

# SGM7J

## Model Designations

SGM7J

Sigma-7 series  
Servomotors:  
SGM7J



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

Code	Specification
A5	50 W
01	100 W
C2	150 W
02	200 W
04	400 W
06	600 W
08	750 W

**3rd digit - Power supply voltage**

Code	Specification
A	200 V AC

**4th digit - Serial encoder**

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

**5th digit - Design revision order**

Code	Specification
A	Standard model

**6th digit - Shaft end**

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

**7th digit - Options**

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

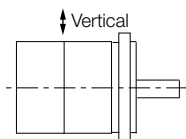
## Specifications and Ratings

### Specifications

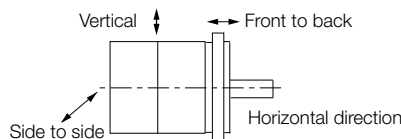
Voltage		200 V						
Model SGM7J-		05A	01A	C2A	02A	04A	06A	08A
Time Rating		Continuous						
Thermal Class		B						
Insulation Resistance		500 VDC, 10 MOhm min.						
Withstand Voltage		1,500 VAC for 1 minute						
Excitation		Permanent magnet						
Mounting		Flange-mounted						
Drive Method		Direct 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 (With derating, usage is possible between 40 °C and 60 °C)*3						
	Surrounding Air Humidity	20% to 80% relative humidity (with no condensation)						
	Installation Site	<ul style="list-style-type: none"> <li>• Must be indoors and free of corrosive and explosive gases.</li> <li>• Must be well-ventilated and free of dust and moisture.</li> <li>• Must facilitate inspection and cleaning.</li> <li>• Must have an altitude of 1,000 m or less. (With derating, usage is possible between 1,000 m and 2,000 m.)*3</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. Storage Temperature: -20 °C to 60 °C (with no freezing) Storage Humidity: 20% to 80% relative humidity (with no condensation)						
Shock Resistance*2	Impact Acceleration Rate at Flange	490 m/s <sup>2</sup>						
	Number of Impacts	2 times						
Vibration Resistance*2	Vibration Acceleration Rate at Flange	49 m/s <sup>2</sup>						
	Applicable SERVOPACKS	SGD7S-	R70A, R70F	R70A, R90F	1R6A, 2R1F	2R8A, 2R8F	5R5A	
	SGD7W-SGD7C	1R6A*4, 2R8A*4		1R6A*4, 2R8A*4	2R8A, 5R5A*4, 7R6A*4	5R5A, 7R6A		

\*1. A vibration class of V15 indicates a vibration amplitude of 15 mm 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.



Shock Applied to the Servomotor



Vibration Applied to the Servomotor

\*3. Refer to the following section for the derating rates.

