

## Model Designations

SGMMV - A1 A 2 A 2 1  
1st + 2nd 3rd 4th 5th 6th 7th digit

Sigma-7 series  
 Servomotors:  
 SGMMV

### 1st + 2nd digit - Rated output

Code	Specification
A1	10 W
A2	20 W
A3	30 W

### 3rd digit - Power supply voltage

Code	Specification
A	200 V AC

### 4th digit - Serial encoder

Code	Specification
2	17-bit absolute

### 5th digit - Design revision order

Code	Specification
A	Standard model

### 6th digit - Shaft end

Code	Specification
2	Straight
A	Straight with flat seats

### 7th digit - Options

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

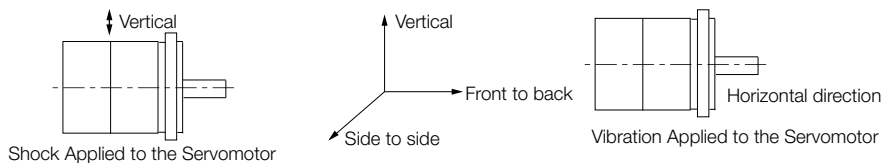
## Specifications and Ratings

### Specifications

Voltage		200 V		
Model SGMMV-		A1A	A2A	A3A
Time Rating		Continuous		
Thermal Class		B		
Insulation Resistance		500 VDC, 10 MOhm min.		
Withstand Voltage		1,500 VAC for 1 minute		
Excitation		Permanent magnet		
Mounting		Flange-mounted		
Drive Method		Direct drive		
Rotation Direction		Counterclockwise (CCW) for forward reference when viewed from the load side		
Vibration Class *1		V15		
Environmental Conditions	Surrounding Air Temperature	0 °C to 40 °C		
	Surrounding Air Humidity	20% to 80% relative humidity (non-condensing)		
	Installation Site	<ul style="list-style-type: none"> <li>• Must be indoors and free of corrosive and explosive gases.</li> <li>• Must be well-ventilated and free of dust and moisture.</li> <li>• Must facilitate inspection and cleaning.</li> <li>• Must have an altitude of 1,000 m or less.</li> <li>• Must be free of strong magnetic fields.</li> </ul>		
	Storage Environment	Store the Servomotor in the following environment if you store it with the power cable disconnected. <ul style="list-style-type: none"> <li>• Storage Temperature: -20 °C to 60 °C (with no freezing)</li> <li>• Storage Humidity: 20% to 80% relative humidity (non-condensing)</li> </ul>		
Shock Resistance *2	Impact Acceleration Rate at Flange	490 m/s <sup>2</sup>		
	Number of Impacts	2 times		
Vibration Resistance *2	Vibration Acceleration Rate at Flange	49 m/s <sup>2</sup>		
Applicable SERVOPACKS	SGD7S-	R90A, R90F		1R6A, 2R1F
	SGD7W-	1R6A *3, 2R8A *3		1R6A, 2R8A *3
	SGD7C-			

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

\*2 The given values are for when the Servomotor shaft is mounted horizontally and shock or vibration is applied in the directions shown in the following figures. The strength of the vibration that the Servomotor can withstand depends on the application. Always check the vibration acceleration rate that is applied to the Servomotor with the actual equipment.



\*3 If you use a Servomotor together with a Sigma-7W or Sigma-7C SERVOPACK, the control gain may not increase as much as with a Sigma-7S SERVOPACK and other performances may be lower than those achieved with a Sigma-7S SERVOPACK.

