YASKAWA

Sigma-X Series

Catalog | 200 V Models

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Rotary Servomotors

Model Designations

SGMXJ - 01 A W A 6 1 A 1

Σ-X-Series Servomotor SGMXJ model

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

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Code	Specification
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6	Straight with key and tap
B	With two flat seats

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A

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Specifications and Ratings

Specification

Voltage	200 V						
Model SGMXJ-	A5A	01A	C2A	02A	04A	06A	08A
Time Rating	Continuous						
Thermal Class	UL: B, CE: B						
Insulation Resistance	500 VDC, 10 MΩ 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						

Continued on next page.

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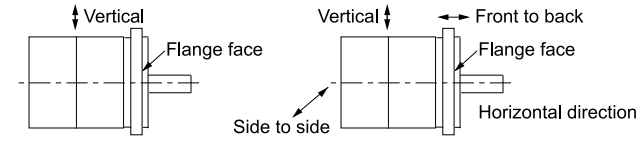
Voltage		200 V						
Model SGMXJ-		A5A	01A	C2A	02A	04A	06A	08A
Environmental Conditions	Surrounding Air Temperature	0°C to 40°C (With derating, usage is possible between 40°C and 60°C.) *3						
	Surrounding Air Humidity	20% to 80% relative humidity (with no condensation)						
	Installation Site	• Must 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 1000 m or less. (With derating, usage is possible between 1000 m and 2000 m.) *3 • 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)						
Impact Resistance *2	Impact Acceleration (at Flange)	490 m/s²						
	Number of Impacts	2 times						
Vibration Resistance *2	Vibration Acceleration (at Flange)	49 m/s²						
Applicable SERVOPACKs	SGDXS-	R70A	R90A	1R6A	1R6A	2R8A	5R5A	5R5A
	SGDXW-	1R6A *4, 2R8A *4	1R6A *4, 2R8A *4	1R6A, 2R8A *4	1R6A, 2R8A *4	2R8A, 5R5A *4, 7R6A *4	5R5A, 7R6A	5R5A, 7R6A
	SGDXT-	1R6A *4, 2R8A *4	1R6A *4, 2R8A *4	1R6A, 2R8A *4	1R6A, 2R8A *4	2R8A	-	-

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

*2 The given values are for when the servomotor shaft is mounted horizontally and impact 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 that is applied to the servomotor with the actual equipment.



Impact Applied to the Servomotor Vibration Applied to the Servomotor

*3 Refer to the following section for the derating rates.
☞ *Derating Rates on page 16*

*4 If you use this combination, performance may not be as good, e.g., the control gain may not increase, in comparison with using a Σ-XS SERVOPACK.

Servomotor Ratings

Voltage			200 V						
Model SGMXJ-			A5A	01A	C2A	02A	04A	06A	08A
Rated Output *1		W	50	100	150	200	400	600	750
Rated Torque *1, *2		N·m	0.159	0.318	0.477	0.637	1.27	1.91	2.39
Instantaneous Maximum Torque *1		N·m	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 Rotation Speed *1		min^{-1}	3000						
Continuous Allowable Rotation Speed		min^{-1}	7000				6000		
Maximum Rotation Speed *1		min^{-1}	7000						
Torque Constant		N·m/Arms	0.316	0.413	0.321	0.444	0.544	0.493	0.584
Rotor Moment of Inertia	Without Holding Brakes	$\times 10^{-4}$ kg·m²	0.0421	0.0669	0.0946	0.263	0.486	0.800	1.59
	With Holding Brakes		0.0501	0.0749	0.103	0.323	0.546	0.860	1.76
	Without Holding Brake and with Batteryless Absolute Encoder		0.0458	0.0706	0.0983	0.267	0.490	0.804	1.59
	With Holding Brake and Batteryless Encoder		0.0538	0.0786	0.107	0.327	0.550	0.864	1.76
	Without Holding Brake and with Compact Batteryless Absolute Encoder		0.0457	0.0705	0.0982	0.267	0.490	0.804	1.59
	With Holding Brake and Compact Batteryless Absolute Encoder		0.0537	0.0785	0.107	0.327	0.550	0.864	1.76
Rated Power Rate *1	Without Holding Brakes	kW/s	6.00	15.1	24.0	15.4	33.1	45.6	35.9
	With Holding Brakes		5.04	13.5	22.1	12.5	29.5	42.4	32.4
Rated Angular Acceleration *1	Without Holding Brakes	rad/s^2	37700	47500	50400	24200	26100	23800	15000
	With Holding Brakes		31700	42400	46400	19700	23200	22200	13500

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Voltage			200 V						
Model SGMXJ-			A5A	01A	C2A	02A	04A	06A	08A
Derating Rate for Servomotor with Oil Seal		%	80	90			95		
Heat Sink Size (aluminum) *3		mm	200 ×200 ×6		250 ×250 × 6				
Protective Structure *4			Totally enclosed, self-cooled, IP67						
Holding Brake Specifications *5	Rated Voltage	V	24 VDC±10%						
	Capacity	W	5.5			6		6.5	
	Holding Torque	N·m	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 (Rotor Moment of Inertia Ratio) *6	At 6000 min^{-1}		35 times	35 times	35 times	15 times	10 times	20 times	12 times
	At 7000 min^{-1}					10 times	5 times	15 times	8 times
	With External Regenerative Resistor and External Dynamic Brake Resistor *7	At 6000 min^{-1}	35 times	35 times	35 times	25 times	25 times	20 times	15 times
		At 7000 min^{-1}							
Allowable Shaft Loads *8	LF	mm	20			25			35
	Allowable Radial Load	N	78			245			392
	Allowable Thrust Load	N	54			74			147

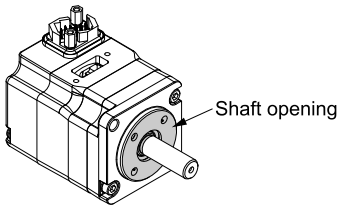
*1 These values are for operation in combination with a SERVOPACK when the temperature of the armature winding is 100°C. The values for other items are at 20°C. These are typical values.

*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.

☞ *Servomotor Heat Dissipation Conditions on page 16*

*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.

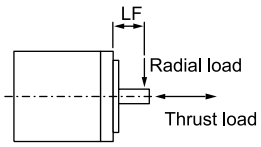
- The holding brake cannot be used to stop the servomotor.
- The time required to release the brake and the time required to brake depend on which discharge circuit is used. Confirm that the operation delay time is appropriate for the actual equipment.
- The 24-VDC power supply is not provided by Yaskawa.

*6 The rotor 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 0020 for the SERVOPACK.
However, you cannot externally connect a dynamic brake resistor if you use the following SERVOPACKs (maximum applicable motor capacity: 400 W).

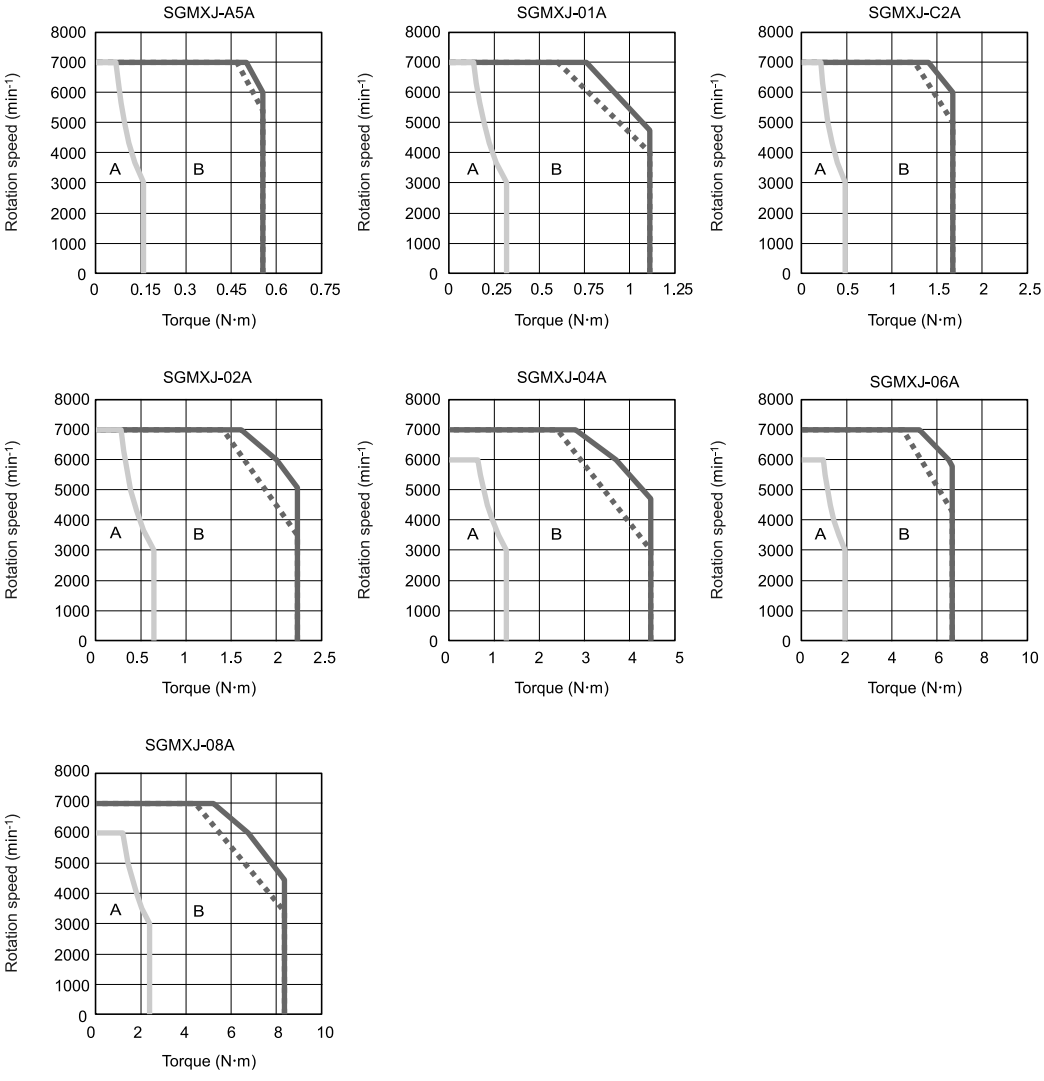
- SGDXS-R70A□□A0020 to -2R8A□□A0020
- SGDXW-1R6A□□A0020, -2R8A□□A0020
- SGDXT-1R6A□□A0020, -2R8A□□A0020

*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.



Torque-Rotation Speed Characteristics

A : Continuous duty zone —— (solid lines): Three-phase, 200 V
B : Intermittent duty zone ····· (dotted lines): Single-phase, 200 V



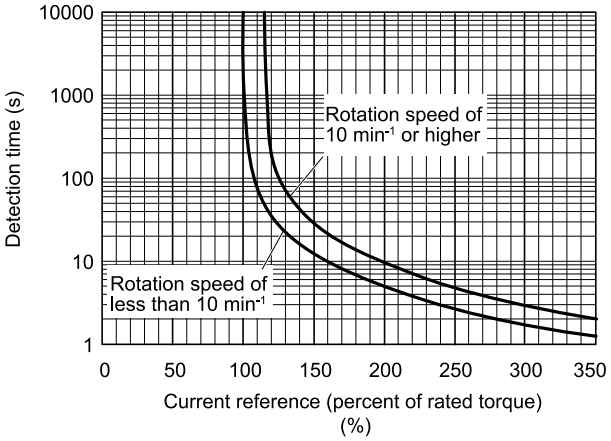
Note:

1. These values (typical values) are for operation in combination with a SERVOPACK when the temperature of the armature winding is 100°C.
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-rotation 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.

For the overload detection level, priority is given to the lower of the detection levels in the overload protection characteristics of the connected SERVOPACK and servomotor.



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-Rotation Speed Characteristics on page 14*".

Allowable Load Moment of Inertia

The allowable load moments of inertia (motor moment of inertia ratios) for the servomotors are given in "*Servomotor Ratings on page 12*". The values are determined by the regenerative energy processing capacity of the SERVOPACK and are also affected by the drive conditions of the servomotor. Use the SigmaSize+ AC servo capacity selection program *1 to check the driving conditions. Perform the required steps for each of the following cases.

*1 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).

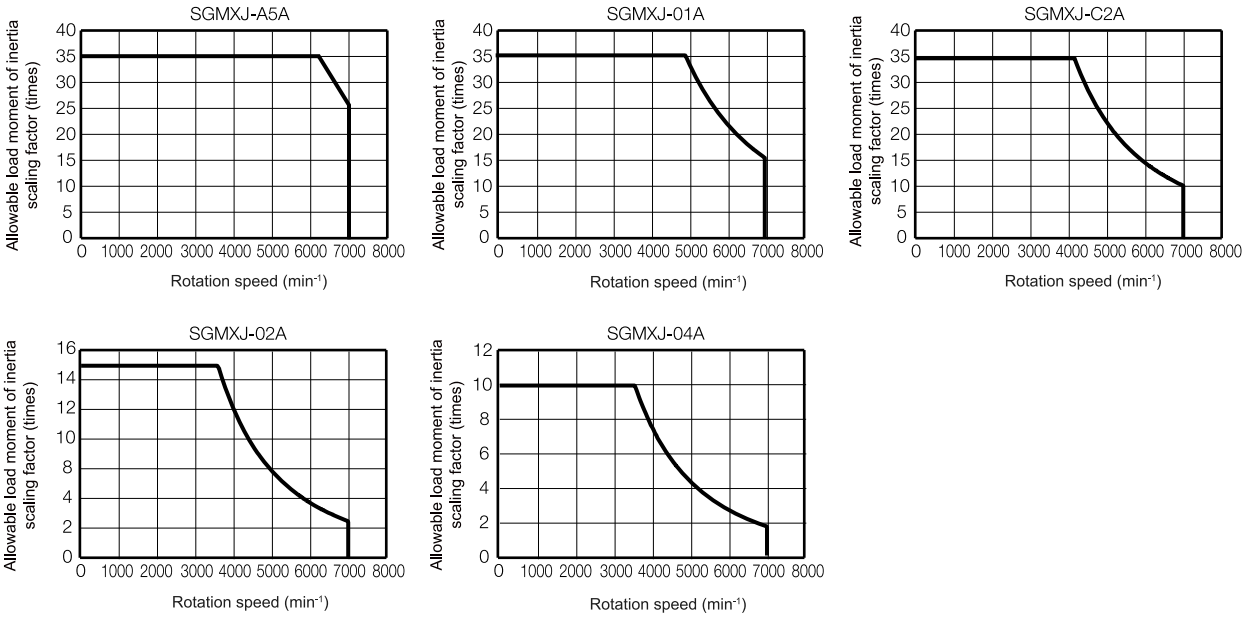
Refer to the following section for the regenerative power (W) that can be processed by the SERVOPACKs.

☞ *Specifications of Built-in Regenerative Resistors in SERVOPACKs on page 478*

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 rotation 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, for the shaded areas of the graphs, use Yaskawa's SigmaSize+, an AC servo drive capacity selection program, to select an external regenerative resistor.



Note:

Applicable SERVOPACK Model: SGDXS-R70A, -90A, -1R6A, -2R8A

■ When an External Regenerative Resistor Is Required

Install the external regenerative resistor which is selected with the SigmaSize+. Contact your Yaskawa representative for information on SigmaSize+.

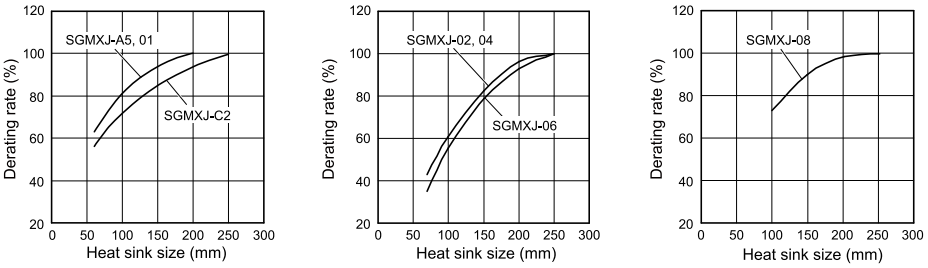
Refer to the following section for details on the external regenerative resistors.

☞ *Specifications and Dimensions of External Regenerative Resistors on page 479*

Derating Rates

■ 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.



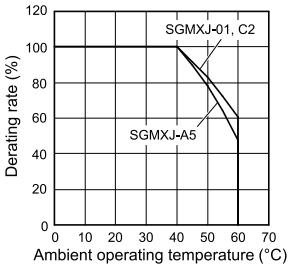
Important

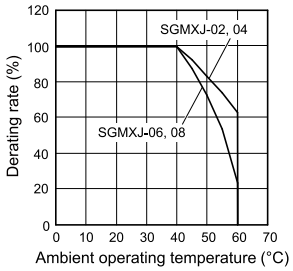
The actual temperature rise depends on the following conditions. Always check the servomotor temperature with the actual equipment.

- How the heat sink (the servomotor mounting section) is attached to the installation surface
- Status between heat sink and servomotor (sealant, reduction gear, etc.)
- What material is used for the servomotor mounting section
- Servomotor rotation speed

■ Applications Where the Surrounding Air Temperature Exceeds 40°C

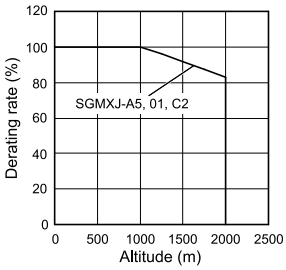
The servomotor ratings are the continuous allowable values at a surrounding air temperature of 40°C. If you use a servomotor at a surrounding air temperature that exceeds 40°C (60°C max.), apply a suitable derating rate from the following graphs.

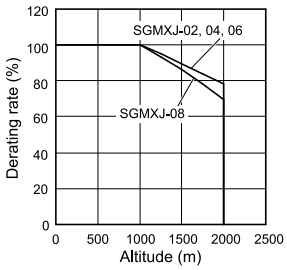




■ Applications Where the Altitude Exceeds 1000 m

The servomotor ratings are the continuous allowable values at an altitude of 1000 m or less. If you use a servomotor at an altitude that exceeds 1000 m (2000 m max.), the heat dissipation effect of the air is reduced. Apply the appropriate derating rate from the following graphs.





Note:

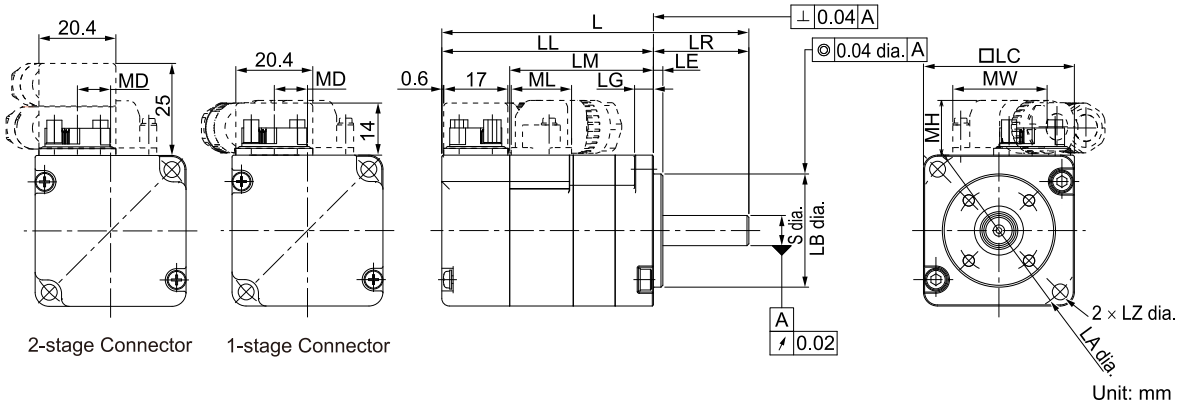
- When using servomotors with derating, change the detection timing of overload warning and overload alarm based on the overload detection level of the motor given in "*Servomotor Overload Protection Characteristics on page 15*".
- Use the combination of the SERVOPACK and servomotor so that the derating conditions are satisfied for both the SERVOPACK and servomotor.
- The derating rates are applicable only when the average rotation speed is less than or equal to the rated rotation speed. If the average rotation speed exceeds the rated rotation speed, consult with your Yaskawa representative.

External Dimensions

SGMXJ-A5 to -C2

■ Standard Specification

Information Models with the additional specification "3 Standard (Functional Safety-Compatible Encoder)" have the same dimensions as those indicated below.



Model SGMXJ-	L *1	LL *1	LM	Flange Dimensions						
				LR	LE	LG	LC	LA	LB	LZ
A5A□A2□A□	80.5 (121.0)	55.5 (96.0)	37.5	25	2.5	5	40	46	$30^{0}_{-0.021}$	4.3
01A□A2□A□	92.5 (133.0)	67.5 (108.0)	49.5	25	2.5	5	40	46	$30^{0}_{-0.021}$	4.3
C2A□A2□A□	104.5 (153.0)	79.5 (128.0)	61.5	25	2.5	5	40	46	$30^{0}_{-0.021}$	4.3

Model SGMXJ-	S	MD	MW	MH	ML	Approx. Mass [kg] *1
A5A□A2□A□	$8^{0}_{-0.009}$	8.4	25	14.5	16	0.3 (0.6)
01A□A2□A□	$8^{0}_{-0.009}$	8.4	25	14.5	16	0.4 (0.7)
C2A□A2□A□	$8^{0}_{-0.009}$	8.4	25	14.5	16	0.5 (0.8)

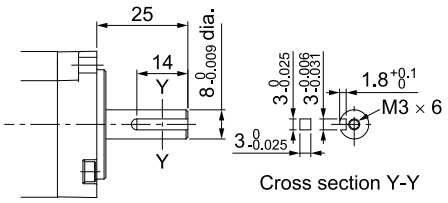
*1 For models that have a batteryless absolute encoder (SGMX□-□□□W), L and LL are +7.5 mm greater and the approximate mass is 0.1 kg greater than the given value. Refer to the following section for the values for individual models.
☞ *Dimensions of Servomotors with Batteryless Absolute Encoders (SGMXJ-□□□W) on page 24*

Note:

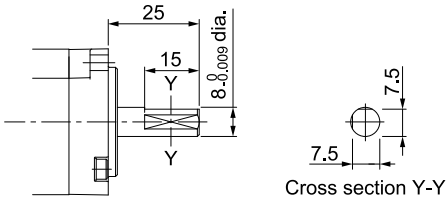
1. The values in parentheses are for servomotors with holding brakes.
2. The values for a straight shaft end without key specification are given. Refer to the information given below for other shaft end specifications and option specifications.
☞ *Shaft End Specification on page 19*
☞ *Option Specification on page 19*

■ Shaft End Specification

• Straight with Key and Tap

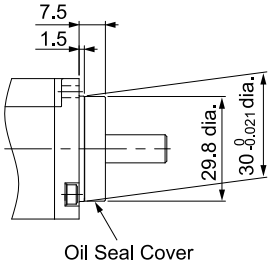


• With Two Flat Seats



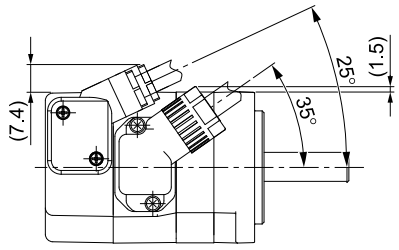
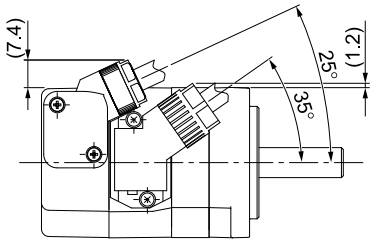
■ Option Specification

• With Oil Seal

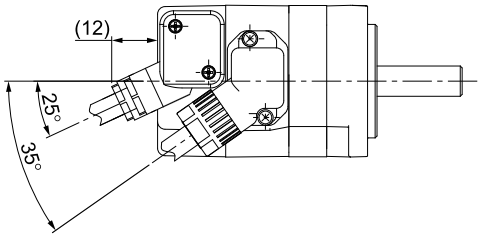
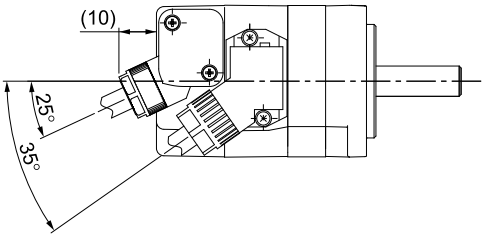


■ Connector Mounting Dimensions

• Cable Installed on Load Side

Standard Specification	Σ-7 Compatible Specification
	

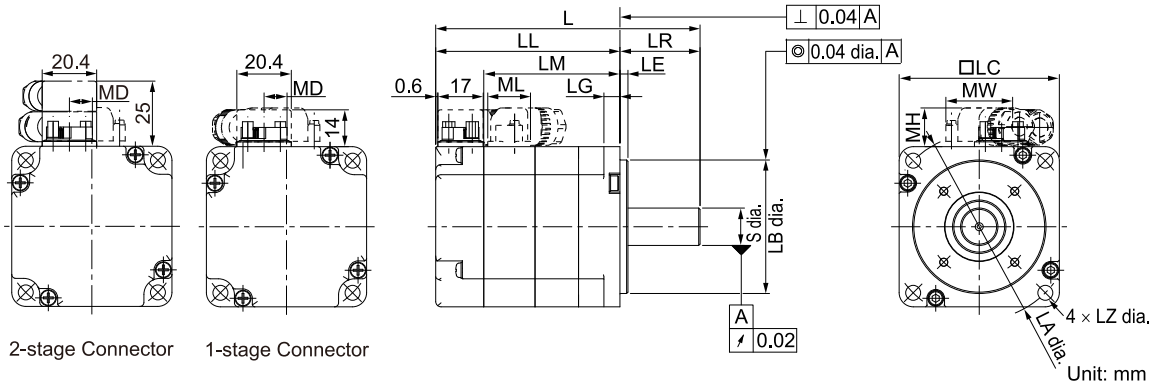
• Cable Installed on Non-load Side

Standard Specification	Σ-7 Compatible Specification
	

SGMXJ-02 to -06

■ Standard Specification

Information Models with the additional specification "3 Standard (Functional Safety-Compatible Encoder)" have the same dimensions as those indicated below.



Model SGMXJ-	L *1	LL *1	LM	Flange Dimensions						
				LR	LE	LG	LC	LA	LB	LZ
02A□A2□A□	98.5 (139.0)	68.5 (109.0)	50.5	30	3	6	60	70	$50^{0}_{-0.025}$	5.5
04A□A2□A□	115 (155.5)	85 (125.5)	67	30	3	6	60	70	$50^{0}_{-0.025}$	5.5
06A□A2□A□	137 (191.0)	107 (161.0)	89	30	3	6	60	70	$50^{0}_{-0.025}$	5.5

Model SGMXJ-	S	MD	MW	MH	ML	Approx. Mass [kg] *1
02A□A2□A□	$14^{0}_{-0.011}$	8.4	25	14.5	16	0.8 (1.4)
04A□A2□A□	$14^{0}_{-0.011}$	8.4	25	14.5	16	1.1 (1.7)
06A□A2□A□	$14^{0}_{-0.011}$	8.4	25	14.5	16	1.6 (2.2)

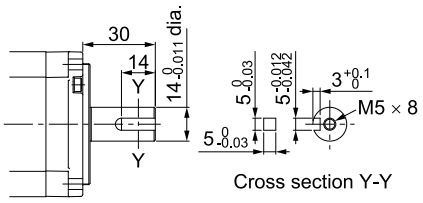
*1 For models that have a batteryless absolute encoder (SGMX□-□□□W), L and LL are +7.5 mm greater and the approximate mass is 0.1 kg greater than the given value. Refer to the following section for the values for individual models.
☞ *Dimensions of Servomotors with Batteryless Absolute Encoders (SGMXJ-□□□W) on page 24*

Note:

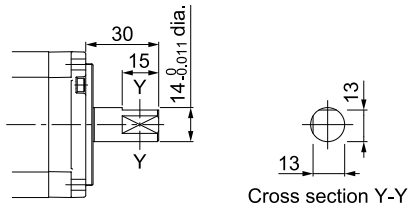
1. The values in parentheses are for servomotors with holding brakes.
2. The values for a straight shaft end without key specification are given. Refer to the information given below for other shaft end specifications and option specifications.
☞ *Shaft End Specification on page 20*
☞ *Option Specification on page 21*

■ Shaft End Specification

- Straight with Key and Tap

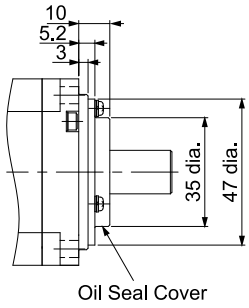


- With Two Flat Seats



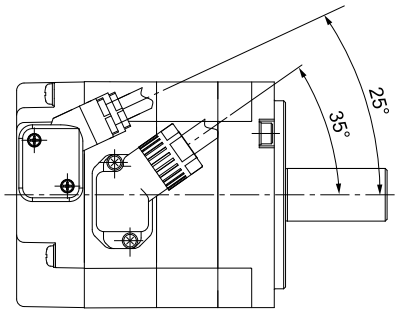
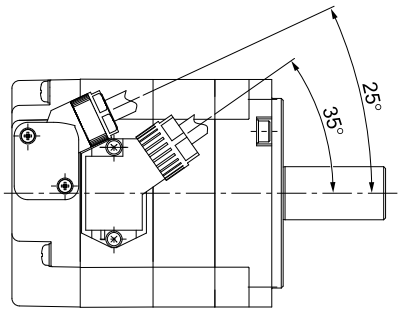
■ Option Specification

• With Oil Seal

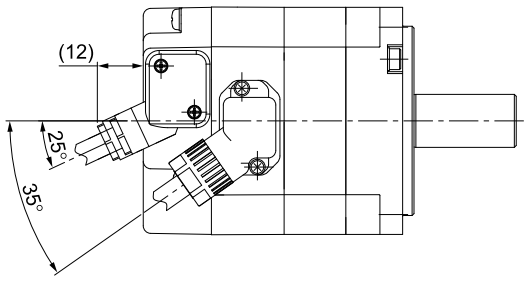
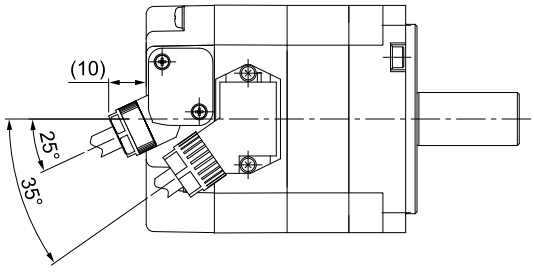


■ Connector Mounting Dimensions

• Cable Installed on Load Side

Standard Specification	Σ-7 Compatible Specification
	

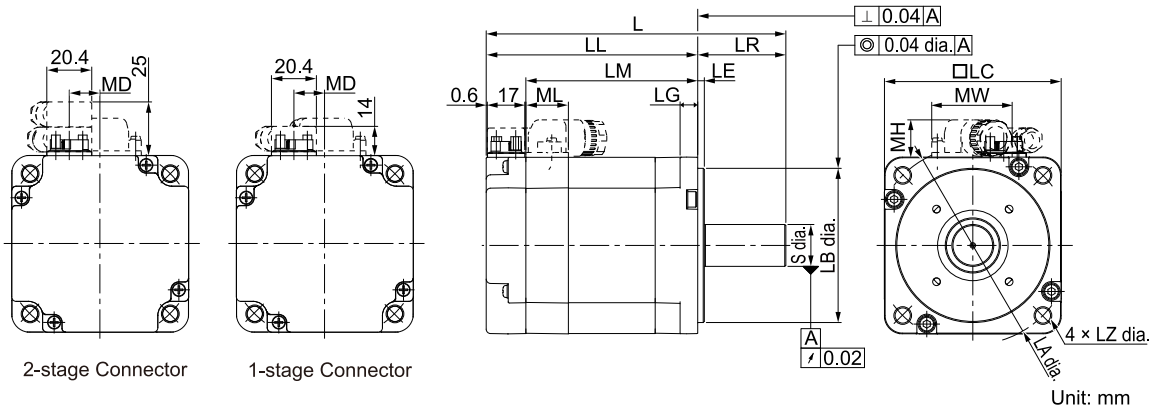
• Cable Installed on Non-load Side

Standard Specification	Σ-7 Compatible Specification
	

SGMXJ-08

■ Standard Specification

Information Models with the additional specification "3 Standard (Functional Safety-Compatible Encoder)" have the same dimensions as those indicated below.



Model SGMXJ-	L *1	LL *1	LM	Flange Dimensions						
				LR	LE	LG	LC	LA	LB	LZ
08A□A2□A□	136 (183.0)	96 (143.0)	78	40	3	8	80	90	$70^{0}_{-0.030}$	7

Model SGMXJ-	S	MD	MW	MH	ML	Approx. Mass *1 [kg]
08A□A2□A□	$19^{0}_{-0.013}$	14	37	17	19.3	2.2 (2.8)

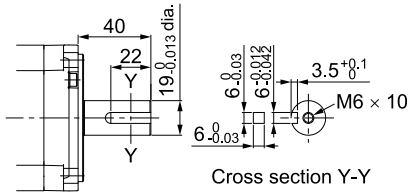
*1 For models that have a batteryless absolute encoder (SGMX□-□□□W), L and LL are 6.5 mm greater and the approximate mass is 0.1 kg greater than the given value. Refer to the following section for the values for individual models.
☞ *Dimensions of Servomotors with Batteryless Absolute Encoders (SGMXJ-□□□W) on page 24*

Note:

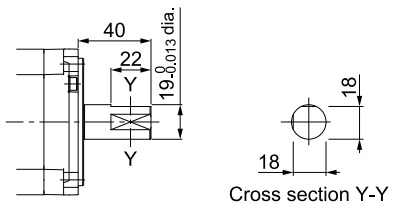
1. The values in parentheses are for servomotors with holding brakes.
2. The values for a straight shaft end without key specification are given. Refer to the information given below for other shaft end specifications and option specifications.
☞ *Shaft End Specification on page 22*
☞ *Option Specification on page 23*

■ Shaft End Specification

- Straight with Key and Tap

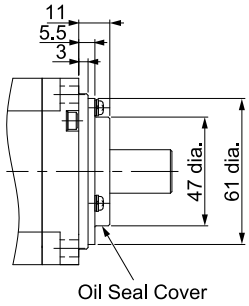


- With Two Flat Seats



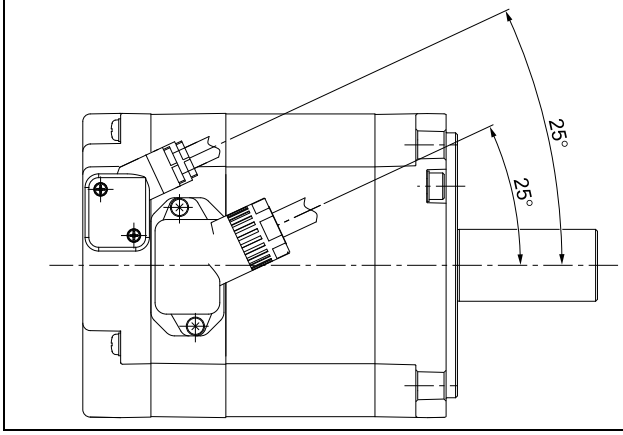
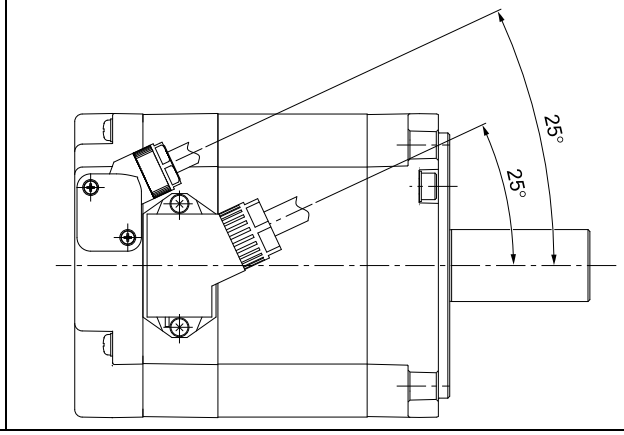
■ Option Specification

• With Oil Seal

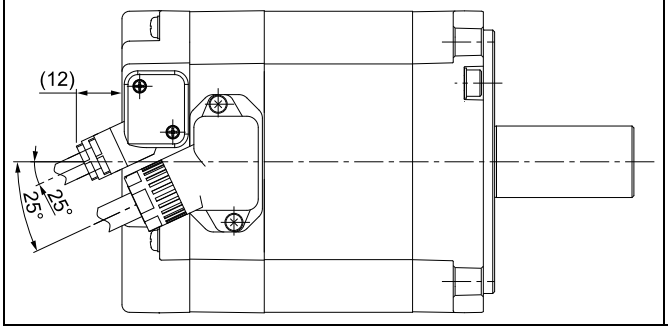
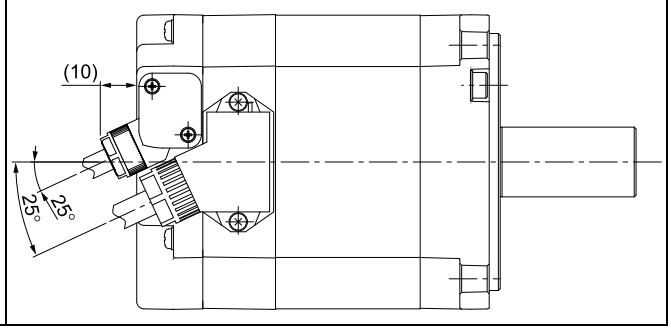


■ Connector Mounting Dimensions

• Cable Installed on Load Side

Standard Specification	Σ-7 Compatible Specification
	

• Cable Installed on Non-load Side

Standard Specification	Σ-7 Compatible Specification
	

Dimensions of Servomotors with Batteryless Absolute Encoders (SGMXJ-□□□W)

Model SGMXJ-	L	LL	Approx. Mass [kg]
A5AWA2□A□	88 (128.5)	63 (103.5)	0.4 (0.7)
01AWA2□A□	100 (140.5)	75 (115.5)	0.5 (0.8)
C2AWA2□A□	112 (160.5)	87 (135.5)	0.6 (0.9)
02AWA2□A□	106 (146.5)	76 (116.5)	0.9 (1.5)
04AWA2□A□	122.5 (163.0)	92.5 (133.0)	1.2 (1.8)
06AWA2□A□	144.5 (198.5)	114.5 (168.5)	1.7 (2.3)
08AWA2□A□	142.5 (189.5)	102.5 (149.5)	2.3 (2.9)

Note:

The values in parentheses are for servomotors with holding brakes.

Model Designations

SGMXA - 01 A W A 6 1 A 1

Σ-X-Series Servomotor SGMXA model

1 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
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

2 Power Supply Voltage

Code	Specification
A	200 VAC

3 Serial Encoder

Code	Specification
U	26-bit absolute encoder
W	26-bit batteryless absolute encoder

4 Design Revision Order

A

5 Shaft End

Code	Specification
2	Straight without key
6	Straight with key and tap
B	With two flat seats*1

*1 Code B does not support models above 1.5 kW.

6 Options

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

Note: The SGMXA-70A does not support models with a holding brake.

7 Destination

A

8 Ancillary Specification

Code	Specification
1	Standard
3	Safety encoder

Specifications and Ratings (200 V Specification)

Specification

Voltage	200 V										
Model SGMXA-	A5A	01A	C2A, 02A	04A	06A, 08A	10A	15A	20A	25A, 30A	40A, 50A	70A
Time Rating	Continuous										
Thermal Class	UL: B, CE: B						UL: F, CE: F				
Insulation Resistance	500 VDC, 10 MΩ min.										
Withstand Voltage	1500 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										

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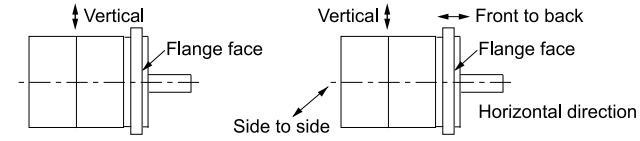
Voltage		200 V										
Model SGMXA-		A5A	01A	C2A, 02A	04A	06A, 08A	10A	15A	20A	25A, 30A	40A, 50A	70A
Environmental Conditions	Surrounding Air Temperature	0°C to 40°C (With derating, usage is possible between 40°C and 60°C.) *3										
	Surrounding Air Humidity	20% to 80% relative humidity (with no condensation)										
	Installation Site	• 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 1000 m or less. (With derating, usage is possible between 1000 m and 2000 m.) *3 • 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)										
Impact Resistance *2	Impact Acceleration (at Flange)	490 m/s²										
	Number of Impacts	2 times										
Vibration Resistance *2	Vibration Acceleration (at Flange)	49 m/s²						49 m/s² (24.5 m/s² front to back)				14.7 m/s²
Applicable SERVOPACKs	SGDXS	R70A	R90A	1R6A	2R8A	5R5A	120A	120A	180A	200A	330A	550A
	SGDXW	1R6A *4, 2R8A *4	1R6A *4, 2R8A *4	1R6A, 2R8A *4	2R8A, 5R5A *4, 7R6A *4	5R5A, 7R6A	–	–	–	–	–	–
	SGDXT-	1R6A *4, 2R8A *4	1R6A *4, 2R8A *4	1R6A, 2R8A *4	2R8A	–	–	–	–	–	–	–

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

*2 The given values are for when the servomotor shaft is mounted horizontally and impact 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 that is applied to the servomotor with the actual equipment.



Impact Applied to the Servomotor Vibration Applied to the Servomotor

*3 Refer to the following section for the derating rates.
☞ *Derating Rates on page 35*

*4 If you use this combination, performance may not be as good, e.g., the control gain may not increase, in comparison with using a Σ-XS SERVOPACK.

Servomotor Ratings

■ SGMXA-A5 to -10

Voltage			200 V							
Model SGMXA-			A5A	01A	C2A	02A	04A	06A	08A	10A
Rated Output *1		W	50	100	150	200	400	600	750	1000
Rated Torque *1, *2		N·m	0.159	0.318	0.477	0.637	1.27	1.91	2.39	3.18
Instantaneous Maximum Torque *1		N·m	0.557	1.11	1.67	2.23	4.46	6.69	8.36	11.1
Rated Current *1		Arms	0.57	0.89	1.5	1.5	2.4	4.5	4.4	6.4
Instantaneous Maximum Current *1		Arms	2.1	3.2	5.6	5.9	9.3	16.9	16.8	23.2
Rated Rotation Speed *1		min^{-1}	3000							
Continuous Allowable Rotation Speed		min^{-1}	7000				6000			
Maximum Rotation Speed *1		min^{-1}	7000							
Torque Constant		N·m/Arms	0.304	0.384	0.332	0.458	0.576	0.456	0.584	0.541
Rotor Moment of Inertia	Without Holding Brakes	$\times 10^{-4}$ kg·m^2	0.0220	0.0340	0.0461	0.139	0.216	0.315	0.773	0.969
	With Holding Brakes		0.0300	0.0420	0.0541	0.199	0.276	0.375	0.943	1.14
	Without Holding Brake and with Batteryless Absolute Encoder		0.0257	0.0377	0.0498	0.143	0.220	0.319	0.777	0.973
	With Holding Brake and Batteryless Encoder		0.0337	0.0457	0.0578	0.203	0.280	0.379	0.947	1.14
	Without Holding Brake and with Compact Batteryless Absolute Encoder		0.0256	0.0376	0.0497	0.143	0.220	0.319	0.777	0.973
	With Holding Brake and Compact Batteryless Absolute Encoder		0.0336	0.0456	0.0577	0.203	0.280	0.379	0.947	1.14
Rated Power Rate *1	Without Holding Brakes	kW/s	11.5	29.7	49.4	29.1	74.7	116	73.7	104
	With Holding Brakes		8.42	24.1	42.1	20.4	58.5	97.3	60.4	88.8

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Voltage			200 V							
Model SGMXA-			A5A	01A	C2A	02A	04A	06A	08A	10A
Rated Angular Acceleration *1	Without Holding Brakes	rad/s²	72200	93500	103500	45700	58800	60600	30800	32800
	With Holding Brakes		53000	75700	88200	31900	46000	50900	25300	27900
Derating Rate for Servomotor with Oil Seal		%	80	90			95			
Heat Sink Size (aluminum) *3		mm	200 × 200 × 6		250 × 250 × 6			300 × 300 × 12 *4	250 × 250 × 6	300 × 300 × 12
Protective Structure *5			Totally enclosed, self-cooled, IP67							
Holding Brake Specifications *6	Rated Voltage	V	24 VDC ±10%							
	Capacity	W	5.5			6		6.5		
	Holding Torque	N·m	0.159	0.318	0.477	0.637	1.27	1.91	2.39	3.18
	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 (Rotor Moment of Inertia Ratio) *7	At 6000 min⁻¹		40 times	40 times	40 times	30 times	20 times	20 times	20 times	20 times
	At 7000 min⁻¹					25 times	15 times	20 times	15 times	20 times
	With External Regenerative Resistor and External Dynamic Brake Resistor *8	At 6000 min⁻¹	40 times	40 times	40 times	30 times	20 times	20 times	20 times	30 times
		At 7000 min⁻¹								
Allowable Shaft Loads *9	LF	mm	20			25			35	
	Allowable Radial Load	N	78			245			392	
	Allowable Thrust Load	N	54			74			147	

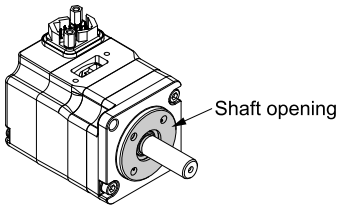
*1 These values are for operation in combination with a SERVOPACK when the temperature of the armature winding is 100°C. The values for other items are at 20°C. These are typical values.

*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.
☞ *Servomotor Heat Dissipation Conditions on page 35*

*4 If the heat sink is 250 mm × 250 mm × 6 mm, the rated output is 550 W and the rated torque is 1.75 N·m. Refer to the following section for details.
☞ *Servomotor Heat Dissipation Conditions on page 35*

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



*6 Observe the following precautions if you use a servomotor with a holding brake.

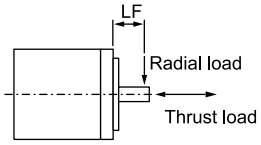
- The holding brake cannot be used to stop the servomotor.
- The time required to release the brake and the time required to brake depend on which discharge circuit is used. Confirm that the operation delay time is appropriate for the actual equipment.
- The 24-VDC power supply is not provided by Yaskawa.

*7 The rotor moment of inertia scaling factor is the value for a standard servomotor without a holding brake.

*8 To externally connect a dynamic brake resistor, select hardware option specification 0020 for the SERVOPACK.
However, you cannot externally connect a dynamic brake resistor if you use the following SERVOPACKs (maximum applicable motor capacity: 400 W).

- SGDXS-R70A□□A0020 to -2R8A□□A0020
- SGDXW-1R6A□□A0020, -2R8A□□A0020
- SGDXT-1R6A□□A0020, -2R8A□□A0020

*9 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.



■ SGMXA-15 to -70

Voltage			200 V						
Model SGMXA-			15A	20A	25A	30A	40A	50A	70A
Rated Output *1		kW	1.5	2.0	2.5	3.0	4.0	5.0	7.0
Rated Torque *1, *2		N·m	4.90	6.36	7.96	9.80	12.6	15.8	22.3
Instantaneous Maximum Torque *1		N·m	14.7	19.1	23.9	29.4	37.8	47.6	54.0
Rated Current *1		Arms	9.3	12.1	15.6	17.9	25.4	27.6	38.3
Instantaneous Maximum Current *1		Arms	28	42	51	56	77	84	105
Rated Rotation Speed *1		min^{-1}	3000						
Continuous Allowable Rotation Speed		min^{-1}	6000		5000	6000		5000	6000
Maximum Rotation Speed *1		min^{-1}	6000 *3						
Torque Constant *1		N·m/Arms	0.590	0.561	0.538	0.582	0.519	0.604	0.604
Rotor Moment of Inertia *4	Without Holding Brakes	$\times 10^{-4}$ kg·m^2	2.00	2.47	3.19	7.00	9.60	12.3	12.3
	With Holding Brakes		2.25	2.72	3.44	9.20	11.8	14.5	–
Rated Power Rate *1	Without Holding Brakes	kW/s	120	164	199	137	165	203	404
	With Holding Brakes		107	149	184	104	134	172	–
Rated Angular Acceleration *1	Without Holding Brakes	rad/s^2	24500	25700	24900	14000	13100	12800	18100
	With Holding Brakes		21700	23300	23100	10600	10600	10800	–
Heat Sink Size (aluminum) *5		mm	300 × 300 × 12			400 × 400 × 20			

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Continued from previous page.

Voltage			200 V						
Model SGMXA-			15A	20A	25A	30A	40A	50A	70A
Protective Structure *6			Totally enclosed, self-cooled, IP67						Totally enclosed, forced ventilation (with fan), IP22
Holding Brake Specifications *7	Rated Voltage	V	24 VDC±10%						–
	Capacity	W	12			10			
	Holding Torque	N·m	7.84		10	20			
	Coil Resistance	Ω (at 20°C)	48			59			
	Rated Current	A (at 20°C)	0.5			0.41			
	Time Required to Release Brake	ms	170			100			
	Time Required to Brake	ms	80						
Allowable Load Moment of Inertia (Rotor Moment of Inertia Ratio) *8	Without External Devices		10 times			5 times			
	With External Regenerative Resistor and External Dynamic Brake Resistor *9		20 times			15 times			
Allowable Shaft Loads *10	LF	mm	45			63			
	Allowable Radial Load	N	686			980	1176		
	Allowable Thrust Load	N	196			392			

*1 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.

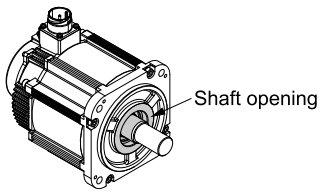
*3 For SGMXA-25A and -50A servomotors, the maximum rotation speed in the continuous duty zone is 5000 min^{-1}. Use the servomotor in a range where the average motor speed and effective torque stay in the continuous zone.

*4 The values for SGMXA-15A to -70A servomotors with batteryless absolute encoders (and holding brakes) are the same as those in the table.

*5 Refer to the following section for the relation between the heat sinks and derating rate.

☞ *Servomotor Heat Dissipation Conditions on page 35*

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



*7 Observe the following precautions if you use a servomotor with a holding brake.

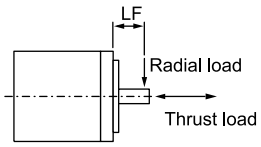
- The holding brake cannot be used to stop the servomotor.
- The time required to release the brake and the time required to brake depend on which discharge circuit is used. Confirm that the operation delay time is appropriate for the actual equipment.
- The 24-VDC power supply is not provided by Yaskawa.

*8 The rotor moment of inertia scaling factor is the value for a standard servomotor without a holding brake.

*9 To externally connect a dynamic brake resistor, select hardware option specification 0020 for the SERVOPACK.
However, you cannot externally connect a dynamic brake resistor if you use the following SERVOPACKs (maximum applicable motor capacity: 400 W).

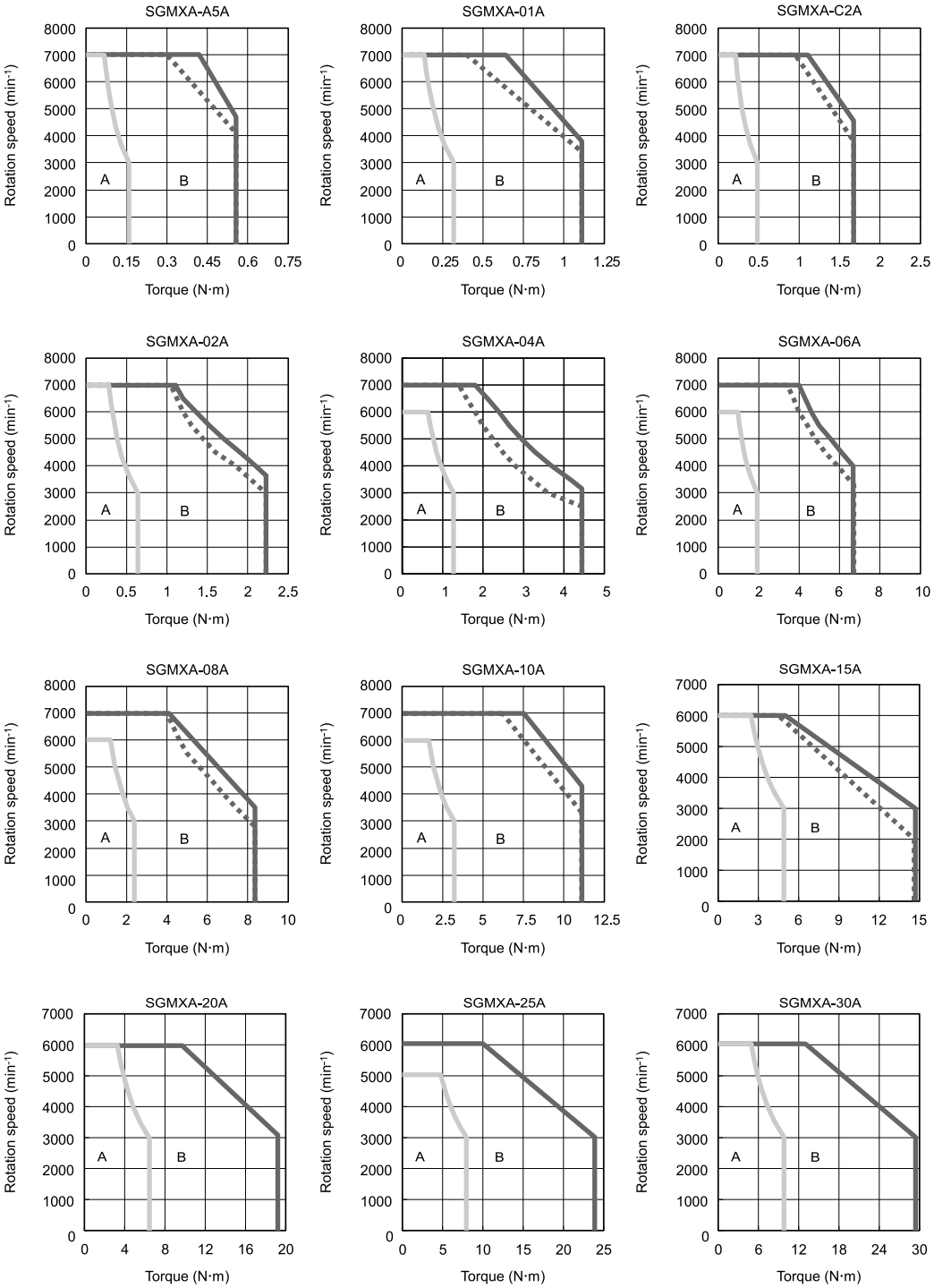
- SGDXS-R70A□□A0020 to -2R8A□□A0020
- SGDXW-1R6A□□A0020 to -2R8A□□A0020

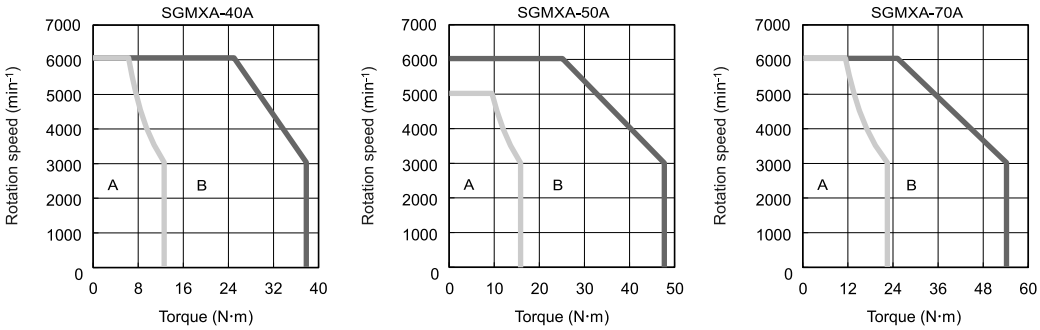
*10 Design the mechanical system so that the thrust and radial loads applied to the servomotor shaft end during operation do not exceed the values given in the table.



Torque-Rotation Speed Characteristics

A : Continuous duty zone ——— (solid lines): Three-phase, 200 V
B : Intermittent duty zone ····· (dotted lines): Single-phase, 200 V





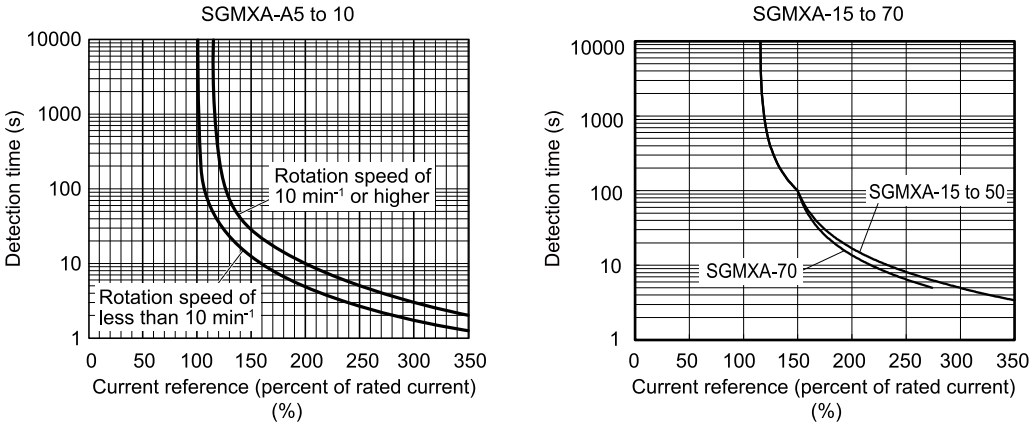
Note:

1. SGMXA-A5A to -10: These values (typical values) are for operation in combination with a SERVOPACK when the temperature of the armature winding is 100°C.
   SGMXA-15A to -70: These values (typical values) are for operation in combination with a SERVOPACK when the temperature of the armature winding is 20°C.
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-rotation speed characteristics will become smaller because the voltage drop increases.
5. The SGMXA-10A and -15A can use a single-phase power input in combination with the SGDXS-120A□□A0008.

Servomotor Overload Protection Characteristics

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

For the overload detection level, priority is given to the lower of the detection levels in the overload protection characteristics of the connected SERVOPACK and servomotor.



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-Rotation Speed Characteristics on page 32*".

Allowable Load Moment of Inertia

The allowable load moments of inertia (motor moment of inertia ratios) for the servomotors are given in "*Servomotor Ratings on page 28*". The values are determined by the regenerative energy processing capacity of the SERVOPACK and are also affected by the drive conditions of the servomotor. Use the SigmaSize+ AC servo capacity selection program *1 to check the driving conditions. Perform the required steps for each of the following cases.

*1 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).

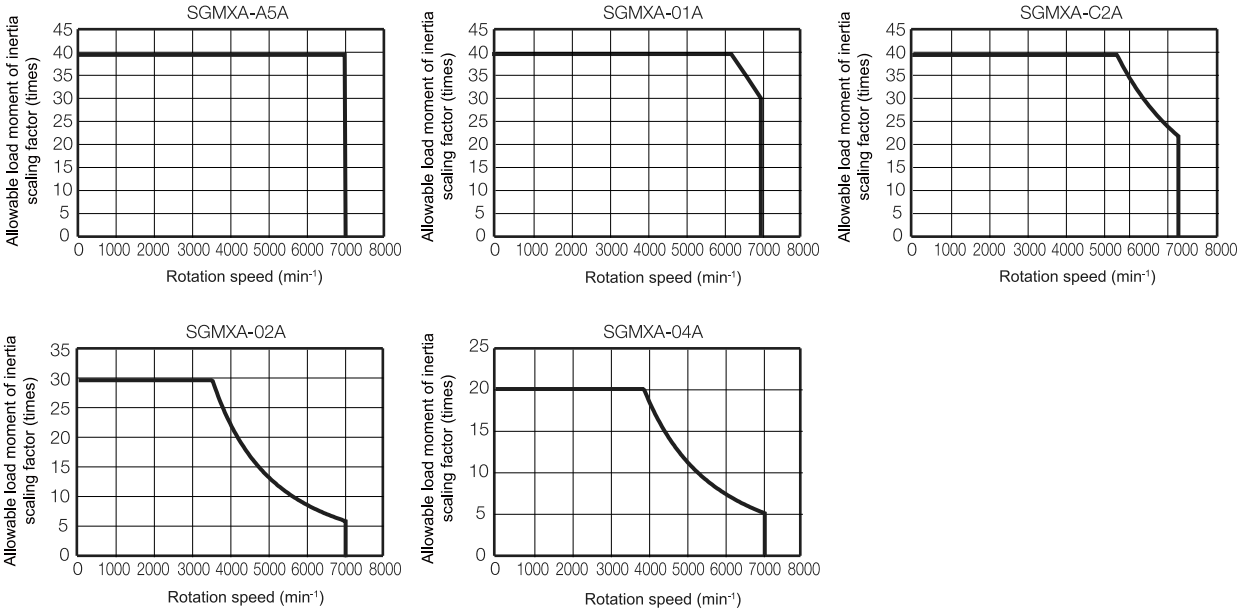
Refer to the following section for the regenerative power (W) that can be processed by the SERVOPACKs.

☞ *Specifications of Built-in Regenerative Resistors in SERVOPACKs on page 478*

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 rotation 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, for the shaded areas of the graphs, use Yaskawa's SigmaSize+, an AC servo capacity selection program, to select an external regenerative resistor.



Note:

Applicable SERVOPACK Model: SGDXS-R70A, -90A, -1R6A, -2R8A

■ When an External Regenerative Resistor Is Required

Install the external regenerative resistor which is selected with the SigmaSize+. Contact your Yaskawa representative for information on SigmaSize+.

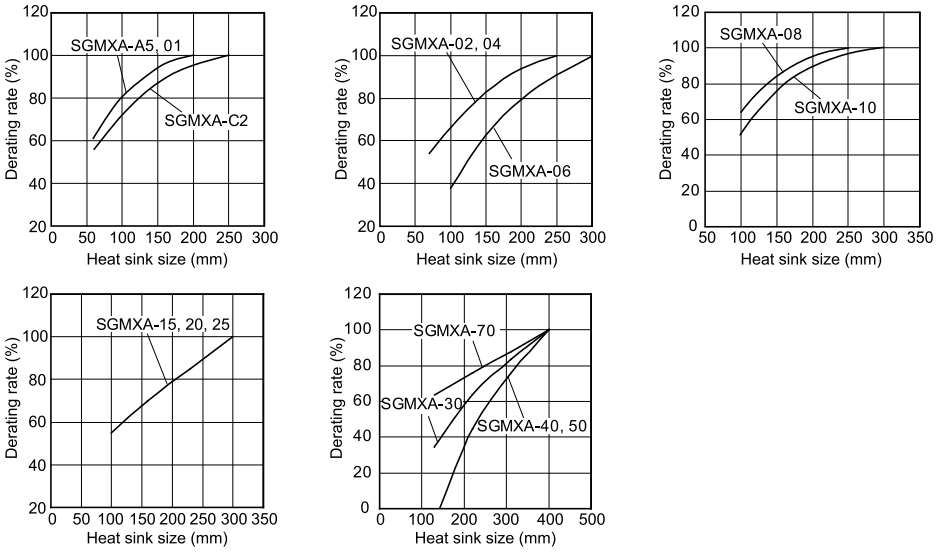
Refer to the following section for details on the external regenerative resistors.

☞ *Specifications and Dimensions of External Regenerative Resistors on page 479*

Derating Rates

■ 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.



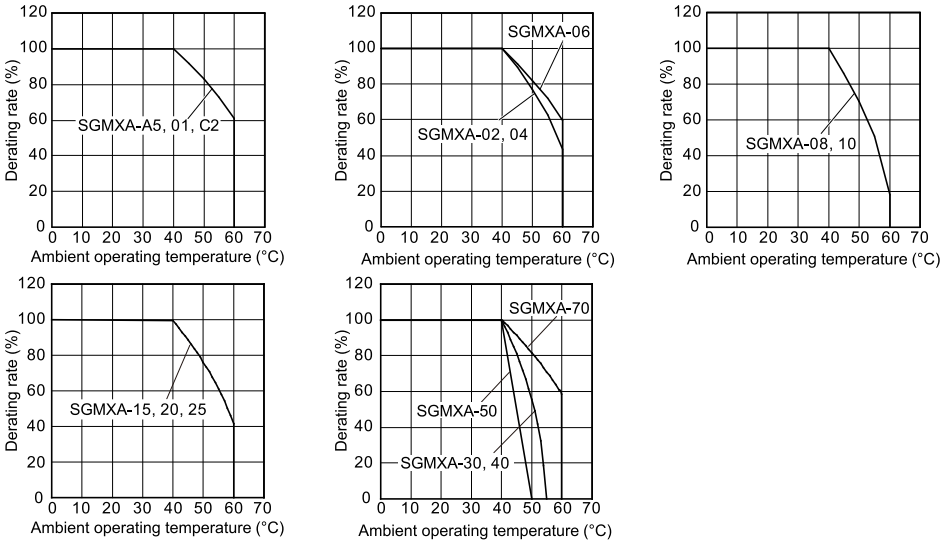
Important

The actual temperature rise depends on the following conditions. Always check the servomotor temperature with the actual equipment.

- How the heat sink (the servomotor mounting section) is attached to the installation surface
- Status between heat sink and servomotor (sealant, reduction gear, etc.)
- What material is used for the servomotor mounting section
- Servomotor rotation speed

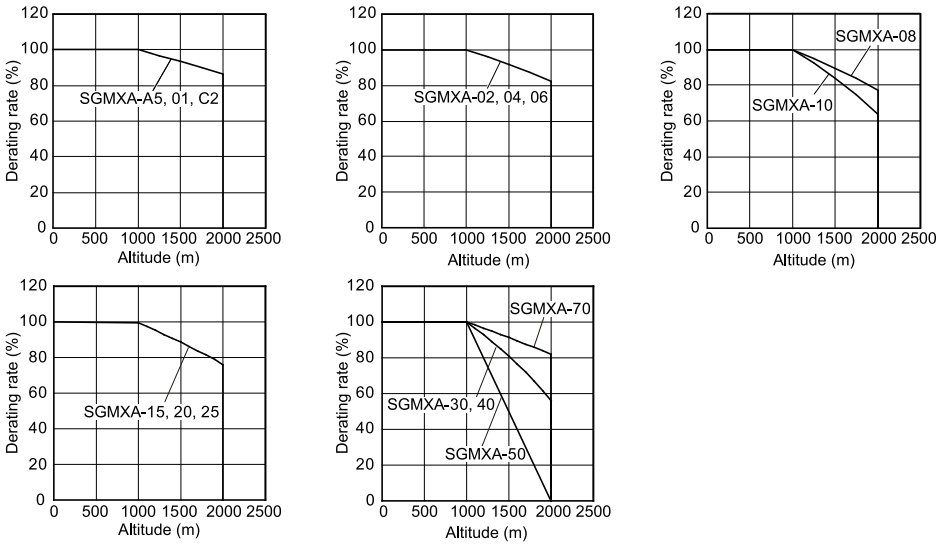
■ Applications Where the Surrounding Air Temperature Exceeds 40°C

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 1000 m

The servomotor ratings are the continuous allowable values at an altitude of 1000 m or less. If you use a servomotor at an altitude that exceeds 1000 m (2000 m max.), the heat dissipation effect of the air is reduced. Apply the appropriate derating rate from the following graphs.



Note:

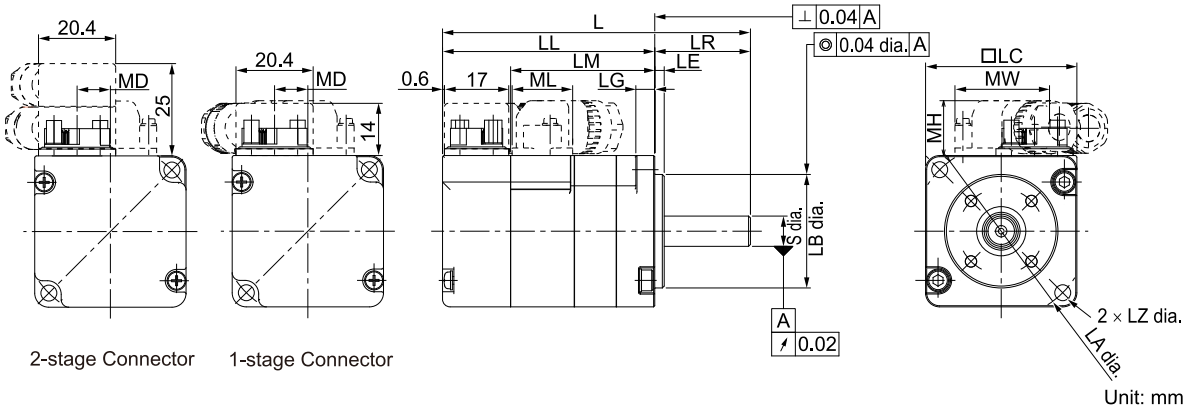
- When using servomotors with derating, change the detection timing of overload warning and overload alarm based on the overload detection level of the motor given in "*Servomotor Overload Protection Characteristics on page 33*".
- Use the combination of the SERVOPACK and servomotor so that the derating conditions are satisfied for both the SERVOPACK and servomotor.
- The derating rates are applicable only when the average rotation speed is less than or equal to the rated rotation speed. If the average rotation speed exceeds the rated rotation speed, consult with your Yaskawa representative.

External Dimensions (200 V Specification)

SGMXA-A5 to -C2

■ Standard Specification

Information Models with the additional specification "3 Standard (Functional Safety-Compatible Encoder)" have the same dimensions as those indicated below.



Unit: mm

Model SGMXA-	L *1	LL *1	LM	Flange Dimensions						
				LR	LE	LG	LC	LA	LB	LZ
A5A□A2□A□	80.5 (121.0)	55.5 (96.0)	37.5	25	2.5	5	40	46	$30^{0}_{-0.021}$	4.3
01A□A2□A□	92.5 (133.0)	67.5 (108.0)	49.5	25	2.5	5	40	46	$30^{0}_{-0.021}$	4.3
C2A□A2□A□	104.5 (153.0)	79.5 (128.0)	61.5	25	2.5	5	40	46	$30^{0}_{-0.021}$	4.3

Model SGMXA-	S	MD	MW	MH	ML	Approx. Mass [kg] *1
A5A□A2□A□	$8^{0}_{-0.009}$	8.4	25	14.5	16	0.3 (0.6)
01A□A2□A□	$8^{0}_{-0.009}$	8.4	25	14.5	16	0.4 (0.7)
C2A□A2□A□	$8^{0}_{-0.009}$	8.4	25	14.5	16	0.5 (0.8)

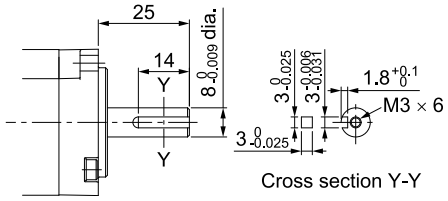
*1 For models that have a batteryless absolute encoder (SGMX□-□□□W), L and LL are +7.5 mm greater and the approximate mass is 0.1 kg greater than the given value. Refer to the following section for the values for individual models.
☞ *Dimensions of Servomotors with Batteryless Absolute Encoders (SGMXA-□□□W) on page 52*

Note:

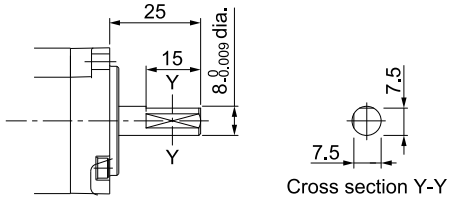
1. The values in parentheses are for servomotors with holding brakes.
2. The values for a straight shaft end without key specification are given. Refer to the information given below for other shaft end specifications and option specifications.
☞ *Shaft End Specification on page 38*
☞ *Option Specification on page 38*

■ Shaft End Specification

• Straight with Key and Tap

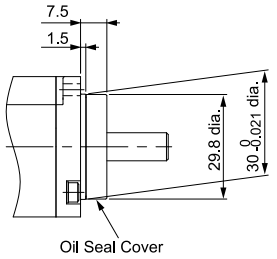


• With Two Flat Seats



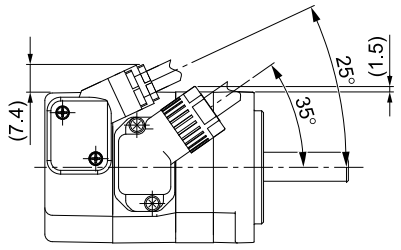
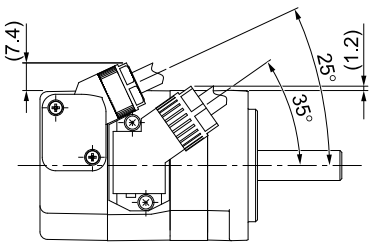
■ Option Specification

• With Oil Seal

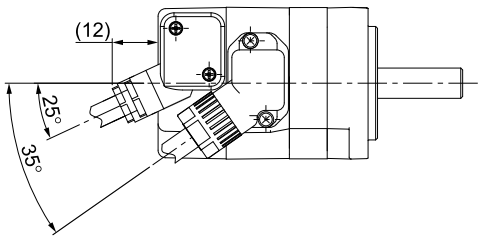
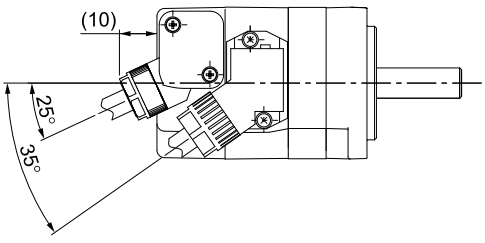


■ Connector Mounting Dimensions

• Cable Installed on Load Side

Standard Specification	Σ-7 Compatible Specification
	

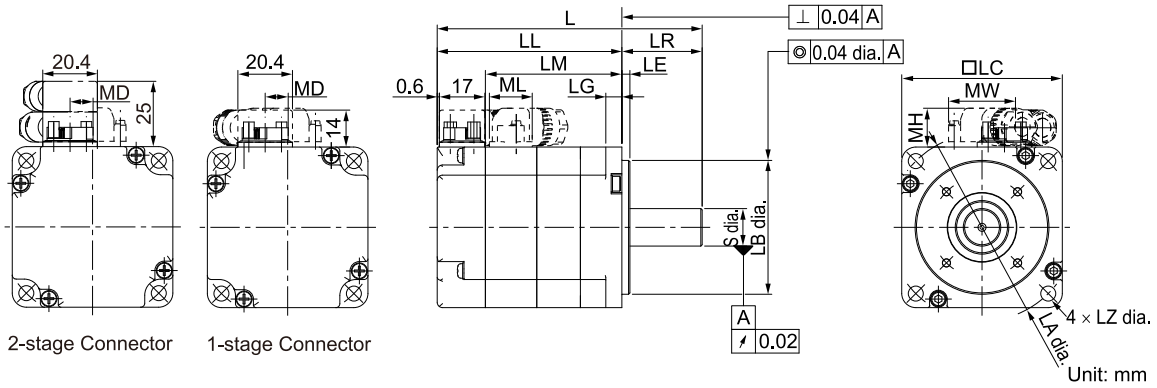
• Cable Installed on Non-load Side

Standard Specification	Σ-7 Compatible Specification
	

SGMXA-02 to -06

■ Standard Specification

Information Models with the additional specification "3 Standard (Functional Safety-Compatible Encoder)" have the same dimensions as those indicated below.



Model SGMXA-	L *1	LL *1	LM	Flange Dimensions						
				LR	LE	LG	LC	LA	LB	LZ
02A□A2□A□	98.5 (139.0)	68.5 (109.0)	50.5	30	3	6	60	70	$50^{0}_{-0.025}$	5.5
04A□A2□A□	115 (155.5)	85 (125.5)	67	30	3	6	60	70	$50^{0}_{-0.025}$	5.5
06A□A2□A□	137 (191.0)	107 (161.0)	89	30	3	6	60	70	$50^{0}_{-0.025}$	5.5

Model SGMXA-	S	MD	MW	MH	ML	Approx. Mass [kg] *1
02A□A2□A□	$14^{0}_{-0.011}$	8.4	25	14.5	16	0.8 (1.4)
04A□A2□A□	$14^{0}_{-0.011}$	8.4	25	14.5	16	1.2 (1.8)
06A□A2□A□	$14^{0}_{-0.011}$	8.4	25	14.5	16	1.6 (2.2)

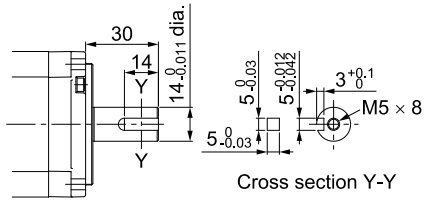
*1 For models that have a batteryless absolute encoder (SGMX□-□□□W), L and LL are +7.5 mm greater and the approximate mass is 0.1 kg greater than the given value. Refer to the following section for the values for individual models.
☞ *Dimensions of Servomotors with Batteryless Absolute Encoders (SGMXA-□□□W) on page 52*

Note:

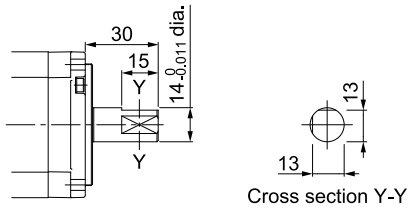
1. The values in parentheses are for servomotors with holding brakes.
2. The values for a straight shaft end without key specification are given. Refer to the information given below for other shaft end specifications and option specifications.
☞ *Shaft End Specification on page 39*
☞ *Option Specification on page 40*

■ Shaft End Specification

- Straight with Key and Tap

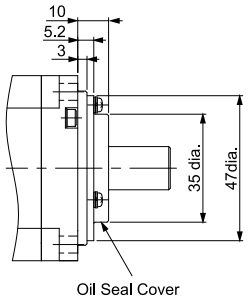


- With Two Flat Seats



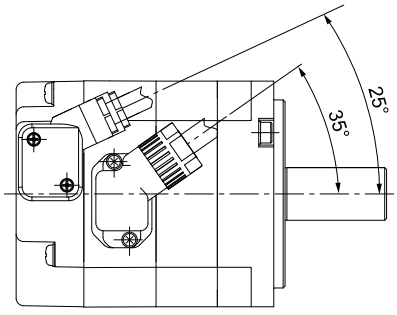
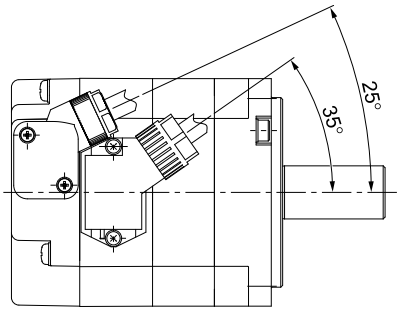
■ Option Specification

- With Oil Seal

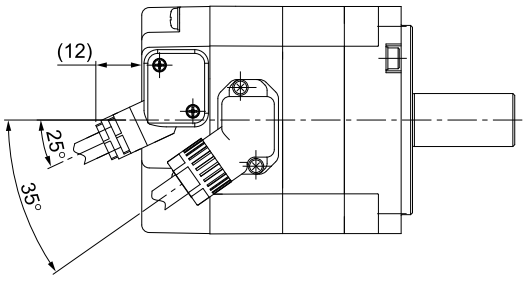
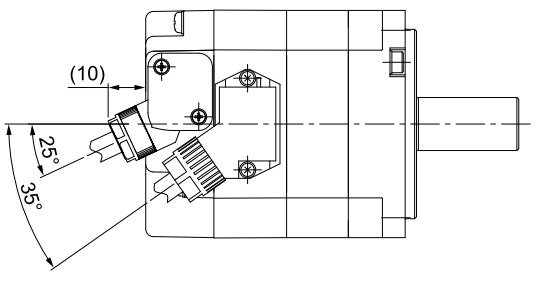


■ Connector Mounting Dimensions

- Cable Installed on Load Side

Standard Specification	Σ-7 Compatible Specification
	

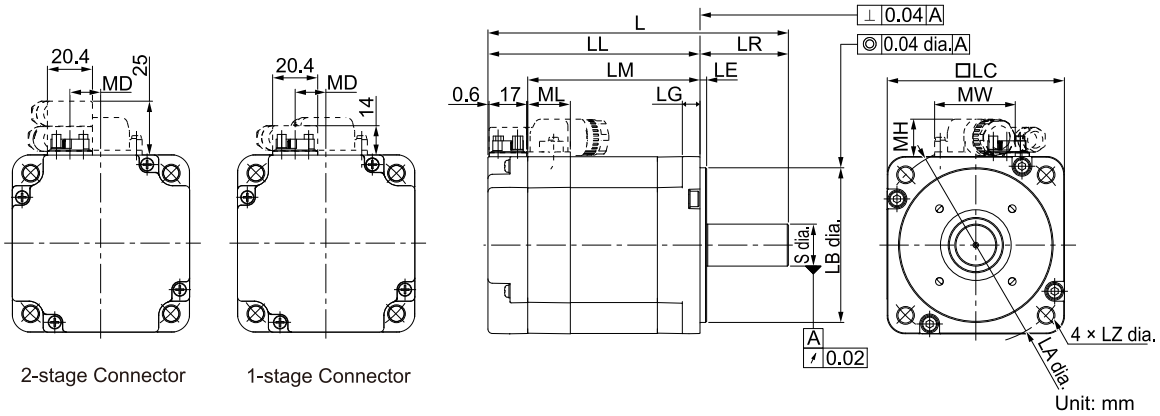
- Cable Installed on Non-load Side

Standard Specification	Σ-7 Compatible Specification
	

SGMXA-08 and -10

■ Standard Specification

Information Models with the additional specification "3 Standard (Functional Safety-Compatible Encoder)" have the same dimensions as those indicated below.