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

# Rotary Servomotors SGM7J

## Ratings

Voltage		200 V							
Model SGM7J-		A5A	01A	C2A	02A	04A	06A	08A	
Rated Output <sup>*1</sup>	W	50	100	150	200	400	600	750	
Rated Torque <sup>*1, *2</sup>	Nm	0.159	0.318	0.477	0.637	1.27	1.91	2.39	
Instantaneous Maximum Torque <sup>*1</sup>	Nm	0.557	1.11	1.67	2.23	4.46	6.69	8.36	
Rated Current <sup>*1</sup>	A	0.55	0.85	1.6	1.6	2.5	4.2	4.4	
Instantaneous Maximum Current <sup>*1</sup>	A	2.0	3.1	5.7	5.8	9.3	15.3	16.9	
Rated Motor Speed <sup>*1</sup>	min <sup>-1</sup>	3,000							
Maximum Motor Speed <sup>*1</sup>	min <sup>-1</sup>	6,000							
Torque Constant	Nm/A	0.316	0.413	0.321	0.444	0.544	0.493	0.584	
Motor Moment of Inertia	x10 <sup>-4</sup> kg·m <sup>2</sup>	0.0395	0.0659	0.0915	0.263	0.486	0.800	1.59	
		with holding brake	0.0475	0.0739	0.0995	0.333	0.556	0.870	1.77
		with batteryless absolute encoder	0.0410	0.0674	0.0930	0.264	0.487	0.801	1.59
Rated Power Rate <sup>*1</sup>	kW/s	6.40	15.3	24.8	15.4	33.1	45.6	35.9	
	with holding brake	5.32	13.6	22.8	12.1	29.0	41.9	32.2	
Rated Angular Acceleration Rate <sup>*1</sup>	rad/s	40,200	48,200	52,100	24,200	26,100	23,800	15,000	
	with holding brake	33,400	43,000	47,900	19,100	22,800	21,900	13,500	
Derating Rate for Servomotor with Oil Seal	%	80	90			95			
Heat Sink Size (Aluminium) <sup>*3</sup>	mm	200 × 200 × 6			250 × 250 × 6				
Protective Structure <sup>*4</sup>	Totally enclosed, self-cooled, IP67								
Holding Brake Specifications <sup>*5</sup>	Rated Voltage	V	24 VDC ±10%						
	Capacity	W	5.5			6		6.5	
	Holding Torque	Nm	0.159	0.318	0.477	0.637	1.27	1.91	2.39
	Coil Resistance	Ω (at 20 °C)	104.8±10%			96±10%		88.6±10%	
	Rated Current	A (at 20 °C)	0.23			0.25		0.27	
	Time Required to Release Brake	ms	60					80	
	Time Required to Brake	ms	100						
Allowable Load Moment of Inertia (Motor Moment of Inertia Ratio) <sup>*6</sup>		35 times			15 times	10 times	20 times	12 times	
	With External Regenerative Resistor and Dynamic Brake Resistor <sup>*7</sup>	35 times			25 times		20 times	15 times	
Allowable Shaft Load <sup>*8</sup>	LF	mm	20			25		35	
	Allowable Radial Load	N	78			245		392	
	Allowable Thrust Load	N	54			74		147	

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

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

\*3. Refer to the following 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.

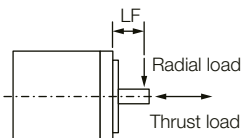
- The holding brake cannot be used to stop the Servomotor.
- The time required to release the brake and the time required to brake depend on which discharge circuit is used. Confirm that the operation delay time is appropriate for the actual equipment.
- The 24-VDC power supply is not provided by YASKAWA.

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

\*7. To externally connect a dynamic brake resistor, select hardware option specification 020 for the SERVOPACK. However, you cannot externally connect a dynamic brake resistor if you use the following SERVOPACKs (maximum applicable motor capacity: 400 W).

- SGD7S-R70□□□A020 to -2R8□□□A020
- SGD7W-1R6A20A020 to -2R8A20A020
- SGD7C-1R6AMAA020 to -2R8AMAA020

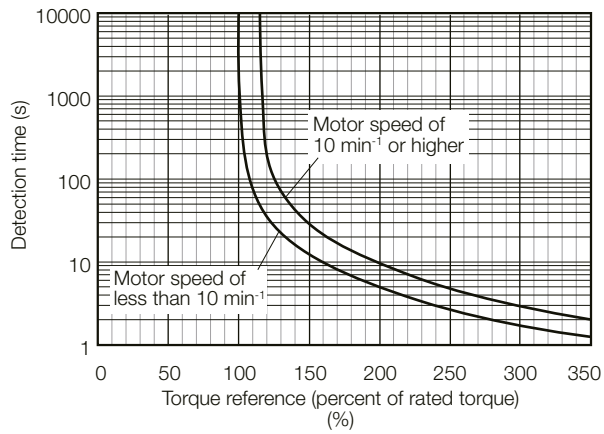
\*8. Design the mechanical system so that the thrust and radial loads applied to the Servomotor shaft end during operation do not exceed the values given in the table.





## 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 Ratings of Servomotors. The values are determined by the regenerative energy processing capacity of the SERVOPACK and are also affected by the drive conditions of the Servomotor. Perform the required Steps for each of the following cases.

Use the SigmaSize+ AC Servo Drive Capacity Selection Program to check the driving conditions. Contact your YASKAWA representative for information on this program.