## Ratings

Voltage		200 V			
Model SGMMV-		A1A	A2A	A3A	
Rated Output *1	W	10	20	30	
Rated Torque *1, *2	Nm	0.0318	0.0637	0.0955	
Instantaneous Maximum Torque *1	Nm	0.0955	0.191	0.286	
Rated Current *1	A	0.70	0.66	0.98	
Instantaneous Maximum Current *1	A	2.0	1.9	2.9	
Rated Motor Speed *1	min <sup>-1</sup>	3000			
Maximum Motor Speed *1	min <sup>-1</sup>	6000			
Torque Constant	Nm/A	0.0516	0.107	0.107	
Motor Moment of Inertia	×10 <sup>-4</sup> kg·m <sup>2</sup>	2.72 (4.07)	4.66 (6.02)	6.68 (8.04)	
Rated Power Rate *1	kW/s	3.72	8.71	13.7	
Rated Angular Acceleration Rate *1	rad/s	117,000	137,000	143,000	
Heat Sink Size (Aluminium) *3	mm	150 × 150 × 3		250 × 250 × 6	
Protective Structure *4	Totally enclosed, self-cooled, IP55 (except for shaft opening)				
Holding Brake Specifications *5	Rated Voltage	V	24 VDC±10%		
	Capacity	W	2.0	2.6	
	Holding Torque	Nm	0.0318	0.0637	0.0955
	Coil Resistance	Ω (at 20 °C)	320	221.5	
	Rated Current	A (at 20 °C)	0.075	0.108	
	Time Required to Release Brake	ms	40		
	Time Required to Brake	ms	100		
Allowable Load Moment of Inertia (Motor Moment of Inertia Ratio) *6		30 times			
With External Regenerative Resistor					
Allowable Shaft Load *7	LF	mm	16		
	Allowable Radial Load	N	34	44	
	Allowable Thrust Load	N	14.5		

### Notes:

The values in parentheses are for Servomotors with Holding Brakes.

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

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

\*3. Refer to the „Servomotor Heat Dissipation Conditions“ section for the relation between the heat sinks and derating rate.

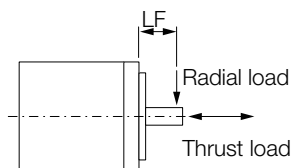
\*4. This does not apply to the shaft opening. Protective structure specifications apply only when the special cable is used.

\*5. Observe the following precautions if you use a Servomotor with a Holding Brake.

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

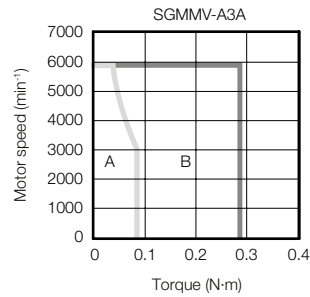
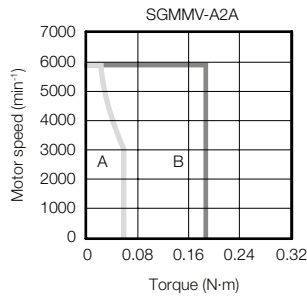
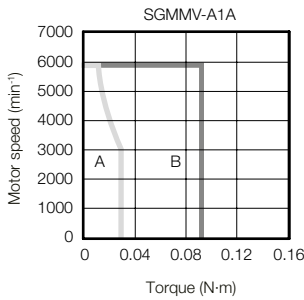
\*6. The motor moment of inertia scaling factor is the value for a standard Servomotor without a Holding Brake.

\*7. Design the mechanical system so that the thrust and radial loads applied to the Servomotor shaft end during operation do not exceed the values given in the table.



## Torque-motor Speed Characteristics

- A** : Continuous duty zone
- B** : Intermittent duty zone\*



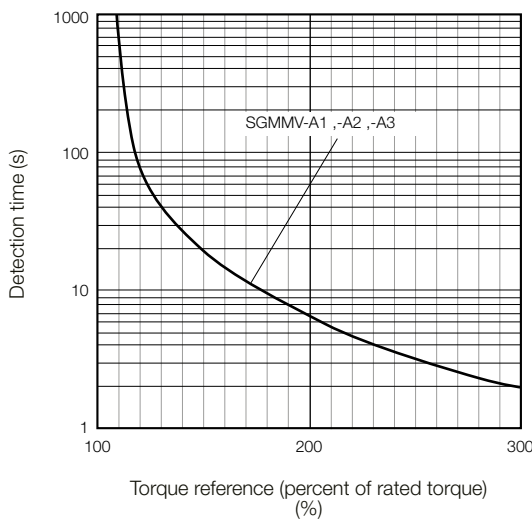
\* The characteristics are the same for three-phase 200 V, single-phase 200 V and single-phase 100 V input..

