1  | 5.7  | 7.3  | 10    | 15    | 25    |
| Control Power Supply                        |                                               | 200 VAC to 240 VAC, -15% to +10%, 50 Hz/60 Hz |      |      |      |      |      |      |      |       |       |       |
| Power Supply Capacity [kVA]*                |                                               | 0.2                                           | 0.3  | 0.5  | 1.0  | 1.3  | 1.6  | 2.3  | 3.2  | 4.0   | 5.9   | 7.5   |
| Power Loss*                                 | Main Circuit Power Loss [W]                   | 5.1                                           | 7.3  | 13.5 | 24.0 | 20.1 | 43.8 | 53.6 | 65.8 | 111.9 | 113.8 | 263.7 |
|                                             | Control Circuit Power Loss [W]                | 17                                            | 17   | 17   | 17   | 17   | 17   | 17   | 22   | 22    | 22    | 27    |
|                                             | Built-in Regenerative Resistor Power Loss [W] | -                                             | -    | -    | -    | 8    | 8    | 8    | 10   | 16    | 16    | 36.0  |
|                                             | Total Power Loss [W]                          | 22.1                                          | 24.3 | 30.5 | 41.0 | 45.1 | 68.8 | 78.6 | 97.8 | 149.9 | 151.8 | 326.7 |
| Regenerative Resistor                       | Built-In Regenerative Resistor                | Resistance [Ω]                                | -    | -    | -    | 40   | 40   | 40   | 20   | 12    | 12    | 8     |
|                                             |                                               | Capacity [W]                                  | -    | -    | -    | 40   | 40   | 40   | 60   | 60    | 60    | 180   |
|                                             | Minimum Allowable External Resistance [Ω]     |                                               | 40   | 40   | 40   | 40   | 40   | 40   | 20   | 12    | 12    | 8     |
| Overvoltage Category                        |                                               | III                                           |      |      |      |      |      |      |      |       |       |       |

\* This is the net value at the rated load.

## SERVOPACKs

### Σ-7S Single-axis Analog Voltage/Pulse Train Reference SERVOPACKs

| Model SGD7S-                                |                                                    | 470A                                          | 550A               | 590A               | 780A               |
|---------------------------------------------|----------------------------------------------------|-----------------------------------------------|--------------------|--------------------|--------------------|
| Maximum Applicable Motor Capacity [kW]      |                                                    | 6.0                                           | 7.5                | 11                 | 15                 |
| Continuous Output Current [Arms]            |                                                    | 46.9                                          | 54.7               | 58.6               | 78.0               |
| Instantaneous Maximum Output Current [Arms] |                                                    | 110                                           | 130                | 140                | 170                |
| Main Circuit                                | Power Supply                                       | 200 VAC to 240 VAC, -15% to +10%, 50 Hz/60 Hz |                    |                    |                    |
|                                             | Input Current [Arms] <sup>*1</sup>                 | 29                                            | 37                 | 54                 | 73                 |
| Control Power Supply                        |                                                    | 200 VAC to 240 VAC, -15% to +10%, 50 Hz/60 Hz |                    |                    |                    |
| Power Supply Capacity [kVA] <sup>*1</sup>   |                                                    | 10.7                                          | 14.6               | 21.7               | 29.6               |
| Power Loss <sup>*1</sup>                    | Main Circuit Power Loss [W]                        | 279.4                                         | 357.8              | 431.7              | 599.0              |
|                                             | Control Circuit Power Loss [W]                     | 33                                            | 33                 | 48                 | 48                 |
|                                             | External Regenerative Resistor Unit Power Loss [W] | 180 <sup>*2</sup>                             | 180 <sup>*3</sup>  | 350 <sup>*3</sup>  | 350 <sup>*3</sup>  |
|                                             | Total Power Loss [W]                               | 312.4                                         | 390.8              | 479.7              | 647.0              |
| External Regenerative Resistor Unit         | External Regenerative Resistor Unit                | Resistance [Ω ]                               | 6.25 <sup>*2</sup> | 3.13 <sup>*3</sup> | 3.13 <sup>*3</sup> |
|                                             |                                                    | Capacity [W]                                  | 880 <sup>*2</sup>  | 1760 <sup>*3</sup> | 1760 <sup>*3</sup> |
|                                             | Minimum Allowable External Resistance [Ω ]         |                                               | 5.8                | 2.9                | 2.9                |
| Overvoltage Category                        |                                                    | III                                           |                    |                    |                    |

\*1. This is the net value at the rated load.

\*2. This value is for the optional JUSP-RA04-E Regenerative Resistor Unit.

\*3. This value is for the optional JUSP-RA05-E Regenerative Resistor Unit.

### ◆ Single-phase, 200 VAC

| Model SGD7S-                                |                                               | R70A                                          | R90A | 1R6A | 2R8A | 5R5A | 120A  |
|---------------------------------------------|-----------------------------------------------|-----------------------------------------------|------|------|------|------|-------|
| Maximum Applicable Motor Capacity [kW]      |                                               | 0.05                                          | 0.1  | 0.2  | 0.4  | 0.75 | 1.5   |
| Continuous Output Current [Arms]            |                                               | 0.66                                          | 0.91 | 1.6  | 2.8  | 5.5  | 11.6  |
| Instantaneous Maximum Output Current [Arms] |                                               | 2.1                                           | 3.2  | 5.9  | 9.3  | 16.9 | 28    |
| Main Circuit                                | Power Supply                                  | 200 VAC to 240 VAC, -15% to +10%, 50 Hz/60 Hz |      |      |      |      |       |
|                                             | Input Current [Arms]*                         | 0.8                                           | 1.6  | 2.4  | 5.0  | 8.7  | 16    |
| Control                                     | Power Supply                                  | 200 VAC to 240 VAC, -15% to +10%, 50 Hz/60 Hz |      |      |      |      |       |
|                                             | Input Current [Arms]*                         | 0.2                                           | 0.2  | 0.2  | 0.2  | 0.2  | 0.25  |
| Power Supply Capacity [kVA]*                |                                               | 0.2                                           | 0.3  | 0.6  | 1.2  | 1.9  | 4.0   |
| Power Loss*                                 | Main Circuit Power Loss [W]                   | 5.1                                           | 7.3  | 13.5 | 24.0 | 43.8 | 71.8  |
|                                             | Control Circuit Power Loss [W]                | 17                                            | 17   | 17   | 17   | 17   | 16    |
|                                             | Built-in Regenerative Resistor Power Loss [W] | -                                             | -    | -    | -    | 8    | 16    |
|                                             | Total Power Loss [W]                          | 22.1                                          | 24.3 | 30.5 | 41.0 | 68.8 | 103.8 |
| Regenerative Resistor                       | Built-In Regenerative Resistor                | Resistance [Ω ]                               | -    | -    | -    | 40   | 12    |
|                                             |                                               | Capacity [W]                                  | -    | -    | -    | 40   | 60    |
|                                             | Minimum Allowable External Resistance [Ω ]    |                                               | 40   | 40   | 40   | 40   | 12    |
| Overvoltage Category                        |                                               | III                                           |      |      |      |      |       |

\* This is the net value at the rated load.



## ◆ 270 VDC

| Model SGD7S-                                |                                | R70A                             | R90A | 1R6A | 2R8A | 3R8A | 5R5A | 7R6A | 120A |
|---------------------------------------------|--------------------------------|----------------------------------|------|------|------|------|------|------|------|
| Maximum Applicable Motor Capacity [kW]      |                                | 0.05                             | 0.1  | 0.2  | 0.4  | 0.5  | 0.75 | 1.0  | 1.5  |
| Continuous Output Current [Arms]            |                                | 0.66                             | 0.91 | 1.6  | 2.8  | 3.8  | 5.5  | 7.6  | 11.6 |
| Instantaneous Maximum Output Current [Arms] |                                | 2.1                              | 3.2  | 5.9  | 9.3  | 11.0 | 16.9 | 17.0 | 28.0 |
| Main Circuit                                | Power Supply                   | 270 VDC to 324 VDC, -15% to +10% |      |      |      |      |      |      |      |
|                                             | Input Current [Arms]*          | 0.5                              | 1.0  | 1.5  | 3.0  | 3.8  | 4.9  | 6.9  | 11   |
| Control Power Supply                        |                                | 270 VDC to 324 VDC, -15% to +10% |      |      |      |      |      |      |      |
| Power Supply Capacity [kVA]*                |                                | 0.2                              | 0.3  | 0.6  | 1    | 1.4  | 1.6  | 2.3  | 3.2  |
| Power Loss*                                 | Main Circuit Power Loss [W]    | 4.6                              | 6.3  | 11.7 | 20.2 | 16.9 | 37.9 | 46.0 | 53.2 |
|                                             | Control Circuit Power Loss [W] | 17                               | 17   | 17   | 17   | 17   | 17   | 17   | 22   |
|                                             | Total Power Loss [W]           | 21.6                             | 23.3 | 28.7 | 37.2 | 33.9 | 54.9 | 63.0 | 75.2 |
| Overvoltage Category                        |                                | III                              |      |      |      |      |      |      |      |

\* This is the net value at the rated load.

| Model SGD7S-                                |                                | 180A                             | 200A  | 330A  | 470A  | 550A  | 590A  | 780A  |
|---------------------------------------------|--------------------------------|----------------------------------|-------|-------|-------|-------|-------|-------|
| Maximum Applicable Motor Capacity [kW]      |                                | 2.0                              | 3.0   | 5.0   | 6.0   | 7.5   | 11.0  | 15.0  |
| Continuous Output Current [Arms]            |                                | 18.5                             | 19.6  | 32.9  | 46.9  | 54.7  | 58.6  | 78.0  |
| Instantaneous Maximum Output Current [Arms] |                                | 42.0                             | 56.0  | 84.0  | 110   | 130   | 140   | 170   |
| Main Circuit                                | Power Supply                   | 270 VDC to 324 VDC, -15% to +10% |       |       |       |       |       |       |
|                                             | Input Current [Arms]*          | 14                               | 20    | 34    | 36    | 48    | 68    | 92    |
| Control Power Supply                        |                                | 270 VDC to 324 VDC, -15% to +10% |       |       |       |       |       |       |
| Power Supply Capacity [kVA]*                |                                | 4.0                              | 5.9   | 7.5   | 10.7  | 14.6  | 21.7  | 29.6  |
| Power Loss*                                 | Main Circuit Power Loss [W]    | 95.8                             | 87.6  | 163.7 | 203.4 | 261.2 | 246.6 | 346.5 |
|                                             | Control Circuit Power Loss [W] | 22                               | 22    | 27    | 33    | 33    | 48    | 48    |
|                                             | Total Power Loss [W]           | 117.8                            | 109.6 | 190.7 | 236.4 | 294.2 | 294.6 | 394.5 |
| Overvoltage Category                        |                                | III                              |       |       |       |       |       |       |

\* This is the net value at the rated load.

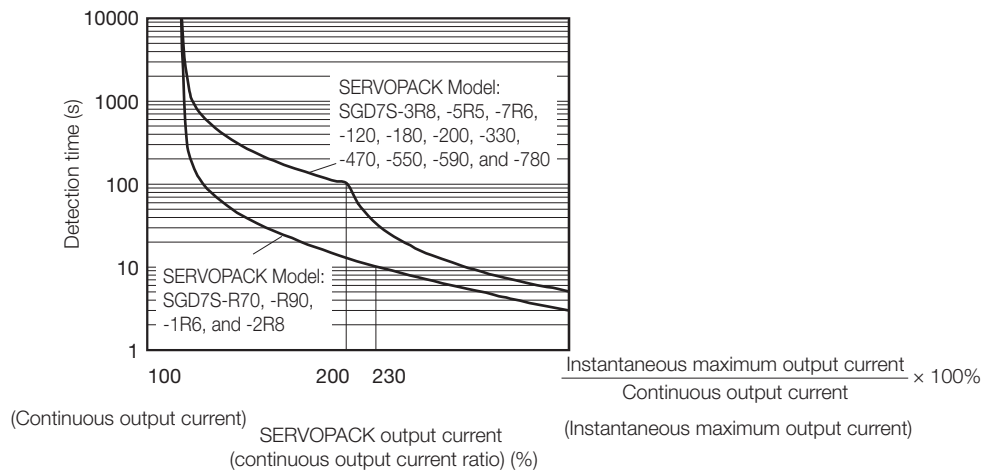
## SERVOPACK Overload Protection Characteristics

The overload detection level is set for hot start conditions with a SERVOPACK surrounding air temperature of 55°C.

An overload alarm (A.710 or A.720) will occur if overload operation that exceeds the overload protection characteristics shown in the following diagram (i.e., operation on the right side of the applicable line) is performed.

The actual overload detection level will be the detection level of the connected SERVOPACK or Servo Motor that has the lower overload protection characteristics.

In most cases, that will be the overload protection characteristics of the Servo Motor.



Note: The above overload protection characteristics do not mean that you can perform continuous duty operation with an output of 100% or higher.

For a Yaskawa-specified combination of SERVOPACK and Servo Motor, maintain the effective torque (or effective force) within the continuous duty zone of the torque-motor speed characteristic (or force-motor speed characteristics) of the Servo Motor.

## Specifications

| Item                                     |                                                                                                                                                                                                                                                                                                   | Specification                                                                                                                                                                                                                                                          |          |                         |              |                                                |              |                                                                  |                 |                        |
|------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|-------------------------|--------------|------------------------------------------------|--------------|------------------------------------------------------------------|-----------------|------------------------|
| Control Method                           |                                                                                                                                                                                                                                                                                                   | IGBT-based PWM control, sine wave current drive                                                                                                                                                                                                                        |          |                         |              |                                                |              |                                                                  |                 |                        |
| Feedback                                 | With Rotary Servo Motor                                                                                                                                                                                                                                                                           | Serial encoder: 20 bits or 24 bits (incremental encoder/absolute encoder)                                                                                                                                                                                              |          |                         |              |                                                |              |                                                                  |                 |                        |
|                                          | With Linear Servo Motor                                                                                                                                                                                                                                                                           | <ul style="list-style-type: none"><li>Absolute linear encoder (The signal resolution depends on the absolute linear encoder.)</li><li>Incremental linear encoder (The signal resolution depends on the incremental linear encoder or Serial Converter Unit.)</li></ul> |          |                         |              |                                                |              |                                                                  |                 |                        |
| Environmental Conditions                 | Surrounding Air Temperature <sup>*1</sup>                                                                                                                                                                                                                                                         | -5°C to 55°C<br>With derating, usage is possible between 55°C and 60°C.<br>Refer to the following section for derating specifications.<br> <i>Derating Specifications</i> (page 475)  |          |                         |              |                                                |              |                                                                  |                 |                        |
|                                          | Storage Temperature                                                                                                                                                                                                                                                                               | -20°C to 85°C                                                                                                                                                                                                                                                          |          |                         |              |                                                |              |                                                                  |                 |                        |
|                                          | Surrounding Air Humidity                                                                                                                                                                                                                                                                          | 95% relative humidity max. (with no freezing or condensation)                                                                                                                                                                                                          |          |                         |              |                                                |              |                                                                  |                 |                        |
|                                          | Storage Humidity                                                                                                                                                                                                                                                                                  | 95% relative humidity max. (with no freezing or condensation)                                                                                                                                                                                                          |          |                         |              |                                                |              |                                                                  |                 |                        |
|                                          | Vibration Resistance                                                                                                                                                                                                                                                                              | 4.9 m/s <sup>2</sup>                                                                                                                                                                                                                                                   |          |                         |              |                                                |              |                                                                  |                 |                        |
|                                          | Shock Resistance                                                                                                                                                                                                                                                                                  | 19.6 m/s <sup>2</sup>                                                                                                                                                                                                                                                  |          |                         |              |                                                |              |                                                                  |                 |                        |
|                                          | Degree of Protection                                                                                                                                                                                                                                                                              | <table><tr><th>Class</th><th>SERVOPACK Model: SGD7S-</th></tr><tr><td>IP20</td><td>R70A, R90A, 1R6A, 2R8A, 3R8A, 5R5A, 7R6A, 120A</td></tr><tr><td>IP10</td><td>180A, 200A, 330A, 470A, 550A, 590A, 780A</td></tr></table>                                             | Class    | SERVOPACK Model: SGD7S- | IP20         | R70A, R90A, 1R6A, 2R8A, 3R8A, 5R5A, 7R6A, 120A | IP10         | 180A, 200A, 330A, 470A, 550A, 590A, 780A                         |                 |                        |
|                                          | Class                                                                                                                                                                                                                                                                                             | SERVOPACK Model: SGD7S-                                                                                                                                                                                                                                                |          |                         |              |                                                |              |                                                                  |                 |                        |
|                                          | IP20                                                                                                                                                                                                                                                                                              | R70A, R90A, 1R6A, 2R8A, 3R8A, 5R5A, 7R6A, 120A                                                                                                                                                                                                                         |          |                         |              |                                                |              |                                                                  |                 |                        |
|                                          | IP10                                                                                                                                                                                                                                                                                              | 180A, 200A, 330A, 470A, 550A, 590A, 780A                                                                                                                                                                                                                               |          |                         |              |                                                |              |                                                                  |                 |                        |
|                                          | Pollution Degree                                                                                                                                                                                                                                                                                  | 2 <ul style="list-style-type: none"><li>Must be no corrosive or flammable gases.</li><li>Must be no exposure to water, oil, or chemicals.</li><li>Must be no dust, salts, or iron dust.</li></ul>                                                                      |          |                         |              |                                                |              |                                                                  |                 |                        |
| Altitude <sup>*1</sup>                   | 1,000 m or less.<br>With derating, usage is possible between 1,000 m and 2,000 m.<br>Refer to the following section for derating specifications.<br> <i>Derating Specifications</i> (page 475)                 |                                                                                                                                                                                                                                                                        |          |                         |              |                                                |              |                                                                  |                 |                        |
| Others                                   | Do not use the SERVOPACK in the following locations: Locations subject to static electricity noise, strong electromagnetic/magnetic fields, or radioactivity                                                                                                                                      |                                                                                                                                                                                                                                                                        |          |                         |              |                                                |              |                                                                  |                 |                        |
| Applicable Standards                     |                                                                                                                                                                                                                                                                                                   | UL 61800-5-1, CSA C22.2 No.274, EN 50178, EN 61800-5-1, EN 55011 group 1 class A, EN 61000-6-2, EN 61000-6-4, EN 61800-3, IEC 61508-1 to 4, IEC 61800-5-2, IEC 62061, ISO 13849-1, and IEC 61326-3-1                                                                   |          |                         |              |                                                |              |                                                                  |                 |                        |
| Mounting                                 | <table><tr><th>Mounting</th><th>SERVOPACK Model: SGD7S-</th></tr><tr><td>Base-mounted</td><td>All Models</td></tr><tr><td>Rack-mounted</td><td>R70A, R90A, 1R6A, 2R8A, 3R8A, 5R5A, 7R6A, 120A, 180A, 200A, 330A</td></tr><tr><td>Duct-ventilated</td><td>470A, 550A, 590A, 780A</td></tr></table> |                                                                                                                                                                                                                                                                        | Mounting | SERVOPACK Model: SGD7S- | Base-mounted | All Models                                     | Rack-mounted | R70A, R90A, 1R6A, 2R8A, 3R8A, 5R5A, 7R6A, 120A, 180A, 200A, 330A | Duct-ventilated | 470A, 550A, 590A, 780A |
|                                          | Mounting                                                                                                                                                                                                                                                                                          | SERVOPACK Model: SGD7S-                                                                                                                                                                                                                                                |          |                         |              |                                                |              |                                                                  |                 |                        |
|                                          | Base-mounted                                                                                                                                                                                                                                                                                      | All Models                                                                                                                                                                                                                                                             |          |                         |              |                                                |              |                                                                  |                 |                        |
|                                          | Rack-mounted                                                                                                                                                                                                                                                                                      | R70A, R90A, 1R6A, 2R8A, 3R8A, 5R5A, 7R6A, 120A, 180A, 200A, 330A                                                                                                                                                                                                       |          |                         |              |                                                |              |                                                                  |                 |                        |
| Duct-ventilated                          | 470A, 550A, 590A, 780A                                                                                                                                                                                                                                                                            |                                                                                                                                                                                                                                                                        |          |                         |              |                                                |              |                                                                  |                 |                        |
| Performance                              | Speed Control Range                                                                                                                                                                                                                                                                               | 1:5000 (At the rated torque, the lower limit of the speed control range must not cause the Servo Motor to stop.)                                                                                                                                                       |          |                         |              |                                                |              |                                                                  |                 |                        |
|                                          | Coefficient of Speed Fluctuation <sup>*2</sup>                                                                                                                                                                                                                                                    | ±0.01% of rated speed max. (for a load fluctuation of 0% to 100%)                                                                                                                                                                                                      |          |                         |              |                                                |              |                                                                  |                 |                        |
|                                          |                                                                                                                                                                                                                                                                                                   | 0% of rated speed max. (for a voltage fluctuation of ±10%)                                                                                                                                                                                                             |          |                         |              |                                                |              |                                                                  |                 |                        |
|                                          |                                                                                                                                                                                                                                                                                                   | ±0.1% of rated speed max. (for a temperature fluctuation of 25°C ±25°C)                                                                                                                                                                                                |          |                         |              |                                                |              |                                                                  |                 |                        |
| Torque Control Precision (Repeatability) |                                                                                                                                                                                                                                                                                                   | ±1%                                                                                                                                                                                                                                                                    |          |                         |              |                                                |              |                                                                  |                 |                        |
| Soft Start Time Setting                  |                                                                                                                                                                                                                                                                                                   | 0 s to 10 s (Can be set separately for acceleration and deceleration.)                                                                                                                                                                                                 |          |                         |              |                                                |              |                                                                  |                 |                        |

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| Item                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                     |                                      | Specification                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------|--------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| I/O Signals                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | Encoder Divided Pulse Output                        |                                      | Phase A, phase B, phase C: Line-driver output<br>Number of divided output pulses: Any setting is allowed.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | Linear Servo Motor Overheat Protection Signal Input |                                      | Number of input points: 1<br>Input voltage range: 0 V to +5 V                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | Sequence Input Signals                              | Fixed Input                          | Allowable voltage range: 5 VDC ±5%<br>Number of input points: 1<br>Absolute Data Request (SEN)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                     | Input Signals That Can Be Allocated  | Allowable voltage range: 24 VDC ±20%<br>Number of input points: 7                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                     |                                      | Input method: Sink inputs or source inputs<br>Input Signals: <ul style="list-style-type: none"><li>• Servo ON (/S-ON)</li><li>• Proportional Control (/P-CON)</li><li>• Forward Drive Prohibit (P-OT) and Reverse Drive Prohibit (N-OT)</li><li>• Alarm Reset (/ALM-RST)</li><li>• Forward External Torque Limit (/P-CL) and Reverse External Torque Limit (/N-CL)</li><li>• Motor Direction (/SPD-D)</li><li>• Internal Set Speed Selection (/SPD-A and /SPD-B)</li><li>• Control Selection (/C-SEL)</li><li>• Zero Clamping (/ZCLAMP)</li><li>• Reference Pulse Inhibit (/INHIBIT)</li><li>• Polarity Detection (/P-DET)</li><li>• Gain Selection (/G-SEL)</li><li>• Reference Pulse Input Multiplication Switch (/PSEL)</li><li>• Absolute Data Request (SEN)</li></ul> A signal can be allocated and the positive and negative logic can be changed. |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                     |                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | Sequence Output Signals                             | Fixed Output                         | Allowable voltage range: 5 VDC to 30 VDC<br>Number of output points: 1<br>Output signal: Servo Alarm (ALM)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                     | Output Signals That Can Be Allocated | Allowable voltage range: 5 VDC to 30 VDC<br>Number of output points: 6<br>(A photocoupler output (isolated) is used for three of the outputs.)<br>(An open-collector output (non-isolated) is used for the other three outputs.)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| Output Signals: <ul style="list-style-type: none"><li>• Positioning Completion (/COIN)</li><li>• Speed Coincidence Detection (/V-CMP)</li><li>• Rotation Detection (/TGON)</li><li>• Servo Ready Output (/S-RDY)</li><li>• Torque Limit Detection (/CLT)</li><li>• Speed Limit Detection (/VLT)</li><li>• Brake (/BK)</li><li>• Warning Output (/WARN)</li><li>• Near Output (/NEAR)</li><li>• Reference Pulse Input Multiplication Switching (/PSELA)</li><li>• Alarm Code (ALO1, ALO2, and ALO3)</li></ul> A signal can be allocated and the positive and negative logic can be changed. |                                                     |                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| Communications                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | RS-422A Communications (CN3)                        | Interfaces                           | Digital Operator (JUSP-OP05A-1-E) and personal computer (with SigmaWin+)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                     | 1:N Communications                   | Up to N = 15 stations possible for RS-422A port                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                     | Axis Address Setting                 | Set with parameters.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | USB Communications (CN7)                            | Interface                            | Personal computer (with SigmaWin+)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                     | Communications Standard              | Conforms to USB2.0 standard (12 Mbps).                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| Displays/Indicators                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                     |                                      | CHARGE indicator and five-digit seven-segment display                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| Panel Operator                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                                     |                                      | Four push switches                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |

Continued from previous page.

| Item                       |                                    | Specification                                                                                                                                                                                                                              |                                |
|----------------------------|------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------|
| Analog Monitor (CN5)       |                                    | Number of points: 2<br>Output voltage range: $\pm 10$ VDC (effective linearity range: $\pm 8$ V)<br>Resolution: 16 bits<br>Accuracy: $\pm 20$ mV (Typ)<br>Maximum output current: $\pm 10$ mA<br>Settling time ( $\pm 1\%$ ): 1.2 ms (Typ) |                                |
| Dynamic Brake (DB)         |                                    | Activated when a servo alarm or overtravel (OT) occurs, or when the power supply to the main circuit or servo is OFF.                                                                                                                      |                                |
| Regenerative Processing    |                                    | Built-in (An external resistor must be connected to the SGD7S-470A to -780A.)<br> <i>Built-In Regenerative Resistor</i> (page 609)                        |                                |
| Overtravel (OT) Prevention |                                    | Stopping with dynamic brake, deceleration to a stop, or coasting to a stop for the P-OT (Forward Drive Prohibit) or N-OT (Reverse Drive Prohibit) signal                                                                                   |                                |
| Protective Functions       |                                    | Overcurrent, overvoltage, low voltage, overload, regeneration error, etc.                                                                                                                                                                  |                                |
| Utility Functions          |                                    | Gain adjustment, alarm history, jogging, origin search, etc.                                                                                                                                                                               |                                |
| Safety Functions           | Inputs                             | /HWBB1 and /HWBB2: Base block signals for Power Modules                                                                                                                                                                                    |                                |
|                            | Output                             | EDM1: Monitors the status of built-in safety circuit (fixed output).                                                                                                                                                                       |                                |
|                            | Applicable Standards <sup>*3</sup> | ISO13849-1 PLe (Category 3) and IEC61508 SIL3                                                                                                                                                                                              |                                |
| Option Module              |                                    | Fully-Closed Modules and Safety Modules<br>Note: You cannot use a Fully-Closed Module and a Safety Module together.                                                                                                                        |                                |
| Controls                   | Speed Control                      | Soft Start Time Setting                                                                                                                                                                                                                    |                                |
|                            |                                    | Input Signal                                                                                                                                                                                                                               | Reference Voltage              |
|                            |                                    |                                                                                                                                                                                                                                            | Input Impedance                |
|                            |                                    |                                                                                                                                                                                                                                            | Circuit Time Constant          |
|                            |                                    | Internal Set Speed Control                                                                                                                                                                                                                 | Rotation Direction Selection   |
|                            |                                    |                                                                                                                                                                                                                                            | Speed Selection                |
|                            | Position Control                   | Feedforward Compensation                                                                                                                                                                                                                   |                                |
|                            |                                    | Output Signal Positioning Completed Width Setting                                                                                                                                                                                          |                                |
|                            |                                    | Input Signals                                                                                                                                                                                                                              | Reference Pulse Form           |
|                            |                                    |                                                                                                                                                                                                                                            | Input Form                     |
|                            |                                    |                                                                                                                                                                                                                                            | Maximum Input Frequency        |
|                            |                                    |                                                                                                                                                                                                                                            | Input Multiplication Switching |
|                            |                                    |                                                                                                                                                                                                                                            | Clear Signal                   |

## SERVOPACKs

### Σ-7S Single-axis Analog Voltage/Pulse Train Reference SERVOPACKs

Continued from previous page.

| Item     |                |              | Specification                                                                                                                                                                                                                       |
|----------|----------------|--------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Controls | Torque Control | Input Signal | <ul style="list-style-type: none"> <li>Maximum input voltage: <math>\pm 12</math> V (forward torque output for positive reference).</li> <li>3 VDC at rated torque (default setting). Input gain setting can be changed.</li> </ul> |
|          |                |              | Input Impedance<br>Approx. 14 k $\Omega$                                                                                                                                                                                            |
|          |                |              | Circuit Time Constant<br>16 $\mu$ s                                                                                                                                                                                                 |

\*1. If you combine a Σ-7-Series SERVOPACK with a Σ-V-Series Option Module, the following Σ-V-Series SERVOPACKs specifications must be used: a surrounding air temperature of 0°C to 55°C and an altitude of 1,000 m max. Also, the applicable range cannot be increased by derating.

\*2. The coefficient of speed fluctuation for load fluctuation is defined as follows:

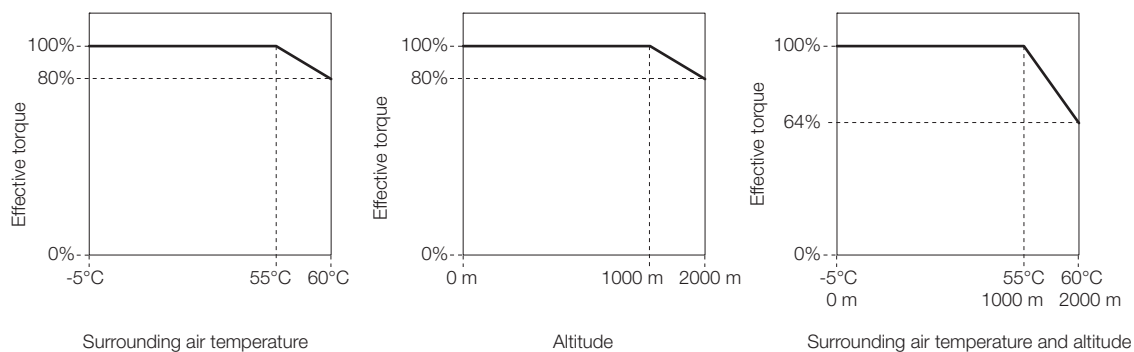
$$\text{Coefficient of speed fluctuation} = \frac{\text{No-load motor speed} - \text{Total-load motor speed}}{\text{Rated motor speed}} \times 100\%$$

\*3. Always perform risk assessment for the system and confirm that the safety requirements are met.

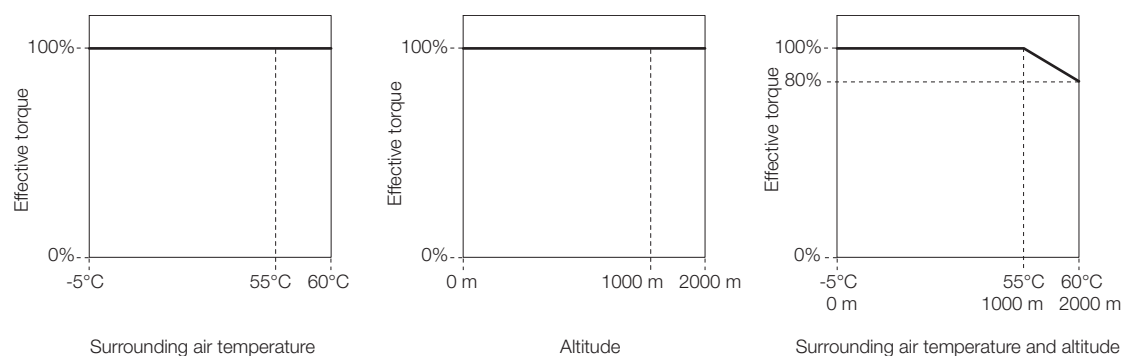
## Derating Specifications

If you use the SERVOPACK at a surrounding air temperature of 55°C to 60°C or at an altitude of 1,000 m to 2,000 m, you must apply the derating rates given in the following graphs.

### ◆ SGD7S-R70A, -R90A, -1R6A, and -2R8A



### ◆ SGD7S-3R8A, -5R5A, -7R6A, -120A, -180A, -200A, -330A, -470A, -550A, -590A, and -780A



## Model Designations

SGD7S - R70 A 30 A 000 F64

Σ-7 Series  
Σ-7S SERVOPACKs

1st+2nd+3rd digits

4th digit

5th+6th digits

7th digit

8th+9th+10th digits

11th+12th+13th digits

1st+2nd+3rd digits Maximum Applicable Motor Capacity

| Voltage               | Code              | Specification |
|-----------------------|-------------------|---------------|
| Three-phase, 200 VAC  | R70 <sup>*1</sup> | 0.05 kW       |
|                       | R90 <sup>*1</sup> | 0.1 kW        |
|                       | 1R6 <sup>*1</sup> | 0.2 kW        |
|                       | 2R8 <sup>*1</sup> | 0.4 kW        |
|                       | 3R8               | 0.5 kW        |
|                       | 5R5 <sup>*1</sup> | 0.75 kW       |
|                       | 7R6               | 1.0 kW        |
|                       | 120 <sup>*3</sup> | 1.5 kW        |
|                       | 180               | 2.0 kW        |
|                       | 200               | 3.0 kW        |
|                       | 330               | 5.0 kW        |
|                       | 470               | 6.0 kW        |
|                       | 550               | 7.5 kW        |
|                       | 590               | 11 kW         |
| Single-phase, 100 VAC | 780               | 15 kW         |
|                       | R70               | 0.05 kW       |
|                       | R90               | 0.1 kW        |
|                       | 2R1               | 0.2 kW        |
|                       | 2R8               | 0.4 kW        |

| Voltage              | Code              | Specification |
|----------------------|-------------------|---------------|
| Three-phase, 400 VAC | 1R9               | 0.5 kW        |
|                      | 3R5               | 1.0 kW        |
|                      | 5R4               | 1.5 kW        |
|                      | 8R4               | 2.0 kW        |
|                      | 120               | 3.0 kW        |
|                      | 170               | 5.0 kW        |
|                      | 210 <sup>*4</sup> | 6.0 kW        |
|                      | 260 <sup>*4</sup> | 7.5 kW        |
|                      | 280 <sup>*4</sup> | 11 kW         |
|                      | 370 <sup>*4</sup> | 15 kW         |
|                      |                   |               |

4th digit Voltage

| Code | Specification |
|------|---------------|
| D    | 400 VAC       |
| A    | 200 VAC       |
| F    | 100 VAC       |

Shaded items are non-stock

5th+6th digits Interface<sup>\*2</sup>

| Code | Specification                             |
|------|-------------------------------------------|
| 30   | MECHATROLINK-III communications reference |

7th digit Design Revision Order

| Code | Specification                   |
|------|---------------------------------|
| A    | Global Design Revision for 200V |
| B    | Global Design Revision for 400V |

8th+9th+10th digits

Hardware Options (400V Models ONLY)

| Code | Specification                |
|------|------------------------------|
| 000  | Without options              |
| 026  | With relay for holding brake |

11th+12th+13th digits

FT/EX Spec (400V Models ONLY)

| Code | Specification   |
|------|-----------------|
| 000  | Without options |
| F64  | Zone Table      |

Note: F64 options is standard for 400V amps and not available for 200V amps.

- \*1. You can use these models with either a single-phase or three-phase power supply input..
- \*2. The same SERVOPACKs are used for both Rotary Servo Motors and Linear Servo Motors.
- \*3. A model with a single-phase, 200-VAC power supply input is available as a hardware option (model: SGD7S-120A30A008).
- \*4. These SERVOPACKs do not have an integrated Dynamic Brake Circuit. Please refer to page 611 for more information on Sigma-7 400V Dynamic Brake Resistors.



## Ratings and Specifications

### Ratings

#### ◆ Single-phase, 100 VAC

| Model SGD7S-                                |                                                    | R70F                                       | R90F | 2R1F | 2R8F |
|---------------------------------------------|----------------------------------------------------|--------------------------------------------|------|------|------|
| Maximum Applicable Motor Capacity [kW]      |                                                    | 0.05                                       | 0.1  | 0.2  | 0.4  |
| Continuous Output Current [Arms]            |                                                    | 0.66                                       | 0.91 | 2.1  | 2.8  |
| Instantaneous Maximum Output Current [Arms] |                                                    | 2.1                                        | 3.2  | 6.5  | 9.3  |
| Main Circuit                                | Power Supply                                       | 100 VAC to 120 VAC, -15% to +10%, 50/60 Hz |      |      |      |
|                                             | Input Current [Arms]*                              | 1.5                                        | 2.5  | 5    | 10   |
| Control Power Supply                        |                                                    | 100 VAC to 120 VAC, -15% to +10%, 50/60 Hz |      |      |      |
| Power Supply Capacity [kVA]*                |                                                    | 0.2                                        | 0.3  | 0.6  | 1.4  |
| Power Loss*                                 | Main Circuit Power Loss [W]                        | 5.3                                        | 7.8  | 14.2 | 26.2 |
|                                             | Control Circuit Power Loss [W]                     | 12                                         | 12   | 12   | 12   |
|                                             | Total Power Loss [W]                               | 17.3                                       | 19.8 | 26.2 | 38.2 |
| Regenerative Resistor                       | Minimum Allowable External Resistance [ $\Omega$ ] | 40                                         | 40   | 40   | 40   |
| Overvoltage Category                        |                                                    | III                                        |      |      |      |

\* This is the net value at the rated load.

#### ◆ Three-phase, 200 VAC

| Model SGD7S-                                |                                                    | R70A                                          | R90A | 1R6A | 2R8A | 3R8A | 5R5A | 7R6A | 120A | 180A  | 200A  | 330A  |
|---------------------------------------------|----------------------------------------------------|-----------------------------------------------|------|------|------|------|------|------|------|-------|-------|-------|
| Maximum Applicable Motor Capacity [kW]      |                                                    | 0.05                                          | 0.1  | 0.2  | 0.4  | 0.5  | 0.75 | 1.0  | 1.5  | 2.0   | 3.0   | 5.0   |
| Continuous Output Current [Arms]            |                                                    | 0.66                                          | 0.91 | 1.6  | 2.8  | 3.8  | 5.5  | 7.6  | 11.6 | 18.5  | 19.6  | 32.9  |
| Instantaneous Maximum Output Current [Arms] |                                                    | 2.1                                           | 3.2  | 5.9  | 9.3  | 11   | 16.9 | 17   | 28   | 42    | 56    | 84.0  |
| Main Circuit                                | Power Supply                                       | 200 VAC to 240 VAC, -15% to +10%, 50 Hz/60 Hz |      |      |      |      |      |      |      |       |       |       |
|                                             | Input Current [Arms]*                              | 0.4                                           | 0.8  | 1.3  | 2.5  | 3.0  | 4.1  | 5.7  | 7.3  | 10    | 15    | 25    |
| Control Power Supply                        |                                                    | 200 VAC to 240 VAC, -15% to +10%, 50 Hz/60 Hz |      |      |      |      |      |      |      |       |       |       |
| Power Supply Capacity [kVA]*                |                                                    | 0.2                                           | 0.3  | 0.5  | 1.0  | 1.3  | 1.6  | 2.3  | 3.2  | 4.0   | 5.9   | 7.5   |
| Power Loss*                                 | Main Circuit Power Loss [W]                        | 5.1                                           | 7.3  | 13.5 | 24.0 | 20.1 | 43.8 | 53.6 | 65.8 | 111.9 | 113.8 | 263.7 |
|                                             | Control Circuit Power Loss [W]                     | 17                                            | 17   | 17   | 17   | 17   | 17   | 17   | 22   | 22    | 22    | 27    |
|                                             | Built-in Regenerative Resistor Power Loss [W]      | —                                             | —    | —    | —    | 8    | 8    | 8    | 10   | 16    | 16    | 36.0  |
|                                             | Total Power Loss [W]                               | 22.1                                          | 24.3 | 30.5 | 41.0 | 45.1 | 68.8 | 78.6 | 97.8 | 149.9 | 151.8 | 326.7 |
| Regenerative Resistor                       | Built-In Regenerative Resistor                     | Resistance [ $\Omega$ ]                       | —    | —    | —    | 40   | 40   | 40   | 20   | 12    | 12    | 8     |
|                                             |                                                    | Capacity [W]                                  | —    | —    | —    | 40   | 40   | 40   | 60   | 60    | 60    | 180   |
|                                             | Minimum Allowable External Resistance [ $\Omega$ ] |                                               | 40   | 40   | 40   | 40   | 40   | 40   | 20   | 12    | 12    | 8     |
| Overvoltage Category                        |                                                    | III                                           |      |      |      |      |      |      |      |       |       |       |

\* This is the net value at the rated load.

## SERVOPACKs

### Σ-7S Single-axis MECHATROLINK-III Communications Reference SERVOPACKs

| Model SGD7S-                                |                                                    | 470A                                           | 550A               | 590A               | 780A               |
|---------------------------------------------|----------------------------------------------------|------------------------------------------------|--------------------|--------------------|--------------------|
| Maximum Applicable Motor Capacity [kW]      |                                                    | 6.0                                            | 7.5                | 11                 | 15                 |
| Continuous Output Current [Arms]            |                                                    | 46.9                                           | 54.7               | 58.6               | 78.0               |
| Instantaneous Maximum Output Current [Arms] |                                                    | 110                                            | 130                | 140                | 170                |
| Main Circuit                                | Power Supply                                       | 200 VAC to 240 VAC, -15%% to +10%, 50 Hz/60 Hz |                    |                    |                    |
|                                             | Input Current [Arms]* <sup>1</sup>                 | 29                                             | 37                 | 54                 | 73                 |
| Control Power Supply                        |                                                    | 200 VAC to 240 VAC, -15%% to +10%, 50 Hz/60 Hz |                    |                    |                    |
| Power Supply Capacity [kVA]* <sup>1</sup>   |                                                    | 10.7                                           | 14.6               | 21.7               | 29.6               |
| Power Loss* <sup>1</sup>                    | Main Circuit Power Loss [W]                        | 279.4                                          | 357.8              | 431.7              | 599.0              |
|                                             | Control Circuit Power Loss [W]                     | 33                                             | 33                 | 48                 | 48                 |
|                                             | External Regenerative Resistor Unit Power Loss [W] | 180* <sup>2</sup>                              | 180* <sup>3</sup>  | 350* <sup>3</sup>  | 350* <sup>3</sup>  |
|                                             | Total Power Loss [W]                               | 312.4                                          | 390.8              | 479.7              | 647.0              |
| External Regen-<br>erative Resistor<br>Unit | External Regen-<br>erative Resistor<br>Unit        | Resistance [Ω ]                                | 6.25* <sup>2</sup> | 3.13* <sup>3</sup> | 3.13* <sup>3</sup> |
|                                             |                                                    | Capacity [W]                                   | 880* <sup>2</sup>  | 1760* <sup>3</sup> | 1760* <sup>3</sup> |
|                                             | Minimum Allowable External Resistance [Ω ]         |                                                | 5.8                | 2.9                | 2.9                |
| Overvoltage Category                        |                                                    | III                                            |                    |                    |                    |

\*1. This is the net value at the rated load.

\*2. This value is for the optional JUSP-RA04-E Regenerative Resistor Unit.

\*3. This value is for the optional JUSP-RA05-E Regenerative Resistor Unit.

## ◆ Single-phase, 200 VAC

| Model SGD7S-                                |                                               | R70A                                          | R90A | 1R6A | 2R8A | 5R5A |
|---------------------------------------------|-----------------------------------------------|-----------------------------------------------|------|------|------|------|
| Maximum Applicable Motor Capacity [kW]      |                                               | 0.05                                          | 0.1  | 0.2  | 0.4  | 0.75 |
| Continuous Output Current [Arms]            |                                               | 0.66                                          | 0.91 | 1.6  | 2.8  | 5.5  |
| Instantaneous Maximum Output Current [Arms] |                                               | 2.1                                           | 3.2  | 5.9  | 9.3  | 16.9 |
| Main Circuit                                | Power Supply                                  | 200 VAC to 240 VAC, -15% to +10%, 50 Hz/60 Hz |      |      |      |      |
|                                             | Input Current [Arms]*                         | 0.8                                           | 1.6  | 2.4  | 5.0  | 8.7  |
| Control Power Supply                        |                                               | 200 VAC to 240 VAC, -15% to +10%, 50 Hz/60 Hz |      |      |      |      |
| Power Supply Capacity [kVA]*                |                                               | 0.2                                           | 0.3  | 0.6  | 1.2  | 1.9  |
| Power Loss*                                 | Main Circuit Power Loss [W]                   | 5.1                                           | 7.3  | 13.5 | 24.0 | 43.8 |
|                                             | Control Circuit Power Loss [W]                | 17                                            | 17   | 17   | 17   | 17   |
|                                             | Built-in Regenerative Resistor Power Loss [W] | —                                             | —    | —    | —    | 8    |
|                                             | Total Power Loss [W]                          | 22.1                                          | 24.3 | 30.5 | 41.0 | 68.8 |
| Regenerative Resistor                       | Built-In Regen-<br>erative Resis-<br>tor      | Resistance [Ω ]                               | —    | —    | —    | 40   |
|                                             |                                               | Capacity [W]                                  | —    | —    | —    | 40   |
|                                             | Minimum Allowable External Resistance [Ω ]    |                                               | 40   | 40   | 40   | 40   |
| Overvoltage Category                        |                                               | III                                           |      |      |      |      |

\* This is the net value at the rated load.

## ◆ 270 VDC

| Model SGD7S-                                |                                | R70A                             | R90A | 1R6A | 2R8A | 3R8A | 5R5A | 7R6A | 120A |
|---------------------------------------------|--------------------------------|----------------------------------|------|------|------|------|------|------|------|
| Maximum Applicable Motor Capacity [kW]      |                                | 0.05                             | 0.1  | 0.2  | 0.4  | 0.5  | 0.75 | 1.0  | 1.5  |
| Continuous Output Current [Arms]            |                                | 0.66                             | 0.91 | 1.6  | 2.8  | 3.8  | 5.5  | 7.6  | 11.6 |
| Instantaneous Maximum Output Current [Arms] |                                | 2.1                              | 3.2  | 5.9  | 9.3  | 11.0 | 16.9 | 17.0 | 28.0 |
| Main Circuit                                | Power Supply                   | 270 VDC to 324 VDC, -15% to +10% |      |      |      |      |      |      |      |
|                                             | Input Current [Arms]*          | 0.5                              | 1.0  | 1.5  | 3.0  | 3.8  | 4.9  | 6.9  | 11   |
| Control Power Supply                        |                                | 270 VDC to 324 VDC, -15% to +10% |      |      |      |      |      |      |      |
| Power Supply Capacity [kVA]*                |                                | 0.2                              | 0.3  | 0.6  | 1    | 1.4  | 1.6  | 2.3  | 3.2  |
| Power Loss*                                 | Main Circuit Power Loss [W]    | 4.6                              | 6.3  | 11.7 | 20.2 | 16.9 | 37.9 | 46.0 | 53.2 |
|                                             | Control Circuit Power Loss [W] | 17                               | 17   | 17   | 17   | 17   | 17   | 17   | 22   |
|                                             | Total Power Loss [W]           | 21.6                             | 23.3 | 28.7 | 37.2 | 33.9 | 54.9 | 63.0 | 75.2 |
| Overvoltage Category                        |                                | III                              |      |      |      |      |      |      |      |

\* This is the net value at the rated load.

| Model SGD7S-                                |                                | 180A                             | 200A  | 330A  | 470A  | 550A  | 590A  | 780A  |
|---------------------------------------------|--------------------------------|----------------------------------|-------|-------|-------|-------|-------|-------|
| Maximum Applicable Motor Capacity [kW]      |                                | 2.0                              | 3.0   | 5.0   | 6.0   | 7.5   | 11.0  | 15.0  |
| Continuous Output Current [Arms]            |                                | 18.5                             | 19.6  | 32.9  | 46.9  | 54.7  | 58.6  | 78.0  |
| Instantaneous Maximum Output Current [Arms] |                                | 42.0                             | 56.0  | 84.0  | 110   | 130   | 140   | 170   |
| Main Circuit                                | Power Supply                   | 270 VDC to 324 VDC, -15% to +10% |       |       |       |       |       |       |
|                                             | Input Current [Arms]*          | 14                               | 20    | 34    | 36    | 48    | 68    | 92    |
| Control Power Supply                        |                                | 270 VDC to 324 VDC, -15% to +10% |       |       |       |       |       |       |
| Power Supply Capacity [kVA]*                |                                | 4.0                              | 5.9   | 7.5   | 10.7  | 14.6  | 21.7  | 29.6  |
| Power Loss*                                 | Main Circuit Power Loss [W]    | 95.8                             | 87.6  | 163.7 | 203.4 | 261.2 | 246.6 | 346.5 |
|                                             | Control Circuit Power Loss [W] | 22                               | 22    | 27    | 33    | 33    | 48    | 48    |
|                                             | Total Power Loss [W]           | 117.8                            | 109.6 | 190.7 | 236.4 | 294.2 | 294.6 | 394.5 |
| Overvoltage Category                        |                                | III                              |       |       |       |       |       |       |

\* This is the net value at the rated load.

## SERVOPACKs

Σ-7S Single-axis MECHATROLINK-III Communications Reference SERVOPACKs

### ◆ Three-phase, 400 VAC

| Model SGD7S-                                |                                               |                 | 1R9D                                                        | 3R5D | 5R4D  | 8R4D  | 120D  | 170D  | 210D  | 260D  | 280D  | 370D  |
|---------------------------------------------|-----------------------------------------------|-----------------|-------------------------------------------------------------|------|-------|-------|-------|-------|-------|-------|-------|-------|
| Maximum Applicable Motor Capacity [kW]      |                                               |                 | 0.5                                                         | 1    | 1.5   | 2     | 3     | 5     | 6     | 7.5   | 11    | 15    |
| Continuous Output Current [Arms]            |                                               |                 | 1.9                                                         | 3.5  | 5.4   | 8.4   | 11.9  | 16    | 20.8  | 25.7  | 28.1  | 37.2  |
| Instantaneous Maximum Output Current [Arms] |                                               |                 | 5.5                                                         | 8.5  | 14    | 21    | 28    | 42    | 55    | 65    | 70    | 85    |
| Main Circuit                                | Power Supply                                  |                 | Three-phase, 380 VAC to 480 VAC, -15%% to +10%, 50 Hz/60 Hz |      |       |       |       |       |       |       |       |       |
|                                             | Input Current [Arms]*                         |                 | 1.4                                                         | 2.9  | 4.3   | 5.8   | 8.6   | 14.5  | 17.4  | 21.7  | 31.8  | 43.4  |
| Control Power Supply                        | Power Supply                                  |                 | 24 VDC ±15%                                                 |      |       |       |       |       |       |       |       |       |
|                                             | Input Current [Arms]*                         |                 | 1.2                                                         |      |       |       |       |       | 1.4   |       | 1.5   |       |
| Power Supply Capacity [kVA]*                |                                               |                 | 1.1                                                         | 2.3  | 3.5   | 4.5   | 7.1   | 11.7  | 12.4  | 14.4  | 21.9  | 30.6  |
| Power Loss*                                 | Main Circuit Power Loss [W]                   |                 | 19.2                                                        | 30   | 62.3  | 89.4  | 136.8 | 188.7 | 188.4 | 228.5 | 278.2 | 389.8 |
|                                             | Control Circuit Power Loss [W]                |                 | 21                                                          |      |       |       |       | 22    | 28    |       | 32    |       |
|                                             | Built-in Regenerative Resistor Power Loss [W] |                 | 14                                                          | 14   | 28    | 28    | 28    | 36    | (180) |       | (240) |       |
|                                             | Total Power Loss [W]                          |                 | 54.2                                                        | 65   | 111.3 | 138.4 | 185.5 | 246.7 | 216.4 | 256.5 | 310.2 | 389.8 |
| Regenerative Resistor                       | Built-In Regenerative Resistor                | Resistance [Ω ] | 75                                                          | 75   | 75    | 43    | 43    | 27    | -     |       |       |       |
|                                             |                                               | Capacity [W]    | 70                                                          | 70   | 140   | 140   | 140   | 180   | -     |       |       |       |
|                                             | Minimum Allowable External Resistance [Ω ]    |                 | 75                                                          | 75   | 75    | 43    | 43    | 27    | 18    |       | 14.25 |       |
| Overvoltage Category                        |                                               |                 | III                                                         |      |       |       |       |       |       |       |       |       |

\* This is the net value at the rated load.

### ◆ 540 VDC

| Model SGD7S-                                |                                               | 1R9D                           | 3R5D | 5R4D | 8R4D | 120D  | 170D  | 210D  | 260D  | 280D  | 370D  |
|---------------------------------------------|-----------------------------------------------|--------------------------------|------|------|------|-------|-------|-------|-------|-------|-------|
| Maximum Applicable Motor Capacity [kW]      |                                               | 0.5                            | 1    | 1.5  | 2    | 3     | 5     | 6     | 7.5   | 11    | 15    |
| Continuous Output Current [Arms]            |                                               | 1.9                            | 3.5  | 5.4  | 8.4  | 11.9  | 16    | 20.8  | 25.7  | 28.1  | 37.2  |
| Instantaneous Maximum Output Current [Arms] |                                               | 5.5                            | 8.5  | 14   | 21   | 28    | 42    | 55    | 65    | 70    | 85    |
| Main Circuit                                | Power Supply                                  | 513 VDC to 648 VDC, -15%, +10% |      |      |      |       |       |       |       |       |       |
|                                             | Input Current [Arms]*                         | 2                              | 3.3  | 5.5  | 6.8  | 11    | 18    | 19.6  | 26.2  | 38.3  | 47.6  |
| Control Power Supply                        | Power Supply                                  | 24 VDC ±15%                    |      |      |      |       |       |       |       |       |       |
|                                             | Input Current [Arms]*                         | 1.2                            |      |      |      |       |       | 1.4   |       | 1.5   |       |
| Power Supply Capacity [kVA]*                |                                               | 1.1                            | 2.3  | 3.5  | 4.5  | 7.1   | 11.7  | 12.4  | 14.4  | 21.9  | 30.6  |
| Power Loss*                                 | Main Circuit Power Loss [W]                   | 19.2                           | 30   | 62.3 | 89.4 | 136.8 | 188.7 | 188.4 | 228.5 | 278.2 | 389.8 |
|                                             | Control Circuit Power Loss [W]                | 21                             |      |      |      |       |       | 22    |       | 28    |       |
|                                             | Built-in Regenerative Resistor Power Loss [W] | 14                             | 14   | 28   | 28   | 28    | 36    | (180) |       | (240) |       |
|                                             | Total Power Loss [W]                          | 37.4                           | 45.4 | 69.5 | 94.7 | 131.4 | 166.5 | 216.4 | 228.5 | 310.2 | 389.8 |
| Overvoltage Category                        |                                               | III                            |      |      |      |       |       |       |       |       |       |

\* This is the net value at the rated load.

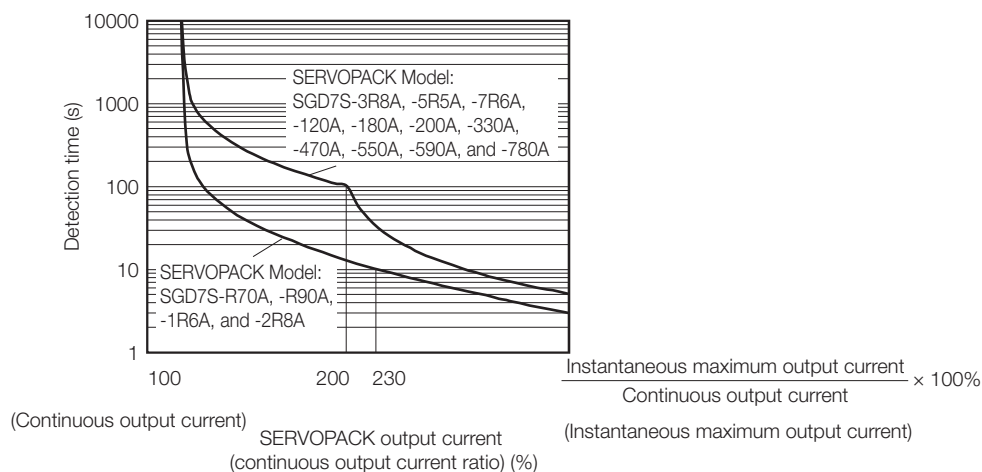
## SERVOPACK Overload Protection Characteristics (200V)

The overload detection level is set for hot start conditions with a SERVOPACK surrounding air temperature of 55°C.

An overload alarm (A.710 or A.720) will occur if overload operation that exceeds the overload protection characteristics shown in the following diagram (i.e., operation on the right side of the applicable line) is performed.

The actual overload detection level will be the detection level of the connected SERVOPACK or Servo Motor that has the lower overload protection characteristics.

In most cases, that will be the overload protection characteristics of the Servo Motor.



Note: The above overload protection characteristics do not mean that you can perform continuous duty operation with an output of 100% or higher.

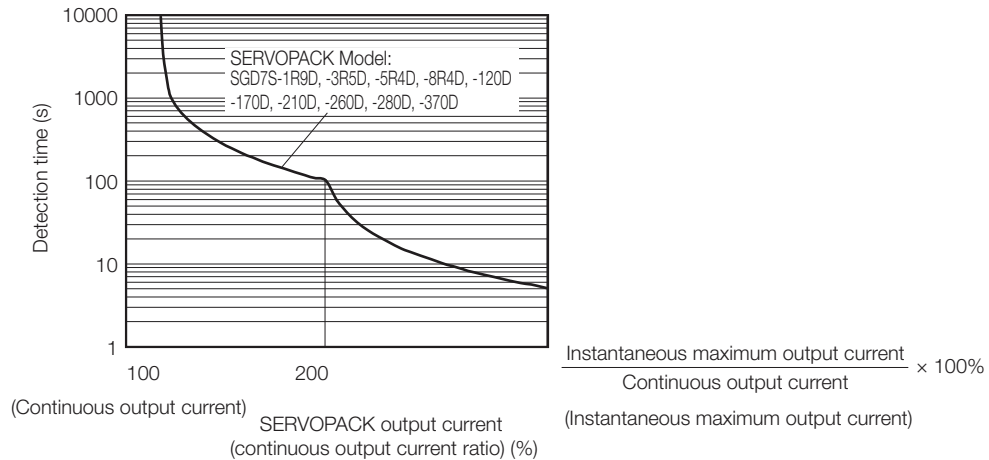
For a Yaskawa-specified combination of SERVOPACK and Servo Motor, maintain the effective torque (or effective force) within the continuous duty zone of the torque-motor speed characteristic (or force-motor speed characteristics) of the Servo Motor.

## SERVOPACK Overload Protection Characteristics (400V)

The overload detection level is set for hot start conditions with a SERVOPACK surrounding air temperature of 55°C\*.

An overload alarm (A.710 or A.720) will occur if overload operation that exceeds the overload protection characteristics shown in the following diagram (i.e., operation on the right side of the applicable line) is performed. The actual overload detection level will be the detection level of the connected SERVOPACK or Servomotor that has the lower overload protection characteristics.

In most cases, that will be the overload protection characteristics of the Servomotor.



Note: The above overload protection characteristics do not mean that you can perform continuous duty operation with an output of 100% or higher.

For a YASKAWA-specified combination of SERVOPACK and Servomotor, maintain the effective torque within the continuous duty zone of the torque-motor speed characteristic of the Servomotor.

\* However, the range for the SGD7S-370D is -5°C to 40°C.

## Specifications (200 V Models)

| Item                     |                                                                                                                                                                                                                                                                                         | Specification                                                                                                                                                                                                                                                                                     |          |                         |              |                                                |              |                                                                  |                 |                        |
|--------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|-------------------------|--------------|------------------------------------------------|--------------|------------------------------------------------------------------|-----------------|------------------------|
| Drive Method             |                                                                                                                                                                                                                                                                                         | IGBT-based PWM control, sine wave current drive                                                                                                                                                                                                                                                   |          |                         |              |                                                |              |                                                                  |                 |                        |
| Feedback                 | With Rotary Servo Motor                                                                                                                                                                                                                                                                 | Serial encoder: 20 bits or 24 bits (incremental encoder/absolute encoder)                                                                                                                                                                                                                         |          |                         |              |                                                |              |                                                                  |                 |                        |
|                          | With Linear Servo Motor                                                                                                                                                                                                                                                                 | <ul style="list-style-type: none"><li>Absolute linear encoder (The signal resolution depends on the absolute linear encoder.)</li><li>Incremental linear encoder (The signal resolution depends on the incremental linear encoder or Serial Converter Unit.)</li></ul>                            |          |                         |              |                                                |              |                                                                  |                 |                        |
| Environmental Conditions | Surrounding Air Temperature <sup>*1</sup>                                                                                                                                                                                                                                               | -5°C to 55°C<br>With derating, usage is possible between 55°C and 60°C.<br>Refer to the following section for derating specifications.<br> <b>Specifications (400 V Models) (page 486)</b>                       |          |                         |              |                                                |              |                                                                  |                 |                        |
|                          | Storage Temperature                                                                                                                                                                                                                                                                     | -20°C to 85°C                                                                                                                                                                                                                                                                                     |          |                         |              |                                                |              |                                                                  |                 |                        |
|                          | Surrounding Air Humidity                                                                                                                                                                                                                                                                | 95% relative humidity max. (with no freezing or condensation)                                                                                                                                                                                                                                     |          |                         |              |                                                |              |                                                                  |                 |                        |
|                          | Storage Humidity                                                                                                                                                                                                                                                                        | 95% relative humidity max. (with no freezing or condensation)                                                                                                                                                                                                                                     |          |                         |              |                                                |              |                                                                  |                 |                        |
|                          | Vibration Resistance                                                                                                                                                                                                                                                                    | 4.9 m/s <sup>2</sup>                                                                                                                                                                                                                                                                              |          |                         |              |                                                |              |                                                                  |                 |                        |
|                          | Shock Resistance                                                                                                                                                                                                                                                                        | 19.6 m/s <sup>2</sup>                                                                                                                                                                                                                                                                             |          |                         |              |                                                |              |                                                                  |                 |                        |
|                          | Degree of Protection                                                                                                                                                                                                                                                                    | <table><tr><th>Class</th><th>SERVOPACK Model: SGD7S-</th></tr><tr><td>IP20</td><td>R70A, R90A, 1R6A, 2R8A, 3R8A, 5R5A, 7R6A, 120A</td></tr><tr><td>IP10</td><td>180A, 200A, 330A, 470A, 550A, 590A, 780A</td></tr></table>                                                                        | Class    | SERVOPACK Model: SGD7S- | IP20         | R70A, R90A, 1R6A, 2R8A, 3R8A, 5R5A, 7R6A, 120A | IP10         | 180A, 200A, 330A, 470A, 550A, 590A, 780A                         |                 |                        |
|                          | Class                                                                                                                                                                                                                                                                                   | SERVOPACK Model: SGD7S-                                                                                                                                                                                                                                                                           |          |                         |              |                                                |              |                                                                  |                 |                        |
|                          | IP20                                                                                                                                                                                                                                                                                    | R70A, R90A, 1R6A, 2R8A, 3R8A, 5R5A, 7R6A, 120A                                                                                                                                                                                                                                                    |          |                         |              |                                                |              |                                                                  |                 |                        |
|                          | IP10                                                                                                                                                                                                                                                                                    | 180A, 200A, 330A, 470A, 550A, 590A, 780A                                                                                                                                                                                                                                                          |          |                         |              |                                                |              |                                                                  |                 |                        |
| Pollution Degree         | 2 <ul style="list-style-type: none"><li>Must be no corrosive or flammable gases.</li><li>Must be no exposure to water, oil, or chemicals.</li><li>Must be no dust, salts, or iron dust.</li></ul>                                                                                       |                                                                                                                                                                                                                                                                                                   |          |                         |              |                                                |              |                                                                  |                 |                        |
| Altitude <sup>*1</sup>   | 1,000 m or less.<br>With derating, usage is possible between 1,000 m and 2,000 m.<br>Refer to the following section for derating specifications.<br> <b>Specifications (400 V Models) (page 486)</b> |                                                                                                                                                                                                                                                                                                   |          |                         |              |                                                |              |                                                                  |                 |                        |
| Others                   | Do not use the SERVOPACK in the following locations: Locations subject to static electricity noise, strong electromagnetic/magnetic fields, or radioactivity                                                                                                                            |                                                                                                                                                                                                                                                                                                   |          |                         |              |                                                |              |                                                                  |                 |                        |
| Applicable Standards     |                                                                                                                                                                                                                                                                                         | UL 61800-5-1, CSA C22.2 No.274, EN 50178, EN 61800-5-1, EN 55011 group 1 class A, EN 61000-6-2, EN 61000-6-4, EN 61800-3, IEC 61508-1 to 4, IEC 61800-5-2, IEC 62061, ISO 13849-1, and IEC 61326-3-1                                                                                              |          |                         |              |                                                |              |                                                                  |                 |                        |
| Mounting                 |                                                                                                                                                                                                                                                                                         | <table><tr><th>Mounting</th><th>SERVOPACK Model: SGD7S-</th></tr><tr><td>Base-mounted</td><td>All Models</td></tr><tr><td>Rack-mounted</td><td>R70A, R90A, 1R6A, 2R8A, 3R8A, 5R5A, 7R6A, 120A, 180A, 200A, 330A</td></tr><tr><td>Duct-ventilated</td><td>470A, 550A, 590A, 780A</td></tr></table> | Mounting | SERVOPACK Model: SGD7S- | Base-mounted | All Models                                     | Rack-mounted | R70A, R90A, 1R6A, 2R8A, 3R8A, 5R5A, 7R6A, 120A, 180A, 200A, 330A | Duct-ventilated | 470A, 550A, 590A, 780A |
| Mounting                 | SERVOPACK Model: SGD7S-                                                                                                                                                                                                                                                                 |                                                                                                                                                                                                                                                                                                   |          |                         |              |                                                |              |                                                                  |                 |                        |
| Base-mounted             | All Models                                                                                                                                                                                                                                                                              |                                                                                                                                                                                                                                                                                                   |          |                         |              |                                                |              |                                                                  |                 |                        |
| Rack-mounted             | R70A, R90A, 1R6A, 2R8A, 3R8A, 5R5A, 7R6A, 120A, 180A, 200A, 330A                                                                                                                                                                                                                        |                                                                                                                                                                                                                                                                                                   |          |                         |              |                                                |              |                                                                  |                 |                        |
| Duct-ventilated          | 470A, 550A, 590A, 780A                                                                                                                                                                                                                                                                  |                                                                                                                                                                                                                                                                                                   |          |                         |              |                                                |              |                                                                  |                 |                        |
| Performance              | Speed Control Range                                                                                                                                                                                                                                                                     | 1:5000 (At the rated torque, the lower limit of the speed control range must not cause the Servo Motor to stop.)                                                                                                                                                                                  |          |                         |              |                                                |              |                                                                  |                 |                        |
|                          | Coefficient of Speed Fluctuation <sup>*2</sup>                                                                                                                                                                                                                                          | ±0.01% of rated speed max. (for a load fluctuation of 0% to 100%)                                                                                                                                                                                                                                 |          |                         |              |                                                |              |                                                                  |                 |                        |
|                          |                                                                                                                                                                                                                                                                                         | 0% of rated speed max. (for a voltage fluctuation of ±10%)                                                                                                                                                                                                                                        |          |                         |              |                                                |              |                                                                  |                 |                        |
|                          |                                                                                                                                                                                                                                                                                         | ±0.1% of rated speed max. (for a temperature fluctuation of 25°C ±25°C)                                                                                                                                                                                                                           |          |                         |              |                                                |              |                                                                  |                 |                        |
|                          | Torque Control Precision (Repeatability)                                                                                                                                                                                                                                                | ±1%                                                                                                                                                                                                                                                                                               |          |                         |              |                                                |              |                                                                  |                 |                        |
| Soft Start Time Setting  |                                                                                                                                                                                                                                                                                         | 0 s to 10 s (Can be set separately for acceleration and deceleration.)                                                                                                                                                                                                                            |          |                         |              |                                                |              |                                                                  |                 |                        |

Continued from previous page.

| Item                                             |                                                      |                                      | Specification                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
|--------------------------------------------------|------------------------------------------------------|--------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| I/O Signals                                      | Encoder Divided Pulse Output                         |                                      | Phase A, phase B, phase C: Line-driver output<br>Number of divided output pulses: Any setting is allowed.                                                                                                                                                                                                                                                                                                                                                                                     |
|                                                  | Linear Servo Motor Over-heat Protection Signal Input |                                      | Number of input points: 1<br>Input voltage range: 0 V to +5 V                                                                                                                                                                                                                                                                                                                                                                                                                                 |
|                                                  | Sequence Input Signals                               | Input Signals That Can Be Allocated  | Allowable voltage range: 24 VDC ±20%<br>Number of input points: 7                                                                                                                                                                                                                                                                                                                                                                                                                             |
|                                                  |                                                      |                                      | Input method: Sink inputs or source inputs<br>Input Signals: <ul style="list-style-type: none"><li>• Origin Return Deceleration Switch (/DEC)</li><li>• External Latch 1 to 3 (/EXT 1 to 3)</li><li>• Forward Drive Prohibit (P-OT) and Reverse Drive Prohibit (N-OT)</li><li>• Forward External Torque Limit (/P-CL) and Reverse External Torque Limit (/N-CL)</li><li>• Polarity Detection (/P-DET)</li></ul> A signal can be allocated and the positive and negative logic can be changed. |
|                                                  | Sequence Output Signals                              | Fixed Output                         | Allowable voltage range: 5 VDC to 30 VDC<br>Number of output points: 1<br>Output signal: Servo Alarm (ALM)                                                                                                                                                                                                                                                                                                                                                                                    |
|                                                  |                                                      | Output Signals That Can Be Allocated | Allowable voltage range: 5 VDC to 30 VDC<br>Number of output points: 3<br>(A photocoupler output (isolated) is used.)                                                                                                                                                                                                                                                                                                                                                                         |
|                                                  |                                                      |                                      | Output Signals: <ul style="list-style-type: none"><li>• Positioning Completion (/COIN)</li><li>• Speed Coincidence Detection (/V-CMP)</li><li>• Rotation Detection (/TGON)</li><li>• Servo Ready Output (/S-RDY)</li><li>• Torque Limit Detection (/CLT)</li><li>• Speed Limit Detection (/VLT)</li><li>• Brake (/BK)</li><li>• Warning Output (/WARN)</li><li>• Near Output (/NEAR)</li></ul> A signal can be allocated and the positive and negative logic can be changed.                  |
| Communications                                   | RS-422A Communications (CN3)                         | Interfaces                           | Digital Operator (JUSP-OP05A-1-E) and personal computer (with SigmaWin+)                                                                                                                                                                                                                                                                                                                                                                                                                      |
|                                                  |                                                      | 1:N Communications                   | Up to N = 15 stations possible for RS-422A port                                                                                                                                                                                                                                                                                                                                                                                                                                               |
|                                                  |                                                      | Axis Address Setting                 | Set with parameters.                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|                                                  | USB Communications (CN7)                             | Interface                            | Personal computer (with SigmaWin+)                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
|                                                  |                                                      | Communications Standard              | Conforms to USB2.0 standard (12 Mbps).                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| Displays/Indicators                              |                                                      |                                      | CHARGE, PWR, COM, L1, and L2 indicators, and one-digit seven-segment display                                                                                                                                                                                                                                                                                                                                                                                                                  |
| MECHATROLINK-III Communications                  | Communications Protocol                              |                                      | MECHATROLINK-III                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
|                                                  | Station Address Settings                             |                                      | 03 to EF hex (maximum number of slaves: 62)<br>The rotary switches (S1 and S2) are used to set the station address.                                                                                                                                                                                                                                                                                                                                                                           |
|                                                  | Baud Rate                                            |                                      | 100 Mbps                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
|                                                  | Transmission Cycle                                   |                                      | 125 μs, 250 μs, 500 μs, 750 μs,<br>1.0 ms to 4.0 ms (multiples of 0.5 ms)                                                                                                                                                                                                                                                                                                                                                                                                                     |
|                                                  | Number of Transmission Bytes                         |                                      | 32 or 48 bytes/station<br>A DIP switch (S3) is used to select the number of transmission bytes.                                                                                                                                                                                                                                                                                                                                                                                               |
| Reference Method                                 | Performance                                          |                                      | Position, speed, or torque control with MECHATROLINK-III communications                                                                                                                                                                                                                                                                                                                                                                                                                       |
|                                                  | Reference Input                                      |                                      | MECHATROLINK-III commands (sequence, motion, data setting, data access, monitoring, adjustment, etc.)                                                                                                                                                                                                                                                                                                                                                                                         |
|                                                  | Profile                                              |                                      | MECHATROLINK-III standard servo profile                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| MECHATROLINK-III Communications Setting Switches |                                                      |                                      | Rotary switch (S1 and S2) positions: 16                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
|                                                  |                                                      |                                      | Number of DIP switch (S3) pins: 4                                                                                                                                                                                                                                                                                                                                                                                                                                                             |



Continued from previous page.

| Item                       |                                    | Specification                                                                                                                                                                                                       |
|----------------------------|------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Analog Monitor (CN5)       |                                    | Number of points: 2<br>Output voltage range: ±10 VDC (effective linearity range: ±8 V)<br>Resolution: 16 bits<br>Accuracy: ±20 mV (Typ)<br>Maximum output current: ±10 mA<br>Settling time (±1%): 1.2 ms (Typ)      |
| Dynamic Brake (DB)         |                                    | Activated when a servo alarm or overtravel (OT) occurs, or when the power supply to the main circuit or servo is OFF.                                                                                               |
| Regenerative Processing    |                                    | Built-in (An external resistor must be connected to the SGD7S-470A to -780A.)<br> <b>Built-In Regenerative Resistor (page 609)</b> |
| Overtravel (OT) Prevention |                                    | Stopping with dynamic brake, deceleration to a stop, or coasting to a stop for the P-OT (Forward Drive Prohibit) or N-OT (Reverse Drive Prohibit) signal                                                            |
| Protective Functions       |                                    | Overcurrent, overvoltage, low voltage, overload, regeneration error, etc.                                                                                                                                           |
| Utility Functions          |                                    | Gain adjustment, alarm history, jogging, origin search, etc.                                                                                                                                                        |
| Safety Functions           | Inputs                             | /HWBB1 and /HWBB2: Base block signals for Power Modules                                                                                                                                                             |
|                            | Output                             | EDM1: Monitors the status of built-in safety circuit (fixed output).                                                                                                                                                |
|                            | Applicable Standards <sup>*3</sup> | ISO13849-1 PLe (Category 3), IEC61508 SIL3                                                                                                                                                                          |
| Option Module              |                                    | Fully-Closed Modules and Safety Modules<br>Note: You cannot use a Fully-Closed Module and a Safety Module together.                                                                                                 |

\*1. If you combine a Σ-7-Series SERVOPACK with a Σ-V-Series Option Module, the following Σ-V-Series SERVOPACKs specifications must be used: a surrounding air temperature of 0°C to 55°C and an altitude of 1,000 m max. Also, the applicable range cannot be increased by derating.