Model SGMXA-	L *1	LL *1	LM	Flange Dimensions						
				LR	LE	LG	LC	LA	LB	LZ
08A□A2□A□	136 (183.0)	96 (143.0)	78	40	3	8	80	90	$70^{0}_{-0.030}$	7
10A□A2□A□	161 (208.0)	121 (168.0)	103	40	3	8	80	90	$70^{0}_{-0.030}$	7

Model SGMXA-	S	MD	MW	MH	ML	Approx. Mass *1 [kg]
08A□A2□A□	$19^{0}_{-0.013}$	14	37	17	19.3	2.3 (2.9)
10A□A2□A□	$19^{0}_{-0.013}$	14	37	17	19.3	3.1 (3.7)

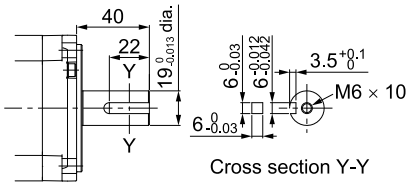
*1 For models that have a batteryless absolute encoder (SGMX□-□□□W), L and LL are 6.5 mm greater and the approximate mass is 0.1 kg greater than the given value. Refer to the following section for the values for individual models.
☞ *Dimensions of Servomotors with Batteryless Absolute Encoders (SGMXA-□□□W) on page 52*

Note:

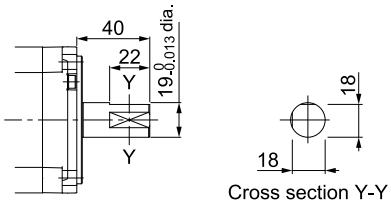
1. The values in parentheses are for servomotors with holding brakes.
2. The values for a straight shaft end without key specification are given. Refer to the information given below for other shaft end specifications and option specifications.
☞ *Shaft End Specification on page 41*
☞ *Option Specification on page 41*

■ Shaft End Specification

- Straight with Key and Tap

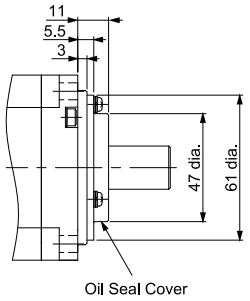


- With Two Flat Seats



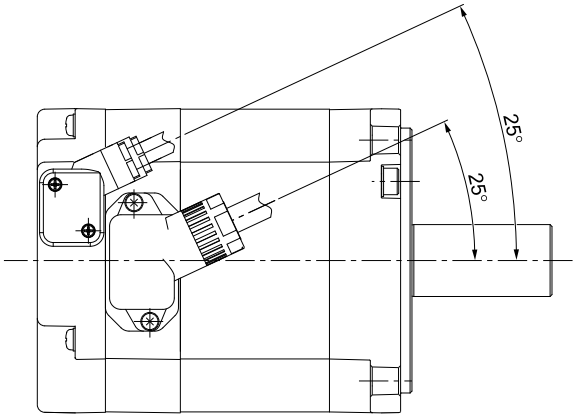
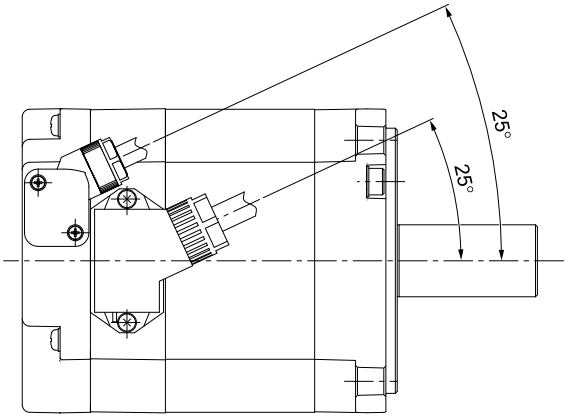
■ Option Specification

- With Oil Seal

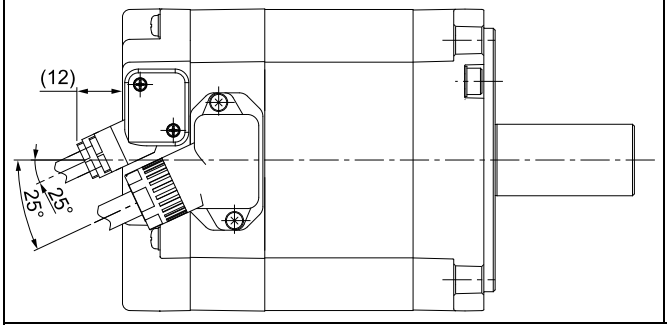
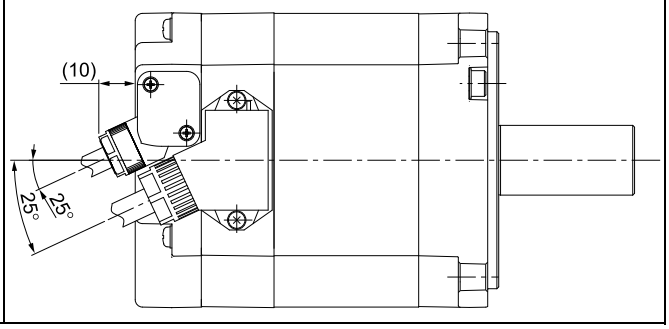


■ Connector Mounting Dimensions

• Cable Installed on Load Side

Standard Specification	Σ-7 Compatible Specification
	

• Cable Installed on Non-load Side

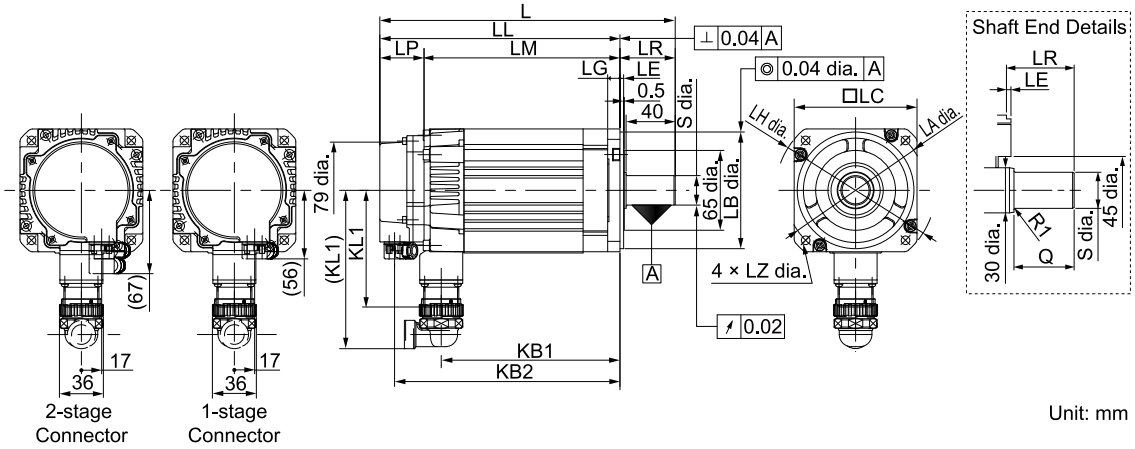
Standard Specification	Σ-7 Compatible Specification
	

SGMXA-15 to -25

■ Servomotors without Holding Brakes

◆ Standard Specification

Information Models with the additional specification "3 Standard (Functional Safety-Compatible Encoder)" have the same dimensions as those indicated below.



Model SGMXA-	L *1	LL *1	LM	LP *1	LR	KB1	KB2 *1	KL1 (KL1 *2)
15A□A21A□	200	155	121	34	45	107	143	95 (129)
20A□A21A□	216	171	137	34	45	123	159	95 (129)
25A□A21A□	239	194	160	34	45	146	182	95 (129)

Model SGMXA-	Flange Dimensions							Shaft End Dimensions		Approx. Mass [kg]
	LA	LB	LC	LE	LG	LH	LZ	S	Q	
15A□A21A□	115	$95^{0}_{-0.035}$	100	3	10	130	7	$24^{0}_{-0.013}$	40	4.6
20A□A21A□	115	$95^{0}_{-0.035}$	100	3	10	130	7	$24^{0}_{-0.013}$	40	5.4
25A□A21A□	115	$95^{0}_{-0.035}$	100	3	10	130	7	$24^{0}_{-0.013}$	40	6.8

*1 For models that have a batteryless absolute encoder (SGMX□-□□□W), L, LL, LP, and KB2 are 8 mm greater than the given value. Refer to the following section for the values for individual models.
☞ *Dimensions of Servomotors with Batteryless Absolute Encoders (SGMXA-□□□W) on page 52*

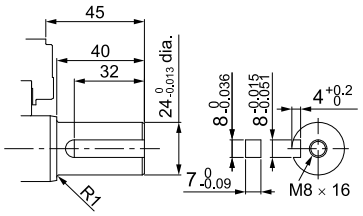
*2 These are the values when the flexible connectors are connected.

Note:

1. The dimensions are same for models with oil seals.
2. The values for a straight shaft end without key specification are given. Refer to the information given below for other shaft end specifications.
☞ *Shaft End Specification on page 43*

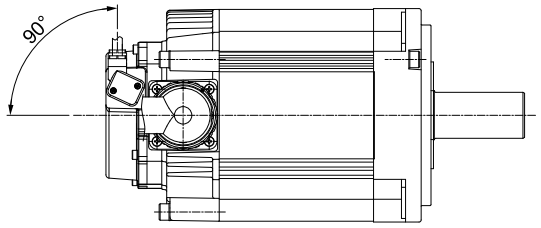
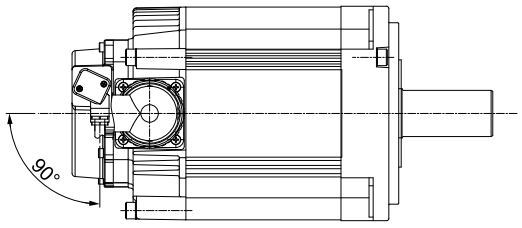
◆ Shaft End Specification

- Straight with Key and Tap



◆ Connector Specifications

- Encoder Connector (26-bit Encoder): Standard Specification
  The encoder cable is installed in the following direction.

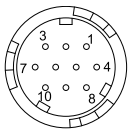
Cable Installed toward Left Side	Cable Installed toward Right Side
	

For details on selecting cables, refer to the following section and manual.

☞ *Cables for the SGMXA Servomotors on page 94*

🕮 Σ-X-Series Peripheral Device Selection Manual (Manual No.: SIEP C710812 12)

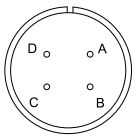
- Encoder Connector (26-bit Encoder): Σ-7 Compatible Specification



1	PS	6 *1	BAT(+)
2	/PS	7	–
3	–	8	–
4	PG5V	9	PG0V
5	BAT(-)	10	FG (frame ground)

*1 A battery is required only for an absolute encoder.
Receptacle: CMV1-R10P
Applicable plug (not provided by Yaskawa)
Plug: CM10-AP10S-□-D (R1) (right-angle type), CM10-SP10S-□-D (R1) (straight), CMV1-AP10S-□□ (right-angle type), CMV1-SP10S-□□ (straight), CMV1S-AP10S-□□ (right-angle type), CMV1S-SP10S-□□ (straight)
(□ varies depending on the applicable cable size.)
Manufacturer: Fujikura Ltd.

- Servomotor Connector: Same for both Standard Specifications and Σ-7 Compatible Specifications



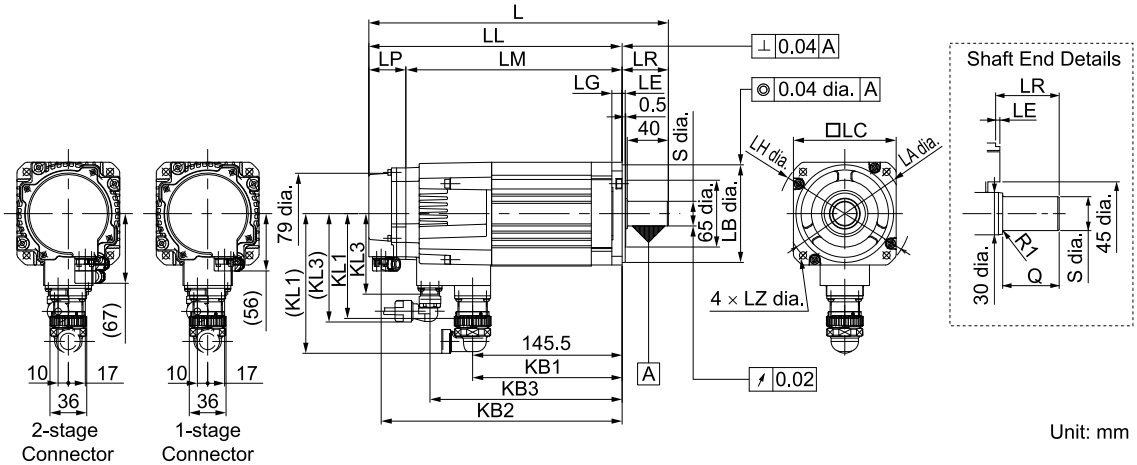
A	Phase U	C	Phase W
B	Phase V	D	FG (frame ground)

Manufacturer: Japan Aviation Electronics Industry, Ltd.

■ Servomotors with Holding Brakes

◆ Standard Specification

Information Models with the additional specification "3 Standard (Functional Safety-Compatible Encoder)" have the same dimensions as those indicated below.



Unit: mm

Model SGMXA-	L *1	LL *1	LM	LP *1	LR	KB1	KB2 *1	KB3	KL1 (KL1 *2)	KL3 (KL3 *2)
15A□A2CA□	241	196	162	34	45	107	184	139	102 (136)	80 (105)
20A□A2CA□	257	212	178	34	45	123	200	155	102 (136)	80 (105)
25A□A2CA□	290	245	211	34	45	156	233	188	102 (136)	80 (105)

Model SGMXA-	Flange Dimensions							Shaft End Dimensions		Approx. Mass [kg]
	LA	LB	LC	LE	LG	LH	LZ	S	Q	
15A□A2CA□	115	$95^{0}_{-0.035}$	100	3	10	130	7	$24^{0}_{-0.013}$	40	6.0
20A□A2CA□	115	$95^{0}_{-0.035}$	100	3	10	130	7	$24^{0}_{-0.013}$	40	6.8
25A□A2CA□	115	$95^{0}_{-0.035}$	100	3	10	130	7	$24^{0}_{-0.013}$	40	8.7

*1 For models that have a batteryless absolute encoder (SGMX□-□□□W), L, LL, LP, and KB2 are 8 mm greater than the given value. Refer to the following section for the values for individual models.
☞ *Dimensions of Servomotors with Batteryless Absolute Encoders (SGMXA-□□□W) on page 52*

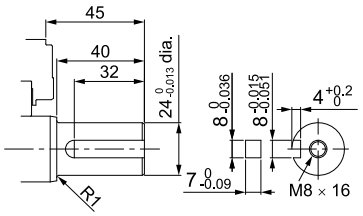
*2 These are the values when the flexible connectors are connected.

Note:

1. The dimensions are same for models with oil seals.
2. The values for a straight shaft end without key specification are given. Refer to the information given below for other shaft end specifications.
☞ *Shaft End Specification on page 45*

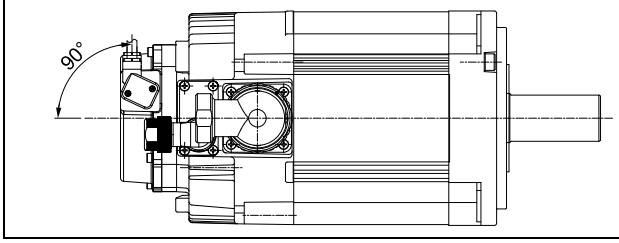
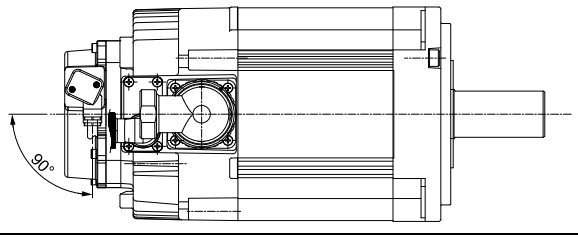
◆ Shaft End Specification

- Straight with Key and Tap



◆ Connector Specifications

- Encoder Connector (26-bit Encoder): Standard Specification
The encoder cable is installed in the following direction.

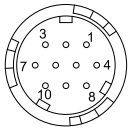
Cable Installed toward Left Side	Cable Installed toward Right Side
	

For details on selecting cables, refer to the following section and manual.

☞ *Cables for the SGMXA Servomotors on page 94*

🕮 Σ-X-Series Peripheral Device Selection Manual (Manual No.: SIEP C710812 12)

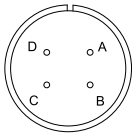
- Encoder Connector (26-bit Encoder): Σ-7 Compatible Specification



1	PS	6 *1	BAT(+)
2	/PS	7	–
3	–	8	–
4	PG5V	9	PG0V
5	BAT(-)	10	FG (frame ground)

*1 A battery is required only for an absolute encoder.
Receptacle: CMV1-R10P
Applicable plug (not provided by Yaskawa)
Plug: CM10-AP10S-□-D (R1) (right-angle type), CM10-SP10S-□-D (R1) (straight), CMV1-AP10S-□□ (right-angle type), CMV1-SP10S-□□ (straight), CMV1S-AP10S-□□ (right-angle type), CMV1S-SP10S-□□ (straight)
(□ varies depending on the applicable cable size.)
Manufacturer: Fujikura Ltd.

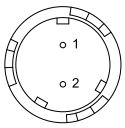
- Servomotor Connector: Same for both Standard Specifications and Σ-7 Compatible Specifications



A	Phase U	C	Phase W
B	Phase V	D	FG (frame ground)

Manufacturer: Japan Aviation Electronics Industry, Ltd.

- Brake Connector: Same for both Standard Specifications and Σ-7 Compatible Specifications



1	Brake terminal
2	Brake terminal

Note:

There is no voltage polarity for the brake terminals.

Receptacle: CMV1-R2P-D

Applicable plug (not provided by Yaskawa)

Plug: CM10-AP2S-□-D (right-angle type), CM10-SP2S-□-D (straight), CMV1-AP2S-□-D (right-angle type), CMV1-SP2S-□-D (straight), CMV1S-AP2S-□-D (right-angle type), CMV1S-SP2S-□-D (straight)

(□ varies depending on the applicable cable size.)

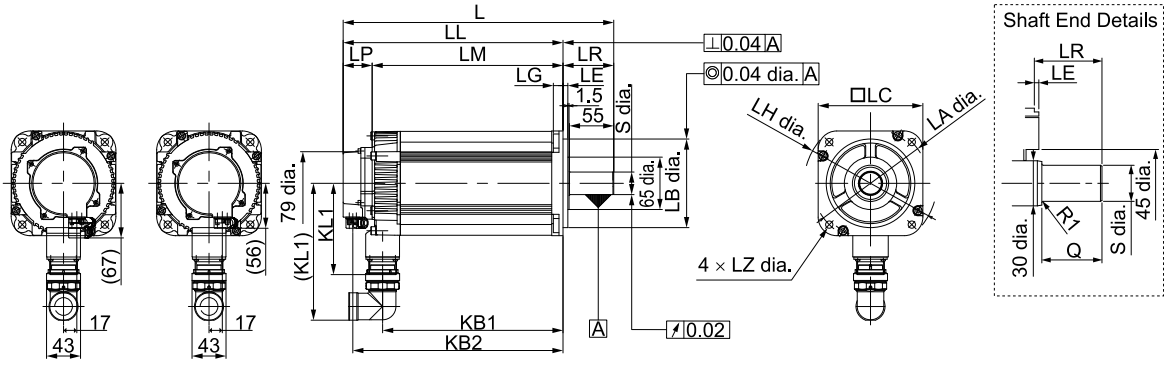
Manufacturer: Fujikura Ltd.

SGMXA-30 to -50

■ Servomotors without Holding Brakes

◆ Standard Specification

Information Models with the additional specification "3 Standard (Functional Safety-Compatible Encoder)" have the same dimensions as those indicated below.



2-stage Connector

1-stage Connector

Unit: mm

Model SGMXA-	L *1	LL *1	LM	LP *1	LR	KB1	KB2 *1	KL1 (KL1 *2)
30A□A21A□	255	192	158	34	63	145	180	114 (170)
40A□A21A□	294	231	197	34	63	184	219	114 (170)
50A□A21A□	334	271	237	34	63	224	259	114 (170)

Model SGMXA-	Flange Dimensions							Shaft End Dimensions		Approx. Mass [kg]
	LA	LB	LC	LE	LG	LH	LZ	S	Q	
30A□A21A□	145	$110^{0}_{-0.035}$	130	6	12	165	9	$28^{0}_{-0.013}$	55	10.5
40A□A21A□	145	$110^{0}_{-0.035}$	130	6	12	165	9	$28^{0}_{-0.013}$	55	13.5
50A□A21A□	145	$110^{0}_{-0.035}$	130	6	12	165	9	$28^{0}_{-0.013}$	55	16.5

*1 For models that have a batteryless absolute encoder (SGMX□-□□□W), L, LL, LP, and KB2 are 8 mm greater than the given value. Refer to the following section for the values for individual models.
☞ *Dimensions of Servomotors with Batteryless Absolute Encoders (SGMXA-□□□W) on page 52*

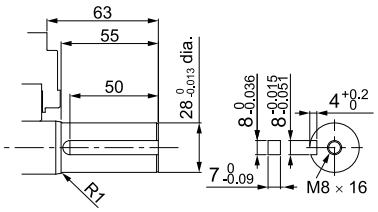
*2 These are reference dimensions when the JL10 connector (flexible type) is connected.

Note:

1. The dimensions are same for models with oil seals.
2. The values for a straight shaft end without key specification are given. Refer to the information given below for other shaft end specifications.
☞ *Shaft End Specification on page 47*

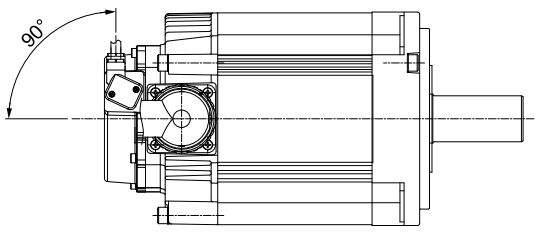
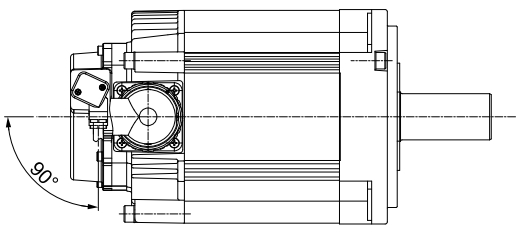
◆ Shaft End Specification

- Straight with Key and Tap



◆ Connector Specifications

- Encoder Connector (26-bit Encoder): Standard Specification
The encoder cable is installed in the following direction.

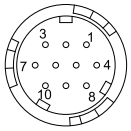
Cable Installed toward Left Side	Cable Installed toward Right Side
	

For details on selecting cables, refer to the following section and manual.

☞ *Cables for the SGMXA Servomotors on page 94*

🕮 Σ-X-Series Peripheral Device Selection Manual (Manual No.: SIEP C710812 12)

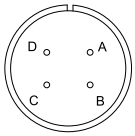
- Encoder Connector (26-bit Encoder): Σ-7 Compatible Specification



1	PS	6 *1	BAT(+)
2	/PS	7	–
3	–	8	–
4	PG5V	9	PG0V
5	BAT(-)	10	FG (frame ground)

*1 A battery is required only for an absolute encoder.
Receptacle: CMV1-R10P
Applicable plug (not provided by Yaskawa)
Plug: CM10-AP10S-□-D (R1) (right-angle type), CM10-SP10S-□-D (R1) (straight), CMV1-AP10S-□□ (right-angle type), CMV1-SP10S-□□ (straight), CMV1S-AP10S-□□ (right-angle type), CMV1S-SP10S-□□ (straight)
(□ varies depending on the applicable cable size.)
Manufacturer: Fujikura Ltd.

- Servomotor Connector: Same for both Standard Specifications and Σ-7 Compatible Specifications



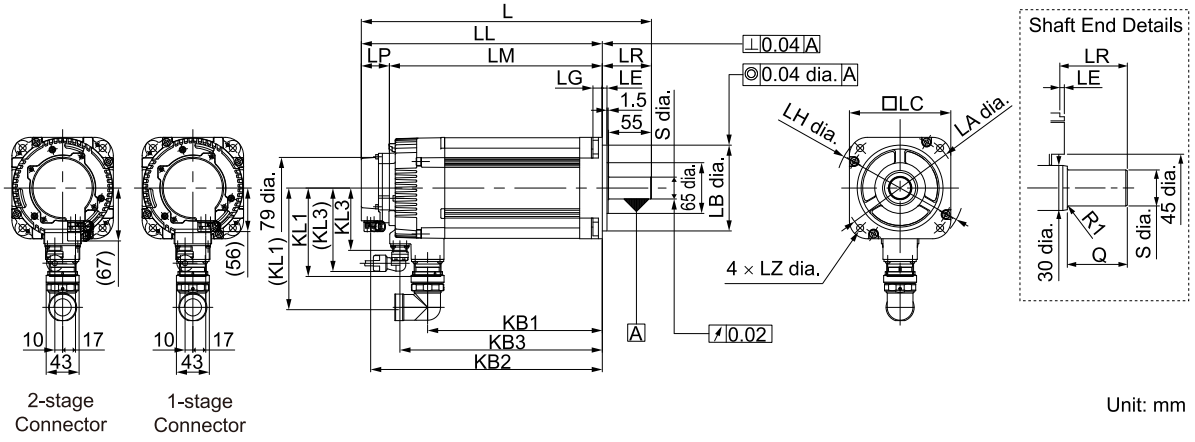
A	Phase U	C	Phase W
B	Phase V	D	FG (frame ground)

Manufacturer: Japan Aviation Electronics Industry, Ltd.

■ Servomotors with Holding Brakes

◆ Standard Specification

Information Models with the additional specification "3 Standard (Functional Safety-Compatible Encoder)" have the same dimensions as those indicated below.



Unit: mm

Model SGMXA-	L *1	LL *1	LM	LP *1	LR	KB1	KB2 *1	KB3	KL1 (KL1 *2)	KL3 (KL3 *2)
30A□A2CA□	291	228	194	34	63	145	216	181	114 (170)	81 (106)
40A□A2CA□	330	267	233	34	63	184	255	220	114 (170)	81 (106)
50A□A2CA□	370	307	273	34	63	224	295	260	114 (170)	81 (106)

Model SGMXA-	Flange Dimensions							Shaft End Dimensions		Approx. Mass [kg]
	LA	LB	LC	LE	LG	LH	LZ	S	Q	
30A□A2CA□	145	$110^{0}_{-0.035}$	130	6	12	165	9	$28^{0}_{-0.013}$	55	13
40A□A2CA□	145	$110^{0}_{-0.035}$	130	6	12	165	9	$28^{0}_{-0.013}$	55	16
50A□A2CA□	145	$110^{0}_{-0.035}$	130	6	12	165	9	$28^{0}_{-0.013}$	55	19

*1 For models that have a batteryless absolute encoder (SGMX□-□□□W), L, LL, LP, and KB2 are 8 mm greater than the given value. Refer to the following section for the values for individual models.
☞ *Dimensions of Servomotors with Batteryless Absolute Encoders (SGMXA-□□□W) on page 52*

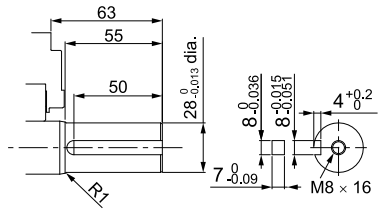
*2 These are reference dimensions when the JL10 connector (flexible type) is connected.

Note:

1. The dimensions are same for models with oil seals.
2. The values for a straight shaft end without key specification are given. Refer to the information given below for other shaft end specifications.
☞ *Shaft End Specification on page 49*

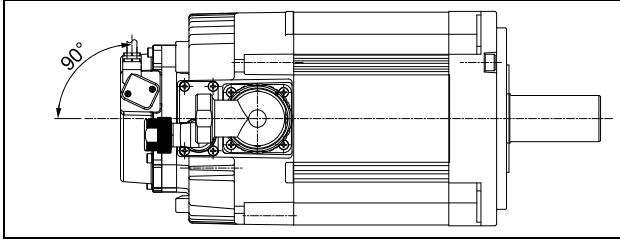
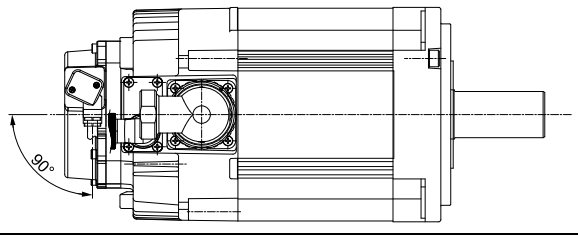
◆ Shaft End Specification

- Straight with Key and Tap



◆ Connector Specifications

- Encoder Connector (26-bit Encoder): Standard Specification
The encoder cable is installed in the following direction.

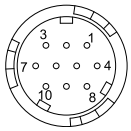
Cable Installed toward Left Side	Cable Installed toward Right Side
	

For details on selecting cables, refer to the following section and manual.

☞ *Cables for the SGMXA Servomotors on page 94*

Σ-X-Series Peripheral Device Selection Manual (Manual No.: SIEP C710812 12)

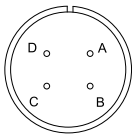
- Encoder Connector (26-bit Encoder): Σ-7 Compatible Specification



1	PS	6 *1	BAT(+)
2	/PS	7	–
3	–	8	–
4	PG5V	9	PG0V
5	BAT(-)	10	FG (frame ground)

*1 A battery is required only for an absolute encoder.
Receptacle: CMV1-R10P
Applicable plug (not provided by Yaskawa)
Plug: CM10-AP10S-□-D (R1) (right-angle type), CM10-SP10S-□-D (R1) (straight), CMV1-AP10S-□□ (right-angle type), CMV1-SP10S-□□ (straight), CMV1S-AP10S-□□ (right-angle type), CMV1S-SP10S-□□ (straight)
(□ varies depending on the applicable cable size.)
Manufacturer: Fujikura Ltd.

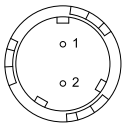
- Servomotor Connector: Same for both Standard Specifications and Σ-7 Compatible Specifications



A	Phase U	C	Phase W
B	Phase V	D	FG (frame ground)

Manufacturer: Japan Aviation Electronics Industry, Ltd.

- Brake Connector: Same for both Standard Specifications and Σ-7 Compatible Specifications



1	Brake terminal
2	Brake terminal

Note:

There is no voltage polarity for the brake terminals.

Receptacle: CMV1-R2P-D

Applicable plug (not provided by Yaskawa)

Plug: CM10-AP2S-□-D (right-angle type), CM10-SP2S-□-D (straight), CMV1-AP2S-□-D (right-angle type), CMV1-SP2S-□-D (straight), CMV1S-AP2S-□-D (right-angle type), CMV1S-SP2S-□-D (straight)

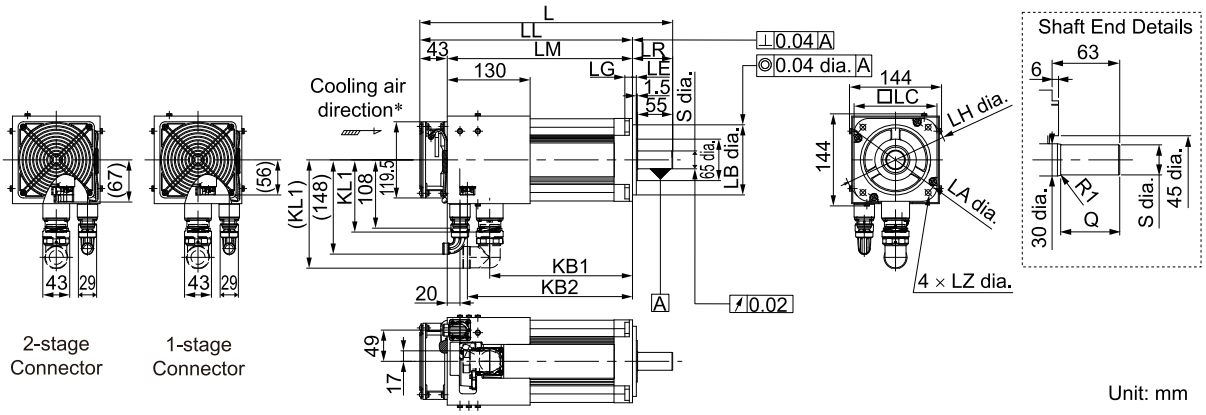
(□ varies depending on the applicable cable size.)

Manufacturer: Fujikura Ltd.

SGMXA-70 (Without Holding Brakes)

■ Standard Specification

Information Models with the additional specification "3 Standard (Functional Safety-Compatible Encoder)" have the same dimensions as those indicated below.



Note:

Mount the servomotor 70 mm or more from walls, machines, and other objects to ensure sufficient cooling air.

Model SGMXA-	L	LL	LM	LR	KB1	KB2 *1	KL1 (KL1)
70A□A21A□	397	334	291	63	224	259	114 (170)

Model SGMXA-	Flange Dimensions							Shaft End Dimensions		Approx. Mass [kg]
	LA	LB	LC	LE	LG	LH	LZ	S	Q	
70A□A21A□	145	$110^{0}_{-0.035}$	130	6	12	165	9	$28^{0}_{-0.013}$	55	18.5

*1 For models that have a batteryless absolute encoder (SGMX□-□□□W), KB2 is 8 mm greater than the given value. Refer to the following section for the values for individual models.

☞ *Dimensions of Servomotors with Batteryless Absolute Encoders (SGMXA-□□□W) on page 52*

Note:

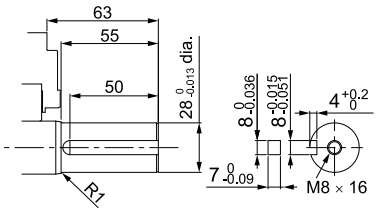
1. The dimensions are same for models with oil seals.
2. The values for a straight shaft end without key specification are given. Refer to the information given below for other shaft end specifications.
☞ *Shaft End Specification on page 51*

■ Cooling Fan Specifications

- Single-phase 220 VAC
- 50/60 Hz
- 17/15 W
- 0.11/0.09 A

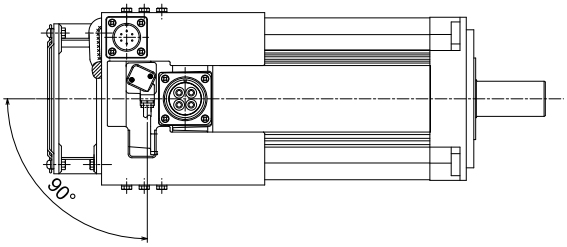
■ Shaft End Specification

- Straight with Key and Tap



■ Connector Specifications

- Encoder Connector (26-bit Encoder): Standard Specification
The encoder cable is installed in the following direction.

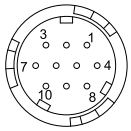


For details on selecting cables, refer to the following section and manual.

☞ *Cables for the SGMXA Servomotors on page 94*

🕮 Σ-X-Series Peripheral Device Selection Manual (Manual No.: SIEP C710812 12)

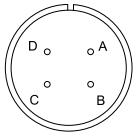
- Encoder Connector (26-bit Encoder): Σ-7 Compatible Specification



1	PS	6 *1	BAT(+)
2	/PS	7	–
3	–	8	–
4	PG5V	9	PG0V
5	BAT(-)	10	FG (frame ground)

*1 A battery is required only for an absolute encoder.
Receptacle: CMV1-R10P
Applicable plug (not provided by Yaskawa)
Plug: CM10-AP10S-□-D (R1) (right-angle type), CM10-SP10S-□-D (R1) (straight), CMV1-AP10S-□□ (right-angle type), CMV1-SP10S-□□ (straight), CMV1S-AP10S-□□ (right-angle type), CMV1S-SP10S-□□ (straight)
(□ varies depending on the applicable cable size.)
Manufacturer: Fujikura Ltd.

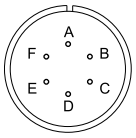
- Servomotor Connector: Same for both Standard Specifications and Σ-7 Compatible Specifications



A	Phase U	C	Phase W
B	Phase V	D	FG (frame ground)

Manufacturer: Japan Aviation Electronics Industry, Ltd.

- Fan Connector



A	Fan motor	D	–
B	Fan motor	E	–
C	–	F	FG (frame ground)

Receptacle: MS3102A14S-6P
Applicable plug (not provided by Yaskawa)
Plug: MS3108B14S-6S
Cable clamp: MS3057-6A
Manufacturer: Japan Aviation Electronics Industry, Ltd.

Note:

The motor connector (receptacle) complies with RoHS Directives.

Contact each connector manufacturer for customer-prepared cable connectors that comply with RoHS Directives.

Dimensions of Servomotors with Batteryless Absolute Encoders (SGMXA-□□□W)

Model SGMXA-	L	LL	LP	KB2	Approx. Mass [kg]
A5AWA□□□□	88 (128.5)	63 (103.5)	–	–	0.4 (0.7)
01AWA□□□□	100 (140.5)	75 (115.5)	–	–	0.5 (0.8)
C2AWA□□□□	112 (160.5)	87 (135.5)	–	–	0.6 (0.9)
02AWA□□□□	106 (146.5)	76 (116.5)	–	–	0.9 (1.5)
04AWA□□□□	122.5 (163.0)	92.5 (133.0)	–	–	1.3 (1.9)
06AWA□□□□	144.5 (198.5)	114.5 (168.5)	–	–	1.7 (2.3)
08AWA□□□□	142.5 (189.5)	102.5 (149.5)	–	–	2.4 (3.0)
10AWA□□□□	167.5 (214.5)	127.5 (174.5)	–	–	3.2 (3.8)
15AWA□□□□	208 (249)	163 (204)	42 (42)	151 (192)	4.6 (6.0)
20AWA□□□□	224 (265)	179 (220)	42 (42)	167 (208)	5.4 (6.8)
25AWA□□□□	247 (298)	202 (253)	42 (42)	190 (241)	6.8 (8.7)
30AWA□□□□	263 (299)	200 (236)	42 (42)	188 (224)	10.5 (13)
40AWA□□□□	302 (338)	239 (275)	42 (42)	227 (263)	13.5 (16)
50AWA□□□□	342 (378)	279 (315)	42 (42)	267 (303)	16.5 (19)
70AWA□□□□	397	334	–	269	18.5

Note:

The values in parentheses are for servomotors with holding brakes.

Model Designations

SGMXG - 09 A W A 6 1 A 1

Σ-X-Series Servomotor SGMXG model

1 Rated Output

Code	1500-min^{-1} Specification	Code	1000-min^{-1} Specification
03	300 W	03	300 W
05	450 W	06	600 W
09	850 W	09	900 W
13	1.3 kW	12	1.2 kW
20	1.8 kW	20	2.0 kW
30	2.9 kW*1	30	3.0 kW
44	4.4 kW	40	4.0 kW
55	5.5 kW	55	5.5 kW
75	7.5 kW		
1A	11 kW		
1E	15 kW		

2 Power Supply Voltage

Code	Specification
A	200 VAC

3 Serial Encoder

Code	Specification
U	26-bit absolute encoder
W	26-bit batteryless absolute encoder

4 Design Revision Order

Code	Specification
A	1500-min^{-1} Specification
B	1000-min^{-1} Specification

5 Shaft End

Code	Specification
2	Straight without key (SGMXG-03A□A to 20A□A) (SGMXG-03A□B to 12A□B)
6	Straight with key and tap
8	With two flat seats (SGMXG-30A□A to 1EA□A) (SGMXG-20A□B to 55A□B)

6 Options

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

7 Destination

A

8 Ancillary Specification

Code	Specification
1	Standard
3	Safety encoder

*1 The rated output is 2.4 kW if you combine the SGMXG-30A□A with the SGDXS-200A.

Specifications and Ratings (200 V, 1500-min^{-1} Specification)

Specification

Voltage	200 V									
Model SGMXG-	03A□A 05A□A	09A□A	13A□A	20A□A	30A□A	44A□A	55A□A	75A□A	1AA□A	1EA□A
Time Rating	Continuous									
Thermal Class	UL: F, CE: F									
Insulation Resistance	500 VDC, 10 MΩ 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									

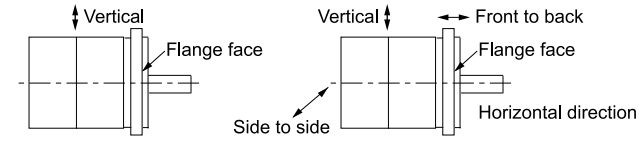
Continued on next page.

Continued from previous page.

Voltage		200 V									
Model SGMXG-		03A□A 05A□A	09A□A	13A□A	20A□A	30A□A	44A□A	55A□A	75A□A	1AA□A	1EA□A
Environmental Conditions	Surrounding Air Temperature	0°C to 40°C (60°C max.) *3									
	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 1000 m or less. (With derating, usage is possible between 1000 m and 2000 m.) *3 • 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)									
Impact Resistance *2	Impact Acceleration (at Flange)	490 m/s²									
	Number of Impacts	2 times									
Vibration Resistance *2	Vibration Acceleration (at Flange)	49 m/s² (24.5 m/s² front to back)						24.5 m/s²			
Applicable SERVOPACKs *4	SGDXS	3R8A	7R6A (120A) *4	120A (180A) *4	180A (200A) *4	330A (470A) *4	330A (550A) *4	470A (780A) *4	550A	590A	780A
	SGDXW	5R5A *5, 7R6A *5	7R6A	–							

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

*2 The given values are for when the servomotor shaft is mounted horizontally and impact 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 that is applied to the servomotor with the actual equipment.



Impact Applied to the Servomotor Vibration Applied to the Servomotor

*3 Refer to the following section for the derating rates.
☞ *Derating Rates on page 63*

*4 To increase the instantaneous maximum torque, use the SERVOPACK model in parentheses ( ).
Refer to the following section for the instantaneous maximum torque for individual SERVOPACK models.
☞ *Servomotor Ratings (SGMXG-03A□A to -20A□A) on page 56*
☞ *Servomotor Ratings (SGMXG-30A□A to -1EA□A) on page 58*
☞ *Torque-Rotation Speed Characteristics on page 60*

*5 If you use a servomotor together with a Σ-XW SERVOPACK, the control gain may not increase as much as with a Σ-XS SERVOPACK and other performances may be lower than those achieved with a Σ-XS SERVOPACK.

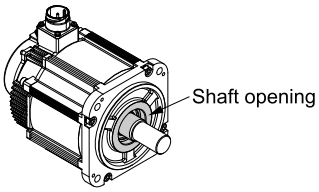
Servomotor Ratings (SGMXG-03A□A to -20A□A)

Voltage			200 V				
Model SGMXG-			03A□A	05A□A	09A□A	13A□A	20A□A
Rated Output *1		kW	0.3	0.45	0.85	1.3	1.8
Rated Torque *1, *2		N·m	1.96	2.86	5.39	8.34	11.5
Instantaneous Maximum Torque *1		N·m	5.88	8.92	14.2 20.0 *3	23.3 30.0 *4	28.7 35.4 *5
Rated Current *1		Arms	2.8	3.8	6.9	10.7	16.7
Instantaneous Maximum Current *1		Arms	8.0	11	17 28 *3	28 40 *4	42 56 *5
Rated Rotation Speed *1		min^{-1}	1500				
Continuous Allowable Rotation Speed		min^{-1}	4000				3000
Maximum Rotation Speed *1		min^{-1}	4000				
Torque Constant *1		N·m/Arms	0.776	0.854	0.859	0.891	0.748
Rotor Moment of Inertia *6	Without Holding Brakes	$\times 10^{-4}$ kg·m^2	2.48	3.33	13.9	19.9	26.0
	With Holding Brakes		2.73	3.58	16.0	22.0	28.1
Rated Power Rate *1	Without Holding Brakes	kW/s	15.5	24.6	20.9	35.0	50.9
	With holding brakes		14.1	22.9	18.2	31.6	47.1
Rated Angular Acceleration *1	Without Holding Brakes	rad/s^2	7900	8590	3880	4190	4420
	With Holding Brakes		7180	7990	3370	3790	4090
Heat Sink Size *7		mm	250 ×250 × 6 (aluminum)		400 × 400 × 20 (steel)		
Protective Structure *8			Totally enclosed, self-cooled, IP67				
Holding Brake Specification *9	Rated Voltage	V	24 VDC $^{+10\%}_{0}$				
	Capacity	W	10				
	Holding Torque	N·m	4.5		12.7	19.6	
	Coil Resistance	Ω (at 20°C)	56		59		
	Rated Current	A (at 20°C)	0.43		0.41		
	Time Required to Release Brake	ms	100				
	Time Required to Brake	ms	80				
Allowable Load Moment of Inertia (Rotor Moment of Inertia Ratio) *10	At 3000 min^{-1}		15 times		5 times		
	At 4000 min^{-1}		8.4 times		2 times		5 times
	With External Regenerative Resistor and External Dynamic Brake Resistor *11	At 3000 min^{-1}	15 times		10 times		
		At 4000 min^{-1}	8.4 times		8 times	9 times	7 times
Allowable Shaft Loads *12	LF	mm	40		58		
	Allowable Radial Load	N	490			686	980
	Allowable Thrust Load	N	98			343	392

*1 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 with an aluminum or steel heat sink of the dimensions given in the table.
*3 This is the value if you combine with the SERVOPACK SGDXS-120A.
*4 This is the value if you combine with the SERVOPACK SGDXS-180A.
*5 This is the value if you combine with the SERVOPACK SGDXS-200A.
*6 The values for the servomotors with batteryless absolute encoders (and holding brakes) are the same as those in the table.

*7 Refer to the following section for the relation between the heat sinks and derating rate.
☞ *Servomotor Heat Dissipation Conditions on page 63*

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



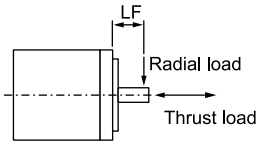
*9 Observe the following precautions if you use a servomotor with a holding brake.

- 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.

*10 The rotor moment of inertia scaling factor is the value for a standard servomotor without a holding brake.

*11 To externally connect a dynamic brake resistor, select hardware option specification 0020 for the SERVOPACK.

*12 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 Ratings (SGMXG-30A□A to -1EA□A)

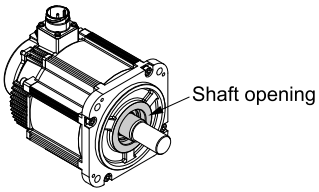
Voltage			200 V						
Model SGMXG-			30A□A	30A□A *3	44A□A	55A□A	75A□A	1AA□A	1EA□A
Rated Output *1		kW	2.9	(2.4)	4.4	5.5	7.5	11	15
Rated Torque *1, *2		N·m	18.6	(15.1)	28.4	35.0	48.0	70.0	95.4
Instantaneous Maximum Torque *1		N·m	54.0 66.8 *4	(45.1)	71.6 95.6 *5	102 134 *6	119	175	224
Rated Current *1		Arms	24.5	(19.6)	32.9	37.2	54.7	58.6	74.0
Instantaneous Maximum Current *1		Arms	71 92 *4	(56)	84 115 *5	110 149 *6	130	140	170
Rated Rotation Speed *1		min^{-1}	1500						
Continuous Allowable Rotation Speed		min^{-1}	3000					2000	
Maximum Rotation Speed *1		min^{-1}	4000					3000	
Torque Constant *1		N·m/Arms	0.826		0.932	1.02	0.957	1.38	1.44
Rotor Moment of Inertia *7	Without Holding Brakes	$\times10^{-4}$ kg·m^2	46.0		67.5	89.0	125	242	303
	With Holding Brakes		53.9		75.4	96.9	133	261	341
Rated Power Rate *1	Without Holding Brakes	kW/s	75.2	(49.6)	119	138	184	202	300
	With Holding Brakes		64.2	(42.3)	107	126	173	188	267
Rated Angular Acceleration *1	Without Holding Brakes	rad/s^2	4040	(3280)	4210	3930	3840	2890	3150
	With Holding Brakes		3450	(2800)	3770	3610	3610	2680	2800
Heat Sink Size *8		mm	550 × 550 × 30 (steel)					650 ×650 × 35 (steel)	
Protective Structure *9			Totally enclosed, self-cooled, IP67						
Holding Brake Specification *10	Rated Voltage	V	24 $VDC^{+10\%}_{0}$						
	Capacity	W	18.5			25		32	35
	Holding Torque	N·m	43.1			72.6		84.3	114.6
	Coil Resistance	Ω (at 20°C)	31			23		18	17
	Rated Current	A (at 20°C)	0.77			1.05		1.33	1.46
	Time Required to Release Brake	ms	170						250
	Time Required to Brake	ms	100			80			

Continued on next page.

Continued from previous page.

Voltage			200 V						
Model SGMXG-			30A□A	30A□A *3	44A□A	55A□A	75A□A	1AA□A	1EA□A
Allowable Load Moment of Inertia (Rotor Moment of Inertia Ratio) *11	At 2000 min-1		–					5 times	
	At 3000 min-1		5 times	3 times	5 times	5 times	5 times	2.2 times	1.5 times
	At 4000 min-1		4 times	2.2 times	2.4 times	3.5 times	2.2 times	–	
	With External Regenerative Resistor and External Dynamic Brake Resistor *12	At 2000 min-1	–					10 times	
		At 3000 min-1	10 times	7 times	10 times	10 times	10 times	4 times	2 times
		At 4000 min-1	5 times	4 times	5 times	5 times	4 times	–	
Allowable Shaft Loads *13	LF	mm	79			113		116	
	Allowable Radial Load	N	1470			1764			4998
	Allowable Thrust Load	N	490			588			2156

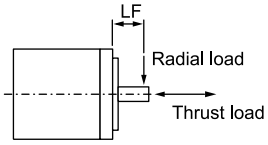
*1 These values are for operation in combination with a SERVOPACK when the temperature of the armature winding is 20°C. These are typical values.
*2 The rated torques are the continuous allowable torque values with an aluminum or steel heat sink of the dimensions given in the table.
*3 This is the value if you combine with the SERVOPACK SGDXS-200A.
The output of the servomotor will be limited by the rated current and maximum current of the SERVOPACK that is used. The load ratio is calculated based on the servomotor's rated current of 24.5 Arms. Use the servomotor with a load ratio of 80% or less.
*4 This is the value if you combine with the SERVOPACK SGDXS-470A.
*5 This is the value if you combine with the SERVOPACK SGDXS-550A.
*6 This is the value if you combine with the SERVOPACK SGDXS-780A.
*7 The values for the servomotors with batteryless absolute encoders (and holding brakes) are the same as those in the table.
*8 Refer to the following section for the relation between the heat sinks and derating rate.
☞ *Servomotor Heat Dissipation Conditions on page 63*
*9 This does not apply to the shaft opening. Protective structure specifications apply only when the special cable is used.



*10 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.

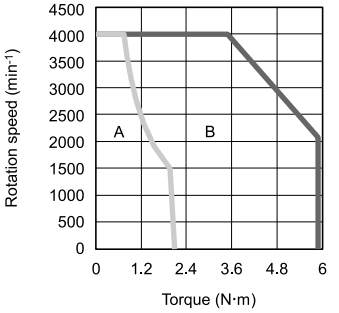
*11 The rotor moment of inertia scaling factor is the value for a standard servomotor without a holding brake.
*12 To externally connect a dynamic brake resistor, select hardware option specification 0020 for the SERVOPACK.
*13 Design the mechanical system so that the thrust and radial loads applied to the servomotor shaft end during operation do not exceed the values given in the table.



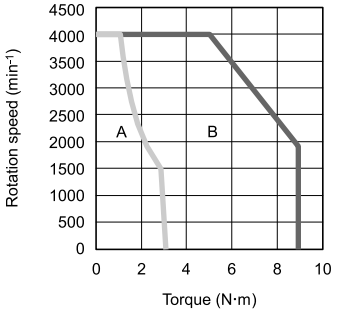
Torque-Rotation Speed Characteristics

A : Continuous duty zone ——— (solid lines): Three-phase, 200 V
B : Intermittent duty zone ····· (dotted lines): Single-phase, 200 V

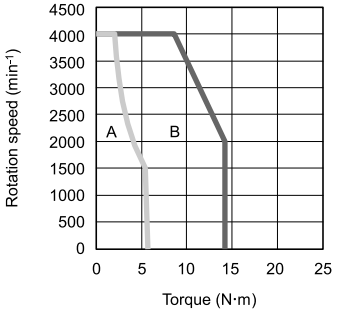
SGMXG-03A□A



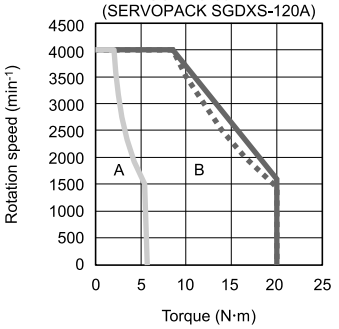
SGMXG-05A□A



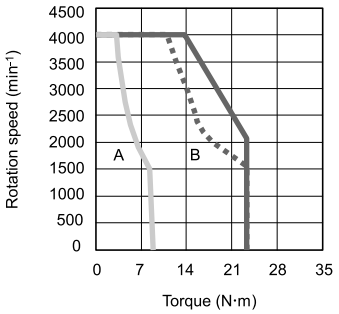
SGMXG-09A□A



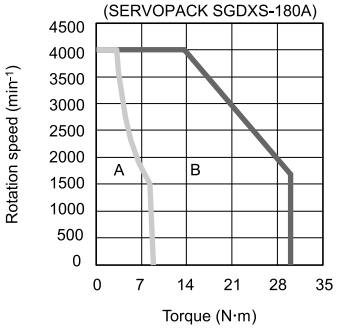
SGMXG-09A□A
(SERVOPACK SGDXS-120A)



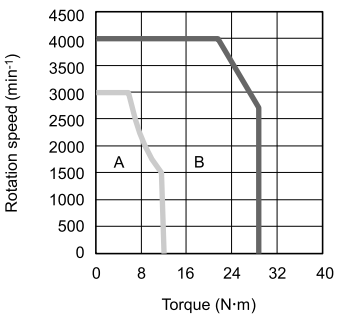
SGMXG-13A□A



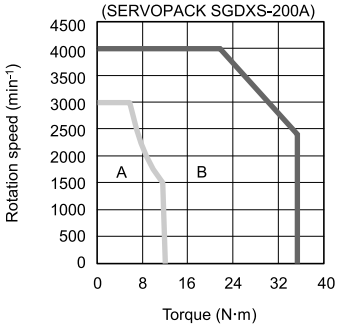
SGMXG-13A□A
(SERVOPACK SGDXS-180A)



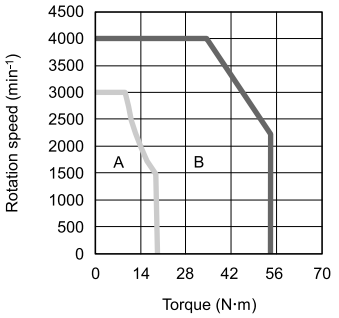
SGMXG-20A□A



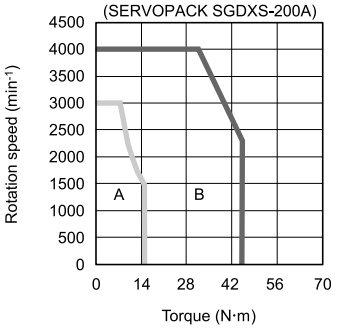
SGMXG-20A□A
(SERVOPACK SGDXS-200A)



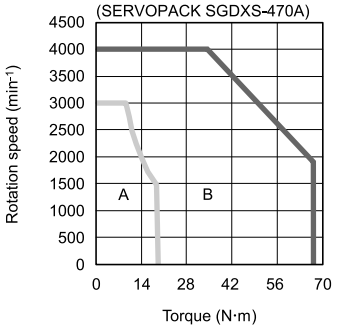
SGMXG-30A□A

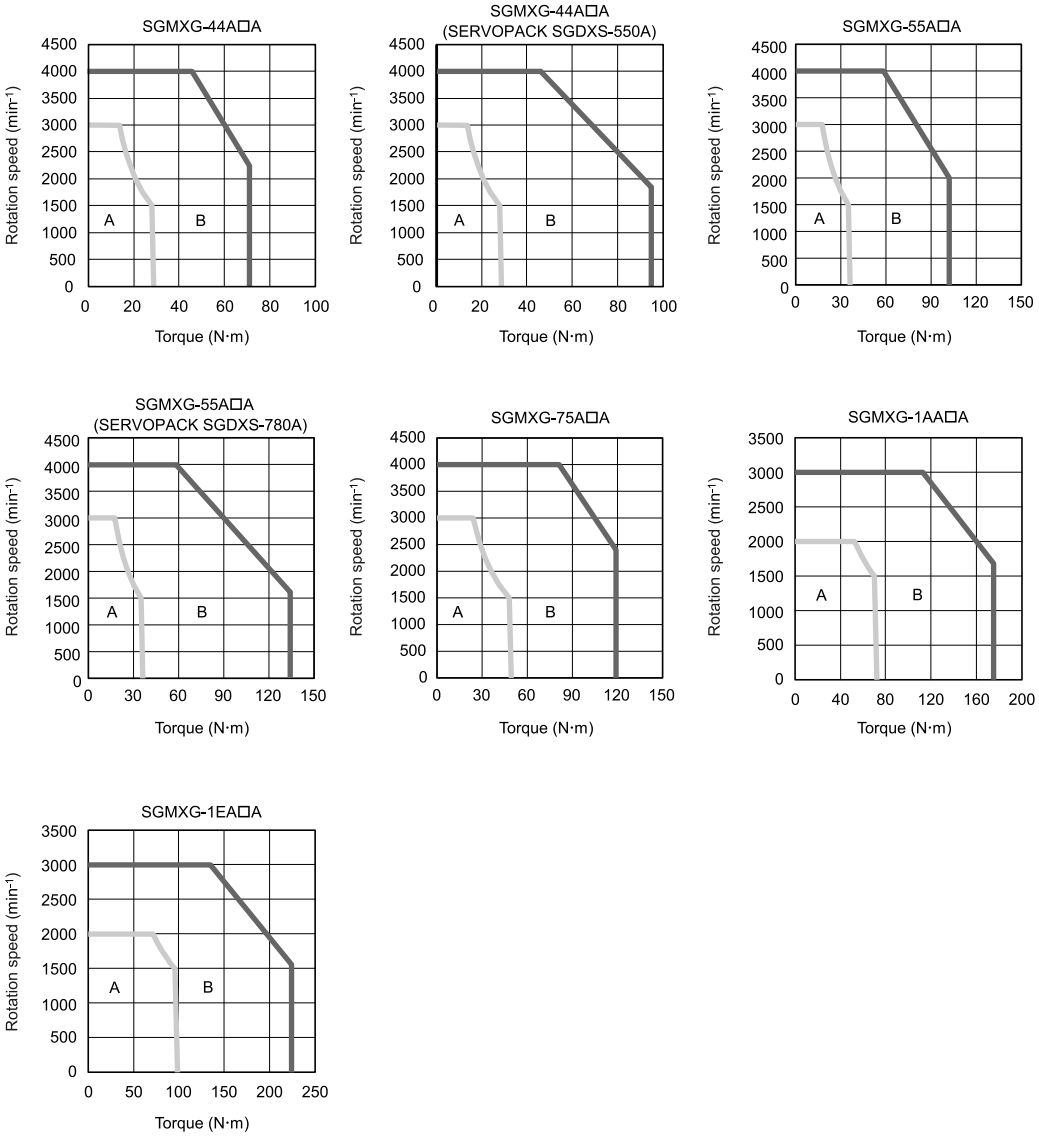


SGMXG-30A□A
(SERVOPACK SGDXS-200A)



SGMXG-30A□A
(SERVOPACK SGDXS-470A)





Note:

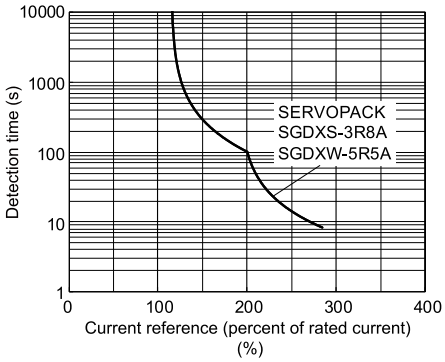
- These values (typical values) are for operation in combination with a SERVOPACK when the temperature of the armature winding is 20°C.
- The characteristics in the intermittent duty zone depend on the power supply voltage.
- If the effective torque is within the allowable range for the rated torque, the servomotor can be used within the intermittent duty zone.
- If you use a servomotor main circuit cable that exceeds 20 m, the intermittent duty zone in the torque-rotation speed characteristics will become smaller because the voltage drop increases.
- The SGMXG-09A□A and -13A□A can use a single-phase power input in combination with the SGDXS-120A□□A0008.

Servomotor Overload Protection Characteristics

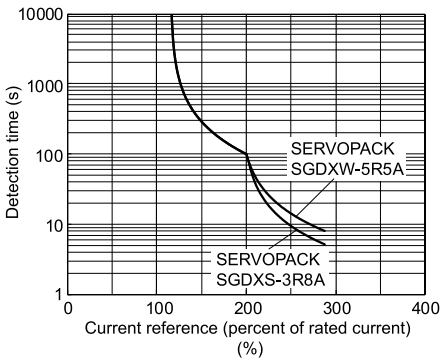
The overload detection level is set for hot start conditions with a servomotor surrounding air temperature of 40°C.

For the overload detection level, priority is given to the lower of the detection levels in the overload protection characteristics of the connected SERVOPACK and servomotor.

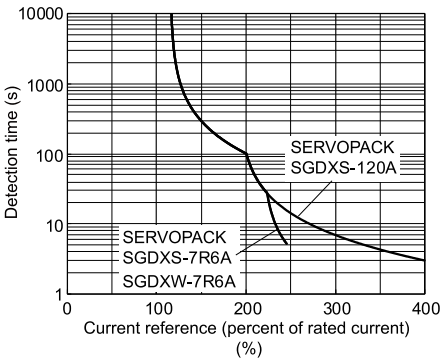
SGMXG-03A□A



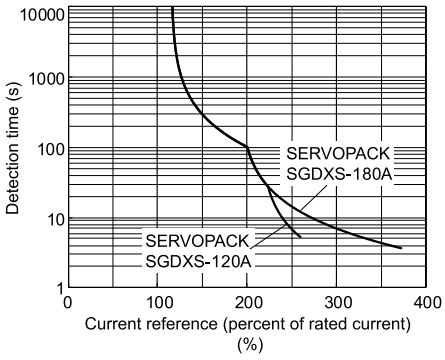
SGMXG-05□A



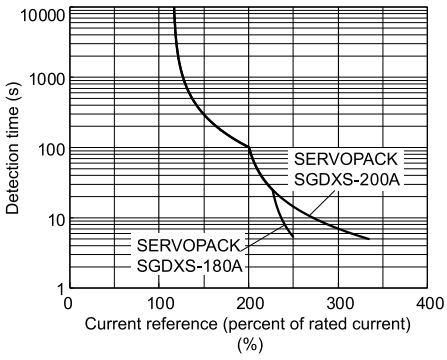
SGMXG-09□A



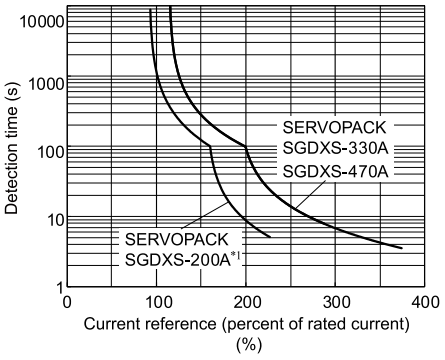
SGMXG-13A□A



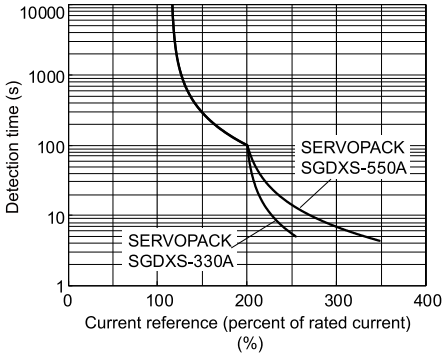
SGMXG-20A□A



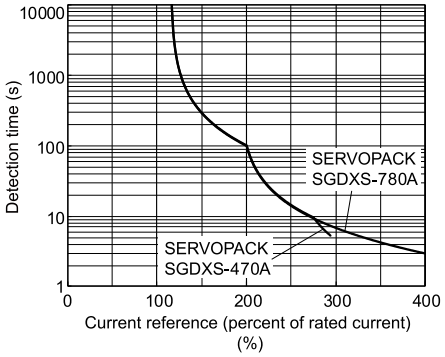
SGMXG-30A□A



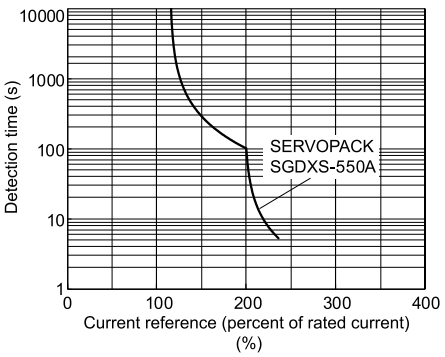
SGMXG-44A□A



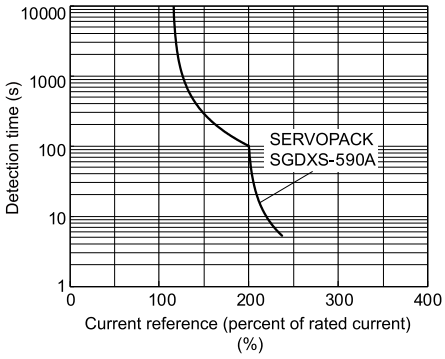
SGMXG-55A□A



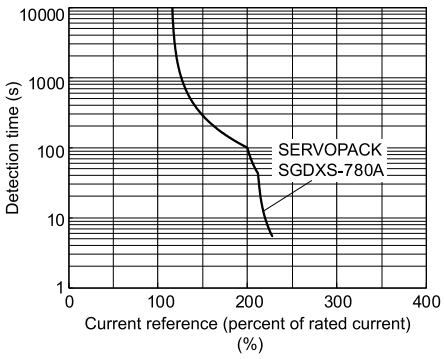
SGMXG-75A□A



SGMXG-1AA□A



SGMXG-1EA□A



*1 The current reference is calculated based on the servomotor's rated current of 24.5 Arms.

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-Rotation Speed Characteristics on page 60*".
- The value for the instantaneous maximum current / rated current (%) for each servomotor is taken as the current reference maximum value.

Allowable Load Moment of Inertia

The allowable load moments of inertia (motor moment of inertia ratios) for the servomotors are given in "*Servomotor Ratings (SGMXG-30A□A to -1EA□A) on page 58*" and "*Servomotor Ratings (SGMXG-30A□A to -1EA□A) on page 58*". The values are determined by the regenerative energy processing capacity of the SERVOPACK and are also affected by the drive conditions of the servomotor. Use the SigmaSize+ AC servo capacity selection program *1 to check the driving conditions. Perform the required steps for each of the following cases.

*1 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 the following section for the regenerative power (W) that can be processed by the SERVOPACKs.

☞ *Specifications of Built-in Regenerative Resistors in SERVOPACKs on page 478*

Install an external regenerative resistor when the built-in regenerative resistor cannot process all of the regenerative power.

■ When an External Regenerative Resistor Is Required

Install the external regenerative resistor which is selected with the SigmaSize+. Contact your Yaskawa representative for information on SigmaSize+.

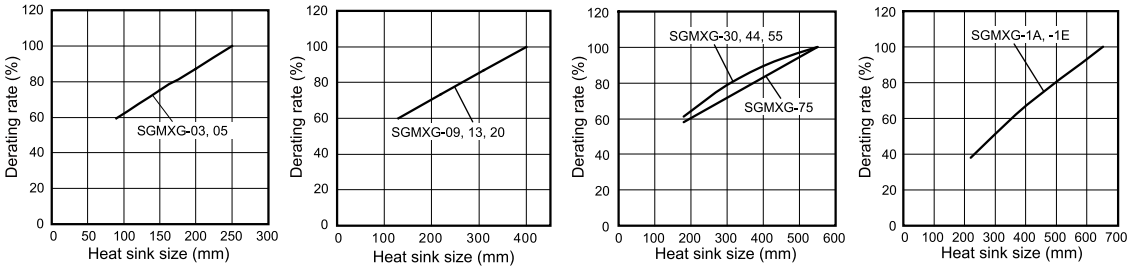
Refer to the following section for details on the external regenerative resistors.

☞ *Specifications and Dimensions of External Regenerative Resistors on page 479*

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.



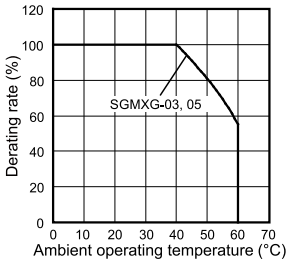
Important

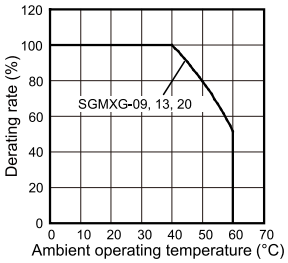
The actual temperature rise depends on the following conditions. Always check the servomotor temperature with the actual equipment.

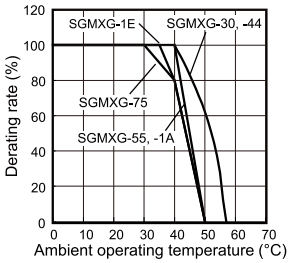
- How the heat sink (the servomotor mounting section) is attached to the installation surface
- Status between heat sink and servomotor (sealant, reduction gear, etc.)
- What material is used for the servomotor mounting section
- Servomotor rotation speed

■ Servomotor Derating Rates for Surrounding Air Temperature

Apply a suitable derating rate from the following graphs according to the surrounding air temperature of the servomotor (60° C max.).

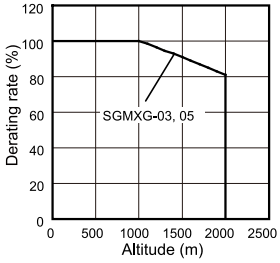


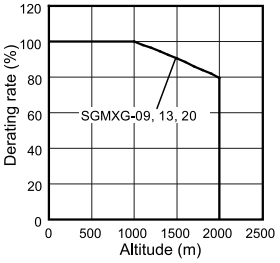


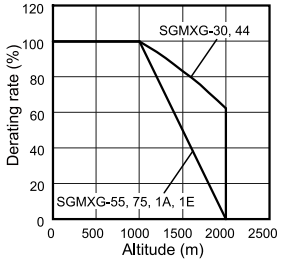


■ Applications Where the Altitude Exceeds 1000 m

The servomotor ratings are the continuous allowable values at an altitude of 1000 m or less. If you use a servomotor at an altitude that exceeds 1000 m (2000 m max.), the heat dissipation effect of the air is reduced. Apply the appropriate derating rate from the following graphs.







Note:

- 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 on page 61*".
- Use the combination of the SERVOPACK and servomotor so that the derating conditions are satisfied for both the SERVOPACK and servomotor.
- The derating rates are applicable only when the average rotation speed is less than or equal to the rated rotation speed. If the average rotation speed exceeds the rated rotation speed, consult with your Yaskawa representative.

Specifications and Ratings (200 V, 1000-min^{-1} Specification)

Specification

Voltage	200 V							
Model SGMXG-	03A□B	06A□B	09A□B	12A□B	20A□B	30A□B	40A□B	55A□B
Time Rating	Continuous							
Thermal Class	UL: F, CE: F							
Insulation Resistance	500 VDC, 10 MΩ 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							

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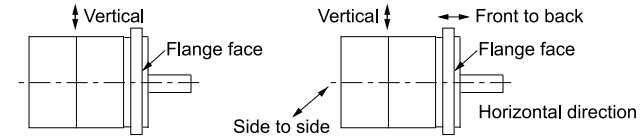
Voltage		200 V							
Model SGMXG-		03A□B	06A□B	09A□B	12A□B	20A□B	30A□B	40A□B	55A□B
Environmental Conditions	Surrounding Air Temperature	0°C to 40°C (60°C max.) *3							
	Surrounding Air Humidity	20% to 80% relative humidity (with no condensation)							
	Installation Site	• Must be indoors and free 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 1000 m or less. (With derating, usage is possible between 1000 m and 2000 m.) *3 • 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)							
Impact Resistance *2	Impact Acceleration (at Flange)	490 m/s²							
	Number of Impacts	2 times							
Vibration Resistance *2	Vibration Acceleration (at Flange)	49 m/s² (24.5 m/s² front to back)						24.5 m/s²	
Applicable SERVOPACKs	SGDXS	3R8A	5R5A	7R6A	120A	180A (200A) *4	200A	330A	470A
	SGDXW	5R5A *5	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 rotation speed.

*2 The given values are for when the servomotor shaft is mounted horizontally and impact 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 that is applied to the servomotor with the actual equipment.



Impact Applied to the Servomotor Vibration Applied to the Servomotor

*3 Refer to the following section for the derating rates.
☞ *Derating Rates on page 63*

*4 To increase the instantaneous maximum torque, use the SERVOPACK model in parentheses ( ).
Refer to the following section for the instantaneous maximum torque for individual SERVOPACK models.
☞ *Servomotor Ratings on page 66*
☞ *Torque-Rotation Speed Characteristics on page 68*

*5 If you use a servomotor together with a Σ-XW SERVOPACK, the control gain may not increase as much as with a Σ-XS SERVOPACK and other performances may be lower than those achieved with a Σ-XS SERVOPACK.

Servomotor Ratings

Voltage			200 V							
Model SGMXG-			03A□B	06A□B	09A□B	12A□B	20A□B	30A□B	40A□B	55A□B
Rated Output *1		kW	0.3	0.6	0.9	1.2	2.0	3.0	4.0	5.5
Rated Torque *1, *2		N·m	2.86	5.68	8.62	11.5	19.1	28.4	38.2	52.6
Instantaneous Maximum Torque *1		N·m	7.17	20.2	24.5	33.5	58 67 *3	86	121	169
Rated Current *1		Arms	3.0	4.4	5.7	9.2	12.7	17.7	24.9	32.2
Instantaneous Maximum Current *1		Arms	7.3	16.9	17	28	42 50.6 *3	56	82	110
Rated Rotation Speed *1		min^{-1}	1000							
Continuous Allowable Rotation Speed *1		min^{-1}	2000							
Maximum Rotation Speed *1		min^{-1}	2000							
Torque Constant *1		N·m/Arms	1.05	1.41	1.64	1.36	1.57	1.7	1.65	1.71
Rotor Moment of Inertia *4	Without Holding Brakes	$\times 10^{-4}$ $kg \cdot m^2$	3.33	13.9	19.9	26	46	67.5	89	125
	With Holding Brakes		3.58	16	22	28.1	53.9	75.4	96.9	133
Rated Power Rate *1	Without Holding Brakes	kW/s	24.6	23.2	37.3	50.9	79.3	119	164	221
	With Holding Brakes		22.9	20.2	33.8	47.1	67.7	107	150.6	208
Rated Angular Acceleration *1	Without Holding Brakes	rad/s^2	8590	4090	4330	4420	4150	4210	4290	4210
	With Holding Brakes		7990	3550	3920	4090	3540	3770	3940	3950
Heat Sink Size *5		mm	250 ×250 × 6 (alumi-num)	400 × 400 × 20 (steel)			550 × 550 × 30 (steel)			
Protective Structure *6			Totally enclosed, self-cooled, IP67							
Holding Brake Specification *7	Rated Voltage	V	24 $VDC^{+10\%}_{0}$							
	Capacity	W	10				18.5		25	
	Holding Torque	N·m	4.5	12.7	19.6		43.1		72.6	
	Coil Resistance	Ω (at 20° C)	56	59			31		23	
	Rated Current	A (at 20° C)	0.43	0.41			0.77		1.05	
	Time Required to Release Brake	ms	100				170			
	Time Required to Brake	ms	80				100		80	
Allowable Load Moment of Inertia (Rotor Moment of Inertia Ratio) *8	Without External Devices		18 times	11 times	7.5 times	8.3 times	11 times	7.3 times	8.3 times	10 times
	With External Regenerative Resistor and External Dynamic Brake Resistor *9		18 times	11 times	18 times	18 times	13 times	12 times	16 times	14 times

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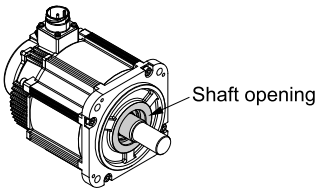
Voltage			200 V							
Model SGMXG-			03A□B	06A□B	09A□B	12A□B	20A□B	30A□B	40A□B	55A□B
Allowable Shaft Loads *10	LF		40	58			79		113	
	Allowable Radial Load	N	490		686	980	1470		1764	
	Allowable Thrust Load	N	98		343	392	490		588	

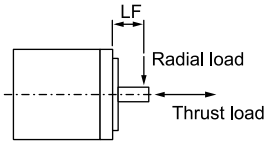
*1 These values are for operation in combination with a SERVOPACK when the temperature of the armature winding is 20°C. These are typical values.
*2 The rated torques are the continuous allowable torque values with an aluminum or steel heat sink of the dimensions given in the table.
*3 This is the value if you combine with the SERVOPACK SGDXS-200A.
*4 The values for the servomotors with batteryless absolute encoders (and holding brakes) are the same as those in the table.
*5 Refer to the following section for the relation between the heat sinks and derating rate.
☞ *Servomotor Heat Dissipation Conditions on page 63*
*6 This does not apply to the shaft opening. Protective structure specifications apply only when the special cable is used.



*7 Observe the following precautions if you use a servomotor with a holding brake.

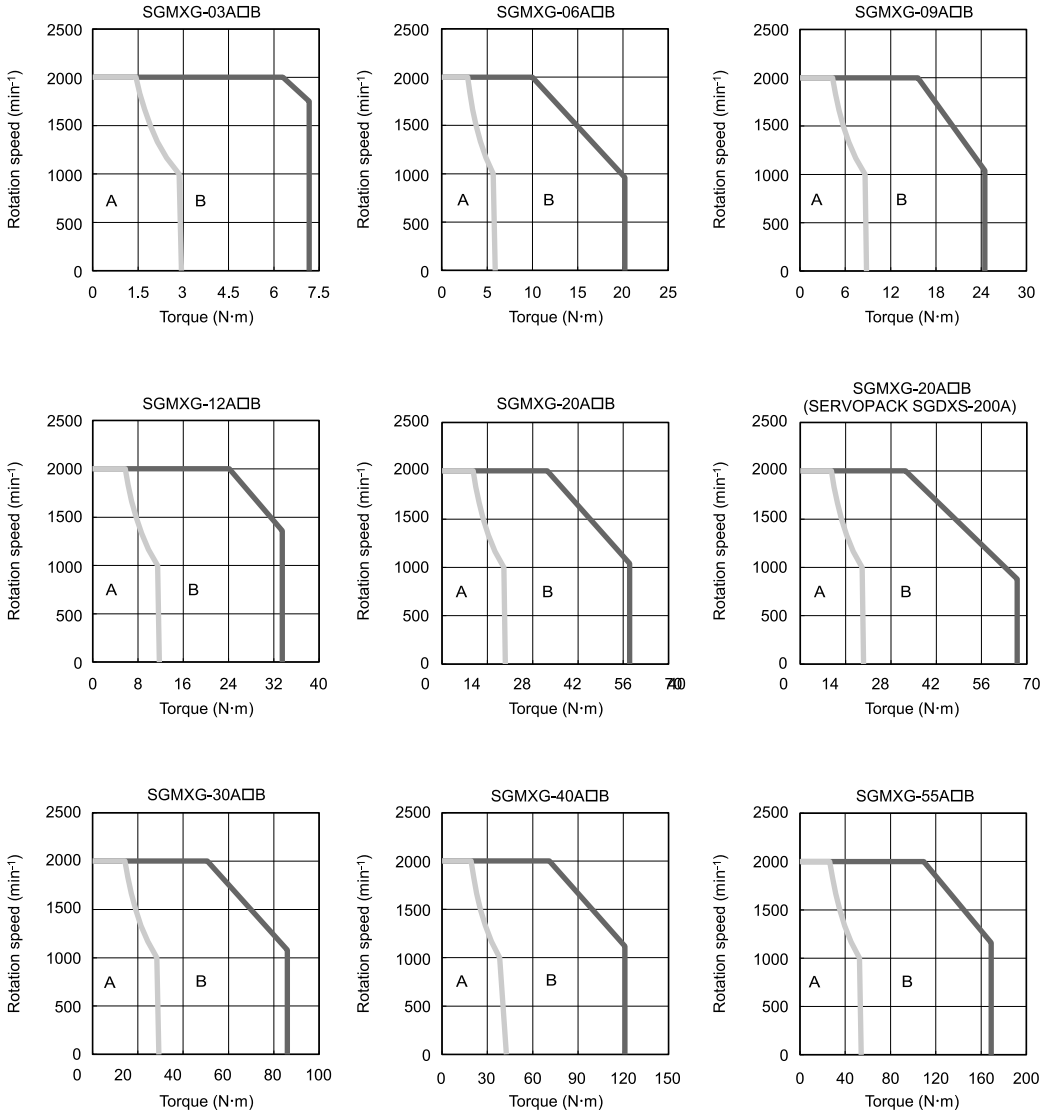
- The holding brake cannot be used to stop the servomotor.
- The time required to release the brake and the time required to brake depend on which discharge circuit is used. Confirm that the operation delay time is appropriate for the actual equipment.
- The 24-VDC power supply is not provided by Yaskawa.

*8 The rotor moment of inertia scaling factor is the value for a standard servomotor without a holding brake.
*9 To externally connect a dynamic brake resistor, select hardware option specification 0020 for the SERVOPACK.
*10 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-Rotation Speed Characteristics

A : Continuous duty zone ——— (solid lines): Three-phase, 200 V
B : Intermittent duty zone ····· (dotted lines): Single-phase, 200 V



Note:

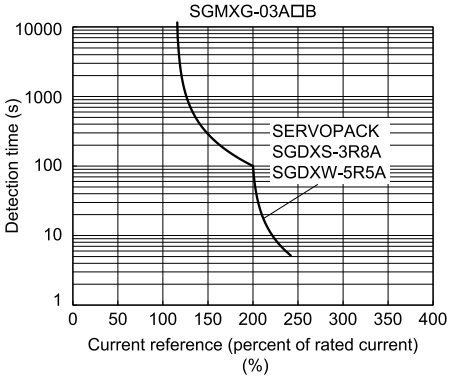
- These values (typical values) are for operation in combination with a SERVOPACK when the temperature of the armature winding is 20°C.
- The characteristics in the intermittent duty zone depend on the power supply voltage.
- If the effective torque is within the allowable range for the rated torque, the servomotor can be used within the intermittent duty zone.
- If you use a servomotor main circuit cable that exceeds 20 m, the intermittent duty zone in the torque-rotation speed characteristics will become smaller because the voltage drop increases.

Servomotor Overload Protection Characteristics

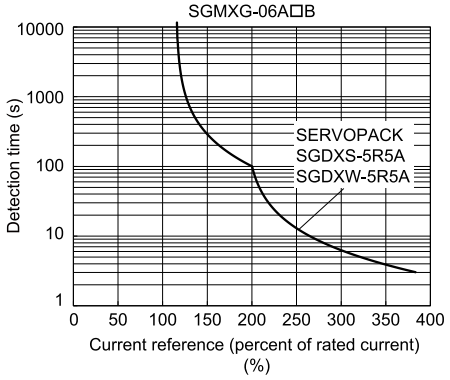
The overload detection level is set for hot start conditions with a servomotor surrounding air temperature of 40°C.

For the overload detection level, priority is given to the lower of the detection levels in the overload protection characteristics of the connected SERVOPACK and servomotor.

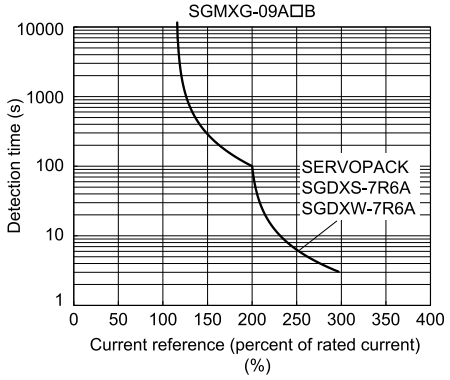
SGMXG-03A□B



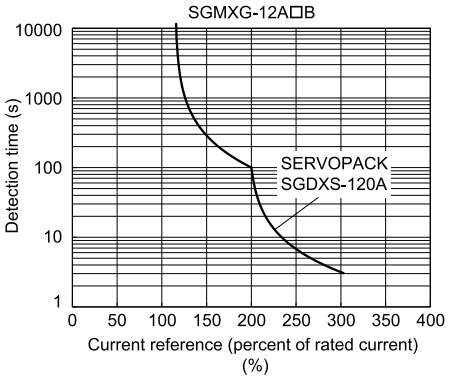
SGMXG-06A□B



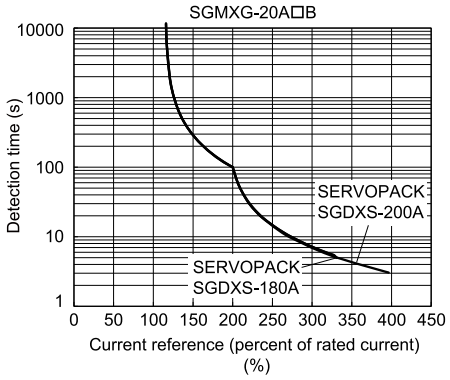
SGMXG-09A□B



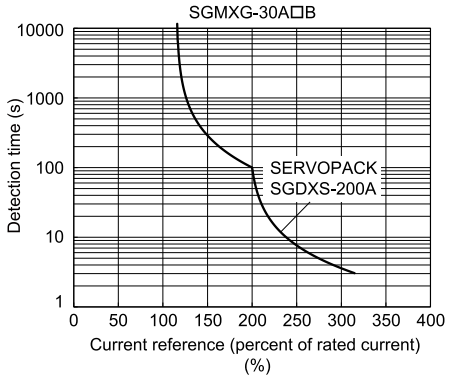
SGMXG-12A□B



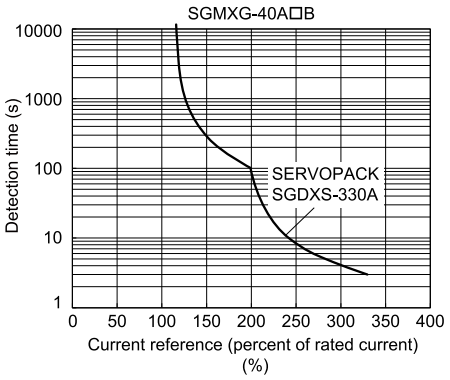
SGMXG-20A□B



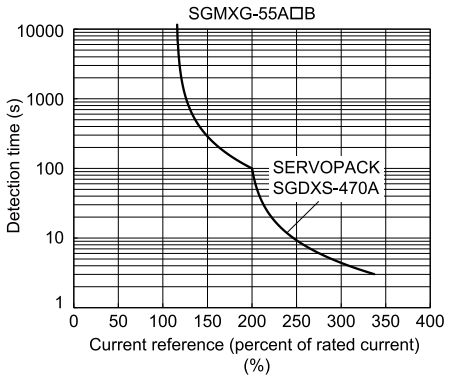
SGMXG-30A□B



SGMXG-40A□B



SGMXG-55A□B



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-Rotation Speed Characteristics on page 68*".
- The value for the instantaneous maximum current / rated current (%) for each servomotor is taken as the current reference maximum value.

Allowable Load Moment of Inertia

The allowable load moments of inertia (rotor moment of inertia ratios) for the servomotors are given in "*Servomotor Ratings on page 66*". 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.

■ 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 rotation 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 the following catalog for the regenerative power (W) that can be processed by the SERVOPACKs.

AC Servo Drives Σ-X Series (Document No.: KAEP C710812 03)

Install an external regenerative resistor when the built-in regenerative resistor cannot process all of the regenerative power.

■ When an External Regenerative Resistor Is Required

Install the external regenerative resistor.

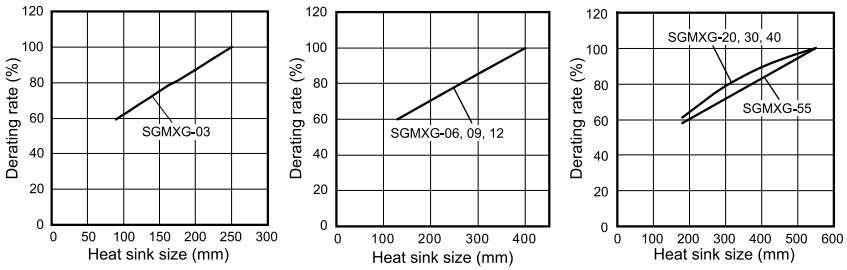
Refer to the following catalog for details on external regenerative resistors.