**Notes:**

1. These values are for operation in combination with a SERVOPACK when the temperature of the armature winding is 100 °C. These are typical values.
2. The characteristics in the intermittent duty zone depend on the power supply voltage.
3. If the effective torque is within the allowable range for the rated torque, the Servomotor can be used within the intermittent duty zone.
4. If you use a Servomotor Main Circuit Cable that exceeds 20 m, the intermittent duty zone in the torque motor speed characteristics will become smaller because the voltage drop increases.

## Servomotor Overload Protection Characteristics

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



**Note:**

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

## Allowable Load Moment of Inertia

The allowable load moments of inertia (motor moment of inertia ratios) for the Servomotors are given in the Servomotor Ratings section. The values are determined by the regenerative energy processing capacity of the SERVOPACK and are also affected by the drive conditions of the Servomotor. Perform the required steps for each of the following cases. Use the SigmaSize+ AC Servo Drive Capacity Selection Program to check the driving conditions. Contact your YASKAWA representative for information on this program.

## Exceeding the allowable Load Moment of Inertia

Use one of the following measures to adjust the load moment of inertia to within the allowable value.

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

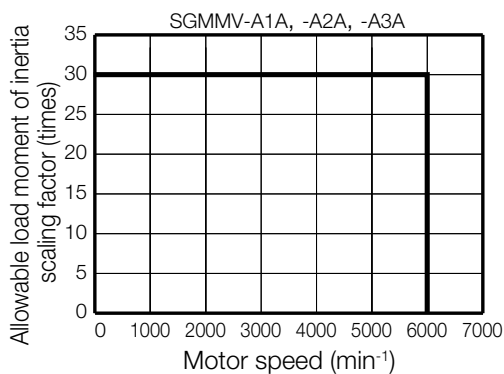
If the above steps are not possible, install an external regenerative resistor.

### Information

An Overvoltage Alarm (A.400) is likely to occur during deceleration if the load moment of inertia exceeds the allowable load moment of inertia. SERVOPACKs with a built-in regenerative resistor may generate a Regenerative Overload Alarm (A.320). Refer to Built-In Regenerative Resistor section for the regenerative power (W) that can be processed by the SERVOPACKs. Install an External Regenerative Resistor when the built-in regenerative resistor cannot process all of the regenerative power.

## SERVOPACKs without built-in Regenerative Resistors

The following graph shows the allowable load moment of inertia scaling factor of the motor speed (reference values for deceleration operation at or above the rated torque). Application is possible without an external regenerative resistor within the allowable value. However, an External Regenerative Resistor is required in the shaded areas of the graphs.



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

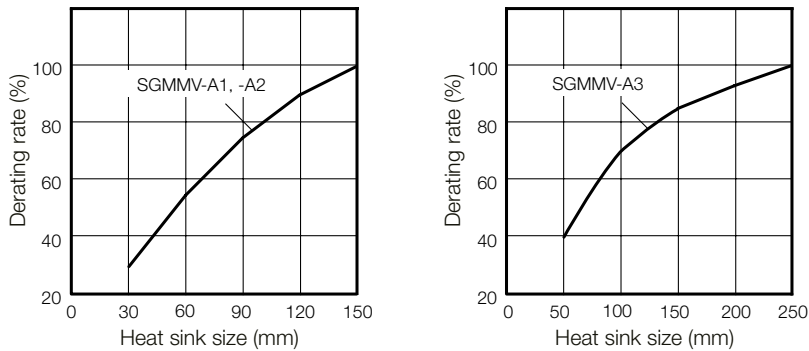
## When an external Regenerative Resistor is required

Install the External Regenerative Resistor. Refer to the “External Regenerative Resistors” section for the recommended products.

## Derating Rates

### Servomotor Heat Dissipation Conditions

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



**Important**

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

#### Information

When using Servomotors with derating, change the detection timing of overload warning and overload alarm based on the overload detection level of the motor given in "Servomotor Overload Protection Characteristics".