\*2. The coefficient of speed fluctuation for load fluctuation is defined as follows:

$$\text{Coefficient of speed fluctuation} = \frac{\text{No-load motor speed} - \text{Total-load motor speed}}{\text{Rated motor speed}} \times 100\%$$

\*3. Always perform risk assessment for the system and confirm that the safety requirements are met.

## Specifications (400 V Models)

| Item                     |                                                | Specification                                                                                                                                                                                                                                                                                 |
|--------------------------|------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Drive Method             |                                                | IGBT-based PWM control, sine wave current drive                                                                                                                                                                                                                                               |
| Feedback                 | With Rotary Servo Motor                        | Serial encoder: 24 bits (incremental encoder/absolute encoder)                                                                                                                                                                                                                                |
|                          | With Linear Servo Motor                        | <ul style="list-style-type: none"> <li>Absolute linear encoder (The signal resolution depends on the absolute linear encoder.)</li> <li>Incremental linear encoder (The signal resolution depends on the incremental linear encoder or Serial Converter Unit.)</li> </ul>                     |
| Environmental Conditions | Surrounding Air Temperature* <sup>1</sup>      | -5°C to 55°C (60°C with derating)<br>However the range for the SGD7S-370D is -5°C to 40°C<br>Refer to the following section for derating specifications.<br> <b>Specifications (400 V Models) (page 486)</b> |
|                          | Storage Temperature                            | -20°C to 85°C                                                                                                                                                                                                                                                                                 |
|                          | Surrounding Air Humidity                       | 95% relative humidity max. (with no freezing or condensation)                                                                                                                                                                                                                                 |
|                          | Storage Humidity                               | 95% relative humidity max. (with no freezing or condensation)                                                                                                                                                                                                                                 |
|                          | Vibration Resistance                           | 4.9 m/s <sup>2</sup>                                                                                                                                                                                                                                                                          |
|                          | Shock Resistance                               | 19.6 m/s <sup>2</sup>                                                                                                                                                                                                                                                                         |
|                          | Degree of Protection                           | IP10                                                                                                                                                                                                                                                                                          |
|                          | Pollution Degree                               | 2 <ul style="list-style-type: none"> <li>Must be no corrosive or flammable gases.</li> <li>Must be no exposure to water, oil, or chemicals.</li> <li>Must be no dust, salts, or iron dust.</li> </ul>                                                                                         |
|                          | Altitude* <sup>1</sup>                         | 1,000 m or less.<br>With derating, usage is possible between 1,000 m and 2,000 m.<br>Refer to the following section for derating specifications.<br> <b>Specifications (400 V Models) (page 486)</b>       |
|                          | Others                                         | Do not use the SERVOPACK in the following locations: Locations subject to static electricity noise, strong electromagnetic/magnetic fields, or radioactivity                                                                                                                                  |
| Applicable Standards     |                                                | UL 61800-5-1, CSA C22.2 No.274, EN 50178, EN 61800-5-1, EN 55011 group 1 class A, EN 61000-6-2, EN 61000-6-4, EN 61800-3, IEC 61508-1 to 4, IEC 61800-5-2, IEC 62061, ISO 13849-1, and IEC 61326-3-1                                                                                          |
| Mounting                 |                                                | Base-mounted                                                                                                                                                                                                                                                                                  |
| Performance              | Speed Control Range                            | 1:5000 (At the rated torque, the lower limit of the speed control range must not cause the Servo Motor to stop.)                                                                                                                                                                              |
|                          | Coefficient of Speed Fluctuation* <sup>2</sup> | ±0.01% of rated speed max. (for a load fluctuation of 0% to 100%)                                                                                                                                                                                                                             |
|                          |                                                | 0% of rated speed max. (for a voltage fluctuation of ±10%)                                                                                                                                                                                                                                    |
|                          |                                                | ±0.1% of rated speed max. (for a temperature fluctuation of 25°C ±25°C)                                                                                                                                                                                                                       |
|                          | Torque Control Precision (Repeatability)       | ±1%                                                                                                                                                                                                                                                                                           |
|                          | Soft Start Time Setting                        | 0 s to 10 s (Can be set separately for acceleration and deceleration.)                                                                                                                                                                                                                        |

Continued from previous page.

| Item                             |                                                      |                                        | Specification                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
|----------------------------------|------------------------------------------------------|----------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| I/O Signals                      | Encoder Divided Pulse Output                         |                                        | Phase A, phase B, phase C: Line-driver output<br>Number of divided output pulses: Any setting is allowed.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|                                  | Linear Servo Motor Over-heat Protection Signal Input |                                        | Number of input points: 1<br>Input voltage range: 0 V to +5 V                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
|                                  | Sequence Input Signals                               | Input Signals That Can Be Allocated    | Allowable voltage range: 24 VDC $\pm$ 20%<br>Number of input points: 7                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
|                                  |                                                      |                                        | Input method: Sink inputs or source inputs<br>Input Signals: <ul style="list-style-type: none"><li>• P-OT (Forward Drive Prohibit) and N-OT (Reverse Drive Prohibit) signals</li><li>• /Probe1 (Probe 1 Latch Input) signal</li><li>• /Probe2 (Probe 2 Latch Input) signal</li><li>• /Home (Home Switch Input) signal</li><li>• /P-CL (Forward External Torque Limit) and /N-CL (Reverse External Torque Limit) signals</li><li>• /SI0 and /SI3 (General-Purpose Input) signals</li></ul> A signal can be allocated and the positive and negative logic can be changed.                                                                                                                                                                                                                                                                                                            |
|                                  | Sequence Output Signals                              | Fixed Output                           | Allowable voltage range: 5 VDC to 30 VDC<br>Number of output points: 1<br>Output signal: Servo Alarm (ALM)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
|                                  |                                                      | Output Signals That Can Be Allocated   | Allowable voltage range: 5 VDC to 30 VDC<br>Number of output points: 5<br>(A photocoupler output (isolated) is used.)<br>Output Signals: <ul style="list-style-type: none"><li>• /COIN (Positioning Completion) signal</li><li>• /V-CMP (Speed Coincidence Detection) signal</li><li>• /TGON (Rotation Detection) signal</li><li>• /S-RDY (Servo Ready) signal</li><li>• /CLT (Torque Limit Detection) signal</li><li>• /VLT (Speed Limit Detection) signal</li><li>• /BK (Brake) signal</li><li>• /WARN (Warning) signal</li><li>• /NEAR (Near) signal</li><li>• /ZONE0 (ZONE Signal 1 Output) signal</li><li>• /ZONE1 (ZONE Signal 2 Output) signal</li><li>• /ZONE2 (ZONE Signal 3 Output) signal</li><li>• /ZONE3 (ZONE Signal 4 Output) signal</li><li>• /nZONE (nZONE output) signal</li></ul> A signal can be allocated and the positive and negative logic can be changed. |
| Communications                   | RS-422A Communications (CN3)                         | Interfaces                             | Digital Operator (JUSP-OP05A-1-E)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
|                                  |                                                      | 1:N Communications                     | Up to N = 15 stations possible for RS-422A port                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
|                                  |                                                      | Axis Address Setting                   | Set with parameters.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
|                                  | USB Communications (CN7)                             | Interface                              | Personal Computer (with SigmaWin+)<br>The software version of the SigmaWin+ must be version 7.11 or higher.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| Communications Standard          |                                                      | Conforms to USB2.0 standard (12 Mbps). |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| Displays/Indicators              |                                                      |                                        | CHARGE, PWR, COM, L1, and L2 indicators, and one-digit seven-segment display                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| MECHA-TROLINK-III Communications | Communications Protocol                              |                                        | MECHATROLINK-III                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
|                                  | Station Address Settings                             |                                        | 03 to EF hex (maximum number of slaves: 62)<br>The rotary switches (S1 and S2) are used to set the station address.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|                                  | Baud Rate                                            |                                        | 100 Mbps                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
|                                  | Transmission Cycle                                   |                                        | 125 $\mu$ s, 250 $\mu$ s, 500 $\mu$ s, 750 $\mu$ s,<br>1.0 ms to 4.0 ms (multiples of 0.5 ms)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
|                                  | Number of Transmission Bytes                         |                                        | 32 or 48 bytes/station<br>A DIP switch (S3) is used to select the number of transmission bytes.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |

## SERVOPACKs

### Σ-7S Single-axis MECHATROLINK-III Communications Reference SERVOPACKs

Continued from previous page.

| Item                                             |                        | Specification                                                                                                                                                                                                       |
|--------------------------------------------------|------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Reference Method                                 | Performance            | Position, speed, or torque control with MECHATROLINK-III communications                                                                                                                                             |
|                                                  | Reference Input        | MECHATROLINK-III commands (sequence, motion, data setting, data access, monitoring, adjustment, etc.)                                                                                                               |
|                                                  | Profile                | MECHATROLINK-III standard servo profile                                                                                                                                                                             |
| MECHATROLINK-III Communications Setting Switches |                        | Rotary switch (S1 and S2) positions: 16                                                                                                                                                                             |
|                                                  |                        | Number of DIP switch (S3) pins: 4                                                                                                                                                                                   |
| Analog Monitor (CN5)                             |                        | Number of points: 2<br>Output voltage range: ±10 VDC (effective linearity range: ±8 V)<br>Resolution: 16 bits<br>Accuracy: ±20 mV (Typ)<br>Maximum output current: ±10 mA<br>Settling time (±1%): 1.2 ms (Typ)      |
| Dynamic Brake (DB)                               |                        | Activated when a servo alarm or overtravel (OT) occurs, or when the power supply to the main circuit or servo is OFF.                                                                                               |
| Regenerative Processing                          |                        | Built-in (An external resistor must be connected to the SGD7S-470A to -780A.)<br> <b>Built-In Regenerative Resistor (page 609)</b> |
| Overtravel (OT) Prevention                       |                        | Stopping with dynamic brake, deceleration to a stop, or coasting to a stop for the P-OT (Forward Drive Prohibit) or N-OT (Reverse Drive Prohibit) signal                                                            |
| Protective Functions                             |                        | Overcurrent, overvoltage, low voltage, overload, regeneration error, etc.                                                                                                                                           |
| Utility Functions                                |                        | Gain adjustment, alarm history, jogging, origin search, etc.                                                                                                                                                        |
| Safety Functions                                 | Inputs                 | /HWBB1 and /HWBB2: Base block signals for Power Modules                                                                                                                                                             |
|                                                  | Output                 | EDM1: Monitors the status of built-in safety circuit (fixed output).                                                                                                                                                |
|                                                  | Applicable Standards*3 | ISO13849-1 PLe (Category 3), IEC61508 SIL3                                                                                                                                                                          |
| Option Module                                    |                        | Fully-Closed Modules                                                                                                                                                                                                |

\*1. If you combine a Σ-7-Series SERVOPACK with a Σ-V-Series Option Module, the surrounding air temperature of 0°C to 55°C and an altitude of 1,000 m max. must be used. Also, the applicable range cannot be increased by derating.

\*2. The coefficient of speed fluctuation for load fluctuation is defined as follows:

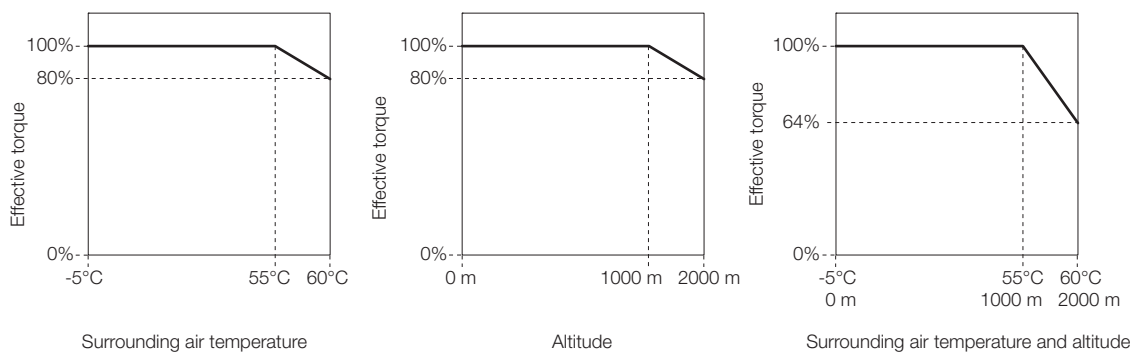
$$\text{Coefficient of speed fluctuation} = \frac{\text{No-load motor speed} - \text{Total-load motor speed}}{\text{Rated motor speed}} \times 100\%$$

\*3. Always perform risk assessment for the system and confirm that the safety requirements are met.

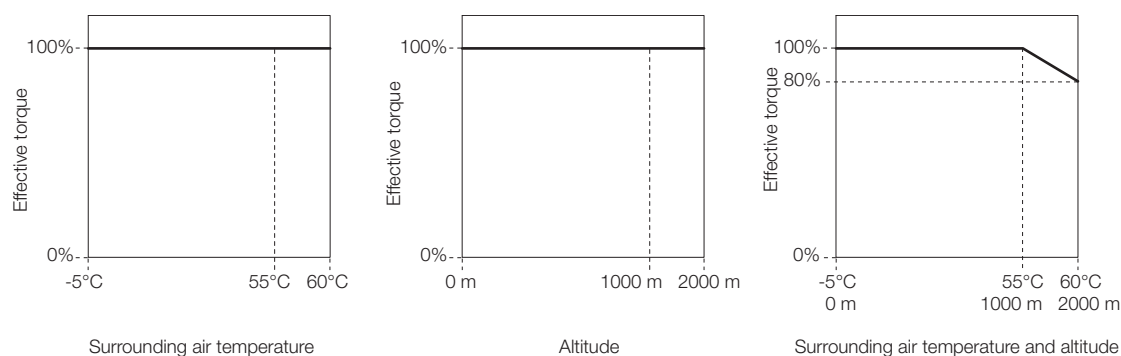
## Derating Specifications

If you use the SERVOPACK at a surrounding air temperature of 55°C to 60°C or at an altitude of 1,000 m to 2,000 m, you must apply the derating rates given in the following graphs.

### ◆ SGD7S-R70A, -R90A, -1R6A, and -2R8A



### ◆ SGD7S-3R8A, -5R5A, -7R6A, -120A, -180A, -200A, -330A, -470A, -550A, -590A, and -780A



# Σ-7S Single-axis EtherCAT Communications Reference SERVOPACKs

## Model Designations

SGD7S - R70 A A0 A 000 F64

Σ-7 Series  
Σ-7S SERVOPACKs

1st+2nd+3rd digits

4th digit

5th+6th digits

7th digit

8th+9th+10th digits

11th+12th+13th digits

1st+2nd+3rd digits Maximum Applicable Motor Capacity

| Voltage               | Code              | Specification |
|-----------------------|-------------------|---------------|
| Three-phase, 200 VAC  | R70* <sup>1</sup> | 0.05 kW       |
|                       | R90* <sup>1</sup> | 0.1 kW        |
|                       | 1R6* <sup>1</sup> | 0.2 kW        |
|                       | 2R8* <sup>1</sup> | 0.4 kW        |
|                       | 3R8               | 0.5 kW        |
|                       | 5R5* <sup>1</sup> | 0.75 kW       |
|                       | 7R6               | 1.0 kW        |
|                       | 120* <sup>3</sup> | 1.5 kW        |
|                       | 180               | 2.0 kW        |
|                       | 200               | 3.0 kW        |
|                       | 330               | 5.0 kW        |
|                       | 470               | 6.0 kW        |
|                       | 550               | 7.5 kW        |
|                       | 590               | 11 kW         |
| Single-phase, 100 VAC | 780               | 15 kW         |
|                       | R70               | 0.05 kW       |
|                       | R90               | 0.1 kW        |
|                       | 2R1               | 0.2 kW        |
|                       | 2R8               | 0.4 kW        |

| Voltage              | Code               | Specification |
|----------------------|--------------------|---------------|
| Three-phase, 400 VAC | 1R9                | 0.5 kW        |
|                      | 3R5                | 1.0 kW        |
|                      | 5R4                | 1.5 kW        |
|                      | 8R4                | 2.0 kW        |
|                      | 120                | 3.0 kW        |
|                      | 170                | 5.0 kW        |
|                      | 210 * <sup>4</sup> | 6.0 kW        |
|                      | 260 * <sup>4</sup> | 7.5 kW        |
|                      | 280 * <sup>4</sup> | 11 kW         |
|                      | 370 * <sup>4</sup> | 15 kW         |

4th digit Voltage

| Code | Specification |
|------|---------------|
| D    | 400 VAC       |
| A    | 200 VAC       |
| F    | 100 VAC       |

Shaded items are non-stock

5th+6th digits Interface\*<sup>2</sup>

| Code | Specification                     |
|------|-----------------------------------|
| A0   | EtherCAT communications reference |

7th digit Design Revision Order

| Code | Specification                   |
|------|---------------------------------|
| A    | Global Design Revision for 200V |
| B    | Global Design Revision for 400V |

8th+9th+10th digits

Hardware Options (400V Models ONLY)

| Code | Specification                |
|------|------------------------------|
| 000  | Without options              |
| 026  | With relay for holding brake |

11th+12th+13th digits

FT/EX Spec (400V Models ONLY)

| Code | Specification   |
|------|-----------------|
| 000  | Without options |
| F64  | Zone Table      |

Note: F64 options is standard for 400V amps and not available for 200V amps.

\*1. You can use these models with either a single-phase or three-phase power supply input..

\*2. The same SERVOPACKs are used for both Rotary Servo Motors and Linear Servo Motors.

\*3. A model with a single-phase, 200-VAC power supply input is available as a hardware option (model: SGD7S-120AA0A008).

\*4. These SERVOPACKs do not have an integrated Dynamic Brake Circuit. Please refer to page 611 for more information on Sigma-7 400V Dynamic Brake Resistors.

## Ratings and Specifications

### Ratings

#### ◆ Single-phase, 100 VAC

| Model SGD7S-                                |                                                    | R70F                                       | R90F | 2R1F | 2R8F |
|---------------------------------------------|----------------------------------------------------|--------------------------------------------|------|------|------|
| Maximum Applicable Motor Capacity [kW]      |                                                    | 0.05                                       | 0.1  | 0.2  | 0.4  |
| Continuous Output Current [Arms]            |                                                    | 0.66                                       | 0.91 | 2.1  | 2.8  |
| Instantaneous Maximum Output Current [Arms] |                                                    | 2.1                                        | 3.2  | 6.5  | 9.3  |
| Main Circuit                                | Power Supply                                       | 100 VAC to 120 VAC, -15% to +10%, 50/60 Hz |      |      |      |
|                                             | Input Current [Arms]*                              | 1.5                                        | 2.5  | 5    | 10   |
| Control Power Supply                        |                                                    | 100 VAC to 120 VAC, -15% to +10%, 50/60 Hz |      |      |      |
| Power Supply Capacity [kVA]*                |                                                    | 0.2                                        | 0.3  | 0.6  | 1.4  |
| Power Loss*                                 | Main Circuit Power Loss [W]                        | 5.3                                        | 7.8  | 14.2 | 26.2 |
|                                             | Control Circuit Power Loss [W]                     | 12                                         | 12   | 12   | 12   |
|                                             | Total Power Loss [W]                               | 17.3                                       | 19.8 | 26.2 | 38.2 |
| Regenerative Resistor                       | Minimum Allowable External Resistance [ $\Omega$ ] | 40                                         | 40   | 40   | 40   |
| Overvoltage Category                        |                                                    | III                                        |      |      |      |

\* This is the net value at the rated load.

#### ◆ Three-phase, 200 VAC

| Model SGD7S-                                |                                                    | R70<br>A                                      | R90<br>A | 1R6<br>A | 2R8<br>A | 3R8<br>A | 5R5<br>A | 7R6<br>A | 120A | 180A  | 200A  | 330A  |
|---------------------------------------------|----------------------------------------------------|-----------------------------------------------|----------|----------|----------|----------|----------|----------|------|-------|-------|-------|
| Maximum Applicable Motor Capacity [kW]      |                                                    | 0.05                                          | 0.1      | 0.2      | 0.4      | 0.5      | 0.75     | 1.0      | 1.5  | 2.0   | 3.0   | 5.0   |
| Continuous Output Current [Arms]            |                                                    | 0.66                                          | 0.91     | 1.6      | 2.8      | 3.8      | 5.5      | 7.6      | 11.6 | 18.5  | 19.6  | 32.9  |
| Instantaneous Maximum Output Current [Arms] |                                                    | 2.1                                           | 3.2      | 5.9      | 9.3      | 11       | 16.9     | 17       | 28   | 42    | 56    | 84.0  |
| Main Circuit                                | Power Supply                                       | 200 VAC to 240 VAC, -15% to +10%, 50 Hz/60 Hz |          |          |          |          |          |          |      |       |       |       |
|                                             | Input Current [Arms]*                              | 0.4                                           | 0.8      | 1.3      | 2.5      | 3.0      | 4.1      | 5.7      | 7.3  | 10    | 15    | 25    |
| Control Power Supply                        |                                                    | 200 VAC to 240 VAC, -15% to +10%, 50 Hz/60 Hz |          |          |          |          |          |          |      |       |       |       |
| Power Supply Capacity [kVA]*                |                                                    | 0.2                                           | 0.3      | 0.5      | 1.0      | 1.3      | 1.6      | 2.3      | 3.2  | 4.0   | 5.9   | 7.5   |
| Power Loss*                                 | Main Circuit Power Loss [W]                        | 5.1                                           | 7.3      | 13.5     | 24.0     | 20.1     | 43.8     | 53.6     | 65.8 | 111.9 | 113.8 | 263.7 |
|                                             | Control Circuit Power Loss [W]                     | 17                                            | 17       | 17       | 17       | 17       | 17       | 17       | 22   | 22    | 22    | 27    |
|                                             | Built-in Regenerative Resistor Power Loss [W]      | —                                             | —        | —        | —        | 8        | 8        | 8        | 10   | 16    | 16    | 36.0  |
|                                             | Total Power Loss [W]                               | 22.1                                          | 24.3     | 30.5     | 41.0     | 45.1     | 68.8     | 78.6     | 97.8 | 149.9 | 151.8 | 326.7 |
| Regenerative Resistor                       | Built-In Regenerative Resistor                     | Resistance [ $\Omega$ ]                       | —        | —        | —        | 40       | 40       | 40       | 20   | 12    | 12    | 8     |
|                                             |                                                    | Capacity [W]                                  | —        | —        | —        | 40       | 40       | 40       | 60   | 60    | 60    | 180   |
|                                             | Minimum Allowable External Resistance [ $\Omega$ ] |                                               | 40       | 40       | 40       | 40       | 40       | 40       | 20   | 12    | 12    | 8     |
| Overvoltage Category                        |                                                    | III                                           |          |          |          |          |          |          |      |       |       |       |

\* This is the net value at the rated load.

## SERVOPACKs

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| Model SGD7S-                                |                                                    | 470A                                          | 550A               | 590A               | 780A               |
|---------------------------------------------|----------------------------------------------------|-----------------------------------------------|--------------------|--------------------|--------------------|
| Maximum Applicable Motor Capacity [kW]      |                                                    | 6.0                                           | 7.5                | 11                 | 15                 |
| Continuous Output Current [Arms]            |                                                    | 46.9                                          | 54.7               | 58.6               | 78.0               |
| Instantaneous Maximum Output Current [Arms] |                                                    | 110                                           | 130                | 140                | 170                |
| Main Circuit                                | Power Supply                                       | 200 VAC to 240 VAC, -15% to +10%, 50 Hz/60 Hz |                    |                    |                    |
|                                             | Input Current [Arms]* <sup>1</sup>                 | 29                                            | 37                 | 54                 | 73                 |
| Control Power Supply                        |                                                    | 200 VAC to 240 VAC, -15% to +10%, 50 Hz/60 Hz |                    |                    |                    |
| Power Supply Capacity [kVA]]* <sup>1</sup>  |                                                    | 10.7                                          | 14.6               | 21.7               | 29.6               |
| Power Loss]* <sup>1</sup>                   | Main Circuit Power Loss [W]                        | 279.4                                         | 357.8              | 431.7              | 599.0              |
|                                             | Control Circuit Power Loss [W]                     | 33                                            | 33                 | 48                 | 48                 |
|                                             | External Regenerative Resistor Unit Power Loss [W] | 180* <sup>2</sup>                             | 180* <sup>3</sup>  | 350* <sup>3</sup>  | 350* <sup>3</sup>  |
|                                             | Total Power Loss [W]                               | 312.4                                         | 390.8              | 479.7              | 647.0              |
| External Regenerative Resistor Unit         | External Regenerative Resistor Unit                | Resistance [Ω]                                | 6.25* <sup>2</sup> | 3.13* <sup>3</sup> | 3.13* <sup>3</sup> |
|                                             |                                                    | Capacity [W]                                  | 880* <sup>2</sup>  | 1760* <sup>3</sup> | 1760* <sup>3</sup> |
|                                             | Minimum Allowable External Resistance [Ω]          |                                               | 5.8                | 2.9                | 2.9                |
| Overvoltage Category                        |                                                    | III                                           |                    |                    |                    |

\*1. This is the net value at the rated load.

\*2. This value is for the optional JUSP-RA04-E Regenerative Resistor Unit.

\*3. This value is for the optional JUSP-RA05-E Regenerative Resistor Unit.

### ◆ Single-phase, 200 VAC

| Model SGD7S-                                |                                               | R70A                                          | R90A | 1R6A | 2R8A | 5R5A |
|---------------------------------------------|-----------------------------------------------|-----------------------------------------------|------|------|------|------|
| Maximum Applicable Motor Capacity [kW]      |                                               | 0.05                                          | 0.1  | 0.2  | 0.4  | 0.75 |
| Continuous Output Current [Arms]            |                                               | 0.66                                          | 0.91 | 1.6  | 2.8  | 5.5  |
| Instantaneous Maximum Output Current [Arms] |                                               | 2.1                                           | 3.2  | 5.9  | 9.3  | 16.9 |
| Main Circuit                                | Power Supply                                  | 200 VAC to 240 VAC, -15% to +10%, 50 Hz/60 Hz |      |      |      |      |
|                                             | Input Current [Arms]*                         | 0.8                                           | 1.6  | 2.4  | 5.0  | 8.7  |
| Control Power Supply                        |                                               | 200 VAC to 240 VAC, -15% to +10%, 50 Hz/60 Hz |      |      |      |      |
| Power Supply Capacity [kVA]*                |                                               | 0.2                                           | 0.3  | 0.6  | 1.2  | 1.9  |
| Power Loss*                                 | Main Circuit Power Loss [W]                   | 5.1                                           | 7.3  | 13.5 | 24.0 | 43.8 |
|                                             | Control Circuit Power Loss [W]                | 17                                            | 17   | 17   | 17   | 17   |
|                                             | Built-in Regenerative Resistor Power Loss [W] | —                                             | —    | —    | —    | 8    |
|                                             | Total Power Loss [W]                          | 22.1                                          | 24.3 | 30.5 | 41.0 | 68.8 |
| Regenerative Resistor                       | Built-In Regenerative Resistor                | Resistance [Ω]                                | —    | —    | —    | 40   |
|                                             |                                               | Capacity [W]                                  | —    | —    | —    | 40   |
|                                             | Minimum Allowable External Resistance [Ω]     |                                               | 40   | 40   | 40   | 40   |
| Overvoltage Category                        |                                               | III                                           |      |      |      |      |

\* This is the net value at the rated load.



## ◆ 270 VDC

| Model SGD7S-                                |                                | R70A                             | R90A | 1R6A | 2R8A | 3R8A | 5R5A | 7R6A | 120A |
|---------------------------------------------|--------------------------------|----------------------------------|------|------|------|------|------|------|------|
| Maximum Applicable Motor Capacity [kW]      |                                | 0.05                             | 0.1  | 0.2  | 0.4  | 0.5  | 0.75 | 1.0  | 1.5  |
| Continuous Output Current [Arms]            |                                | 0.66                             | 0.91 | 1.6  | 2.8  | 3.8  | 5.5  | 7.6  | 11.6 |
| Instantaneous Maximum Output Current [Arms] |                                | 2.1                              | 3.2  | 5.9  | 9.3  | 11.0 | 16.9 | 17.0 | 28.0 |
| Main Circuit                                | Power Supply                   | 270 VDC to 324 VDC, -15% to +10% |      |      |      |      |      |      |      |
|                                             | Input Current [Arms]*          | 0.5                              | 1.0  | 1.5  | 3.0  | 3.8  | 4.9  | 6.9  | 11   |
| Control Power Supply                        |                                | 270 VDC to 324 VDC, -15% to +10% |      |      |      |      |      |      |      |
| Power Supply Capacity [kVA]*                |                                | 0.2                              | 0.3  | 0.6  | 1    | 1.4  | 1.6  | 2.3  | 3.2  |
| Power Loss*                                 | Main Circuit Power Loss [W]    | 4.6                              | 6.3  | 11.7 | 20.2 | 16.9 | 37.9 | 46.0 | 53.2 |
|                                             | Control Circuit Power Loss [W] | 17                               | 17   | 17   | 17   | 17   | 17   | 17   | 22   |
|                                             | Total Power Loss [W]           | 21.6                             | 23.3 | 28.7 | 37.2 | 33.9 | 54.9 | 63.0 | 75.2 |
| Overvoltage Category                        |                                | III                              |      |      |      |      |      |      |      |

\* This is the net value at the rated load.

| Model SGD7S-                                |                                | 180A                             | 200A  | 330A  | 470A  | 550A  | 590A  | 780A  |
|---------------------------------------------|--------------------------------|----------------------------------|-------|-------|-------|-------|-------|-------|
| Maximum Applicable Motor Capacity [kW]      |                                | 2.0                              | 3.0   | 5.0   | 6.0   | 7.5   | 11.0  | 15.0  |
| Continuous Output Current [Arms]            |                                | 18.5                             | 19.6  | 32.9  | 46.9  | 54.7  | 58.6  | 78.0  |
| Instantaneous Maximum Output Current [Arms] |                                | 42.0                             | 56.0  | 84.0  | 110   | 130   | 140   | 170   |
| Main Circuit                                | Power Supply                   | 270 VDC to 324 VDC, -15% to +10% |       |       |       |       |       |       |
|                                             | Input Current [Arms]*          | 14                               | 20    | 34    | 36    | 48    | 68    | 92    |
| Control Power Supply                        |                                | 270 VDC to 324 VDC, -15% to +10% |       |       |       |       |       |       |
| Power Supply Capacity [kVA]*                |                                | 4.0                              | 5.9   | 7.5   | 10.7  | 14.6  | 21.7  | 29.6  |
| Power Loss*                                 | Main Circuit Power Loss [W]    | 95.8                             | 87.6  | 163.7 | 203.4 | 261.2 | 246.6 | 346.5 |
|                                             | Control Circuit Power Loss [W] | 22                               | 22    | 27    | 33    | 33    | 48    | 48    |
|                                             | Total Power Loss [W]           | 117.8                            | 109.6 | 190.7 | 236.4 | 294.2 | 294.6 | 394.5 |
| Overvoltage Category                        |                                | III                              |       |       |       |       |       |       |

\* This is the net value at the rated load.

## SERVOPACKs

### Σ-7S Single-axis EtherCAT Communications Reference SERVOPACKs

#### ◆ Three-phase, 400 VAC

| Model SGD7S-                                |                                               |                 | 1R9D                                                        | 3R5D | 5R4D  | 8R4D  | 120D  | 170D  | 210D  | 260D  | 280D  | 370D  |
|---------------------------------------------|-----------------------------------------------|-----------------|-------------------------------------------------------------|------|-------|-------|-------|-------|-------|-------|-------|-------|
| Maximum Applicable Motor Capacity [kW]      |                                               |                 | 0.5                                                         | 1    | 1.5   | 2     | 3     | 5     | 6     | 7.5   | 11    | 15    |
| Continuous Output Current [Arms]            |                                               |                 | 1.9                                                         | 3.5  | 5.4   | 8.4   | 11.9  | 16    | 20.8  | 25.7  | 28.1  | 37.2  |
| Instantaneous Maximum Output Current [Arms] |                                               |                 | 5.5                                                         | 8.5  | 14    | 21    | 28    | 42    | 55    | 65    | 70    | 85    |
| Main Circuit                                | Power Supply                                  |                 | Three-phase, 380 VAC to 480 VAC, -15%% to +10%, 50 Hz/60 Hz |      |       |       |       |       |       |       |       |       |
|                                             | Input Current [Arms]*                         |                 | 1.4                                                         | 2.9  | 4.3   | 5.8   | 8.6   | 14.5  | 17.4  | 21.7  | 31.8  | 43.4  |
| Control Power Supply                        | Power Supply                                  |                 | 24 VDC ±15%                                                 |      |       |       |       |       |       |       |       |       |
|                                             | Input Current [Arms]*                         |                 | 1.2                                                         |      |       |       |       |       | 1.4   |       | 1.5   |       |
| Power Supply Capacity [kVA]*                |                                               |                 | 1.1                                                         | 2.3  | 3.5   | 4.5   | 7.1   | 11.7  | 12.4  | 14.4  | 21.9  | 30.6  |
| Power Loss*                                 | Main Circuit Power Loss [W]                   |                 | 19.2                                                        | 30   | 62.3  | 89.4  | 136.8 | 188.7 | 188.4 | 228.5 | 278.2 | 389.8 |
|                                             | Control Circuit Power Loss [W]                |                 | 21                                                          |      |       |       |       | 22    | 28    |       | 32    |       |
|                                             | Built-in Regenerative Resistor Power Loss [W] |                 | 14                                                          | 14   | 28    | 28    | 28    | 36    | (180) |       | (240) |       |
|                                             | Total Power Loss [W]                          |                 | 54.2                                                        | 65   | 111.3 | 138.4 | 185.5 | 246.7 | 216.4 | 256.5 | 310.2 | 389.8 |
| Regenerative Resistor                       | Built-In Regenerative Resistor                | Resistance [Ω ] | 75                                                          | 75   | 75    | 43    | 43    | 27    | -     |       |       |       |
|                                             |                                               | Capacity [W]    | 70                                                          | 70   | 140   | 140   | 140   | 180   | -     |       |       |       |
|                                             | Minimum Allowable External Resistance [Ω ]    |                 | 75                                                          | 75   | 75    | 43    | 43    | 27    | 18    |       | 14.25 |       |
| Overvoltage Category                        |                                               |                 | III                                                         |      |       |       |       |       |       |       |       |       |

\* This is the net value at the rated load.

#### ◆ 540 VDC

| Model SGD7S-                                |                                               | 1R9D                           | 3R5D | 5R4D | 8R4D | 120D  | 170D  | 210D  | 260D  | 280D  | 370D  |
|---------------------------------------------|-----------------------------------------------|--------------------------------|------|------|------|-------|-------|-------|-------|-------|-------|
| Maximum Applicable Motor Capacity [kW]      |                                               | 0.5                            | 1    | 1.5  | 2    | 3     | 5     | 6     | 7.5   | 11    | 15    |
| Continuous Output Current [Arms]            |                                               | 1.9                            | 3.5  | 5.4  | 8.4  | 11.9  | 16    | 20.8  | 25.7  | 28.1  | 37.2  |
| Instantaneous Maximum Output Current [Arms] |                                               | 5.5                            | 8.5  | 14   | 21   | 28    | 42    | 55    | 65    | 70    | 85    |
| Main Circuit                                | Power Supply                                  | 513 VDC to 648 VDC, -15%, +10% |      |      |      |       |       |       |       |       |       |
|                                             | Input Current [Arms]*                         | 2                              | 3.3  | 5.5  | 6.8  | 11    | 18    | 19.6  | 26.2  | 38.3  | 47.6  |
| Control Power Supply                        | Power Supply                                  | 24 VDC ±15%                    |      |      |      |       |       |       |       |       |       |
|                                             | Input Current [Arms]*                         | 1.2                            |      |      |      |       |       | 1.4   |       | 1.5   |       |
| Power Supply Capacity [kVA]*                |                                               | 1.1                            | 2.3  | 3.5  | 4.5  | 7.1   | 11.7  | 12.4  | 14.4  | 21.9  | 30.6  |
| Power Loss*                                 | Main Circuit Power Loss [W]                   | 19.2                           | 30   | 62.3 | 89.4 | 136.8 | 188.7 | 188.4 | 228.5 | 278.2 | 389.8 |
|                                             | Control Circuit Power Loss [W]                | 21                             |      |      |      |       |       | 22    |       | 28    |       |
|                                             | Built-in Regenerative Resistor Power Loss [W] | 14                             | 14   | 28   | 28   | 28    | 36    | (180) |       | (240) |       |
|                                             | Total Power Loss [W]                          | 37.4                           | 45.4 | 69.5 | 94.7 | 131.4 | 166.5 | 216.4 | 228.5 | 310.2 | 389.8 |
| Overvoltage Category                        |                                               | III                            |      |      |      |       |       |       |       |       |       |

\* This is the net value at the rated load.

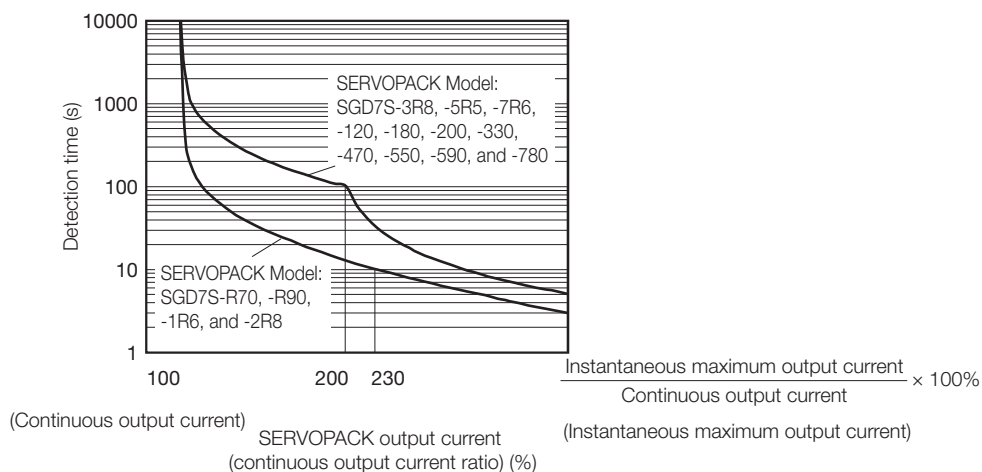
## SERVOPACK Overload Protection Characteristics (200V)

The overload detection level is set for hot start conditions with a SERVOPACK surrounding air temperature of 55°C.

An overload alarm (A.710 or A.720) will occur if overload operation that exceeds the overload protection characteristics shown in the following diagram (i.e., operation on the right side of the applicable line) is performed.

The actual overload detection level will be the detection level of the connected SERVOPACK or Servo Motor that has the lower overload protection characteristics.

In most cases, that will be the overload protection characteristics of the Servo Motor.



Note: The above overload protection characteristics do not mean that you can perform continuous duty operation with an output of 100% or higher.

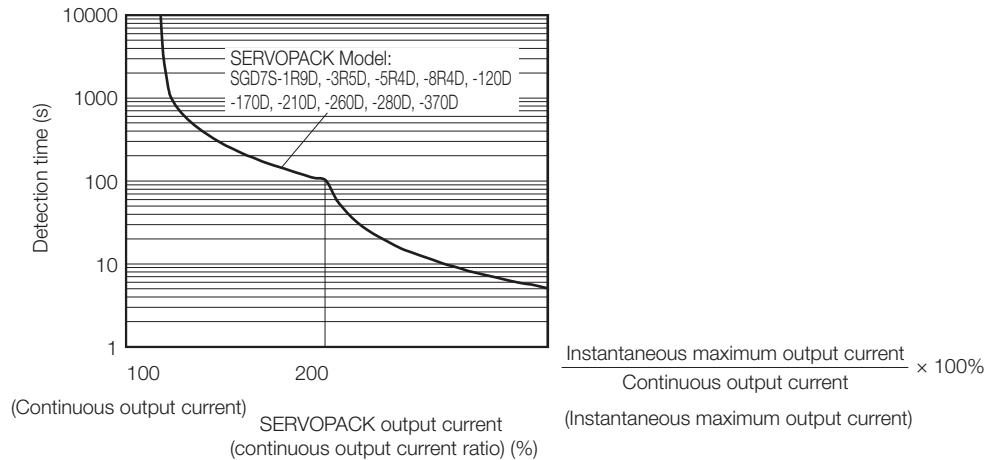
For a Yaskawa-specified combination of SERVOPACK and Servo Motor, maintain the effective torque (or effective force) within the continuous duty zone of the torque-motor speed characteristic (or force-motor speed characteristics) of the Servo Motor.

## SERVOPACK Overload Protection Characteristics (400V)

The overload detection level is set for hot start conditions with a SERVOPACK surrounding air temperature of 55°C\*.

An overload alarm (A.710 or A.720) will occur if overload operation that exceeds the overload protection characteristics shown in the following diagram (i.e., operation on the right side of the applicable line) is performed. The actual overload detection level will be the detection level of the connected SERVOPACK or Servomotor that has the lower overload protection characteristics.

In most cases, that will be the overload protection characteristics of the Servomotor.



Note: The above overload protection characteristics do not mean that you can perform continuous duty operation with an output of 100% or higher.

For a YASKAWA-specified combination of SERVOPACK and Servomotor, maintain the effective torque within the continuous duty zone of the torque-motor speed characteristic of the Servomotor.

\* However, the range for the SGD7S-370D is -5°C to 40°C.

## Specifications (200V Models)

| Item                     |                                                                                                                                                                                                                                                                                  | Specification                                                                                                                                                                                                                                                                                     |  |          |                         |              |                                                |              |                                                                  |                 |                        |
|--------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|----------|-------------------------|--------------|------------------------------------------------|--------------|------------------------------------------------------------------|-----------------|------------------------|
| Control Method           |                                                                                                                                                                                                                                                                                  | IGBT-based PWM control, sine wave current drive                                                                                                                                                                                                                                                   |  |          |                         |              |                                                |              |                                                                  |                 |                        |
| Feedback                 | With Rotary Servo Motor                                                                                                                                                                                                                                                          | Serial encoder: 20 bits or 24 bits (incremental encoder/absolute encoder)                                                                                                                                                                                                                         |  |          |                         |              |                                                |              |                                                                  |                 |                        |
|                          | With Linear Servo Motor                                                                                                                                                                                                                                                          | <ul style="list-style-type: none"><li>Absolute linear encoder (The signal resolution depends on the absolute linear encoder.)</li><li>Incremental linear encoder (The signal resolution depends on the incremental linear encoder or Serial Converter Unit.)</li></ul>                            |  |          |                         |              |                                                |              |                                                                  |                 |                        |
| Environmental Conditions | Surrounding Air Temperature <sup>*1</sup>                                                                                                                                                                                                                                        | -5°C to 55°C<br>With derating, usage is possible between 55°C and 60°C.<br>Refer to the following section for derating specifications.<br> Specifications (400 V Models) (page 501)                              |  |          |                         |              |                                                |              |                                                                  |                 |                        |
|                          | Storage Temperature                                                                                                                                                                                                                                                              | -20°C to 85°C                                                                                                                                                                                                                                                                                     |  |          |                         |              |                                                |              |                                                                  |                 |                        |
|                          | Surrounding Air Humidity                                                                                                                                                                                                                                                         | 95% relative humidity max. (with no freezing or condensation)                                                                                                                                                                                                                                     |  |          |                         |              |                                                |              |                                                                  |                 |                        |
|                          | Storage Humidity                                                                                                                                                                                                                                                                 | 95% relative humidity max. (with no freezing or condensation)                                                                                                                                                                                                                                     |  |          |                         |              |                                                |              |                                                                  |                 |                        |
|                          | Vibration Resistance                                                                                                                                                                                                                                                             | 4.9 m/s <sup>2</sup>                                                                                                                                                                                                                                                                              |  |          |                         |              |                                                |              |                                                                  |                 |                        |
|                          | Shock Resistance                                                                                                                                                                                                                                                                 | 19.6 m/s <sup>2</sup>                                                                                                                                                                                                                                                                             |  |          |                         |              |                                                |              |                                                                  |                 |                        |
|                          | Degree of Protection                                                                                                                                                                                                                                                             | <table><tr><th>Class</th><th>SERVOPACK Model: SGD7S-</th></tr><tr><td>IP20</td><td>R70A, R90A, 1R6A, 2R8A, 3R8A, 5R5A, 7R6A, 120A</td></tr><tr><td>IP10</td><td>180A, 200A, 330A, 470A, 550A, 590A, 780A</td></tr></table>                                                                        |  | Class    | SERVOPACK Model: SGD7S- | IP20         | R70A, R90A, 1R6A, 2R8A, 3R8A, 5R5A, 7R6A, 120A | IP10         | 180A, 200A, 330A, 470A, 550A, 590A, 780A                         |                 |                        |
|                          | Class                                                                                                                                                                                                                                                                            | SERVOPACK Model: SGD7S-                                                                                                                                                                                                                                                                           |  |          |                         |              |                                                |              |                                                                  |                 |                        |
|                          | IP20                                                                                                                                                                                                                                                                             | R70A, R90A, 1R6A, 2R8A, 3R8A, 5R5A, 7R6A, 120A                                                                                                                                                                                                                                                    |  |          |                         |              |                                                |              |                                                                  |                 |                        |
|                          | IP10                                                                                                                                                                                                                                                                             | 180A, 200A, 330A, 470A, 550A, 590A, 780A                                                                                                                                                                                                                                                          |  |          |                         |              |                                                |              |                                                                  |                 |                        |
| Pollution Degree         | 2 <ul style="list-style-type: none"><li>Must be no corrosive or flammable gases.</li><li>Must be no exposure to water, oil, or chemicals.</li><li>Must be no dust, salts, or iron dust.</li></ul>                                                                                |                                                                                                                                                                                                                                                                                                   |  |          |                         |              |                                                |              |                                                                  |                 |                        |
| Altitude <sup>*1</sup>   | 1,000 m or less.<br>With derating, usage is possible between 1,000 m and 2,000 m.<br>Refer to the following section for derating specifications.<br> Specifications (400 V Models) (page 501) |                                                                                                                                                                                                                                                                                                   |  |          |                         |              |                                                |              |                                                                  |                 |                        |
| Others                   | Do not use the SERVOPACK in the following locations: Locations subject to static electricity noise, strong electromagnetic/magnetic fields, or radioactivity                                                                                                                     |                                                                                                                                                                                                                                                                                                   |  |          |                         |              |                                                |              |                                                                  |                 |                        |
| Applicable Standards     |                                                                                                                                                                                                                                                                                  | UL 61800-5-1, CSA C22.2 No.274, EN 50178, EN 61800-5-1, EN 55011 group 1 class A, EN 61000-6-2, EN 61000-6-4, EN 61800-3, IEC 61508-1 to 4, IEC 61800-5-2, IEC 62061, ISO 13849-1, and IEC 61326-3-1                                                                                              |  |          |                         |              |                                                |              |                                                                  |                 |                        |
| Mounting                 |                                                                                                                                                                                                                                                                                  | <table><tr><th>Mounting</th><th>SERVOPACK Model: SGD7S-</th></tr><tr><td>Base-mounted</td><td>All Models</td></tr><tr><td>Rack-mounted</td><td>R70A, R90A, 1R6A, 2R8A, 3R8A, 5R5A, 7R6A, 120A, 180A, 200A, 330A</td></tr><tr><td>Duct-ventilated</td><td>470A, 550A, 590A, 780A</td></tr></table> |  | Mounting | SERVOPACK Model: SGD7S- | Base-mounted | All Models                                     | Rack-mounted | R70A, R90A, 1R6A, 2R8A, 3R8A, 5R5A, 7R6A, 120A, 180A, 200A, 330A | Duct-ventilated | 470A, 550A, 590A, 780A |
| Mounting                 | SERVOPACK Model: SGD7S-                                                                                                                                                                                                                                                          |                                                                                                                                                                                                                                                                                                   |  |          |                         |              |                                                |              |                                                                  |                 |                        |
| Base-mounted             | All Models                                                                                                                                                                                                                                                                       |                                                                                                                                                                                                                                                                                                   |  |          |                         |              |                                                |              |                                                                  |                 |                        |
| Rack-mounted             | R70A, R90A, 1R6A, 2R8A, 3R8A, 5R5A, 7R6A, 120A, 180A, 200A, 330A                                                                                                                                                                                                                 |                                                                                                                                                                                                                                                                                                   |  |          |                         |              |                                                |              |                                                                  |                 |                        |
| Duct-ventilated          | 470A, 550A, 590A, 780A                                                                                                                                                                                                                                                           |                                                                                                                                                                                                                                                                                                   |  |          |                         |              |                                                |              |                                                                  |                 |                        |
| Performance              | Speed Control Range                                                                                                                                                                                                                                                              | 1:5000 (At the rated torque, the lower limit of the speed control range must not cause the Servo Motor to stop.)                                                                                                                                                                                  |  |          |                         |              |                                                |              |                                                                  |                 |                        |
|                          | Coefficient of Speed Fluctuation <sup>*2</sup>                                                                                                                                                                                                                                   | ±0.01% of rated speed max. (for a load fluctuation of 0% to 100%)                                                                                                                                                                                                                                 |  |          |                         |              |                                                |              |                                                                  |                 |                        |
|                          |                                                                                                                                                                                                                                                                                  | 0% of rated speed max. (for a voltage fluctuation of ±10%)                                                                                                                                                                                                                                        |  |          |                         |              |                                                |              |                                                                  |                 |                        |
|                          |                                                                                                                                                                                                                                                                                  | ±0.1% of rated speed max. (for a temperature fluctuation of 25°C ±25°C)                                                                                                                                                                                                                           |  |          |                         |              |                                                |              |                                                                  |                 |                        |
|                          | Torque Control Precision (Repeatability)                                                                                                                                                                                                                                         | ±1%                                                                                                                                                                                                                                                                                               |  |          |                         |              |                                                |              |                                                                  |                 |                        |
| Soft Start Time Setting  |                                                                                                                                                                                                                                                                                  | 0 s to 10 s (Can be set separately for acceleration and deceleration.)                                                                                                                                                                                                                            |  |          |                         |              |                                                |              |                                                                  |                 |                        |

Continued from previous page.

| Item                |                                                     |                                      | Specification                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
|---------------------|-----------------------------------------------------|--------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| I/O Signals         | Encoder Divided Pulse Output                        |                                      | Phase A, phase B, phase C: Line-driver output<br>Number of divided output pulses: Any setting is allowed.                                                                                                                                                                                                                                                                                                                                                                                     |
|                     | Linear Servo Motor Overheat Protection Signal Input |                                      | Number of input points: 1<br>Input voltage range: 0 V to +5 V                                                                                                                                                                                                                                                                                                                                                                                                                                 |
|                     | Sequence Input Signals                              | Input Signals That Can Be Allocated  | Allowable voltage range: 24 VDC ±20%<br>Number of input points: 7                                                                                                                                                                                                                                                                                                                                                                                                                             |
|                     |                                                     |                                      | Input method: Sink inputs or source inputs<br>Input Signals: <ul style="list-style-type: none"><li>• Origin Return Deceleration Switch (/DEC)</li><li>• External Latch 1 to 3 (/EXT 1 to 3)</li><li>• Forward Drive Prohibit (P-OT) and Reverse Drive Prohibit (N-OT)</li><li>• Forward External Torque Limit (/P-CL) and Reverse External Torque Limit (/N-CL)</li><li>• Polarity Detection (/P-DET)</li></ul> A signal can be allocated and the positive and negative logic can be changed. |
|                     | Sequence Output Signals                             | Fixed Output                         | Allowable voltage range: 5 VDC to 30 VDC<br>Number of output points: 1<br>Output signal: Servo Alarm (ALM)                                                                                                                                                                                                                                                                                                                                                                                    |
|                     |                                                     | Output Signals That Can Be Allocated | Allowable voltage range: 5 VDC to 30 VDC<br>Number of output points: 3<br>(A photocoupler output (isolated) is used.)                                                                                                                                                                                                                                                                                                                                                                         |
|                     |                                                     |                                      | Output Signals: <ul style="list-style-type: none"><li>• Positioning Completion (/COIN)</li><li>• Speed Coincidence Detection (/V-CMP)</li><li>• Rotation Detection (/TGON)</li><li>• Servo Ready Output (/S-RDY)</li><li>• Torque Limit Detection (/CLT)</li><li>• Speed Limit Detection (/VLT)</li><li>• Brake (/BK)</li><li>• Warning Output (/WARN)</li><li>• Near Output (/NEAR)</li></ul> A signal can be allocated and the positive and negative logic can be changed.                  |
| Communi-<br>cations | RS-422A Communi-<br>cations (CN3)                   | Interfaces                           | Digital Operator (JUSP-OP05A-1-E) and personal computer (with SigmaWin+)                                                                                                                                                                                                                                                                                                                                                                                                                      |
|                     |                                                     | 1:N Communi-<br>cations              | Up to N = 15 stations possible for RS-422A port                                                                                                                                                                                                                                                                                                                                                                                                                                               |
|                     |                                                     | Axis Address Setting                 | Set with parameters.                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|                     | USB Com-<br>muni-<br>cations (CN7)                  | Interface                            | Personal computer (with SigmaWin+)                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
|                     |                                                     | Communi-<br>cations Standard         | Conforms to USB2.0 standard (12 Mbps).                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| Displays/Indicators |                                                     |                                      | CHARGE, PWR, and COM indicators, and one-digit seven-segment display                                                                                                                                                                                                                                                                                                                                                                                                                          |

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| Item                       |                                     | Specification                                                                                                                                                                                                                                                                                                                                                                                             |
|----------------------------|-------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| EtherCAT Communications    | Applicable Communications Standards | IEC 61158 Type 12, IEC 61800-7 CiA402 Drive Profile                                                                                                                                                                                                                                                                                                                                                       |
|                            | Physical Layer                      | 100BASE-TX (IEEE 802.3)                                                                                                                                                                                                                                                                                                                                                                                   |
|                            | Communications Connectors           | CN6A (RJ45): EtherCAT signal input connector<br>CN6B (RJ45): EtherCAT signal output connector                                                                                                                                                                                                                                                                                                             |
|                            | Cable                               | Category 5, 4 shielded twisted pairs<br>* The cable is automatically detected with AUTO MDIX.                                                                                                                                                                                                                                                                                                             |
|                            | Sync Manager                        | SM0: Mailbox output, SM1: Mailbox input, SM2: Process data output, and SM3: Process data input                                                                                                                                                                                                                                                                                                            |
|                            | FMMU                                | FMMU 0: Mapped in process data output (RxPDO) area.<br>FMMU 1: Mapped in process data input (TxPDO) area.<br>FMMU 2: Mapped to mailbox status.                                                                                                                                                                                                                                                            |
|                            | EtherCAT Commands (Data Link Layer) | APRD, FPRD, BRD, LRD, APWR, FPWR, BWR, LWR, ARMW, and FRMW (APRW, FPRW, BRW, and LRW commands are not supported.)                                                                                                                                                                                                                                                                                         |
|                            | Process Data                        | Assignments can be changed with PDO mapping.                                                                                                                                                                                                                                                                                                                                                              |
|                            | Mailbox (CoE)                       | Emergency messages, SDO requests, SDO responses, and SDO information (TxPDO/RxPDO and remote TxPDO/RxPDO are not supported.)                                                                                                                                                                                                                                                                              |
|                            | Distributed Clocks                  | Free-Run Mode and DC Mode (Can be switched.)<br>Applicable DC cycles: 125 μs to 4 ms in 125-μs increments                                                                                                                                                                                                                                                                                                 |
|                            | Slave Information Interface         | 256 bytes (read-only)                                                                                                                                                                                                                                                                                                                                                                                     |
|                            | Indicators                          | EtherCAT communications in progress: Link/Activity x 2<br>EtherCAT communications status: RUN x 1<br>EtherCAT error status: ERR x 1                                                                                                                                                                                                                                                                       |
| CiA402 Drive Profile       |                                     | <ul style="list-style-type: none"> <li>• Homing Mode</li> <li>• Profile Position Mode</li> <li>• Interpolated Position Mode</li> <li>• Profile Velocity Mode</li> <li>• Profile Torque Mode</li> <li>• Cyclic Synchronous Position Mode</li> <li>• Cyclic Synchronous Velocity Mode</li> <li>• Cyclic Synchronous Torque Mode</li> <li>• Touch Probe Function</li> <li>• Torque Limit Function</li> </ul> |
| Analog Monitor (CN5)       |                                     | Number of points: 2<br>Output voltage range: ±10 VDC (effective linearity range: ±8 V)<br>Resolution: 16 bits<br>Accuracy: ±20 mV (Typ)<br>Maximum output current: ±10 mA<br>Settling time (±1%): 1.2 ms (Typ)                                                                                                                                                                                            |
| Dynamic Brake (DB)         |                                     | Activated when a servo alarm or overtravel (OT) occurs, or when the power supply to the main circuit or servo is OFF.                                                                                                                                                                                                                                                                                     |
| Regenerative Processing    |                                     | Built-in (An external resistor must be connected to the SGD7S-470A to -780A.)<br> <b>Built-In Regenerative Resistor (page 609)</b>                                                                                                                                                                                     |
| Overtravel (OT) Prevention |                                     | Stopping with dynamic brake, deceleration to a stop, or coasting to a stop for the P-OT (Forward Drive Prohibit) or N-OT (Reverse Drive Prohibit) signal                                                                                                                                                                                                                                                  |
| Protective Functions       |                                     | Overcurrent, overvoltage, low voltage, overload, regeneration error, etc.                                                                                                                                                                                                                                                                                                                                 |
| Utility Functions          |                                     | Gain adjustment, alarm history, jogging, origin search, etc.                                                                                                                                                                                                                                                                                                                                              |
| Safety Functions           | Inputs                              | /HWBB1 and /HWBB2: Base block signals for Power Modules                                                                                                                                                                                                                                                                                                                                                   |
|                            | Output                              | EDM1: Monitors the status of built-in safety circuit (fixed output).                                                                                                                                                                                                                                                                                                                                      |
|                            | Applicable Standards*3              | ISO13849-1 PLe (Category 3), IEC61508 SIL3                                                                                                                                                                                                                                                                                                                                                                |
| Option Module              |                                     | Fully-Closed Modules and Safety Modules<br>Note: You cannot use a Fully-Closed Module and a Safety Module together.                                                                                                                                                                                                                                                                                       |

## SERVOPACKs

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### Σ-7S Single-axis EtherCAT Communications Reference SERVOPACKs

\*1. If you combine a Σ-7-Series SERVOPACK with a Σ-V-Series Option Module, the following Σ-V-Series SERVOPACKs specifications must be used: a surrounding air temperature of 0°C to 55°C and an altitude of 1,000 m max. Also, the applicable range cannot be increased by derating.

\*2. The coefficient of speed fluctuation for load fluctuation is defined as follows:

$$\text{Coefficient of speed fluctuation} = \frac{\text{No-load motor speed} - \text{Total-load motor speed}}{\text{Rated motor speed}} \times 100\%$$

\*3. Always perform risk assessment for the system and confirm that the safety requirements are met.



## Specifications (400 V Models)

| Item                     |                                                | Specification                                                                                                                                                                                                                                                                                 |
|--------------------------|------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Drive Method             |                                                | IGBT-based PWM control, sine wave current drive                                                                                                                                                                                                                                               |
| Feedback                 | With Rotary Servo Motor                        | Serial encoder: 24 bits (incremental encoder/absolute encoder)                                                                                                                                                                                                                                |
|                          | With Linear Servo Motor                        | <ul style="list-style-type: none"> <li>Absolute linear encoder (The signal resolution depends on the absolute linear encoder.)</li> <li>Incremental linear encoder (The signal resolution depends on the incremental linear encoder or Serial Converter Unit.)</li> </ul>                     |
| Environmental Conditions | Surrounding Air Temperature <sup>*1</sup>      | -5°C to 55°C (60°C with derating)<br>However the range for the SGD7S-370D is -5°C to 40°C<br>Refer to the following section for derating specifications.<br> <b>Specifications (400 V Models) (page 501)</b> |
|                          | Storage Temperature                            | -20°C to 85°C                                                                                                                                                                                                                                                                                 |
|                          | Surrounding Air Humidity                       | 95% relative humidity max. (with no freezing or condensation)                                                                                                                                                                                                                                 |
|                          | Storage Humidity                               | 95% relative humidity max. (with no freezing or condensation)                                                                                                                                                                                                                                 |
|                          | Vibration Resistance                           | 4.9 m/s <sup>2</sup>                                                                                                                                                                                                                                                                          |
|                          | Shock Resistance                               | 19.6 m/s <sup>2</sup>                                                                                                                                                                                                                                                                         |
|                          | Degree of Protection                           | IP10                                                                                                                                                                                                                                                                                          |
|                          | Pollution Degree                               | 2 <ul style="list-style-type: none"> <li>Must be no corrosive or flammable gases.</li> <li>Must be no exposure to water, oil, or chemicals.</li> <li>Must be no dust, salts, or iron dust.</li> </ul>                                                                                         |
|                          | Altitude <sup>*1</sup>                         | 1,000 m or less.<br>With derating, usage is possible between 1,000 m and 2,000 m.<br>Refer to the following section for derating specifications.<br> <b>Specifications (400 V Models) (page 501)</b>       |
|                          | Others                                         | Do not use the SERVOPACK in the following locations: Locations subject to static electricity noise, strong electromagnetic/magnetic fields, or radioactivity                                                                                                                                  |
| Applicable Standards     |                                                | UL 61800-5-1, CSA C22.2 No.274, EN 50178, EN 61800-5-1, EN 55011 group 1 class A, EN 61000-6-2, EN 61000-6-4, EN 61800-3, IEC 61508-1 to 4, IEC 61800-5-2, IEC 62061, ISO 13849-1, and IEC 61326-3-1                                                                                          |
| Mounting                 |                                                | Base-mounted                                                                                                                                                                                                                                                                                  |
| Performance              | Speed Control Range                            | 1:5000 (At the rated torque, the lower limit of the speed control range must not cause the Servo Motor to stop.)                                                                                                                                                                              |
|                          | Coefficient of Speed Fluctuation <sup>*2</sup> | ±0.01% of rated speed max. (for a load fluctuation of 0% to 100%)                                                                                                                                                                                                                             |
|                          |                                                | 0% of rated speed max. (for a voltage fluctuation of ±10%)                                                                                                                                                                                                                                    |
|                          |                                                | ±0.1% of rated speed max. (for a temperature fluctuation of 25°C ±25°C)                                                                                                                                                                                                                       |
|                          | Torque Control Precision (Repeatability)       | ±1%                                                                                                                                                                                                                                                                                           |
|                          | Soft Start Time Setting                        | 0 s to 10 s (Can be set separately for acceleration and deceleration.)                                                                                                                                                                                                                        |

Continued from previous page.

| Item                                     |                                                      |                                      | Specification                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
|------------------------------------------|------------------------------------------------------|--------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| I/O Signals                              | Encoder Divided Pulse Output                         |                                      | Phase A, phase B, phase C: Line-driver output<br>Number of divided output pulses: Any setting is allowed.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
|                                          | Linear Servo Motor Over-heat Protection Signal Input |                                      | Number of input points: 1<br>Input voltage range: 0 V to +5 V                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
|                                          | Sequence Input Signals                               | Input Signals That Can Be Allocated  | Allowable voltage range: 24 VDC ±20%<br>Number of input points: 7                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
|                                          |                                                      |                                      | Input method: Sink inputs or source inputs<br>Input Signals: <ul style="list-style-type: none"><li>• P-OT (Forward Drive Prohibit) and N-OT (Reverse Drive Prohibit) signals</li><li>• /Probe1 (Probe 1 Latch Input) signal</li><li>• /Probe2 (Probe 2 Latch Input) signal</li><li>• /Home (Home Switch Input) signal</li><li>• /P-CL (Forward External Torque Limit) and /N-CL (Reverse External Torque Limit) signals</li><li>• /SI0 and /SI3 (General-Purpose Input) signals</li></ul> A signal can be allocated and the positive and negative logic can be changed.                                                                                                                                                                                   |
|                                          | Sequence Output Signals                              | Fixed Output                         | Allowable voltage range: 5 VDC to 30 VDC<br>Number of output points: 1<br>Output signal: Servo Alarm (ALM)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|                                          |                                                      | Output Signals That Can Be Allocated | Allowable voltage range: 5 VDC to 30 VDC<br>Number of output points: 5<br>(A photocoupler output (isolated) is used.)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
|                                          |                                                      |                                      | Output Signals: <ul style="list-style-type: none"><li>• /COIN (Positioning Completion) signal</li><li>• /V-CMP (Speed Coincidence Detection) signal</li><li>• /TGON (Rotation Detection) signal</li><li>• /S-RDY (Servo Ready) signal</li><li>• /CLT (Torque Limit Detection) signal</li><li>• /VLT (Speed Limit Detection) signal</li><li>• /BK (Brake) signal</li><li>• /WARN (Warning) signal</li><li>• /NEAR (Near) signal</li><li>• /ZONE0 (ZONE Signal 1 Output) signal</li><li>• /ZONE1 (ZONE Signal 2 Output) signal</li><li>• /ZONE2 (ZONE Signal 3 Output) signal</li><li>• /ZONE3 (ZONE Signal 4 Output) signal</li><li>• /nZONE (nZONE output) signal</li></ul> A signal can be allocated and the positive and negative logic can be changed. |
| Communications                           | RS-422A Communications (CN3)                         | Interfaces                           | Digital Operator (JUSP-OP05A-1-E)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
|                                          |                                                      | 1:N Communications                   | Up to N = 15 stations possible for RS-422A port                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
|                                          |                                                      | Axis Address Setting                 | Set with parameters.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
|                                          | USB Communications (CN7)                             | Interface                            | Personal Computer (with SigmaWin+)<br>The software version of the SigmaWin+ must be version 7.11 or higher.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
|                                          |                                                      | Communications Standard              | Conforms to USB2.0 standard (12 Mbps).                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| Displays/Indicators                      |                                                      |                                      | CHARGE, PWR, RUN, ERR, and L/A (A and B) indicators, and one-digit seven-segment display                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| EtherCAT Communications Setting Switches |                                                      |                                      | EtherCAT secondary address (S1 and S2), 16 positions                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |

Continued from previous page.

| Item                       |                                     | Specification                                                                                                                                                                                                                                                                                                                                                                                             |
|----------------------------|-------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| EtherCAT Communications    | Applicable Communications Standards | IEC 61158 Type 12, IEC 61800-7 CiA402 Drive Profile                                                                                                                                                                                                                                                                                                                                                       |
|                            | Physical Layer                      | 03100BASE-TX (IEEE 802.3)                                                                                                                                                                                                                                                                                                                                                                                 |
|                            | Communications Connectors           | CN6A (RJ45): EtherCAT signal input connector<br>CN6B (RJ45): EtherCAT signal output connector                                                                                                                                                                                                                                                                                                             |
|                            | Cable                               | Category 5, 4 shielded twisted pairs<br>* The cable is automatically detected with AUTO MDIX.                                                                                                                                                                                                                                                                                                             |
|                            | Sync Manager                        | SM0: Mailbox output, SM1: Mailbox input, SM2: Process data output, and SM3: Process data input                                                                                                                                                                                                                                                                                                            |
|                            | FMMU                                | FMMU 0: Mapped in process data output (RxPDO) area.<br>FMMU 1: Mapped in process data input (TxPDO) area.<br>FMMU 2: Mapped to mailbox status                                                                                                                                                                                                                                                             |
|                            | EtherCAT Commands (Data Link Layer) | APRD, FPRD, BRD, LRD, APWR, FPWR, BWR, LWR, ARMW, and FRMW (APRW, FPRW, BRW, and LRW commands are not supported.)                                                                                                                                                                                                                                                                                         |
|                            | Process Data                        | Assignments can be changed with PDO mapping                                                                                                                                                                                                                                                                                                                                                               |
|                            | Mailbox (CoE)                       | Emergency messages, SDO requests, SDO responses, and SDO information (TxPDO/RxPDO and remote TxPDO/RxPDO are not supported.)                                                                                                                                                                                                                                                                              |
|                            | Distributed Clocks                  | Free-Run Mode and DC Mode (Can be switched.)<br>Applicable DC cycles: 125 s to 4 ms in 125-s increments                                                                                                                                                                                                                                                                                                   |
|                            | Slave Information Interface         | 256 bytes (read-only)                                                                                                                                                                                                                                                                                                                                                                                     |
|                            | Indicators                          | EtherCAT communications in progress: Link/Activity x 2<br>EtherCAT communications status: RUN x 1<br>EtherCAT error status: ERR x 1                                                                                                                                                                                                                                                                       |
| CiA402 Drive Profile       |                                     | <ul style="list-style-type: none"> <li>• Homing Mode</li> <li>• Profile Position Mode</li> <li>• Interpolated Position Mode</li> <li>• Profile Velocity Mode</li> <li>• Profile Torque Mode</li> <li>• Cyclic Synchronous Position Mode</li> <li>• Cyclic Synchronous Velocity Mode</li> <li>• Cyclic Synchronous Torque Mode</li> <li>• Touch Probe Function</li> <li>• Torque Limit Function</li> </ul> |
| Analog Monitor (CN5)       |                                     | Number of points: 2<br>Output voltage range: $\pm 10$ VDC (effective linearity range: $\pm 8$ V)<br>Resolution: 16 bits<br>Accuracy: $\pm 20$ mV (Typ)<br>Maximum output current: $\pm 10$ mA<br>Settling time ( $\pm 1\%$ ): 1.2 ms (Typ)                                                                                                                                                                |
| Dynamic Brake (DB)         |                                     | Activated when a servo alarm or overtravel (OT) occurs, or when the power supply to the main circuit or servo is OFF.                                                                                                                                                                                                                                                                                     |
| Regenerative Processing    |                                     | Built-in<br> Built-In Regenerative Resistor (page 609)                                                                                                                                                                                                                                                                 |
| Overtravel (OT) Prevention |                                     | Stopping with dynamic brake, deceleration to a stop, or coasting to a stop for the P-OT (Forward Drive Prohibit) or N-OT (Reverse Drive Prohibit) signal                                                                                                                                                                                                                                                  |
| Protective Functions       |                                     | Overcurrent, overvoltage, low voltage, overload, regeneration error, etc.                                                                                                                                                                                                                                                                                                                                 |
| Utility Functions          |                                     | Gain adjustment, alarm history, jogging, origin search, etc.                                                                                                                                                                                                                                                                                                                                              |
| Safety Functions           | Inputs                              | /HWBB1 and /HWBB2: Base block signals for Power Modules                                                                                                                                                                                                                                                                                                                                                   |
|                            | Output                              | EDM1: Monitors the status of built-in safety circuit (fixed output).                                                                                                                                                                                                                                                                                                                                      |
|                            | Applicable Standards <sup>*3</sup>  | ISO13849-1 PLe (Category 3), IEC61508 SIL3                                                                                                                                                                                                                                                                                                                                                                |
| Option Module              |                                     | Fully-Closed Modules                                                                                                                                                                                                                                                                                                                                                                                      |

## SERVOPACKs

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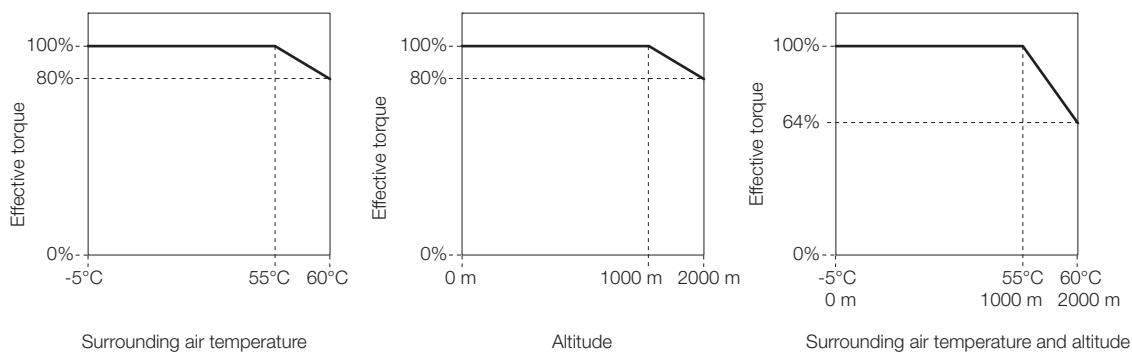
### Σ-7S Single-axis EtherCAT Communications Reference SERVOPACKs

- \*1. If you combine a Σ-7-Series SERVOPACK with a Σ-V-Series Option Module, the surrounding air temperature of 0°C to 55°C and an altitude of 1,000 m max. must be used. Also, the applicable range cannot be increased by derating.
- \*2. The coefficient of speed fluctuation for load fluctuation is defined as follows:  
$$\text{Coefficient of speed fluctuation} = \frac{\text{No-load motor speed} - \text{Total-load motor speed}}{\text{Rated motor speed}} \times 100\%$$
- \*3. Always perform risk assessment for the system and confirm that the safety requirements are met.