### Exceeding the allowable Load Moment of Inertia

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

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

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

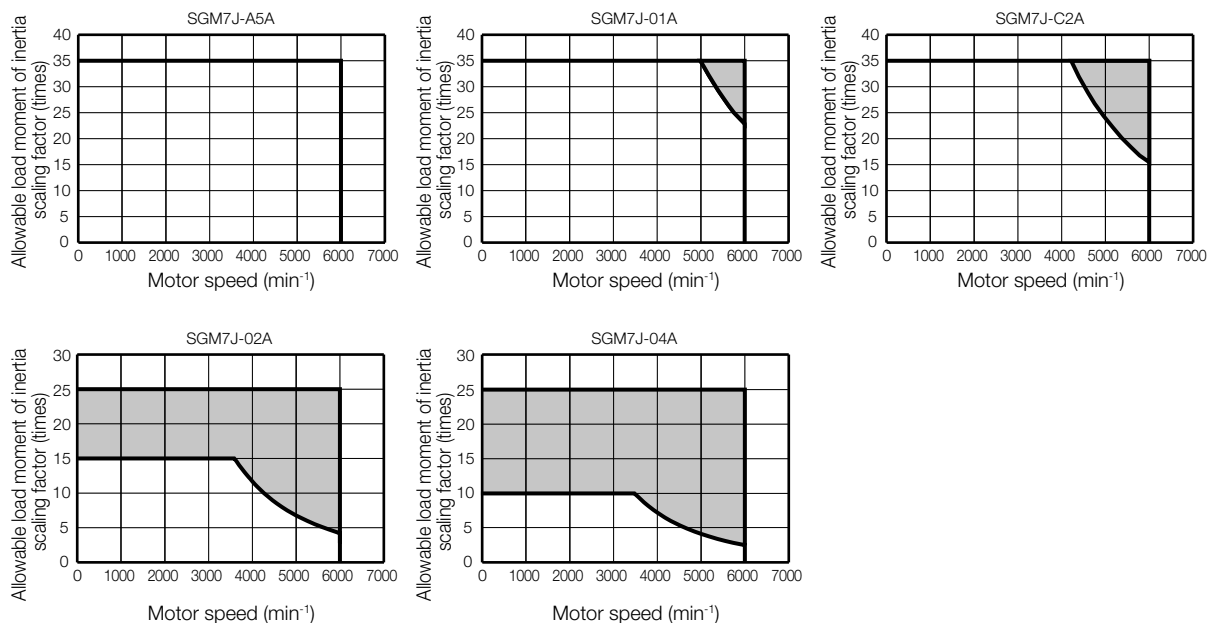
#### Information

An Overvoltage Alarm (A.400) is likely to occur during deceleration if the load moment of inertia exceeds the allowable load moment of inertia. SERVOPACKs with a built-in regenerative resistor may generate a Regenerative Overload Alarm (A.320). Refer to Built-In Regenerative Resistor 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.



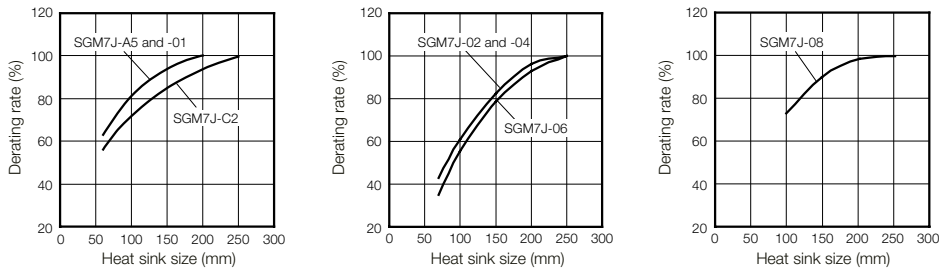
Note: Applicable SERVOPACK models: SGD7S-R70A, -R90A, -1R6A, -2R8A, -R70F, -R90F, -2R1F, and -2R8F

### When an External Regenerative Resistor is required

Install the External Regenerative Resistor. Refer to the following section for the recommended products.

