Model Designations

SGM7A	-	02	D	F	F	6	1
Sigma-7 Series Servomotors: SGM7A		1st + 2nd	3rd	4th	5th	6th	7th digit

1st + 2nd digit - Rated Output	
Code	Specification
02	**200 W**
04	**400 W**
08	**750 W**
10	**1.0 kW**
15	**1.5 kW**
20	**2.0 kW**
25	**2.5 kW**
30	**3.0 kW**
40	**4.0 kW**
50	**5.0 kW**
70	**7.0 kW**

Bolded options are considered standard warehouse products.

3rd digit - Power Supply Voltage	
Code	Specification
D	**400 VAC**

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

5th digit - Design Revision Order	
F	**Standard Model**

6th digit - Shaft End	
Code	Specifications
2	Straight without key
6	**Straight with key and tap**

7th digit - Options	
Code	Specifications
1	**Without options**
C	With holding brake (24 VDC)
F*	**With dust seal**
H*	With dust seal and holding brake (24 VDC)

* This option is supported only for SGM7A-10 to -50 Servomotors.

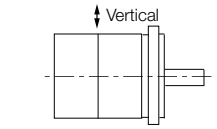
Specifications and Ratings

Specifications

Voltage		400 V									
Model SGM7A-		02D	04D	08D	10D	15D	20D	25D	30D	40D	50D	70D
Time Rating		Continuous										
Thermal Class		B				F						
Insulation Resistance		500 VDC, 10 MΩ min.										
Withstand Voltage		1,800 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	• 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/s²										
	Number of Impacts	2 times										
Vibration Resistance*3	Vibration Acceleration Rate at Flange	49 m/s² (Models 15A to 30D: 24.5 m/s² front to back)										14.7 m/s²
Applicable SERVOPACKs	SGD7S-	1R9D		3R5D	5R4D		8R4D	120D	170D			260D
	SGD7W-	2R6D*6	2R6D*6 or 5R4D*6	2R6D or 5R4D*6	5R4D*6	5R4D	–					

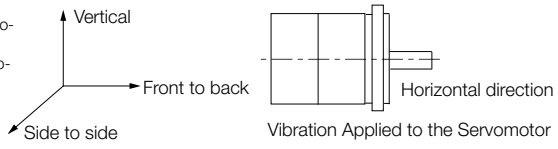
*1 A Vibration class of V15 indicates a vibration amplitude of 15 µm maximum on the Servomotor without a load at the rated motor speed.

*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 Refer to the section “Applications where the Surrounding Air Temperature of the Servomotor Exceeds 40°C”.

*5 If the altitude will exceed 1,000 m, refer to the section “Applications where the Altitude of the Servomotor Exceeds 1000m”.

*6 If you use this combination, performance may not be as good, e.g., the control gain may not increase, in comparison with using a Sigma-7 Single Axis SERVOPACK.

Servomotor Ratings

Voltage			400 V									
Model SGM7A-			02D	04D	08D	10D	15D	20D	25D	30D	40D	50D	70D
Rated Output*1		W	200	400	750	1,000	1,500	2,000	2,500	3,000	4,000	5,000	7,000
Rated Torque*1, *2		Nm	0.637	1.27	2.39	3.18	4.90	6.36	7.96	9.80	12.6	15.8	22.3
Instantaneous Maximum Torque*1		Nm	2.23	4.46	8.36	11.1	14.7	19.1	23.9	29.4	37.8	47.6	54.0
Rated Current*1		Arms	1.2	1.2	2.2	3.2	4.7	6.1	7.4	8.9	12.5	13.8	19.2
Instantaneous Maximum Current*1		Arms	5.1	4.9	8.5	12	14	20	25	28	38	42	52.5
Rated Motor Speed*1		min^{-1}	3000										
Maximum Motor Speed*1		min^{-1}	6000*6										
Torque Constant		Nm/Arms	0.556	1.11	1.16	1.07	1.23	1.18	1.15	1.16	1.06	1.21	1.21
Motor Moment of Inertia		$\times10^{-4}$ kg m^2	0.139 (0.209)	0.216 (0.286)	0.775 (0.955)	0.971 (1.15)	2.00 (2.25)	2.47 (2.72)	3.19 (3.44)	7.00 (9.20)	9.60 (11.8)	12.3 (14.5)	12.3
Rated Power Rate*1		kW/s	29.2 (19.4)	74.7 (56.3)	73.7 (59.8)	104 (87.9)	120 (106)	164 (148)	199 (184)	137 (104)	165 (134)	203 (172)	404
Rated Angular Acceleration Rate*1		rad/s^2	45,800 (30,400)	58,700 (44,400)	30,800 (25,000)	32,700 (27,600)	24,500 (21,700)	25,700 (23,300)	24,900 (23,100)	14,000 (10,600)	13,100 (10,600)	12,800 (10,800)	18,100
Derating Rate for Servomotor with Dust Seal		%	–			95	100						
Heat Sink Size		mm	250 × 250 × 6			300 × 300 × 12				400 × 400 × 20			
Protective Structure*3			Totally enclosed, self-cooled, IP67										Totally enclosed, separately cooled (with fan), IP22 cooled (with fan)
Holding Brake Specifications*4	Rated Voltage	V	24 VDC ± 10 %										-
	Capacity	W	6		6.5		12			10			-
	Holding Torque	Nm	0.637	1.27	2.39	3.18	7.84	7.84	10	20			-
	Coil Resistance	Ω (at 20 °C)	96±10 %		88.6±10 %		48±10 %			59			-
	Rated Current	A (at 20 °C)	0.25		0.27		0.5			0.41			-
	Time Required to Release Brake	ms	60		80		170			100			-
	Time Required to Brake	ms	100				80						-
Allowable Load Moment of Inertia (Motor Moment of Inertia Ratio)	Standard		30 times		20 times		10 times			5 times			15 times
	With External Regenerative Resistor and Dynamic Brake Resistor Connected		30 times	20 times	30 times		20 times			15 times			
Allowable Shaft Load*5	LF	mm	25		35		45			63			
	Allowable Radial Load	N	245		392		686			980	1,176		
	Allowable Thrust Load	N	74		147		196			392			

