



ULTRA SMALL AC SERVO DRIVES

SIGMA-5 MINI SERIES

PRODUCT CATALOG



EN

DE

Σ -V MINI

Σ -V M

Σ -V MINI

Σ -V MINI

Σ -V MINI

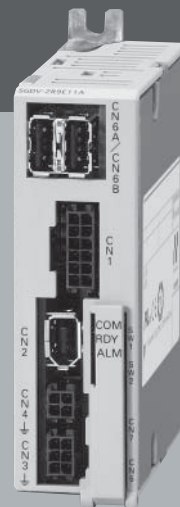
Σ -V MINI

Σ -V MINI

Σ -V MINI

MECHATROLINK-II Communications Reference SERVOPACKs

SGDV-□□□E11 (For Rotary Servomotors)



Model Designations

S G D V - 2R9 E 11 A 000 00 0

Σ-V Series
SGDV
SERVOPACKs
with DC Power Input

1st+2nd+3rd digits

4th digit

5th+6th digits

7th digit

8th+9th+10th digits

11th+12th digits

13th digit

1st+2nd+3rd digits Current

Voltage	Code	Applicable Servomotor Max. Capacity kW
24 VDC/	1R7	0.011
48 VDC	2R9	0.030

4th digit Power Supply Voltage

Code	Specifications
E	48 VDC*

5th+6th digits Interface

Code	Specifications
11	MECHATROLINK-II communications Reference (for rotary servomotors)

7th digit Design Revision Order
A, B...

8th+9th+10th digits Options (hardware)

Code	Specifications
000	Standard

11th+12th digits Options (software)

Code	Specifications
00	Standard

13th digit Options (parameter)

Code	Specifications
0	Standard

*: Either a 24-VDC or a 48-VDC power supply can be used for the main circuit. The control power supply must be 24 VDC.
Note: If the option codes digits 8 to 13 are all zeros, they are omitted.

Features

● Real-time communications

MECHATROLINK-II communications enable high-speed control for 30 stations at a maximum transmission speed of 10 Mbps in a transmission cycle from $250\ \mu\text{s}$ to 4 ms (set by the host controller). Such a high transmission speed allows real-time transmission of various data required for control.

● Cost savings

Thirty stations can be connected to a single MECHATROLINK-II transmission line, so wiring costs and time are greatly reduced. Also, only one signal connector is required on the host controller. And, the all-digital network eliminates the need for conversion from digital to analog for speed/torque references and for a pulse generator to generate position references.

● High-precision motion control

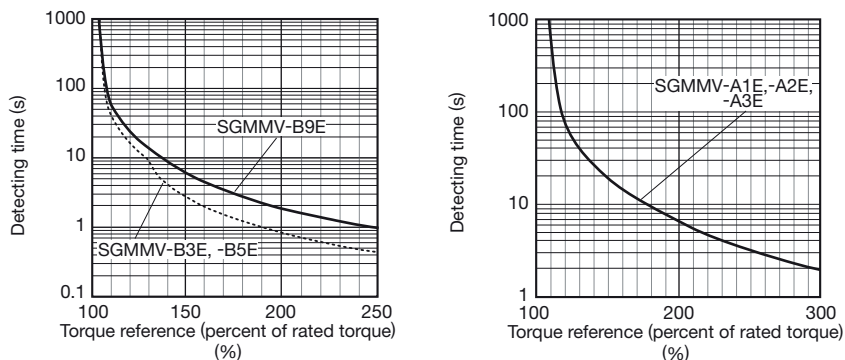
The SGD V SERVOPACK when connected to the host controller in the MECHATROLINK-II network provides not only torque, position, and speed control but also synchronized phase control that requires advanced control technology. The control mode can be changed online so that the machine can move smoothly in complex motions with great efficiency.

Ratings

SERVOPACK Model SGD V-□□□□	1R7E		2R9E	
Applicable Servomotor Max. Capacity kW	0.011		0.030	
Continuous Output Current Arms	1.7		2.9	
Max. Output Current Arms	4.1		8.6	
Regenerative Resistors	None			
Main Circuit*	24 VDC \pm 15%	48 VDC \pm 15%	24 VDC \pm 15%	48 VDC \pm 15%
Control Circuit	24 VDC \pm 15%			

*: Either a 24-VDC or a 48-VDC power supply can be used for the main circuit. When a 24-VDC power supply is used, the torque-motor speed characteristics for a 48 VDC cannot be achieved. For details, refer to *Torque-Motor Speed Characteristics* on page 6.

● SERVOPACK Overload Characteristics



Note: Overload characteristics shown above do not guarantee continuous duty of 100% or more output. Use a servomotor with effective torque within the continuous duty zone of *Torque-Motor Speed Characteristics*.

DC

M
II

Specifications

Items		Specifications		
Control Method		PWM control, sine-wave driven		
Feedback		Serial encoder: 17-bit (incremental/absolute)		
Operating Conditions	Ambient Temperature	0 to +55°C		
	Storage Temperature	-20 to +85°C		
	Ambient Humidity	90%RH or less	With no freezing or condensation	
	Storage Humidity	90%RH or less		
	Vibration Resistance	4.9 m/s ²		
	Shock Resistance	19.6 m/s ²		
	Protection Class	IP10	An environment that satisfies the following conditions. · Free of corrosive or flammable gases · Free of exposure to water, oil, or chemicals · Free of dust, salts, or iron dust	
	Pollution Degree	2		
	Altitude	1000 m or less		
Others	Do not use SERVOPACKs in the following locations: · Locations subject to static electricity noise, strong electromagnetic/magnetic fields, radioactivity			
Applicable Standards		UL508C EN55011/A1 , EN61000-6-2 , EN61800-3 , EN61800-5-1		
Mounting		Base-mounted		
Performance	Speed Control Range		1 : 5000 (The lower limit of the speed control range must be lower than the point at which the rated torque does not cause the servomotor to stop.)	
	Speed Regulation*1	Load Fluctuation	0% to 100% load: ±0.01% max. (at rated speed)	
		Voltage Fluctuation	Rated voltage: ±10% : 0% (at rated speed)	
		Temperature Fluctuation	25±25°C : ±0.1% max. (at rated speed)	
	Torque Control Tolerance (Repeatability)		±1%	
Soft Start Time Setting*2		0 to 10 s (can be set individually for acceleration and deceleration.)		
I/O Signal	Sequence Input	Input Signals which can be allocated	Number of Channels	3 channels
			Functions	· Homing deceleration switch signal (/DEC) · External latch signals (/EXT 1) · Forward run prohibited (P-OT), reverse run prohibited (N-OT) · Forward external torque limit (/P-CL), reverse external torque limit (/N-CL) Positive and negative logic can be changed.
	Sequence Output	Output Signals which can be allocated	Fixed Output	Servo alarm (ALM)
			Number of Channels	3 channels
			Functions	· Positioning completion (/COIN) · Speed limit detection (/VLT) · Speed coincidence detection (/V-CMP) · Brake (/BK) · Rotation detection (/TGON) · Warning (/WARN) · Servo ready (/S-RDY) · Near (/NEAR) · Torque limit detection (/CLT) Positive and negative logic can be changed.
Communications	Computer (USB)	Compatible with SigmaWin+. Compliant with the USB1.1 standard (12 Mbps)		
Display		Servo alarm (ALM): red; servo ready (RDY): green; communications(COM): green		
DIP Switches for MECHATROLINK-II Communication Settings		DIP switches: SW1 and SW2	Number of poles: 4/DIP switch (two DIP switches)*3	
Analog Monitor		Number of points: 2 Output voltage: ±10 VDC (linearity effective range: ±8 V) Output through the analog monitor unit (model: JUSP-PC001-E)		

*1: Speed regulation is defined as follows:

$$\text{Speed regulation} = \frac{\text{No-load motor speed} - \text{Total load motor speed}}{\text{Rated motor speed}} \times 100\%$$

The motor speed may change due to voltage fluctuation or temperature fluctuation.

The ratio of speed changes to the rated speed represent speed regulation due to voltage and temperature fluctuations.

*2: For information on soft start, refer to 4.2.10 Velocity Control (VELCTRL: 3CH) in the AC Servo Drives Σ -V Series USER S MANUAL MECHATROLINK-II Commands (manual no. SIJP S800000 54).

*3: For details, refer to 4.1.1 Setting Switches SW1 and SW2 in the AC Servo Drives DC Power Input Σ -V Series USER S MANUAL Design and Maintenance (manual no. SIJP S800000 82)

(Cont d)

Specifications

Items		Specifications
Dynamic Brake (DB)		Not available
Regenerative Processing		Not available
Overtravelling (OT) Prevention		Decelerate to a stop or coast to a stop when overtraveling is detected and an overtravel signal (P-OT or N-OT) is input.
Protective Functions		Overcurrent, Overvoltage, low voltage, overload, etc.
Utility Functions		Gain adjustment, alarm history, JOG operation, origin search, etc.
MECHATROLINK-II Communications	Communications Protocol	MECHATROLINK-II
	Station Address	41H to 5FH (max. number of slaves: 30) Set station addresses with combinations of SW1 and SW2 settings.
	Transmission Speed	10 Mbps, 4 Mbps Set by using the SW2 DIP switch.
	Transmission Cycle	250 μ s or 0.5 ms to 4.0 ms (increments of 0.5 ms)
	Number of Transmission Bytes	Can be switched between 17 bytes /station and 32 bytes / station. Set by using the SW2 DIP switch.
Command Method	Performance	Position control, speed control, and torque control through MECHATROLINK-II communications
	Command Input	MECHATROLINK-II commands (for sequence, motion, data setting/reference, monitoring, adjustment, and other commands.)