## Servomotor Heat Dissipation Conditions

The Servomotor ratings are the continuous allowable values at a surrounding air temperature of 40°C 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.

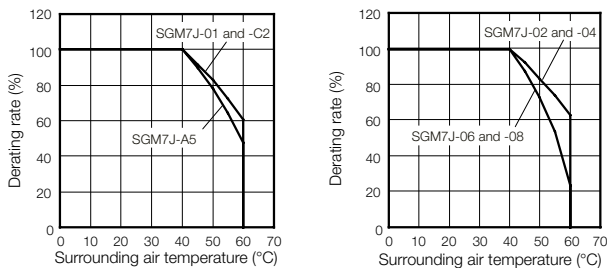


**Important**

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.

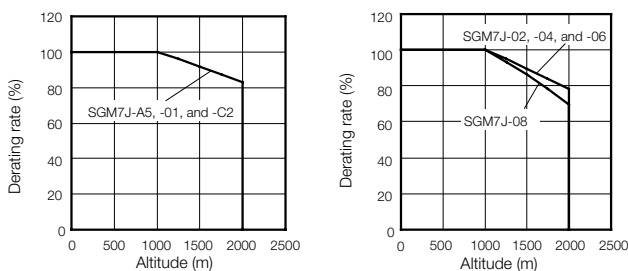
## Applications where the surrounding Air Temperature of the Servomotor exceeds 40 °C

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



## Applications where the Altitude exceeds 1,000 m

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



### Information

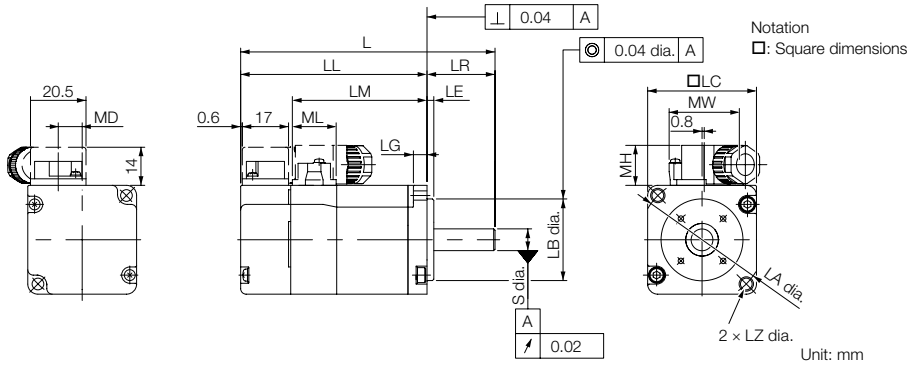
When using Servomotors with derating, change the detection timing of overload warning and overload alarm based on the overload detection level of the motor given in Servomotor Overload Protection Characteristics.

#### Notes:

1. Use the combination of the SERVOPACK and Servomotor so that the derating conditions are satisfied for both the SERVOPACK and Servomotor.
2. The derating rates are applicable only when the average motor speed is less than or equal to the rated motor speed. If the average motor speed exceeds the rated motor speed, consult with your YASKAWA representative.

## Dimensions

### SGM7J-A5, -01, and -C2



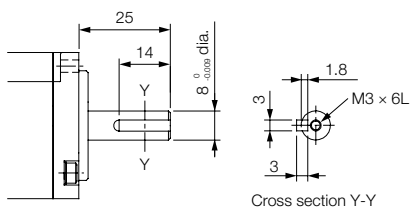
Model SGM7J-	L*	LL*	LM	Flange Dimensions							S	MD	MW	MH	ML	Approx. Mass [kg]
				LR	LE	LG	LC	LA	LB	LZ						
A5A□A2□	81.5 (122)	56.5 (97)	37.9	25	2.5	5	40	46	30 <sup>0</sup> -0.021	4.3	8 <sup>0</sup> -0.009	8.8	25.8	14.7	16.1	0.3 (0.6)
01A□A2□	93.5 (134)	68.5 (109)	49.9	25	2.5	5	40	46	30 <sup>0</sup> -0.021	4.3	8 <sup>0</sup> -0.009	8.8	25.8	14.7	16.1	0.4 (0.7)
C2A□A2□	105.5 (153.5)	80.5 (128.5)	61.9	25	2.5	5	40	46	30 <sup>0</sup> -0.021	4.3	8 <sup>0</sup> -0.009	8.8	25.8	14.7	16.1	0.5 (0.8)