AC Servo Drives Σ-X Series (Document No.: KAEP C710812 03)

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.



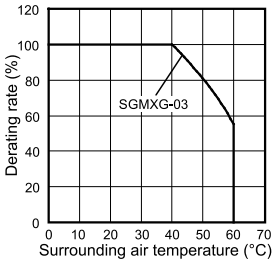
Important

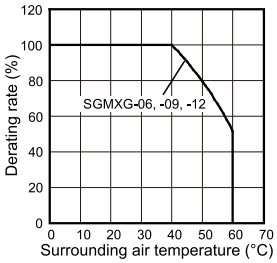
The actual temperature rise depends on the following conditions. Always check the servomotor temperature with the actual equipment.

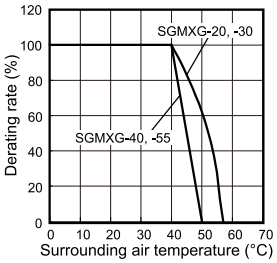
- How the heat sink (the servomotor mounting section) is attached to the installation surface
- Status between heat sink and servomotor (sealant, reduction gear, etc.)
- What material is used for the servomotor mounting section
- Servomotor rotation speed

■ Servomotor Derating Rates for Surrounding Air Temperature

Apply a suitable derating rate from the following graphs according to the surrounding air temperature of the servomotor (60° C max.).

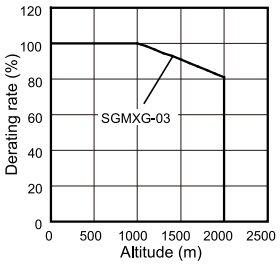


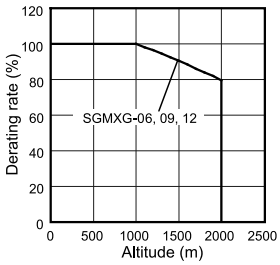


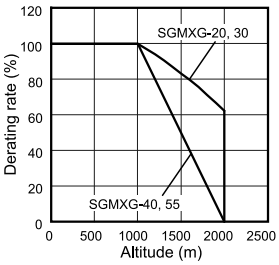


■ Applications Where the Altitude Exceeds 1000 m

The servomotor ratings are the continuous allowable values at an altitude of 1000 m or less. If you use a servomotor at an altitude that exceeds 1000 m (2000 m max.), the heat dissipation effect of the air is reduced. Apply the appropriate derating rate from the following graphs.







Note:

- 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 on page 69*".
- Use the combination of the SERVOPACK and servomotor so that the derating conditions are satisfied for both the SERVOPACK and servomotor.
- The derating rates are applicable only when the average rotation speed is less than or equal to the rated rotation speed. If the average rotation speed exceeds the rated rotation speed, consult with your Yaskawa representative.

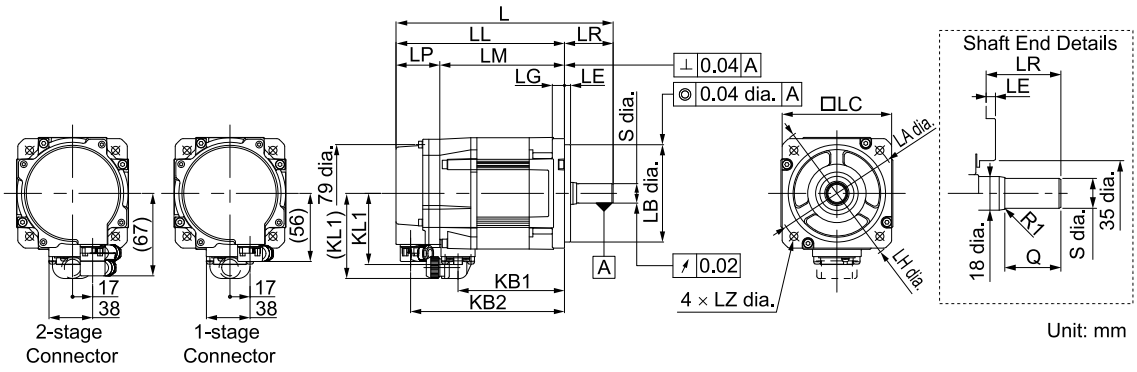
External Dimensions (200 V Specification)

SGMXG-03A□A, -05A□A, -03A□B

■ Servomotors without Holding Brakes

◆ Standard Specification

Information Models with the additional specification "3 Standard (Functional Safety-Compatible Encoder)" have the same dimensions as those indicated below.



Model SGMXG-	L *1	LL *1	LM	LP *1	LR	KB1	KB2 *1	KL1 (KL1)
03A□A21A□	164	124	90	34	40	75	112	59 (70)
05A□A21A□	177	137	103	34	40	88	125	59 (70)
03A□B21A□	177	137	103	34	40	88	125	59 (70)

Model SGMXG-	Flange Dimensions							Shaft End Dimensions		Approx. Mass [kg]
	LA	LB	LC	LE	LG	LH	LZ	S	Q	
03A□A21A□	100	$80^{0}_{-0.030}$	90	5	10	120	6.6	$16^{0}_{-0.011}$	30	2.6
05A□A21A□	100	$80^{0}_{-0.030}$	90	5	10	120	6.6	$16^{0}_{-0.011}$	30	3.2
03A□B21A□	100	$80^{0}_{-0.030}$	90	5	10	120	6.6	$16^{0}_{-0.011}$	30	3.2

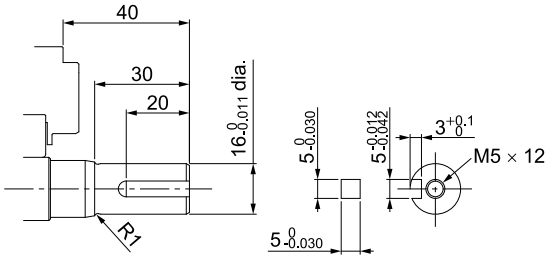
*1 For models that have a batteryless absolute encoder (SGMX□-□□□W), L, LL, LP, and KB2 are 8 mm greater than the given value. Refer to the following section for the values for individual models.
☞ *Dimensions of Servomotors with Batteryless Absolute Encoders (SGMXG-□□□W) on page 89*

Note:

1. The dimensions are same for models with oil seals.
2. The values for a straight shaft end without key specification are given. Refer to the information given below for other shaft end specifications.
☞ *Shaft End Specification on page 72*

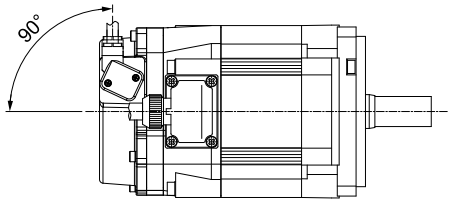
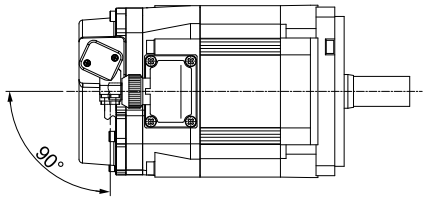
◆ Shaft End Specification

- Straight with Key and Tap



◆ Connector Specifications

- Encoder Connector (26-bit Encoder): Standard Specification
  The encoder cable is installed in the following direction.

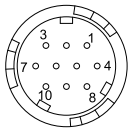
Cable Installed toward Left Side	Cable Installed toward Right Side
	

For details on selecting cables, refer to the following section and manual.

☞ *Cables for the SGMXG Servomotors on page 102*

🕮 Σ-X-Series Peripheral Device Selection Manual (Manual No.: SIEP C710812 12)

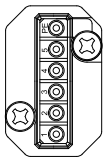
- Encoder Connector (26-bit Encoder): Σ-7 Compatible Specification



1	PS	6 *1	BAT(+)
2	/PS	7	–
3	–	8	–
4	PG5V	9	PG0V
5	BAT(-)	10	FG (frame ground)

*1 A battery is required only for an absolute encoder.
Receptacle: CMV1-R10P
Applicable plug (not provided by Yaskawa)
Plug: CM10-AP10S-□-D (R1) (right-angle type), CM10-SP10S-□-D (R1) (straight), CMV1-AP10S-□□ (right-angle type), CMV1-SP10S-□□ (straight), CMV1S-AP10S-□□ (right-angle type), CMV1S-SP10S-□□ (straight)
(□ varies depending on the applicable cable size.)
Manufacturer: Fujikura Ltd.

- Servomotor Connector: Same for both Standard Specifications and Σ-7 Compatible Specifications



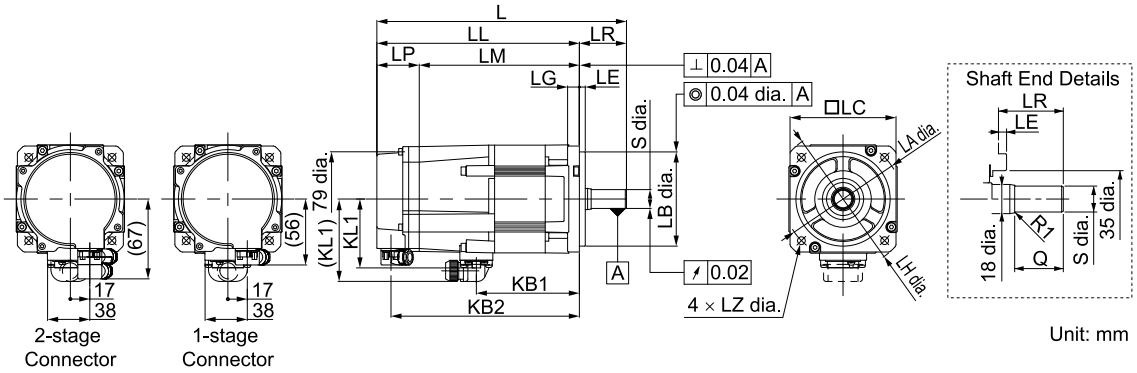
PE	FG (frame ground)	3	Phase U
5	–	2	Phase V
4	–	1	Phase W

Manufacturer: Japan Aviation Electronics Industry, Ltd.

■ Servomotors with Holding Brakes

◆ Standard Specification

Information Models with the additional specification “3 Standard (Functional Safety-Compatible Encoder)” have the same dimensions as those indicated below.



Model SGMXG-	L *1	LL *1	LM	LP *1	LR	KB1	KB2 *1	KL1 (KL1)
03A□A2CA□	197	157	123	34	40	75	145	59 (70)
05A□A2CA□	210	170	136	34	40	88	158	59 (70)
03A□B2CA□	210	170	136	34	40	88	158	59 (70)

Model SGMXG-	Flange Dimensions							Shaft End Dimensions		Approx. Mass [kg]
	LA	LB	LC	LE	LG	LH	LZ	S	Q	
03A□A2CA□	100	$80^{0}_{-0.030}$	90	5	10	120	6.6	$16^{0}_{-0.011}$	30	3.6
05A□A2CA□	100	$80^{0}_{-0.030}$	90	5	10	120	6.6	$16^{0}_{-0.011}$	30	4.2
03A□B2CA□	100	$80^{0}_{-0.030}$	90	5	10	120	6.6	$16^{0}_{-0.011}$	30	4.2

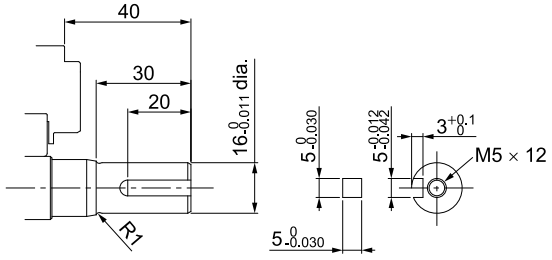
*1 For models that have a batteryless absolute encoder (SGMX□-□□□W), L, LL, LP, and KB2 are 8 mm greater than the given value. Refer to the following section for the values for individual models.
☞ *Dimensions of Servomotors with Batteryless Absolute Encoders (SGMXG-□□□W) on page 89*

Note:

1. The dimensions are same for models with oil seals.
2. The values for a straight shaft end without key specification are given. Refer to the information given below for other shaft end specifications.
☞ *Shaft End Specification on page 74*

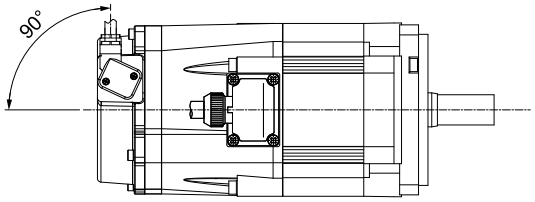
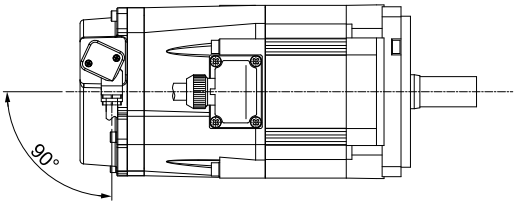
◆ Shaft End Specification

- Straight with Key and Tap



◆ Connector Specifications

- Encoder Connector (26-bit Encoder): Standard Specification
  The encoder cable is installed in the following direction.

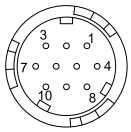
Cable Installed toward Left Side	Cable Installed toward Right Side
	

For details on selecting cables, refer to the following section and manual.

☞ *Cables for the SGMXG Servomotors on page 102*

Σ-X-Series Peripheral Device Selection Manual (Manual No.: SIEP C710812 12)

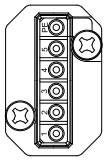
- Encoder Connector (26-bit Encoder): Σ-7 Compatible Specification



1	PS	6 *1	BAT(+)
2	/PS	7	–
3	–	8	–
4	PG5V	9	PG0V
5	BAT(-)	10	FG (frame ground)

*1 A battery is required only for an absolute encoder.
Receptacle: CMV1-R10P
Applicable plug (not provided by Yaskawa)
Plug: CM10-AP10S-□-D (R1) (right-angle type), CM10-SP10S-□-D (R1) (straight), CMV1-AP10S-□□ (right-angle type), CMV1-SP10S-□□ (straight), CMV1S-AP10S-□□ (right-angle type), CMV1S-SP10S-□□ (straight)
(□ varies depending on the applicable cable size.)
Manufacturer: Fujikura Ltd.

- Servomotor Connector: Same for both Standard Specifications and Σ-7 Compatible Specifications



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

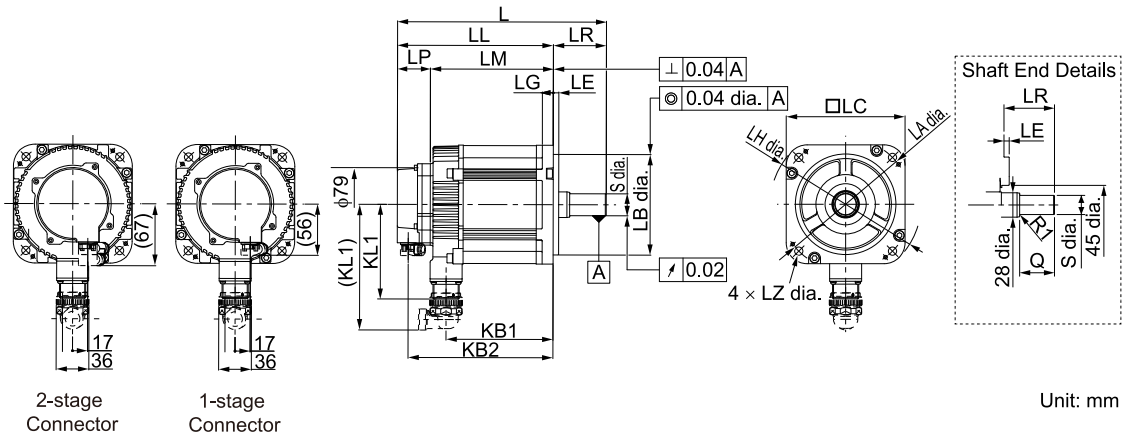
Manufacturer: Japan Aviation Electronics Industry, Ltd.

SGMXG-09A□A to -20A□A, -06A□B to -12A□B

■ Servomotors without Holding Brakes

◆ Standard Specification

Information Models with the additional specification "3 Standard (Functional Safety-Compatible Encoder)" have the same dimensions as those indicated below.



2-stage Connector

1-stage Connector

Unit: mm

Model SGMXG-	L *1	LL *1	LM	LP *1	LR	KB1	KB2 *1	KL1 (KL1 *2)
09A□A21A□	193	135	101	34	58	83	123	104 (138)
13A□A21A□	209	151	117	34	58	99	139	104 (138)
20A□A21A□	227	169	135	34	58	117	157	104 (138)
06A□B21A□	193	135	101	34	58	83	123	104 (138)
09A□B21A□	209	151	117	34	58	99	139	104 (138)
12A□B21A□	227	169	135	34	58	117	157	104 (138)

Model SGMXG-	Flange Dimensions							Shaft End Dimensions		Approx. Mass [kg]
	LA	LB	LC	LE	LG	LH	LZ	S	Q	
09A□A21A□	145	$110^{0}_{-0.035}$	130	6	12	165	9	$24^{0}_{-0.013}$	40	5.5
13A□A21A□	145	$110^{0}_{-0.035}$	130	6	12	165	9	$24^{0}_{-0.013}$	40	7.1
20A□A21A□	145	$110^{0}_{-0.035}$	130	6	12	165	9	$24^{0}_{-0.013}$	40	8.6
06A□B21A□	145	$110^{0}_{-0.035}$	130	6	12	165	9	$24^{0}_{-0.013}$	40	5.5
09A□B21A□	145	$110^{0}_{-0.035}$	130	6	12	165	9	$24^{0}_{-0.013}$	40	7.1
12A□B21A□	145	$110^{0}_{-0.035}$	130	6	12	165	9	$24^{0}_{-0.013}$	40	8.6

*1 For models that have a batteryless absolute encoder (SGMX□-□□□W), L, LL, LP, and KB2 are 8 mm greater than the given value. Refer to the following section for the values for individual models.
☞ *Dimensions of Servomotors with Batteryless Absolute Encoders (SGMXG-□□□W) on page 89*

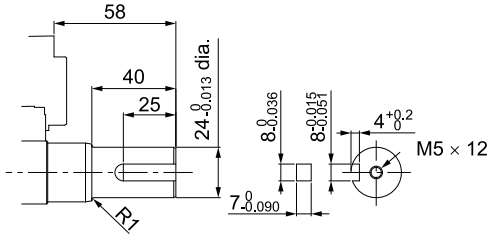
*2 These are the values when the flexible connectors are connected.

Note:

1. The dimensions are same for models with oil seals.
2. The values for a straight shaft end without key specification are given. Refer to the information given below for other shaft end specifications.
☞ *Shaft End Specification on page 76*

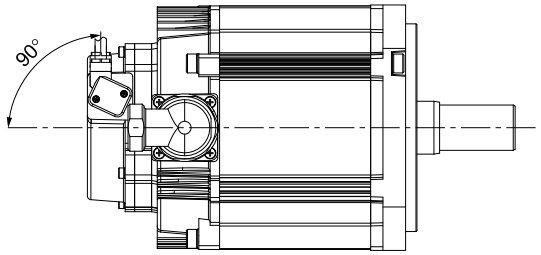
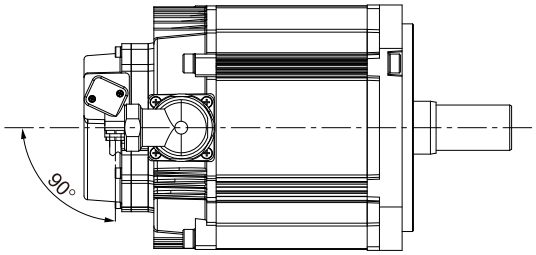
◆ Shaft End Specification

- Straight with Key and Tap



◆ Connector Specifications

- Encoder Connector (26-bit Encoder): Standard Specification
  The encoder cable is installed in the following direction.

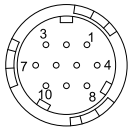
Cable Installed toward Left Side	Cable Installed toward Right Side
	

For details on selecting cables, refer to the following section and manual.

☞ *Cables for the SGMXG Servomotors on page 102*

Σ-X-Series Peripheral Device Selection Manual (Manual No.: SIEP C710812 12)

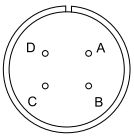
- Encoder Connector (26-bit Encoder): Σ-7 Compatible Specification



1	PS	6 *1	BAT(+)
2	/PS	7	–
3	–	8	–
4	PG5V	9	PG0V
5	BAT(-)	10	FG (frame ground)

*1 A battery is required only for an absolute encoder.
Receptacle: CMV1-R10P
Applicable plug (not provided by Yaskawa)
Plug: CM10-AP10S-□-D (R1) (right-angle type), CM10-SP10S-□-D (R1) (straight), CMV1-AP10S-□□ (right-angle type), CMV1-SP10S-□□ (straight), CMV1S-AP10S-□□ (right-angle type), CMV1S-SP10S-□□ (straight)
(□ varies depending on the applicable cable size.)
Manufacturer: Fujikura Ltd.

- Servomotor Connector: Same for both Standard Specifications and Σ-7 Compatible Specifications



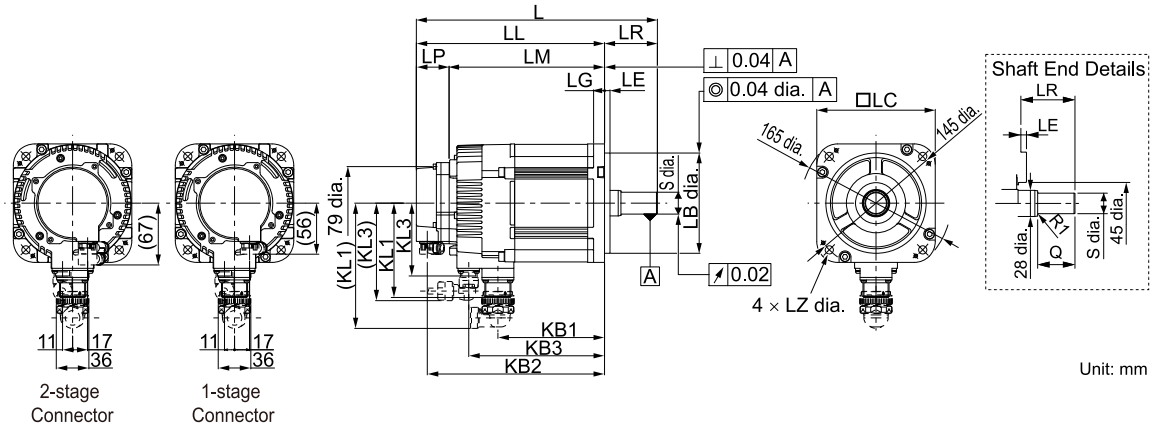
A	Phase U	C	Phase W
B	Phase V	D	FG (frame ground)

Manufacturer: Japan Aviation Electronics Industry, Ltd.

■ Servomotors with Holding Brakes

◆ Standard Specification

Information Models with the additional specification "3 Standard (Functional Safety-Compatible Encoder)" have the same dimensions as those indicated below.



Model SGMXG-	L *1	LL *1	LM	LP *1	LR	KB1	KB2 *1	KB3	KL1 (KL1 *2)	KL3 (KL3 *2)
09A□A2CA□	229	171	137	34	58	83	159	115	104 (138)	81 (106)
13A□A2CA□	245	187	153	34	58	99	175	131	104 (138)	81 (106)
20A□A2CA□	263	205	171	34	58	117	193	149	104 (138)	81 (106)

Continued on next page.

Continued from previous page.

Model SGMXG-	L *1	LL *1	LM	LP *1	LR	KB1	KB2 *1	KB3	KL1 (KL1 *2)	KL3 (KL3 *2)
06A□B2CA□	229	171	137	34	58	83	159	115	104 (138)	81 (106)
09A□B2CA□	245	187	153	34	58	99	175	131	104 (138)	81 (106)
12A□B2CA□	263	205	171	34	58	117	193	149	104 (138)	81 (106)

Model SGMXG-	Flange Dimensions							Shaft End Dimensions		Approx. Mass [kg]
	LA	LB	LC	LE	LG	LH	LZ	S	Q	
09A□A2CA□	145	$110^{0}_{-0.035}$	130	6	12	165	9	$24^{0}_{-0.013}$	40	7.5
13A□A2CA□	145	$110^{0}_{-0.035}$	130	6	12	165	9	$24^{0}_{-0.013}$	40	9.0
20A□A2CA□	145	$110^{0}_{-0.035}$	130	6	12	165	9	$24^{0}_{-0.013}$	40	11.0
06A□B2CA□	145	$110^{0}_{-0.035}$	130	6	12	165	9	$24^{0}_{-0.013}$	40	7.5
09A□B2CA□	145	$110^{0}_{-0.035}$	130	6	12	165	9	$24^{0}_{-0.013}$	40	9.0
12A□B2CA□	145	$110^{0}_{-0.035}$	130	6	12	165	9	$24^{0}_{-0.013}$	40	11.0

*1 For models that have a batteryless absolute encoder (SGMX□-□□□W), L, LL, LP, and KB2 are 8 mm greater than the given value. Refer to the following section for the values for individual models.
☞ *Dimensions of Servomotors with Batteryless Absolute Encoders (SGMXG-□□□W) on page 89*

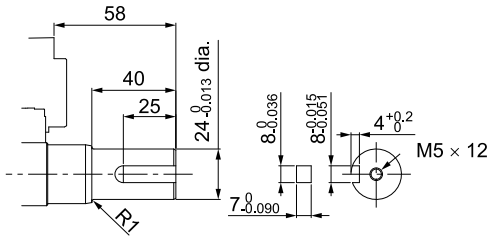
*2 These are the values when the flexible connectors are connected.

Note:

1. The dimensions are same for models with oil seals.
2. The values for a straight shaft end without key specification are given. Refer to the information given below for other shaft end specifications.
☞ *Shaft End Specification on page 78*

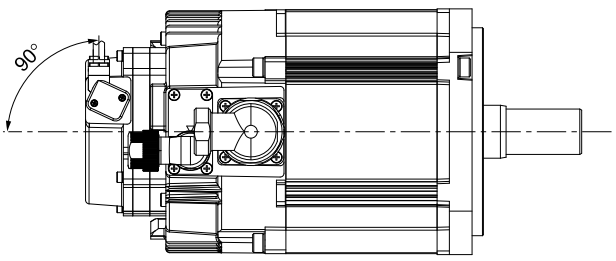
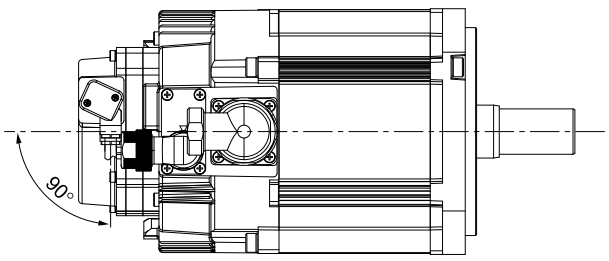
◆ Shaft End Specification

- Straight with Key and Tap



◆ Connector Specifications

- Encoder Connector (26-bit Encoder): Standard Specification
  The encoder cable is installed in the following direction.

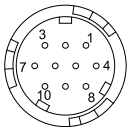
Cable Installed toward Left Side	Cable Installed toward Right Side
	

For details on selecting cables, refer to the following section and manual.

☞ *Cables for the SGMXG Servomotors on page 102*

🕮 Σ-X-Series Peripheral Device Selection Manual (Manual No.: SIEP C710812 12)

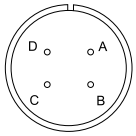
- Encoder Connector (26-bit Encoder): Σ-7 Compatible Specification



1	PS	6 *1	BAT(+)
2	/PS	7	–
3	–	8	–
4	PG5V	9	PG0V
5	BAT(-)	10	FG (frame ground)

*1 A battery is required only for an absolute encoder.
Receptacle: CMV1-R10P
Applicable plug (not provided by Yaskawa)
Plug: CM10-AP10S-□-D (R1) (right-angle type), CM10-SP10S-□-D (R1) (straight), CMV1-AP10S-□□ (right-angle type), CMV1-SP10S-□□ (straight), CMV1S-AP10S-□□ (right-angle type), CMV1S-SP10S-□□ (straight)
(□ varies depending on the applicable cable size.)
Manufacturer: Fujikura Ltd.

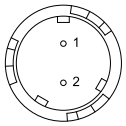
- Servomotor Connector: Same for both Standard Specifications and Σ-7 Compatible Specifications



A	Phase U	C	Phase W
B	Phase V	D	FG (frame ground)

Manufacturer: Japan Aviation Electronics Industry, Ltd.

- Brake Connector: Same for both Standard Specifications and Σ-7 Compatible Specifications



1	Brake terminal
2	Brake terminal

Note:

There is no voltage polarity for the brake terminals.

Receptacle: CMV1Y-R2P-0(F)

Applicable plug (not provided by Yaskawa)

Plug: CM10-AP2S-□-D (R1) (right-angle type), CM10-SP2S-□-D (R1) (straight), CMV1-AP2S-□□ (right-angle type), CMV1-SP2S-□□ (straight), CMV1S-AP2S-□□ (right-angle type), CMV1S-SP2S-□□ (straight)

(□ varies depending on the applicable cable size.)

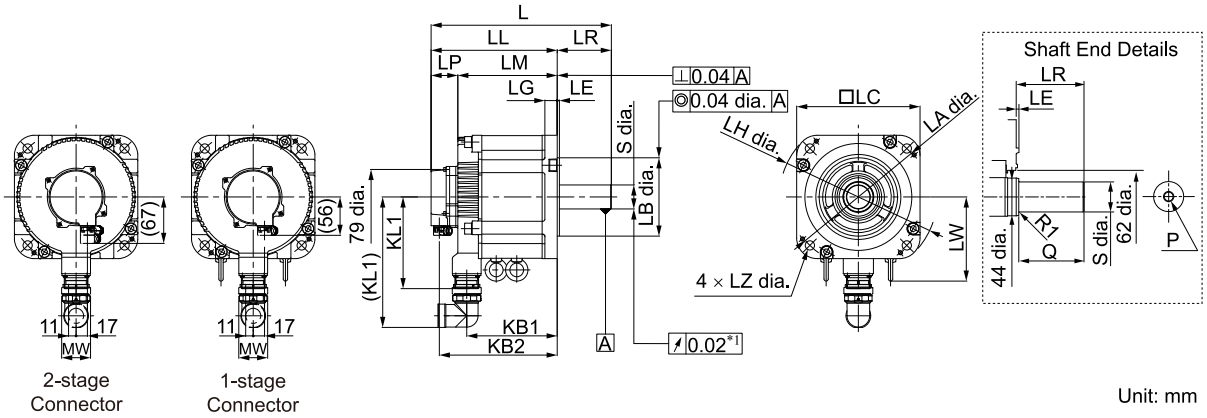
Manufacturer: Fujikura Ltd.

SGMXG-30A□A to -75A□A, -20A□B to -55A□B

■ Servomotors without Holding Brakes

◆ Standard Specification

Information Models with the additional specification “3 Standard (Functional Safety-Compatible Encoder)” have the same dimensions as those indicated below.



*1 This is 0.04 for the SGMXG-55A□A, -75A□A, -40A□B, and -55A□B.

Model SGMXG-	L *1	LL *1	LM	LP *1	LR	KB1	KB2 *1	LW	KL1 (KL1 *2)	MW
30A□A81A□	237	158	124	34	79	108	146	–	134 (190)	43
44A□A81A□	261	182	148	34	79	132	170	–	134 (190)	
55A□A81A□	332	219	185	34	113	163	207	123	145 (221)	59
75A□A81A□	378	265	231	34	113	209	253	123	145 (221)	
20A□B81A□	237	158	124	34	79	108	146	–	134 (190)	43
30A□B81A□	261	182	148	34	79	132	170	–	134 (190)	
40A□B81A□	332	219	185	34	113	163	207	123	145 (221)	59
55A□B81A□	378	265	231	34	113	209	253	123	145 (221)	

Model SGMXG-	Flange Dimensions							Shaft End Dimensions			Approx. Mass [kg]
	LA	LB	LC	LE	LG	LH	LZ	S	Q	P	
30A□A81A□	200	$114.3^{0}_{-0.025}$	180	3.2	18	230	13.5	$35^{+0.01}_{0}$	76	M12 × 25	13.5
44A□A81A□	200	$114.3^{0}_{-0.025}$	180	3.2	18	230	13.5	$35^{+0.01}_{0}$	76		17.5
55A□A81A□	200	$114.3^{0}_{-0.025}$	180	3.2	18	230	13.5	$42^{0}_{-0.016}$	110	M16 × 32	21.5
75A□A81A□	200	$114.3^{0}_{-0.025}$	180	3.2	18	230	13.5	$42^{0}_{-0.016}$	110		29.5
20A□B81A□	200	$114.3^{0}_{-0.025}$	180	3.2	18	230	13.5	$35^{+0.01}_{0}$	76	M12 × 25	13.5
30A□B81A□	200	$114.3^{0}_{-0.025}$	180	3.2	18	230	13.5	$35^{+0.01}_{0}$	76		17.5
40A□B81A□	200	$114.3^{0}_{-0.025}$	180	3.2	18	230	13.5	$42^{0}_{-0.016}$	110	M16 × 32	21.5
55A□B81A□	200	$114.3^{0}_{-0.025}$	180	3.2	18	230	13.5	$42^{0}_{-0.016}$	110		29.5

*1 For models that have a batteryless absolute encoder (SGMX□-□□□W), L, LL, LP, and KB2 are 8 mm greater than the given value. Refer to the following section for the values for individual models.
☞ *Dimensions of Servomotors with Batteryless Absolute Encoders (SGMXG-□□□W) on page 89*

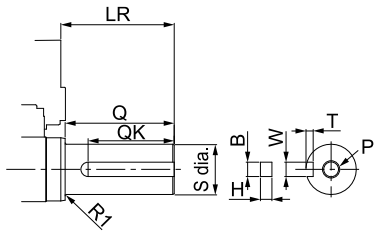
*2 These are the values when the flexible connectors are connected.

Note:

1. The dimensions are same for models with oil seals.
2. The values for the shaft end are for a straight shaft without key and with tap. Refer to the information given below for other shaft end specifications.
☞ *Shaft End Specification on page 80*

◆ Shaft End Specification

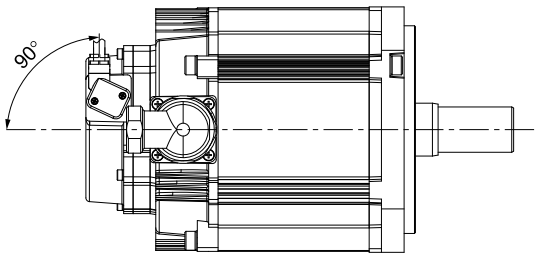
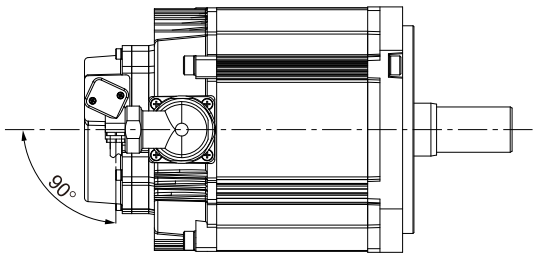
- Straight with Key and Tap



Model SGMXG-	LR	Q	QK	S	B	H	W	T	P
30A□A61□□	79	76	60	$35^{+0.01}_{0}$	$10^{0}_{-0.036}$	$8^{0}_{-0.090}$	$10^{-0.015}_{-0.051}$	$5^{+0.2}_{0}$	M12 × 25
44A□A61□□	79	76	60	$35^{+0.01}_{0}$	$10^{0}_{-0.036}$	$8^{0}_{-0.090}$	$10^{-0.015}_{-0.051}$	$5^{+0.2}_{0}$	
55A□A61□□	113	110	90	$42^{0}_{-0.016}$	$12^{0}_{-0.043}$	$8^{0}_{-0.090}$	$12^{-0.018}_{-0.061}$	$5^{+0.2}_{0}$	M16 × 32
75A□A61□□	113	110	90	$42^{0}_{-0.016}$	$12^{0}_{-0.043}$	$8^{0}_{-0.090}$	$12^{-0.018}_{-0.061}$	$5^{+0.2}_{0}$	
20A□B61□□	79	76	60	$35^{+0.01}_{0}$	$10^{0}_{-0.036}$	$8^{0}_{-0.090}$	$10^{-0.015}_{-0.051}$	$5^{+0.2}_{0}$	M12 × 25
30A□B61□□	79	76	60	$35^{+0.01}_{0}$	$10^{0}_{-0.036}$	$8^{0}_{-0.090}$	$10^{-0.015}_{-0.051}$	$5^{+0.2}_{0}$	
40A□B61□□	113	110	90	$42^{0}_{-0.016}$	$12^{0}_{-0.043}$	$8^{0}_{-0.090}$	$12^{-0.018}_{-0.061}$	$5^{+0.2}_{0}$	M16 × 32
55A□B61□□	113	110	90	$42^{0}_{-0.016}$	$12^{0}_{-0.043}$	$8^{0}_{-0.090}$	$12^{-0.018}_{-0.061}$	$5^{+0.2}_{0}$	

◆ Connector Specifications

- Encoder Connector (26-bit Encoder): Standard Specification
  The encoder cable is installed in the following direction.

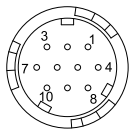
Cable Installed toward Left Side	Cable Installed toward Right Side
	

For details on selecting cables, refer to the following section and manual.

☞ *Cables for the SGMXG Servomotors on page 102*

🕮 Σ-X-Series Peripheral Device Selection Manual (Manual No.: SIEP C710812 12)

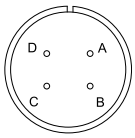
- Encoder Connector (26-bit Encoder): Σ-7 Compatible Specification



1	PS	6 *1	BAT(+)
2	/PS	7	–
3	–	8	–
4	PG5V	9	PG0V
5	BAT(-)	10	FG (frame ground)

*1 A battery is required only for an absolute encoder.
Receptacle: CMV1-R10P
Applicable plug (not provided by Yaskawa)
Plug: CM10-AP10S-□-D (R1) (right-angle type), CM10-SP10S-□-D (R1) (straight), CMV1-AP10S-□□ (right-angle type), CMV1-SP10S-□□ (straight), CMV1S-AP10S-□□ (right-angle type), CMV1S-SP10S-□□ (straight)
(□ varies depending on the applicable cable size.)
Manufacturer: Fujikura Ltd.

- Servomotor Connector: Same for both Standard Specifications and Σ-7 Compatible Specifications



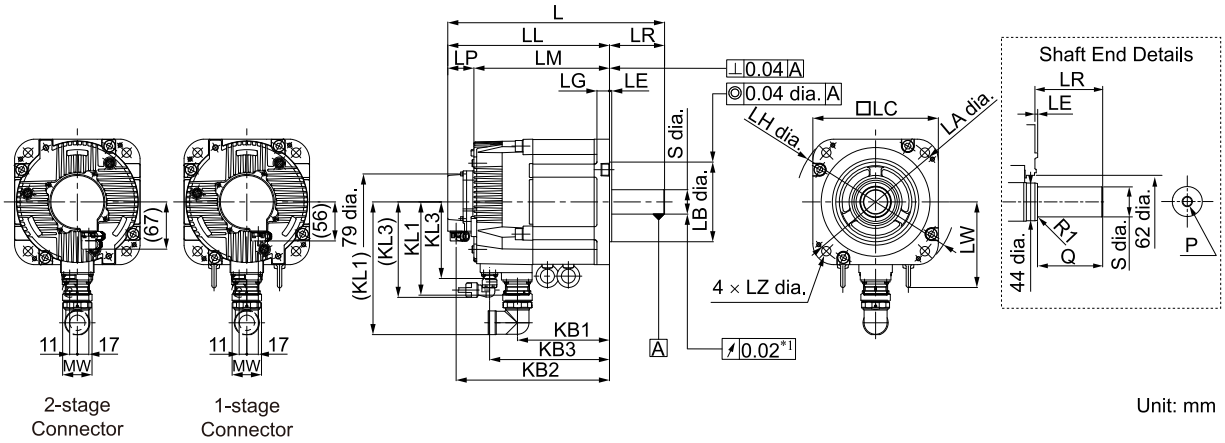
A	Phase U	C	Phase W
B	Phase V	D	FG (frame ground)

Manufacturer: Japan Aviation Electronics Industry, Ltd.

■ Servomotors with Holding Brakes

◆ Standard Specification

Information Models with the additional specification "3 Standard (Functional Safety-Compatible Encoder)" have the same dimensions as those indicated below.



*1 This is 0.04 for the SGMXG-55A□A, -75A□A, -40A□B, and -55A□B.

Model SGMXG-	L *1	LL *1	LM	LP *1	LR	KB1	KB2 *1	KB3	LW	KL1 (KL1 *2)	KL3 (KL3 *2)	MW
30A□A8CA□	287	208	174	34	79	108	196	150	–	134 (190)	111 (136)	43
44A□A8CA□	311	232	198	34	79	132	220	174	–	134 (190)	111 (136)	
55A□A8CA□	376	263	229	34	113	163	251	205	123	145 (221)	111 (136)	59
75A□A8CA□	422	309	275	34	113	209	297	251	123	145 (221)	111 (136)	
20A□B8CA□	287	208	174	34	79	108	196	150	–	134 (190)	111 (136)	43
30A□B8CA□	311	232	198	34	79	132	220	174	–	134 (190)	111 (136)	
40A□B8CA□	376	263	229	34	113	163	251	205	123	145 (221)	111 (136)	59
55A□B8CA□	422	309	275	34	113	209	297	251	123	145 (221)	111 (136)	

Model SGMXG-	Flange Dimensions							Shaft End Dimensions			Approx. Mass [kg]
	LA	LB	LC	LE	LG	LH	LZ	S	Q	P	
30A□A8CA□	200	$114.3^{0}_{-0.025}$	180	3.2	18	230	13.5	$35^{+0.01}_{0}$	76	M12 × 25	19.5
44A□A8CA□	200	$114.3^{0}_{-0.025}$	180	3.2	18	230	13.5	$35^{+0.01}_{0}$	76		23.5
55A□A8CA□	200	$114.3^{0}_{-0.025}$	180	3.2	18	230	13.5	$42^{0}_{-0.016}$	110	M16 × 32	27.5
75A□A8CA□	200	$114.3^{0}_{-0.025}$	180	3.2	18	230	13.5	$42^{0}_{-0.016}$	110		35.0
20A□B8CA□	200	$114.3^{0}_{-0.025}$	180	3.2	18	230	13.5	$35^{+0.01}_{0}$	76	M12 × 25	19.5
30A□B8CA□	200	$114.3^{0}_{-0.025}$	180	3.2	18	230	13.5	$35^{+0.01}_{0}$	76		23.5
40A□B8CA□	200	$114.3^{0}_{-0.025}$	180	3.2	18	230	13.5	$42^{0}_{-0.016}$	110	M16 × 32	27.5
55A□B8CA□	200	$114.3^{0}_{-0.025}$	180	3.2	18	230	13.5	$42^{0}_{-0.016}$	110		35.0

*1 For models that have a batteryless absolute encoder (SGMX□-□□□W), L, LL, LP, and KB2 are 8 mm greater than the given value. Refer to the following section for the values for individual models.
☞ *Dimensions of Servomotors with Batteryless Absolute Encoders (SGMXG-□□□W) on page 89*

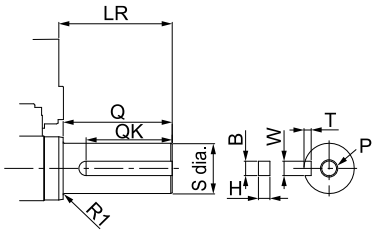
*2 These are the values when the flexible connectors are connected.

Note:

1. The dimensions are same for models with oil seals.
2. The values for the shaft end are for a straight shaft without key and with tap. Refer to the information given below for other shaft end specifications.
☞ *Shaft End Specification on page 83*

◆ Shaft End Specification

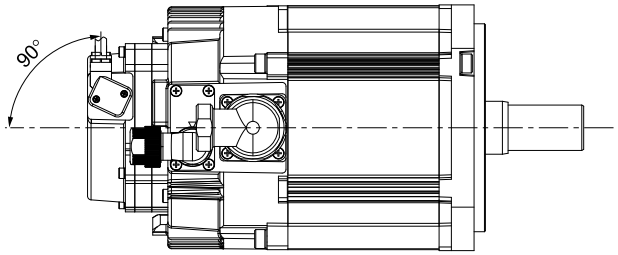
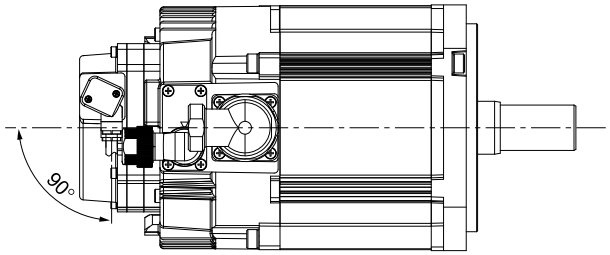
• Straight with Key and Tap



Model SGMXG-	LR	Q	QK	S	B	H	W	T	P
30A□A6C□□	79	76	60	$35^{+0.01}_{0}$	$10^{0}_{-0.036}$	$8^{0}_{-0.090}$	$10^{-0.015}_{-0.051}$	$5^{+0.2}_{0}$	M12 × 25
44A□A6C□□	79	76	60	$35^{+0.01}_{0}$	$10^{0}_{-0.036}$	$8^{0}_{-0.090}$	$10^{-0.015}_{-0.051}$	$5^{+0.2}_{0}$	
55A□A6C□□	113	110	90	$42^{0}_{-0.016}$	$12^{0}_{-0.043}$	$8^{0}_{-0.090}$	$12^{-0.018}_{-0.061}$	$5^{+0.2}_{0}$	M16 × 32
75A□A6C□□	113	110	90	$42^{0}_{-0.016}$	$12^{0}_{-0.043}$	$8^{0}_{-0.090}$	$12^{-0.018}_{-0.061}$	$5^{+0.2}_{0}$	
20A□B6C□□	79	76	60	$35^{+0.01}_{0}$	$10^{0}_{-0.036}$	$8^{0}_{-0.090}$	$10^{-0.015}_{-0.051}$	$5^{+0.2}_{0}$	M12 × 25
30A□B6C□□	79	76	60	$35^{+0.01}_{0}$	$10^{0}_{-0.036}$	$8^{0}_{-0.090}$	$10^{-0.015}_{-0.051}$	$5^{+0.2}_{0}$	
40A□B6C□□	113	110	90	$42^{0}_{-0.016}$	$12^{0}_{-0.043}$	$8^{0}_{-0.090}$	$12^{-0.018}_{-0.061}$	$5^{+0.2}_{0}$	M16 × 32
55A□B6C□□	113	110	90	$42^{0}_{-0.016}$	$12^{0}_{-0.043}$	$8^{0}_{-0.090}$	$12^{-0.018}_{-0.061}$	$5^{+0.2}_{0}$	

◆ Connector Specifications

• Encoder Connector (26-bit Encoder): Standard Specification
The encoder cable is installed in the following direction.

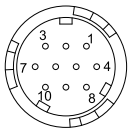
Cable Installed toward Left Side	Cable Installed toward Right Side
	

For details on selecting cables, refer to the following section and manual.

☞ *Cables for the SGMXG Servomotors on page 102*

🕮 Σ-X-Series Peripheral Device Selection Manual (Manual No.: SIEP C710812 12)

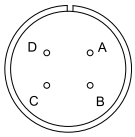
- Encoder Connector (26-bit Encoder): Σ-7 Compatible Specification



1	PS	6 *1	BAT(+)
2	/PS	7	–
3	–	8	–
4	PG5V	9	PG0V
5	BAT(-)	10	FG (frame ground)

*1 A battery is required only for an absolute encoder.
Receptacle: CMV1-R10P
Applicable plug (not provided by Yaskawa)
Plug: CM10-AP10S-□-D (R1) (right-angle type), CM10-SP10S-□-D (R1) (straight), CMV1-AP10S-□□ (right-angle type), CMV1-SP10S-□□ (straight), CMV1S-AP10S-□□ (right-angle type), CMV1S-SP10S-□□ (straight)
(□ varies depending on the applicable cable size.)
Manufacturer: Fujikura Ltd.

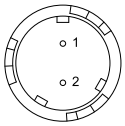
- Servomotor Connector: Same for both Standard Specifications and Σ-7 Compatible Specifications



A	Phase U	C	Phase W
B	Phase V	D	FG (frame ground)

Manufacturer: Japan Aviation Electronics Industry, Ltd.

- Brake Connector: Same for both Standard Specifications and Σ-7 Compatible Specifications



1	Brake terminal
2	Brake terminal

Note:

There is no voltage polarity for the brake terminals.

Receptacle: CMV1Y-R2P-0(F)

Applicable plug (not provided by Yaskawa)

Plug: CM10-AP2S-□-D (R1) (right-angle type), CM10-SP2S-□-D (R1) (straight), CMV1-AP2S-□□ (right-angle type), CMV1-SP2S-□□ (straight), CMV1S-AP2S-□□ (right-angle type), CMV1S-SP2S-□□ (straight)

(□ varies depending on the applicable cable size.)

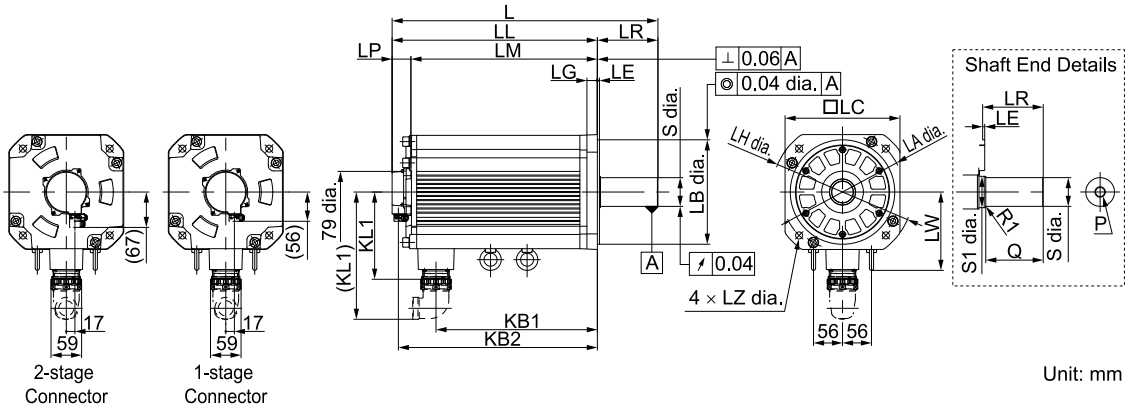
Manufacturer: Fujikura Ltd.

SGMXG-1A, -1E

■ Servomotors without Holding Brakes

◆ Standard Specification

Information Models with the additional specification “3 Standard (Functional Safety-Compatible Encoder)” have the same dimensions as those indicated below.



Unit: mm

Model SGMXG-	L *1	LL *1	LM	LP *1	LR	KB1	KB2 *1	LW	KL1 (KL1 *2)
1AA□A81A□	445	329	295	34	116	247	317	150	168 (245)
1EA□A81A□	507	391	357	34	116	309	379	150	168 (245)

Model SGMXG-	Flange Dimensions							Shaft End Dimensions				Approx. Mass [kg]
	LA	LB	LC	LE	LG	LH	LZ	S	S1	Q	P	
1AA□A81A□	235	$200^{0}_{-0.046}$	220	4	20	270	13.5	$42^{0}_{-0.016}$	50	110	M16 × 32	57
1EA□A81A□	235	$200^{0}_{-0.046}$	220	4	20	270	13.5	$55^{+0.030}_{+0.011}$	60	110	M20 × 40	67

*1 For models that have a batteryless absolute encoder (SGMX□-□□□W), L, LL, LP, and KB2 are 8 mm greater than the given value. Refer to the following section for the values for individual models.
☞ *Dimensions of Servomotors with Batteryless Absolute Encoders (SGMXG-□□□W) on page 89*

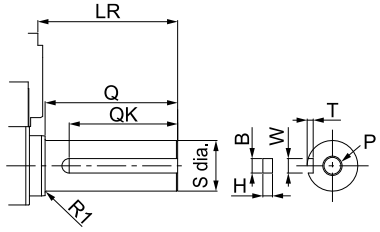
*2 These are the values when the flexible connectors are connected.

Note:

1. The dimensions are same for models with oil seals.
2. The values for a straight shaft end without key specification are given. Refer to the information given below for other shaft end specifications.
☞ *Shaft End Specification on page 85*

◆ Shaft End Specification

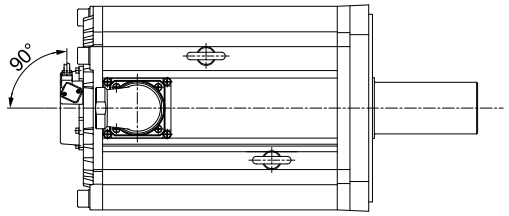
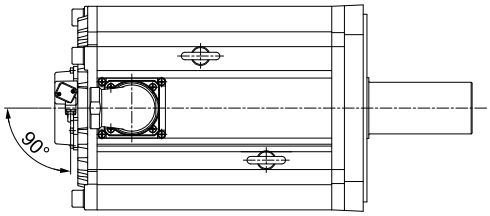
- Straight with Key and Tap



Model SGMXG-	LR	Q	QK	S	B	H	W	T	P
1AA□A61□□	116	110	90	$42^{0}_{-0.016}$	$12^{0}_{-0.043}$	$8^{0}_{-0.090}$	$12^{-0.018}_{-0.061}$	$5^{+0.2}_{0}$	M16 × 32
1EA□A61□□	116	110	90	$55^{+0.030}_{+0.011}$	$16^{0}_{-0.043}$	$10^{0}_{-0.090}$	$16^{-0.018}_{-0.061}$	$6^{+0.2}_{0}$	M20 × 40

◆ Connector Specifications

- Encoder Connector (26-bit Encoder): Standard Specification
  The encoder cable is installed in the following direction.

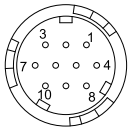
Cable Installed toward Left Side	Cable Installed toward Right Side
	

For details on selecting cables, refer to the following section and manual.

☞ *Cables for the SGMXG Servomotors on page 102*

🕮 Σ-X-Series Peripheral Device Selection Manual (Manual No.: SIEP C710812 12)

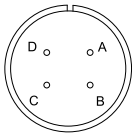
- Encoder Connector (26-bit Encoder): Σ-7 Compatible Specification



1	PS	6 *1	BAT(+)
2	/PS	7	–
3	–	8	–
4	PG5V	9	PG0V
5	BAT(-)	10	FG (frame ground)

*1 A battery is required only for an absolute encoder.
Receptacle: CMV1-R10P
Applicable plug (not provided by Yaskawa)
Plug: CM10-AP10S-□-D (R1) (right-angle type), CM10-SP10S-□-D (R1) (straight), CMV1-AP10S-□□ (right-angle type), CMV1-SP10S-□□ (straight), CMV1S-AP10S-□□ (right-angle type), CMV1S-SP10S-□□ (straight)
(□ varies depending on the applicable cable size.)
Manufacturer: Fujikura Ltd.

- Servomotor Connector: Same for both Standard Specifications and Σ-7 Compatible Specifications



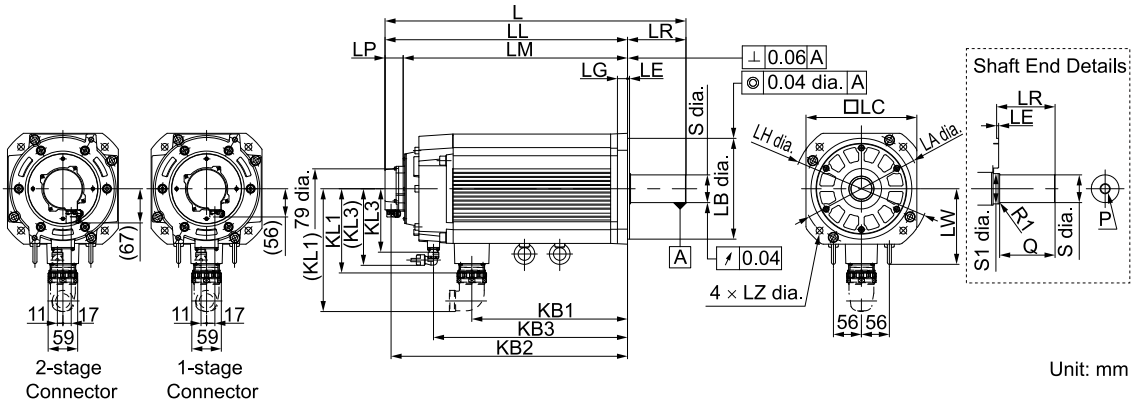
A	Phase U	C	Phase W
B	Phase V	D	FG (frame ground)

Manufacturer: Japan Aviation Electronics Industry, Ltd.

■ Servomotors with Holding Brakes

◆ Standard Specification

Information Models with the additional specification "3 Standard (Functional Safety-Compatible Encoder)" have the same dimensions as those indicated below.



Model SGMXG-	L *1	LL *1	LM	LP *1	LR	KB1	KB2 *1	KB3	LW	KL1 (KL1 *2)	KL3 (KL3 *2)
1AA□A8CA□	496	380	346	34	116	247	368	315	150	168 (245)	126 (151)
1EA□A8CA□	596	480	446	34	116	309	468	385	150	168 (245)	126 (151)

Model SGMXG-	Flange Dimensions							Shaft End Dimensions				Approx. Mass [kg]
	LA	LB	LC	LE	LG	LH	LZ	S	S1	Q	P	
1AA□A8CA□	235	$200^{0}_{-0.046}$	220	4	20	270	13.5	$42^{0}_{-0.016}$	50	110	M16 × 32	65
1EA□A8CA□	235	$200^{0}_{-0.046}$	220	4	20	270	13.5	$55^{+0.030}_{+0.011}$	60	110	M20 × 40	85

*1 For models that have a batteryless absolute encoder (SGMX□-□□□W), L, LL, LP, and KB2 are 8 mm greater than the given value. Refer to the following section for the values for individual models.
☞ *Dimensions of Servomotors with Batteryless Absolute Encoders (SGMXG-□□□W) on page 89*

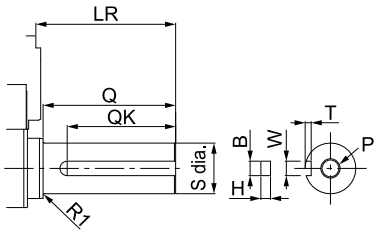
*2 These are the values when the flexible connectors are connected.

Note:

1. The dimensions are same for models with oil seals.
2. The values for a straight shaft end without key specification are given. Refer to the information given below for other shaft end specifications.
☞ *Shaft End Specification on page 87*

◆ Shaft End Specification

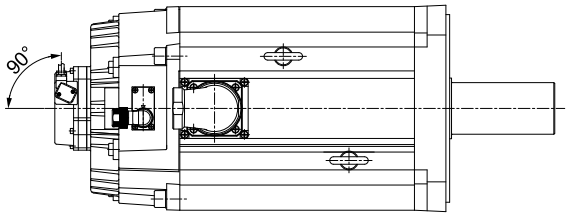
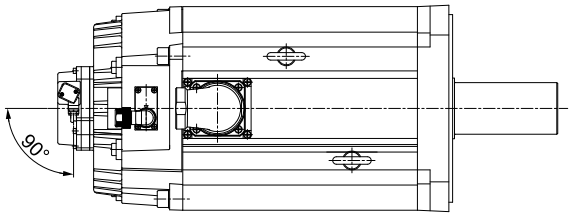
- Straight with Key and Tap



Model SGMXG-	LR	Q	QK	S	B	H	W	T	P
1AA□A6C□□	116	110	90	$42^{0}_{-0.016}$	$12^{0}_{-0.043}$	$8^{0}_{-0.090}$	$12^{-0.018}_{-0.061}$	$5^{+0.2}_{0}$	M16 × 32
1EA□A6C□□	116	110	90	$55^{+0.030}_{+0.011}$	$16^{0}_{-0.043}$	$10^{0}_{-0.090}$	$16^{-0.018}_{-0.061}$	$6^{+0.2}_{0}$	M20 × 40

◆ Connector Specifications

- Encoder Connector (26-bit Encoder): Standard Specification
  The encoder cable is installed in the following direction.

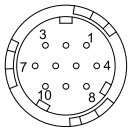
Cable Installed toward Left Side	Cable Installed toward Right Side
	

For details on selecting cables, refer to the following section and manual.

☞ *Cables for the SGMXG Servomotors on page 102*

🕮 Σ-X-Series Peripheral Device Selection Manual (Manual No.: SIEP C710812 12)

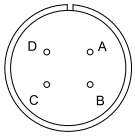
- Encoder Connector (26-bit Encoder): Σ-7 Compatible Specification



1	PS	6 *1	BAT(+)
2	/PS	7	–
3	–	8	–
4	PG5V	9	PG0V
5	BAT(-)	10	FG (frame ground)

*1 A battery is required only for an absolute encoder.
Receptacle: CMV1-R10P
Applicable plug (not provided by Yaskawa)
Plug: CM10-AP10S-□-D (R1) (right-angle type), CM10-SP10S-□-D (R1) (straight), CMV1-AP10S-□□ (right-angle type), CMV1-SP10S-□□ (straight), CMV1S-AP10S-□□ (right-angle type), CMV1S-SP10S-□□ (straight)
(□ varies depending on the applicable cable size.)
Manufacturer: Fujikura Ltd.

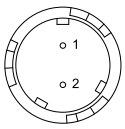
- Servomotor Connector: Same for both Standard Specifications and Σ-7 Compatible Specifications



A	Phase U	C	Phase W
B	Phase V	D	FG (frame ground)

Manufacturer: Japan Aviation Electronics Industry, Ltd.

- Brake Connector: Same for both Standard Specifications and Σ-7 Compatible Specifications



1	Brake terminal
2	Brake terminal

Note:

There is no voltage polarity for the brake terminals.

Receptacle: CMV1Y-R2P-0(F)

Applicable plug (not provided by Yaskawa)

Plug: CM10-AP2S-□-D (R1) (right-angle type), CM10-SP2S-□-D (R1) (straight), CMV1-AP2S-□□ (right-angle type), CMV1-SP2S-□□ (straight), CMV1S-AP2S-□□ (right-angle type), CMV1S-SP2S-□□ (straight)

(□ varies depending on the applicable cable size.)

Manufacturer: Fujikura Ltd.

Dimensions of Servomotors with Batteryless Absolute Encoders (SGMXG-□□□W)

■ 1500-min^{-1} Specification

Model SGMXG-	L	LL	LP	KB2
03AWA□□A□	172 (205)	132 (165)	42 (42)	120 (153)
05AWA□□A□	185 (218)	145 (178)	42 (42)	133 (166)
09AWA□□A□	201 (237)	143 (179)	42 (42)	131 (167)
13AWA□□A□	217 (253)	159 (195)	42 (42)	147 (183)
20AWA□□A□	235 (271)	177 (213)	42 (42)	165 (201)
30AWA□□A□	245 (295)	166 (216)	42 (42)	154 (204)
44AWA□□A□	269 (319)	190 (240)	42 (42)	178 (228)
55AWA□□A□	340 (384)	227 (271)	42 (42)	215 (259)
75AWA□□A□	386 (430)	273 (317)	42 (42)	261 (305)
1AAWA□□A□	453 (504)	337 (388)	42 (42)	325 (376)
1EAWA□□A□	515 (604)	399 (488)	42 (42)	387 (476)

Note:

The values in parentheses are for servomotors with holding brakes.

■ 1000-min^{-1} Specification

Model SGMXG-	L	LL	LP	KB2
03AWB□□A□	185 (218)	145 (178)	42 (42)	133 (166)
06AWB□□A□	201 (237)	143 (179)	42 (42)	131 (167)
09AWB□□A□	217 (253)	159 (195)	42 (42)	147 (183)
12AWB□□A□	235 (271)	177 (213)	42 (42)	165 (201)
20AWB□□A□	245 (295)	166 (216)	42 (42)	154 (204)
30AWB□□A□	269 (319)	190 (240)	42 (42)	178 (228)
40AWB□□A□	340 (384)	227 (271)	42 (42)	215 (259)
55AWB□□A□	386 (430)	273 (317)	42 (42)	261 (305)

Note:

The values in parentheses are for servomotors with holding brakes.

Cables and Connectors

This chapter describes the cables that are used to connect one servomotor to the SERVOPACK and provides related precautions.

Cables for the SGMXJ Servomotors

Information Refer to the following manual for details on connecting multiple devices to the SERVOPACK.

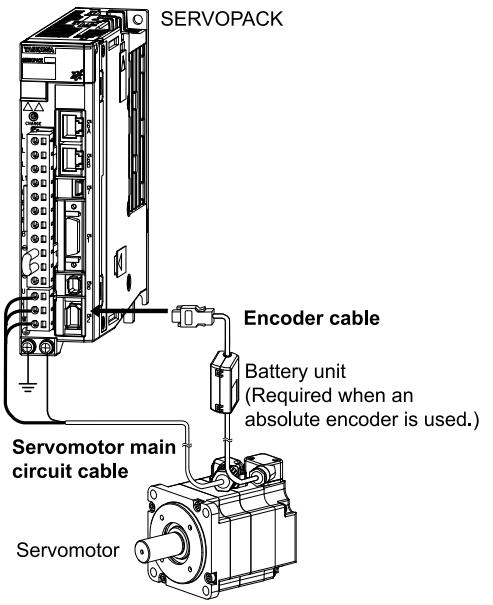
Σ-X-Series Peripheral Device Selection Manual (Manual No.: SIEP C710812 12)

System Configurations

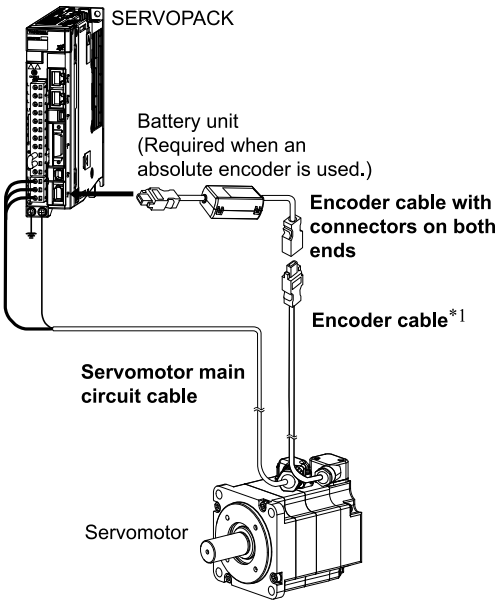
■ Servomotors with Standard Specifications

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

When Not Relaying the Encoder Cable



When Relaying the Encoder Cable



*1 The JZSP-UCMP00-□□-E and JZSP-CSP12-E cannot be connected at the same time.

Note:

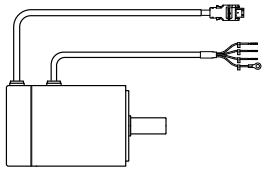
1. The encoder cable to use depends on whether the encoder cable will be relayed.
2. When you will relay the encoder cable, use the following configuration.
   Cables: 2 cables, cable relay point: 1 location, combined cable length: 50 m
3. If you use a servomotor main circuit cable that exceeds 20 m, the intermittent duty zone in the torque-rotation speed characteristics will become smaller because the voltage drop increases.
   Refer to the following section for the intermittent duty zone.
   ☞ *Torque-Rotation Speed Characteristics on page 14*
4. Refer to the following manual for the following information.
   - Cable dimensional drawings and wiring specifications
   - Order numbers and specifications of individual connectors for cables
   - Order numbers and specifications for wiring materials

   Σ-X-Series AC Servo Drive Peripheral Device Selection Manual (Manual No.: SIEP C710812 12)

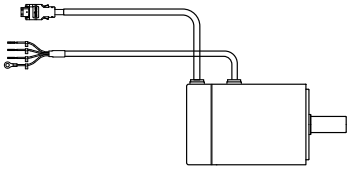
Important

There are different order numbers for the servomotor main circuit cables and encoder cables depending on the cable installation direction. Confirm the order numbers before you order.

Cable Installed toward Load



Cable Installed away from Load



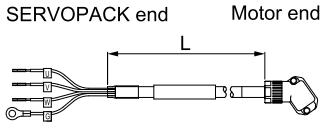
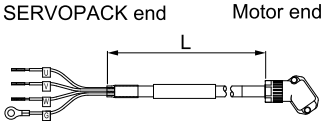
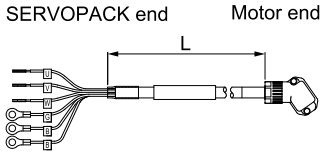
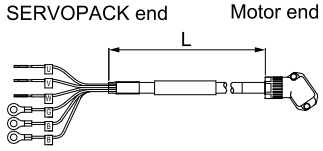
Servomotor Main Circuit Cables

This section provides information on selecting a servomotor main circuit cable. Refer to the following manual for detailed information on cables and for the wiring materials to make your own cables.

Σ-X-Series Peripheral Device Selection Manual (Manual No.: SIEP C710812 12)

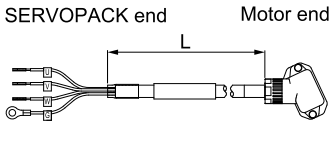
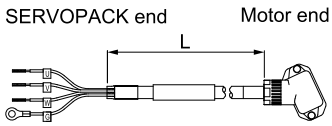
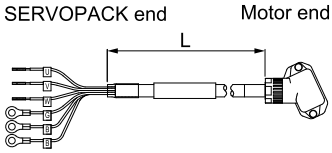
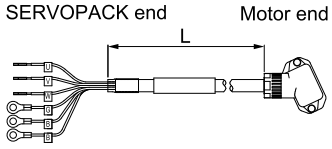
■ Servomotors with Standard Specifications

◆ SGMXJ-A5 to -06 (50 to 600 W)

Name	Length (L)	Order Number	Appearance
		Flexible Cable *1 *2	
For servomotors without holding brakes Cable installed toward load	3 m	JWSP-XMA5NF1-03-M7	
	5 m	JWSP-XMA5NF1-05-M7	
	10 m	JWSP-XMA5NF1-10-M7	
	15 m	JWSP-XMA5NF1-15-M7	
	20 m	JWSP-XMA5NF1-20-M7	
For servomotors without holding brakes Cable installed away from load	3 m	JWSP-XMA5NF2-03-M7	
	5 m	JWSP-XMA5NF2-05-M7	
	10 m	JWSP-XMA5NF2-10-M7	
	15 m	JWSP-XMA5NF2-15-M7	
	20 m	JWSP-XMA5NF2-20-M7	
For servomotors with holding brakes Cable installed toward load	3 m	JWSP-XMA5BF1-03-M7	
	5 m	JWSP-XMA5BF1-05-M7	
	10 m	JWSP-XMA5BF1-10-M7	
	15 m	JWSP-XMA5BF1-15-M7	
	20 m	JWSP-XMA5BF1-20-M7	
For servomotors with holding brakes Cable installed away from load	3 m	JWSP-XMA5BF2-03-M7	
	5 m	JWSP-XMA5BF2-05-M7	
	10 m	JWSP-XMA5BF2-10-M7	
	15 m	JWSP-XMA5BF2-15-M7	
	20 m	JWSP-XMA5BF2-20-M7	

*1 Use flexible cables for moving parts of machines, such as robots.
*2 The recommended bending radius (R) is 90 mm or larger.

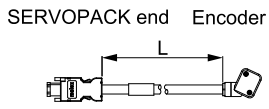
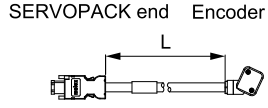
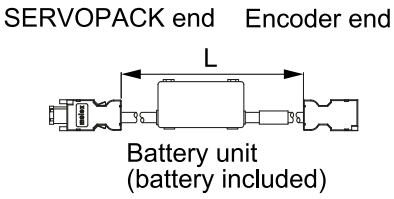
◆ SGMXJ-08 (750 W)

Name	Length (L)	Order Number	Appearance
		Flexible Cable *1 *2	
For servomotors without holding brakes Cable installed toward load	3 m	JWSP-XM08NF1-03-M7	
	5 m	JWSP-XM08NF1-05-M7	
	10 m	JWSP-XM08NF1-10-M7	
	15 m	JWSP-XM08NF1-15-M7	
	20 m	JWSP-XM08NF1-20-M7	
For servomotors without holding brakes Cable installed away from load	3 m	JWSP-XM08NF2-03-M7	
	5 m	JWSP-XM08NF2-05-M7	
	10 m	JWSP-XM08NF2-10-M7	
	15 m	JWSP-XM08NF2-15-M7	
	20 m	JWSP-XM08NF2-20-M7	
For servomotors with holding brakes Cable installed toward load	3 m	JWSP-XM08BF1-03-M7	
	5 m	JWSP-XM08BF1-05-M7	
	10 m	JWSP-XM08BF1-10-M7	
	15 m	JWSP-XM08BF1-15-M7	
	20 m	JWSP-XM08BF1-20-M7	
For servomotors with holding brakes Cable installed away from load	3 m	JWSP-XM08BF2-03-M7	
	5 m	JWSP-XM08BF2-05-M7	
	10 m	JWSP-XM08BF2-10-M7	
	15 m	JWSP-XM08BF2-15-M7	
	20 m	JWSP-XM08BF2-20-M7	

*1 Use flexible cables for moving parts of machines, such as robots.
*2 The recommended bending radius (R) is 90 mm or larger.

Encoder Cables (When Not Relaying the Encoder Cable)

■ Servomotors with Standard Specifications

Name	Length (L)	Order Number	Appearance
		Flexible Cable *1 *2	
For batteryless absolute encoder Cable installed toward load	3 m	JWSP-XP2IF1-03-G#	
	5 m	JWSP-XP2IF1-05-G#	
	10 m	JWSP-XP2IF1-10-G#	
	15 m	JWSP-XP2IF1-15-G#	
	20 m	JWSP-XP2IF1-20-G#	
For batteryless absolute encoder Cable installed away from load	3 m	JWSP-XP2IF2-03-G#	
	5 m	JWSP-XP2IF2-05-G#	
	10 m	JWSP-XP2IF2-10-G#	
	15 m	JWSP-XP2IF2-15-G#	
	20 m	JWSP-XP2IF2-20-G#	
For absolute encoder: With battery unit *3	0.3 m	JZSP-CSP12-E-G#	

*1 Use flexible cables for moving parts of machines, such as robots.
*2 The recommended bending radius (R) is 46 mm or larger.
*3 If a battery is connected to the host controller, the battery unit is not required.

Note:

Do not use these cables as relay cables.

Cables for the SGMXA Servomotors

Information Refer to the following manual for details on connecting multiple devices to the SERVOPACK.

Σ-X-Series Peripheral Device Selection Manual (Manual No.: SIEP C710812 12)

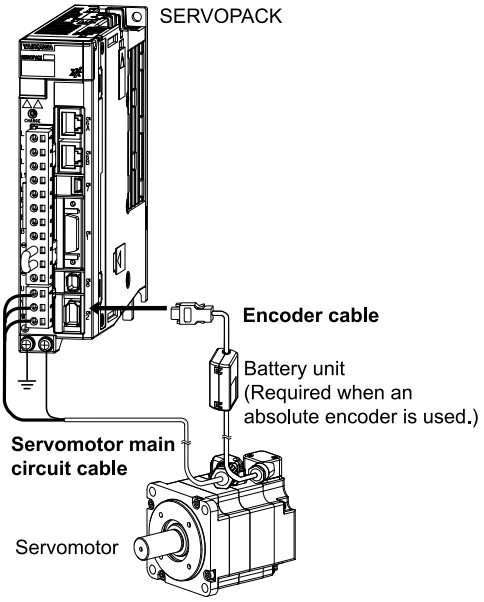
System Configurations

■ Servomotors with Standard Specifications

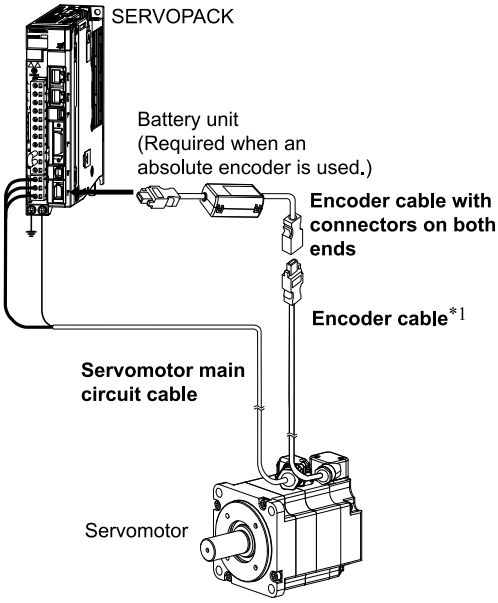
The cables shown below are required to connect a servomotor to a SERVOPACK.

- SGMXA-A5 to -10

When Not Relaying the Encoder Cable

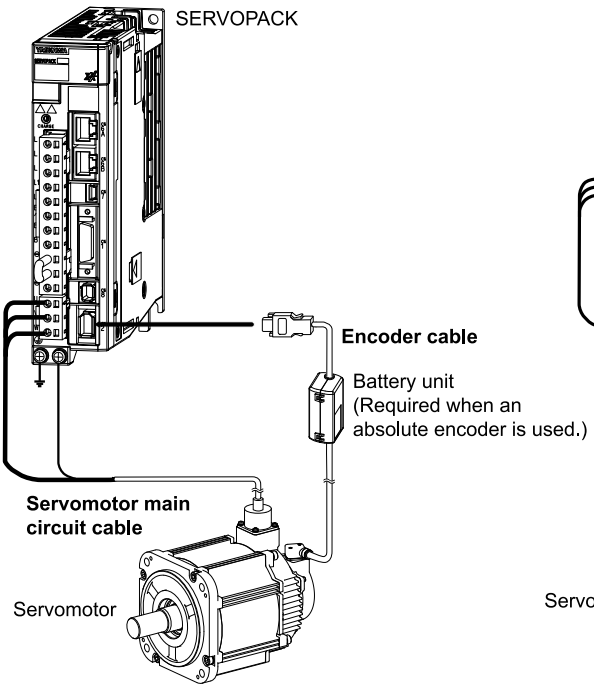


When Relaying the Encoder Cable

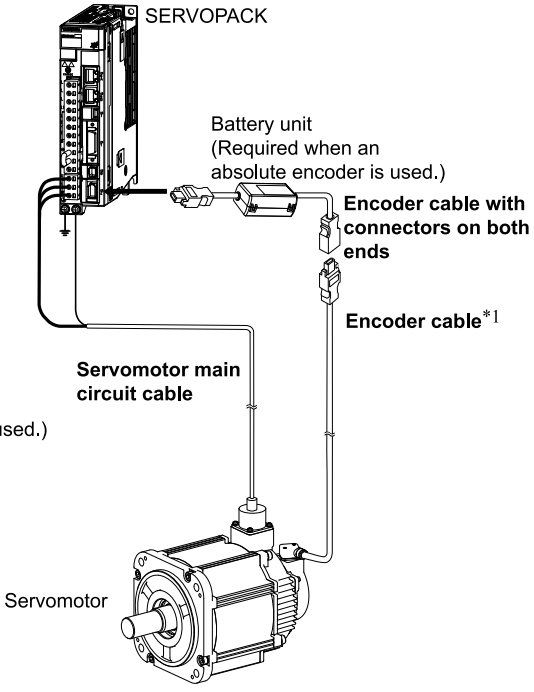


- SGMXA-15 to -70

When Not Relaying the Encoder Cable



When Relaying the Encoder Cable



*1 The JZSP-UCMP00-□□-E and JZSP-CSP12-E cannot be connected at the same time.

Note:

1. The encoder cable to use depends on whether the encoder cable will be relayed.
2. When you will relay the encoder cable, use the following configuration.
   Cables: 2 cables, cable relay point: 1 location, combined cable length: 50 m
3. If you use a servomotor main circuit cable that exceeds 20 m, the intermittent duty zone in the torque-rotation speed characteristics will become smaller because the voltage drop increases.
   Refer to the following section for the intermittent duty zone.
   ☞ *Torque-Rotation Speed Characteristics on page 32*
4. Refer to the following manual for the following information.
   - Cable dimensional drawings and wiring specifications
   - Order numbers and specifications of individual connectors for cables
   - Order numbers and specifications for wiring materials

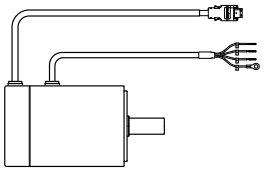
   🕮 Σ-X-Series AC Servo Drive Peripheral Device Selection Manual (Manual No.: SIEP C710812 12)

Important

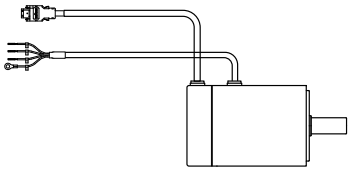
There are different order numbers for the servomotor main circuit cables and encoder cables depending on the cable installation direction. Confirm the order numbers before you order.

- SGMXA-A5 to -10

Cable Installed toward Load

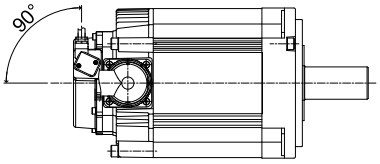


Cable Installed away from Load

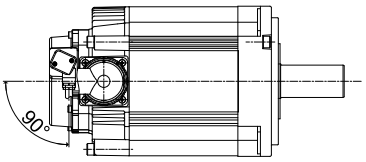


- SGMXA-15 to -70

Cable Installed on Left Side



Cable Installed on Right Side



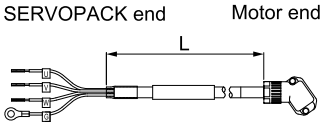
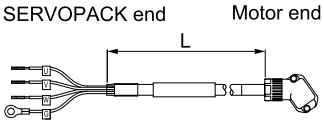
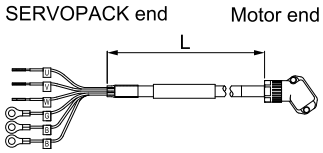
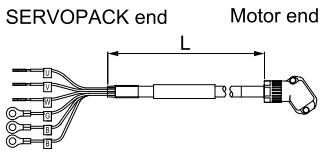
Servomotor Main Circuit Cables

This section provides information on selecting a servomotor main circuit cable. Refer to the following manual for detailed information on cables and for the wiring materials to make your own cables.

Σ-X-Series Peripheral Device Selection Manual (Manual No.: SIEP C710812 12)

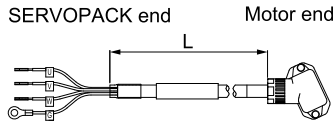
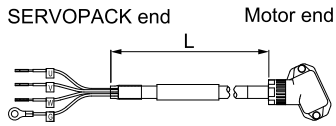
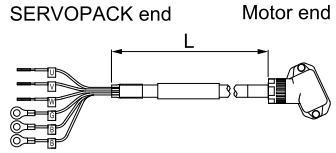
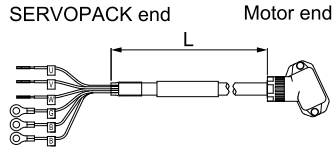
■ Servomotors with Standard Specifications

◆ SGMXA-A5 to -06 (50 to 600 W)

Name	Length (L)	Order Number	Appearance
		Flexible Cable *1 *2	
For servomotors without holding brakes Cable installed toward load	3 m	JWSP-XMA5NF1-03-M7	
	5 m	JWSP-XMA5NF1-05-M7	
	10 m	JWSP-XMA5NF1-10-M7	
	15 m	JWSP-XMA5NF1-15-M7	
	20 m	JWSP-XMA5NF1-20-M7	
For servomotors without holding brakes Cable installed away from load	3 m	JWSP-XMA5NF2-03-M7	
	5 m	JWSP-XMA5NF2-05-M7	
	10 m	JWSP-XMA5NF2-10-M7	
	15 m	JWSP-XMA5NF2-15-M7	
	20 m	JWSP-XMA5NF2-20-M7	
For servomotors with holding brakes Cable installed toward load	3 m	JWSP-XMA5BF1-03-M7	
	5 m	JWSP-XMA5BF1-05-M7	
	10 m	JWSP-XMA5BF1-10-M7	
	15 m	JWSP-XMA5BF1-15-M7	
	20 m	JWSP-XMA5BF1-20-M7	
For servomotors with holding brakes Cable installed away from load	3 m	JWSP-XMA5BF2-03-M7	
	5 m	JWSP-XMA5BF2-05-M7	
	10 m	JWSP-XMA5BF2-10-M7	
	15 m	JWSP-XMA5BF2-15-M7	
	20 m	JWSP-XMA5BF2-20-M7	

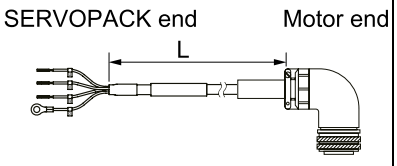
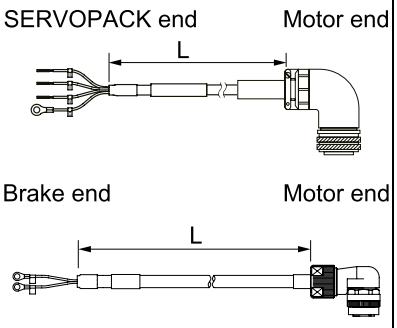
*1 Use flexible cables for moving parts of machines, such as robots.
*2 The recommended bending radius (R) is 90 mm or larger.

