

SGM7J

Model Designations

SGM7J - 01 A 7 A 2 1

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

Sigma-7 Series
Servomotors:
SGM7J

1st + 2nd digit - Rated Output	
Code	Specifications
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	Specifications
A	200 VAC

4th digit - Serial Encoder	
Code	Specifications
7	24-bit absolute
F	24-bit incremental

5th digit - Design Revision Order	
Code	Specifications
A	Initial Design

6th digit - Shaft End	
Code	Specifications
2	Straight without key
6	Straight with key and tap
B	With two flat seats

7th digit - Options	
Code	Specifications
1	Without options
C	With holding brake (24 VDC)
E	With oil seal and holding brake (24 VDC)
S	With oil seal

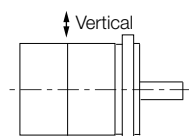
Specifications and Ratings

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)*4						
	Surrounding Air Humidity	20% to 80% relative humidity (with no condensation)						
	Installation Site	<ul style="list-style-type: none"> • Must be indoors and free of corrosive and explosive gases. • Must be well-ventilated and free of dust and moisture. • Must facilitate inspection and cleaning. • Must have an altitude of 1,000 m or less. (With derating, usage is possible between 1,000 m and 2,000 m.)*5 • Must be free of strong magnetic fields. 						
	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 ²						
	Number of Impacts	2 times						
Vibration Resistance*3	Vibration Acceleration Rate at Flange	49 m/s ²						
Applicable SERVOPACKS	SGD7S-	R70A	R70A	1R6A	2R8A	5R5A		
	SGD7W-	1R6A*6, 2R8A*6		1R6A*6, 2R8A*6	2R8A, 5R5A*6, 7R6A*6	5R5A, 7R6A		

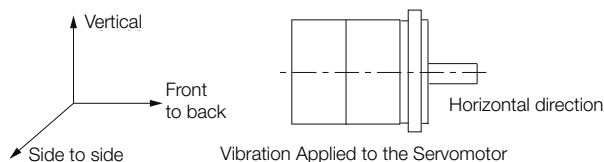
*1 A Vibration class of V15 indicates a vibration amplitude of 15 μm maximum on the Servomotor without a load at the rated motor speed.

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



Shock Applied to the Servomotor

*3 The vertical, side-to-side, and front-to-back vibration resistance for vibration in three directions when the Servomotor is mounted with the shaft in a horizontal position is given in the above table. 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.



Vibration Applied to the Servomotor

*4 If the surrounding air temperature will exceed 40°C, refer to the following section or Applications Where the Ambient Air Temperature of the Servomotor Exceeds 40°C on page 61.

*5 If the altitude will exceed 1,000 m, refer to the following section or Applications Where the Altitude of the Servomotor Exceeds 1,000 m on page 62.

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

Rotary Servomotors

Ratings

Voltage		200 V							
Model SGM7J-		A5A	01A	C2A	02A	04A	06A	08A	
Rated Output *1	W	50	100	150	200	400	600	750	
Rated Torque *1, *2	Nm	0.159	0.318	0.477	0.637	1.27	1.91	2.39	
Instantaneous Maximum Torque *1	Nm	0.557	1.11	1.67	2.23	4.46	6.69	8.36	
Rated Current *1	Arms	0.55	0.85	1.6	1.6	2.5	4.2	4.4	
Instantaneous Maximum Current *1	Arms	2.0	3.1	5.7	5.8	9.3	15.3	16.9	
Rated Motor Speed *1	min ⁻¹	3000							
Maximum Motor Speed	min ⁻¹	6000							
Torque Constant	Nm/Arms	0.316	0.413	0.321	0.444	0.544	0.493	0.584	
Motor Moment of Inertia	×10 ⁻⁴ kg m ²	0.0395 (0.0475)	0.0659 (0.0739)	0.0915 (0.0995)	0.263 (0.333)	0.486 (0.556)	0.800 (0.870)	1.59 (1.77)	
Rated Power Rate *1	kW/s	6.40 (5.32)	15.3 (13.6)	24.8 (22.8)	15.4 (12.1)	33.1 (29.0)	45.6 (41.9)	35.9 (32.2)	
Rated Angular Acceleration Rate *1	rad/s	40200 (33400)	48200 (43000)	52100 (47900)	24200 (19100)	26100 (22800)	23800 (21900)	15000 (13500)	
Derating Rate for Servomotor with Oil Seal	%	80	90			95			
Heat Sink Size (Aluminium)	mm	200 × 200 × 6			250 × 250 × 6				
Protective Structure *3	Totally enclosed, self-cooled, IP67								
Holding Brake Specifications *4	Rated Voltage	V	24 VDC ± $\begin{matrix} 10\% \\ 0 \end{matrix}$						
	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)	With External Regenerative Resistor and Dynamic Brake Resistor		35 times		15 times	10 times	20 times	12 times	
Allowable Shaft Load *5	LF	mm	20			25		35	
	Allowable Radial Load	N	78			245		392	
	Allowable Thrust Load	N	54			74		147	