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

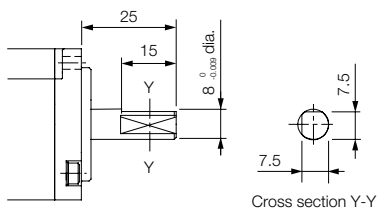
1. The values in parentheses are for Servomotors with Holding Brakes.
2. The values for a straight, without key specification are given. Refer to the information given below for other shaft end specifications and option specifications.

## Shaft End Specifications

### Straight with Key and Tap

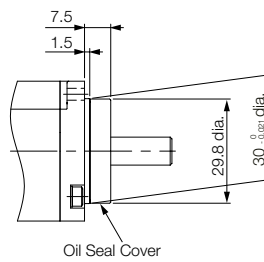


### with Two Flat Seats



## Specifications of Options

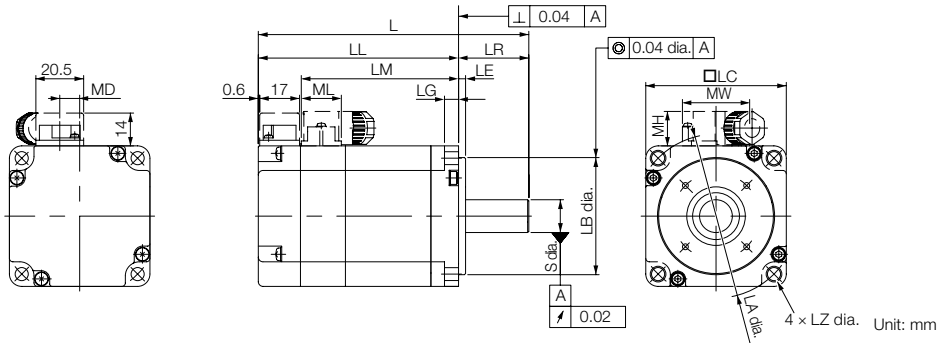
### Oil Seal





# Rotary Servomotors SGM7J

## SGM7J-02, -04 and -06



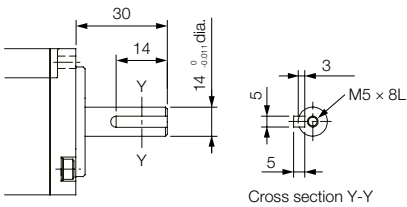
Model SGM7J-	L*	LL*	LM	Flange Dimensions							S	MD	MW	MH	ML	Approx. Mass [kg]
				LR	LE	LG	LC	LA	LB	LZ						
02A□A2□	99.5 (140)	69.5 (110)	51.2	30	3	6	60	70	50 <sup>0</sup> -0.025	5.5	14 <sup>0</sup> -0.011	8.5	28.7	14.7	17.1	0.8 (1.4)
04A□A2□	115.5 (156)	85.5 (126)	67.2	30	3	6	60	70	50 <sup>0</sup> -0.025	5.5	14 <sup>0</sup> -0.011	8.5	28.7	14.7	17.1	1.1 (1.7)
06A□A2□	137.5 (191.5)	107.5 (161.5)	89.2	30	3	6	60	70	50 <sup>0</sup> -0.025	5.5	14 <sup>0</sup> -0.011	8.5	28.7	14.7	17.1	1.6 (2.2)

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

1. The values in parentheses are for Servomotors with Holding Brakes.
2. The values for a straight, without key specification are given. Refer to the information given below for other shaft end specifications and option specifications.

