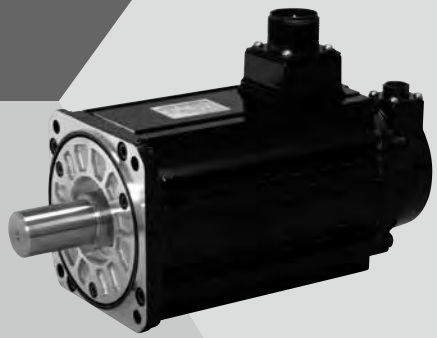
Rotary Servomotors

# SGMSV



## Model Designations

SGMSV - 10 A D A 2 1

| Σ-V Series Servomotor SGMSV | 1st+2nd digits | 3rd digit | 4th digit | 5th digit | 6th digit | 7th digit |
|---|---|---|---|---|---|---|

### 1st+2nd digits Rated Output

| Code | Specifications |
|---|---|
| 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* |

*: Available only for 200-VAC models without brake.

### 3rd digit Power Supply Voltage

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

### 4th digit Serial Encoder

| Code | Specifications |
|---|---|
| 3 | 20-bit absolute |
| D | 20-bit incremental |

### 5th digit Design Revision Order

| Code | Specifications |
|---|---|
| A | Standard |

### 6th digit Shaft End

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

### 7th digit Options

| Code | Specifications |
|---|---|
| 1 | Without options |
| B | With holding brake (90 VDC) |
| C | With holding brake (24 VDC) |
| D | With oil seal and holding brake (90 VDC) |
| E | With oil seal and holding brake (24 VDC) |
| S | With oil seal |

Limited Stock Items  Non-Stock Items

## Features

- Super high power
- Wide selection: 1.0 kW to 7.0 kW capacity, holding brake option
- Mounted serial encoder: 20 bits, high resolution
- Protective structure: IP67 (Not including the IP22 compliant enclosure for 7.0 kW motor)

## Application Examples

- Chip mounters
- PCB drilling stations
- Machine tool feeders



## Configurations of connectors for the main circuit

### SGMSV-10 to -70

The connectors for these models are round. The connectors specified by Yaskawa are required. Note that the connectors vary depending on the operation environment of servomotors.
Two types of connectors are available.

- Standard connectors.
- Protective structure IP67 and European Safety Standards compliant connectors

Note: Connectors are not provided by Yaskawa.

# Ratings and Specifications

Time Rating: Continuous
Vibration Class: V15
Insulation Resistance: 500 VDC, 10 MΩ min.
Ambient Temperature: 0 to 40°C
Excitation: Permanent magnet
Mounting: Flange-mounted
Thermal Class: F

Withstand Voltage: 1500 VAC for one minute (200-V class)
1800 VAC for one minute (400-V class)
Enclosure: Totally enclosed, self-cooled, IP67
(except for shaft opening)
Note: IP22 for SGMSV-70 servomotors.
Ambient Humidity: 20% to 80% (no condensation)
Drive Method: Direct drive
Rotation Direction: Counterclockwise (CCW) with forward run reference when viewed from the load side

200-V Class

| Servomotor Model: SGMSV-□□□ | | 10A | 15A | 20A | 25A | 30A | 40A | 50A | 70A |
|---|---|---|---|---|---|---|---|---|---|
| Rated Output* | kW | 1.0 | 1.5 | 2.0 | 2.5 | 3.0 | 4.0 | 5.0 | 7.0 |
| Rated Torque* | N·m | 3.18 | 4.90 | 6.36 | 7.96 | 9.80 | 12.6 | 15.8 | 22.3 |
| Instantaneous Peak Torque* | N·m | 9.54 | 14.7 | 19.1 | 23.9 | 29.4 | 37.8 | 47.6 | 54 |
| Rated Current* | $A_{rms}$ | 5.7 | 9.3 | 12.1 | 13.8 | 17.9 | 25.4 | 27.6 | 38.3 |
| Instantaneous Max. Current* | $A_{rms}$ | 17 | 28 | 42 | 44.5 | 56 | 77 | 84 | 105 |
| Rated Speed* | $min^{-1}$ | 3000 | | | | | | | |
| Max. Speed* | $min^{-1}$ | 6000 | 5000 | | | | | | |
| Torque Constant | $N·m/A_{rms}$ | 0.636 | 0.590 | 0.561 | 0.610 | 0.582 | 0.519 | 0.604 | 0.604 |
| Rotor Moment of Inertia | $×10^{-4}$ kg·m² | 1.74 (1.99) | 2.00 (2.25) | 2.47 (2.72) | 3.19 (3.44) | 7.00 (9.2) | 9.60 (11.8) | 12.3 (14.5) | 12.3 |
| Rated Power Rate* | kW/s | 58 (51) | 120 (107) | 164 (149) | 199 (184) | 137 (104) | 165 (135) | 203 (172) | 404 |
| Rated Angular Acceleration* | rad/s² | 18300 (16000) | 24500 (21800) | 25700 (23400) | 25000 (23100) | 14000 (10700) | 13100 (10700) | 12800 (10900) | 18100 |
| Applicable SERVOPACK | SGDV-□□□□ | 7R6A | 120A | 180A | 200A | 200A | 330A | 330A | 550A |

*: These items and torque-motor speed characteristics quoted in combination with a SERVOPACK are at an armature winding temperature of 20°C.
Notes: 1 The values in parentheses are for servomotors with holding brakes.
2 The above specifications show the values under the cooling condition when the following heat sinks are mounted on the servomotors.
SGMSV-10A/-15A/-20A/-25A : 300 mm×300 mm×12 mm (aluminum)
SGMSV-30A/-40A/-50A/-70A : 400 mm×400 mm×20 mm (aluminum)

400-V Class

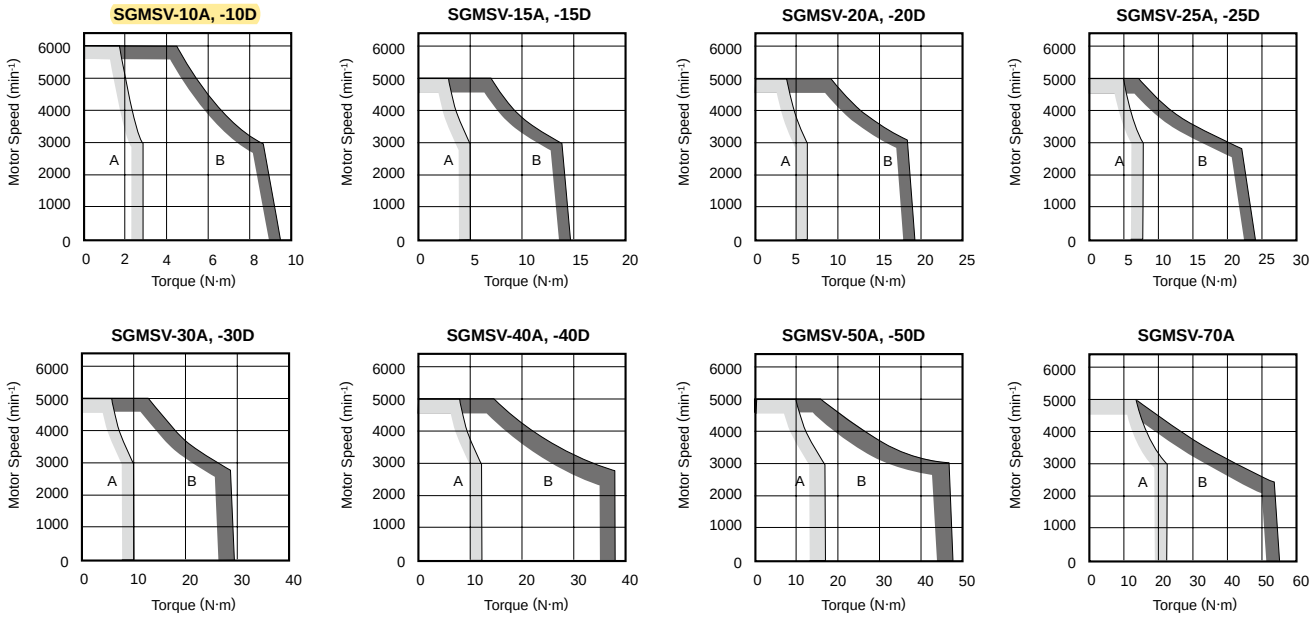
| Servomotor Model: SGMSV-□□□ | | 10D | 15D | 20D | 25D | 30D | 40D | 50D |
|---|---|---|---|---|---|---|---|---|
| Rated Output* | kW | 1.0 | 1.5 | 2.0 | 2.5 | 3.0 | 4.0 | 5.0 |
| Rated Torque* | N·m | 3.18 | 4.9 | 6.36 | 7.96 | 9.8 | 12.6 | 15.8 |
| Instantaneous Peak Torque* | N·m | 9.54 | 14.7 | 19.1 | 23.9 | 29.4 | 37.8 | 47.6 |
| Rated Current* | $A_{rms}$ | 2.8 | 4.7 | 6.1 | 7.4 | 8.9 | 12.5 | 13.8 |
| Instantaneous Max. Current* | $A_{rms}$ | 8.5 | 14 | 20 | 25 | 28 | 38 | 42 |
| Rated Speed* | $min^{-1}$ | 3000 | | | | | | |
| Max. Speed* | $min^{-1}$ | 6000 | 5000 | | | | | |
| Torque Constant | $N·m/A_{rms}$ | 1.27 | 1.23 | 1.18 | 1.15 | 1.16 | 1.06 | 1.21 |
| Rotor Moment of Inertia | $×10^{-4}$ kg·m² | 1.74 (1.99) | 2.00 (2.25) | 2.47 (2.72) | 3.19 (3.44) | 7.00 (9.2) | 9.60 (11.8) | 12.3 (14.5) |
| Rated Power Rate* | kW/s | 58 (51) | 120 (107) | 164 (149) | 199 (184) | 137 (104) | 165 (135) | 203 (172) |
| Rated Angular Acceleration* | rad/s² | 18300 (16000) | 24500 (21800) | 25700 (23400) | 25000 (23100) | 14000 (10700) | 13100 (10700) | 12800 (10900) |
| Applicable SERVOPACK | SGDV-□□□□ | 3R5D | 5R4D | 8R4D | 120D | 120D | 170D | 170D |

*: These items and torque-motor speed characteristics quoted in combination with a SERVOPACK are at an armature winding temperature of 20°C.
Notes: 1 The values in parentheses are for servomotors with holding brakes.
2 The above specifications show the values under the cooling condition when the following heat sinks are mounted on the servomotors.
SGMSV-10D/-15D/-20D/-25D : 300 mm×300 mm×12 mm (aluminum)
SGMSV-30D/-40D/-50D : 400 mm×400 mm×20 mm (aluminum)

## Ratings and Specifications

### ●Torque-Motor Speed Characteristics(200 V/400 V)

A: Continuous Duty Zone B: Intermittent Duty Zone (Note1)




Note: 1 When the effective torque during intermittent duty is within the rated torque, the servomotor can be used within the intermittent duty zone.
2 When the main circuit cable length exceeds 20 m, note that the intermittent duty zone of the Torque-Motor Speed Characteristics will shrink as the line-to-line voltage drops.