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

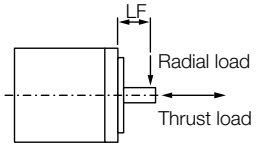
*1. For the SGM7A-02D to SGM7A-10D, these values are for operation in combination with a SERVOPACK when the temperature of the armature winding is 100°C. The values for other items are at 20°C. For the SGM7A-15D to SGM7A-30D, these values are for operation in combination with a SERVOPACK when the temperature of the armature winding is 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.

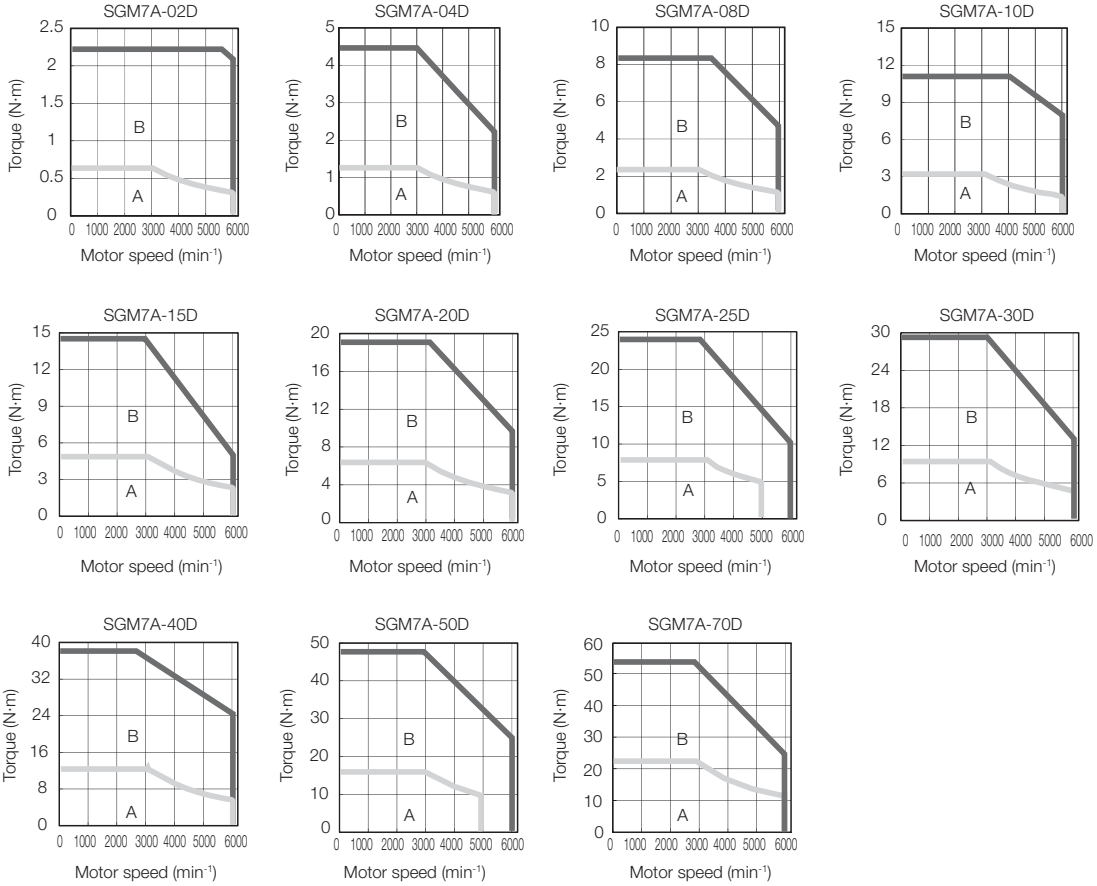
*4. Observe the following precautions if you use a Servomotor with a Holding Brake.
- The holding brake cannot be used to stop the Servomotor.
- The time required to release the brake and the time required to brake depend on which discharge circuit is used. Confirm that the operation delay time is appropriate 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.



*6. For the SGM7A-25D, the maximum motor speed for the continuous duty zone is 5,000 min-1. Use the Servomotor within the continuous duty zone for the average motor speed and effective torque.