Power Supply Capacities and Power Losses

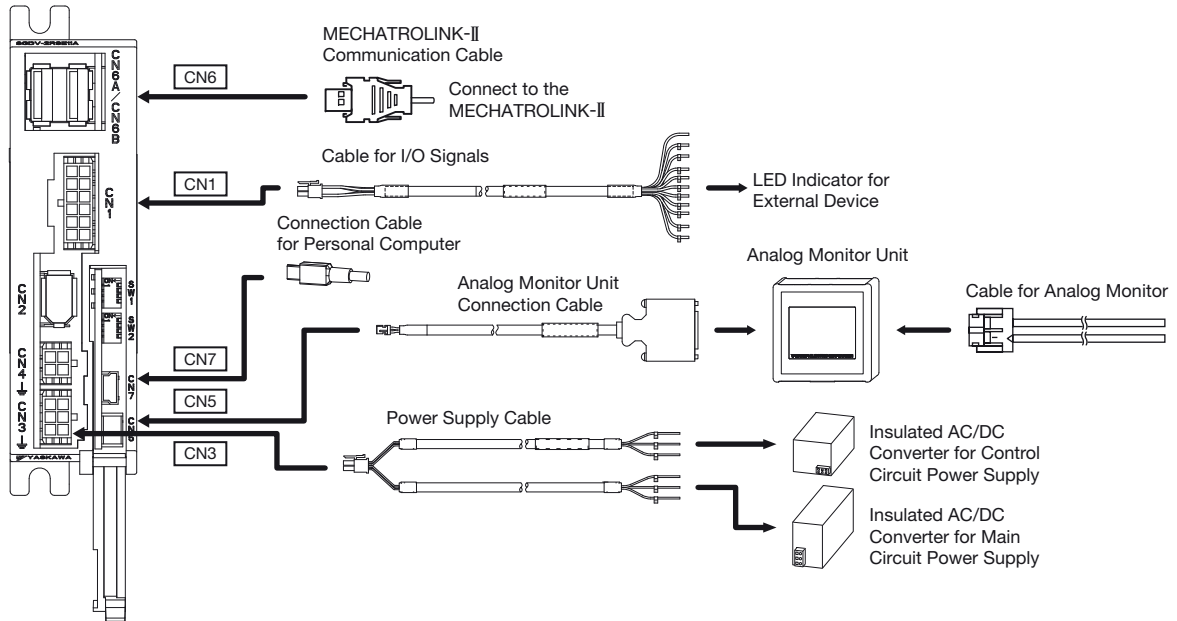
The following table shows SERVOPACK s power supply capacities and power losses at the rated output.

Main Circuit Power Supply	Applicable Servomotor Max. Capacity W	SERVOPACK Model SGD V-	Main Circuit Power Supply Capacity per SERVOPACK W	Output Current Arms	Main Circuit Power Loss W	Regenerative Resistor Power Loss W	Control Circuit Power Loss W	Total Power Loss W
24 VDC	11	1R7E	108	1.7	3.4	-	7.2	10.6
	30	2R9E	165	2.9	6.9			14.1
48 VDC	11	1R7E	169	1.7	3.4	-	7.2	10.6
	30	2R9E	411	2.9	6.9			14.1

Note: These power supply capacities are net values at instantaneous maximum loads.

Selecting Cables

● Cables for **CN1** **CN3** **CN5** **CN6** **CN7** (MECHATROLINK-II Communications Reference SERVOPACKs)



Name	Length	Order No.	Specifications	Details	
CN1 Cables for I/O Signals	1 m	JZSP-CF1102-1-E		(1)	
	2 m	JZSP-CF1102-2-E			
	3 m	JZSP-CF1102-3-E			
CN3 Power Supply Cables	1 m	JZSP-CF1G00-01-E	SERVOPACK End Power Supply End 	(2)	
	2 m	JZSP-CF1G00-02-E			
	3 m	JZSP-CF1G00-03-E			
	4 m	JZSP-CF1G00-04-E			
	5 m	JZSP-CF1G00-05-E			
	6 m	JZSP-CF1G00-06-E			
	7 m	JZSP-CF1G00-07-E			
	8 m	JZSP-CF1G00-08-E			
	9 m	JZSP-CF1G00-09-E			
	10 m	JZSP-CF1G00-10-E			
CN5 Analog Monitor Unit Cable	Analog Monitor Unit			(3)	
	Analog Monitor Unit Connection Cable	0.3 m	JZSP-CF1S06-A3-E	SERVOPACK End Analog Monitor Unit End 	(4)
	Cables for Analog Monitor	1 m	JZSP-CA01-E	Analog Monitor Unit End 	(5)
CN6A CN6B MECHATROLINK-II Communication Cable	Cables with Connectors at Both Ends	0.5 to 50 m	JEPMC-W6002-□□-E		(6)
	Cables with Connectors at Both Ends (with Ferrite Core)	0.5 to 50 m	JEPMC-W6003-□□-E		(7)
	Terminator		JEPMC-W6022-E		(8)
CN7 Connection Cables for Personal Computer	2.5 m	JZSP-CVS06-02-E	Cable with Connectors at Both Ends 	(9)	

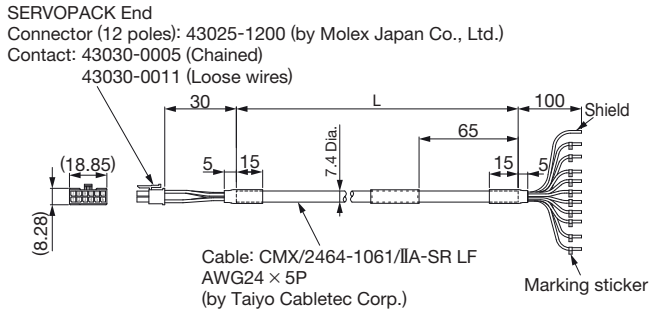
DC

M II

Selecting Cables

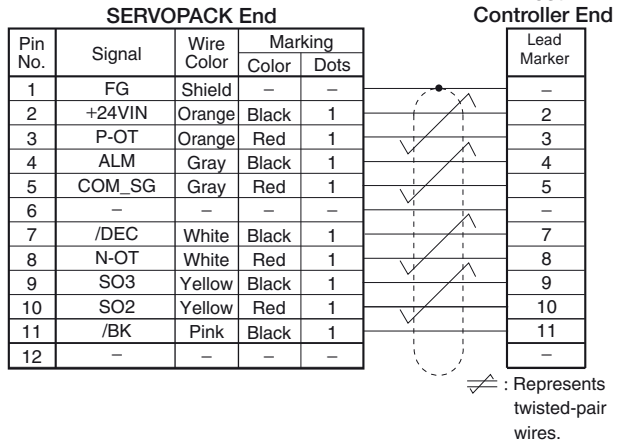
(1) Cable with Loose Wires at One End for CN1 (Model: JZSP-CF1102-□-E)

· External Dimensions (Units: mm)



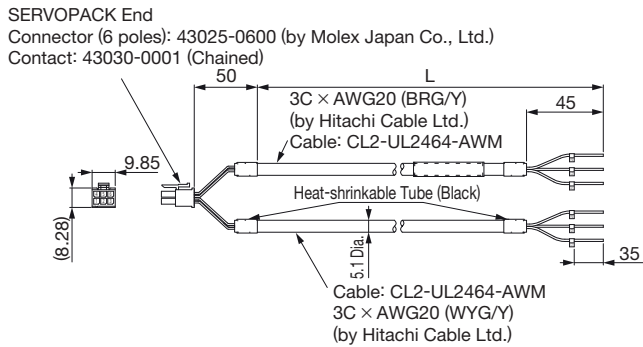
Model	Cable Length
JZSP-CF1102-1-E	1 m
JZSP-CF1102-2-E	2 m
JZSP-CF1102-3-E	3 m

● Cable with Loose Wires at One End for CN1 Connection Diagram of JZSP-CF1102-□-E Cable



(2) Cable with Loose Wires at One End for CN3 (Model: JZSP-CF1G00-□□-E)

· External Dimensions (Units: mm)



Model	Cable Length
JZSP-CF1G00-01-E	1 m
JZSP-CF1G00-02-E	2 m
JZSP-CF1G00-03-E	3 m
JZSP-CF1G00-04-E	4 m
JZSP-CF1G00-05-E	5 m
JZSP-CF1G00-06-E	6 m
JZSP-CF1G00-07-E	7 m
JZSP-CF1G00-08-E	8 m
JZSP-CF1G00-09-E	9 m
JZSP-CF1G00-10-E	10 m

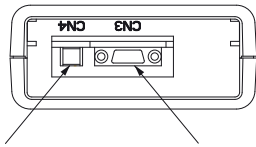
· Specifications

Pin No.	Cable Color	Signal
1	Green/yellow	FG
2	Green/yellow	FG
3	Blue	L2
4	White	C2
5	Yellow	C1
6	Red	L1

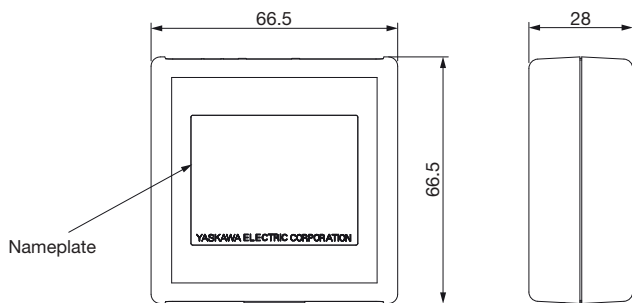
Selecting Cables

**(3) Analog Monitor Unit
(Model: JUSP-PC001-E)**

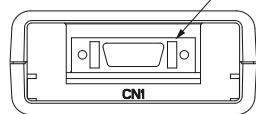
• External Dimensions (Units: mm)



CN4: Connector for Analog Monitor CN3: Connector for Digital Operator



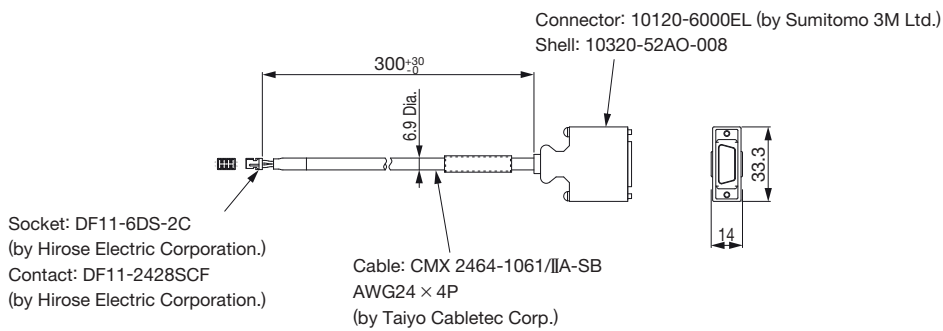
CN1: Connector for SERVOPACK



Note: The cable (JZSP-CF1S06-A3-E) to connect the SERVOPACK is not included.

**(4) Analog Monitor Unit Connection Cable for CN5
(Model: JZSP-CF1S06-A3-E)**

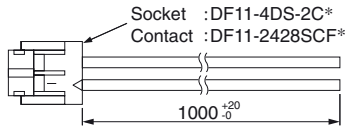
• External Dimensions (Units: mm)



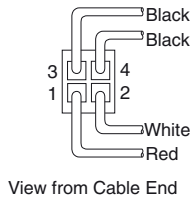
Selecting Cables

(5) Analog Monitor Unit Cable for CN4 (Model: JZSP-CA01-E)

- External Dimensions (Units: mm)



* : Manufactured by Hirose Electric Corporation.