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. The values for other items are at 20°C. These are typical values.

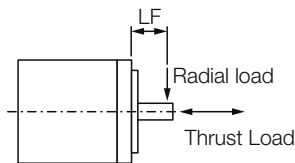
2 The rated torques are the continuous allowable torque values at a surrounding air temperature of 40°C with an aluminum heat sink of the dimensions given in the table.

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

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

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

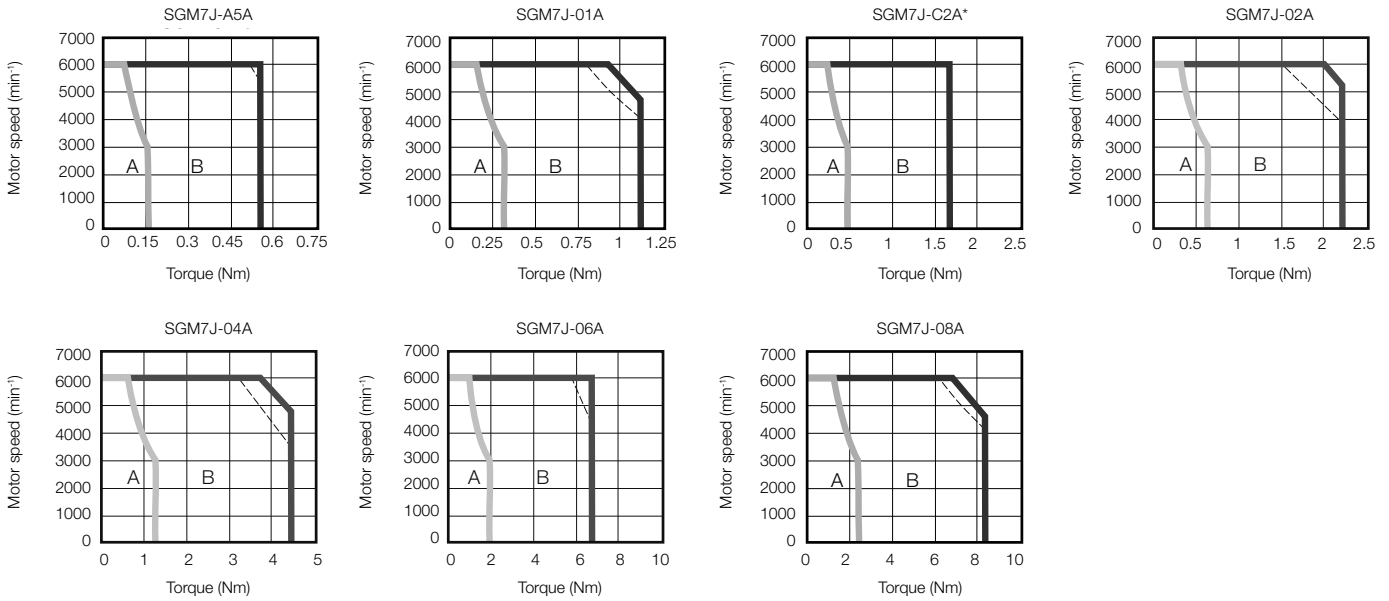
5 The allowable shaft loads are illustrated in the following figure. Design the mechanical system so that the thrust and radial loads applied to the Servomotor shaft end during operation do not exceed the values given in the table.