Motor Speed-Torque Characteristics

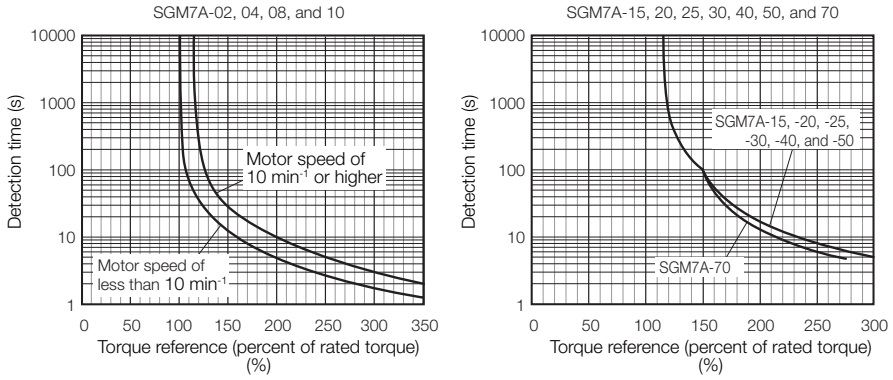


Note:

1. For the SGM7A-02D to SGM7A-10D, these values are for operation in combination with a SERVOPACK when the temperature of the armature winding is 100°C.
   For the SGM7A-15D to SGM7A-30D, these values are for operation in combination with a SERVOPACK when the temperature of the armature winding is 20°C. These are typical values.
2. The characteristics in the intermittent duty zone depend on the power supply voltage. The intermittent duty zones in the graphs show the characteristics when a three-phase, 400-VAC power supply voltage is used.
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 Motor Speed-Torque Characteristics.

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 Rotary Serovmotors SGM7J. This value is provided strictly as a guideline and results depend on Servomotor driving conditions.

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.

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.

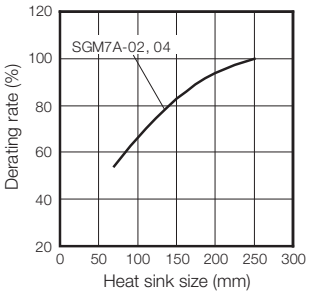
Also, change the overload warning and overload alarm detection timing in advance based on the overload detection level of the motor. Refer to the section Servomotor Overload Protection Characteristics.

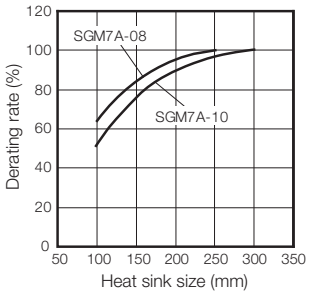
Note:

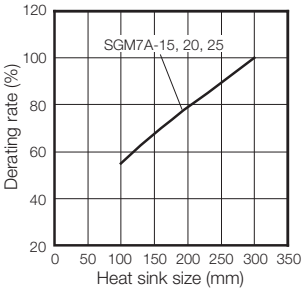
The derating rates are applicable only when the average motor speed is less than or equal to the rated motor speed.
If the average motor speed exceeds the rated motor speed, consult with your YASKAWA representative.

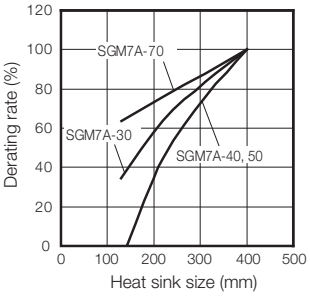
Important:

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.









See Servomotor Ratings for more information.

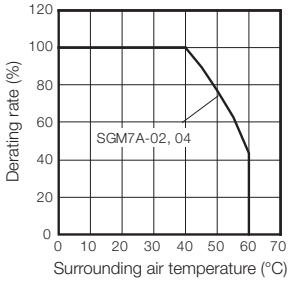
Applications Where the Surrounding Air Temperature of the Servomotor Exceeds 40°C

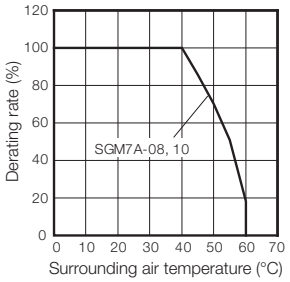
The Servomotor ratings are the continuous allowable values at a surrounding air temperature of 40°C. If you use a Servomotor at a surrounding air temperature that exceeds 40°C (60°C max.), apply a suitable derating rate from the following graphs.

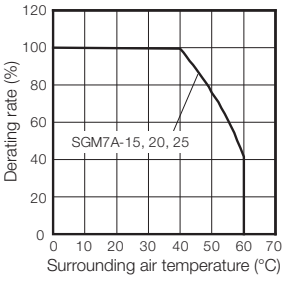
Also, change the overload warning and overload alarm detection timing in advance based on the overload detection level of the motor. Refer to the section Servomotor Overload Protection Characteristics.

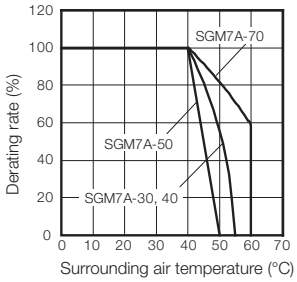
Note:

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.