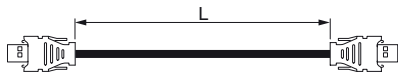
- Specifications

Pin No.	Cable Color	Signal	Standard Settings
1	Red	Analog Monitor 2	Motor speed : 1V/1000 min ⁻¹
2	White	Analog Monitor 1	Torque reference : 1V/100% rated torque
3, 4	Black (2 cables)	GND (0V)	-

Note : The specifications above are factory settings. Monitor specifications can be changed by changing parameters Pn006 and Pn007.

(6) Cable with Connectors at Both Ends for CN6 (Model: JEPMC-W6002-□□-E)

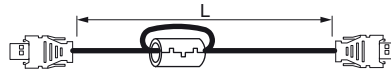
- External Dimensions (Units: mm)



Model	Cable Length (L)
JEPMC-W6002-A5-E	0.5 m
JEPMC-W6002-01-E	1.0 m
JEPMC-W6002-03-E	3.0 m
JEPMC-W6002-05-E	5.0 m
JEPMC-W6002-10-E	10.0 m
JEPMC-W6002-20-E	20.0 m
JEPMC-W6002-30-E	30.0 m
JEPMC-W6002-40-E	40.0 m
JEPMC-W6002-50-E	50.0 m

(7) Cable with Connectors at Both Ends (with Ferrite Core) for CN6 (Model: JEPMC-W6003-□□-E)

- External Dimensions (Units: mm)

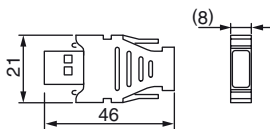


Model	Cable Length (L)
JEPMC-W6003-A5-E	0.5 m
JEPMC-W6003-01-E	1.0 m
JEPMC-W6003-03-E	3.0 m
JEPMC-W6003-05-E	5.0 m
JEPMC-W6003-10-E	10.0 m
JEPMC-W6003-20-E	20.0 m
JEPMC-W6003-30-E	30.0 m
JEPMC-W6003-40-E	40.0 m
JEPMC-W6003-50-E	50.0 m

IMPORTANT Use a MECHATROLINK-II communications cable specified by Yaskawa. When using other cables, noise resistance may be reduced, and operation cannot be guaranteed.

(8) MECHATROLINK-II Terminator for CN6 (Model : JEPMC-W6022-E)

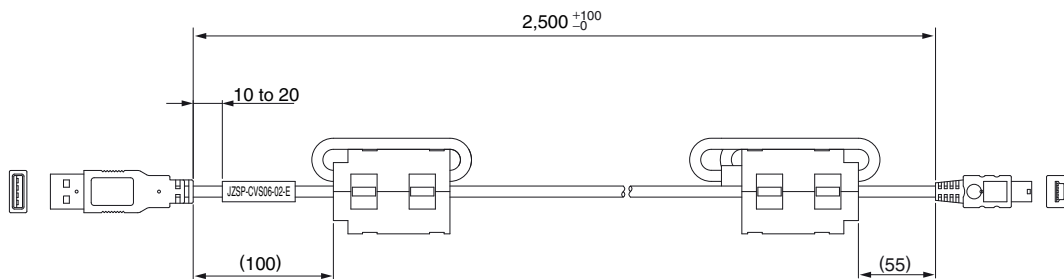
- External Dimensions (Units: mm)



Selecting Cables

(9) Connection Cable for Personal Computer for CN7 (Model: JZSP-CVS06-02-E)

· External Dimensions (Units: mm)

**IMPORTANT**

Use a cable specified by Yaskawa.
When using other cables, operation cannot be guaranteed.

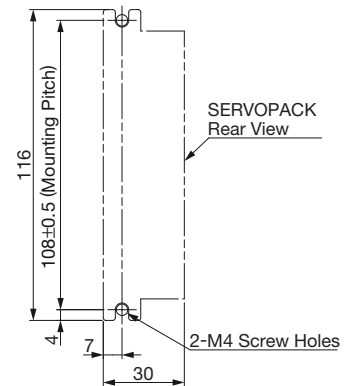
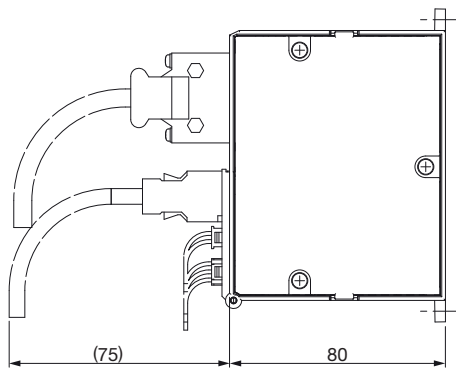
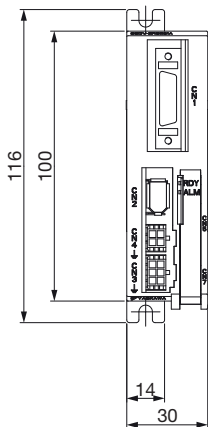


SERVOPACK External Dimensions

External Dimensions Units: mm

● Base-Mounted SERVOPACKS

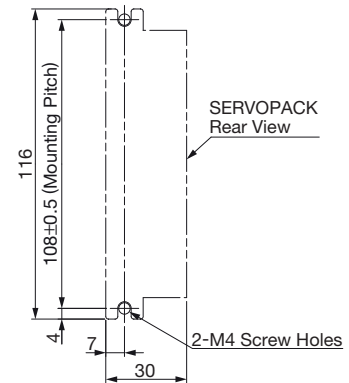
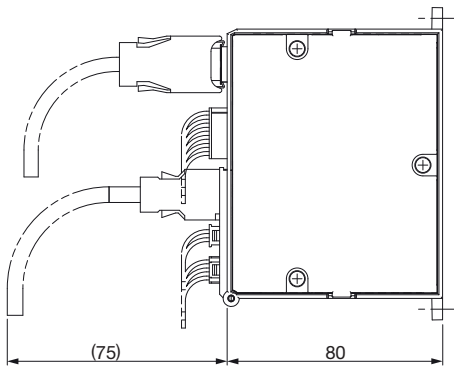
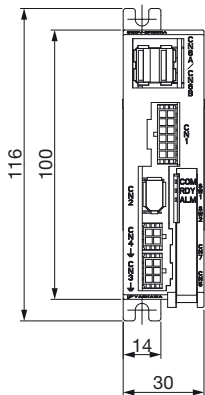
- (1) Analog Voltage Reference, Model: SGDV-1R7ES1A, -2R9ES1A
Pulse Train Reference, Model: SGDV-1R7EP1A, -2R9EP1A



Mounting Hole Diagram

Approx. Mass: 0.3 kg

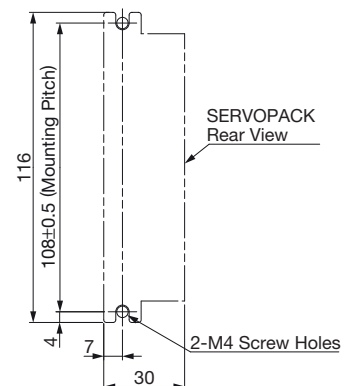
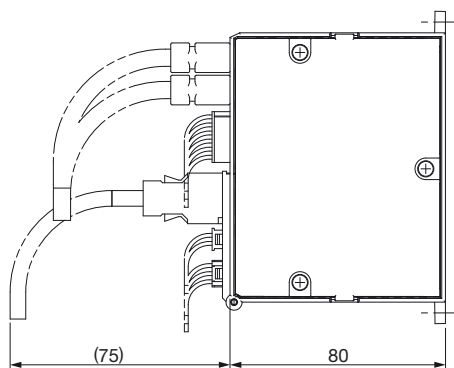
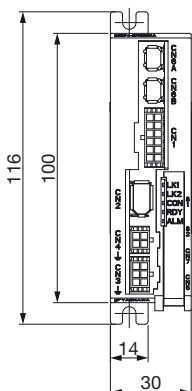
- (2) MECHATROLINK-II Communications Reference, Model: SGDV-1R7E11A, -2R9E11A



Mounting Hole Diagram

Approx. Mass: 0.3 kg

- (3) MECHATROLINK-III Communications Reference, Model: SGDV-1R7E21A, -2R9E21A

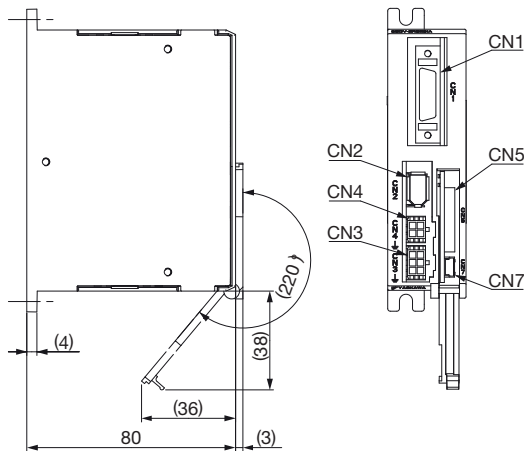


Mounting Hole Diagram

Approx. Mass: 0.3 kg

Cover Dimensions and Connectors

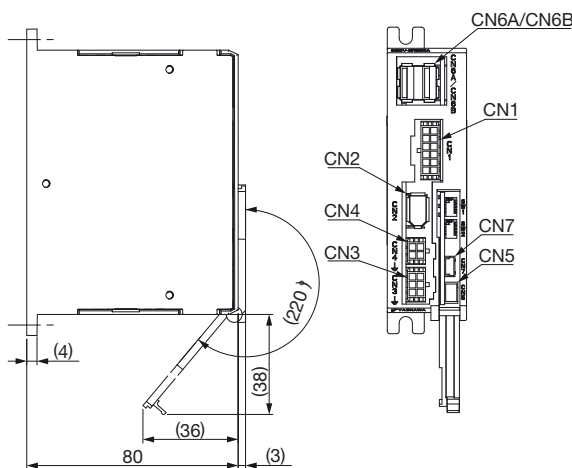
(1) Analog Voltage Reference /Pulse Train Reference



Port	Model	Pin	Manufacturer
CN1	10226-52A2PL	26	Sumitomo 3M Ltd.
CN2	3E106-0220KV	6	Sumitomo 3M Ltd.
CN3	43045-0600	6	Molex Japan Co., Ltd.
CN4	43045-0400	4	Molex Japan Co., Ltd.
CN5	DA3R018HB1	18	Japan Aviation Electronics Industry, Ltd.
CN7	UX60SC-MB-5S8(80)	5	Hirose Electric Corporation.