◆ SGMXA-08, -10 (750 W, 1.0 kW)

Name	Length (L)	Order Number	Appearance
		Flexible Cable *1 *2	
For servomotors without holding brakes Cable installed toward load	3 m	JWSP-XM08NF1-03-M7	
	5 m	JWSP-XM08NF1-05-M7	
	10 m	JWSP-XM08NF1-10-M7	
	15 m	JWSP-XM08NF1-15-M7	
	20 m	JWSP-XM08NF1-20-M7	
For servomotors without holding brakes Cable installed away from load	3 m	JWSP-XM08NF2-03-M7	
	5 m	JWSP-XM08NF2-05-M7	
	10 m	JWSP-XM08NF2-10-M7	
	15 m	JWSP-XM08NF2-15-M7	
	20 m	JWSP-XM08NF2-20-M7	
For servomotors with holding brakes Cable installed toward load	3 m	JWSP-XM08BF1-03-M7	
	5 m	JWSP-XM08BF1-05-M7	
	10 m	JWSP-XM08BF1-10-M7	
	15 m	JWSP-XM08BF1-15-M7	
	20 m	JWSP-XM08BF1-20-M7	
For servomotors with holding brakes Cable installed away from load	3 m	JWSP-XM08BF2-03-M7	
	5 m	JWSP-XM08BF2-05-M7	
	10 m	JWSP-XM08BF2-10-M7	
	15 m	JWSP-XM08BF2-15-M7	
	20 m	JWSP-XM08BF2-20-M7	

*1 Use flexible cables for moving parts of machines, such as robots.
*2 The recommended bending radius (R) is 90 mm or larger.

◆ SGMXA-15 (1.5 kW)

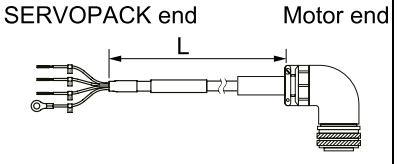
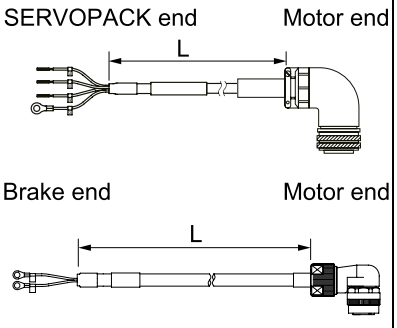
Name	Connector Specifications	Length (L)	Order Number Flexible Cable *1 *2	Appearance
For servomotors without holding brakes	Right-angle Plug *3	3 m	JWSP-XM15NFL-03-G7	
		5 m	JWSP-XM15NFL-05-G7	
		10 m	JWSP-XM15NFL-10-G7	
		15 m	JWSP-XM15NFL-15-G7	
		20 m	JWSP-XM15NFL-20-G7	
For servomotors with holding brakes (Set of two cables)	Right-angle Plug *3	3 m	JWSP-XM15NFL-03-G7 *4 JWSP-XB0FL-03-G7 *5	
		5 m	JWSP-XM15NFL-05-G7 *4 JWSP-XB0FL-05-G7 *5	
		10 m	JWSP-XM15NFL-10-G7 *4 JWSP-XB0FL-10-G7 *5	
		15 m	JWSP-XM15NFL-15-G7 *4 JWSP-XB0FL-15-G7 *5	
		20 m	JWSP-XM15NFL-20-G7 *4 JWSP-XB0FL-20-G7 *5	

*1 Use flexible cables for moving parts of machines, such as robots.
*2 The recommended bending radius (R) is 90 mm or larger.
*3 The lead installation direction is the non-load side. Contact your Yaskawa representative if you require the leads to be installed in another direction.
*4 Main power supply cable.
*5 Holding brake cable.

Note:

If you need a cable with a length of 20 m to 50 m, consider the operating conditions and specify a suitable length.

◆ SGMXA-20, -25 (2.0 kW, 2.5 kW)

Name	Connector Specifications	Length (L)	Order Number Flexible Cable *1 *2	Appearance
For servomotors without holding brakes	Right-angle Plug *3	3 m	JWSP-XM20NFL-03-G7	
		5 m	JWSP-XM20NFL-05-G7	
		10 m	JWSP-XM20NFL-10-G7	
		15 m	JWSP-XM20NFL-15-G7	
		20 m	JWSP-XM20NFL-20-G7	
For servomotors with holding brakes (Set of two cables)	Right-angle Plug *3	3 m	JWSP-XM20NFL-03-G7 *4 JWSP-XB0FL-03-G7 *5	
		5 m	JWSP-XM20NFL-05-G7 *4 JWSP-XB0FL-05-G7 *5	
		10 m	JWSP-XM20NFL-10-G7 *4 JWSP-XB0FL-10-G7 *5	
		15 m	JWSP-XM20NFL-15-G7 *4 JWSP-XB0FL-15-G7 *5	
		20 m	JWSP-XM20NFL-20-G7 *4 JWSP-XB0FL-20-G7 *5	

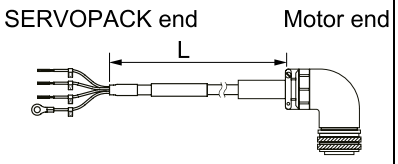
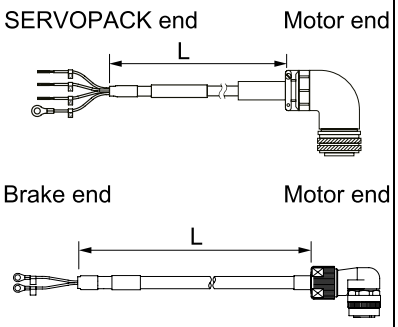
*1 Use flexible cables for moving parts of machines, such as robots.
*2 The recommended bending radius (R) is 90 mm or larger.
*3 The lead installation direction is the non-load side. Contact your Yaskawa representative if you require the leads to be installed in another direction.

*4 Main power supply cable.
*5 Holding brake cable.

Note:

If you need a cable with a length of 20 m to 50 m, consider the operating conditions and specify a suitable length.

◆ SGMXA-30 (3.0 kW)

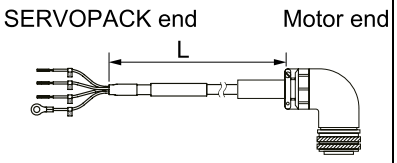
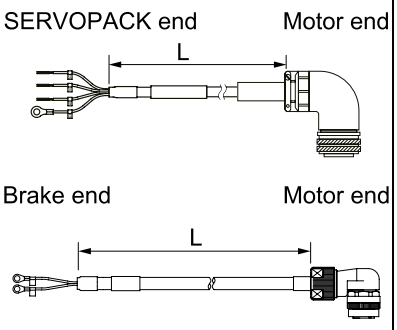
Name	Connector Specifications	Length (L)	Order Number	Appearance
			Flexible Cable *1 *2	
For servomotors without holding brakes	Right-angle Plug *3	3 m	JWSP-XM30NFL-03-G7	
		5 m	JWSP-XM30NFL-05-G7	
		10 m	JWSP-XM30NFL-10-G7	
		15 m	JWSP-XM30NFL-15-G7	
		20 m	JWSP-XM30NFL-20-G7	
For servomotors with holding brakes (Set of two cables)	Right-angle Plug *3	3 m	JWSP-XM30NFL-03-G7 *4 JWSP-XB0FL-03-G7 *5	
		5 m	JWSP-XM30NFL-05-G7 *4 JWSP-XB0FL-05-G7 *5	
		10 m	JWSP-XM30NFL-10-G7 *4 JWSP-XB0FL-10-G7 *5	
		15 m	JWSP-XM30NFL-15-G7 *4 JWSP-XB0FL-15-G7 *5	
		20 m	JWSP-XM30NFL-20-G7 *4 JWSP-XB0FL-20-G7 *5	

*1 Use flexible cables for moving parts of machines, such as robots.
*2 The recommended bending radius (R) is 90 mm or larger.
*3 The lead installation direction is the non-load side. Contact your Yaskawa representative if you require the leads to be installed in another direction.
*4 Main power supply cable.
*5 Holding brake cable.

Note:

If you need a cable with a length of 20 m to 50 m, consider the operating conditions and specify a suitable length.

◆ SGMXA-40, -50 (4.0 kW, 5.0 kW)

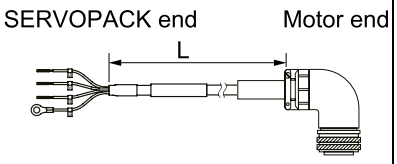
Name	Connector Specifications	Length (L)	Order Number Flexible Cable *1 *2	Appearance
For servomotors without holding brakes	Right-angle Plug *3	3 m	JWSP-XM40NFL-03-G7	
		5 m	JWSP-XM40NFL-05-G7	
		10 m	JWSP-XM40NFL-10-G7	
		15 m	JWSP-XM40NFL-15-G7	
		20 m	JWSP-XM40NFL-20-G7	
For servomotors with holding brakes (Set of two cables)	Right-angle Plug *3	3 m	JWSP-XM40NFL-03-G7 *4 JWSP-XB0FL-03-G7 *5	
		5 m	JWSP-XM40NFL-05-G7 *4 JWSP-XB0FL-05-G7 *5	
		10 m	JWSP-XM40NFL-10-G7 *4 JWSP-XB0FL-10-G7 *5	
		15 m	JWSP-XM40NFL-15-G7 *4 JWSP-XB0FL-15-G7 *5	
		20 m	JWSP-XM40NFL-20-G7 *4 JWSP-XB0FL-20-G7 *5	

*1 Use flexible cables for moving parts of machines, such as robots.
*2 The recommended bending radius (R) is 90 mm or larger.
*3 The lead installation direction is the non-load side. Contact your Yaskawa representative if you require the leads to be installed in another direction.
*4 Main power supply cable.
*5 Holding brake cable.

Note:

If you need a cable with a length of 20 m to 50 m, consider the operating conditions and specify a suitable length.

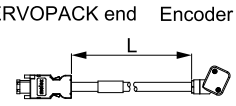
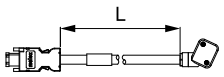
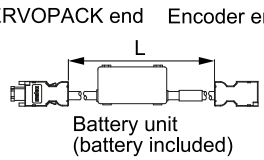
◆ SGMXA-70 (7.0 kW)

Name	Connector Specifications	Length (L)	Order Number *1	Appearance
For servomotors without holding brakes	Right-angle Plug *2	3 m	JWSP-XM70NFL-03-G7	
		5 m	JWSP-XM70NFL-05-G7	
		10 m	JWSP-XM70NFL-10-G7	
		15 m	JWSP-XM70NFL-15-G7	
		20 m	JWSP-XM70NFL-20-G7	

*1 These standard cables are flexible cables. The recommended bending radius (R) is 90 mm or larger.
*2 The lead installation direction is the non-load side. Contact your Yaskawa representative if you require the leads to be installed in another direction.

Encoder Cables (When Not Relaying the Encoder Cable)

■ Servomotors with Standard Specifications

Name	Length (L)	Order Number		Appearance
		Standard Cable	Flexible Cable *1 *2	
For batteryless absolute encoder SGMXA-A5 to -10: Cable installed toward load SGMXA-15 to -50: Cable installed toward left side *3	3 m	JWSP-XP2IS1-03	JWSP-XP2IF1-03-G7	
	5 m	JWSP-XP2IS1-05	JWSP-XP2IF1-05-G7	
	10 m	JWSP-XP2IS1-10	JWSP-XP2IF1-10-G7	
	15 m	JWSP-XP2IS1-15	JWSP-XP2IF1-15-G7	
	20 m	JWSP-XP2IS1-20	JWSP-XP2IF1-20-G7	
For batteryless absolute encoder SGMXA-A5 to -10: Cable installed away from load SGMXA-15 to -70: Cable installed toward right side	3 m	JWSP-XP2IS2-03	JWSP-XP2IF2-03-G7	
	5 m	JWSP-XP2IS2-05	JWSP-XP2IF2-05-G7	
	10 m	JWSP-XP2IS2-10	JWSP-XP2IF2-10-G7	
	15 m	JWSP-XP2IS2-15	JWSP-XP2IF2-15-G7	
	20 m	JWSP-XP2IS2-20	JWSP-XP2IF2-20-G7	
For absolute encoder: With battery unit *4	0.3 m	-	JZSP-CSP12-E-G#	

*1 Use flexible cables for moving parts of machines, such as robots.
*2 The recommended bending radius (R) is 46 mm or larger.
*3 An encoder cable installed toward the left side cannot be used for the SGMXA-70 (7.0 kW). Use an encoder cable installed toward the right side.
*4 If a battery is connected to the host controller, the battery unit is not required.

Note:

Do not use these cables as relay cables.

Cables for the SGMXG Servomotors

Information Refer to the following manual for details on connecting multiple devices to the SERVOPACK.

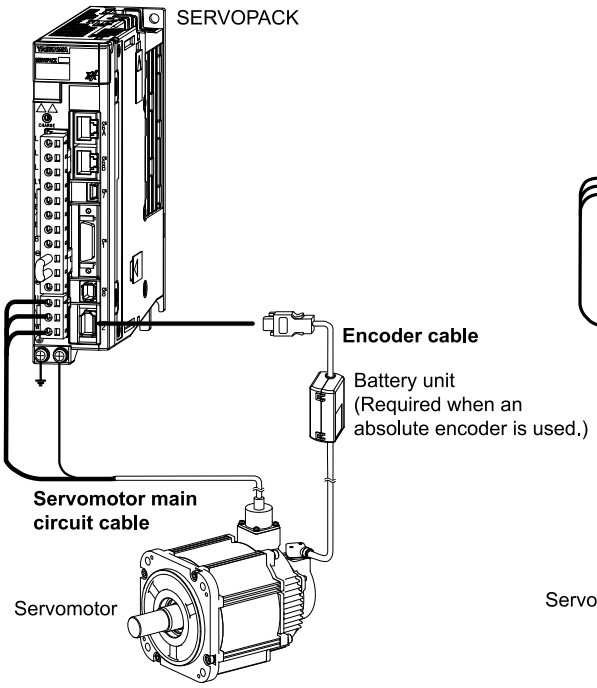
Σ-X-Series Peripheral Device Selection Manual (Manual No.: SIEP C710812 12)

System Configurations

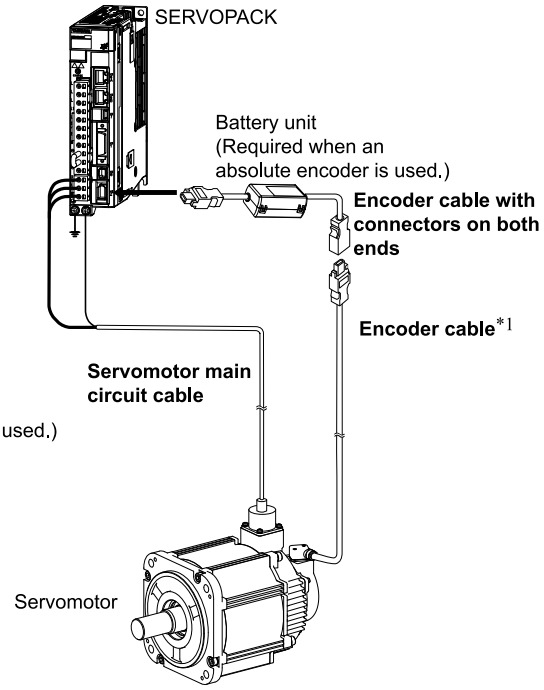
■ Servomotors with Standard Specifications

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

When Not Relaying the Encoder Cable



When Relaying the Encoder Cable



*1 The JZSP-UCMP00-□□-E and JZSP-CSP12-E cannot be connected at the same time.

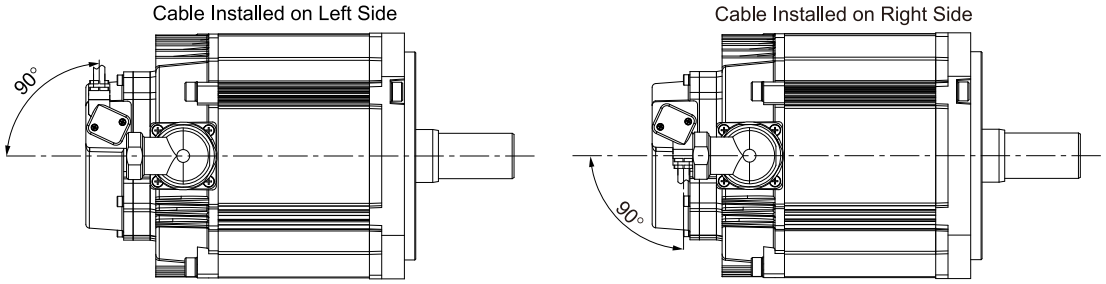
Note:

1. Cables with connectors on both ends that are compliant with an IP67 protective structure and European Safety Standards are not available from Yaskawa for the SGMXG servomotors. You must make such a cable yourself. Use the connectors specified by Yaskawa for these servomotors. (These connectors are compliant with the standards.) Yaskawa does not specify what wiring materials to use. Use appropriate wiring materials for the current specifications and connectors.
2. The encoder cable to use depends on whether the encoder cable will be relayed.
3. When you will relay the encoder cable, use the following configuration.
   Cables: 2 cables, cable relay point: 1 location, combined cable length: 50 m
4. If you use a servomotor main circuit cable that exceeds 20 m, the intermittent duty zone in the torque-rotation speed characteristics will become smaller because the voltage drop increases.
   Refer to the following section for the intermittent duty zone.
   ☞ *Torque-Rotation Speed Characteristics on page 60*
   ☞ *Torque-Rotation Speed Characteristics on page 68*
5. Refer to the following manual for the following information.
   - Cable dimensional drawings and wiring specifications
   - Order numbers and specifications of individual connectors for cables
   - Order numbers and specifications for wiring materials

   Σ-X-Series AC Servo Drive Peripheral Device Selection Manual (Manual No.: SIEP C710812 12)

Important

There are different order numbers for the encoder cables depending on the cable installation direction. Confirm the order numbers before you order.



Servomotor Main Circuit Cables

The servomotor main circuit cable for the standard specification servomotor is same as that for the Σ-V or Σ-7 compatible specification servomotor.

Information

SGMXG servomotors can also use the same cables as Σ-V or Σ-7 series rotary servomotors. However, if the servomotor must be compliant with protection class IP67, use the cables listed in this manual.

Refer to the following manual for information on the Σ-7-series for rotary servomotor cables.

Σ-7-Series Peripheral Device Selection Manual (Manual No.: SIEP S800001 32)

This section provides information on selecting a servomotor main circuit cable. Refer to the following manual for detailed information on cables and for the wiring materials to make your own cables.

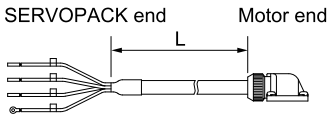
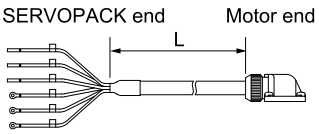
Σ-X-Series Peripheral Device Selection Manual (Manual No.: SIEP C710812 12)

Note:

These servomotor main circuit cables are not supported in a combination with a SERVOPACK to increase instantaneous maximum torque.

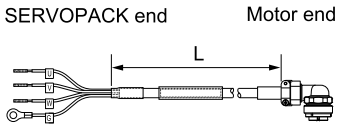
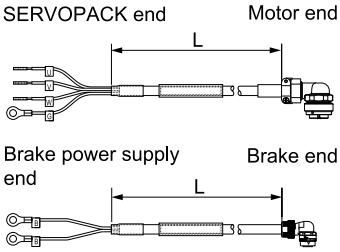
Yaskawa does not provide servomotor main circuit cables for a combination with a SERVOPACK to increase instantaneous maximum torque.

■ SGMXG-03A□A, -05A□A (300 W, 450 W), -03A□B (300 W)

Name	Length (L)	Order Number *1	Appearance
For servomotors without holding brakes	3 m	JZSP-CVM21-03-E-G7	
	5 m	JZSP-CVM21-05-E-G7	
	10 m	JZSP-CVM21-10-E-G7	
	15 m	JZSP-CVM21-15-E-G7	
	20 m	JZSP-CVM21-20-E-G7	
	30 m	JZSP-CVM21-30-E-G7	
For servomotors with holding brakes	3 m	JZSP-CVM41-03-E-G7	
	5 m	JZSP-CVM41-05-E-G7	
	10 m	JZSP-CVM41-10-E-G7	
	15 m	JZSP-CVM41-15-E-G7	
	20 m	JZSP-CVM41-20-E-G7	

*1 These standard cables are flexible cables. The recommended bending radius (R) is 90 mm or larger.

■ SGMXG-09A□A, -13A□A (850 W, 1.3 kW), -06A□B, -09A□B, -12A□B (600 W, 900 W, 1.2 kW)

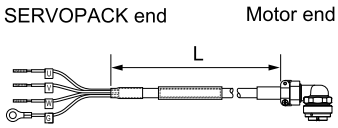
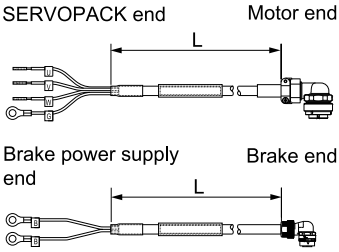
Name	Connector Specifications	Length (L)	Order Number	Appearance
			Flexible Cable *1 *2	
For servomotors without holding brakes	Right-angle Plug *3	3 m	JWSP-XM15NFL-03-G7	
		5 m	JWSP-XM15NFL-05-G7	
		10 m	JWSP-XM15NFL-10-G7	
		15 m	JWSP-XM15NFL-15-G7	
		20 m	JWSP-XM15NFL-20-G7	
For servomotors with holding brakes (Set of two cables)	Right-angle Plug *3	3 m	JWSP-XM15NFL-03-G7 *4 JWSP-XB0FL-03-G7 *5	
		5 m	JWSP-XM15NFL-05-G7 *4 JWSP-XB0FL-05-G7 *5	
		10 m	JWSP-XM15NFL-10-G7 *4 JWSP-XB0FL-10-G7 *5	
		15 m	JWSP-XM15NFL-15-G7 *4 JWSP-XB0FL-15-G7 *5	
		20 m	JWSP-XM15NFL-20-G7 *4 JWSP-XB0FL-20-G7 *5	

*1 Use flexible cables for moving parts of machines, such as robots.
*2 The recommended bending radius (R) is 90 mm or larger.
*3 The lead installation direction is the non-load side. Contact your Yaskawa representative if you require the leads to be installed in another direction.
*4 Main power supply cable.
*5 Holding brake cable.

Note:

If you need a cable with a length of 20 m to 50 m, consider the operating conditions and specify a suitable length.

■ SGMXG-20A□A (1.8 kW)

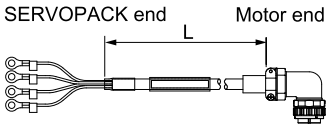
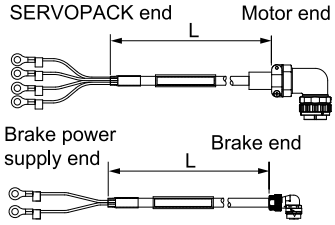
Name	Connector Specifications	Length (L)	Order Number Flexible Cable *1 *2	Appearance
For servomotors without holding brakes	Right-angle Plug *3	3 m	JWSP-XM20NFL-03-G7	
		5 m	JWSP-XM20NFL-05-G7	
		10 m	JWSP-XM20NFL-10-G7	
		15 m	JWSP-XM20NFL-15-G7	
		20 m	JWSP-XM20NFL-20-G7	
For servomotors with holding brakes (Set of two cables)	Right-angle Plug *3	3 m	JWSP-XM20NFL-03-G7 *4 JWSP-XMB0FL-03-G7 *5	
		5 m	JWSP-XM20NFL-05-G7 *4 JWSP-XMB0FL-05-G7 *5	
		10 m	JWSP-XM20NFL-10-G7 *4 JWSP-XMB0FL-10-G7 *5	
		15 m	JWSP-XM20NFL-15-G7 *4 JWSP-XMB0FL-15-G7 *5	
		20 m	JWSP-XM20NFL-20-G7 *4 JWSP-XMB0FL-20-G7 *5	

*1 Use flexible cables for moving parts of machines, such as robots.
*2 The recommended bending radius (R) is 90 mm or larger.
*3 The lead installation direction is the non-load side. Contact your Yaskawa representative if you require the leads to be installed in another direction.
*4 Main power supply cable.
*5 Holding brake cable.

Note:

If you need a cable with a length of 20 m to 50 m, consider the operating conditions and specify a suitable length.

■ SGMXG-30A□A, -44A□A (2.9 kW, 4.4 kW), -20A□B, -30A□B, 40A□B (2.0 kW, 3.0 kW, 4.0 kW)

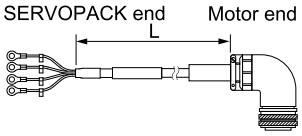
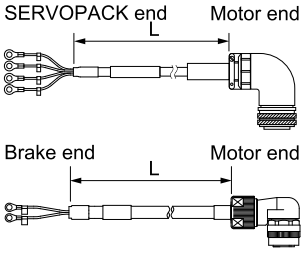
Name	Connector Specifications	Length (L)	Order Number	Appearance
			Flexible Cable *1 *2	
For servomotors without holding brakes	Right-angle Plug *3	3 m	JWSP-XM40NFL-03-G7	
		5 m	JWSP-XM40NFL-05-G7	
		10 m	JWSP-XM40NFL-10-G7	
		15 m	JWSP-XM40NFL-15-G7	
		20 m	JWSP-XM40NFL-20-G7	
For servomotors with holding brakes (Set of two cables)	Right-angle Plug *3	3 m	JWSP-XM40NFL-03-G7 *4 JWSP-XB0FL-03-G7 *5	
		5 m	JWSP-XM40NFL-05-G7 *4 JWSP-XB0FL-05-G7 *5	
		10 m	JWSP-XM40NFL-10-G7 *4 JWSP-XB0FL-10-G7 *5	
		15 m	JWSP-XM40NFL-15-G7 *4 JWSP-XB0FL-15-G7 *5	
		20 m	JWSP-XM40NFL-20-G7 *4 JWSP-XB0FL-20-G7 *5	

*1 Use flexible cables for moving parts of machines, such as robots.
*2 The recommended bending radius (R) is 90 mm or larger.
*3 The lead installation direction is the non-load side. Contact your Yaskawa representative if you require the leads to be installed in another direction.
*4 Main power supply cable.
*5 Holding brake cable.

Note:

If you need a cable with a length of 20 m to 50 m, consider the operating conditions and specify a suitable length.

■ SGMXG-55A□A (5.5 kW), -55A□B (5.5 kW)

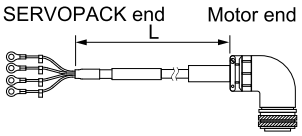
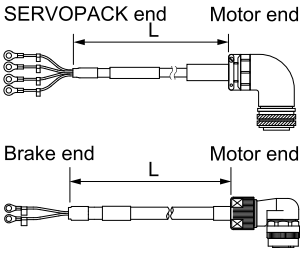
Name	Connector Specifications	Length (L)	Order Number Flexible Cable *1 *2	Appearance
For servomotors without holding brakes	Right-angle Plug *3	3 m	JZSP-CVMCA14-03-E-G#	
		5 m	JZSP-CVMCA14-05-E-G#	
		10 m	JZSP-CVMCA14-10-E-G#	
		15 m	JZSP-CVMCA14-15-E-G#	
		20 m	JZSP-CVMCA14-20-E-G#	
For servomotors with holding brakes (Set of two cables)	Right-angle Plug *3	3 m	JZSP-CVMCA14-03-E-G# *4 JZSP-CVB12Y-03-E-G# *5	
		5 m	JZSP-CVMCA14-05-E-G# *4 JZSP-CVB12Y-05-E-G# *5	
		10 m	JZSP-CVMCA14-10-E-G# *4 JZSP-CVB12Y-10-E-G# *5	
		15 m	JZSP-CVMCA14-15-E-G# *4 JZSP-CVB12Y-15-E-G# *5	
		20 m	JZSP-CVMCA14-20-E-G# *4 JZSP-CVB12Y-20-E-G# *5	

*1 Use flexible cables for moving parts of machines, such as robots.
*2 The recommended bending radius (R) is 90 mm or larger.
*3 The lead installation direction is the non-load side. Contact your Yaskawa representative if you require the leads to be installed in another direction.
*4 Main power supply cable.
*5 Holding brake cable.

Note:

If you need a cable with a length of 20 m to 50 m, consider the operating conditions and specify a suitable length.

■ SGMXG-70A□A, -1A (7.5 kW, 11 kW)

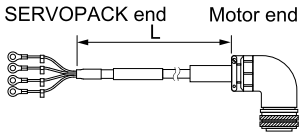
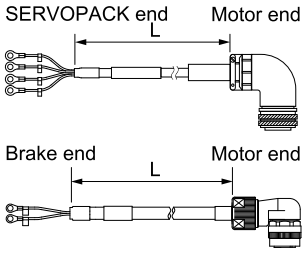
Name	Connector Specifications	Length (L)	Order Number *1	Appearance
For servomotors without holding brakes	Right-angle Plug *2	3 m	JZSP-CVMCA15-03-E-G#	
		5 m	JZSP-CVMCA15-05-E-G#	
		10 m	JZSP-CVMCA15-10-E-G#	
		15 m	JZSP-CVMCA15-15-E-G#	
		20 m	JZSP-CVMCA15-20-E-G#	
For servomotors with holding brakes (Set of two cables)	Right-angle Plug *2	3 m	JZSP-CVMCA15-03-E-G# *3 JZSP-CVB12Y-03-E-G# *4	
		5 m	JZSP-CVMCA15-05-E-G# *3 JZSP-CVB12Y-05-E-G# *4	
		10 m	JZSP-CVMCA15-10-E-G# *3 JZSP-CVB12Y-10-E-G# *4	
		15 m	JZSP-CVMCA15-15-E-G# *3 JZSP-CVB12Y-15-E-G# *4	
		20 m	JZSP-CVMCA15-20-E-G# *3 JZSP-CVB12Y-20-E-G# *4	

*1 These standard cables are flexible cables. The recommended bending radius (R) is 90 mm or larger.
*2 The lead installation direction is the non-load side. Contact your Yaskawa representative if you require the leads to be installed in another direction.
*3 Main power supply cable.
*4 Holding brake cable.

Note:

If you need a cable with a length of 20 m to 50 m, consider the operating conditions and specify a suitable length.

■ SGMXG-1E (15 kW)

Name	Connector Specifications	Length (L)	Order Number *1	Appearance
For servomotors without holding brakes	Right-angle Plug *2	3 m	JZSP-CVMCA16-03-E-G#	
		5 m	JZSP-CVMCA16-05-E-G#	
		10 m	JZSP-CVMCA16-10-E-G#	
		15 m	JZSP-CVMCA16-15-E-G#	
		20 m	JZSP-CVMCA16-20-E-G#	
For servomotors with holding brakes (Set of two cables)	Right-angle Plug *2	3 m	JZSP-CVMCA16-03-E-G# *3 JZSP-CVB12Y-03-E-G# *4	
		5 m	JZSP-CVMCA16-05-E-G# *3 JZSP-CVB12Y-05-E-G# *4	
		10 m	JZSP-CVMCA16-10-E-G# *3 JZSP-CVB12Y-10-E-G# *4	
		15 m	JZSP-CVMCA16-15-E-G# *3 JZSP-CVB12Y-15-E-G# *4	
		20 m	JZSP-CVMCA16-20-E-G# *3 JZSP-CVB12Y-20-E-G# *4	

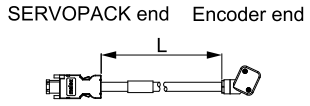
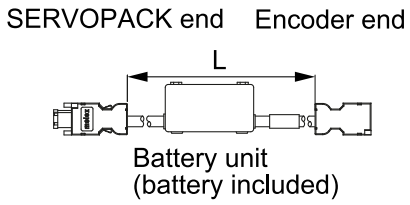
*1 These standard cables are flexible cables. The recommended bending radius (R) is 90 mm or larger.
*2 The lead installation direction is the non-load side. Contact your Yaskawa representative if you require the leads to be installed in another direction.
*3 Main power supply cable.
*4 Holding brake cable.

Note:

If you need a cable with a length of 20 m to 50 m, consider the operating conditions and specify a suitable length.

Encoder Cables (When Not Relaying the Encoder Cable)

■ Servomotors with Standard Specifications

Name	Length (L)	Order Number	Appearance
		Flexible Cable *1 *2	
For batteryless absolute encoder For incremental encoder	3 m	JWSP-XPIFL-03-G7	
	5 m	JWSP-XPIFL-05-G7	
	10 m	JWSP-XPIFL-10-G7	
	15 m	JWSP-XPIFL-15-G7	
	20 m	JWSP-XPIFL-20-G7	
For absolute encoder: With battery unit *3	3 m	JWSP-XPAFL-03-G7	
	5 m	JWSP-XPAFL-05-G7	
	10 m	JWSP-XPAFL-10-G7	
	15 m	JWSP-XPAFL-15-G7	
	20 m	JWSP-XPAFL-20-G7	

*1 Use flexible cables for moving parts of machines, such as robots.
*2 The recommended bending radius (R) is 46 mm or larger.
*3 If a battery is connected to the host controller, the battery unit is not required.

Note:

Do not use these cables as relay cables.

Direct Drive Servomotors

Model Designations

SGM7D - 30 F 7 C 4 1

Direct drive servomotors: SGM7D

❶ ❷ ❸ ❹ ❺ ❻

❶ Rated Torque

Code	Specification	Code	Specification	Code	Specification
01	1.30 N·m	18	18.0 N·m	58	58.0 N·m
02	2.06 N·m	20	20.0 N·m	70	70.0 N·m
03	3.00 N·m	24	24.0 N·m	90	90.0 N·m
05	5.00 N·m	28	28.0 N·m	1Z	100 N·m
06	6.00 N·m	30	30.0 N·m	1A	110 N·m
08	8.00 N·m	34	34.0 N·m	1C	130 N·m
09	9.00 N·m	38	38.0 N·m	2B	220 N·m
12	12.0 N·m	45	45.0 N·m	2D	240 N·m

❷ Servomotor Outer Diameter

Code	Specification	Code	Specification
F	264-mm dia.	J	150-mm dia.
G	160-mm dia.	K	107-mm dia.
H	116-mm dia.	L	224 mm × 224 mm
I	264-mm dia.		

❸ Serial Encoder

Code	Specification
7	24-bit multiturn absolute encoder*1
F	24-bit incremental encoder*1

❹ Design Revision Order

C

❺ Flange

Code	Mounting		Servomotor Outer Diameter Code (3rd Digit)						
			F	G	H	I	J	K	L
4	Non-load side	With cable on side	✓	✓	✓	-	-	-	✓
5	Non-load side	With cable on bottom	✓	✓*2	-	✓	✓	✓	-

✓: Applicable models.

❻ Options

Code	Specification
1	Standard mechanical precision
2	High mechanical precision*3

*1 The encoder can be used as a single-turn absolute encoder by setting a parameter.
*2 SGM7D-01-G and -05G are not available with a cable extending from the bottom.
*3 SGM7D-01G, -05G, and -03H are available only with high mechanical precision..

Note:

1. Direct drive servomotors are not available with holding brakes.
2. This information is provided to explain model numbers. It is not meant to imply that models are available for all combinations of codes.

Manufactured Models

Rated Torque N·m	Servomotor Outer Diameter						
	F (264-mm dia.)	G (160-mm dia.)	H (116-mm dia.)	I (264-mm dia.)	J (150-mm dia.)	K (107-mm dia.)	L (□224)
1.30	-	SGM7D-01G	-	-	-	-	-
2.06	-	-	-	-	-	SGM7D-02K	-
3.00	-	-	SGM7D-03H	-	-	-	-
5.00	-	SGM7D-05G	-	-	-	-	-
6.00	-	-	-	-	SGM7D-06J	SGM7D-06K	SGM7D-06L
8.00	-	SGM7D-08G	-	-	-	SGM7D-08K	-
9.00	-	-	-	-	SGM7D-09J	-	-
12.0	-	-	-	-	-	-	SGM7D-12L

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Rated Torque N·m	Servomotor Outer Diameter						
	F (264-mm dia.)	G (160-mm dia.)	H (116-mm dia.)	I (264-mm dia.)	J (150-mm dia.)	K (107-mm dia.)	L (□224)
18.0	-	SGM7D-18G	-	-	SGM7D-18J	-	-
20.0	-	-	-	-	SGM7D-20J	-	-
24.0	-	SGM7D-24G	-	-	-	-	-
28.0	-	-	-	SGM7D-28I	-	-	-
30.0	SGM7D-30F	-	-	-	-	-	SGM7D-30L
34.0	-	SGM7D-34G	-	-	-	-	-
38.0	-	-	-	-	SGM7D-38J	-	-
45.0	-	SGM7D-45G	-	-	-	-	-
58.0	SGM7D-58F	-	-	-	-	-	-
70.0	-	-	-	SGM7D-70I	-	-	-
90.0	SGM7D-90F	-	-	-	-	-	-
100	-	-	-	SGM7D-1ZI	-	-	-
110	SGM7D-1AF	-	-	-	-	-	-
130	-	-	-	SGM7D-1CI	-	-	-
220	-	-	-	SGM7D-2BI	-	-	-
240	-	-	-	SGM7D-2DI	-	-	-

Note:
The above table shows combinations of the rated torque and outer diameter. The fourth through seventh digits have been omitted.

Specifications and Ratings

Specifications

■ SGM7D-□□F, -□□G, -□□H

Voltage	200 V											
Model: SGM7D-	30F	58F	90F	1AF	01G	05G	08G	18G	24G	34G	45G	03H
Time Rating	Continuous											
Thermal Class	F											
Insulation Resistance	500 VDC, 10 MΩ min.											
Withstand Voltage	1500 VAC for 1 minute											
Excitation	Three-phase											
Mounting	Flange-mounted											
Drive Method	Direct drive											
Rotation Direction	Counterclockwise (CCW) for forward reference when viewed from the load side											
Absolute Accuracy	±15 s											
Repeatability	±1.3 s											

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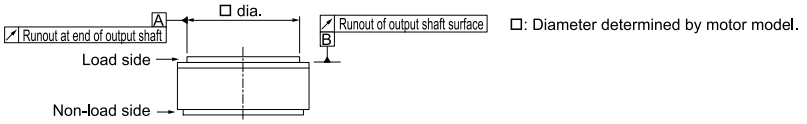
Voltage				200 V									
Model: SGM7D-				30F	58F	90F	1AF	01G	05G	08G	18G	24G	34G	45G	03H
Protective Structure *1				Totally enclosed, self-cooled, IP20				Totally enclosed, self-cooled, IP30		Totally enclosed, self-cooled, IP20					Totally enclosed, self-cooled, IP30
Environmental Conditions	Surrounding Air Temperature			0°C to 40°C (with no freezing)											
	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 1000 m or less. 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)											
Mechanical Tolerances *2	Runout of Output Shaft Surface/Runout at End of Output Shaft	Standard Mechanical Precision	mm	0.1				-		0.1			0.1		-
		High Mechanical Precision	mm	0.005				0.01		0.005			0.01		
Applicable SERVOPACKs	SGDXS-			120A				2R8A		120A					2R8A
	SGDXW-			-											

*1 Protective structure specifications apply only when the special cable is used.
*2 Refer to the following figure for the relevant locations on the servomotor. Refer to the dimensional drawings of the individual servomotors for more information on tolerances.



■ SGM7D-□□I, -□□J

Voltage	200 V										
Model: SGM7D-	28I	70I	1ZI	1CI	2BI	2DI	06J	09J	18J	20J	38J
Time Rating	Continuous										
Thermal Class	F										
Insulation Resistance	500 VDC, 10 MΩ min.										
Withstand Voltage	1500 VAC for 1 minute										
Excitation	Three-phase										
Mounting	Flange-mounted										
Drive Method	Direct drive										
Rotation Direction	Counterclockwise (CCW) for forward reference when viewed from the load side										
Absolute Accuracy	±15 s										
Repeatability	±1.3 s										

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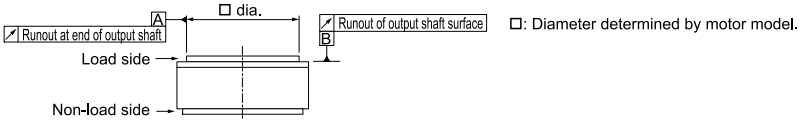
Voltage				200 V								
Model: SGM7D-				28I	70I	1ZI	1CI	2BI	2DI	06J	09J	18J	20J	38J
Protective Structure *1				Totally enclosed, self-cooled, IP30										
Environmental Conditions	Surrounding Air Temperature			0°C to 40°C (with no freezing)										
	Surrounding Air Humidity			20% to 80% relative 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 1000 m or less. 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)										
Mechanical Tolerances *2	Runout of Output Shaft Surface/Runout at End of Output Shaft	Standard Mechanical Precision	mm	0.1										
		High Mechanical Precision	mm	0.005			0.02			0.005				0.01
Applicable SERVOPACKs		SGDXS-		120A										
		SGDXW-		-										

*1 Protective structure specifications apply only when the special cable is used.

*2 Refer to the following figure for the relevant locations on the servomotor. Refer to the dimensional drawings of the individual servomotors for more information on tolerances.



■ SGM7D-□□K, -□□L

Voltage	200 V					
Model: SGM7D-	02K	06K	08K	06L	12L	30L
Time Rating	Continuous					
Thermal Class	F					
Insulation Resistance	500 VDC, 10 MΩ min.					
Withstand Voltage	1500 VAC for 1 minute					
Excitation	Three-phase					
Mounting	Flange-mounted					
Drive Method	Direct drive					
Rotation Direction	Counterclockwise (CCW) for forward reference when viewed from the load side					
Absolute Accuracy	±15 s					
Repeatability	±1.3 s					
Protective Structure *1	Totally enclosed, self-cooled, IP30					

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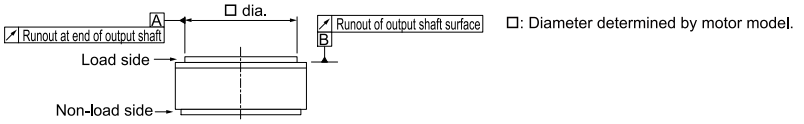
Voltage				200 V					
Model: SGM7D-				02K	06K	08K	06L	12L	30L
Environmental Conditions	Surrounding Air Temperature			0°C to 40°C (with no freezing)					
	Surrounding Air Humidity			20% to 80% relative humidity (with no condensation)					
	Installation Site			Must be indoors and free of corrosive and explosive gases. Must be well-ventilated and free of dust and moisture. Must facilitate inspection and cleaning. Must have an altitude of 1000 m or less. 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)					
Mechanical Tolerances *2	Runout of Output Shaft Surface/ Runout at End of Output Shaft	Standard Mechanical Precision	mm	0.1			0.05		
		High Mechanical Precision	mm	0.01			0.005		
Applicable SERVOPACKs		SGDXS-		2R8A					120A
		SGDXW-		-					

*1 Protective structure specifications apply only when the special cable is used.
*2 Refer to the following figure for the relevant locations on the servomotor. Refer to the dimensional drawings of the individual servomotors for more information on tolerances.



Ratings

■ SGM7D-□□F, -□□G, -□□H

Voltage		200 V											
Model: SGM7D-		30F	58F	90F	1AF	01G	05G	08G	18G	24G	34G	45G	03H
Rated Output	W	188	364	565	691	16	63	101	226	302	320	565	38
Rated Torque *1	N·m	30.0	58.0	90.0	110	1.30	5.00	8.00	18.0	24.0	34.0	45.0	3.00
Repetitive Rated Torque *2	N·m	-	-	-	-	-	-	-	-	27.0	40.0	52.0	-
Instantaneous Maximum Torque	N·m	50.0	100	150	200	4.00	6.00	15.0	30.0	45.0	60.0	75.0	4.00
Stall Torque	N·m	30.0	58.0	90.0	110	1.30	5.00	8.00	18.0	24.0	34.0	45.0	3.00
Rated Current	Arms	5.7	6.4	5.9	5.0	1.7	1.6	3.4	3.4	3.1	3.3	4.8	1.1
Instantaneous Maximum Current	Arms	14.1				4.2	3.5	10.6					3.5
Rated Rotation Speed	min^{-1}	60				120					90	120	120
Maximum Rotation Speed	min^{-1}	72				150		144					150
Torque Constant	N·m/Arms	6.25	12.5	17.8	24.5	1.09	3.84	2.82	5.76	8.57	11.2	10.2	3.01
Rotor Moment of Inertia	×10^{-4} kg·m^2	960	1190	1420	1670	55.0	75.0	120	150	190	230	270	25.0
Rated Power Rate	kW/s	9.38	28.3	57.0	72.5	0.307	3.33	5.33	21.6	30.3	50.3	75.0	3.60

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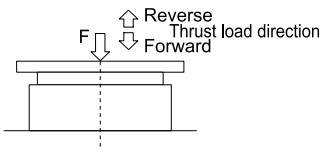
Voltage				200 V										
Model: SGM7D-				30F	58F	90F	1AF	01G	05G	08G	18G	24G	34G	45G	03H
Rated Angular Acceleration			rad/s²	313	487	634	659	236	667	667	1200	1260	1480	1670	1200
Heat Sink Size			mm	550 × 550 × 30 (aluminum)											350 × 350 × 20 (steel)
Allowable Load Moment of Inertia (Rotor Moment of Inertia Ratio)			times	200	150	150	130	130	300	400	350	300	250	200	600
	With external regenerative resistor		times	2500	3500	4000	5000	130	300	2000	3000	4000	4000	4000	600
Allowable Load *3	Allowable Thrust Load	Forward	N	4×10^4				50	200	3×10^4					50
		Reverse	N	2×10^4				50	200	1×10^4					50
	Allowable Moment Load		N·m	400				-	50	200					-
Rigidity	Thrust Displacement Rigidity	Forward	mm/N	2×10^{-6}				-		2.5×10^{-6}					-
		Reverse	mm/N	3×10^{-6}				-		3×10^{-6}					-
	Moment Displacement Rigidity		rad/N·m	4×10^{-7}				-		1×10^{-6}					-

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

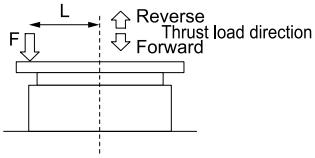
*2 The repetitive rated torque is the value for 60% ED.

*3 The thrust loads and moment loads that are applied while a servomotor is operating are roughly classified into the following patterns. Design the machine so that the thrust loads or moment loads will not exceed the values given in the table.
The allowable load is for a static load in one direction.
When designing the system, multiply the allowable load by the following safety coefficient depending on the type of load.

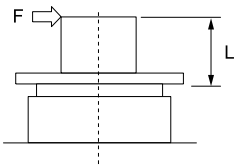
- Smooth load with no shock: 1/3
- Light repetitive load: 1/5
- Shock load: 1/10



Where F is the external force,
Thrust load = F + Load mass
Moment load = 0



Where F is the external force,
Thrust load = F + Load mass
Moment load = F × L



Where F is the external force,
Thrust load = Load mass
Moment load = F × L

Note:

1. 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. For the bearings used in these servomotors, the loss depends on the bearing temperature. The amount of heat loss is higher at low temperatures.

■ SGM7D-□□I, -□□J

Voltage		200 V										
Model: SGM7D-		28I	70I	1ZI	1CI	2BI	2DI	06J	09J	18J	20J	38J
Rated Output	W	264	440	628	817	691	754	75	113	226	251	358
Rated Torque *1	N·m	28.0	70.0	100	130	220	240	6.00	9.00	18.0	20.0	38.0
Instantaneous Maximum Torque	N·m	50.0	100	150	200	300	400	8.00	15.0	30.0	45.0	60.0
Stall Torque	N·m	28.0	70.0	100	130	220	240	6.00	9.00	18.0	20.0	38.0

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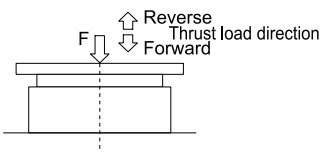
Voltage				200 V									
Model: SGM7D-				28I	70I	1ZI	1CI	2BI	2DI	06J	09J	18J	20J	38J
Rated Current			Arms	5.2	5.6	5.5	5.0	5.6	4.8	4.0	3.4	3.0	2.2	3.1
Instantaneous Maximum Current			Arms	14.1						10.6				
Rated Rotation Speed			min^{-1}	90	60			30		120				90
Maximum Rotation Speed			min^{-1}	108	72			60	48	144				
Torque Constant			N·m/Arms	6.90	13.9	20.8	27.8	41.5	54.4	1.71	3.29	6.62	9.88	13.3
Rotor Moment of Inertia			$\times 10^{-4}$ kg·m^2	1800	2000	2300	2850	3400	4000	150	210	240	260	330
Rated Power Rate			kW/s	4.36	24.5	43.5	59.3	142	144	2.40	3.86	13.5	15.4	43.8
Rated Angular Acceleration			rad/s^2	156	350	435	456	647	600	400	429	750	769	1150
Heat Sink Size			mm	550 × 550 × 30										
Allowable Load Moment of Inertia (Rotor Moment of Inertia Ratio)			times	50	100	90	80	100	150	350	250	240	220	180
	With external regenerative resistor and dynamic brake resistor		times	800	2000	2500	3000	100	150	700	900	2500	2000	2000
Allowable Load *2	Allowable Thrust Load	Forward	N	4×10^4						3×10^4				
		Reverse	N	2×10^4						1×10^4				
	Allowable Moment Load		N·m	400						200				
Rigidity	Thrust Displacement Rigidity	Forward	mm/N	2×10^{-6}						3×10^{-6}				
		Reverse	mm/N	3×10^{-6}						4×10^{-6}				
	Moment Displacement Rigidity		rad/N·m	4×10^{-7}						2×10^{-6}				

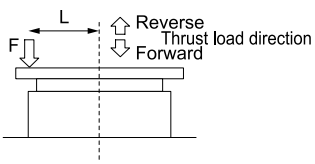
*1 The rated torques are the continuous allowable torque values at a surrounding air temperature of 40°C with an aluminum heat sink of the dimensions given in the table.

*2 The thrust loads and moment loads that are applied while a servomotor is operating are roughly classified into the following patterns. Design the machine so that the thrust loads or moment loads will not exceed the values given in the table.
The allowable load is for a static load in one direction.
When designing the system, multiply the allowable load by the following safety coefficient depending on the type of load.

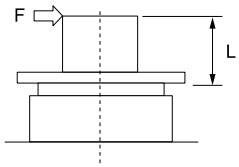
- Smooth load with no shock: 1/3
- Light repetitive load: 1/5
- Shock load: 1/10



Where F is the external force,
Thrust load = F + Load mass
Moment load = 0



Where F is the external force,
Thrust load = F + Load mass
Moment load = F × L



Where F is the external force,
Thrust load = Load mass
Moment load = F × L

Note:

1. 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. For the bearings used in these servomotors, the loss depends on the bearing temperature. The amount of heat loss is higher at low temperatures.

■ SGM7D-□□K, -□□L

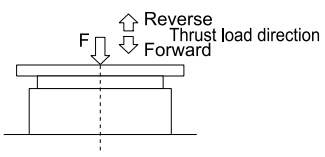
Voltage				200 V					
Model: SGM7D-				02K	06K	08K	06L	12L	30L
Rated Output			W	52	151	201	113	226	565
Rated Torque *1			N·m	2.06	6.00	8.00	6.00	12.0	30.0
Repetitive Rated Torque *2			N·m	-	6.90	-	-	-	-
Instantaneous Maximum Torque			N·m	5.00	10.0	15.0	10.0	20.0	40.0
Stall Torque			N·m	2.06	6.00	8.00	6.00	12.0	30.0
Rated Current			Arms	1.6	1.8	1.6	1.7	2.1	8.1
Instantaneous Maximum Current			Arms	4.2			4.2	4.2	14.1
Rated Rotation Speed			min^{-1}	240			180		
Maximum Rotation Speed			min^{-1}	360			216		
Torque Constant			N·m/Arms	1.83	3.67	5.50	4.13	6.59	3.95
Rotor Moment of Inertia			$\times 10^{-4}$ kg·m^2	60.0	70.0	80.0	220	220	370
Rated Power Rate			kW/s	0.707	5.14	8.00	1.64	6.55	24.3
Rated Angular Acceleration			rad/s^2	343	857	1000	273	545	811
Heat Sink Size			mm	550 × 550 × 30			650 × 650 × 30		
Allowable Load Moment of Inertia (Rotor Moment of Inertia Ratio)			times	200	350	25	450	20	60
	With external regenerative resistor		times	200	350	25	450	20	3500
Allowable Load *3	Allowable Thrust Load	Forward	N	5×10^3			2000		
		Reverse	N	3×10^3			1000		
	Allowable Moment Load		N·m	20			100		
Rigidity	Thrust Displacement Rigidity	Forward	mm/N	4×10^{-6}			-		
		Reverse	mm/N	8×10^{-6}			-		
	Moment Displacement Rigidity		rad/N·m	8×10^{-6}			-		

*1 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.

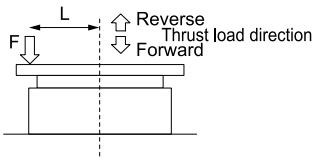
*2 The repetitive rated torque is the value for 60% ED.

*3 The thrust loads and moment loads that are applied while a servomotor is operating are roughly classified into the following patterns. Design the machine so that the thrust loads or moment loads will not exceed the values given in the table.
The allowable load is for a static load in one direction.
When designing the system, multiply the allowable load by the following safety coefficient depending on the type of load.

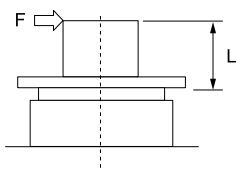
- Smooth load with no shock: 1/3
- Light repetitive load: 1/5
- Shock load: 1/10



Where F is the external force,
Thrust load = F + Load mass
Moment load = 0



Where F is the external force,
Thrust load = F + Load mass
Moment load = F × L



Where F is the external force,
Thrust load = Load mass
Moment load = F × L

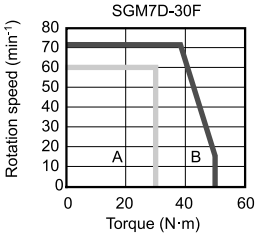
Note:

1. 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. For the bearings used in these servomotors, the loss depends on the bearing temperature. The amount of heat loss is higher at low temperatures.

Torque-Motor Speed Characteristics

A : Continuous duty zone -------- (dotted lines): With duty factor of 60% ED and 10-min rating
B : Intermittent duty zone*1 ——— (solid lines): With three-phase 200-V input or single-phase 200-V input

SGM7D-30F



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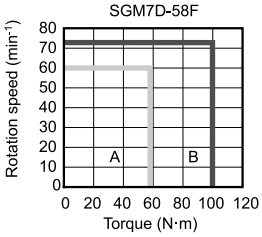

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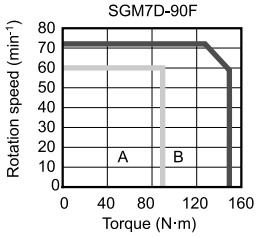

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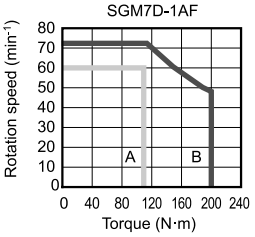

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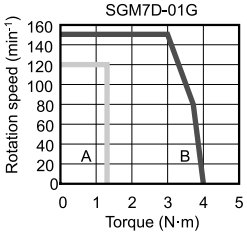

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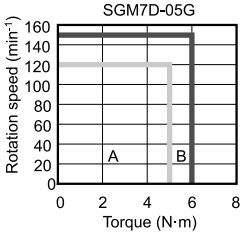

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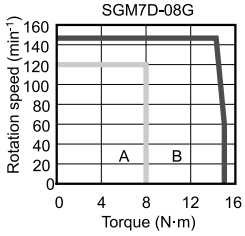

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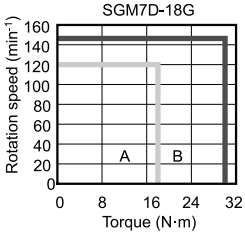

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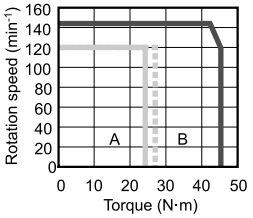

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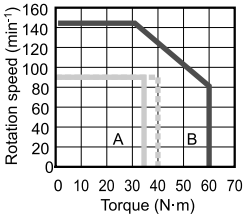

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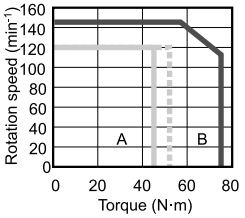

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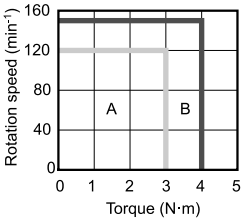

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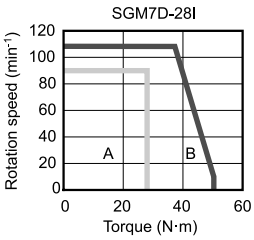

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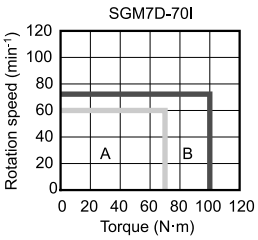

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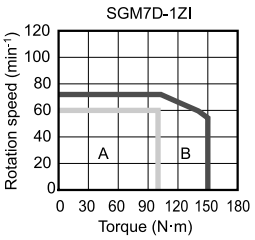

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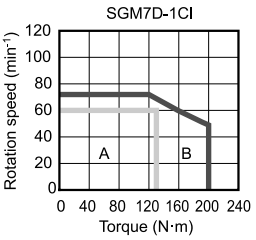

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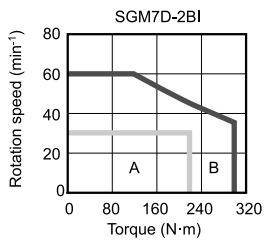

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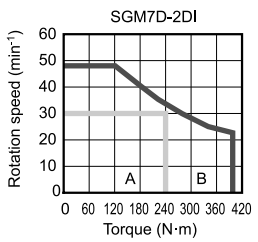

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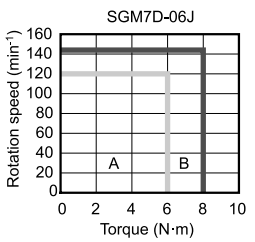

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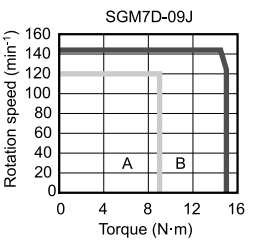

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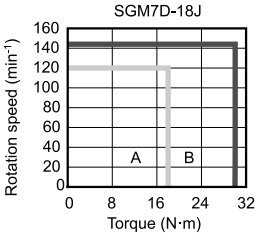

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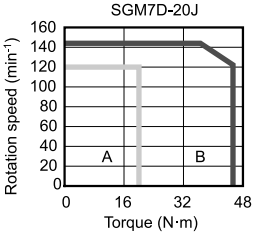

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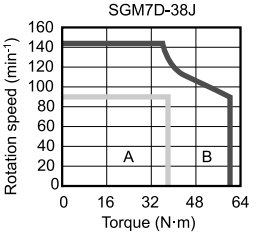

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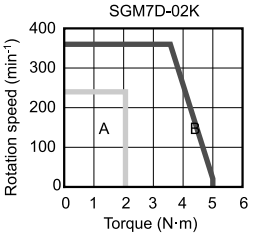
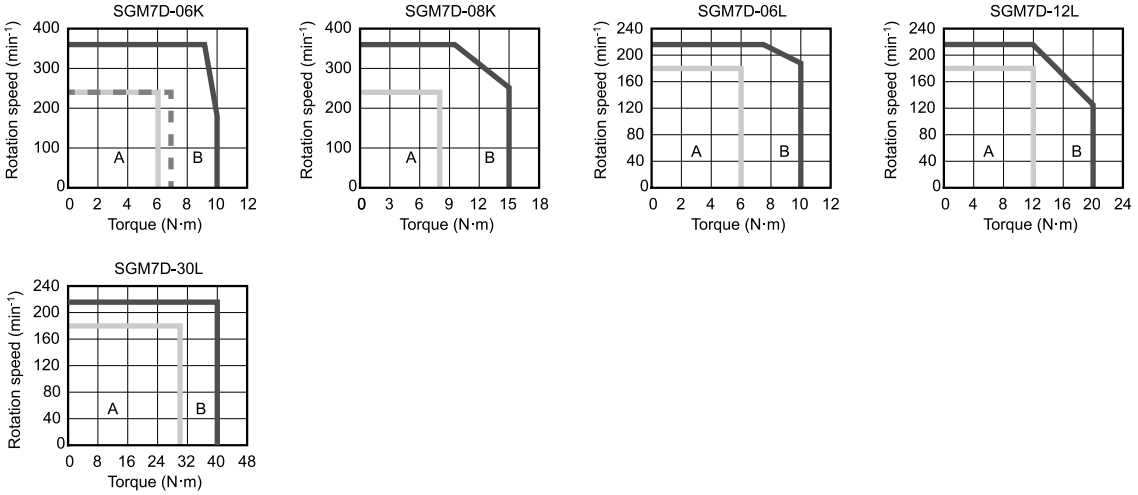




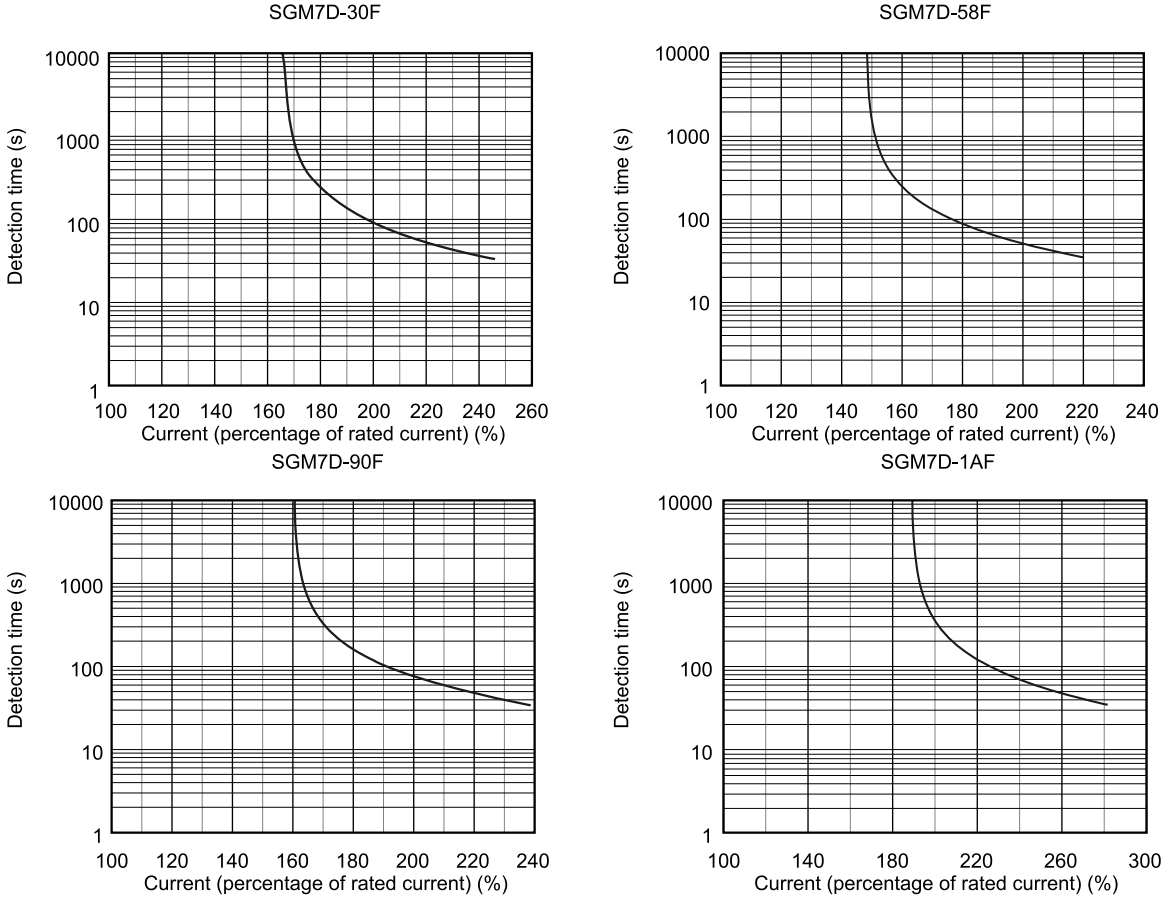
*1 The characteristics are the same for a three-phase 200-VAC input and single-phase 200-VAC input.

Note:

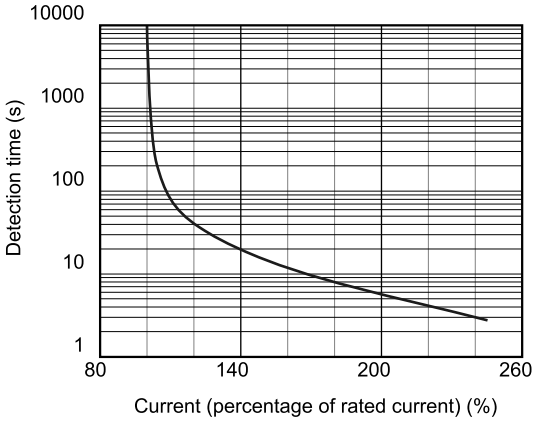
1. These values are for operation in combination with a SERVOPACK when the temperature of the armature winding is 20°C. These are typical values.
2. The characteristics in the intermittent duty zone depend on the power supply voltage.
3. If the effective torque is within the allowable range for the rated 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.



SGM7D-01G



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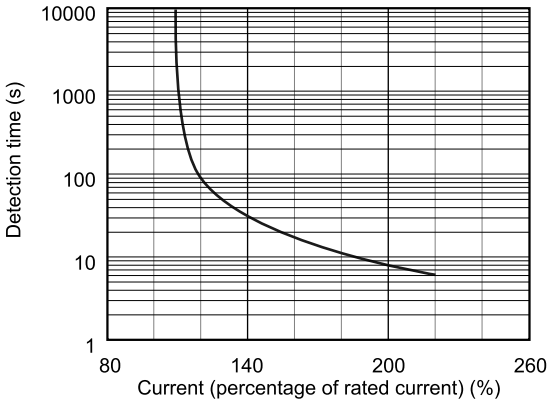

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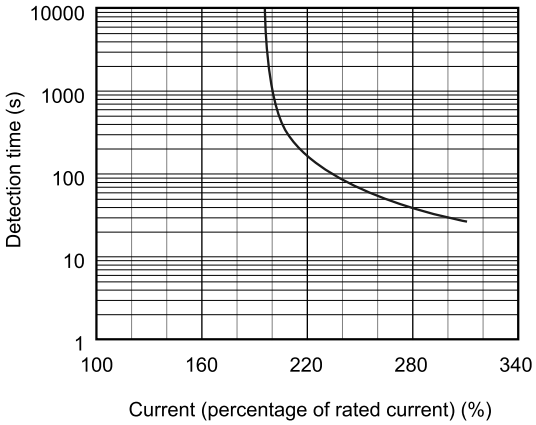

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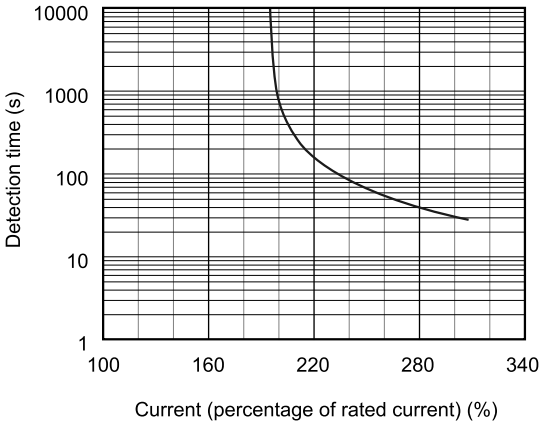

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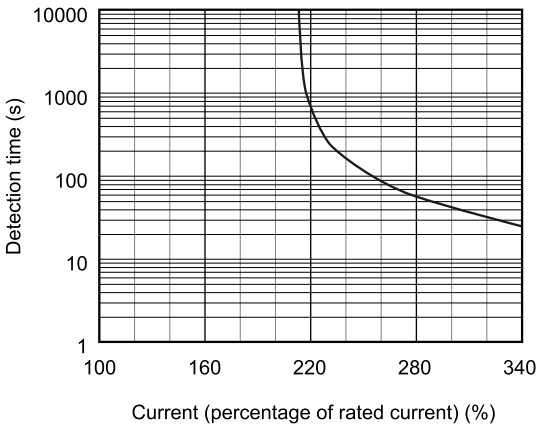

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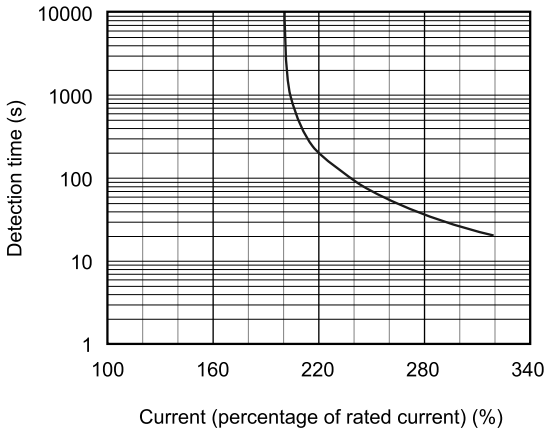

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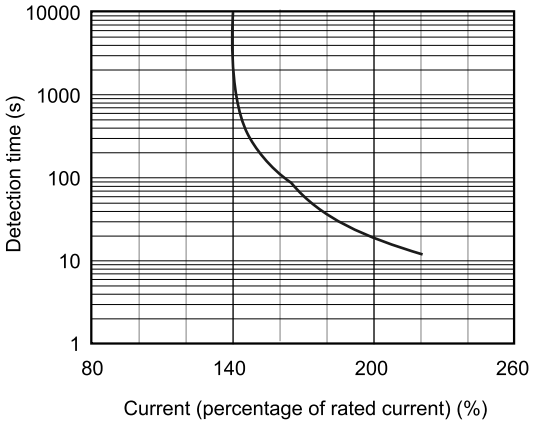

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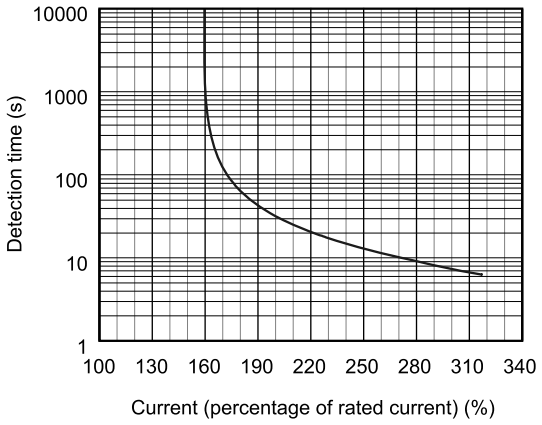

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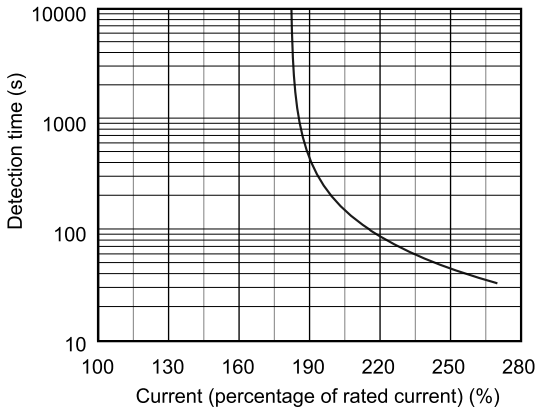

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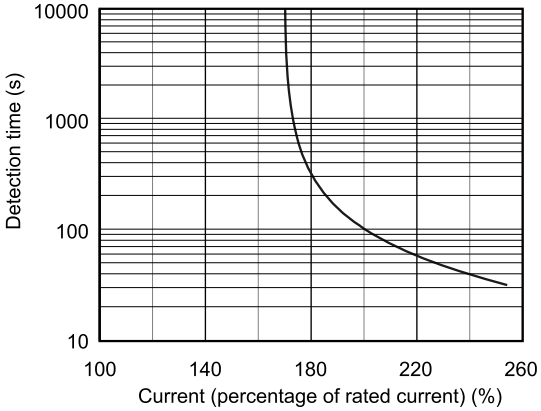

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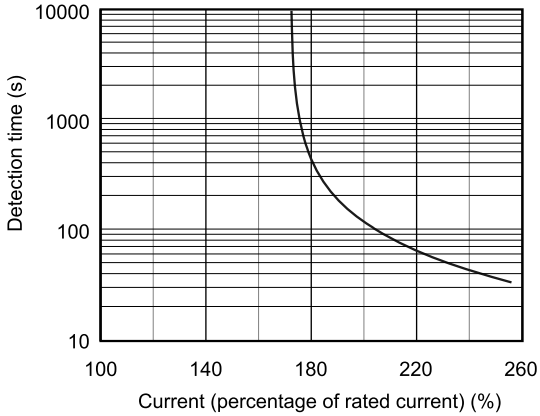

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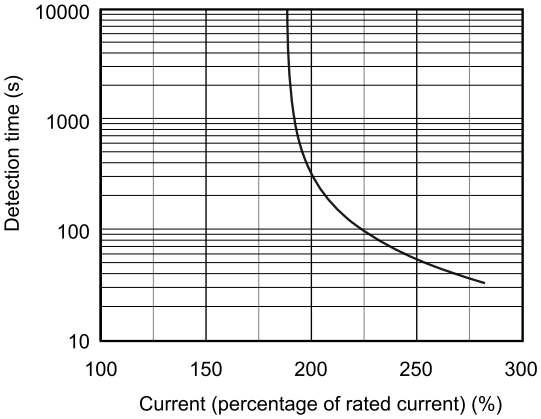

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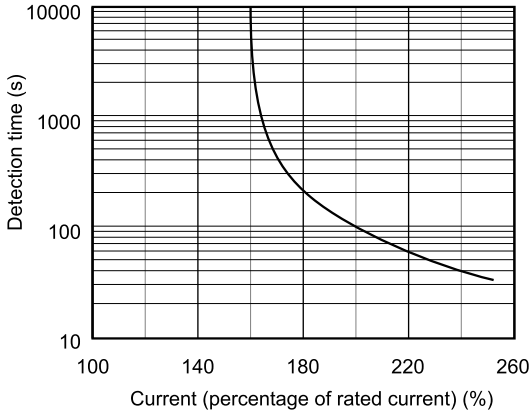

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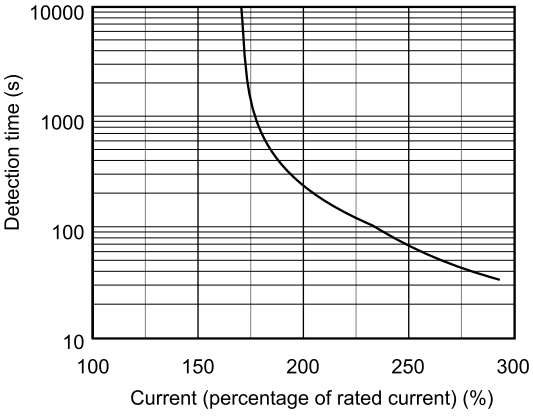

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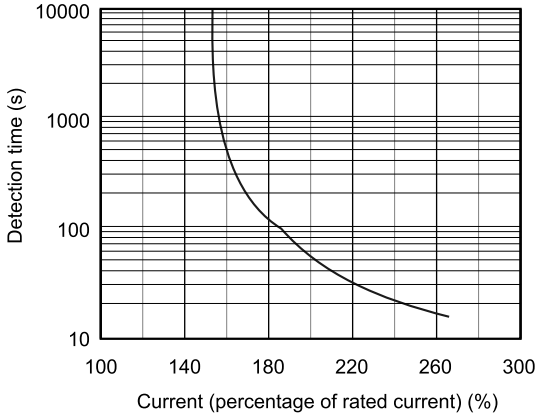

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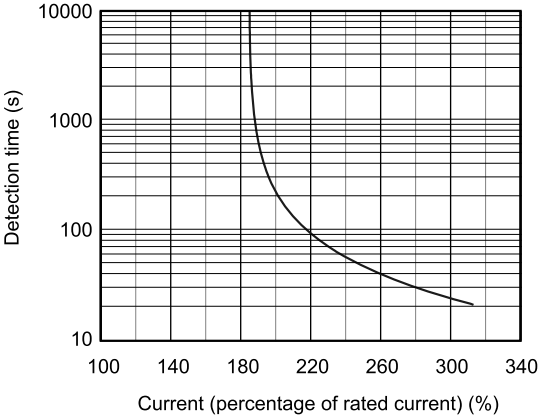

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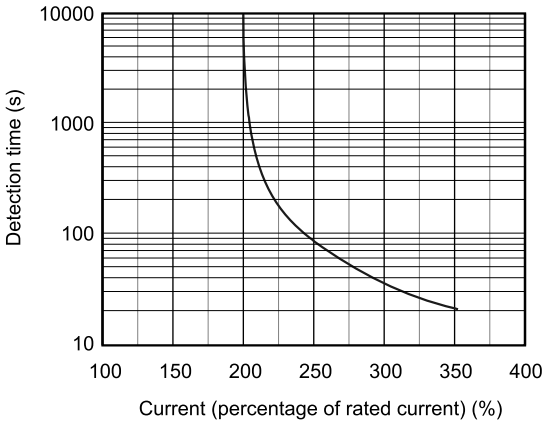

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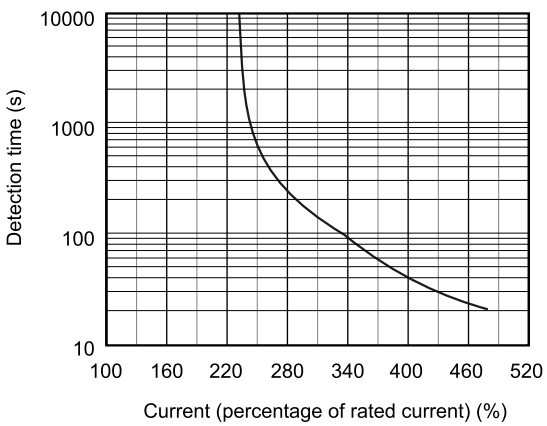
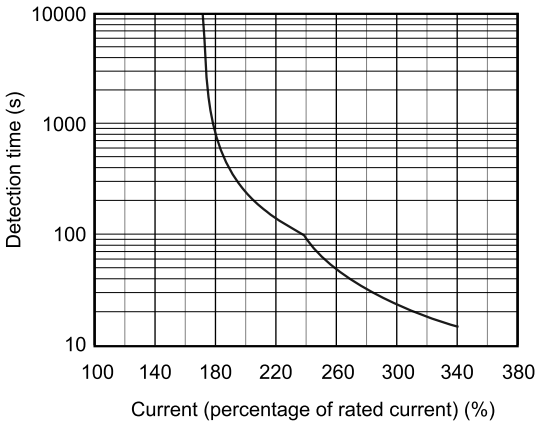
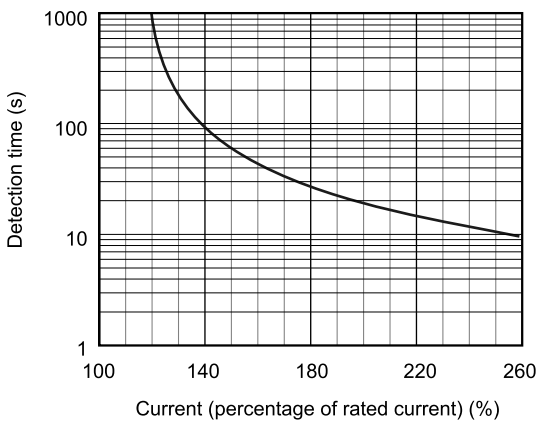


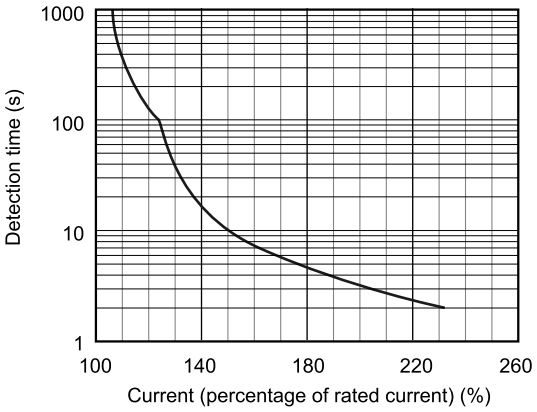
SGM7D-38J



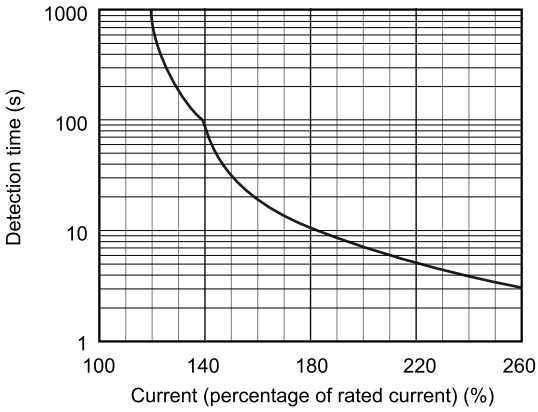
SGM7D-02K



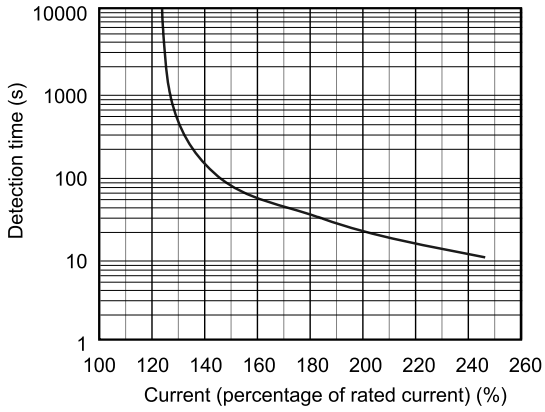
SGM7D-06K



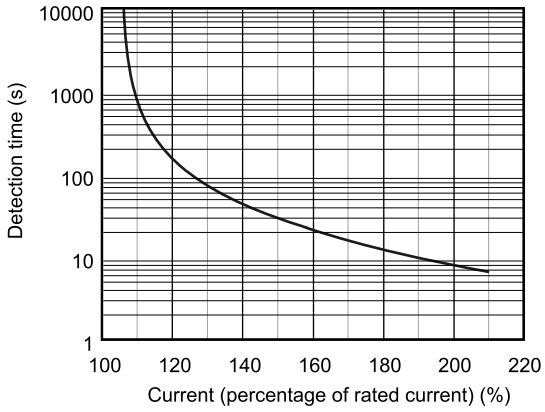
SGM7D-08K



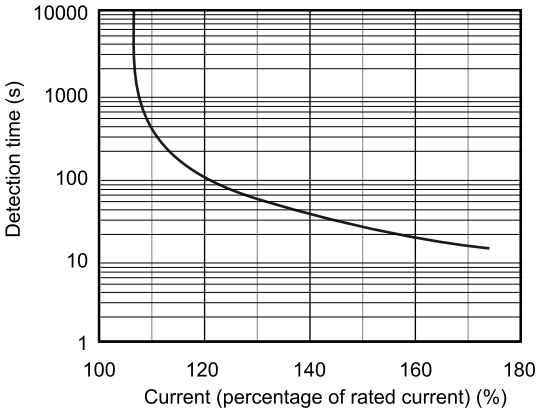
SGM7D-06L



SGM7D-12L



SGM7D-30L



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. Refer to the following section for details on the effective torque.

☞ *Torque-Motor Speed Characteristics on page 120*

Allowable Load Moment of Inertia

The allowable load moments of inertia (motor moment of inertia ratios) for the servomotors are given in "*Ratings on page 116*". The values are determined by the regenerative energy processing capacity of the SERVOPACK and are also affected by the drive conditions of the servomotor. Use the SigmaSize+ AC servo capacity selection program to check the driving conditions. Perform the required steps for each of the following cases.

*1 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). Install an external regenerative resistor when the built-in regenerative resistor cannot process all of the regenerative power.

Refer to the following section for the regenerative power (W) that can be processed by the SERVOPACKs.

☞ *Specifications of Built-in Regenerative Resistors in SERVOPACKs on page 478*

■ When an External Regenerative Resistor Is Required

Install the external regenerative resistor which is selected with the SigmaSize+. Contact your Yaskawa representative for information on SigmaSize+.