### ●Holding Brake Electrical Specifications

| Servomotor Model | Servomotor Rated Output kW | Holding Brake Specifications | | | | |
|---|---|---|---|---|---|---|
| | | Holding Torque N·m | Rated Voltage 24 VDC | | Rated Voltage 90 VDC | |
| | | | Capacity W | Rated Current A (at 20˚C) | Capacity W | Rated Current A (at 20˚C) |
| SGMSV-10 | 1.0 | 7.84 | 12 | 0.5 | 12 | 0.13 |
| SGMSV-15 | 1.5 | 7.84 | 12 | 0.5 | 12 | 0.13 |
| SGMSV-20 | 2.0 | 7.84 | 12 | 0.5 | 12 | 0.13 |
| SGMSV-25 | 2.5 | 10 | 12 | 0.5 | 12 | 0.13 |
| SGMSV-30 | 3.0 | 20 | 10 | 0.41 | 10 | 0.11 |
| SGMSV-40 | 4.0 | 20 | 10 | 0.41 | 10 | 0.11 |
| SGMSV-50 | 5.0 | 20 | 10 | 0.41 | 10 | 0.11 |

Notes: 1 The holding brake is only used to hold the load and cannot be used to stop the servomotor.
2 The holding brake open time and holding brake operation time vary depending on which discharge circuit is used. Make sure holding brake open time and holding brake operation time are correct for your servomotor.
3 A 24 VDC power supply is to be provided by customers.

## ●Allowable Load Moment of Inertia at the Motor Shaft

The rotor moment of inertia ratio is the value for a servomotor without a gear and a holding brake.

| Servomotor Model | Servomotor Rated Output | Allowable Load Moment of Inertia (Rotor Moment of Inertia Ratio) |
|---|---|---|
| SGMSV-10 to -70 | 1.0 to 7.0 kW | 5 times |

## ●Load Moment of Inertia

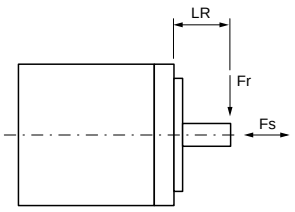
The larger the load moment of inertia, the worse the movement response.
The allowable load moment of inertia ($J_L$) depends on motor capacity, as shown above. This value is provided strictly as a guideline and results may vary depending on servomotor drive conditions.
Use the AC servo drive capacity selection program SigmaJunmaSize+ to check the operation conditions.
The program can be downloaded for free from our web site (http://www.e-mechatronics.com/).

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). Take one of the following steps if this occurs.

- Reduce the torque limit.
- Reduce the deceleration rate.
- Reduce the maximum speed.
- Install an external regenerative resistor if the alarm cannot be cleared using the steps above. Refer to Regenerative Resistors on page 386.

## ●Allowable Radial and Thrust Loads

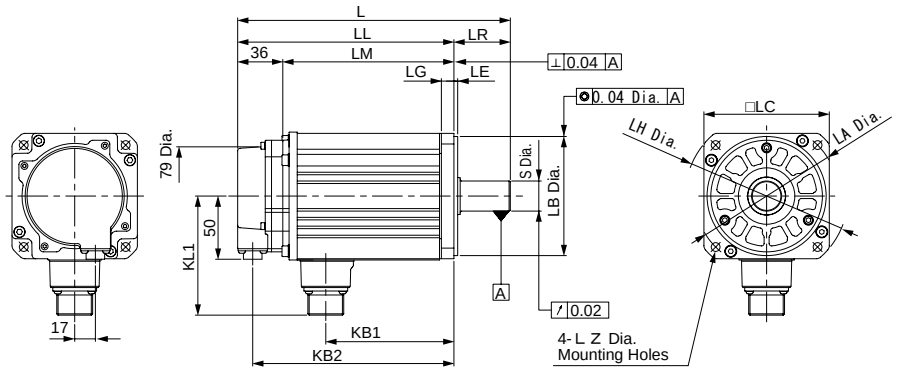
Design the mechanical system so thrust and radial loads applied to the servomotor shaft end during operation fall within the ranges shown in the table.

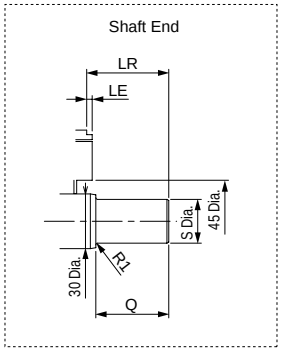
| Servomotor Model | | Allowable Radial Load (Fr) N | Allowable Thrust Load (Fs) N | LR mm | Reference Diagram |
|---|---|---|---|---|---|
| SGMSV- | 10□□A21 | 686 | 196 | 45 |   |
| | 15□□A21 | | | | |
| | 20□□A21 | | | | |
| | 25□□A21 | | | | |
| | 30□□A21 | 980 | 392 | 63 | |
| | 40□□A21 | 1176 | | | |
| | 50□□A21 | | | | |
| | 70□□A21 | | | | |

## External Dimensions Units: mm

### ●Without Holding Brakes

(1) 1.0 to 5.0 kW



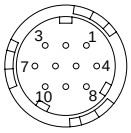




Note: For the specifications of the other shaft ends, refer to page 79.

| Model SGMSV- | L | LL | LM | LR | KB1 | KB2 | KL1 | Flange Face Dimensions | | | | | | | | Shaft End Dimensions | | Approx. Mass |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | LA | LB | LC | LE | LF | LG | LH | LZ | S | Q | kg |
| 10□□A21 | 192 | 147 | 111 | 45 | 76 | 135 | 96 | 115 | $95^{0}_{-0.035}$ | 100 | 3 | 3 | 10 | 130 | 7 | $24^{0}_{-0.013}$ | 40 | 4.1 |
| 15□□A21 | 202 | 157 | 121 | 45 | 86 | 145 | 96 | 115 | $95^{0}_{-0.035}$ | 100 | 3 | 3 | 10 | 130 | 7 | $24^{0}_{-0.013}$ | 40 | 4.6 |
| 20□□A21 | 218 | 173 | 137 | 45 | 102 | 161 | 96 | 115 | $95^{0}_{-0.035}$ | 100 | 3 | 3 | 10 | 130 | 7 | $24^{0}_{-0.013}$ | 40 | 5.4 |
| 25□□A21 | 241 | 196 | 160 | 45 | 125 | 184 | 96 | 115 | $95^{0}_{-0.035}$ | 100 | 3 | 3 | 10 | 130 | 7 | $24^{0}_{-0.013}$ | 40 | 6.8 |
| 30□□A21 | 259 | 196 | 160 | 63 | 124 | 184 | 114 | 145 | $110^{0}_{-0.035}$ | 130 | 6 | 6 | 12 | 165 | 9 | $28^{0}_{-0.013}$ | 55 | 10.5 |
| 40□□A21 | 296 | 233 | 197 | 63 | 161 | 221 | 114 | 145 | $110^{0}_{-0.035}$ | 130 | 6 | 6 | 12 | 165 | 9 | $28^{0}_{-0.013}$ | 55 | 13.5 |
| 50□□A21 | 336 | 273 | 237 | 63 | 201 | 261 | 114 | 145 | $110^{0}_{-0.035}$ | 130 | 6 | 6 | 12 | 165 | 9 | $28^{0}_{-0.013}$ | 55 | 16.5 |

Note: Models with oil seals are of the same configuration.

· Cable Specifications for Encoder-end Connector (20-bit Encoder)




Receptacle: CM10-R10P-D
Applicable plug (To be provided by the customer)
Plug: CM10-AP10S-□-D (Angle)
CM10-SP10S-□-D (Straight)
(Boxes (□) indicate a value that varies, depending on cable size.)
Manufacturer: DDK Ltd.