Note: The connectors above or their equivalents are used for SERVOPACKs.

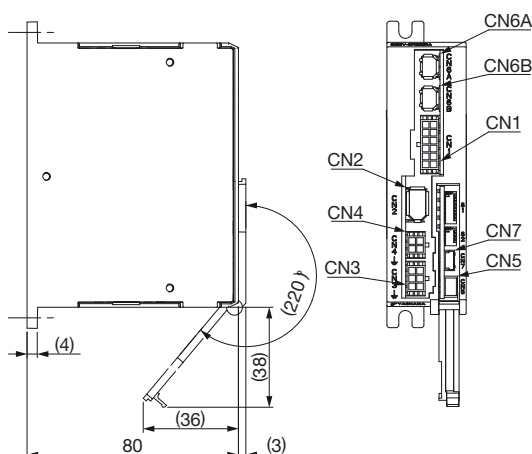
(2) MECHATROLINK-II Communications Reference



Port	Model	Pin	Manufacturer
CN1	43045-1201	12	Molex Japan Co., Ltd.
CN2	3E106-0220KV	6	Sumitomo 3M Ltd.
CN3	43045-0600	6	Molex Japan Co., Ltd.
CN4	43045-0400	4	Molex Japan Co., Ltd.
CN5	DF11-6DP-2DS(52)	6	Hirose Electric Corporation.
CN6A/ CN6B	1903815-1	8	Tyco Electronics Japan G.K.
CN7	UX60SC-MB-5S8(80)	5	Hirose Electric Corporation.

Note: The connectors above or their equivalents are used for SERVOPACKs.

(3) MECHATROLINK-III Communications Reference



Port	Model	Pin	Manufacturer
CN1	43045-1201	12	Molex Japan Co., Ltd.
CN2	3E106-0220KV	6	Sumitomo 3M Ltd.
CN3	43045-0600	6	Molex Japan Co., Ltd.
CN4	43045-0400	4	Molex Japan Co., Ltd.
CN5	DF11-6DP-2DS(52)	6	Hirose Electric Corporation.
CN6A/ CN6B	1981386-1	8	Tyco Electronics Japan G.K.
CN7	UX60SC-MB-5S8(80)	5	Hirose Electric Corporation.

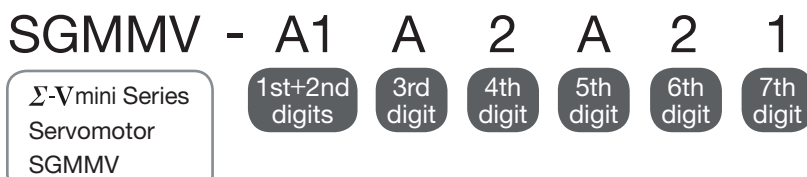
Note: The connectors above or their equivalents are used for SERVOPACKs.

Rotary Servomotors

SGMMV



Model Designations



1st+2nd digits Rated Output

Code	Specifications
B3	3.3 W
B5	5.5 W
B9	11 W
A1	10 W
A2	20 W
A3	30 W

5th digit Design Revision Order

Code	Specifications
A	Standard

7th digit Options

Code	Specifications
1	Without options
C	With holding brake (24 VDC, flange size: 25 mm × 25 mm)

6th digit Shaft End

Code	Specifications
2	Straight (Standard)
A	Straight with flat seats (Optional)

3rd digit Power Supply Voltage

Code	Specifications
A	200 VAC (Flange size: 25 mm × 25 mm)
E	24 VDC/48 VDC*

*: Same for 24 VDC and 48 VDC.
Characteristics vary with the voltage of
the main circuit for SERVOPACKS

4th digit Serial Encoder

Code	Specifications
2	17-bit absolute

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: 15 mm×15 mm B (UL: A)
 25 mm×25 mm B
Withstand Voltage: 600 VAC for one minute

Enclosure: 15 mm×15 mm: Totally enclosed, self-cooled, IP42 (except for shaft opening)
 25 mm×25 mm: Totally enclosed, self-cooled, IP55 (except for shaft opening)
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

Voltage		24 VDC/48 VDC*3					
Servomotor Model: SGM MV-		B3E	B5E	B9E	A1E	A2E	A3E
Rated Output*1	W	3.3	5.5	11	10	20	30
Rated Torque*1, *2	N·m	0.0105	0.0175	0.0350	0.0318	0.0637	0.0955
Instantaneous Peak Torque*1	N·m	0.0263	0.0438	0.0875	0.0955	0.191	0.286
Rated Current*1	Arms	1.5	1.5	1.7	2.1	2.0	2.9
Instantaneous Max. Current*1	Arms	3.6	3.7	4.1	6.1	5.8	8.6
Rated Speed*1	min ⁻¹	3000					
Max. Speed*1	min ⁻¹	6000					
Torque Constant	N·m/Arms	0.00814	0.0132	0.0241	0.0172	0.0358	0.0358
Rotor Moment of Inertia	kg·m ²	4.41 × 10 ⁻⁸	7.96 × 10 ⁻⁸	2.21 × 10 ⁻⁷	2.72 × 10 ⁻⁷ (4.07 × 10 ⁻⁷)	4.66 × 10 ⁻⁷ (6.02 × 10 ⁻⁷)	6.68 × 10 ⁻⁷ (8.04 × 10 ⁻⁷)
Rated Power Rate*1	kW/s	2.50	3.85	5.54	3.72	8.71	13.7
Rated Angular Acceleration*1	rad/s ²	238000	220000	158000	117000	137000	143000
Flange Size	mm	15 × 15			25 × 25		
Applicable SERVOPACK	SGDV-□□□□	1R7E			2R9E		

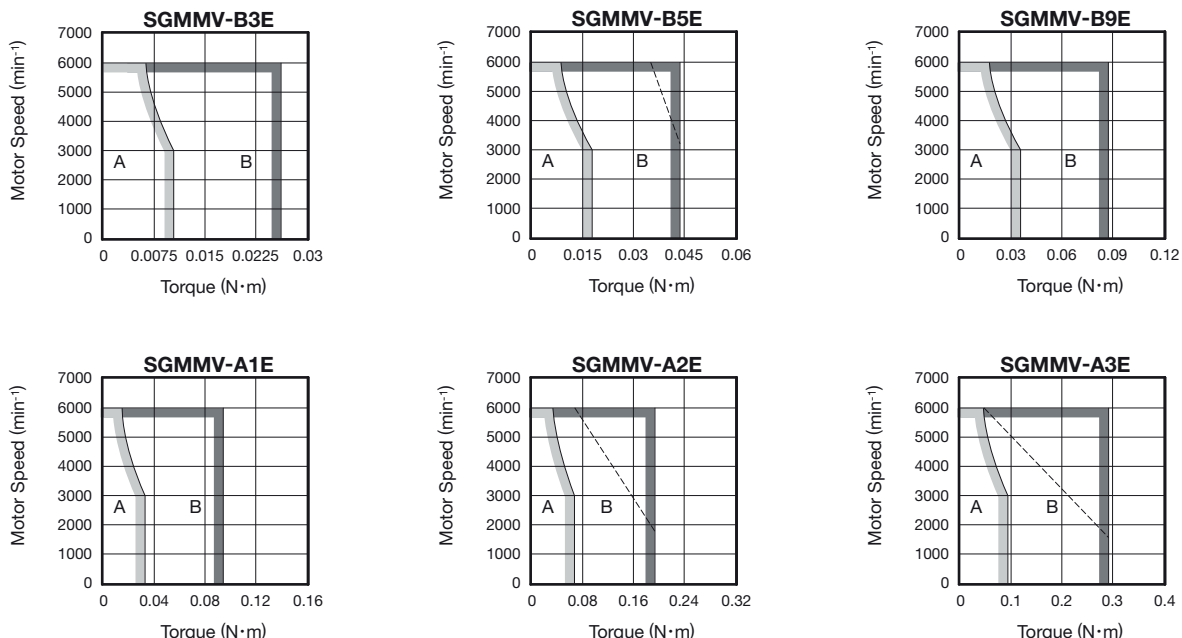
*1: These items and torque-motor speed characteristics quoted in combination with an SGD V SERVOPACK are at an armature winding temperature of 100°C. Other values quoted are at 20°C.

*2: Rated torques are continuous allowable torque values at 40°C with an aluminum heat sink of the following dimensions attached.
 SGM MV-B3E, -B5E, -B9E, -A1E, -A2E: 150 mm×150 mm×3 mm
 SGM MV-A3E : 250 mm×250 mm×6 mm

*3: Torque-speed characteristics differ depending on if a 24 VDC or a 48 VDC is used for the main circuit for the SERVOPACK.

Note: The values in parentheses are for servomotors with holding brakes.

● Torque-Motor Speed Characteristics A : Continuous Duty Zone B : Intermittent Duty Zone



Notes: 1 The characteristics of the intermittent duty zone differ depending on the supply voltage.

Solid lines indicate characteristics when a 48-VDC power supply is applied to the main circuit of the SERVOPACK, and dotted lines indicate characteristics when a 24 VDC is applied.

For SGM MV-B3E, -B9E, -A1E SERVOPACKs, characteristics are the same for both 24-VDC or 48-VDC versions.

2 When the effective torque is within the rated torque, the servomotor can be used within the intermittent duty zone.

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: B

Withstand Voltage: 1500 VAC for one minute
Enclosure: Totally enclosed, self-cooled, IP55 (except for shaft opening)
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

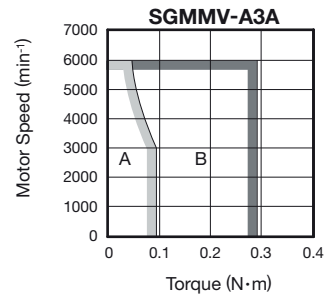
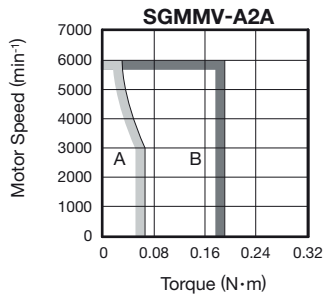
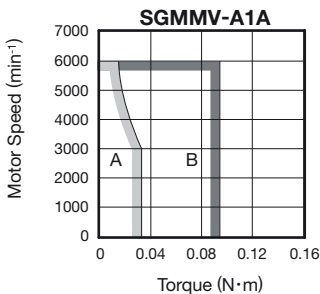
Voltage		200 VAC		
Servomotor Model: SGMMV-		A1A	A2A	A3A
Rated Output*1	W	10	20	30
Rated Torque*1, *2	N·m	0.0318	0.0637	0.0955
Instantaneous Peak Torque*1	N·m	0.0955	0.191	0.286
Rated Current*1	Arms	0.70	0.66	0.98
Instantaneous Max. Current*1	Arms	2.0	1.9	2.9
Rated Speed*1	min ⁻¹	3000		
Max. Speed*1	min ⁻¹	6000		
Torque Constant	N·m/Arms	0.0516	0.107	0.107
Rotor Moment of Inertia	kg·m ²	2.72×10 ⁻⁷ (4.07×10 ⁻⁷)	4.66×10 ⁻⁷ (6.02×10 ⁻⁷)	6.68×10 ⁻⁷ (8.04×10 ⁻⁷)
Rated Power Rate*1	kW/s	3.72	8.71	13.7
Rated Angular Acceleration*1	rad/s ²	117000	137000	143000
Flange Size	mm	25×25		
Applicable SERVOPACK	SGDV-	R90		1R6A_2R1F

*1: These items and torque-motor speed characteristics quoted in combination with an SGDV SERVOPACK are at an armature winding temperature of 100°C. Other values quoted are at 20°C.