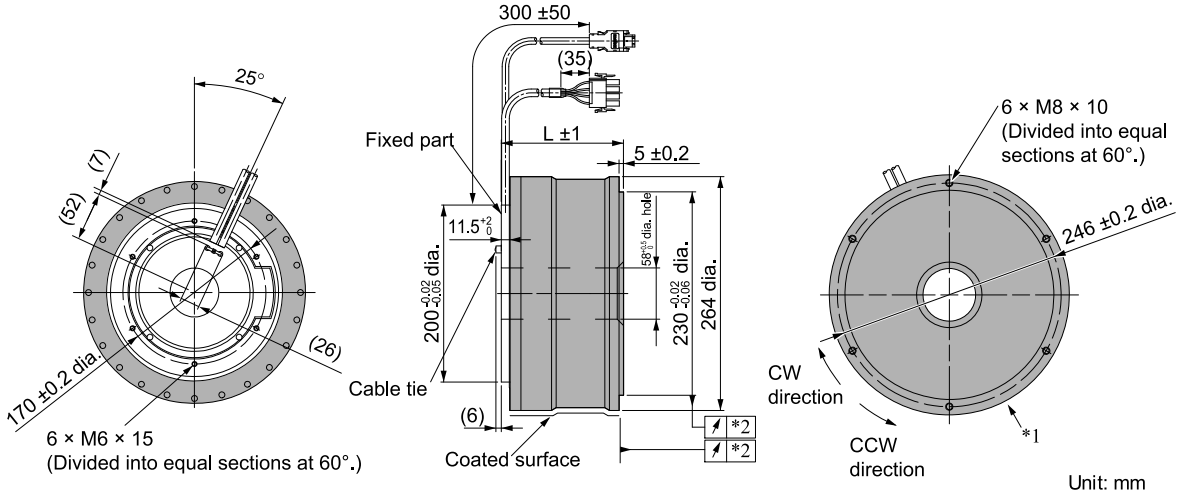
Refer to the following section for information on the external regenerative resistors.

☞ *Specifications and Dimensions of External Regenerative Resistors on page 479*

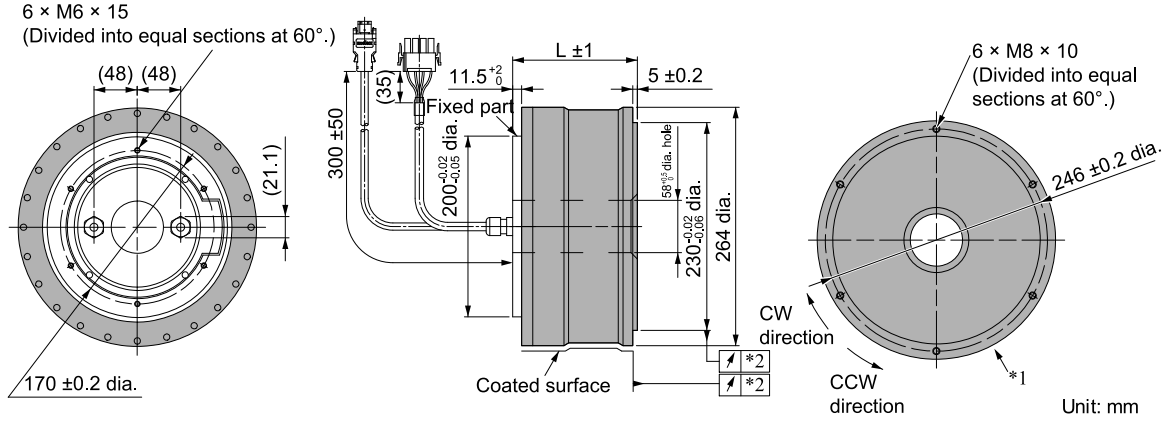
External Dimensions

SGM7D-□□F

· Servomotors with the Cable on the Side



· Servomotors with the Cable on the Bottom



*1 The shaded section indicates the rotating parts.

*2 The precision depends on the option specification. For details, refer to the following section.

☞ *Specifications on page 113*

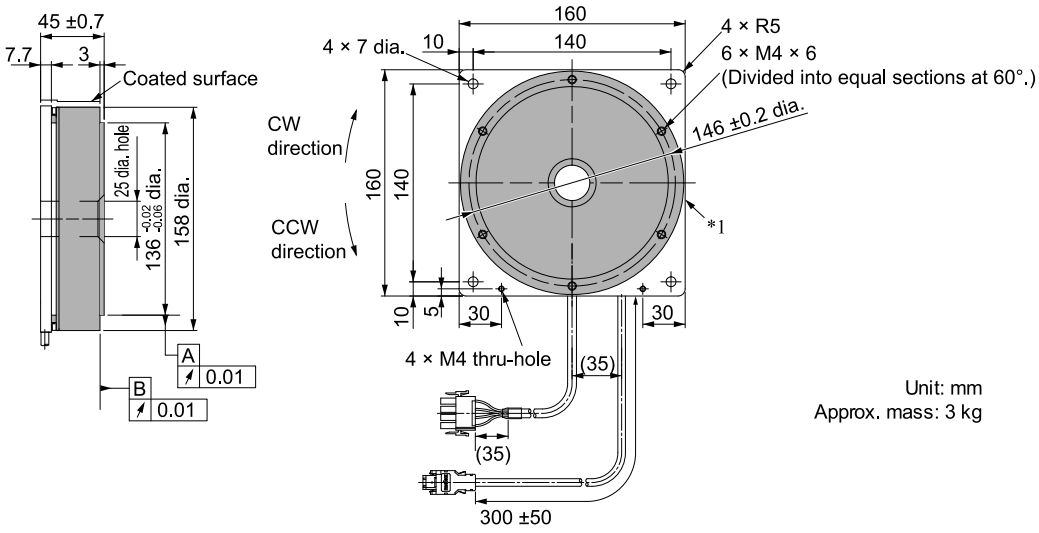
Note:

Values in parentheses are reference dimensions.

Model: SGM7D-	L	Approx. mass [kg]
30F□C□□	113 ±1	14.5
58F□C□□	138 ±1	19
90F□C□□	163 ±1	24
1AF□C□□	188 ±1	29

SGM7D-01G

· Servomotors with the Cable on the Side



Unit: mm
Approx. mass: 3 kg

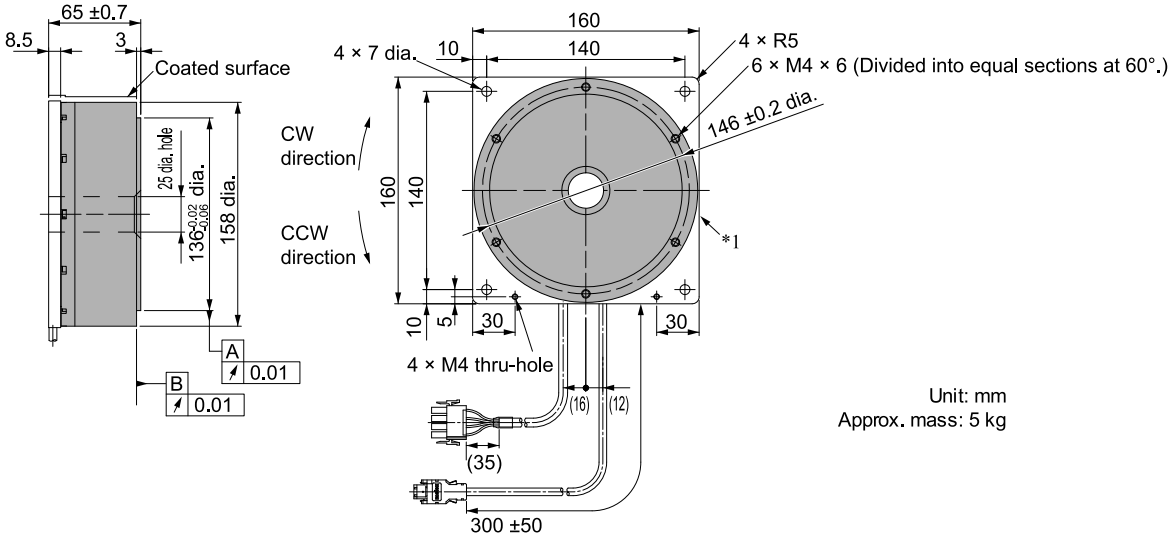
*1 The shaded section indicates the rotating parts.

Note:

Values in parentheses are reference dimensions.

SGM7D-05G

· Servomotors with the Cable on the Side



Unit: mm
Approx. mass: 5 kg

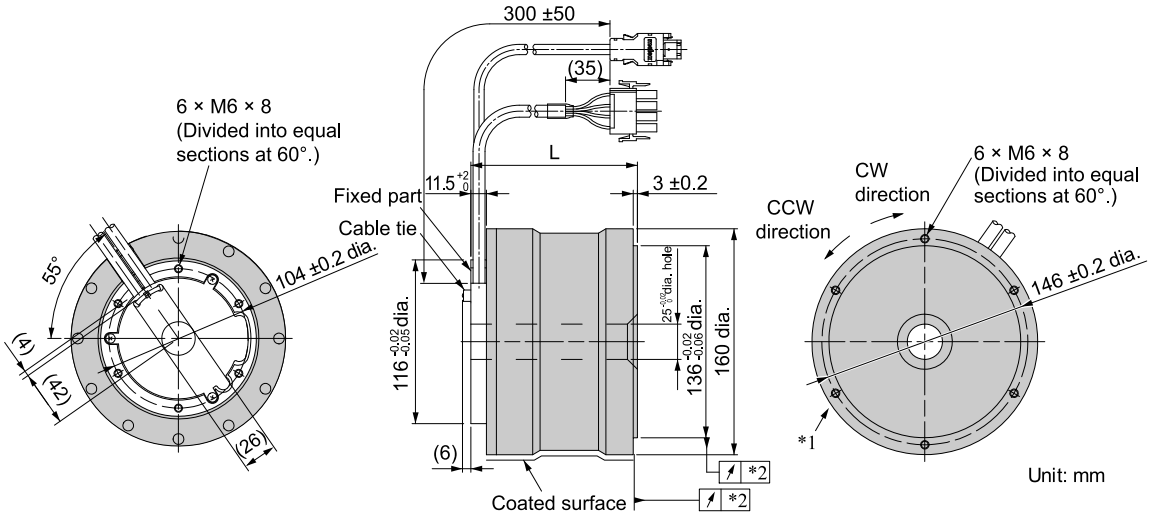
*1 The shaded section indicates the rotating parts.

Note:

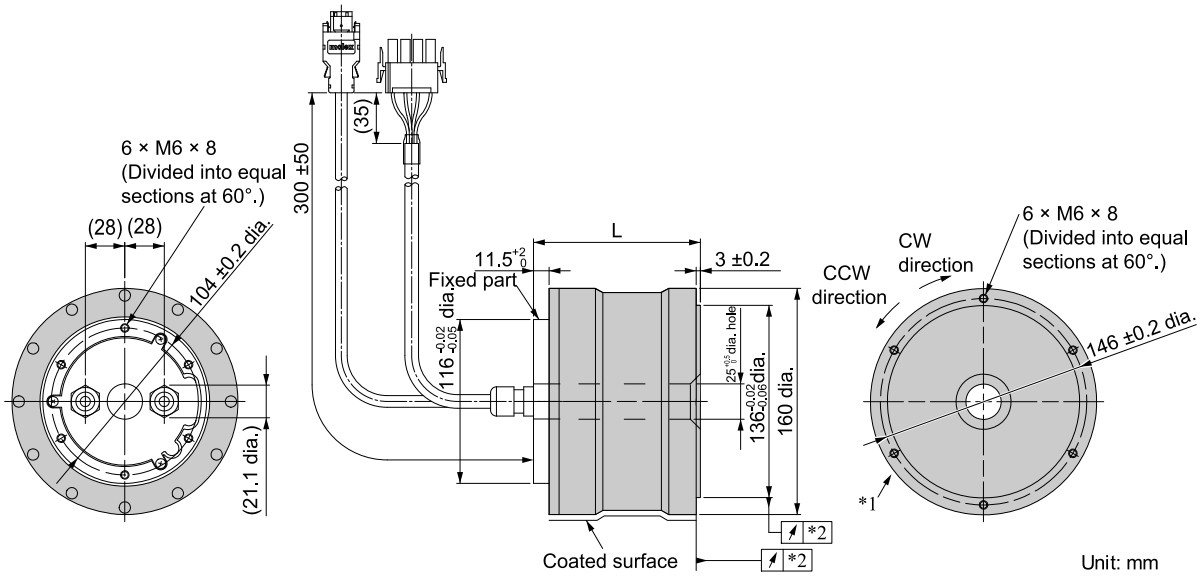
Values in parentheses are reference dimensions.

SGM7D-08G , -18G , -24G , -34G , -45G

· Servomotors with the Cable on the Side



· Servomotors with the Cable on the Bottom



*1 The shaded section indicates the rotating parts.

*2 The precision depends on the option specification. For details, refer to the following section.

☞ *Specifications on page 113*

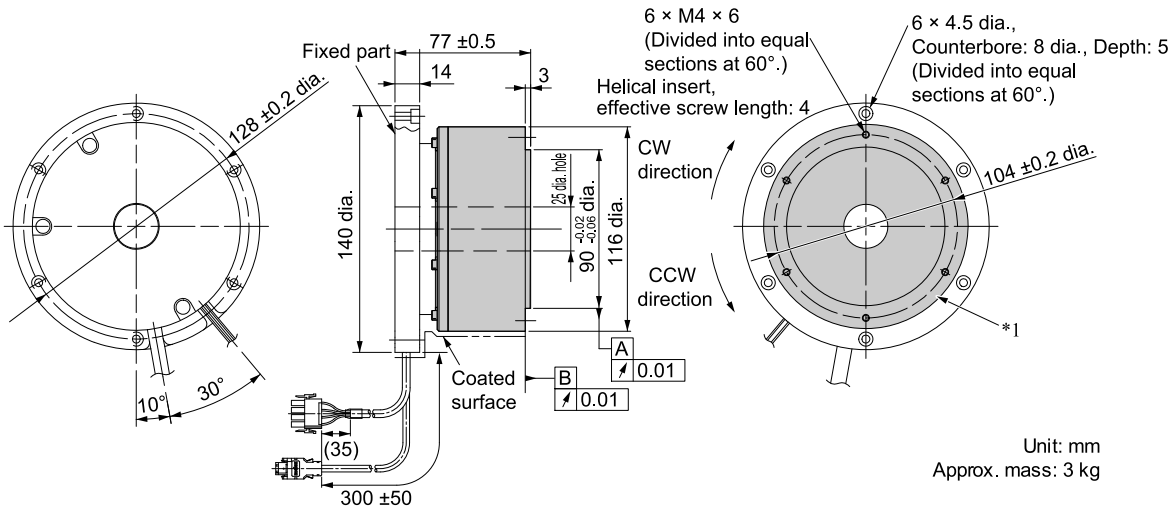
Note:

Values in parentheses are reference dimensions.

Model: SGM7D-	L	Approx. mass [kg]
08G□C□□	92.5 ±1	5.5
18G□C□□	118 ±1	7.5
24G□C□□	143 ±1	9.5
34G□C□□	168 ±1	12
45G□C□□	194 ±1	14

SGM7D-03H

· Servomotors with the Cable on the Side



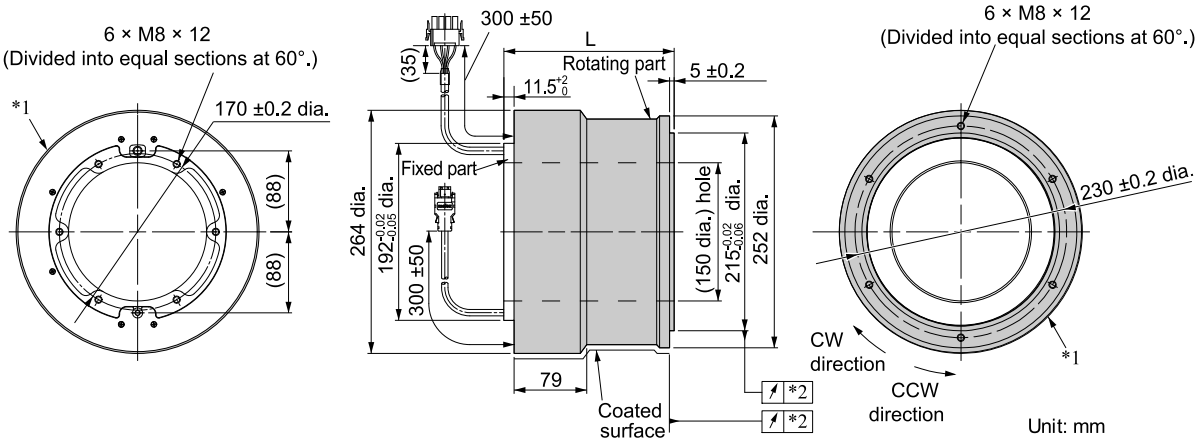
*1 The shaded section indicates the rotating parts.

Note:

Values in parentheses are reference dimensions.

SGM7D-□□I

· Servomotors with the Cable on the Bottom



*1 The shaded section indicates the rotating parts.

*2 The precision depends on the option specification. For details, refer to the following section.

☞ *Specifications on page 113*

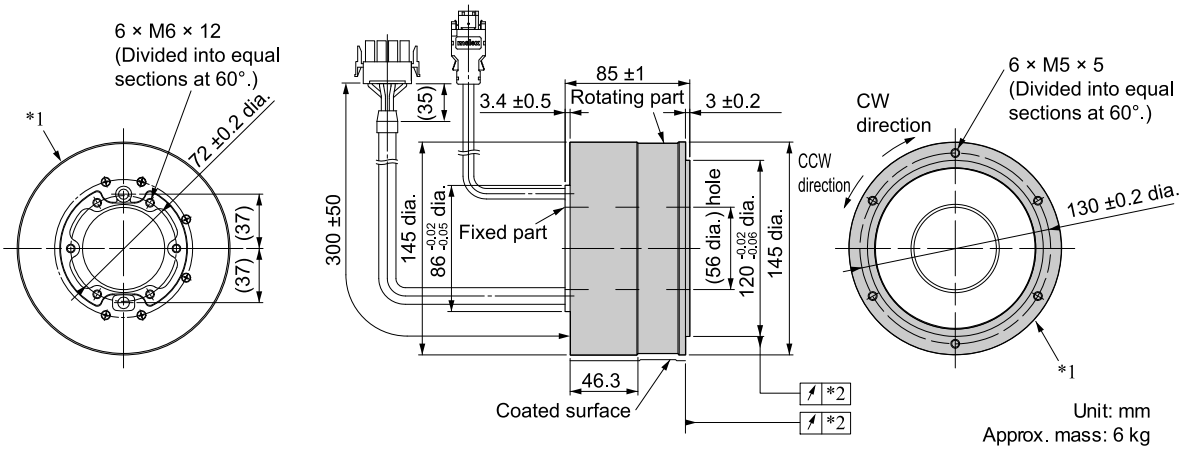
Note:

Values in parentheses are reference dimensions.

Model: SGM7D-	L	Approx. mass [kg]
28I□C5□	158 ±1	23
70I□C5□	185 ±1	28
1ZI□C5□	212 ±1	33
1CI□C5□	250 ±1	45
2BI□C5□	304 ±1	55
2DI□C5□	358 ±1	65

SGM7D-06J

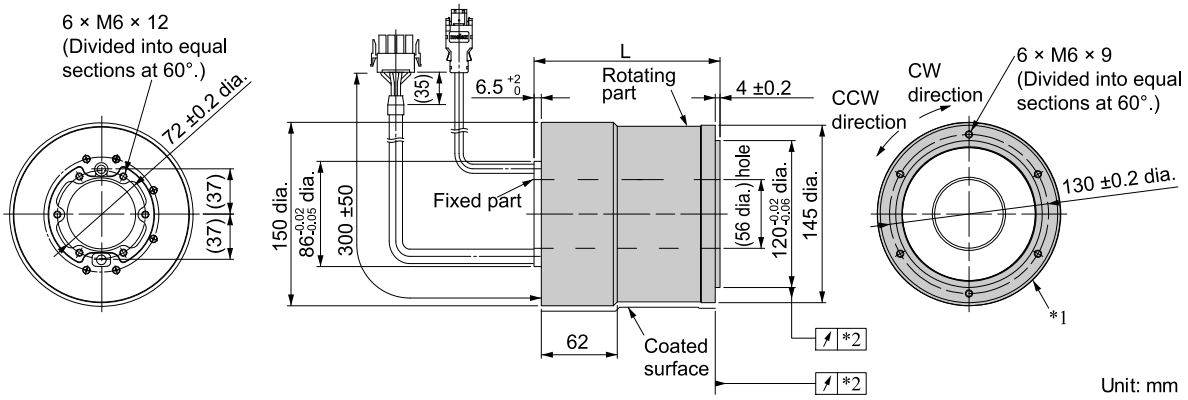
· Servomotors with the Cable on the Bottom



*1 The shaded section indicates the rotating parts.
*2 The precision depends on the option specification. For details, refer to the following section.
☞ *Specifications on page 113*

SGM7D-09J, -18J, -20J, -38J

· Servomotors with the Cable on the Bottom



*1 The shaded section indicates the rotating parts.
*2 The precision depends on the option specification. For details, refer to the following section.
☞ *Specifications on page 113*

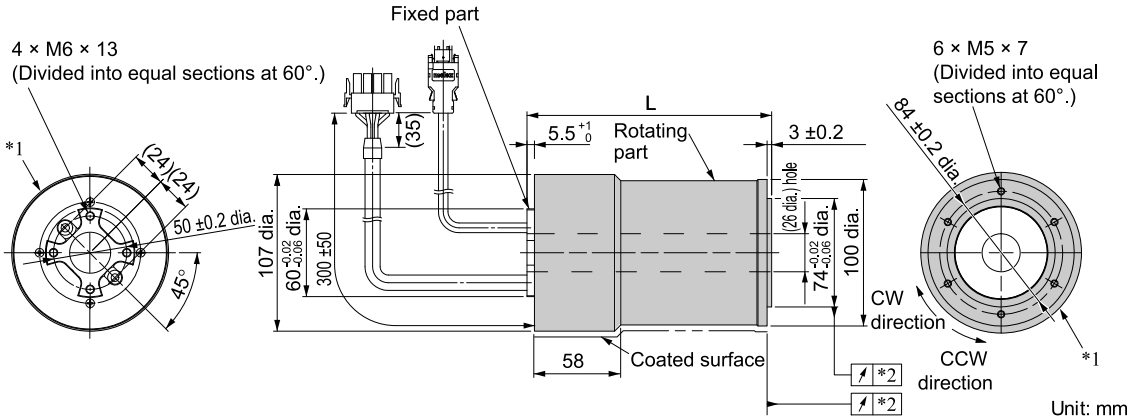
Note:

Values in parentheses are reference dimensions.

Model: SGM7D-	L	Approx. mass [kg]
09J□C5□	123 ±1	8.0
18J□C5□	151 ±1	11.0
20J□C5□	179 ±1	13.0
38J□C5□	207 ±1	15.5

SGM7D-□□K

· Servomotors with the Cable on the Bottom



*1 The shaded section indicates the rotating parts.

*2 The precision depends on the option specification. For details, refer to the following section.

☞ *Specifications on page 113*

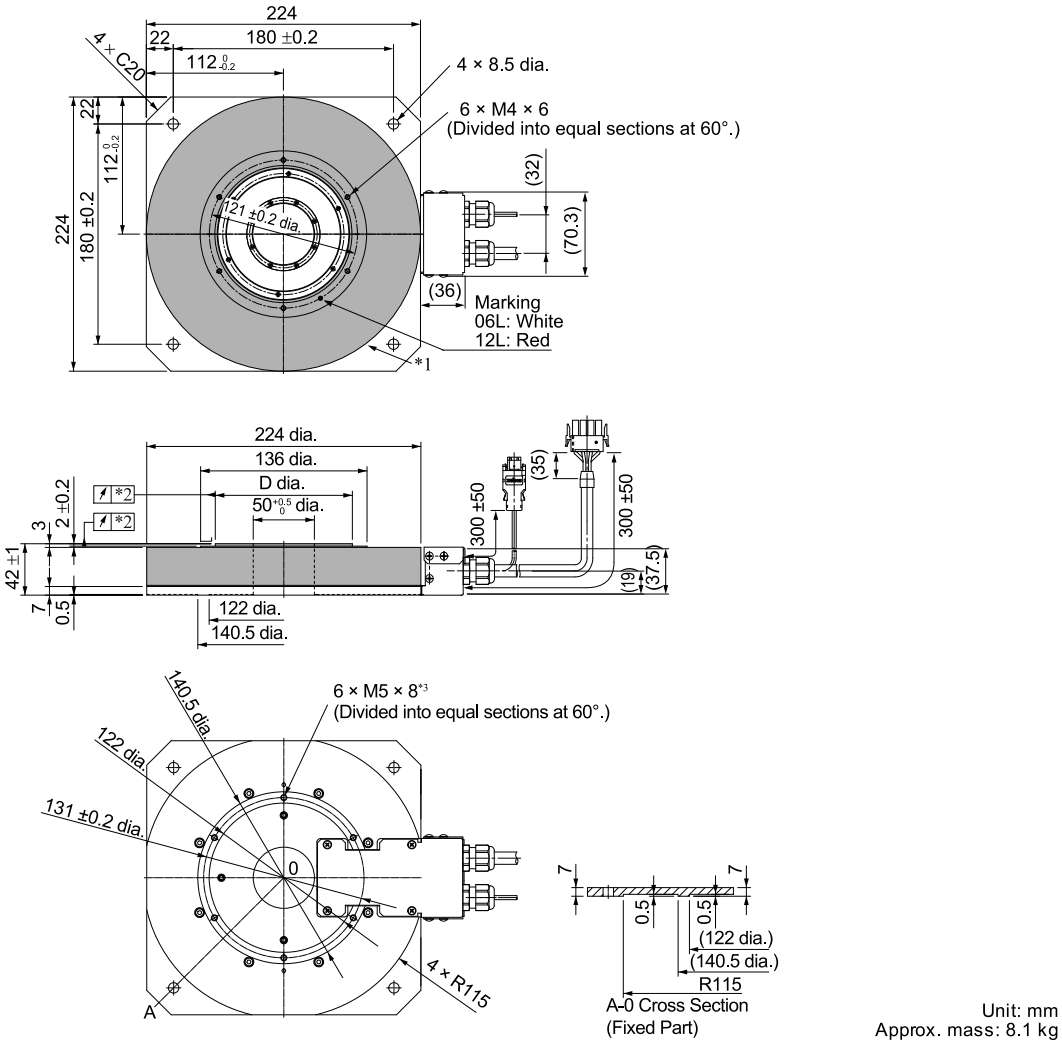
Note:

Values in parentheses are reference dimensions.

Model: SGM7D-	L	Approx. mass [kg]
02K□C5□	113 ±1	4.0
06K□C5□	140 ±1	5.0
08K□C5□	167 ±1	6.5

SGM7D-06L, -12L

· Servomotors with the Cable on the Side



Unit: mm
Approx. mass: 8.1 kg

*1 The shaded section indicates the rotating parts.

*2 The precision depends on the option specification. For details, refer to the following section.

☞ *Specifications on page 113*

*3 In the following cases, rigidity is required in the servomotor. Therefore, secure the servomotor with these holes.

- There is a fluctuating vertical load on the servomotor.
- There is a moment load on the servomotor.
- The servomotor is used hanging upside down.

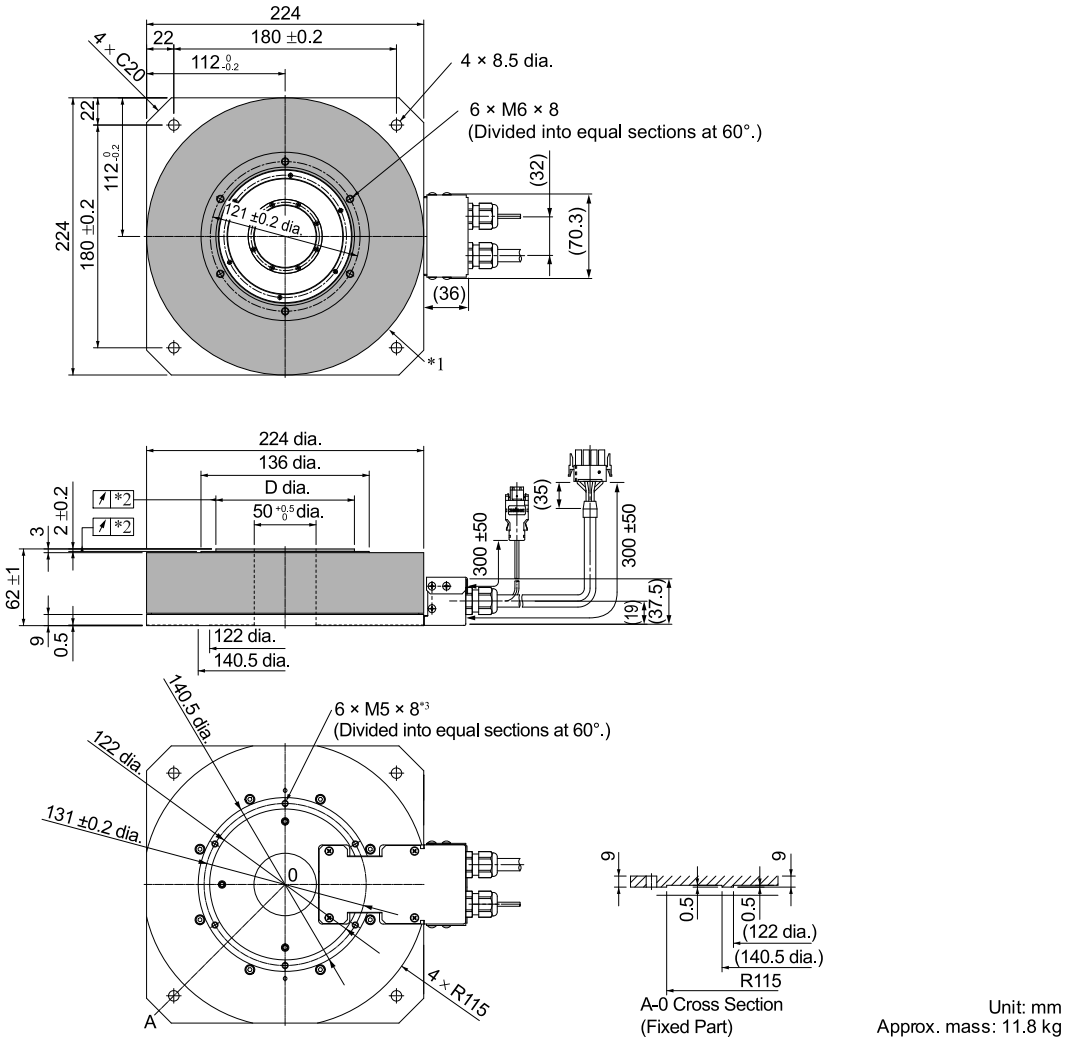
Note:

Values in parentheses are reference dimensions.

Model: SGM7D-	D
□□L□C42 (High mechanical precision)	$111.9^{-0.02}_{-0.06}$
□□L□C41 (Standard mechanical precision)	$112^{-0.02}_{-0.06}$

SGM7D-30L

· Servomotors with the Cable on the Side



*1 The shaded section indicates the rotating parts.

*2 The precision depends on the option specification. For details, refer to the following section.

☞ *Specifications on page 113*

*3 In the following cases, rigidity is required in the servomotor. Therefore, secure the servomotor with these holes.

- There is a fluctuating vertical load on the servomotor.
- There is a moment load on the servomotor.
- The servomotor is used hanging upside down.

Note:

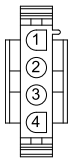
Values in parentheses are reference dimensions.

Model: SGM7D-	D
30L□C41 (Standard mechanical precision)	$112^{-0.02}_{-0.06}$
30L□C42 (High mechanical precision)	$111.9^{-0.02}_{-0.06}$

Connector Specifications

SGM7D-□□F

· Servomotor Connector



1	Phase U	Red
2	Phase V	Gray
3	Phase W	Blue
4	FG (frame ground)	Green (yellow)

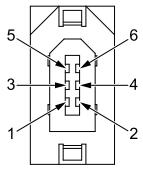
Model

- Plug: 350779-1
- Pins: 350218-3 or 350547-3 (No.1 to 3)
- Ground pin: 350654-1 or 350669-1 (No. 4)
  Manufacturer: Tyco Electronics Japan G.K.

Mating Connector

- Cap: 350780-1
- Socket: 350536-3 or 350550-3

· Encoder Connector



1	PG5V
2	PG0V
3 **1*	BAT
4 **1*	BAT0
5	PS
6	/PS
Connector case	FG (frame ground)

*1 A battery is required only for a multiturn absolute encoder.

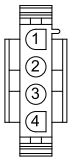
Model: 55102-0600

Manufacturer: Molex Japan LLC

Mating connector: 54280-0609

SGM7D-05G

· Servomotor Connector



1	Phase U	Red
2	Phase V	Gray
3	Phase W	Blue
4	FG (frame ground)	Green

Model

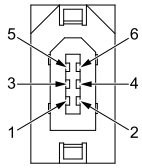
- Plug: 350779-1
- Pins: 350561-3 or 350690-3 (No.1 to 3)
- Ground pin: 350654-1 or 350669-1 (No. 4)

Manufacturer: Tyco Electronics Japan G.K.

Mating Connector

- Cap: 350780-1
- Socket: 350570-3 or 350689-3

· Encoder Connector



1	PG5V
2	PG0V
3 **1*	BAT
4 **1*	BAT0
5	PS
6	/PS
Connector case	FG (frame ground)

*1 A battery is required only for a multiturn absolute encoder.

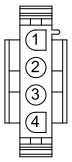
Model: 55102-0600

Manufacturer: Molex Japan LLC

Mating connector: 54280-0609

SGM7D-08G，-18G，-24G，-34G，-45G

· Servomotor Connector



1	Phase U	Red
2	Phase V	Gray
3	Phase W	Blue
4	FG (frame ground)	Green (yellow)

Model

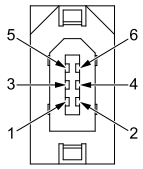
- Plug: 350779-1
- Pins: 350218-3 or 350547-3 (No.1 to 3)
- Ground pin: 350654-1 or 350669-1 (No. 4)

Manufacturer: Tyco Electronics Japan G.K.

Mating Connector

- Cap: 350780-1
- Socket: 350536-3 or 350550-3

· Encoder Connector



1	PG5V
2	PG0V
3 **1*	BAT
4 **1*	BAT0
5	PS
6	/PS
Connector case	FG (frame ground)

*1 A battery is required only for a multiturn absolute encoder.

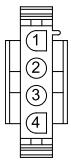
Model: 55102-0600

Manufacturer: Molex Japan LLC

Mating connector: 54280-0609

SGM7D-03H

· Servomotor Connector



1	Phase U	Red
2	Phase V	Gray
3	Phase W	Blue
4	FG (frame ground)	Green

Model

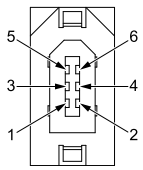
- Plug: 350779-1
- Pins: 350561-3 or 350690-3 (No.1 to 3)
- Ground pin: 350654-1 or 350669-1 (No. 4)

Manufacturer: Tyco Electronics Japan G.K.

Mating Connector

- Cap: 350780-1
- Socket: 350570-3 or 350689-3

· Encoder Connector



1	PG5V
2	PG0V
3 **1*	BAT
4 **1*	BAT0
5	PS
6	/PS
Connector case	FG (frame ground)

*1 A battery is required only for a multiturn absolute encoder.

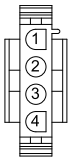
Model: 55102-0600

Manufacturer: Molex Japan LLC

Mating connector: 54280-0609

SGM7D-□□I

· Servomotor Connector



1	Phase U	Red
2	Phase V	Gray
3	Phase W	Blue
4	FG (frame ground)	Green (yellow)

Model

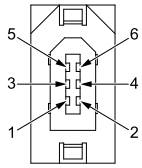
- Plug: 350779-1
- Pins: 350218-3 or 350547-3 (No.1 to 3)
- Ground pin: 350654-1 or 350669-1 (No. 4)

Manufacturer: Tyco Electronics Japan G.K.

Mating Connector

- Cap: 350780-1
- Socket: 350536-3 or 350550-3

· Encoder Connector



1	PG5V
2	PG0V
3 **1*	BAT
4 **1*	BAT0
5	PS
6	/PS
Connector case	FG (frame ground)

*1 A battery is required only for a multiturn absolute encoder.

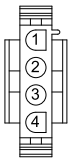
Model: 55102-0600

Manufacturer: Molex Japan LLC

Mating connector: 54280-0609

SGM7D-09J, -18J, -20J, -38J

· Servomotor Connector



1	Phase U	Red
2	Phase V	Gray
3	Phase W	Blue
4	FG (frame ground)	Green (yellow)

Model

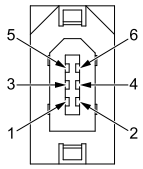
- Plug: 350779-1
- Pins: 350218-3 or 350547-3 (No.1 to 3)
- Ground pin: 350654-1 or 350669-1 (No. 4)

Manufacturer: Tyco Electronics Japan G.K.

Mating Connector

- Cap: 350780-1
- Socket: 350536-3 or 350550-3

· Encoder Connector



1	PG5V
2	PG0V
3 **1*	BAT
4 **1*	BAT0
5	PS
6	/PS
Connector case	FG (frame ground)

*1 A battery is required only for a multiturn absolute encoder.

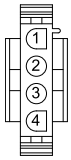
Model: 55102-0600

Manufacturer: Molex Japan LLC

Mating connector: 54280-0609

SGM7D-□□K

· Servomotor Connector



1	Phase U	Red
2	Phase V	Gray
3	Phase W	Blue
4	FG (frame ground)	Green

Model

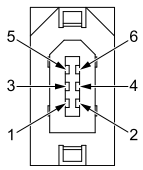
- Plug: 350779-1
- Pins: 350561-3 or 350690-3 (No.1 to 3)
- Ground pin: 350654-1 or 350669-1 (No. 4)

Manufacturer: Tyco Electronics Japan G.K.

Mating Connector

- Cap: 350780-1
- Socket: 350570-3 or 350689-3

· Encoder Connector



1	PG5V
2	PG0V
3 **1*	BAT
4 **1*	BAT0
5	PS
6	/PS
Connector case	FG (frame ground)

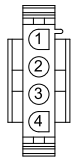
*1 A battery is required only for a multiturn absolute encoder.

Model: 55102-0600 Manufacturer: Molex Japan LLC

Mating connector: 54280-0609

SGM7D-06L, -12L

· Servomotor Connector



1	Phase U	Red
2	Phase V	Gray
3	Phase W	Blue
4	FG (frame ground)	Green (yellow)

Model

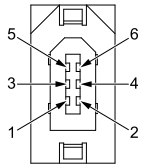
- Plug: 350779-1
- Pins: 350218-3 or 350547-3 (No.1 to 3)
- Ground pin: 350654-1 or 350669-1 (No. 4)

Manufacturer: Tyco Electronics Japan G.K.

Mating Connector

- Cap: 350780-1
- Socket: 350536-3 or 350550-3

· Encoder Connector



1	PG5V
2	PG0V
3 *1*	BAT
4 *1*	BAT0
5	PS
6	/PS
Connector case	FG (frame ground)

*1 A battery is required only for a multiturn absolute encoder.

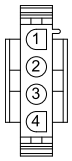
Model: 55102-0600

Manufacturer: Molex Japan LLC

Mating connector: 54280-0609

SGM7D-30L

· Servomotor Connector



1	Phase U	Red
2	Phase V	Gray
3	Phase W	Blue
4	FG (frame ground)	Green (yellow)

Model

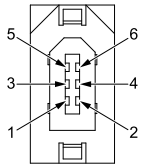
- Plug: 350779-1
- Pins: 350218-3 or 350547-3 (No.1 to 3)
- Ground pin: 350654-1 or 350669-1 (No. 4)

Manufacturer: Tyco Electronics Japan G.K.

Mating Connector

- Cap: 350780-1
- Socket: 350536-3 or 350550-3

· Encoder Connector



1	PG5V
2	PG0V
3 *1*	BAT
4 *1*	BAT0
5	PS
6	/PS
Connector case	FG (frame ground)

*1 A battery is required only for a multiturn absolute encoder.

Model: 55102-0600

Manufacturer: Molex Japan LLC

Mating connector: 54280-0609

SGM7E

Model Designations

SGM7E - 02 B 7 A 1 1

Direct drive servomotors: SGM7E

❶ 02 ❷ B ❸ 7 ❹ A ❺ 1 ❻ 1

❶ Rated Output

Code	Specification
02	2.00 N·m
04	4.00 N·m
05	5.00 N·m
07	7.00 N·m
08	8.00 N·m
10	10.0 N·m
14	14.0 N·m
16	16.0 N·m
17	17.0 N·m
25	25.0 N·m
35	35.0 N·m

❷ Servomotor Outer Diameter

Code	Specification
B	135-mm dia.
C	175-mm dia.
D	230-mm dia.
E	290-mm dia.

❸ Serial Encoder

Code	Specification
7	24-bit multiturn absolute encoder*1
F	24-bit incremental encoder*1

❹ Design Revision Order

A

❺ Flange

Code	Mounting
1	Non-load side
4	Non-load side (with cable on side)

❻ Options

Code	Specification
1	Without options
2	High machine precision (runout at end of shaft and runout of shaft surface: 0.01 mm)

*1 The encoder can be used as a single-turn absolute encoder by setting a parameter.

Note:

1. Direct drive servomotors are not available with holding brakes.
2. This information is provided to explain model numbers. It is not meant to imply that models are available for all combinations of codes.

Manufactured Models

Rated Torque N·m	Servomotor Outer Diameter			
	B (135-mm dia.)	C (175-mm dia.)	D (230-mm dia.)	E (290-mm dia.)
2.00	SGM7E-02B	-	-	-
4.00	-	SGM7E-04C	-	-
5.00	SGM7E-05B	-	-	-
7.00	SGM7E-07B	-	-	-
8.00	-	-	SGM7E-08D	-
10.0	-	SGM7E-10C	-	-
14.0	-	SGM7E-14C	-	-
16.0	-	-	-	SGM7E-16E
17.0	-	-	SGM7E-17D	-
25.0	-	-	SGM7E-25D	-
35.0	-	-	-	SGM7E-35E

Note:

The above table shows combinations of the rated torque and outer diameter. The fourth through seventh digits have been omitted.

Specifications and Ratings

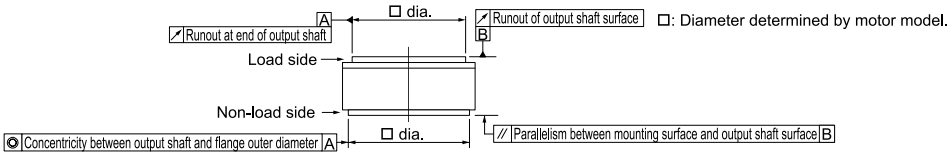
Specifications

Voltage			200 V									
Model: SGM7E-			02B	05B	07B	04C	10C	14C	08D	17D	25D	16E	35E
Time Rating			Continuous									
Thermal Class			A									
Insulation Resistance			500 VDC, 10 MΩ min.									
Withstand Voltage			1500 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									
Absolute Accuracy			±15 s									
Repeatability			±1.3 s									
Protective Structure *2			Totally enclosed, self-cooled, IP42 (The protective structure is IP40 for CE Marking.)									
Environmental Conditions	Surrounding Air Temperature		0°C to 40°C (with no freezing)									
	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 1000 m or less. • 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)									
Mechanical Tolerances *3	Runout of Output Shaft Surface	mm	0.02 (0.01 for high machine precision option)									
	Runout at End of Output Shaft	mm	0.04 (0.01 for high machine precision option)									
	Parallelism between Mounting Surface and Output Shaft Surface	mm	0.07						0.08			
	Concentricity between Output Shaft and Flange Outer Diameter	mm	0.07						0.08			
Impact Resistance *4	Impact Acceleration at Flange		490 m/s²									
	Number of Impacts		2 times									
Vibration Resistance *4	Vibration Acceleration at Flange		49 m/s²									
Applicable SERVOPACKs		SGDXS-	2R8A									5R5A
		SGDXW-										

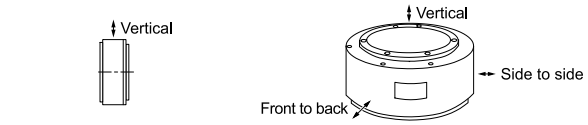
*1 A vibration class of V15 indicates a vibration amplitude of 15 μm maximum on the servomotor without a load at the rated rotation speed.

*2 The hollow hole section, motor mounting surface, output shaft surface, and gap around the rotating part of the shaft are excluded. Protective structure specifications apply only when the special cable is used. The protective structure is IP40 for CE Marking.

*3 Refer to the following figure for the relevant locations on the servomotor. Refer to the dimensional drawings of the individual servomotors for more information on tolerances.



*4 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. Check the vibration acceleration.



Shock Applied to the Servomotor

Vibration Applied to the Servomotor

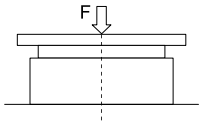
Ratings

Voltage			200 V										
Model: SGM7E-			02B	05B	07B	04C	10C	14C	08D	17D	25D	16E	35E
Rated Output *1		W	42	105	147	84	209	293	168	356	393	335	550
Rated Torque *2		N·m	2.00	5.00	7.00	4.00	10.0	14.0	8.00	17.0	25.0	16.0	35.0
Instantaneous Maximum Torque *1		N·m	6.00	15.0	21.0	12.0	30.0	42.0	24.0	51.0	75.0	48.0	105
Stall Torque *1		N·m	2.05	5.15	7.32	4.09	10.1	14.2	8.23	17.4	25.4	16.5	35.6
Rated Current *1		Arms	1.8	1.7	1.4	2.2		2.8	1.9	2.5	2.6	3.3	3.5
Instantaneous Maximum Current *1		Arms	5.4	5.1	4.1	7.0		8.3	5.6	7.5	8.0	9.4	10.0
Rated Rotation Speed *1		min^{-1}	200			200			200		150	200	150
Maximum Rotation Speed *1		min^{-1}	500			500	400	300	500	350	250	500	250
Torque Constant		N·m/Arms	1.18	3.17	5.44	2.04	5.05	5.39	5.10	7.79	10.8	5.58	11.1
Rotor Moment of Inertia		$\times 10^{-4}$ kg·m^2	28.0	51.0	77.0	77.0	140	220	285	510	750	930	1430
Rated Power Rate *1		kW/s	1.43	4.90	6.36	2.08	7.14	8.91	2.25	5.67	8.33	2.75	8.57
Rated Angular Acceleration *1		rad/s^2	710	980	910	520	710	640	280	330		170	240
Heat Sink Size		mm	350 × 350 × 12			450 × 450 × 12			550 × 550 × 12			650 × 650 × 12	
Allowable Load Moment of Inertia (Motor Moment of Inertia Ratio)		times	10				5	3					
	With external regenerative resistor	times	10				5	3					
Allowable Load *3	Allowable Thrust Load	N	1500			3300			4000			11000	
	Allowable Moment Load	N·m	40	50	64	70	75	90	93	103	135	250	320

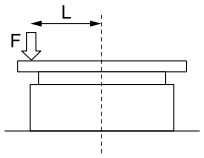
*1 These values are for operation in combination with a SERVOPACK when the temperature of the armature winding is 100°C. The values for other items are at 20°C. These are typical values.

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

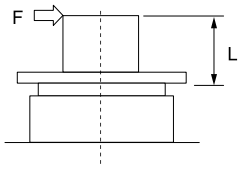
*3 The thrust loads and moment loads that are applied while a servomotor is operating are roughly classified into the following patterns. Design the machine so that the thrust loads or moment loads will not exceed the values given in the table.



Where F is the external force,
Thrust load = F + Load mass
Moment load = 0



Where F is the external force,
Thrust load = F + Load mass
Moment load = F × L



Where F is the external force,
Thrust load = Load mass
Moment load = F × L

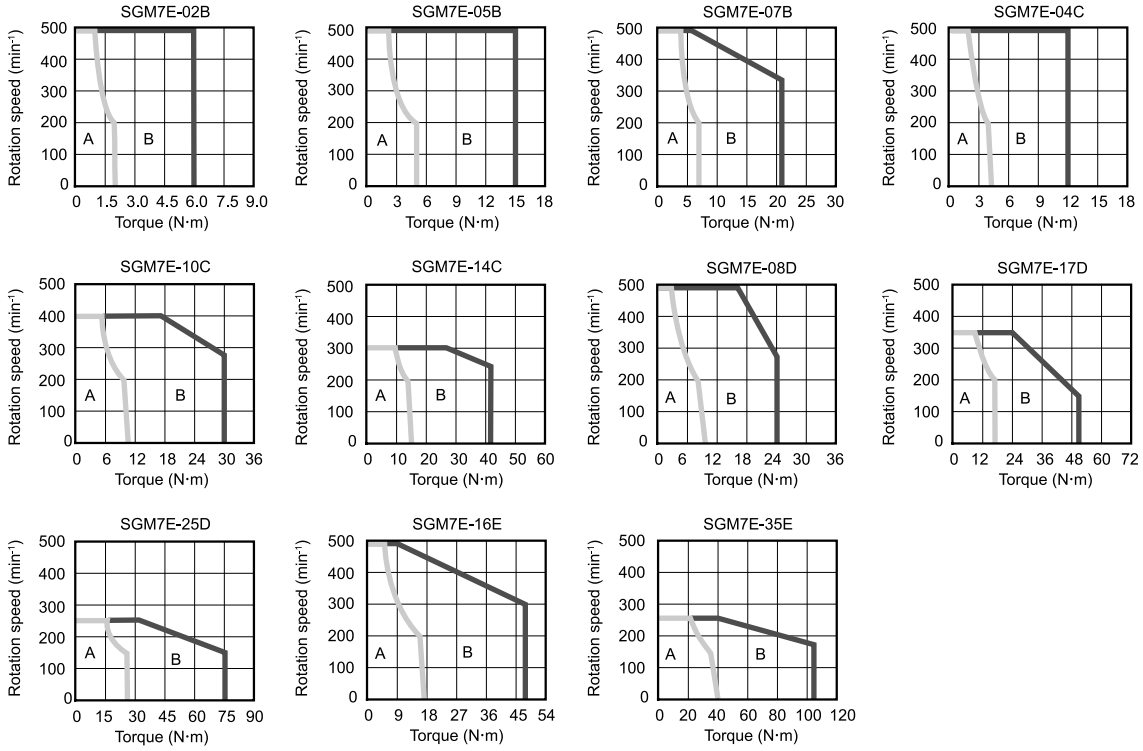
Note:

For the bearings used in these servomotors, the loss depends on the bearing temperature. The amount of heat loss is higher at low temperatures.

Torque-Motor Speed Characteristics

A : Continuous duty zone

B : Intermittent duty zone



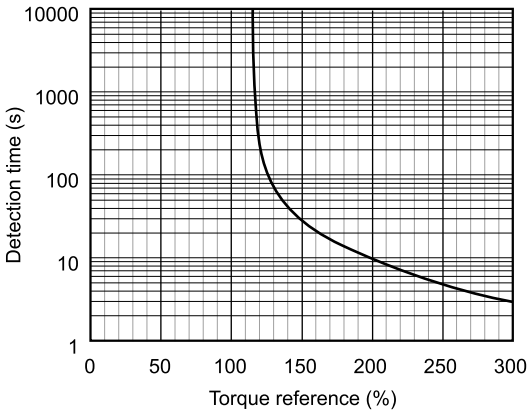
Note:

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.

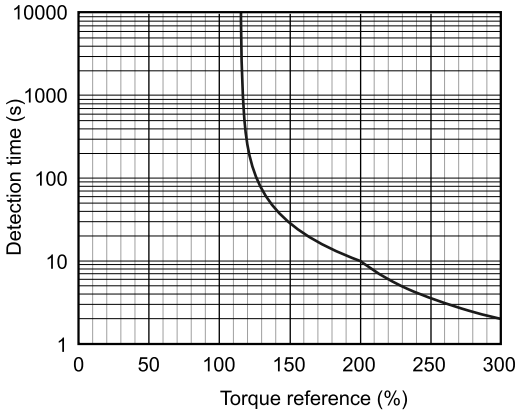
Servomotor Overload Protection Characteristics

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

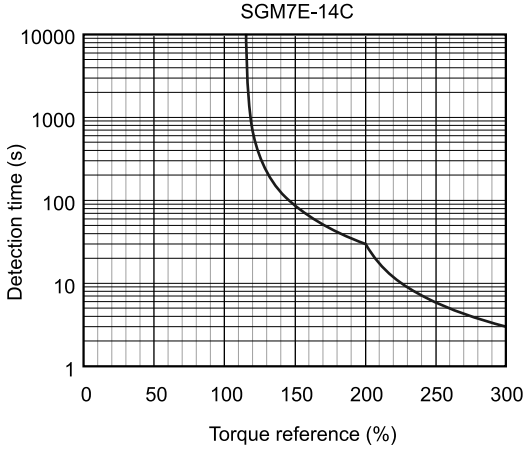
SGM7E-02B, -05B, -07B, -10C, -17D, and -35E



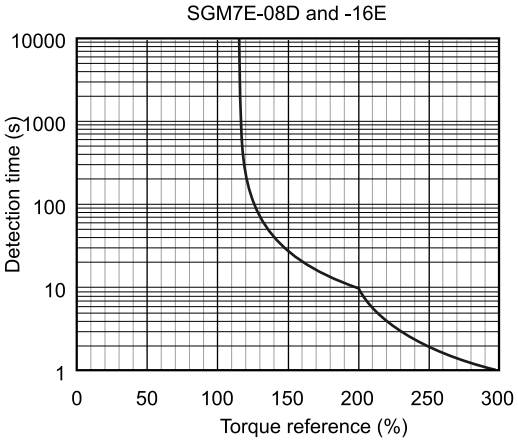
SGM7E-04C



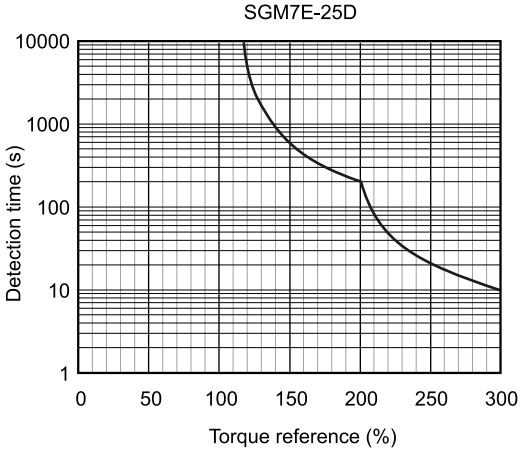
SGM7E-14C



SGM7E-08D and -16E



SGM7E-25D



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. Refer to the following section for details on the effective torque.

☞ *Torque-Motor Speed Characteristics on page 145*

Allowable Load Moment of Inertia

The allowable load moments of inertia (motor moment of inertia ratios) for the servomotors are given in "*Ratings on page 144*". The values are determined by the regenerative energy processing capacity of the SERVOPACK and are also affected by

the drive conditions of the servomotor. Use the SigmaSize+ AC servo capacity selection program to check the driving conditions. Perform the required steps for each of the following cases.

*1 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.

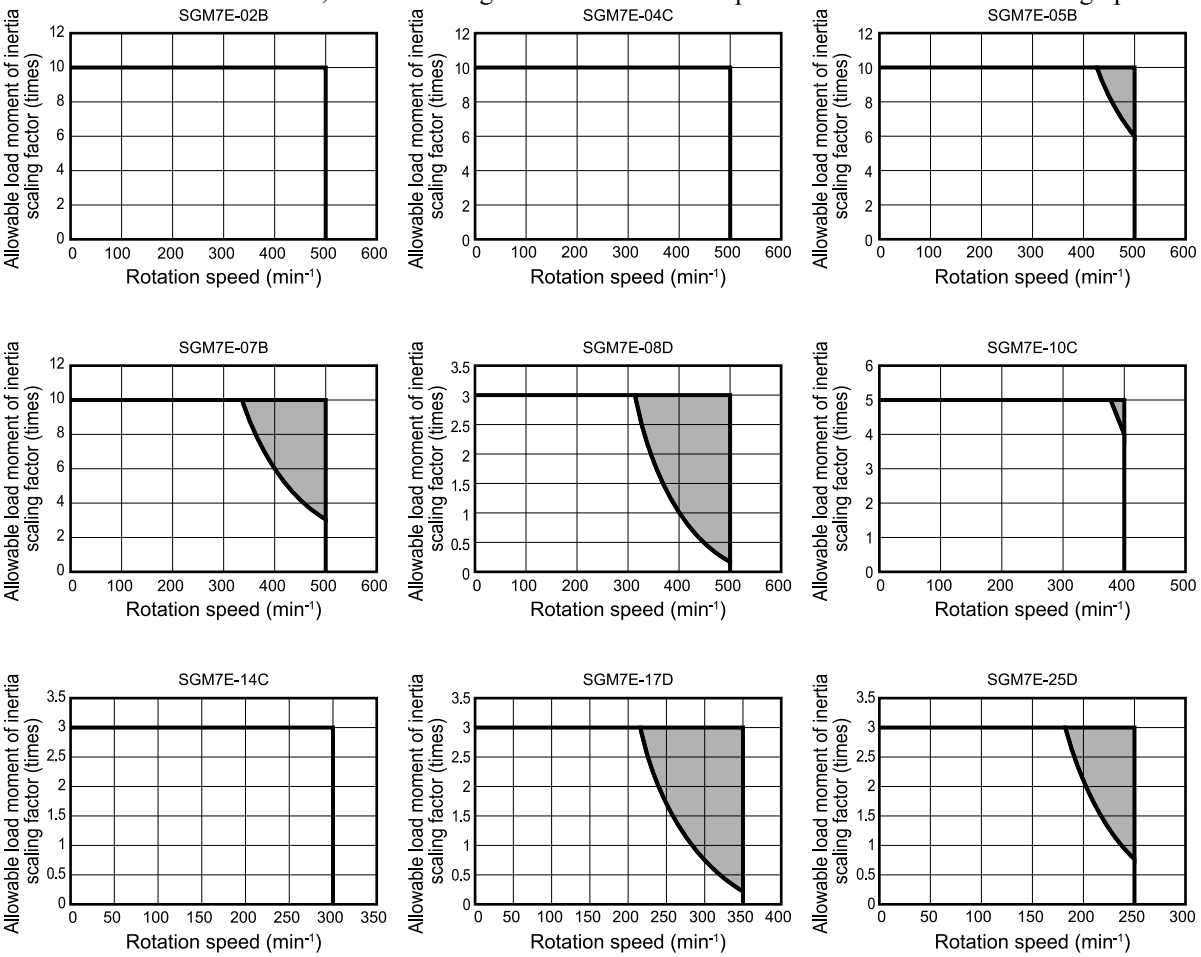
If the above steps is not possible, install an external regenerative resistor.

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). Install an external regenerative resistor when the built-in regenerative resistor cannot process all of the regenerative power. Refer to the following section for the regenerative power (W) that can be processed by the SERVOPACKs.

☞ *Specifications of Built-in Regenerative Resistors in SERVOPACKs on page 478*

■ SERVOPACKs without Built-in Regenerative Resistors

The following graph shows the allowable load moment of inertia scaling factor of the rotation 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 Model: SGDXS-2R8A

■ When an External Regenerative Resistor Is Required

Install the external regenerative resistor which is selected with the SigmaSize+. Contact your Yaskawa representative for information on SigmaSize+.

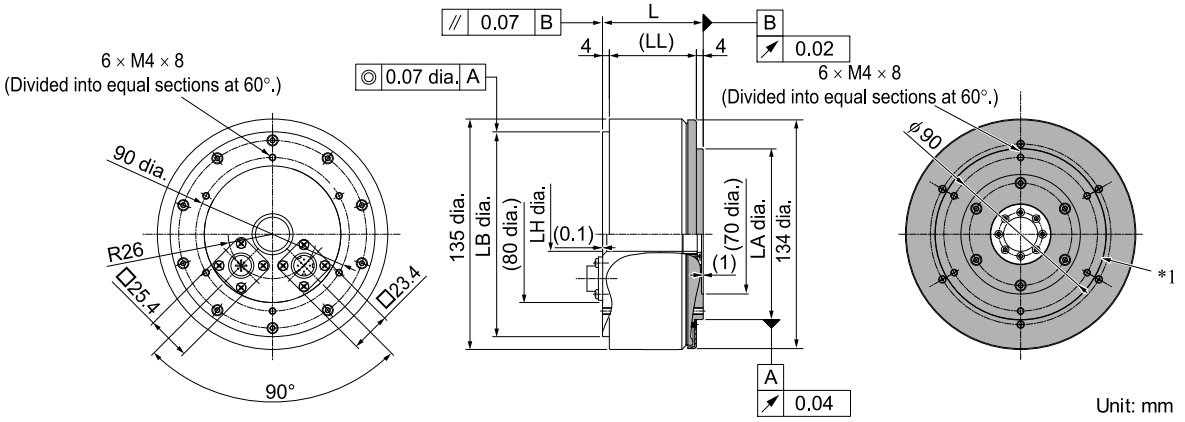
Refer to the following section for information on the external regenerative resistors.

☞ *Specifications and Dimensions of External Regenerative Resistors on page 479*

External Dimensions

SGM7E-□□B

· Flange Specification 1



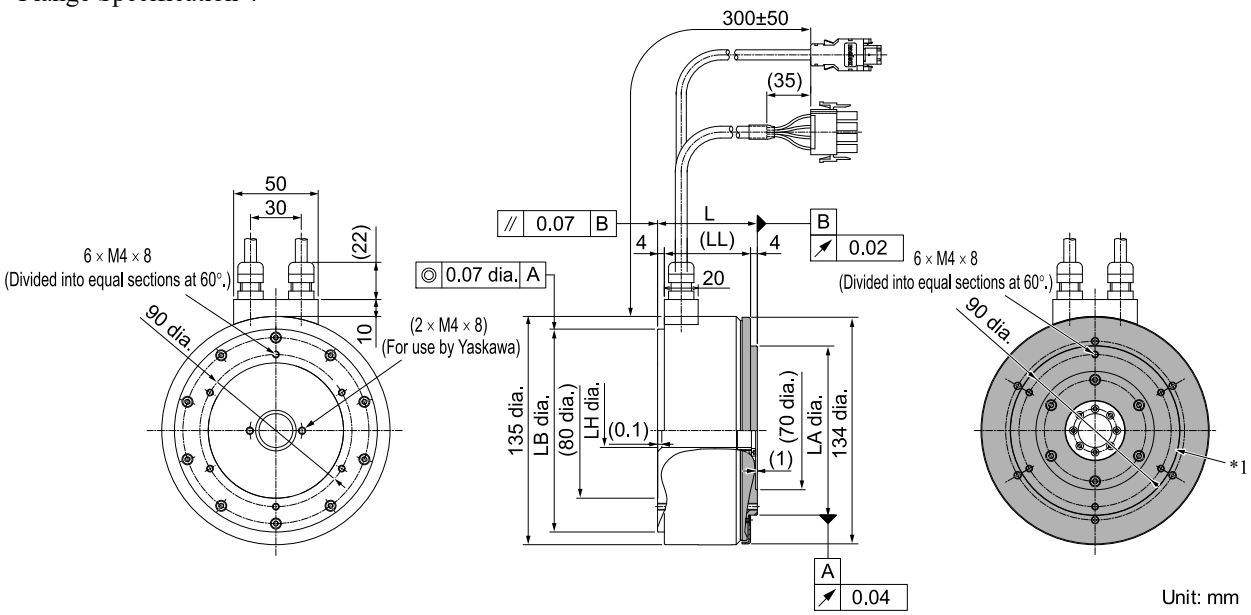
*1 The shaded section indicates the rotating parts.

Note:

Values in parentheses are reference dimensions.

Model: SGM7E-	L	(LL)	LB	LH	LA	Approx. mass [kg]
02B□A11	59	51	$120^{0}_{-0.035}$	$20^{+0.4}_{0}$	$100^{0}_{-0.035}$	4.8
05B□A11	88	80	$120^{0}_{-0.035}$	$20^{+0.4}_{0}$	$100^{0}_{-0.035}$	5.8
07B□A11	128	120	$120^{0}_{-0.035}$	$20^{+0.4}_{0}$	$100^{0}_{-0.035}$	8.2

· Flange Specification 4



*1 The shaded section indicates the rotating parts.

Note:

Values in parentheses are reference dimensions.

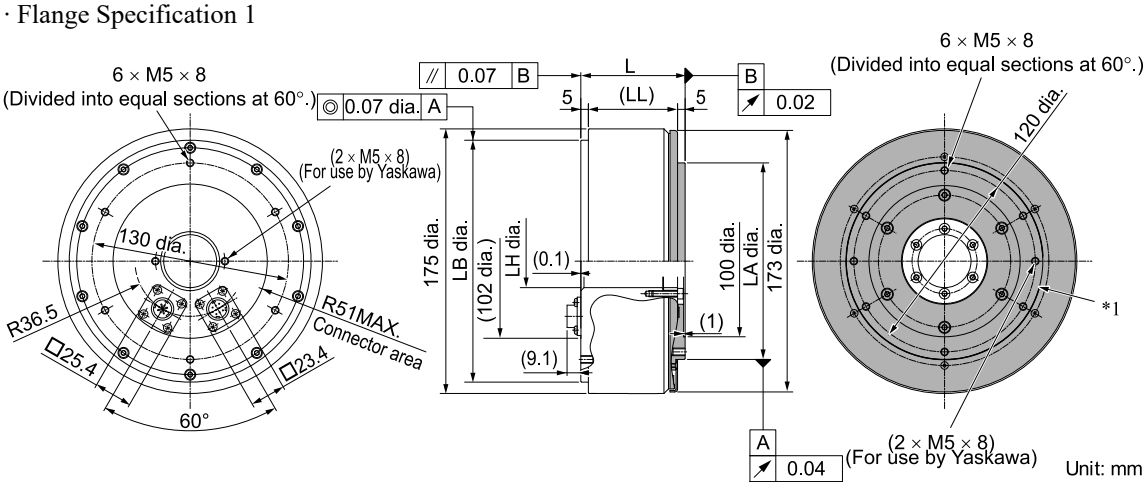
Model: SGM7E-	L	(LL)	LB	LH	LA	Approx. mass [kg]
02B□A41	59	51	$120^{0}_{-0.035}$	$20^{+0.4}_{0}$	$100^{0}_{-0.035}$	4.8
05B□A41	88	80	$120^{0}_{-0.035}$	$20^{+0.4}_{0}$	$100^{0}_{-0.035}$	5.8
07B□A41	128	120	$120^{0}_{-0.035}$	$20^{+0.4}_{0}$	$100^{0}_{-0.035}$	8.2

Refer to the following section for information on connector models.

☞ *Connector Specifications on page 155*

SGM7E-□□C

· Flange Specification 1



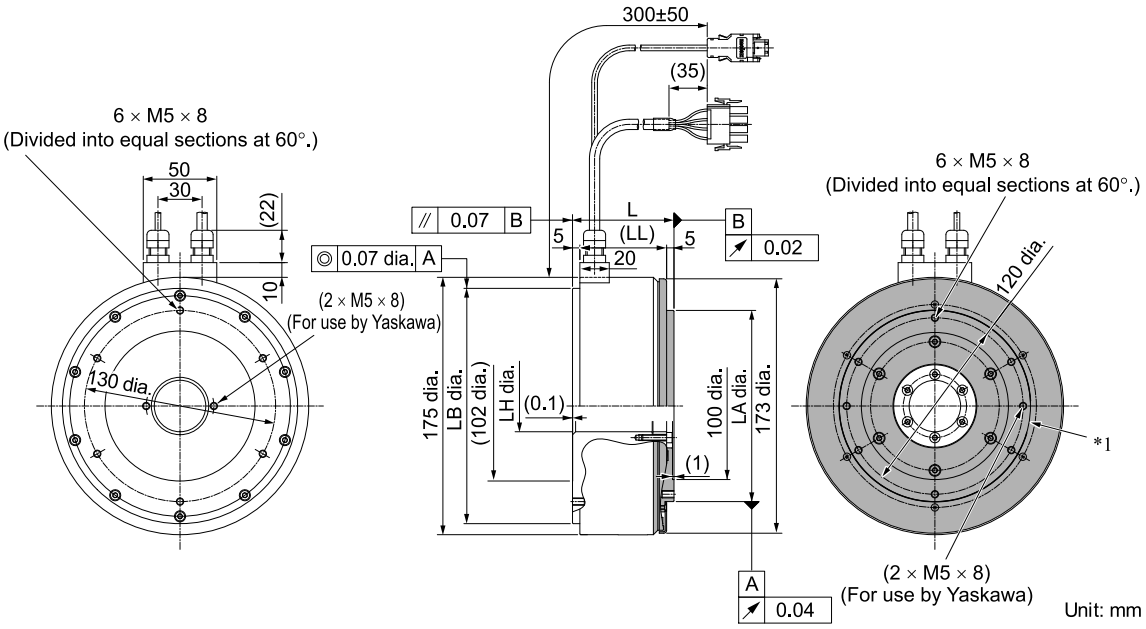
*1 The shaded section indicates the rotating parts.

Note:

Values in parentheses are reference dimensions.

Model: SGM7E-	L	(LL)	LB	LH	LA	Approx. mass [kg]
04C□A11	69	59	$160^{0}_{-0.040}$	$35^{+0.4}_{0}$	$130^{0}_{-0.040}$	7.2
10C□A11	90	80	$160^{0}_{-0.040}$	$35^{+0.4}_{0}$	$130^{0}_{-0.040}$	10.2
14C□A11	130	120	$160^{0}_{-0.040}$	$35^{+0.4}_{0}$	$130^{0}_{-0.040}$	14.2

· Flange Specification 4



*1 The shaded section indicates the rotating parts.

Note:

Values in parentheses are reference dimensions.

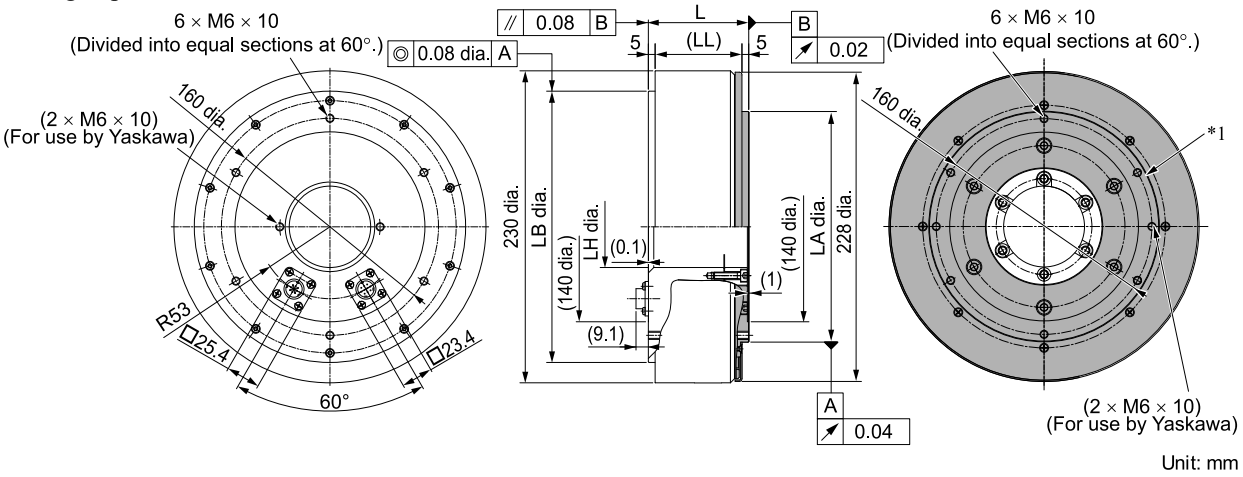
Model: SGM7E-	L	(LL)	LB	LH	LA	Approx. mass [kg]
04C□A41	69	59	$160^{0}_{-0.040}$	$35^{+0.4}_{0}$	$130^{0}_{-0.040}$	7.2
10C□A41	90	80	$160^{0}_{-0.040}$	$35^{+0.4}_{0}$	$130^{0}_{-0.040}$	10.2
14C□A41	130	120	$160^{0}_{-0.040}$	$35^{+0.4}_{0}$	$130^{0}_{-0.040}$	14.2

Refer to the following section for information on connector models.

☞ *Connector Specifications on page 155*

SGM7E-□□D

· Flange Specification 1



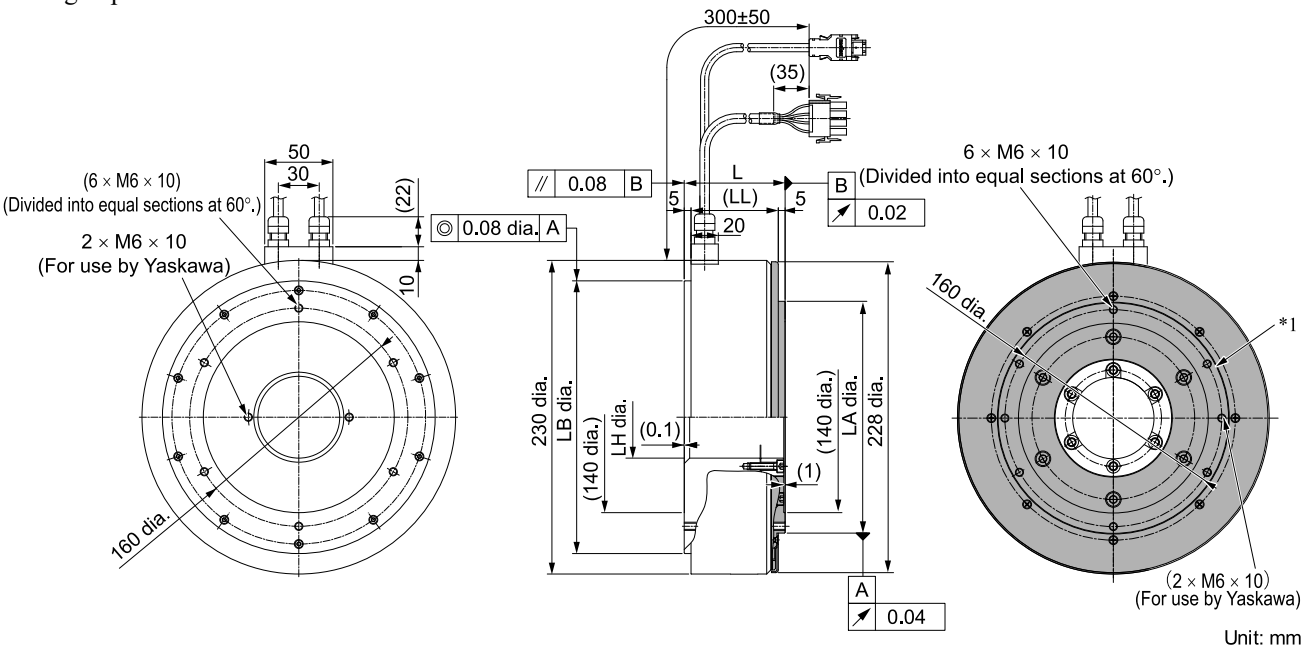
*1 The shaded section indicates the rotating parts.

Note:

Values in parentheses are reference dimensions.

Model: SGM7E-	L	(LL)	LB	LH	LA	Approx. mass [kg]
08D□A11	74	64	$200^{0}_{-0.046}$	$60^{+0.4}_{0}$	$170^{0}_{-0.040}$	14.0
17D□A11	110	100	$200^{0}_{-0.046}$	$60^{+0.4}_{0}$	$170^{0}_{-0.040}$	22.0
25D□A11	160	150	$200^{0}_{-0.046}$	$60^{+0.4}_{0}$	$170^{0}_{-0.040}$	29.7

· Flange Specification 4



*1 The shaded section indicates the rotating parts.

Note:

Values in parentheses are reference dimensions.

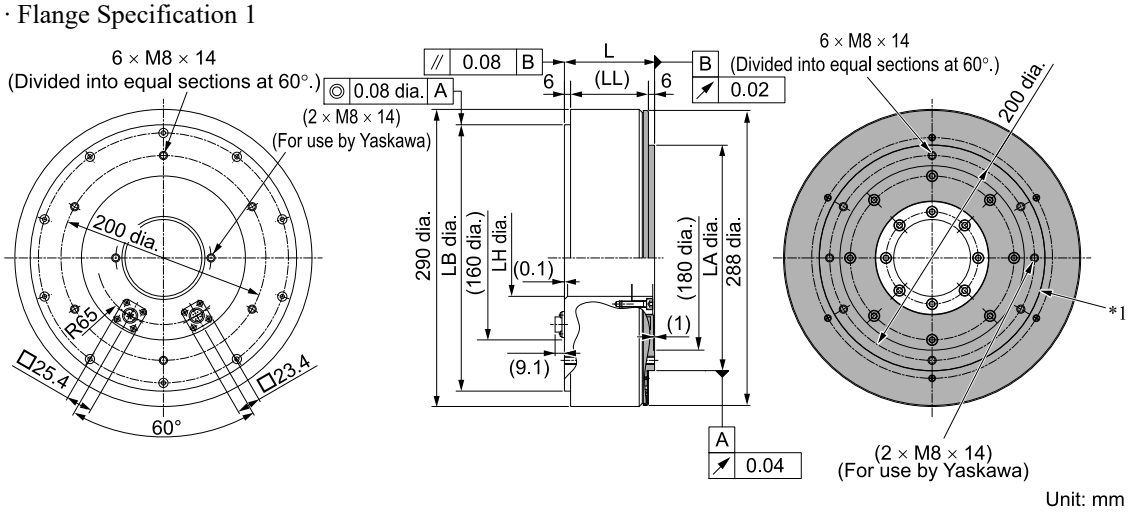
Model: SGM7E-	L	(LL)	LB	LH	LA	Approx. mass [kg]
08D□A41	74	64	$200^{0}_{-0.046}$	$60^{+0.4}_{0}$	$170^{0}_{-0.040}$	14.0
17D□A41	110	100	$200^{0}_{-0.046}$	$60^{+0.4}_{0}$	$170^{0}_{-0.040}$	22.0
25D□A41	160	150	$200^{0}_{-0.046}$	$60^{+0.4}_{0}$	$170^{0}_{-0.040}$	29.7

Refer to the following section for information on connector models.

☞ *Connector Specifications on page 155*

SGM7E-□□E

· Flange Specification 1



Unit: mm

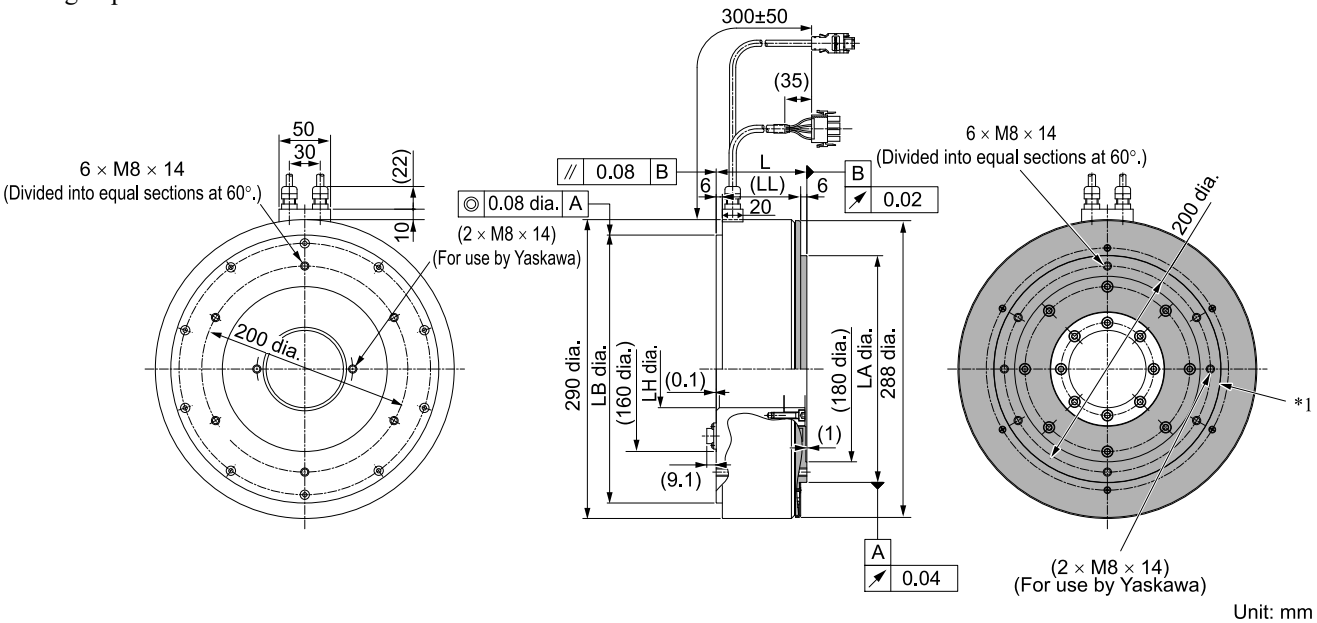
*1 The shaded section indicates the rotating parts.

Note:

Values in parentheses are reference dimensions.

Model: SGM7E-	L	(LL)	LB	LH	LA	Approx. mass [kg]
16E□A11	88	76	$260^{0}_{-0.052}$	$75^{+0.4}_{0}$	$220^{0}_{-0.046}$	26.0
35E□A11	112	100	$260^{0}_{-0.052}$	$75^{+0.4}_{0}$	$220^{0}_{-0.046}$	34.0

· Flange Specification 4



Unit: mm

*1 The shaded section indicates the rotating parts.

Note:

Values in parentheses are reference dimensions.

Model: SGM7E-	L	(LL)	LB	LH	LA	Approx. mass [kg]
16E□A41	88	76	$260^{0}_{-0.052}$	$75^{+0.4}_{0}$	$220^{0}_{-0.046}$	26.0
35E□A41	112	100	$260^{0}_{-0.052}$	$75^{+0.4}_{0}$	$220^{0}_{-0.046}$	34.0

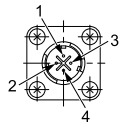
Refer to the following section for information on connector models.

☞ *Connector Specifications on page 155*

Connector Specifications

Flange Specification 1

· Servomotor Connector



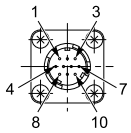
1	Phase U
2	Phase V
3	Phase W
4	FG (frame ground)

Model: JN1AS04MK2R

Manufacturer: Japan Aviation Electronics Industry, Ltd.

Mating connector: JN1DS04FK1 (Not provided by Yaskawa.)

· Encoder Connector



1	PS
2	/PS
3	-
4	PG5V
5 *1	BAT0
6	-
7	FG (frame ground)
8 *1	BAT
9	PG0V
10	-

*1 A battery is required only for a multiturn absolute encoder.

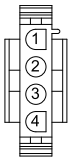
Model: JN1AS10ML1-R

Manufacturer: Japan Aviation Electronics Industry, Ltd.

Mating connector: JN1DS10SL1 (Not provided by Yaskawa.)

Flange Specification 4

· Servomotor Connector



1	Phase U	Red
2	Phase V	White
3	Phase W	Blue
4	FG (frame ground)	Green (yellow)

Model

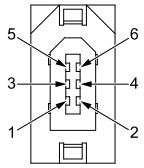
- Plug: 350779-1
- Pins: 350561-3 or 350690-3 (No.1 to 3)
- Ground pin: 350654-1 or 350669-1 (No. 4)

Manufacturer: Tyco Electronics Japan G.K.

Mating Connector

- Cap: 350780-1
- Socket: 350570-3 or 350689-3

· Encoder Connector



1	PG5V
2	PG0V
3 **1*	BAT
4 **1*	BAT0
5	PS
6	/PS
Connector case	FG (frame ground)

*1 A battery is required only for a multiturn absolute encoder.

Model: 55102-0600

Manufacturer: Molex Japan LLC

Mating connector: 54280-0609

Model Designations

SGM7F - 02 A 7 A 1 1

Direct drive servomotors: SGM7F

1 Rated Output

● Small Capacity

Code	Specification
02	2.00 N·m
04	4.00 N·m
05	5.00 N·m
07	7.00 N·m
08	8.00 N·m
10	10.0 N·m
14	14.0 N·m
16	16.0 N·m
17	17.0 N·m
25	25.0 N·m
35	35.0 N·m

● Medium Capacity

Code	Specification
45	45.0 N·m
80	80.0 N·m
1A	110 N·m
1E	150 N·m
2Z	200 N·m

2 Servomotor Outer Diameter

Code	Specification
A	100-mm dia.
B	135-mm dia.
C	175-mm dia.
D	230-mm dia.
M	280-mm dia.
N	360-mm dia.

3 Serial Encoder

Code	Specification
7	24-bit multiturn absolute encoder*1
F	24-bit incremental encoder*1

4 Design Revision Order

A

5 Flange

Code	Mounting	Servomotor Outer Diameter Code (3rd Digit)					
		A	B	C	D	M	N
1	Non-load side	✓	✓	✓	✓	–	–
	Load side	–	–	–	–	✓	✓
3	Non-load side	–	–	–	–	✓	✓
4	Non-load side (with cable on side)	✓	✓	✓	✓	–	–

✓ : Applicable models.

6 Options

Code	Specification
1	Without options
2	High machine precision (runout at end of shaft and runout of shaft surface: 0.01 mm)

*1 The encoder can be used as a single-turn absolute encoder by setting a parameter.

Note:

1. Direct drive servomotors are not available with holding brakes.
2. This information is provided to explain model numbers. It is not meant to imply that models are available for all combinations of codes.