Torque-Motor Speed Characteristics

A : Continuous duty zone
B : Intermittent duty zone

—— (solid lines): With three-phase 200-V or single-phase 230-V input
 - - - - (dotted lines): With single-phase 200-V input



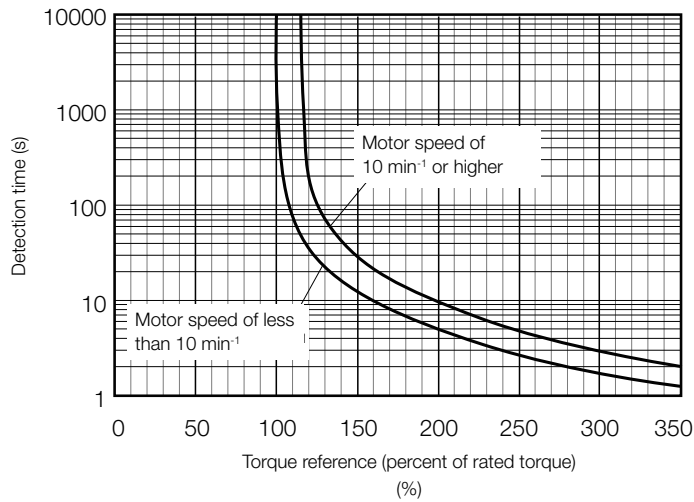
* The characteristics are the same for three-phase 200 V and single-phase 200 V.

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:

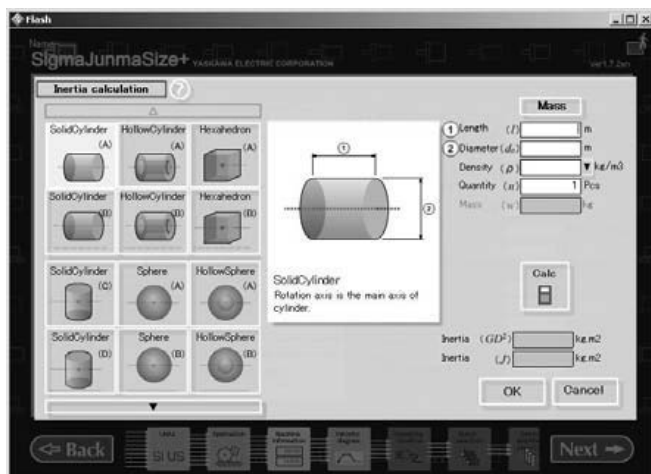
The above overload characteristics does not give permission to perform continuous duty operation with an output of 100% or higher. Use the Servomotor so that the effective torque remains within the continuous duty zone given in Torque-Motor Speed Characteristics on page 51.

Load Moment of Inertia

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

The allowable size of the load moment of inertia (J_L) for the Servomotor is restricted. Refer to Ratings of Servomotors on page 50. This value is provided strictly as a guideline and results depend on Servomotor driving conditions.