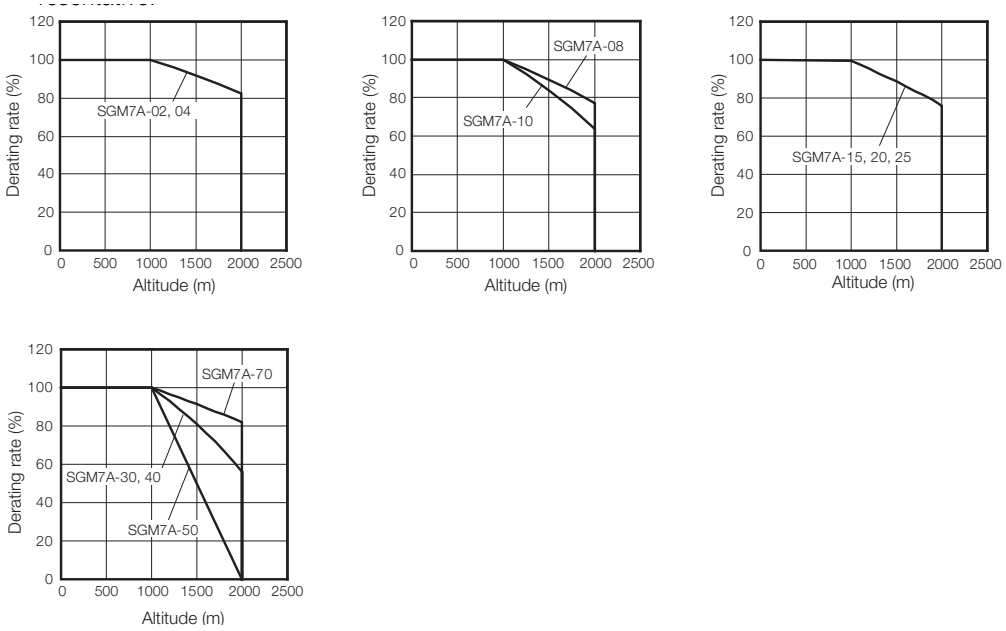


Applications Where the Altitude of the Servomotor Exceeds 1,000 m

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.

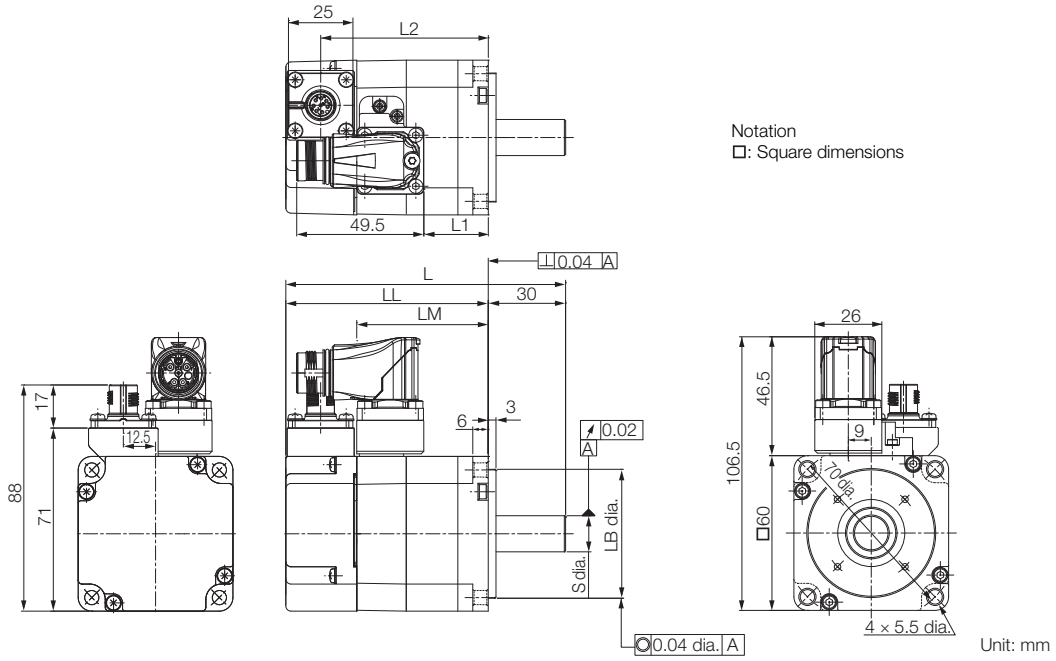
Also, change the overload warning and overload alarm detection timing in advance based on the overload detection level of the motor. Refer to the section Servomotor Overload Protection Characteristics.

Note:
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.



External Dimensions

SGM7A-02, -04



Unit: mm

Model SGM7A-	L	LL	LM	LB	S	L1	L2	Approx. Mass [kg]
02D□F2□	108.5 (148.5)	78.5 (118.5)	51.2	$50^{0}_{-0.025}$	$14^{0}_{-0.011}$	25	65 (105)	0.9 (1.5)
04D□F2□	125 (165)	95 (135)	67.2	$50^{0}_{-0.025}$	$14^{0}_{-0.011}$	41.5	81.5 (121.5)	1.2 (1.8)