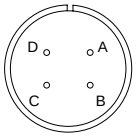
With an Absolute Encoder

| | | | |
|---|---|---|---|
| 1 | PS | 6 | BAT (+) |
| 2 | /PS | 7 | – |
| 3 | – | 8 | – |
| 4 | PG 5V | 9 | PG 0V |
| 5 | BAT (–) | 10 | FG (Frame ground) |

With an Incremental Encoder

| | | | |
|---|---|---|---|
| 1 | PS | 6 | – |
| 2 | /PS | 7 | – |
| 3 | – | 8 | – |
| 4 | PG 5V | 9 | PG 0V |
| 5 | – | 10 | FG (Frame ground) |

· Cable Specifications for Servomotor-end Connector



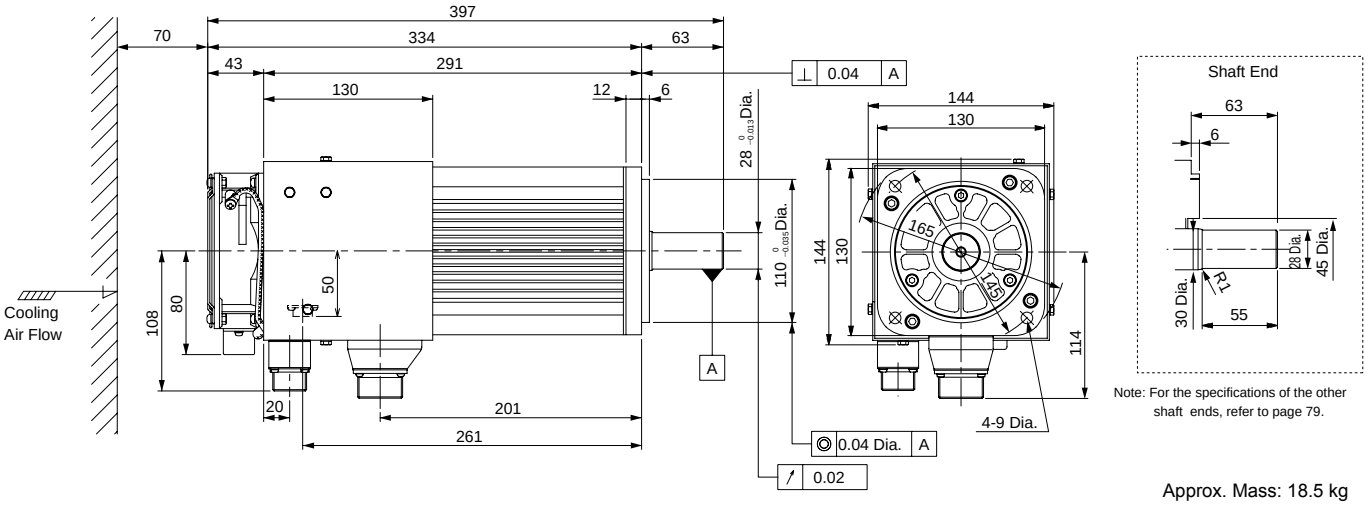

| | |
|---|---|
| A | Phase U |
| B | Phase V |
| C | Phase W |
| D | FG (Frame ground) |

· SGMSV-10 to -25
Manufacturer: DDK Ltd.
· SGMSV-30 to -50
Manufacturer: Japan Aviation Electronics Industry, Ltd.

# External Dimensions Units: mm

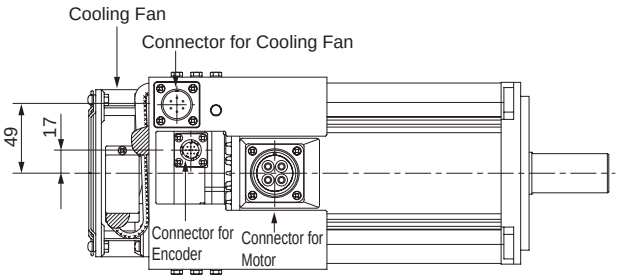
## (2) 7.0 kW (only for 200 V servomotors)

Notes: 1 Leave a minimum space of 70 mm around the servomotor to allow for a sufficient amount of cooling air.
2 Cooling Fan : single-phase 220 V, 50/60Hz, 17/15 W, 0.11/0.09 A

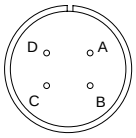



Note: For the specifications of the other shaft ends, refer to page 79.

Approx. Mass: 18.5 kg




· Cable Specifications for Servomotor-end Connector




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

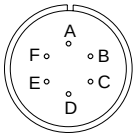
Manufacturer: Japan Aviation Electronics Industry, Ltd.

· Specifications of Cooling Fan
Single-phase 220 V
50/60 Hz
17/15 W
0.11/0.09 A

· Specifications of rotation error detector
Contact Capacity:
- Max. allowable voltage: 350 V (AC, DC)
- Max. allowable current: 120 mA (AC, DC)
- Max. controllable power: 360 mW

Alarm Contact:
- ON at normal fan rotation.
- OFF at 1680±100 $min^{-1}$ or less.
- (OFF during 3 seconds at start-up)

· Cable Specifications for Fan-end Connector

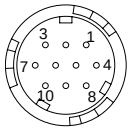



Receptacle:MS3102A14S-6P
Applicable plug
Plug:MS3108B14S-6S
Cable clamp:MS3057-6A

Note: Servomotor-end connectors (receptacles) are RoHS-compliant. Contact the respective connector manufacturers for RoHS-compliant cable-end connectors.

| | |
|---|---|
| A | Fan motor |
| B | Fan motor |
| C | – |
| D | Alarm terminal |
| E | Alarm terminal |
| F | FG (Frame ground) |

· Cable Specifications for Encoder-end Connector
(20-bit Encoder)




Receptacle: CM10-R10P-D
Applicable plug (To be provided by the customer)
Plug: CM10-SP10S-□-D (Straight)
(Boxes (□) indicate a value that varies, depending on cable size.)
Use straight plugs to avoid interference with the fan cover.
Manufacturer: DDK Ltd.

With an Absolute Encoder

| | | | |
|---|---|---|---|
| 1 | PS | 6 | BAT (+) |
| 2 | /PS | 7 | – |
| 3 | – | 8 | – |
| 4 | PG 5V | 9 | PG 0V |
| 5 | BAT (–) | 10 | FG (Frame ground) |

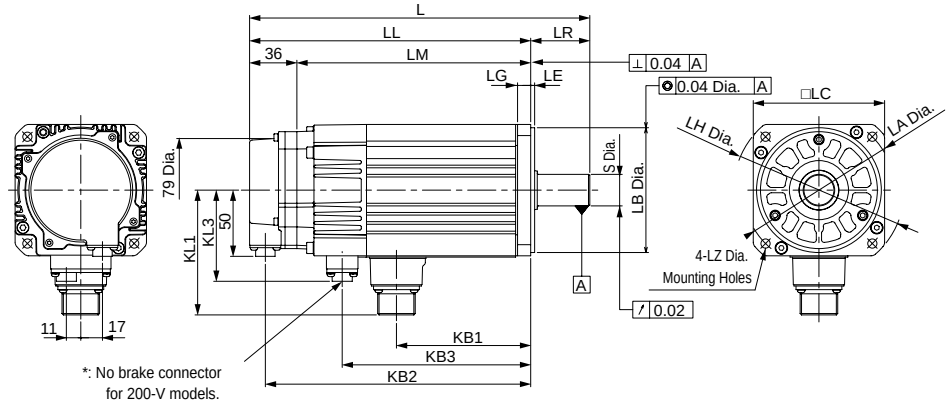
With an Incremental Encoder

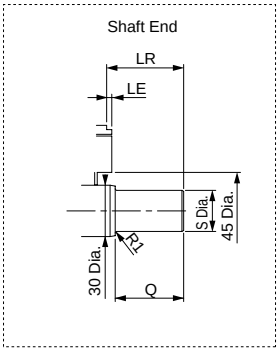
| | | | |
|---|---|---|---|
| 1 | PS | 6 | – |
| 2 | /PS | 7 | – |
| 3 | – | 8 | – |
| 4 | PG 5V | 9 | PG 0V |
| 5 | – | 10 | FG (Frame ground) |

## External Dimensions Units: mm

### ●With Holding Brakes

(1) 1.0 to 5.0 kW



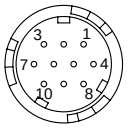




Note: For the specifications of the other shaft ends, refer to page 79.

| Model SGMSV- | L | LL | LM | LR | KB1 200V | KB1 400V | KB2 | KB3* 400V | KL1 200V | KL1 400V | KL3* 400V | Flange Face Dimensions LA | LB | LC | LE | LF | LG | LH | LZ | Shaft End Dimensions S | Q | Approx.Mass |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 10□□A2□ | 233 | 188 | 152 | 45 | 67 | 76 | 176 | 118 | 102 | 96 | 69 | 115 | $95^{0}_{-0.035}$ | 100 | 3 | 3 | 10 | 130 | 7 | $24^{0}_{-0.013}$ | 40 | 5.5 |
| 15□□A2□ | 243 | 198 | 162 | 45 | 77 | 86 | 186 | 128 | 102 | 96 | 69 | 115 | $95^{0}_{-0.035}$ | 100 | 3 | 3 | 10 | 130 | 7 | $24^{0}_{-0.013}$ | 40 | 6 |
| 20□□A2□ | 259 | 214 | 178 | 45 | 93 | 102 | 202 | 144 | 102 | 96 | 69 | 115 | $95^{0}_{-0.035}$ | 100 | 3 | 3 | 10 | 130 | 7 | $24^{0}_{-0.013}$ | 40 | 6.8 |
| 25□□A2□ | 292 | 247 | 211 | 45 | 116 | 125 | 225 | 177 | 102 | 96 | 69 | 115 | $95^{0}_{-0.035}$ | 100 | 3 | 3 | 10 | 130 | 7 | $24^{0}_{-0.013}$ | 40 | 8.7 |
| 30□□A2□ | 295 | 232 | 196 | 63 | 114 | 124 | 220 | 176 | 119 | 114 | 81 | 145 | $110^{0}_{-0.035}$ | 130 | 6 | 6 | 12 | 165 | 9 | $28^{0}_{-0.013}$ | 55 | 13 |
| 40□□A2□ | 332 | 269 | 233 | 63 | 151 | 161 | 257 | 213 | 119 | 114 | 81 | 145 | $110^{0}_{-0.035}$ | 130 | 6 | 6 | 12 | 165 | 9 | $28^{0}_{-0.013}$ | 55 | 16 |
| 50□□A2□ | 372 | 309 | 273 | 63 | 191 | 201 | 297 | 253 | 119 | 114 | 81 | 145 | $110^{0}_{-0.035}$ | 130 | 6 | 6 | 12 | 165 | 9 | $28^{0}_{-0.013}$ | 55 | 19 |

*: No brake connector for 200-V models (there are brake terminals on the servomotor-end connectors).
Note: Models with oil seals are of the same configuration.

· Cable Specifications for Encoder-end Connector (20-bit Encoder)




Receptacle: CM10-R10P-D
Applicable plug (To be provided by the customer)
Plug: CM10-AP10S-□-D (Angle)
CM10-SP10S-□-D (Straight)
(Boxes (□) indicate a value that varies, depending on cable size.)
Manufacturer: DDK Ltd.