## Shaft End Specifications

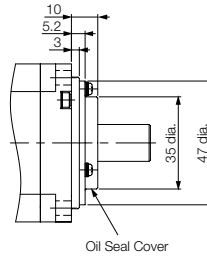
### Straight with Key and Tap



Cross section Y-Y

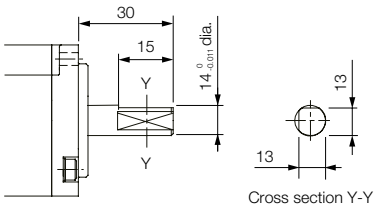
## Specifications of Options

### Oil Seal



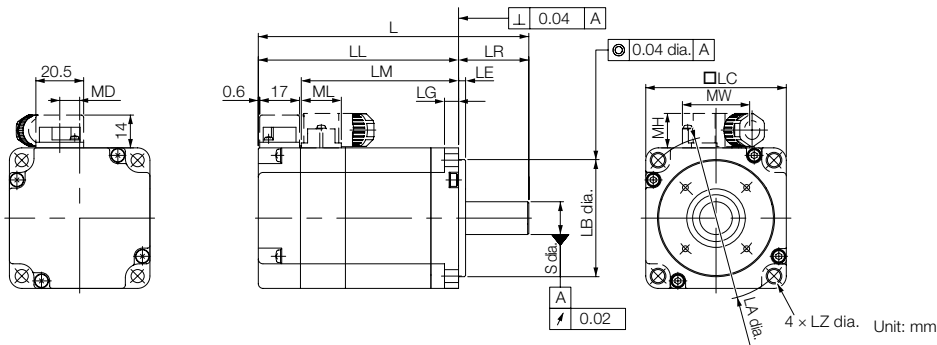
Oil Seal Cover

### with Two Flat Seats



Cross section Y-Y

## SGM7J-08



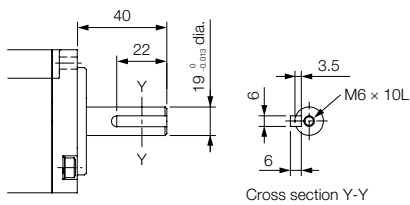
Model SGM7J-	L*	LL*	LM	Flange Dimensions							S	MD	MW	MH	ML	Approx. Mass [kg]
				LR	LE	LG	LC	LA	LB	LZ						
08A□A2□	137 (184)	97 (144)	78.5	40	3	8	80	90	70 <sup>0</sup> -0.030	7	19 <sup>0</sup> -0.013	13.6	38	14.7	19.3	2.2 (2.8)

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

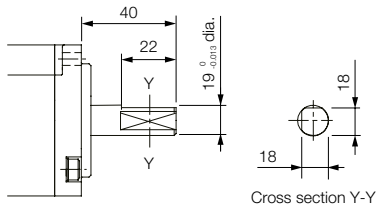
1. The values in parentheses are for Servomotors with Holding Brakes.
2. The values for a straight, without key specification are given. Refer to the information given below for other shaft end specifications and option specifications.

## Shaft End Specifications

### Straight with Key and Tap

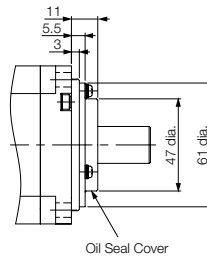


### with Two Flat Seats



## Specifications of Options

### Oil Seal



## Dimensions of Servomotors with batteryless Absolute Encoders

Model SGM7J-	L	LL	Approx. Mass [kg]
A5A6A2□	89.5 (130)	64.5 (105)	0.3 (0.6)
01A6A2□	101.5 (142)	76.5 (117)	0.4 (0.7)
C2A6A2□	113.5 (161.5)	88.5 (136.5)	0.5 (0.8)
02A6A2□	107.5 (148)	77.5 (118)	0.8 (1.4)
04A6A2□	123.5 (164)	93.5 (134)	1.1 (1.7)
06A6A2□	145.5 (198.5)	115.5 (169.5)	1.6 (2.2)
08A6A2□	145 (192)	105 (152)	2.3 (2.9)