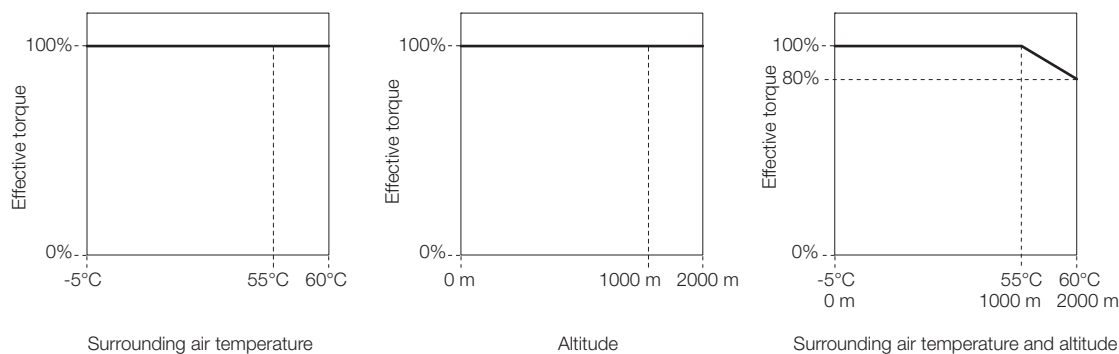
## Derating Specifications

If you use the SERVOPACK at a surrounding air temperature of 55°C to 60°C or at an altitude of 1,000 m to 2,000 m, you must apply the derating rates given in the following graphs.

### ◆ SGD7S-R70A, -R90A, -1R6A, and -2R8A



### ◆ SGD7S-3R8A, -5R5A, -7R6A, -120A, -180A, -200A, -330A, -470A, -550A, -590A, and -780A



## Model Designations

SGD7W - 2R8 A 20 A 700

Σ-7 Series  
Σ-7W SERVOPACKs

1st+2nd+3rd  
digits

4th  
digit

5th+6th  
digits

7th  
digit

8th+9th+10th  
digits

1st+2nd+3rd digits Maximum Applicable  
Motor Capacity per Axis

| Voltage                    | Code              | Specification |
|----------------------------|-------------------|---------------|
| Three-phase,<br>200<br>VAC | 1R6 <sup>*1</sup> | 0.2 kW        |
|                            | 2R8 <sup>*1</sup> | 0.4 kW        |
|                            | 5R5 <sup>*1</sup> | 0.75 kW       |
|                            | 7R6               | 1.0 kW        |
| Three-phase,<br>400<br>VAC | 2R6               | 0.75 kW       |
|                            | 5R4               | 1.5 kW        |

5th+6th digits Interface<sup>\*2</sup>

| Code | Specification                                                                                                |
|------|--------------------------------------------------------------------------------------------------------------|
| 20   | MECHATROLINK-III communications reference with IMI connector (200V: 0.75 kW and 1.0 kW Units)                |
| 30   | MECHATROLINK-III communications reference with RJ45 connector (200V: 0.2 kW and 0.4 kW Units and 400V Units) |

8th+9th+10th digits Hardware Options  
Specification

| Code | Specification                | Applicable Models |
|------|------------------------------|-------------------|
| 700  | HWBB Option <sup>*3</sup>    | 200 V             |
| -    | Without options              | 400 V             |
| 026  | With relay for holding brake |                   |

Shaded options are non-stock

4th digit Voltage

| Code | Specification |
|------|---------------|
| D    | 400 VAC       |

7th digit Design Revision Order

| Code | Specification                   |
|------|---------------------------------|
| A    | Global Design Revision for 200V |
| B    | Global Design Revision for 400V |

\*1. You can use these models with either a single-phase or three phase power supply input

\*2. The same SERVOPACKs are used for both Rotary Servo Motors and Linear Servo Motors

\*3. Refer to the following manual for details:

Sigma-7 Series AC Servo Drive SGD7W SERVOPACK with Hardware Option Specifications HWBB Function Product Manual (Manual No: SIEPS800000172)

## Ratings and Specifications

### Ratings

#### ◆ Three-phase, 200 VAC

| Model SGD7W-                                         |                                               |                     | 1R6A                                          | 2R8A | 5R5A  | 7R6A  |
|------------------------------------------------------|-----------------------------------------------|---------------------|-----------------------------------------------|------|-------|-------|
| Maximum Applicable Motor Capacity per Axis [kW]      |                                               |                     | 0.2                                           | 0.4  | 0.75  | 1.0   |
| Continuous Output Current per Axis [Arms]            |                                               |                     | 1.6                                           | 2.8  | 5.5   | 7.6   |
| Instantaneous Maximum Output Current per Axis [Arms] |                                               |                     | 5.9                                           | 9.3  | 16.9  | 17.0  |
| Main Circuit                                         | Power Supply                                  |                     | 200 VAC to 240 VAC, -15% to +10%, 50 Hz/60 Hz |      |       |       |
|                                                      | Input Current [Arms]*                         |                     | 2.5                                           | 4.7  | 7.8   | 11    |
| Control Power Supply                                 |                                               |                     | 200 VAC to 240 VAC, -15% to +10%, 50 Hz/60 Hz |      |       |       |
| Power Supply Capacity [kVA]*                         |                                               |                     | 1.0                                           | 1.9  | 3.2   | 4.5   |
| Power Loss*                                          | Main Circuit Power Loss [W]                   |                     | 27.0                                          | 48.0 | 87.6  | 107.2 |
|                                                      | Control Circuit Power Loss [W]                |                     | 24                                            | 24   | 24    | 24    |
|                                                      | Built-in Regenerative Resistor Power Loss [W] |                     | 8                                             | 8    | 16    | 16    |
|                                                      | Total Power Loss [W]                          |                     | 59.0                                          | 80.0 | 127.6 | 147.2 |
| Regenera-<br>tive Resistor                           | Built-In Regenera-<br>tive Resistor           | Resis-<br>tance [Ω] | 40                                            | 40   | 12    | 12    |
|                                                      |                                               | Capacity [W]        | 40                                            | 40   | 60    | 60    |
|                                                      | Minimum Allowable External Resistance [Ω]     |                     | 40                                            | 40   | 40    | 40    |
| Overvoltage Category                                 |                                               |                     | III                                           |      |       |       |

\* This is the net value at the rated load.

#### ◆ Single-phase, 200 VAC

| Model SGD7W-                                         |                                                |                | 1R6A                                          | 2R8A | 5R5A <sup>*1</sup> |
|------------------------------------------------------|------------------------------------------------|----------------|-----------------------------------------------|------|--------------------|
| Maximum Applicable Motor Capacity per Axis [kW]      |                                                |                | 0.2                                           | 0.4  | 0.75               |
| Continuous Output Current per Axis [Arms]            |                                                |                | 1.6                                           | 2.8  | 5.5                |
| Instantaneous Maximum Output Current per Axis [Arms] |                                                |                | 5.9                                           | 9.3  | 16.9               |
| Main Circuit                                         | Power Supply                                   |                | 200 VAC to 240 VAC, -15% to +10%, 50 Hz/60 Hz |      |                    |
|                                                      | Input Current [Arms] <sup>*2</sup>             |                | 5.5                                           | 11   | 12                 |
| Control Power Supply                                 |                                                |                | 200 VAC to 240 VAC, -15% to +10%, 50 Hz/60 Hz |      |                    |
| Power Supply Capacity [kVA] <sup>*2</sup>            |                                                |                | 1.3                                           | 2.4  | 2.7                |
| Power Loss <sup>*2</sup>                             | Main Circuit Power Loss [W]                    |                | 27.0                                          | 48.0 | 87.6               |
|                                                      | Control Circuit Power Loss [W]                 |                | 24                                            | 24   | 24                 |
|                                                      | Built-in Regenerative Resistor Power Loss [W]  |                | 8                                             | 8    | 16                 |
|                                                      | Total Power Loss [W]                           |                | 59.0                                          | 80.0 | 127.6              |
| Regenerative Resistor                                | Built-In Regenera-<br>tive Resistor            | Resistance [Ω] | 40                                            | 40   | 12                 |
|                                                      |                                                | Capacity [W]   | 40                                            | 40   | 60                 |
|                                                      | Minimum Allowable External Resis-<br>tance [Ω] |                | 40                                            | 40   | 40                 |
| Overvoltage Category                                 |                                                |                | III                                           |      |                    |

\*1. If you use the SGD7W-5R5A with a single-phase 200-VAC power supply input, derate the load ratio to 65%. An example is given below.

If the load ratio of the first axis is 90%, use a load ratio of 40% for the second axis so that average load ratio for both axes is 65% ((90% + 40%)/2 = 65%).

\*2. This is the net value at the rated load.

## ◆ 270 VDC

| Model SGD7W-                                |                                | 1R6A                             | 2R8A | 5R5A | 7R6A |
|---------------------------------------------|--------------------------------|----------------------------------|------|------|------|
| Maximum Applicable Motor Capacity [kW]      |                                | 0.2                              | 0.4  | 0.75 | 1.0  |
| Continuous Output Current [Arms]            |                                | 1.6                              | 2.8  | 5.5  | 7.6  |
| Instantaneous Maximum Output Current [Arms] |                                | 5.9                              | 9.3  | 16.9 | 17.0 |
| Main Circuit                                | Power Supply                   | 270 VDC to 324 VDC, -15% to +10% |      |      |      |
|                                             | Input Current [Arms]*          | 3.0                              | 5.8  | 9.7  | 14   |
| Control Power Supply                        |                                | 270 VDC to 324 VDC, -15% to +10% |      |      |      |
| Power Supply Capacity [kVA]*                |                                | 1.2                              | 2    | 3.2  | 4.6  |
| Power Loss*                                 | Main Circuit Power Loss [W]    | 23                               | 40   | 76   | 92   |
|                                             | Control Circuit Power Loss [W] | 24                               | 24   | 24   | 24   |
|                                             | Total Power Loss [W]           | 47                               | 64   | 100  | 116  |
| Overvoltage Category                        |                                | III                              |      |      |      |

\* This is the net value at the rated load.



## ◆ Three-phase, 400 VAC

| Model SGD7W-                                         |                                               |                     | 2R6D                                                         | 5R4D  |
|------------------------------------------------------|-----------------------------------------------|---------------------|--------------------------------------------------------------|-------|
| Maximum Applicable Motor Capacity per Axis [kW]      |                                               |                     | 0.75                                                         | 1.5   |
| Continuous Output Current per Axis [Arms]            |                                               |                     | 2.6                                                          | 5.4   |
| Instantaneous Maximum Output Current per Axis [Arms] |                                               |                     | 8.5                                                          | 14    |
| Main Circuit                                         | Power Supply                                  |                     | Three-phase 380 VAC to 480 VAC, -15% to +10%,<br>50 Hz/60 Hz |       |
|                                                      | Input Current [Arms]*                         |                     | 4.4                                                          | 8.6   |
| Control                                              | Power Supply                                  |                     | 24 VDC ±15%                                                  |       |
|                                                      | Input Current [Arms]*                         |                     | 1.2                                                          |       |
| Power Supply Capacity [kVA]*                         |                                               |                     | 3.5                                                          | 6.8   |
| Power Loss*                                          | Main Circuit Power Loss [W]                   |                     | 65.4                                                         | 108.6 |
|                                                      | Control Circuit Power Loss [W]                |                     | 21                                                           |       |
|                                                      | Built-in Regenerative Resistor Power Loss [W] |                     | 28                                                           | 28    |
|                                                      | Total Power Loss [W]                          |                     | 114.4                                                        | 157.6 |
| Regenerative Resistor                                | Built-In Regenera-<br>tive Resistor           | Resis-<br>tance [Ω] | 43                                                           | 43    |
|                                                      |                                               | Capacity [W]        | 140                                                          | 140   |
|                                                      | Minimum Allowable External Resistance [Ω]     |                     | 43                                                           | 43    |
| Overvoltage Category                                 |                                               |                     | III                                                          |       |

\* This is the net value at the rated load.

## ◆ 540 VDC

| Model SGD7W-                                         |                                | 2R6D                             | 5R4D  |
|------------------------------------------------------|--------------------------------|----------------------------------|-------|
| Maximum Applicable Motor Capacity per Axis [kW]      |                                | 0.75                             | 1.5   |
| Continuous Output Current per Axis [Arms]            |                                | 2.6                              | 5.4   |
| Instantaneous Maximum Output Current per Axis [Arms] |                                | 8.5                              | 14    |
| Main Circuit                                         | Power Supply                   | 513 VDC to 648 VDC, -15% to +10% |       |
|                                                      | Input Current [Arms]*          | 5                                | 11    |
| Control                                              | Power Supply                   | 24 VDC ±15%                      |       |
|                                                      | Input Current [Arms]*          | 1.2                              |       |
| Power Supply Capacity [kVA]*                         |                                | 3.5                              | 6.8   |
| Power Loss*                                          | Main Circuit Power Loss [W]    | 47.4                             | 90.6  |
|                                                      | Control Circuit Power Loss [W] | 21                               |       |
|                                                      | Total Power Loss [W]           | 68.4                             | 111.6 |
| Overvoltage Category                                 |                                | III                              |       |

\* This is the net value at the rated load.

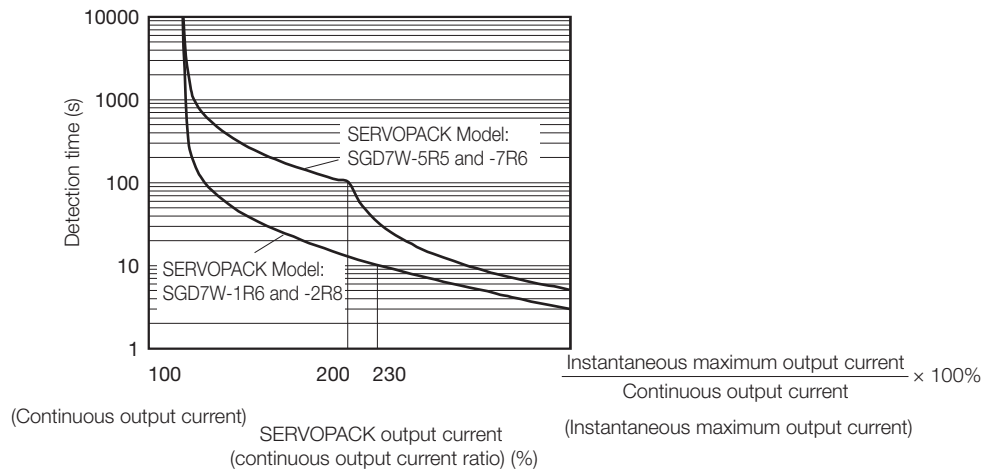
## SERVOPACK Overload Protection Characteristics (200 V Models)

The overload detection level is set for hot start conditions with a SERVOPACK surrounding air temperature of 55°C.

An overload alarm (A.710 or A.720) will occur if overload operation that exceeds the overload protection characteristics shown in the following diagram (i.e., operation on the right side of the applicable line) is performed.

The actual overload detection level will be the detection level of the connected SERVOPACK or Servo Motor that has the lower overload protection characteristics.

In most cases, that will be the overload protection characteristics of the Servo Motor.



Note: The above overload protection characteristics do not mean that you can perform continuous duty operation with an output of 100% or higher.

For a Yaskawa-specified combination of SERVOPACK and Servo Motor, maintain the effective torque (or effective force) within the continuous duty zone of the torque-motor speed characteristic (or force-motor speed characteristics) of the Servo Motor.

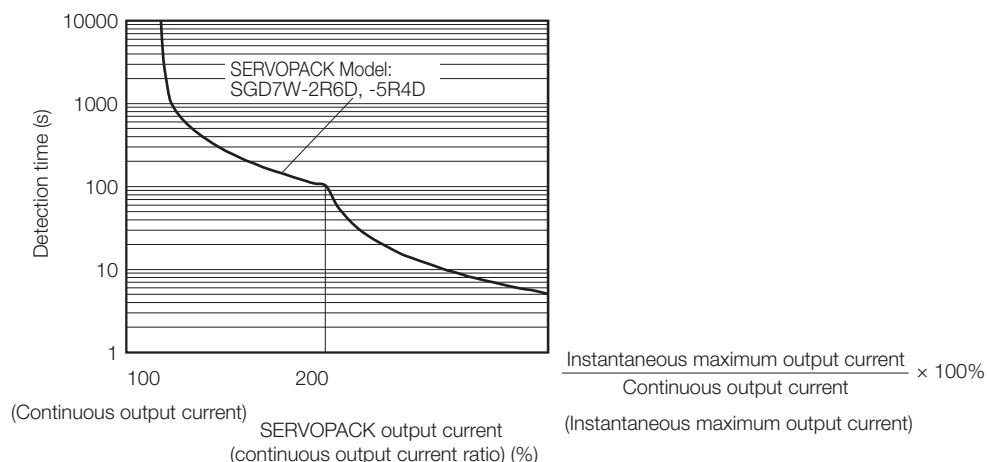
## SERVOPACK Overload Protection Characteristics (400 V Models)

The overload detection level is set for hot start conditions with a SERVOPACK surrounding air temperature of 55°C.

An overload alarm (A.710 or A.720) will occur if overload operation that exceeds the overload protection characteristics shown in the following diagram (i.e., operation on the right side of the applicable line) is performed.

The actual overload detection level will be the detection level of the connected SERVOPACK or Servo Motor that has the lower overload protection characteristics.

In most cases, that will be the overload protection characteristics of the Servo Motor.



Note: The above overload protection characteristics do not mean that you can perform continuous duty operation with an output of 100% or higher.

For a Yaskawa-specified combination of SERVOPACK and Servo Motor, maintain the effective torque (or effective force) within the continuous duty zone of the torque-motor speed characteristic (or force-motor speed characteristics) of the Servo Motor.

## Specifications (200V Models)

| Item                     |                                          | Specification                                                                                                                                                                                                                                                                          |
|--------------------------|------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Control Method           |                                          | IGBT-based PWM control, sine wave current drive                                                                                                                                                                                                                                        |
| Feedback                 | With Rotary Servo Motor                  | Serial encoder: 20 bits or 24 bits (incremental encoder/absolute encoder)                                                                                                                                                                                                              |
|                          | With Linear Servo Motor                  | <ul style="list-style-type: none"> <li>• Absolute linear encoder (The signal resolution depends on the absolute linear encoder.)</li> <li>• Incremental linear encoder (The signal resolution depends on the incremental linear encoder or Serial Converter Unit.)</li> </ul>          |
| Environmental Conditions | Surrounding Air Temperature              | -5°C to 55°C<br>With derating, usage is possible between 55°C and 60°C.<br>Refer to the following section for derating specifications.<br> <i>Specifications (400V Models) (page 515)</i>             |
|                          | Storage Temperature                      | -20°C to 85°C                                                                                                                                                                                                                                                                          |
|                          | Surrounding Air Humidity                 | 95% relative humidity max. (with no freezing or condensation)                                                                                                                                                                                                                          |
|                          | Storage Humidity                         | 95% relative humidity max. (with no freezing or condensation)                                                                                                                                                                                                                          |
|                          | Vibration Resistance                     | 4.9 m/s <sup>2</sup>                                                                                                                                                                                                                                                                   |
|                          | Shock Resistance                         | 19.6 m/s <sup>2</sup>                                                                                                                                                                                                                                                                  |
|                          | Degree of Protection                     | IP20                                                                                                                                                                                                                                                                                   |
|                          | Pollution Degree                         | 2<br><ul style="list-style-type: none"> <li>• Must be no corrosive or flammable gases.</li> <li>• Must be no exposure to water, oil, or chemicals.</li> <li>• Must be no dust, salts, or iron dust.</li> </ul>                                                                         |
|                          | Altitude                                 | 1,000 m or less.<br>With derating, usage is possible between 1,000 m and 2,000 m.<br>Refer to the following section for derating specifications.<br> <i>Specifications (400V Models) (page 515)</i> |
|                          | Others                                   | Do not use the SERVOPACK in the following locations: Locations subject to static electricity noise, strong electromagnetic/magnetic fields, or radioactivity                                                                                                                           |
| Applicable Standards     |                                          | UL 61800-5-1, CSA C22.2 No.274, EN50178, EN 61800-5-1, EN 55011 group 1 class A, EN 61000-6-2, EN 61000-6-4, and EN 61800-3                                                                                                                                                            |
| Mounting                 |                                          | Base-mounted or rack-mounted                                                                                                                                                                                                                                                           |
| Performance              | Speed Control Range                      | 1:5000 (At the rated torque, the lower limit of the speed control range must not cause the Servo Motor to stop.)                                                                                                                                                                       |
|                          | Coefficient of Speed Fluctuation*        | ±0.01% of rated speed max. (for a load fluctuation of 0% to 100%)                                                                                                                                                                                                                      |
|                          |                                          | 0% of rated speed max. (for a voltage fluctuation of ±10%)                                                                                                                                                                                                                             |
|                          |                                          | ±0.1% of rated speed max. (for a temperature fluctuation of 25°C ±25°C)                                                                                                                                                                                                                |
|                          | Torque Control Precision (Repeatability) | ±1%                                                                                                                                                                                                                                                                                    |
|                          | Soft Start Time Setting                  | 0 s to 10 s (Can be set separately for acceleration and deceleration.)                                                                                                                                                                                                                 |

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| Item                |                                                     |                                           | Specification                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
|---------------------|-----------------------------------------------------|-------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| I/O Signals         | Linear Servo Motor Overheat Protection Signal Input |                                           | Number of input points: 2<br>Input voltage range: 0 V to +5 V                                                                                                                                                                                                                                                                                                                                                                                                                               |
|                     | Sequence Input Signals                              | Input Signals That Can Be Allocated       | Allowable voltage range: 24 VDC ±20%<br>Number of input points: 12                                                                                                                                                                                                                                                                                                                                                                                                                          |
|                     |                                                     |                                           | Input method: Sink inputs or source inputs<br>Input Signals <ul style="list-style-type: none"> <li>• Origin Return Deceleration Switch (/DEC)</li> <li>• External Latch (/EXT 1 to 3)</li> <li>• Forward Drive Prohibit (P-OT) and Reverse Drive Prohibit (N-OT)</li> <li>• Forward External Torque Limit (/P-CL) and Reverse External Torque Limit (/N-CL)</li> <li>• Polarity Detection (/P-DET)</li> </ul> A signal can be allocated and the positive and negative logic can be changed. |
|                     | Sequence Output Signals                             | Output Signals That Can Be Allocated      | Fixed Output                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|                     |                                                     |                                           | Allowable voltage range: 5 VDC to 30 VDC<br>Number of output points: 2<br>Output signal: Servo Alarm (ALM)                                                                                                                                                                                                                                                                                                                                                                                  |
|                     |                                                     |                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| Communications      | RS-422A Communications (CN3)                        | Inter-<br>faces                           | Digital Operator (JUSP-OP05A-1-E) and personal computer (with SigmaWin+)                                                                                                                                                                                                                                                                                                                                                                                                                    |
|                     |                                                     | 1:N Commu-<br>nica-<br>tions              | Up to N = 15 stations possible for RS-422A port                                                                                                                                                                                                                                                                                                                                                                                                                                             |
|                     |                                                     | Axis<br>Address<br>Settings               | Set with parameters.                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
|                     | USB Commu-<br>nications (CN7)                       | Inter-<br>face                            | Personal computer (with SigmaWin+)                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|                     |                                                     | Commu-<br>nica-<br>tions<br>Stan-<br>dard | Conforms to USB2.0 standard (12 Mbps).                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| Displays/Indicators |                                                     |                                           | CHARGE, PWR, COM, L1, and L2 indicators, and two, one-digit seven-segment displays                                                                                                                                                                                                                                                                                                                                                                                                          |

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| Item                                              |                               | Specification                                                                                                                                                                                                  |
|---------------------------------------------------|-------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| MECHA-TROLINK-III Commu-nications                 | Communications Protocol       | MECHATROLINK-III                                                                                                                                                                                               |
|                                                   | Station Address Settings      | 03 to EF hex (maximum number of slaves: 62)<br>The rotary switches (S1 and S2) are used to set the station address.                                                                                            |
|                                                   | Extended Address Setting      | Axis 1: 00 hex, Axis 2: 01 hex                                                                                                                                                                                 |
|                                                   | Baud Rate                     | 100 Mbps                                                                                                                                                                                                       |
|                                                   | Transmission Cycle            | 250 μs, 500 μs, 750 μs,<br>1.0 ms to 4.0 ms (multiples of 0.5 ms)                                                                                                                                              |
|                                                   | Number of Transmis-sion Bytes | 32 or 48 bytes/station<br>A DIP switch (S3) is used to select the baud rate.                                                                                                                                   |
| Reference Method                                  | Performance                   | Position, speed, or torque control with MECHATROLINK-III communi-cations                                                                                                                                       |
|                                                   | Reference Input               | MECHATROLINK-III commands (sequence, motion, data setting, data access, monitoring, adjustment, etc.)                                                                                                          |
|                                                   | Profile                       | MECHATROLINK-III standard servo profile                                                                                                                                                                        |
| MECHATROLINK-III Communica-tions Setting Switches |                               | Rotary switch (S1 and S2) positions: 16                                                                                                                                                                        |
|                                                   |                               | Number of DIP switch (S3) pins: 4                                                                                                                                                                              |
| Analog Monitor (CN5)                              |                               | Number of points: 2<br>Output voltage range: ±10 VDC (effective linearity range: ±8 V)<br>Resolution: 16 bits<br>Accuracy: ±20 mV (Typ)<br>Maximum output current: ±10 mA<br>Settling time (±1%): 1.2 ms (Typ) |
| Dynamic Brake (DB)                                |                               | Activated when a servo alarm or overtravel (OT) occurs, or when the power supply to the main circuit or servo is OFF.                                                                                          |
| Regenerative Processing                           |                               | Built-in                                                                                                                                                                                                       |
| Overtravel (OT) Prevention                        |                               | Stopping with dynamic brake, deceleration to a stop, or coasting to a stop for the P-OT (Forward Drive Prohibit) or N-OT (Reverse Drive Prohibit) signal                                                       |
| Protective Functions                              |                               | Overcurrent, overvoltage, low voltage, overload, regeneration error, etc.                                                                                                                                      |
| Utility Functions                                 |                               | Gain adjustment, alarm history, jogging, origin search, etc.                                                                                                                                                   |
| Option Module                                     |                               | Option Module cannot be attached.                                                                                                                                                                              |

\* The coefficient of speed fluctuation for load fluctuation is defined as follows:

$$\text{Coefficient of speed fluctuation} = \frac{\text{No-load motor speed} - \text{Total-load motor speed}}{\text{Rated motor speed}} \times 100\%$$

## Specifications (400V Models)

| Item                     |                                          | Specification                                                                                                                                                                                                                                                                          |
|--------------------------|------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Control Method           |                                          | IGBT-based PWM control, sine wave current drive                                                                                                                                                                                                                                        |
| Feedback                 | With Rotary Servo Motor                  | Serial encoder: 24 bits (incremental encoder/absolute encoder)                                                                                                                                                                                                                         |
|                          | With Linear Servo Motor                  | <ul style="list-style-type: none"> <li>Absolute linear encoder (The signal resolution depends on the absolute linear encoder.)</li> <li>Incremental linear encoder (The signal resolution depends on the incremental linear encoder or Serial Converter Unit.)</li> </ul>              |
| Environmental Conditions | Surrounding Air Temperature              | -5°C to 55°C<br>With derating, usage is possible between 55°C and 60°C.<br>Refer to the following section for derating specifications.<br> <i>Specifications (400V Models) (page 515)</i>             |
|                          | Storage Temperature                      | -20°C to 85°C                                                                                                                                                                                                                                                                          |
|                          | Surrounding Air Humidity                 | 95% relative humidity max. (with no freezing or condensation)                                                                                                                                                                                                                          |
|                          | Storage Humidity                         | 95% relative humidity max. (with no freezing or condensation)                                                                                                                                                                                                                          |
|                          | Vibration Resistance                     | 4.9 m/s <sup>2</sup>                                                                                                                                                                                                                                                                   |
|                          | Shock Resistance                         | 19.6 m/s <sup>2</sup>                                                                                                                                                                                                                                                                  |
|                          | Degree of Protection                     | IP10                                                                                                                                                                                                                                                                                   |
|                          | Pollution Degree                         | 2<br><ul style="list-style-type: none"> <li>Must be no corrosive or flammable gases.</li> <li>Must be no exposure to water, oil, or chemicals.</li> <li>Must be no dust, salts, or iron dust.</li> </ul>                                                                               |
|                          | Altitude                                 | 1,000 m or less.<br>With derating, usage is possible between 1,000 m and 2,000 m.<br>Refer to the following section for derating specifications.<br> <i>Specifications (400V Models) (page 515)</i> |
|                          | Others                                   | Do not use the SERVOPACK in the following locations: Locations subject to static electricity noise, strong electromagnetic/magnetic fields, or radioactivity                                                                                                                           |
| Applicable Standards     |                                          | UL 61800-5-1, CSA C22.2 No.274, EN50178, EN 61800-5-1, EN 55011 group 1 class A, EN 61000-6-2, EN 61000-6-4, and EN 61800-3                                                                                                                                                            |
| Mounting                 |                                          | Base-mounted                                                                                                                                                                                                                                                                           |
| Performance              | Speed Control Range                      | 1:5000 (At the rated torque, the lower limit of the speed control range must not cause the Servo Motor to stop.)                                                                                                                                                                       |
|                          | Coefficient of Speed Fluctuation*        | ±0.01% of rated speed max. (for a load fluctuation of 0% to 100%)                                                                                                                                                                                                                      |
|                          |                                          | 0% of rated speed max. (for a voltage fluctuation of ±10%)                                                                                                                                                                                                                             |
|                          |                                          | ±0.1% of rated speed max. (for a temperature fluctuation of 25°C ±25°C)                                                                                                                                                                                                                |
|                          | Torque Control Precision (Repeatability) | ±1%                                                                                                                                                                                                                                                                                    |
|                          | Soft Start Time Setting                  | 0 s to 10 s (Can be set separately for acceleration and deceleration.)                                                                                                                                                                                                                 |

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| Item                |                                                     |                                           | Specification                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
|---------------------|-----------------------------------------------------|-------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| I/O Signals         | Linear Servo Motor Overheat Protection Signal Input |                                           | Number of input points: 2<br>Input voltage range: 0 V to +5 V                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
|                     | Sequence Input Signals                              | Input Signals That Can Be Allocated       | Allowable voltage range: 24 VDC ±20%<br>Number of input points: 10                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|                     |                                                     |                                           | Input method: Sink inputs or source inputs<br>Input Signals <ul style="list-style-type: none"><li>• /DEC (Origin Return Deceleration Switch) signal</li><li>• /EXT1 to /EXT3 (External Latch Input 1 to 3) signals</li><li>• P-OT (Forward Drive Prohibit) and N-OT (Reverse Drive Prohibit) signals</li><li>• /P-CL (Forward External Torque Limit) and /N-CL (Reverse External Torque Limit) signals</li><li>• Torque Limit) signals</li><li>• /P-DET (Polarity Detection) signal</li></ul> A signal can be allocated and the positive and negative logic can be changed. |
|                     | Sequence Output Signals                             | Fixed Output                              | Allowable voltage range: 5 VDC to 30 VDC<br>Number of output points: 1<br>Output signal: Servo Alarm (ALM)                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
|                     |                                                     | Output Signals That Can Be Allocated      | Allowable voltage range: 5 VDC to 30 VDC<br>Number of output points: 6<br>(A photocoupler output (isolated) is used.)                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
|                     |                                                     |                                           | Output Signals <ul style="list-style-type: none"><li>• /COIN (Positioning Completion) signal</li><li>• /V-CMP (Speed Coincidence Detection) signal</li><li>• /TGON (Rotation Detection) signal</li><li>• /S-RDY (Servo Ready) signal</li><li>• /CLT (Torque Limit Detection) signal</li><li>• /VLT (Speed Limit Detection) signal</li><li>• /BK (Brake) signal</li><li>• /WARN (Warning) signal</li><li>• /NEAR (Near) signal</li></ul> A signal can be allocated and the positive and negative logic can be changed.                                                       |
| Communications      | RS-422A Communications (CN3)                        | Inter-<br>faces                           | Digital Operator (JUSP-OP05A-1-E)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
|                     |                                                     | 1:N Commu-<br>nica-<br>tions              | Up to N = 15 stations possible for RS-422A port                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
|                     |                                                     | Axis Address Settings                     | Set with parameters.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
|                     | USB Communications (CN7)                            | Inter-<br>face                            | Personal Computer (with SigmaWin+)<br>The software version of the SigmaWin+ must be version 7.11 or higher.                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
|                     |                                                     | Commu-<br>nica-<br>tions<br>Stan-<br>dard | Conforms to USB2.0 standard (12 Mbps).                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| Displays/Indicators |                                                     |                                           | CHARGE, PWR, CN, L1, and L2 indicators, and two, one-digit seven-segment displays                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |

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| Item                              |                               | Specification                                                                                                                                                                                                  |
|-----------------------------------|-------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| MECHA-TROLINK-III Commu-nications | Communications Protocol       | MECHATROLINK-III                                                                                                                                                                                               |
|                                   | Station Address Settings      | 03 to EF hex (maximum number of slaves: 62)<br>The rotary switches (S1 and S2) are used to set the station address.                                                                                            |
|                                   | Extended Address Setting      | Axis 1: 00 hex, Axis 2: 01 hex                                                                                                                                                                                 |
|                                   | Baud Rate                     | 100 Mbps                                                                                                                                                                                                       |
|                                   | Transmission Cycle            | 250 μs, 500 μs, 750 μs,<br>1.0 ms to 4.0 ms (multiples of 0.5 ms)                                                                                                                                              |
|                                   | Number of Transmis-sion Bytes | 32 or 48 bytes/station<br>A DIP switch (S3) is used to select the baud rate.                                                                                                                                   |
| Reference Method                  | Performance                   | Position, speed, or torque control with MECHATROLINK-III communications                                                                                                                                        |
|                                   | Reference Input               | MECHATROLINK-III commands (sequence, motion, data setting, data access, monitoring, adjustment, etc.)                                                                                                          |
|                                   | Profile                       | MECHATROLINK-III standard servo profile                                                                                                                                                                        |
| Analog Monitor (CN5)              |                               | Number of points: 2<br>Output voltage range: ±10 VDC (effective linearity range: ±8 V)<br>Resolution: 16 bits<br>Accuracy: ±20 mV (Typ)<br>Maximum output current: ±10 mA<br>Settling time (±1%): 1.2 ms (Typ) |
| Dynamic Brake (DB)                |                               | Activated when a servo alarm or overtravel (OT) occurs, or when the power supply to the main circuit or servo is OFF.                                                                                          |
| Regenerative Processing           |                               | Built-in                                                                                                                                                                                                       |
| Overtravel (OT) Prevention        |                               | Stopping with dynamic brake, deceleration to a stop, or coasting to a stop for the P-OT (Forward Drive Prohibit) or N-OT (Reverse Drive Prohibit) signal                                                       |
| Protective Functions              |                               | Overcurrent, overvoltage, low voltage, overload, regeneration error, etc.                                                                                                                                      |
| Utility Functions                 |                               | Gain adjustment, alarm history, jogging, origin search, etc.                                                                                                                                                   |
| Safety Functions                  | Inputs                        | /HWBB_A1, /HWWB_A2, /HWWB_B1 and /HWBB_B2: Base block signals for Power Modules                                                                                                                                |
|                                   | Outputs                       | EDM_A and EDM_B: Monitor the status of built-in safety circuits (fixed out-puts).                                                                                                                              |
|                                   | Applicable Stan-dards         | ISO13849-1 PLe (Category 3), IEC61508 SIL3                                                                                                                                                                     |
| Option Module                     |                               | Option Module Safety                                                                                                                                                                                           |

\*1. The coefficient of speed fluctuation for load fluctuation is defined as follows:

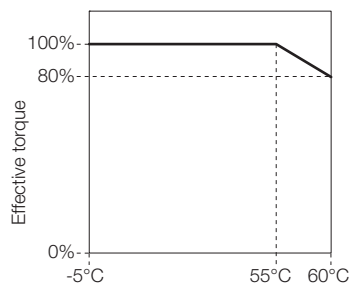
$$\text{Coefficient of speed fluctuation} = \frac{\text{No-load motor speed} - \text{Total-load motor speed}}{\text{Rated motor speed}} \times 100\%$$

\*2. . Always perform risk assessment for the system and confirm that the safety requirements are met.

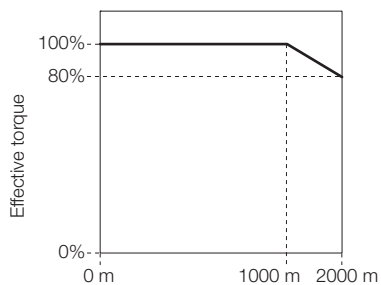
## Derating Specifications

If you use the SERVOPACK at a surrounding air temperature of 55°C to 60°C or at an altitude of 1,000 m to 2,000 m, you must apply the derating rates given in the following graphs.

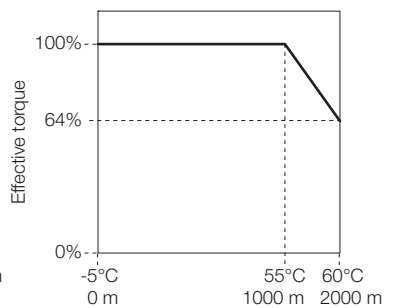
### ◆ SGD7W-1R6A, -2R8A, -5R5A, and -7R6A



Surrounding air temperature



Altitude



Surrounding air temperature and altitude



## Model Designations

SGD7W - 2R6 D A0 B

Σ-7 Series  
 Σ-7W SERVOPACKs

1st+2nd+3rd digits    4th digit    5th+6th digits    7th digit    8th+9th+10th digits

1st+2nd+3rd digits Maximum Applicable Motor Capacity per Axis

| Voltage              | Code | Specification |
|----------------------|------|---------------|
| Three-phase, 400 VAC | 2R6  | 0.75 kW       |
|                      | 5R4  | 1.5 kW        |

5th+6th digits Interface\*2

| Code | Specification                     |
|------|-----------------------------------|
| A0   | EtherCAT communications reference |

8th+9th+10th digits Hardware Options Specification

| Code | Specification                | Applicable Models |
|------|------------------------------|-------------------|
| -    | Without options              | 400 V             |
| 026  | With relay for holding brake |                   |

7th digit Design Revision Order

| Code | Specification                   |
|------|---------------------------------|
| B    | Global Design Revision for 400V |

4th digit Voltage

| Code | Specification |
|------|---------------|
| D    | 400 VAC       |

Shaded items are non-stock

## Ratings and Specifications

### Ratings

#### ◆ Three-phase, 400 VAC

| Model SGD7W-                                         |                                               |                     | 2R6D                                                         | 5R4D  |
|------------------------------------------------------|-----------------------------------------------|---------------------|--------------------------------------------------------------|-------|
| Maximum Applicable Motor Capacity per Axis [kW]      |                                               |                     | 0.75                                                         | 1.5   |
| Continuous Output Current per Axis [Arms]            |                                               |                     | 2.6                                                          | 5.4   |
| Instantaneous Maximum Output Current per Axis [Arms] |                                               |                     | 8.5                                                          | 14    |
| Main Circuit                                         | Power Supply                                  |                     | Three-phase 380 VAC to 480 VAC, -15% to +10%,<br>50 Hz/60 Hz |       |
|                                                      | Input Current [Arms]*                         |                     | 4.4                                                          | 8.6   |
| Control                                              | Power Supply                                  |                     | 24 VDC ±15%                                                  |       |
|                                                      | Input Current [Arms]*                         |                     | 1.2                                                          |       |
| Power Supply Capacity [kVA]*                         |                                               |                     | 3.5                                                          | 6.8   |
| Power Loss*                                          | Main Circuit Power Loss [W]                   |                     | 65.4                                                         | 108.6 |
|                                                      | Control Circuit Power Loss [W]                |                     | 21                                                           |       |
|                                                      | Built-in Regenerative Resistor Power Loss [W] |                     | 28                                                           | 28    |
|                                                      | Total Power Loss [W]                          |                     | 114.4                                                        | 157.6 |
| Regenerative Resistor                                | Built-In Regenera-<br>tive Resistor           | Resis-<br>tance [Ω] | 43                                                           | 43    |
|                                                      |                                               | Capacity<br>[W]     | 140                                                          | 140   |
|                                                      | Minimum Allowable External Resistance [Ω]     |                     | 43                                                           | 43    |
| Overvoltage Category                                 |                                               |                     | III                                                          |       |

\* This is the net value at the rated load.

#### ◆ 540 VDC

| Model SGD7W-                                         |                                | 2R6D                             | 5R4D  |
|------------------------------------------------------|--------------------------------|----------------------------------|-------|
| Maximum Applicable Motor Capacity per Axis [kW]      |                                | 0.75                             | 1.5   |
| Continuous Output Current per Axis [Arms]            |                                | 2.6                              | 5.4   |
| Instantaneous Maximum Output Current per Axis [Arms] |                                | 8.5                              | 14    |
| Main Circuit                                         | Power Supply                   | 513 VDC to 648 VDC, -15% to +10% |       |
|                                                      | Input Current [Arms]*          | 5                                | 11    |
| Control                                              | Power Supply                   | 24 VDC ±15%                      |       |
|                                                      | Input Current [Arms]*          | 1.2                              |       |
| Power Supply Capacity [kVA]*                         |                                | 3.5                              | 6.8   |
| Power Loss*                                          | Main Circuit Power Loss [W]    | 47.4                             | 90.6  |
|                                                      | Control Circuit Power Loss [W] | 21                               |       |
|                                                      | Total Power Loss [W]           | 68.4                             | 111.6 |
| Overvoltage Category                                 |                                | III                              |       |

\* This is the net value at the rated load.

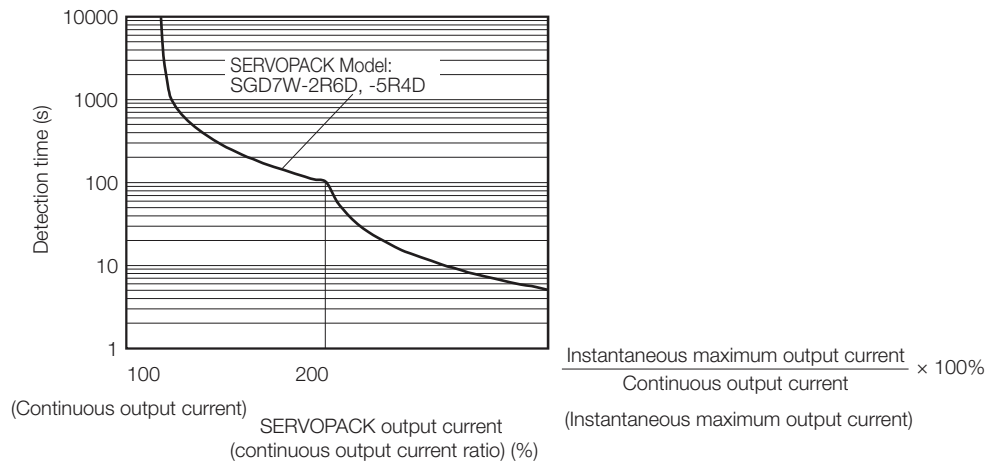
## SERVOPACK Overload Protection Characteristics

The overload detection level is set for hot start conditions with a SERVOPACK surrounding air temperature of 55°C.

An overload alarm (A.710 or A.720) will occur if overload operation that exceeds the overload protection characteristics shown in the following diagram (i.e., operation on the right side of the applicable line) is performed.

The actual overload detection level will be the detection level of the connected SERVOPACK or Servo Motor that has the lower overload protection characteristics.

In most cases, that will be the overload protection characteristics of the Servo Motor.



Note: The above overload protection characteristics do not mean that you can perform continuous duty operation with an output of 100% or higher.

For a Yaskawa-specified combination of SERVOPACK and Servo Motor, maintain the effective torque (or effective force) within the continuous duty zone of the torque-motor speed characteristic (or force-motor speed characteristics) of the Servo Motor.

## Specifications

| Item                     |                                          | Specification                                                                                                                                                                                                                                                             |
|--------------------------|------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Control Method           |                                          | IGBT-based PWM control, sine wave current drive                                                                                                                                                                                                                           |
| Feedback                 | With Rotary Servo Motor                  | Serial encoder: 24 bits (incremental encoder/absolute encoder)                                                                                                                                                                                                            |
|                          | With Linear Servo Motor                  | <ul style="list-style-type: none"> <li>Absolute linear encoder (The signal resolution depends on the absolute linear encoder.)</li> <li>Incremental linear encoder (The signal resolution depends on the incremental linear encoder or Serial Converter Unit.)</li> </ul> |
| Environmental Conditions | Surrounding Air Temperature              | -5°C to 55°C<br>With derating, usage is possible between 55°C and 60°C.<br>Refer to the following section for derating specifications.<br> Specifications (page 523)                     |
|                          | Storage Temperature                      | -20°C to 85°C                                                                                                                                                                                                                                                             |
|                          | Surrounding Air Humidity                 | 95% relative humidity max. (with no freezing or condensation)                                                                                                                                                                                                             |
|                          | Storage Humidity                         | 95% relative humidity max. (with no freezing or condensation)                                                                                                                                                                                                             |
|                          | Vibration Resistance                     | 4.9 m/s <sup>2</sup>                                                                                                                                                                                                                                                      |
|                          | Shock Resistance                         | 19.6 m/s <sup>2</sup>                                                                                                                                                                                                                                                     |
|                          | Degree of Protection                     | IP10                                                                                                                                                                                                                                                                      |
|                          | Pollution Degree                         | 2<br><ul style="list-style-type: none"> <li>Must be no corrosive or flammable gases.</li> <li>Must be no exposure to water, oil, or chemicals.</li> <li>Must be no dust, salts, or iron dust.</li> </ul>                                                                  |
|                          | Altitude                                 | 1,000 m or less.<br>With derating, usage is possible between 1,000 m and 2,000 m.<br>Refer to the following section for derating specifications.<br> Specifications (page 523)         |
|                          | Others                                   | Do not use the SERVOPACK in the following locations: Locations subject to static electricity noise, strong electromagnetic/magnetic fields, or radioactivity                                                                                                              |
| Applicable Standards     |                                          | UL 61800-5-1, CSA C22.2 No.274, EN50178, EN 61800-5-1, EN 55011 group 1 class A, EN 61000-6-2, EN 61000-6-4, and EN 61800-3                                                                                                                                               |
| Mounting                 |                                          | Base-mounted                                                                                                                                                                                                                                                              |
| Performance              | Speed Control Range                      | 1:5000 (At the rated torque, the lower limit of the speed control range must not cause the Servo Motor to stop.)                                                                                                                                                          |
|                          | Coefficient of Speed Fluctuation*        | ±0.01% of rated speed max. (for a load fluctuation of 0% to 100%)                                                                                                                                                                                                         |
|                          |                                          | 0% of rated speed max. (for a voltage fluctuation of ±10%)                                                                                                                                                                                                                |
|                          |                                          | ±0.1% of rated speed max. (for a temperature fluctuation of 25°C ±25°C)                                                                                                                                                                                                   |
|                          | Torque Control Precision (Repeatability) | ±1%                                                                                                                                                                                                                                                                       |
|                          | Soft Start Time Setting                  | 0 s to 10 s (Can be set separately for acceleration and deceleration.)                                                                                                                                                                                                    |

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| Item                                      |                                                     |                                      | Specification                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
|-------------------------------------------|-----------------------------------------------------|--------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| I/O Signals                               | Linear Servo Motor Overheat Protection Signal Input |                                      | Number of input points: 1<br>Input voltage range: 0 V to +5 V                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
|                                           | Sequence Input Signals                              | Input Signals That Can Be Allocated  | Allowable voltage range: 24 VDC ±20%<br>Number of input points: 7                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
|                                           |                                                     |                                      | Input method: Sink inputs or source inputs<br>Input Signals <ul style="list-style-type: none"><li>• P-OT (Forward Drive Prohibit) and N-OT (Reverse Drive Prohibit) signals</li><li>• /Probe1 (Probe 1 Latch Input) signal</li><li>• /Probe2 (Probe 2 Latch Input) signal</li><li>• /Home (Home Switch Input) signal</li><li>• /P-CL (Forward External Torque Limit) and /N-CL (Reverse External Torque Limit) signals</li><li>• /SI0 and /SI3 (General-Purpose Input) signals</li></ul> A signal can be allocated and the positive and negative logic can be changed.                                                                                                                                                                                   |
|                                           | Sequence Output Signals                             | Fixed Output                         | Allowable voltage range: 5 VDC to 30 VDC<br>Number of output points: 1<br>Output signal: Servo Alarm (ALM)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
|                                           |                                                     | Output Signals That Can Be Allocated | Allowable voltage range: 5 VDC to 30 VDC<br>Number of output points: 5<br>(A photocoupler output (isolated) is used.)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
|                                           |                                                     |                                      | Output Signals <ul style="list-style-type: none"><li>• /COIN (Positioning Completion) signal</li><li>• /V-CMP (Speed Coincidence Detection) signal</li><li>• /TGON (Rotation Detection) signal</li><li>• /S-RDY (Servo Ready) signal</li><li>• /CLT (Torque Limit Detection) signal</li><li>• /VLT (Speed Limit Detection) signal</li><li>• /BK (Brake) signal</li><li>• /WARN (Warning) signal</li><li>• /NEAR (Near) signal</li><li>• /ZONE0 (ZONE Signal 1 Output) signal</li><li>• /ZONE1 (ZONE Signal 2 Output) signal</li><li>• /ZONE2 (ZONE Signal 3 Output) signal</li><li>• /ZONE3 (ZONE Signal 4 Output) signal</li><li>• /nZONE (nZONE Output) signal</li></ul> A signal can be allocated and the positive and negative logic can be changed. |
| Communications                            | RS-422A Communications (CN3)                        | Inter-<br>faces                      | Digital Operator (JUSP-OP05A-1-E)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
|                                           |                                                     | 1:N Com-<br>muni-<br>cations         | Up to N = 15 stations possible for RS-422A port                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|                                           |                                                     | Axis<br>Address<br>Settings          | Set with parameters.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
|                                           | USB Com-<br>muni-<br>cations (CN7)                  | Interface                            | Personal Computer (with SigmaWin+)<br>The software version of the SigmaWin+ must be version 7.11 or higher.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
|                                           |                                                     | Communi-<br>cations<br>Standard      | Conforms to USB2.0 standard (12 Mbps).                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| Displays/Indicators                       |                                                     |                                      | CHARGE, PWR, RUN, ERR, and L/A (A and B) indicators, and one-digit seven-seg-<br>ment display                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| EtherCAT Communications Settings Switches |                                                     |                                      | EtherCAT secondary address (S1 and S2), 16 positions                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |

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| Item                       |                                     | Specification                                                                                                                                                                                                                                                                                                                                                                                             |
|----------------------------|-------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| EtherCAT Communications    | Applicable Communications Standards | IEC 61158 Type 12, IEC 61800-7 CiA402 Drive Profile                                                                                                                                                                                                                                                                                                                                                       |
|                            | Physical Layer                      | 100BASE-TX (IEEE 802.3)                                                                                                                                                                                                                                                                                                                                                                                   |
|                            | Communications Connectors           | CN6A (RJ45): EtherCAT signal input connector<br>CN6B (RJ45): EtherCAT signal output connector                                                                                                                                                                                                                                                                                                             |
|                            | Cable                               | Category 5, 4 shielded twisted pairs<br>* The cable is automatically detected with AUTO MDIX.                                                                                                                                                                                                                                                                                                             |
|                            | Sync Manager                        | SM0: Mailbox output, SM1: Mailbox input, SM2: Process data output, and SM3: Process data input                                                                                                                                                                                                                                                                                                            |
|                            | FMMU                                | FMMU 0: Mapped in process data output (RxPDO) area.<br>FMMU 1: Mapped in process data input (TxPDO) area.<br>FMMU 2: Mapped to mailbox status.                                                                                                                                                                                                                                                            |
|                            | EtherCAT Commands (Data Link Layer) | APRD, FPRD, BRD, LRD, APWR, FPWR, BWR, LWR, ARMW, and FRMW (APRW, FPRW, BRW, and LRW commands are not supported.)                                                                                                                                                                                                                                                                                         |
|                            | Process Data                        | Assignments can be changed with PDO mapping.                                                                                                                                                                                                                                                                                                                                                              |
|                            | Mailbox (CoE)                       | Emergency messages, SDO requests, SDO responses, and SDO information (TxPDO/RxPDO and remote TxPDO/RxPDO are not supported.)                                                                                                                                                                                                                                                                              |
|                            | Distributed Clocks                  | Free-Run Mode and DC Mode (Can be switched.)<br>Applicable DC cycles: 125 μs to 4 ms in 125-μs increments                                                                                                                                                                                                                                                                                                 |
|                            | Slave Information Interface         | 256 bytes (read-only)                                                                                                                                                                                                                                                                                                                                                                                     |
|                            | Indicators                          | EtherCAT communications in progress: Link/Activity x 2<br>EtherCAT communications status: RUN x 1<br>EtherCAT error status: ERR x 1                                                                                                                                                                                                                                                                       |
| CiA402 Drive Profile       |                                     | <ul style="list-style-type: none"> <li>• Homing Mode</li> <li>• Profile Position Mode</li> <li>• Interpolated Position Mode</li> <li>• Profile Velocity Mode</li> <li>• Profile Torque Mode</li> <li>• Cyclic Synchronous Position Mode</li> <li>• Cyclic Synchronous Velocity Mode</li> <li>• Cyclic Synchronous Torque Mode</li> <li>• Touch Probe Function</li> <li>• Torque Limit Function</li> </ul> |
| Analog Monitor (CN5)       |                                     | Number of points: 2<br>Output voltage range: ±10 VDC (effective linearity range: ±8 V)<br>Resolution: 16 bits<br>Accuracy: ±20 mV (Typ)<br>Maximum output current: ±10 mA<br>Settling time (±1%): 1.2 ms (Typ)                                                                                                                                                                                            |
| Dynamic Brake (DB)         |                                     | Activated when a servo alarm or overtravel (OT) occurs, or when the power supply to the main circuit or servo is OFF.                                                                                                                                                                                                                                                                                     |
| Regenerative Processing    |                                     | Built-in                                                                                                                                                                                                                                                                                                                                                                                                  |
| Overtravel (OT) Prevention |                                     | Stopping with dynamic brake, deceleration to a stop, or coasting to a stop for the P-OT (Forward Drive Prohibit) or N-OT (Reverse Drive Prohibit) signal                                                                                                                                                                                                                                                  |
| Protective Functions       |                                     | Overcurrent, overvoltage, low voltage, overload, regeneration error, etc.                                                                                                                                                                                                                                                                                                                                 |
| Utility Functions          |                                     | Gain adjustment, alarm history, jogging, origin search, etc.                                                                                                                                                                                                                                                                                                                                              |
| Safety Functions           | Inputs                              | /HWBB_A1, /HWBB_A2, /HWBB_B1 and /HWBB_B2: Base block signals for Power Modules                                                                                                                                                                                                                                                                                                                           |
|                            | Outputs                             | EDM_A and EDM_B: Monitor the status of built-in safety circuits (fixed outputs).                                                                                                                                                                                                                                                                                                                          |
|                            | Applicable Standards                | ISO13849-1 PLe (Category 3), IEC61508 SIL3                                                                                                                                                                                                                                                                                                                                                                |
| Option Module              |                                     | Option Module Safety                                                                                                                                                                                                                                                                                                                                                                                      |

\*1. The coefficient of speed fluctuation for load fluctuation is defined as follows:

$$\text{Coefficient of speed fluctuation} = \frac{\text{No-load motor speed} - \text{Total-load motor speed}}{\text{Rated motor speed}} \times 100\%$$

\*2. . Always perform risk assessment for the system and confirm that the safety requirements are met.

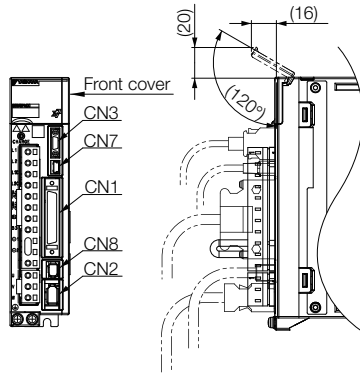
# SERVOPACK External Dimensions

## Front Cover Dimensions and Connector Specifications

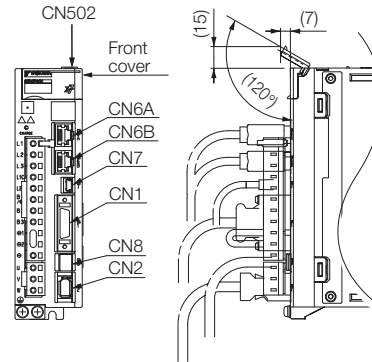
The front cover dimensions and panel connectors depend on the SERVOPACK interface. Refer to the following figures.

### Front Cover Dimensions (200V Models)

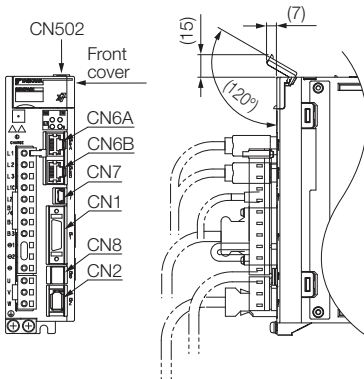
- $\Sigma$ -7S Analog Voltage/Pulse Train Reference SERVOPACKs



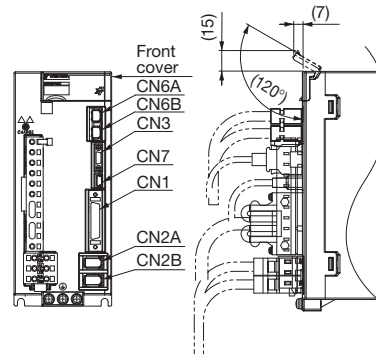
- $\Sigma$ -7S MECHATROLINK-III Communications Reference SERVOPACKs



- $\Sigma$ -7S EtherCAT Communications Reference SERVOPACKs



- $\Sigma$ -7W MECHATROLINK-III Communications Reference SERVOPACKs



\* A Command Option Module must be attached to the Command Option Attachable-Type SERVOPACK. To find the dimensions of the SERVOPACK with a Command Option Module attached, add the dimensions of the Command Option Module (refer to page 240 and following pages).

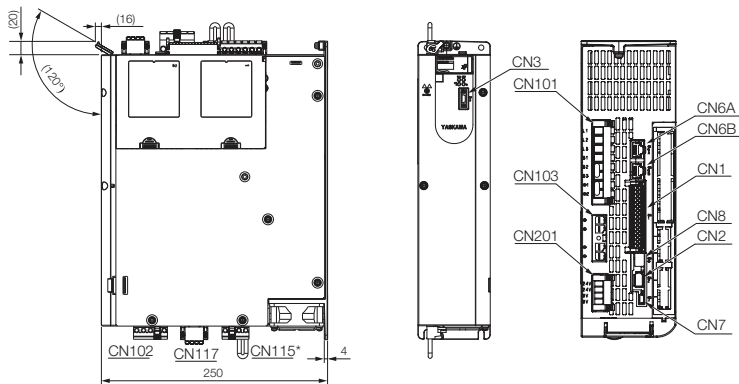
## Connector Specifications (200V Models)

| SERVOPACK                                                                 | Connector No. | Model                       | Number of Pins | Manufacturer                  |
|---------------------------------------------------------------------------|---------------|-----------------------------|----------------|-------------------------------|
| $\Sigma$ -7S<br>Analog Voltage/Pulse<br>Train Reference<br>SERVOPACK      | CN1           | 10250-59A3MB                | 50             | 3M Japan Ltd.                 |
|                                                                           | CN2           | 3E106-0220KV                | 6              | 3M Japan Ltd.                 |
|                                                                           | CN3           | HDR-EC14LF-<br>DTN-SLD-PLUS | 14             | Honda Tsushin Kogyo Co., Ltd. |
|                                                                           | CN7           | 2172034-1                   | 5              | Tyco Electronics Japan G.K.   |
|                                                                           | CN8           | 1981080-1                   | 8              | Tyco Electronics Japan G.K.   |
| $\Sigma$ -7S<br>MECHATROLINK-III<br>Communications<br>Reference SERVOPACK | CN1           | 10226-59A3MB                | 26             | 3M Japan Ltd.                 |
|                                                                           | CN2           | 3E106-0220KV                | 6              | 3M Japan Ltd.                 |
|                                                                           | CN502         | S8B-ZR-SM4A-TF<br>(LF)(SN)  | 8              | J.S.T. Mfg. Co., Ltd.         |
|                                                                           | CN6A,<br>CN6B | 1-1734579-4                 | 8              | Tyco Electronics Japan G.K.   |
|                                                                           | CN7           | 2172034-1                   | 5              | Tyco Electronics Japan G.K.   |
|                                                                           | CN8           | 1981080-1                   | 8              | Tyco Electronics Japan G.K.   |
| $\Sigma$ -7S EtherCAT<br>Communications<br>Reference SERVOPACK            | CN1           | 10226-59A3MB                | 26             | 3M Japan Ltd.                 |
|                                                                           | CN2           | 3E106-0220KV                | 6              | 3M Japan Ltd.                 |
|                                                                           | CN502         | S8B-ZR-SM4A-TF<br>(LF)(SN)  | 8              | J.S.T. Mfg. Co., Ltd.         |
|                                                                           | CN6A,<br>CN6B | 1903815-1                   | 8              | Tyco Electronics Japan G.K.   |
|                                                                           | CN7           | 2172034-1                   | 5              | Tyco Electronics Japan G.K.   |
|                                                                           | CN8           | 1981080-1                   | 8              | Tyco Electronics Japan G.K.   |
| $\Sigma$ -7W<br>MECHATROLINK-III<br>Communications<br>Reference SERVOPACK | CN1           | 10236-59A3MB                | 36             | 3M Japan Ltd.                 |
|                                                                           | CN2A,<br>CN2B | 3E106-2230KV                | 6              | 3M Japan Ltd.                 |
|                                                                           | CN3           | HDR-EC14LF-<br>DTN-SLD-PLUS | 14             | Honda Tsushin Kogyo Co., Ltd. |
|                                                                           | CN6A,<br>CN6B | 1981386-1                   | 8              | Tyco Electronics Japan G.K.   |
|                                                                           | CN7           | 2172034-1                   | 5              | Tyco Electronics Japan G.K.   |

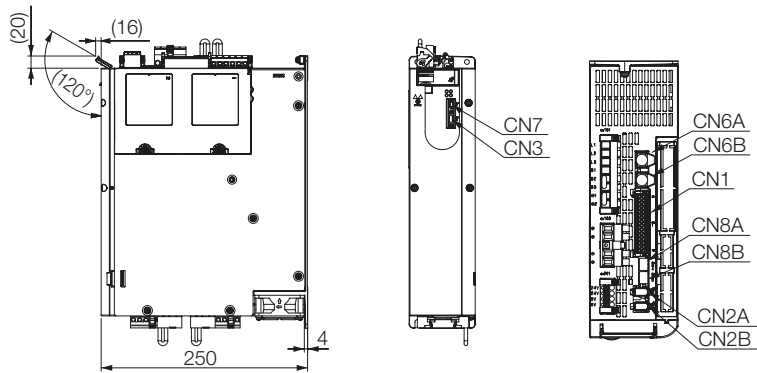
Note: The above connectors or their equivalents are used for the SERVOPACKs.

## Front Cover Dimensions (400V Models)

- $\Sigma$ -7S MECHATROLINK-III and EtherCAT Reference SERVOPACKs



- $\Sigma$ -7W MECHATROLINK-III and EtherCAT Communications Reference SERVOPACKs



Unit: mm

\* Dynamic Brake Connector only for SGD7S-1R9D up to -170D.

## Connector Specifications (400V Models)

| SERVO-<br>PACK                                             | Conne-<br>ctor No.                                                  | Function                                                                                   | Model                                    | Yaskawa Order<br>Code | No. of<br>Pins | Manufacturer                     |
|------------------------------------------------------------|---------------------------------------------------------------------|--------------------------------------------------------------------------------------------|------------------------------------------|-----------------------|----------------|----------------------------------|
| Σ-7S MECHATROLINK-III or EtherCAT Communications Reference | CN1                                                                 | I/O Connector                                                                              | DFMC1,5/15-ST-3,5-LRBK                   | JUSP-7CN001           | 30             | Phoenix Contact                  |
|                                                            | CN2                                                                 | Encoder Connector                                                                          | -                                        | JZSP-CMP9-1-E         | 6              | Sumitomo 3M Ltd                  |
|                                                            | CN3                                                                 | Digital Operator                                                                           | -                                        | -                     | 14             | Honda Tsushin<br>Kogyo Co., Ltd  |
|                                                            |                                                                     |                                                                                            | -                                        |                       |                |                                  |
|                                                            | CN6A/<br>CN6B                                                       | Fieldbus Connector                                                                         | -                                        | -                     | 8              | Tyco Electronics<br>Japan G.K    |
|                                                            | CN7                                                                 | SigmaWin USB<br>Connector                                                                  | -                                        | -                     | 5              |                                  |
|                                                            | CN8                                                                 | Safety Connector Kit                                                                       | -                                        | 2013595-1             | 8              |                                  |
|                                                            |                                                                     | Safety Jumper Connector                                                                    | -                                        | JZSP-CVH05-E          | 8              |                                  |
|                                                            | CN101                                                               | Main Power Connector<br>SGD7S-1R9D to -170D                                                | BLZ 7.62HP/08/180LR SN BK<br>BX PRT      | JUSP-7CN101           | 8              | Weidmüller                       |
|                                                            |                                                                     | Main Power Connector<br>SGD7S-210D to -370D                                                | BUZ 10.16HP/07/180F AG BK<br>BX LPR SO   | JUSP-7CN101-1         | 7              |                                  |
|                                                            | CN102                                                               | Motor Power Connector<br>SGD7S-1R9D to -170D                                               | BLZ 7.62IT/04/180MF4 SN<br>BK BX PRT     | JUSP-7CN102           | 4              |                                  |
|                                                            |                                                                     | Motor Power Connector<br>SGD7S-210D to -370D                                               | BUZ 10.16IT/04/180MF4 AG<br>BK BX LPR SO | JUSP-7CN102-1         | 4              |                                  |
|                                                            | CN103                                                               | DC Power Input<br>SGD7S-1R9D to -170D                                                      | BVZ 7.62IT/04/180MF3 SN<br>BK BX PRT     | JUSP-7CN103           | 4              |                                  |
|                                                            |                                                                     | DC Power Input<br>SGD7S-210D to -370D                                                      | BUZ 10.16IT/04/180MF3 AG<br>BK BX LPR SO | JUSP-7CN103-1         | 4              |                                  |
| CN115                                                      | DC Bus Sharing - Contact<br>Yaskawa for Application<br>Restrictions | BLZ 7.62IT/03/180MF2 SN<br>BK BX PRT                                                       | JUSP-7CN115                              | 3                     |                |                                  |
|                                                            |                                                                     | No integrated Dynamic Brake circuit. External Dynamic<br>Brake circuit possible as option. |                                          |                       |                |                                  |
| CN117                                                      | Holding Brake Connector                                             | BLF 5.08HC/04/180LR SN BK<br>BX SO                                                         | JUSP-7CN117                              | 4                     | Weidmüller     |                                  |
| CN201                                                      | 24V Control Power Input                                             | BLF 5.08HC/04/180LR SN OR<br>BX SO                                                         | JUSP-7CN201                              | 4                     |                |                                  |
| Σ-7S MECHATROLINK-III or EtherCAT Communications Reference | CN1                                                                 | I/O Connector                                                                              | DFMC1,5/15-ST-3,5-LRBK                   | JUSP-7CN001           | 30             | Phoenix Contact                  |
|                                                            | CN2A/<br>CN2B                                                       | Encoder Connector Axis A<br>Encoder Connector Axis B                                       | -                                        | JZSP-CMP9-1-E         | 6              | Sumitomo 3M Ltd                  |
|                                                            | CN3                                                                 | Digital Operator                                                                           | -                                        | -                     | 14             | Honda Tsushin<br>Kogyo Co., Ltd. |
|                                                            | CN6A/<br>CN6B                                                       | Fieldbus Connector                                                                         | -                                        | -                     | 8              | Tyco Electronics<br>Japan G.K.   |
|                                                            | CN7                                                                 | SigmaWin USB<br>Connector                                                                  | -                                        | -                     | 5              |                                  |
|                                                            | CN8A                                                                | Safety Connector Kit                                                                       | -                                        | 2013595-1             | 8              |                                  |
|                                                            |                                                                     | Safety Jumper Connector                                                                    | -                                        | JZSP-CVH05-E          |                |                                  |
|                                                            | CN8B                                                                | Safety Connector Kit                                                                       | -                                        | 2013595-1             | 8              |                                  |
|                                                            |                                                                     | Safety Jumper Connector                                                                    | -                                        | JZSP-CVH05-E          |                |                                  |
|                                                            | CN101                                                               | Main Power Connector                                                                       | BLZ 7.62HP/08/180LR SN BK<br>BX PRT      | JUSP-7CN101           | 8              | Weidmüller                       |
|                                                            | CN102A/<br>CN102B                                                   | Motor Power Connector<br>Axis A/ Motor Power Con-<br>nector Axis B                         | BLZ 7.62IT/04/180MF4 SN<br>BK BX PRT     | JUSP-7CN102           | 4              |                                  |
|                                                            | CN103                                                               | DC Bus Sharing - Contact<br>Yaskawa for Application<br>Restrictions                        | BVZ 7.62IT/04/180MF3 SN<br>BK BX PRT     | JUSP-7CN103           | 4              |                                  |
|                                                            | CN115A/<br>CN115B                                                   | DB Connector Axis A /<br>DB Connector Axis B                                               | BLZ 7.62IT/03/180MF2 SN<br>BK BX PRT     | JUSP-7CN115           | 3              |                                  |
|                                                            | CN117                                                               | Holding Brake Connector                                                                    | BLF 5.08HC/04/180LR SN BK<br>BX SO       | JUSP-7CN117           | 4              |                                  |
| CN201                                                      | 24V Control Power Input                                             | BLF 5.08HC/04/180LR SN OR<br>BX SO                                                         | JUSP-7CN201                              | 4                     |                |                                  |

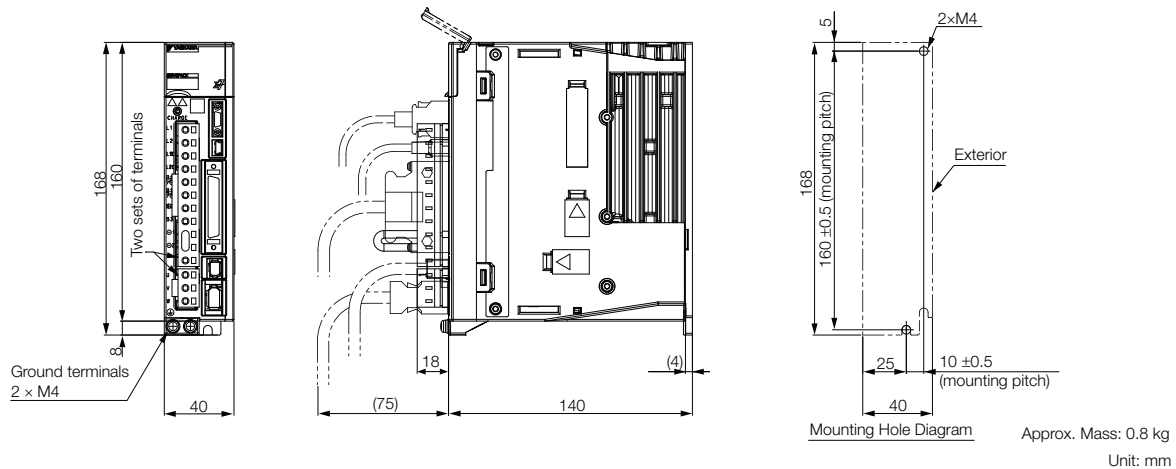
Note: The above connectors or their equivalents are used for the SERVOPACKs.

## SERVOPACK External Dimensions

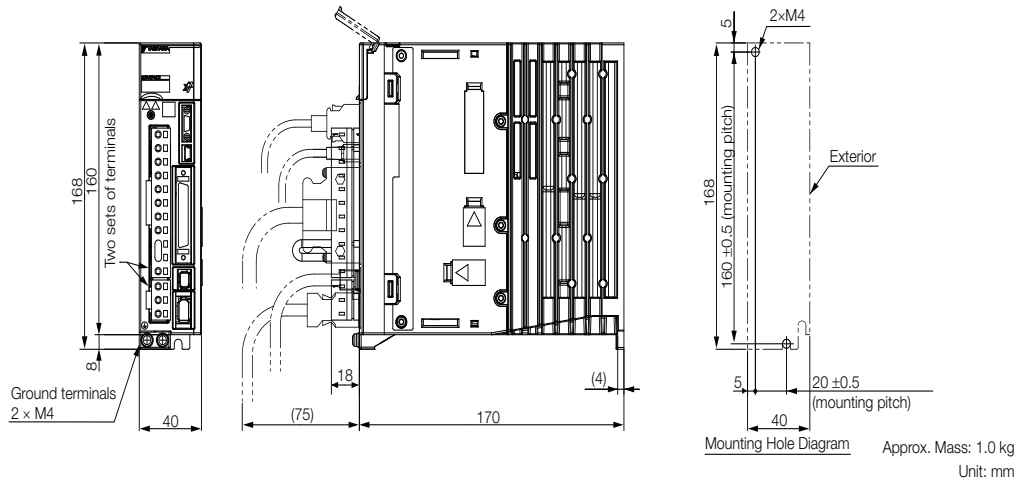
### $\Sigma$ -7S SERVOPACKs: Analog/Pulse & Command Option Type (100/200V)

All of the dimensional drawings show Analog Voltage/Pulse Train Reference SERVOPACKs as typical examples.