Manufactured Models

Rated Torque N·m	Servomotor Outer Diameter					
	A (100-mm dia.)	B (135-mm dia.)	C (175-mm dia.)	D (230-mm dia.)	M (280-mm dia.)	N (360-mm dia.)
2.00	SGM7F-02A	–	–	–	–	–
4.00	–	SGM7F-04B	–	–	–	–
5.00	SGM7F-05A	–	–	–	–	–
7.00	SGM7F-07A	–	–	–	–	–
8.00	–	–	SGM7F-08C	–	–	–
10.0	–	SGM7F-10B	–	–	–	–
14.0	–	SGM7F-14B	–	–	–	–
16.0	–	–	–	SGM7F-16D	–	–
17.0	–	–	SGM7F-17C	–	–	–
25.0	–	–	SGM7F-25C	–	–	–
35.0	–	–	–	SGM7F-35D	–	–

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Rated Torque N·m	Servomotor Outer Diameter					
	A (100-mm dia.)	B (135-mm dia.)	C (175-mm dia.)	D (230-mm dia.)	M (280-mm dia.)	N (360-mm dia.)
45.0	–	–	–	–	SGM7F-45M	–
80.0	–	–	–	–	SGM7F-80M	SGM7F-80N
110	–	–	–	–	SGM7F-1AM	–
150	–	–	–	–	–	SGM7F-1EN
200	–	–	–	–	–	SGM7F-2ZN

Note:
The above table shows combinations of the rated torque and outer diameter. The fourth through seventh digits have been omitted.

Specifications and Ratings: Small Capacity

Specifications

Voltage		200 V										
Model: SGM7F-		02A	05A	07A	04B	10B	14B	08C	17C	25C	16D	35D
Time Rating		Continuous										
Thermal Class		A										
Insulation Resistance		500 VDC, 10 MΩ min.										
Withstand Voltage		1500 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										
Absolute Accuracy		±15 s										
Repeatability		±1.3 s										
Protective Structure *2		Totally enclosed, self-cooled, IP42 (The protective structure is IP40 for CE Marking.)										
Environ-mental Conditions	Surrounding Air Temperature	0°C to 40°C (with no freezing)										
	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 1000 m or less. • 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)										

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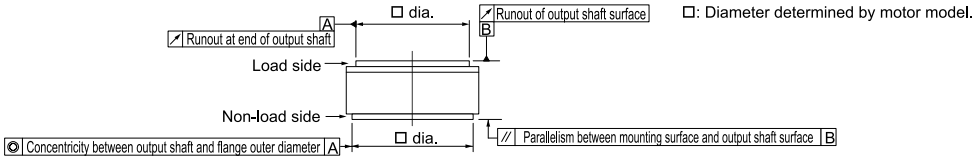
Voltage			200 V									
Model: SGM7F-			02A	05A	07A	04B	10B	14B	08C	17C	25C	16D	35D
Mechanical Tolerances *3	Runout of Output Shaft Surface	mm	0.02 (0.01 for high machine precision option)										
	Runout at End of Output Shaft	mm	0.04 (0.01 for high machine precision option)										
	Parallelism between Mounting Surface and Output Shaft Surface	mm	0.07										
	Concentricity between Output Shaft and Flange Outer Diameter	mm	0.07										
Impact Resistance *4	Impact Acceleration at Flange		490 m/s²										
	Number of Impacts		2 times										
Vibration Resistance *4	Vibration Acceleration at Flange		49 m/s²										
Applicable SERVOPACKs	SGDXS-		2R8A					5R5A	2R8A	5R5A	7R6A	5R5A	7R6A *5, 120A
	SGDXW-												7R6A *5

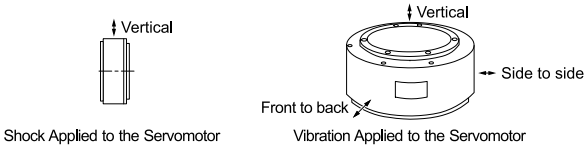
*1 A vibration class of V15 indicates a vibration amplitude of 15 μm maximum on the servomotor without a load at the rated rotation speed.

*2 The hollow hole section, motor mounting surface, output shaft surface, and gap around the rotating part of the shaft are excluded. Protective structure specifications apply only when the special cable is used.

*3 Refer to the following figure for the relevant locations on the servomotor.
Refer to the dimensional drawings of the individual servomotors for more information on tolerances.



*4 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. Check the vibration acceleration.



*5 Use derated values for this combination. Refer to the following section for details on the derated values.
☞ *Ratings on page 160*

Ratings

Voltage		200 V									
Model: SGM7F-		02A	05A	07A	04B	10B	14B	08C	17C	25C	16D	35D
Rated Output *1	W	63	157	220	126	314	440	251	534	785	503	1100 1000 *4
Rated Torque *1 *2	N·m	2.00	5.00	7.00	4.00	10.0	14.0	8.00	17.0	25.0	16.0	35.0
Instantaneous Maximum Torque *1	N·m	6.00	15.0	21.0	12.0	30.0	42.0	24.0	51.0	75.0	48.0	105
Stall Torque *1	N·m	2.00	5.00	7.00	4.00	10.0	14.0	8.00	17.0	25.0	16.0	35.0

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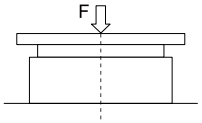
Voltage			200 V									
Model: SGM7F-			02A	05A	07A	04B	10B	14B	08C	17C	25C	16D	35D
Rated Current *1		Arms	1.7	1.8	2.1	2.0	2.8	4.6	2.4	4.5		5.0	
Instantaneous Maximum Current *1		Arms	5.1	5.4	6.3	6.4	8.9	14.1	8.6	14.7	13.9	16.9	16.0
Rated Rotation Speed *1		min^{-1}	300			300			300				300 270*5
Maximum Rotation Speed *1		min^{-1}	600			600			600		500	600	400
Torque Constant		N·m/Arms	1.28	3.01	3.64	2.21	3.81	3.27	3.52	4.04	6.04	3.35	7.33
Rotor Moment of Inertia		×10^{-4} kg·m^2	8.04	14.5	19.3	16.2	25.2	36.9	56.5	78.5	111	178	276
Rated Power Rate *1		kW/s	4.98	17.2	25.4	9.88	39.7	53.1	11.3	36.8	56.3	14.4	44.4
Rated Angular Acceleration *1		rad/s^2	2490	3450	3630	2470	3970	3790	1420	2170	2250	899	1270
Heat Sink Size		mm	300 × 300 × 12		350 × 350 × 12				450 × 450 × 12			550 × 550 × 12	
Allowable Load Moment of Inertia (Rotor Moment of Inertia Ratio)		times	25	35	35	25	40	45	15	25	25	10	15
	With external regenerative resistor	times	25	35	35	25	40	45	15	25	25	10	15
Allowable Load *3	Allowable Thrust Load	N	1100			1500			3300			4000	
	Allowable Moment Load	N·m	22	24	26	45	55	65	92	98	110	210	225

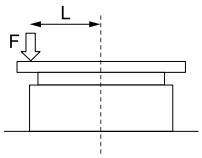
*1 These values are for operation in combination with a SERVOPACK when the temperature of the armature winding is 100°C. The values for other items are at 20°C. These are typical values.

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

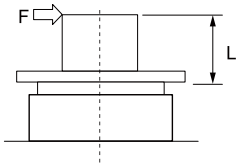
*3 The thrust loads and moment loads that are applied while a servomotor is operating are roughly classified into the following patterns. Design the machine so that the thrust loads or moment loads will not exceed the values given in the table.



Where F is the external force,
Thrust load = F + Load mass
Moment load = 0



Where F is the external force,
Thrust load = F + Load mass
Moment load = F × L



Where F is the external force,
Thrust load = Load mass
Moment load = F × L

*4 If you use an SGDXS-7R6A SERVOPACK and SGM7E-35D servomotor together, use this value (a derated value).

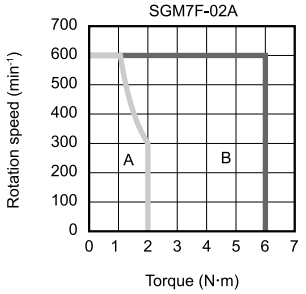
Note:

For the bearings used in these servomotors, the loss depends on the bearing temperature. The amount of heat loss is higher at low temperatures.

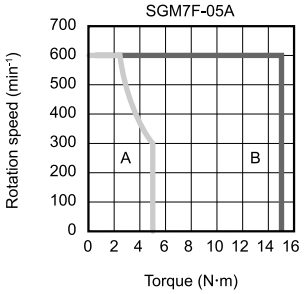
Torque-Motor Speed Characteristics

A : Continuous duty zone ——— (solid lines): With three-phase 200-V or single-phase 230-V input
B : Intermittent duty zone - - - - - - - (dotted lines): With single-phase 200-V input

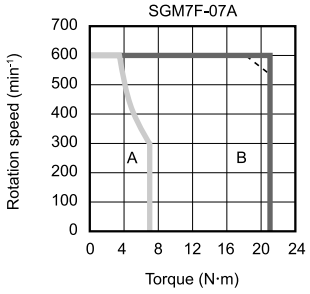
SGM7F-02A



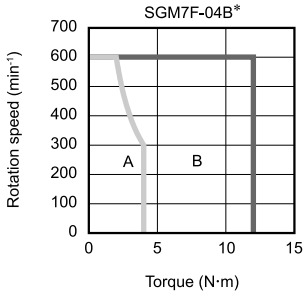
SGM7F-05A



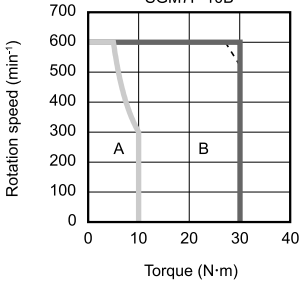
SGM7F-07A



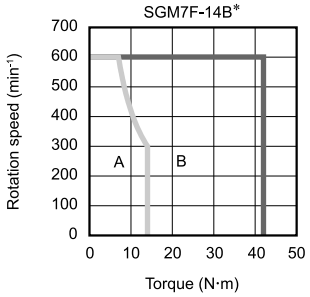
SGM7F-04B*



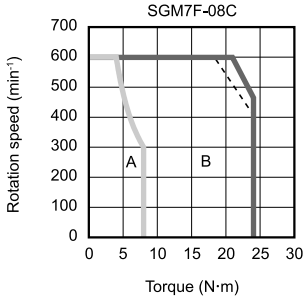
SGM7F-10B



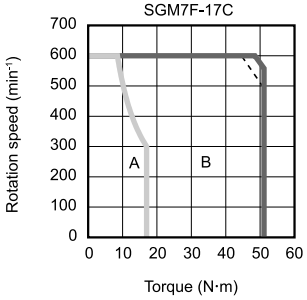
SGM7F-14B*



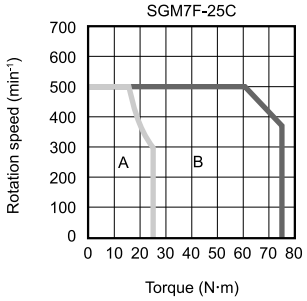
SGM7F-08C



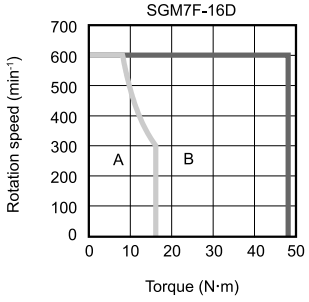
SGM7F-17C



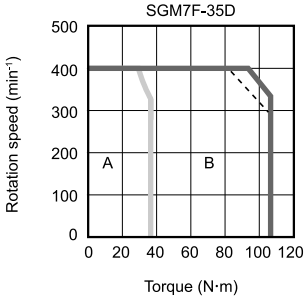
SGM7F-25C



SGM7F-16D



SGM7F-35D



*1 The characteristics are the same for a three-phase 200-VAC input and single-phase 200-VAC input.

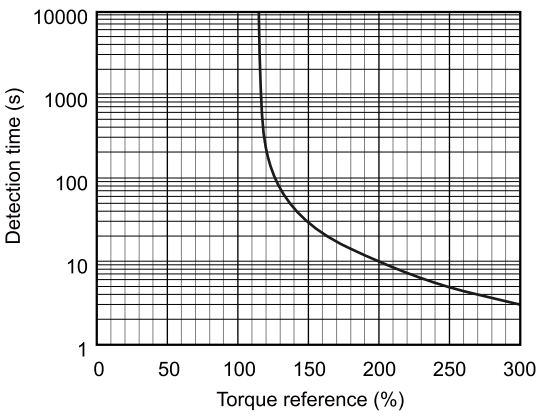
Note:

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 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.

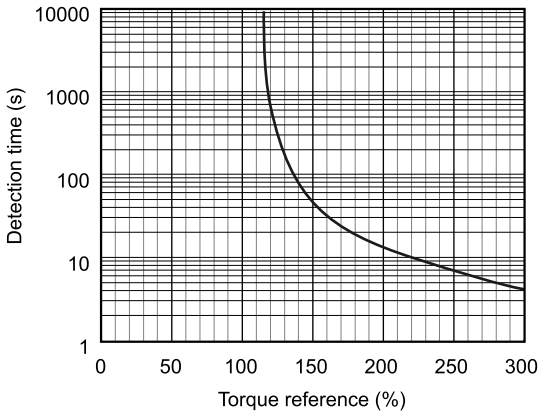
Servomotor Overload Protection Characteristics

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

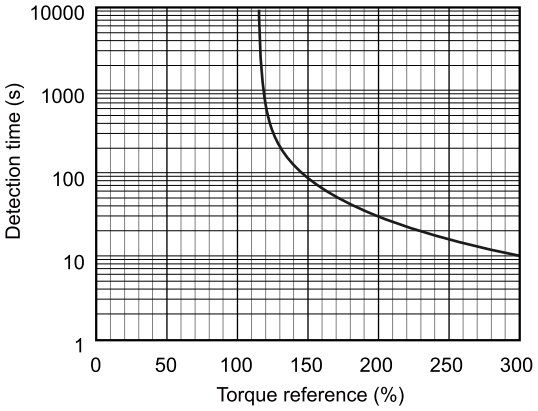
SGM7F-□□A and -□□B



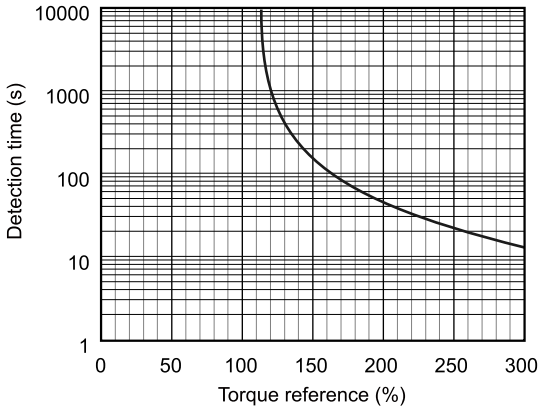
SGM7F-08C



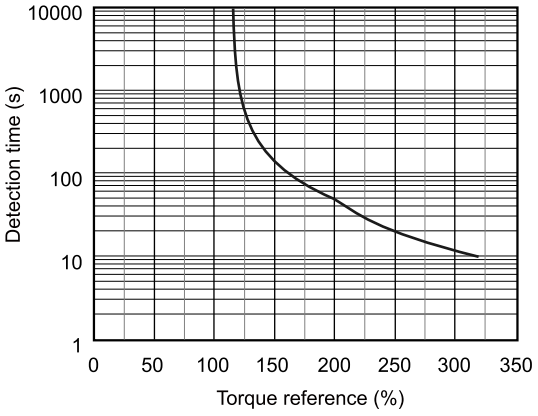
SGM7F-17C and -25C



SGM7F-16D



SGM7F-35D



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. Refer to the following section for details on the effective torque.

☞ *Torque-Motor Speed Characteristics on page 162*

Allowable Load Moment of Inertia

The allowable load moments of inertia (motor moment of inertia ratios) for the servomotors are given in "*Ratings on page 160*". The values are determined by the regenerative energy processing capacity of the SERVOPACK and are also affected by the drive conditions of the servomotor. Use the SigmaSize+ AC servo capacity selection program to check the driving conditions. Perform the required steps for each of the following cases.

*1 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.

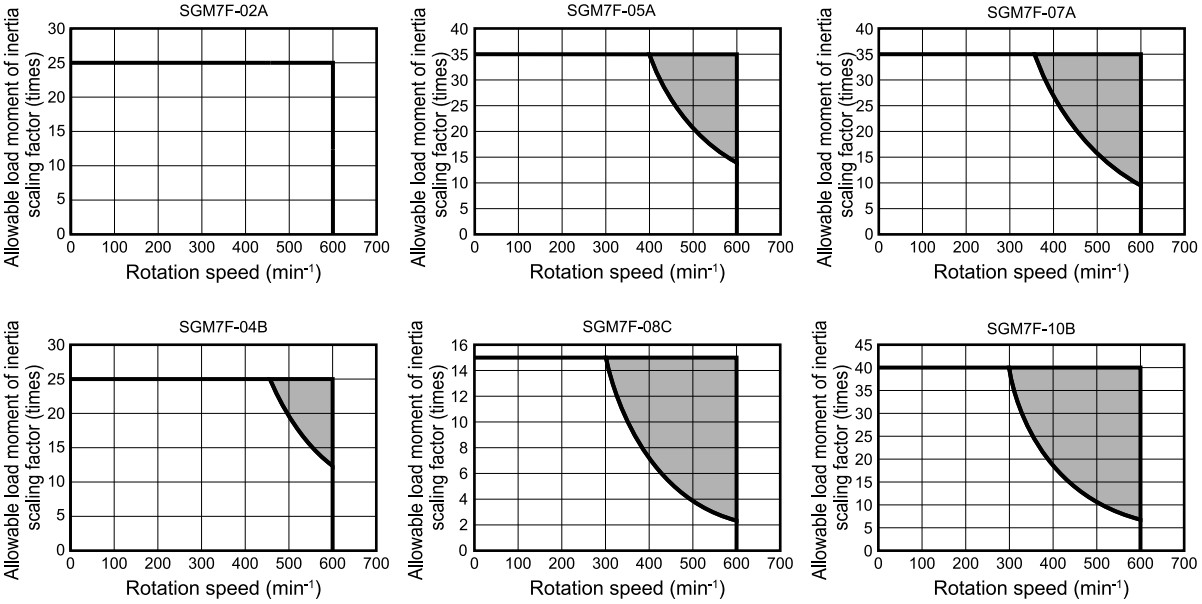
Information An Overvoltage Alarm (A.400) is likely to occur during deceleration if the load moment of inertia exceeds the allowable load moment of inertia. SERVOPACKs with a built-in regenerative resistor may generate a Regenerative Overload Alarm (A.320). Install an external regenerative resistor when the built-in regenerative resistor cannot process all of the regenerative power.

Refer to the following section for the regenerative power (W) that can be processed by the SERVOPACKs.

☞ *Specifications of Built-in Regenerative Resistors in SERVOPACKs on page 478*

■ SERVOPACKs without Built-in Regenerative Resistors

The following graph shows the allowable load moment of inertia scaling factor of the rotation 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 Model: SGDXS-2R8A

■ When an External Regenerative Resistor Is Required

Install the external regenerative resistor which is selected with the SigmaSize+. Contact your Yaskawa representative for information on SigmaSize+.

Refer to the following section for information on the external regenerative resistors.

☞ *Specifications and Dimensions of External Regenerative Resistors on page 479*

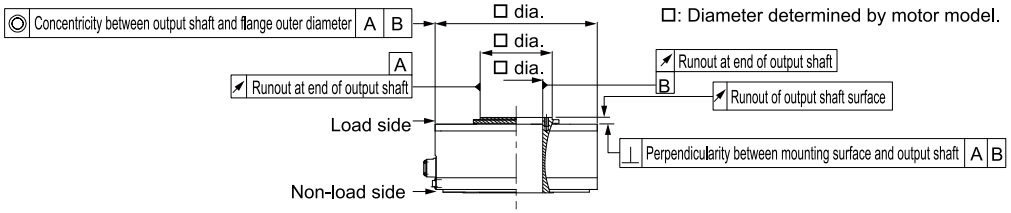
Specifications and Ratings: Medium Capacity

Specifications

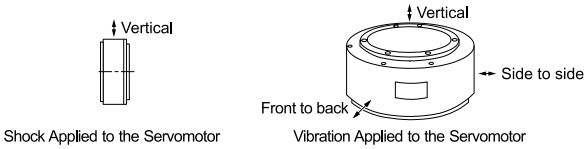
Voltage			200 V					
Model: SGM7F-			45M	80M	1AM	80N	1EN	2ZN
Time Rating			Continuous					
Thermal Class			F					
Insulation Resistance			500 VDC, 10 MΩ min.					
Withstand Voltage			1500 VAC for 1 minute					
Excitation			Permanent magnet					
Mounting			Flange-mounted					
Drive Method			Direct drive					
Rotation Direction			Counterclockwise (CCW) for forward reference when viewed from the load side					
Vibration Class *1			V15					
Absolute Accuracy			±15 s					
Repeatability			±1.3 s					
Protective Structure *2			Totally enclosed, self-cooled, IP44 (The protective structure is IP40 for CE Marking.)					
Environmental Conditions	Surrounding Air Temperature		0°C to 40°C (with no freezing)					
	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 1000 m or less. • 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)					
Mechanical Tolerances *3	Runout of Output Shaft Surface	mm	0.02 (0.01 for high machine precision option)					
	Runout at End of Output Shaft	mm	0.04 (0.01 for high machine precision option)					
	Parallelism between Mounting Surface and Output Shaft Surface	mm	–					
	Concentricity between Output Shaft and Flange Outer Diameter	mm	0.08					
	Perpendicularity between Mounting Surface and Output Shaft	mm	0.08					
Impact Resistance *4	Impact Acceleration at Flange		490 m/s^2					
	Number of Impacts		2 times					
Vibration Resistance *4	Vibration Acceleration at Flange		24.5 m/s^2					
Applicable SERVOPACKs	SGDXS-		7R6A	120A	180A	120A	200A	
	SGDXW-		7R6A	–				

*1 A vibration class of V15 indicates a vibration amplitude of 15 μm maximum on the servomotor without a load at the rated rotation speed.
*2 This does not apply to the shaft opening. Protective structure specifications apply only when the special cable is used.

*3 Refer to the following figure for the relevant locations on the servomotor. Refer to the dimensional drawings of the individual servomotors for more information on tolerances.



*4 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. Check the vibration acceleration.

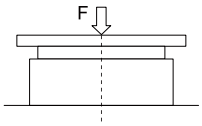


Ratings

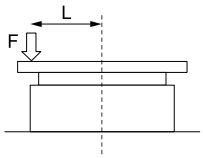
Voltage			200 V					
Model: SGM7F-			45M	80M	1AM	80N	1EN	2ZN
Rated Output *1		W	707	1260	1730	1260	2360	3140
Rated Torque *1 *2		N·m	45.0	80.0	110	80.0	150	200
Instantaneous Maximum Torque *1		N·m	135	240	330	240	450	600
Stall Torque *1		N·m	45.0	80.0	110	80.0	150	200
Rated Current *1		Arms	5.8	9.7	13.4	9.4	17.4	18.9
Instantaneous Maximum Current *1		Arms	17.0	28.0	42.0	28.0	56.0	56.0
Rated Rotation Speed *1		min^{-1}	150			150		
Maximum Rotation Speed *1		min^{-1}	300			300	250	
Torque Constant		N·m/Arms	8.39	8.91	8.45	9.08	9.05	11.5
Rotor Moment of Inertia		$\times 10^{-4}$ kg·m^2	388	627	865	1360	2470	3060
Rated Power Rate *1		kW/s	52.2	102	140	47.1	91.1	131
Rated Angular Acceleration *1		rad/s^2	1160	1280	1270	588	607	654
Heat Sink Size		mm	750 × 750 × 45					
Allowable Load Moment of Inertia (Rotor Moment of Inertia Ratio)			3 times					
	With external regenerative resistor and dynamic brake resistor		3 times					
Allowable Load *3	A	mm	33			37.5		
	Allowable Thrust Load	N	9000			16000		
	Allowable Moment Load	N·m	180			350		

*1 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 a steel heat sink of the dimensions given in the table.

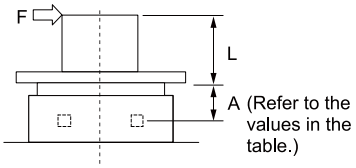
*3 The thrust loads and moment loads that are applied while a servomotor is operating are roughly classified into the following patterns. Design the machine so that the thrust loads or moment loads will not exceed the values given in the table.



Where F is the external force,
Thrust load = F + Load mass
Moment load = 0



Where F is the external force,
Thrust load = F + Load mass
Moment load = F × L



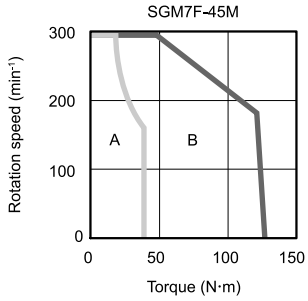
Where F is the external force,
Thrust load = Load mass
Moment load = F × (L + A)

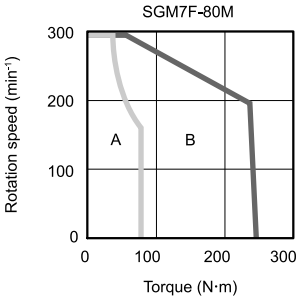
Note:

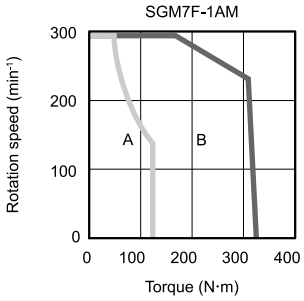
For the bearings used in these servomotors, the loss depends on the bearing temperature. The amount of heat loss is higher at low temperatures.

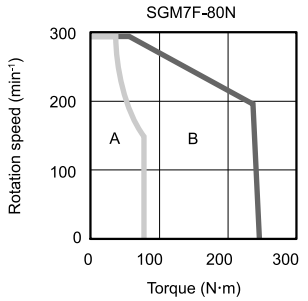
Torque-Motor Speed Characteristics

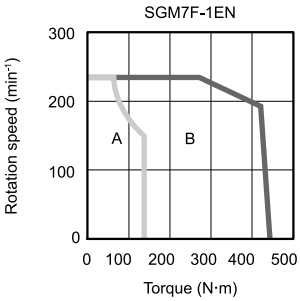
A : Continuous duty zone
B : Intermittent duty zone

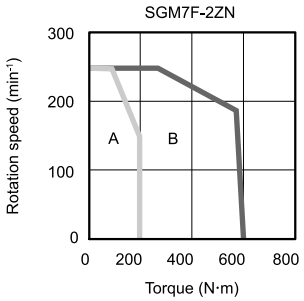












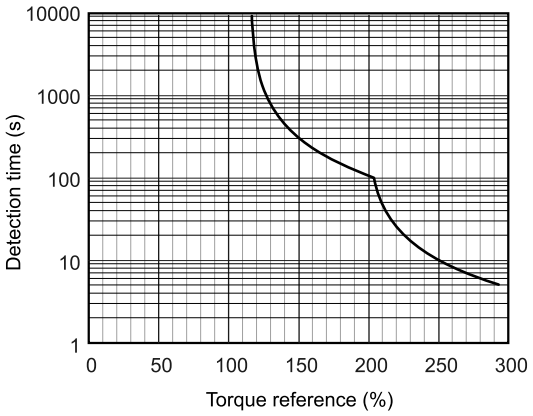
Note:

1. These values (typical values) are for operation in combination with a SERVOPACK when the temperature of the armature winding is 20°C.
2. If the effective torque is within the allowable range for the rated torque, the servomotor can be used within the intermittent duty zone.
3. 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.

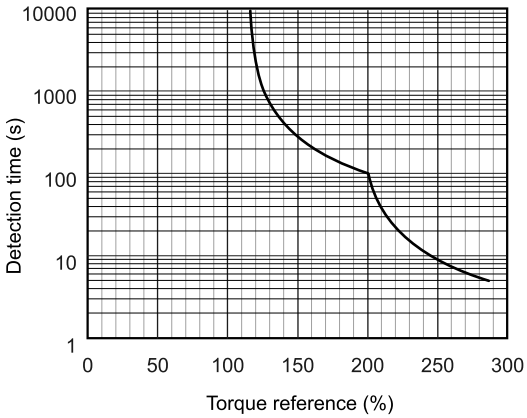
Servomotor Overload Protection Characteristics

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

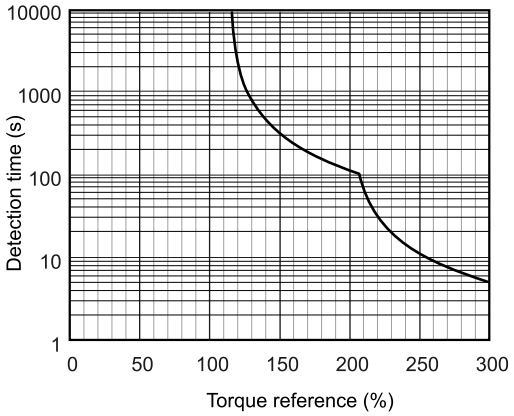
SGM7F-45M



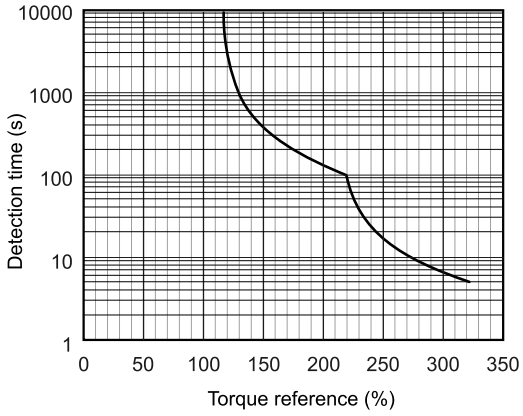
SGM7F-80M



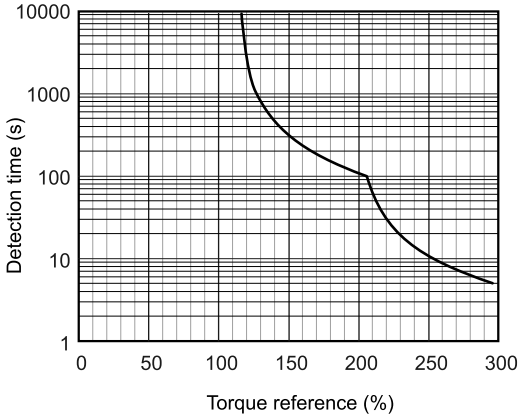
SGM7F-1AM and -80N



SGM7F-1EN



SGM7F-2ZN



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 force remains within the continuous duty zone given in *Torque-Motor Speed Characteristics on page 167*.

Allowable Load Moment of Inertia

The allowable load moments of inertia (motor moment of inertia ratios) for the servomotors are given in "*Ratings on page 166*". The values are determined by the regenerative energy processing capacity of the SERVOPACK and are also affected by the drive conditions of the servomotor. Use the SigmaSize+ AC servo capacity selection program to check the driving conditions. Perform the required steps for each of the following cases.

*1 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). Install an external regenerative resistor when the built-in regenerative resistor cannot process all of the regenerative power.

Refer to the following section for the regenerative power (W) that can be processed by the SERVOPACKs.

☞ *Specifications of Built-in Regenerative Resistors in SERVOPACKs on page 478*

■ When an External Regenerative Resistor Is Required

Install the external regenerative resistor which is selected with the SigmaSize+. Contact your Yaskawa representative for information on SigmaSize+.

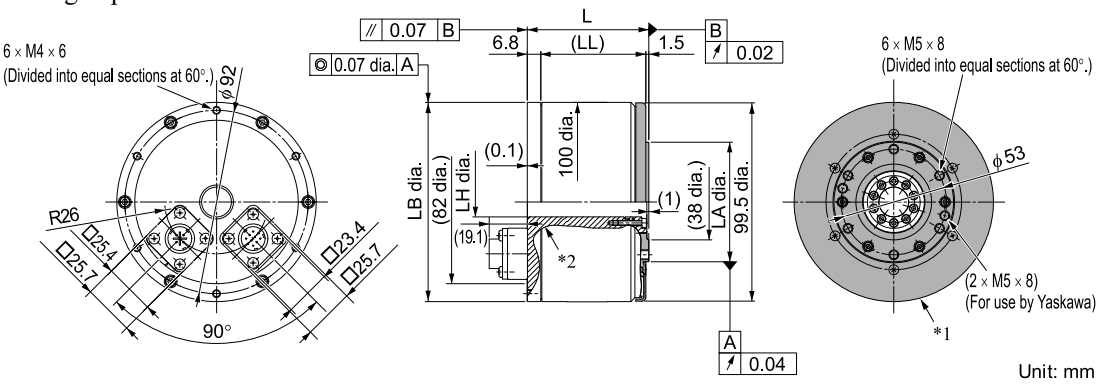
Refer to the following section for information on the external regenerative resistors.

☞ *Specifications and Dimensions of External Regenerative Resistors on page 479*

External Dimensions

SGM7F-□□A

· Flange Specification 1



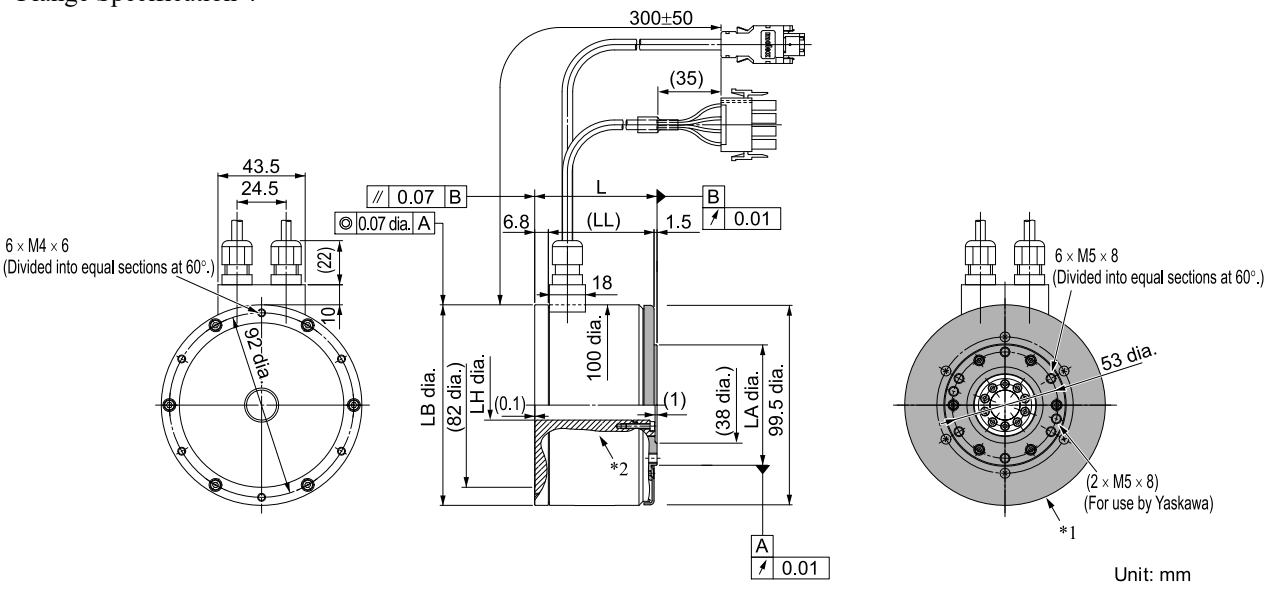
*1 The shaded section indicates the rotating parts.
*2 The hatched section indicates the non-rotating parts.

Note:

Values in parentheses are reference dimensions.

Model: SGM7F-	L	(LL)	LB	LH	LA	Approx. mass [kg]
02A□A11	61	(52.7)	$100^{0}_{-0.035}$	$15^{+0.4}_{0}$	$60^{0}_{-0.030}$	2.5
05A□A11	96	(87.7)	$100^{0}_{-0.035}$	$15^{+0.4}_{0}$	$60^{0}_{-0.030}$	4.5
07A□A11	122	(113.7)	$100^{0}_{-0.035}$	$15^{+0.4}_{0}$	$60^{0}_{-0.030}$	5.5

· Flange Specification 4



*1 The shaded section indicates the rotating parts.
*2 The hatched section indicates the non-rotating parts.

Note:

Values in parentheses are reference dimensions.

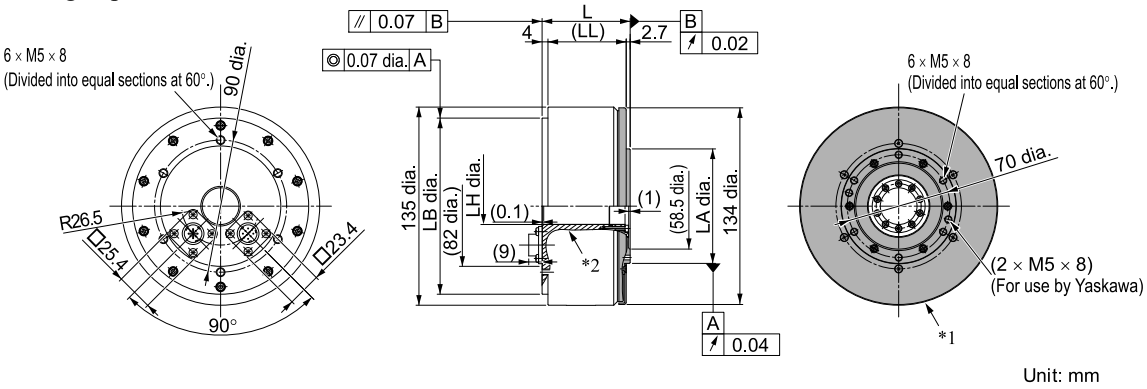
Model: SGM7F-	L	(LL)	LB	LH	LA	Approx. mass [kg]
02A□A41	61	(52.7)	$100^{0}_{-0.035}$	$15^{+0.4}_{0}$	$60^{0}_{-0.030}$	2.5
05A□A41	96	(87.7)	$100^{0}_{-0.035}$	$15^{+0.4}_{0}$	$60^{0}_{-0.030}$	4.5
07A□A41	122	(113.7)	$100^{0}_{-0.035}$	$15^{+0.4}_{0}$	$60^{0}_{-0.030}$	5.5

Refer to the following section for information on connector models.

☞ *Connector Specifications on page 178*

SGM7F-□□B

· Flange Specification 1



Unit: mm

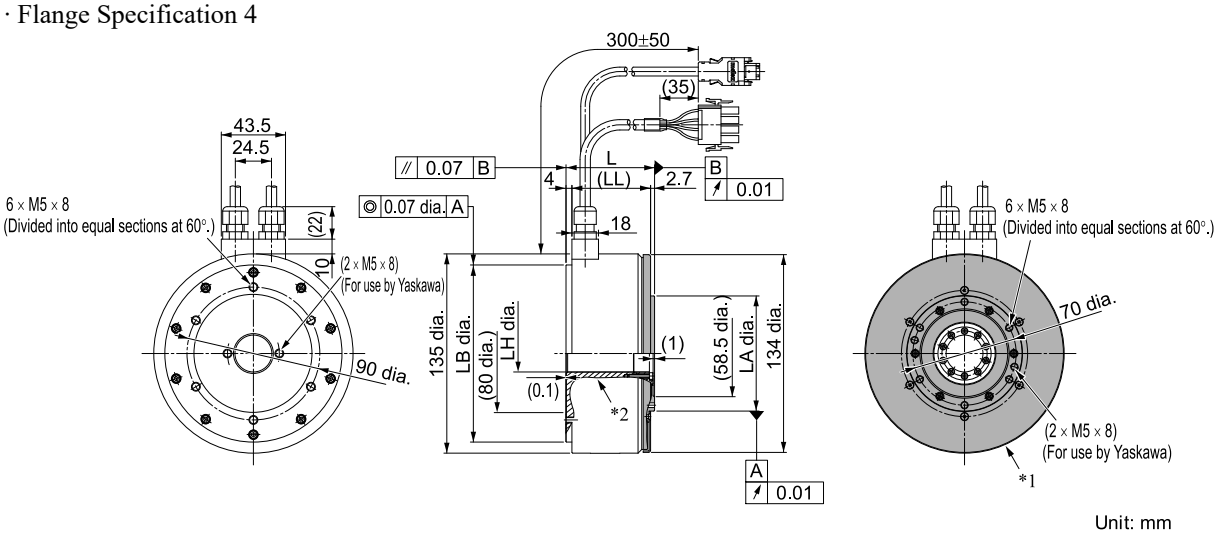
*1 The shaded section indicates the rotating parts.
*2 The hatched section indicates the non-rotating parts.

Note:

Values in parentheses are reference dimensions.

Model: SGM7F-	L	(LL)	LB	LH	LA	Approx. mass [kg]
04B□A11	60	53.3	$120^{0}_{-0.035}$	$25^{+0.3}_{+0.1}$	$78^{0}_{-0.030}$	5.0
10B□A11	85	78.3	$120^{0}_{-0.035}$	$25^{+0.3}_{+0.1}$	$78^{0}_{-0.030}$	6.5
14B□A11	115	108.3	$120^{0}_{-0.035}$	$25^{+0.3}_{+0.1}$	$78^{0}_{-0.030}$	9.0

· Flange Specification 4



Unit: mm

*1 The shaded section indicates the rotating parts.
*2 The hatched section indicates the non-rotating parts.

Note:

Values in parentheses are reference dimensions.

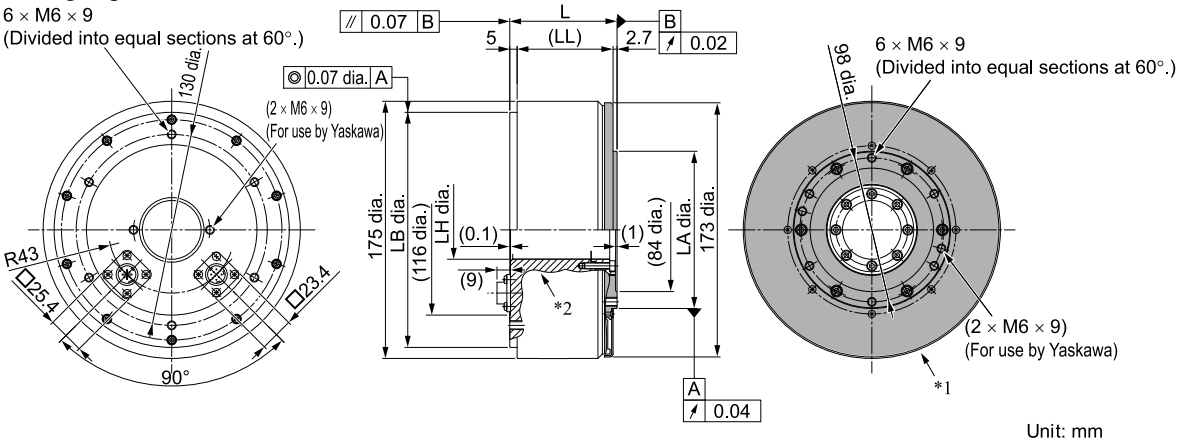
Model: SGM7F-	L	(LL)	LB	LH	LA	Approx. mass [kg]
04B□A41	60	53.3	$120^{0}_{-0.035}$	$25^{+0.3}_{+0.1}$	$78^{0}_{-0.030}$	5.0
10B□A41	85	78.3	$120^{0}_{-0.035}$	$25^{+0.3}_{+0.1}$	$78^{0}_{-0.030}$	6.5
14B□A41	115	108.3	$120^{0}_{-0.035}$	$25^{+0.3}_{+0.1}$	$78^{0}_{-0.030}$	9.0

Refer to the following section for information on connector models.

☞ *Connector Specifications on page 178*

SGM7F-□□C

· Flange Specification 1



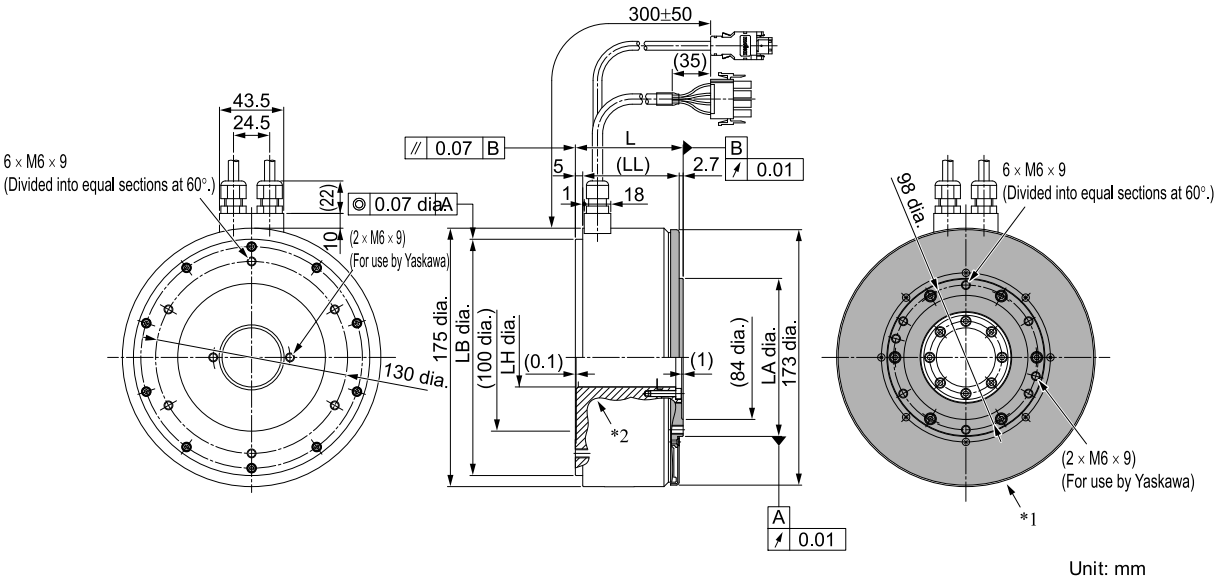
*1 The shaded section indicates the rotating parts.
*2 The hatched section indicates the non-rotating parts.

Note:

Values in parentheses are reference dimensions.

Model: SGM7F-	L	(LL)	LB	LH	LA	Approx. mass [kg]
08C□A11	73	65.3	$160^{0}_{-0.040}$	$40^{+0.3}_{+0.1}$	$107^{0}_{-0.035}$	9.0
17C□A11	87	79.3	$160^{0}_{-0.040}$	$40^{+0.3}_{+0.1}$	$107^{0}_{-0.035}$	11.0
25C□A11	117	109.3	$160^{0}_{-0.040}$	$40^{+0.3}_{+0.1}$	$107^{0}_{-0.035}$	15.0

· Flange Specification 4



Unit: mm

*1 The shaded section indicates the rotating parts.
*2 The hatched section indicates the non-rotating parts.

Note:

Values in parentheses are reference dimensions.

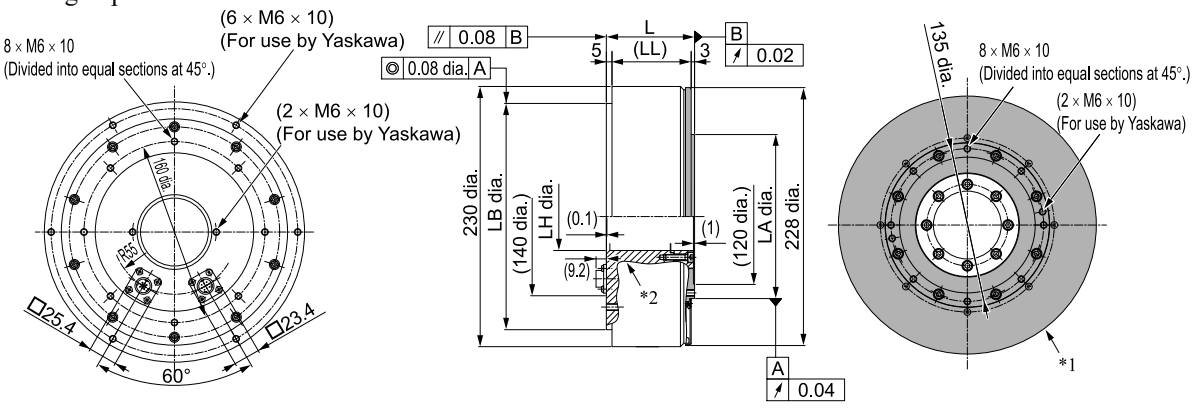
Model: SGM7F-	L	(LL)	LB	LH	LA	Approx. mass [kg]
08C□A41	73	65.3	$160^{0}_{-0.040}$	$40^{+0.3}_{+0.1}$	$107^{0}_{-0.035}$	9.0
17C□A41	87	79.3	$160^{0}_{-0.040}$	$40^{+0.3}_{+0.1}$	$107^{0}_{-0.035}$	11.0
25C□A41	117	109.3	$160^{0}_{-0.040}$	$40^{+0.3}_{+0.1}$	$107^{0}_{-0.035}$	15.0

Refer to the following section for information on connector models.

☞ *Connector Specifications on page 178*

SGM7F-□□D

· Flange Specification 1



Unit: mm

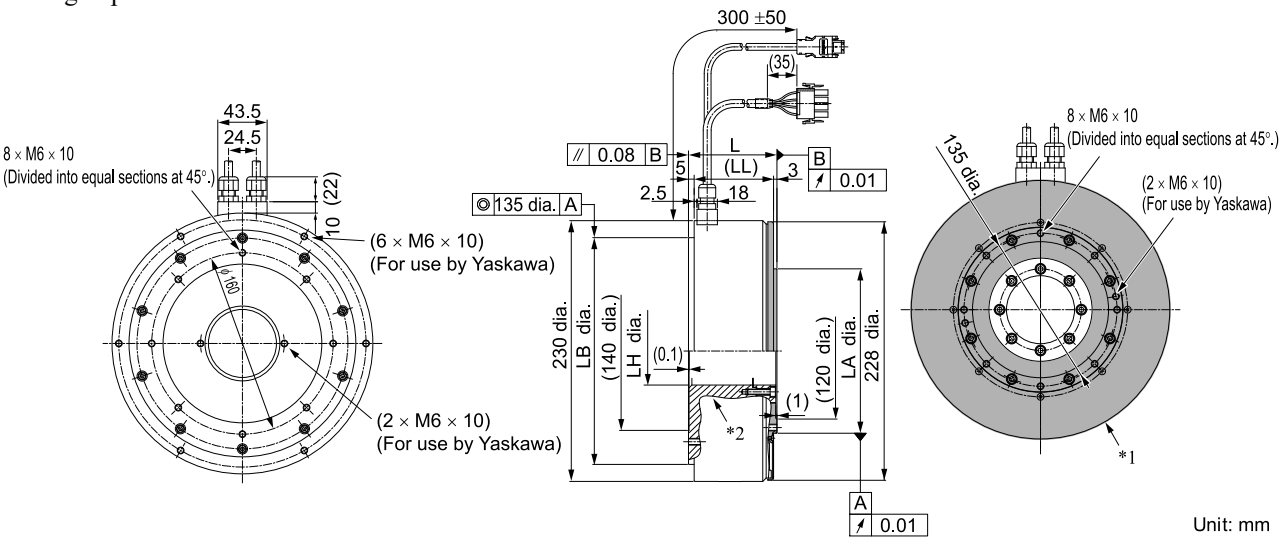
*1 The shaded section indicates the rotating parts.
*2 The hatched section indicates the non-rotating parts.

Note:

Values in parentheses are reference dimensions.

Model: SGM7F-	L	(LL)	LB	LH	LA	Approx. mass [kg]
16D□A11	78	70	$200^{0}_{-0.046}$	$60^{+0.4}_{0}$	$145^{0}_{-0.040}$	16.0
35D□A11	107	99	$200^{0}_{-0.046}$	$60^{+0.4}_{0}$	$145^{0}_{-0.040}$	25.0

· Flange Specification 4



Unit: mm

*1 The shaded section indicates the rotating parts.
*2 The hatched section indicates the non-rotating parts.

Note:

Values in parentheses are reference dimensions.

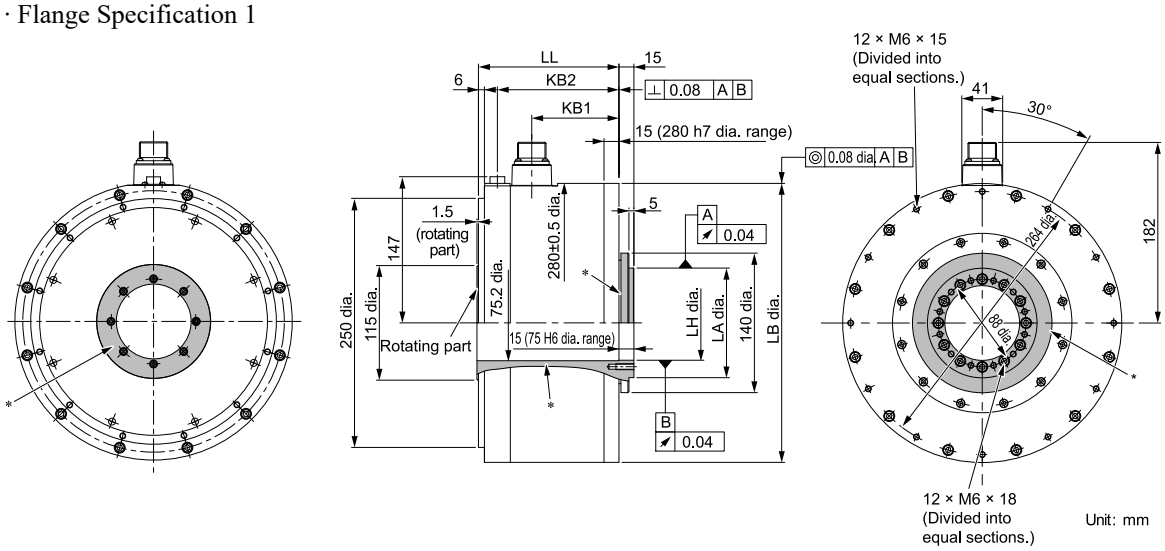
Model: SGM7F-	L	(LL)	LB	LH	LA	Approx. mass [kg]
16D□A41	78	70	$200^{0}_{-0.046}$	$60^{+0.4}_{0}$	$145^{0}_{-0.040}$	16.0
35D□A41	107	99	$200^{0}_{-0.046}$	$60^{+0.4}_{0}$	$145^{0}_{-0.040}$	25.0

Refer to the following section for information on connector models.

☞ *Connector Specifications on page 178*

SGM7F-□□M

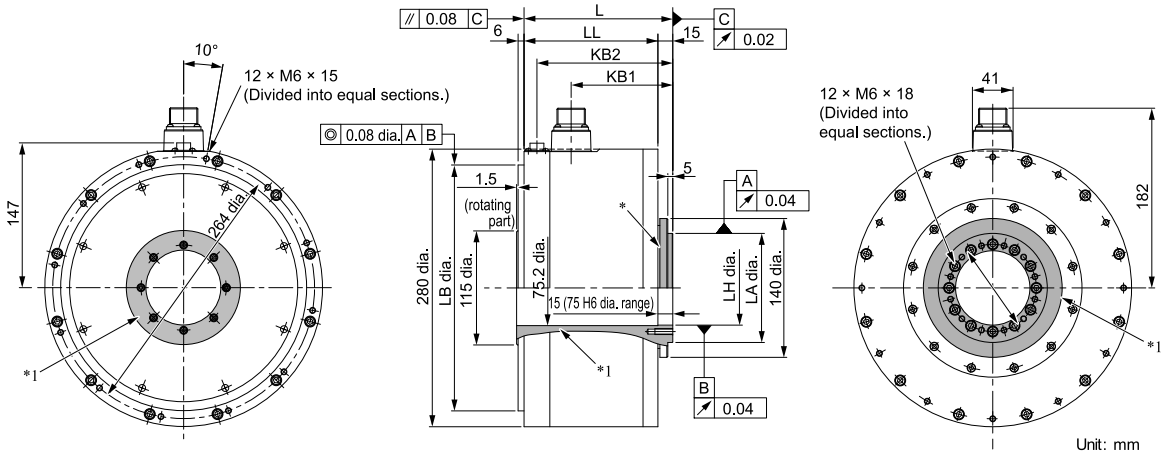
· Flange Specification 1



*1 The shaded section indicates the rotating parts.

Model: SGM7F-	LL	KB1	KB2	LB	LH	LA	Approx. mass [kg]
45M□A11	141	87.5	122	$280^{0}_{-0.052}$	$75^{+0.019}_{0}$	$110^{0}_{-0.035}$	38
80M□A11	191	137.5	172	$280^{0}_{-0.052}$	$75^{+0.019}_{0}$	$110^{0}_{-0.035}$	45
1AM□A11	241	187.5	222	$280^{0}_{-0.052}$	$75^{+0.019}_{0}$	$110^{0}_{-0.035}$	51

· Flange Specification 3



*1 The shaded section indicates the rotating parts.

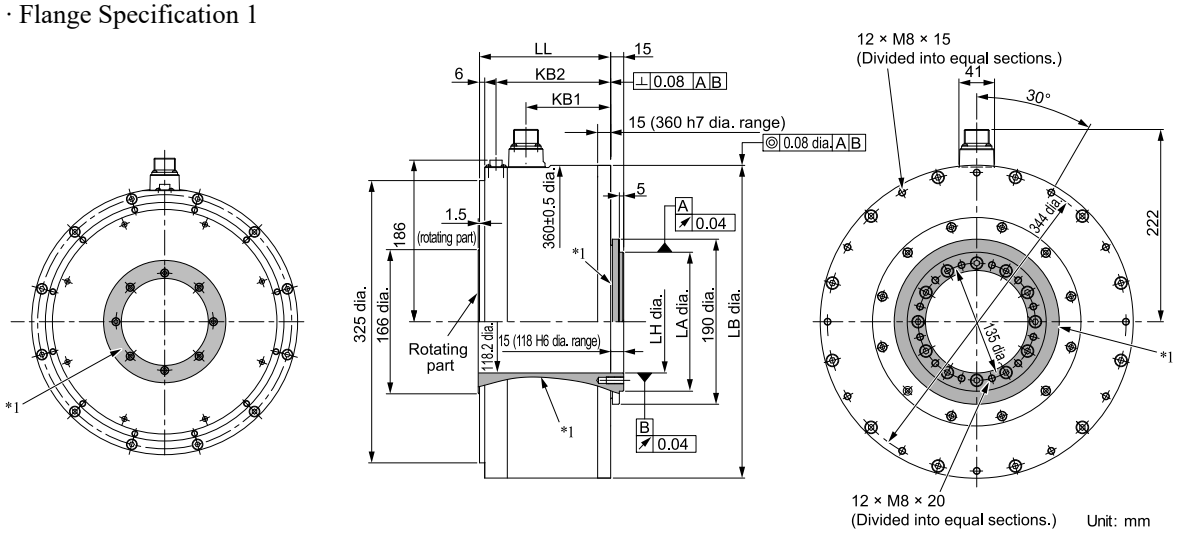
Model: SGM7F-	L	LL	KB1	KB2	LB	LH	LA	Approx. mass [kg]
45M□A31	150	135	102.5	137	$248^{0}_{-0.046}$	$75^{+0.019}_{0}$	$110^{0}_{-0.035}$	38
80M□A31	200	185	152.5	187	$248^{0}_{-0.046}$	$75^{+0.019}_{0}$	$110^{0}_{-0.035}$	45
1AM□A31	250	235	202.5	237	$248^{0}_{-0.046}$	$75^{+0.019}_{0}$	$110^{0}_{-0.035}$	51

Refer to the following section for information on connector models.

☞ *Connector Specifications on page 178*

SGM7F-□□N

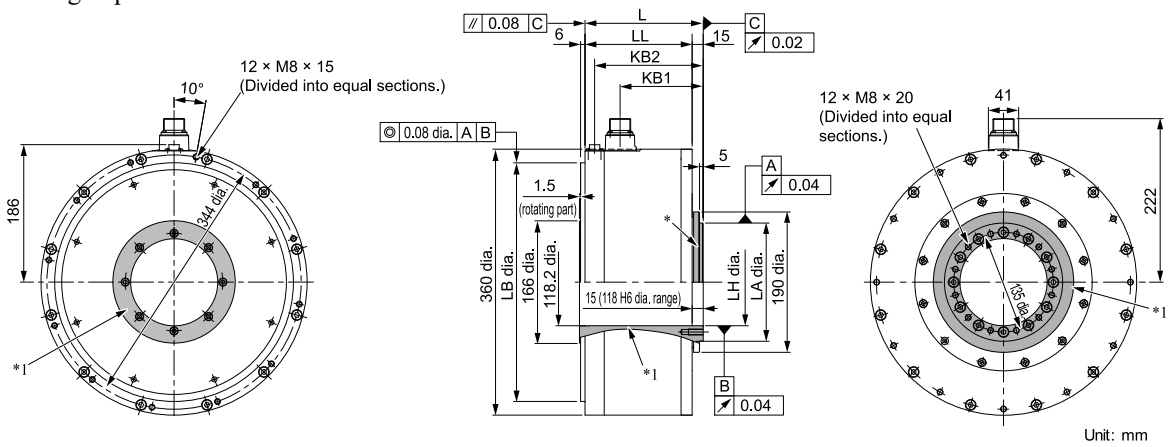
· Flange Specification 1



*1 The shaded section indicates the rotating parts.

Model: SGM7F-	LL	KB1	KB2	LB	LH	LA	Approx. mass [kg]
80N□A11	151	98	132	$360^{0}_{-0.057}$	$118^{+0.022}_{0}$	$160^{0}_{-0.040}$	50
1EN□A11	201	148	182	$360^{0}_{-0.057}$	$118^{+0.022}_{0}$	$160^{0}_{-0.040}$	68
2ZN□A11	251	198	232	$360^{0}_{-0.057}$	$118^{+0.022}_{0}$	$160^{0}_{-0.040}$	86

· Flange Specification 3



*1 The shaded section indicates the rotating parts.

Model: SGM7F-	L	LL	KB1	KB2	LB	LH	LA	Approx. mass [kg]
80N□A31	160	145	113	147	$323^{0}_{-0.057}$	$118^{+0.022}_{0}$	$160^{0}_{-0.040}$	50
1EN□A31	210	195	163	197	$323^{0}_{-0.057}$	$118^{+0.022}_{0}$	$160^{0}_{-0.040}$	68
2ZN□A31	260	245	213	247	$323^{0}_{-0.057}$	$118^{+0.022}_{0}$	$160^{0}_{-0.040}$	86

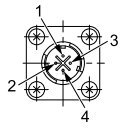
Refer to the following section for information on connector models.

☞ *Connector Specifications on page 178*

Connector Specifications

SGM7F-□□A, -□□B, -□□C, or -□□D: Flange Specification 1

· Servomotor Connector



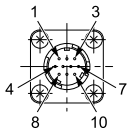
1	Phase U
2	Phase V
3	Phase W
4	FG (frame ground)

Model: JN1AS04MK2R

Manufacturer: Japan Aviation Electronics Industry, Ltd.

Mating connector: JN1DS04FK1 (Not provided by Yaskawa.)

· Encoder Connector



1	PS
2	/PS
3	–
4	PG5V
5 *1	BAT0
6	–
7	FG (frame ground)
8 *1	BAT
9	PG0V
10	–

*1 A battery is required only for a multiturn absolute encoder.

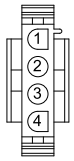
Model: JN1AS10ML1-R

Manufacturer: Japan Aviation Electronics Industry, Ltd.

Mating connector: JN1DS10SL1 (Not provided by Yaskawa.)

SGM7F-□□A, -□□B, -□□C, or -□□D: Flange Specification 4

· Servomotor Connector



1	Phase U	Red
2	Phase V	White
3	Phase W	Blue
4	FG (frame ground)	Green (yellow)

Model

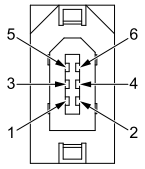
- Plug: 350779-1
- Pins: 350561-3 or 350690-3 (No.1 to 3)
- Ground pin: 350654-1 or 350669-1 (No. 4)

Manufacturer: Tyco Electronics Japan G.K.

Mating Connector

- Cap: 350780-1
- Socket: 350570-3 or 350689-3

· Encoder Connector



1	PG5V
2	PG0V
3 *1*	BAT
4 *1*	BAT0
5	PS
6	/PS
Connector case	FG (frame ground)

*1 A battery is required only for a multiturn absolute encoder.

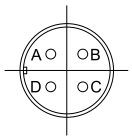
Model: 55102-0600

Manufacturer: Molex Japan LLC

Mating connector: 54280-0609

SGM7F-□□M, -□□N: Flange Specification 1, 3

· Servomotor Connector



A	Phase U
B	Phase V
C	Phase W
D	FG (frame ground)

Model: CE05-2A18-10PD

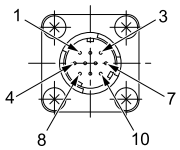
Manufacturer: DDK Ltd.

Mating Connector

Plug: CE05-6A18-10SD-D-BSS

Cable clamp: CE3057-10A-□(D265)

· Encoder Connector



1	PS
2	/PS
3	–
4	PG5V
5 *1*	BAT0
6	–
7	FG (frame ground)
8 *1*	BAT
9	PG0V
10	–

*1 A battery is required only for a multiturn absolute encoder.

Model: JN1AS10ML1

Manufacturer: Japan Aviation Electronics Industry, Ltd.

Mating connector: JN1DS10SL1 (Not provided by Yaskawa.)

Cables and Connectors

This chapter describes the cables that are used to connect one direct drive servomotor to the SERVOPACK and provides related precautions.

Cables for the SGM7D Direct Drives Servomotors

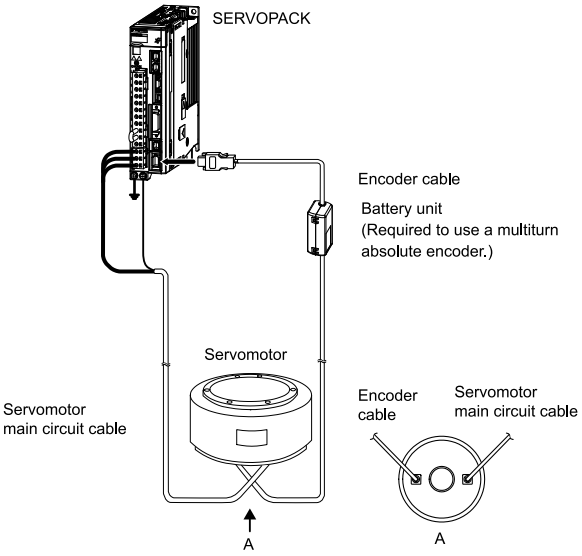
Information Refer to the following manual for details on connecting multiple devices to the SERVOPACK.

Σ-X-Series Peripheral Device Selection Manual (Manual No.: SIEP C710812 12)

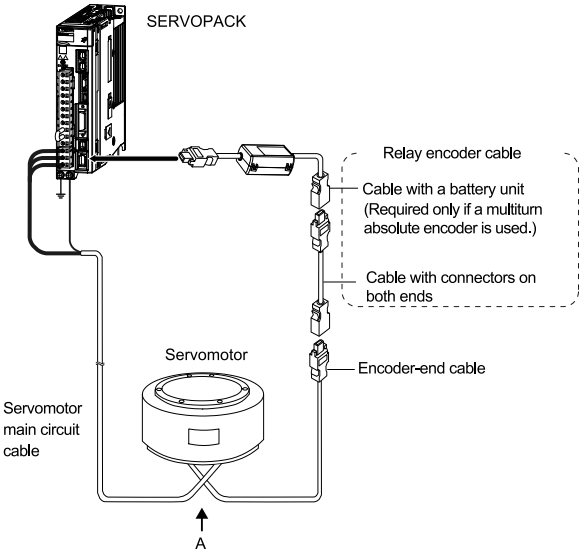
Cable Configurations

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

Encoder Cables of 20 m or Less



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

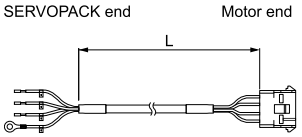
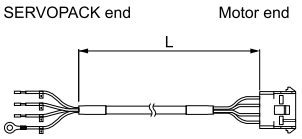


Note:

1. If the encoder cable length exceeds 20 m, use a relay encoder cable.
2. 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.
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

   Σ-X-Series Peripheral Device Selection Manual (Manual No.: SIEP C710812 12)

Servomotor Main Circuit Cables

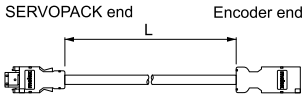
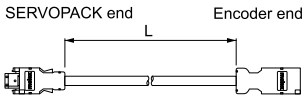
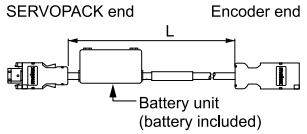
Servomotor Model	Length (L)	Order Number		Appearance
		Standard Cable	Flexible Cable *1	
SGM7D-□□F SGM7D-08G to -45G SGM7D-□□I SGM7D-□□J SGM7D-□□L	3 m	JZSP-CMM00-03-E	JZSP-C7DM21-03-E	
	5 m	JZSP-CMM00-05-E	JZSP-C7DM21-05-E	
	10 m	JZSP-CMM00-10-E	JZSP-C7DM21-10-E	
	15 m	JZSP-CMM00-15-E	JZSP-C7DM21-15-E	
	20 m	JZSP-CMM00-20-E	JZSP-C7DM21-20-E	
SGM7D-01G and -05G SGM7D-□□H SGM7D-□□K	3 m	JZSP-CMM00-03-E	JZSP-CMM01-03-E	
	5 m	JZSP-CMM00-05-E	JZSP-CMM01-05-E	
	10 m	JZSP-CMM00-10-E	JZSP-CMM01-10-E	
	15 m	JZSP-CMM00-15-E	JZSP-CMM01-15-E	
	20 m	JZSP-CMM00-20-E	JZSP-CMM01-20-E	

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

Note:

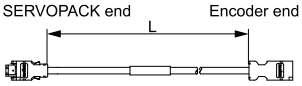
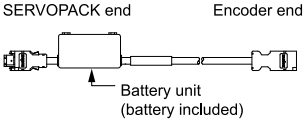
Direct drive servomotors are not available with holding brakes.

Encoder Cables of 20 m or Less

Servomotor Model	Name	Length (L)	Order Number		Appearance
			Standard Cable	Flexible Cable *1	
All SGM7D models	For incremental encoder (without battery unit)	3 m	JZSP-CMP00-03-E	JZSP-CMP10-03-E	
		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	
	For multiturn absolute encoder (without battery unit) *2	3 m	JZSP-CMP00-03-E	JZSP-CMP10-03-E	
		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	
	For multiturn absolute encoder (with battery unit)	3 m	JZSP-CSP19-03-E	JZSP-CSP29-03-E	
		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	

*1 Use flexible cables for moving parts of machines, such as robots. The recommended bending radius (R) is 46 mm or larger.
*2 Use one of these cables if a battery is installed at the host controller.

Relay Encoder Cables of 30 m to 50 m

Servomotor Model	Name	Length (L)	Order Number *1	Appearance
All SGM7D models	Cables with connectors on both ends (for incremental or multiturn absolute encoder)	30 m	JZSP-UCMP00-30-E	
		40 m	JZSP-UCMP00-40-E	
		50 m	JZSP-UCMP00-50-E	
	Cable with a battery unit (for multiturn absolute encoder) *2	0.3 m	JZSP-CSP12-E	

*1 Flexible cables are not available.
*2 This cable is not required if a battery is connected to the host controller.

Cables for the SGM7E Direct Drives Servomotors

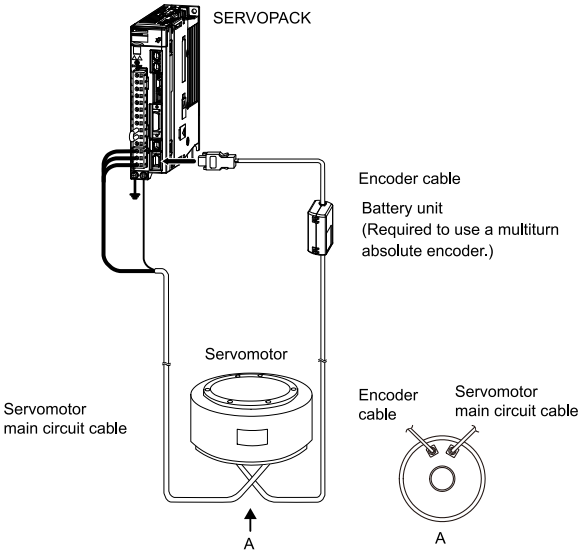
Information Refer to the following manual for details on connecting multiple devices to the SERVOPACK.

Σ-X-Series Peripheral Device Selection Manual (Manual No.: SIEP C710812 12)

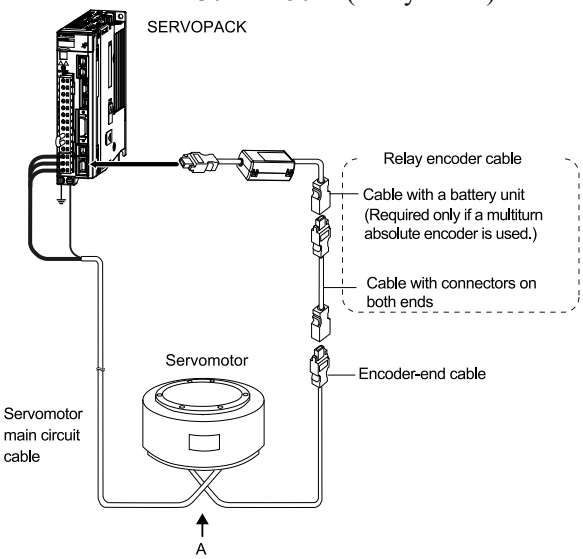
Cable Configurations

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

Encoder Cables of 20 m or Less



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

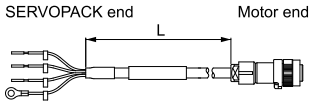
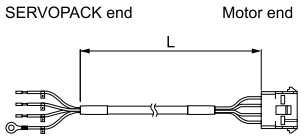


Note:

1. If the encoder cable length exceeds 20 m, use a relay encoder cable.
2. 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.
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

   Σ-X-Series Peripheral Device Selection Manual (Manual No.: SIEP C710812 12)

Servomotor Main Circuit Cables

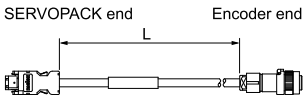
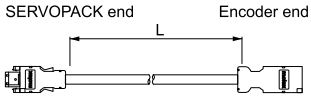
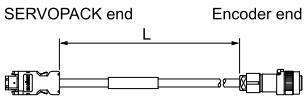
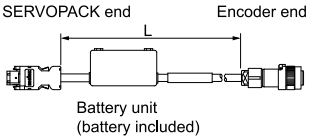
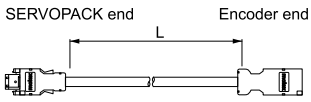
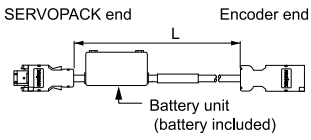
Servomotor Model	Length (L)	Order Number		Appearance
		Standard Cable	Flexible Cable *1	
SGM7E-□□□□ Flange Specification *2: 1	3 m	JZSP-CMM60-03-E	JZSP-C7MDN23-03-E	
	5 m	JZSP-CMM60-05-E	JZSP-C7MDN23-05-E	
	10 m	JZSP-CMM60-10-E	JZSP-C7MDN23-10-E	
	15 m	JZSP-CMM60-15-E	JZSP-C7MDN23-15-E	
	20 m	JZSP-CMM60-20-E	JZSP-C7MDN23-20-E	
SGM7E-□□□□ Flange Specification *2: 4	3 m	JZSP-CMM00-03-E	JZSP-C7MDS23-03-E	
	5 m	JZSP-CMM00-05-E	JZSP-C7MDS23-05-E	
	10 m	JZSP-CMM00-10-E	JZSP-C7MDS23-10-E	
	15 m	JZSP-CMM00-15-E	JZSP-C7MDS23-15-E	
	20 m	JZSP-CMM00-20-E	JZSP-C7MDS23-20-E	

*1 Use flexible cables for moving parts of machines, such as robots. The recommended bending radius (R) is 90 mm or larger.
*2 Refer to the following section for flange specifications.
☞ *Model Designations on page 142*

Note:

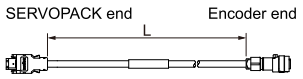
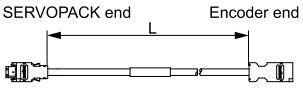
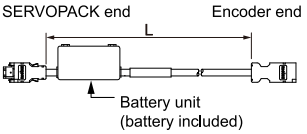
Direct drive servomotors are not available with holding brakes.

Encoder Cables of 20 m or Less

Servomotor Model	Name	Length (L)	Order Number		Appearance
			Standard Cable	Flexible Cable *1	
SGM7E-□□□F Flange Specification *2: 1	For incremental encoder	3 m	JZSP-CMP60-03-E	JZSP-CSP60-03-E	
		5 m	JZSP-CMP60-05-E	JZSP-CSP60-05-E	
		10 m	JZSP-CMP60-10-E	JZSP-CSP60-10-E	
		15 m	JZSP-CMP60-15-E	JZSP-CSP60-15-E	
		20 m	JZSP-CMP60-20-E	JZSP-CSP60-20-E	
SGM7E-□□□F Flange Specification *2: 4		3 m	JZSP-CMP00-03-E	JZSP-CMP10-03-E	
		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	
SGM7E-□□□7 Flange Specification *2: 1	For multiturn absolute encoder (without battery unit) *3	3 m	JZSP-C7PI00-03-E	JZSP-C7PI20-03-E	
		5 m	JZSP-C7PI00-05-E	JZSP-C7PI20-05-E	
		10 m	JZSP-C7PI00-10-E	JZSP-C7PI20-10-E	
		15 m	JZSP-C7PI00-15-E	JZSP-C7PI20-15-E	
		20 m	JZSP-C7PI00-20-E	JZSP-C7PI20-20-E	
	For multiturn absolute encoder (with battery unit)	3 m	JZSP-C7PA00-03-E	JZSP-C7PA20-03-E	
		5 m	JZSP-C7PA00-05-E	JZSP-C7PA20-05-E	
		10 m	JZSP-C7PA00-10-E	JZSP-C7PA20-10-E	
		15 m	JZSP-C7PA00-15-E	JZSP-C7PA20-15-E	
		20 m	JZSP-C7PA00-20-E	JZSP-C7PA20-20-E	
SGM7E-□□□7 Flange Specification *2: 4	For multiturn absolute encoder (without battery unit) *3	3 m	JZSP-CMP00-03-E	JZSP-CMP10-03-E	
		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	
	For multiturn absolute encoder (with battery unit)	3 m	JZSP-CSP19-03-E	JZSP-CSP29-03-E	
		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	

*1 Use flexible cables for moving parts of machines, such as robots. The recommended bending radius (R) is 46 mm or larger.
*2 Refer to the following section for flange specifications.
☞ *Model Designations on page 142*
*3 Use one of these cables if a battery is installed at the host controller.

Relay Encoder Cables of 30 m to 50 m

Servomotor Model	Name	Length (L)	Order Number *1	Appearance
SGM7E-□□□F SGM7E-□□□7 Flange Specification *2: 1	Encoder cable (for incremental or multiturn absolute encoder)	0.3 m	JZSP-C7PRC0-E	
SGM7E-□□□F SGM7E-□□□7 Flange Specification *2: 1 or 4	Cables with connectors on both ends (for incremental or multiturn absolute encoder)	30 m	JZSP-UCMP00-30-E	
		40 m	JZSP-UCMP00-40-E	
		50 m	JZSP-UCMP00-50-E	
SGM7E-□□□7 Flange Specification *2: 1 or 4	Cable with a battery unit (for multiturn absolute encoder) *3	0.3 m	JZSP-CSP12-E	

*1 Flexible cables are not available.
*2 Refer to the following section for flange specifications.
☞ *Model Designations on page 142*
*3 This cable is not required if a battery is connected to the host controller.

Cables for the SGM7F Direct Drives Servomotors

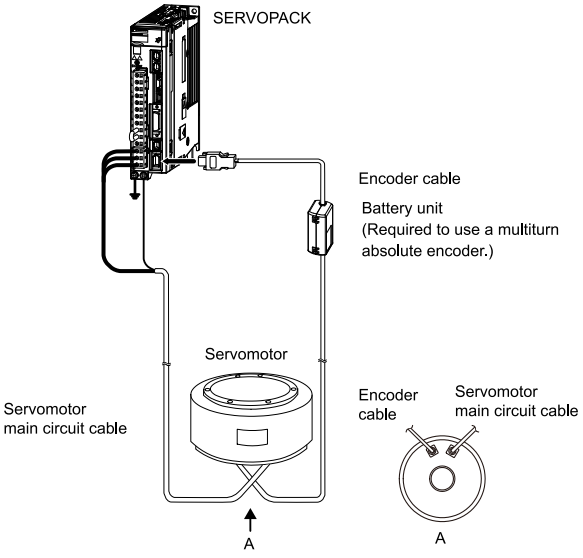
Information Refer to the following manual for details on connecting multiple devices to the SERVOPACK.

Σ-X-Series Peripheral Device Selection Manual (Manual No.: SIEP C710812 12)

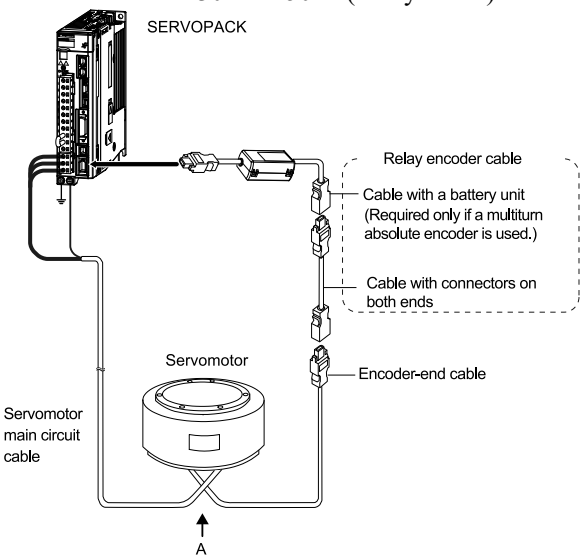
Cable Configurations

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

Encoder Cables of 20 m or Less



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

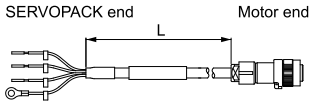
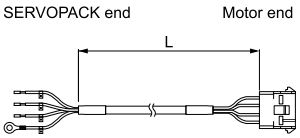
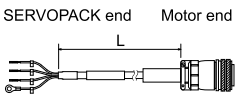
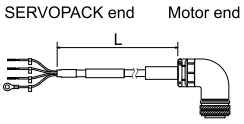
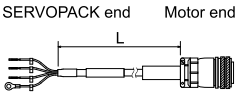
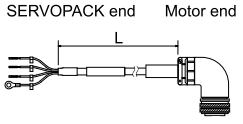


Note:

1. If the encoder cable length exceeds 20 m, use a relay encoder cable.
2. 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.
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

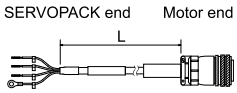
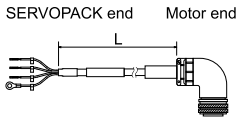
   Σ-X-Series Peripheral Device Selection Manual (Manual No.: SIEP C710812 12)

Servomotor Main Circuit Cables

Servomotor Model	Length (L)	Order Number		Appearance
		Standard Cable	Flexible Cable *1	
SGM7F-□□A SGM7F-□□B SGM7F-□□C SGM7F-□□D Flange Specification *2: 1	3 m	JZSP-CMM60-03-E	JZSP-C7MDN23-03-E	
	5 m	JZSP-CMM60-05-E	JZSP-C7MDN23-05-E	
	10 m	JZSP-CMM60-10-E	JZSP-C7MDN23-10-E	
	15 m	JZSP-CMM60-15-E	JZSP-C7MDN23-15-E	
	20 m	JZSP-CMM60-20-E	JZSP-C7MDN23-20-E	
SGM7F-□□A SGM7F-□□B SGM7F-□□C SGM7F-□□D Flange Specification *2: 4	3 m	JZSP-CMM00-03-E	JZSP-C7MDS23-03-E	
	5 m	JZSP-CMM00-05-E	JZSP-C7MDS23-05-E	
	10 m	JZSP-CMM00-10-E	JZSP-C7MDS23-10-E	
	15 m	JZSP-CMM00-15-E	JZSP-C7MDS23-15-E	
	20 m	JZSP-CMM00-20-E	JZSP-C7MDS23-20-E	
SGM7F-□□M SGM7F-□□N □□ : 45 □□ : 80	3 m	JZSP-USA101-03-E	JZSP-USA121-03-E	
	5 m	JZSP-USA101-05-E	JZSP-USA121-05-E	
	10 m	JZSP-USA101-10-E	JZSP-USA121-10-E	
	15 m	JZSP-USA101-15-E	JZSP-USA121-15-E	
	20 m	JZSP-USA101-20-E	JZSP-USA121-20-E	
	3 m	JZSP-USA102-03-E	JZSP-USA122-03-E	
	5 m	JZSP-USA102-05-E	JZSP-USA122-05-E	
	10 m	JZSP-USA102-10-E	JZSP-USA122-10-E	
	15 m	JZSP-USA102-15-E	JZSP-USA122-15-E	
	20 m	JZSP-USA102-20-E	JZSP-USA122-20-E	
SGM7F-□□M SGM7F-□□N □□ : 1A	3 m	JZSP-USA301-03-E	JZSP-USA321-03-E	
	5 m	JZSP-USA301-05-E	JZSP-USA321-05-E	
	10 m	JZSP-USA301-10-E	JZSP-USA321-10-E	
	15 m	JZSP-USA301-15-E	JZSP-USA321-15-E	
	20 m	JZSP-USA301-20-E	JZSP-USA321-20-E	
	3 m	JZSP-USA302-03-E	JZSP-USA322-03-E	
	5 m	JZSP-USA302-05-E	JZSP-USA322-05-E	
	10 m	JZSP-USA302-10-E	JZSP-USA322-10-E	
	15 m	JZSP-USA302-15-E	JZSP-USA322-15-E	
	20 m	JZSP-USA302-20-E	JZSP-USA322-20-E	

Continued on next page.