With an Absolute Encoder

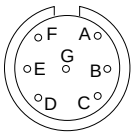
| | | | |
|---|---|---|---|
| 1 | PS | 6 | BAT (+) |
| 2 | /PS | 7 | – |
| 3 | – | 8 | – |
| 4 | PG 5V | 9 | PG 0V |
| 5 | BAT (–) | 10 | FG (Frame ground) |

With an Incremental Encoder

| | | | |
|---|---|---|---|
| 1 | PS | 6 | – |
| 2 | /PS | 7 | – |
| 3 | – | 8 | – |
| 4 | PG 5V | 9 | PG 0V |
| 5 | – | 10 | FG (Frame ground) |

200-V Class

· Cable Specifications for Servomotor-end Connector



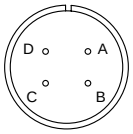

| | |
|---|---|
| A | Phase U |
| B | Phase V |
| C | Phase W |
| D | FG(Frame ground) |
| E | Brake terminal |
| F | Brake terminal |
| G | – |

Manufacturer: Japan Aviation Electronics Industry, Ltd.

Note: No polarity for connection to the brake terminals

400-V Class

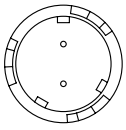
· Cable Specifications for Servomotor-end Connector




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

· SGMSV-10 to -25
Manufacturer: DDK Ltd.
· SGMSV-30 to -50
Manufacturer: Japan Aviation Electronics Industry, Ltd.

· Cable Specifications for Brake-end Connector



Receptacle: CM10-R2P-D
Applicable plug (To be provided by the customer)
Plug: CM10-AP2S-□-D (Angle)
CM10-SP2S-□-D (Straight)
(Boxes (□) indicate a value that varies, depending on cable size.)
Manufacturer: DDK Ltd.

| |
|---|
| Brake terminal |
| Brake terminal |

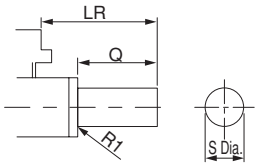
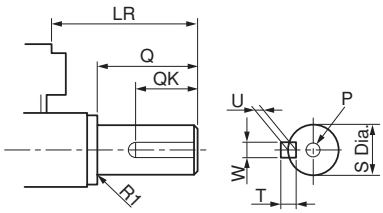
Note: No polarity for connection to the brake terminals

## External Dimensions Units: mm

● Shaft End

SGMSV - □□□□□□□

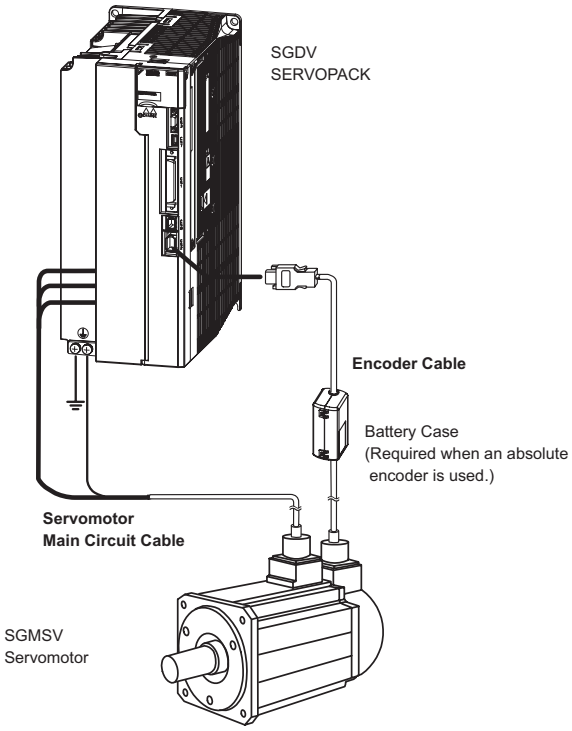
| Code | Specifications | Remarks |
|---|---|---|
| 2 | Straight without key | Optional/Non-stock |
| 6 | Straight with key and tap for one location (Key slot is JIS B1301-1996 fastening type) | Standard/Stock |

| Code | Specifications | Shaft End | | Model SGMSV- | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | 10 | 15 | 20 | 25 | 30 | 40 | 50 | 70 |
| 2 | Straight without Key |  | LR | 45 | | | | 63 | | | |
| | | | Q | 40 | | | | 55 | | | |
| | | | S | $24\ ^{0}_{-0.013}$ | | | | $28\ ^{0}_{-0.013}$ | | | |
| 6 | Straight with Key and Tap |  | LR | 45 | | | | 63 | | | |
| | | | Q | 40 | | | | 55 | | | |
| | | | QK | 32 | | | | 50 | | | |
| | | | S | $24\ ^{0}_{-0.013}$ | | | | $28\ ^{0}_{-0.013}$ | | | |
| | | | W | 8 | | | | | | | |
| | | | T | 7 | | | | | | | |
| | | | U | 4 | | | | | | | |
| | | | P | M8 Screw Depth16 | | | | | | | |

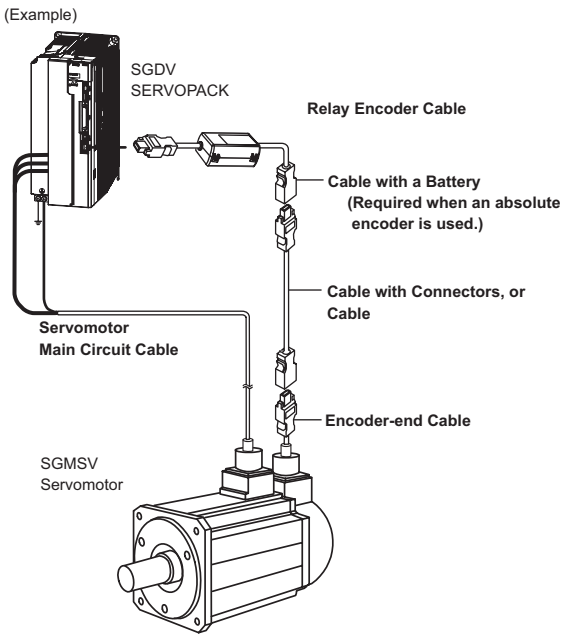
## Selecting Cables

### ●Cables Connections

#### ●Standard Wiring (Max. encoder cable length: 20 m)




#### ●Encoder Cable Extension from 30 to 50 m

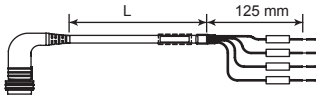
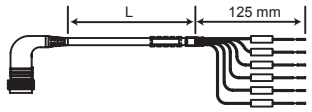
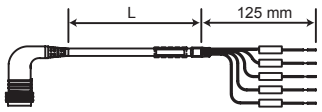
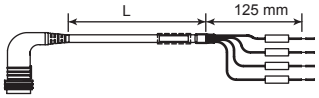
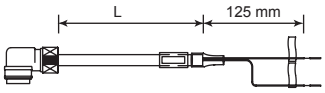
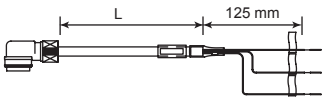



**⚠CAUTION**

- Separate the servomotor main circuit cable wiring from the I/O signal cable and encoder cable at least 30 cm, and do not bundle or run them in the same duct.
- When the main circuit cable length exceeds 20 m, note that the intermittent duty zone of the Torque-Motor Speed Characteristics will shrink as the line-to-line voltage drops.

# Selecting Cables

## ●Servomotor Main Circuit Cables

| Voltage | Name | Servomotor Rated Output | Length | Order No. | | Specifications | Details |
|---|---|---|---|---|---|---|---|
| | | | | Value Type | Premium Type *2 | | |
| 200V | Servomotor Power Cable (for Servomotor without Holding Brake) | 1.0kW to 2.5kW | 3 m | B1EV-03(A)-E | B1EP-03(A)-E |  | (1) |
| | | | 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 | | |
| | | 3.0kW | 3 m | B3EV-03(A)-E | B3EP-03(A)-E | | |
| | | | 5 m | B3EV-05(A)-E | B3EP-05(A)-E | | |
| | | | 10 m | B3EV-10(A)-E | B3EP-10(A)-E | | |
| | | | 15 m | B3EV-15(A)-E | B3EP-15(A)-E | | |
| | | | 20 m | B3EV-20(A)-E | B3EP-20(A)-E | | |
| | | 4.0 to 7.0kW *4 | 3 m | B4EV-03(A)-E | B4EP-03(A)-E | | |
| | | | 5 m | B4EV-05(A)-E | B4EP-05(A)-E | | |
| | | | 10 m | B4EV-10(A)-E | B4EP-10(A)-E | | |
| | | | 15 m | B4EV-15(A)-E | B4EP-15(A)-E | | |
| | | | 20 m | B4EV-20(A)-E | B4EP-20(A)-E | | |
| | Servomotor Power Cable (for Servomotor with Holding Brake) *3 | 1.0kW to 2.5kW | 3 m | BABEV-03(A)-E | BABEP-03(A)-E |  | (5) |
| | | | 5 m | BABEV-05(A)-E | BABEP-05(A)-E | | |
| | | | 10 m | BABEV-10(A)-E | BABEP-10(A)-E | | |
| | | | 15 m | BABEV-15(A)-E | BABEP-15(A)-E | | |
| | | | 20 m | BABEV-20(A)-E | BABEP-20(A)-E | | |
| | | 3.0kW | 3 m | BCBEV-03(A)-E | BCBEP-03(A)-E | | |
| | | | 5 m | BCBEV-05(A)-E | BCBEP-05(A)-E | | |
| | | | 10 m | BCBEV-10(A)-E | BCBEP-10(A)-E | | |
| | | | 15 m | BCBEV-15(A)-E | BCBEP-15(A)-E | | |
| | | | 20 m | BCBEV-20(A)-E | BCBEP-20(A)-E | | |
| | | 4.0 to 5.0kW *4 | 3 m | BDBEV-03(A)-E | BDBEP-03(A)-E | | |
| | | | 5 m | BDBEV-05(A)-E | BDBEP-05(A)-E | | |
| | | | 10 m | BDBEV-10(A)-E | BDBEP-10(A)-E | | |
| | | | 15 m | BDBEV-15(A)-E | BDBEP-15(A)-E | | |
| | | | 20 m | BDBEV-20(A)-E | BDBEP-20(A)-E | | |
| | Fan Cable | 7.0kW | 3 m | BFEV-03(A)-E | - |  | (4) |
| | | | 5 m | BFEV-05(A)-E | | | |
| | | | 10 m | BFEV-10(A)-E | | | |
| | | | 15 m | BFEV-15(A)-E | | | |
| | | | 20 m | BFEV-20(A)-E | | | |
| 400V | Servomotor Power Cable (for Servomotor with or without Holding Brake) *1 | 1.0kW to 2.5kW | 3 m | B1EV-03(A)-E | B1EP-03(A)-E |  | (1) |
| | | | 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 | | |
| | | 3.0 to 5.0kW | 3 m | B3EV-03(A)-E | B3EP-03(A)-E | | |
| | | | 5 m | B3EV-05(A)-E | B3EP-05(A)-E | | |
| | | | 10 m | B3EV-10(A)-E | B3EP-10(A)-E | | |
| | | | 15 m | B3EV-15(A)-E | B3EP-15(A)-E | | |
| | | | 20 m | B3EV-20(A)-E | B3EP-20(A)-E | | |
| | Holding Brake Cable | 1kW to 5kW | 3 m | BBEV-03(A)-E | - |  | (2) |
| | | | 5 m | BBEV-05(A)-E | - | | |
| | | | 10 m | BBEV-10(A)-E | - | | |
| | | | 15 m | BBEV-15(A)-E | - | | |
| | | | 20 m | BBEV-20(A)-E | - | | |
| | | | 3 m | - | BBEP-03(A)-E |  | (3) |
| | | | 5 m | - | BBEP-05(A)-E | | |
| | | | 10 m | - | BBEP-10(A)-E | | |
| | | | 15 m | - | BBEP-15(A)-E | | |
| | | | 20 m | - | BBEP-20(A)-E | | |