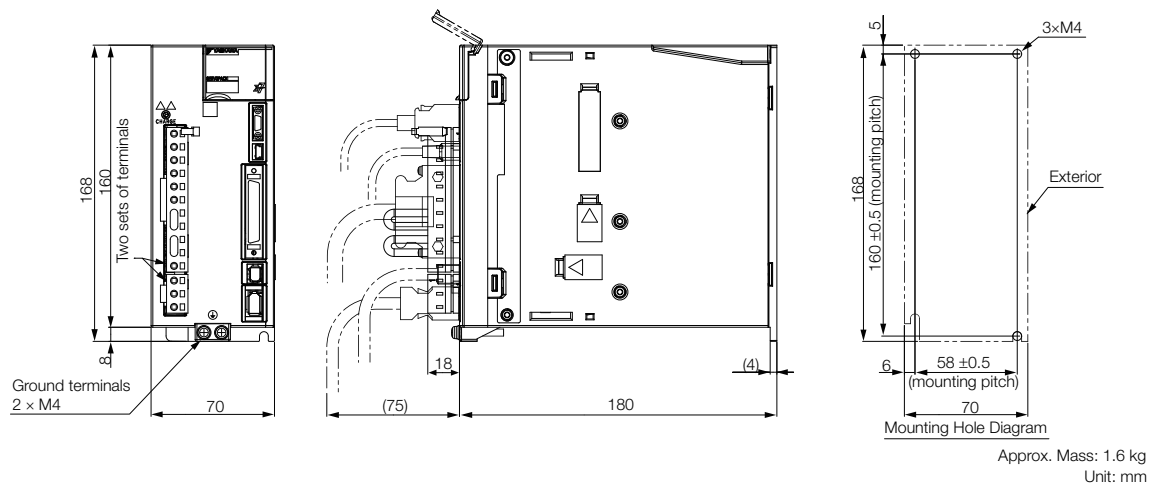
- ◆ Three-phase, 200 VAC: SGD7S-R70A, -R90A, and -1R6A  
Single-phase, 100 VAC: SGD7S-R70F, -R90F



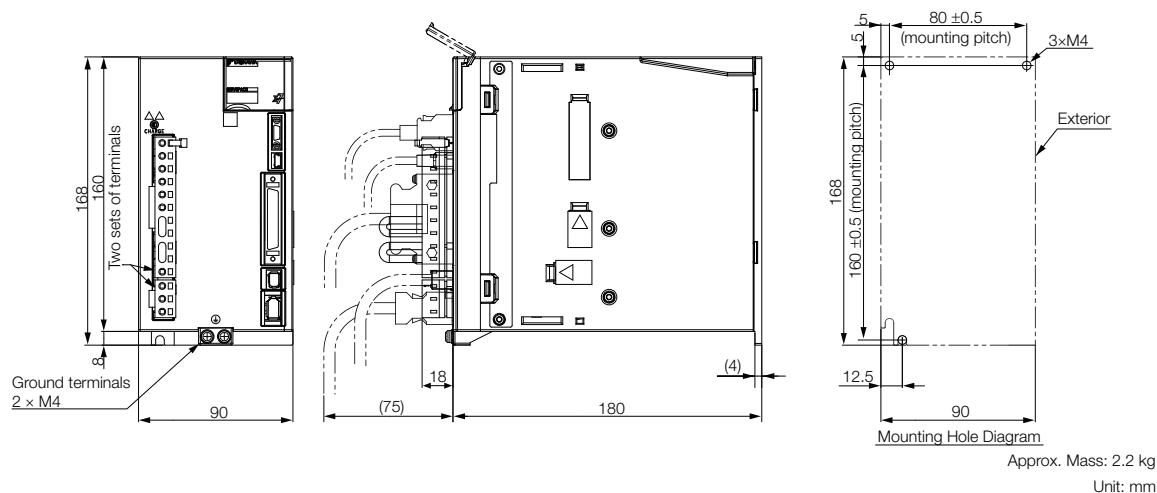
- ◆ Three-phase, 200 VAC: SGD7S-2R8A  
Single-phase, 100 VAC: SGD7S-2R1F



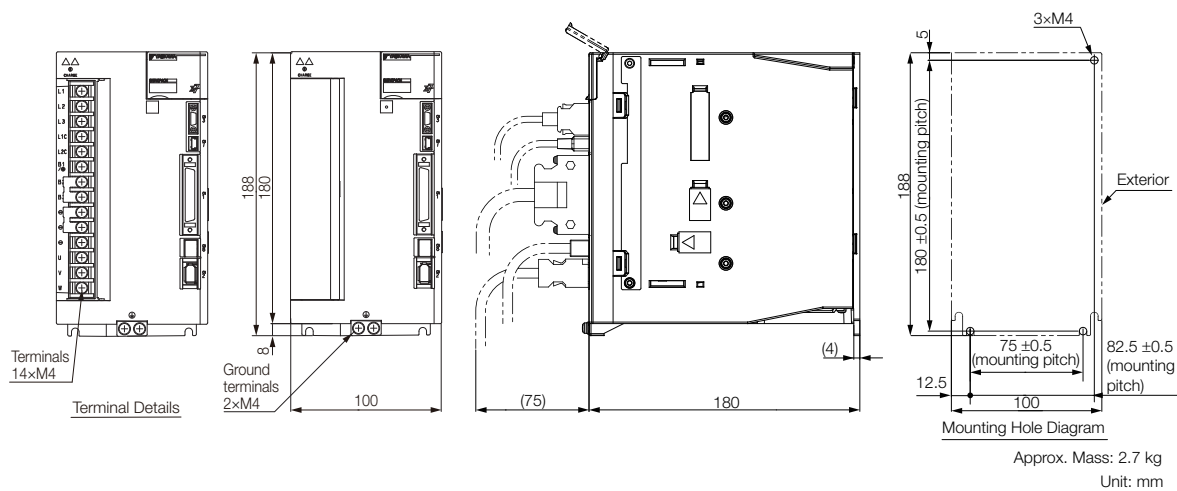
- ◆ Three-phase, 200 VAC: SGD7S-3R8A, -5R5A, and -7R6A  
Single-phase, 100 VAC: SGD7S-2R8F



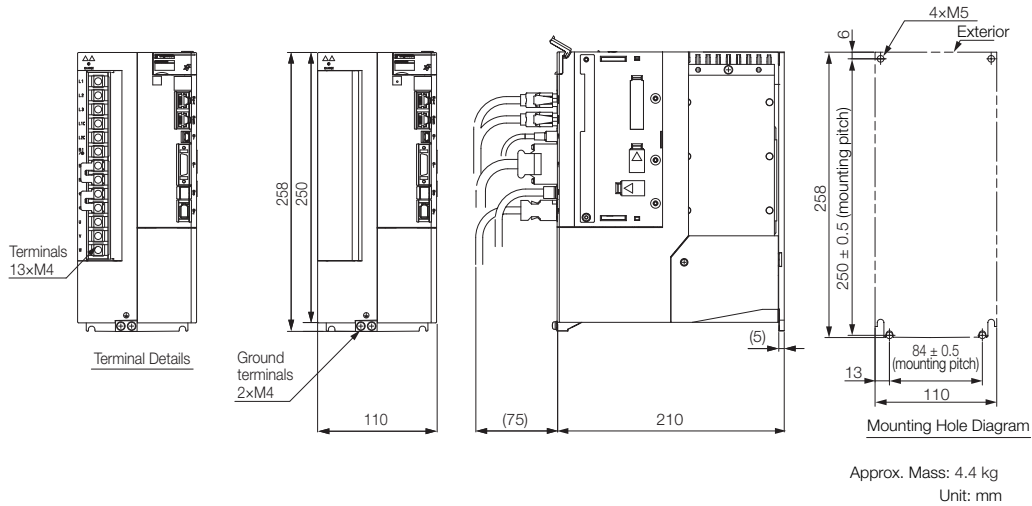
- ◆ Three-phase, 200 VAC: SGD7S-120A



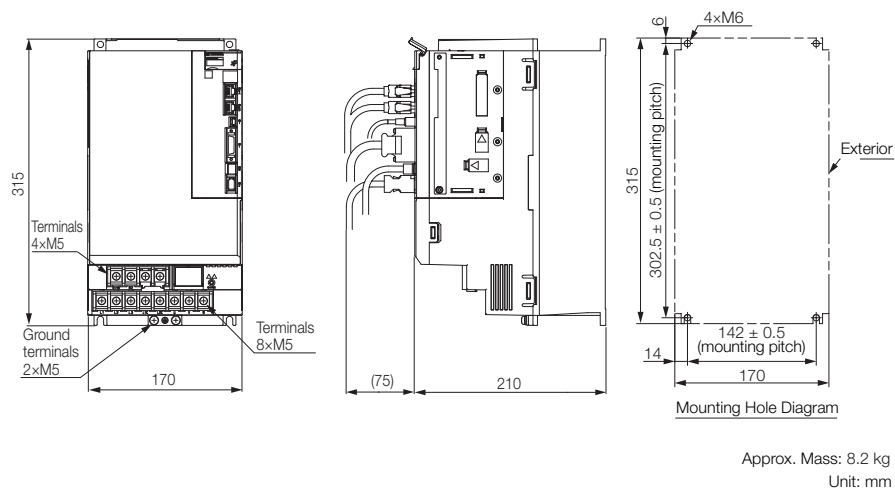
- ◆ Three-phase, 200 VAC: SGD7S-180A and -200A



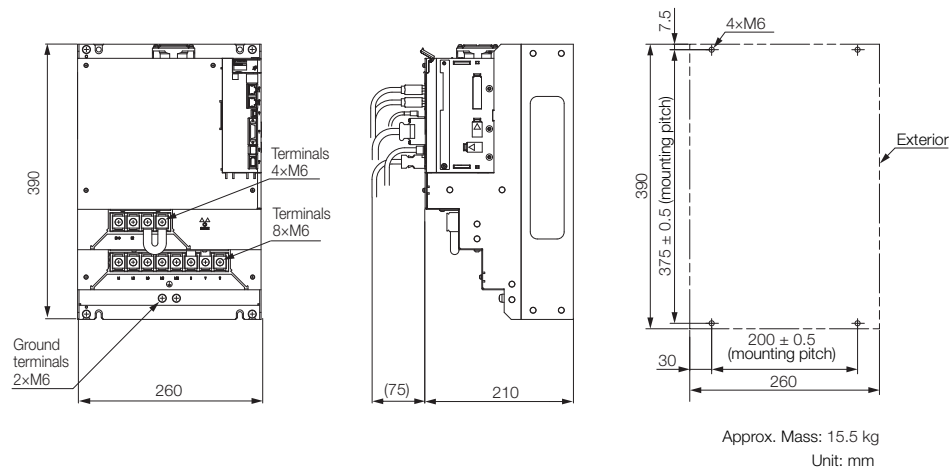
◆ Three-phase, 200 VAC: SGD7S-330A



◆ Three-phase, 200 VAC: SGD7S-470A and -550A



◆ Three-phase, 200 VAC: SGD7S-590A and -780A

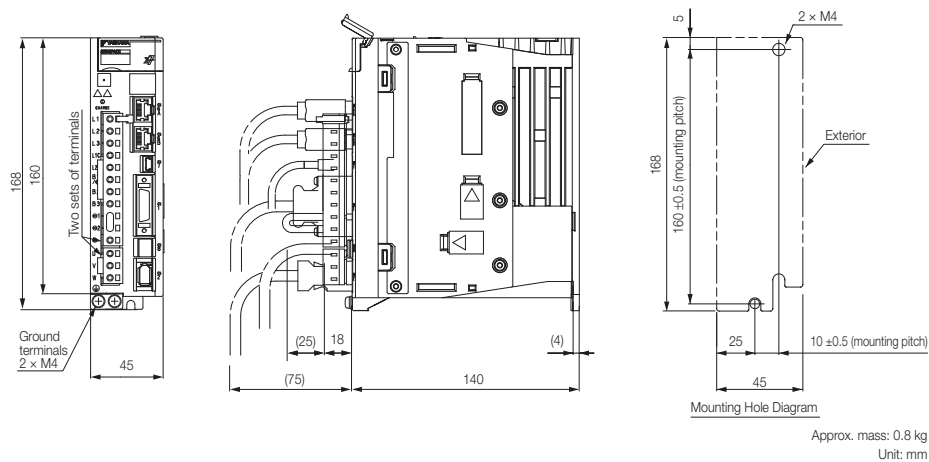




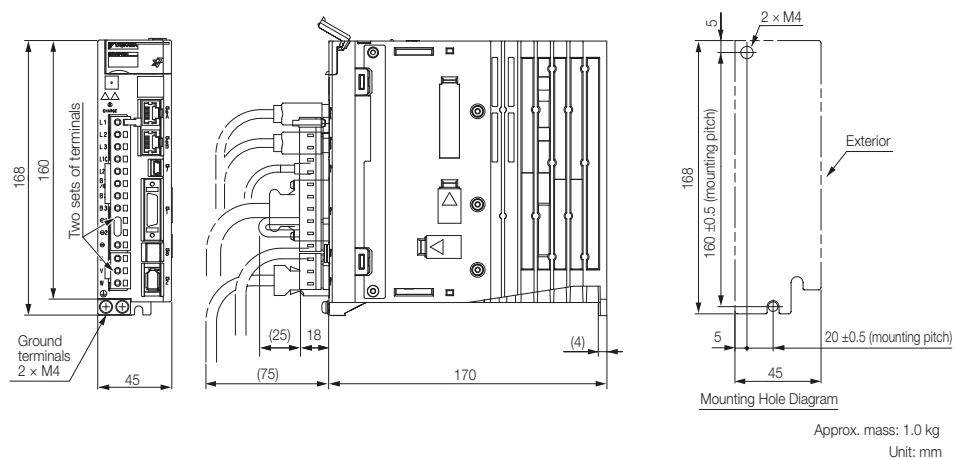
## Σ-7S SERVOPACKs: MECHATROLINK-III & EtherCAT Type (100/200V)

All of the dimensional drawings show MECHATROLINK-III Reference SERVOPACKs as typical examples.

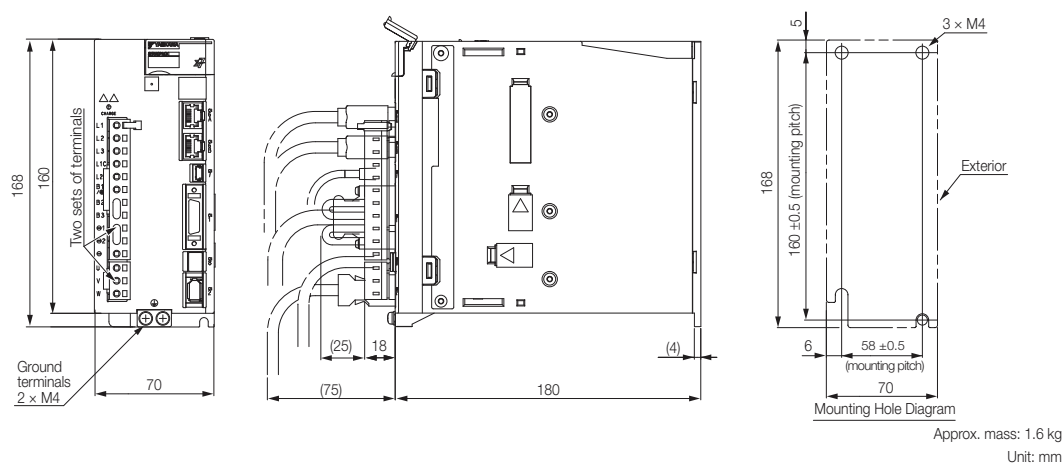
- ◆ Three-phase, 200 VAC: SGD7S-R70A, -R90A, and -1R6A  
Single-phase, 100 VAC: SGD7S-R70F, -R90F



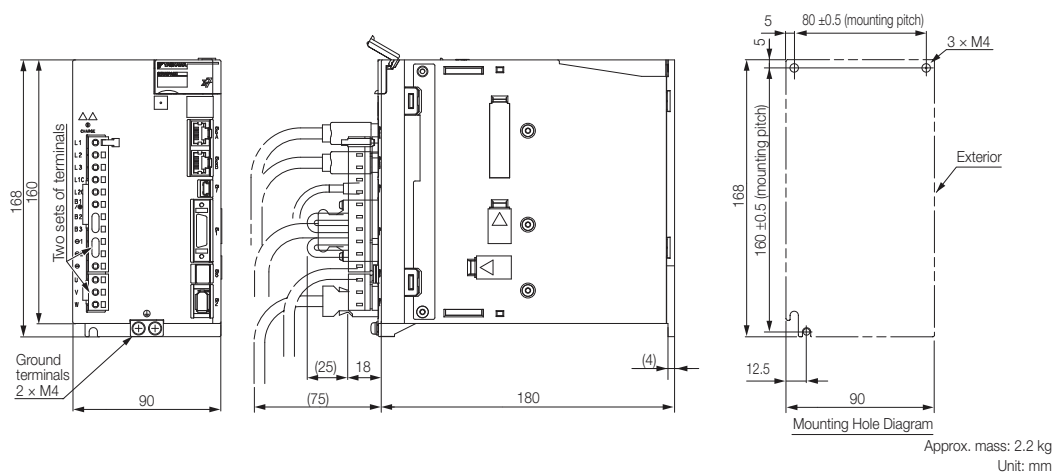
- ◆ Three-phase, 200 VAC: SGD7S-2R8A  
Single-phase, 100 VAC: SGD7S-2R1F



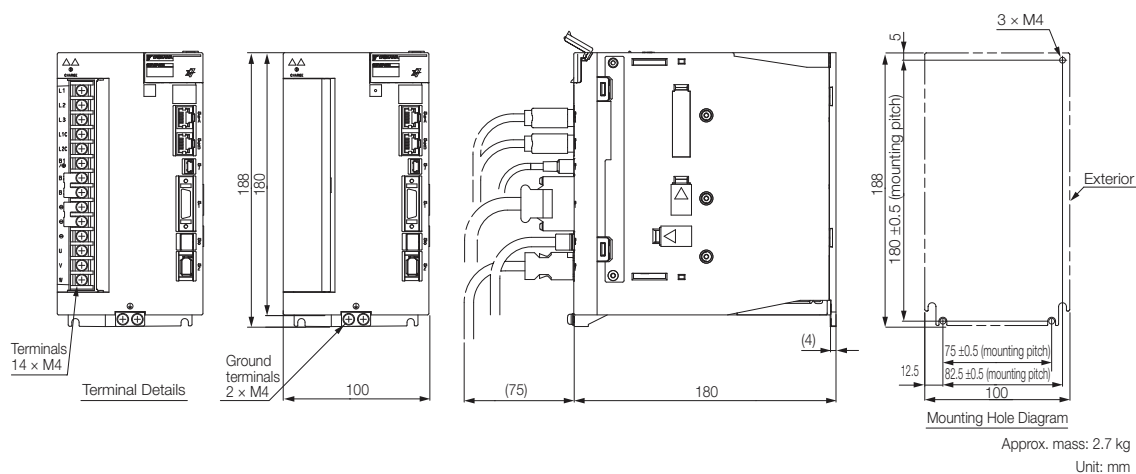
- ◆ Three-phase, 200 VAC: SGD7S-3R8A, -5R5A, and -7R6A  
Single-phase, 100 VAC: SGD7S-2R8F



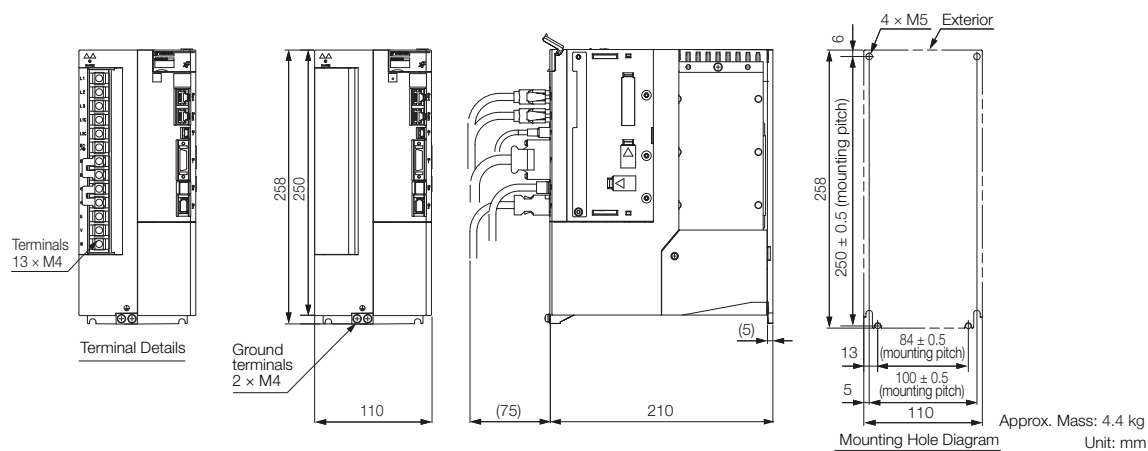
- ◆ Three-phase, 200 VAC: SGD7S-120A



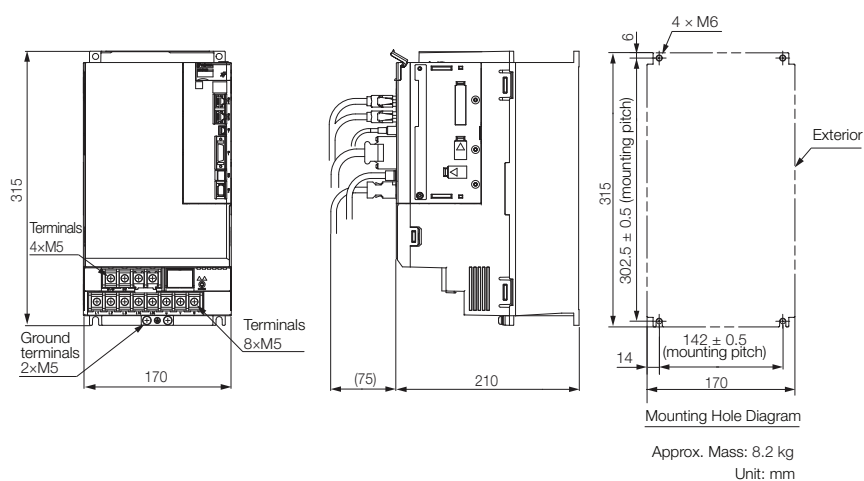
- ◆ Three-phase, 200 VAC: SGD7S-180A and -200A



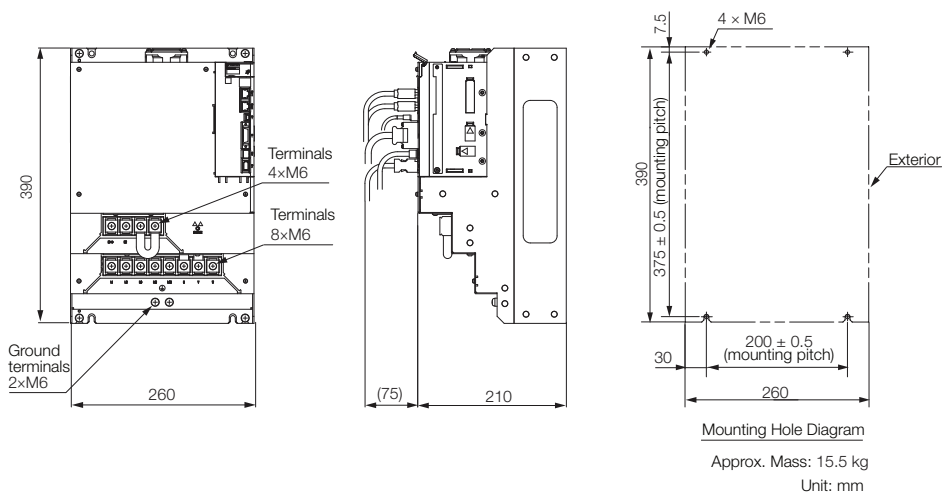
## ◆ Three-phase, 200 VAC: SGD7S-330A



## ◆ Three-phase, 200 VAC: SGD7S-470A and -550A



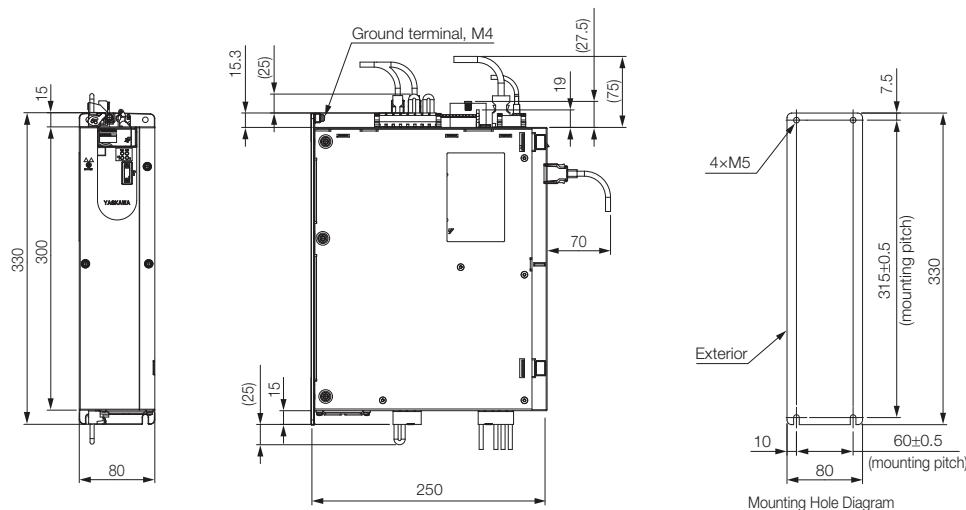
## ◆ Three-phase, 200 VAC: SGD7S-590A and -780A



## Σ-7S SERVOPACKs: MECHATROLINK-III and EtherCAT Type (400 V)

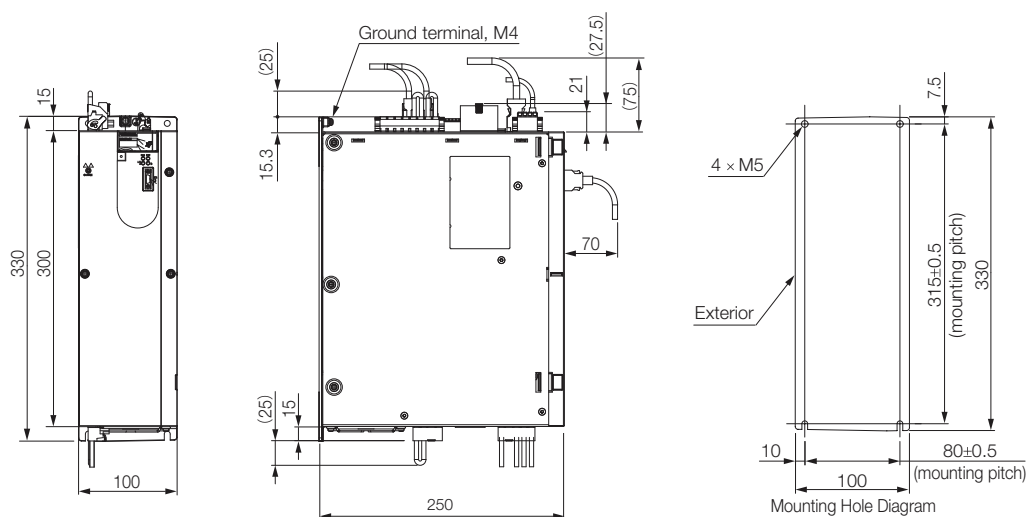
All of the dimensional drawings show MECHATROLINK-III Reference SERVOPACKs as typical examples.

### ◆ Three-phase, 400 VAC: SGD7S-1R9D, -3R5D, -5R4D, -8R4D, and -120D



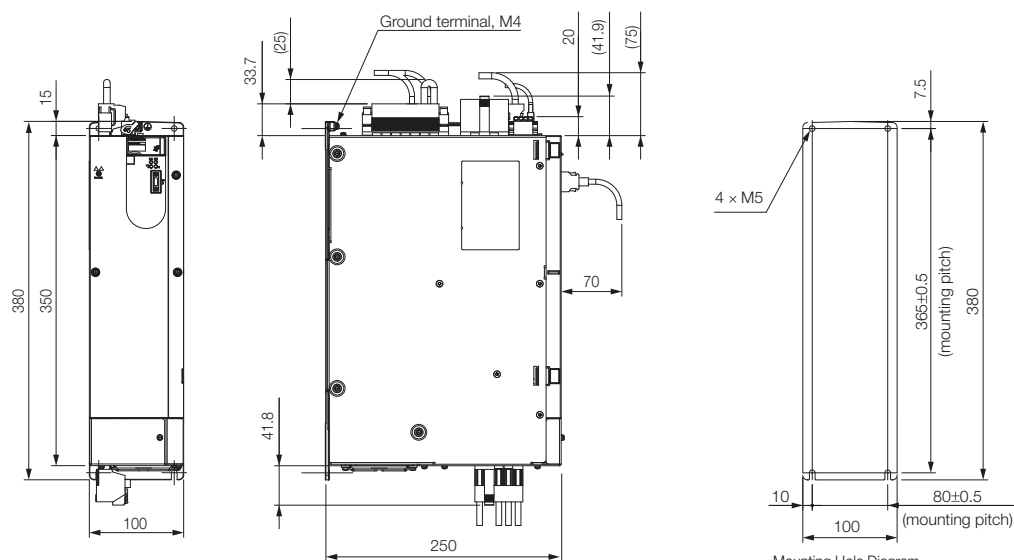
Approx. mass: SGD7S-1R9D, -3R5D, or -5R4D: 3.4 kg  
 SGD7S-8R4D or -120D: 3.7 kg  
 Unit: mm

### ◆ Three-phase, 400 VAC: SGD7S-170D



Approx. mass: 5.5 kg  
 Unit: mm

◆ Three-phase, 400 VAC: SGD7S-210D and -260D

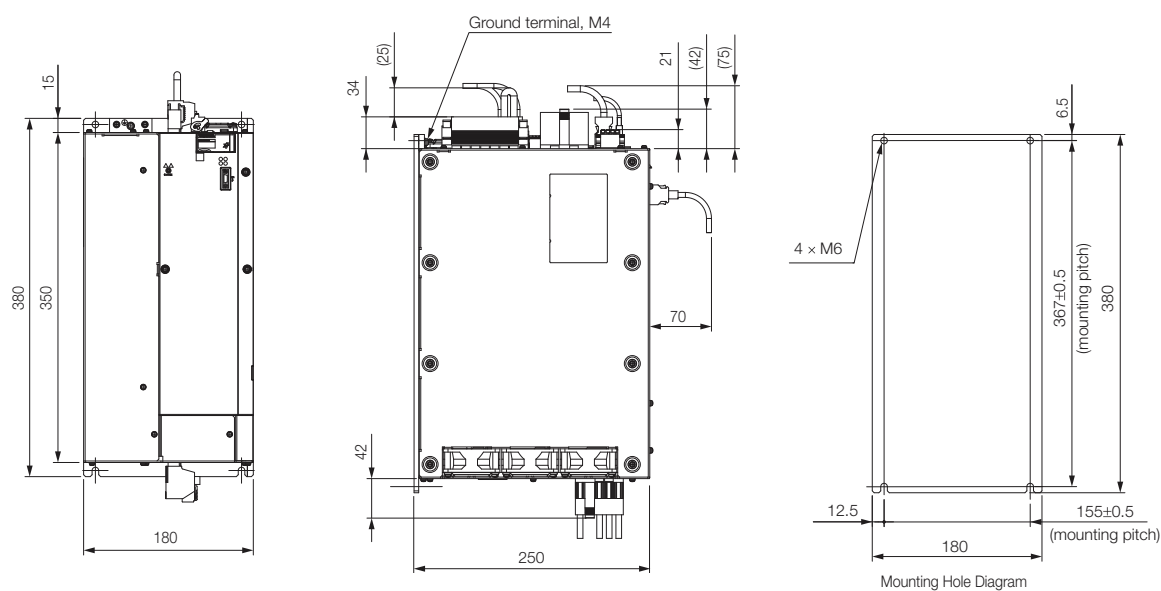


Mounting Hole Diagram

Approx. mass: 7.0 kg

Unit: mm

◆ Three-phase, 400 VAC: SGD7S-280D and -370D



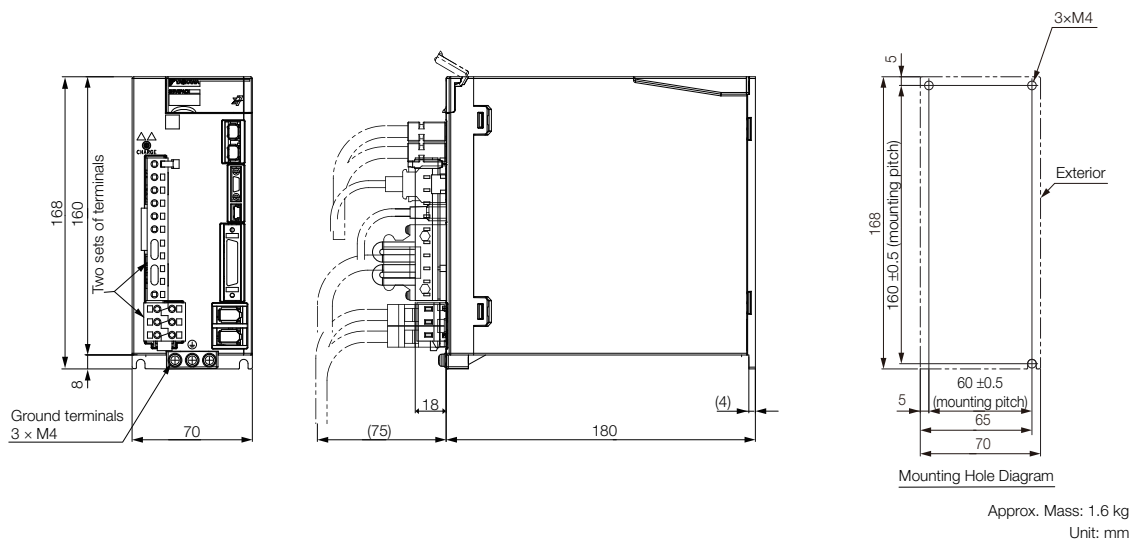
Mounting Hole Diagram

Approx. mass: 13.5 kg

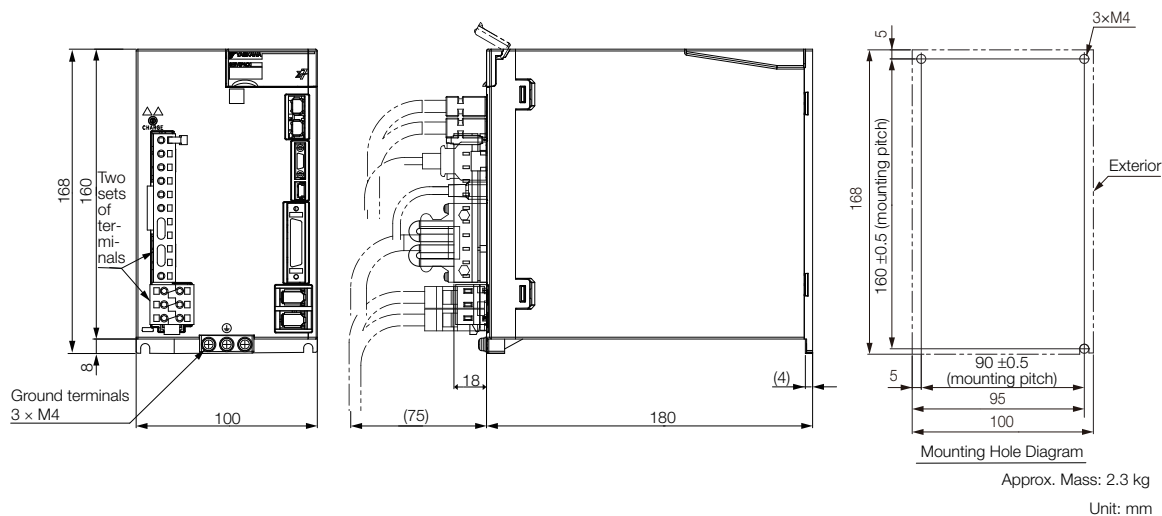
Unit: mm

## Σ-7W SERVOPACKs: MECHATROLINK-III (200 V)

### ◆ Three-phase, 200 VAC: SGD7W-1R6A and -2R8A

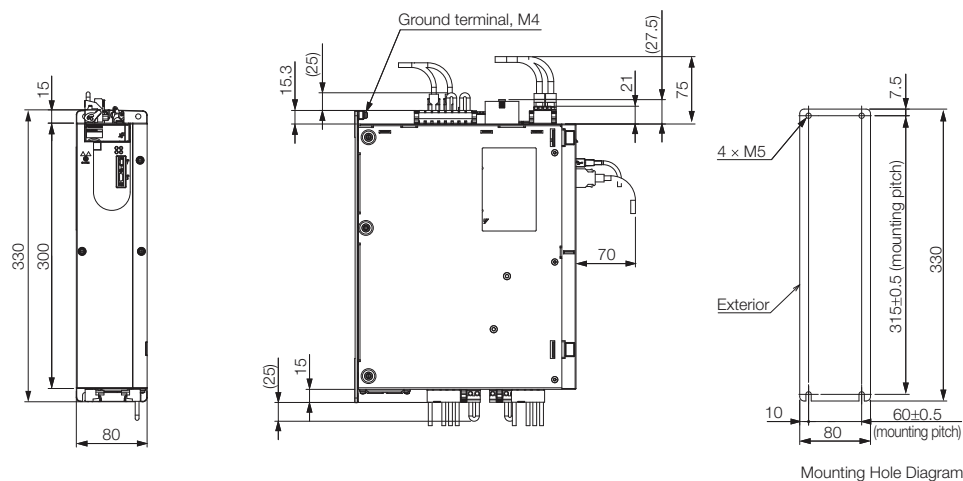


### ◆ Three-phase, 200 VAC: SGD7W-5R5A and -7R6A



## Σ-7W SERVOPACKs: MECHATROLINK-III and EtherCAT Type (400 V)

### ◆ Three-phase, 400 VAC: SGD7W-2R6D and -5R4D



Approx. mass: 2R6D: 4.1 kg

5R4D: 4.3 kg

Unit: mm

## **SERVOPACKs**

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### SERVOPACK External Dimensions



# Additional SERVOPACK Options

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|                                                  |     |
|--------------------------------------------------|-----|
| Feedback Option .....                            | 542 |
| Safety Option .....                              | 548 |
| Sigma-7Siec Option .....                         | 554 |
| MP2600iec Option .....                           | 556 |
| SigmaLogic7 Compact Option .....                 | 564 |
| FT19 Option - Less Deviation Control .....       | 566 |
| FT79 Option - Built-in Indexer .....             | 568 |
| FT81 Option - Harmonic Drive SHA Actuators ..... | 570 |
| FT82/83 Option - for SGM7D Direct Drive Motor .. | 572 |

# Feedback Option

## Fully-Closed Loop Option

With fully-closed control, an externally installed encoder is used to detect the position of the controlled machine and the machine's position information is fed back to the SERVOPACK. High-precision positioning is possible because the actual machine position is fed back directly. To perform fully-closed loop control, the fully closed loop option must be selected.

## SERVOPACK Designations

### ◆ Purchasing a SERVOPACK with the fully closed loop option

To order SERVOPACKs with the fully-closed loop option, use the following model numbers.

SGD7S<sup>\*1</sup> R70 A 00 A 000 001

Σ-7 Series Σ-7S Models    1st+2nd+3rd digits    4th digit    5th+6th digits    7th digit    8th+9th+10th digits    11th+12th+13th digits

1st+2nd+3rd digits Maximum Applicable Motor Capacity

| Voltage               | Code              | Specification |
|-----------------------|-------------------|---------------|
| Three-phase, 200 VAC  | R70 <sup>*2</sup> | 0.05 kW       |
|                       | R90 <sup>*2</sup> | 0.1 kW        |
|                       | 1R6 <sup>*2</sup> | 0.2 kW        |
|                       | 2R8 <sup>*2</sup> | 0.4 kW        |
|                       | 3R8               | 0.5 kW        |
|                       | 5R5 <sup>*2</sup> | 0.75 kW       |
|                       | 7R6               | 1.0 kW        |
|                       | 120               | 1.5 kW        |
|                       | 180               | 2.0 kW        |
|                       | 200               | 3.0 kW        |
|                       | 330               | 5.0 kW        |
|                       | 470               | 6.0 kW        |
|                       | 550               | 7.5 kW        |
|                       | 590               | 11 kW         |
|                       | 780               | 15 kW         |
| Single-phase, 100 VAC | R70               | 0.05 kW       |
|                       | R90               | 0.1 kW        |
|                       | 2R1               | 0.2 kW        |
|                       | 2R8               | 0.4 kW        |

4th digit Voltage

| Code | Specification |
|------|---------------|
| A    | 200 VAC       |
| F    | 100 VAC       |
| D    | 400 VAC       |

5th+6th digits Interface

| Code | Specification                                        |
|------|------------------------------------------------------|
| 00   | Analog voltage/pulse train reference (100/200V only) |
| 30   | MECHATROLINK-III communications reference            |
| A0   | EtherCAT communications reference                    |

7th digit Design Revision Order

A: Global design revision

8th+9th+10th digits Hardware Options Specification

| Code | Specification   | Applicable Models |
|------|-----------------|-------------------|
| 000  | Without options | All models        |

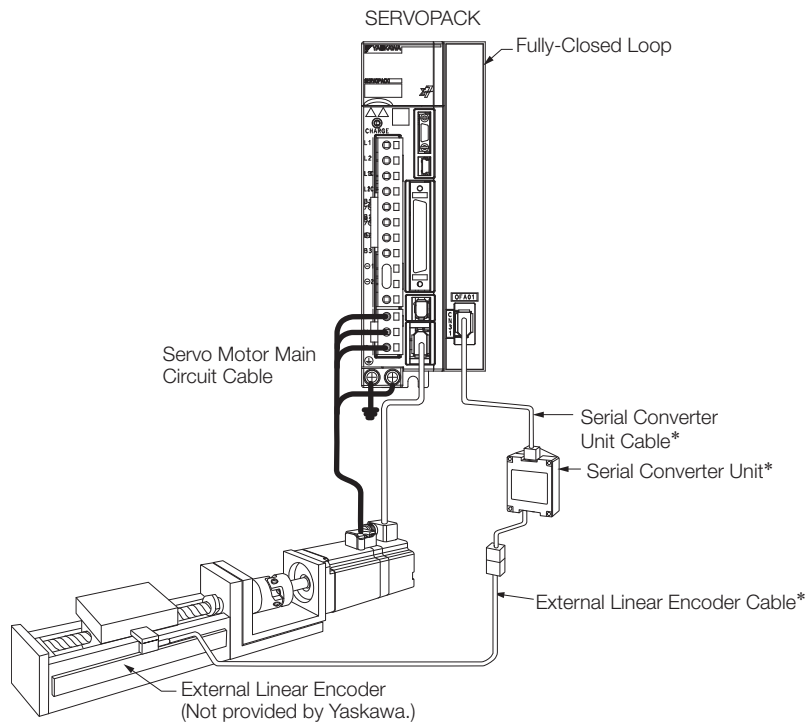
11th+12th+13th digits Option Module

| Code | Specification                     |
|------|-----------------------------------|
| 001  | Fully-Closed Module (100/200 VAC) |
| 002  | Fully-Closed Module (400 VAC)     |

\*1. The model number of a SERVOPACK with an Option is not hyphenated after SGD7S.

\*2. You can use these models with either a single-phase or three-phase power supply input.

## System Configuration



\* The connected devices and cables depend on the type of external Linear Encoder that is used.

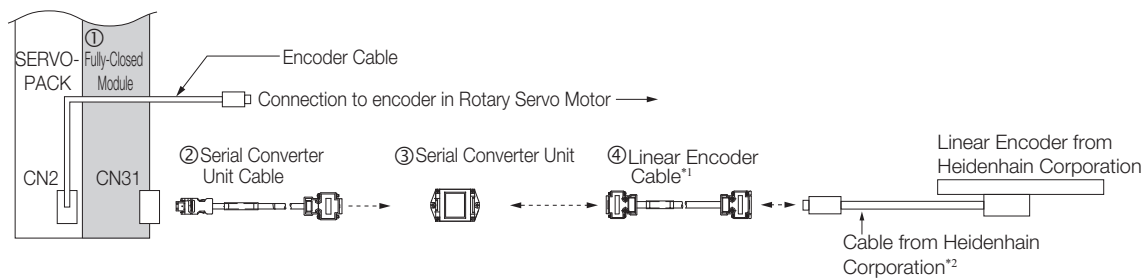
Note: Refer to the following section for information on peripheral devices.

 *Peripheral Devices* (page 300)

### ◆ Connections to Linear Encoder from Heidenhain Corporation

#### ■ Connections for a 1 Vp-p Analog Voltage Output Signal

You must make the connections through a Yaskawa Serial Converter Unit. The output signal will be multiplied by 8 bits (256 divisions) in the Serial Converter Unit.



\*1. When using a JZDP-J00□-□□□ Serial Converter Unit, do not use a Yaskawa Linear Encoder Cable that is longer than 3 m.

\*2. Contact Heidenhain Corporation for details on cables (analog 1 Vp-p output, D-sub 15-pin, male) from Heidenhain Corporation.

| No. | Item                        | Model           | Reference |
|-----|-----------------------------|-----------------|-----------|
| ②   | Serial Converter Unit Cable | JZSP-CLP70-□□-E | page 298  |
| ③   | Serial Converter Unit       | JZDP-D003-000   | page 301  |
| ④   | Linear Encoder Cable        | JZSP-CLL30-□□-E | page 281  |

Note: 1. Refer to the following section for recommended Linear Encoders.

 *Recommended Linear Encoders* (page M-11)

2. Refer to the following manual for the specifications of the Serial Converter Units.

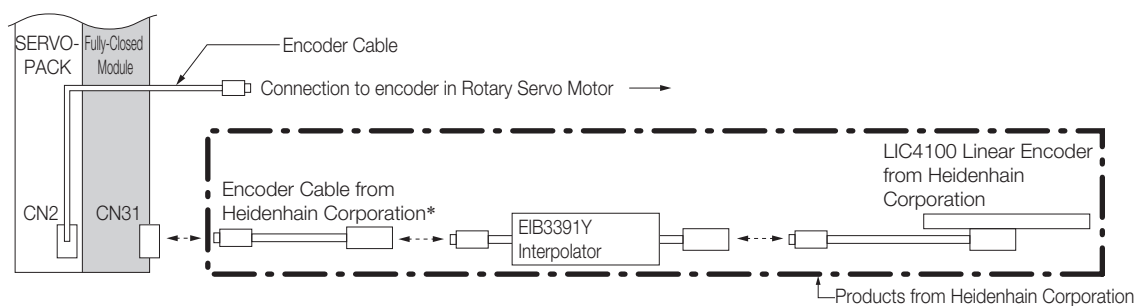
 *Σ-7-Series AC Servo Drive Peripheral Device Selection Manual* (Manual No.: SIEP S800001 32)

3. Refer to the following section for information on Servo Motor Main Circuit Cables and Encoder Cables.

 *Cables and Peripheral Devices* (page 253)

## ■ Connections When Using a Yaskawa Serial Interface for the Output Signals

- LIC4100 Linear Encoder with EIB3391Y Interpolator

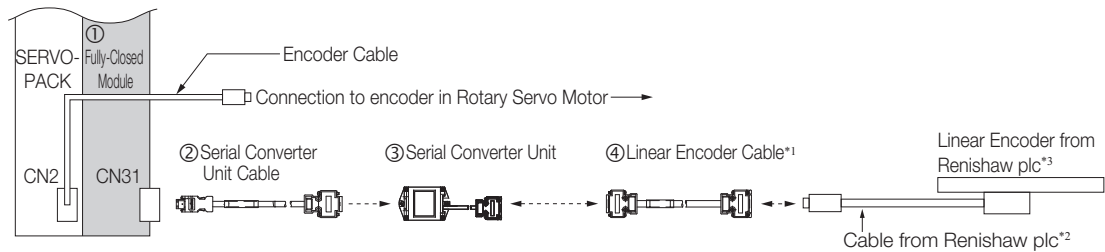


\* Use an Encoder Cable from Heidenhain Corporation. Contact Heidenhain Corporation for detailed Encoder Cable specifications.

◆ Connections to Linear Encoder from Renishaw Plc

■ Connections for a 1 Vp-p Analog Voltage Output Signal

You must make the connections through a Yaskawa Serial Converter Unit. The output signal will be multiplied by 8 bits (256 divisions) in the Serial Converter Unit.



- \*1. When using a JZDP-J00□-□□□ Serial Converter Unit, do not use a Yaskawa Linear Encoder Cable that is longer than 3 m.
- \*2. Contact Renishaw plc for details on cables (analog 1 Vp-p output, D-sub 15-pin, male) from Renishaw plc. However, the BID and DIR signals are not connected.
- \*3. If you use the origin signals with a Linear Encoder from Renishaw plc, the origin may sometimes be falsely detected. If that occurs, use the BID/DIR signal to output the origin signal only in one direction.

| No. | Item                        | Model           | Reference |
|-----|-----------------------------|-----------------|-----------|
| ②   | Serial Converter Unit Cable | JZSP-CLP70-□□-E | page 281  |
| ③   | Serial Converter Unit       | JZDP-D005-000   | page 284  |
| ④   | Linear Encoder Cable        | JZSP-CLL00-□□-E | page 281  |

Note: 1. Refer to the following section for recommended Linear Encoders.

🔧 *Recommended Linear Encoders* (page M-11)

2. Refer to the following manual for the specifications of the Serial Converter Units.

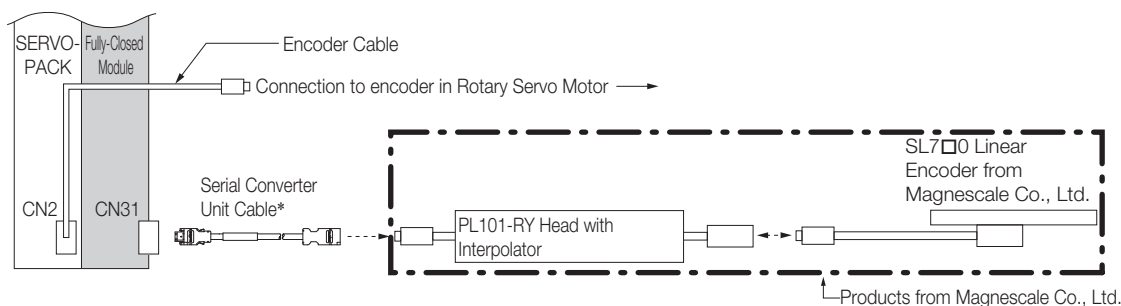
📖 *Σ-7-Series AC Servo Drive Peripheral Device Selection Manual* (Manual No.: SIEP S800001 32)

3. Refer to the following section for information on Servo Motor Main Circuit Cables and Encoder Cables.

🔧 *Cables and Peripheral Devices* (page 253)

## ◆ Connections to Linear Encoder from Magnescale Co., Ltd.

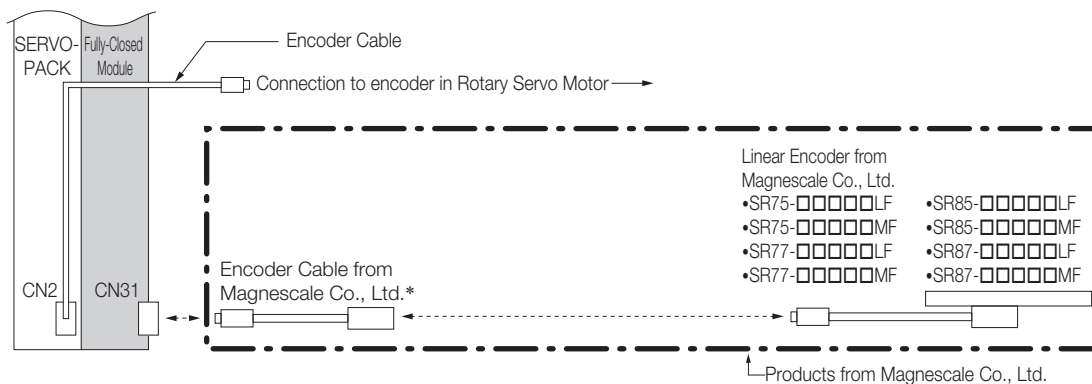
### ■ SL7□□ 0 Linear Encoder and PL101-RY Sensor Head with Interpolator



\* Refer to the following section for information on cables to connect Fully-Closed Loop and Linear Encoders.

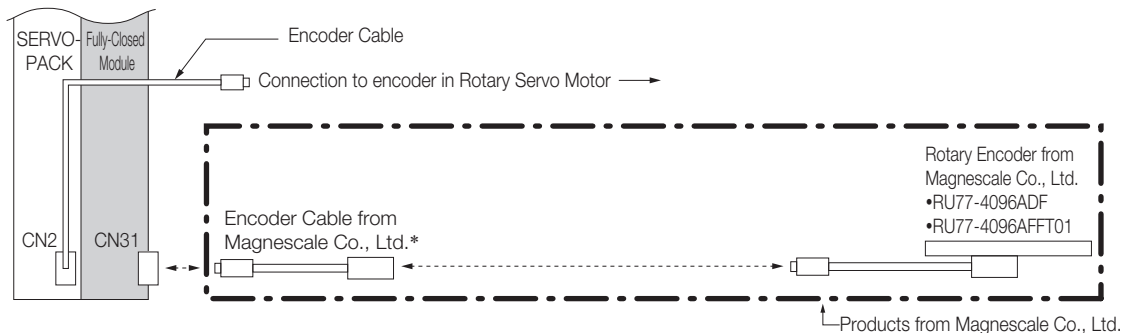
👉 **Serial Converter Unit Cables (page 281)**

### ■ SR-75, SR-77, SR-85, and SR-87 Linear Encoders



\* To connect the SERVOPACK and Linear Encoder, use a CH33-xx□□G Cable from Magnescale Co., Ltd. (This Cable has connectors designed for use with Yaskawa products.)

### ■ RU77-4096ADF/RU77-4096AFFT01 Absolute Rotary Encoders

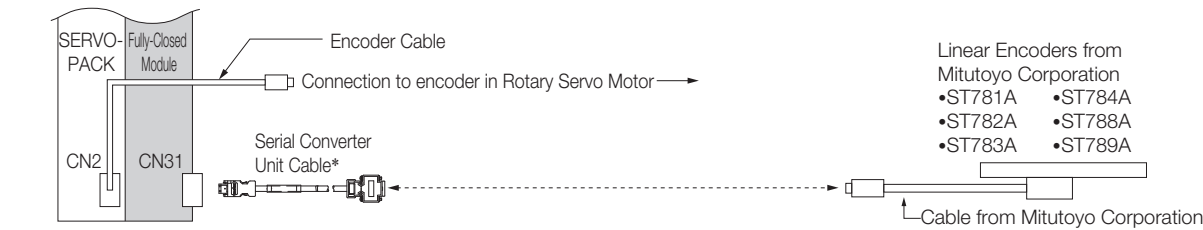


\* To connect the SERVOPACK and Rotary Encoder, use a CE28-Series Extension Cable for RU77 from Magnescale Co., Ltd.

Note: The RU77 is a single-turn absolute rotary encoder.

◆ Connections to Linear Encoders from Mitutoyo Corporation

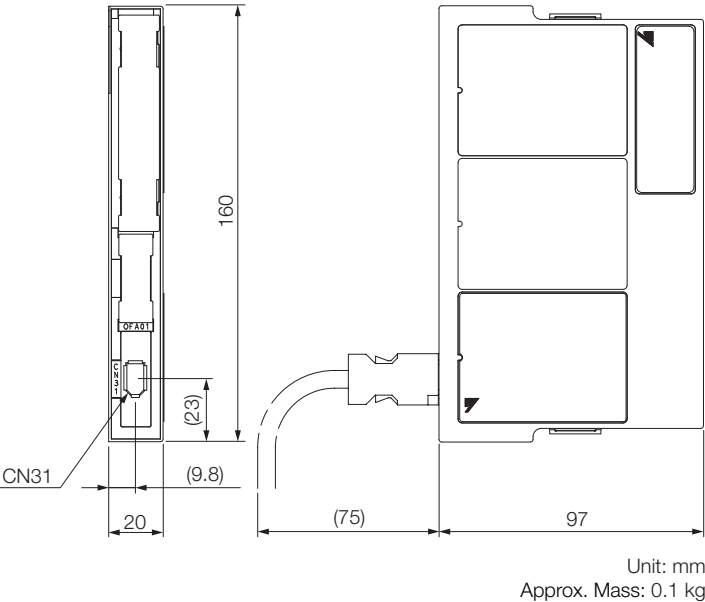
■ ST78□ A Linear Encoders



\* Refer to the following section for information on cables to connect Fully-Closed Loop and Linear Encoders.  
Serial Converter Unit Cables (page 281)

External Dimensions

Refer to pages 234 for the external dimensions of the individual SERVOPACKs.



Connectors

| Device Label | Model        | Number of Pins | Manufacturer  |
|--------------|--------------|----------------|---------------|
| CN31         | 3E106-0220KV | 6              | 3M Japan Ltd. |

Note: The above connectors or their equivalents are used for the Fully-Closed Option.

# Safety Option

## Advanced Safety Option

This advanced safety option implements safety functions that conform to EN ISO 13849-1 (the harmonized EU Machinery Directive) and are specified in the individual IEC 61800-5-2 standard. The advanced safety option for the SGD7S SERVOPACK is designed to optimize safety in a machine system according to industry needs.

## SERVOPACK Designations

### ◆ Purchasing a SERVOPACK with the advanced safety option

To order SERVOPACKs with the advanced safety option, use the following model numbers.

|                           |                       |              |                   |              |                        |                           |
|---------------------------|-----------------------|--------------|-------------------|--------------|------------------------|---------------------------|
| SGD7S <sup>*1</sup>       | R70                   | A            | 00                | A            | 000                    | 010                       |
| Σ-7 Series<br>Σ-7S Models | 1st+2nd+3rd<br>digits | 4th<br>digit | 5th+6th<br>digits | 7th<br>digit | 8th+9th+10th<br>digits | 11th+12th+<br>13th digits |

1st+2nd+3rd digits Maximum Applicable Motor Capacity

| Voltage               | Code              | Specification |
|-----------------------|-------------------|---------------|
| Three-phase, 200 VAC  | R70 <sup>*1</sup> | 0.05 kW       |
|                       | R90 <sup>*1</sup> | 0.1 kW        |
|                       | 1R6 <sup>*1</sup> | 0.2 kW        |
|                       | 2R8 <sup>*1</sup> | 0.4 kW        |
|                       | 3R8               | 0.5 kW        |
|                       | 5R5 <sup>*1</sup> | 0.75 kW       |
|                       | 7R6               | 1.0 kW        |
|                       | 120 <sup>*3</sup> | 1.5 kW        |
|                       | 180               | 2.0 kW        |
|                       | 200               | 3.0 kW        |
|                       | 330               | 5.0 kW        |
|                       | 470               | 6.0 kW        |
|                       | 550               | 7.5 kW        |
| Single-phase, 100 VAC | 590               | 11 kW         |
|                       | 780               | 15 kW         |
|                       | R70               | 0.05 kW       |
|                       | R90               | 0.1 kW        |
|                       | 2R1               | 0.2 kW        |
|                       | 2R8               | 0.4 kW        |

| Voltage              | Code              | Specification |
|----------------------|-------------------|---------------|
| Three-phase, 400 VAC | 1R9               | 0.5 kW        |
|                      | 3R5               | 1.0 kW        |
|                      | 5R4               | 1.5 kW        |
|                      | 8R4               | 2.0 kW        |
|                      | 120               | 3.0 kW        |
|                      | 170               | 5.0 kW        |
|                      | 210 <sup>*4</sup> | 6.0 kW        |
|                      | 260 <sup>*4</sup> | 7.5 kW        |
|                      | 280 <sup>*4</sup> | 11 kW         |
|                      | 370 <sup>*4</sup> | 15 kW         |

4th digit Voltage

| Code | Specification |
|------|---------------|
| D    | 400 VAC       |
| A    | 200 VAC       |
| F    | 100 VAC       |

Shaded items are non-stock

5th+6th digits Interface

| Code | Specification                                               |
|------|-------------------------------------------------------------|
| 00   | Analog voltage/pulse train reference (100/200 VAC Only)     |
| 30   | MECHATROLINK-III communications reference                   |
| A0   | EtherCAT communications reference                           |
| M0   | Sigma-7Siec built-in single-axis control (100/200 VAC Only) |

7th digit Design Revision Order

A: Global design revision

8th+9th+10th digits Hardware Options Specification

| Code | Specification   | Applicable Models |
|------|-----------------|-------------------|
| 000  | Without options | All models        |

11th+12th+13th digits Option Module

| Code | Specification                        |
|------|--------------------------------------|
| 010  | Advanced Safety Option (100/200 VAC) |
| 020  | Advanced Safety Option(400 VAC)      |

\*1. The model number of a SERVOPACK with an Option is not hyphenated after SGD7S.

\*2. You can use these models with either a single-phase or three-phase power supply input.



## Applicable Standards and Functions

### ◆ Applicable Safety Standards

| Safety Standard     | Applicable Standard                            | Applicable Products |                    |
|---------------------|------------------------------------------------|---------------------|--------------------|
|                     |                                                | SERVOPACK           | SERVOPACK + Safety |
| Safety of Machinery | EN ISO13849-1:2008/AC:2009<br>IEC 60204-1      | ✓                   | ✓                  |
| Functional Safety   | IEC 61508 Series<br>IEC 62061<br>IEC 61800-5-2 | ✓                   | ✓                  |
| EMC                 | IEC 61326-3-1                                  | ✓                   | ✓                  |

✓: Applicable

### ◆ Support for Functions Defined in IEC61800-5-2

Safety functions are implemented by using the hard wire base block (HWBB) in the SERVOPACK.

| Safety Function                                            | Description                                                                                                                                                                                                                     | Applicable Products |                    |
|------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------|--------------------|
|                                                            |                                                                                                                                                                                                                                 | SERVOPACK           | SERVOPACK + Safety |
| Safe BaseBlock Function (SBB function)                     | This safety function is equivalent to an STO function. (It shuts OFF the power supply from the SERVOPACK to the motor.)                                                                                                         | ✓                   | ✓                  |
| Safe BaseBlock with Delay Function (SBB-D function)        | This safety function is equivalent to an SS1 function. (It monitors the deceleration operation of the motor for the specified time and then shuts OFF the power supply from the SERVOPACK to the motor.)                        | —                   | ✓                  |
| Safe Position Monitor with Delay Function (SPM-D function) | This safety function is equivalent to an SS2 function. (It monitors the deceleration operation of the motor for the specified time and then monitors the position after the motor stops.)                                       | —                   | ✓                  |
| Safely Limit Speed with Delay Function (SLS-D function)    | This safety function is equivalent to an SLS function. (It monitors the deceleration operation of the motor for the specified time and then monitors the speed of the motor to confirm that it remains in the allowable range.) | —                   | ✓                  |

✓: Applicable

## Specifications

### ◆ Basic Specifications

| Item                 |                             | Specification                                                                                                                                                       |                                                                                                                                                                                                       |
|----------------------|-----------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Operating Conditions | Surrounding Air Temperature | 0°C to +55°C                                                                                                                                                        |                                                                                                                                                                                                       |
|                      | Storage Temperature         | -20°C to +85°C                                                                                                                                                      |                                                                                                                                                                                                       |
|                      | Surrounding Air Humidity    | 90% relative humidity max.                                                                                                                                          | There must be no freezing or condensation.                                                                                                                                                            |
|                      | Storage Humidity            | 90% relative humidity max.                                                                                                                                          |                                                                                                                                                                                                       |
|                      | Vibration Resistance        | 4.9 m/s <sup>2</sup>                                                                                                                                                |                                                                                                                                                                                                       |
|                      | Shock Resistance            | 19.6 m/s <sup>2</sup>                                                                                                                                               |                                                                                                                                                                                                       |
|                      | Degree of Protection        | IP10                                                                                                                                                                | <ul style="list-style-type: none"><li>• Must be no corrosive or flammable gases.</li><li>• Must be no exposure to water, oil, or chemicals.</li><li>• Must be no dust, salts, or iron dust.</li></ul> |
|                      | Pollution Degree            | 2                                                                                                                                                                   |                                                                                                                                                                                                       |
|                      | Altitude                    | 1000 m max.                                                                                                                                                         |                                                                                                                                                                                                       |
|                      | Others                      | Do not use the SERVOPACK in the following locations:<br>Locations subject to static electricity noise, strong electromagnetic/<br>magnetic fields, or radioactivity |                                                                                                                                                                                                       |

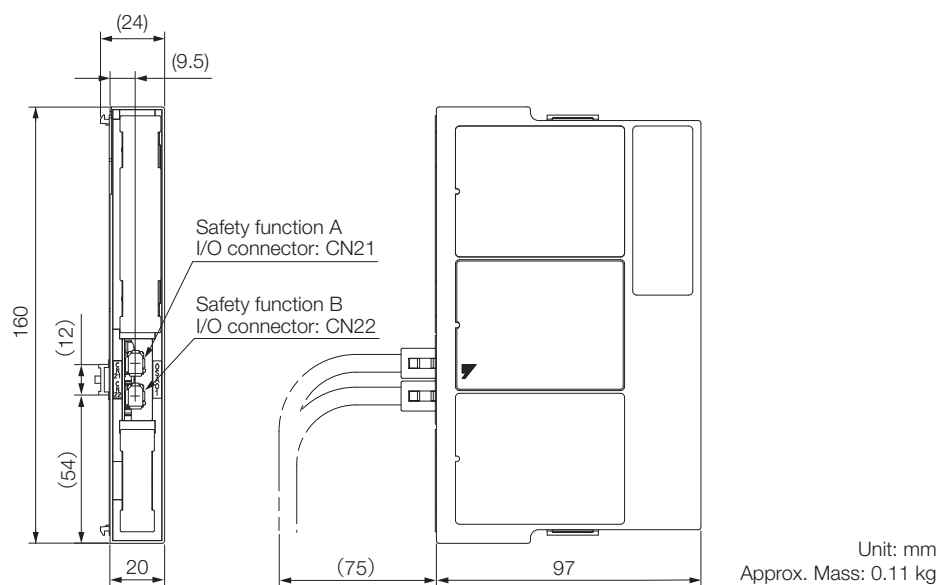
### ◆ Compliance with UL Standards, EU Directives, and Other Safety Standards (in Combination with SERVOPACK)

| Item                            |                                    | Specification                                                               |                 |
|---------------------------------|------------------------------------|-----------------------------------------------------------------------------|-----------------|
| North American Safety Standards |                                    | UL61800-5-1<br>CSA C22.2 No.274                                             |                 |
| European Directives             | Machinery Directive (2006/42/EC)   | EN ISO 13849-1: 2008/AC: 2009                                               |                 |
|                                 | EMC Directive (2004/108/EC)        | EN 55011/A2 group 1, class A<br>EN 61000-6-2<br>EN 61000-6-4<br>EN 61800-3  |                 |
|                                 | Low Voltage Directive (2006/95/EC) | EN 50178<br>EN 61800-5-1                                                    |                 |
| Safety Standards                | Safety of Machinery                | EN ISO 13849-1, IEC 60204-1                                                 |                 |
|                                 | Functional Safety                  | IEC 61508-1 to IEC 61508-7, IEC 62061, and IEC 61800-5-2                    |                 |
|                                 | EMC                                | IEC 61326-3-1                                                               |                 |
| Safety Function                 |                                    | IEC 61800-5-2                                                               | IEC 60204-1     |
|                                 |                                    | Safe Torque Off (STO)                                                       | Stop Category 0 |
|                                 |                                    | Safe Stop 1 (SS1)                                                           | Stop Category 1 |
|                                 |                                    | Safe Stop 2 (SS2)                                                           | Stop Category 2 |
|                                 |                                    | Safely Limited Speed (SLS)                                                  |                 |
|                                 | Number of Blocks                   | 2                                                                           |                 |
|                                 | Safety Function A                  | Input signals: 2 channels (redundant signals),<br>output signals: 1 channel |                 |
|                                 | Safety Function B                  | Input signals: 2 channels (redundant signals),<br>output signals: 1 channel |                 |

| Item                                           | Specification                       |
|------------------------------------------------|-------------------------------------|
| Safe Performance                               |                                     |
| Safety Integrity Level                         | SIL2, SILCL2                        |
| Probability of Dangerous Failure per Hour      | $PFH \geq 3.3 \times 10^{-7}$ [1/h] |
| Category                                       | Cat2                                |
| Performance Level                              | PLd (Category 2)                    |
| Mean Time to Dangerous Failure of Each Channel | MTTFd: High                         |
| Average Diagnostic Coverage                    | DCave: Medium                       |
| Proof Test Interval                            | 10 years                            |

## External Dimensions

Refer to pages 234 for the external dimensions of the individual SERVOPACKs.



## Connectors

| Device Label | Model     | Number of Pins | Manufacturer                |
|--------------|-----------|----------------|-----------------------------|
| CN21         | 1981080-1 | 8              | Tyco Electronics Japan G.K. |
| CN22         | 1981080-1 | 8              | Tyco Electronics Japan G.K. |

Note: The above connectors or their equivalents are used for SERVOPACKs.

## Cables with Connectors

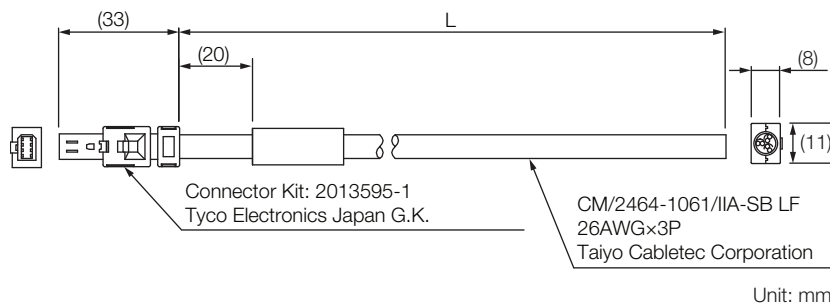
### ◆ Selection Table

| Order Number    | Length    | Inquires               |
|-----------------|-----------|------------------------|
| JZSP-CVH03-01-E | 1981080-1 | Yaskawa representative |
| JZSP-CVH03-03-E | 1981080-1 |                        |

Note: When using safety functions, connect this cable to the safety function devices.

When not using safety functions, connect the enclosed Safety Jumper Connector to the SERVOPACK.

### ◆ Dimensional Drawing



### ◆ Wiring Specifications

| Pin | Signal        | Lead Color | Markings |
|-----|---------------|------------|----------|
| 1   | Not connected | -          | -        |
| 2   | Not connected | -          | -        |
| 3   | /HWBB1-       | White      | Black    |
| 4   | /HWBB1+       | White      | Red      |
| 5   | /HWBB2-       | Light gray | Black    |
| 6   | /HWBB2+       | Light gray | Red      |
| 7   | EDM1-         | Orange     | Black    |
| 8   | EDM1+         | Orange     | Red      |



# Single-Axis Control Option

## Sigma-7Siec Option

The Sigma-7Siec option for Sigma-7 SERVOPACKs provides a compact, all-in-one servo/controller package with the following features:

- IEC61131-3 standard programming environment with PLCopen function blocks for motion control
- Self-tuning, anti-vibration, and other high performance, easy-to-implement servo control features
- Ethernet/IP, Modbus TCP/IP, and OPC server, which provide connectivity to PLCs, HMIs, SCADA, MES, and ERP
- Scalability with the multi-axis MP3000ie controller platform via the common programming environment, Motion-Works IEC
- Web server that allows for maintenance diagnostics and troubleshooting
- I/O features: 7 digital inputs, 4 digital outputs

## SERVOPACK Designations

### ◆ Purchasing a SERVOPACK with the Sigma-7Siec option

To order SERVOPACKs with the Sigma-7Siec option, use the following model numbers.

|                         |  |  |   |                       |  |              |                   |              |                        |                           |                           |   |   |
|-------------------------|--|--|---|-----------------------|--|--------------|-------------------|--------------|------------------------|---------------------------|---------------------------|---|---|
| SGD7S                   |  |  | - | 2R8                   |  | A            | M0                | A            | 000                    | F50                       | -                         | - | - |
| Σ-7 Series<br>SERVOPACK |  |  |   | 1st+2nd+3rd<br>digits |  | 4th<br>digit | 5th+6th<br>digits | 7th<br>digit | 8th+9th+10th<br>digits | 11th+12th+<br>13th digits | 14th+15th+<br>16th digits |   |   |

| 1st+2nd+3rd digits Maximum Applicable Motor Capacity |                   |               | 4th digit Voltage    |                   |               | 8th+9th+10th digits Hardware Options Specification |                 |                   |
|------------------------------------------------------|-------------------|---------------|----------------------|-------------------|---------------|----------------------------------------------------|-----------------|-------------------|
| Voltage                                              | Code              | Specification | Voltage              | Code              | Specification | Code                                               | Specification   | Applicable Models |
| Three-phase, 200 VAC                                 | R70 <sup>*2</sup> | 0.05 kW       | Three-phase, 400 VAC | 1R9               | 500 W         | 000                                                | Without options | All models        |
|                                                      | R90 <sup>*2</sup> | 0.1 kW        |                      | 3R5               | 1.0 kW        |                                                    |                 |                   |
|                                                      | 1R6 <sup>*2</sup> | 0.2 kW        |                      | 5R4               | 1.5 kW        |                                                    |                 |                   |
|                                                      | 2R8 <sup>*2</sup> | 0.4 kW        |                      | 8R4               | 2.0 kW        |                                                    |                 |                   |
|                                                      | 3R8               | 0.5 kW        |                      | 120               | 3.0 kW        |                                                    |                 |                   |
|                                                      | 5R5 <sup>*2</sup> | 0.75 kW       |                      | 170               | 5.0 kW        |                                                    |                 |                   |
|                                                      | 7R6               | 1.0 kW        |                      | 210 <sup>*4</sup> | 6.0 kW        |                                                    |                 |                   |
|                                                      | 120               | 1.5 kW        |                      | 260 <sup>*4</sup> | 7.5 kW        |                                                    |                 |                   |
|                                                      | 180               | 2.0 kW        |                      | 280 <sup>*4</sup> | 11 kW         |                                                    |                 |                   |
|                                                      | 200               | 3.0 kW        |                      | 370 <sup>*4</sup> | 15 kW         |                                                    |                 |                   |
|                                                      | 330               | 5.0 kW        |                      |                   |               |                                                    |                 |                   |
|                                                      | 470               | 6.0 kW        |                      |                   |               |                                                    |                 |                   |
|                                                      | 550               | 7.5 kW        |                      |                   |               |                                                    |                 |                   |
|                                                      | 590               | 11 kW         |                      |                   |               |                                                    |                 |                   |
|                                                      | 780               | 15 kW         |                      |                   |               |                                                    |                 |                   |
| Single-phase, 100 VAC                                | R70               | 0.05 kW       |                      |                   |               |                                                    |                 |                   |
|                                                      | R90               | 0.1 kW        |                      |                   |               |                                                    |                 |                   |
|                                                      | 2R1               | 0.2 kW        |                      |                   |               |                                                    |                 |                   |
|                                                      | 2R8               | 0.4 kW        |                      |                   |               |                                                    |                 |                   |

| Code | Specification |
|------|---------------|
| F    | 100 VAC       |
| A    | 200 VAC       |
| D    | 400 VAC       |

| Code | Specification                              |
|------|--------------------------------------------|
| M0   | Sigma-7Siec (built-in single-axis control) |

| Code              | Specification               |
|-------------------|-----------------------------|
| Blank             | Standard                    |
| 010 <sup>*1</sup> | Safety Module <sup>*3</sup> |

| Code | Specification                                                      |
|------|--------------------------------------------------------------------|
| F50  | Application function for Sigma-7Siec                               |
| F82  | Application function for Sigma-7Siec with support for SGM7D motors |

| Code              | Specification               |
|-------------------|-----------------------------|
| Blank             | Standard                    |
| 010 <sup>*1</sup> | Safety Module <sup>*3</sup> |

\*1. The model number of a SERVOPACK with the Functional Safety option is not hyphenated after SGD7S.