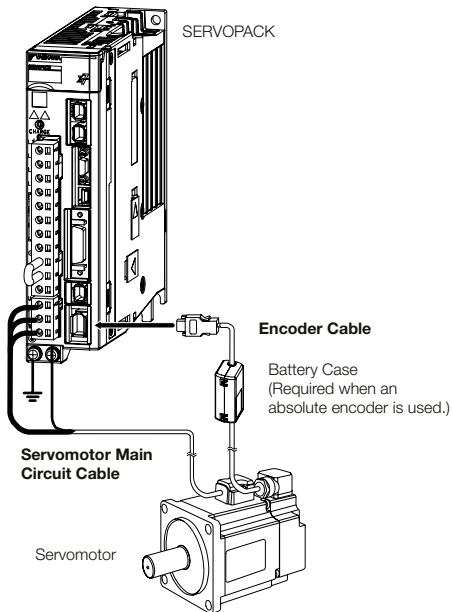
Note: The values in parentheses are for Servomotors with Holding Brakes.

## Selecting Cables SGM7J

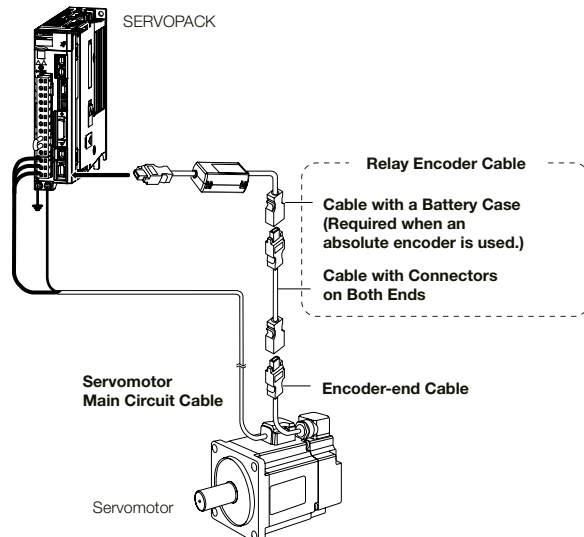
### Cable Configurations

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

#### Encoder Cable of 20 m or less



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



#### Note:

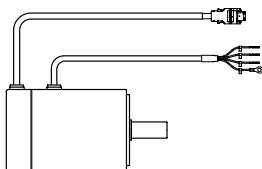
1. If the Encoder Cable length exceeds 20 m, be sure to use a Relay Encoder Cable.
2. If you use a Servomotor Motor Power Cable that exceeds 20 m, the intermittent duty zone in the torquemotor speed characteristics will become smaller because the voltage drop increases.
3. Refer to the following manual 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)



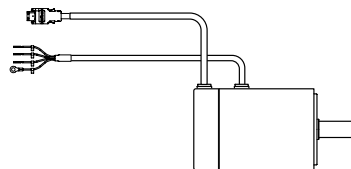
#### Important

There are different order numbers for the Servomotor Motor Power Cables and Encoder Cables depending on the cable installation direction. Confirm the order numbers before you order.