*1 400V Servomotors with holding brakes require a holding brake cable in addition to a power cable.
*2 Premium cables have a braided cable shield and are intended for use in applications that require CE. Premium cables have a continuous flex rating and are intended for use in movable sections such as robot arms.
*3 200V servomotors with holding brakes use a combined power and brake cable
*4 The 7.0kW, 200V servomotor requires a separate fan cable. 7.0kW units are not available with holding brake.

## Selecting Cables

### (1) Wiring Specifications for 200V and 400V Servomotors without Holding Brakes*

● Value Type

SERVOPACK-end Leads

| Wire Label | Signal |
|---|---|
| G | FG |
| W | Phase W |
| V | Phase V |
| U | Phase U |

Servomotor-end Connector

| Signal | Pin No. |
|---|---|
| FG | D |
| Phase W | C |
| Phase V | B |
| Phase U | A |

*400V servomotors with holding brakes require a separate holding brake cable. See (2) and (3).

● Premium Type

SERVOPACK-end Leads

| Wire Label | Signal |
|---|---|
| G | FG |
| W | Phase W |
| V | Phase V |
| U | Phase U |

Servomotor-end Connector

| Signal | Pin No. |
|---|---|
| FG | D |
| Phase W | C |
| Phase V | B |
| Phase U | A |

*400V servomotors with holding brakes require a separate holding brake cable. See (2) and (3).

### (2) Wiring Specifications for the Value Type Brake Cable for 400V Servomotors

SERVOPACK-end Leads

| Wire Color | Signal |
|---|---|
| Black | Brake |
| White | Brake |

Servomotor-end Connector

| Signal | Pin No. |
|---|---|
| Brake | 1 |
| Brake | 2 |

Note: No polarity for connection to a holding brake.

### (3) Wiring Specifications for the Premium Type Brake Cable for 400V Servomotors

SERVOPACK-end Leads

| Wire Color | Signal |
|---|---|
| Black | Brake |
| Blue | Brake |
| Green/Yellow | Shield |

Servomotor-end Connector

| Signal | Pin No. |
|---|---|
| Brake | 1 |
| Brake | 2 |

Shield Wire

Note: No polarity for connection to a holding brake.

### (4) Wiring Specifications for the Fan on 200V 7.0kW Servomotors

SERVOPACK-end Leads

| Wire Label | Signal |
|---|---|
| FAN | Fan |
| FAN | Fan |
| ALM | Alarm |
| ALM | Alarm |
| GND | FG |

Servomotor-end Connector

| Signal | Pin No. |
|---|---|
| Fan Motor | A |
| Fan Motor | B |
| Alarm Terminal | D |
| Alarm Terminal | E |
| FG | F |

Notes:
No polarity for connection to a fan.
No polarity for connection to an alarm circuit.

### (5) Wiring Specifications for 200V Servomotors with Holding Brakes

● Value Type

SERVOPACK-end Leads

| Wire Label | Signal |
|---|---|
| U | Phase U |
| V | Phase V |
| W | Phase W |
| G | FG |
| BK | Brake |
| BK | Brake |

Servomotor-end Connector

| Signal | Pin No. |
|---|---|
| Phase U | A |
| Phase V | B |
| Phase W | C |
| FG | D |
| Brake | E |
| Brake | F |

Note: No polarity for connection to a holding brake.

● Premium Type

SERVOPACK-end Leads

| Wire Label | Signal |
|---|---|
| U | Phase U |
| V | Phase V |
| W | Phase W |
| G | FG |
| BK | Brake |
| BK | Brake |

Servomotor-end Connector

| Signal | Pin No. |
|---|---|
| Phase U | A |
| Phase V | B |
| Phase W | C |
| FG * | D |
| Brake | E |
| Brake | F |

Note: No polarity for connection to a holding brake.
* For 200V Premium Cable, shield is connected to FG wire on the servomotor-end of the cable.

## ●Customer Cable Assembly

Customers may assemble the servomotor's main circuit cables and attach connectors to connect the SERVOPACKs and the SGMSV servomotors.

The connectors for these models are round. The connectors specified by Yaskawa are required. Note that the connectors vary depending on the operation environment of servomotors.

Two types of connectors are available.

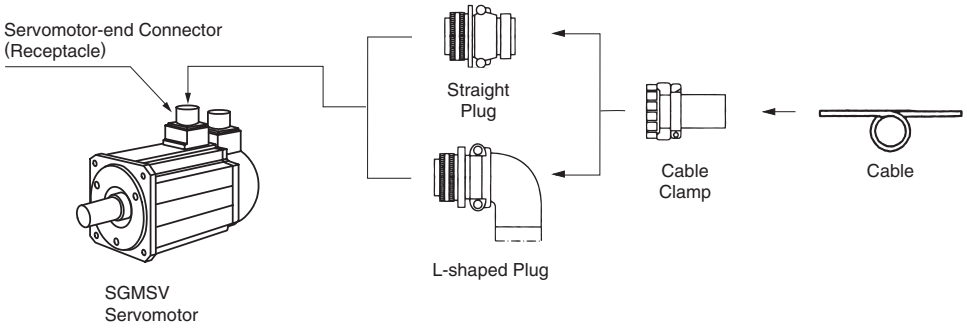
· Standard connectors

· Protective structure IP67 and European Safety Standards compliant connectors

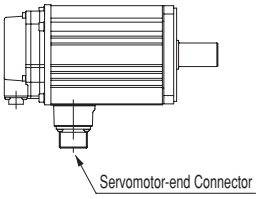
Yaskawa does not specify which cables to use. Use appropriate cables for the connectors.

## ●Standard Connectors

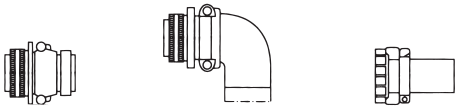
### ● Connector Configuration




### (1) Without Holding Brakes




Servomotor-end Connector
For 1.0 to 7.0 kW

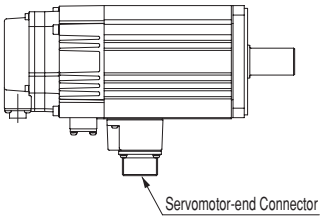


| Capacity kW | Servomotor-end Connector (Receptacle) | Cable-end Connector (Not provided by Yaskawa) | | |
|---|---|---|---|---|
| | | Straight Plug | L-shaped Plug | Cable Clamp |
| 1.0 to 2.5 | MS3102A18-10P | MS3106B18-10S | MS3108B18-10S | MS3057-10A |
| 3.0 to 7.0 | MS3102A22-22P | MS3106B22-22S | MS3108B22-22S | MS3057-12A |

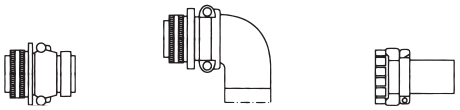
Note: Servomotor-end connectors (receptacles) are RoHS-compliant. Contact the respective connector manufacturers for RoHS-compliant cable-end connectors.

### (2) With Holding Brakes (200 V)

No brake connector for 200-V models
(there are brake terminals on the servomotor-end connectors).




Servomotor-end Connector
For 1.0 to 5.0 kW

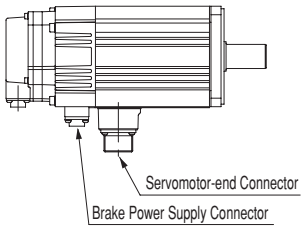


| Capacity kW | Servomotor-end Connector (Receptacle) | Cable-end Connector (Not provided by Yaskawa) | | |
|---|---|---|---|---|
| | | Straight Plug | L-shaped Plug | Cable Clamp |
| 1.0 to 2.5 | MS3102A20-15P | MS3106B20-15S | MS3108B20-15S | MS3057-12A |
| 3.0 to 5.0 | MS3102A24-10P | MS3106B24-10S | MS3108B24-10S | MS3057-16A |

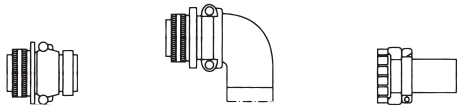
Note: Servomotor-end connectors (receptacles) are RoHS-compliant. Contact the respective connector manufacturers for RoHS-compliant cable-end connectors.