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



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

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

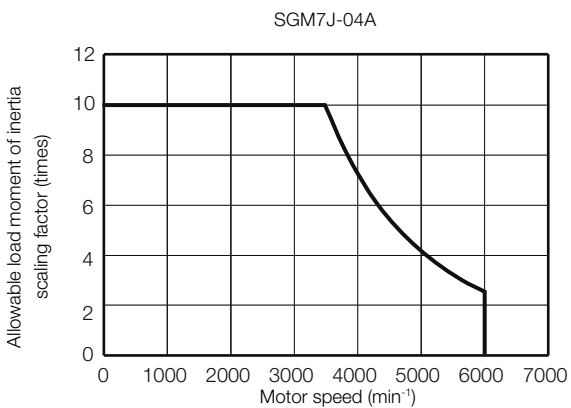
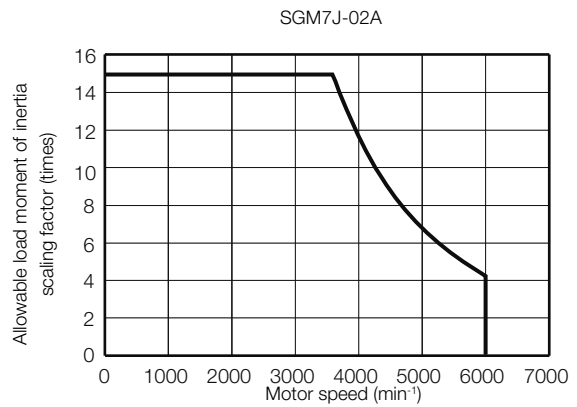
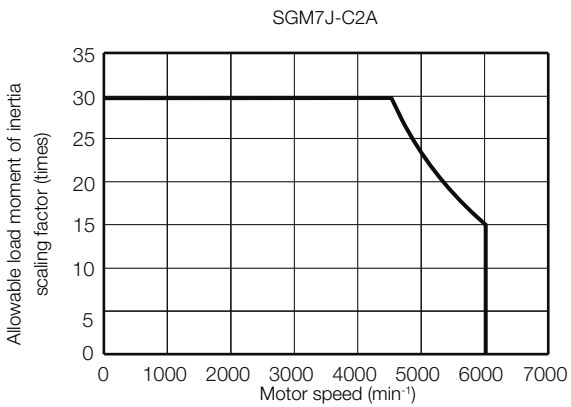
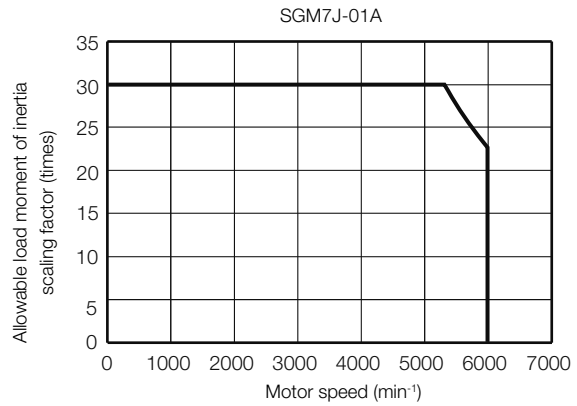
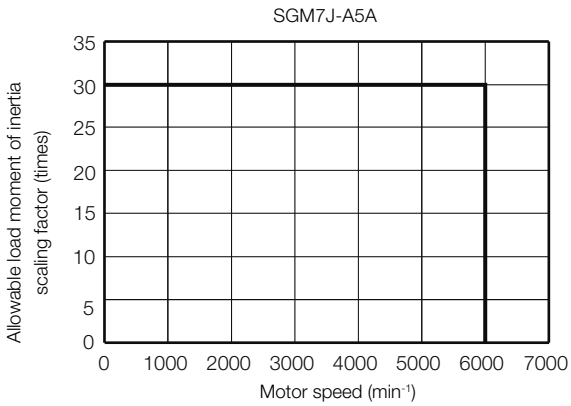
Regenerative resistors are not built into SERVOPACKs for 400-W Servomotors or smaller Servomotors. Even for SERVOPACKs with built-in regenerative resistors, an External Regenerative Resistor is required if the energy that results from the regenerative driving conditions exceeds the allowable loss capacity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

Allowable Load Moment of Inertia Scaling Factor for SERVO-PACKs without Built-in Regenerative Resistors

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

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

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



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

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.

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

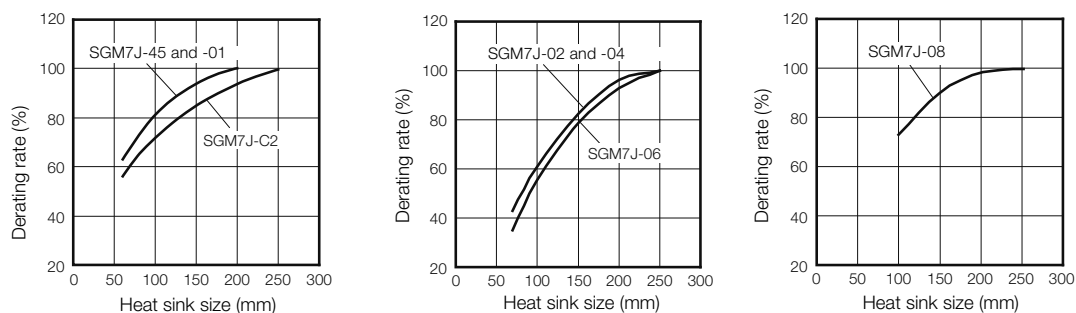
Sigma-7-Series AC Servo Drive Rotary Servomotor Product Manual (Manual No.: SIEP S800001 36)