\*2. You can use these models with either a single-phase or three-phase power supply input.

\*3. Safety module only available in 100 V and 200 V

\*4. These SERVOPACKs do not have an integrated Dynamic Brake Circuit. Please refer to page 611 for more information on Sigma-7 400V Dynamic Brake Resistors.

## Ratings and Specifications

Reference Sigma-7S EtherCAT Communications Reference SERVOPACKs ratings and specifications:

 *Ratings and Specifications* (page 491)

## External Dimensions

Reference Sigma-7S EtherCAT Communications Reference SERVOPACK external dimensions:

 *Σ-7S SERVOPACKs: MECHATROLINK-III & EtherCAT Type (100/200V)* (page 533)

## Cables and Peripheral Devices

Reference Sigma-7S EtherCAT Communications Reference SERVOPACK cables and peripheral devices:

 *SERVOPACK Cables* (page 574)

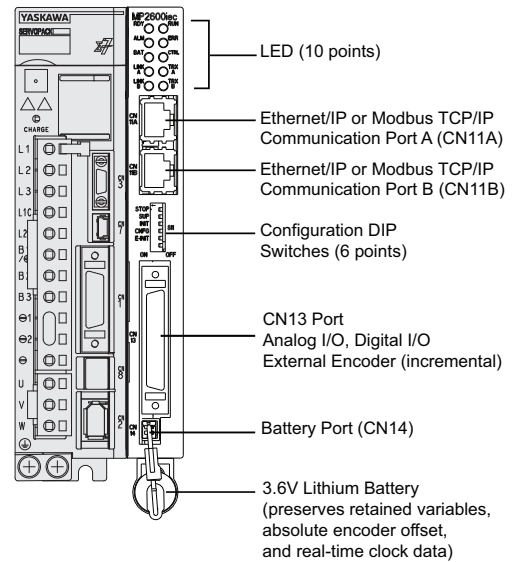
 *SERVOPACK Peripheral Devices* (page 584)

# 1.5-Axis Control Option

## MP2600iec Option

The MP2600iec option for Sigma-7 SERVOPACKs provides a compact, all-in-one servo/controller package with the following features:

- IEC61131-3 standard programming environment with PLCopen function blocks for motion control
- Self-tuning, anti-vibration, and other high performance, easy-to-implement servo control features
- Ethernet/IP, Modbus TCP/IP, and OPC server, which provide connectivity to PLCs, HMIs, SCADA, MES, and ERP
- Scalability with the multi-axis MP3000iec controller platform via the common programming environment, MotionWorks IEC
- Web server that allows for maintenance diagnostics and troubleshooting
- I/O features:
  - 15 digital inputs
  - 11 digital outputs
  - 1 analog input
  - 1 analog output
  - 1 external encoder input
  - 1 external encoder latch



## SERVOPACK Designations

### ◆ Purchasing a SERVOPACK with the MP2600iec option

To order SERVOPACKs with the MP2600iec option, use the following model numbers.

SGD7S<sup>\*1</sup> 2R8 A E0 A 000 300

Σ-7 Series SERVOPACK    1st+2nd+3rd digits    4th digit    5th+6th digits    7th digit    8th+9th+10th digits    11th+12th+13th digits

1st+2nd+3rd digits Maximum Applicable Motor Capacity

| Voltage               | Code              | Specification |
|-----------------------|-------------------|---------------|
| Three-phase, 200 VAC  | R70 <sup>*2</sup> | 0.05 kW       |
|                       | R90 <sup>*2</sup> | 0.1 kW        |
|                       | 1R6 <sup>*2</sup> | 0.2 kW        |
|                       | 2R8 <sup>*2</sup> | 0.4 kW        |
|                       | 3R8               | 0.5 kW        |
|                       | 5R5 <sup>*2</sup> | 0.75 kW       |
|                       | 7R6               | 1.0 kW        |
|                       | 120               | 1.5 kW        |
|                       | 180               | 2.0 kW        |
|                       | 200               | 3.0 kW        |
| Single-phase, 100 VAC | 330               | 5.0 kW        |
|                       | 470               | 6.0 kW        |
|                       | 550               | 7.5 kW        |
|                       | 590               | 11 kW         |
|                       | 780               | 15 kW         |
| Single-phase, 100 VAC | R70               | 0.05 kW       |
|                       | R90               | 0.1 kW        |
|                       | 2R1               | 0.2 kW        |
|                       | 2R8               | 0.4 kW        |

4th digit Voltage

| Code | Specification |
|------|---------------|
| A    | 200 VAC       |
| F    | 100 VAC       |

5th+6th digits Interface

| Code | Specification                   |
|------|---------------------------------|
| E0   | Other control architecture type |

7th digit Design Revision Order  
A: Global design revision

8th+9th+10th digits Hardware Options Specification

| Code | Specification   | Applicable Models |
|------|-----------------|-------------------|
| 000  | Without options | All models        |

11th+12th+13th digits FT/EX Specification

| Code | Specification                        |
|------|--------------------------------------|
| 300  | MP2600iec single-axis control option |

\*1. The model number of a SERVOPACK with an Option is not hyphenated after SGD7S.

\*2. You can use these models with either a single-phase or three-phase power supply input.

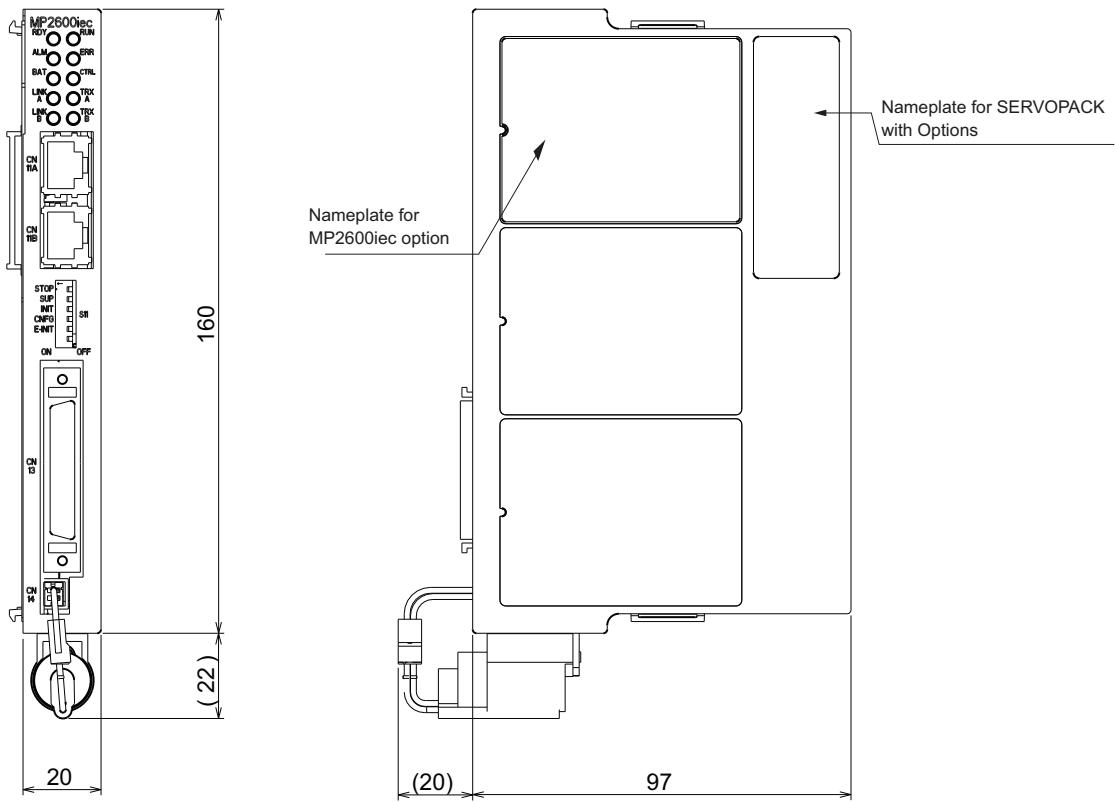


## External Dimensions

Reference Analog Voltage / Pulse Train Reference SERVOPACKs external dimensions

 *Σ-7S SERVOPACKs: Analog/Pulse & Command Option Type (100/200V) (page 530)*

In order to determine the overall dimensions of the SERVOPACK & MP2600iec option card, add the dimensions of the option card pictured below to the base SERVOPACK dimensions.



Dimensions in mm.

# Ratings and Specifications

## SERVOPACK Ratings

### ◆ Three-Phase, 200 VAC

| Model SGD7S-                                |                                               |                | R70A                                          | R90A | 1R6A | 2R8A | 3R8A | 5R5A | 7R6A | 120A | 180A  | 200A  | 330A  |
|---------------------------------------------|-----------------------------------------------|----------------|-----------------------------------------------|------|------|------|------|------|------|------|-------|-------|-------|
| Maximum Applicable Motor Capacity [kW]      |                                               |                | 0.05                                          | 0.1  | 0.2  | 0.4  | 0.5  | 0.75 | 1.0  | 1.5  | 2.0   | 3.0   | 5.0   |
| Continuous Output Current [Arms]            |                                               |                | 0.66                                          | 0.91 | 1.6  | 2.8  | 3.8  | 5.5  | 7.6  | 11.6 | 18.5  | 19.6  | 32.9  |
| Instantaneous Maximum Output Current [Arms] |                                               |                | 2.1                                           | 3.2  | 5.9  | 9.3  | 11   | 16.9 | 17   | 28   | 42    | 56    | 84.   |
| Main<br>Circuit                             | Power Supply                                  |                | 200 VAC to 240 VAC, -15% to +10%, 50 Hz/60 Hz |      |      |      |      |      |      |      |       |       |       |
|                                             | Input Current [Arms]*                         |                | 0.4                                           | 0.8  | 1.3  | 2.5  | 3.0  | 4.1  | 5.7  | 7.3  | 10    | 15    | 25    |
| Control                                     | Power Supply                                  |                | 200 VAC to 240 VAC, -15% to +10%, 50 Hz/60 Hz |      |      |      |      |      |      |      |       |       |       |
|                                             | Input Current [Arms]*                         |                | 0.2                                           | 0.2  | 0.2  | 0.2  | 0.2  | 0.2  | 0.2  | 0.2  | 0.25  | 0.25  | 0.3   |
| Power Supply Capacity [kVA]*                |                                               |                | 0.2                                           | 0.3  | 0.5  | 1.0  | 1.3  | 1.6  | 2.3  | 3.2  | 4.0   | 5.9   | 7.5   |
| Power Loss*                                 | Main Circuit Power Loss [W]                   |                | 5.0                                           | 7.0  | 11.9 | 22.5 | 28.5 | 38.9 | 49.2 | 72.6 | 104.2 | 114.2 | 226.6 |
|                                             | Control Circuit Power Loss [W]                |                | 12                                            | 12   | 12   | 12   | 14   | 14   | 14   | 15   | 16    | 16    | 19    |
|                                             | Built-in Regenerative Resistor Power Loss [W] |                | -                                             | -    | -    | -    | 8    | 8    | 8    | 10   | 16    | 16    | 36    |
|                                             | Total Power Loss [W]                          |                | 17.0                                          | 19.0 | 23.9 | 34.5 | 50.5 | 60.9 | 71.2 | 97.6 | 136.2 | 146.2 | 281.6 |
| Regenerative Resistor                       | Built-In Regenerative Resistor                | Resistance [W] | -                                             | -    | -    | -    | 40   | 40   | 40   | 20   | 12    | 12    | 8     |
|                                             |                                               | Capacity [W]   | -                                             | -    | -    | -    | 40   | 40   | 40   | 60   | 60    | 60    | 180   |
|                                             | Minimum Allowable External Resistance [W]     |                | 40                                            | 40   | 40   | 40   | 40   | 40   | 40   | 20   | 12    | 12    | 8     |
| Overvoltage Category                        |                                               |                | III                                           |      |      |      |      |      |      |      |       |       |       |

\* This is the net value at the rated load.

| Model SGD7S-                                |                                               |                 | 470A                                          | 550A               | 590A               | 780A               |
|---------------------------------------------|-----------------------------------------------|-----------------|-----------------------------------------------|--------------------|--------------------|--------------------|
| Maximum Applicable Motor Capacity [kW]      |                                               |                 | 6.0                                           | 7.5                | 11                 | 15                 |
| Continuous Output Current [Arms]            |                                               |                 | 46.9                                          | 54.7               | 58.6               | 78.0               |
| Instantaneous Maximum Output Current [Arms] |                                               |                 | 110                                           | 130                | 140                | 170                |
| Main Circuit                                | Power Supply                                  |                 | 200 VAC to 240 VAC, -15% to +10%, 50 Hz/60 Hz |                    |                    |                    |
|                                             | Input Current [Arms]* <sup>1</sup>            |                 | 29                                            | 37                 | 54                 | 73                 |
| Control                                     | Power Supply                                  |                 | 200 VAC to 240 VAC, -15% to +10%, 50 Hz/60 Hz |                    |                    |                    |
|                                             | Input Current [Arms]* <sup>1</sup>            |                 | 0.3                                           | 0.3                | 0.4                | 0.4                |
| Power Supply Capacity [kVA]* <sup>1</sup>   |                                               |                 | 10.7                                          | 14.6               | 21.7               | 29.6               |
| Power Loss* <sup>1</sup>                    | Main Circuit Power Loss [W]                   |                 | 271.7                                         | 326.9              | 365.3              | 501.4              |
|                                             | Control Circuit Power Loss [W]                |                 | 21                                            | 21                 | 28                 | 28                 |
|                                             | External Regenerative Resistor Power Loss [W] |                 | 180* <sup>2</sup>                             | 350* <sup>3</sup>  | 350* <sup>3</sup>  | 350* <sup>3</sup>  |
|                                             | Total Power Loss [W]                          |                 | 292.7                                         | 347.9              | 393.3              | 529.4              |
| Regenerative Resistor                       | External Regenerative Resistor                | Resistance [Ω ] | 6.25* <sup>2</sup>                            | 3.13* <sup>3</sup> | 3.13* <sup>3</sup> | 3.13* <sup>3</sup> |
|                                             |                                               | Capacity [W]    | 880* <sup>2</sup>                             | 1760* <sup>3</sup> | 1760* <sup>3</sup> | 1760* <sup>3</sup> |
|                                             | Minimum Allowable External Resistance [Ω ]    |                 | 5.8                                           | 2.9                | 2.9                | 2.9                |
| Overvoltage Category                        |                                               |                 | III                                           |                    |                    |                    |

\*1. This is the net value at the rated load.

\*2. This value is for the optional JUSP-RA04-E Regenerative Resistor Unit.

\*3. This value is for the optional JUSP-RA05-E Regenerative Resistor Unit.

## ◆ Single-phase, 200 VAC

| Model SGD7S-                                |                                               |                 | R70A                                          | R90A | 1R6A | 2R8A | 5R5A | 120A  |
|---------------------------------------------|-----------------------------------------------|-----------------|-----------------------------------------------|------|------|------|------|-------|
| Maximum Applicable Motor Capacity [kW]      |                                               |                 | 0.05                                          | 0.1  | 0.2  | 0.4  | 0.75 | 1.5   |
| Continuous Output Current [Arms]            |                                               |                 | 0.66                                          | 0.91 | 1.6  | 2.8  | 5.5  | 11.6  |
| Instantaneous Maximum Output Current [Arms] |                                               |                 | 2.1                                           | 3.2  | 5.9  | 9.3  | 16.9 | 28    |
| Main Circuit                                | Power Supply                                  |                 | 200 VAC to 240 VAC, -15% to +10%, 50 Hz/60 Hz |      |      |      |      |       |
|                                             | Input Current [Arms]*                         |                 | 0.8                                           | 1.6  | 2.4  | 5.0  | 8.7  | 16    |
| Control                                     | Power Supply                                  |                 | 200 VAC to 240 VAC, -15% to +10%, 50 Hz/60 Hz |      |      |      |      |       |
|                                             | Input Current [Arms]*                         |                 | 0.2                                           | 0.2  | 0.2  | 0.2  | 0.2  | 0.25  |
| Power Supply Capacity [kVA]*                |                                               |                 | 0.2                                           | 0.3  | 0.6  | 1.2  | 1.9  | 4.0   |
| Power Loss*                                 | Main Circuit Power Loss [W]                   |                 | 5.0                                           | 7.1  | 12.1 | 23.7 | 39.2 | 71.8  |
|                                             | Control Circuit Power Loss [W]                |                 | 12                                            | 12   | 12   | 12   | 14   | 16    |
|                                             | Built-in Regenerative Resistor Power Loss [W] |                 | —                                             | —    | —    | —    | 8    | 16    |
|                                             | Total Power Loss [W]                          |                 | 17.0                                          | 19.1 | 24.1 | 35.7 | 61.2 | 103.8 |
| Regenerative Resistor                       | Built-In Regen-erative Resistor               | Resistance [Ω ] | —                                             | —    | —    | —    | 40   | 12    |
|                                             |                                               | Capacity [W]    | —                                             | —    | —    | —    | 40   | 60    |
|                                             | Minimum Allowable External Resistance [Ω ]    |                 | 40                                            | 40   | 40   | 40   | 40   | 12    |
| Overvoltage Category                        |                                               |                 | III                                           |      |      |      |      |       |

\* This is the net value at the rated load.

## ◆ 270 VDC

| Model SGD7S-                                |                                    | R70A                             | R90A | 1R6A | 2R8A | 3R8A | 5R5A | 7R6A | 120A              |
|---------------------------------------------|------------------------------------|----------------------------------|------|------|------|------|------|------|-------------------|
| Maximum Applicable Motor Capacity [kW]      |                                    | 0.05                             | 0.1  | 0.2  | 0.4  | 0.5  | 0.75 | 1.0  | 1.5               |
| Continuous Output Current [Arms]            |                                    | 0.66                             | 0.91 | 1.6  | 2.8  | 3.8  | 5.5  | 7.6  | 11.6              |
| Instantaneous Maximum Output Current [Arms] |                                    | 2.1                              | 3.2  | 5.9  | 9.3  | 11.0 | 16.9 | 17.0 | 28.0              |
| Main Circuit                                | Power Supply                       | 270 VDC to 324 VDC, -15% to +10% |      |      |      |      |      |      |                   |
|                                             | Input Current [Arms]* <sup>1</sup> | 0.5                              | 1.0  | 1.5  | 3.0  | 3.8  | 4.9  | 6.9  | 11                |
| Control                                     | Power Supply                       | 270 VDC to 324 VDC, -15% to +10% |      |      |      |      |      |      |                   |
|                                             | Input Current [Arms]* <sup>1</sup> | 0.2                              | 0.2  | 0.2  | 0.2  | 0.2  | 0.2  | 0.2  | 0.2* <sup>2</sup> |
| Power Supply Capacity [kVA]* <sup>1</sup>   |                                    | 0.2                              | 0.3  | 0.6  | 1    | 1.4  | 1.6  | 2.3  | 3.2               |
| Power Loss* <sup>1</sup>                    | Main Circuit Power Loss [W]        | 4.4                              | 5.9  | 9.8  | 17.5 | 23.0 | 30.7 | 38.7 | 55.8              |
|                                             | Control Circuit Power Loss [W]     | 12                               | 12   | 12   | 12   | 14   | 14   | 14   | 15                |
|                                             | Total Power Loss [W]               | 16.4                             | 17.9 | 21.8 | 29.5 | 37.0 | 44.7 | 52.7 | 70.8              |
| Overvoltage Category                        |                                    | III                              |      |      |      |      |      |      |                   |

\*1. This is the net value at the rated load.

\*2. The value is 0.25 Arms for the SGD7S-120A00A008.

| Model SGD7S-                                |                                | 180A                             | 200A | 330A  | 470A  | 550A  | 590A  | 780A  |
|---------------------------------------------|--------------------------------|----------------------------------|------|-------|-------|-------|-------|-------|
| Maximum Applicable Motor Capacity [kW]      |                                | 2.0                              | 3.0  | 5.0   | 6.0   | 7.5   | 11.0  | 15.0  |
| Continuous Output Current [Arms]            |                                | 18.5                             | 19.6 | 32.9  | 46.9  | 54.7  | 58.6  | 78.0  |
| Instantaneous Maximum Output Current [Arms] |                                | 42.0                             | 56.0 | 84.0  | 110   | 130   | 140   | 170   |
| Main Circuit                                | Power Supply                   | 270 VDC to 324 VDC, -15% to +10% |      |       |       |       |       |       |
|                                             | Input Current [Arms]*          | 14                               | 20   | 34    | 36    | 48    | 68    | 92    |
| Control                                     | Power Supply                   | 270 VDC to 324 VDC, -15% to +10% |      |       |       |       |       |       |
|                                             | Input Current [Arms]*          | 0.25                             | 0.25 | 0.3   | 0.3   | 0.3   | 0.4   | 0.4   |
| Power Supply Capacity [kVA]*                |                                | 4.0                              | 5.9  | 7.5   | 10.7  | 14.6  | 21.7  | 29.6  |
| Power Loss*                                 | Main Circuit Power Loss [W]    | 82.7                             | 83.5 | 146.2 | 211.6 | 255.3 | 243.6 | 343.4 |
|                                             | Control Circuit Power Loss [W] | 16                               | 16   | 19    | 21    | 21    | 28    | 28    |
|                                             | Total Power Loss [W]           | 98.7                             | 99.5 | 165.2 | 232.6 | 276.3 | 271.6 | 371.4 |
| Overvoltage Category                        |                                | III                              |      |       |       |       |       |       |

\* This is the net value at the rated load.

## Additional SERVOPACK Options

### 1.5-Axis Control Option

#### ◆ Single-phase, 100 VAC

| Model SGD7S-                                |                                                    | R70F                                          | R90F | 2R1F | 2R8F |
|---------------------------------------------|----------------------------------------------------|-----------------------------------------------|------|------|------|
| Maximum Applicable Motor Capacity [kW]      |                                                    | 0.05                                          | 0.1  | 0.2  | 0.4  |
| Continuous Output Current [Arms]            |                                                    | 0.66                                          | 0.91 | 2.1  | 2.8  |
| Instantaneous Maximum Output Current [Arms] |                                                    | 2.1                                           | 3.2  | 6.5  | 9.3  |
| Main Circuit                                | Power Supply                                       | 100 VAC to 120 VAC, -15% to +10%, 50 Hz/60 Hz |      |      |      |
|                                             | Input Current [Arms]*                              | 1.5                                           | 2.5  | 5    | 10   |
| Control                                     | Power Supply                                       | 100 VAC to 120 VAC, -15% to +10%, 50 Hz/60 Hz |      |      |      |
|                                             | Input Current [Arms]*                              | 0.38                                          | 0.38 | 0.38 | 0.38 |
| Power Supply Capacity [kVA]*                |                                                    | 0.2                                           | 0.3  | 0.6  | 1.4  |
| Power Loss*                                 | Main Circuit Power Loss [W]                        | 5.3                                           | 7.8  | 14.2 | 26.2 |
|                                             | Control Circuit Power Loss [W]                     | 12                                            | 12   | 12   | 12   |
|                                             | Total Power Loss [W]                               | 17.3                                          | 19.8 | 26.2 | 38.2 |
| Regenerative Resistor                       | Minimum Allowable External Resistance [ $\Omega$ ] | 40                                            | 40   | 40   | 40   |
| Overvoltage Category                        |                                                    | III                                           |      |      |      |

\* This is the net value at the rated load.

## Specifications

| Item                                     |                                                                                                                                                                                                              | Specification                                                                                                                                                                                                                                                                                                             |          |                         |              |                                                                        |              |                                                                                          |                 |                        |
|------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|-------------------------|--------------|------------------------------------------------------------------------|--------------|------------------------------------------------------------------------------------------|-----------------|------------------------|
| Control Method                           |                                                                                                                                                                                                              | IGBT-based PWM control, sine wave current drive                                                                                                                                                                                                                                                                           |          |                         |              |                                                                        |              |                                                                                          |                 |                        |
| Feedback                                 | With Rotary Servomotor                                                                                                                                                                                       | Serial encoder: 17 bits (absolute encoder)<br>20 bits or 24 bits (incremental encoder/absolute encoder)                                                                                                                                                                                                                   |          |                         |              |                                                                        |              |                                                                                          |                 |                        |
|                                          | With Linear Servomotor                                                                                                                                                                                       | <ul style="list-style-type: none"><li>Absolute linear encoder (The signal resolution depends on the absolute linear encoder.)</li><li>Incremental linear encoder (The signal resolution depends on the incremental linear encoder or Serial Converter Unit.)</li></ul>                                                    |          |                         |              |                                                                        |              |                                                                                          |                 |                        |
| Environmental Conditions                 | Surrounding Air Temperature                                                                                                                                                                                  | 0°C to 45°C                                                                                                                                                                                                                                                                                                               |          |                         |              |                                                                        |              |                                                                                          |                 |                        |
|                                          | Storage Temperature                                                                                                                                                                                          | -20°C to 85°C                                                                                                                                                                                                                                                                                                             |          |                         |              |                                                                        |              |                                                                                          |                 |                        |
|                                          | Surrounding Air Humidity                                                                                                                                                                                     | 90% relative humidity max. (with no freezing or condensation)                                                                                                                                                                                                                                                             |          |                         |              |                                                                        |              |                                                                                          |                 |                        |
|                                          | Storage Humidity                                                                                                                                                                                             | 90% relative humidity max. (with no freezing or condensation)                                                                                                                                                                                                                                                             |          |                         |              |                                                                        |              |                                                                                          |                 |                        |
|                                          | Vibration Resistance                                                                                                                                                                                         | 4.9 m/s <sup>2</sup>                                                                                                                                                                                                                                                                                                      |          |                         |              |                                                                        |              |                                                                                          |                 |                        |
|                                          | Shock Resistance                                                                                                                                                                                             | 19.6 m/s <sup>2</sup>                                                                                                                                                                                                                                                                                                     |          |                         |              |                                                                        |              |                                                                                          |                 |                        |
|                                          | Degree of Protection                                                                                                                                                                                         | <table><tr><td>Class</td><td>SERVOPACK Model: SGD7S-</td></tr><tr><td>IP20</td><td>R70A, R90A, 1R6A, 2R8A, 3R8A, 5R5A, 7R6A, 120A, R70F, R90F, 2R1F, 2R8F</td></tr><tr><td>IP10</td><td>120AE0A008, 180A, 200A, 330A, 470A, 550A, 590A, 780A</td></tr></table>                                                            | Class    | SERVOPACK Model: SGD7S- | IP20         | R70A, R90A, 1R6A, 2R8A, 3R8A, 5R5A, 7R6A, 120A, R70F, R90F, 2R1F, 2R8F | IP10         | 120AE0A008, 180A, 200A, 330A, 470A, 550A, 590A, 780A                                     |                 |                        |
|                                          | Class                                                                                                                                                                                                        | SERVOPACK Model: SGD7S-                                                                                                                                                                                                                                                                                                   |          |                         |              |                                                                        |              |                                                                                          |                 |                        |
|                                          | IP20                                                                                                                                                                                                         | R70A, R90A, 1R6A, 2R8A, 3R8A, 5R5A, 7R6A, 120A, R70F, R90F, 2R1F, 2R8F                                                                                                                                                                                                                                                    |          |                         |              |                                                                        |              |                                                                                          |                 |                        |
|                                          | IP10                                                                                                                                                                                                         | 120AE0A008, 180A, 200A, 330A, 470A, 550A, 590A, 780A                                                                                                                                                                                                                                                                      |          |                         |              |                                                                        |              |                                                                                          |                 |                        |
| Pollution Degree                         | <div>2</div> <ul style="list-style-type: none"><li>Must be no corrosive or flammable gases.</li><li>Must be no exposure to water, oil, or chemicals.</li><li>Must be no dust, salts, or iron dust.</li></ul> |                                                                                                                                                                                                                                                                                                                           |          |                         |              |                                                                        |              |                                                                                          |                 |                        |
| Altitude                                 | 1,000 m max.                                                                                                                                                                                                 |                                                                                                                                                                                                                                                                                                                           |          |                         |              |                                                                        |              |                                                                                          |                 |                        |
| Others                                   | Do not use the SERVOPACK in the following locations: Locations subject to static electricity noise, strong electromagnetic/magnetic fields, or radioactivity                                                 |                                                                                                                                                                                                                                                                                                                           |          |                         |              |                                                                        |              |                                                                                          |                 |                        |
| Applicable Standards                     |                                                                                                                                                                                                              | UL 61800-5-1 (E147823), CSA C22.2 No.274, EN ISO13849-1: 2015, EN 55011 group 1 class A, EN 61000-6-2, EN 61000-6-4, EN 61800-3 (Category C2, Second environment), EN 50178, EN 61800-5-1, IEC 60204-1, IEC 61508 series, IEC 62061, IEC 61800-5-2, and IEC 61326-3-1                                                     |          |                         |              |                                                                        |              |                                                                                          |                 |                        |
| Mounting                                 |                                                                                                                                                                                                              | <table><tr><td>Mounting</td><td>SERVOPACK Model: SGD7S-</td></tr><tr><td>Base-mounted</td><td>All Models</td></tr><tr><td>Rack-mounted</td><td>R70A, R90A, 1R6A, 2R8A, 3R8A, 5R5A, 7R6A, 120A, 180A, 200A, 330A, R70F, R90F, 2R1F, 2R8F</td></tr><tr><td>Duct-ventilated</td><td>470A, 550A, 590A, 780A</td></tr></table> | Mounting | SERVOPACK Model: SGD7S- | Base-mounted | All Models                                                             | Rack-mounted | R70A, R90A, 1R6A, 2R8A, 3R8A, 5R5A, 7R6A, 120A, 180A, 200A, 330A, R70F, R90F, 2R1F, 2R8F | Duct-ventilated | 470A, 550A, 590A, 780A |
| Mounting                                 | SERVOPACK Model: SGD7S-                                                                                                                                                                                      |                                                                                                                                                                                                                                                                                                                           |          |                         |              |                                                                        |              |                                                                                          |                 |                        |
| Base-mounted                             | All Models                                                                                                                                                                                                   |                                                                                                                                                                                                                                                                                                                           |          |                         |              |                                                                        |              |                                                                                          |                 |                        |
| Rack-mounted                             | R70A, R90A, 1R6A, 2R8A, 3R8A, 5R5A, 7R6A, 120A, 180A, 200A, 330A, R70F, R90F, 2R1F, 2R8F                                                                                                                     |                                                                                                                                                                                                                                                                                                                           |          |                         |              |                                                                        |              |                                                                                          |                 |                        |
| Duct-ventilated                          | 470A, 550A, 590A, 780A                                                                                                                                                                                       |                                                                                                                                                                                                                                                                                                                           |          |                         |              |                                                                        |              |                                                                                          |                 |                        |
| Performance                              | Speed Control Range                                                                                                                                                                                          | 1:5000 (At the rated torque, the lower limit of the speed control range must not cause the Servomotor to stop.)                                                                                                                                                                                                           |          |                         |              |                                                                        |              |                                                                                          |                 |                        |
|                                          | Coefficient of Speed Fluctuation* <sup>1</sup>                                                                                                                                                               | ±0.01% of rated speed max. (for a load fluctuation of 0% to 100%)                                                                                                                                                                                                                                                         |          |                         |              |                                                                        |              |                                                                                          |                 |                        |
|                                          |                                                                                                                                                                                                              | 0% of rated speed max. (for a voltage fluctuation of ±10%)                                                                                                                                                                                                                                                                |          |                         |              |                                                                        |              |                                                                                          |                 |                        |
|                                          |                                                                                                                                                                                                              | ±0.1% of rated speed max. (for a temperature fluctuation of 25°C ±25°C)                                                                                                                                                                                                                                                   |          |                         |              |                                                                        |              |                                                                                          |                 |                        |
| Torque Control Precision (Repeatability) |                                                                                                                                                                                                              | ±1%                                                                                                                                                                                                                                                                                                                       |          |                         |              |                                                                        |              |                                                                                          |                 |                        |
| Soft Start Time Setting                  |                                                                                                                                                                                                              | 0 s to 10 s (Can be set separately for acceleration and deceleration.)                                                                                                                                                                                                                                                    |          |                         |              |                                                                        |              |                                                                                          |                 |                        |
| I/O Signals                              | Encoder Divided Pulse Output                                                                                                                                                                                 | Phase A, phase B, phase C: Line-driver output<br>Number of divided output pulses: Any setting is allowed.                                                                                                                                                                                                                 |          |                         |              |                                                                        |              |                                                                                          |                 |                        |
|                                          | Overheat Protection Input                                                                                                                                                                                    | Number of input points: 1<br>Input voltage range: 0 V to +5 V                                                                                                                                                                                                                                                             |          |                         |              |                                                                        |              |                                                                                          |                 |                        |

Continued on next page.

Continued from previous page.

| Item                       |                              |                                                     | Specification                                                                                                                                                                                                                                                                                                                                                                                                              |
|----------------------------|------------------------------|-----------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| I/O Signals                | Sequence Input Signals       | SERVOPACK                                           | Fixed Input                                                                                                                                                                                                                                                                                                                                                                                                                |
|                            |                              |                                                     | Allowable voltage range: 24 VDC ±20%<br>Number of input points: 6                                                                                                                                                                                                                                                                                                                                                          |
|                            |                              |                                                     | Input method: Sink inputs or source inputs<br>Input Signals: <ul style="list-style-type: none"><li>• Alarm Reset (/ALM-RST)</li><li>• Forward Drive Prohibited (P-OT)</li><li>• Reverse Drive Prohibited (N-OT)</li><li>• Origin Return Deceleration Switch (/DEC)</li><li>• Registration (/RGRT)</li><li>• Servo ON (/S-ON)</li></ul> A signal can be allocated and the positive and negative logic can be changed.       |
|                            |                              |                                                     | Allowable voltage range: 24 VDC ±20%<br>Number of input points: 11                                                                                                                                                                                                                                                                                                                                                         |
|                            |                              |                                                     | /MODE 0/1 (Mode Switch Input) signal                                                                                                                                                                                                                                                                                                                                                                                       |
| Sequence Output Signals    | SERVOPACK                    | Fixed Output                                        | Allowable voltage range: 5 VDC to 30 VDC<br>Number of output points: 1<br>Output signal: Servo Alarm (/ALM)                                                                                                                                                                                                                                                                                                                |
|                            |                              | Output Signals for Which Allocations Can Be Changed | Allowable voltage range: 5 VDC to 30 VDC<br>Number of output points: 3. (A photocoupler output (isolated) is used.)<br><br>Output Signals: <ul style="list-style-type: none"><li>• Warning Output (/WARN)</li><li>• Brake Output (/BK)</li><li>• Servo Ready Output (/S-RDY)</li><li>• Alarm Code Output (/ALO1, /ALO2, and /ALO3)</li></ul> A signal can be allocated and the positive and negative logic can be changed. |
| Communications             | RS-422A Communications (CN3) | Interfaces                                          | Digital Operator (JUSP-OP05A-1-E) and personal computer (with SigmaWin+)                                                                                                                                                                                                                                                                                                                                                   |
|                            |                              | 1:N Communications                                  | Up to N = 15 stations possible for RS-422A port                                                                                                                                                                                                                                                                                                                                                                            |
|                            |                              | Axis Address Setting                                | Set with parameters.                                                                                                                                                                                                                                                                                                                                                                                                       |
|                            | USB Communications (CN7)     | Interfaces                                          | Interface Personal computer (with SigmaWin+)                                                                                                                                                                                                                                                                                                                                                                               |
|                            |                              | Communications Standard                             | Conforms to USB2.0 standard (12 Mbps).                                                                                                                                                                                                                                                                                                                                                                                     |
| Displays/Indicators        | SERVOPACK                    |                                                     | CHARGE and PWR indicators, and one-digit seven-segment display                                                                                                                                                                                                                                                                                                                                                             |
| Analog Monitor (CN5)       |                              |                                                     | Number of points: 2<br>Output voltage range: ±10 VDC (effective linearity range: ±8 V)<br>Resolution: 16 bits; Accuracy: ±20 mV (Typ)<br>Maximum output current: ±10 mA<br>Settling time (±1%): 1.2 ms (Typ)                                                                                                                                                                                                               |
| Dynamic Brake (DB)         |                              |                                                     | Activated when a servo alarm or overtravel (OT) occurs, or when the power supply to the main circuit or servo is OFF.                                                                                                                                                                                                                                                                                                      |
| Regenerative Processing    |                              |                                                     | Built-in (An external resistor must be connected to the SGD7S-470A to -780A.) Refer to the following section for details.<br> <b>Built-In Regenerative Resistor (page 609)</b>                                                                                                                                                          |
| Overtravel (OT) Prevention |                              |                                                     | Stopping with a dynamic brake (DB), coasting to a stop, performing a hard stop, or performing a smooth stop (decelerating to a stop) for a CCW-OT (CCW Drive Prohibit Input) signal or CW-OT (CW Drive Prohibit Input) signal.                                                                                                                                                                                             |
| Protective Functions       |                              |                                                     | Overcurrent, overvoltage, low voltage, overload, regeneration error, etc.                                                                                                                                                                                                                                                                                                                                                  |
| Utility Functions          |                              |                                                     | Gain adjustment, alarm history, jogging, origin search, etc.                                                                                                                                                                                                                                                                                                                                                               |
| Safety Functions           | Inputs                       |                                                     | /HWBB1 and /HWBB2: Base block signals for Power Modules                                                                                                                                                                                                                                                                                                                                                                    |
|                            | Output                       |                                                     | EDM1: Monitors the status of built-in safety circuit (fixed output).                                                                                                                                                                                                                                                                                                                                                       |
|                            | Applicable Standards*2       |                                                     | ISO13849-1 PLe (Category 3), IEC61508 SIL3                                                                                                                                                                                                                                                                                                                                                                                 |

\*1. The coefficient of speed fluctuation for load fluctuation is defined as follows:

$$\text{Coefficient of speed fluctuation} = \frac{\text{No-load motor speed} - \text{Total-load motor speed}}{\text{Rated motor speed}} \times 100\%$$

\*2. Always perform risk assessment for the system and confirm that the safety requirements are met.

## Cables and Peripheral Devices

Reference Sigma-7S Single-Axis Command Option Attachable SERVOPACK section for cables and peripheral devices:

 *SERVOPACK Cables* (page 574)

 *SERVOPACK Peripheral Devices* (page 584)

# Network Indexer Option

## SigmaLogic7 Compact Option

The SigmaLogic7 Compact option for Sigma-7 SERVOPACKs provides an intuitive, easy to implement solution for programming motion control using Rockwell PLCs. SigmaLogic7 Compact allows you to use Yaskawa's written and tested add-on instructions (AOIs) in your RSLogix5000 program with a ControlLogix or CompactLogix PLC. No other Yaskawa programming software is required:

- Use as many SigmaLogic instances as you have unused connections in your PLC
- Perform basic point-to-point moves, blended speed moves, homing, jogging, and gearing to an external encoder using direct commands or initiating moves through a configurable sequence table
- The LogixWorks™ software utility may be used to download sequence and configuration data

A full list of available add-on instructions is listed below. These are compatible with all CompactLogix and ControlLogix PLCs using RSLogix5000 software version 17 and above.

| AOI Names     | AOI Descriptions                      |
|---------------|---------------------------------------|
| MCFG_Yaskawa  | Motion Axis Configuration             |
| MSO_Yaskawa   | Motion Axis Servo On                  |
| MSF_Yaskawa   | Motion Axis Servo Off                 |
| MAS_Yaskawa   | Motion Axis Stop                      |
| MAFR_Yaskawa  | Motion Axis Fault Reset               |
| MAM_Yaskawa   | Motion Axis Move                      |
| MAJ_Yaskawa   | Motion Axis Jog                       |
| MAHSP_Yaskawa | Motion Axis Home Set Position         |
| MAH_Yaskawa   | Motion Axis Homing                    |
| MAB_Yaskawa   | Motion Axis "Blend" Move              |
| MSQR_Yaskawa  | Motion Axis Index Run Sequencer       |
| MSQE_Yaskawa  | Motion Axis Index Step Edit           |
| MHSI_Yaskawa  | Motion Axis High Speed Index          |
| MTRQ_Yaskawa  | Motion Axis Torque Control            |
| MCLK_Yaskawa  | Motion Axis Set Clock                 |
| MPLS_Yaskawa  | Motion Axis Programmable Limit Switch |
| MRSE_Yaskawa  | Motion Report Servo Error             |

| Home Types                                        |
|---------------------------------------------------|
| Set Position Directly                             |
| Home in Positive Direction to Hard Stop           |
| Home in Negative Direction to Hard Stop           |
| Home in Positive Direction to Limit w/o C-Pulse   |
| Home in Negative Direction to Limit w/o C-Pulse   |
| Home in Positive Direction to Limit w/C-Pulse     |
| Home in Negative Direction to Limit w/C-Pulse     |
| Home in Positive Direction to Input w/o C-Pulse   |
| Home in Negative Direction to Input w/o C-Pulse   |
| Home in Positive Direction to Input w/C-Pulse     |
| Home in Negative Direction to Input w/C-Pulse     |
| Home in Positive Direction to Hard Stop w/C-Pulse |
| Home in Negative Direction to Hard Stop w/C-Pulse |

| Move Types                              |
|-----------------------------------------|
| Absolute Move                           |
| Absolute Move with Registration         |
| Relative Move                           |
| Relative Move with Registration         |
| Blended Move                            |
| Jog                                     |
| Jog with Registration                   |
| Torque Move                             |
| High Speed Index                        |
| Rotary Absolute Move with Shortest Path |



## SERVOPACK Designations

### ◆ Purchasing a SERVOPACK with the SigmaLogic7 Compact option

To order SERVOPACKs with the SigmaLogic7 Compact option, use the following model numbers.

SGD7S - 2R8 A Q0 A 000 F51

Σ-7 Series SERVOPACK      1st+2nd+3rd digits      4th digit      5th+6th digits      7th digit      8th+9th+10th digits      11th+12th+13th digits

| 1st+2nd+3rd digits    |                   |         | Maximum Applicable Motor Capacity |      |        |
|-----------------------|-------------------|---------|-----------------------------------|------|--------|
| Voltage               | Code              | Spec.   | Voltage                           | Code | Spec.  |
| Three-phase, 200 VAC  | R70 <sup>*1</sup> | 0.05 kW | Three-phase, 400 VAC              | 1R9  | 500 W  |
|                       | R90 <sup>*1</sup> | 0.1 kW  |                                   | 3R5  | 1.0 kW |
|                       | 1R6 <sup>*1</sup> | 0.2 kW  |                                   | 5R4  | 1.5 kW |
|                       | 2R8 <sup>*1</sup> | 0.4 kW  |                                   | 8R4  | 2.0 kW |
|                       | 3R8               | 0.5 kW  |                                   | 120  | 3.0 kW |
|                       | 5R5 <sup>*1</sup> | 0.75 kW |                                   | 170  | 5.0 kW |
|                       | 7R6               | 1.0 kW  |                                   | 210  | 6.0 kW |
|                       | 120               | 1.5 kW  |                                   | 260  | 7.5 kW |
|                       | 180               | 2.0 kW  |                                   | 280  | 11 kW  |
|                       | 200               | 3.0 kW  |                                   | 370  | 15 kW  |
|                       | 330               | 5.0 kW  |                                   |      |        |
|                       | 470               | 6.0 kW  |                                   |      |        |
|                       | 550               | 7.5 kW  |                                   |      |        |
|                       | 590               | 11 kW   |                                   |      |        |
| 780                   | 15 kW             |         |                                   |      |        |
| Single-phase, 100 VAC | R70               | 0.05 kW |                                   |      |        |
|                       | R90               | 0.1 kW  |                                   |      |        |
|                       | 2R1               | 0.2 kW  |                                   |      |        |
|                       | 2R8               | 0.4 kW  |                                   |      |        |

| 4th digit |               | Voltage |
|-----------|---------------|---------|
| Code      | Specification |         |
| A         | 200 VAC       |         |
| F         | 100 VAC       |         |
| D         | 400 VAC       |         |

| 8th+9th+10th digits |                 |                   | Hardware Options Specification |
|---------------------|-----------------|-------------------|--------------------------------|
| Code                | Specification   | Applicable Models |                                |
| 000                 | Without options | All models        |                                |

| 11th+12th+13th digits |                                                                    | FT/EX Specification |
|-----------------------|--------------------------------------------------------------------|---------------------|
| Code                  | Specification                                                      |                     |
| F51                   | Application function for SigmaLogic7                               |                     |
| F82                   | Application function for SigmaLogic7 with support for SGM7D motors |                     |

| 5th+6th digits |                     | Interface |
|----------------|---------------------|-----------|
| Code           | Specification       |           |
| Q0             | SigmaLogic7 Compact |           |

| 7th digit |                              | Design Revision Order |
|-----------|------------------------------|-----------------------|
| A         | Global design revision       |                       |
| B         | 400 V global design revision |                       |

<sup>\*1</sup>: These models can be used with either a single-phase or three-phase power supply input

\*1: These models can be used with either a single-phase or three-phase power supply input

## Ratings and Specifications

Reference Sigma-7S EtherCAT Communications Reference SERVOPACKs ratings and specifications:

📖 Ratings and Specifications (page 491)

## External Dimensions

Reference Sigma-7S EtherCAT Communications Reference SERVOPACK external dimensions:

📖 Σ-7S SERVOPACKs: MECHATROLINK-III & EtherCAT Type (100/200V) (page 533)

## Cables and Peripheral Devices

Reference Sigma-7S EtherCAT Communications Reference SERVOPACK cables and peripheral devices:

📖 SERVOPACK Cables (page 574)

📖 SERVOPACK Peripheral Devices (page 584)

## FT Specification Options

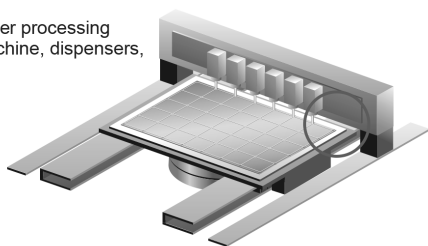
### FT19 Option - Less Deviation Control

The FT19 option for the Sigma-7 SERVOPACK provides built-in control with less deviation. There is almost no delay in motor operation for position references, which prevents path error caused by positioning response delays, and prevents interference between the machine and moving parts. FT19 is available with MECHATROLINK-III and Analog/Pulse style SERVOPACKs.

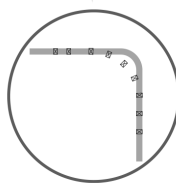
#### Applications

Ideal for applications that require reference tracking performance (high position accuracy) during movement

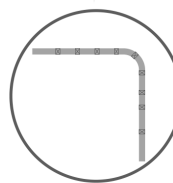
Laser processing machine, dispensers, etc.



Corner cut without precision with circular command.



Higher Tracking Performance!





# FT Specification Options

## FT79 Option - Built-in Indexer

The FT79 option for the Sigma-7 SERVOPACK provides built-in positioning with an indexer that lets you easily achieve motion control simply by entering positions, speeds, and other data for the operation pattern in the SigmaWin+ configuration tool. FT79 is available with Analog/Pulse style SERVOPACKs.

### Features High-Precision, High-Speed Positioning without a Motion Controller

The operation pattern is easily set by entering the positions, speeds, and other data in a program table. You can use the SigmaWin+ Engineering Tool to easily and efficiently set up and edit operation patterns.

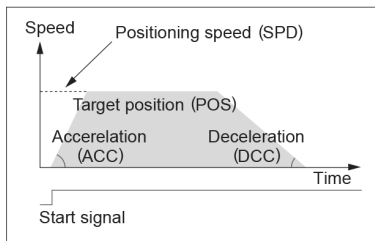
- Convenient positioning functions are also provided: ZONE signal outputs, jog speed table, origin returns, and more.
- A start command is received from a host controller to start positioning.

#### Program Table Setting Example

| PGMSTEP | POS      | SPD  | RDST   | RSPD | ACC | DEC | EVENT    | LOOP | NEXT |
|---------|----------|------|--------|------|-----|-----|----------|------|------|
| 0       | I+400000 | 2000 | 500000 | 1000 | 200 | 100 | T5000    | 1    | 1    |
| 1       | I+100000 | 1000 | 200000 | 2000 | 100 | 50  | IT0      | 1    | END  |
| n       | I+400000 | 2000 | 500000 | 1000 | 100 | 50  | IT100    | 1    | n+1  |
| n+1     | I+100000 | 1000 | 200000 | 2000 |     |     | NT0      | 1    | END  |
| 254     | I+400000 | 2000 | 500000 | 1000 | 100 | 50  | SEL3T200 | 1    | 127  |
| 255     | I+100000 | 1000 | 200000 | 2000 | 100 | 50  | DT0      | 1    | END  |

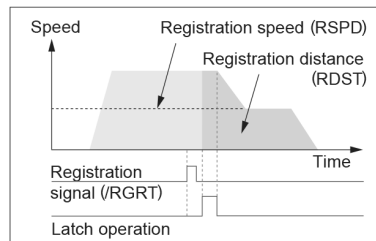
#### POS/SPD/ACC/DEC commands

An operation pattern is set up by entering the target positions, positioning speeds, accelerations, and decelerations.



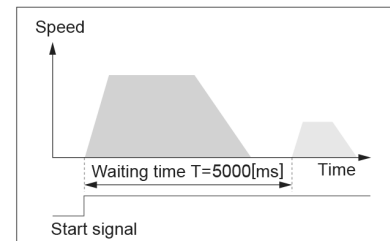
#### RDST/RSPD commands

The external signals can be used to control positioning (registration).



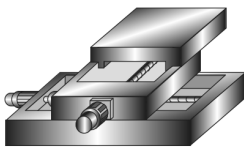
#### EVENT command

Conditions can be set to determine the completion of a program step.

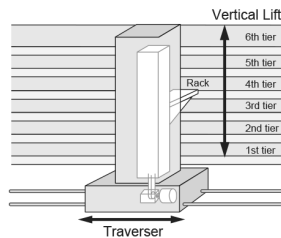


### Applications High-precision Positioning and Downsizing

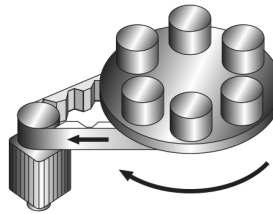
Point-to-point positioning



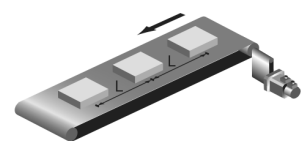
Fixed point positioning



Station positioning (Indexing)



Feeding



## SERVOPACK Designations

### ◆ Purchasing a SERVOPACK with the FT79 option

To order SERVOPACKs with the FT79 option, use the following model numbers.

SGD7S - 2R8 A 30 A 000 F79

Σ-7 Series SERVOPACK    1st+2nd+3rd digits    4th digit    5th+6th digits    7th digit    8th+9th+10th digits    11th+12th+13th digits

| 1st+2nd+3rd digits Maximum Applicable Motor Capacity |       |               | 4th digit Voltage |               | 8th+9th+10th digits Hardware Options Specification |                 |                   |
|------------------------------------------------------|-------|---------------|-------------------|---------------|----------------------------------------------------|-----------------|-------------------|
| Voltage                                              | Code  | Specification | Code              | Specification | Code                                               | Specification   | Applicable Models |
| Three-phase, 200 VAC                                 | R70*1 | 0.05 kW       | A                 | 200 VAC       | 000                                                | Without options | All models        |
|                                                      | R90*1 | 0.1 kW        | F                 | 100 VAC       |                                                    |                 |                   |
|                                                      | 1R6*1 | 0.2 kW        |                   |               |                                                    |                 |                   |
|                                                      | 2R8*1 | 0.4 kW        |                   |               |                                                    |                 |                   |
|                                                      | 3R8   | 0.5 kW        |                   |               |                                                    |                 |                   |
|                                                      | 5R5*1 | 0.75 kW       |                   |               |                                                    |                 |                   |
|                                                      | 7R6   | 1.0 kW        |                   |               |                                                    |                 |                   |
|                                                      | 120   | 1.5 kW        |                   |               |                                                    |                 |                   |
|                                                      | 180   | 2.0 kW        |                   |               |                                                    |                 |                   |
|                                                      | 200   | 3.0 kW        |                   |               |                                                    |                 |                   |
|                                                      | 330   | 5.0 kW        |                   |               |                                                    |                 |                   |
|                                                      | 470   | 6.0 kW        |                   |               |                                                    |                 |                   |
|                                                      | 550   | 7.5 kW        |                   |               |                                                    |                 |                   |
|                                                      | 590   | 11 kW         |                   |               |                                                    |                 |                   |
|                                                      | 780   | 15 kW         |                   |               |                                                    |                 |                   |
| Single-phase, 100 VAC                                | R70   | 0.05 kW       |                   |               |                                                    |                 |                   |
|                                                      | R90   | 0.1 kW        |                   |               |                                                    |                 |                   |
|                                                      | 2R1   | 0.2 kW        |                   |               |                                                    |                 |                   |
|                                                      | 2R8   | 0.4 kW        |                   |               |                                                    |                 |                   |

| 5th+6th digits Interface |                                      |
|--------------------------|--------------------------------------|
| Code                     | Specification                        |
| 00                       | Analog voltage/pulse train reference |

7th digit Design Revision Order  
A: Global design revision

| 11th+12th+13th digits FT/EX Specification |                                         |
|-------------------------------------------|-----------------------------------------|
| Code                                      | Specification                           |
| F79                                       | Application function for Simple Indexer |

\*1. You can use these models with either a single-phase or three-phase power supply input.

## Ratings and Specifications

Reference the Sigma-7S Ratings and Specifications of the appropriate SERVOPACK type:

- Σ-7S Single-axis Analog Voltage/Pulse Train Reference SERVOPACKs (page 466)
- Σ-7S Single-axis MECHATROLINK-III Communications Reference SERVOPACKs (page 476)
- Σ-7S Single-axis EtherCAT Communications Reference SERVOPACKs (page 490)

## External Dimensions

Reference the Sigma-7S External Dimensions of the appropriate SERVOPACK type:

- SERVOPACK External Dimensions (page 526)

## Cables and Peripheral Devices

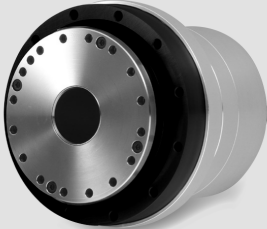
Reference Sigma-7S Cables and Peripheral Devices of the appropriate SERVOPACK type::

- SERVOPACK Cables (page 574)
- SERVOPACK Peripheral Devices (page 584)

## FT Specification Options

### FT81 Option - Harmonic Drive SHA Actuators

The FT81 option for the Sigma-7 SERVOPACK provides support for Harmonic Drive SHA Series Actuators. FT81 is available with MECHATROLINK-III and EtherCAT style SERVOPACKs.

| SHA-SG                                                                                                                                                                                                                                                                                                                                                                                                                              | SHA-CG                                                                                                                                                                                                                                                                                                                                                                                                                      |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>SHA-SG featuring compact-shape</p> <p>Compact</p>  <p>The SHA Servo Actuator combines precision Harmonic Drive® gearing with a flat AC servo motor. It has a unique compact shape and Hollow Shaft actuator design. Five sizes are available: 25, 32, 40, 58, and 65. Sizes 25 and 32 can also be combined with HarmonicPlanetary® gearing.</p> | <p>SHA-CG with improved output flange runout accuracy</p> <p>High Accuracy</p> <p>Even Ratios</p>  <p>The SHA-CG delivers high precision with improved positioning accuracy and surface runout. These actuators are ideal for high precision rotary applications such as indexing tables. Three sizes are available: 25, 32, and 40.</p> |

## SERVOPACK Designations

### ◆ Purchasing a SERVOPACK with the FT81 option

To order SERVOPACKs with the FT81 option, use the following model numbers.

|                                 |         |                       |                                      |                   |                                           |                        |                                                                            |
|---------------------------------|---------|-----------------------|--------------------------------------|-------------------|-------------------------------------------|------------------------|----------------------------------------------------------------------------|
| SGD7S                           | -       | 2R8                   | A                                    | 30                | A                                         | 000                    | F81                                                                        |
| Σ-7 Series<br>SERVOPACK         |         | 1st+2nd+3rd<br>digits | 4th<br>digit                         | 5th+6th<br>digits | 7th<br>digit                              | 8th+9th+10th<br>digits | 11th+12th+<br>13th digits                                                  |
|                                 |         | 1st+2nd+3rd digits    | Maximum Applicable<br>Motor Capacity | 4th digit         | Voltage                                   | 8th+9th+10th digits    | Hardware Options<br>Specification                                          |
| Three-<br>phase,<br>200<br>VAC  | Voltage | Code                  | Specification                        | Code              | Specification                             | Code                   | Specification                                                              |
|                                 |         | R70*1                 | 0.05 kW                              | A                 | 200 VAC                                   | 000                    | Without options                                                            |
|                                 |         | R90*1                 | 0.1 kW                               | F                 | 100 VAC                                   |                        | All models                                                                 |
|                                 |         | 1R6*1                 | 0.2 kW                               |                   |                                           |                        |                                                                            |
|                                 |         | 2R8*1                 | 0.4 kW                               |                   |                                           |                        |                                                                            |
|                                 |         | 3R8                   | 0.5 kW                               |                   |                                           |                        |                                                                            |
|                                 |         | 5R5*1                 | 0.75 kW                              |                   |                                           |                        |                                                                            |
|                                 |         | 7R6                   | 1.0 kW                               |                   |                                           |                        |                                                                            |
|                                 |         | 120                   | 1.5 kW                               |                   |                                           |                        |                                                                            |
|                                 |         | 180                   | 2.0 kW                               |                   |                                           |                        |                                                                            |
|                                 |         | 200                   | 3.0 kW                               |                   |                                           |                        |                                                                            |
|                                 |         | 330                   | 5.0 kW                               |                   |                                           |                        |                                                                            |
|                                 |         | 470                   | 6.0 kW                               |                   |                                           |                        |                                                                            |
|                                 |         | 550                   | 7.5 kW                               |                   |                                           |                        |                                                                            |
| Single-<br>phase,<br>100<br>VAC |         | 590                   | 11 kW                                |                   |                                           |                        |                                                                            |
|                                 |         | 780                   | 15 kW                                |                   |                                           |                        |                                                                            |
|                                 |         | R70                   | 0.05 kW                              |                   |                                           |                        |                                                                            |
|                                 |         | R90                   | 0.1 kW                               |                   |                                           |                        |                                                                            |
|                                 |         | 2R1                   | 0.2 kW                               |                   |                                           |                        |                                                                            |
|                                 |         | 2R8                   | 0.4 kW                               |                   |                                           |                        |                                                                            |
|                                 |         |                       |                                      | 5th+6th digits    | Interface                                 | 11th+12th+13th digits  | FT/EX Specification                                                        |
|                                 |         |                       |                                      | Code              | Specification                             | Code                   | Specification                                                              |
|                                 |         |                       |                                      | 00                | Analog voltage/pulse train reference      | F81                    | Application function for connection to Harmonic Drive SHA series actuators |
|                                 |         |                       |                                      | 30                | MECHATROLINK-III communications reference |                        |                                                                            |
|                                 |         |                       |                                      | A0                | EtherCAT communications reference         |                        |                                                                            |
|                                 |         |                       |                                      | 7th digit         | Design Revision Order                     |                        |                                                                            |
|                                 |         |                       |                                      |                   | A: Global design revision                 |                        |                                                                            |

\*1. You can use these models with either a single-phase or three-phase power supply input.

## Ratings and Specifications

Reference the Sigma-7S Ratings and Specifications of the appropriate SERVOPACK type:

- ☞ *Σ-7S Single-axis Analog Voltage/Pulse Train Reference SERVOPACKs* (page 466)
- ☞ *Σ-7S Single-axis MECHATROLINK-III Communications Reference SERVOPACKs* (page 476)
- ☞ *Σ-7S Single-axis EtherCAT Communications Reference SERVOPACKs* (page 490)

## External Dimensions

Reference the Sigma-7S External Dimensions of the appropriate SERVOPACK type:

- ☞ *SERVOPACK External Dimensions* (page 526)

## Cables and Peripheral Devices

Reference Sigma-7S Cables and Peripheral Devices of the appropriate SERVOPACK type::

- ☞ *SERVOPACK Cables* (page 574)
- ☞ *SERVOPACK Peripheral Devices* (page 584)

For more information on Harmonic Drive SHA Series Actuators:

Visit: <http://www.harmonicdrive.net/products/rotary-actuators/hollow-shaft-actuators/sha-sg>

# FT Specification Options

## FT82/83 Option - for SGM7D Direct Drive Motor

To order SERVOPACKs with the FT82/83 option, use the following model numbers.

SGD7S - 2R8 A 00 A 001 F82

Σ-7 Series  
Σ-7S SERVOPACKs
1st+2nd+3rd  
digits
4th  
digit
5th+6th  
digits
7th  
digit
8th+9th+10th  
digits
11th+12th+13th  
digits

1st+2nd+3rd digits Maximum Applicable Motor Capacity

| Voltage               | Code  | Specification |
|-----------------------|-------|---------------|
| Three-phase, 200 VAC  | 2R8*1 | 0.4 kW        |
|                       | 120*2 | 1.5 kW        |
| Single-phase, 100 VAC | 2R8   | 0.4 kW        |

4th digit Voltage

| Code | Specification |
|------|---------------|
| A    | 200 VAC       |
| F    | 100 VAC       |

5th+6th digits Interface

| Code | Specification                             |
|------|-------------------------------------------|
| 00   | Analog voltage/pulse train reference      |
| 30   | MECHATROLINK-III communications reference |
| A0   | EtherCAT communications reference         |
| M0   | Sigma-7Siec                               |
| Q0   | SigmaLogic7 Compact                       |

7th digit Design Revision Order

A

8th+9th+10th digits Hardware Options Specification

| Code        | Specification                            | Applicable Models |
|-------------|------------------------------------------|-------------------|
| None<br>000 | Without options                          | All models        |
| 008         | Single-phase, 200-VAC power supply input | SGD7S-120A        |

11th+12th+13th digits FT Specification

| Code | Specification                                                                                     |
|------|---------------------------------------------------------------------------------------------------|
| F82  | Application function for connection to SGM7D motors                                               |
| F83  | Application function for connection to SGM7D motors plus application function for simple indexer* |

\* Only available with Analog/Pulse interface

\*1. You can use these models with either a single-phase or three-phase power supply input.

\*2. A model with a single-phase, 200-VAC power supply input is available as a hardware option (model: SGD7S-120A□ 0A008).

Note: Refer to the following manual for details.


**Σ-7-Series AC Servo Drive Σ-7S SERVOPACK with FT/EX Specification for SGM7D Motor Product Manual (Manual No.: SIEP S800001 91)**



# SERVOPACK Cables/ Peripherals

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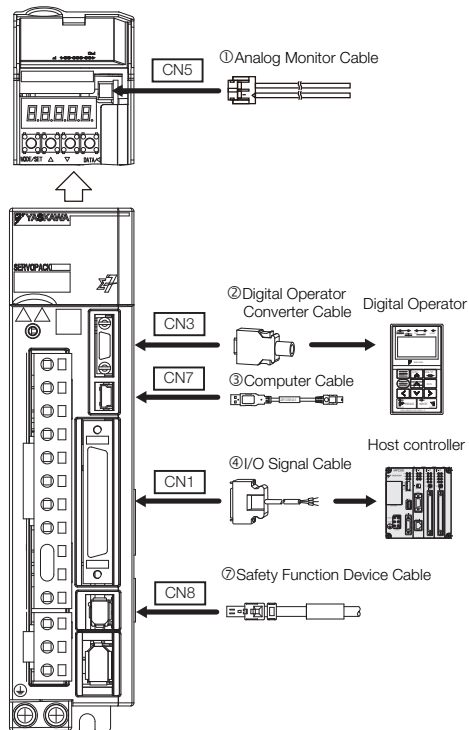
SERVOPACK Cables .....574

SERVOPACK Peripheral Devices .....584

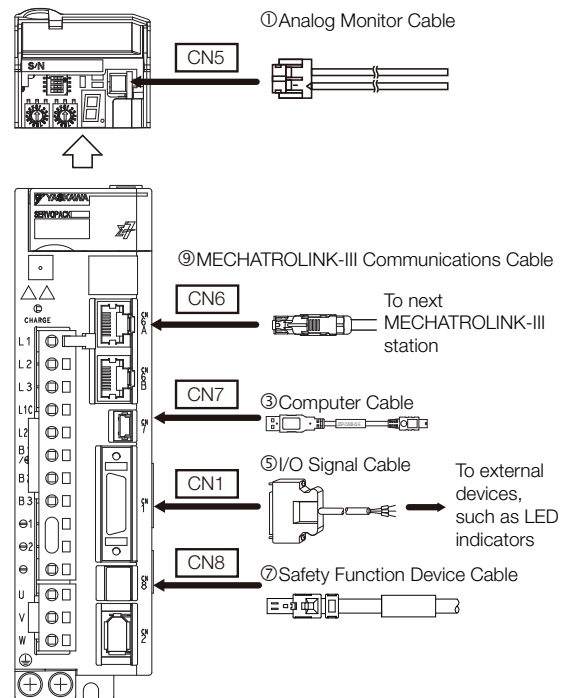
# SERVOPACK Cables

## System Configurations (200V)

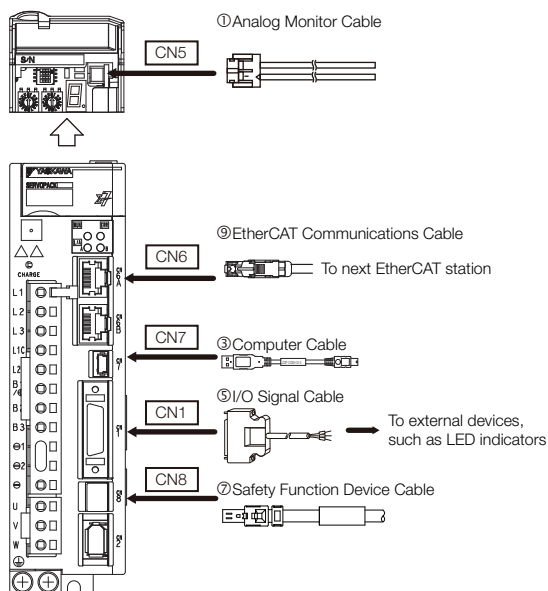
### ■ $\Sigma$ -7S Single-axis Analog Voltage/Pulse Train Reference SERVOPACKs



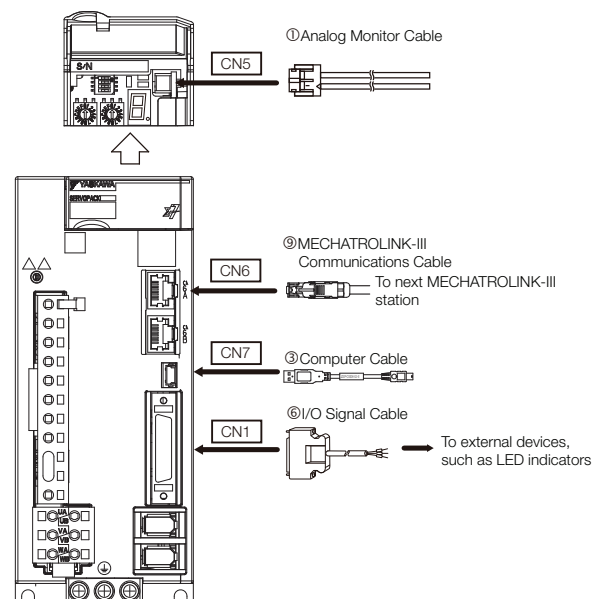
### ■ $\Sigma$ -7S Single-axis MECHATROLINK-III Communications Reference SERVOPACKs



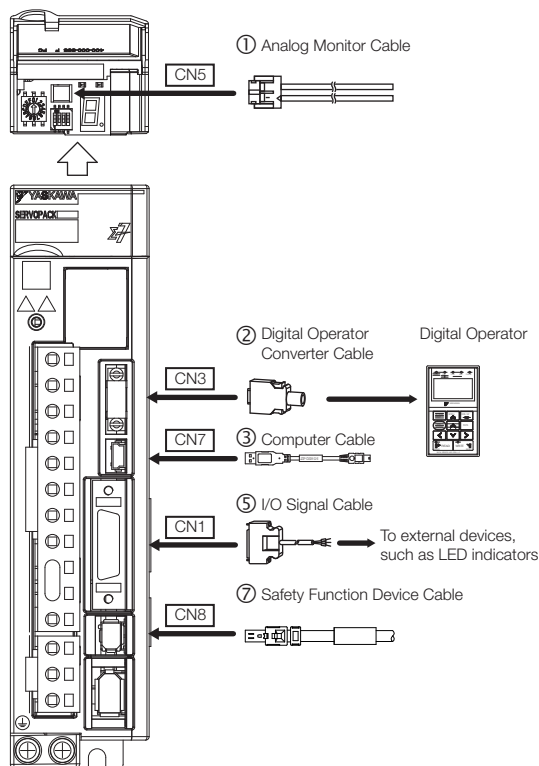
### ■ $\Sigma$ -7S Single-axis EtherCAT Comm. Reference and Sigma-7Siec SERVOPACKs



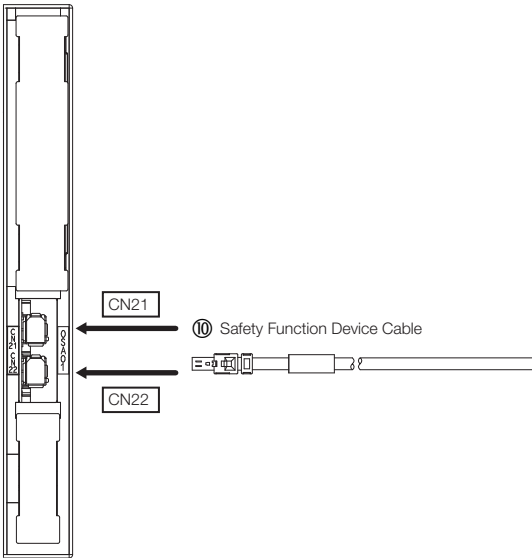
### ■ $\Sigma$ -7W Two-axis MECHATROLINK-III Communications Reference SERVOPACKs



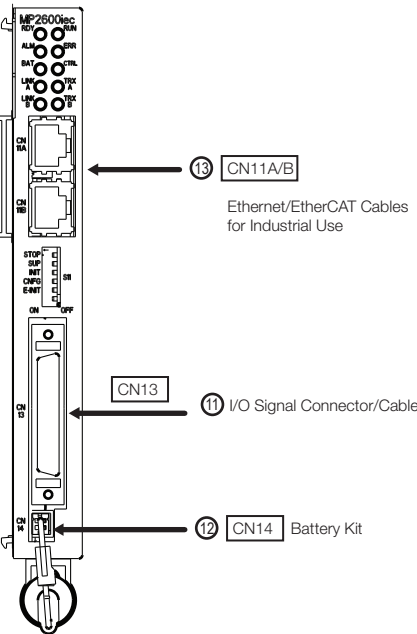
■  $\Sigma$ -7S Single-axis Command Option  
Attachable-Type SERVOPACKs



■ Command Option Module:  
Safety Module



■ Command Option Module:  
MP2600 Module



## Selection Table



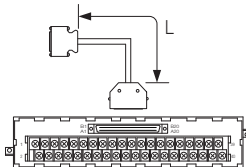
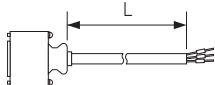
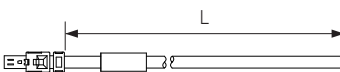
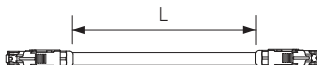
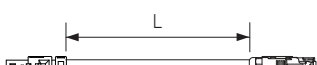
1. Use the cable specified by Yaskawa for the Computer Cable. Operation may not be dependable with any other cable.
2. Use the cable specified by Yaskawa for the MECHATROLINK Communications Cables. Operation may not be dependable due to low noise resistance with any other cable.