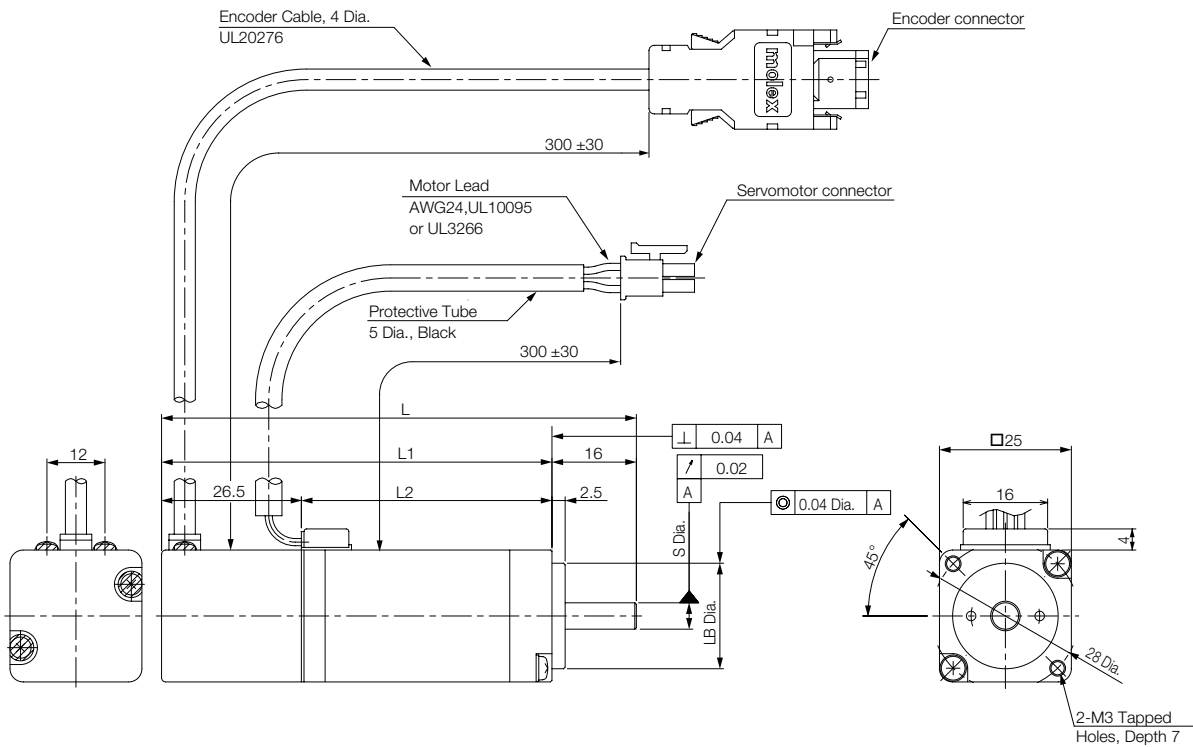
#### Note

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

## External Dimensions

### Servomotors without Holding Brakes

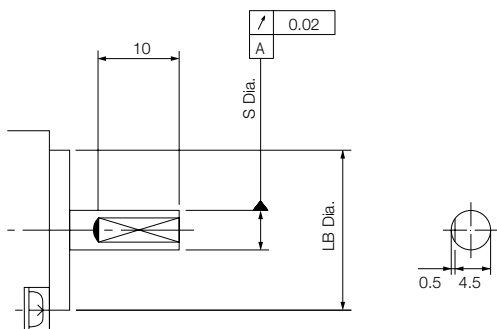
#### SGMMV-A1, -A2 and -A3



Model SGMMV	L	L1	L2	Flange Dimensions		Approx. Mass [kg]
				S	LB	
A1A2A□1	70	54	27.5	5 <sup>0</sup> <sub>-0.008</sub>	20 <sup>0</sup> <sub>-0.021</sub>	0.13
A2A2A□1	80	64	37.5	5 <sup>0</sup> <sub>-0.008</sub>	20 <sup>0</sup> <sub>-0.021</sub>	0.17
A3A2A□1	90	74	47.5	5 <sup>0</sup> <sub>-0.008</sub>	20 <sup>0</sup> <sub>-0.021</sub>	0.21