*2: Rated torques are continuous allowable torque values at 40°C with an aluminum heat sink of the following dimensions attached.
 SGMMV-A1A, -A2A: 150 mm×150 mm×3 mm
 SGMMV-A3A : 250 mm×250 mm×6 mm

Note: The values in parentheses are for servomotors with holding brakes.

● **Torque-Motor Speed Characteristics** [A] : Continuous Duty Zone [B] : Intermittent Duty Zone



Notes: 1 The characteristics of the intermittent duty zone differ depending on the supply voltage.
 2 When the effective torque is within the rated torque, the servomotor can be used within the intermittent duty zone.

Ratings and Specifications

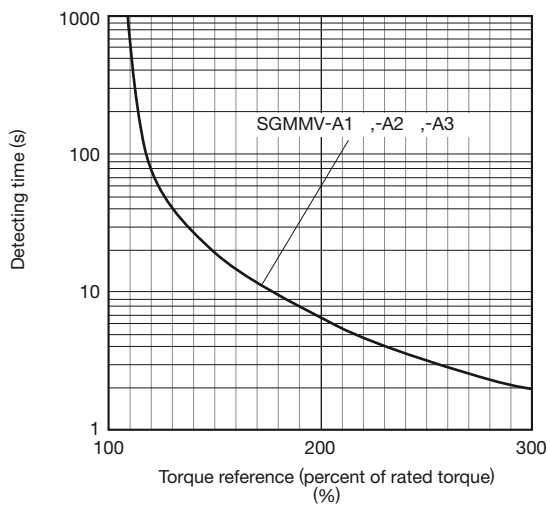
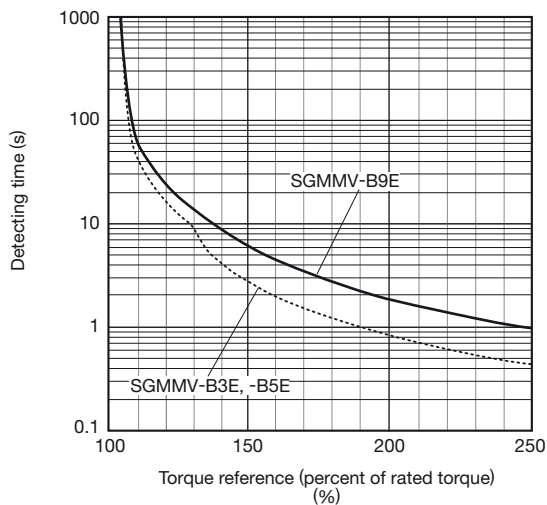
● Holding Brake Electrical Specifications

Holding Brake Rated Voltage	Servomotor Model	Servomotor Rated Output W	Holding Brake Specifications					
			Capacity W	Holding Torque N·m	Coil Resistance Ω (at 20°C)	Rated Current A(at 20°C)	Brake Release Time ms	Brake Operation Time ms
24 VDC $^{+10\%}_0$	SGMMV-A1E	10	2.0	0.0318	320	0.075	40	100
	SGMMV-A1A							
	SGMMV-A2E	20	2.6	0.0637	221.5	0.108	40	100
	SGMMV-A2A							
	SGMMV-A3E	30	2.6	0.0955	221.5	0.108	40	100
	SGMMV-A3A							

- 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 not included.

● Overload Characteristics

The overload detection level is set under hot start conditions at a servomotor ambient temperature of 40°C.



Note: Overload characteristics shown above do not guarantee continuous duty of 100% or more output. Use a servomotor with effective torque within the continuous duty zone of *Torque-Motor Speed Characteristics*.

Ratings and Specifications

● 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)
SGMMV-	B3	3.3 W
	B5	5.5 W
	B9	11 W
	A1	10 W
	A2	20 W
	A3	30 W
		30 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 the 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. Take one of the following steps if this occurs.

- Reduce the torque limit.
- Reduce the deceleration rate.
- Reduce the maximum speed.

● Allowable Radial and Thrust Loads

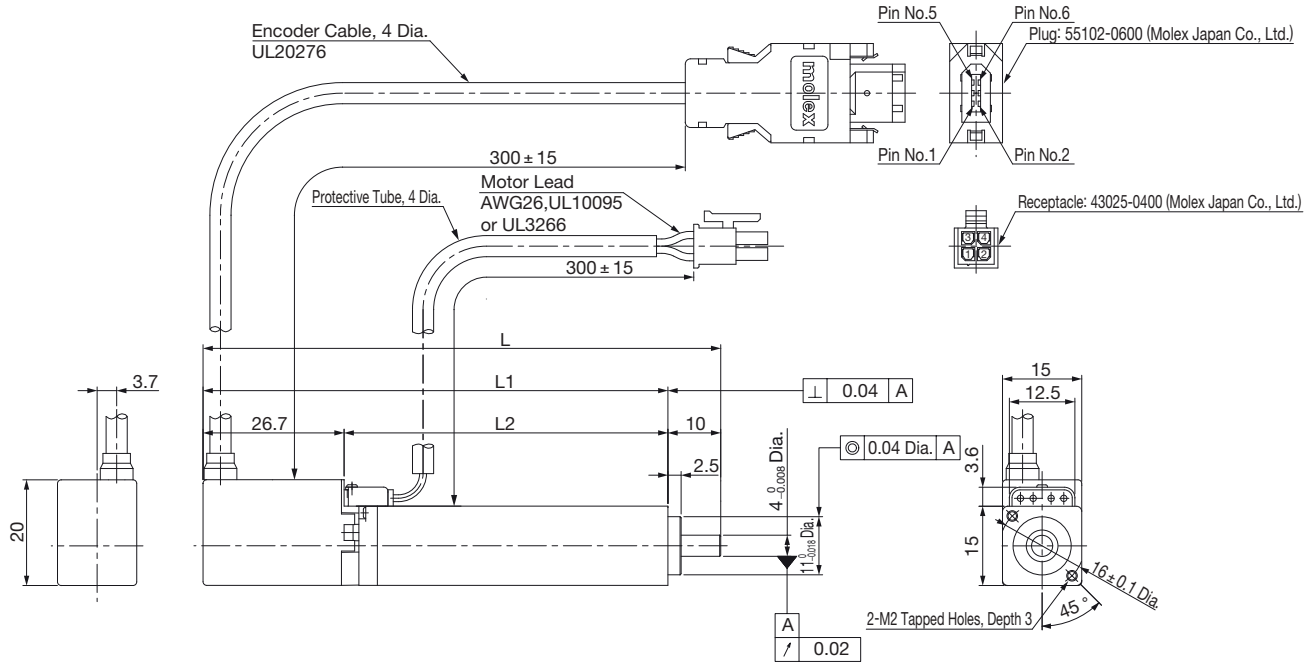
Design the mechanical system so thrust and radial loads applied to the servomotor shaft end during operation fall within the ranges shown in the table.

Servomotor Model	Allowable Radial Load (F_r) N	Allowable Thrust Load (F_s) N	LF mm	Reference Diagram	
SGMMV-	B3	8	4	10	
	B5	8	4	10	
	B9	10	4	10	
	A1	34	14.5	16	
	A2	44	14.5	16	
	A3	44	14.5	16	

External Dimensions Units: mm

● Without Holding Brakes

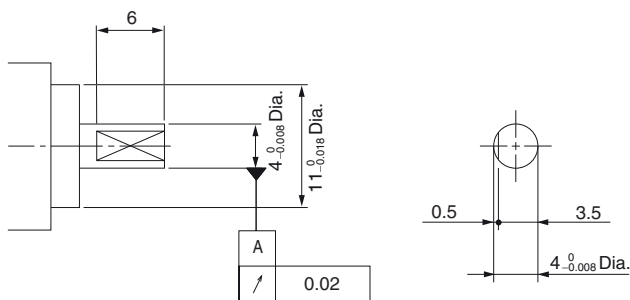
(1) 3.3 to 11 W



Model SGMMV-	L	L1	L2	Approx. Mass kg
B3E2A□1	58	48	21.3	0.055
B5E2A□1	64	54	27.3	0.06
B9E2A□1	98	88	61.3	0.1