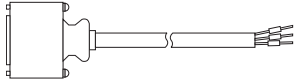
Note: Refer to the following manual for the following information.

- Cable dimensional drawings and cable connection specifications
- Order numbers and specifications of individual connectors for cables

Σ-7-Series AC Servo Drive Peripheral Device Selection Manual (Manual No.: SIEP S800001 32)

| Code | Name                             |                                                                          | Length (L) | Order Number      | Appearance/Spec                       |
|------|----------------------------------|--------------------------------------------------------------------------|------------|-------------------|---------------------------------------|
| ①    | Analog Monitor Cable             |                                                                          | 1 m        | JZSP-CA01-E       |                                       |
| ②    | Digital Operator Converter Cable |                                                                          | 0.3 m      | JZSP-CVS05-A3-E*1 |                                       |
|      |                                  |                                                                          |            | JZSP-CVS07-A3-E*2 |                                       |
| ③    | Computer Cable                   |                                                                          | 2.5 m      | JZSP-CVS06-02-E   |                                       |
| ④    | I/O Signal Cable                 | Soldered Connector Kit                                                   |            | JZSP-CSI9-1-E     |                                       |
|      |                                  | Cable for Terminal Block                                                 | 0.5 m      | JUSP-WA50P-A5A    | Terminal block & connection cable<br> |
|      |                                  |                                                                          | 1 m        | JUSP-WA50P-01A    |                                       |
|      |                                  |                                                                          | 3 m        | JUSP-WA50P-03A    |                                       |
|      |                                  | Terminal Block                                                           |            | 51176710          |                                       |
|      |                                  | Cable with Loose Wires at One End (loose wires on peripheral device end) | 1 m        | JZSP-CSI01-1-E    |                                       |
|      |                                  |                                                                          | 2 m        | JZSP-CSI01-2-E    |                                       |
|      |                                  |                                                                          | 3 m        | JZSP-CSI01-3-E    |                                       |
| ⑤    | I/O Signal Cables                | Soldered Connector Kit                                                   |            | JZSP-CSI9-2-E     |                                       |
|      |                                  | Cable for-Terminal Block                                                 | 0.5 m      | CBL-SBK-A5A       | Terminal block & connection cable<br> |
|      |                                  |                                                                          | 1 m        | CBL-SBK-01A       |                                       |
|      |                                  |                                                                          | 3 m        | CBL-SBK-03A       |                                       |
|      |                                  | Terminal Block                                                           |            | 60372493          |                                       |
|      |                                  | Cable with Loose Wires at One End (loose wires on peripheral device end) | 1 m        | JZSP-CSI02-1-E    |                                       |
|      |                                  |                                                                          | 2 m        | JZSP-CSI02-2-E    |                                       |
|      |                                  |                                                                          | 3 m        | JZSP-CSI02-3-E    |                                       |

| Code | Name                                               |                                                                      | Length (L) | Order Number                                                                                                                  | Appearance/Spec                                                                       |  |
|------|----------------------------------------------------|----------------------------------------------------------------------|------------|-------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|--|
| ⑥    | I/O Signal Cables                                  | Soldered Connector Kit                                               |            | DP9420007-E                                                                                                                   |    |  |
|      |                                                    | Connector-Terminal Block Converter Unit (with cable)                 | 0.5 m      | JUSP-TA36P-E                                                                                                                  |    |  |
|      |                                                    |                                                                      | 1 m        | JUSP-TA36P-1-E                                                                                                                |                                                                                       |  |
|      |                                                    |                                                                      | 2 m        | JUSP-TA36P-2-E                                                                                                                |                                                                                       |  |
|      |                                                    | Cable with Loose Wires at One End (peripheral device end)            | 1 m        | JZSP-CSI03-1-E                                                                                                                |    |  |
|      |                                                    |                                                                      | 2 m        | JZSP-CSI03-2-E                                                                                                                |                                                                                       |  |
|      |                                                    |                                                                      | 3 m        | JZSP-CSI03-3-E                                                                                                                |                                                                                       |  |
| ⑦    | Safety Function Device Cable                       | Cables with Connectors*3                                             | 0.45 m     | JZSP-CVH03-A45(A)-E                                                                                                           |    |  |
|      |                                                    |                                                                      | 1 m        | JZSP-CVH03-01(A)-E                                                                                                            |                                                                                       |  |
|      |                                                    |                                                                      | 3 m        | JZSP-CVH03-03(A)-E                                                                                                            |                                                                                       |  |
|      |                                                    | Connector Kit*4                                                      |            | Contact Tyco Electronics Japan G.K.<br>Name: Industrial Mini I/O D-shape Type 1 Plug Connector Kit<br>Model number: 2013595-1 |                                                                                       |  |
|      |                                                    |                                                                      |            |                                                                                                                               |                                                                                       |  |
| ⑨    | EtherCAT or MECHATROLINK-III Communications Cables | Cables with RJ45 Connectors on Both Ends                             | 0.2 m      | CM3RRM0-00P2-E                                                                                                                |   |  |
|      |                                                    |                                                                      | 0.5 m      | CM3RRM0-00P5-E                                                                                                                |                                                                                       |  |
|      |                                                    |                                                                      | 1 m        | JZSP-CM3RRM0-01-E                                                                                                             |                                                                                       |  |
|      |                                                    |                                                                      | 3 m        | JZSP-CM3RRM0-03-E                                                                                                             |                                                                                       |  |
|      |                                                    |                                                                      | 5 m        | JZSP-CM3RRM0-05-E                                                                                                             |                                                                                       |  |
|      |                                                    |                                                                      | 10 m       | JZSP-CM3RRM0-10-E                                                                                                             |                                                                                       |  |
|      |                                                    |                                                                      | 20 m       | JZSP-CM3RR00-20-E                                                                                                             |                                                                                       |  |
|      |                                                    |                                                                      | 30 m       | JZSP-CM3RR00-30-E                                                                                                             |                                                                                       |  |
|      |                                                    |                                                                      | 40 m       | JZSP-CM3RR01-40-E                                                                                                             |                                                                                       |  |
|      |                                                    |                                                                      | 50 m       | JZSP-CM3RR01-50-E                                                                                                             |                                                                                       |  |
|      |                                                    | Cables with RJ45 Connector on One End and IMI Connector on Other End | 0.2 m      | CM3RMM0-00P2-E                                                                                                                |  |  |
|      |                                                    |                                                                      | 0.5 m      | CM3RMM0-00P5-E                                                                                                                |                                                                                       |  |
|      |                                                    |                                                                      | 1 m        | JZSP-CM3RMM0-01-E                                                                                                             |                                                                                       |  |
|      |                                                    |                                                                      | 3 m        | JZSP-CM3RMM0-03-E                                                                                                             |                                                                                       |  |
|      |                                                    |                                                                      | 5 m        | JZSP-CM3RMM0-05-E                                                                                                             |                                                                                       |  |
|      |                                                    |                                                                      | 10 m       | JZSP-CM3RMM0-10-E                                                                                                             |                                                                                       |  |
|      |                                                    |                                                                      | 20 m       | JZSP-CM3RM00-20-E                                                                                                             |                                                                                       |  |
|      |                                                    |                                                                      | 30 m       | JZSP-CM3RM00-30-E                                                                                                             |                                                                                       |  |
|      |                                                    |                                                                      | 40 m       | JZSP-CM3RM01-40-E                                                                                                             |                                                                                       |  |
|      |                                                    |                                                                      | 50 m       | JZSP-CM3RM01-50-E                                                                                                             |                                                                                       |  |
| ⑩    | Safety Function Device Cables                      | Cables with Connectors*3                                             | 0.45 m     | JZSP-CVH03-A45(A)-E                                                                                                           |  |  |
|      |                                                    |                                                                      | 1 m        | JZSP-CVH03-01(A)-E                                                                                                            |                                                                                       |  |
|      |                                                    |                                                                      | 3 m        | JZSP-CVH03-03(A)-E                                                                                                            |                                                                                       |  |
|      |                                                    | Connector Kit*4                                                      |            | Contact Tyco Electronics Japan G.K.<br>Name: Industrial Mini I/O D-shape Type 1 Plug Connector Kit<br>Model number: 2013595-1 |                                                                                       |  |
|      |                                                    |                                                                      |            |                                                                                                                               |                                                                                       |  |
|      |                                                    |                                                                      |            |                                                                                                                               |                                                                                       |  |
|      |                                                    |                                                                      |            |                                                                                                                               |                                                                                       |  |

| Code | Name                                    |                          | Length (L) | Order Number                                                                           | Appearance/Spec                                                                     |
|------|-----------------------------------------|--------------------------|------------|----------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| ⑪    | MP2600iec Cables for I/O Signals (CN13) | Connector Kit            |            | JZSP-CSI9-1E                                                                           |  |
|      |                                         | Cable for-Terminal Block | 0.5 m      | CBL-MP2B-A5A                                                                           |  |
|      |                                         |                          | 1 m        | CBL-MP2B-01A                                                                           |                                                                                     |
|      |                                         |                          | 3 m        | CBL-MP2B-03A                                                                           |                                                                                     |
|      |                                         | Terminal Block           |            | 60372471                                                                               |  |
|      |                                         | Flying Lead Cable        | 0.5 m      | CFC-U-MP2B-A5                                                                          |                                                                                     |
|      |                                         |                          | 1 m        | CFC-U-MP2B-01                                                                          |                                                                                     |
|      |                                         |                          | 3 m        | CFC-U-MP2B-03                                                                          |                                                                                     |
| ⑫    | MP2600iec CN14 Battery Kit              |                          |            | SGDV-OZC02A                                                                            | 3.6 V Lithium battery, cable with connector, and mounting bracket for MP2600iec     |
| ⑬    | MP2600iec Cables for I/O Signals (CN13) |                          |            | Category: CAT5e<br>Shield specifications: S/UTP or S/STP<br>Cable length: 50 m maximum |                                                                                     |

\*1. This Converter Cable is required to use the  $\Sigma$ -III-series Digital Operator (JUSP-OP05A) for  $\Sigma$ -7-series SERVOPACKs.

\*2. If you use a MECHATROLINK-III Communications Reference SERVOPACK, this Converter Cable is required to prevent the cable from disconnecting from the Digital Operator.

\*3. When using safety functions, connect this Cable to the safety function devices.

When not using safety functions, connect the enclosed Safety Jumper Connector to the SERVOPACK.

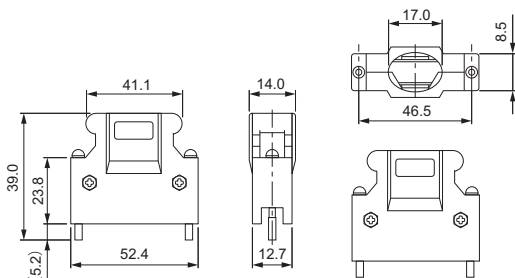
\*4. Use the Connector Kit when you make cables yourself.

## ◆ Connector Kit for CN13 (MP2600iec)

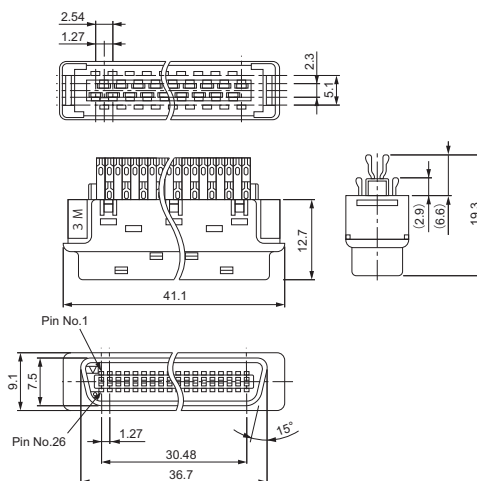
Use the following connector and cable to assemble the cable. The CN13 connector kit includes one case and one connector.

| Connector Kit Model | Case            |       | Connector                |     |
|---------------------|-----------------|-------|--------------------------|-----|
|                     | Model           | Qty   | Model                    | Qty |
| JZSP-CSI9-1-E       | 10350-52Z0-008* | 1 set | 10150-3000PE* (Soldered) | 1   |

Dimensional Drawings of Case



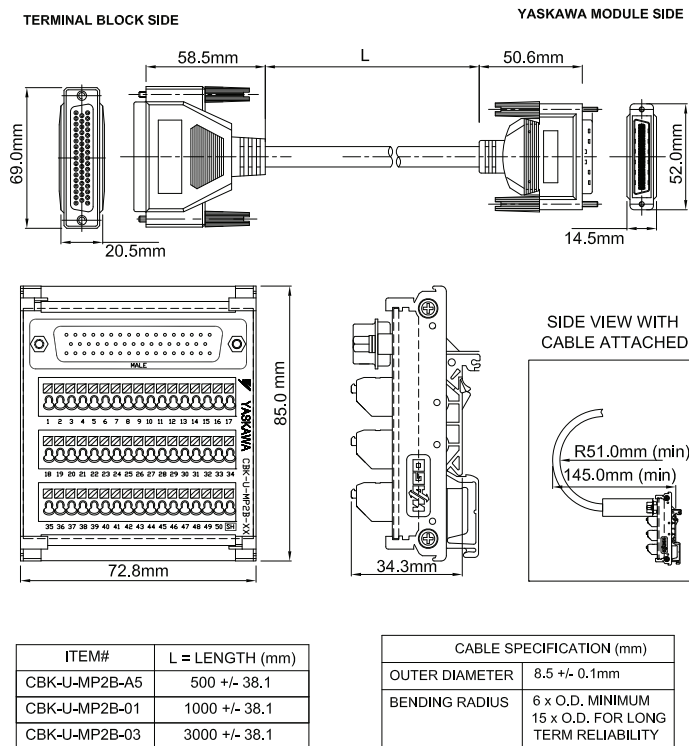
Dimensional Drawings of Connector



## Cable Size

| Item                    | Specifications                                 |
|-------------------------|------------------------------------------------|
| Cable                   | Use twisted pair or twisted pair shielded wire |
| Applicable Wires        | AWG 24, 26, 28, 30                             |
| Cable Finished Diameter | 16 dia. max                                    |

## ◆ Connector Terminal Converter Unit for CN13 (MP2600iec)

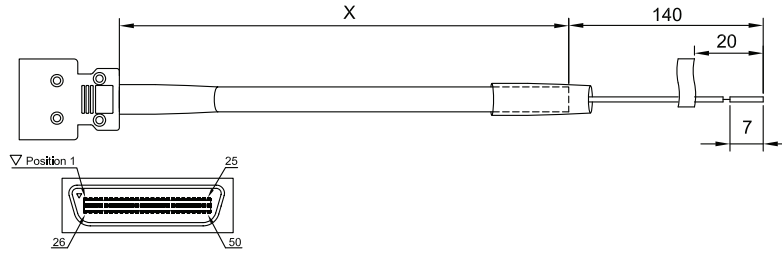


CN13 Cable + Terminal Block Function Chart for MP2600iec

| Pin No. | Signal Name | I/O | Function                                                        |
|---------|-------------|-----|-----------------------------------------------------------------|
| 1       | AO          | O   | Analog output                                                   |
| 2       | AI          | I   | Analog input                                                    |
| 3       | -           | -   | -                                                               |
| 4       | PA+         | I   | Phase A pulse (+)                                               |
| 5       | PA-         | I   | Phase A pulse (-)                                               |
| 6       | GND         | P   | Encoder input ground                                            |
| 7       | BAT+        | P   | Controller SRAM Battery (+)                                     |
| 8       | -           | -   | -                                                               |
| 9       | PILC5V      | I   | Phase-C latch pulse (-) for 5VDC input                          |
| 10      | PILC24V     | I   | Phase-C latch pulse (-) for 24VDC input                         |
| 11      | DO 00-      | O   | Digital output 0 (-)                                            |
| 12      | DO 02-      | O   | Digital output 2 (-)                                            |
| 13      | DICOM       | I   | Digital input common                                            |
| 14      | DI 00       | I   | Digital input 0                                                 |
| 15      | DI 02       | I   | Digital input 2                                                 |
| 16      | DI 04       | I   | Digital input 4                                                 |
| 17      | DI 06       | I   | Digital input 6                                                 |
| 18      | DO 04-      | O   | Digital output 4 (-)                                            |
| 19      | DO 06-      | O   | Digital output 6 (-)                                            |
| 20      | -           | -   | -                                                               |
| 21      | DO 00+      | O   | Digital output 0 (+)                                            |
| 22      | DO 02+      | O   | Digital output 2 (+)                                            |
| 23      | DO 04+      | O   | Digital output 4 (+)                                            |
| 24      | DO 06+      | O   | Digital output 6 (+)                                            |
| 25      | -           | -   | -                                                               |
| 26      | AO GND      | O   | Analog output ground                                            |
| 27      | AI GND      | I   | Analog input ground                                             |
| 28      | -           | -   | -                                                               |
| 29      | PB+         | I   | Phase B pulse (+)                                               |
| 30      | PB-         | I   | Phase B pulse (-)                                               |
| 31      | GND         | P   | Encoder input ground                                            |
| 32      | BAT-        | P   | Controller SRAM Battery (-)                                     |
| 33      | -           | -   | -                                                               |
| 34      | PILC12V     | I   | Phase-C latch pulse (-) for 12VDC input                         |
| 35      | PIL         | I   | Phase-C latch pulse (+)                                         |
| 36      | DO 01-      | O   | Digital output 1 (-)                                            |
| 37      | DO 03-      | O   | Digital output 3 (-)                                            |
| 38      | DICOM       | I   | Digital input common                                            |
| 39      | DI 01       | I   | Digital input 1 - shared with pulse latch input                 |
| 40      | DI 03       | I   | Digital input 3                                                 |
| 41      | DI 05       | I   | Digital input 5                                                 |
| 42      | DI 07       | I   | Digital input 7                                                 |
| 43      | DO 05-      | O   | Digital output 5 (-)                                            |
| 44      | DO 07-      | O   | Digital output 7 (-)                                            |
| 45      | -           | -   | -                                                               |
| 46      | DO 01+      | O   | Digital output 1 (+)                                            |
| 47      | DO 03+      | O   | Digital output 3 (+)                                            |
| 48      | DO 05+      | O   | Digital output 5 (+)                                            |
| 49      | DO 07+      | O   | Digital output 7 (+) - shared w/ position agreement COIN signal |
| 50      | -           | -   | -                                                               |

I = Input, O = Output, P = Power

# ◆ Flying Lead Cable for CN13 (MP2600iec)



| ITEM NUMBER   | X = LENGTH (mm) |
|---------------|-----------------|
| CFC-U-MP2B-A5 | 500             |
| CFC-U-MP2B-01 | 1000            |
| CFC-U-MP2B-03 | 3000            |

| CABLE SPECIFICATION (mm) |         |
|--------------------------|---------|
| OUTER DIAMETER           | 8.1     |
| BENDING RADIUS           | 12 O.D. |

CFC-U-MP2B-XX Function Chart for MP2600iec

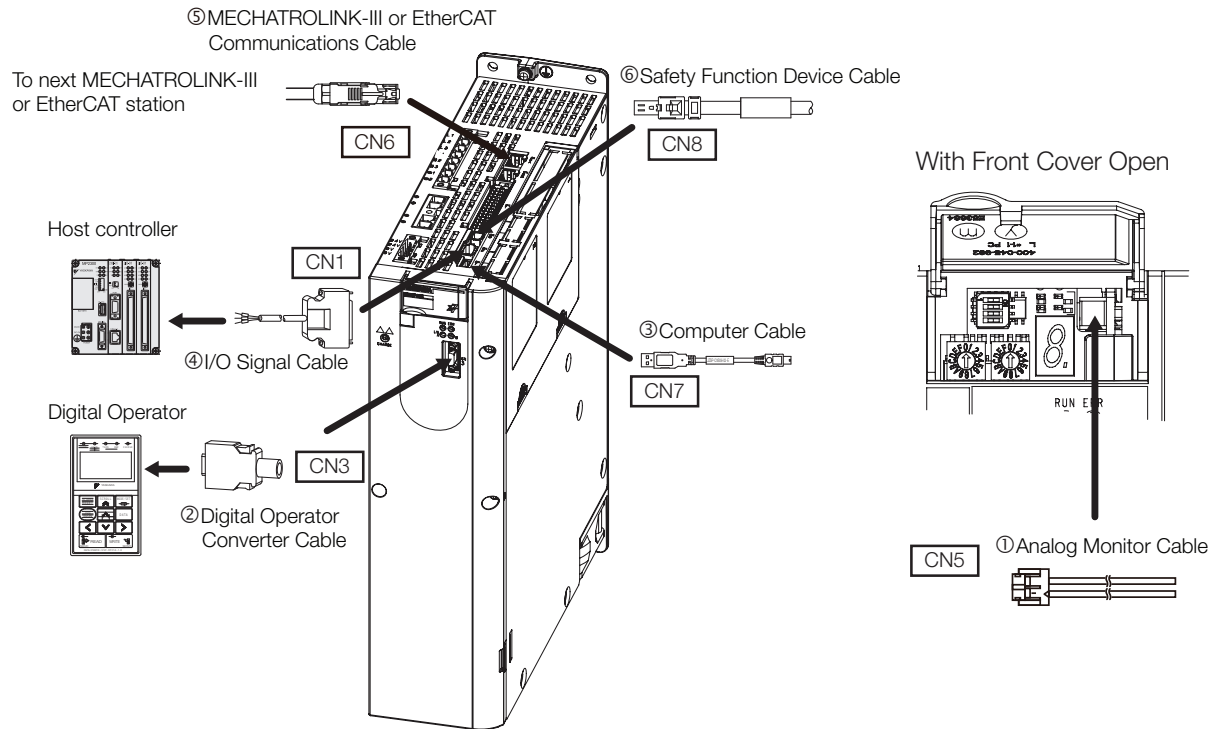
| Pin No. | Color (Solid/Band) | Signal Name |   | Function                                                        |
|---------|--------------------|-------------|---|-----------------------------------------------------------------|
| 1       | BLK/RED            | AO          | O | Analog output                                                   |
| 2       | BLK/WHT            | AI          | I | Analog input                                                    |
| 3       | RED/GRN            | -           | - | -                                                               |
| 4       | BLK/BLU            | PA+         | I | Phase A pulse (+)                                               |
| 5       | BLU/BLK            | PA-         | I | Phase A pulse (-)                                               |
| 6       | RED/BLU            | GND         | P | Encoder input ground                                            |
| 7       | RED/WHT            | BAT+        | P | Controller SRAM Battery (+)                                     |
| 8       | BLK/GRN            | -           | - | -                                                               |
| 9       | BLK/YEL            | PILC5V      | I | Phase-C latch pulse (-) for 5VDC input                          |
| 10      | BLK/ORG            | PILC24V     | I | Phase-C latch pulse (-) for 24VDC input                         |
| 11      | RED/YEL            | DO 00-      | O | Digital output 0 (-)                                            |
| 12      | RED/BRN            | DO 02-      | O | Digital output 2 (-)                                            |
| 13      | RED/ORG            | DICOM       | I | Digital input common                                            |
| 14      | GRN/WHT            | DI 00       | I | Digital input 0                                                 |
| 15      | GRN/BLU            | DI 02       | I | Digital input 2                                                 |
| 16      | GRN/YEL            | DI 04       | I | Digital input 4                                                 |
| 17      | GRN/BRN            | DI 06       | I | Digital input 6                                                 |
| 18      | GRN/ORG            | DO 04-      | O | Digital output 4 (-)                                            |
| 19      | WHT/BLU            | DO 06-      | O | Digital output 6 (-)                                            |
| 20      | WHT/YEL            | -           | - | -                                                               |
| 21      | YEL/RED            | DO 00+      | O | Digital output 0 (+)                                            |
| 22      | BRN/RED            | DO 02+      | O | Digital output 2 (+)                                            |
| 23      | ORG/GRN            | DO 04+      | O | Digital output 4 (+)                                            |
| 24      | BLU/WHT            | DO 06+      | O | Digital output 6 (+)                                            |
| 25      | WHT/BRN            | -           | - | -                                                               |
| 26      | RED/BLK            | AO GND      | O | Analog output ground                                            |
| 27      | WHT/BLK            | AI GND      | I | Analog input ground                                             |
| 28      | GRN/RED            | -           | - | -                                                               |
| 29      | BLK/BRN            | PB+         | I | Phase B pulse (+)                                               |
| 30      | BRN/BLK            | PB-         | I | Phase B pulse (-)                                               |
| 31      | BLU/RED            | GND         | P | Encoder input ground                                            |
| 32      | WHT/RED            | BAT-        | P | Controller SRAM Battery (-)                                     |
| 33      | GRN/BLK            | -           | - | -                                                               |
| 34      | ORG/BLK            | PILC12V     | I | Phase-C latch pulse (-) for 12VDC input                         |
| 35      | YEL/BLK            | PIL         | I | Phase-C latch pulse (+)                                         |
| 36      | WHT/ORG            | DO 01-      | O | Digital output 1 (-)                                            |
| 37      | BLU/YEL            | DO 03-      | O | Digital output 3 (-)                                            |
| 38      | ORG/RED            | DICOM       | I | Digital input common                                            |
| 39      | WHT/GRN            | DI 01       | I | Digital input 1 - shared with pulse latch input                 |
| 40      | BLU/GRN            | DI 03       | I | Digital input 3                                                 |
| 41      | YEL/GRN            | DI 05       | I | Digital input 5                                                 |
| 42      | BRN/GRN            | DI 07       | I | Digital input 7                                                 |
| 43      | BLU/BRN            | DO 05-      | O | Digital output 5 (-)                                            |
| 44      | BLU/ORG            | DO 07-      | O | Digital output 7 (-)                                            |
| 45      | YEL/WHT            | -           | - | -                                                               |
| 46      | ORG/WHT            | DO 01+      | O | Digital output 1 (+)                                            |
| 47      | YEL/BLU            | DO 03+      | O | Digital output 3 (+)                                            |
| 48      | BRN/BLU            | DO 05+      | O | Digital output 5 (+)                                            |
| 49      | ORG/BLU            | DO 07+      | O | Digital output 7 (+) - shared w/ position agreement COIN signal |
| 50      | BRN/WHT            | -           | - | -                                                               |

I = Input, O = Output, P = Power



# System Configurations (400V)

■  $\Sigma$ -7S and  $\Sigma$ -7W MECHATROLINK and EtherCAT Comm. Reference SERVOPACKs

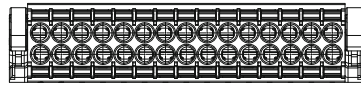
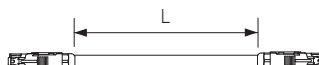
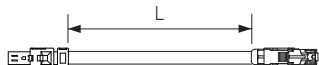


## Selection Table



1. Use the cable specified by Yaskawa for the Computer Cable. Operation may not be dependable with any other cable.
2. Use the cable specified by Yaskawa for the MECHATROLINK Communications Cables. Operation may not be dependable due to low noise resistance with any other cable.

| Code | Name                                   | Length (L) | Order Number    | Appearance/Spec |
|------|----------------------------------------|------------|-----------------|-----------------|
| ①    | Analog Monitor Cable (CN5)             | 1 m        | JZSP-CA01-E     |                 |
| ②    | Digital Operator (including 1 m cable) | 1.0 m      | JUSP-OP05A-1-E  |                 |
| ③    | Computer Cable                         | 2.5 m      | JZSP-CVS06-02-E |                 |

| Code | Name                                               |                                                                      | Length (L) | Order Number                                                                                                                  | Appearance/Spec                                                                       |  |
|------|----------------------------------------------------|----------------------------------------------------------------------|------------|-------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|--|
| ④    | I/O Connector (CN1)                                |                                                                      | N/A        | JUSP-7CN001                                                                                                                   |    |  |
| ⑤    | EtherCAT or MECHATROLINK-III Communications Cables | Cables with RJ45 Connectors on Both Ends                             | 0.2 m      | CM3RRM0-00P2-E                                                                                                                |    |  |
|      |                                                    |                                                                      | 0.5 m      | CM3RRM0-00P5-E                                                                                                                |                                                                                       |  |
|      |                                                    |                                                                      | 1 m        | JZSP-CM3RRM0-01-E                                                                                                             |                                                                                       |  |
|      |                                                    |                                                                      | 3 m        | JZSP-CM3RRM0-03-E                                                                                                             |                                                                                       |  |
|      |                                                    |                                                                      | 5 m        | JZSP-CM3RRM0-05-E                                                                                                             |                                                                                       |  |
|      |                                                    |                                                                      | 10 m       | JZSP-CM3RRM0-10-E                                                                                                             |                                                                                       |  |
|      |                                                    |                                                                      | 20 m       | JZSP-CM3RR00-20-E                                                                                                             |                                                                                       |  |
|      |                                                    |                                                                      | 30 m       | JZSP-CM3RR00-30-E                                                                                                             |                                                                                       |  |
|      |                                                    |                                                                      | 40 m       | JZSP-CM3RR01-40-E                                                                                                             |                                                                                       |  |
|      |                                                    |                                                                      | 50 m       | JZSP-CM3RR01-50-E                                                                                                             |                                                                                       |  |
|      |                                                    | Cables with RJ45 Connector on One End and IMI Connector on Other End | 0.2 m      | CM3RMM0-00P2-E                                                                                                                |  |  |
|      |                                                    |                                                                      | 0.5 m      | CM3RMM0-00P5-E                                                                                                                |                                                                                       |  |
|      |                                                    |                                                                      | 1 m        | JZSP-CM3RMM0-01-E                                                                                                             |                                                                                       |  |
|      |                                                    |                                                                      | 3 m        | JZSP-CM3RMM0-03-E                                                                                                             |                                                                                       |  |
|      |                                                    |                                                                      | 5 m        | JZSP-CM3RMM0-05-E                                                                                                             |                                                                                       |  |
|      |                                                    |                                                                      | 10 m       | JZSP-CM3RMM0-10-E                                                                                                             |                                                                                       |  |
|      |                                                    |                                                                      | 20 m       | JZSP-CM3RM00-20-E                                                                                                             |                                                                                       |  |
|      |                                                    |                                                                      | 30 m       | JZSP-CM3RM00-30-E                                                                                                             |                                                                                       |  |
|      |                                                    |                                                                      | 40 m       | JZSP-CM3RM01-40-E                                                                                                             |                                                                                       |  |
|      |                                                    |                                                                      | 50 m       | JZSP-CM3RM01-50-E                                                                                                             |                                                                                       |  |
| ⑥    | Safety Function Device Cable                       | Cables with Connectors*1                                             | 1 m        | JZSP-CVH03-01-E-G                                                                                                             |  |  |
|      |                                                    |                                                                      | 3 m        | JZSP-CVH03-03-E-G                                                                                                             |                                                                                       |  |
|      |                                                    | Connector Kit*2                                                      |            | Contact Tyco Electronics Japan G.K.<br>Name: Industrial Mini I/O D-shape Type 1 Plug Connector Kit<br>Model number: 2013595-1 |                                                                                       |  |
|      |                                                    |                                                                      |            |                                                                                                                               |                                                                                       |  |

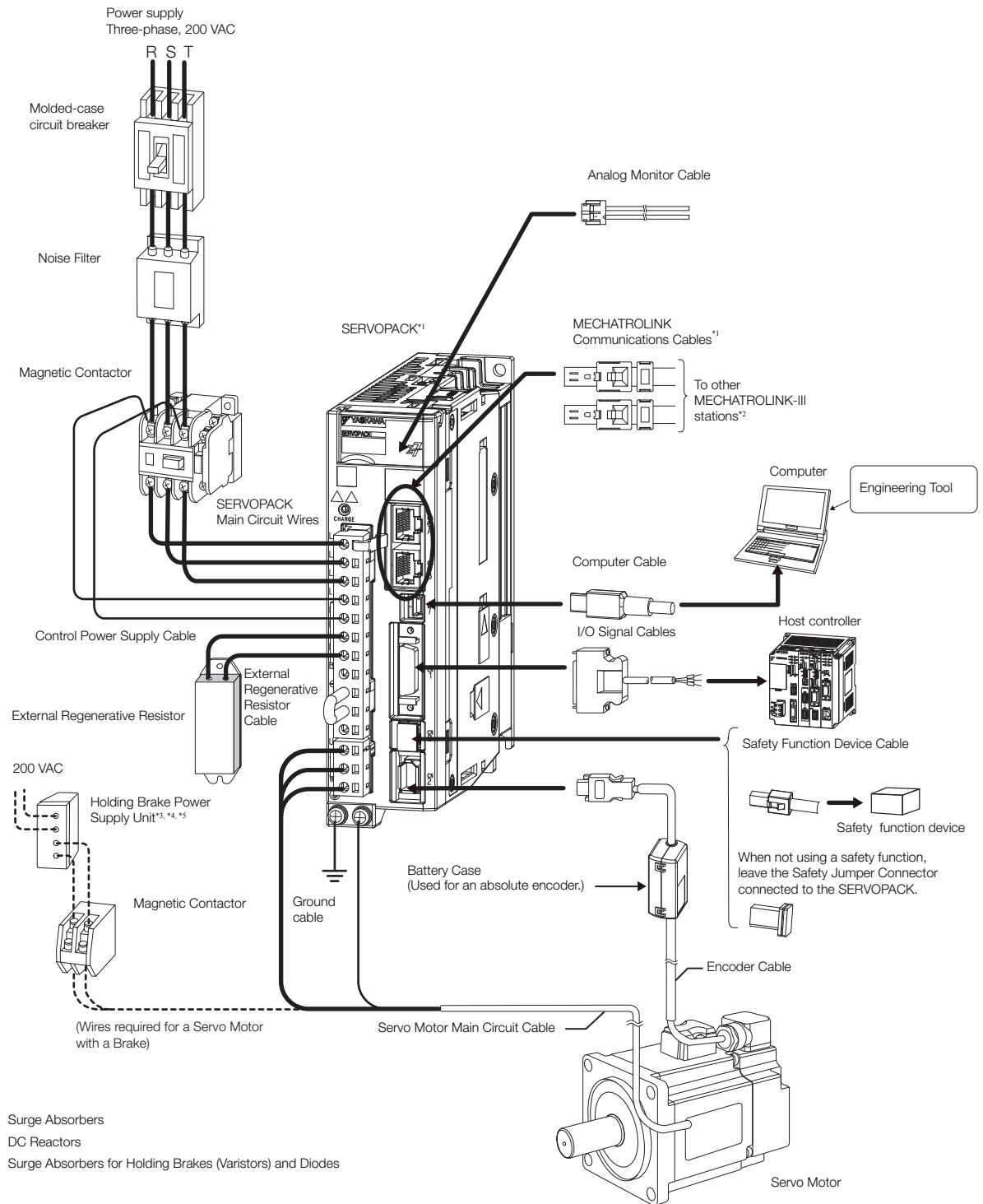
\*1. When using the safety function, connect this cable to the safety devices. Even when not using the safety function, use SERVOPACKs with the Safe Jumper Connector (model: JZSP-CVH05-E) connected.

\*2. Use the connector kit when you make cables yourself.



# SERVOPACK Peripheral Devices

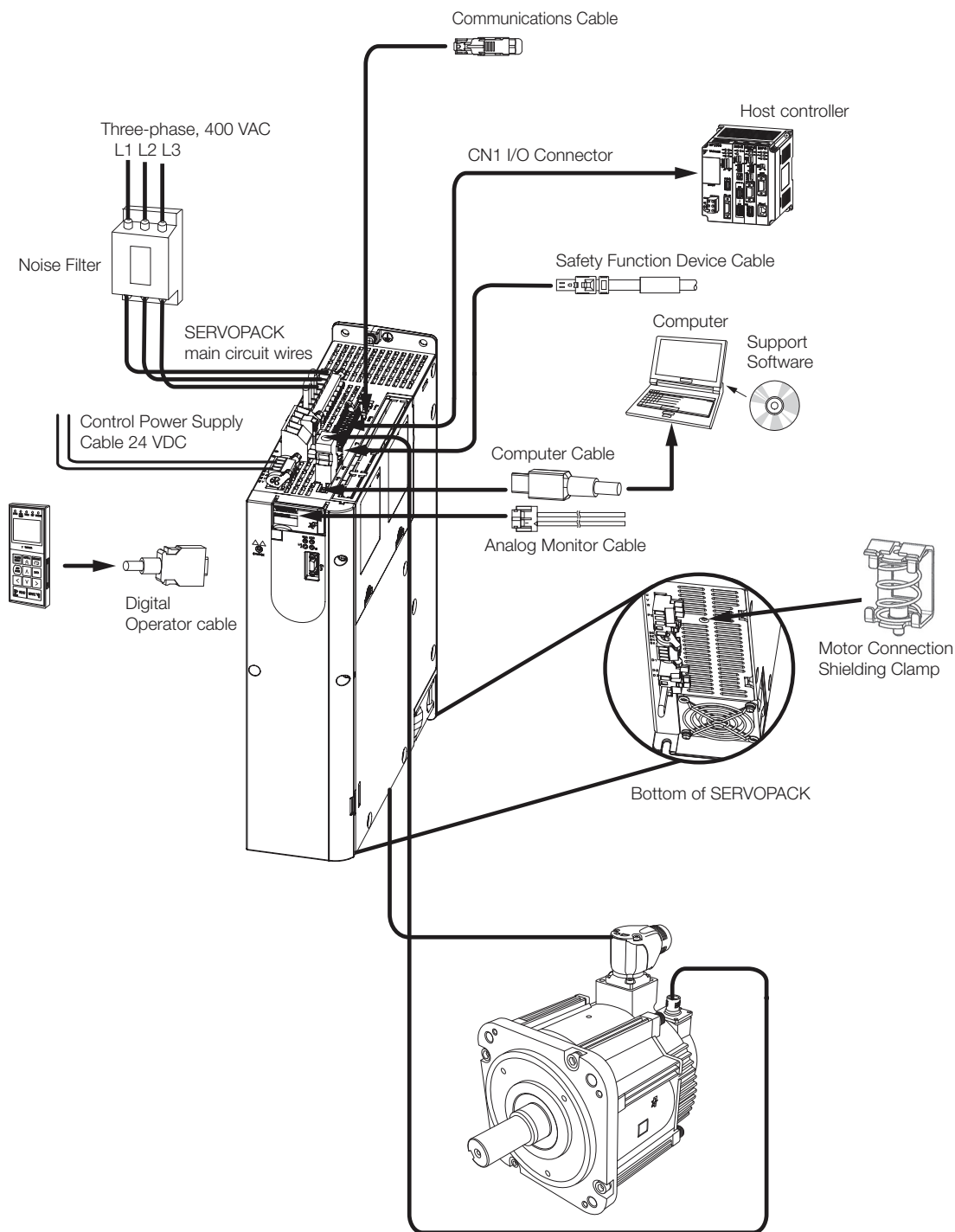
## System Configuration (200 V Models)



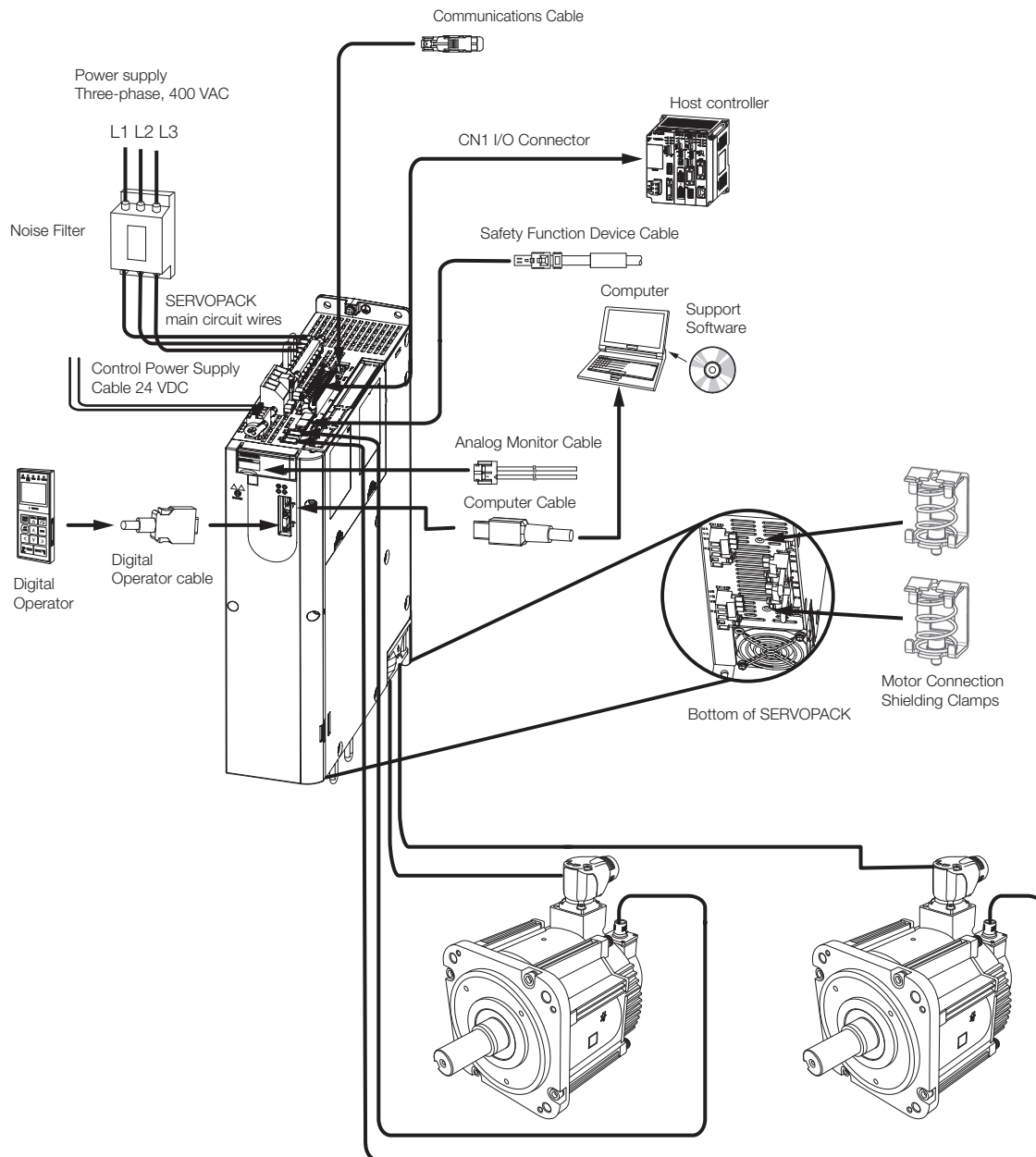
- \*1. The peripheral devices are described using a MECHATROLINK-III Communications Reference SERVOPACK as an example. The shapes of the connectors may be different for other interfaces.
- \*2. The connected devices depend on the interface.  
For MECHATROLINK-II communications references: Other MECHATROLINK-II stations  
For analog voltage/pulse train references: There is no CN6 connector.
- \*3. A Holding Brake Power Supply Unit is required to use a Servo Motor with a Holding Brake. Holding Brake Power Supply Units for 24 VDC are not provided by Yaskawa. Obtain these from other manufacturers.  
Never connect Holding Brake Power Supply Units with different output voltages to a SERVOPACK. Overcurrent may result in burning in the brake.
- \*4. If you use a Servo Motor with a Holding Brake, select a brake relay according to the power supply voltage and current of the brake. Yaskawa does not recommend any particular brake relays. Select an appropriate brake relay using the selection method of the brake relay manufacturer.
- \*5. The power supply for the holding brake is not provided by Yaskawa. Select a power supply based on the holding brake specifications. If you use a 24-V brake, install a separate power supply for the 24-VDC power supply from other power supplies, such as the one for the I/O signals of the CN1 connector. If the power supply is shared, the I/O signals may malfunction.

## System Configuration (400 V Models)

### SGD7S Single Axis SERVOPACK (400 V)



## SGD7W Dual Axis SERVOPACK (400 V)



## Peripheral Device Selection Table

| Main<br>Circuit<br>Power<br>Supply | SERVOPACK                                          |                 |                 | Noise Filter* <sup>1</sup> | DC<br>Reac-<br>tor* <sup>2</sup> | Magnetic<br>Contactor | Surge Absorber | Digital<br>Operator |
|------------------------------------|----------------------------------------------------|-----------------|-----------------|----------------------------|----------------------------------|-----------------------|----------------|---------------------|
|                                    | Maximum<br>Applicable<br>Motor<br>Capacity<br>[kW] | Model<br>SGD7S- | Model<br>SGD7W- |                            |                                  |                       |                |                     |
| Three-<br>phase,<br>200<br>VAC     | 0.05                                               | R70A            | —               | HF3010C-SZC                | X5061                            | SC-03                 | LT-C32G801WS   | JUSP-OP05A-1-E      |
|                                    | 0.1                                                | R90A            | —               |                            |                                  |                       |                |                     |
|                                    | 0.2                                                | 1R6A            | —               |                            |                                  |                       |                |                     |
|                                    | 0.4                                                | 2R8A            | 1R6A            |                            |                                  |                       |                |                     |
|                                    | 0.5                                                | 3R8A            | —               |                            |                                  |                       |                |                     |
|                                    | 0.75                                               | 5R5A            | 2R8A            | HF3020C-SZC                | X5060                            | SC-4-1                |                |                     |
|                                    | 1.0                                                | 7R6A            | —               |                            |                                  |                       |                |                     |
|                                    | 1.5                                                | 120A            | 5R5A            |                            |                                  |                       |                |                     |
|                                    | 2.0                                                | 180A            | 7R6A            |                            |                                  |                       |                |                     |
|                                    | 3.0                                                | 200A            | —               | HF3030C-SZC                | X5059                            | SC-5-1                |                |                     |
|                                    | 5.0                                                | 330A            | —               | HF3050C-SZC<br>-47EDD      | X5068                            |                       |                |                     |
|                                    | 6.0                                                | 470A            | —               | HF3060C-SZC                | —                                | SC-N2                 |                |                     |
|                                    | 7.5                                                | 550A            | —               |                            |                                  | SC-N2S                |                |                     |
|                                    | 11                                                 | 590A            | —               |                            |                                  | SC-N3                 |                |                     |
|                                    | 15                                                 | 780A            | —               |                            |                                  | HF3100C-SZC           |                |                     |
| Single-<br>phase,<br>200<br>VAC    | 0.05                                               | R70A            | —               | HF2010A-UPF                | X5071                            | SC-03                 | LT-C12G801WS   |                     |
|                                    | 0.1                                                | R90A            | —               |                            | X5070                            |                       |                |                     |
|                                    | 0.2                                                | 1R6A            | —               |                            | X5069                            |                       |                |                     |
|                                    | 0.4                                                | 2R8A            | 1R6A            |                            |                                  |                       |                |                     |
|                                    | 0.75                                               | 5R5A            | 2R8A            | HF2020A-UPF-<br>2BB        | X5079                            | SC-4-1                |                |                     |
|                                    | 1.5                                                | —               | 5R5A            | HF2030A-UPF-<br>2BB        | X5078                            | SC-5-1                |                |                     |
| Three-<br>phase,<br>400<br>VAC     | 0.5                                                | 1R9D            |                 | FESS-4009A* <sup>3</sup>   | X5074                            | SC-4-1/G              | LT-C35G102WS   | JUSP-OP05A-1-E      |
|                                    | 1.0                                                | 3R5D            |                 |                            | X5075                            |                       |                |                     |
|                                    | 1.5                                                | 5R4D            |                 |                            | X5076                            | SC-5-1/G              |                |                     |
|                                    | 2.0                                                | 8R4D            |                 |                            |                                  |                       |                |                     |
|                                    | 3.0                                                | 120D            |                 |                            | FESS-4015A* <sup>3</sup>         | X5077                 |                |                     |
|                                    | 5.0                                                | 170D            |                 | -                          |                                  |                       |                |                     |
|                                    | 6.0                                                | 210D            |                 | FESS-4022A* <sup>3</sup>   | -                                |                       |                |                     |
|                                    | 7.5                                                | 260D            |                 | FESS-4044A* <sup>3</sup>   | -                                | -                     |                |                     |
|                                    | 11.0                                               | 280D            |                 |                            |                                  |                       |                |                     |
|                                    | 15.0                                               | 370D            |                 |                            |                                  |                       |                |                     |
|                                    | 2 x 0.75                                           |                 | 2R6D            | FESS-4009A* <sup>3</sup>   | X5075                            | SC-4-1/G              |                |                     |
|                                    | 2 x 1.5                                            |                 | 5R4D            |                            | X5076                            | SC-5-1/G              |                |                     |



| Device              | Inquiries                                                          |
|---------------------|--------------------------------------------------------------------|
| Noise Filters       | Yaskawa Controls Co., Ltd. (200 V Models); EPA GmbH (400 V Models) |
| Surge Absorbers     | Yaskawa Controls Co., Ltd.                                         |
| DC Reactors         |                                                                    |
| Magnetic Contactors | Fuji Electric FA Components & Systems Co., Ltd.                    |

\*1. Some Noise Filters have large leakage currents. The grounding conditions also affect the size of the leakage current. If necessary, select an appropriate leakage detector or leakage breaker taking into account the grounding conditions and the leakage current from the Noise Filter.

\*2. The last digit of an RoHS-compliant serial number is R. Consult with Yaskawa Controls Co., Ltd. for RoHS-compliant reactors.

Note: 1. Consult the manufacturer for details on peripheral devices.

2. Refer to the following section for information on Digital Operator Converter Cables.

 *Selection Table* (page 576)

3. Refer to the following manual for the following information.

- Dimensional drawings, ratings, and specifications of peripheral devices

 *Σ-7-Series AC Servo Drive Peripheral Device Selection Manual* (Manual No.: SIEP S800001 32)

## Molded-case Circuit Breakers and Fuses

### Using an AC Power Supply

Use a molded-case circuit breaker and fuse to protect the power supply line. They protect the power line by shutting OFF the circuit when overcurrent is detected. Select these devices based on the information in the following tables.

Note: The following tables also provide the net values of the current capacity and inrush current. Select a fuse and a molded-case circuit breaker that meet the following conditions.

- Main circuit and control circuit: No breaking at three times the current value given in the table for 5 s.
- Inrush current: No breaking at the current value given in the table for 20 ms.

### ◆ Σ-7S SERVOPACKs

| Main Circuit<br>Power Supply | Maximum<br>Applicable Motor<br>Capacity [kW] | SERVOPACK<br>Model: SGD7S- | Power Supply<br>Capacity per<br>SERVOPACK<br>[kVA]* | Current Capacity           |                                      | Inrush Current            |                                      |     |
|------------------------------|----------------------------------------------|----------------------------|-----------------------------------------------------|----------------------------|--------------------------------------|---------------------------|--------------------------------------|-----|
|                              |                                              |                            |                                                     | Main<br>Circuit<br>[Arms]* | Control<br>Power<br>Supply<br>[Arms] | Main<br>Circuit<br>[A0-p] | Control<br>Power<br>Supply<br>[A0-p] |     |
| Single-phase,<br>100 VAC     | 0.05                                         | R70F                       | 0.2                                                 | 1.5                        | 0.38                                 | 34                        | 34                                   |     |
|                              | 0.1                                          | R90F                       | 0.3                                                 | 2.5                        |                                      |                           |                                      |     |
|                              | 0.2                                          | 2R1F                       | 0.6                                                 | 5                          |                                      |                           |                                      |     |
|                              | 0.4                                          | 2R8F                       | 1.4                                                 | 10                         |                                      |                           |                                      |     |
| Three-phase,<br>200 VAC      | 0.05                                         | R70A                       | 0.2                                                 | 0.4                        | 0.2                                  | 34                        | 34                                   |     |
|                              | 0.1                                          | R90A                       | 0.3                                                 | 0.8                        |                                      |                           |                                      |     |
|                              | 0.2                                          | 1R6A                       | 0.5                                                 | 1.3                        |                                      |                           |                                      |     |
|                              | 0.4                                          | 2R8A                       | 1.0                                                 | 2.5                        |                                      |                           |                                      |     |
|                              | 0.5                                          | 3R8A                       | 1.3                                                 | 3.0                        |                                      |                           |                                      |     |
|                              | 0.75                                         | 5R5A                       | 1.6                                                 | 4.1                        |                                      |                           |                                      |     |
|                              | 1.0                                          | 7R6A                       | 2.3                                                 | 5.7                        |                                      |                           |                                      |     |
|                              | 1.5                                          | 120A                       | 3.2                                                 | 7.3                        | 0.25                                 |                           |                                      |     |
|                              | 2.0                                          | 180A                       | 4.0                                                 | 10                         |                                      |                           |                                      |     |
|                              | 3.0                                          | 200A                       | 5.9                                                 | 15                         |                                      |                           |                                      |     |
|                              | 5.0                                          | 330A                       | 7.5                                                 | 25                         | 0.3                                  | 68                        |                                      |     |
|                              | 6.0                                          | 470A                       | 10.7                                                | 29                         |                                      |                           |                                      |     |
|                              | 7.5                                          | 550A                       | 14.6                                                | 37                         |                                      |                           |                                      |     |
|                              | 11                                           | 590A                       | 21.7                                                | 54                         | 0.4                                  | 114                       |                                      |     |
|                              | 15                                           | 780A                       | 29.6                                                | 73                         |                                      |                           |                                      |     |
| Single-phase,<br>200 VAC     | 0.05                                         | R70A                       | 0.2                                                 | 0.8                        | 0.2                                  | 34                        |                                      |     |
|                              | 0.1                                          | R90A                       | 0.3                                                 | 1.6                        |                                      |                           |                                      |     |
|                              | 0.2                                          | 1R6A                       | 0.6                                                 | 2.4                        |                                      |                           |                                      |     |
|                              | 0.4                                          | 2R8A                       | 1.2                                                 | 5.0                        |                                      |                           |                                      |     |
|                              | 0.75                                         | 5R5A                       | 1.9                                                 | 8.7                        |                                      |                           |                                      |     |
| Three-phase,<br>400 VAC      | 0.5                                          | 1R9D                       | 1.1                                                 | 1.4                        | 1.2                                  | 19                        | -                                    |     |
|                              | 1.0                                          | 3R5D                       | 2.3                                                 | 2.9                        |                                      | 38                        |                                      |     |
|                              | 1.5                                          | 5R4D                       | 3.5                                                 | 4.3                        |                                      |                           |                                      |     |
|                              | 2.0                                          | 8R4D                       | 4.5                                                 | 5.8                        |                                      |                           |                                      |     |
|                              | 3.0                                          | 120D                       | 7.1                                                 | 8.6                        |                                      |                           |                                      | 1.4 |
|                              | 5.0                                          | 170D                       | 11.7                                                | 14.5                       |                                      |                           |                                      |     |
|                              | 6.0                                          | 210D                       | 12.4                                                | 17.4                       |                                      |                           |                                      |     |
|                              | 7.5                                          | 260D                       | 14.4                                                | 21.7                       | 1.7                                  |                           |                                      |     |
|                              | 11.0                                         | 280D                       | 21.9                                                | 31.8                       |                                      |                           |                                      |     |
|                              | 15.0                                         | 370D                       | 30.6                                                | 43.4                       |                                      |                           |                                      |     |

\* This is the net value at the rated load.

## ◆ Σ-7W SERVOPACKs

| Main Circuit Power Supply | Maximum Applicable Motor Capacity per Axis [kW] | SERVOPACK Model: SGD7W- | Power Supply Capacity per SERVOPACK [kVA]* <sup>1</sup> | Current Capacity                  |                             | Inrush Current      |                             |
|---------------------------|-------------------------------------------------|-------------------------|---------------------------------------------------------|-----------------------------------|-----------------------------|---------------------|-----------------------------|
|                           |                                                 |                         |                                                         | Main Circuit [Arms]* <sup>1</sup> | Control Power Supply [Arms] | Main Circuit [A0-p] | Control Power Supply [A0-p] |
| Three-phase, 200 VAC      | 0.2                                             | 1R6A                    | 1.0                                                     | 2.5                               | 0.25                        | 34                  | 34                          |
|                           | 0.4                                             | 2R8A                    | 1.9                                                     | 4.7                               |                             |                     |                             |
|                           | 0.75                                            | 5R5A                    | 3.2                                                     | 7.8                               |                             |                     |                             |
|                           | 1.0                                             | 7R6A                    | 4.5                                                     | 11                                |                             |                     |                             |
| Single-phase, 200 VAC     | 0.2                                             | 1R6A                    | 1.3                                                     | 5.5                               |                             |                     |                             |
|                           | 0.4                                             | 2R8A                    | 2.4                                                     | 11                                |                             |                     |                             |
|                           | 0.75                                            | 5R5A* <sup>2</sup>      | 2.7                                                     | 12                                |                             |                     |                             |
| Three-phase, 400 VAC      | 0.75                                            | 2R6D                    | 3.5                                                     | 4.4                               | 1.2                         | 19                  | -                           |
|                           | 1.5                                             | 5R4D                    | 6.8                                                     | 8.6                               |                             | 38                  |                             |

\*1. This is the net value at the rated load.

\*2. If you use the SGD7W-5R5A with a single-phase 200-VAC power supply input, derate the load ratio to 65%. An example is given below.

If the load ratio of the first axis is 90%, use a load ratio of 40% for the second axis so that average load ratio for both axes is 65%  $((90\% + 40\%)/2 = 65\%)$ .

## Using a DC Power Supply with 200 V SERVOPACKS

This section gives the power supply specifications for using a DC power supply input. Use the Fuses given in the following tables to protect the power supply line and SERVOPACK. They protect the power line by shutting OFF the circuit when overcurrent is detected.

Note: The following tables provide the net values of the current capacity and inrush current.

## ◆ Σ-7S SERVOPACKs

| Main<br>Circuit<br>Power<br>Supply | SERVOPACK<br>Model: SGD7S- | Power Supply<br>Capacity per<br>SERVOPACK<br>[kVA]* <sup>1</sup> | Current Capacity                          |                                      | Inrush Current                        |                                      | External Fuse                          |                          |                            |
|------------------------------------|----------------------------|------------------------------------------------------------------|-------------------------------------------|--------------------------------------|---------------------------------------|--------------------------------------|----------------------------------------|--------------------------|----------------------------|
|                                    |                            |                                                                  | Main Cir-<br>cuit<br>[Arms]* <sup>1</sup> | Control<br>Power<br>Supply<br>[Arms] | Main Cir-<br>cuit [A0-p]              | Control<br>Power<br>Supply<br>[A0-p] | Order Number* <sup>2</sup>             | Current<br>Rating<br>[A] | Voltage<br>Rating<br>[Vdc] |
| 270<br>VDC                         | R70A                       | 0.2                                                              | 0.5                                       | 0.2                                  | 34                                    | 34                                   | 3,5URGJ17/16UL                         | 16                       | 400                        |
|                                    | R90A                       | 0.3                                                              | 1.0                                       |                                      |                                       |                                      |                                        |                          |                            |
|                                    | 1R6A                       | 0.5                                                              | 1.5                                       |                                      |                                       |                                      |                                        |                          |                            |
|                                    | 2R8A                       | 1.0                                                              | 3.0                                       |                                      |                                       |                                      |                                        |                          |                            |
|                                    | 3R8A                       | 1.3                                                              | 3.8                                       | 0.2                                  |                                       |                                      | 3,5URGJ17/40UL                         | 40                       |                            |
|                                    | 5R5A                       | 1.6                                                              | 4.9                                       |                                      |                                       |                                      |                                        |                          |                            |
|                                    | 7R6A                       | 2.3                                                              | 6.9                                       |                                      |                                       |                                      |                                        |                          |                            |
|                                    | 120A                       | 3.2                                                              | 11                                        | 0.2                                  |                                       |                                      | 3,5URGJ17/63UL                         | 63                       |                            |
|                                    | 180A                       | 4.0                                                              | 14                                        | 0.25                                 |                                       |                                      |                                        |                          |                            |
|                                    | 200A                       | 5.9                                                              | 20                                        |                                      |                                       |                                      |                                        |                          |                            |
|                                    | 330A                       | 7.5                                                              | 34                                        | 0.3                                  | 68* <sup>3</sup><br>(5 Ω<br>external) | 3,5URGJ17/100UL                      | 100                                    |                          |                            |
|                                    | 470A                       | 10.7                                                             | 36                                        |                                      |                                       | 3,5URGJ23/160UL                      | 160                                    |                          |                            |
|                                    | 550A                       | 14.6                                                             | 48                                        |                                      |                                       | 0.4                                  | 114* <sup>3</sup><br>(3 Ω<br>external) | 3,5URGJ23/200UL          |                            |
|                                    | 590A                       | 21.7                                                             | 68                                        |                                      |                                       |                                      |                                        |                          |                            |
|                                    | 780A                       | 29.6                                                             | 92                                        |                                      |                                       |                                      |                                        |                          |                            |

\*1. This is the net value at the rated load.

\*2. These Fuses are manufactured by MERSEN Japan.

\*3. If you use a DC power supply input with any of the following SERVOPACKs, externally connect an inrush current limiting circuit and use the power ON and OFF sequences recommended by Yaskawa: SGD7S-330A, -470A, -550A, -590A, or -780A. There is a risk of equipment damage.

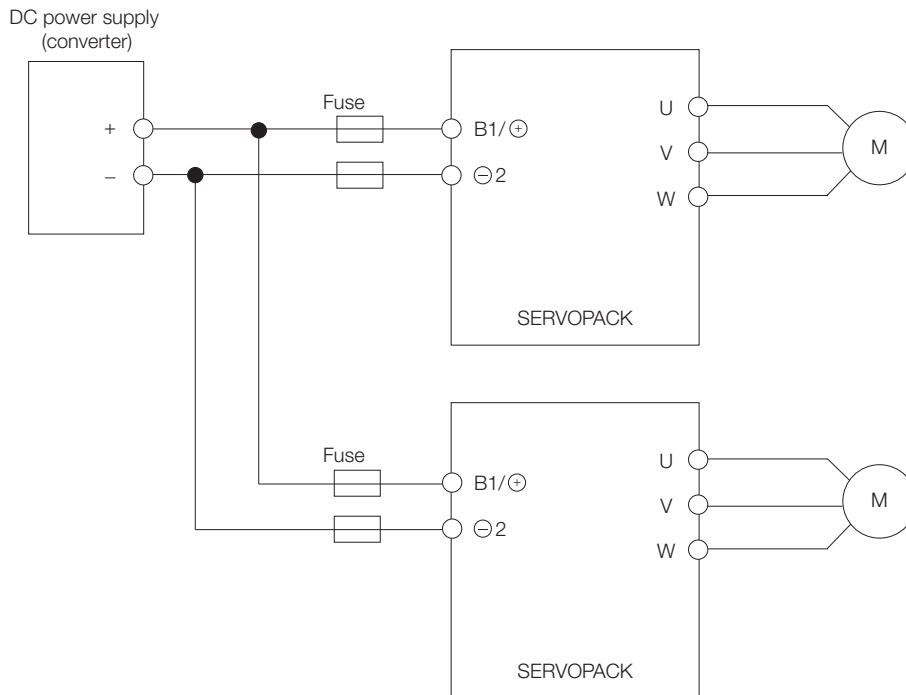
For information on the power ON and OFF sequences, refer to the product manual for the type of references used by your SERVOPACK.

### ◆ $\Sigma$ -7W SERVOPACKs

| Main<br>Circuit<br>Power<br>Supply | SERVOPACK<br>Model: SGD7W- | Power Supply<br>Capacity per<br>SERVOPACK<br>[kVA]* <sup>1</sup> | Current Capacity                          |                                      | Inrush Current           |                                      | External Fuse              |                          |                            |
|------------------------------------|----------------------------|------------------------------------------------------------------|-------------------------------------------|--------------------------------------|--------------------------|--------------------------------------|----------------------------|--------------------------|----------------------------|
|                                    |                            |                                                                  | Main Cir-<br>cuit<br>[Arms]* <sup>1</sup> | Control<br>Power<br>Supply<br>[Arms] | Main Cir-<br>cuit [A0-p] | Control<br>Power<br>Supply<br>[A0-p] | Order Number* <sup>2</sup> | Current<br>Rating<br>[A] | Voltage<br>Rating<br>[Vdc] |
| 270<br>VDC                         | 1R6A                       | 1                                                                | 3.0                                       | 0.25                                 | 34                       | 34                                   | 3,5URGJ17/40UL             | 40                       | 400                        |
|                                    | 2R8A                       | 1.9                                                              | 5.8                                       |                                      |                          |                                      | 3,5URGJ17/63UL             | 63                       |                            |
|                                    | 5R5A                       | 3.2                                                              | 9.7                                       |                                      |                          |                                      |                            |                          |                            |
|                                    | 7R6A                       | 4.5                                                              | 14                                        |                                      |                          |                                      |                            |                          |                            |

\*1. This is the net value at the rated load.

\*2. These Fuses are manufactured by MERSEN Japan.



Note: If you connect more than one SERVOPACK to the same DC power supply, connect Fuses for each SERVOPACK.

## SERVOPACK Main Circuit Wires

This section describes the main circuit wires for SERVOPACKs.



These specifications are based on IEC/EN 61800-5-1, UL 61800-5-1, and CSA C22.2 No.274.

1. To comply with UL standards, use UL-compliant wires.
2. Use copper wires with a rated temperature of 75° or higher.
3. Use copper wires with a rated withstand voltage of 300 V or higher.

Note: To use 600-V heat-resistant polyvinyl chloride-insulated wire (HIV), use the following table as reference for the applicable wires.

- The specified wire sizes are for three bundled leads when the rated current is applied with a surrounding air temperature of 40°C.
- Select the wires according to the surrounding air temperature.

### Three-phase, 200-VAC Wires for $\Sigma$ -7S SERVOPACKs

| SERVOPACK<br>Model: SGD7S- | Terminals                            |            | Wire Size                         | Screw<br>Size | Tightening<br>Torque<br>[N·m] |
|----------------------------|--------------------------------------|------------|-----------------------------------|---------------|-------------------------------|
| R70A                       | Main Circuit Power Supply Cable      | L1, L2, L3 | AWG16 (1.25 mm <sup>2</sup> )     | —             | —                             |
|                            | Servo Motor Main Circuit Cable*      | U, V, W    |                                   |               |                               |
|                            | Control Power Supply Cable           | L1C, L2C   |                                   |               |                               |
|                            | External Regenerative Resistor Cable | B1/⊕, B2   |                                   |               |                               |
|                            | Ground cable                         | ⓪          | AWG14 (2.0 mm <sup>2</sup> ) min. | M4            | 1.2 to 1.4                    |
| R90A                       | Main Circuit Power Supply Cable      | L1, L2, L3 | AWG16 (1.25 mm <sup>2</sup> )     | —             | —                             |
|                            | Servo Motor Main Circuit Cable*      | U, V, W    |                                   |               |                               |
|                            | Control Power Supply Cable           | L1C, L2C   |                                   |               |                               |
|                            | External Regenerative Resistor Cable | B1/⊕, B2   |                                   |               |                               |
|                            | Ground cable                         | ⓪          | AWG14 (2.0 mm <sup>2</sup> ) min. | M4            | 1.2 to 1.4                    |
| 1R6A                       | Main Circuit Power Supply Cable      | L1, L2, L3 | AWG16 (1.25 mm <sup>2</sup> )     | —             | —                             |
|                            | Servo Motor Main Circuit Cable*      | U, V, W    |                                   |               |                               |
|                            | Control Power Supply Cable           | L1C, L2C   |                                   |               |                               |
|                            | External Regenerative Resistor Cable | B1/⊕, B2   |                                   |               |                               |
|                            | Ground cable                         | ⓪          | AWG14 (2.0 mm <sup>2</sup> ) min. | M4            | 1.2 to 1.4                    |
| 2R8A                       | Main Circuit Power Supply Cable      | L1, L2, L3 | AWG16 (1.25 mm <sup>2</sup> )     | —             | —                             |
|                            | Servo Motor Main Circuit Cable*      | U, V, W    |                                   |               |                               |
|                            | Control Power Supply Cable           | L1C, L2C   |                                   |               |                               |
|                            | External Regenerative Resistor Cable | B1/⊕, B2   |                                   |               |                               |
|                            | Ground cable                         | ⓪          | AWG14 (2.0 mm <sup>2</sup> ) min. | M4            | 1.2 to 1.4                    |

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**SERVOPACK Cables/Peripherals**
**SERVOPACK Peripheral Devices**

Continued from previous page.

| SERVOPACK<br>Model: SGD7S- | Terminals                            |            | Wire Size                         | Screw<br>Size | Tightening<br>Torque<br>[N·m] |
|----------------------------|--------------------------------------|------------|-----------------------------------|---------------|-------------------------------|
| 3R8A                       | Main Circuit Power Supply Cable      | L1, L2, L3 | AWG16 (1.25 mm <sup>2</sup> )     | —             | —                             |
|                            | Servo Motor Main Circuit Cable*      | U, V, W    |                                   |               |                               |
|                            | Control Power Supply Cable           | L1C, L2C   |                                   |               |                               |
|                            | External Regenerative Resistor Cable | B1/⊕, B2   |                                   |               |                               |
|                            | Ground cable                         | ⊕          | AWG14 (2.0 mm <sup>2</sup> ) min. | M4            | 1.2 to 1.4                    |
| 5R5A                       | Main Circuit Power Supply Cable      | L1, L2, L3 | AWG16 (1.25 mm <sup>2</sup> )     | —             | —                             |
|                            | Servo Motor Main Circuit Cable*      | U, V, W    |                                   |               |                               |
|                            | Control Power Supply Cable           | L1C, L2C   |                                   |               |                               |
|                            | External Regenerative Resistor Cable | B1/⊕, B2   |                                   |               |                               |
|                            | Ground cable                         | ⊕          | AWG14 (2.0 mm <sup>2</sup> ) min. | M4            | 1.2 to 1.4                    |
| 7R6A                       | Main Circuit Power Supply Cable      | L1, L2, L3 | AWG16 (1.25 mm <sup>2</sup> )     | —             | —                             |
|                            | Servo Motor Main Circuit Cable*      | U, V, W    |                                   |               |                               |
|                            | Control Power Supply Cable           | L1C, L2C   |                                   |               |                               |
|                            | External Regenerative Resistor Cable | B1/⊕, B2   |                                   |               |                               |
|                            | Ground cable                         | ⊕          | AWG14 (2.0 mm <sup>2</sup> ) min. | M4            | 1.2 to 1.4                    |
| 120A                       | Main Circuit Power Supply Cable      | L1, L2, L3 | AWG14 (2.0 mm <sup>2</sup> )      | —             | —                             |
|                            | Servo Motor Main Circuit Cable*      | U, V, W    |                                   |               |                               |
|                            | Control Power Supply Cable           | L1C, L2C   | AWG16 (1.25 mm <sup>2</sup> )     |               |                               |
|                            | External Regenerative Resistor Cable | B1/⊕, B2   |                                   |               |                               |
|                            | Ground cable                         | ⊕          | AWG14 (2.0 mm <sup>2</sup> ) min. | M4            | 1.2 to 1.4                    |
| 180A                       | Main Circuit Power Supply Cable      | L1, L2, L3 | AWG14 (2.0 mm <sup>2</sup> )      |               |                               |
|                            | Servo Motor Main Circuit Cable*      | U, V, W    | AWG10 (5.5 mm <sup>2</sup> )      |               |                               |
|                            | Control Power Supply Cable           | L1C, L2C   | AWG16 (1.25 mm <sup>2</sup> )     |               |                               |
|                            | External Regenerative Resistor Cable | B1/⊕, B2   |                                   |               |                               |
|                            | Ground cable                         | ⊕          | AWG14 (2.0 mm <sup>2</sup> ) min. |               |                               |
| 200A                       | Main Circuit Power Supply Cable      | L1, L2, L3 | AWG12 (3.5 mm <sup>2</sup> )      |               |                               |
|                            | Servo Motor Main Circuit Cable*      | U, V, W    | AWG10 (5.5 mm <sup>2</sup> )      |               |                               |
|                            | Control Power Supply Cable           | L1C, L2C   | AWG16 (1.25 mm <sup>2</sup> )     |               |                               |
|                            | External Regenerative Resistor Cable | B1/⊕, B2   |                                   |               |                               |
|                            | Ground cable                         | ⊕          | AWG14 (2.0 mm <sup>2</sup> ) min. |               |                               |

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| SERVOPACK<br>Model: SGD7S- | Terminals                            |            | Wire Size                         | Screw<br>Size | Tightening<br>Torque<br>[N·m] |
|----------------------------|--------------------------------------|------------|-----------------------------------|---------------|-------------------------------|
| 330A                       | Main Circuit Power Supply Cable      | L1, L2, L3 | AWG8 (8.0 mm <sup>2</sup> )       | M4            | 1.2 to 1.4                    |
|                            | Servo Motor Main Circuit Cable*      | U, V, W    |                                   |               |                               |
|                            | Control Power Supply Cable           | L1C, L2C   | AWG16 (1.25 mm <sup>2</sup> )     |               |                               |
|                            | External Regenerative Resistor Cable | B1/⊕, B2   | AWG14 (2.0 mm <sup>2</sup> )      |               |                               |
|                            | Ground cable                         | ⊖          | AWG14 (2.0 mm <sup>2</sup> ) min. |               |                               |
| 470A                       | Main Circuit Power Supply Cable      | L1, L2, L3 | AWG8 (8.0 mm <sup>2</sup> )       | M5            | 2.2 to 2.4                    |
|                            | Servo Motor Main Circuit Cable*      | U, V, W    | AWG6 (14 mm <sup>2</sup> )        |               |                               |
|                            | Control Power Supply Cable           | L1C, L2C   | AWG16 (1.25 mm <sup>2</sup> )     |               |                               |
|                            | External Regenerative Resistor Cable | B1/⊕, B2   | AWG14 (2.0 mm <sup>2</sup> )      |               |                               |
|                            | Ground cable                         | ⊖          | AWG14 (2.0 mm <sup>2</sup> ) min. |               |                               |
| 550A                       | Main Circuit Power Supply Cable      | L1, L2, L3 | AWG8 (8.0 mm <sup>2</sup> )       | M5            | 2.2 to 2.4                    |
|                            | Servo Motor Main Circuit Cable*      | U, V, W    | AWG4 (22 mm <sup>2</sup> )        |               |                               |
|                            | Control Power Supply Cable           | L1C, L2C   | AWG16 (1.25 mm <sup>2</sup> )     |               |                               |
|                            | External Regenerative Resistor Cable | B1/⊕, B2   | AWG10 (5.5 mm <sup>2</sup> )      |               |                               |
|                            | Ground cable                         | ⊖          | AWG14 (2.0 mm <sup>2</sup> ) min. |               |                               |
| 590A                       | Main Circuit Power Supply Cable      | L1, L2, L3 | AWG4 (22 mm <sup>2</sup> )        | M6            | 2.7 to 3.0                    |
|                            | Servo Motor Main Circuit Cable*      | U, V, W    |                                   |               |                               |
|                            | Control Power Supply Cable           | L1C, L2C   | AWG16 (1.25 mm <sup>2</sup> )     |               |                               |
|                            | External Regenerative Resistor Cable | B1/⊕, B2   | AWG10 (5.5 mm <sup>2</sup> )      |               |                               |
|                            | Ground cable                         | ⊖          | AWG14 (2.0 mm <sup>2</sup> ) min. |               |                               |
| 780A                       | Main Circuit Power Supply Cable      | L1, L2, L3 | AWG3 (30 mm <sup>2</sup> )        | M6            | 2.7 to 3.0                    |
|                            | Servo Motor Main Circuit Cable*      | U, V, W    |                                   |               |                               |
|                            | Control Power Supply Cable           | L1C, L2C   | AWG16 (1.25 mm <sup>2</sup> )     |               |                               |
|                            | External Regenerative Resistor Cable | B1/⊕, B2   | AWG8 (8.0 mm <sup>2</sup> )       |               |                               |
|                            | Ground cable                         | ⊖          | AWG14 (2.0 mm <sup>2</sup> ) min. |               |                               |

\* If you do not use the recommended Servo Motor Main Circuit Cable, use this table to select wires.