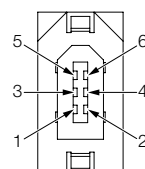
## Shaft End Specifications

### Straight with Flat Seats



## Connector Specifications

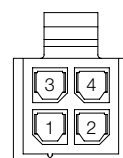
### Encoder Connector



1	PG5V	Red
2	PG0V	Black
3*	BAT	Orange
4*	BAT0	Orange/White
5	PS	Light blue
6	/PS	Light blue/white
Connector Case	FG (frame ground)	Shield

\*) A battery is required only for an absolute encoder.  
 Model: 55102-0600  
 Manufacturer: Molex Japan LLC  
 Mating Connector: 54280-0609

### Servomotor Connector

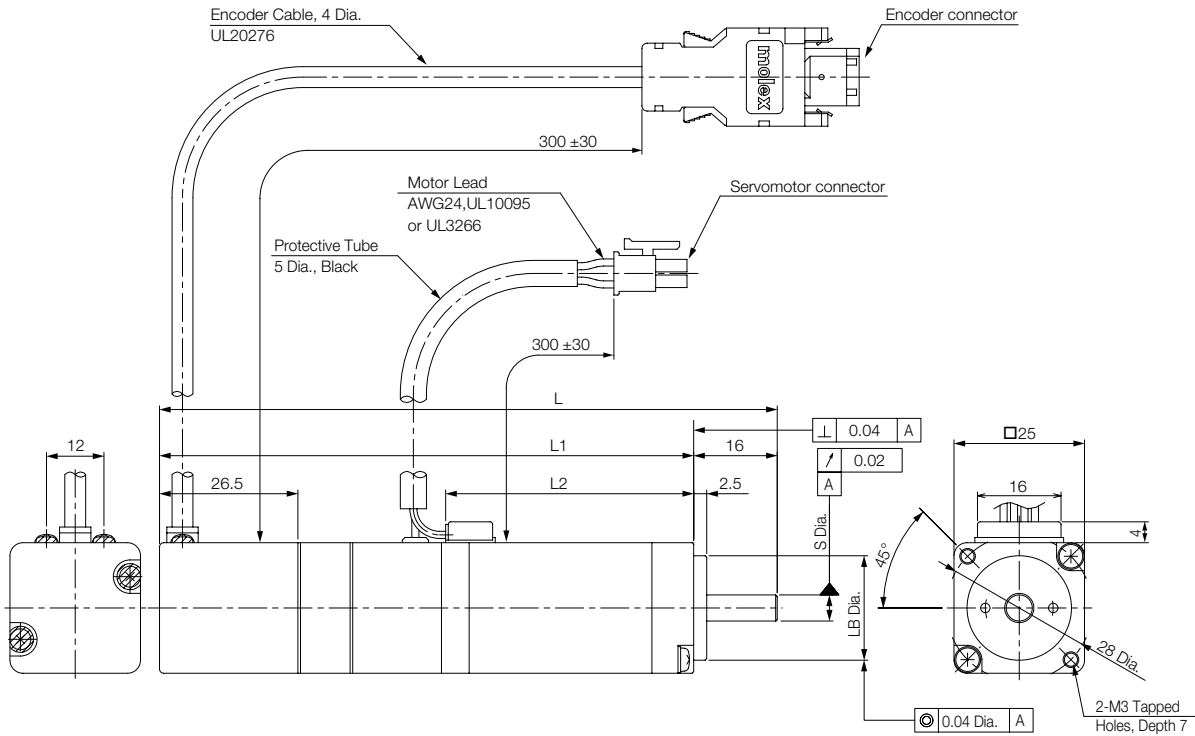


1	Phase U
2	Phase V
3	Phase W
4	FG (frame ground)

Receptacle: 43025-0400  
 Manufacturer: Molex Japan LLC

## Servomotors with Holding Brakes

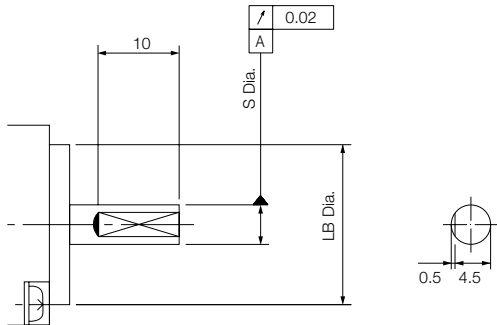
### SGMMV-A1, -A2 and -A3



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