Continued from previous page.

Servomotor Model	Length (L)	Order Number		Appearance
		Standard Cable	Flexible Cable *1	
SGM7F-□□M SGM7F-□□N □□ : 1E □□ : 2Z	3 m	JZSP-USA501-03-E	JZSP-USA521-03-E	
	5 m	JZSP-USA501-05-E	JZSP-USA521-05-E	
	10 m	JZSP-USA501-10-E	JZSP-USA521-10-E	
	15 m	JZSP-USA501-15-E	JZSP-USA521-15-E	
	20 m	JZSP-USA501-20-E	JZSP-USA521-20-E	
	3 m	JZSP-USA502-03-E	JZSP-USA522-03-E	
	5 m	JZSP-USA502-05-E	JZSP-USA522-05-E	
	10 m	JZSP-USA502-10-E	JZSP-USA522-10-E	
	15 m	JZSP-USA502-15-E	JZSP-USA522-15-E	
	20 m	JZSP-USA502-20-E	JZSP-USA522-20-E	

*1 Use flexible cables for moving parts of machines, such as robots. The recommended bending radius of the flexible cables are given in the following table.

*2 Refer to the following section for flange specifications.

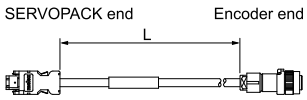
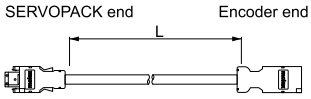
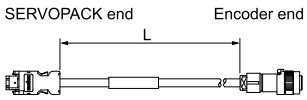
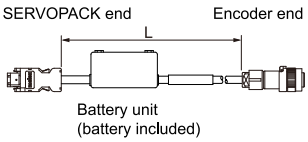
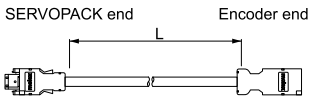
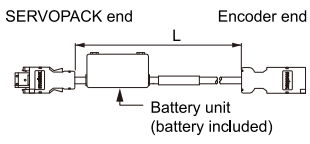
☞ *Model Designations on page 158*

Order Number	Recommended Bending Radius (R)	Order Number	Recommended Bending Radius (R)
JZSP-C7MDN23-□□-E	90 mm min.	JZSP-USA321-□□-E	113 mm min.
JZSP-C7MDS23-□□-E		JZSP-USA322-□□-E	
JZSP-USA121-□□-E	96 mm min.	JZSP-USA521-□□-E	150 mm min.
JZSP-USA122-□□-E		JZSP-USA522-□□-E	

Note:

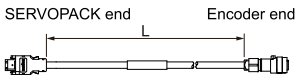
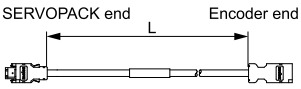
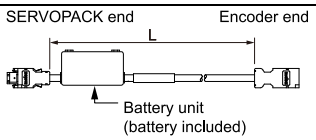
Direct drive servomotors are not available with holding brakes.

Encoder Cables of 20 m or Less

Servomotor Model	Name	Length (L)	Order Number		Appearance
			Standard Cable	Flexible Cable *1	
SGM7F-□□□F Flange Specification *2: 1 or 3	For incremental encoder	3 m	JZSP-CMP60-03-E	JZSP-CSP60-03-E	
		5 m	JZSP-CMP60-05-E	JZSP-CSP60-05-E	
		10 m	JZSP-CMP60-10-E	JZSP-CSP60-10-E	
		15 m	JZSP-CMP60-15-E	JZSP-CSP60-15-E	
		20 m	JZSP-CMP60-20-E	JZSP-CSP60-20-E	
SGM7F-□□AF SGM7F-□□BF SGM7F-□□CF SGM7F-□□DF Flange Specification *2: 4		3 m	JZSP-CMP00-03-E	JZSP-CMP10-03-E	
		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	
SGM7F-□□□7 Flange Specification *2: 1 or 3	For multiturn absolute encoder (without battery unit) *3	3 m	JZSP-C7PI00-03-E	JZSP-C7PI20-03-E	
		5 m	JZSP-C7PI00-05-E	JZSP-C7PI20-05-E	
		10 m	JZSP-C7PI00-10-E	JZSP-C7PI20-10-E	
		15 m	JZSP-C7PI00-15-E	JZSP-C7PI20-15-E	
		20 m	JZSP-C7PI00-20-E	JZSP-C7PI20-20-E	
	For multiturn absolute encoder (with battery unit)	3 m	JZSP-C7PA00-03-E	JZSP-C7PA20-03-E	
		5 m	JZSP-C7PA00-05-E	JZSP-C7PA20-05-E	
		10 m	JZSP-C7PA00-10-E	JZSP-C7PA20-10-E	
		15 m	JZSP-C7PA00-15-E	JZSP-C7PA20-15-E	
		20 m	JZSP-C7PA00-20-E	JZSP-C7PA20-20-E	
SGM7F-□□A7 SGM7F-□□B7 SGM7F-□□C7 SGM7F-□□D7 Flange Specification *2: 4	For multiturn absolute encoder (without battery unit) *3	3 m	JZSP-CMP00-03-E	JZSP-CMP10-03-E	
		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	
	For multiturn absolute encoder (with battery unit)	3 m	JZSP-CSP19-03-E	JZSP-CSP29-03-E	
		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	

*1 Use flexible cables for moving parts of machines, such as robots. The recommended bending radius (R) is 46 mm or larger.
*2 Refer to the following section for flange specifications.
☞ *Model Designations on page 158*
*3 Use one of these cables if a battery is installed at the host controller.

Relay Encoder Cables of 30 m to 50 m

Servomotor Model	Name	Length (L)	Order Number *1	Appearance
SGM7F-□□□F SGM7F-□□□7 Flange Specification *2: 1 or 3	Encoder cable (for incremental or multiturn absolute encoder)	0.3 m	JZSP-C7PRC0-E	
SGM7F-□□□F SGM7F-□□□7 Flange Specification *2: 1, 3, or 4	Cables with connectors on both ends (for incremental or multiturn absolute encoder)	30 m	JZSP-UCMP00-30-E	
		40 m	JZSP-UCMP00-40-E	
		50 m	JZSP-UCMP00-50-E	
SGM7F-□□□7 Flange Specification *2: 1, 3, or 4	Cable with a battery unit (for multiturn absolute encoder) *3	0.3 m	JZSP-CSP12-E	

*1 Flexible cables are not available.
*2 Refer to the following section for flange specifications.
☞ *Model Designations on page 158*
*3 This cable is not required if a battery is connected to the host controller.

Linear Servomotors

SGLGW

Model Designations

Moving Coil

SGL G W - 30 A 050 C P □ - E

Linear Σ series
Linear servomotors

❶ ❷ ❸ ❹ ❺ ❻ ❼ ❽ ❾

❶ Servomotor Type

Code	Specification
G	Coreless model

❷ Moving Coil/Magnetic Way

Code	Specification
W	Moving coil

❸ Magnet Height

Code	Specification
30	30 mm
40	40 mm
60	60 mm
90	86 mm

❹ Power Supply Voltage

Code	Specification
A	200 VAC

❺ Length of Moving Coil

Code	Specification
050	50 mm
080	80 mm
140	140 mm
200	199 mm
253	252.5 mm
365	365 mm
370	367 mm
535	535 mm

❻ Design Revision Order

A, B...

❼ Sensor Specification and Cooling Method

Code	Specifications		Applicable Models
	Polarity Sensor (Hall Sensor)	Cooling Method	
None	None	Self-cooled	All models
C	None	Air-cooled	SGLGW -40A, -60A, -90A
H	Yes	Air-cooled	
P	Yes	Self-cooled	All models

❽ Connector for Servomotor Main Circuit Cable

Code	Specification	Applicable Models
None	Connector from Tyco Electronics Japan G.K.	All models
D	Connector from Interconnectron GmbH	SGLGW -30A, -40A, -60A

❾ EU Directive Certification

Code	Specification
E	Certified
None	Not certified

Note:
This information is provided to explain model numbers. It is not meant to imply that models are available for all combinations of codes.

Magnetic Way

SGL G M - 30 108 A □

Linear Σ series Linear servomotors ❶ ❷ ❸ ❹ ❺ ❻

❶ Servomotor Type

(Same as for the moving coil.)

❷ Moving Coil/Magnetic Way

Code	Specification
M	Magnetic way

❸ Magnet Height

(Same as for the moving coil.)

❹ Length of Magnetic Way

Code	Specification
090	90 mm
108	108 mm
216	216 mm
225	225 mm
252	252 mm
360	360 mm
405	405 mm
432	432 mm
450	450 mm
504	504 mm

❺ Design Revision Order

A, B, C*...

❻ Options

Code	Specification	Applicable Models
None	Standard-force	All models
-M	High-force	SGLGM-40, -60

*1 The SGLGM-40 and SGLGM-60 also have a "CT" code.

- C = Without mounting holes on the bottom
- CT = With mounting holes on the bottom

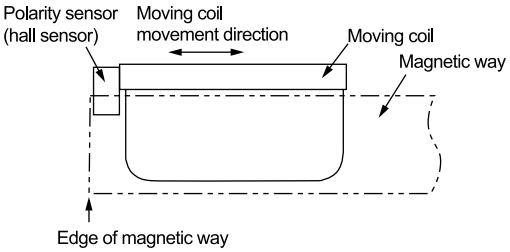
Note:

This information is provided to explain model numbers. It is not meant to imply that models are available for all combinations of codes.

Precautions on Moving Coils with Polarity Sensors (Hall Sensors)

When you use a moving coil with a polarity sensor (hall sensor), the magnetic way must cover the bottom of the polarity sensor (hall sensor). Refer to the example that shows the correct installation. When determining the length of the moving coil's stroke or the length of the magnetic way, consider the total length (L) of the moving coil and the polarity sensor (hall sensor). Refer to the following table.

<Correct>



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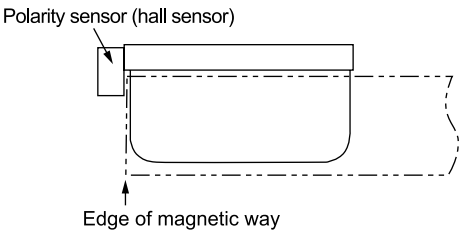
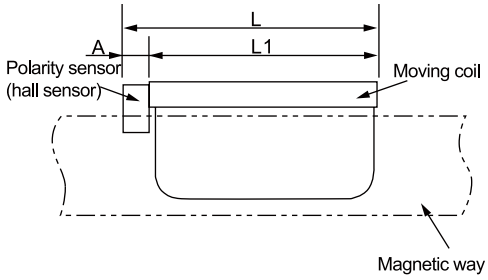


■ Total Length of Moving Coil with Polarity Sensor (Hall Sensor)



Moving Coil Model SGLGW-	Length of Moving Coil L1 [mm]	Length of Polarity Sensor (Hall Sensor) A [mm]	Total Length L [mm]
30A050□P□	50	0 (Included in the length of moving coil.)	50
30A080□P□	80		80
40A140□H□ 40A140□P□	140	16	156
40A253□H□ 40A253□P□	252.5		268.5
40A365□H□ 40A365□P□	365		381
60A140□H□ 60A140□P□	140	16	156
60A253□H□ 60A253□P□	252.5		268.5
60A365□H□ 60A365□P□	365		381
90A200□H□ 90A200□P□	199	0 (Included in the length of moving coil.)	199
90A370□H□ 90A370□P□	367		367
90A535□H□ 90A535□P□	535		535

Ratings and Specifications

Specifications: With Standard-Force Magnetic Way

Linear Servomotor Moving Coil Model SGLGW-		30A		40A			60A			90A		
		050C	080C	140C	253C	365C	140C	253C	365C	200C	370C	535C
Time Rating		Continuous										
Thermal Class		B										
Insulation Resistance		500 VDC, 10 MΩ min.										
Withstand Voltage		1500 VAC for 1 minute										
Excitation		Permanent magnet										
Cooling Method		Self-cooled or air-cooled (Only self-cooled models are available for the SGLGW-30A.)										
Protective Structure		IP00										
Environmental Conditions	Surrounding Air Temperature	0°C to 40°C (with no freezing)										
	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 1000 m or less. Must be free of strong magnetic fields.										
Shock Resistance	Impact Acceleration Rate	196 m/s²										
	Number of Impacts	2 times										
Vibration Resistance	Vibration Acceleration Rate	49 m/s² (the vibration resistance in three directions, vertical, side-to-side, and front-to-back)										

Ratings: With Standard-Force Magnetic Way

Linear Servomotors Moving Coil Model SGLGW-		30A		40A			60A			90A		
		050C	080C	140C	253C	365C	140C	253C	365C	200C	370C	535C
Rated Motor Speed (Reference Speed during Speed Control) *1	m/s	1.5	1.5	2.0	2.0	2.0	2.3	2.3	2.3	1.8	1.5	1.5
Maximum Speed *1	m/s	5.0	5.0	5.0	5.0	5.0	4.8	4.8	4.8	4.0	4.0	4.0
Rated Force *1, *2	N	12.5	25	47	93	140	70	140	210	325	550	750
Maximum Force *1	N	40	80	140	280	420	220	440	660	1300	2200	3000
Rated Current *1	Arms	0.51	0.79	0.80	1.6	2.4	1.2	2.2	3.3	4.4	7.5	10.2
Maximum Current *1	Arms	1.6	2.5	2.4	4.9	7.3	3.5	7.0	10.5	17.6	30.0	40.8
Moving Coil Mass	kg	0.10	0.15	0.34	0.60	0.87	0.42	0.76	1.1	2.2	3.6	4.9
Force Constant	N/Arms	26.4	33.9	61.5	61.5	61.5	66.6	66.6	66.6	78.0	78.0	78.0
BEMF Constant	Vrms/(m/s)/phase	8.80	11.3	20.5	20.5	20.5	22.2	22.2	22.2	26.0	26.0	26.0

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Linear Servomotors Moving Coil Model SGLGW-		30A		40A			60A			90A		
		050C	080C	140C	253C	365C	140C	253C	365C	200C	370C	535C
Motor Constant	N/√W	3.66	5.63	7.79	11.0	13.5	11.1	15.7	19.2	26.0	36.8	45.0
Electrical Time Constant	ms	0.19	0.41	0.43	0.43	0.43	0.45	0.45	0.45	1.4	1.4	1.4
Mechanical Time Constant	ms	7.5	4.7	5.6	5.0	4.8	3.4	3.1	3.0	3.3	2.7	2.4
Thermal Resistance (with Heat Sink)	K/W	5.19	3.11	1.67	0.87	0.58	1.56	0.77	0.51	0.39	0.26	0.22
Thermal Resistance (without Heat Sink)	K/W	8.13	6.32	3.02	1.80	1.23	2.59	1.48	1.15	1.09	0.63	0.47
Magnetic Attraction	N	0	0	0	0	0	0	0	0	0	0	0
Maximum Allowable Payload	kg	1.7	3.4	5.9	12	18	9.9	19	48	110	190	260
Maximum Allowable Payload (With External Regenerative Resistor)	kg	1.7	3.4	5.9	12	18	9.9	19	48	110	190	260
Combined Magnetic Way, SGLGM-		30□□□A		40□□□C□			60□□□C□			90□□□A		
Combined Serial Converter Unit, JZDP-□□□□-		250	251	252	253	254	258	259	260	264	265	266
Applicable SERVOPACKs	SGDXS-	R70A	R90A		1R6A	2R8A	1R6A	2R8A	5R5A	120A	180A	200A
	SGDXW-	1R6A				2R8A	1R6A	2R8A	5R5A	-		

*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.

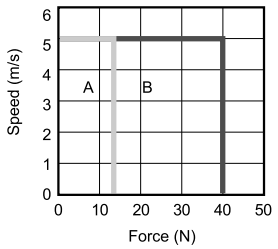
*2 The rated forces are the continuous allowable force values at a surrounding air temperature of 40°C with an aluminum heat sink of the dimensions given in the following table.
Heat Sink Dimensions

- 200 mm × 300 mm × 12 mm: SGLGW-30A050C, 30A080C, 40A140C, 60A140C
- 300 mm × 400 mm × 12 mm: SGLGW-40A253C, 60A253C
- 400 mm × 500 mm × 12 mm: SGLGW-40A365C, 60A365C
- 800 mm × 900 mm × 12 mm: SGLGW-90A200C, 90A370C, 90A535C

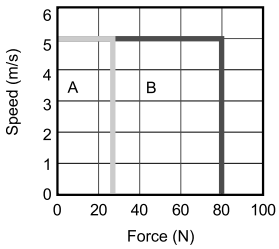
Force-Motor Speed Characteristics

A : Continuous duty zone ———— (solid lines): With three-phase 200-V input
B : Intermittent duty zone - - - - - - - - (dotted lines): With single-phase 200-V input

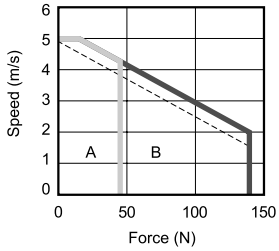
SGLGW-30A050C*



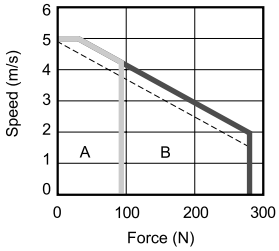
SGLGW-30A080C*



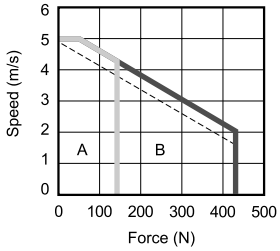
SGLGW-40A140C



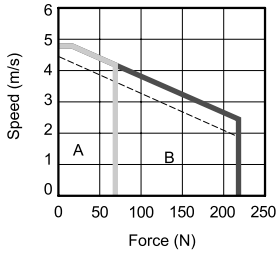
SGLGW-40A253C



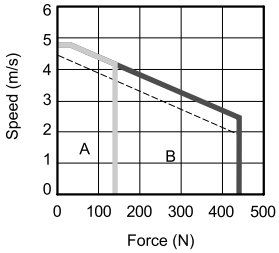
SGLGW-40A365C



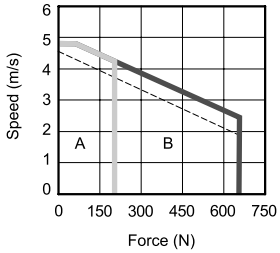
SGLGW-60A140C



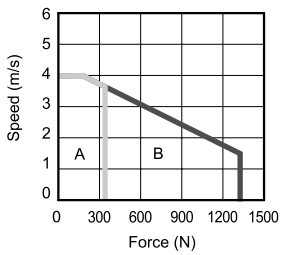
SGLGW-60A253C



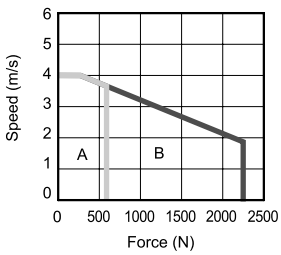
SGLGW-60A365C



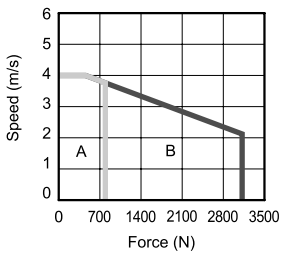
SGLGW-90A200C



SGLGW-90A370C



SGLGW-90A535C



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

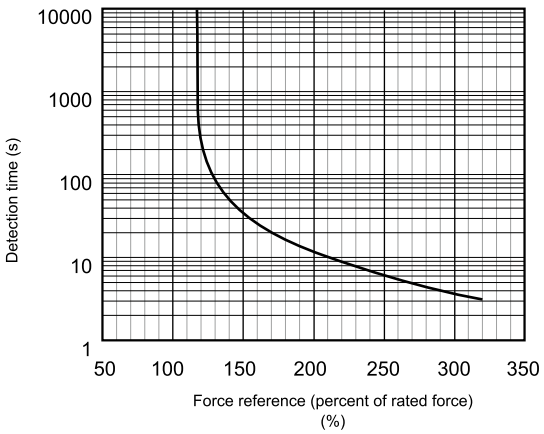
Note:

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 force is within the allowable range for the rated force, 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.

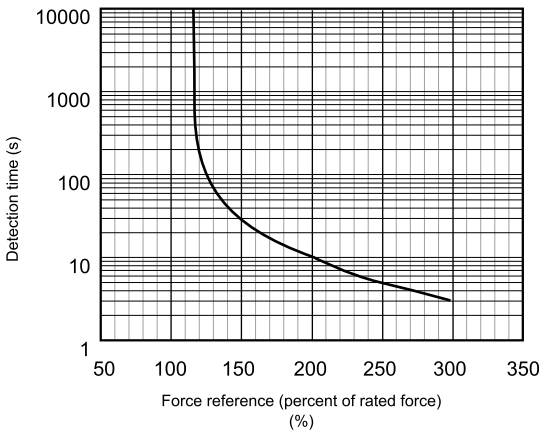
Servomotor Overload Protection Characteristics

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

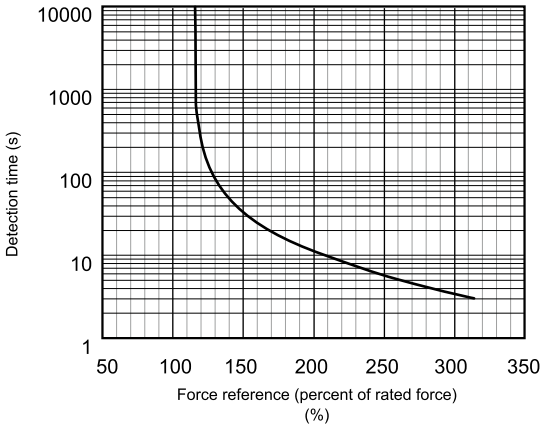
SGLGW-30A



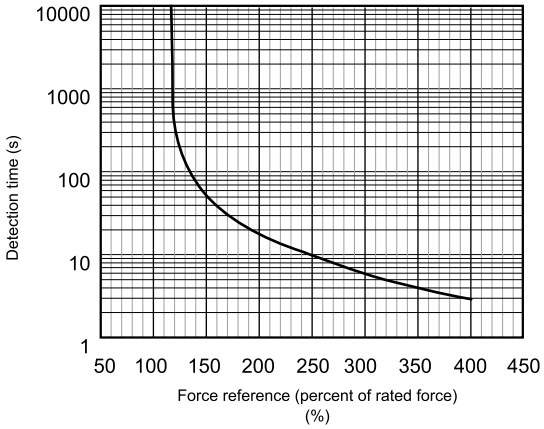
SGLGW-40A



SGLGW-60A



SGLGW-90A



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 force remains within the continuous duty zone given in *Force-Motor Speed Characteristics on page 199*.

Specifications: With High-Force Magnetic Way

Linear Servomotor Moving Coil Model SGLGW-	40A			60A		
	140C	253C	365C	140C	253C	365C
Time Rating	Continuous					
Thermal Class	B					
Insulation Resistance	500 VDC, 10 MΩ min.					
Withstand Voltage	1,500 VAC for 1 minute					
Excitation	Permanent magnet					
Cooling Method	Self-cooled or air-cooled					
Protective Structure	IP00					

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Linear Servomotor Moving Coil Model SGLGW-		40A			60A		
		140C	253C	365C	140C	253C	365C
Environmental Conditions	Surrounding Air Temperature	0°C to 40°C (with no freezing)					
	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. Must be free of strong magnetic fields.					
Shock Resistance	Impact Acceleration Rate	196 m/s^2					
	Number of Impacts	2 times					
Vibration Resistance	Vibration Acceleration Rate	49 m/s^2(the vibration resistance in three directions, vertical, side-to-side, and front-to-back)					

Ratings: With High-Force Magnetic Way

Linear Servomotor Moving Coil Model SGLGW-		40A			60A		
		140C	253C	365C	140C	253C	365C
Rated Motor Speed (Reference Speed during Speed Control) *1	m/s	1.0	1.0	1.0	1.0	1.0	1.0
Maximum Speed *1	m/s	4.2	4.2	4.2	4.2	4.2	4.2
Rated Force *1, *2	N	57	114	171	85	170	255
Maximum Force *1	N	230	460	690	360	720	1080
Rated Current *1	Arms	0.80	1.6	2.4	1.2	2.2	3.3
Maximum Current *1	Arms	3.2	6.5	9.7	5.0	10.0	14.9
Moving Coil Mass	kg	0.34	0.60	0.87	0.42	0.76	1.1
Force Constant	N/Arms	76.0	76.0	76.0	77.4	77.4	77.4
BEMF Constant	Vrms/(m/s)/phase	25.3	25.3	25.3	25.8	25.8	25.8
Motor Constant	$N/\sqrt{W}$	9.62	13.6	16.7	12.9	18.2	22.3
Electrical Time Constant	ms	0.43	0.43	0.43	0.45	0.45	0.45
Mechanical Time Constant	ms	3.7	3.2	3.1	2.5	2.3	2.2
Thermal Resistance (with Heat Sink)	K/W	1.67	0.87	0.58	1.56	0.77	0.51
Thermal Resistance (without Heat Sink)	K/W	3.02	1.80	1.23	2.59	1.48	1.15
Magnetic Attraction	N	0	0	0	0	0	0
Maximum Allowable Payload	kg	12	24	58	18	61	91
Maximum Allowable Payload (With External Regenerative Resistor)	kg	12	24	58	18	61	91
Combined Magnetic Way, SGLGM-		40□□□C□-M			60□□□C□-M		
Combined Serial Converter Unit JZDP-□□□□-		255	256	257	261	262	263
Applicable SERVOPACKs	SGDXS-	1R6A	2R8A	3R8A	1R6A	3R8A	7R6A
	SGDXW-	1R6A	2R8A	5R5A	1R6A	5R5A	7R6A

*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.

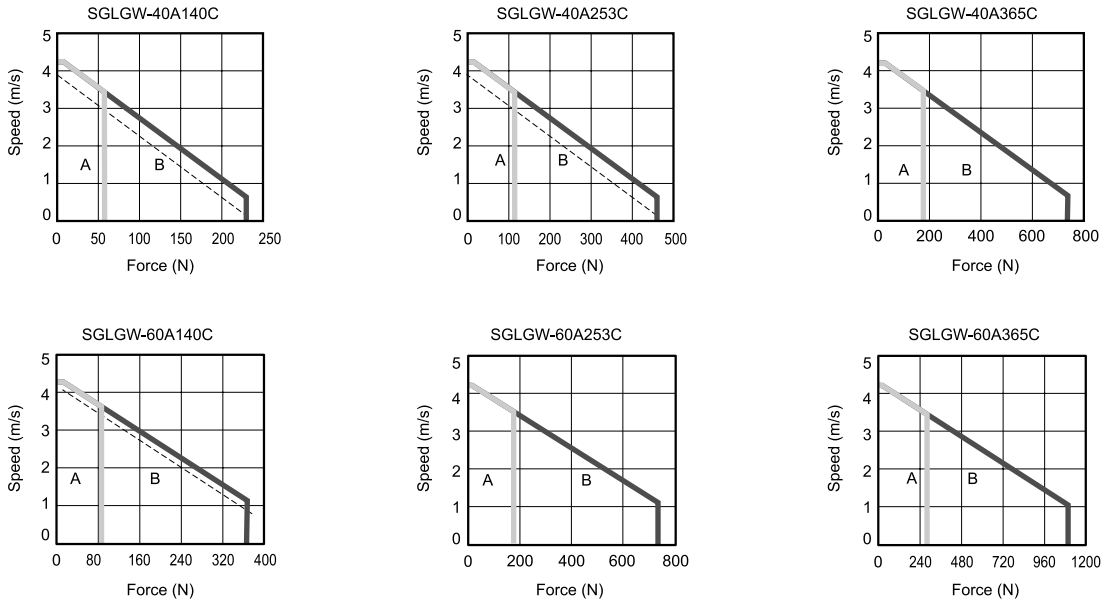
*2 The rated forces are the continuous allowable force values at a surrounding air temperature of 40°C with an aluminum heat sink of the dimensions given in the following table.
<・ Heat Sink Dimensions>

- 200 mm × 300 mm × 12 mm: SGLGW-40A140C, 60A140C
- 300 mm × 400 mm × 12 mm: SGLGW-40A253C, 60A253C
- 400 mm × 500 mm × 12 mm: SGLGW-40A365C, 60A365C

Force-Motor Speed Characteristics

A : Continuous duty zone ———— (solid lines): With three-phase 200-V input

B : Intermittent duty zone - - - - - - - - (dotted lines): With single-phase 200-V input



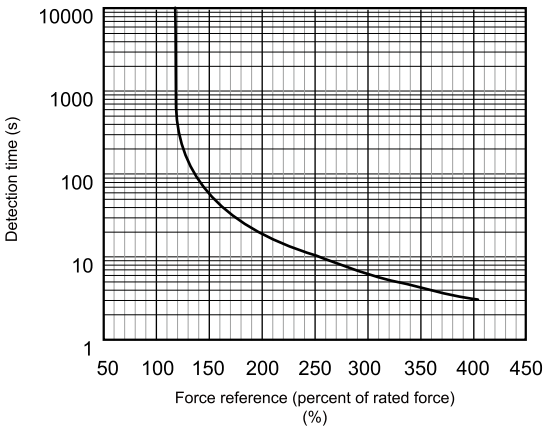
Note:

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 force is within the allowable range for the rated force, 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.

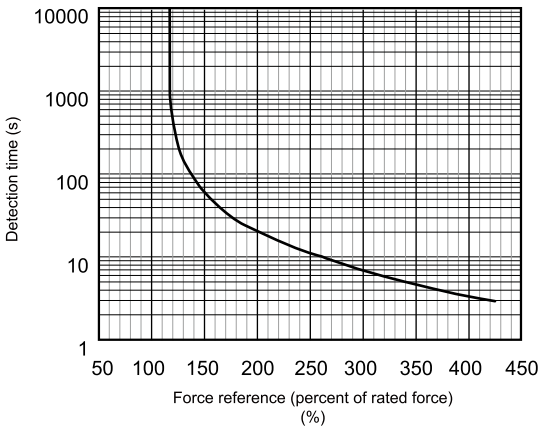
Servomotor Overload Protection Characteristics

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

SGLGW-40A with High-Force Magnetic Way



SGLGW-60A with High-Force Magnetic Way



Note:

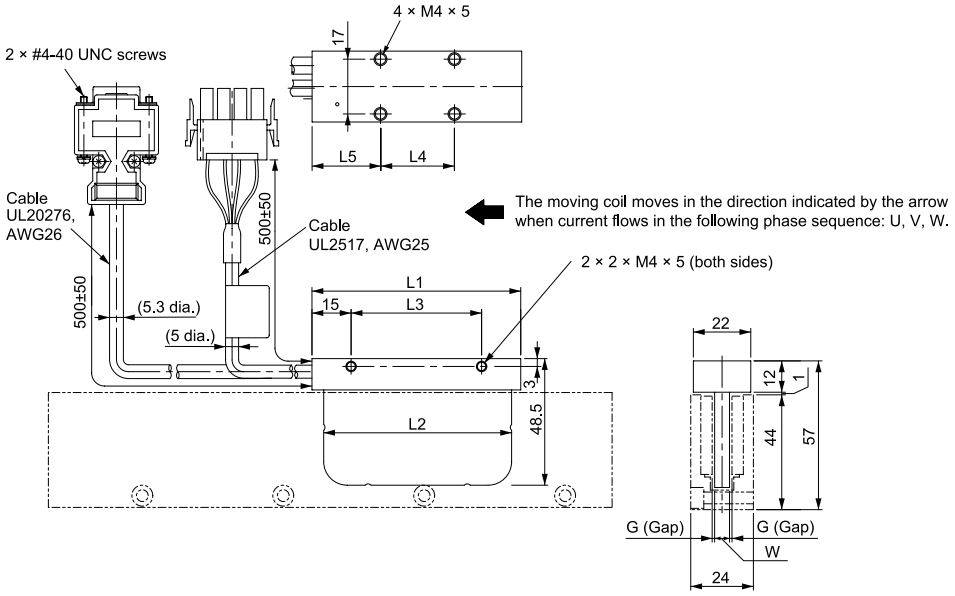
The above overload protection characteristics do not mean that you can perform continuous duty operation with an output of 100% or higher.

Use the servomotor so that the effective force remains within the continuous duty zone given in *Force-Motor Speed Characteristics on page 202*.

External Dimensions

SGLGW-30

■ Moving Coils: SGLGW-30A□□□C□



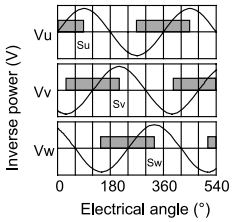
Unit: mm

Moving Coil Model SGLGW-	L1	L2	L3	L4	L5	W	G (Gap)	Approx. Mass *1 [kg]
30A050C□	50	48	30	20	20	5.9	0.85	0.14
30A080C□	80	72	50	30	25	5.7	0.95	0.19

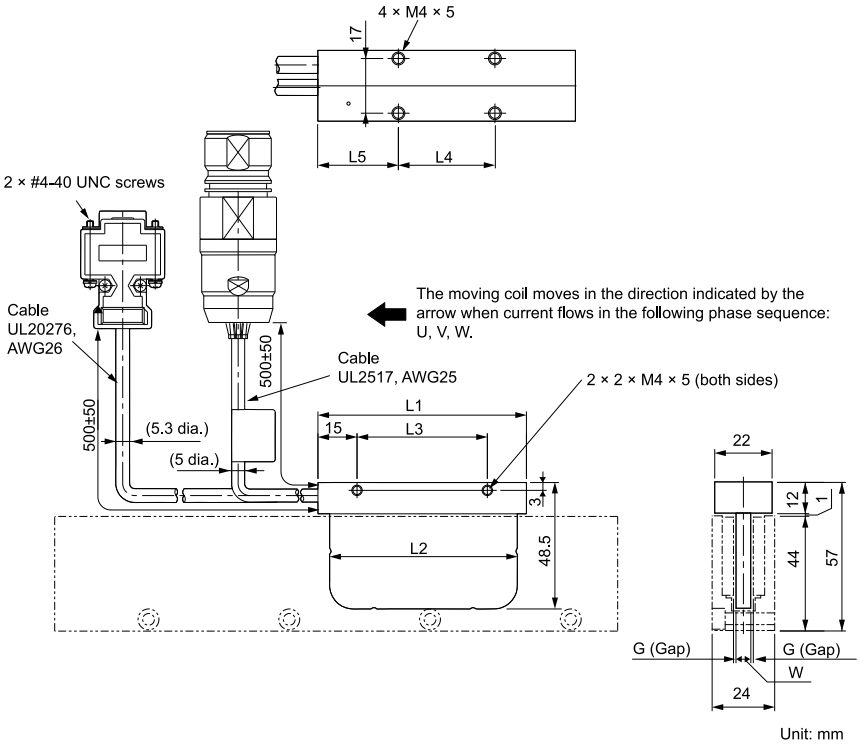
*1 The mass is for a moving coil with a polarity sensor (hall sensor).

◆ Polarity Sensor (Hall Sensor) Output Signal

The figure on the right shows the relationship between the Su, Sv, and Sw polarity sensor (hall sensor) output signals and the inverse power of each motor phase Vu, Vv, and Vw when the moving coil moves in the direction indicated by the arrow in the dimensional drawings of the moving coil.



■ Moving Coils: SGLGW-30A□□□C□D

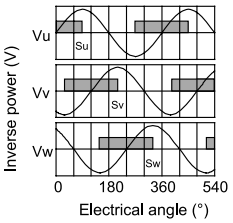


Moving Coil Model SGLGW-	L1	L2	L3	L4	L5	W	G (Gap)	Approx. Mass *1 [kg]
30A050C□D	50	48	30	20	20	5.9	0.85	0.14
30A080C□D	80	72	50	30	25	5.7	0.95	0.19

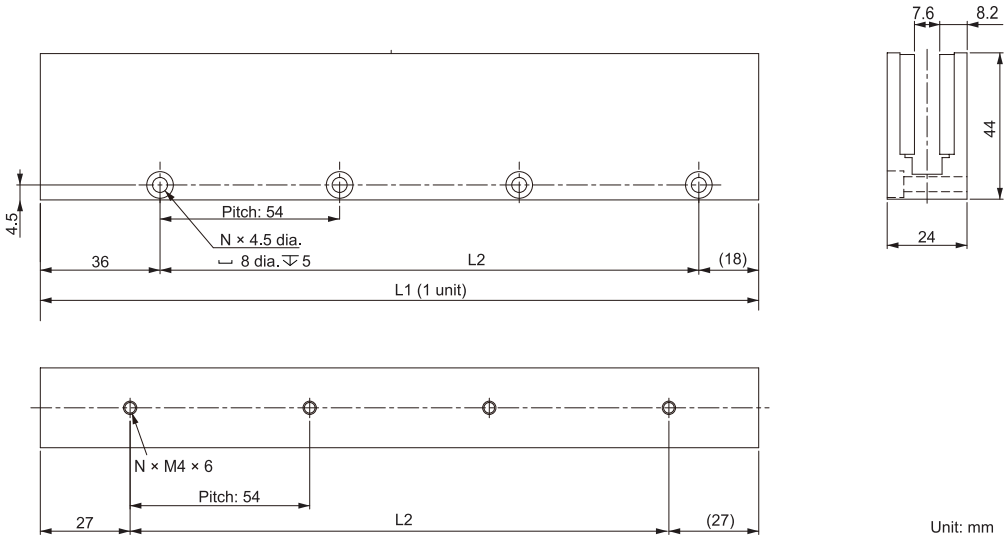
*1 The mass is for a moving coil with a polarity sensor (hall sensor).

◆ Polarity Sensor (Hall Sensor) Output Signal

The figure on the right shows the relationship between the Su, Sv, and Sw polarity sensor (hall sensor) output signals and the inverse power of each motor phase Vu, Vv, and Vw when the moving coil moves in the direction indicated by the arrow in the dimensional drawings of the moving coil.



■ Standard-Force Magnetic Ways: SGLGM-30□□□A

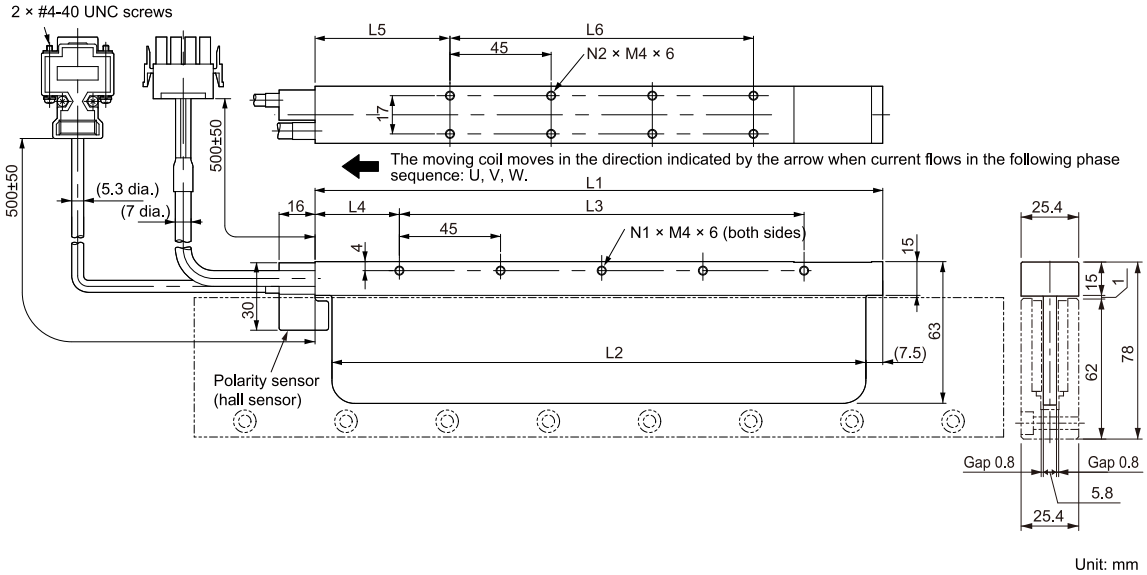


Unit: mm

Magnetic Way Model SGLGM -	L1	L2	N	Approx. Mass [kg]
30108A	$108^{-0.1}_{-0.3}$	54	2	0.6
30216A	$216^{-0.1}_{-0.3}$	162	4	1.1
30432A	$432^{-0.1}_{-0.3}$	378	8	2.3

SGLGW-40

■ Moving Coils: SGLGW-40A□□□C□



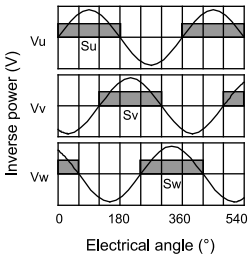
Unit: mm

Moving Coil Model SGLGW-	L1	L2	L3	L4	L5	L6	N1	N2	Approx. Mass *1 [kg]
40A140C□	140	125	90	30	52.5	45	3	4	0.40
40A253C□	252.5	237.5	180	37.5	60	135	5	8	0.66
40A365C□	365	350	315	30	52.5	270	8	14	0.93

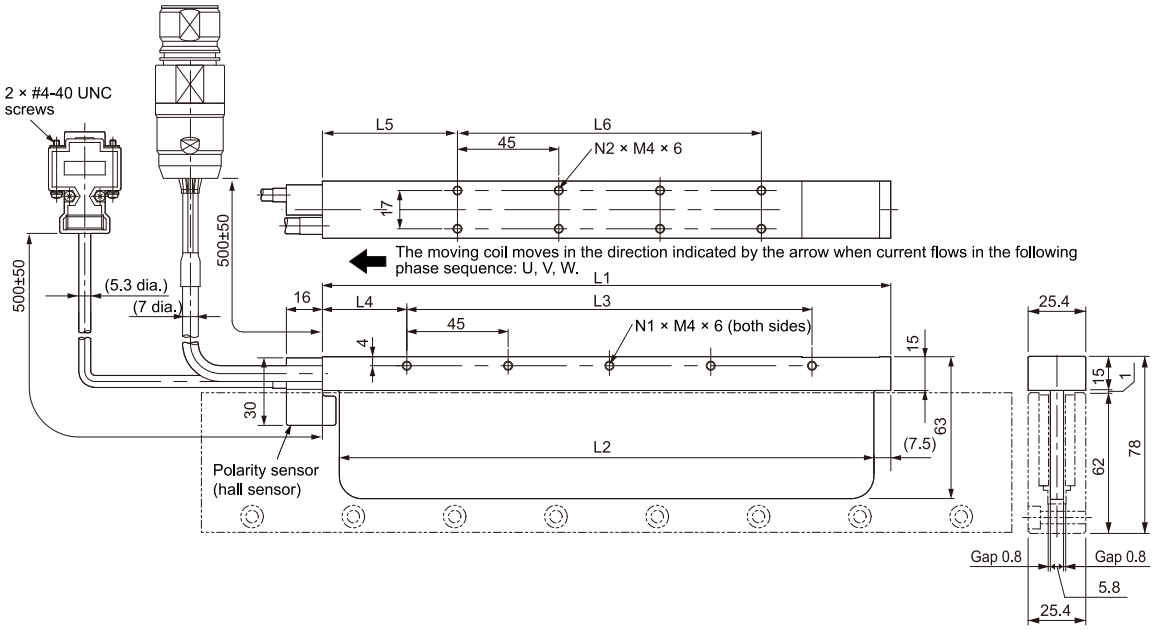
*1 The mass is for a moving coil with a polarity sensor (hall sensor).

◆ Polarity Sensor (Hall Sensor) Output Signal

The figure on the right shows the relationship between the Su, Sv, and Sw polarity sensor (hall sensor) output signals and the inverse power of each motor phase Vu, Vv, and Vw when the moving coil moves in the direction indicated by the arrow in the dimensional drawings of the moving coil.



■ Moving Coils: SGLGW-40A□□□C□D



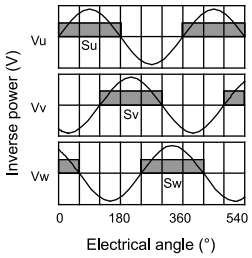
Unit: mm

Moving Coil Model SGLGW-	L1	L2	L3	L4	L5	L6	N1	N2	Approx. Mass *1 [kg]
40A140C□D	140	125	90	30	52.5	45	3	4	0.40
40A253C□D	252.5	237.5	180	37.5	60	135	5	8	0.66
40A365C□D	365	350	315	30	52.5	270	8	14	0.93

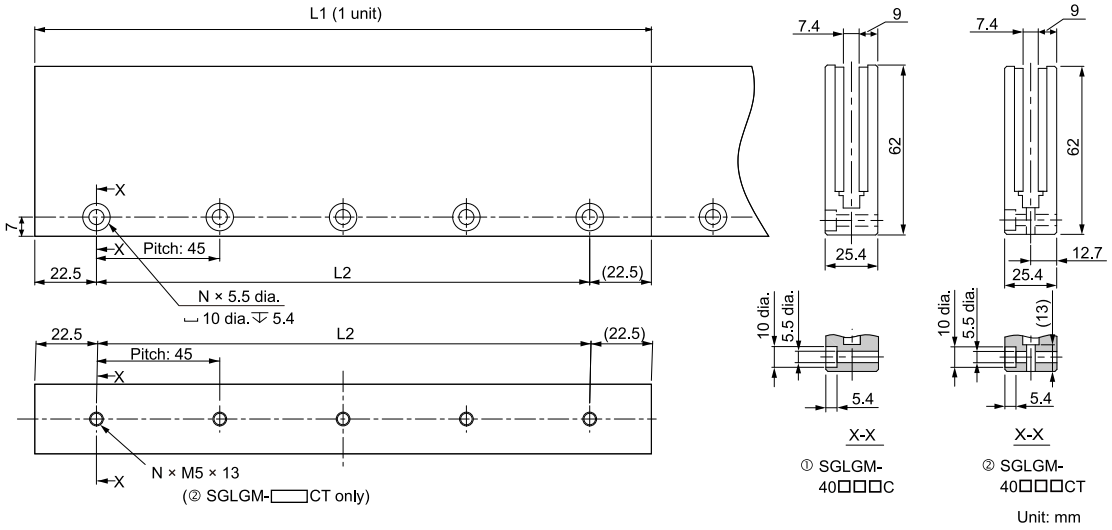
*1 The mass is for a moving coil with a polarity sensor (hall sensor).

◆ Polarity Sensor (Hall Sensor) Output Signal

The figure on the right shows the relationship between the Su, Sv, and Sw polarity sensor (hall sensor) output signals and the inverse power of each motor phase Vu, Vv, and Vw when the moving coil moves in the direction indicated by the arrow in the dimensional drawings of the moving coil.

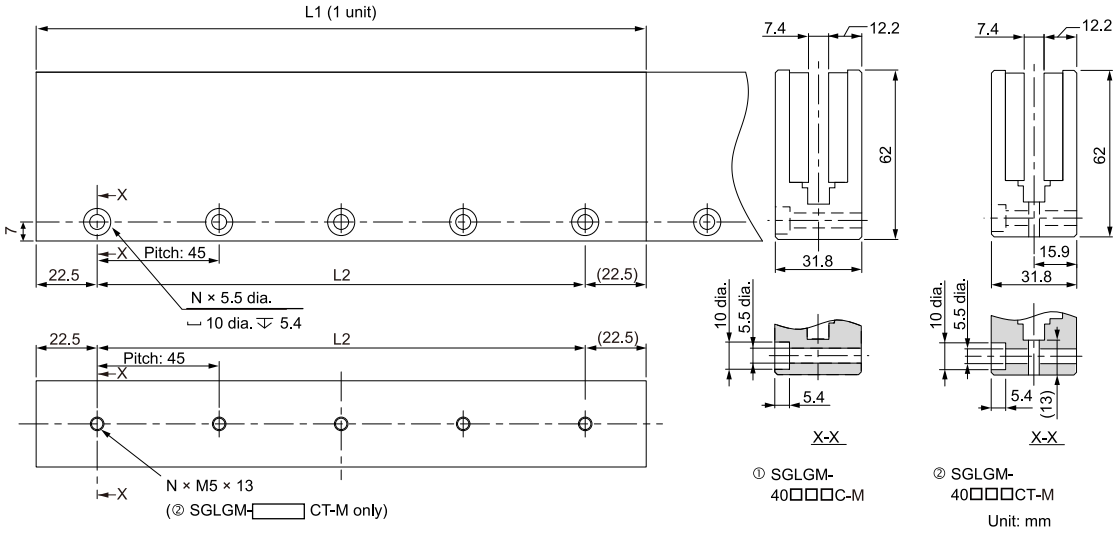


■ Standard-Force Magnetic Ways: SGLGM-40□□□C(without Mounting Holes on the Bottom) SGLGM-40□□□CT(with Mounting Holes on the Bottom)



Type	Magnetic Way Model SGLGM-	L1	L2	N	Approx. Mass [kg]
Standard-Force	40090C or 40090CT	$90^{-0.1}_{-0.3}$	45	2	0.8
	40225C or 40225CT	$225^{-0.1}_{-0.3}$	180	5	2.0
	40360C or 40360CT	$360^{-0.1}_{-0.3}$	315	8	3.1
	40405C or 40405CT	$405^{-0.1}_{-0.3}$	360	9	3.5
	40450C or 40450CT	$450^{-0.1}_{-0.3}$	405	10	3.9

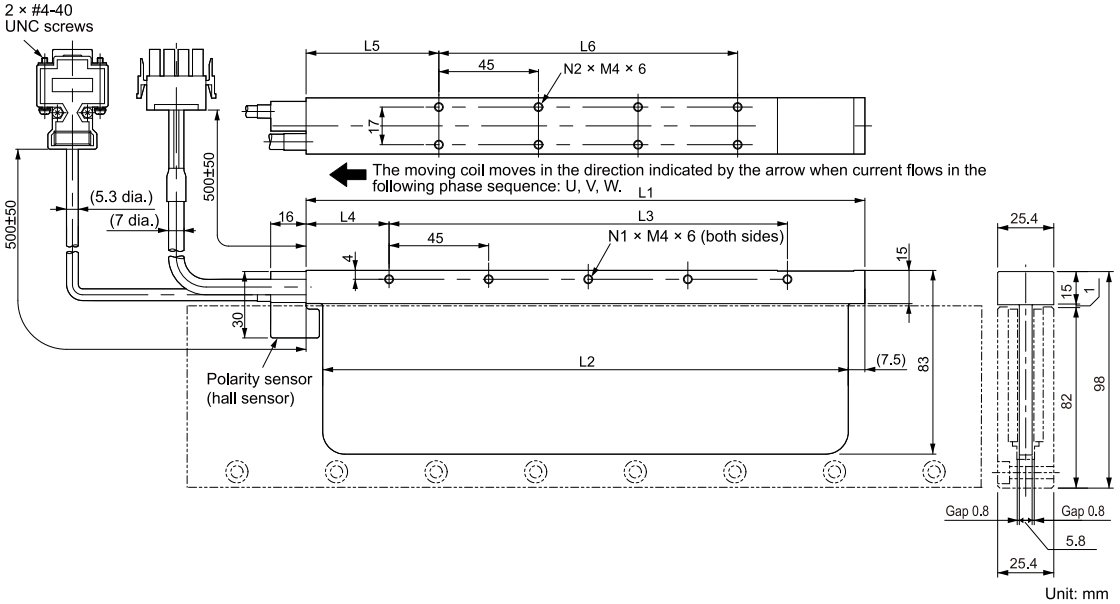
■ High-Force Magnetic Ways: SGLGM-40□□□C-M(without Mounting Holes on the Bottom) SGLGM-40□□□CT-M(with Mounting Holes on the Bottom)



Type	Magnetic Way Model SGLGM-	L1	L2	N	Approx. Mass [kg]
High-Force	40090C-M or 40090CT-M	$90^{-0.1}_{-0.3}$	45	2	1.0
	40225C-M or 40225CT-M	$225^{-0.1}_{-0.3}$	180	5	2.6
	40360C-M or 40360CT-M	$360^{-0.1}_{-0.3}$	315	8	4.1
	40405C-M or 40405CT-M	$405^{-0.1}_{-0.3}$	360	9	4.6
	40450C-M or 40450CT-M	$450^{-0.1}_{-0.3}$	405	10	5.1

SGLGW-60

■ Moving Coils: SGLGW-60A□□□C□

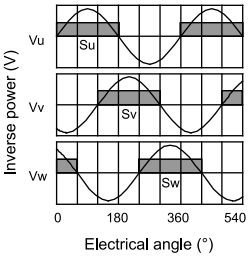


Moving Coil Model SGLGW-	L1	L2	L3	L4	L5	L6	N1	N2	Approx. Mass *1 [kg]
60A140C□	140	125	90	30	52.5	45	3	4	0.48
60A253C□	252.5	237.5	180	37.5	60	135	5	8	0.82
60A365C□	365	350	315	30	52.5	270	8	14	1.16

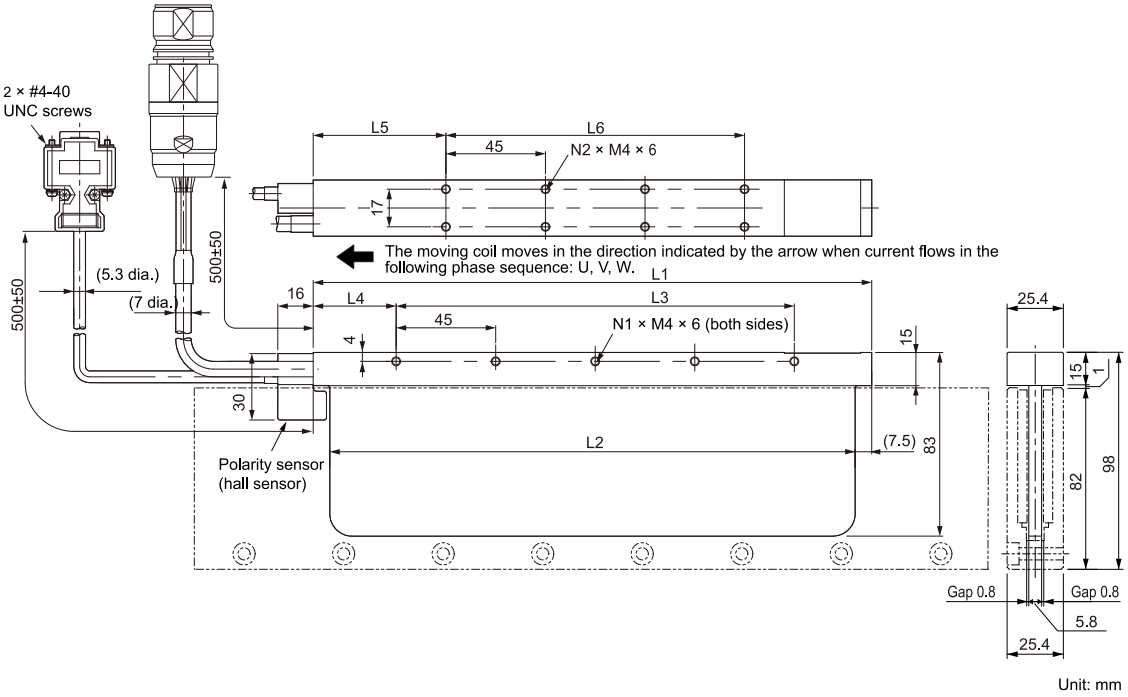
*1 The mass is for a moving coil with a polarity sensor (hall sensor).

◆ Polarity Sensor (Hall Sensor) Output Signal

The figure on the right shows the relationship between the Su, Sv, and Sw polarity sensor (hall sensor) output signals and the inverse power of each motor phase Vu, Vv, and Vw when the moving coil moves in the direction indicated by the arrow in the dimensional drawings of the moving coil.



■ Moving Coils: SGLGW-60A□□□C□D

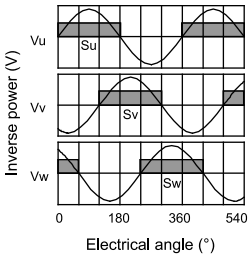


Moving Coil Model SGLGW-	L1	L2	L3	L4	L5	L6	N1	N2	Approx. Mass *1 [kg]
60A140C□D	140	125	90	30	52.5	45	3	4	0.48
60A253C□D	252.5	237.5	180	37.5	60	135	5	8	0.82
60A365C□D	365	350	315	30	52.5	270	8	14	1.16

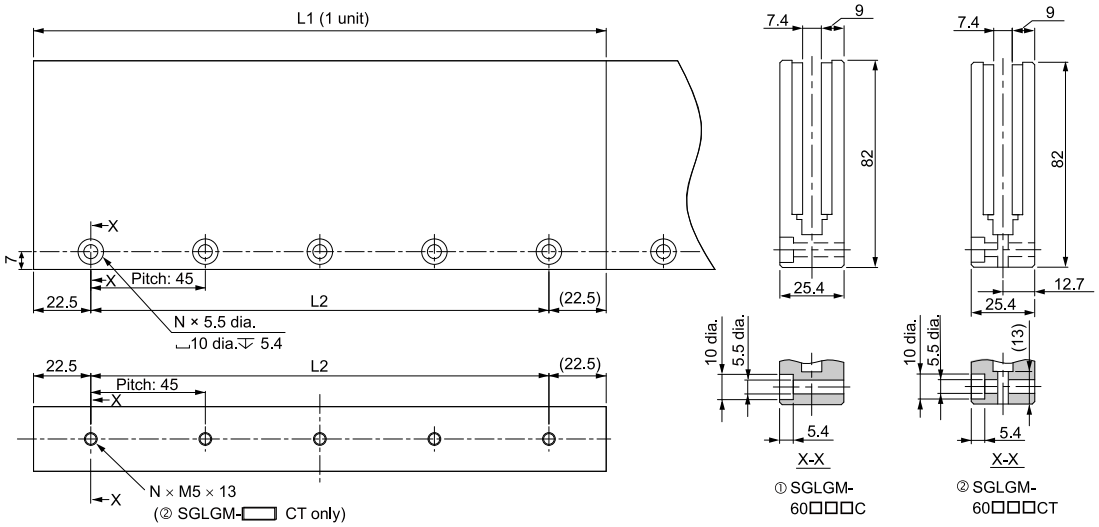
*1 The mass is for a moving coil with a polarity sensor (hall sensor).

◆ Polarity Sensor (Hall Sensor) Output Signal

The figure on the right shows the relationship between the Su, Sv, and Sw polarity sensor (hall sensor) output signals and the inverse power of each motor phase Vu, Vv, and Vw when the moving coil moves in the direction indicated by the arrow in the dimensional drawings of the moving coil.



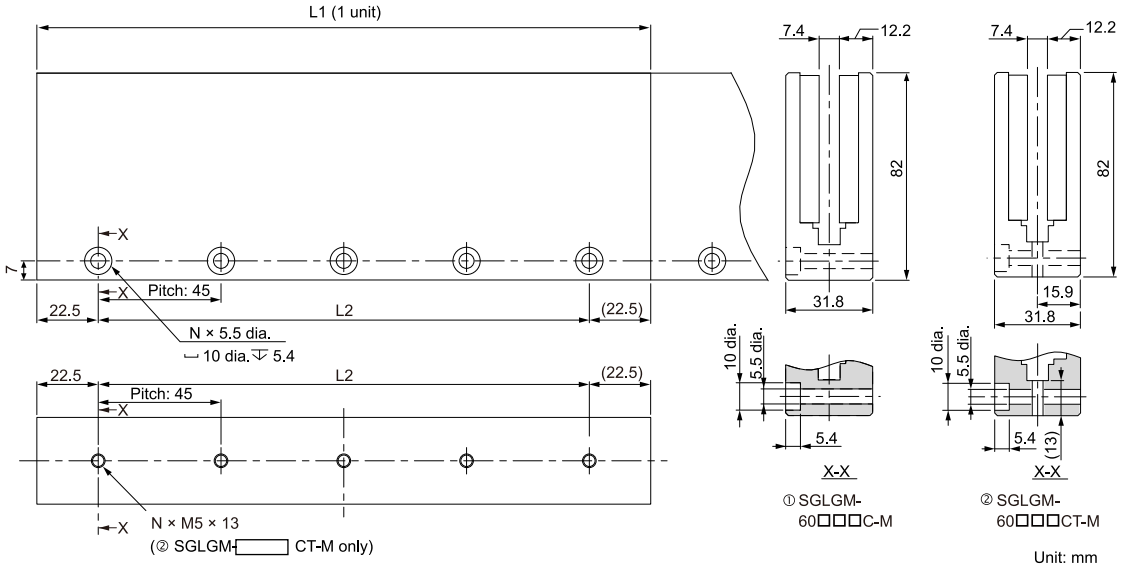
■ Standard-Force Magnetic Ways: SGLGM-60□□□C(without Mounting Holes on the Bottom) SGLGM-60□□□CT(with Mounting Holes on the Bottom)



Unit: mm

Type	Magnetic Way Model SGLGM-	L1	L2	N	Approx. Mass [kg]
Standard-Force	60090C or 60090CT	$90^{-0.1}_{-0.3}$	45	2	1.1
	60225C or 60225CT	$225^{-0.1}_{-0.3}$	180	5	2.6
	60360C or 60360CT	$360^{-0.1}_{-0.3}$	315	8	4.1
	60405C or 60405CT	$405^{-0.1}_{-0.3}$	360	9	4.6
	60450C or 60450CT	$450^{-0.1}_{-0.3}$	405	10	5.1

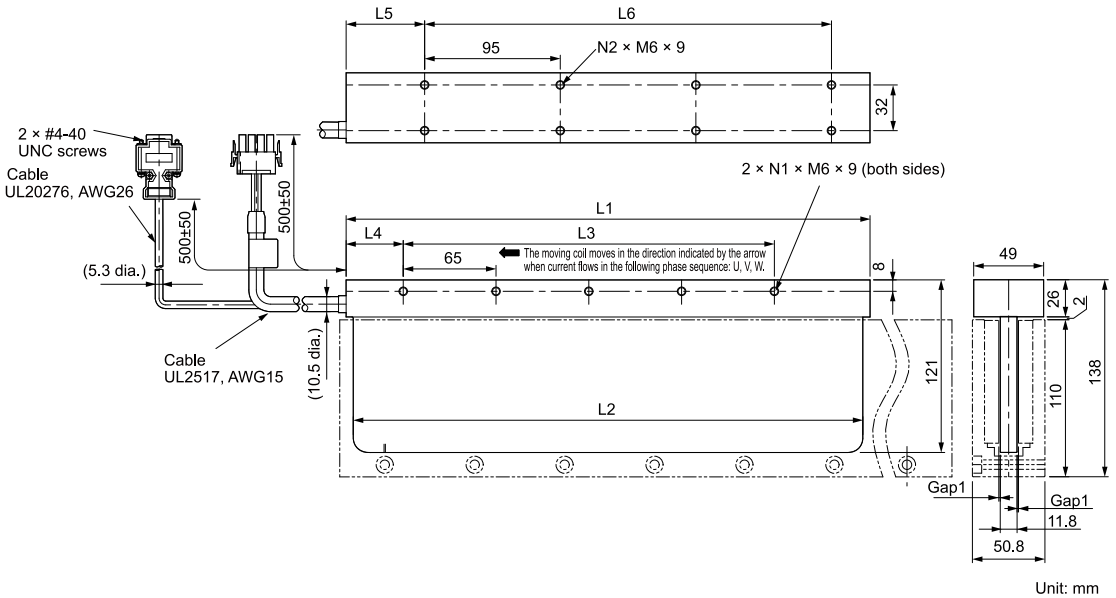
■ High-Force Magnetic Ways: SGLGM-60□□□C-M(without Mounting Holes on the Bottom) SGLGM-60□□□CT-M(with Mounting Holes on the Bottom)



Type	Magnetic Way Model SGLGM-	L1	L2	N	Approx. Mass [kg]
High-Force	60090C-M or 60090CT-M	$90^{-0.1}_{-0.3}$	45	2	1.3
	60225C-M or 60225CT-M	$225^{-0.1}_{-0.3}$	180	5	3.3
	60360C-M or 60360CT-M	$360^{-0.1}_{-0.3}$	315	8	5.2
	60405C-M or 60405CT-M	$405^{-0.1}_{-0.3}$	360	9	5.9
	60450C-M or 60450CT-M	$450^{-0.1}_{-0.3}$	405	10	6.6

SGLGW-90

■ Moving Coils: SGLGW-90A□□□C□

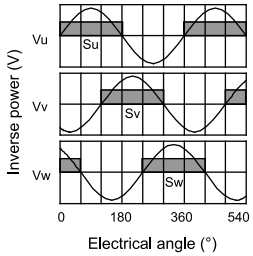


Moving Coil Model SGLGW-	L1	L2	L3	L4	L5	L6	N1	N2	Approx. Mass *1 [kg]
90A200C□	199	189	130	40	60	95	3	4	2.2
90A370C□	367	357	260	40	55	285	5	8	3.65
90A535C□	535	525	455	40	60	380	8	10	4.95

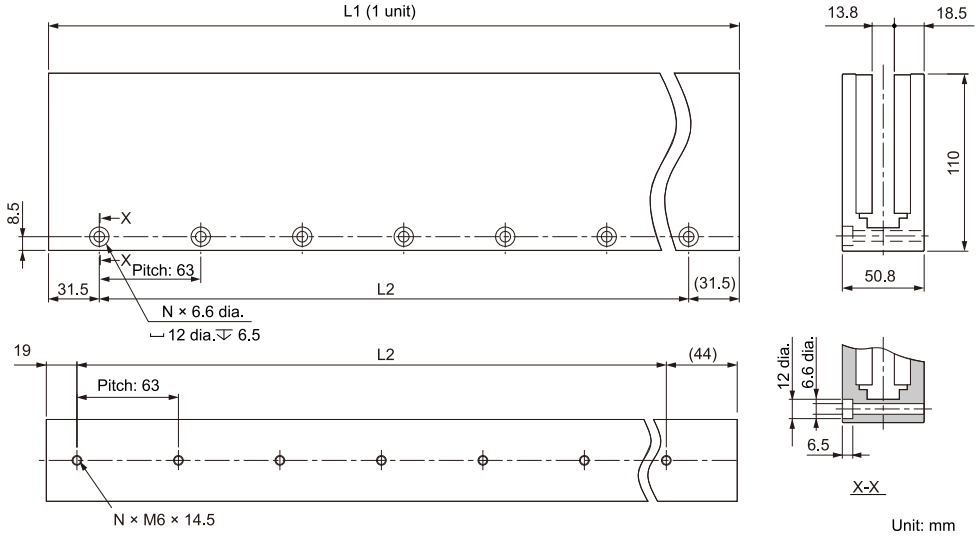
*1 The mass is for a moving coil with a polarity sensor (hall sensor).

◆ Polarity Sensor (Hall Sensor) Output Signal

The figure on the right shows the relationship between the Su, Sv, and Sw polarity sensor (hall sensor) output signals and the inverse power of each motor phase Vu, Vv, and Vw when the moving coil moves in the direction indicated by the arrow in the dimensional drawings of the moving coil.



■ Standard-Force Magnetic Ways: SGLGM-90□□□A



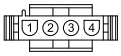
Magnetic Way Model SGLGM -	L1	L2	N	Approx. Mass [kg]
90252A	$252^{-0.1}_{-0.3}$	189	4	7.3
90504A	$504^{-0.1}_{-0.3}$	441	8	14.7

Connector Specifications

SGLGW-30

■ SGLGW-30A□□□C□

· Servomotor Connector

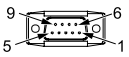


1	Phase U	Red	3	Phase W	Blue
2	Phase V	White	4	FG	Green

Plug: 350779-1
Pins: 350924-1 or 770672-1
From Tyco Electronics Japan G.K.

Mating Connector
Cap: 350780-1
Socket: 350925-1 or 770673-1

· Polarity Sensor (Hall Sensor) Connector



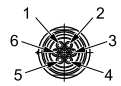
1	+5V (power supply)	6	Not used
2	Phase U	7	
3	Phase V	8	
4	Phase W	9	
5	0 V (power supply)	-	-

Pin connector: 17JE-23090-02 (D8C)-CG
From DDK Ltd.

Mating Connector
Socket connector: 17JE-13090-02 (D8C) A-CG
Studs: 17L-002C or 17L-002C1

■ SGLGW-30A□□□C□D

· Servomotor Connector

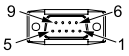


1	Phase U	Red	4	Not used	-
2	Phase V	White	5	Not used	-
3	Phase W	Blue	6	FG	Green

Extension: SROC06JMSCN169
Pins: 021.423.1020
From Interconnectron GmbH

Mating Connector
Plug: SPUC06KFSDN236
Socket: 020.030.1020

· Polarity Sensor (Hall Sensor) Connector



1	+5V (power supply)	6	Not used
2	Phase U	7	
3	Phase V	8	
4	Phase W	9	
5	0 V (power supply)	-	-

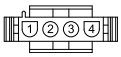
Pin connector: 17JE-23090-02 (D8C)-CG
From DDK Ltd.

Mating Connector
Socket connector: 17JE-13090-02 (D8C) A-CG
Studs: 17L-002C or 17L-002C1

SGLGW-40

■ SGLGW-40A□□□C□

· Servomotor Connector



1	Phase U	Red	3	Phase W	Blue
2	Phase V	White	4	FG	Green

Plug: 350779-1

Pins: 350561-3 or 350690-3 (No.1 to 3)

350654-1 or 350669-1 (No. 4)

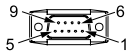
From Tyco Electronics Japan G.K.

Mating Connector

Cap: 350780-1

Socket: 350570-3 or 350689-3

· Polarity Sensor (Hall Sensor) Connector



1	+5V (power supply)	6	Not used
2	Phase U	7	
3	Phase V	8	
4	Phase W	9	
5	0 V (power supply)	-	-

Pin connector: 17JE-23090-02 (D8C)-CG

From DDK Ltd.

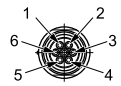
Mating Connector

Socket connector: 17JE-13090-02 (D8C) A-CG

Studs: 17L-002C or 17L-002C1

■ SGLGW-40A□□□C□D

· Servomotor Connector

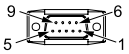


1	Phase U	Red	4	Not used	-
2	Phase V	White	5	Not used	-
3	Phase W	Blue	6	FG	Green

Extension: SROC06JMSCN169
Pins: 021.423.1020
From Interconnectron GmbH

Mating Connector
Plug: SPUC06KFSDN236
Socket: 020.030.1020

· Polarity Sensor (Hall Sensor) Connector



1	+5V (power supply)	6	Not used
2	Phase U	7	
3	Phase V	8	
4	Phase W	9	
5	0 V (power supply)	-	-

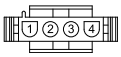
Pin connector: 17JE-23090-02 (D8C)-CG
From DDK Ltd.

Mating Connector
Socket connector: 17JE-13090-02 (D8C) A-CG
Studs: 17L-002C or 17L-002C1

SGLGW-60

■ SGLGW-60A□□□C□

· Servomotor Connector

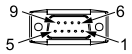


1	Phase U	Red	3	Phase W	Blue
2	Phase V	White	4	FG	Green

Plug: 350779-1
Pins: 350561-3 or 350690-3 (No.1 to 3)
350654-1 or 350669-1 (No. 4)
From Tyco Electronics Japan G.K.

Mating Connector
Cap: 350780-1
Socket: 350537-3 or 350689-3

· Polarity Sensor (Hall Sensor) Connector



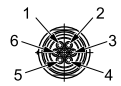
1	+5V (power supply)	6	Not used
2	Phase U	7	
3	Phase V	8	
4	Phase W	9	
5	0 V (power supply)	-	-

Pin connector: 17JE-23090-02 (D8C)-CG
From DDK Ltd.

Mating Connector
Socket connector: 17JE-13090-02 (D8C) A-CG
Studs: 17L-002C or 17L-002C1

■ SGLGW-60A□□□C□D

· Servomotor Connector

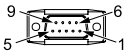


1	Phase U	Red	4	Not used	-
2	Phase V	White	5	Not used	-
3	Phase W	Blue	6	FG	Green

Extension: SROC06JMSCN169
Pins: 021.423.1020
From Interconnectron GmbH

Mating Connector
Plug: SPUC06KFSDN236
Socket: 020.030.1020

· Polarity Sensor (Hall Sensor) Connector



1	+5V (power supply)	6	Not used
2	Phase U	7	
3	Phase V	8	
4	Phase W	9	
5	0 V (power supply)	-	-

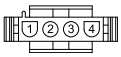
Pin connector: 17JE-23090-02 (D8C)-CG
From DDK Ltd.

Mating Connector
Socket connector: 17JE-13090-02 (D8C) A-CG
Studs: 17L-002C or 17L-002C1

SGLGW-90

■ SGLGW-90A□□□C□

· Servomotor Connector

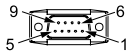


1	Phase U	Red	3	Phase W	Blue
2	Phase V	White	4	FG	Green

Plug: 350779-1
Pins: 350218-3 or 350547-3 (No.1 to 3)
350654-1 or 350669-1 (No. 4)
From Tyco Electronics Japan G.K.

Mating Connector
Cap: 350780-1
Socket: 350537-3 or 350550-3

· Polarity Sensor (Hall Sensor) Connector



1	+5 V (DC)	6	Not used
2	Phase U	7	
3	Phase V	8	
4	Phase W	9	
5	0 V (power supply)	-	-

Pin connector: 17JE-23090-02 (D8C)-CG
From DDK Ltd.

Mating Connector
Socket connector: 17JE-13090-02 (D8C) A-CG
Studs: 17L-002C or 17L-002C1

Model Designations

Moving Coil

SGL F W2 - 30 A 270 A T 1 E

Linear Σ-Series Servomotor

❶ ❷ ❸ ❹ ❺ ❻ ❼ ❽ ❾

❶ Servomotor Type

Code	Specification
F	With F-type iron core

❷ Moving Coil / Magnetic Way

Code	Specification
W2	Moving coil

❸ Magnet Height

Code	Specification
30	30 mm
45	45 mm
90	90 mm
1D	135 mm

❹ Power Supply Voltage

Code	Specification
A	200 VAC

❺ Length of Moving Coil

Code	Specification
270	270 mm
306	306 mm
450	450 mm
510	510 mm
630	630 mm
714	714 mm

❻ Design Revision Order

A

❼ Sensor Specification

Code	Specification
S	With polarity sensor (hall sensor) and thermal protector
T	Without polarity sensor (hall sensor), with thermal protector

❽ Cooling Method

Code	Specification
1	Self-cooled
L	Water-cooled*

❾ Connector for Servomotor Main Circuit Cable and Cable Length

Code	
E	Metal round connector (Phoenix)

*1 Contact your Yaskawa representative for details on water-cooled models.

Note:

This information is provided to explain model numbers. It is not meant to imply that models are available for all combinations of codes.

Magnetic Way

SGL F M2 - 30 270 A

Linear Σ-Series Servomotor

❶ ❷ ❸ ❹ ❺

❶ Servomotor Type

(Same as for the moving coil.)

❷ Moving Coil / Magnetic Way

Code	Specification
M2	Magnetic Way

❸ Magnet Height

(Same as for the moving coil.)

❹ Length of Magnetic Way

Code	Specification
270	270 mm
306	306 mm
450	450 mm
510	510 mm
630	630 mm
714	714 mm

❺ Design Revision Order

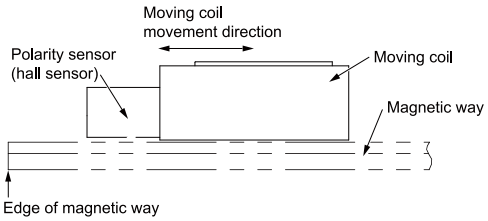
A

Precautions on Moving Coils with Polarity Sensors (Hall Sensors)

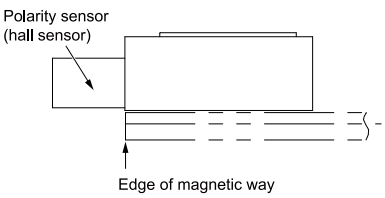
When you use a moving coil with a polarity sensor (hall sensor), the magnetic way must cover the bottom of the polarity sensor (hall sensor). Refer to the example that shows the correct installation.

When determining the length of the moving coil's stroke or the length of the magnetic way, consider the total length (L) of the moving coil and the polarity sensor (hall sensor). Refer to the following table.

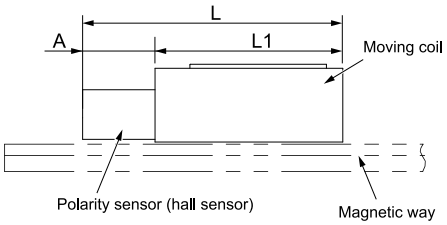
<Correct>



<Incorrect>



■ Total Length of Moving Coil with Polarity Sensor (Hall Sensor)



Moving Coil Model SGLFW2-	Length of Moving Coil L1 [mm]	Length of Polarity Sensor (Hall Sensor) A [mm]	Total Length L [mm]
30A070AS	70	27	97
30A120AS	125		152
30A230AS	230		257
45A200AS	205	32	237
45A380AS	384		416
90A200AS	205	32	237
90A380AS	384		416
90A560AS	563		595
1DA380AS	384	32	416
1DA560AS	563		595

Ratings and Specifications

Specifications

Linear Servomotor Moving Coil Model SGLFW2-		30A			45A		90A			1DA	
		070A□	120A□	230A□	200A□	380A□	200A□	380A□	560A□	380A□	560A□
Time Rating		Continuous									
Thermal Class		B									
Insulation Resistance		500 VDC, 10 MΩ min.									
Withstand Voltage		1,500 VAC for 1 minute									
Excitation		Permanent magnet									
Cooling Method		Self-cooled and water-cooled *1*									
Protective Structure		IP00									
Environmental Conditions	Surrounding Air Temperature	0°C to 40°C (with no freezing)									
	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. Must be free of strong magnetic fields.									
Shock Resistance	Impact Acceleration	196 m/s²									
	Number of Impacts	2 times									
Vibration Resistance	Vibration Acceleration	49 m/s² (the vibration resistance in three directions, vertical, side-to-side, and front-to-back)									

*1 Contact your Yaskawa representative for details on water-cooled models.

Ratings

Linear Servomotor Moving Coil Model SGLFW2-		30A				45A		
		070A□1	120A□1	230A□1		200A□1	380A□1	
Rated Speed (Reference Speed during Speed Control) *1*	m/s	4.0	4.0	4.0		4.0	4.0	
Maximum speed *1* *2*	m/s	5.0	5.0	5.0		4.5	4.5	
Rated Force *1*	N	45	90	180	170	280	560	
Maximum Force *1*	N	135	270	540	500	840	1680	1500
Rated Current *1*	Arms	1.4	1.5	2.9	2.8	4.4	8.7	
Maximum Current *1*	Arms	5.3	5.2	10.5	9.3	16.4	32.7	27.5
Moving Coil Mass	kg	0.50	0.90	1.7		2.9	5.5	
Force Constant	N/Arms	33.3	64.5	64.5		67.5	67.5	
BEMF Constant	Vrms/(m/s)/phase	11.1	21.5	21.5		22.5	22.5	

Continued on next page.

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Linear Servomotor Moving Coil Model SGLFW2-		30A				45A		
		070A□1	120A□1	230A□1		200A□1	380A□1	
Motor Constant	N/√W	11.3	17.3	24.4		36.9	52.2	
Electrical Time Constant	ms	7.6	7.3	7.3		19	19	
Mechanical Time Constant	ms	3.9	3.0	2.9		2.1	2.0	
Thermal Resistance (with Heat Sink)	K/W	2.62	1.17	0.79		0.60	0.44	
Thermal Resistance (without Heat Sink)	K/W	11.3	4.43	2.55		2.64	1.49	
Magnetic Attraction	N	200	630	1260		2120	4240	
Maximum Allowable Payload	kg	5.6	9.4	34	10	58	110	95
Maximum Allowable Payload (With External Regenerative Resistor)	kg	5.6	11	34	20	64	110	110
Combined Magnetic Way, SGLFM2-		30□□□A				45□□□A		
Combined Serial Converter Unit, JZDP-□□□□-		628	629	630		631	632	
Applicable SERVOPACKs	SGDXS-	1R6A		3R8A	2R8A	5R5A	180A	120A
	SGDXW-	1R6A		-	2R8A	5R5A	-	

*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 forces are the continuous allowable force values at a surrounding air temperature of 40°C with an aluminum heat sink of the dimensions given in the following table.
<Heat Sink Dimensions>

- 150 mm × 100 mm × 10 mm: SGLFW2-30A070A
- 254 mm × 254 mm × 25 mm: SGLFW2-30A120A and 30A230A
- 400 mm × 500 mm × 25 mm: SGLFW2-45A200A and 45A380A

Linear Servomotor Moving Coil Model SGLFW2-		90A			1DA	
		200A□1	380A□1	560A□1	380A□1	560A□1
Rated Speed (Reference Speed during Speed Control) *1	m/s	4.0	4.0	4.0	2.0	2.0
Maximum speed *1	m/s	4.0	4.0	4.0	2.5	2.5
Rated Force *1 *2	N	560	1120	1680	1680	2520
Maximum Force *1	N	1680	3360	5040	5040	7560
Rated Current *1	Arms	7.2	14.4	21.6	14.4	21.6
Maximum Current *1	Arms	26.9	53.9	80.8	53.9	80.8
Moving Coil Mass	kg	5.3	10.1	14.9	14.6	21.5
Force Constant	N/Arms	82.0	82.0	82.0	123	123
BEMF Constant	Vrms/(m/s)/phase	27.3	27.3	27.3	41.0	41.0
Motor Constant	N/√W	58.1	82.2	101	105	129
Electrical Time Constant	ms	24	23	24	25	25
Mechanical Time Constant	ms	1.6	1.5	1.5	1.3	1.3

Continued on next page.