Note:

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

Important:

The actual temperature rise depends on how the heat sink (i.e., the 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

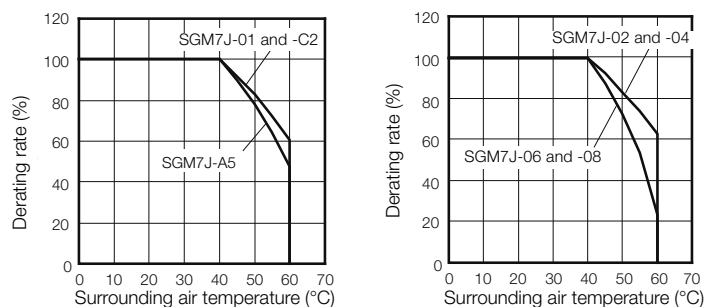
The Servomotor ratings are the continuous allowable values at a surrounding air temperature of 40°C. If you use a Servomotor at a surrounding air temperature that exceeds 40°C (60°C max.), apply a suitable derating rate from the following graphs.

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

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

Note:

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



Applications Where the Altitude of the Servomotor Exceeds 1,000 m

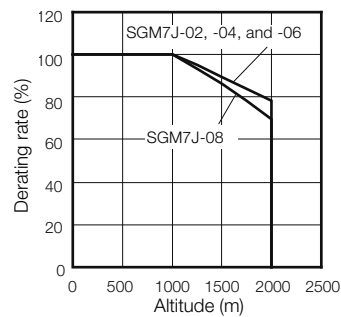
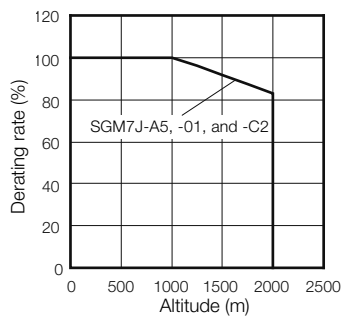
The Servomotor ratings are the continuous allowable values at an altitude of 1,000 m or less. If you use a Servomotor at an altitude that exceeds 1,000 m (2,000 m max.), the heat dissipation effect of the air is reduced. Apply the appropriate derating rate from the following graphs.

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

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

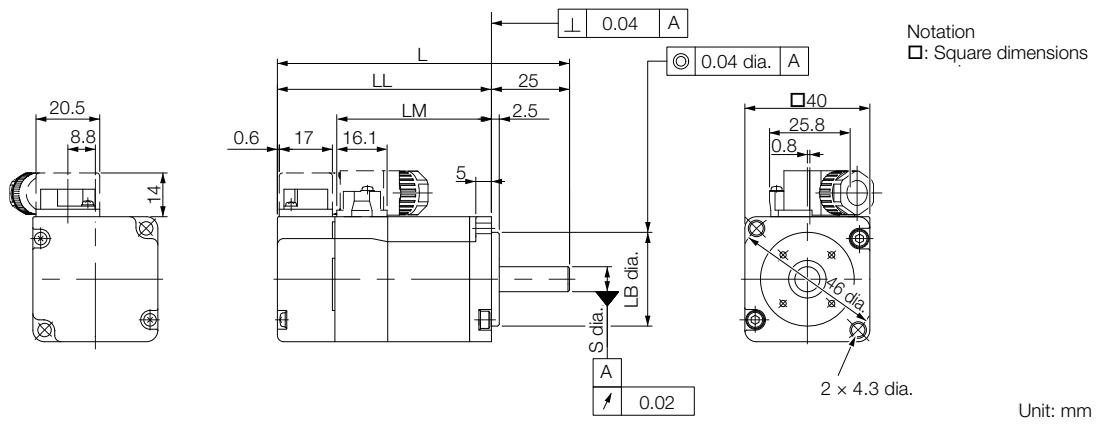
Note:

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



Dimensions

SGM7J-A5, -01, and -C2

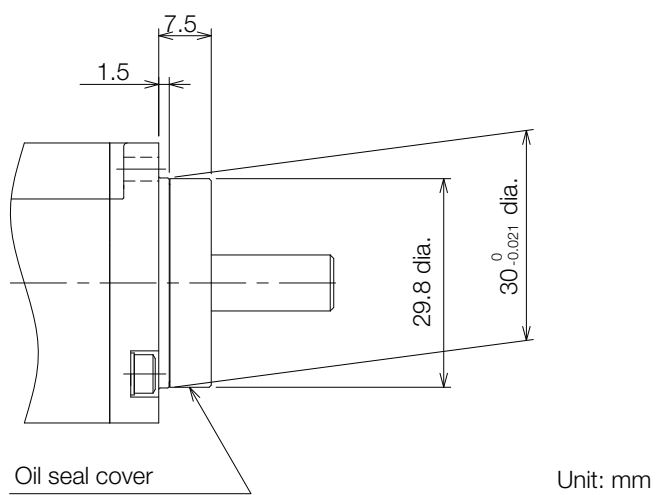


Model SGM7J-	L	LL	LM	LB	S	Approx. Mass [kg]
A5A□A2□	81.5 (122)	56.5 (97)	37.9	30 ⁰ -0.021	8 ⁰ -0.009	0.3 (0.6)
01A□A2□	93.5 (134)	68.5 (109)	49.9	30 ⁰ -0.021	8 ⁰ -0.009	0.4 (0.7)
C2A□A2□	105.5 (153.5)	80.5 (128.5)	61.9	30 ⁰ -0.021	8 ⁰ -0.009	0.5 (0.8)

- Notes:
- 1 The values in parentheses are for Servomotors with Holding Brakes.
 - 2 Refer to the following section for detailed shaft end specifications.

Specifications of Options

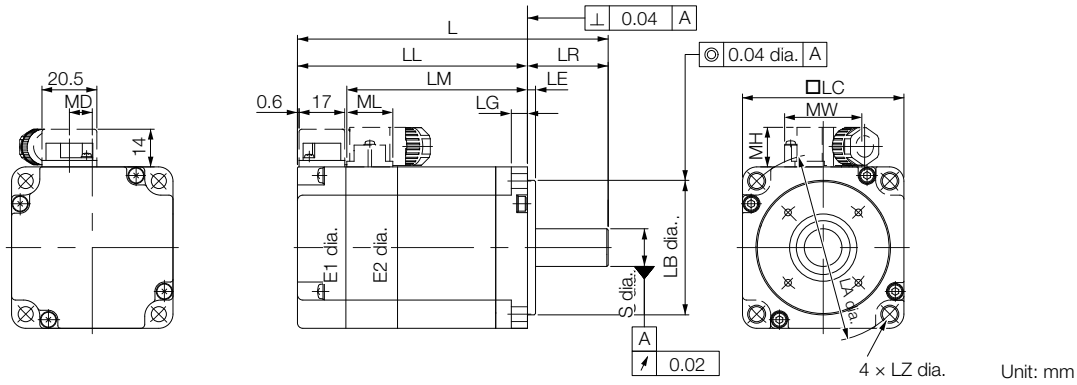
Oil Seal



Rotary Servomotors

Dimensions

SGM7J-02, -04, -06, and -08



Model SGM7J-	L	LL	LM	Flange Dimensions							S
				LR	LE	LG	LC	LA	LB	LZ	
02A□A2□	99.5 (140)	69.5 (110)	51.2	30	3	6	60	70	50 ⁰ _{-0.025}	5.5	14 ⁰ _{-0.011}
04A□A2□	115.5 (156)	85.5 (126)	67.2	30	3	6	60	70	50 ⁰ _{-0.025}	5.5	14 ⁰ _{-0.011}
06A□A2□	137.5 (191.5)	107.5 (161.5)	89.2	30	3	6	60	70	50 ⁰ _{-0.025}	5.5	14 ⁰ _{0.011}
08A□A2□	137 (184)	97 (144)	78.5	40	3	8	80	90	70 ⁰ _{-0.030}	7	19 ⁰ _{-0.013}