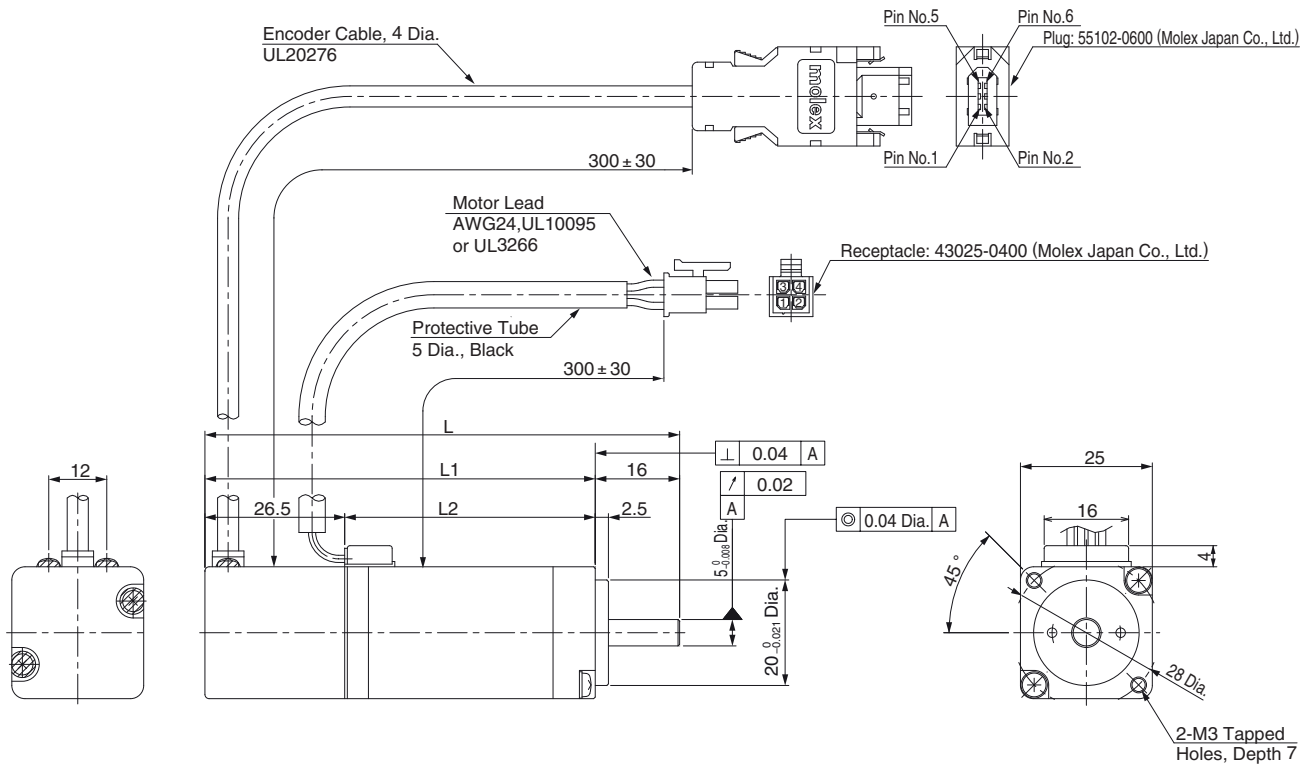
<Shaft End>

● With a Flat Seat



External Dimensions Units: mm

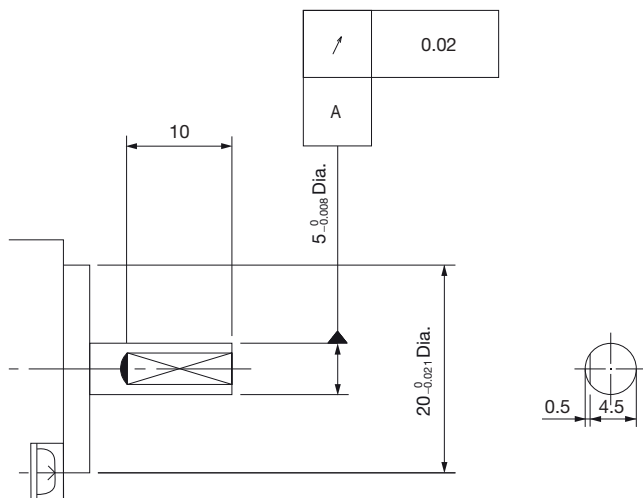
(2) 10 to 30 W



Model SGMMV-	L	L1	L2	Approx. Mass kg
A1□2A□1	70	54	27.5	0.13
A2□2A□1	80	64	37.5	0.17
A3□2A□1	90	74	47.5	0.21

<Shaft End>

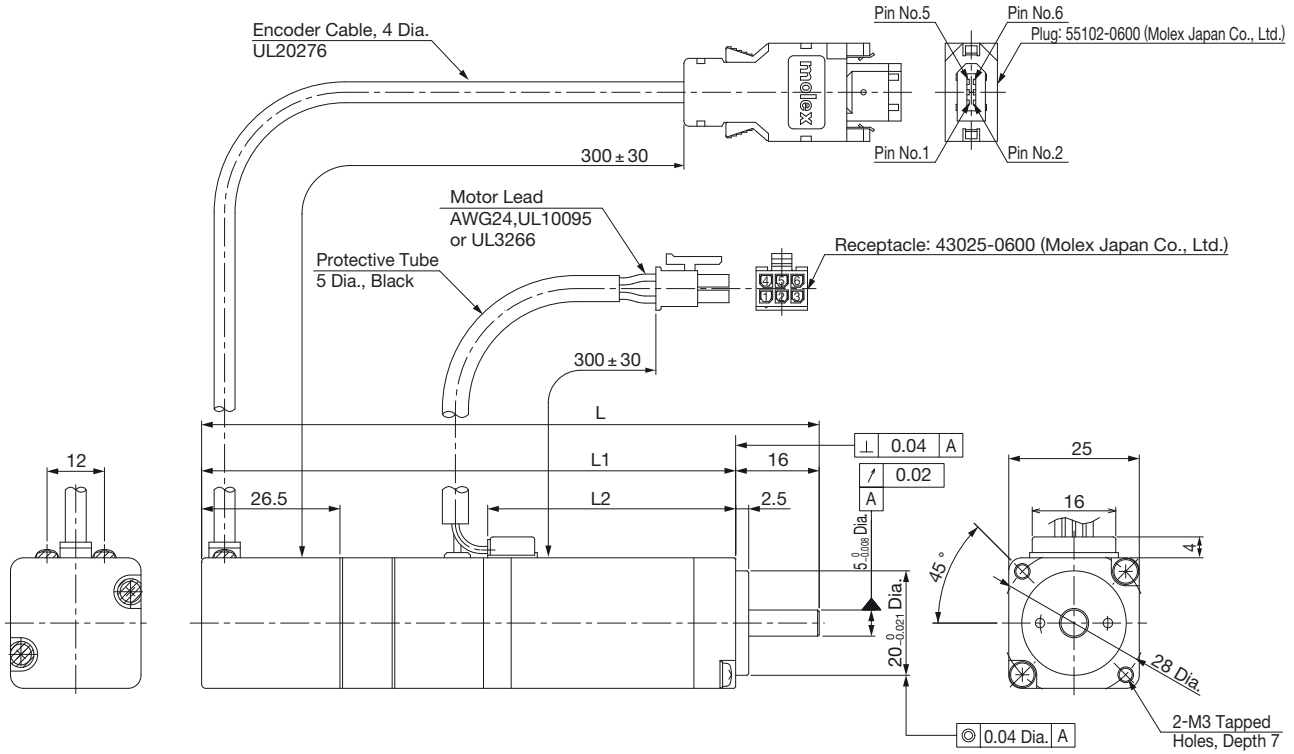
● With a Flat Seat



External Dimensions Units: mm

● With Holding Brakes

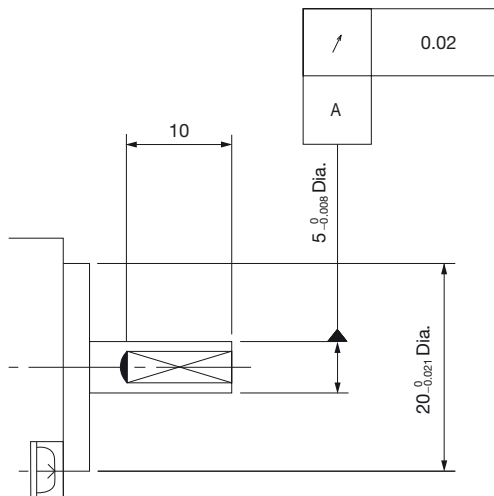
(1) 10 to 30 W



Model SGMMV-	L	L1	L2	Approx. Mass kg
A1□2A□C	94.5	78.5	27.5	0.215
A2□2A□C	108.5	92.5	37.5	0.27
A3□2A□C	118.5	102.5	47.5	0.31

<Shaft End>

● With a Flat Seat

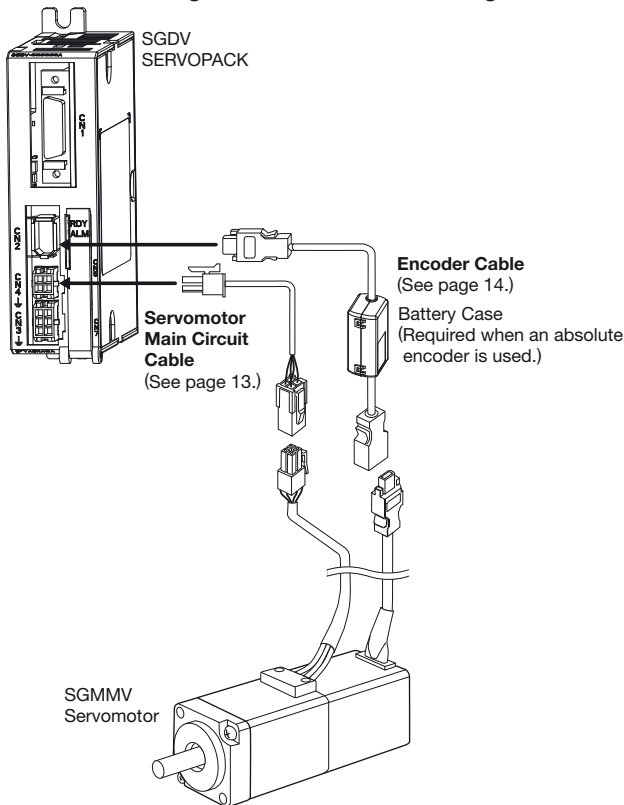


Selecting Cables for SERVOPACKs with DC Power Input

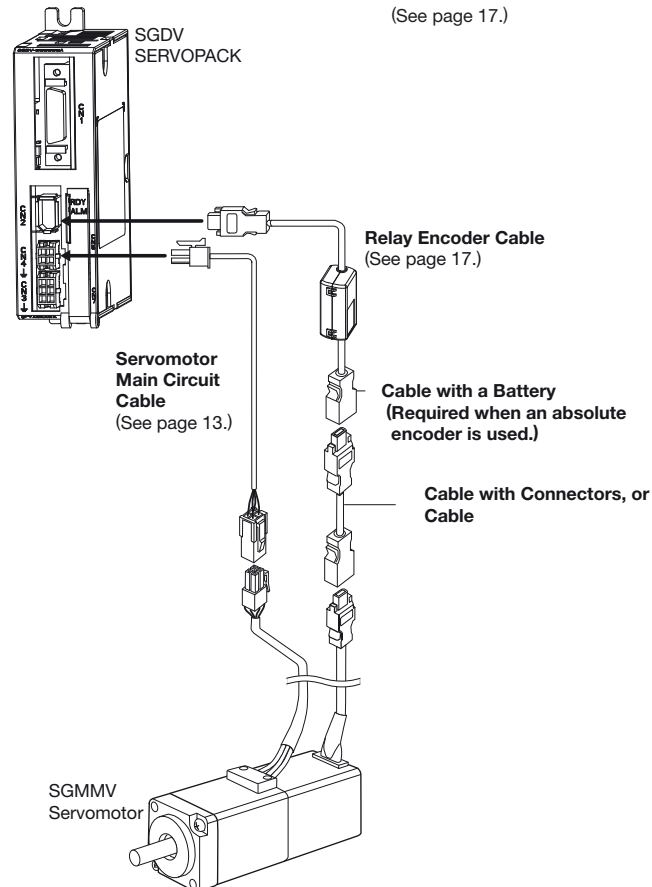
Note: Refer to page 18 for information on cables for SERVOPACKs with AC power input.