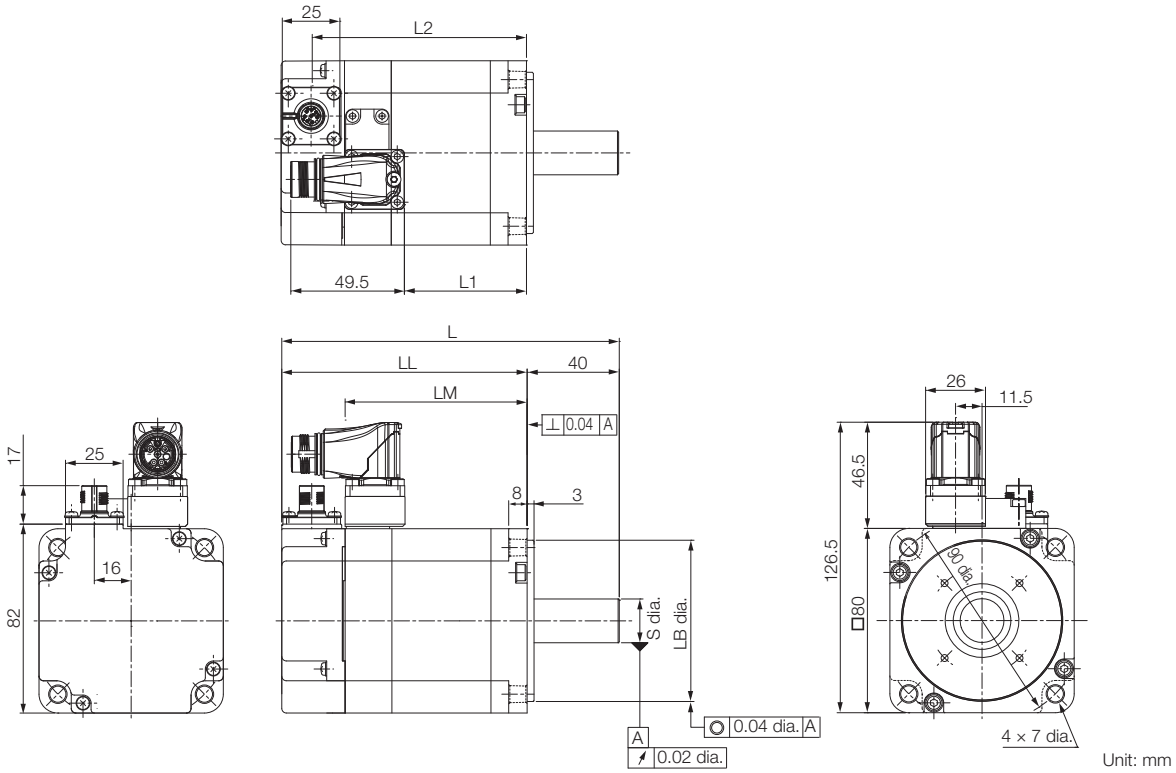
Note:

The values in parentheses are for Servomotors with Holding Brakes.

Refer to the section Shaft End Specifications for SGMA7A-02 to -10.

Refer to the section Connector Specifications.

SGM7A-08



Unit: mm

Model SGM7A-	L	LL	LM	LB	S	L1	L2	Approx. Mass [kg]
08D□F2□	146.5 (193.5)	106.5 (153.5)	79	$70^{0}_{-0.030}$	$19^{0}_{-0.013}$	53	93 (140)	2.4 (3.0)

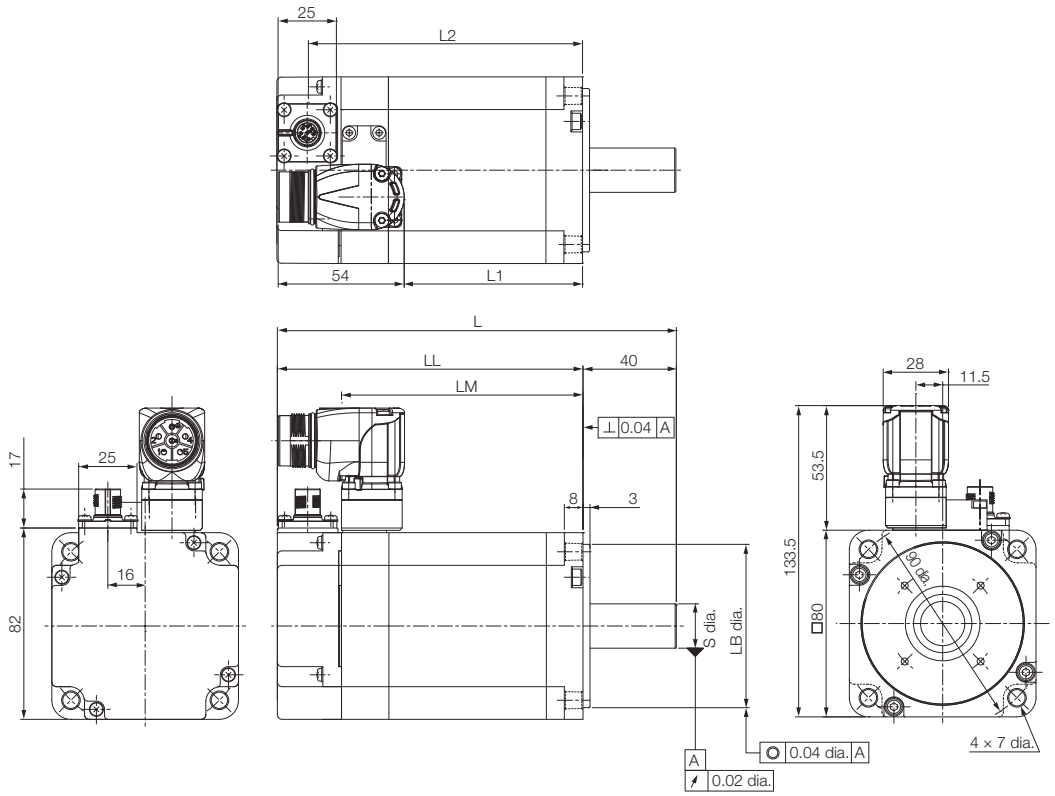
Note:

The values in parentheses are for Servomotors with Holding Brakes.

Refer to the section Shaft End Specifications for SGMA7A-02 to -10.

Refer to the section Connector Specifications.

SGM7A-10



Unit: mm

Model SGM7A-	L	LL	LM	LB	S	L1	L2	Approx. Mass [kg]
10D□F2□	171 (218)	131 (178)	103.5	$70^{0}_{-0.030}$	$19^{0}_{-0.013}$	77	117.5 (164.5)	3.2 (3.8)

Note:

The values in parentheses are for Servomotors with Holding Brakes.