## Selecting Cables

(3) With Holding Brakes (400 V)



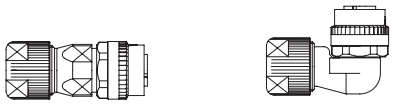

Servomotor-end Connector
For 1.0 to 5.0 kW



| Capacity kW | Servomotor-end Connector (Receptacle) | Cable-end Connector (Not provided by Yaskawa) | | |
|---|---|---|---|---|
| | | Straight Plug | L-shaped Plug | Cable Clamp |
| 1.0 to 2.5 | MS3102A18-10P | MS3106B18-10S | MS3108B18-10S | MS3057-10A |
| 3.0 to 5.0 | MS3102A22-22P | MS3106B22-22S | MS3108B22-22S | MS3057-12A |

Note: Servomotor-end connectors (receptacles) are RoHS-compliant. Contact the respective connector manufacturers for RoHS-compliant cable-end connectors.

Brake Power Supply Connector
For 1.0 to 5.0 kW



| Capacity kW | Servomotor-end Connector (Receptacle) | Cable-end Connector (Not provided by Yaskawa) | | |
|---|---|---|---|---|
| | | Straight Plug | L-shaped Plug | Manufacturer |
| 1.0 to 5.0 | CM10-R2P-D | CM10-SP2S-S-D<br>Applicable Cable:<br>4.0 dia. to 6.0 dia. | CM10-AP2S-S-D<br>Applicable Cable:<br>4.0 dia. to 6.0 dia. | DDK Ltd. |
| | | CM10-SP2S-M-D<br>Applicable Cable:<br>6.0 dia. to 9.0 dia. | CM10-AP2S-M-D<br>Applicable Cable:<br>6.0 dia. to 9.0 dia. | |
| | | CM10-SP2S-L-D<br>Applicable Cable:<br>9.0 dia. to 11.6 dia. | CM10-AP2S-L-D<br>Applicable Cable:<br>9.0 dia. to 11.6 dia. | |

To order a brake power supply connecter kit (1.0 to 5.0 kW) with the order no. below, contact your Yaskawa representative.

J Z S P - C V B 9 - S M S2 - E

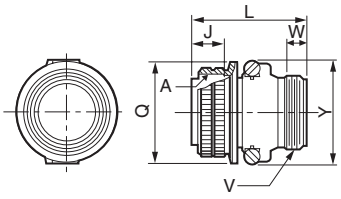
- Connector Type
  - S: Straight plug
  - A: L-shaped plug
- Bush Size*1
  - S : Size S (4.0 dia. to 6.0 dia.)
  - M: Size M (6.0 dia. to 9.0 dia.)
  - L : Size L (9.0 dia. to 11.6 dia.)
- Contact Pin Size
  - S2: Soldered
  - C3: Crimping type*2

*1: A size-M connector kit is available as standard equipment.
*2: A crimp tool (model: 357J-50448T) by DDK Ltd. is required.

## Selecting Cables Units: mm

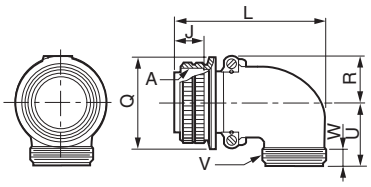
● Cable-end Connectors

(1) MS3106B□□-□□S :
Straight Plug



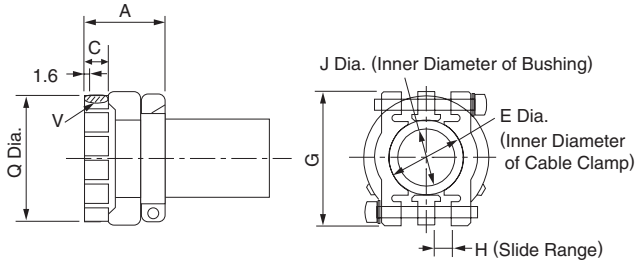

| Shell Size | Joint Screw A | Length of Joint Portion J±0.12 | Overall Length L max. | Outer Diameter of Joint Nut Q $^{+0}_{-0.38}$ | Cable Clamp Set Screw V | Effective Screw Length W min. | Maximum Width Y max. |
|---|---|---|---|---|---|---|---|
| 18 | 1-1/8-18UNEF | 18.26 | 52.37 | 34.13 | 1-20UNEF | 9.53 | 42 |
| 20 | 1-1/4-18UNEF | 18.26 | 55.57 | 37.28 | 1-3/16-18UNEF | 9.53 | 47 |
| 22 | 1-3/8-18UNEF | 18.26 | 55.57 | 40.48 | 1-3/16-18UNEF | 9.53 | 50 |
| 24 | 1-1/2-18UNEF | 18.26 | 58.72 | 43.63 | 1-7/16-18UNEF | 9.53 | 53 |

(2) MS3108B□□-□□S :
L-shaped Plug



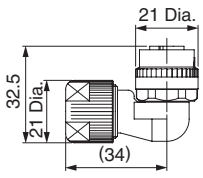

| Shell Size | Joint Screw A | Length of Joint Portion J±0.12 | Overall Length L max. | Outer Diameter of Joint Nut Q $^{+0}_{-0.38}$ | R ±0.5 | U ±0.5 | Cable Clamp Set Screw V | Effective Screw Length W min. |
|---|---|---|---|---|---|---|---|---|
| 18 | 1-1/8-18UNEF | 18.26 | 68.27 | 34.13 | 20.5 | 30.2 | 1-20UNEF | 9.53 |
| 20 | 1-1/4-18UNEF | 18.26 | 76.98 | 37.28 | 22.5 | 33.3 | 1-3/16-18UNEF | 9.53 |
| 22 | 1-3/8-18UNEF | 18.26 | 76.98 | 40.48 | 24.1 | 33.3 | 1-3/16-18UNEF | 9.53 |
| 24 | 1-1/2-18UNEF | 18.26 | 86.51 | 43.63 | 25.6 | 36.5 | 1-7/16-18UNEF | 9.53 |

(3) MS3057-□□A : Cable Clamp with Rubber Bushing

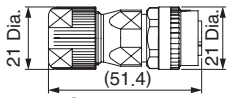



| Cable Clamp Type | Applicable Connector Shell Size | Overall Length A±0.7 | Effective Screw Length C | E Diameter | G±0.7 | H | J Diameter | Set Screw V | Outer Diameter Q±0.7 Dia. | Attached Bushing |
|---|---|---|---|---|---|---|---|---|---|---|
| MS3057-10A | 18 | 23.8 | 10.3 | 15.9 | 31.7 | 3.2 | 14.3 | 1-20UNEF | 30.1 | AN3420-10 |
| MS3057-12A | 20□22 | 23.8 | 10.3 | 19 | 37.3 | 4 | 15.9 | 1-3/16-18UNEF | 35.0 | AN3420-12 |
| MS3057-16A | 24 | 26.2 | 10.3 | 23.8 | 42.9 | 4.8 | 19.1 | 1-7/16-18UNEF | 42.1 | AN3420-16 |

● Dimensional Drawings of Brake Power Supply



Angled Plug



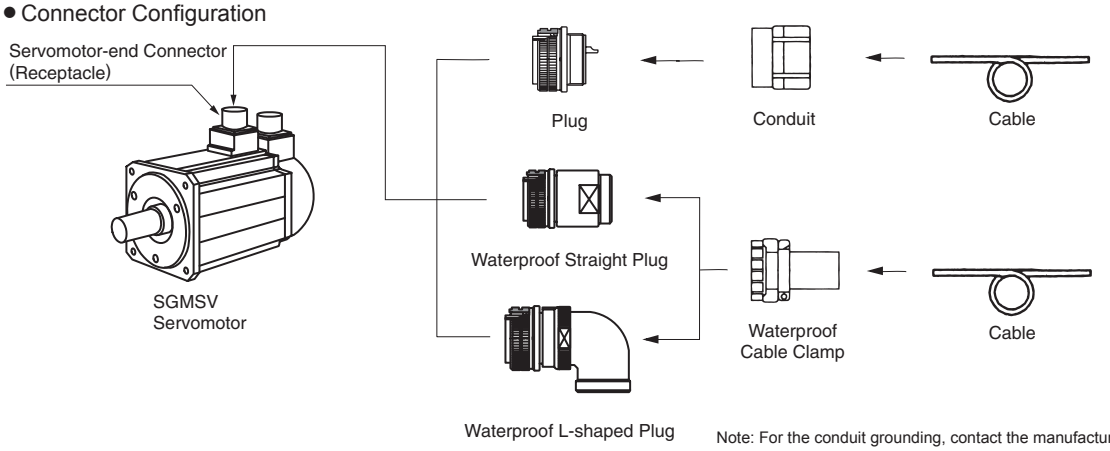
Straight Plug

| Items | Specifications |
|---|---|
| Connector Order No. | CM10- □P2S-□ -D (Cables are not included.) |
| Protective Structure | IP67 |
| Manufacturer | DDK Ltd. |
| Instructions | Angled plug (CM10-AP2S- □ -D): TC-573, Straight plug (CM10-SP2S- □ -D): TC-583 |
| Electrical Contact Order No. | Electrical contact (100 pcs in one bag)<br>· Crimping type: CM10-#22SC(C3)-100, Wire size: AWG16 to 20,<br>Outer diameter of sheath: 1.87 to 2.45 dia., Hand tool: 357J-50448T<br>· Soldered type: CM10-#22SC (S2)-100, Wire size: AWG16 max.<br>Real contact (4000 pcs on one reel)<br>· Crimping type: CM10-#22SC(C3)-4000, Wire size: AWG 16 to 20,<br>Outer diameter of sheath: 1.87 to 2.45 dia.,<br>Semi-automatic tool: AP-A50541T (product name for one set),<br>AP-A50541T-1 (product name for applicator)<br>Note: The product name of the semi-automatic tool refers to the product name of the press and applicator (crimper) as a set. |

## Selecting Cables

### ●Protective Structure IP67 and European Safety Standards Compliant Connector

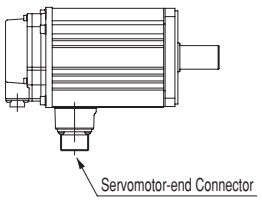
● Connector Configuration




Note: For the conduit grounding, contact the manufacturer of the conduit being used.