Single-phase, 200-VAC Wires for  $\Sigma$ -7S SERVOPACKs

| SERVOPACK<br>Model: SGD7S- | Terminals                            |            | Wire Size                         | Screw<br>Size | Tightening<br>Torque<br>[N·m] |
|----------------------------|--------------------------------------|------------|-----------------------------------|---------------|-------------------------------|
| R70A                       | Main Circuit Power Supply Cable      | L1, L2     | AWG16 (1.25 mm <sup>2</sup> )     | —             | —                             |
|                            | Servo Motor Main Circuit Cable*      | U, V, W    |                                   |               |                               |
|                            | Control Power Supply Cable           | L1C, L2C   |                                   |               |                               |
|                            | External Regenerative Resistor Cable | B1/⊕, B2   |                                   |               |                               |
|                            | Ground cable                         | ⊕          | AWG14 (2.0 mm <sup>2</sup> ) min. | M4            | 1.2 to 1.4                    |
| R90A                       | Main Circuit Power Supply Cable      | L1, L2     | AWG16 (1.25 mm <sup>2</sup> )     | —             | —                             |
|                            | Servo Motor Main Circuit Cable*      | U, V, W    |                                   |               |                               |
|                            | Control Power Supply Cable           | L1C, L2C   |                                   |               |                               |
|                            | External Regenerative Resistor Cable | B1/⊕, B2   |                                   |               |                               |
|                            | Ground cable                         | ⊕          | AWG14 (2.0 mm <sup>2</sup> ) min. | M4            | 1.2 to 1.4                    |
| 1R6A                       | Main Circuit Power Supply Cable      | L1, L2, L3 | AWG16 (1.25 mm <sup>2</sup> )     | —             | —                             |
|                            | Servo Motor Main Circuit Cable*      | U, V, W    |                                   |               |                               |
|                            | Control Power Supply Cable           | L1C, L2C   |                                   |               |                               |
|                            | External Regenerative Resistor Cable | B1/⊕, B2   |                                   |               |                               |
|                            | Ground cable                         | ⊕          | AWG14 (2.0 mm <sup>2</sup> ) min. | M4            | 1.2 to 1.4                    |
| 2R8A                       | Main Circuit Power Supply Cable      | L1, L2, L3 | AWG16 (1.25 mm <sup>2</sup> )     | —             | —                             |
|                            | Servo Motor Main Circuit Cable*      | U, V, W    |                                   |               |                               |
|                            | Control Power Supply Cable           | L1C, L2C   |                                   |               |                               |
|                            | External Regenerative Resistor Cable | B1/⊕, B2   |                                   |               |                               |
|                            | Ground cable                         | ⊕          | AWG14 (2.0 mm <sup>2</sup> ) min. | M4            | 1.2 to 1.4                    |
| 5R5A                       | Main Circuit Power Supply Cable      | L1, L2, L3 | AWG14 (2.0 mm <sup>2</sup> )      | —             | —                             |
|                            | Servo Motor Main Circuit Cable*      | U, V, W    | AWG16 (1.25 mm <sup>2</sup> )     |               |                               |
|                            | Control Power Supply Cable           | L1C, L2C   |                                   |               |                               |
|                            | External Regenerative Resistor Cable | B1/⊕, B2   |                                   |               |                               |
|                            | Ground cable                         | ⊕          | AWG14 (2.0 mm <sup>2</sup> ) min. | M4            | 1.2 to 1.4                    |

\* If you do not use the recommended Servo Motor Main Circuit Cable, use this table to select wires.



DC Power Supply Wires for  $\Sigma$ -7S SERVOPACKs

| SERVOPACK<br>Model: SGD7S- | Terminal Symbols*1                  |                       | Wire Size                              | Screw<br>Size | Tightening<br>Torque<br>[N·m] |
|----------------------------|-------------------------------------|-----------------------|----------------------------------------|---------------|-------------------------------|
| R70A                       | Servo Motor Main Circuit<br>Cables  | U, V, W <sup>*2</sup> | AWG16 (1.25 mm <sup>2</sup> )          | —             | —                             |
|                            | Control Power Supply<br>Cables      | L1C, L2C              | AWG16 (1.25 mm <sup>2</sup> )          | —             | —                             |
|                            | Main Circuit Power<br>Supply Cables | B1/⊕, ⊖2              | AWG16 (1.25 mm <sup>2</sup> )          | —             | —                             |
|                            | Ground Cable                        | ⊕                     | AWG14 (2.0 mm <sup>2</sup> ) or larger | M4            | 1.2 to 1.4                    |
| R90A                       | Servo Motor Main Circuit<br>Cables  | U, V, W <sup>*2</sup> | AWG16 (1.25 mm <sup>2</sup> )          | —             | —                             |
|                            | Control Power Supply<br>Cables      | L1C, L2C              | AWG16 (1.25 mm <sup>2</sup> )          | —             | —                             |
|                            | Main Circuit Power<br>Supply Cables | B1/⊕, ⊖2              | AWG16 (1.25 mm <sup>2</sup> )          | —             | —                             |
|                            | Ground Cable                        | ⊕                     | AWG14 (2.0 mm <sup>2</sup> ) or larger | M4            | 1.2 to 1.4                    |
| 1R6A                       | Servo Motor Main Circuit<br>Cables  | U, V, W <sup>*2</sup> | AWG16 (1.25 mm <sup>2</sup> )          | —             | —                             |
|                            | Control Power Supply<br>Cables      | L1C, L2C              | AWG16 (1.25 mm <sup>2</sup> )          | —             | —                             |
|                            | Main Circuit Power<br>Supply Cables | B1/⊕, ⊖2              | AWG16 (1.25 mm <sup>2</sup> )          | —             | —                             |
|                            | Ground Cable                        | ⊕                     | AWG14 (2.0 mm <sup>2</sup> ) or larger | M4            | 1.2 to 1.4                    |
| 2R8A                       | Servo Motor Main Circuit<br>Cables  | U, V, W <sup>*2</sup> | AWG16 (1.25 mm <sup>2</sup> )          | —             | —                             |
|                            | Control Power Supply<br>Cables      | L1C, L2C              | AWG16 (1.25 mm <sup>2</sup> )          | —             | —                             |
|                            | Main Circuit Power<br>Supply Cables | B1/⊕, ⊖2              | AWG16 (1.25 mm <sup>2</sup> )          | —             | —                             |
|                            | Ground Cable                        | ⊕                     | AWG14 (2.0 mm <sup>2</sup> ) or larger | M4            | 1.2 to 1.4                    |
| 3R8A                       | Servo Motor Main Circuit<br>Cables  | U, V, W <sup>*2</sup> | AWG16 (1.25 mm <sup>2</sup> )          | —             | —                             |
|                            | Control Power Supply<br>Cables      | L1C, L2C              | AWG16 (1.25 mm <sup>2</sup> )          | —             | —                             |
|                            | Main Circuit Power<br>Supply Cables | B1/⊕, ⊖2              | AWG16 (1.25 mm <sup>2</sup> )          | —             | —                             |
|                            | Ground Cable                        | ⊕                     | AWG14 (2.0 mm <sup>2</sup> ) or larger | M4            | 1.2 to 1.4                    |
| 5R5A                       | Servo Motor Main Circuit<br>Cables  | U, V, W <sup>*2</sup> | AWG16 (1.25 mm <sup>2</sup> )          | —             | —                             |
|                            | Control Power Supply<br>Cables      | L1C, L2C              | AWG16 (1.25 mm <sup>2</sup> )          | —             | —                             |
|                            | Main Circuit Power<br>Supply Cables | B1/⊕, ⊖2              | AWG16 (1.25 mm <sup>2</sup> )          | —             | —                             |
|                            | Ground Cable                        | ⊕                     | AWG14 (2.0 mm <sup>2</sup> ) or larger | M4            | 1.2 to 1.4                    |
| 7R6A                       | Servo Motor Main Circuit<br>Cables  | U, V, W <sup>*2</sup> | AWG16 (1.25 mm <sup>2</sup> )          | —             | —                             |
|                            | Control Power Supply<br>Cables      | L1C, L2C              | AWG16 (1.25 mm <sup>2</sup> )          | —             | —                             |
|                            | Main Circuit Power<br>Supply Cables | B1/⊕, ⊖2              | AWG16 (1.25 mm <sup>2</sup> )          | —             | —                             |
|                            | Ground Cable                        | ⊕                     | AWG14 (2.0 mm <sup>2</sup> ) or larger | M4            | 1.2 to 1.4                    |

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**SERVOPACK Cables/Peripherals**
**SERVOPACK Peripheral Devices**

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| SERVOPACK Model: SGD7S- | Terminal Symbols*1               |           | Wire Size                              | Screw Size | Tightening Torque [N·m] |
|-------------------------|----------------------------------|-----------|----------------------------------------|------------|-------------------------|
| 120A                    | Servo Motor Main Circuit Cables  | U, V, W*2 | AWG14 (2.0 mm <sup>2</sup> )           | —          | —                       |
|                         | Control Power Supply Cables      | L1C, L2C  | AWG16 (1.25 mm <sup>2</sup> )          | —          | —                       |
|                         | Main Circuit Power Supply Cables | B1/⊕, ⊖2  | AWG14 (2.0 mm <sup>2</sup> )           | —          | —                       |
|                         | Ground Cable                     | ⊕         | AWG14 (2.0 mm <sup>2</sup> ) or larger | M4         | 1.2 to 1.4              |
| 180A                    | Servo Motor Main Circuit Cables  | U, V, W*2 | AWG10 (5.5 mm <sup>2</sup> )           | M4         | 1.2 to 1.4              |
|                         | Control Power Supply Cables      | L1C, L2C  | AWG16 (1.25 mm <sup>2</sup> )          | M4         | 1.2 to 1.4              |
|                         | Main Circuit Power Supply Cables | B1/⊕, ⊖2  | AWG10 (5.5 mm <sup>2</sup> )           | M4         | 1.2 to 1.4              |
|                         | Ground Cable                     | ⊕         | AWG14 (2.0 mm <sup>2</sup> ) or larger | M4         | 1.2 to 1.4              |
| 200A                    | Servo Motor Main Circuit Cables  | U, V, W*2 | AWG10 (5.5 mm <sup>2</sup> )           | M4         | 1.2 to 1.4              |
|                         | Control Power Supply Cables      | L1C, L2C  | AWG16 (1.25 mm <sup>2</sup> )          | M4         | 1.2 to 1.4              |
|                         | Main Circuit Power Supply Cables | B1/⊕, ⊖2  | AWG10 (5.5 mm <sup>2</sup> )           | M4         | 1.2 to 1.4              |
|                         | Ground Cable                     | ⊕         | AWG14 (2.0 mm <sup>2</sup> ) or larger | M4         | 1.2 to 1.4              |
| 330A                    | Servo Motor Main Circuit Cables  | U, V, W   | AWG8 (8.0 mm <sup>2</sup> )            | M4         | 1.2 to 1.4              |
|                         | Control Power Supply Cables      | L1C, L2C  | AWG16 (1.25 mm <sup>2</sup> )          | M4         | 1.2 to 1.4              |
|                         | Main Circuit Power Supply Cables | B1/⊕, ⊖2  | AWG8 (8.0 mm <sup>2</sup> )            | M4         | 1.2 to 1.4              |
|                         | Ground Cable                     | ⊕         | AWG14 (2.0 mm <sup>2</sup> ) or larger | M4         | 1.2 to 1.4              |
| 470A                    | Servo Motor Main Circuit Cables  | U, V, W   | AWG6 (14 mm <sup>2</sup> )             | M5         | 2.2 to 2.4              |
|                         | Control Power Supply Cables      | L1C, L2C  | AWG16 (1.25 mm <sup>2</sup> )          | M5         | 2.2 to 2.4              |
|                         | Main Circuit Power Supply Cables | B1/⊕, ⊖2  | AWG8 (8.0 mm <sup>2</sup> )            | M5         | 2.2 to 2.4              |
|                         | Ground Cable                     | ⊕         | AWG14 (2.0 mm <sup>2</sup> ) or larger | M5         | 2.2 to 2.4              |
| 550A                    | Servo Motor Main Circuit Cables  | U, V, W   | AWG4 (22 mm <sup>2</sup> )             | M5         | 2.2 to 2.4              |
|                         | Control Power Supply Cables      | L1C, L2C  | AWG16 (1.25 mm <sup>2</sup> )          | M5         | 2.2 to 2.4              |
|                         | Main Circuit Power Supply Cables | B1/⊕, ⊖2  | AWG6 (14 mm <sup>2</sup> )             | M5         | 2.2 to 2.4              |
|                         | Ground Cable                     | ⊕         | AWG14 (2.0 mm <sup>2</sup> ) or larger | M5         | 2.2 to 2.4              |
| 590A                    | Servo Motor Main Circuit Cables  | U, V, W   | AWG4 (22 mm <sup>2</sup> )             | M6         | 2.7 to 3.0              |
|                         | Control Power Supply Cables      | L1C, L2C  | AWG16 (1.25 mm <sup>2</sup> )          | M6         | 2.7 to 3.0              |
|                         | Main Circuit Power Supply Cables | B1/⊕, ⊖2  | AWG3 (30 mm <sup>2</sup> )             | M6         | 2.7 to 3.0              |
|                         | Ground Cable                     | ⊕         | AWG14 (2.0 mm <sup>2</sup> ) or larger | M6         | 2.7 to 3.0              |

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| SERVOPACK Model: SGD7S- | Terminal Symbols*1               |          | Wire Size                              | Screw Size | Tightening Torque [N·m] |
|-------------------------|----------------------------------|----------|----------------------------------------|------------|-------------------------|
| 780A                    | Servo Motor Main Circuit Cables  | U, V, W  | AWG3 (30 mm <sup>2</sup> )             | M6         | 2.7 to 3.0              |
|                         | Control Power Supply Cables      | L1C, L2C | AWG16 (1.25 mm <sup>2</sup> )          | M6         | 2.7 to 3.0              |
|                         | Main Circuit Power Supply Cables | B1/⊕, ⊖2 | AWG3 (30 mm <sup>2</sup> )             | M6         | 2.7 to 3.0              |
|                         | Ground Cable                     | ⊕        | AWG14 (2.0 mm <sup>2</sup> ) or larger | M6         | 2.7 to 3.0              |

\*1. Do not wire the following terminals: L1, L2, L3, B2, B3, ⊖1, and ⊖ terminals.

\*2. If you do not use the recommended Servo Motor Main Circuit Cable, use this table to select wires.

## Three-phase, 400-VAC Wires for $\Sigma$ -7S SERVOPACKs

| SERVOPACK Model: SGD7S- | Terminals                            |            | Wire Size                    |
|-------------------------|--------------------------------------|------------|------------------------------|
| 1R9D                    | Main Circuit Power Supply Cable      | L1, L2, L3 | AWG16 (1.5 mm <sup>2</sup> ) |
|                         | Servo Motor Main Circuit Cable*      | U, V, W    |                              |
|                         | Control Power Supply Cable           | 24V, 0V    |                              |
|                         | External Regenerative Resistor Cable | B1/⊕, B2   |                              |
|                         | Ground cable                         | ⊕          |                              |
| 3R5D                    | Main Circuit Power Supply Cable      | L1, L2, L3 |                              |
|                         | Servo Motor Main Circuit Cable*      | U, V, W    |                              |
|                         | Control Power Supply Cable           | 24V, 0V    |                              |
|                         | External Regenerative Resistor Cable | B1/⊕, B2   |                              |
|                         | Ground cable                         | ⊕          |                              |
| 5R4D                    | Main Circuit Power Supply Cable      | L1, L2, L3 |                              |
|                         | Servo Motor Main Circuit Cable*      | U, V, W    |                              |
|                         | Control Power Supply Cable           | 24V, 0V    |                              |
|                         | External Regenerative Resistor Cable | B1/⊕, B2   |                              |
|                         | Ground cable                         | ⊕          |                              |
| 8R4D                    | Main Circuit Power Supply Cable      | L1, L2, L3 | AWG14 (2.5 mm <sup>2</sup> ) |
|                         | Servo Motor Main Circuit Cable*      | U, V, W    | AWG16 (1.5 mm <sup>2</sup> ) |
|                         | Control Power Supply Cable           | 24V, 0V    |                              |
|                         | External Regenerative Resistor Cable | B1/⊕, B2   | AWG14 (2.5 mm <sup>2</sup> ) |
|                         | Ground cable                         | ⊕          | AWG14 (2.5 mm <sup>2</sup> ) |
| 120D                    | Main Circuit Power Supply Cable      | L1, L2, L3 | AWG14 (2.5 mm <sup>2</sup> ) |
|                         | Servo Motor Main Circuit Cable*      | U, V, W    | AWG16 (1.5 mm <sup>2</sup> ) |
|                         | Control Power Supply Cable           | 24V, 0V    |                              |
|                         | External Regenerative Resistor Cable | B1/⊕, B2   | AWG14 (2.5 mm <sup>2</sup> ) |
|                         | Ground cable                         | ⊕          | AWG14 (2.5 mm <sup>2</sup> ) |
| 170D                    | Main Circuit Power Supply Cable      | L1, L2, L3 | AWG12 (4.0 mm <sup>2</sup> ) |
|                         | Servo Motor Main Circuit Cable*      | U, V, W    | AWG16 (1.5 mm <sup>2</sup> ) |
|                         | Control Power Supply Cable           | 24V, 0V    |                              |
|                         | External Regenerative Resistor Cable | B1/⊕, B2   | AWG14 (2.5 mm <sup>2</sup> ) |
|                         | Ground cable                         | ⊕          | AWG12 (4.0 mm <sup>2</sup> ) |

**SERVOPACK Cables/Peripherals**
**SERVOPACK Peripheral Devices**

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| SERVOPACK<br>Model: SGD7S- | Terminals                            |            | Wire Size                    |
|----------------------------|--------------------------------------|------------|------------------------------|
| 210D                       | Main Circuit Power Supply Cable      | L1, L2, L3 | AWG12 (4.0 mm <sup>2</sup> ) |
|                            | Servo Motor Main Circuit Cable*      | U, V, W    | AWG10 (4.0 mm <sup>2</sup> ) |
|                            | Control Power Supply Cable           | 24V, 0V    | AWG16 (1.5 mm <sup>2</sup> ) |
|                            | External Regenerative Resistor Cable | B1/⊕, B2   | AWG12 (4.0 mm <sup>2</sup> ) |
|                            | Ground cable                         | ⊕          |                              |
| 260D                       | Main Circuit Power Supply Cable      | L1, L2, L3 | AWG10 (4.0 mm <sup>2</sup> ) |
|                            | Servo Motor Main Circuit Cable*      | U, V, W    |                              |
|                            | Control Power Supply Cable           | 24V, 0V    | AWG16 (1.5 mm <sup>2</sup> ) |
|                            | External Regenerative Resistor Cable | B1/⊕, B2   | AWG12 (4.0 mm <sup>2</sup> ) |
|                            | Ground cable                         | ⊕          | AWG10 (4.0 mm <sup>2</sup> ) |
| 280D                       | Main Circuit Power Supply Cable      | L1, L2, L3 | AWG8 (10 mm <sup>2</sup> )   |
|                            | Servo Motor Main Circuit Cable*      | U, V, W    |                              |
|                            | Control Power Supply Cable           | 24V, 0V    | AWG16 (1.5 mm <sup>2</sup> ) |
|                            | External Regenerative Resistor Cable | B1/⊕, B2   | AWG10 (4.0 mm <sup>2</sup> ) |
|                            | Ground cable                         | ⊕          | AWG8 (10 mm <sup>2</sup> )   |
| 370D                       | Main Circuit Power Supply Cable      | L1, L2, L3 | AWG8 (10 mm <sup>2</sup> )   |
|                            | Servo Motor Main Circuit Cable*      | U, V, W    |                              |
|                            | Control Power Supply Cable           | 24V, 0V    | AWG16 (1.5 mm <sup>2</sup> ) |
|                            | External Regenerative Resistor Cable | B1/⊕, B2   | AWG8 (10 mm <sup>2</sup> )   |
|                            | Ground cable                         | ⊕          |                              |

Three-phase, 200-VAC Wires for  $\Sigma$ -7W SERVOPACKs

| SERVOPACK<br>Model: SGD7W- | Terminals                            |                        | Wire Size                         | Screw<br>Size | Tightening<br>Torque<br>[N·m] |
|----------------------------|--------------------------------------|------------------------|-----------------------------------|---------------|-------------------------------|
| 1R6A                       | Main Circuit Power Supply Cable      | L1, L2, L3             | AWG16 (1.25 mm <sup>2</sup> )     | -             | -                             |
|                            | Servo Motor Main Circuit Cable*      | UA, VA, WA, UB, VB, WB |                                   |               |                               |
|                            | Control Power Supply Cable           | L1C, L2C               |                                   |               |                               |
|                            | External Regenerative Resistor Cable | B1/⊕, B2               |                                   |               |                               |
|                            | Ground cable                         | ⊕                      | AWG14 (2.0 mm <sup>2</sup> ) min. | M4            | 1.2 to 1.4                    |
| 2R8A                       | Main Circuit Power Supply Cable      | L1, L2, L3             | AWG14 (2.0 mm <sup>2</sup> )      | -             | -                             |
|                            | Servo Motor Main Circuit Cable*      | UA, VA, WA, UB, VB, WB | AWG16 (1.25 mm <sup>2</sup> )     |               |                               |
|                            | Control Power Supply Cable           | L1C, L2C               |                                   |               |                               |
|                            | External Regenerative Resistor Cable | B1/⊕, B2               |                                   |               |                               |
|                            | Ground cable                         | ⊕                      | AWG14 (2.0 mm <sup>2</sup> ) min. | M4            | 1.2 to 1.4                    |
| 5R5A                       | Main Circuit Power Supply Cable      | L1, L2, L3             | AWG14 (2.0 mm <sup>2</sup> )      | -             | -                             |
|                            | Servo Motor Main Circuit Cable*      | UA, VA, WA, UB, VB, WB | AWG16 (1.25 mm <sup>2</sup> )     |               |                               |
|                            | Control Power Supply Cable           | L1C, L2C               |                                   |               |                               |
|                            | External Regenerative Resistor Cable | B1/⊕, B2               | AWG14 (2.0 mm <sup>2</sup> )      |               |                               |
|                            | Ground cable                         | ⊕                      | AWG14 (2.0 mm <sup>2</sup> ) min. | M4            | 1.2 to 1.4                    |
| 7R6A                       | Main Circuit Power Supply Cable      | L1, L2, L3             | AWG14 (2.0 mm <sup>2</sup> )      | -             | -                             |
|                            | Servo Motor Main Circuit Cable*      | UA, VA, WA, UB, VB, WB | AWG16 (1.25 mm <sup>2</sup> )     |               |                               |
|                            | Control Power Supply Cable           | L1C, L2C               |                                   |               |                               |
|                            | External Regenerative Resistor Cable | B1/⊕, B2               | AWG14 (2.0 mm <sup>2</sup> )      |               |                               |
|                            | Ground cable                         | ⊕                      | AWG14 (2.0 mm <sup>2</sup> ) min. | M4            | 1.2 to 1.4                    |

\* If you do not use the recommended Servo Motor Main Circuit Cable, use this table to select wires.

Single-phase, 200-VAC Wires for  $\Sigma$ -7W SERVOPACKs

| SERVOPACK<br>Model: SGD7W- | Terminals                            |                        | Wire Size                         | Screw<br>Size | Tightening<br>Torque<br>[N·m] |
|----------------------------|--------------------------------------|------------------------|-----------------------------------|---------------|-------------------------------|
| 1R6A                       | Main Circuit Power Supply Cable      | L1, L2, L3             | AWG16 (1.25 mm <sup>2</sup> )     | —             | —                             |
|                            | Servo Motor Main Circuit Cable*      | UA, VA, WA, UB, VB, WB |                                   |               |                               |
|                            | Control Power Supply Cable           | L1C, L2C               |                                   |               |                               |
|                            | External Regenerative Resistor Cable | B1/⊕, B2               |                                   |               |                               |
|                            | Ground cable                         | ⓪                      | AWG14 (2.0 mm <sup>2</sup> ) min. | M4            | 1.2 to 1.4                    |
| 2R8A                       | Main Circuit Power Supply Cable      | L1, L2, L3             | AWG14 (2.0 mm <sup>2</sup> )      | —             | —                             |
|                            | Servo Motor Main Circuit Cable*      | UA, VA, WA, UB, VB, WB | AWG16 (1.25 mm <sup>2</sup> )     |               |                               |
|                            | Control Power Supply Cable           | L1C, L2C               |                                   |               |                               |
|                            | External Regenerative Resistor Cable | B1/⊕, B2               |                                   |               |                               |
|                            | Ground cable                         | ⓪                      | AWG14 (2.0 mm <sup>2</sup> ) min. | M4            | 1.2 to 1.4                    |
| 5R5A                       | Main Circuit Power Supply Cable      | L1, L2, L3             | AWG14 (2.0 mm <sup>2</sup> )      | —             | —                             |
|                            | Servo Motor Main Circuit Cable*      | UA, VA, WA, UB, VB, WB | AWG16 (1.25 mm <sup>2</sup> )     |               |                               |
|                            | Control Power Supply Cable           | L1C, L2C               |                                   |               |                               |
|                            | External Regenerative Resistor Cable | B1/⊕, B2               | AWG14 (2.0 mm <sup>2</sup> )      |               |                               |
|                            | Ground cable                         | ⓪                      | AWG14 (2.0 mm <sup>2</sup> ) min. | M4            | 1.2 to 1.4                    |

\* If you do not use the recommended Servo Motor Main Circuit Cable, use this table to select wires.

DC Power Supply Wires for  $\Sigma$ -7W SERVOPACKs

| SERVOPACK<br>Model: SGD7W- | Terminal Symbols*1               |                          | Wire Size                              | Screw<br>Size | Tightening<br>Torque<br>[N·m] |
|----------------------------|----------------------------------|--------------------------|----------------------------------------|---------------|-------------------------------|
| 1R6A                       | Servo Motor Main Circuit Cables  | UA, VA, WA, UB, VB, WB*2 | AWG16 (1.25 mm <sup>2</sup> )          | —             | —                             |
|                            | Control Power Supply Cables      | L1C, L2C                 | AWG16 (1.25 mm <sup>2</sup> )          | —             | —                             |
|                            | Main Circuit Power Supply Cables | B1/⊕, ⊖2                 | AWG16 (1.25 mm <sup>2</sup> )          | —             | —                             |
|                            | Ground Cable                     | ⓪                        | AWG14 (2.0 mm <sup>2</sup> ) or larger | M4            | 1.2 to 1.4                    |
| 2R8A                       | Servo Motor Main Circuit Cables  | UA, VA, WA, UB, VB, WB*2 | AWG16 (1.25 mm <sup>2</sup> )          | —             | —                             |
|                            | Control Power Supply Cables      | L1C, L2C                 | AWG16 (1.25 mm <sup>2</sup> )          | —             | —                             |
|                            | Main Circuit Power Supply Cables | B1/⊕, ⊖2                 | AWG16 (1.25 mm <sup>2</sup> )          | —             | —                             |
|                            | Ground Cable                     | ⓪                        | AWG14 (2.0 mm <sup>2</sup> ) or larger | M4            | 1.2 to 1.4                    |

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| SERVOPACK<br>Model: SGD7W- | Terminal Symbols*1                  |                                | Wire Size                              | Screw<br>Size | Tightening<br>Torque<br>[N·m] |
|----------------------------|-------------------------------------|--------------------------------|----------------------------------------|---------------|-------------------------------|
| 5R5A                       | Servo Motor Main Circuit<br>Cables  | UA, VA, WA,<br>UB, VB,<br>WB*2 | AWG16 (1.25 mm <sup>2</sup> )          | —             | —                             |
|                            | Control Power Supply<br>Cables      | L1C, L2C                       | AWG16 (1.25 mm <sup>2</sup> )          | —             | —                             |
|                            | Main Circuit Power<br>Supply Cables | B1/⊕, ⊖2                       | AWG14 (2.0 mm <sup>2</sup> )           | —             | —                             |
|                            | Ground Cable                        | ⊕                              | AWG14 (2.0 mm <sup>2</sup> ) or larger | M4            | 1.2 to 1.4                    |
| 7R6A                       | Servo Motor Main Circuit<br>Cables  | UA, VA, WA,<br>UB, VB,<br>WB*2 | AWG16 (1.25 mm <sup>2</sup> )          | —             | —                             |
|                            | Control Power Supply<br>Cables      | L1C, L2C                       | AWG16 (1.25 mm <sup>2</sup> )          | —             | —                             |
|                            | Main Circuit Power<br>Supply Cables | B1/⊕, ⊖2                       | AWG14 (2.0mm <sup>2</sup> )            | —             | —                             |
|                            | Ground Cable                        | ⊕                              | AWG14 (2.0 mm <sup>2</sup> ) or larger | M4            | 1.2 to 1.4                    |

\*1. Do not wire the following terminals: L1, L2, L3, B2, B3, ⊖1, and ⊖ terminals.

\*2. If you do not use the recommended Servo Motor Main Circuit Cable, use this table to select wires.

### Three-phase, 400-VAC Wires for $\Sigma$ -7W SERVOPACKs

| SERVOPACK<br>Model: SGD7W- | Terminals                            |            | Wire Size                     |
|----------------------------|--------------------------------------|------------|-------------------------------|
| 2R6D                       | Main Circuit Power Supply Cable      | L1, L2, L3 | AWG14 (2.0 mm <sup>2</sup> )  |
|                            | Servo Motor Main Circuit Cable*      | U, V, W    | AWG16 (1.25 mm <sup>2</sup> ) |
|                            | Control Power Supply Cable           | 24V, 0V    |                               |
|                            | External Regenerative Resistor Cable | B1/⊕, B2   |                               |
|                            | Ground cable                         | ⊕          | AWG14 (2.0 mm <sup>2</sup> )  |
| 5R4D                       | Main Circuit Power Supply Cable      | L1, L2, L3 | AWG14 (2.0 mm <sup>2</sup> )  |
|                            | Servo Motor Main Circuit Cable*      | U, V, W    | AWG16 (1.25 mm <sup>2</sup> ) |
|                            | Control Power Supply Cable           | 24V, 0V    |                               |
|                            | External Regenerative Resistor Cable | B1/⊕, B2   |                               |
|                            | Ground cable                         | ⊕          | AWG14 (2.0 mm <sup>2</sup> )  |

## Wire Types

The following table shows the wire sizes and allowable currents for three bundled leads.

| HIV Specifications*                                |                                           | Allowable Current at Surrounding Air Temperatures [Arms] |      |      |
|----------------------------------------------------|-------------------------------------------|----------------------------------------------------------|------|------|
| Nominal Cross-sectional Area<br>[mm <sup>2</sup> ] | Configuration<br>[Wires/mm <sup>2</sup> ] | 30°C                                                     | 40°C | 50°C |
| 0.9                                                | 37/0.18                                   | 15                                                       | 13   | 11   |
| 1.25                                               | 50/0.15                                   | 16                                                       | 14   | 12   |
| 2.0                                                | 7/0.6                                     | 23                                                       | 20   | 17   |
| 3.5                                                | 7/0.8                                     | 32                                                       | 28   | 24   |
| 5.5                                                | 7/1.0                                     | 42                                                       | 37   | 31   |
| 8.0                                                | 7/1.2                                     | 52                                                       | 46   | 39   |
| 14.0                                               | 7/1.6                                     | 75                                                       | 67   | 56   |
| 22.0                                               | 7/2.0                                     | 98                                                       | 87   | 73   |
| 38.0                                               | 7/2.6                                     | 138                                                      | 122  | 103  |

\* This is reference data based on JIS C3317 600-V-grade heat-resistant polyvinyl chloride-insulated wires (HIV).



## Crimp Terminals and Insulating Sleeves

If you use crimp terminals for wiring, use insulating sleeves. Do not allow the crimp terminals to come close to adjacent terminals or the case.

To comply with UL standards, you must use UL-compliant closed-loop crimp terminals and insulating sleeves for the main circuit terminals. Use the tool recommended by the crimp terminal manufacturer to attach the crimp terminals.

The following tables give the recommended tightening torques, closed-loop crimp terminals, and insulating sleeves in sets. Use the set that is suitable for your model and wire size.

### Σ-7S SERVOPACKs for Use with Three-Phase, 200-VAC and DC Power Supply

| SERVOPACK<br>Model: SGD7S-                                 | Main<br>Circuit Ter-<br>minals                                                      | Screw<br>Size | Tightening<br>Torque<br>[N·m] | Crimp<br>Terminal<br>Horizontal<br>Width | Recom-<br>mended<br>Wire Size    | Crimp<br>Terminal<br>Model   | Crimping<br>Tool | Die              | Insulating<br>Sleeve<br>Model |
|------------------------------------------------------------|-------------------------------------------------------------------------------------|---------------|-------------------------------|------------------------------------------|----------------------------------|------------------------------|------------------|------------------|-------------------------------|
|                                                            |                                                                                     |               |                               |                                          |                                  | (From J.S.T. Mfg. Co., Ltd.) |                  |                  | (Tokyo Dip<br>Co., Ltd.)      |
| R70A, R90A,<br>1R6A, 2R8A,<br>3R8A, 5R5A,<br>7R6A, or 120A | Connector                                                                           | —             |                               |                                          |                                  |                              |                  |                  |                               |
|                                                            |    | M4            | 1.2 to 1.4                    | 10 mm<br>max.                            | AWG14<br>(2.0 mm <sup>2</sup> )  | R2-4                         | YHT-<br>2210     | —                | —                             |
| 180A or 200A                                               | Terminal<br>block                                                                   | M4            | 1.2 to 1.4                    | 7.7 mm<br>max.                           | AWG10<br>(5.5 mm <sup>2</sup> )  | 5.5-S4                       | YHT-<br>2210     | —                | TP-005                        |
|                                                            |                                                                                     |               |                               |                                          | AWG14<br>(2.0 mm <sup>2</sup> )  | 2-M4                         |                  | —                | TP-003                        |
|                                                            |                                                                                     |               |                               |                                          | AWG16<br>(1.25 mm <sup>2</sup> ) |                              |                  | —                |                               |
|                                                            |  | M4            | 1.2 to 1.4                    | 10 mm<br>max.                            | AWG14<br>(2.0 mm <sup>2</sup> )  | R2-4                         | YHT-<br>2210     | —                | —                             |
| 330A                                                       | Terminal<br>block                                                                   | M4            | 1.2 to 1.4                    | 9.9 mm<br>max.                           | AWG8<br>(8.0 mm <sup>2</sup> )   | 8-4NS                        | YPT-60N          | TD-121<br>TD-111 | TP-008                        |
|                                                            |                                                                                     |               |                               |                                          | AWG14<br>(2.0 mm <sup>2</sup> )  | R2-4                         | YHT-<br>2210     | —                | TP-003                        |
|                                                            |                                                                                     |               |                               |                                          | AWG16<br>(1.25 mm <sup>2</sup> ) |                              |                  | —                |                               |
|                                                            |  | M4            | 1.2 to 1.4                    | 10 mm<br>max.                            | AWG14<br>(2.0 mm <sup>2</sup> )  | R2-4                         | YHT-<br>2210     | —                | —                             |
| 470A or 550A                                               | Terminal<br>block                                                                   | M5            | 2.2 to 2.4                    | 13 mm<br>max.                            | AWG4<br>(22 mm <sup>2</sup> )    | 22-S5                        | YPT-60N          | TD-123<br>TD-112 | TP-022                        |
|                                                            |                                                                                     |               |                               |                                          | AWG6<br>(14 mm <sup>2</sup> )    | R14-5                        |                  | TD-122<br>TD-111 | TP-014                        |
|                                                            |                                                                                     |               |                               |                                          | AWG8<br>(8.0 mm <sup>2</sup> )   | R8-5                         |                  | TD-121<br>TD-111 | TP-008                        |
|                                                            |                                                                                     |               |                               |                                          | AWG10<br>(5.5 mm <sup>2</sup> )  | R5.5-5                       | YHT-<br>2210     | —                | TP-005                        |
|                                                            |                                                                                     |               |                               |                                          | AWG14<br>(2.0 mm <sup>2</sup> )  | R2-5                         |                  | —                | TP-003                        |
|                                                            |                                                                                     |               |                               |                                          | AWG16<br>(1.25 mm <sup>2</sup> ) |                              |                  | —                |                               |
|                                                            |  | M5            | 2.2 to 2.4                    | 12 mm<br>max.                            | AWG14<br>(2.0 mm <sup>2</sup> )  | R2-5                         | YHT-<br>2210     | —                | —                             |

Continued on next page.

## SERVOPACK Cables/Peripherals

### SERVOPACK Peripheral Devices

Continued from previous page.

| SERVOPACK<br>Model: SGD7S- | Main<br>Circuit Ter-<br>minals                                                    | Screw<br>Size | Tightening<br>Torque<br>[N·m] | Crimp<br>Terminal<br>Horizontal<br>Width | Recom-<br>mended<br>Wire Size    | Crimp<br>Terminal<br>Model   | Crimping<br>Tool | Die              | Insulating<br>Sleeve<br>Model |
|----------------------------|-----------------------------------------------------------------------------------|---------------|-------------------------------|------------------------------------------|----------------------------------|------------------------------|------------------|------------------|-------------------------------|
|                            |                                                                                   |               |                               |                                          |                                  | (From J.S.T. Mfg. Co., Ltd.) |                  |                  | (Tokyo Dip<br>Co., Ltd.)      |
| 590A or 780A               | Terminal<br>block                                                                 | M6            | 2.7 to 3.0                    | 18 mm<br>max.                            | AWG3<br>(30 mm <sup>2</sup> )    | 38-S6                        | YPT-60N          | TD-124<br>TD-112 | TP-038                        |
|                            |                                                                                   |               |                               |                                          | AWG4<br>(22 mm <sup>2</sup> )    | R22-6                        |                  | TD-123<br>TD-112 | TP-022                        |
|                            |                                                                                   |               |                               |                                          | AWG8<br>(8.0 mm <sup>2</sup> )   | R8-6                         |                  | TD-121<br>TD-111 | TP-008                        |
|                            |                                                                                   |               |                               |                                          | AWG10<br>(5.5 mm <sup>2</sup> )  | R5.5-6                       | YHT-<br>2210     | —                | TP-005                        |
|                            |                                                                                   |               |                               |                                          | AWG14<br>(2.0 mm <sup>2</sup> )  | R2-6                         |                  | —                | TP-003                        |
|                            |                                                                                   |               |                               |                                          | AWG16<br>(1.25 mm <sup>2</sup> ) |                              |                  | —                |                               |
|                            |  | M6            | 2.7 to 3.0                    | 12 mm<br>max.                            | AWG14<br>(2.0 mm <sup>2</sup> )  | R2-6                         | YHT-<br>2210     | —                | —                             |

### Σ-7S SERVOPACKs for Use with Single-Phase, 200-VAC Power Supply

| SERVOPACK<br>Model: SGD7S-            | Main<br>Circuit Ter-<br>minals                                                      | Screw<br>Size | Tightening<br>Torque<br>[N·m] | Crimp<br>Terminal<br>Horizontal<br>Width | Recom-<br>mended<br>Wire Size   | Crimp<br>Terminal<br>Model   | Crimping<br>Tool | Die | Insulating<br>Sleeve<br>Model |
|---------------------------------------|-------------------------------------------------------------------------------------|---------------|-------------------------------|------------------------------------------|---------------------------------|------------------------------|------------------|-----|-------------------------------|
|                                       |                                                                                     |               |                               |                                          |                                 | (From J.S.T. Mfg. Co., Ltd.) |                  |     | (Tokyo Dip<br>Co., Ltd.)      |
| R70A, R90A,<br>1R6A, 2R8A, or<br>5R5A | Connector                                                                           | —             |                               |                                          |                                 |                              |                  |     |                               |
|                                       |  | M4            | 1.2 to 1.4                    | 10 mm<br>max.                            | AWG14<br>(2.0 mm <sup>2</sup> ) | R2-4                         | YHT-<br>2210     | —   | —                             |

### Σ-7W SERVOPACKs for Use with Three-Phase, 200-VAC and DC Power Supply

| SERVOPACK<br>Model: SGD7W-   | Main<br>Circuit Ter-<br>minals                                                      | Screw<br>Size | Tightening<br>Torque<br>[N·m] | Crimp<br>Terminal<br>Horizontal<br>Width | Recom-<br>mended<br>Wire Size   | Crimp<br>Terminal<br>Model   | Crimping<br>Tool | Die | Insulating<br>Sleeve<br>Model |
|------------------------------|-------------------------------------------------------------------------------------|---------------|-------------------------------|------------------------------------------|---------------------------------|------------------------------|------------------|-----|-------------------------------|
|                              |                                                                                     |               |                               |                                          |                                 | (From J.S.T. Mfg. Co., Ltd.) |                  |     | (Tokyo Dip<br>Co., Ltd.)      |
| 1R6A, 2R8A,<br>5R5A, or 7R6A | Connector                                                                           | —             |                               |                                          |                                 |                              |                  |     |                               |
|                              |  | M4            | 1.2 to 1.4                    | 10 mm<br>max.                            | AWG14<br>(2.0 mm <sup>2</sup> ) | R2-4                         | YHT-<br>2210     | —   | —                             |

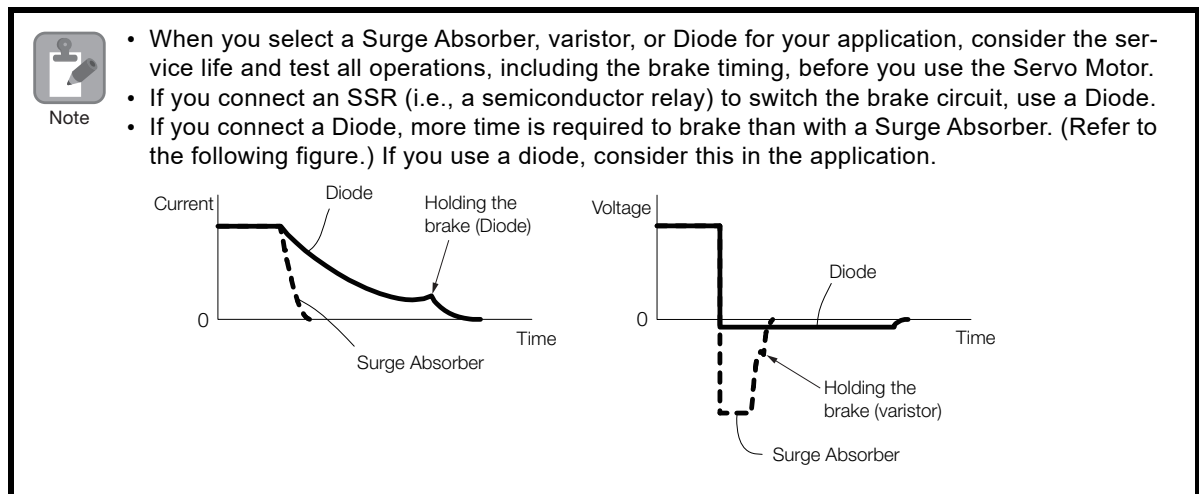
### Σ-7W SERVOPACKs for Use with Single-Phase, 200-VAC Power Supply

| SERVOPACK<br>Model: SGD7W- | Main<br>Circuit Ter-<br>minals                                                      | Screw<br>Size | Tightening<br>Torque<br>[N·m] | Crimp<br>Terminal<br>Horizontal<br>Width | Recom-<br>mended<br>Wire Size   | Crimp<br>Terminal<br>Model   | Crimping<br>Tool | Die | Insulating<br>Sleeve<br>Model |
|----------------------------|-------------------------------------------------------------------------------------|---------------|-------------------------------|------------------------------------------|---------------------------------|------------------------------|------------------|-----|-------------------------------|
|                            |                                                                                     |               |                               |                                          |                                 | (From J.S.T. Mfg. Co., Ltd.) |                  |     |                               |
| 1R6A, 2R8A, or<br>5R5A     | Connector                                                                           | —             |                               |                                          |                                 |                              |                  |     |                               |
|                            |  | M4            | 1.2 to 1.4                    | 10 mm<br>max.                            | AWG14<br>(2.0 mm <sup>2</sup> ) | R2-4                         | YHT-<br>2210     | —   | —                             |

## Surge Absorbers (Varistors) and Diodes for Holding Brake Power Supplies

Surge Absorbers (varistors) and Diodes for holding brake power supplies help prevent damage to brake coils caused by voltage surges.

If you use a Servo Motor with a Holding Brake and switch the brake power supply circuit on the DC side, connect a Surge Absorber (varistor) or Diode that is suitable for the brake power supply voltage and current.



### ◆ Surge Absorbers (Varistors) for Holding Brake Power Supplies

Use the following table as reference in selecting a Surge Absorber. Elements were selected for a Surge Absorber surrounding air temperature range of -20°C to 60°C and an ON/OFF switching frequency of 10 times or less per minute. The information in this table is for reference only, and does not ensure operation in combination with the holding brake.

| Holding Brake Power Supply Voltage |          | 24 VDC                       |                     |
|------------------------------------|----------|------------------------------|---------------------|
| Manufacturer                       |          | Nippon Chemi-Con Corporation | Semitec Corporation |
|                                    |          | Order Number                 |                     |
| Brake Rated Current                | 1 A max. | TNR5V121K                    | Z5D121              |
|                                    | 2 A max. | TNR7V121K                    | Z7D121              |
|                                    | 4 A max. | TNR10V121K                   | Z10D121             |
|                                    | 8 A max. | TNR14V121K                   | Z15D121             |

### ◆ Diodes for Holding Brake Power Supplies

Select a Diode for the holding brake power supply with a rated current that is greater than that of the holding brake and with the recommended withstand voltage given in the following table.

Diodes are not provided by Yaskawa.

| Holding Brake Power Supply Unit Specifications |               | Withstand Voltage |
|------------------------------------------------|---------------|-------------------|
| Rated Output Voltage                           | Input Voltage |                   |
| 24 VDC                                         | 200 V         | 100 V to 200 V    |

## Regenerative Resistors

### Types of Regenerative Resistors

The following regenerative resistors can be used.

- Built-in regenerative resistors: Some models of SERVOPACKs have regenerative resistors built into them.
- External regenerative resistors: These resistors are used when the smoothing capacitor and built-in regenerative resistor in the SERVOPACK cannot consume all of the regenerative power. Use Yaskawa's SigmaJunmaSize+, an AC Servo drive capacity selection program, to determine if a regenerative resistor is required.

Note: If you use an External Regenerative Resistor, you must change the setting of the Pn600 (Regenerative Resistor Capacity) or Pn603 (Regenerative Resistance) parameters.

### Selection Table

| SERVOPACK Model                          |                        | Built-In Regenerative Resistor | External Regenerative Resistor | Contents                                                                                                                                                                                                                                         |
|------------------------------------------|------------------------|--------------------------------|--------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| SGD7S-                                   | SGD7W-                 |                                |                                |                                                                                                                                                                                                                                                  |
| R70A, R90A, 1R6A, 2R8A                   | —                      | None                           | Basically not required         | There is no built-in regenerative resistor, but normally an external regenerative resistor is not required. Install an external regenerative resistor when the smoothing capacitor in the SERVOPACK cannot process all the regenerative power.*1 |
| 3R8A, 5R5A, 7R6A, 120A, 180A, 200A, 330A | 1R6A, 2R8A, 5R5A, 7R6A | Standard feature*2             | Basically not required         | A built-in regenerative resistor is provided as a standard feature. Install an external regenerative resistor when the built-in regenerative resistor cannot process all the regenerative power.*1                                               |
| 1R9D, 3R5D, 5R4D, 8R4D, 120D, 170D       | 2R6D, 5R4D             |                                |                                |                                                                                                                                                                                                                                                  |
| 470A, 550A, 590A, 780A                   | —                      | None                           | Required.*3                    | A built-in regenerative resistor is not provided. An External Regenerative Resistor is required. If the External Regenerative Resistor is not connected to the SERVOPACK, a Regeneration Alarm (A.300) will occur.                               |

\*1. Use Yaskawa's SigmaJunmaSize+, an AC Servo drive capacity selection program, to select an external regenerative resistor.

\*2. Refer to the following section for the specifications of built-in regenerative resistors.

 *Built-In Regenerative Resistor* (page 609)

\*3. Regenerative Resistor Units are available. Refer to the following sections for details.

 *Regenerative Resistor Units* (page 610)

## Built-In Regenerative Resistor

The following table gives the specifications of the built-in regenerative resistors in the SERVOPACKs and the amount of regenerative power (average values) that they can process.

| SERVOPACK Model        |            | Built-In Regenerative Resistor |                      | Regenerative Power Processing Capacity of Built-In Regenerative Resistor [W] | Minimum Allowable Resistance [Ω ] |
|------------------------|------------|--------------------------------|----------------------|------------------------------------------------------------------------------|-----------------------------------|
| SGD7S-                 | SGD7W-     | Resistance [Ω ]                | Capacity [W]         |                                                                              |                                   |
| R70A, R90A, 1R6A, 2R8A | —          | —                              | —                    | —                                                                            | 40                                |
| 3R8A, 5R5A, 7R6A       | 1R6A, 2R8A | 40                             | 40                   | 8                                                                            | 40                                |
| 120A                   | —          | 20                             | 60                   | 10                                                                           | 20                                |
| 180A, 200A             | 5R5A, 7R6A | 12                             | 60                   | 16                                                                           | 12                                |
| 330A                   | —          | 8                              | 180                  | 36                                                                           | 8                                 |
| 470A                   | —          | (6.25)* <sup>1</sup>           | (880)* <sup>1</sup>  | (180)* <sup>1</sup>                                                          | 5.8                               |
| 550A, 590A, 780A       | —          | (3.13)* <sup>2</sup>           | (1760)* <sup>2</sup> | (350)* <sup>2</sup>                                                          | 2.9                               |
| 1R9D, 3R5D             |            | 75                             | 70                   | 14                                                                           | 75                                |
| 5R4D                   |            |                                | 140                  | 28                                                                           |                                   |
| 8R4D, 120D             |            | 43                             |                      |                                                                              |                                   |
| 170D                   |            | 27                             | 180                  | 36                                                                           | 27                                |
|                        | 2R6D       | 43                             | 140                  | 28                                                                           | 43                                |
|                        | 5R4D       |                                |                      |                                                                              |                                   |

\*1. Values in parentheses are for the optional JUSP-RA04-E Regenerative Resistor Unit.

\*2. Values in parentheses are for the optional JUSP-RA05-E Regenerative Resistor Unit.

## External Regenerative Resistors (200 V Models)

| Model           | Specification                        | Inquiries                  | Manufacturer                    |
|-----------------|--------------------------------------|----------------------------|---------------------------------|
| RH120           | 70 W, 1 $\Omega$ to 100 $\Omega$     | Yaskawa Controls Co., Ltd. | Iwaki Musen Kenkyusho Co., Ltd. |
| RH150           | 90 W, 1 $\Omega$ to 100 $\Omega$     |                            |                                 |
| RH220 or RH220B | 120 W, 1 $\Omega$ to 100 $\Omega$    |                            |                                 |
| RH300C          | 200 W, 1 k $\Omega$ to 10 k $\Omega$ |                            |                                 |
| RH500           | 300 W, 2 $\Omega$ to 50 $\Omega$     |                            |                                 |

Note: 1. Consult Yaskawa Controls Co., Ltd. if you require a RoHS-compliant resistor.

2. Consult Yaskawa Controls Co., Ltd. for the model numbers and specifications of resistors with thermostats.

|       |            |                      |
|-------|------------|----------------------|
| RH120 | 10Ω        | J                    |
| Model | Resistance | Resistance Tolerance |
|       |            | Code                 |
|       |            | Specification        |
|       |            | K                    |
|       |            | ±10%                 |
|       |            | J                    |
|       |            | ±5%                  |
|       |            | H                    |
|       |            | +3%                  |

## External Regenerative Resistors (400 V Models)

| SERVOPACK Specification |      |                                                  | Resistor Specification |                    |              |              |
|-------------------------|------|--------------------------------------------------|------------------------|--------------------|--------------|--------------|
| SERVOPACK               |      | Minimum Allowable<br>External Resistance<br>[Ω ] | Model Resistor         | Resistance<br>[Ω ] | Power<br>[W] | Manufacturer |
| SGD7S-                  | 1R9D | 75                                               | RH-0520W120-UL-T       | 120                | 520          | Heine        |
|                         | 3R5D |                                                  |                        |                    |              |              |
|                         | 5R4D |                                                  |                        |                    |              |              |
|                         | 8R4D | 43                                               | RH-0400W045-UL-T       | 45                 | 400          |              |
|                         | 120D |                                                  |                        |                    |              |              |
|                         | 170D | 27                                               | RH-0400W032-UL-T       | 32                 |              |              |
|                         | 210D | 18                                               | RH-4800W022-10-UL-T    | 22                 | 1000         |              |
|                         | 260D |                                                  |                        |                    |              |              |
|                         | 280D | 14.25                                            |                        |                    |              |              |
|                         | 370D |                                                  |                        |                    |              |              |
| SGD7W-                  | 2R6D | 43                                               | RH-0400W045-UL-T       | 45                 | 400          |              |
|                         | 5R4D |                                                  |                        |                    |              |              |

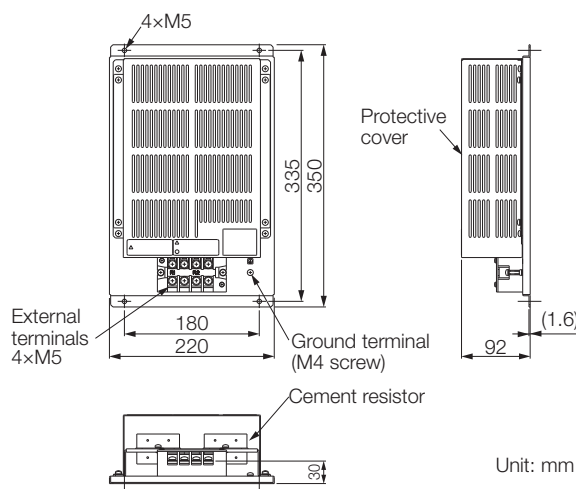
## Regenerative Resistor Units

| SERVOPACK Model:<br>SGD7S- | Regenerative Resistor Unit<br>Model | Specifications  | Allowable Power Loss |
|----------------------------|-------------------------------------|-----------------|----------------------|
| 470A                       | JUSP-RA04-E                         | 6.25 Ω, 880 W   | 180 W                |
| 550A, 590A, or 780A        | JUSP-RA05-E                         | 3.13 Ω, 1,760 W | 350 W                |

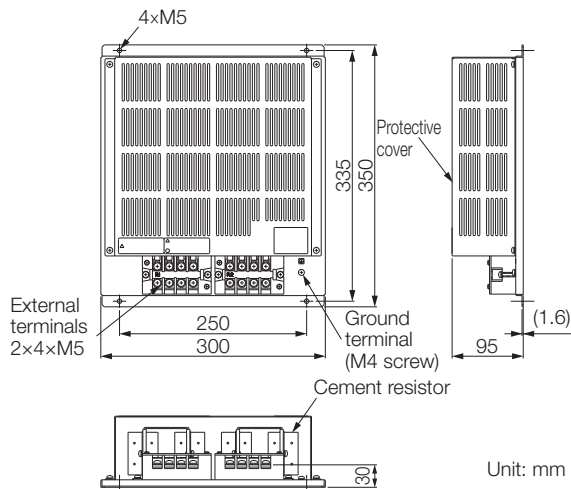
Note: If you use only the above Regenerative Resistor Units, you do not need to change the setting of the Pn600 (Regenerative Resistor Capacity) or Pn603 (Regenerative Resistance) parameters.

### ◆ External Dimensions

#### ■ JUSP-RA04-E



#### ■ JUSP-RA05-E



## Dynamic Brake Resistors

### Dynamic Brake Resistors for 400V SERVOPACKS

| SERVOPACK Specification |      | Resistor Specification                    |                |                |           |              |
|-------------------------|------|-------------------------------------------|----------------|----------------|-----------|--------------|
| SERVOPACK               |      | Minimum Allowable External Resistance [Ω] | Model Resistor | Resistance [Ω] | Power [W] | Manufacturer |
| SGD7S-                  | 1R9D | 20                                        | -              | -              | -         | -            |
|                         | 3R5D | 7.5                                       | -              | -              | -         | -            |
|                         | 5R4D |                                           | -              | -              | -         | -            |
|                         | 8R4D | 7.8                                       | -              | -              | -         | -            |
|                         | 120D | 4                                         | -              | -              | -         | -            |
|                         | 170D | 3.3                                       | -              | -              | -         | -            |
|                         | 210D | No integrated Dynamic Brake circuit       |                |                |           |              |
|                         | 260D |                                           |                |                |           |              |
|                         | 280D |                                           |                |                |           |              |
|                         | 370D |                                           |                |                |           |              |
| SGD7W-                  | 2R6D | 7.5                                       | -              | -              | -         | -            |
|                         | 5R4D |                                           | -              | -              | -         | -            |

Note: Contact you Yaskawa representative for information on Sigma-7 400V Dynamic Brake Resistors.

Calculate the energy that must be consumed by the resistance for one dynamic brake stop. To simplify the energy consumption calculation, assume that all the kinetic energy until the Servomotor stops is consumed by the dynamic brake resistor and use the following formula.

Out of all possible operation patterns, use the one which maximizes the kinetic energy of the Servomotor.

#### Rotary Servomotors

$$E_{DB} = \frac{1}{2} \times (J_M + J_L) \times \left( \frac{2\pi}{60} \times N \right)^2$$

Energy consumption of the dynamic brake resistor: EDB [J]

Motor moment of inertia\*: JM [kgm<sup>2</sup>]

Load inertia: JL [kgm<sup>2</sup>]

Motor speed just before stopping with the dynamic brake: N [min<sup>-1</sup>]

\* For detailed information on the motor moment of inertia, refer to the catalog or Servomotor product manual.

#### Linear Servomotors

$$E_{DB} = \frac{1}{2} \times (m_M + m_L) \times v^2$$

Energy consumption of the dynamic brake resistor: EDB [J]

Moving Coil mass\*: mM [kg]

Load mass: mL [kg]

Motor speed just before stopping with the dynamic brake: v [m/s]

\* For detailed information on Moving Coil mass, refer to the catalog or Servomotor product manual.

## Batteries for Servo Motor with Absolute Encoders

If you use an absolute encoder, you can use an Encoder Cable with a Battery Case connected to it to supply power and retain the absolute position data.

You can also retain the absolute position data by supplying power from a battery on the host controller.

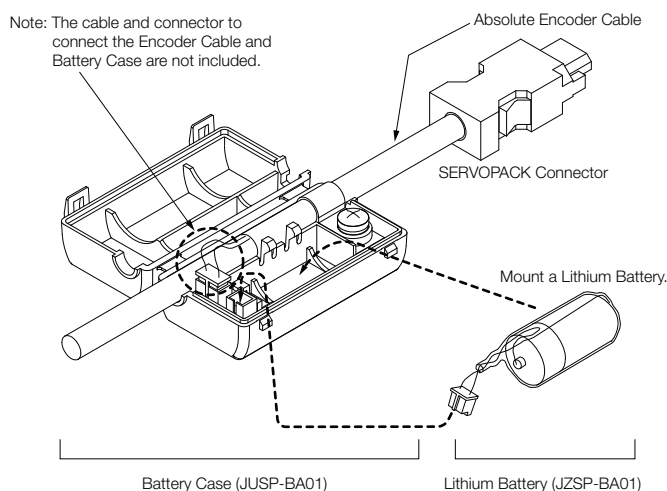
The Battery Case is sold as a replacement part for the Battery Case that is included with an Absolute Encoder Cable.

| Name                     | Order Number | Remarks                                                                                                     |
|--------------------------|--------------|-------------------------------------------------------------------------------------------------------------|
| Battery Case (case only) | JUSP-BA01    | The Encoder Cable and Battery are not included.<br>(This is a replacement part for a damaged Battery Case.) |
| Lithium Battery          | JZSP-BA01    | This is a special battery that mounts into the Battery Case.                                                |



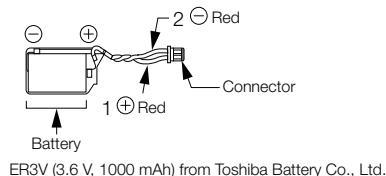
Important

1. You cannot attach the Battery Case to an Incremental Encoder Cable.
2. Install the Battery Case where the surrounding air temperature is between -5°C and 60°C.



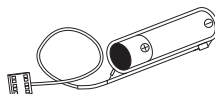
### ◆ Mounting a Battery in the Battery Case

Obtain a Lithium Battery (JZSP-BA01) and mount it in the Battery Case.



### ◆ Connecting a Battery to the Host Controller

Use a battery that meets the specifications of the host controller. Use an ER6VC3N Battery (3.6 V, 2,000 mAh) from Toshiba Battery Co., Ltd. or an equivalent battery.





## Current Suppression Devices

Inrush current suppression devices prevent equipment from being damaged by inrush current.

They are used only when using a SERVOPACK of 5 kW or higher (SGD7S-330A, -470A, -550A, -590A, or -780A) with a DC power supply input.

### Selection Table

#### ◆ External Inrush Current Suppression Resistors

| Main<br>Circuit<br>Power<br>Supply | SERVO-<br>PACK Model:<br>SGD7S- | External Inrush Current<br>Suppression Resistor |                        |                       | Manufacturer                          | Inquiries                       |  |  |  |
|------------------------------------|---------------------------------|-------------------------------------------------|------------------------|-----------------------|---------------------------------------|---------------------------------|--|--|--|
|                                    |                                 | Order Num-<br>ber                               | Resis-<br>tance<br>[Ω] | Rated<br>Power<br>[W] |                                       |                                 |  |  |  |
| 270 VDC                            | 330A                            | RH120-5ΩJ                                       | 5                      | 70                    | Iwaki Musen<br>Kenkyusho<br>Co., Ltd. | Yaskawa<br>Controls<br>Co.,Ltd. |  |  |  |
|                                    | 470A                            |                                                 |                        |                       |                                       |                                 |  |  |  |
|                                    | 550A                            |                                                 |                        |                       |                                       |                                 |  |  |  |
|                                    | 590A                            | RH120-3ΩJ                                       | 3                      |                       |                                       |                                 |  |  |  |
|                                    | 780A                            |                                                 |                        |                       |                                       |                                 |  |  |  |

#### ◆ Inrush Current Suppression Resistor Short Relays

| Main Circuit Power Supply | SERVO-PACK Model: SGD7S- | Main Circuit DC Current [Amps] | Contact Specification | Recommended Inrush Current Suppression Resistor Short Relay |                      |                    | Manufacturer      |
|---------------------------|--------------------------|--------------------------------|-----------------------|-------------------------------------------------------------|----------------------|--------------------|-------------------|
|                           |                          |                                |                       | Model                                                       | Voltage Rating [Vdc] | Current Rating [A] |                   |
| 270 VDC                   | 330A                     | 34                             | NO                    | G9EA-1-B                                                    | 400                  | 60                 | OMRON Corporation |
|                           | 470A                     | 36                             |                       | G9EA-1-B-CA                                                 |                      | 100                |                   |
|                           | 550A                     | 48                             |                       | G9EA-1-B-CA <sup>*1</sup>                                   |                      | 200                |                   |
|                           | 590A                     | 68                             |                       | G9EC-1-B <sup>*2</sup>                                      |                      |                    |                   |
|                           | 780A                     | 92                             |                       |                                                             |                      |                    |                   |

\*1. Connect two Relays in parallel. Also, maintain the same resistance between the DC power supply and SERVOPACK for the wiring for each Relay.

\*2. This Relay is applicable only when the temperature of the Relay installation environment is 50°C or less.

## Software

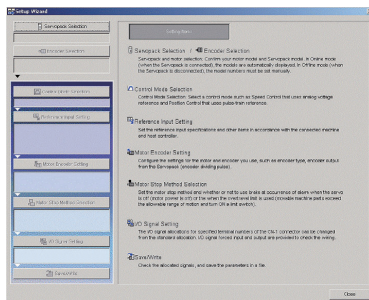
### SigmaWin+: AC Servo Drive Engineering Tool

The SigmaWin+ Engineering Tool is used to set up and optimally tune Yaskawa  $\Sigma$ -series Servo Drives.

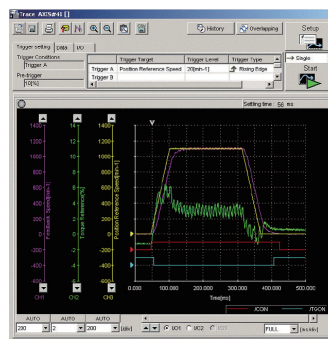
#### ◆ Features

- Set parameters with a wizard.
- Display SERVOPACK data on a computer just like you would on an oscilloscope.
- Estimate moments of inertia and measure vibration frequencies.
- Display alarms and alarm diagnostics.

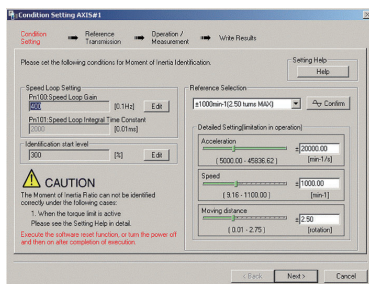
#### Setting Parameters with a Wizard



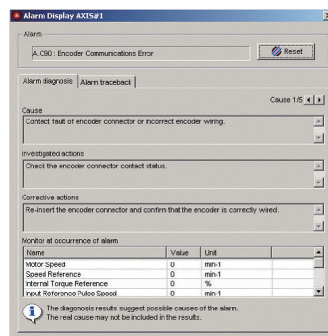
#### Displaying SERVOPACK Data on a Computer Just Like You Would on an Oscilloscope



#### Estimating Moments of Inertia and Measuring Vibration Frequencies



#### Displaying Alarms and Alarm Diagnostics



#### ◆ System Requirements

| Item                      | System Requirement                                                                  |
|---------------------------|-------------------------------------------------------------------------------------|
| Supported Languages       | English and Japanese                                                                |
| OS                        | Windows XP, Windows Vista, or Windows 7 (32-bit or 64-bit edition)                  |
| CPU                       | Pentium 200 MHz min.                                                                |
| Memory                    | 64 MB min. (96 MB or greater recommended)                                           |
| Available Hard Disk Space | For Standard Setup:<br>350 MB min. (400 MB or greater recommended for installation) |

# Appendices

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# Capacity Selection for Servo Motors

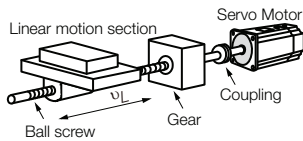
## Selecting the Servo Motor Capacity

Use Yaskawa's SigmaJunmaSize+, an AC servo drive capacity selection program, to select the Servo Motor capacity. With the SigmaJunmaSize+, you can find the optimum Servo Motor capacity by simply selecting and entering information according to instructions from a wizard.

Refer to the following selection examples to select Servo Motor capacities with manual calculations rather than with the above software.

## Capacity Selection Example for a Rotary Servo Motor: For Speed Control

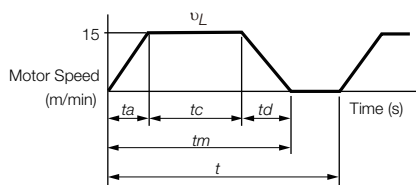
### 1. Mechanical Specifications



| Item                                    | Code     | Value                             |
|-----------------------------------------|----------|-----------------------------------|
| Load Speed                              | $v_L$    | 15 m/min                          |
| Linear Motion Section Mass              | $m$      | 250 kg                            |
| Ball Screw Length                       | $\ell_B$ | 1.0 m                             |
| Ball Screw Diameter                     | $d_B$    | 0.02 m                            |
| Ball Screw Lead                         | $P_B$    | 0.01 m                            |
| Ball Screw Material Density             | $\rho$   | $7.87 \times 10^3 \text{ kg/m}^3$ |
| Gear Ratio                              | $R$      | 2 (gear ratio: 1/2)               |
| External Force on Linear Motion Section | $F$      | 0 N                               |

| Item                                | Code   | Value                                           |
|-------------------------------------|--------|-------------------------------------------------|
| Gear and Coupling Moment of Inertia | $J_G$  | $0.40 \times 10^{-4} \text{ kg}\cdot\text{m}^2$ |
| Number of Feeding Operations        | $n$    | 40 operations/min                               |
| Feeding Distance                    | $\ell$ | 0.275 m                                         |
| Feeding Time                        | $tm$   | 1.2 s max.                                      |
| Friction Coefficient                | $\mu$  | 0.2                                             |
| Mechanical Efficiency               | $\eta$ | 0.9 (90%)                                       |

### 2. Operation Pattern



$$t = \frac{60}{n} = \frac{60}{40} = 1.5 \text{ (s)}$$

$$\text{If } ta = td,$$

$$ta = tm - \frac{60 \ell}{v_L} = 1.2 - \frac{60 \times 0.275}{15} = 1.2 - 1.1 = 0.1 \text{ (s)}$$

$$tc = 1.2 - 0.1 \times 2 = 1.0 \text{ (s)}$$

### 3. Motor Speed

- Load shaft speed  $n_L = \frac{v_L}{P_B} = \frac{15}{0.01} = 1,500 \text{ (min}^{-1}\text{)}$

- Motor shaft speed  $n_M = n_L \cdot R = 1,500 \times 2 = 3,000 \text{ (min}^{-1}\text{)}$

### 4. Load Torque

$$T_L = \frac{(9.8 \cdot \mu \cdot m + F) \cdot P_B}{2\pi R \cdot \eta} = \frac{(9.8 \times 0.2 \times 250 + 0) \times 0.01}{2\pi \times 2 \times 0.9} = 0.43 \text{ (N}\cdot\text{m)}$$

## 5. Load Moment of Inertia

- Linear motion section

$$J_{L1} = m \left( \frac{P_B}{2\pi R} \right)^2 = 250 \times \left( \frac{0.01}{2\pi \times 2} \right)^2 = 1.58 \times 10^{-4} \text{ (kg}\cdot\text{m}^2\text{)}$$

- Ball screw

$$J_B = \frac{\pi}{32} \rho \cdot \ell_B \cdot d_B^4 \cdot \frac{1}{R^2} = \frac{\pi}{32} \times 7.87 \times 10^3 \times 1.0 \times (0.02)^4 \cdot \frac{1}{2^2} = 0.31 \times 10^{-4} \text{ (kg}\cdot\text{m}^2\text{)}$$

- Coupling  $J_G = 0.40 \times 10^{-4} \text{ (kg}\cdot\text{m}^2\text{)}$
- Load moment of inertia at motor shaft

$$J_L = J_{L1} + J_B + J_G = (1.58 + 0.31 + 0.40) \times 10^{-4} = 2.29 \times 10^{-4} \text{ (kg}\cdot\text{m}^2\text{)}$$

## 6. Load Moving Power

$$P_O = \frac{2\pi n_M \cdot T_L}{60} = \frac{2\pi \times 3,000 \times 0.43}{60} = 135 \text{ (W)}$$

## 7. Load Acceleration Power

$$P_a = \left( \frac{2\pi}{60} n_M \right)^2 \frac{J_L}{t_a} = \left( \frac{2\pi}{60} \times 3,000 \right)^2 \times \frac{2.29 \times 10^{-4}}{0.1} = 226 \text{ (W)}$$

## 8. Servo Motor Provisional Selection

### ① Selection Conditions

- $T_L \leq$  Motor rated torque
- $\frac{(P_O + P_a)}{2} <$  Provisionally selected Servo Motor rated output  $< (P_O + P_a)$
- $n_M \leq$  Rated motor speed
- $J_L \leq$  Allowable load moment of inertia

The following Servo Motor meets the selection conditions.