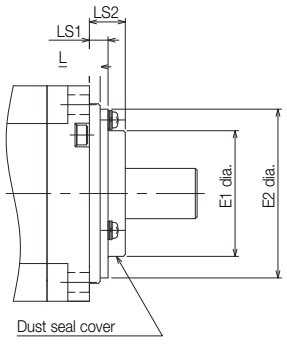
Refer to the section Shaft End Specifications for SGMA7A-02 to -10.

Refer to the section Connector Specifications.

Options

- With Dust Seal

Model SGM7A-	Dimensions with Dust Seal			
	E1	E2	LS1	LS2
10D	47	61	5.5	11

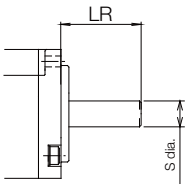
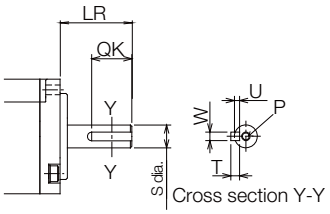


Unit: mm

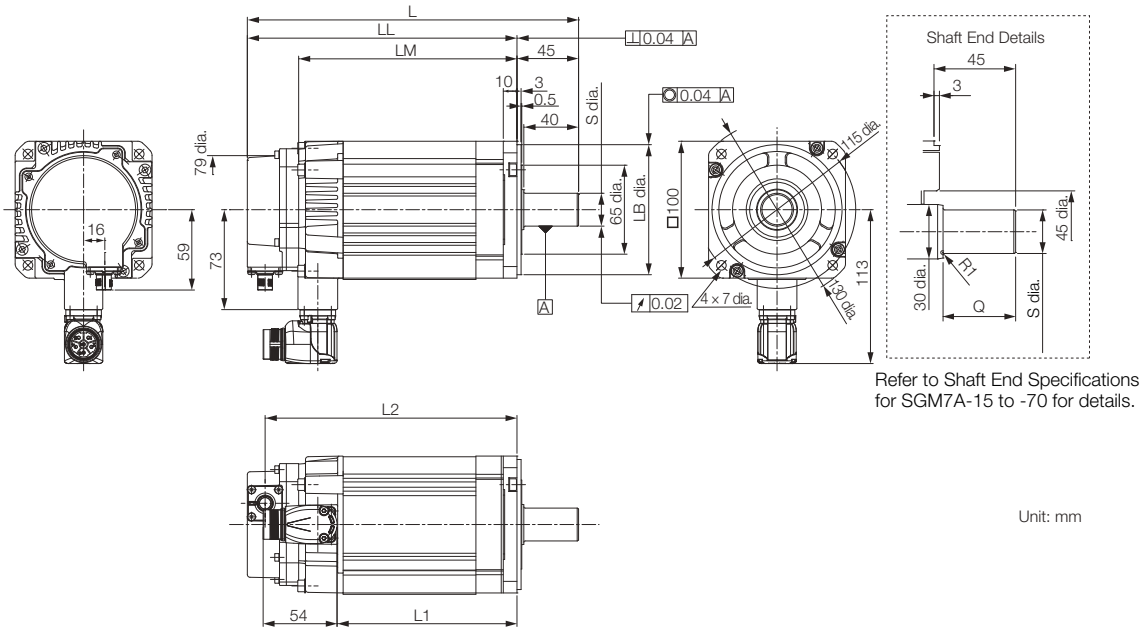
Shaft End Specifications for SGM7A-02 to -10

SGM7A-□□□□□□□

Code	Specification
2	Straight without key
6	Straight with key and tap for one location (Key slot is JIS B1301-1996 fastening type.)

Shaft End Details		Servomotor Model SGM7A-			
		02	04	08	10
Code: 2 (Straight without Key)					
	LR	30		40	
	S	$14^{0}_{-0.011}$		$19^{0}_{-0.013}$	
Code: 6 (Straight with Key and Tap)					
	LR	30		40	
	QK	14		22	
	S	$14^{0}_{-0.011}$		$19^{0}_{-0.013}$	
	W	5		6	
	T	5		6	
	U	3		3.5	
	P	M5 × 8L		M6 × 10L	

SGM7A-15, -20, and -25



Refer to Shaft End Specifications for SGM7A-15 to -70 for details.