#### (1) Without Holding Brakes

Servomotor-end Connector
For 1.0 to 7.0 kW



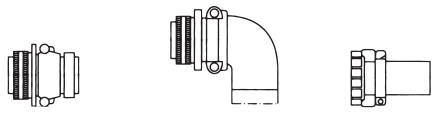

| Capacity kW | Servomotor-end Connector (Receptacle) | Cable-end Connector (Not Provided by Yaskawa) | | | | | |
|---|---|---|---|---|---|---|---|
| | | Plug | Straight Plug | L-shaped Plug | Cable Clamp | Applicable Cable Diameter (For Reference) | Manufacturer |
| 1.0 to 2.5 | CE05-2A18-10PD-D | CE05-6A18-10SD-D | CE05-6A18-10SD-D-BSS | CE05-8A18-10SD-D-BAS | CE3057-10A-1-D | 10.5 dia. to 14.1 dia. | DDK Ltd. |
| | | | | | CE3057-10A-2-D | 8.5 dia. to 11.0 dia. | |
| | | | | | CE3057-10A-3-D | 6.5 dia. to 8.7 dia. | |
| 3.0 to 7.0 | JL04HV-2E22-22PE-B-R | JL04V-6A22-22SE-R | JL04V-6A22-22SE-EB-R or JA06A-22-22S-J1-EB-R* | JL04V-8A22-22SE-EB-R or JA08A-22-22S-J1-EB-R* | JL04-2022CK (09) -R | 6.5 Dia. to 9.5 Dia. | Japan Aviation Electronics Industry, Ltd. |
| | | | | | JL04-2022CK (12) -R | 9.5 Dia. to 13.0 Dia. | |
| | | | | | JL04-2022CK (14) -R | 12.9 Dia. to 15.9 Dia. | |

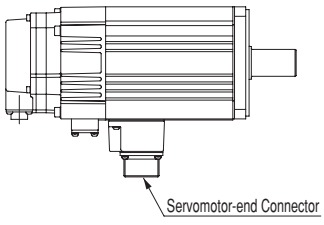
*: Not compliant with European Safety Standards, but compliant with protective structure IP67.

#### (2) With Holding Brakes (200 V)

No brake connector for 200-V models
(there are brake terminals on the servomotor-end connectors).

Servomotor-end Connector
For 1.0 to 5.0 kW

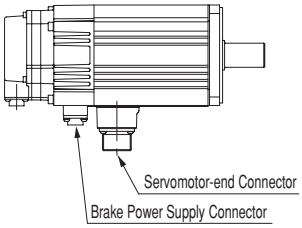





| Capacity kW | Servomotor-end Connector (Receptacle) | Cable-end Connector (Not Provided by Yaskawa) | | | | | |
|---|---|---|---|---|---|---|---|
| | | Plug | Straight Plug | L-shaped Plug | Cable Clamp | Applicable Cable Diameter (For Reference) | Manufacturer |
| 1.0 to 2.5 | JL04V-2E20-15PE-B-R | JL04V-6A20-15SE-R | JL04V-6A20-15SE-EB-R | JL04V-8A20-15SE-EB-R | JL04-2022CK (09) -R | 6.5 Dia. to 9.5 Dia. | Japan Aviation Electronics Industry, Ltd. |
| | | | | | JL04-2022CK (12) -R | 9.5 Dia. to 13.0 Dia. | |
| | | | | | JL04-2022CK (14) -R | 12.9 Dia. to 15.9 Dia. | |
| 3.0 to 5.0 | JL04V-2E24-10PE-B-R | JL04-6A24-10SE-R | JL04V-6A24-10SE-EB-R or JA06A-24-10S-J1-EB-R* | JL04V-8A24-10SE-EB-R or JA08A-24-10S-J1-EB-R* | JL04-2428CK (11) -R | 9.0 Dia. to 12.0 Dia. | |
| | | | | | JL04-2428CK (14) -R | 12.0 Dia. to 15.0 Dia. | |
| | | | | | JL04-2428CK (17) -R | 15.0 Dia. to 18.0 Dia. | |
| | | | | | JL04-2428CK (20) -R | 18.0 Dia. to 20.0 Dia. | |

*: Not compliant with European Safety Standards, but compliant with protective structure IP67.

(3) With Holding Brakes (400 V)

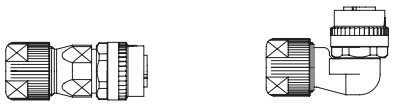



Servomotor-end Connector
For 1.0 to 5.0 kW

| Capacity kW | Servomotor-end Connector (Receptacle) | Cable-end Connector (Not Provided by Yaskawa) | | | | | |
|---|---|---|---|---|---|---|---|
| | | Plug | Straight Plug | L-shaped Plug | Cable Clamp | Applicable Cable Diameter (For Reference) | Manufacturer |
| 1.0 to 2.5 | CE05-2A18-10PD-D | CE05-6A18-10SD-D | CE05-6A18-10SD-D-BSS | CE05-8A18-10SD-D-BAS | CE3057-10A-1-D | 10.5 dia. to 14.1 dia. | DDK Ltd. |
| | | | | | CE3057-10A-2-D | 8.5 dia. to 11.0 dia. | |
| | | | | | CE3057-10A-3-D | 6.5 dia. to 8.7 dia. | |
| 3.0 to 5.0 | JL04HV-2E22-22PE-B-R | JL04V-6A22-22SE-R | JL04V-6A22SE-EB-R or JA06A-22-22S-J1-EB-R* | JL04V-8A22-22SE-EB-R or JA08A-22-22S-J1-EB-R* | JL04-2022CK(09)-R | 6.5 Dia. to 9.5 Dia. | Japan Aviation Electronics Industry, Ltd. |
| | | | | | JL04-2022CK(12)-R | 9.5 Dia. to 13.0 Dia. | |
| | | | | | JL04-2022CK(14)-R | 12.9 Dia. to 15.9 Dia. | |

*: Not compliant with European Safety Standards, but compliant with protective structure IP67.

Brake Power Supply Connector
For 1.0 to 5.0 kW



| Capacity kW | Servomotor-end Connector (Receptacle) | Cable-end Connector (Not provided by Yaskawa) | | |
|---|---|---|---|---|
| | | Straight Plug | L-shaped Plug | Manufacturer |
| 1.0 to 5.0 | CM10-R2P-D | CM10-SP2S-S-D Applicable Cable: 4.0 dia. to 6.0 dia. | CM10-AP2S-S-D Applicable Cable: 4.0 dia. to 6.0 dia. | DDK Ltd. |
| | | CM10-SP2S-M-D Applicable Cable: 6.0 dia. to 9.0 dia. | CM10-AP2S-M-D Applicable Cable: 6.0 dia. to 9.0 dia. | |
| | | CM10-SP2S-L-D Applicable Cable: 9.0 dia. to 11.6 dia. | CM10-AP2S-L-D Applicable Cable: 9.0 dia. to 11.6 dia. | |

To order a brake power supply connecter kit (1.0 to 5.0 kW) with the order no. below, contact your Yaskawa representative.

J Z S P - C V B 9 - S M S2 - E

Connector Type
S: Straight plug
A: L-shaped plug

Bush Size*1
S : Size S (4.0 dia. to 6.0 dia.)
M: Size M (6.0 dia. to 9.0 dia.)
L : Size L (9.0 dia. to 11.6 dia.)

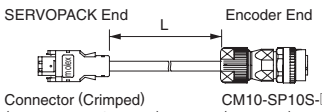
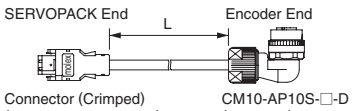
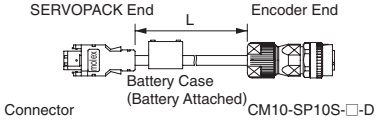
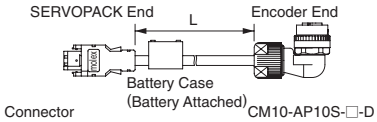
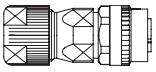
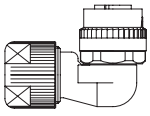
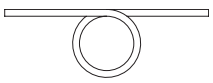
Contact Pin Size
S2: Soldered
C3: Crimping type*2

*1: A size-M connector kit is available as standard equipment.
*2: A crimp tool (model: 357J-50448T) by DDK Ltd. is required.

## Selecting Cables

### ●Encoder Cables (Max. length: 20 m)

■ Non-Stock Items

| Name | Length (L) | Order No. Standard Type | Order No. Flexible Type* | Specifications | Details |
|---|---|---|---|---|---|
| Encoder Cable with Connectors (For Incremental Encoder) | 3 m | JZSP-CVP01-03-E | JZSP-CVP11-03-E |  | (1) |
| | 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 | | |
| Encoder Cable with Connectors (For Absolute Encoder, with a Battery Case) | 3 m | JZSP-CVP06-03-E | JZSP-CVP26-03-E |  | (2) |
| | 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 | | |
| SERVOPACK-end Connector Kit | | JZSP-CMP9-1-E | | Soldered  (Molex Japan Co., Ltd.) | (3) |
| Encoder-end Connectors for Protective Structure IP67 Straight Plug | | JZSP-CVP9-1-E: Connector Specifications Plug: CM10-SP10S-M-D Electrical Contact: (Crimped)** CM10-#22SC(C4)-100 Applicable Cable Diameter: 6.0 dia. to 9.0 dia. | |  + Electrical Contact (DDK Ltd.) | - |
| | | JZSP-CVP9-3-E: Connector Specifications Plug: CM10-SP10S-M-D Electrical Contact: (Soldered) CM10-#22SC(S1)-100 Applicable Cable Diameter: 6.0 dia. to 9.0 dia | | | |
| Encoder-end Connectors for Protective Structure IP67 L-shaped Plug | | JZSP-CVP9-2-E: Connector Specifications Plug: CM10-AP10S-M-D Electrical Contact: (Crimped)** CM10-#22SC(C4)-100 Applicable Cable Diameter: 6.0 dia. to 9.0 dia. | |  + Electrical Contact (DDK Ltd.) | - |
| | | JZSP-CVP9-4-E: Connector Specifications Plug: CM10-AP10S-M-D Electrical Contact: (Soldered) CM10-#22SC(S1)-100 Applicable Cable Diameter: 6.0 dia. to 9.0 dia | | | |
| Cables | 3 m | JZSP-CMP09-03-E | JZSP-CSP39-03-E |  | (4) |
| | 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 | | |