- SGM7J-02A Servo Motor

### ② Specifications of the Provisionally Selected Servo Motor

| Item                             | Value                                                                                     |
|----------------------------------|-------------------------------------------------------------------------------------------|
| Rated Output                     | 200 (W)                                                                                   |
| Rated Motor Speed                | 3,000 (min <sup>-1</sup> )                                                                |
| Rated Torque                     | 0.637 (N·m)                                                                               |
| Instantaneous Maximum Torque     | 2.23 (N·m)                                                                                |
| Motor Moment of Inertia          | $0.263 \times 10^{-4} \text{ (kg}\cdot\text{m}^2\text{)}$                                 |
| Allowable Load Moment of Inertia | $0.263 \times 10^{-4} \times 15 = 3.94 \times 10^{-4} \text{ (kg}\cdot\text{m}^2\text{)}$ |

## 9. Verification of the Provisionally Selected Servo Motor

- Verification of required acceleration torque:

$$T_P = \frac{2\pi n_M (J_M + J_L)}{60 t_a} + T_L = \frac{2\pi \times 3,000 \times (0.263 + 2.29) \times 10^{-4}}{60 \times 0.1} + 0.43$$

$$\approx 1.23 \text{ (N}\cdot\text{m)} < \text{Maximum instantaneous torque...Satisfactory}$$

- Verification of required deceleration torque:

$$T_S = \frac{2\pi n_M (J_M + J_L)}{60 t_d} - T_L = \frac{2\pi \times 3,000 \times (0.263 + 2.29) \times 10^{-4}}{60 \times 0.1} - 0.43$$

$$\approx 0.37 \text{ (N}\cdot\text{m)} < \text{Maximum instantaneous torque...Satisfactory}$$

## Appendices

### Capacity Selection for Servo Motors

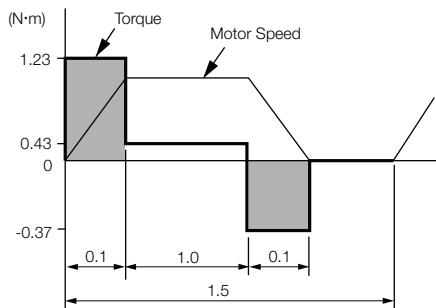
- Verification of effective torque value:

$$T_{rms} = \sqrt{\frac{T_P^2 \cdot t_a + T_L^2 \cdot t_c + T_S^2 \cdot t_d}{t}} = \sqrt{\frac{(1.23)^2 \times 0.1 + (0.43)^2 \times 1.0 + (0.37)^2 \times 0.1}{1.5}}$$

$$\approx 0.483 \text{ (N}\cdot\text{m)} < \text{Rated torque...Satisfactory}$$

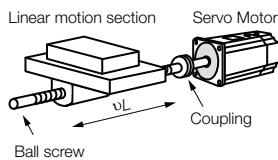
## 10. Result

It has been verified that the provisionally selected Servo Motor is applicable.  
The torque diagram is shown below.



## Capacity Selection Example for a Rotary Servo Motor: For Position Control

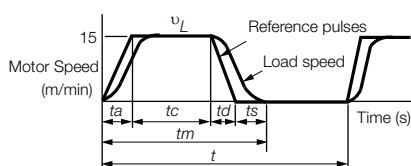
### 1. Mechanical Specifications



| Item                                    | Code     | Value                             |
|-----------------------------------------|----------|-----------------------------------|
| Load Speed                              | $v_L$    | 15 m/min                          |
| Linear Motion Section Mass              | $m$      | 80 kg                             |
| Ball Screw Length                       | $\ell_B$ | 0.8 m                             |
| Ball Screw Diameter                     | $d_B$    | 0.016 m                           |
| Ball Screw Lead                         | $P_B$    | 0.005 m                           |
| Ball Screw Material Density             | $\rho$   | $7.87 \times 10^3 \text{ kg/m}^3$ |
| External Force on Linear Motion Section | $F$      | 0 N                               |
| Coupling Mass                           | $m_C$    | 0.3 kg                            |

| Item                          | Code     | Value                 |
|-------------------------------|----------|-----------------------|
| Coupling Outer Diameter       | $d_C$    | 0.03 m                |
| Number of Feeding Operations  | $n$      | 40 rotation/min       |
| Feeding Distance              | $\ell$   | 0.25 m                |
| Feeding Time                  | $tm$     | 1.2 s max.            |
| Electrical Stopping Precision | $\delta$ | $\pm 0.01 \text{ mm}$ |
| Friction Coefficient          | $\mu$    | 0.2                   |
| Mechanical Efficiency         | $\eta$   | 0.9 (90%)             |

### 2. Speed Diagram



$$t = \frac{60}{n} = \frac{60}{40} = 1.5 \text{ (s)}$$

If  $t_a = t_d$  and  $t_s = 0.1 \text{ (s)}$ ,

$$t_a = tm - t_s - \frac{60 \ell}{v_L} = 1.2 - 0.1 - \frac{60 \times 0.25}{15} = 0.1 \text{ (s)}$$

$$t_c = 1.2 - 0.1 - 0.1 \times 2 = 0.9 \text{ (s)}$$

### 3. Motor Speed

- Load shaft speed  $n_L = \frac{v_L}{P_B} = \frac{15}{0.005} = 3,000 \text{ (min}^{-1}\text{)}$
- Motor shaft speed Direct coupling gear ratio  $1/R = 1/1$   
Therefore,  $n_M = n_L \cdot R = 3,000 \times 1 = 3,000 \text{ (min}^{-1}\text{)}$

### 4. Load Torque

$$T_L = \frac{(9.8 \mu \cdot m + F) \cdot P_B}{2\pi R \cdot \eta} = \frac{(9.8 \times 0.2 \times 80 + 0) \times 0.005}{2\pi \times 1 \times 0.9} = 0.139 \text{ (N}\cdot\text{m)}$$

### 5. Load Moment of Inertia

- Linear motion section

$$J_{L1} = m \left( \frac{P_B}{2\pi R} \right)^2 = 80 \times \left( \frac{0.005}{2\pi \times 1} \right)^2 = 0.507 \times 10^{-4} \text{ (kg}\cdot\text{m}^2\text{)}$$

- Ball screw  $J_B = \frac{\pi}{32} \rho \cdot \ell_B \cdot d_B^4 = \frac{\pi}{32} \times 7.87 \times 10^3 \times 0.8 \times (0.016)^4 = 0.405 \times 10^{-4} \text{ (kg}\cdot\text{m}^2\text{)}$

- Coupling  $J_C = \frac{1}{8} m_C \cdot d_C^2 = \frac{1}{8} \times 0.3 \times (0.03)^2 = 0.338 \times 10^{-4} \text{ (kg}\cdot\text{m}^2\text{)}$

- Load moment of inertia at motor shaft

$$J_L = J_{L1} + J_B + J_C = 1.25 \times 10^{-4} \text{ (kg}\cdot\text{m}^2\text{)}$$

### 6. Load Moving Power

$$P_O = \frac{2\pi n_M \cdot T_L}{60} = \frac{2\pi \times 3,000 \times 0.139}{60} = 43.7 \text{ (W)}$$

### 7. Load Acceleration Power

$$P_a = \left( \frac{2\pi}{60} n_M \right)^2 \frac{J_L}{ta} = \left( \frac{2\pi}{60} \times 3,000 \right)^2 \times \frac{1.25 \times 10^{-4}}{0.1} = 123.4 \text{ (W)}$$

### 8. Servo Motor Provisional Selection

#### ① Selection Conditions

- $T_L \leq$  Motor rated torque
- $\frac{(P_O + P_a)}{2} <$  Provisionally selected Servo Motor rated output  $< (P_O + P_a)$
- $n_M \leq$  Rated motor speed
- $J_L \leq$  Allowable load moment of inertia

The following Servo Motor meets the selection conditions.

- SGM7J-01A Servo Motor

#### ② Specifications of the Provisionally Selected Servo Motor

| Item                             | Value                                                                         |
|----------------------------------|-------------------------------------------------------------------------------|
| Rated Output                     | 100 (W)                                                                       |
| Rated Motor Speed                | 3,000 (min <sup>-1</sup> )                                                    |
| Rated Torque                     | 0.318 (N·m)                                                                   |
| Instantaneous Maximum Torque     | 1.11 (N·m)                                                                    |
| Motor Moment of Inertia          | 0.0659 × 10 <sup>-4</sup> (kg·m <sup>2</sup> )                                |
| Allowable Load Moment of Inertia | 0.0659 × 10 <sup>-4</sup> × 35 = 2.31 × 10 <sup>-4</sup> (kg·m <sup>2</sup> ) |
| Encoder Resolution               | 16,777,216 pulses/rev [24 bits]                                               |

## 9. Verification of the Provisionally Selected Servo Motor

- Verification of required acceleration torque:

$$T_P = \frac{2\pi n_M (J_M + J_L)}{60ta} + T_L = \frac{2\pi \times 3,000 \times (0.0659 + 1.25) \times 10^{-4}}{60 \times 0.1} + 0.139$$

$$\approx 0.552 \text{ (N}\cdot\text{m)} < \text{Maximum instantaneous torque...Satisfactory}$$

- Verification of required deceleration torque:

$$T_S = \frac{2\pi n_M (J_M + J_L)}{60td} - T_L = \frac{2\pi \times 3,000 \times (0.0659 + 1.25) \times 10^{-4}}{60 \times 0.1} - 0.139$$

$$\approx 0.274 \text{ (N}\cdot\text{m)} < \text{Maximum instantaneous torque...Satisfactory}$$

- Verification of effective torque value:

$$T_{rms} = \sqrt{\frac{T_P^2 \cdot ta + T_L^2 \cdot tc + T_S^2 \cdot td}{t}} = \sqrt{\frac{(0.552)^2 \times 0.1 + (0.139)^2 \times 0.9 + (0.274)^2 \times 0.1}{1.5}}$$

$$\approx 0.192 \text{ (N}\cdot\text{m)} < \text{Rated torque...Satisfactory}$$

It has been verified that the provisionally selected Servo Motor is applicable in terms of capacity. Position control is considered next.

## 10. Positioning Resolution

The electrical stopping precision  $\delta$  is  $\pm 0.01$  mm, so the positioning resolution  $\Delta_\ell$  is 0.01 mm.

The ball screw lead  $P_B$  is 0.005 m, so the number of pulses per motor rotation is calculated with the following formula.

$$\text{The number of pulses per revolution (pulses)} = \frac{P_B}{\Delta_\ell} = \frac{5 \text{ mm/rev}}{0.01 \text{ mm}} = 500 \text{ (pulses/rev)} < \text{Encoder resolution [16777216 (pulses/rev)]}$$

The number of pulses per motor rotation is less than the encoder resolution (pulses/rev), so the provisionally selected Servo Motor can be used.

## 11. Reference Pulse Frequency

The load speed  $v_L$  is 15 m/min, or  $1,000 \times 15/60$  mm/s and the positioning resolution (travel distance per pulse) is 0.01 mm/pulse, so the reference pulse frequency is calculated with the following formula.

$$v_s = \frac{1,000 v_L}{60 \times \Delta_\ell} = \frac{1,000 \times 15}{60 \times 0.01} = 25,000 \text{ (pps)}$$

The reference pulse frequency is less than the maximum input pulse frequency,\* so the provisionally selected Servo Motor can be used.

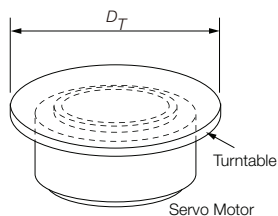
\*Refer to the specifications in the SERVOPACK manual for the maximum input pulse frequency.

It has been verified that the provisionally selected Servo Motor is applicable for position control.



## Capacity Selection Example for Direct Drive Servo Motors

### 1. Mechanical Specifications

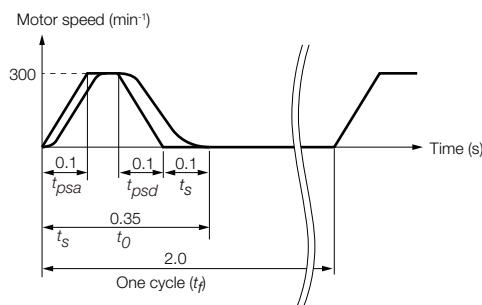


| Item                          | Code     | Value   | Item                                  | Code                                | Value |
|-------------------------------|----------|---------|---------------------------------------|-------------------------------------|-------|
| Turntable Mass                | $w$      | 12 kg   | Acceleration/<br>Deceleration<br>Time | $t_p$<br>$= t_{psa}$<br>$= t_{psd}$ | 0.1 s |
| Turntable<br>Diameter         | $D_T$    | 300 mm  | Operating<br>Frequency                | $t_f$                               | 2 s   |
| Rotational Angle<br>per Cycle | $\theta$ | 270 deg | Load Torque                           | $T_L$                               | 0 N·m |
| Positioning Time              | $t_0$    | 0.35 s  | Settling Time                         | $t_s$                               | 0.1 s |

### 2. Motor Speed of Direct Drive Servo Motor

$$N_O = \frac{\theta}{360} \times \frac{60}{(t_0 - t_p - t_s)} = \frac{270}{360} \times \frac{60}{(0.35 - 0.1 - 0.1)} = 300 \text{ (min}^{-1}\text{)}$$

### 3. Operation Pattern



### 4. Load Moment of Inertia

$$J_L = \frac{1}{8} \times D_T^2 \times W = \frac{1}{8} \times (300 \times 10^{-3})^2 \times 12 = 0.135 \text{ (kg} \cdot \text{m}^2\text{)}$$

### 5. Load Acceleration/Deceleration Torque

$$T_a = J_L \times 2\pi \times \frac{N_O/60}{t_p} = 0.135 \times 2\pi \times \frac{300/60}{0.1} = 42.4 \text{ (N} \cdot \text{m)}$$

### 6. Provisional Selection of Direct Drive Servo Motor

#### ① Selection Conditions

- Load acceleration/deceleration torque < Instantaneous maximum torque of Direct Drive Servo Motor
- Load moment of inertia < Allowable load moment of inertia ratio ( $J_R$ ) × Moment of inertia of Direct Drive Servo Motor ( $J_M$ )

The following Servo Motor meets the selection conditions.

- SGMCV-17CEA11

#### ② Specifications of the Provisionally Selected Servo Motor

| Item                         | Value    |
|------------------------------|----------|
| Rated Torque                 | 17 (N·m) |
| Instantaneous Maximum Torque | 51 (N·m) |

## Appendices

### Capacity Selection for Servo Motors

| Item                                             | Value                        |
|--------------------------------------------------|------------------------------|
| Moment of Inertia ( $J_M$ )                      | 0.00785 (kg·m <sup>2</sup> ) |
| Allowable Load Moment of Inertia Ratio ( $J_R$ ) | 25                           |

#### 7. Verification of the Provisionally Selected Servo Motor

- Verification of required acceleration torque:

$$T_{Ma} = \frac{(J_L + J_M) \times N_O}{9.55 \times t_{psa}} = \frac{(0.135 + 0.00785) \times 300}{9.55 \times 0.1}$$

$$\approx 44.9 \text{ (N·m)} < \text{Maximum instantaneous torque...Satisfactory}$$

- Verification of required deceleration torque:

$$T_{Md} = -\frac{(J_L + J_M) \times N_O}{9.55 \times t_{psd}} = -\frac{(0.135 + 0.00785) \times 300}{9.55 \times 0.1}$$

$$\approx -44.9 \text{ (N·m)} < \text{Maximum instantaneous torque...Satisfactory}$$

- Verification of effective torque value:

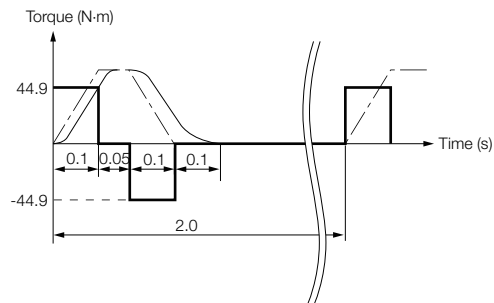
$$T_{rms} = \sqrt{\frac{T_{Ma}^2 \times t_{psa} + T_L^2 \times t_c + T_{Md}^2 \times t_{psd}}{t_f}} = \sqrt{\frac{44.9^2 \times 0.1 + 0^2 \times 0.05 + (-44.9)^2 \times 0.1}{2}}$$

$$\approx 14.2 \text{ (N·m)} < \text{Rated torque...Satisfactory}$$

$$t_c = \text{Time of constant motor speed} = t_0 - t_s - t_{psa} - t_{psd}$$

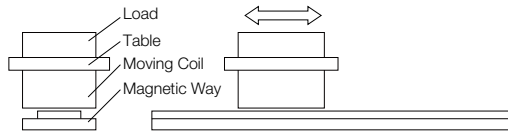
#### 8. Result

It has been verified that the provisionally selected Servo Motor is applicable.  
The torque diagram is shown below.



## Servo Motor Capacity Selection Example for Linear Servo Motors

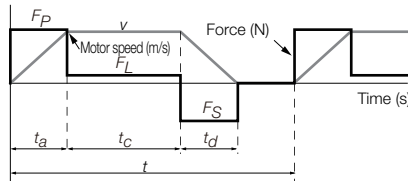
### 1. Mechanical Specifications



| Item                 | Code  | Value  |
|----------------------|-------|--------|
| Load Mass            | $m_W$ | 1 kg   |
| Table Mass           | $m_T$ | 2 kg   |
| Motor Speed          | $v$   | 2 m/s  |
| Feeding Distance     | $l$   | 0.76 m |
| Friction Coefficient | $\mu$ | 0.2    |

| Item                                    | Code  | Value  |
|-----------------------------------------|-------|--------|
| Acceleration Time                       | $t_a$ | 0.02 s |
| Constant-speed Time                     | $t_c$ | 0.36 s |
| Deceleration Time                       | $t_d$ | 0.02 s |
| Cycle Time                              | $t$   | 0.5 s  |
| External Force on Linear Motion Section | $F$   | 0 N    |

### 2. Operation Pattern



### 3. Steady-State Force (Excluding Servo Motor Moving Coil)

$$F_L = \{9.8 \times \mu \times (m_W + m_T)\} + F = 9.8 \times 0.2 \times (1 + 2) + 0 = 5.88 \text{ (N)}$$

### 4. Acceleration Force (Excluding Servo Motor Moving Coil)

$$F_P = (m_W + m_T) \times \frac{v}{t_a} + F_L = (1 + 2) \times \frac{2}{0.02} + 5.88 = 305.88 \text{ (N)}$$

### 5. Provisional Selection of Linear Servo Motor

#### ① Selection Conditions

- $F_P \leq \text{Maximum force} \times 0.9$
- $F_S \leq \text{Maximum force} \times 0.9$
- $F_{rms} \leq \text{Rated force} \times 0.9$

The following Servo Motor Moving Coil and Magnetic Way meet the selection conditions.

- SGLGW-60A253CP Linear Servo Motor Moving Coil
- SGLGM-60□□□C Linear Servo Motor Magnetic Way

#### ② Specifications of the Provisionally Selected Servo Motor

| Item                                          | Value     |
|-----------------------------------------------|-----------|
| Maximum Force                                 | 440 (N)   |
| Rated Force                                   | 140 (N)   |
| Moving Coil Mass ( $m_M$ )                    | 0.82 (kg) |
| Servo Motor Magnetic Attraction ( $F_{att}$ ) | 0 (N)     |

## 6. Verification of the Provisionally Selected Servo Motor

- Steady-State Force

$$F_L = \mu \{9.8 \times (m_W + m_T + m_M) + F_{att}\} = 0.2 \{9.8 \times (1 + 2 + 0.82) + 0\} = 7.5 \text{ (N)}$$

- Verification of Acceleration Force

$$F_P = (m_W + m_T + m_M) \times \frac{v}{t_a} + F_L = (1 + 2 + 0.82) \times \frac{2}{0.02} + 7.5$$

$$= 389.5 \text{ (N)} \leq \text{Maximum force} \times 0.9 (= 396 \text{ N}) \dots \text{Satisfactory}$$

- Verification of Deceleration Force

$$F_S = (m_W + m_T + m_M) \times \frac{v}{t_d} - F_L = (1 + 2 + 0.82) \times \frac{2}{0.02} - 7.5$$

$$= 374.5 \text{ (N)} \leq \text{Maximum force} \times 0.9 (= 396 \text{ N}) \dots \text{Satisfactory}$$

- Verification of Effective Force

$$F_{rms} = \sqrt{\frac{F_P^2 \cdot t_a + F_L^2 \cdot t_c + F_S^2 \cdot t_d}{t}} = \sqrt{\frac{389.5^2 \times 0.02 + 7.5^2 \times 0.36 + 374.5^2 \times 0.02}{0.5}}$$

$$= 108.3 \text{ (N)} \leq \text{Rated force} \times 0.9 (= 132.3 \text{ N}) \dots \text{Satisfactory}$$

## 7. Result

It has been verified that the provisionally selected Servo Motor is applicable.



# Capacity Selection for Regenerative Resistors

If the regenerative power exceeds the amount that can be absorbed by charging the smoothing capacitor, a regenerative resistor is used.

## Regenerative Power and Regenerative Resistance

The rotational energy of a driven machine such as a Servo Motor that is returned to the SERVOPACK is called regenerative power. The regenerative power is absorbed by charging a smoothing capacitor. When the regenerative power exceeds the capacity of the capacitor, it is consumed by a regenerative resistor. (This is called resistance regeneration.)

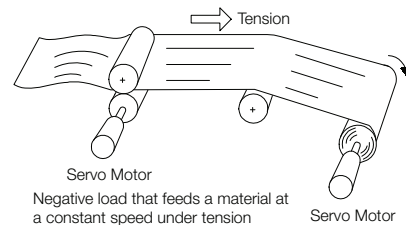
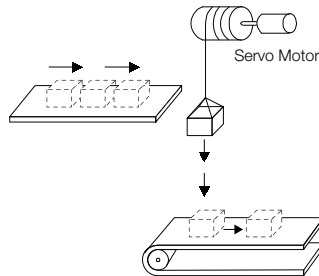
The Servo Motor is driven in a regeneration state in the following circumstances:

- While decelerating to a stop during acceleration/deceleration operation.
- While performing continuous downward operation on a vertical axis.
- During continuous operation in which the Servo Motor is rotated by the load (i.e., a negative load).



You cannot use the resistance regeneration provided by the SERVOPACK for continuous regeneration. For continuous operation with a negative load, you must design a system that also includes a Power Regenerative Converter or Power Regenerative Unit (for example, Yaskawa model D1000 or R1000). If regenerative power is not appropriately processed, the regenerative energy from the load will exceed the allowable range and damage the SERVOPACK. Examples of negative loads are shown below.

- Motor Drive to Lower Objects without a Counterweight
- Motor Drive for Feeding



## Types of Regenerative Resistors

The following regenerative resistors can be used.

- Built-in regenerative resistor: A regenerative resistor that is built into the SERVOPACK. Not all SERVOPACKs have built-in regenerative resistors.
- External Regenerative Resistor: A regenerative resistor that is connected externally to a SERVOPACK. These resistors are used when the smoothing capacitor and built-in regenerative resistor in the SERVOPACK cannot consume all of the regenerative power.

| SERVOPACK Model |                                          | Built-In Regenerative Resistor | External Regenerative Resistor |
|-----------------|------------------------------------------|--------------------------------|--------------------------------|
| SGD7S-          | R70A, R90A, 1R6A, 2R8A                   | None                           | Basically not required         |
|                 | 3R8A, 5R5A, 7R6A, 120A, 180A, 200A, 330A | Standard feature <sup>*1</sup> | Basically not required         |
|                 | 470A, 550A, 590A, 780A                   | None                           | Required <sup>*2</sup>         |
| SGD7W-          | 1R6A, 2R8A, 5R5A, 7R6A                   | Standard feature <sup>*1</sup> | Basically not required         |

<sup>\*1</sup>. Refer to the following section for the specifications of the regenerative resistors built into SERVOPACKs.

Built-In Regenerative Resistor (page 609)

<sup>\*2</sup>. An optional external Regenerative Resistor Unit is required.

## Selecting External Regenerative Resistor

Use Yaskawa's SigmaJunmaSize+, an AC servo drive capacity selection program, to determine if you need an External Regenerative Resistor.

You can use one of the following two methods to manually calculate whether an External Regenerative Resistor is required. Refer to the following information if you do not use the SigmaJunmaSize+.

 [Simple Calculation \(page 627\)](#)

 [Calculating the Regenerative Energy \(page 632\)](#)

### Simple Calculation

When driving a Servo Motor with a horizontal shaft, check if an External Regenerative Resistor is required using the following calculation method. The calculation method depends on the model of the SERVOPACK.

#### ◆ SERVOPACK Models SGD7S-R70A, -R90A, -1R6A, and -2R8A

Regenerative resistors are not built into the above SERVOPACKs. The total amount of energy that can be charged in the capacitors is given in the following table.

If the rotational energy ( $E_S$ ) of the Servo Motor and load exceeds the processable regenerative energy, then connect an External Regenerative Resistor.

| Applicable SERVOPACK |                  | Processable Regenerative Energy (Joules) | Remarks                                          |
|----------------------|------------------|------------------------------------------|--------------------------------------------------|
| SGD7S-               | R70A, R90A, 1R6A | 24.2                                     | Value when main circuit input voltage is 200 VAC |
|                      | 2R8A             | 31.7                                     |                                                  |

Calculate the rotational energy ( $E_S$ ) of the servo system with the following equation:

$$E_S = J \times (n_M)^2 / 182 \text{ (Joules)}$$

- $J = J_M + J_L$
- $J_M$ : Servo Motor moment of inertia ( $\text{kg} \cdot \text{m}^2$ )
- $J_L$ : Load moment of inertia at motor shaft ( $\text{kg} \cdot \text{m}^2$ )
- $n_M$ : Servo Motor operating motor speed ( $\text{min}^{-1}$ )

◆ **SERVOPACK Models SGD7S-3R8A, -5R5A, -7R6A, -120A, -180A, -200A, -330A, -470A, -550A, -590A, and -780A; SGD7W-1R6A, -2R8A, -5R5A, and -7R6A**

These SERVOPACKs have built-in regenerative resistors. The allowable frequencies for regenerative operation of the Servo Motor without a load in acceleration/deceleration operation during an operation cycle from 0 ( $\text{min}^{-1}$ ) to the maximum motor speed and back to 0, are listed in the following table. Convert the data into the values for the actual motor speed and load moment of inertia to determine whether an External Regenerative Resistor is required.

■ **Rotary Servo Motors**

| Servo Motor Model |     | Allowable Frequencies in Regenerative Operation (Operations/Min) |                                                             |
|-------------------|-----|------------------------------------------------------------------|-------------------------------------------------------------|
|                   |     | SERVOPACK Model: SGD7S                                           | SERVOPACK Model: SGD7W (Simultaneous Operation of Two Axes) |
| SGM7J-            | A5A | –                                                                | 300                                                         |
|                   | 01A | –                                                                | 180                                                         |
|                   | C2A | –                                                                | 130                                                         |
|                   | 02A | –                                                                | 46                                                          |
|                   | 04A | –                                                                | 25                                                          |
|                   | 06A | 30                                                               | 30                                                          |
|                   | 08A | 15                                                               | 15                                                          |
| SGM7A-            | A5A | –                                                                | 560                                                         |
|                   | 01A | –                                                                | 360                                                         |
|                   | C2A | –                                                                | 260                                                         |
|                   | 02A | –                                                                | 87                                                          |
|                   | 04A | –                                                                | 56                                                          |
|                   | 06A | 77                                                               | 77                                                          |
|                   | 08A | 31                                                               | 31                                                          |
|                   | 10A | 31                                                               | –                                                           |
|                   | 15A | 15                                                               | –                                                           |
|                   | 20A | 19                                                               | –                                                           |
|                   | 25A | 15                                                               | –                                                           |
|                   | 30A | 6.9                                                              | –                                                           |
|                   | 40A | 11                                                               | –                                                           |
|                   | 50A | 8.8                                                              | –                                                           |
|                   | 70A | 86                                                               | –                                                           |

| Servo Motor Model |     | Allowable Frequencies in Regenerative Operation (Operations/Min) |                                                             |
|-------------------|-----|------------------------------------------------------------------|-------------------------------------------------------------|
|                   |     | SERVOPACK Model: SGD7S                                           | SERVOPACK Model: SGD7W (Simultaneous Operation of Two Axes) |
| SGM7P-            | 01A | –                                                                | 200                                                         |
|                   | C2A | –                                                                | 46                                                          |
|                   | 04A | –                                                                | 29                                                          |
|                   | 08A | 11                                                               | 11                                                          |
|                   | 15A | 7.5                                                              | –                                                           |
|                   | 03A | 39                                                               | 39                                                          |
| SGM7G-            | 05A | 29                                                               | 29                                                          |
|                   | 09A | 6.9                                                              | 6.9                                                         |
|                   | 13A | 6.1                                                              | –                                                           |
|                   | 20A | 7.4                                                              | –                                                           |
|                   | 30A | 9.5                                                              | –                                                           |
|                   | 44A | 6.4                                                              | –                                                           |
|                   | 55A | 24                                                               | –                                                           |
|                   | 75A | 34                                                               | –                                                           |
|                   | 1AA | 39                                                               | –                                                           |
|                   | 1EA | 31                                                               | –                                                           |



■ Direct Drive Servo Motors

| Servo Motor Model |     | Allowable Frequencies in Regenerative Operation (Operations/Min) |                                                             |
|-------------------|-----|------------------------------------------------------------------|-------------------------------------------------------------|
|                   |     | SERVOPACK Model: SGD7S                                           | SERVOPACK Model: SGD7W (Simultaneous Operation of Two Axes) |
| SGMCS-            | 02B | —                                                                | 62                                                          |
|                   | 05B | —                                                                | 34                                                          |
|                   | 07B | —                                                                | 22                                                          |
|                   | 04C | —                                                                | 22                                                          |
|                   | 08D | —                                                                | 6.1                                                         |
|                   | 10C | —                                                                | 19                                                          |
|                   | 14C | —                                                                | 22                                                          |
|                   | 17D | —                                                                | 7                                                           |
|                   | 25D | —                                                                | 9.3                                                         |
|                   | 16E | 3.7                                                              | 3.7                                                         |
|                   | 35E | 9.7                                                              | 9.7                                                         |
|                   | 45M | 25                                                               | 25                                                          |
|                   | 80M | 19                                                               | —                                                           |
|                   | 80N | 8.9                                                              | —                                                           |
|                   | 1AM | 22                                                               | —                                                           |
|                   | 1EN | 11                                                               | —                                                           |
|                   | 2ZN | 9.1                                                              | —                                                           |

## Appendices

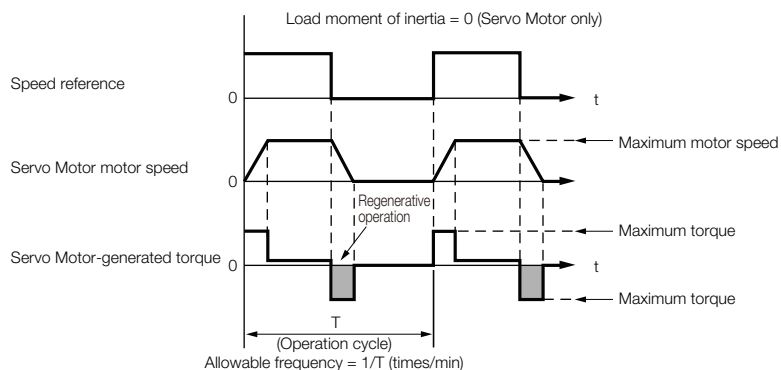
### Capacity Selection for Regenerative Resistors

#### ■ Linear Servo Motors

| Servo Motor Model                          |         | Allowable Frequencies in Regenerative Operation (Operations/Min) |                                                             |
|--------------------------------------------|---------|------------------------------------------------------------------|-------------------------------------------------------------|
|                                            |         | SERVOPACK Model: SGD7S                                           | SERVOPACK Model: SGD7W (Simultaneous Operation of Two Axes) |
| SGLGW- Using a Standard-Force Magnetic Way | 30A050C | —                                                                | 190                                                         |
|                                            | 30A080C | —                                                                | 120                                                         |
|                                            | 40A140C | —                                                                | 56                                                          |
|                                            | 40A253C | —                                                                | 32                                                          |
|                                            | 40A365C | —                                                                | 22                                                          |
|                                            | 60A140C | —                                                                | 49                                                          |
|                                            | 60A253C | —                                                                | 27                                                          |
|                                            | 60A365C | 37                                                               | 37                                                          |
|                                            | 90A200C | 34                                                               | —                                                           |
|                                            | 90A370C | 33                                                               | —                                                           |
|                                            | 90A535C | 24                                                               | —                                                           |
| SGLGW- Using a High-Force Magnetic Way     | 40A140C | —                                                                | 80                                                          |
|                                            | 40A253C | —                                                                | 45                                                          |
|                                            | 40A365C | 62                                                               | 62                                                          |
|                                            | 60A140C | —                                                                | 64                                                          |
|                                            | 60A253C | 71                                                               | 71                                                          |
|                                            | 60A365C | 49                                                               | 49                                                          |
| SGLFW-                                     | 20A090A | —                                                                | 27                                                          |
|                                            | 20A120A | —                                                                | 21                                                          |
|                                            | 35A120A | —                                                                | 14                                                          |
|                                            | 35A230A | 16                                                               | 16                                                          |
|                                            | 50A200B | 10                                                               | 10                                                          |
|                                            | 50A380B | 6.9                                                              | —                                                           |
|                                            | 1ZA200B | 7.8                                                              | —                                                           |
|                                            | 1ZA380B | 6.6                                                              | —                                                           |
| SGLTW-                                     | 20A170A | 15                                                               | 15                                                          |
|                                            | 20A320A | 8.3                                                              | 8.3                                                         |
|                                            | 20A460A | 7.1                                                              | —                                                           |
|                                            | 35A170A | 10                                                               | 10                                                          |
|                                            | 35A170H | 8.5                                                              | 8.5                                                         |
|                                            | 35A320A | 7                                                                | —                                                           |
|                                            | 35A320H | 5.9                                                              | —                                                           |
|                                            | 35A460A | 7.6                                                              | —                                                           |
|                                            | 40A400B | 13                                                               | —                                                           |
|                                            | 40A600B | 19                                                               | —                                                           |
|                                            | 50A170H | 15                                                               | 15                                                          |
|                                            | 50A320H | 11                                                               | —                                                           |
|                                            | 80A400B | 28                                                               | —                                                           |
|                                            | 80A600B | 180                                                              | —                                                           |

\*1. This value is in combination with the SGD7S-120A.

\*2. This value is in combination with the SGD7S-180A



Operating Conditions for Calculating the Allowable Regenerative Frequency

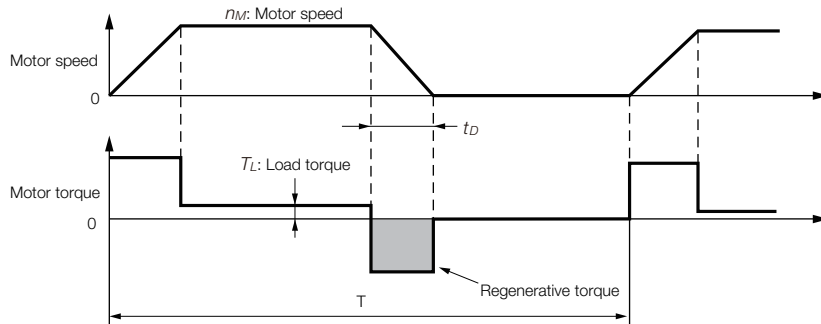
Use the following equation to calculate the allowable frequency for regenerative operation.

$$\text{Allowable frequency} = \frac{\text{Allowable frequency for regenerative operation for Servo Motor without load}}{(1+n)} \times \left( \frac{\text{Maximum motor speed}}{\text{Operating motor speed}} \right)^2 (\text{time/min})$$

- $n = J_L/J_M$
- $J_M$ : Servo Motor moment of inertia ( $\text{kg}\cdot\text{m}^2$ )
- $J_L$ : Load moment of inertia at motor shaft ( $\text{kg}\cdot\text{m}^2$ )

## Calculating the Regenerative Energy

This section shows how to calculate the regenerative resistor capacity for the acceleration/deceleration operation shown in the following figure.



### • Calculation Procedure for Regenerative Resistor Capacity

| Step | Item                                                                      | Code  | Formula                                                                                                                                                                                          |
|------|---------------------------------------------------------------------------|-------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1    | Calculate the rotational energy of the Servo Motor.                       | $E_S$ | $E_S = J n_M^2 / 182$                                                                                                                                                                            |
| 2    | Calculate the energy consumed by load loss during the deceleration period | $E_L$ | $E_L = (\pi/60) n_M T_L t_D$<br>Note: If the load loss is unknown, calculate the value with $E_L$ set to 0.                                                                                      |
| 3    | Calculate the energy lost from Servo Motor winding resistance.            | $E_M$ | (Value calculated from the graphs in <b>◆ Servo Motor Winding Resistance Loss</b> on page 635) $\times t_D$                                                                                      |
| 4    | Calculate the energy that can be absorbed by the SERVOPACK.               | $E_C$ | Calculate from the graphs in <b>◆ SERVOPACK-absorbable Energy</b> on page 633                                                                                                                    |
| 5    | Calculate the energy consumed by the regenerative resistor.               | $E_K$ | $E_K = E_S - (E_L + E_M + E_C)$<br>$E_K = E_S - (E_L + E_M + E_C) + E_G^*$<br>Note: Use this formula if there will be continuous periods of regenerative operation, such as for a vertical axis. |
| 6    | Calculate the required regenerative resistor capacity (W).                | $W_K$ | $W_K = E_K / (0.2 \times T)$                                                                                                                                                                     |

\*  $E_G$  (joules): Energy for continuous period of regenerative operation

$$E_G = (2\pi/60) n_{MG} T_G t_G$$

- $T_G$ : Servo Motor's generated torque in continuous period of regenerative operation (N·m)
- $n_{MG}$ : Servo Motor's motor speed for same operation period as above ( $\text{min}^{-1}$ )
- $t_G$ : Same operation period as above (s)

Note: 1. The 0.2 in the equation for calculating  $W_K$  is the value when the regenerative resistor's utilized load ratio is 20%.

2. The units for the various symbols are given in the following table.

| Code           | Description                                    |
|----------------|------------------------------------------------|
| $E_S$ to $E_K$ | Energy in joules (J)                           |
| $W_K$          | Required regenerative resistor capacity (W)    |
| $J$            | $= J_M + J_L$ ( $\text{kg} \cdot \text{m}^2$ ) |
| $n_M$          | Servo Motor motor speed ( $\text{min}^{-1}$ )  |

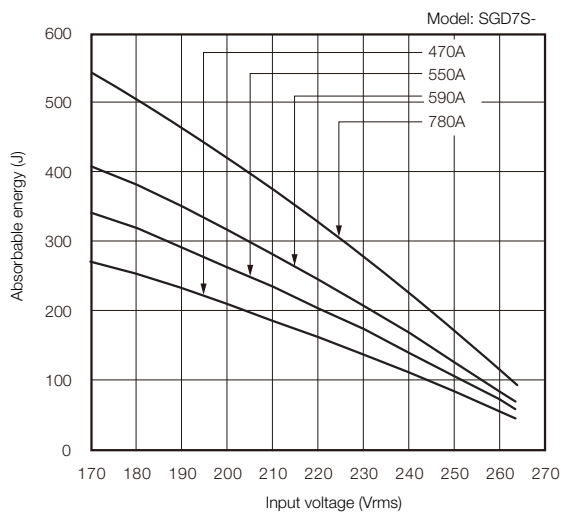
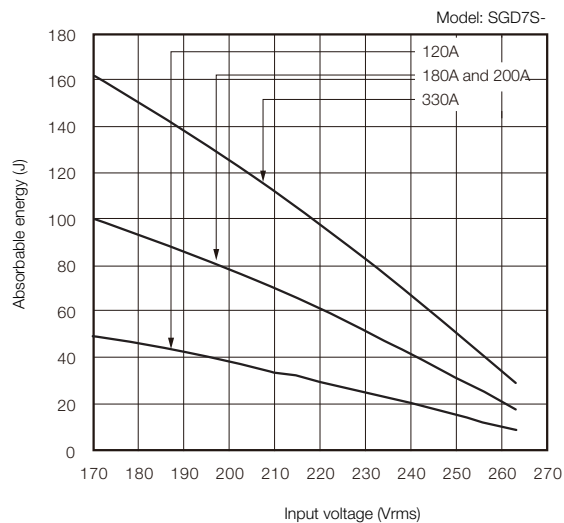
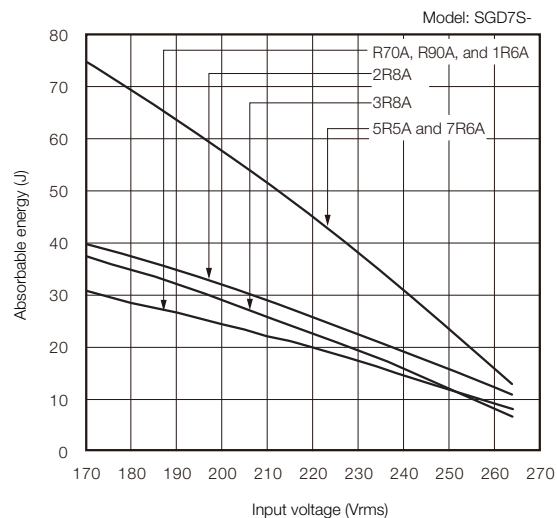
| Code  | Description                            |
|-------|----------------------------------------|
| $T_L$ | Load torque (N·m)                      |
| $t_D$ | Deceleration stopping time (s)         |
| $T$   | Servo Motor repeat operation cycle (s) |

If the value of  $W_K$  does not exceed the capacity of the built-in regenerative resistor of the SERVOPACK, an External Regenerative Resistor is not required. For details on the built-in regenerative resistors, refer to the SERVOPACK specifications. If the value of  $W_K$  exceeds the capacity of the built-in regenerative resistor, install an External Regenerative Resistor with a capacity equal to the value for  $W$  calculated above.

## ◆ SERVOPACK-absorbable Energy

The following figures show the relationship between the SERVOPACK's input power supply voltage and its absorbable energy.

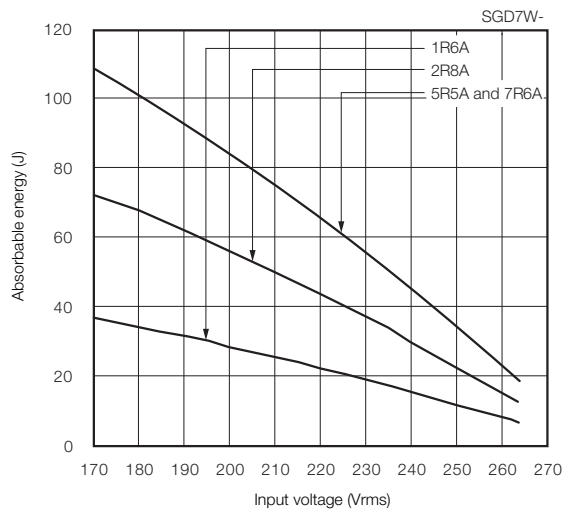
### ■ $\Sigma$ -7S SERVOPACKs



## Appendices

### Capacity Selection for Regenerative Resistors

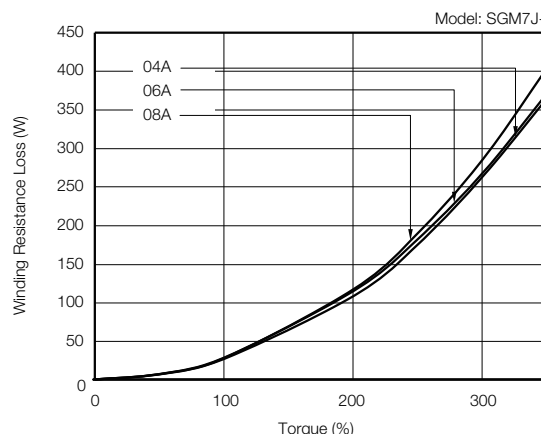
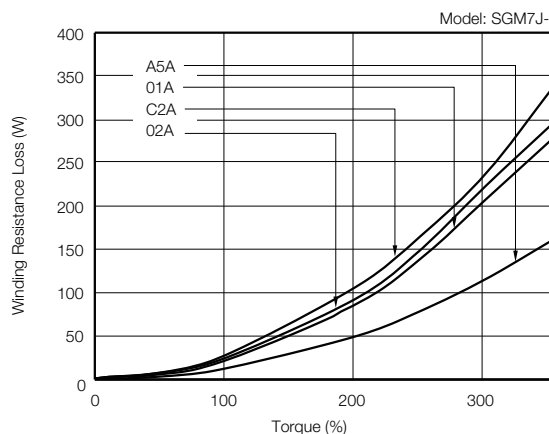
#### ■ $\Sigma$ -7W SERVOPACKs



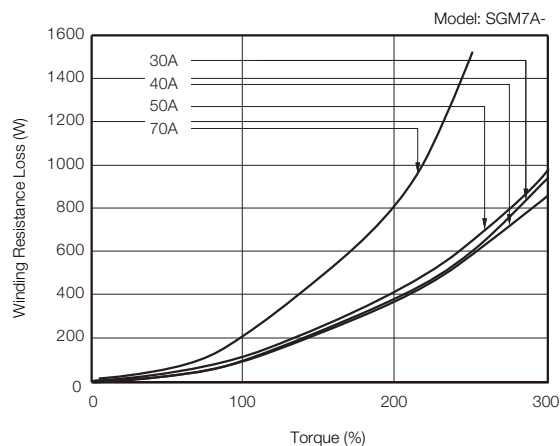
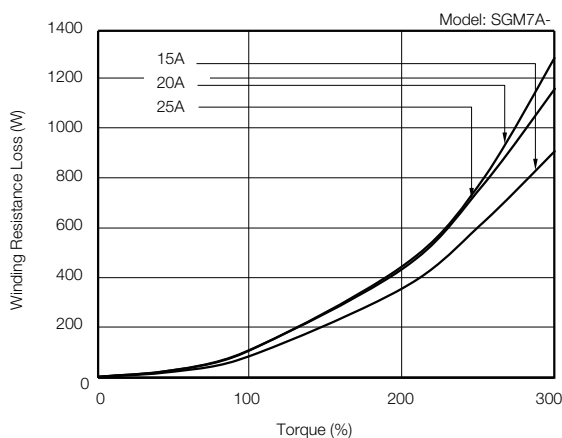
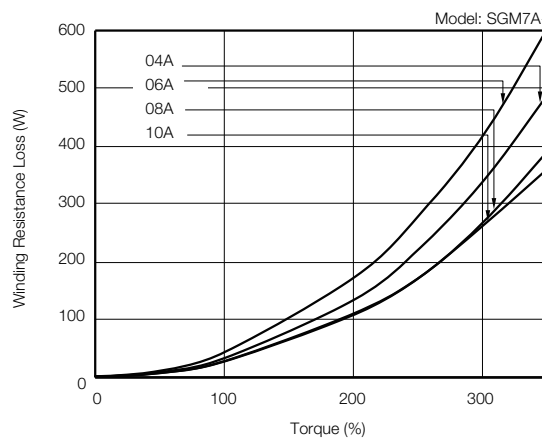
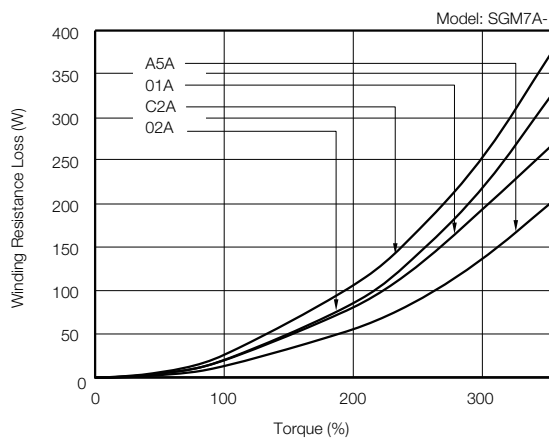
## ◆ Servo Motor Winding Resistance Loss

The following figures show the relationship for each Servo Motor between the Servo Motor's generated torque and the winding resistance loss.

### ■ SGM7J Rotary Servo Motors



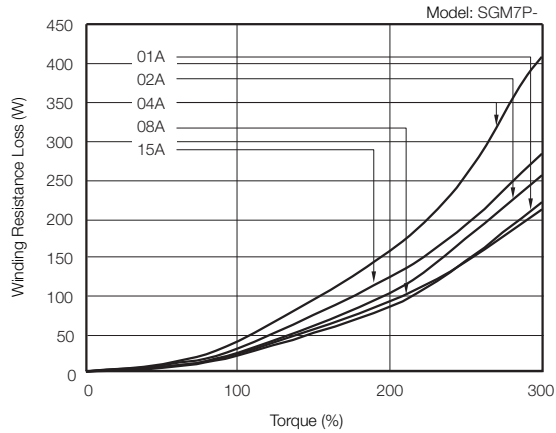
### ■ SGM7A Rotary Servo Motors



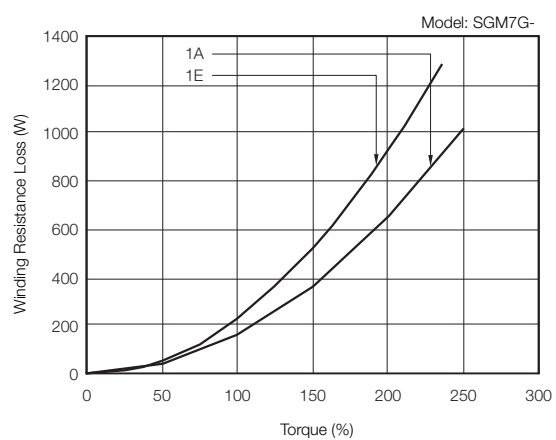
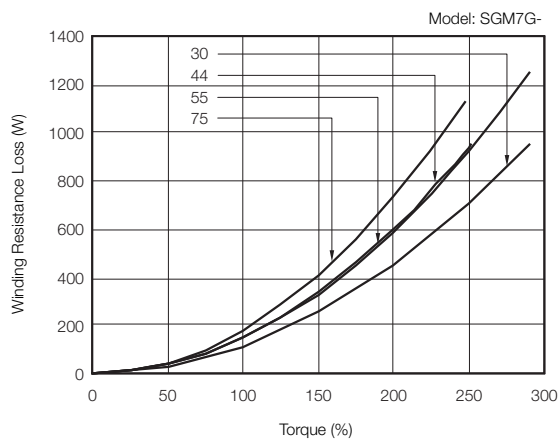
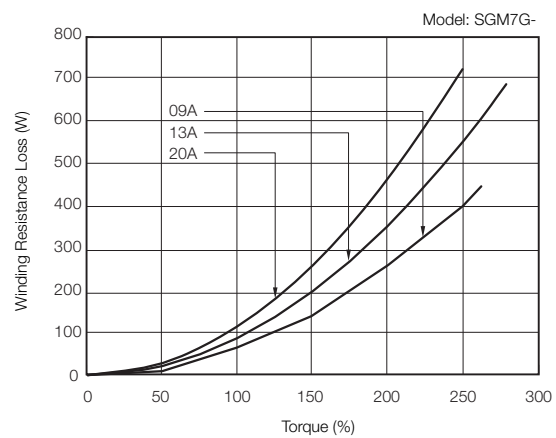
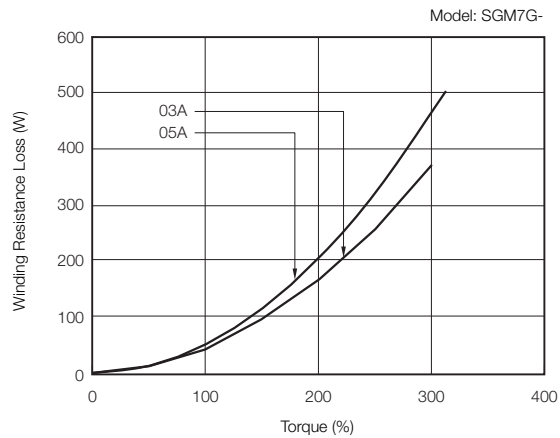
## Appendices

### Capacity Selection for Regenerative Resistors

#### SGM7P Rotary Servo Motors

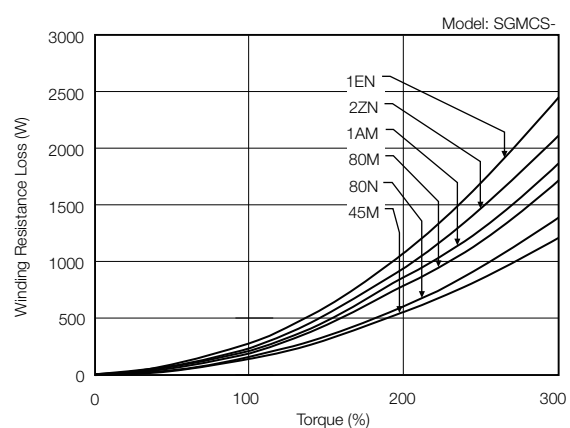
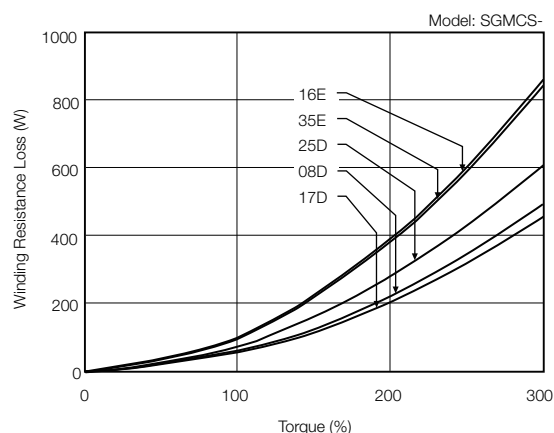
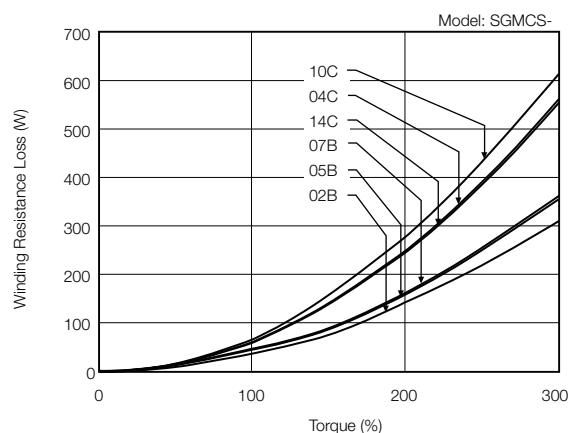


#### SGM7G Rotary Servo Motors





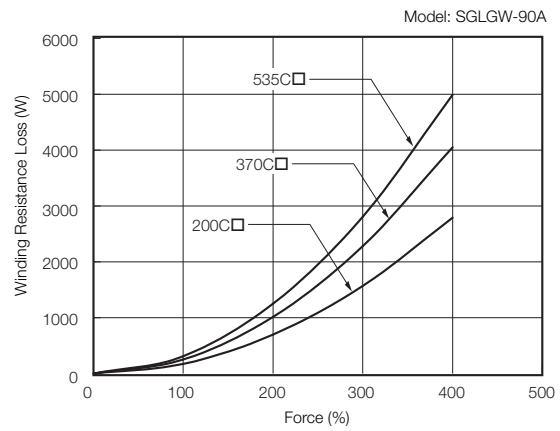
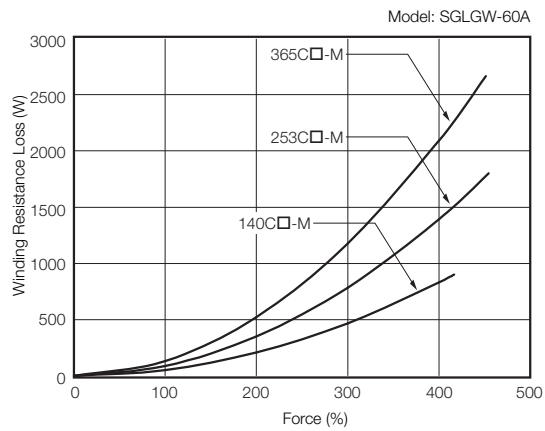
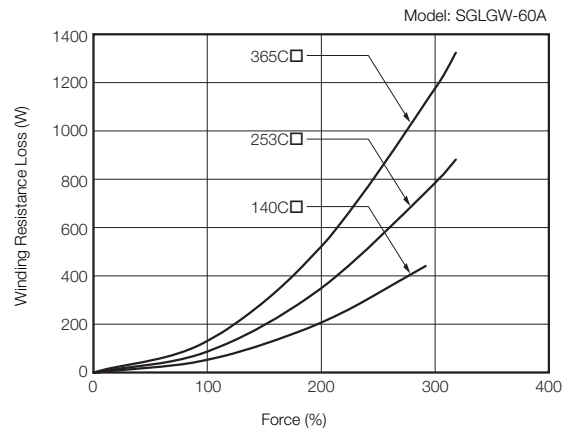
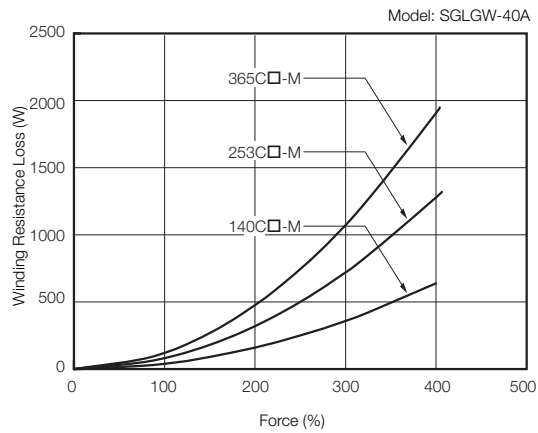
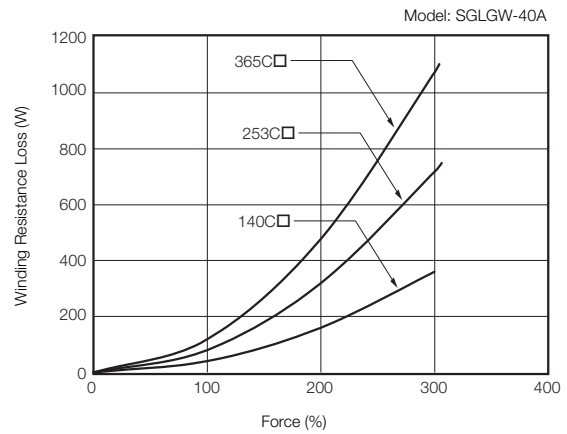
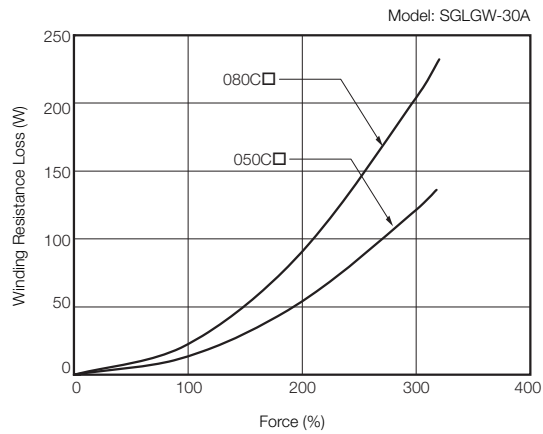
# ■ SGMCS Direct Drive Servo Motors



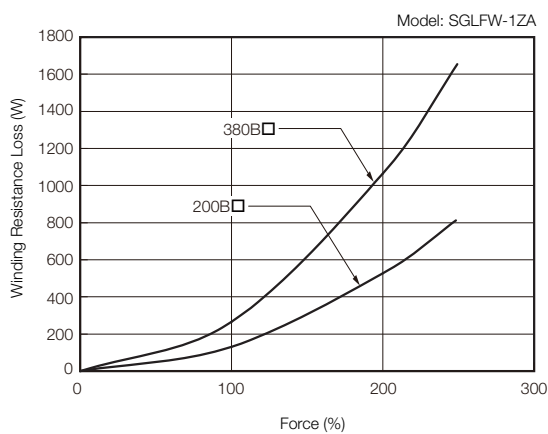
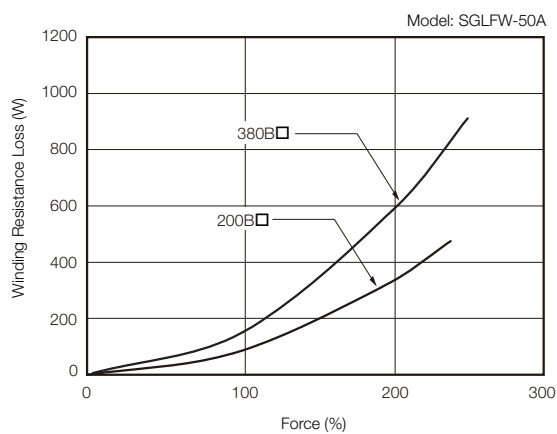
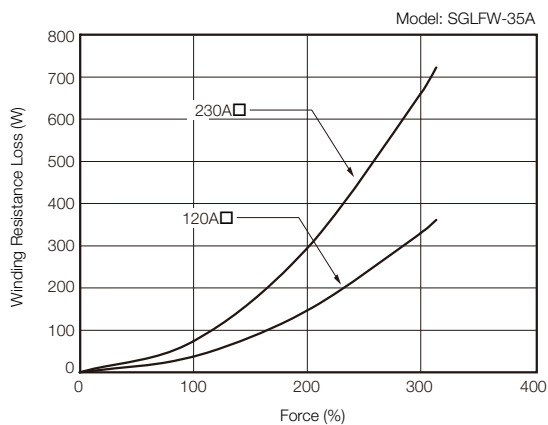
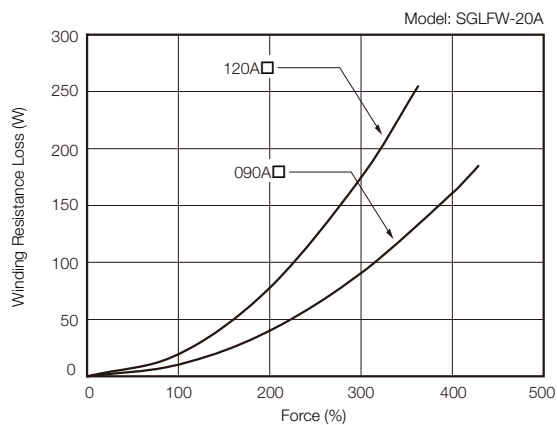
## Appendices

### Capacity Selection for Regenerative Resistors

#### ■ SGLGW Linear Servo Motors



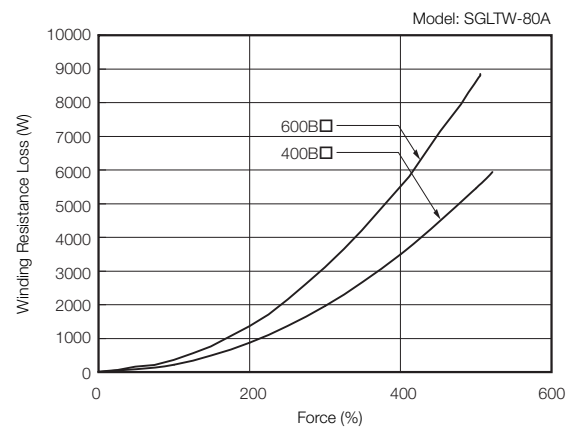
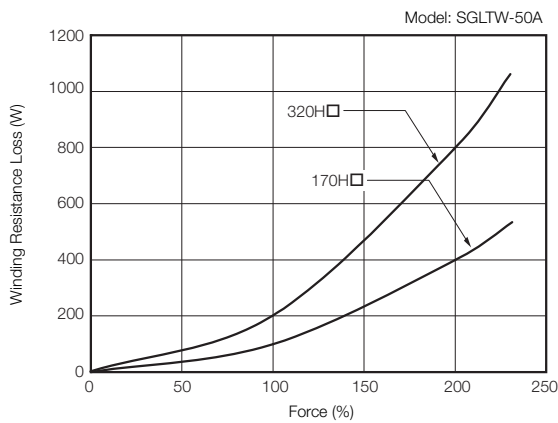
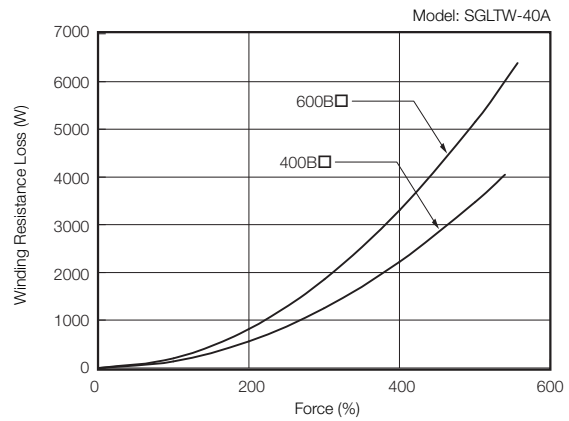
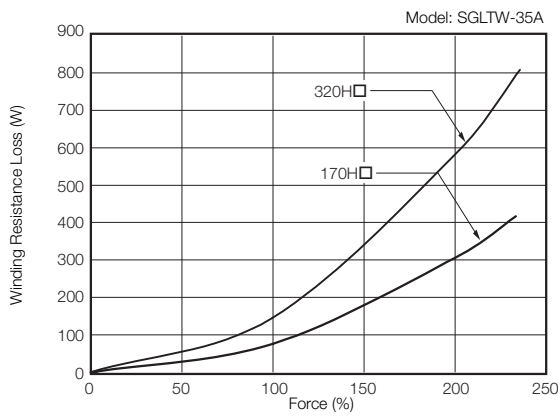
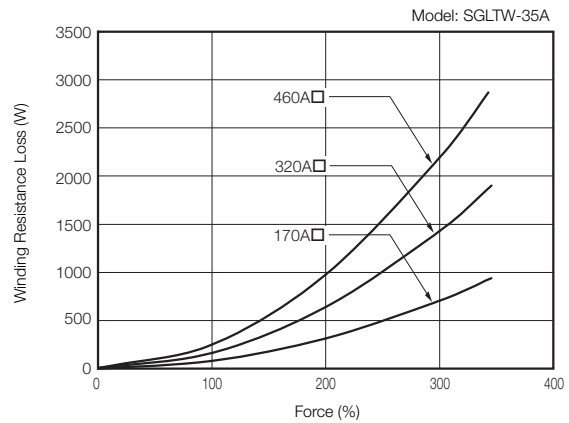
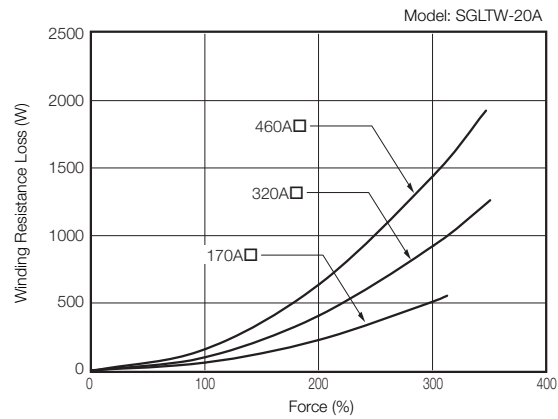
## ■ SGLFW Linear Servo Motors



## Appendices

### Capacity Selection for Regenerative Resistors

#### ■ SGLTW Linear Servo Motors





# International Standards

● : Certified, – : Not Certified

| Product                   |                     | Model                         | UL/CSA Standards                                                                  | CE Marking                                                                         | KC Mark                                                                             | RoHS Directive |
|---------------------------|---------------------|-------------------------------|-----------------------------------------------------------------------------------|------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|----------------|
|                           |                     |                               |  |  |  |                |
| SERVOPACKs                |                     | SGD7S                         | ●                                                                                 | ●                                                                                  | ●                                                                                   | ●              |
|                           |                     | SGD7W                         | ●                                                                                 | ●                                                                                  | ●                                                                                   | ●              |
| Feedback Option           | Fully-Closed Module | SGDV-OFA01A <sup>*1</sup>     | ●                                                                                 | ●                                                                                  | ●                                                                                   | ●              |
| Safety Option             | Safety Module       | SGDV-OSA01A <sup>*1</sup>     | ●                                                                                 | ●                                                                                  | ●                                                                                   | ●              |
| Product                   |                     | Model                         | UL/CSA Standards                                                                  | CE Marking                                                                         | RoHS Directive                                                                      |                |
|                           |                     |                               |  |  |                                                                                     |                |
| Rotary Servo Motors       |                     | SGM7J                         | ●                                                                                 | ●                                                                                  | ●                                                                                   |                |
|                           |                     | SGM7A                         | ●                                                                                 | ●                                                                                  | ●                                                                                   |                |
|                           |                     | SGM7P                         | ●                                                                                 | ●                                                                                  | ●                                                                                   |                |
|                           |                     | SGM7G                         | ●                                                                                 | ●                                                                                  | ●                                                                                   |                |
| Direct Drive Servo Motors |                     | SGMCS                         | ●                                                                                 | <sup>*3</sup>                                                                      | ● <sup>*2</sup>                                                                     |                |
|                           |                     | SGM7F                         | ●                                                                                 | ●                                                                                  | ●                                                                                   |                |
|                           |                     | SGM7D                         | –                                                                                 | ●                                                                                  | ●                                                                                   |                |
| Linear Servo Motors       |                     | SGLFW2 (SGLFM2) <sup>*4</sup> | ●                                                                                 | ●                                                                                  | ●                                                                                   |                |
|                           |                     | SGLGW (SGLGM) <sup>*4</sup>   | ●                                                                                 | <sup>*5</sup>                                                                      | ●                                                                                   |                |
|                           |                     | SGLFW (SGLFM) <sup>*4</sup>   | ●                                                                                 | <sup>*5</sup>                                                                      | ●                                                                                   |                |
|                           |                     | SGLTW (SGLTM) <sup>*4</sup>   | ●                                                                                 | <sup>*5</sup>                                                                      | ●                                                                                   |                |

<sup>\*1</sup>. Use this model number to purchase the Option Module separately.

<sup>\*2</sup>. Estimates are provided for RoHS-compliant products. The model numbers have an “-E” suffix.

<sup>\*3</sup>. CE Marking certification has not yet been received for SGMCS-□□M and SGMCS-□□N Direct Drive Servo Motors. CE Marking certification has been received for the following Direct Drive Servo Motors: SGMCS-□□B, SGMCS-□□C, SGMCS-□□D, and SGMCS-□□E. Contact your Yaskawa representative if the CE Marking label is required.

<sup>\*4</sup>. The model numbers of the Magnetic Ways of Linear Servo Motors are given in parentheses.

<sup>\*5</sup>. CE Marking certification has been received. Contact your Yaskawa representative if the CE Marking label is required.



# Warranty

## ◆ Details of Warranty

### ■ Warranty Period

The warranty period for a product that was purchased (hereinafter called the “delivered product”) is one year from the time of delivery to the location specified by the customer or 18 months from the time of shipment from the Yaskawa factory, whichever is sooner.

### ■ Warranty Scope

Yaskawa shall replace or repair a defective product free of charge if a defect attributable to Yaskawa occurs during the above warranty period.

This warranty does not cover defects caused by the delivered product reaching the end of its service life and replacement of parts that require replacement or that have a limited service life.

This warranty does not cover failures that result from any of the following causes.

- Improper handling, abuse, or use in unsuitable conditions or in environments not described in product catalogs or manuals, or in any separately agreed-upon specifications
- Causes not attributable to the delivered product itself
- Modifications or repairs not performed by Yaskawa
- Use of the delivered product in a manner in which it was not originally intended
- Causes that were not foreseeable with the scientific and technological understanding at the time of shipment from Yaskawa
- Events for which Yaskawa is not responsible, such as natural or human-made disasters

## ◆ Limitations of Liability

- Yaskawa shall in no event be responsible for any damage or loss of opportunity to the customer that arises due to failure of the delivered product.
- Yaskawa shall not be responsible for any programs (including parameter settings) or the results of program execution of the programs provided by the user or by a third party for use with programmable Yaskawa products.
- The information described in product catalogs or manuals is provided for the purpose of the customer purchasing the appropriate product for the intended application. The use thereof does not guarantee that there are no infringements of intellectual property rights or other proprietary rights of Yaskawa or third parties, nor does it construe a license.
- Yaskawa shall not be responsible for any damage arising from infringements of intellectual property rights or other proprietary rights of third parties as a result of using the information described in catalogs or manuals.



## ◆ Suitability for Use

- It is the customer's responsibility to confirm conformity with any standards, codes, or regulations that apply if the Yaskawa product is used in combination with any other products.
- The customer must confirm that the Yaskawa product is suitable for the systems, machines, and equipment used by the customer.
- Consult with Yaskawa to determine whether use in the following applications is acceptable. If use in the application is acceptable, use the product with extra allowance in ratings and specifications, and provide safety measures to minimize hazards in the event of failure.
  - Outdoor use, use involving potential chemical contamination or electrical interference, or use in conditions or environments not described in product catalogs or manuals
  - Nuclear energy control systems, combustion systems, railroad systems, aviation systems, vehicle systems, medical equipment, amusement machines, and installations subject to separate industry or government regulations
  - Systems, machines, and equipment that may present a risk to life or property
  - Systems that require a high degree of reliability, such as systems that supply gas, water, or electricity, or systems that operate continuously 24 hours a day
  - Other systems that require a similar high degree of safety
- Never use the product for an application involving serious risk to life or property without first ensuring that the system is designed to secure the required level of safety with risk warnings and redundancy, and that the Yaskawa product is properly rated and installed.
- The circuit examples and other application examples described in product catalogs and manuals are for reference. Check the functionality and safety of the actual devices and equipment to be used before using the product.
- Read and understand all use prohibitions and precautions, and operate the Yaskawa product correctly to prevent accidental harm to third parties.

## ◆ Specifications Change

The names, specifications, appearance, and accessories of products in product catalogs and manuals may be changed at any time based on improvements and other reasons. The next editions of the revised catalogs or manuals will be published with updated code numbers. Consult with your Yaskawa representative to confirm the actual specifications before purchasing a product.

YASKAWA.COM



Yaskawa is the leading global manufacturer of low and medium voltage variable frequency drives, servo systems, machine controllers and industrial robots. Our standard products, as well as tailor-made solutions, are well known and have a high reputation for outstanding quality and reliability.

# YASKAWA

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