Unit: mm

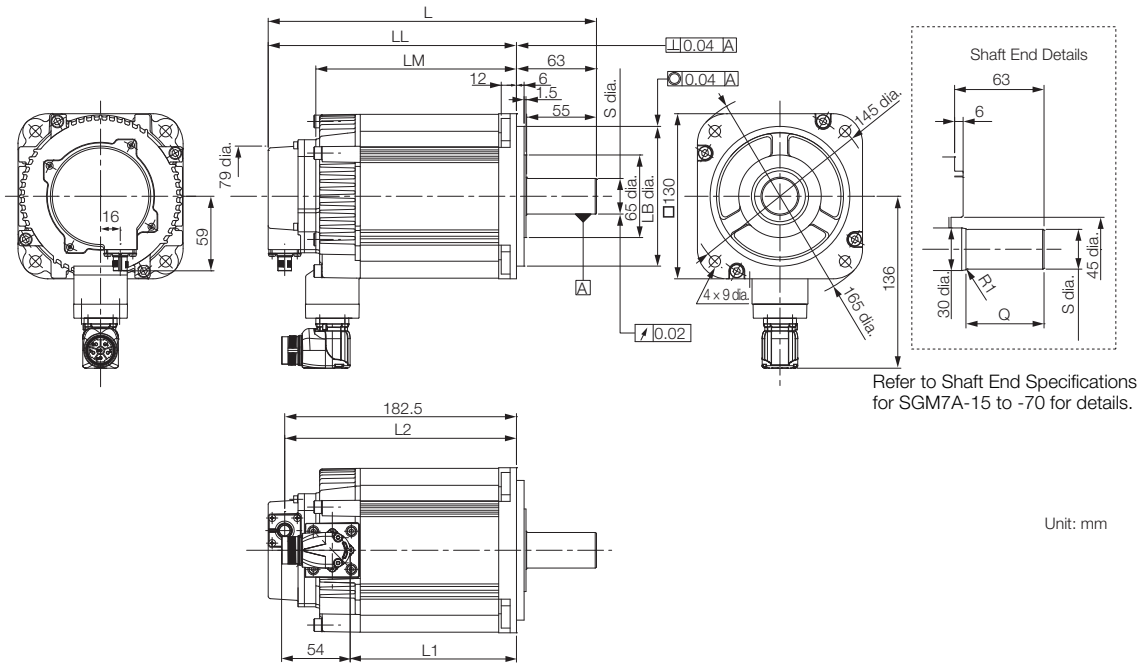
Model SGM7A-	L	LL	LM	L1	L2	LB	Shaft End Dimensions		Approx. Mass [kg]
							S	Q	
15D□F2□	204 (245)	159 (200)	121 (162)	90	145 (187)	$95^{0}_{-0.035}$	$24^{0}_{-0.013}$	40	4.7 (6.1)
20D□F2□	220 (261)	175 (216)	137 (178)	106	161 (203)	$95^{0}_{-0.035}$	$24^{0}_{-0.013}$	40	5.5 (6.9)
25D□F2□	243 (294)	198 (249)	160 (211)	129	184 (235)	$95^{0}_{-0.035}$	$24^{0}_{-0.013}$	40	6.9 (8.8)

Note:

1. The values in parentheses are for Servomotors with Holding Brakes.
2. Servomotors with Dust Seals have the same dimensions.
3. Refer to Shaft End Specifications for SGM7A-15 to -70 for details.

Refer to the section Connector Specifications.

SGM7A-30 to -50



Unit: mm

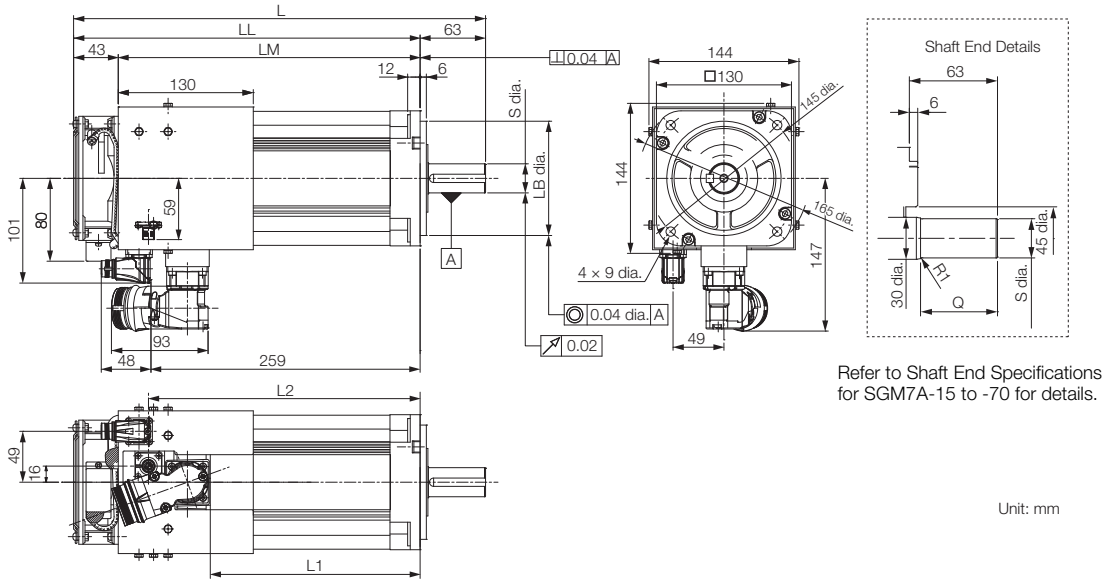
Model SGM7A-	L	LL	LM	L1	L2	LB	Shaft End Dimensions		Approx. Mass [kg]
							S	Q	
30D□F2□	259 (295)	196 (232)	158 (194)	131	183 (219)	$110^{0}_{-0.035}$	$28^{0}_{-0.013}$	55	10.6 (13.1)
40D□F2□	298 (334)	235 (271)	197 (233)	170	222 (258)	$110^{0}_{-0.035}$	$28^{0}_{-0.013}$	55	14.0 (16.5)
50D□F2□	338 (374)	275 (311)	237 (273)	210	262 (298)	$110^{0}_{-0.035}$	$28^{0}_{-0.013}$	55	17.0 (19.5)

Note:

1. The values in parentheses are for Servomotors with Holding Brakes.
2. Servomotors with Dust Seals have the same dimensions.
3. Refer to Shaft End Specifications for SGM7A-15 to -70 for details.

Refer to the section Connector Specifications.

SGM7A-70



Refer to Shaft End Specifications for SGM7A-15 to -70 for details.