Examples of Cable Connections

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



Encoder Cable Extension from 30 to 50 m (See page 17.)



⚠ 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 cable length exceeds 20 m, be sure to use a relay encoder cable.
- If the main circuit cable for the servomotor causes the line-to-line voltage to drop, the intermittent duty zone of the torque-motor speed characteristics may become smaller.

Servomotor Main Circuit Cable

Name	Length	Order No.		Specifications	Details
		Standard Type	Flexible Type*		
For Servomotor without Holding Brakes	3 m	JZSP-CF1M00-03-E	JZSP-CF1M20-03-E		(1)
	5 m	JZSP-CF1M00-05-E	JZSP-CF1M20-05-E		
	10 m	JZSP-CF1M00-10-E	JZSP-CF1M20-10-E		
	15 m	JZSP-CF1M00-15-E	JZSP-CF1M20-15-E		
	20 m	JZSP-CF1M00-20-E	JZSP-CF1M20-20-E		
	30 m	JZSP-CF1M00-30-E	JZSP-CF1M20-30-E		
	40 m	JZSP-CF1M00-40-E	JZSP-CF1M20-40-E		
For Servomotor with Holding Brakes	3 m	JZSP-CF1M10-03-E	JZSP-CF1M30-03-E		(2)
	5 m	JZSP-CF1M10-05-E	JZSP-CF1M30-05-E		
	10 m	JZSP-CF1M10-10-E	JZSP-CF1M30-10-E		
	15 m	JZSP-CF1M10-15-E	JZSP-CF1M30-15-E		
	20 m	JZSP-CF1M10-20-E	JZSP-CF1M30-20-E		
	30 m	JZSP-CF1M10-30-E	JZSP-CF1M30-30-E		
	40 m	JZSP-CF1M10-40-E	JZSP-CF1M30-40-E		
50 m	JZSP-CF1M10-50-E	JZSP-CF1M30-50-E			

*: Use flexible cables for movable sections such as robot arms.

Selecting Cables for SERVOPACKs with DC Power Input

(1) Wiring Specifications for Servomotors without Holding Brakes

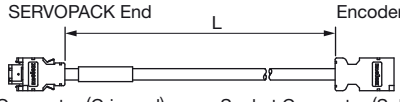
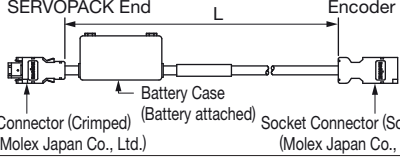
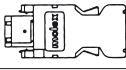


SERVOPACK End		Servomotor End	
Pin No.	Signal	Signal	Pin No.
1	Phase U	Phase U	1
2	Phase V	Phase V	2
3	Phase W	Phase W	3
4	FG	FG	4

(2) Wiring Specifications for Servomotor with Holding Brakes

SERVOPACK End		Servomotor End	
Pin No.	Signal	Signal	Pin No.
1	Phase U	Phase U	1
2	Phase V	Phase V	2
3	Phase W	Phase W	3
4	FG	FG	4
Ring terminal	Brake	Brake	5
Ring terminal	Brake	Brake	6

Note: No polarity for connection to a holding brake.

● Encoder Cables (Length: 20 m or less)

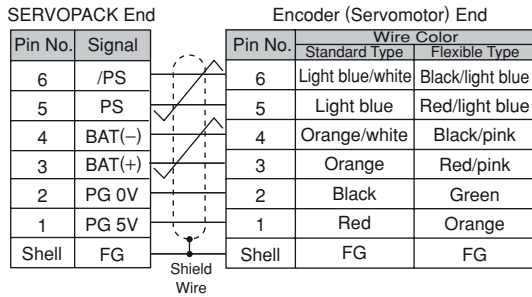
Name	Length	Order No.		Specifications	Details
		Standard Type	Flexible Type*1		
Cable with Connectors (For Incremental Encoder)	3 m	JZSP-CMP00-03-E	JZSP-CMP10-03-E	 SERVOPACK End L Encoder End Connector (Crimped) (Molex Japan Co., Ltd.) Socket Connector (Soldered) (Molex Japan Co., Ltd.)	(1)
	5 m	JZSP-CMP00-05-E	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		
Cable with Connectors*2 (For Absolute Encoder, with a Battery Case)	3 m	JZSP-CSP19-03-E	JZSP-CSP29-03-E	 SERVOPACK End L Encoder End Connector (Crimped) (Molex Japan Co., Ltd.) Battery Case (Battery attached) Socket Connector (Soldered) (Molex Japan Co., Ltd.)	(2)
	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		
SERVOPACK-end Connector Kit		JZSP-CMP9-1-E		Soldered 	(3)
Encoder-end Connector Kit		JZSP-CMP9-2-E		Soldered 	
Cables	5 m	JZSP-CMP09-05-E	JZSP-CSP39-05-E	20 m Max. 	(4)
	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		

*1: Use flexible cables for movable sections such as robot arms.

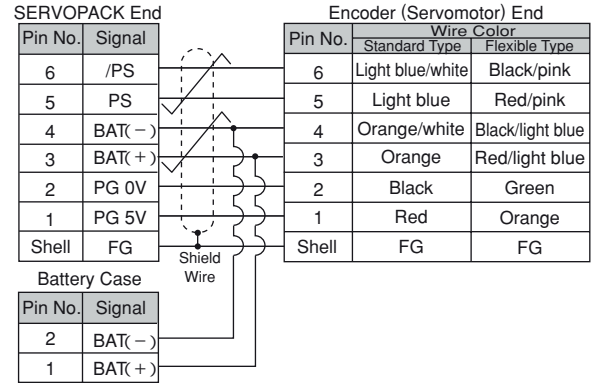
*2: When the battery is connected to the host controller, no battery case is required. If so, use a cable for incremental encoders.

Selecting Cables for SERVOPACKs with DC Power Input

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



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



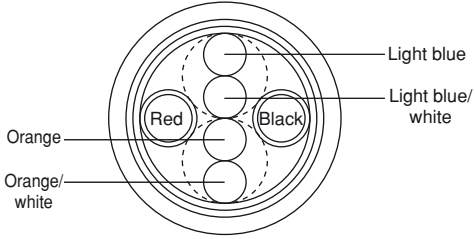
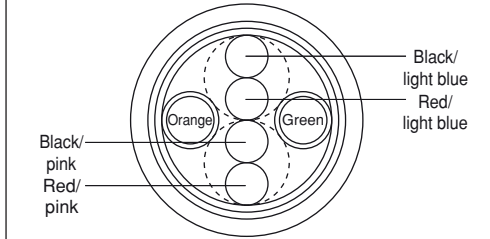
(3) SERVOPACK-end/Encoder-end Connector Kit Specifications

Items	SERVOPACK-end Connector Kit	Encoder-end Connector Kit
Order No.	JZSP-CMP9-1-E (Cables are not included.)	JZSP-CMP9-2-E (Cables are not included.)
Manufacturer	Molex Japan Co., Ltd.	Molex Japan Co., Ltd.
Specifications	55100-0670 (soldered) Product Specification: PS-54280	54280-0609 (soldered) Product Specification: PS-54280
External Dimensions mm		

SGMMV

Selecting Cables for SERVOPACKs with DC Power Input

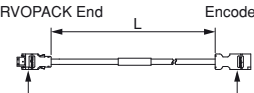
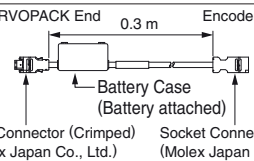

(4) Cable Specifications

Items	Standard Type	Flexible Type
Order No.*	JZSP-CMP09-□□-E	JZSP-CSP39-□□-E
Cable Length	20 m max.	
Specifications	UL20276 (Rating temperature: 80°C) AWG22×2C+AWG24×2P AWG22 (0.33 mm ²) Outer diameter of insulating sheath: 1.15 dia. mm AWG24 (0.20 mm ²) Outer diameter of insulating sheath: 1.09 dia. mm	UL20276 (Rating temperature: 80°C) AWG22×2C+AWG24×2P AWG22 (0.33 mm ²) Outer diameter of insulating sheath: 1.35 dia. mm AWG24 (0.20 mm ²) Outer diameter of insulating sheath: 1.21 dia. mm
Finished Dimensions	6.5 dia. mm	6.8 dia. mm
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)

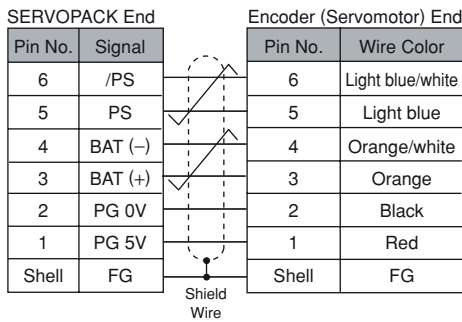
Selecting Cables for SERVOPACKs with DC Power Input

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

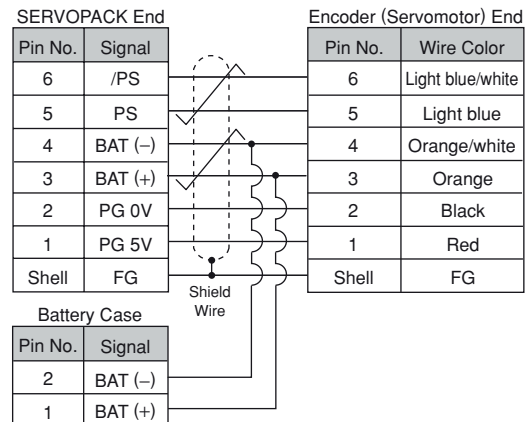
Name	Length	Order No. Standard Type	Specifications	Details
Cable with Connectors (For incremental and absolute encoder)	30 m	JZSP-UCMP00-30-E	 SERVOPACK End Encoder End Plug Connector (Crimped) (Molex Japan Co., Ltd.) Socket Connector (Soldered) (Molex Japan Co., Ltd.)	(1)
	40 m	JZSP-UCMP00-40-E		
	50 m	JZSP-UCMP00-50-E		
Cable with a Battery Case (Required when an absolute encoder is used*)	0.3 m	JZSP-CSP12-E	 SERVOPACK End 0.3 m Encoder End Plug Connector (Crimped) (Molex Japan Co., Ltd.) Socket Connector (Soldered) (Molex Japan Co., Ltd.) Battery Case (Battery attached)	(2)
Cables	30 m	JZSP-CMP19-30-E		(3)
	40 m	JZSP-CMP19-40-E		
	50 m	JZSP-CMP19-50-E		

*: Not required when connecting a battery to the host controller.