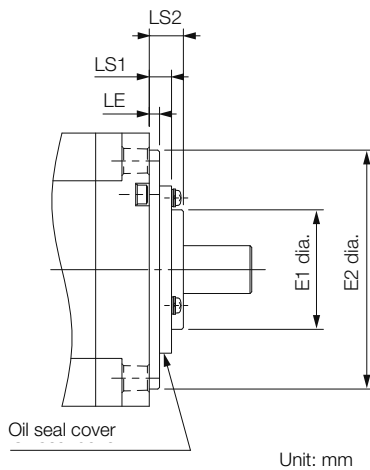
Model SGM7J-	MD	MW	ML	ML	Approx. Mass [kg]
02A□A2□	8.5	28.7	14.7	17.1	0.8 (1.4)
04A□A2□	8.5	28.7	14.7	17.1	1.1 (1.7)
06A□A2□	8.5	28.7	14.7	17.1	1.6 (2.2)
08A□A2□	13.6	38	14.7	19.3	2.2 (2.8)

Notes:

- 1 The values in parentheses are for Servomotors with Holding Brakes.
- 2 Refer to the following section for detailed shaft end specifications.

Specifications of Options

Oil Seal

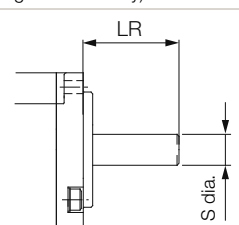
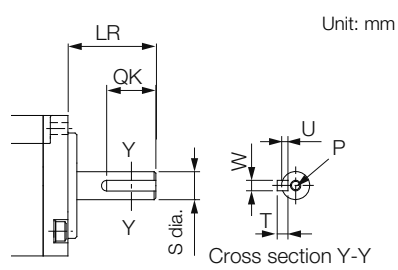
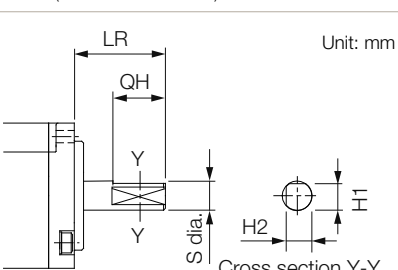


Model SGM7J-	Dimensions with Oil Seal			
	E1	E2	LS1	LS2
02A, 04A, 06A	35	47	5.2	10
08A	47	61	5.5	11

Shaft End Specifications

SGM7J-□□□□□□□□

Code	Specification
2	Straight without key
6	Straight with key and tap (Key slot is JIS B1301-1996 fastening type.)
B	With two flat seats

Shaft End Details	Servomotor Model SGM7J-						
	A5	01	C2	02	04	06	08
Code: 2 (Straight without Key)							
 <p>Unit: mm</p>	LR	25		30		40	
	S	$8^0_{-0.009}$		$14^0_{-0.011}$		$19^0_{-0.013}$	
Code: 6 (Straight with Key and Tap)							
 <p>Unit: mm</p> <p>Cross section Y-Y</p>	LR	25		30		40	
	QK	14		14		22	
	S	$8^0_{-0.009}$		$14^0_{-0.011}$		$19^0_{-0.013}$	
	W	3		5		6	
	T	3		5		6	
	U	1.8		3		3.5	
	P	M3 × 6L		M5 × 8L		M6 × 10L	
Code: B (with Two Flat Seats)							
 <p>Unit: mm</p> <p>Cross section Y-Y</p>	LR	25		30		40	
	QH	15		15		22	
	S	$8^0_{-0.009}$		$14^0_{-0.011}$		$19^0_{-0.013}$	
	H1	7.5		13		18	
	H2	7.5		13		18	