Unit: mm

Model SGM7A-	L	LL	LM	L1	L2	LB	Shaft End Dimensions		Approx. Mass [kg]
							S	Q	
70D□F2□	397	334	291	204	262	$110^{0}_{-0.035}$	$28^{0}_{-0.013}$	55	19.0

Note:

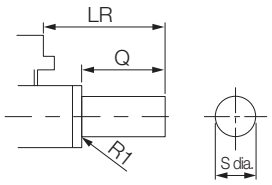
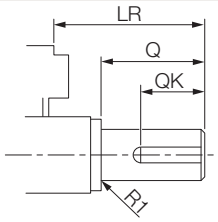
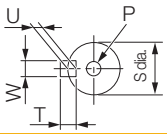
1. The values in parentheses are for Servomotors with Holding Brakes.
2. Servomotors with Dust Seals have the same dimensions.
3. Refer to Shaft End Specifications for SGM7A-15 to -70 for details.

Refer to the section Connector Specifications.

Shaft End Specifications for SGM7A-15 to -70

SGM7A-□□□□□□□

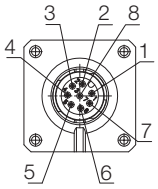
Code	Specification
2	Straight without key
6	Straight with key and tap for one location (Key slot is JIS B1301-1996 fastening type.)

Shaft End Details		Servomotor Model SGM7A-						
		15	20	25	30	40	50	70
Code: 2 (Straight without Key)								
	LR	45			63			
	Q	40			55			
	S	$24^{0}_{-0.013}$			$28^{0}_{-0.013}$			
Code: 6 (Straight with Key and Tap)								
	LR	45			63			
	Q	40			55			
	QK	32			50			
	S	$24^{0}_{-0.013}$			$28^{0}_{-0.013}$			
	W	8						
	T	7						
	U	4						
	P	M8 screw, Depth: 16						

Connector Specifications

SGM7A-02 to -70

- Encoder Connector Specifications

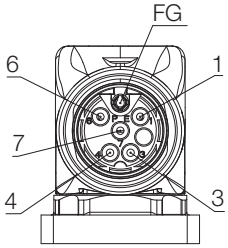


Receptacle
Size: M12
Part number: 1419959
Model: SACC-MSQ-M12MS-25-3,2 SCO
Manufacturer: Phoenix Contact

1	PG 5V
2	PG 0V
3	FG
4	BAT (+)
5	BAT (-)
6	Data (+)
7	Data (-)
8	Empty
Housing	Shield

SGM7A-02 to -08

- Servomotor Connector Specifications

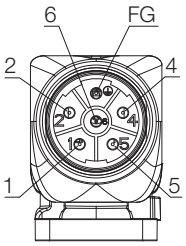


Receptacle
Size: M17
Part number: 1620448
Model: ST-5EP1N8AA500S
Manufacturer: Phoenix Contact

1	(Brake)
3	U
4	V
5	Empty
6	(Brake)
7	W
FG	FG
Housing	Shield

SGM7A-10 to -50

- Servomotor Connector Specifications

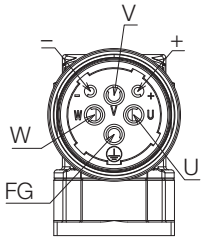


Receptacle
Size: M23
Part number: 1617905
Model: ST-5EP1N8AAD00S
Manufacturer: Phoenix Contact

1	V
2	(Brake)
4	(Brake)
5	U
6	W
FG	FG
Housing	Shield

SGM7A-70

- Servomotor Connector Specifications

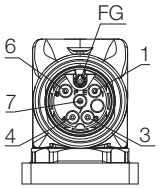


Receptacle
Size: M40
Part number: 1607927
Model: SM-5EPWN8AAD00S
Manufacturer: Phoenix Contact

U	U
V	V
W	W
+	Empty
-	Empty
FG	FG
Housing	Shield

SGM7A-70

- Fan Connector Specifications



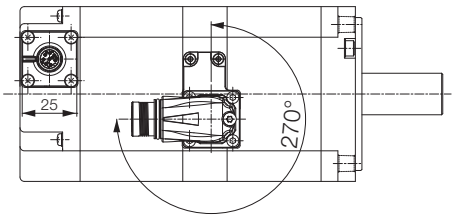
Receptacle
Size: M17
Part number: 1620448
Model: ST-5EP1N8AA500S
Manufacturer: Phoenix Contact

1	ALARM TERMINAL
3	FAN MOTOR
4	FAN MOTOR
6	ALARM TERMINAL
7	Empty
FG	FG
Housing	Shield

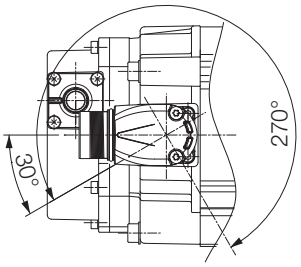
Servomotor Connector Rotational Angle

Allowable number of rotations: 10

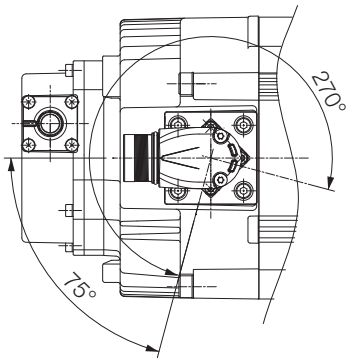
SGM7A-02 to -10



SGM7A-15 to -25



SGM7A-30 to -50



SGM7A-70