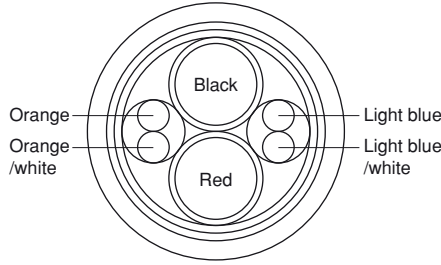
(1) Wiring Specifications for Cable with Connectors



(2) Wiring Specifications for Cable with a Battery Case



(3) Cable Specifications

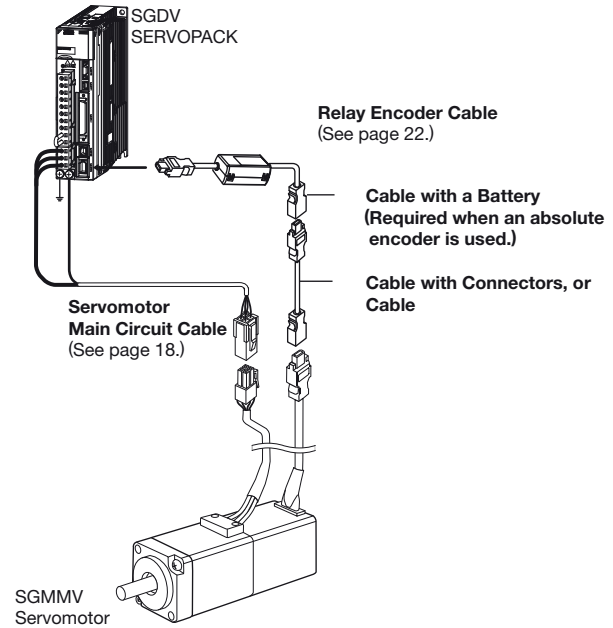
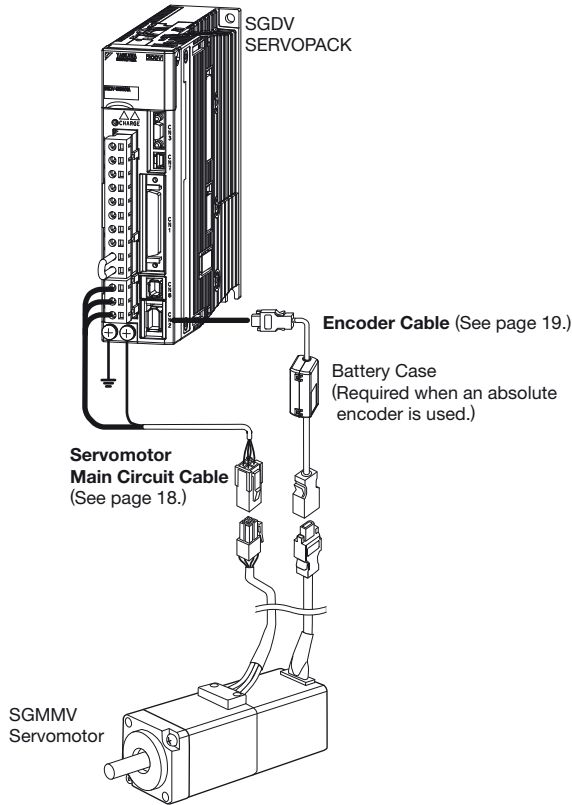
Item	Standard Type
Order No.*	JZSP-CMP19-□□-E
Cable Length	50 m max.
Specifications	UL20276 (Rating temperature: 80°C) AWG16×2C+AWG26×2P AWG16 (1.31 mm ²) Outer diameter of insulating sheath: 2.0 dia. mm AWG26 (0.13 mm ²) Outer diameter of insulating sheath: 0.91 dia. mm
Finished Dimensions	6.8 dia. mm
Internal Configuration and Lead Colors	
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)

Selecting Cables for SERVOPACKs with AC Power Input

● Examples of Cable Connections

- Standard Wiring (Max. encoder cable length: 20 m)
- Encoder Cable Extension from 30 to 50 m (See page 22.)



⚠ 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 cable length exceeds 20 m, be sure to use a relay encoder cable.
- 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.

● Servomotor Main Circuit Cable

Name	Length	Order No.		Specifications	Details
		Standard Type	Flexible Type*		
For Servomotor without Holding Brakes	3 m	JZSP-CF2M00-03-E	JZSP-CF2M20-03-E		(1)
	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		
For Servomotor with Holding Brakes	3 m	JZSP-CF2M03-03-E	JZSP-CF2M23-03-E		(2)
	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			

*: Use flexible cables for movable sections such as robot arms.

Selecting Cables for SERVOPACKs with AC Power Input

(1) Wiring Specifications for Servomotors without Holding Brakes

SERVOPACK-end Leads		Servomotor-end Connector	
Wire Color	Signal	Signal	Pin No.
Red	Phase U	Phase U	1
White	Phase V	Phase V	2
Blue	Phase W	Phase W	3
Green/yellow	FG	FG	4

(2) Wiring Specifications for Servomotor with Holding Brakes

SERVOPACK-end Leads		Servomotor-end Connector	
Wire Color	Signal	Signal	Pin No.
Red	Phase U	Phase U	1
White	Phase V	Phase V	2
Blue	Phase W	Phase W	3
Green/yellow	FG	FG	4
Black	Brake	Brake	5
Black	Brake	Brake	6

Note: No polarity for connection to a holding brake.

●Encoder Cables (Length: 20 m or less)

Name	Length	Order No.		Specifications	Details
		Standard Type	Flexible Type*1		
Cable with Connectors (For Incremental Encoder)	3 m	JZSP-CMP00-03-E	JZSP-CMP10-03-E		(1)
	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		
Cable with Connectors*2 (For Absolute Encoder, with a Battery Case)	3 m	JZSP-CSP19-03-E	JZSP-CSP29-03-E		(2)
	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		
SERVOPACK-end Connector Kit		JZSP-CMP9-1-E		Soldered	(3)
Encoder-end Connector Kit		JZSP-CMP9-2-E		Soldered	
Cables	5 m	JZSP-CMP09-05-E	JZSP-CSP39-05-E	20 m Max.	(4)
	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		

*1: Use flexible cables for movable sections such as robot arms.

*2: When the battery is connected to the host controller, no battery case is required. If so, use a cable for incremental encoders.

Selecting Cables for SERVOPACKs with AC Power Input

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

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

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

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

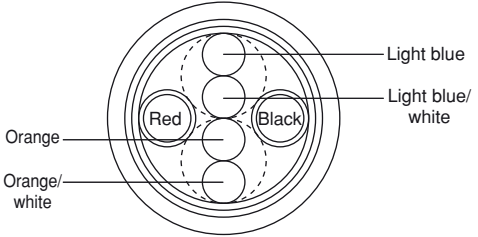
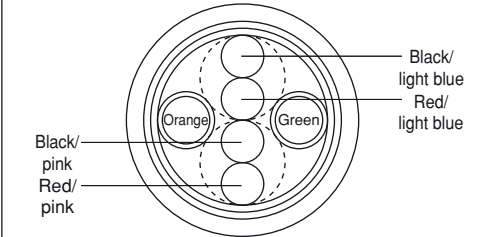
Battery Case	
Pin No.	Signal
2	BAT(-)
1	BAT(+)

(3) SERVOPACK-end/Encoder-end Connector Kit Specifications

Items	SERVOPACK-end Connector Kit	Encoder-end Connector Kit
Order No.	JZSP-CMP9-1-E (Cables are not included.)	JZSP-CMP9-2-E (Cables are not included.)
Manufacturer	Molex Japan Co., Ltd.	Molex Japan Co., Ltd.
Specifications	55100-0670 (soldered) Product Specification: PS-54280	54280-0609 (soldered) Product Specification: PS-54280
External Dimensions mm		

Selecting Cables for SERVOPACKs with AC Power Input

(4) Cable Specifications

Items	Standard Type	Flexible Type
Order No.*	JZSP-CMP09-□□-E	JZSP-CSP39-□□-E
Cable Length	20 m max.	
Specifications	UL20276 (Rating temperature: 80°C) AWG22×2C+AWG24×2P AWG22 (0.33 mm ²) Outer diameter of insulating sheath: 1.15 dia. mm AWG24 (0.20 mm ²) Outer diameter of insulating sheath: 1.09 dia. mm	UL20276 (Rating temperature: 80°C) AWG22×2C+AWG24×2P AWG22 (0.33 mm ²) Outer diameter of insulating sheath: 1.35 dia. mm AWG24 (0.20 mm ²) Outer diameter of insulating sheath: 1.21 dia. mm
Finished Dimensions	6.5 dia. mm	6.8 dia. mm
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 for SERVOPACKs with AC Power Input

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

Name	Length	Order No. Standard Type	Specifications	Details
Cable with Connectors (For incremental and absolute encoder)	30 m	JZSP-UCMP00-30-E		(1)
	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		(2)
Cables	30 m	JZSP-CMP19-30-E		(3)
	40 m	JZSP-CMP19-40-E		
	50 m	JZSP-CMP19-50-E		

*: Not required when connecting a battery to the host controller.

(1) Wiring Specifications for Cable with Connectors

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

(2) Wiring Specifications for Cable with a Battery Case

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

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

(3) Cable Specifications

Item	Standard Type
Order No.*	JZSP-CMP19-□□-E
Cable Length	50 m max.
Specifications	UL20276 (Rating temperature: 80°C) AWG16×2C+AWG26×2P AWG16 (1.31 mm ²) Outer diameter of insulating sheath: 2.0 dia. mm AWG26 (0.13 mm ²) Outer diameter of insulating sheath: 0.91 dia. mm
Finished Dimensions	6.8 dia. mm
Internal Configuration and Lead Colors	
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)



YASKAWA Europe GmbH

Drives & Motion Division
Hauptstr. 185
65760 Eschborn
Germany

Tel: +49 6196 569-500
info@yaskawa.eu.com
www.yaskawa.eu.com