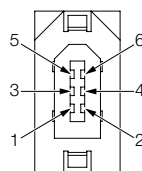
## Shaft End Specifications

### Straight with Flat Seats



## Connector Specifications

### Encoder Connector



1	PG5V	Red
2	PG0V	Black
3*	BAT	Orange
4*	BAT0	Orange/White
5	PS	Light blue
6	/PS	Light blue/white
Connector Case	FG (frame ground)	Shield

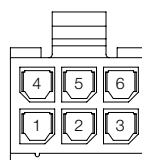
\*) A battery is required only for an absolute encoder.

Model: 55102-0600

Manufacturer: Molex Japan LLC

Mating Connector: 54280-0609

### Servomotor Connector



1	Phase U
2	Phase V
3	Phase W
4	FG (frame ground)
5	Brake
6	Brake

Receptacle: 43025-0600

Manufacturer: Molex Japan LLC

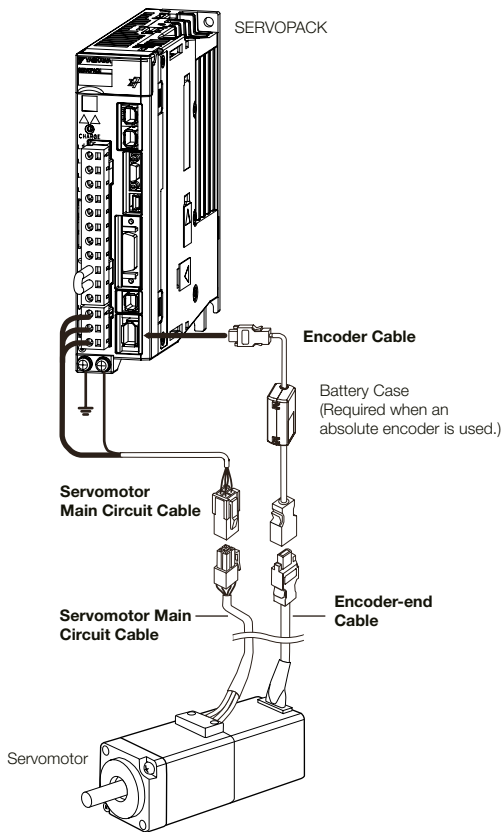


## Selecting Cables SGMMV

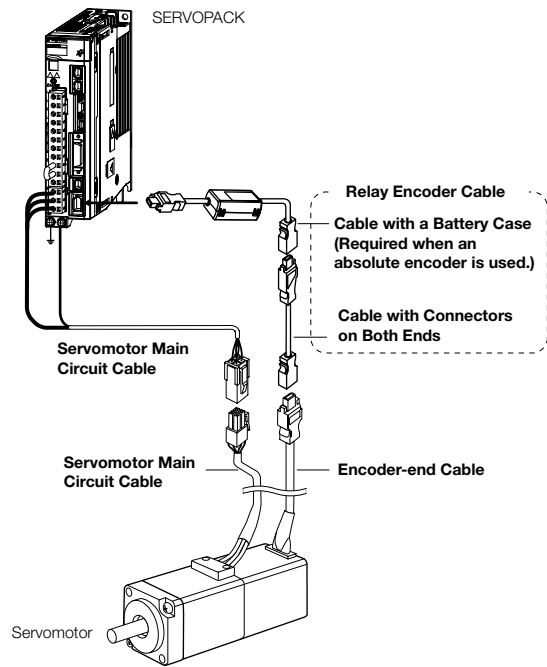
### Cable Configurations

The cables shown below are required to connect a Servomotor to a SERVOPACK.