* Use flexible cables for movable sections such as robot arms.
** A crimp tool (357J-52667T) is required

(1) Wiring Specifications for Cable with Connectors
(For incremental encoder)

· Standard Type

| SERVOPACK End | | | Encoder (Servomotor) End | |
|---|---|---|---|---|
| Pin No. | Signal | | Pin No. | Wire Color |
| 6 | /PS | | 2 | Light blue/white |
| 5 | PS | | 1 | Light blue |
| 4 | BAT(–) | | 5 | Orange/white |
| 3 | BAT(+) | | 6 | Orange |
| 2 | PG 0V | | 9 | Black |
| 1 | PG 5V | | 4 | Red |
| Shell | FG | Shield Wire | 10 | FG |

· Flexible Type

| SERVOPACK End | | | Encoder (Servomotor) End | |
|---|---|---|---|---|
| Pin No. | Signal | | Pin No. | Wire Color |
| 6 | /PS | | 2 | Black/pink |
| 5 | PS | | 1 | Red/pink |
| 4 | BAT(–) | | 5 | Black/light blue |
| 3 | BAT(+) | | 6 | Red/light blue |
| 2 | PG 0V | | 9 | Green |
| 1 | PG 5V | | 4 | Orange |
| Shell | FG | Shield Wire | 10 | FG |

(2) Wiring Specifications for Cable with Connectors
(For absolute encoder, with a battery case)

· Standard Type

| SERVOPACK End | | | Encoder (Servomotor) End | |
|---|---|---|---|---|
| Pin No. | Signal | | Pin No. | Wire Color |
| 6 | /PS | | 2 | Light blue/white |
| 5 | PS | | 1 | Light blue |
| 4 | BAT(–) | | 5 | Orange/white |
| 3 | BAT(+) | | 6 | Orange |
| 2 | PG 0V | | 9 | Black |
| 1 | PG 5V | | 4 | Red |
| Shell | FG | Shield Wire | 10 | FG |

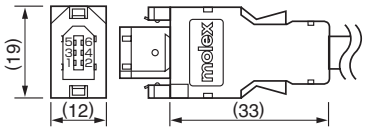
| Battery Case | |
|---|---|
| Pin No. | Signal |
| 2 | BAT(–) |
| 1 | BAT(+) |

· Flexible Type

| SERVOPACK End | | | Encoder (Servomotor) End | |
|---|---|---|---|---|
| Pin No. | Signal | | Pin No. | Wire Color |
| 6 | /PS | | 2 | Black/pink |
| 5 | PS | | 1 | Red/pink |
| 4 | BAT(–) | | 5 | Black/light blue |
| 3 | BAT(+) | | 6 | Red/light blue |
| 2 | PG 0V | | 9 | Green |
| 1 | PG 5V | | 4 | Orange |
| Shell | FG | Shield Wire | 10 | FG |

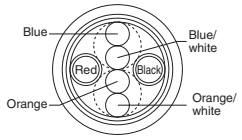
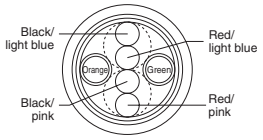
| Battery Case | |
|---|---|
| Pin No. | Signal |
| 2 | BAT(–) |
| 1 | BAT(+) |

(3) SERVOPACK-end Connector Kit Specifications

| Items | Specifications |
|---|---|
| Order No. | JZSP-CMP9-1-E |
| Manufacturer | Molex Japan Co., Ltd. |
| Connector Model (For standard) | 55100-0670 (soldered) |
| External Dimensions (Units: mm) |   |

Note: The mating connector model on SERVOPACK: 54280-800
The mating connector model on servomotor: 55102-0600

(4) Cable Specifications

| Items | Standard Type | Flexible Type |
|---|---|---|
| Order No.* | JZSP-CMP09-□□-E | JZSP-CSP39-□□-E |
| Cable Length | 20 m max. | |
| Specifications | UL20276 (Max. rating temperature: 80˚C)<br>AWG22×2C + AWG24×2P<br>AWG22 (0.33 mm$^2$)<br>Outer diameter of insulating sheath: 1.15 dia.<br>AWG24 (0.20 mm$^2$)<br>Outer diameter of insulating sheath: 1.09 dia. | UL20276 (Max. rating temperature: 80˚C)<br>AWG22×2C + AWG24×2P<br>AWG22 (0.33 mm$^2$)<br>Outer diameter of insulating sheath: 1.35 dia.<br>AWG24 (0.20 mm$^2$)<br>Outer diameter of insulating sheath: 1.21 dia. |
| Finished Dimensions | 6.5 dia. | 6.8 dia. |
| Internal Configuration and Lead Color |   |   |
| Yaskawa Standards Specifications (Standard Length) | Cable length: 5 m, 10 m, 15 m, 20 m | |

*: Specify the cable length in □□ of order no.
Example: JZSP-CMP09-05-E (5 m)

# Selecting Cables

## ●Encoder Cables (For extending from 30 to 50 m)

■ Limited Stock Items

| Name | Length | Order No. | Specifications | Datails |
|---|---|---|---|---|
| ① Encoder-end Cables (For incremental and absolute encoder) | 0.3 m | JZSP-CVP01-E | SERVOPACK End — 0.3 m — Encoder End<br>Plug Connector (Crimped) (Molex Japan Co., Ltd.)<br>CM10-SP10S-□-D (DDK Ltd.) | (1) |
| | | JZSP-CVP02-E | SERVOPACK End — 0.3 m — Encoder End<br>Plug Connector (Crimped) (Molex Japan Co., Ltd.)<br>CM10-AP10S-□-D (DDK Ltd.) | |
| ② Cable with Connectors (For incremental and absolute encoder) | 30 m | JZSP-UCMP00-30-E | SERVOPACK End — L — Encoder End<br>Connector (Crimped) (Molex Japan Co., Ltd.)<br>Socket Connector (Soldered) (Molex Japan Co., Ltd.) | (2) |
| | 40 m | JZSP-UCMP00-40-E | | |
| | 50 m | JZSP-UCMP00-50-E | | |
| ③ Cable with a Battery Case (For absolute encoder) | 0.3 m | JZSP-CSP12-E* | SERVOPACK End — 0.3 m — Encoder End<br>Battery Case (Battery attachesl)<br>Connector (Crimped) (Molex Japan Co., Ltd.)<br>Socket Connector (Soldered) (Molex Japan Co., Ltd.) | (3) |
| ④ Relay Cables | 30 m | JZSP-CMP19-30-E | | (4) |
| | 40 m | JZSP-CMP19-40-E | | |
| | 50 m | JZSP-CMP19-50-E | | |

*: When using an incremental encoder or using an absolute encoder with a battery connected to the host controller, no battery case is required.

### (1) Wiring Specifications for Encoder-end Cable (For incremental and absolute encoder)

| SERVOPACK End | | Encoder (Servomotor) End | |
|---|---|---|---|
| Pin No. | Signal | Pin No. | Wire Color |
| 6 | /PS | 2 | Light blue/white |
| 5 | PS | 1 | Light blue |
| 4 | BAT(–) | 5 | Orange/white |
| 3 | BAT(+) | 6 | Orange |
| 2 | PG 0V | 9 | Black |
| 1 | PG 5V | 4 | Red |
| Shell | FG | 10 | FG |

Shield Wire

Note: The signals BAT(+) and BAT(–) are used when using an absolute encoder.

### (2) Wiring Specifications for Cable with Connectors (For incremental and absolute encoder)

| SERVOPACK End | | Encoder (Servomotor) End | |
|---|---|---|---|
| Pin No. | Signal | Pin No. | Wire Color |
| 6 | /PS | 6 | Light blue/white |
| 5 | PS | 5 | Light blue |
| 4 | BAT (–) | 4 | Orange/white |
| 3 | BAT (+) | 3 | Orange |
| 2 | PG 0V | 2 | Black |
| 1 | PG 5V | 1 | Red |
| Shell | FG | Shell | FG |

Shield Wire

### (3) Wiring Specifications for Cable with a Battery Case (For absolute encoder)

| SERVOPACK End | | Encoder (Servomotor) End | |
|---|---|---|---|
| Pin No. | Signal | Pin No. | Wire Color |
| 6 | /PS | 6 | Lignt blue/white |
| 5 | PS | 5 | Light blue |
| 4 | BAT (–) | 4 | Orange/white |
| 3 | BAT (+) | 3 | Orange |
| 2 | PG 0V | 2 | Black |
| 1 | PG 5V | 1 | Red |
| Shell | FG | Shell | FG |

Shield Wire

Battery Case

| Pin No. | Signal |
|---|---|
| 2 | BAT (–) |
| 1 | BAT (+) |

### (4) Relay Encoder Cable Specifications

| Item | Standard Type |
|---|---|
| Order No.* | JZSP-CMP19-□□-E |
| Cable Length | 50 m max. |
| Specifications | UL20276 (Max. rating temperature: 80˚C)<br>AWG16×2C+AWG26×2P<br>AWG16 (1.31 mm²)<br>Outer diameter of insulating sheath: 2.0 dia. mm<br>AWG26 (0.13 mm²)<br>Outer diameter of insulating sheath: 0.91 dia. mm |
| Finished Dimensions | 6.8 dia. |
| Internal Configuration and Lead Colors | Orange, Orange /white, Black, Red, Light Blue, Light Blue /white |
| Yaskawa Standard Specifications (Standard Length) | Cable length: 30 m, 40 m, 50 m |

*: Specify the cable length in □□ of order no.
Example: JZSP-CMP19-30-E (30 m)