#### Cable installed towards Load



#### Cable installed away from Load



## Servomotor Motor Power Cables

Servomotor Model	Description	Length	Order Number	Appearance
			Flexible Cable*	
SGM7J-A5 to -C2 50 W to 150 W	For Servomotors without Holding Brakes  Cable installed towards load	3m	JZSP-CSM21-03-E-G#	
		5m	JZSP-CSM21-05-E-G#	
		10m	JZSP-CSM21-10-E-G#	
		15m	JZSP-CSM21-15-E-G#	
		20m	JZSP-CSM21-20-E-G#	
SGM7J-02 to -06 200 W to 600 W		3m	JZSP-CSM22-03-E-G#	
		5m	JZSP-CSM22-05-E-G#	
		10m	JZSP-CSM22-10-E-G#	
		15m	JZSP-CSM22-15-E-G#	
		20m	JZSP-CSM22-20-E-G#	
SGM7J-08 750 W, 1.0 kW		30m	JZSP-CSM22-30-E-G#	
		3m	JZSP-CSM23-03-E-G#	
		5m	JZSP-CSM23-05-E-G#	
		10m	JZSP-CSM23-10-E-G#	
		15m	JZSP-CSM23-15-E-G#	
SGM7J-A5 to -C2 50 W to 150 W	20m	JZSP-CSM23-20-E-G#		
	30m	JZSP-CSM23-30-E-G#		
	SGM7J-02 to -06 200 W to 600 W	3m	JZSP-CSM31-03-E-G#	
		5m	JZSP-CSM31-05-E-G#	
		10m	JZSP-CSM31-10-E-G#	
15m		JZSP-CSM31-15-E-G#		
20m		JZSP-CSM31-20-E-G#		
SGM7J-02 to -06 200 W to 600 W	3m	JZSP-CSM32-03-E-G#		
	5m	JZSP-CSM32-05-E-G#		
	10m	JZSP-CSM32-10-E-G#		
	15m	JZSP-CSM32-15-E-G#		
	20m	JZSP-CSM32-20-E-G#		
SGM7J-08 750 W, 1.0 kW	3m	JZSP-CSM33-03-E-G#		
	5m	JZSP-CSM33-05-E-G#		
	10m	JZSP-CSM33-10-E-G#		
	15m	JZSP-CSM33-15-E-G#		
	20m	JZSP-CSM33-20-E-G#		

\* Use Flexible Cables for moving parts of machines, such as robots. The recommended bending radius (R) is 90 mm or larger.  
Note: The digit # of the order number represents the design revision number.

## Encoder Cables

Servomotor Model	Description	Length	Order Number	Appearance	
SGM7J-A5 to 08 50 W - 750 W	Cable direction to load side	3 m	JZSP-C7PI2D-03-E-G#		
		5 m	JZSP-C7PI2D-05-E-G#		
		10 m	JZSP-C7PI2D-10-E-G#		
		15 m	JZSP-C7PI2D-15-E-G#		
		20 m	JZSP-C7PI2D-20-E-G#		
		25 m	JZSP-C7PI2D-25-E-G#		
		30 m	JZSP-C7PI2D-30-E-G#		
		35 m	JZSP-C7PI2D-35-E-G#		
		40 m	JZSP-C7PI2D-40-E-G#		
		Cable direction away from load	3 m		JZSP-C7PI2E-03-E-G#
	5 m		JZSP-C7PI2E-05-E-G#		
	10 m		JZSP-C7PI2E-10-E-G#		
	15 m		JZSP-C7PI2E-15-E-G#		
	20 m		JZSP-C7PI2E-20-E-G#		
	25 m		JZSP-C7PI2E-25-E-G#		
	30 m		JZSP-C7PI2E-30-E-G#		
	35 m		JZSP-C7PI2E-35-E-G#		
	40 m		JZSP-C7PI2E-40-E-G#		
	Cable with battery case, direction to load side		3 m		JZSP-C7PA2D-03-E-G#
		5 m	JZSP-C7PA2D-05-E-G#		
		10 m	JZSP-C7PA2D-10-E-G#		
		15 m	JZSP-C7PA2D-15-E-G#		
		20 m	JZSP-C7PA2D-20-E-G#		
		25 m	JZSP-C7PA2D-25-E-G#		
		30 m	JZSP-C7PA2D-30-E-G#		
		35 m	JZSP-C7PA2D-35-E-G#		
		40 m	JZSP-C7PA2D-40-E-G#		
		Cable with battery case, direction away from load side	3 m	JZSP-C7PA2E-03-E-G#	
	5 m		JZSP-C7PA2E-05-E-G#		
	10 m		JZSP-C7PA2E-10-E-G#		
	15 m		JZSP-C7PA2E-15-E-G#		
	20 m		JZSP-C7PA2E-20-E-G#		
	25 m		JZSP-C7PA2E-25-E-G#		
	30 m		JZSP-C7PA2E-30-E-G#		
	35 m		JZSP-C7PA2E-35-E-G#		
	40 m		JZSP-C7PA2E-40-E-G#		