#### Encoder Cable of 20m or less



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



#### Note:

1. If the Encoder Cable length exceeds 20m, be sure to use a Relay Encoder Cable.
2. If you use a Servomotor Main Circuit Cable that exceeds 20 m, the intermittent duty zone in the torquemotor speed characteristics will become smaller because the voltage drop increases.
3. Refer to the following manual for the following information.
  - Cable dimensional drawings and cable connection specifications
  - Order numbers and specifications of individual connectors for cables
  - Order numbers and specifications for wiring materials: Sigma-7-Series AC Servo Drive Peripheral Device Selection Manual (Manual No.: SIEP S800001 32)

## Servomotor Main Circuit Cables

Description	Length	Order Number		Appearance
		Standard Cable	Flexible Cable*	
For Servomotors without Holding Brakes	3m	JZSP-CF1M00-03-E	JZSP-CF1M20-03-E	
	5m	JZSP-CF1M00-05-E	JZSP-CF1M20-05-E	
	10m	JZSP-CF1M00-10-E	JZSP-CF1M20-10-E	
	15m	JZSP-CF1M00-15-E	JZSP-CF1M20-15-E	
	20m	JZSP-CF1M00-20-E	JZSP-CF1M20-20-E	
	30m	JZSP-CF1M00-30-E	JZSP-CF1M20-30-E	
	40m	JZSP-CF1M00-40-E	JZSP-CF1M20-40-E	
For Servomotors with Holding Brakes	3m	JZSP-CF1M03-03-E	JZSP-CF1M23-03-E	
	5m	JZSP-CF1M03-05-E	JZSP-CF1M23-05-E	
	10m	JZSP-CF1M03-10-E	JZSP-CF1M23-10-E	
	15m	JZSP-CF1M03-15-E	JZSP-CF1M23-15-E	
	20m	JZSP-CF1M03-20-E	JZSP-CF1M23-20-E	
	30m	JZSP-CF1M03-30-E	JZSP-CF1M23-30-E	
	40m	JZSP-CF1M03-40-E	JZSP-CF1M23-40-E	
50m	JZSP-CF1M03-50-E	JZSP-CF1M23-50-E		

\* Use Flexible Cables for moving parts of machines, such as robots. The recommended bending radius (R) is 90 mm or larger.

## Encoder Cables of 20 m or less

Description	Length	Order Number		Appearance
		Standard Cable	Flexible Cable*	
Cables with Connectors on Both Ends (for incremental encoder)	3m	JZSP-CMP00-03-E	JZSP-CMP10-03-E	
	5m	JZSP-CMP00-05-E	JZSP-CMP10-05-E	
	10m	JZSP-CMP00-10-E	JZSP-CMP10-10-E	
	15m	JZSP-CMP00-15-E	JZSP-CMP10-15-E	
	20m	JZSP-CMP00-20-E	JZSP-CMP10-20-E	
Cables with Connectors on Both Ends (for absolute encoder: With Battery Case)	3m	JZSP-CSP19-03-E	JZSP-CSP29-03-E	
	5m	JZSP-CSP19-05-E	JZSP-CSP29-05-E	
	10m	JZSP-CSP19-10-E	JZSP-CSP29-10-E	
	15m	JZSP-CSP19-15-E	JZSP-CSP29-15-E	
	20m	JZSP-CSP19-20-E	JZSP-CSP29-20-E	

\* Use Flexible Cables for moving parts of machines, such as robots. The recommended bending radius (R) is 90 mm or larger.

## Encoder Extension Cables of 30 m to 50 m

Description	Length	Order Number	Appearance
Cables with Connectors on Both Ends (for incremental or absolute encoder)	30m	JZSP-UCMP00-30-E	
	40m	JZSP-UCMP00-40-E	
	50m	JZSP-UCMP00-50-E	
Cable with a Battery Case (Required when an absolute encoder is used.)*	0.3m	JZSP-CSP12-E	

Note: Encoder Extension cables can only be used together with suitable Encoder Cables.

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