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Linear Servomotor Moving Coil Model SGLFW2-		90A			1DA	
		200A□1	380A□1	560A□1	380A□1	560A□1
Thermal Resistance (with Heat Sink)	K/W	0.45	0.21	0.18	0.18	0.12
Thermal Resistance (without Heat Sink)	K/W	1.81	1.03	0.72	0.79	0.55
Magnetic Attraction	N	4240	8480	12700	12700	19100
Maximum Allowable Payload	kg	130	160	360	690	1000
Maximum Allowable Payload (With External Regenerative Resistor)	kg	140	290	440	710	1000
Combined Magnetic Way, SGLFM2-		90□□□A			1D□□□A	
Combined Serial Converter Unit, JZDP-□□□□-		633	634	648	649	650
Applicable SERVOPACKs	SGDXS-	120A	200A	330A	200A	330A
	SGDXW-	-				

*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 forces are the continuous allowable force values at a surrounding air temperature of 40°C with an aluminum heat sink of the dimensions given in the following table.
<Heat Sink Dimensions>

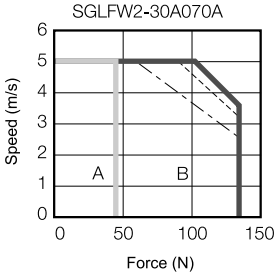
- 400 mm × 500 mm × 25 mm: SGLFW2-90A200A
- 609 mm × 762 mm × 40 mm: SGLFW2-90A380A
- 900 mm × 762 mm × 40 mm: SGLFW2-90A560A and 1DA380A
- 1400 mm × 900 mm × 40 mm: SGLFW2-1DA560A

Force-Motor Speed Characteristics

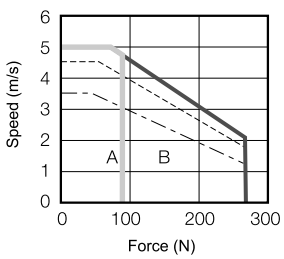
A : Continuous duty zone
B : Continuous duty zone

——— (solid lines): With three-phase 200-V input
- - - - - - - - (dotted lines): With single-phase 200-V input
— — - - (dashed lines): With single-phase 100-V input

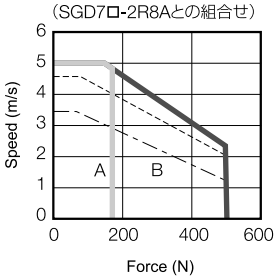
SGLFW2-30A070A



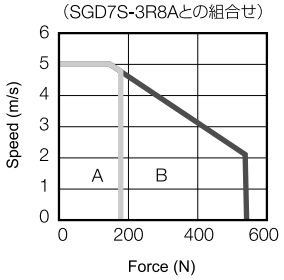
SGLFW2-30A120A



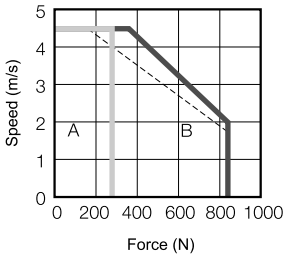
SGLFW2-30A230A
(SGD7□-2R8Aとの組合せ)



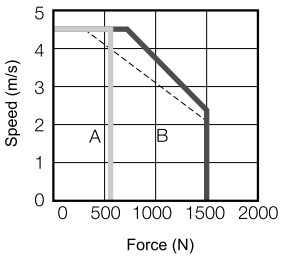
SGLFW2-30A230A
(SGD7S-3R8Aとの組合せ)



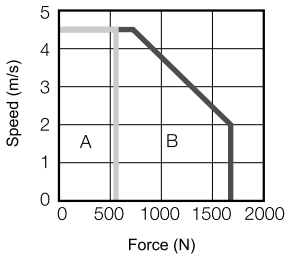
SGLFW2-45A200A



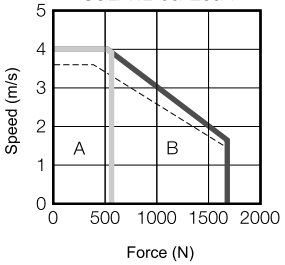
SGLFW2-45A380A
(SGD7S-120Aとの組合せ)



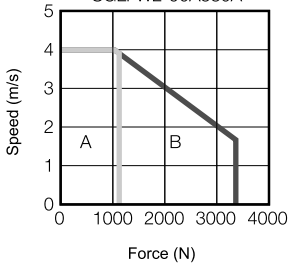
SGLFW2-45A380A
(SGD7S-180Aとの組合せ)



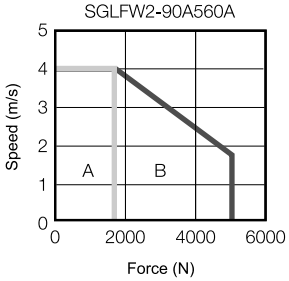
SGLFW2-90A200A



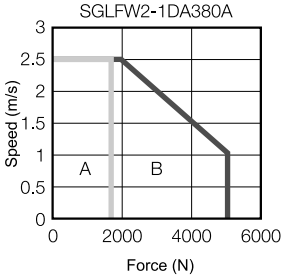
SGLFW2-90A380A



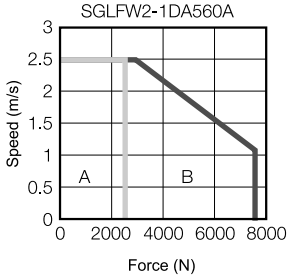
SGLFW2-90A560A



SGLFW2-1DA380A



SGLFW2-1DA560A

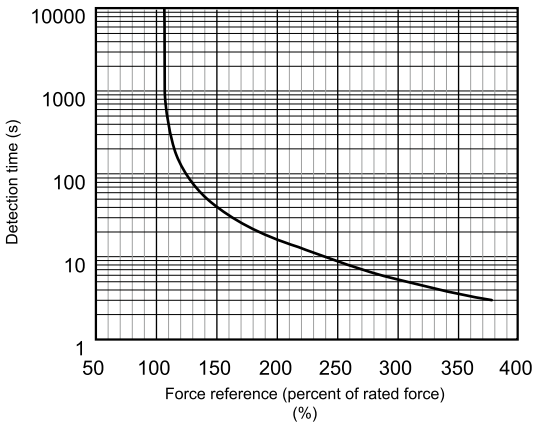


Note:

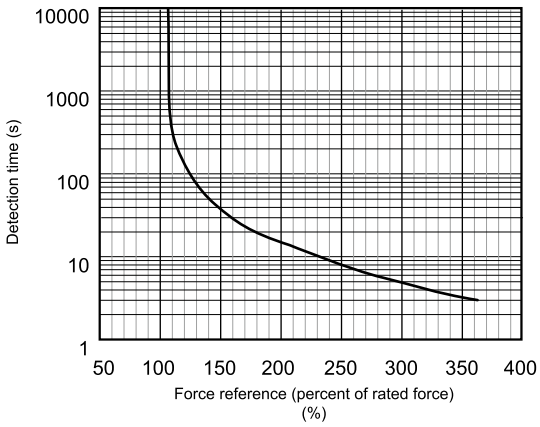
1. These values are for operation in combination with a SERVOPACK when the temperature of the armature winding is 100°C. These are typical values.
2. The characteristics in the intermittent duty zone depend on the power supply voltage.
3. If the effective force is within the allowable range for the rated force, 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

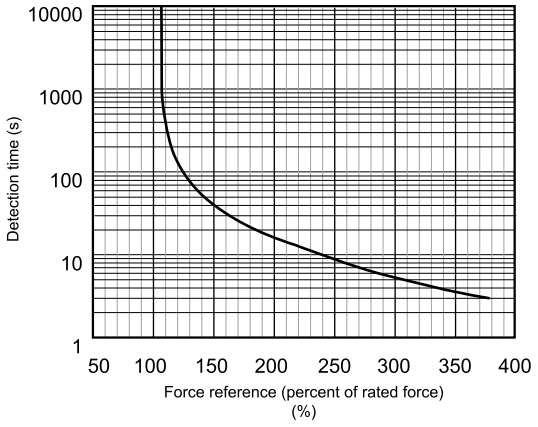
SGLFW2-30A070A



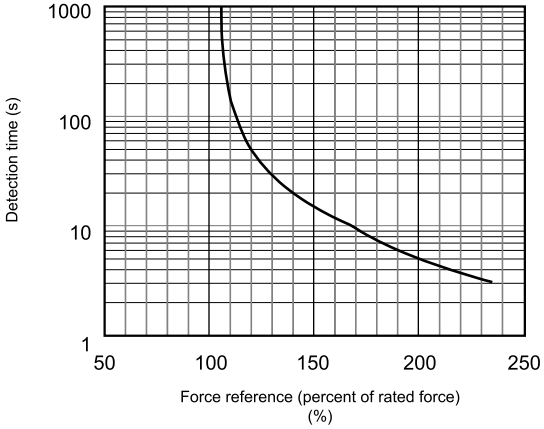
SGLFW2-30A120A and -230A



SGLFW2-45A, -90A□1, and -1DA□1



SGLFW2-90A□L



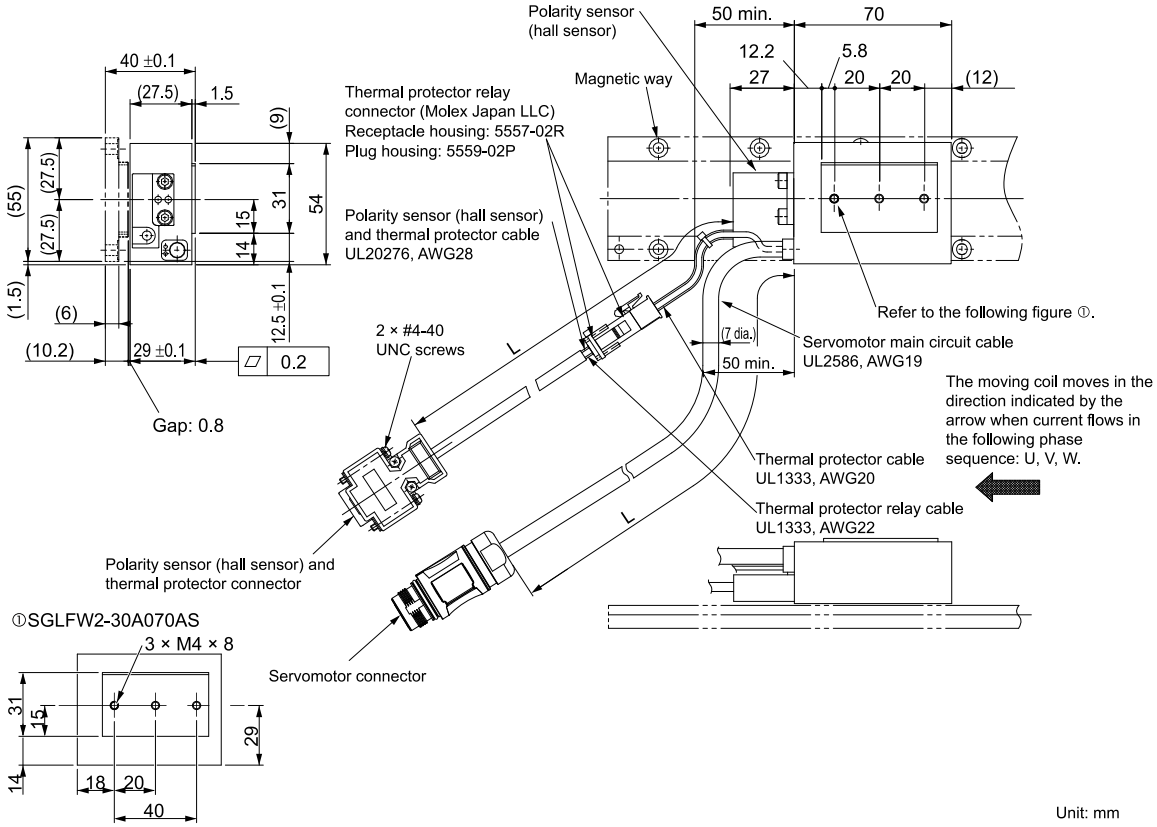
Note:

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 force remains within the continuous duty zone given in *Force-Motor Speed Characteristics on page 227*.

External Dimensions

SGLFW2-30

■ Moving Coils with Polarity Sensors (Hall Sensors): SGLFW2-30A070AS

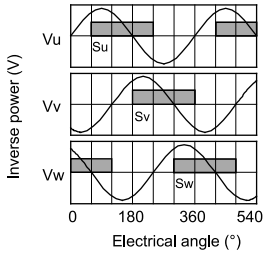


Unit: mm

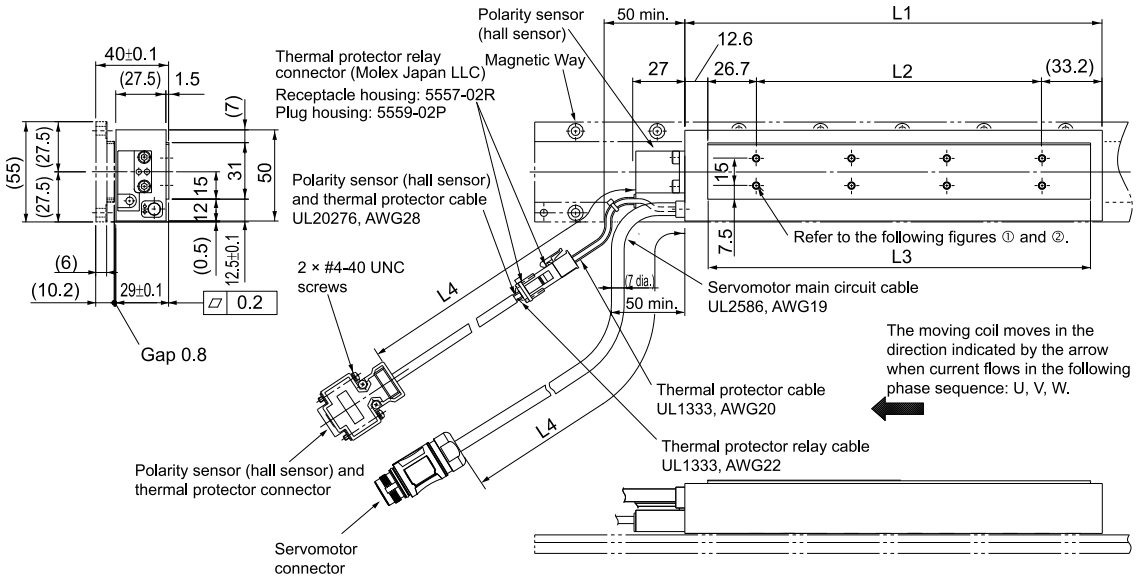
Moving Coil Model SGLFW2-	L	Approx. Mass [kg]
30A070AS1	300 ±30	0.5
30A070AS1E	500 ±50	0.5
30A070AS1H	500 ±50	0.5

◆ Polarity Sensor (Hall Sensor) Output Signal

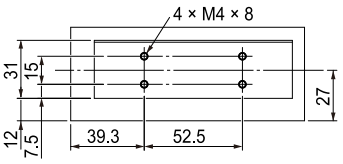
The figure on the right shows the relationship between the Su, Sv, and Sw polarity sensor (hall sensor) output signals and the inverse power of each motor phase Vu, Vv, and Vw when the moving coil moves in the direction indicated by the arrow in the dimensional drawings of the moving coil.



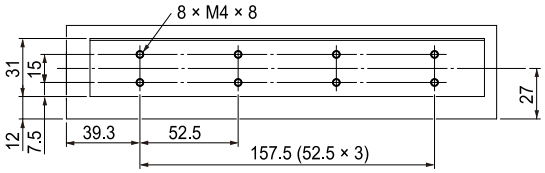
■ Moving Coils with Polarity Sensors (Hall Sensors): SGLFW2-30A□□□AS



①SGLFW2-30A120AS



②SGLFW2-30A230AS

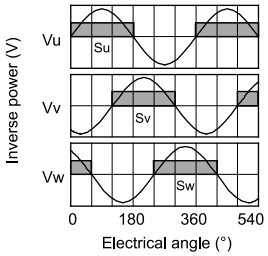


Unit: mm

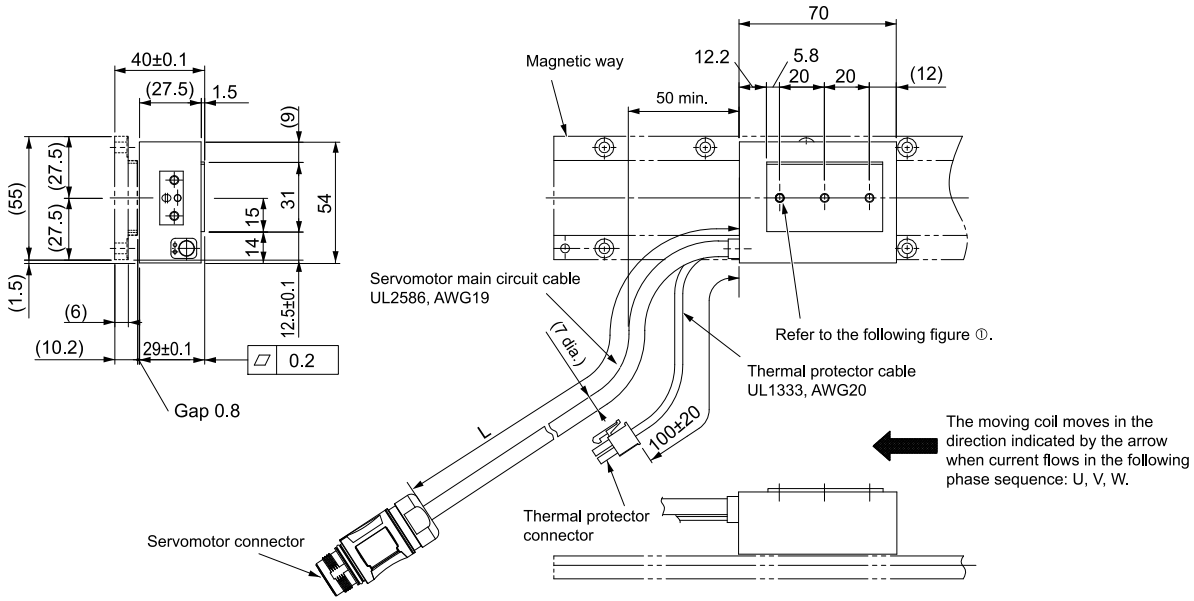
Moving Coil Model SGLFW2-	L1	L2	L3	L4	Approx. Mass [kg]
30A120AS1	125	52.5	105.9	300 ±30	0.9
30A120AS1E				500 ±50	
30A120AS1H				500 ±50	
30A230AS1	230	157.5	210.9	300 ±30	1.7
30A230AS1E				500 ±50	
30A230AS1H				500 ±50	

◆ Polarity Sensor (Hall Sensor) Output Signal

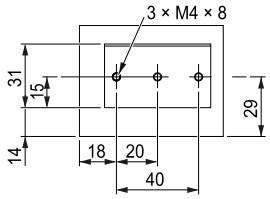
The figure on the right shows the relationship between the Su, Sv, and Sw polarity sensor (hall sensor) output signals and the inverse power of each motor phase Vu, Vv, and Vw when the moving coil moves in the direction indicated by the arrow in the dimensional drawings of the moving coil.



■ Moving Coil without Polarity Sensor (Hall Sensor): SGLFW2-30A070AT



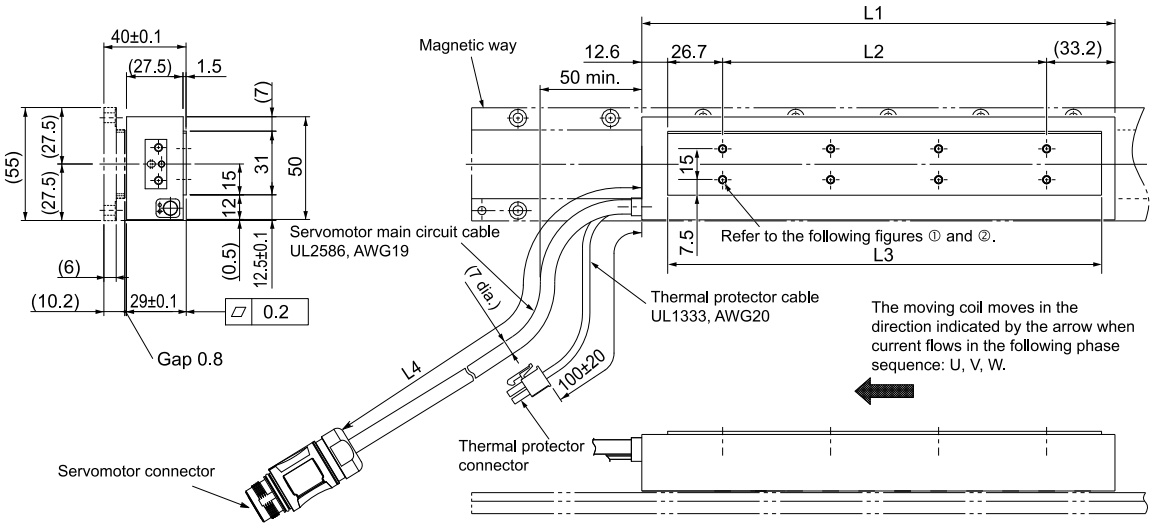
①SGLFW2-30A070AT



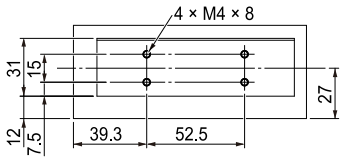
Unit: mm

Moving Coil Model SGLFW2-	L	Approx. Mass [kg]
30A070AT1	300 ±30	0.5
30A070AT1E	500 ±50	0.5
30A070AT1H	500 ±50	0.5

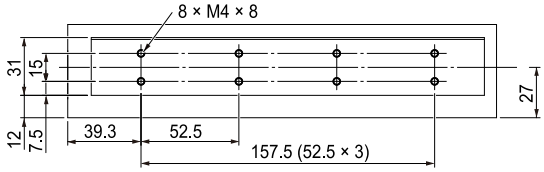
■ Moving Coil without Polarity Sensor (Hall Sensor): SGLFW2-30A□□□AT



①SGLFW2-30A120AT



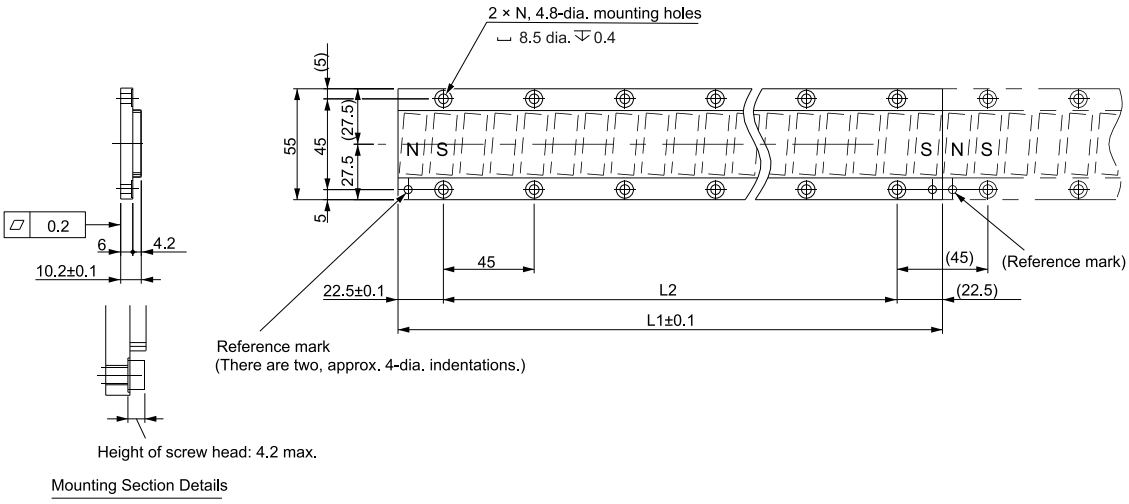
②SGLFW2-30A230AT



Unit: mm

Moving Coil Model SGLFW2-	L1	L2	L3	L4	Approx. Mass [kg]
30A120AT1	125	52.5	105.9	300 ±30	0.9
30A120AT1E				500 ±50	
30A120AT1H				500 ±50	
30A230AT1	230	157.5	210.9	300 ±30	1.7
30A230AT1E				500 ±50	
30A230AT1H				500 ±50	

■ Magnetic Ways: SGLFM2-30□□□A



Unit: mm

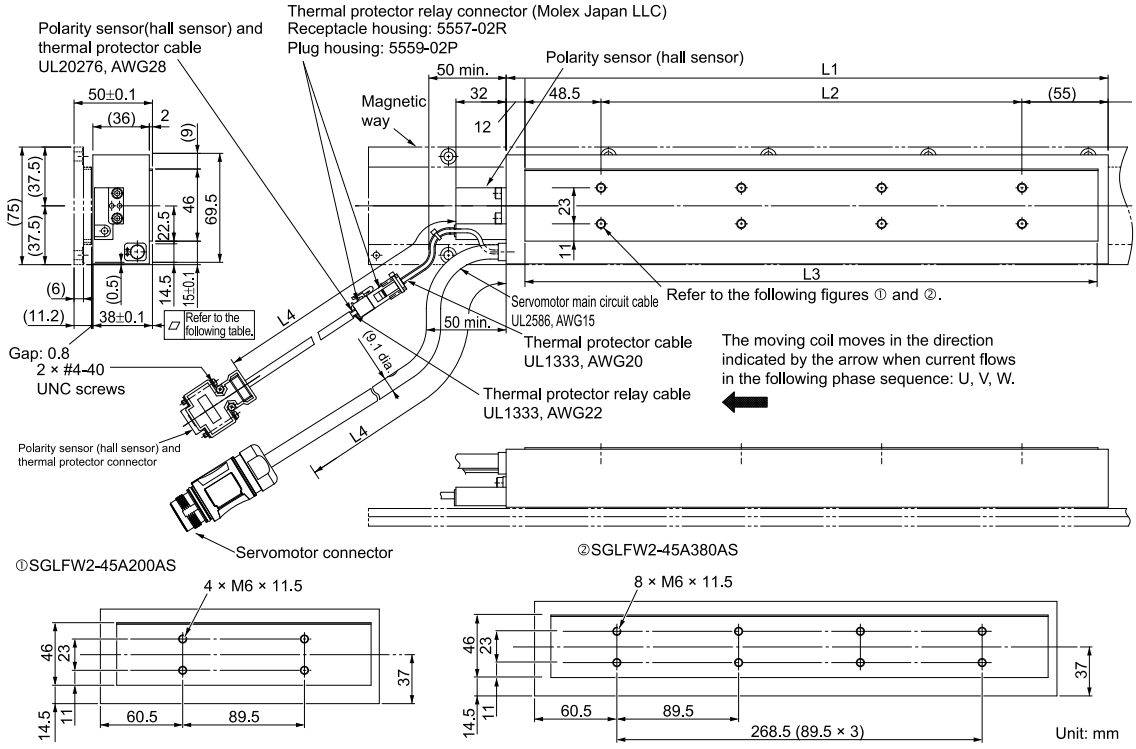
Note:

More than one magnetic way can be connected. Connect the magnetic ways so that the reference marks on them are aligned in the same direction as shown in the figure.

Magnetic Way Model SGLFM2-	L1± 0.1	L2	N	Approx. Mass [kg]
30270A	270	225 (45 × 5)	6	0.9
30450A	450	405 (45 × 9)	10	1.5
30630A	630	585 (45 × 13)	14	2.0

SGLFW2-45

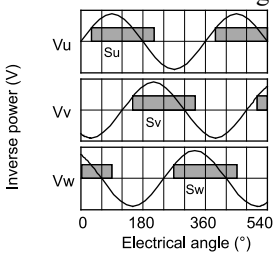
■ Moving Coils with Polarity Sensors (Hall Sensors): SGLFW2-45A□□□AS



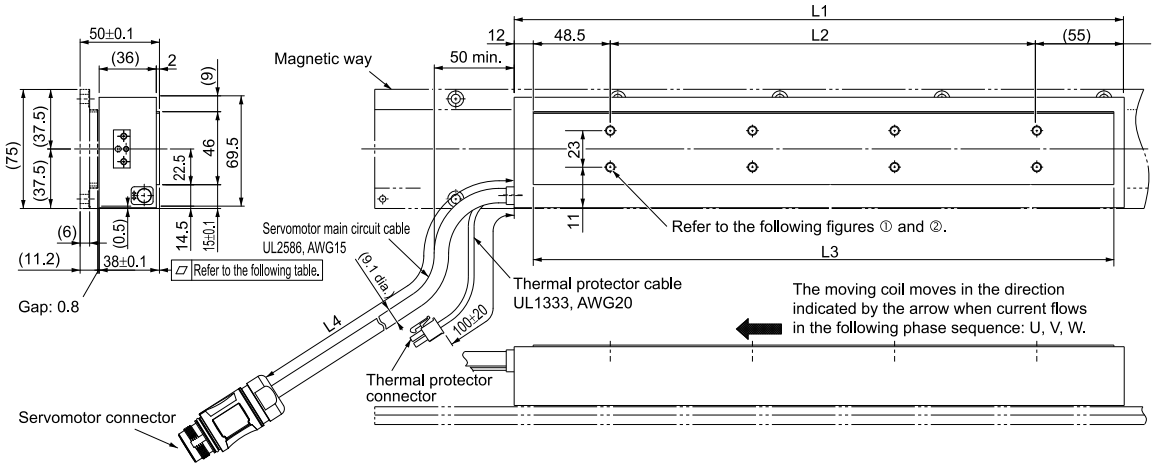
Moving Coil Model SGLFW2-	L1	L2	L3	L4	Flatness	Approx. Mass [kg]
45A200AS1	205	89.5	187	300 ±30	0.2	2.9
45A200AS1E				500 ±50		
45A200AS1H				500 ±50		
45A380AS1	384	268.5	365.5	300 ±30	0.3	5.5
45A380AS1E				500 ±50		
45A380AS1H				500 ±50		

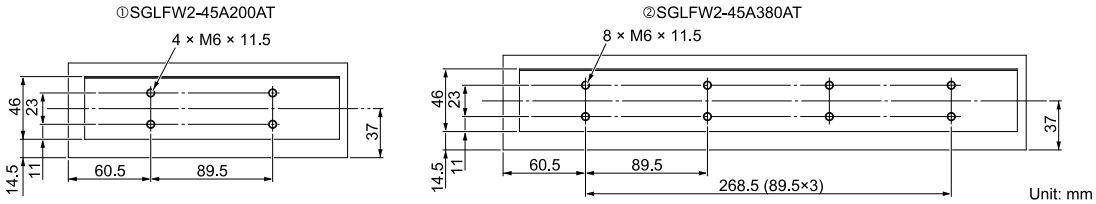
◆ Polarity Sensor (Hall Sensor) Output Signal

The figure on the right shows the relationship between the Su, Sv, and Sw polarity sensor (hall sensor) output signals and the inverse power of each motor phase Vu, Vv, and Vw when the moving coil moves in the direction indicated by the arrow in the dimensional drawings of the moving coil.



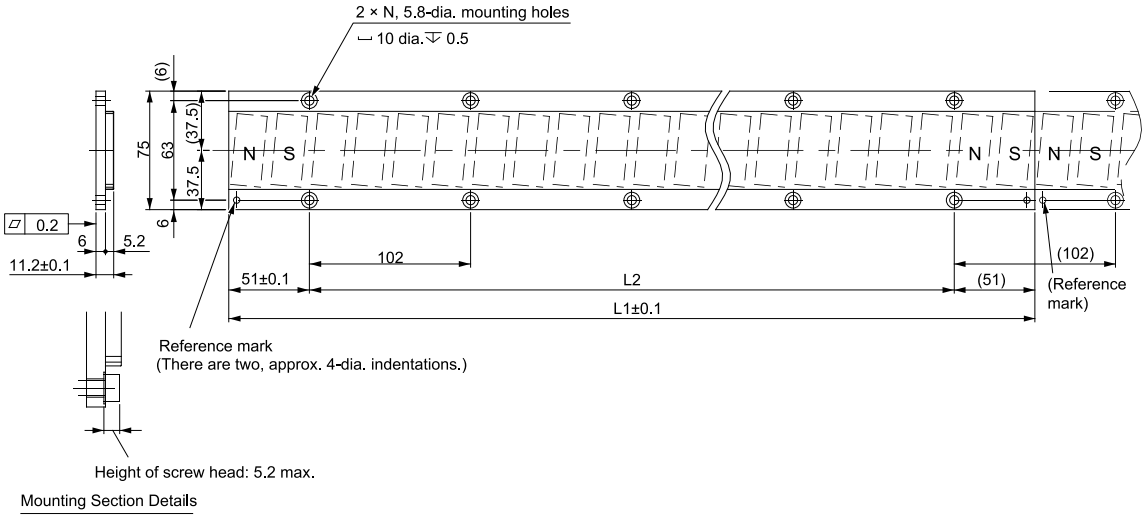
■ Moving Coils without Polarity Sensors (Hall Sensors): SGLFW2-45A□□□AT





Moving Coil Model SGLFW2-	L1	L2	L3	L4	Flatness	Approx. Mass [kg]
45A200AT1	205	89.5	187	300 ±30	0.2	2.9
45A200AT1E				500 ±50		
45A200AT1H				500 ±50		
45A380AT1	384	268.5	365.5	300 ±30	0.3	5.5
45A380AT1E				500 ±50		
45A380AT1H				500 ±50		

■ Magnetic Ways: SGLFM2-45□□□A



Unit: mm

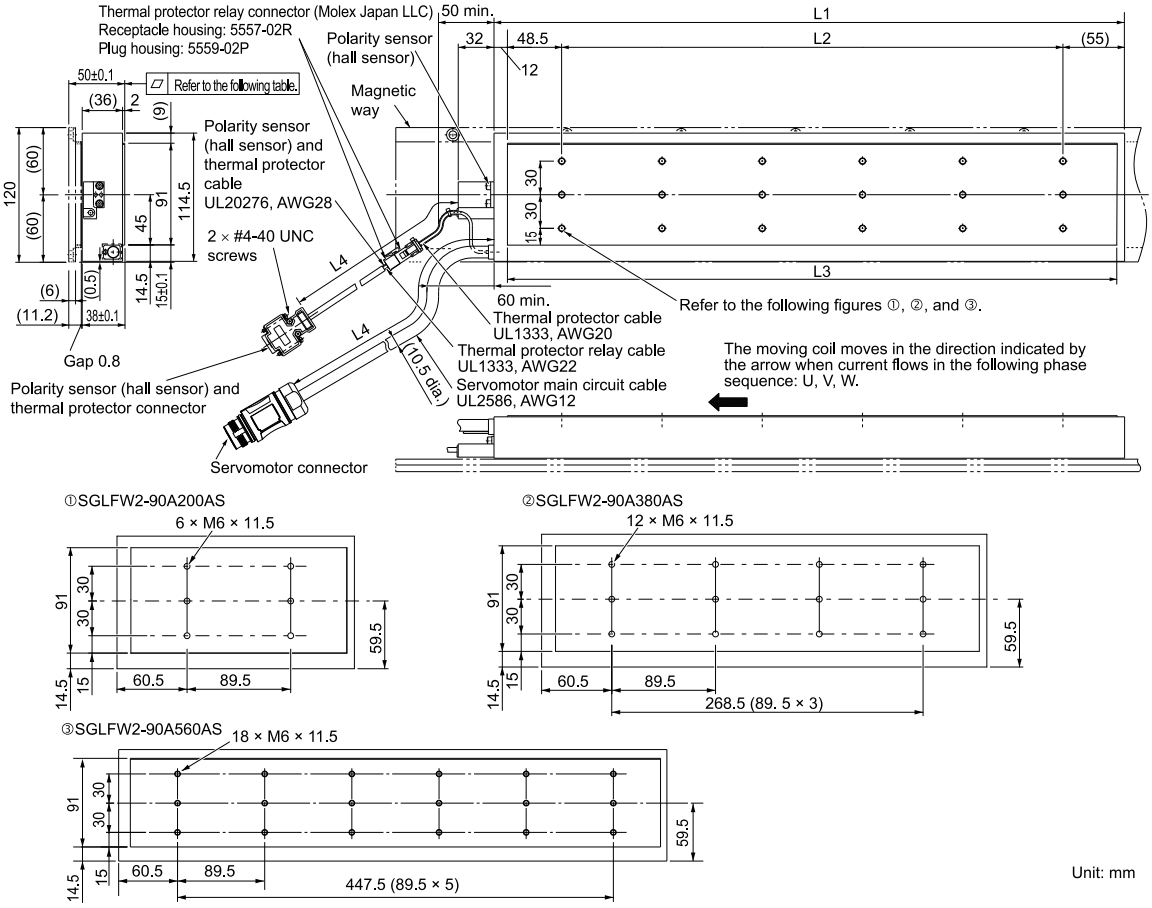
Note:

More than one magnetic way can be connected. Connect the magnetic ways so that the reference marks on them are aligned in the same direction as shown in the figure.

Magnetic Way Model SGLFM2-	L1± 0.1	L2	N	Approx. Mass [kg]
45306A	306	204 (102 × 2)	3	1.5
45510A	510	408 (102 × 4)	5	2.5
45714A	714	612 (102 × 6)	7	3.4

SGLFW2-90

■ Moving Coils with Polarity Sensors (Hall Sensors): SGLFW2-90A□□□AS1

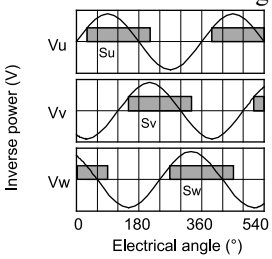


Unit: mm

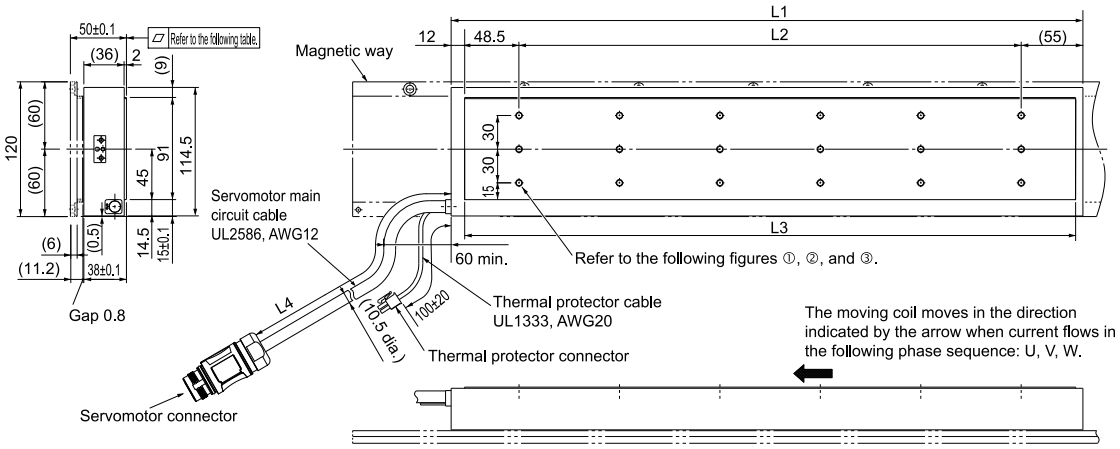
Moving Coil Model SGLFW2-	L1	L2	L3	L4	Flatness	Approx. Mass [kg]
90A200AS1	205	89.5	187	300 ±30	0.2	5.3
90A200AS1E				500 ±50		
90A200AS1H				500 ±50		
90A380AS1	384	268.5	365.5	300 ±30	0.3	10.1
90A380AS1E				500 ±50		
90A380AS1H				500 ±50		
90A560AS1	563	447.5	544	300 ±30	0.3	14.9
90A560AS1E				500 ±50		
90A560AS1H				500 ±50		

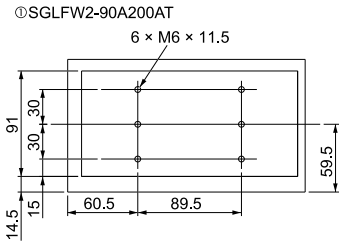
◆ Polarity Sensor (Hall Sensor) Output Signal

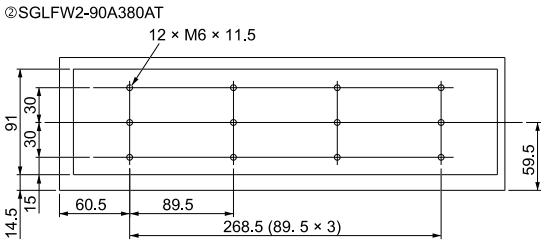
The figure on the right shows the relationship between the Su, Sv, and Sw polarity sensor (hall sensor) output signals and the inverse power of each motor phase Vu, Vv, and Vw when the moving coil moves in the direction indicated by the arrow in the dimensional drawings of the moving coil.

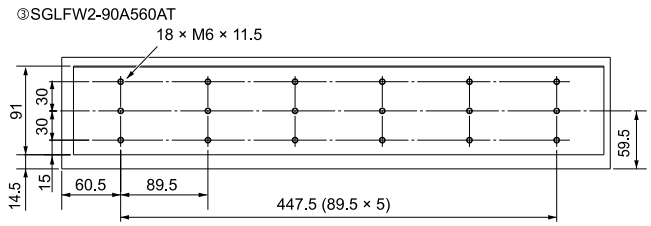


■ Moving Coils without Polarity Sensors (Hall Sensors): SGLFW2-90A□□□AT1









Unit: mm

Moving Coil Model SGLFW2-	L1	L2	L3	L4	Flatness	Approx. Mass [kg]
90A200AT1	205	89.5	187	300 ±30	0.2	5.3
90A200AT1E				500 ±50		
90A200AT1H				500 ±50		
90A380AT1	384	268.5	365.5	300 ±30	0.3	10.1
90A380AT1E				500 ±50		
90A380AT1H				500 ±50		

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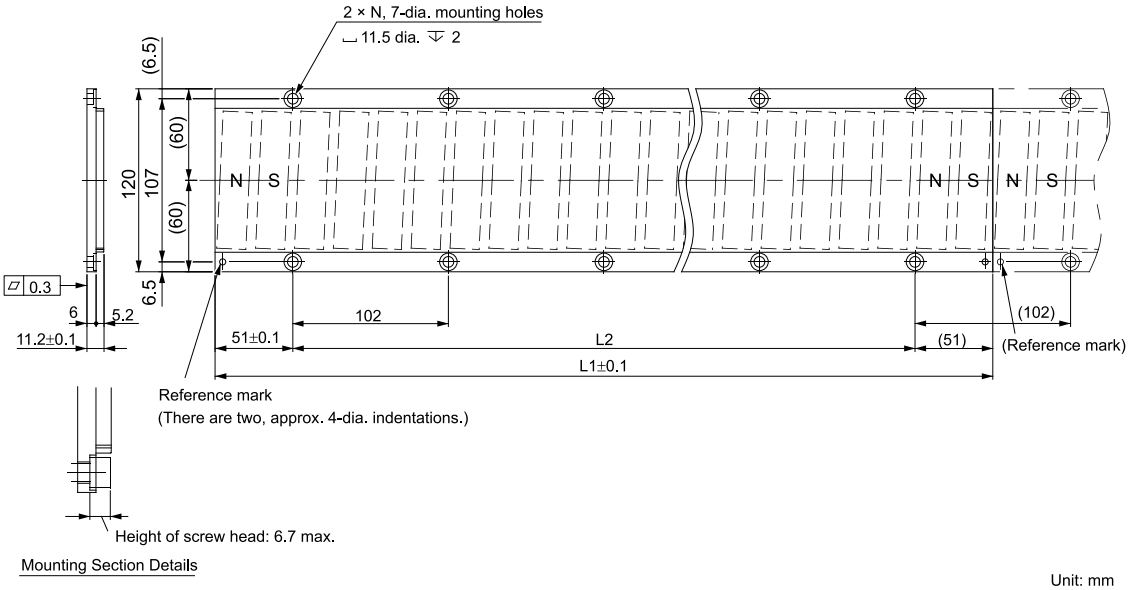
Moving Coil Model SGLFW2-	L1	L2	L3	L4	Flatness	Approx. Mass [kg]
90A560AT1	563	447.5	544	300 ±30	0.3	14.9
90A560AT1E				500 ±50		
90A560AT1H				500 ±50		

■ Magnetic Ways: SGLFM2-90□□□A



Unit: mm

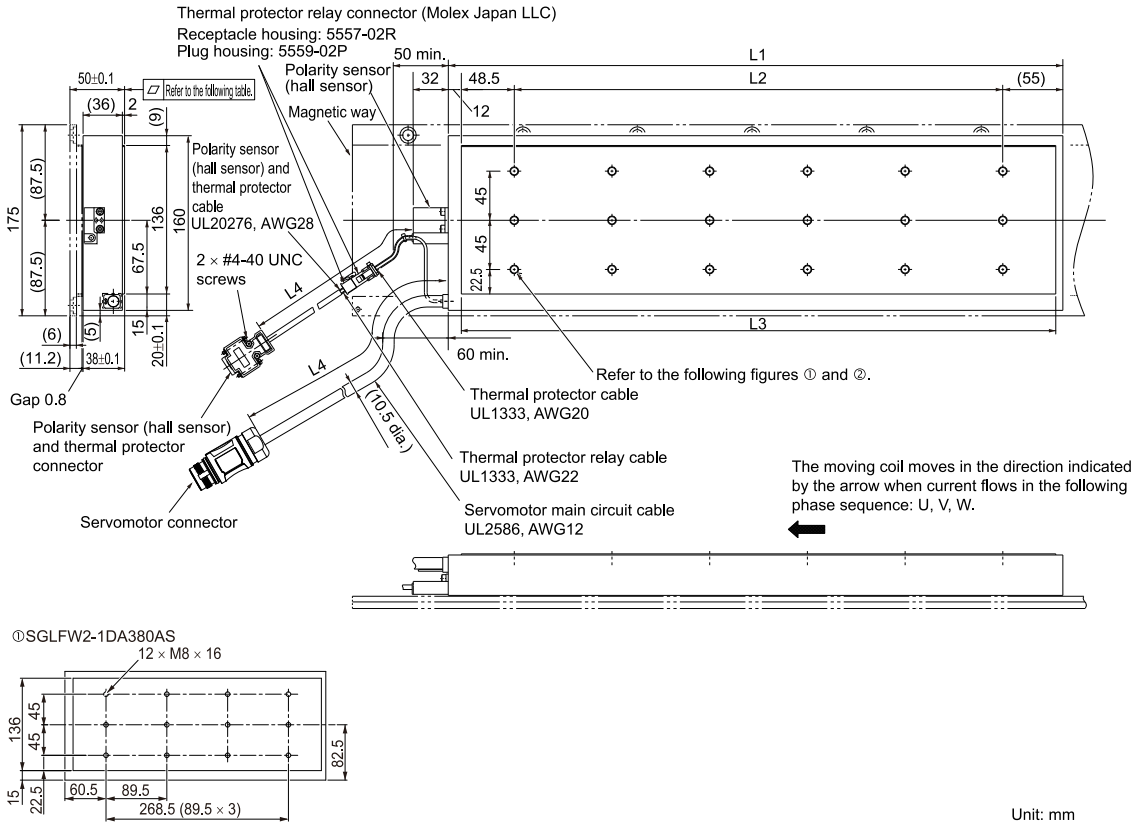
Note:

More than one magnetic way can be connected. Connect the magnetic ways so that the reference marks on them are aligned in the same direction as shown in the figure.

Magnetic Way Model SGLFM2-	L1± 0.1	L2	N	Approx. Mass [kg]
90306A	306	204 (102 × 2)	3	2.6
90510A	510	408 (102 × 4)	5	4.2
90714A	714	612 (102 × 6)	7	5.9

SGLFW2-1D

■ Moving Coil with Polarity Sensor (Hall Sensor): SGLFW2-1DA□□□AS1

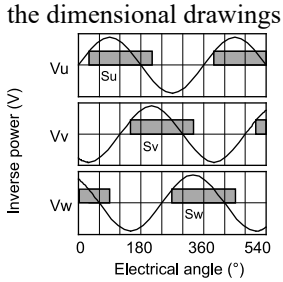


Unit: mm

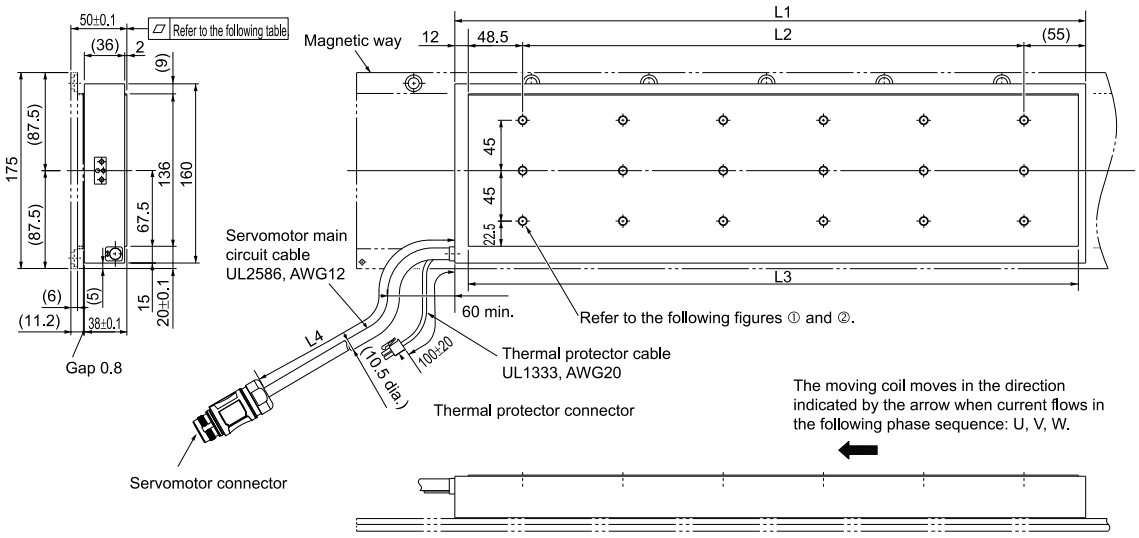
Moving Coil Model SGLFW2-	L1	L2	L3	L4	Flatness	Approx. Mass [kg]
1DA380AS1	384	268.5	365.5	300 ±30	0.3	14.6
1DA380AS1E				500 ±50		
1DA380AS1H				500 ±50		
1DA560AS1	563	447.5	544	300 ±30	0.3	21.5
1DA560AS1E				500 ±50		
1DA560AS1H				500 ±50		

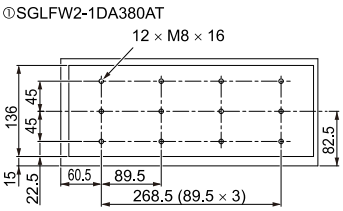
◆ Polarity Sensor (Hall Sensor) Output Signal

The figure on the right shows the relationship between the Su, Sv, and Sw polarity sensor (hall sensor) output signals and the inverse power of each motor phase Vu, Vv, and Vw when the moving coil moves in the direction indicated by the arrow in the dimensional drawings of the moving coil.



■ Moving Coil without Polarity Sensor (Hall Sensor): SGLFW2-1DA□□□AT1

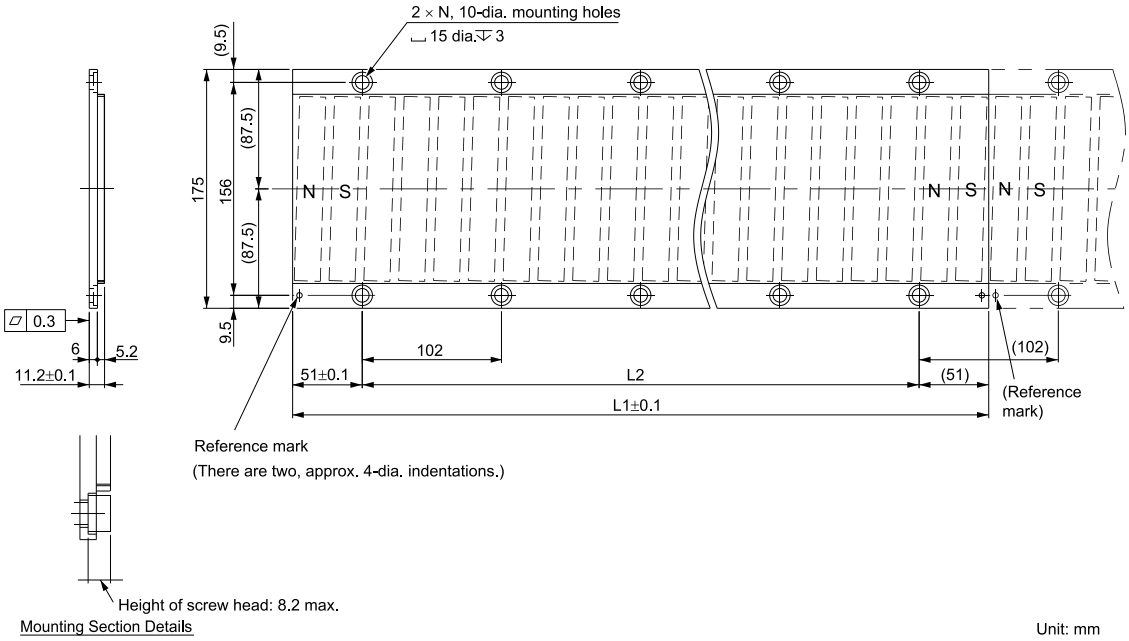




Unit: mm

Moving Coil Model SGLFW2-	L1	L2	L3	L4	Flatness	Approx. Mass [kg]
1DA380AT1	384	268.5	365.5	300 ±30	0.3	14.6
1DA380AT1E				500 ±50		
1DA380AT1H				500 ±50		
1DA560AT1	563	447.5	544	300 ±30	0.3	21.5
1DA380AT1E				500 ±50		
1DA560AT1H				500 ±50		

■ Magnetic Ways: SGLFM2-1D□□□A



Note:

More than one magnetic way can be connected. Connect the magnetic ways so that the reference marks on them are aligned in the same direction as shown in the figure.

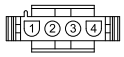
Magnetic Way Model SGLFM2-	L1± 0.1	L2	N	Approx. Mass [kg]
1D306A	306	204 (102 × 2)	3	3.7
1D510A	510	408 (102 × 4)	5	6.2
1D714A	714	612 (102 × 6)	7	8.6

Connector Specifications

SGLFW2-30

■ SGLFW2-30A070AS

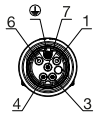
- Servomotor Connector (Tyco Electronics Japan G.K.)



1	Phase U	Red	3	Phase W	Blue
2	Phase V	White	4	FG	Green

  - Plug: 350779-1
  - Pins:
    - 350218-3 or 350547-3 (No.1 to 3)
    - 350654-1 or 350669-1 (No. 4)
  - Mating Connector
    - Cap: 350780-1
    - Socket: 350536-3 or 350550-3

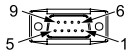
- Servomotor Connector (Phoenix Contact GmbH & Co. KG)



1	-	7	Phase W
2	Phase U	Ground	FG
4	Phase V	Case	Shield
6	-		

  - Connector: ST-5EP1N8A9003S (1607706)
  - Contact: ST-10KP030 (1618261)

- Polarity Sensor (Hall Sensor) and Thermal Protector Connector (DDK Ltd.)

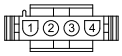


1	+5 V (thermal protector), +5 V (power supply)		
2	Su	6	Not used
3	Sv	7	
4	Sw	8	
5	0 V (power supply)	9	Thermal Protector

  - Pin connector: 17JE-23090-02 (D8C)-CG
  - Mating Connector
    - Socket connector: 17JE-13090-02 (D8C) A-CG
    - Studs: 17L-002C or 17L-002C1

■ SGLFW2-30A□□□AS

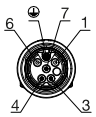
- Servomotor Connector (Tyco Electronics Japan G.K.)



1	Phase U	Red	3	Phase W	Blue
2	Phase V	White	4	FG	Green

  - Plug: 350779-1
  - Pins:
    - 350218-3 or 350547-3 (No.1 to 3)
    - 350654-1 or 350669-1 (No. 4)
  - Mating Connector
    - Cap: 350780-1
    - Socket: 350536-3 or 350550-3

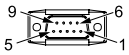
- Servomotor Connector (Phoenix Contact GmbH & Co. KG)



1	-	7	Phase W
2	Phase U	Ground	FG
4	Phase V	Case	Shield
6	-		

  - Connector: ST-5EP1N8A9003S (1607706)
  - Contact: ST-10KP030 (1618261)

- Polarity Sensor (Hall Sensor) and Thermal Protector Connector (DDK Ltd.)

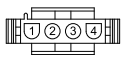


1	+5 V (thermal protector), +5 V (power supply)		
2	Su	6	Not used
3	Sv	7	
4	Sw	8	
5	0 V (power supply)	9	Thermal Protector

  - Pin connector: 17JE-23090-02 (D8C)-CG
  - Mating Connector
    - Socket connector: 17JE-13090-02 (D8C) A-CG
    - Studs: 17L-002C or 17L-002C1

■ SGLFW2-30A070AT

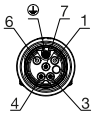
- Servomotor Connector (Tyco Electronics Japan G.K.)



1	Phase U	Red	3	Phase W	Blue
2	Phase V	White	4	FG	Green

  - Plug: 350779-1
  - Pins:
    - 350218-3 or 350547-3 (No.1 to 3)
    - 350654-1 or 350669-1 (No. 4)
  - Mating Connector
    - Cap: 350780-1
    - Socket: 350536-3 or 350550-3

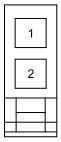
- Servomotor Connector (Phoenix Contact GmbH & Co. KG)



1	-	7	Phase W
2	Phase U	Ground	FG
4	Phase V	Case	Shield
6	-		

  - Connector: ST-5EP1N8A9003S (1607706)
  - Contact: ST-10KP030 (1618261)

- Thermal Protector Connector (Molex Japan LLC)

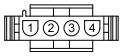


1	Thermal Protector
2	Thermal Protector

  - Receptacle housing: 5557-02R
  - Terminals: 5556T or 5556TL
  - Mating Connector
    - Plug housing: 5559-02P
    - Terminals: 5558T or 5558TL

■ SGLFW2-30A□□□AT

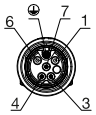
- Servomotor Connector (Tyco Electronics Japan G.K.)



1	Phase U	Red	3	Phase W	Blue
2	Phase V	White	4	FG	Green

  - Plug: 350779-1
  - Pins:
    - 350218-3 or 350547-3 (No.1 to 3)
    - 350654-1 or 350669-1 (No. 4)
  - Mating Connector
    - Cap: 350780-1
    - Socket: 350536-3 or 350550-3

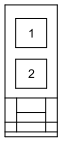
- Servomotor Connector (Phoenix Contact GmbH & Co. KG)



1	-	7	Phase W
2	Phase U	Ground	FG
4	Phase V	Case	Shield
6	-		

  - Connector: ST-5EP1N8A9003S (1607706)
  - Contact: ST-10KP030 (1618261)

- Thermal Protector Connector (Molex Japan LLC)



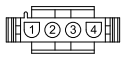
1	Thermal Protector
2	Thermal Protector

  - Receptacle housing: 5557-02R
  - Terminals: 5556T or 5556TL
  - Mating Connector
    - Plug housing: 5559-02P
    - Terminals: 5558T or 5558TL

SGLFW2-45

■ SGLFW2-45A□□□AS

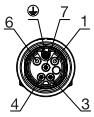
- Servomotor Connector (Tyco Electronics Japan G.K.)



1	Phase U	Red	3	Phase W	Blue
2	Phase V	White	4	FG	Green

  - Plug: 350779-1
  - Pins:
    - 350218-3 or 350547-3 (No.1 to 3)
    - 350654-1 or 350669-1 (No. 4)
  - Mating Connector
    - Cap: 350780-1
    - Socket: 350536-3 or 350550-3

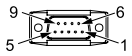
- Servomotor Connector (Phoenix Contact GmbH & Co. KG)



1	-	7	Phase W
2	Phase U	Ground	FG
4	Phase V	Case	Shield
6	-		

  - Connector: ST-5EP1N8A9003S (1607706)
  - Contact: ST-10KP030 (1618261)

- Polarity Sensor (Hall Sensor) and Thermal Protector Connector (DDK Ltd.)

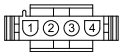


1	+5 V (thermal protector), +5 V (power supply)		
2	Su	6	Not used
3	Sv	7	
4	Sw	8	
5	0 V (power supply)	9	Thermal Protector

  - Pin connector: 17JE-23090-02 (D8C)-CG
  - Mating Connector
    - Socket connector: 17JE-13090-02 (D8C) A-CG
    - Studs: 17L-002C or 17L-002C1

■ SGLFW2-45A□□□AT

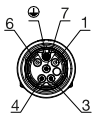
- Servomotor Connector (Tyco Electronics Japan G.K.)



1	Phase U	Red	3	Phase W	Blue
2	Phase V	White	4	FG	Green

  - Plug: 350779-1
  - Pins:
    - 350218-3 or 350547-3 (No.1 to 3)
    - 350654-1 or 350669-1 (No. 4)
  - Mating Connector
    - Cap: 350780-1
    - Socket: 350536-3 or 350550-3

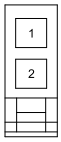
- Servomotor Connector (Phoenix Contact GmbH & Co. KG)



1	-	7	Phase W
2	Phase U	Ground	FG
4	Phase V	Case	Shield
6	-		

  - Connector: ST-5EP1N8A9003S (1607706)
  - Contact: ST-10KP030 (1618261)

- Thermal Protector Connector (Molex Japan LLC)



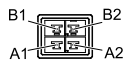
1	Thermal Protector
2	Thermal Protector

  - Receptacle housing: 5557-02R
  - Terminals: 5556T or 5556TL
  - Mating Connector
    - Plug housing: 5559-02P
    - Terminals: 5558T or 5558TL

SGLFW2-90

■ SGLFW2-90A□□□AS1

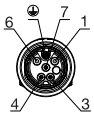
- Servomotor Connector (Tyco Electronics Japan G.K.)



A1	Phase U	Red	B1	Phase W	Black
A2	Phase V	White	B2	FG	Green

  - Tab housing: 1-917808-2
  - Contacts:
    - 917803-2 (A1, A2, and B1)
    - 84695-1 (B2)
  - Mating Connector
    - Receptacle housing: 1-917807-2
    - Contacts: 179956-2

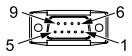
- Servomotor Connector (Phoenix Contact GmbH & Co. KG)



1	-	7	Phase W
2	Phase U	Ground	FG
4	Phase V	Case	Shield
6	-		

  - Connector: ST-5EP1N8A9003S (1607706)
  - Contact: ST-10KP030 (1618261)

- Polarity Sensor (Hall Sensor) and Thermal Protector Connector (DDK Ltd.)



1	+5 V (thermal protector), +5 V (power supply)		
2	Su	6	Not used
3	Sv	7	
4	Sw	8	
5	0 V (power supply)	9	Thermal Protector

  - Pin connector: 17JE-23090-02 (D8C)-CG
  - Mating Connector
    - Socket connector: 17JE-13090-02 (D8C) A-CG
    - Studs: 17L-002C or 17L-002C1

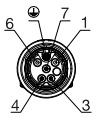
■ SGLFW2-90A□□□AT1

- Servomotor Connector (Tyco Electronics Japan G.K.)

A1	Phase U	Red	B1	Phase W	Black
A2	Phase V	White	B2	FG	Green

  - Tab housing: 1-917808-2
  - Contacts:
    - 917803-2 (A1, A2, and B1)
    - 84695-1 (B2)
  - Mating Connector
    - Receptacle housing: 1-917807-2
    - Contacts: 179956-2

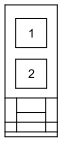
- Servomotor Connector (Phoenix Contact GmbH & Co. KG)



1	-	7	Phase W
2	Phase U	Ground	FG
4	Phase V	Case	Shield
6	-		

  - Connector: ST-5EP1N8A9003S (1607706)
  - Contact: ST-10KP030 (1618261)

- Thermal Protector Connector (Molex Japan LLC)



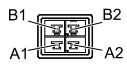
1	Thermal Protector
2	Thermal Protector

  - Receptacle housing: 5557-02R
  - Terminals: 5556T or 5556TL
  - Mating Connector
    - Plug housing: 5559-02P
    - Terminals: 5558T or 5558TL

SGLFW2-1D

■ SGLFW2-1DA□□□AS1

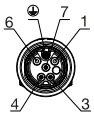
- Servomotor Connector (Tyco Electronics Japan G.K.)



A1	Phase U	Red	B1	Phase W	Black
A2	Phase V	White	B2	FG	Green

  - Tab housing: 1-917808-2
  - Contacts:
    - 917803-2 (A1, A2, and B1)
    - 84695-1 (B2)
  - Mating Connector
    - Receptacle housing: 1-917807-2
    - Contacts: 179956-2

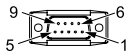
- Servomotor Connector (Phoenix Contact GmbH & Co. KG)



1	-	7	Phase W
2	Phase U	Ground	FG
4	Phase V	Case	Shield
6	-		

  - Connector: ST-5EP1N8A9003S (1607706)
  - Contact: ST-10KP030 (1618261)

- Polarity Sensor (Hall Sensor) and Thermal Protector Connector (DDK Ltd.)



1	+5 V (thermal protector), +5 V (power supply)		
2	Su	6	Not used
3	Sv	7	
4	Sw	8	
5	0 V (power supply)	9	Thermal Protector

  - Pin connector: 17JE-23090-02 (D8C)-CG
  - Mating Connector
    - Socket connector: 17JE-13090-02 (D8C) A-CG
    - Studs: 17L-002C or 17L-002C1

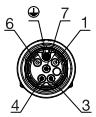
■ SGLFW2-1DA□□□AT1

- Servomotor Connector (Tyco Electronics Japan G.K.)

A1	Phase U	Red	B1	Phase W	Black
A2	Phase V	White	B2	FG	Green

  - Tab housing: 1-917808-2
  - Contacts:
    - 917803-2 (A1, A2, and B1)
    - 84695-1 (B2)
  - Mating Connector
    - Receptacle housing: 1-917807-2
    - Contacts: 179956-2

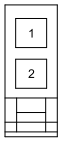
- Servomotor Connector (Phoenix Contact GmbH & Co. KG)



1	-	7	Phase W
2	Phase U	Ground	FG
4	Phase V	Case	Shield
6	-		

  - Connector: ST-5EP1N8A9003S (1607706)
  - Contact: ST-10KP030 (1618261)

- Thermal Protector Connector (Molex Japan LLC)



1	Thermal Protector
2	Thermal Protector

  - Receptacle housing: 5557-02R
  - Terminals: 5556T or 5556TL
  - Mating Connector
    - Plug housing: 5559-02P
    - Terminals: 5558T or 5558TL

Model Designations

Moving Coil

SGL T W - 20 A 170 A P □ - E

Linear Σ series
Linear servomotors

❶ ❷ ❸ ❹ ❺ ❻ ❼ ❽ ❾

❶ Servomotor Type

Code	Specification
T	With T-type iron core

❷ Moving Coil/Magnetic Way

Code	Specification
W	Moving coil

❸ Magnet Height

Code	Specification
20	20 mm
35	36 mm
40	40 mm
50	51 mm
80	76.5 mm

❹ Power Supply Voltage

Code	Specification
A	200 VAC

❺ Length of Moving Coil

Code	Specification
170	170 mm
320	315 mm
400	394.2 mm
460	460 mm
600	574.2 mm

❻ Design Revision Order

A, B …
H: High-efficiency model

❼ Sensor Specification and Cooling Method

Code	Specifications		Applicable Models
	Polarity Sensor (Hall Sensor)	Cooling Method	
None	None	Self-cooled	All models
C*1	None	Water-cooled	SGLTW-40, -80
H*1	Yes	Water-cooled	
P	Yes	Self-cooled	All models

❽ Connector for Servomotor Main Circuit Cable

Code	Specification	Applicable Models
None	Connector from Tyco Electronics Japan G.K.	SGLTW-20A□□□□□ -35A□□□□□
	MS connector	SGLTW-40A□□□B□ -80A□□□B□
	Loose lead wires with no connector	SGLTW-35A□□□H□ -50A□□□H□

❾ EU Directive Certification

Code	Specification
E	Certified
None	Not certified

*1 Contact your Yaskawa representative for the characteristics, dimensions, and other details on servomotors with these specifications.

Note:

This information is provided to explain model numbers. It is not meant to imply that models are available for all combinations of codes.

Magnetic Way

SGL T M - 20 324 A □

Linear Σ series Linear servomotors ❶ ❷ ❸ ❹ ❺ ❻

❶ Servomotor Type

(Same as for the moving coil.)

❷ Moving Coil/Magnetic Way

Code	Specification
M	Magnetic way

❸ Magnet Height

(Same as for the moving coil.)

❹ Length of Magnetic Way

Code	Specification
324	324 mm
405	405 mm
540	540 mm
675	675 mm
756	756 mm
945	945 mm

❺ Design Revision Order

A, B …
H: High-efficiency model

❻ Options

Code	Specification	Applicable Models
None	Without options	–
C	With magnet cover	All models
Y	With base and magnet cover	SGLTM-20, -35*1, -40, -80

*1 The SGLTM-35□□□H (high-efficiency models) do not support this specification.

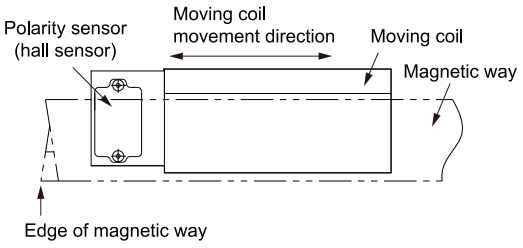
Note:
This information is provided to explain model numbers. It is not meant to imply that models are available for all combinations of codes.

Precautions on Moving Coils with Polarity Sensors (Hall Sensor)

When you use a moving coil with a polarity sensor (hall sensor), the magnetic way must cover the bottom of the polarity sensor (hall sensor). Refer to the example that shows the correct installation.

When determining the length of the moving coil's stroke or the length of the magnetic way, consider the total length (L) of the moving coil and the polarity sensor (hall sensor). Refer to the following table.

<Correct>



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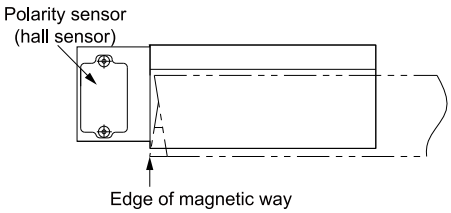
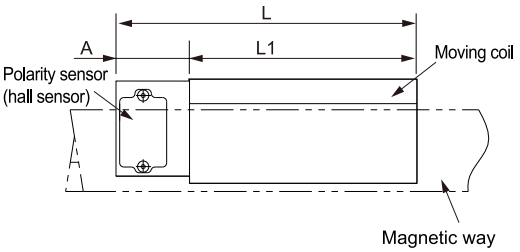


■ Total Length of Moving Coil with Polarity Sensor (Hall Sensor)



Ratings and Specifications

Specifications

Linear Servomotor Moving Coil Model SGLTW-		Standard Models										High-efficiency Models			
		20A			35A			40A		80A		35A		50A	
		170A	320A	460A	170A	320A	460A	400B	600B	400B	600B	170H	320H	170H	320H
Time Rating		Continuous													
Thermal Class		B													
Insulation Resistance		500 VDC, 10 MΩ min.													
Withstand Voltage		1,500 VAC for 1 minute													
Excitation		Permanent magnet													
Cooling Method		Self-cooled													
Protective Structure		IP00													
Environmental Conditions	Surrounding Air Temperature	0°C to 40°C (with no freezing)													
	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. Must be free of strong magnetic fields.													
Shock Resistance	Impact Acceleration	196 m/s²													
	Number of Impacts	2 times													
Vibration Resistance	Vibration Acceleration	49 m/s² (the vibration resistance in three directions, vertical, side-to-side, and front-to-back)													

Ratings

Linear Servomotor Moving Coil Model SGLTW-		Standard Models										High-efficiency Models			
		20A			35A			40A		80A		35A		50A	
		170A	320A	460A	170A	320A	460A	400B	600B	400B	600B	170H	320H	170H	320H
Rated Motor Speed (Reference Speed during Speed Control) *1	m/s	3.0	3.0	3.0	2.5	2.5	2.5	1.5	2.0	2.0	2.0	2.5	2.0	2.0	2.0
Maximum Speed *1	m/s	5.0	5.0	5.0	5.0	5.0	5.0	3.1	3.1	2.5	2.5	4.8	4.8	3.2	3.1
Rated Force *1 *2	N	130	250	380	220	440	670	670	1000	1300	2000	300	600	450	900
Maximum Force *1	N	380	760	1140	660	1320	2000	2600	4000	5000	7500	600	1200	900	1800
Rated Current *1	Arms	2.3	4.4	6.7	3.5	7.0	10.7	7.3	10.9	11.1	17.1	5.1	10.1	5.1	10.2
Maximum Current *1	Arms	7.7	15.4	23.2	12.1	24.2	36.7	39.4	60.6	57.9	86.9	11.9	23.9	11.8	23.6

Continued on next page.

Continued from previous page.

Linear Servomotor Moving Coil Model SGLTW-		Standard Models										High-efficiency Models			
		20A			35A			40A		80A		35A		50A	
		170A	320A	460A	170A	320A	460A	400B	600B	400B	600B	170H	320H	170H	320H
Moving Coil Mass	kg	2.5	4.6	6.7	3.7	6.8	10	15	23	24	35	4.9	8.8	6.0	11
Force Constant	N/Arms	61.0	61.0	61.0	67.5	67.5	67.5	99.1	99.1	126	126	64.0	64.0	95.2	95.2
BEMF Constant	Vrms/(m/s)/phase	20.3	20.3	20.3	22.5	22.5	22.5	33.0	33.0	42.0	42.0	21.3	21.3	31.7	31.7
Motor Constant	N/$\sqrt{W}$	18.7	26.5	32.3	26.7	37.5	46.4	61.4	75.2	94.7	116	37.4	52.9	48.6	68.7
Electrical Time Constant	ms	5.9	5.9	5.9	6.9	6.8	6.9	15	15	17	17	15	16	16	17
Mechanical Time Constant	ms	7.1	6.6	6.4	5.2	4.8	4.6	4.0	4.1	2.7	2.6	3.5	3.1	2.5	2.4
Thermal Resistance (with Heat Sink)	K/W	1.01	0.49	0.38	0.76	0.44	0.32	0.24	0.20	0.22	0.18	0.76	0.40	0.61	0.30
Thermal Resistance (without Heat Sink)	K/W	1.82	1.11	0.74	1.26	0.95	0.61	0.57	0.40	0.47	0.33	1.26	0.83	0.97	0.80
Magnetic Attraction *3	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Magnetic Attraction One Side *4	N	800	1590	2380	1400	2780	4170	3950	5890	7650	11400	1400	2780	2000	3980
Maximum Allowable Payload	kg	25	50	76	44	88	130	280	440	690	1000	33	67	92	190
Maximum Allowable Payload (With External Regenerative Resistor and External Dynamic Brake Resistor)	kg	25	50	76	44	88	130	280	440	690	1000	40	82	95	190
Combined Magnetic Way, SGLTM-		20□□□A□			35□□□A□			40□□□A□		80□□□A□		35□□□H□		50□□□H□	
Combined Serial Converter Unit, JZDP-□□□□-		011	012	013	014	015	016	185	186	187	188	105	106	108	109
Applicable SERVOPACKs	SGDXS-	3R8A	7R6A	120A	5R5A	120A	180A	180A	330A	330A	550A	5R5A	120A	5R5A	120A
	SGDXW-	5R5A	7R6A	-	5R5A	-	-	-	-	-	-	5R5A	-	5R5A	-

*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 forces are the continuous allowable force values at a surrounding air temperature of 40°C with an aluminum heat sink of the dimensions given in the following table.
<Heat Sink Dimensions>

- 254 mm × 254 mm × 25 mm: SGLTW-20A170A, 35A170A
- 400 mm × 500 mm × 40 mm: SGLTW-20A320A, 20A460A, 35A170H, 35A320A, 35A320H, 35A460A, 50A170H
- 609 mm × 762 mm × 50 mm: SGLTW-40A400B, 40A600B, 50A320H, 80A400B, 80A600B

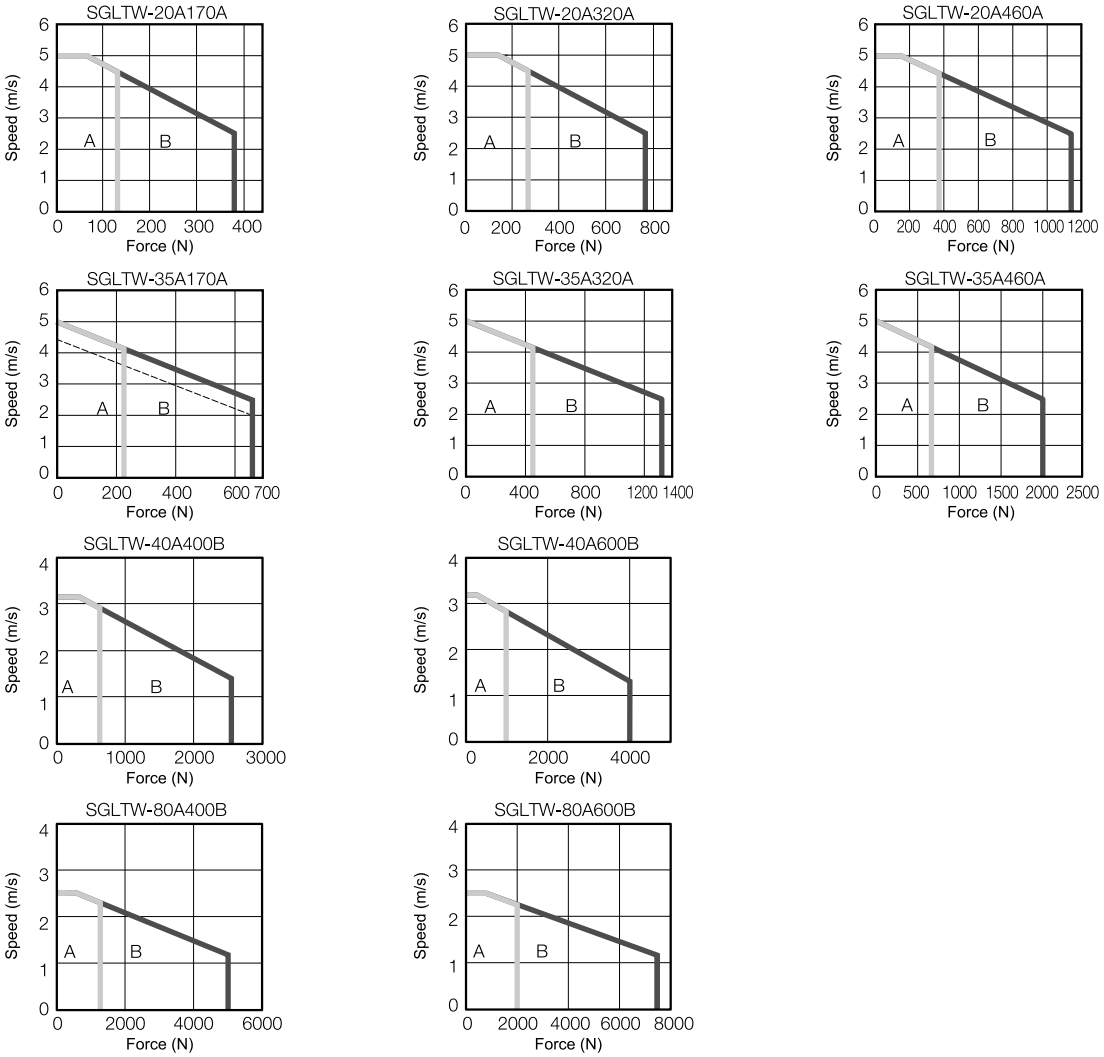
*3 The unbalanced magnetic gap that results from the moving coil installation condition causes a magnetic attraction on the moving coil.

*4 The value that is given is the magnetic attraction that is generated on one side of the magnetic way.

Force-Motor Speed Characteristics

A : Continuous duty zone ———— (solid lines): With three-phase 200-V input
B : Intermittent duty zone - - - - - - - - (dotted lines): With single-phase 200-V input

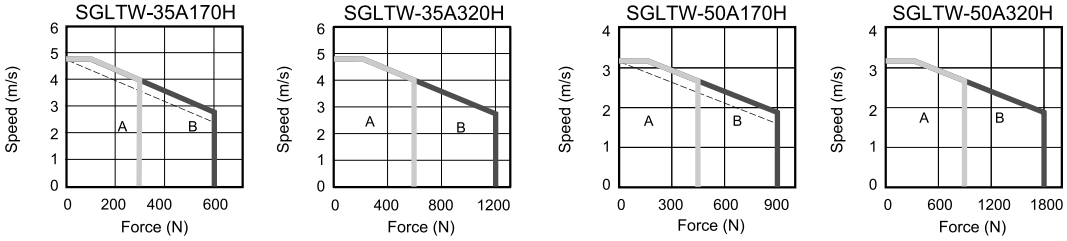
■ Standard Models



Note:

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 force is within the allowable range for the rated force, 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.

■ High-efficiency Models



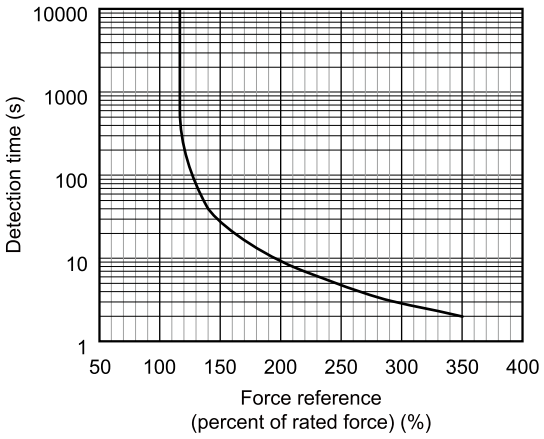
Note:

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 force is within the allowable range for the rated force, 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.

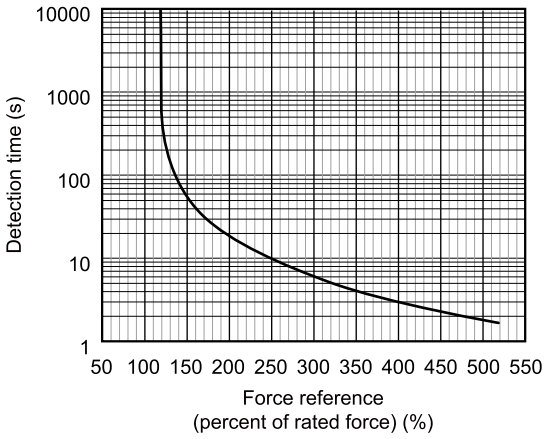
Servomotor Overload Protection Characteristics

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

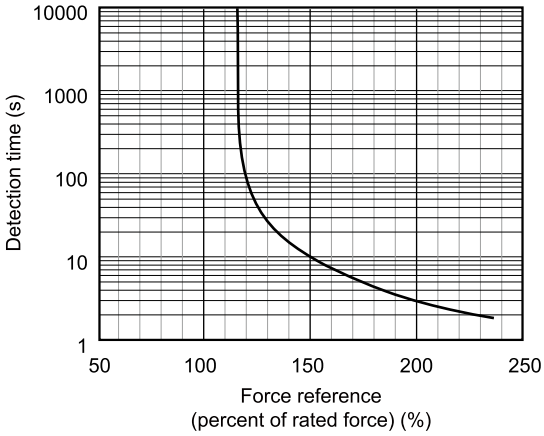
SGLTW-20A□□□A and 35A□□□A



SGLTW-40A□□□B and 80A□□□B



SGLTW-35A□□□H and 50A□□□H



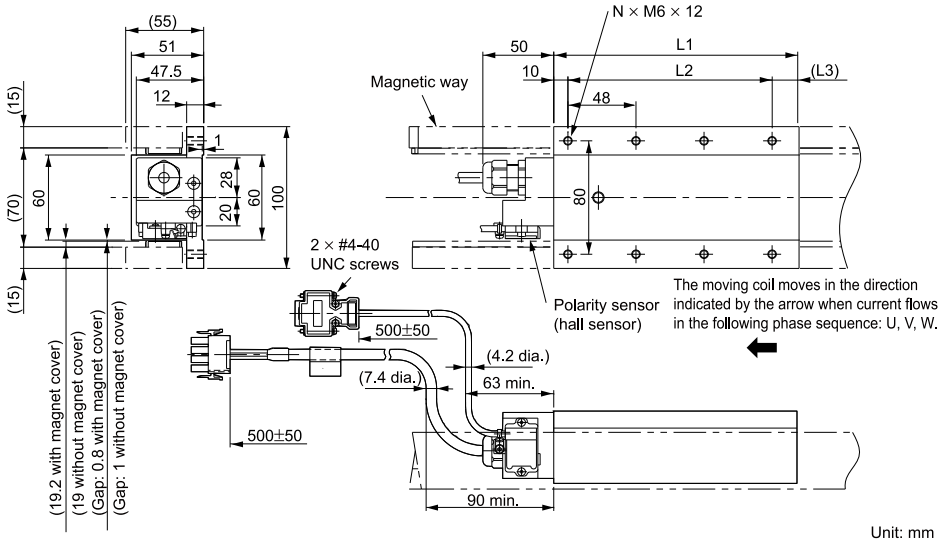
Note:

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 force remains within the continuous duty zone given in *Force-Motor Speed Characteristics on page 257*.

External Dimensions (200 V Specification)

SGLTW-20: Standard Models

■ Moving Coils: SGLTW-20A□□□A□

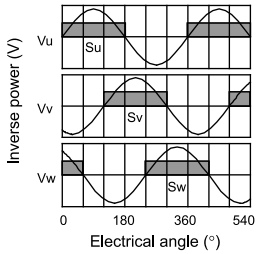


Unit: mm

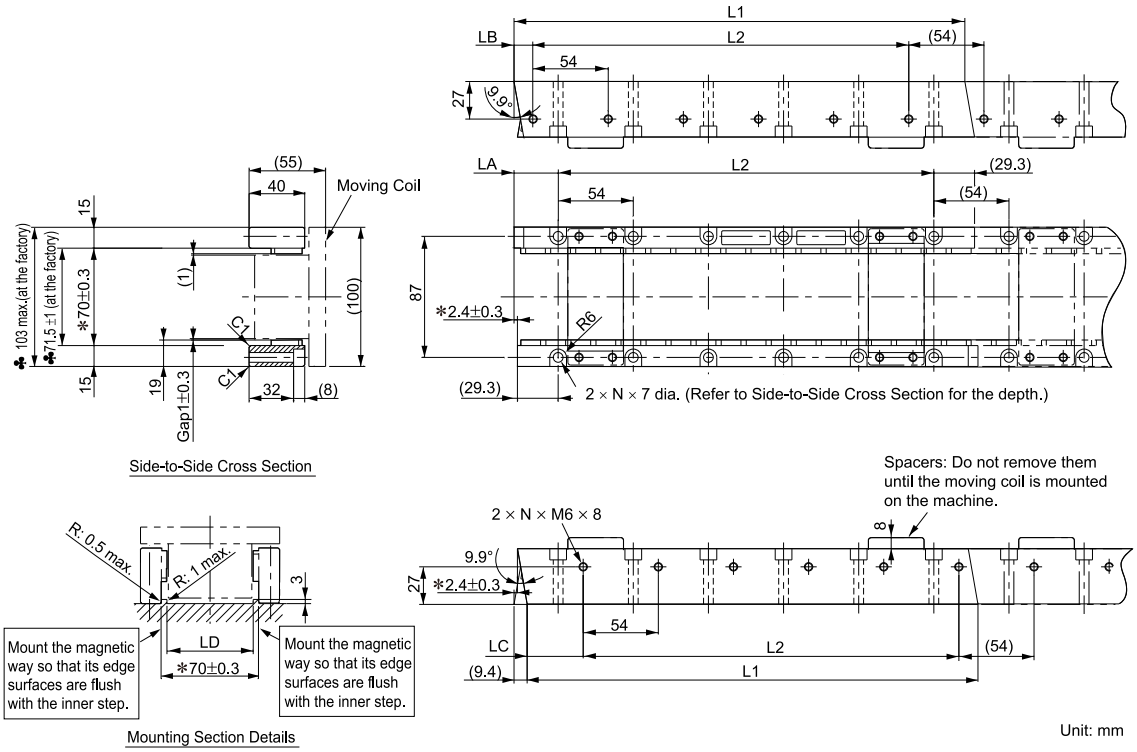
Moving Coil Model SGLTW-	L1	L2	(L3)	N	Approx. Mass [kg]
20A170A□	170	144 (48 × 3)	(16)	8	2.5
20A320A□	315	288 (48 × 6)	(17)	14	4.6
20A460A□	460	432 (48 × 9)	(18)	20	6.7

◆ Polarity Sensor (Hall Sensor) Output Signal

The figure on the right shows the relationship between the Su, Sv, and Sw polarity sensor (hall sensor) output signals and the inverse power of each motor phase Vu, Vv, and Vw when the moving coil moves in the direction indicated by the arrow in the dimensional drawings of the moving coil.



■ Magnetic Ways: SGLTM-20□□□A

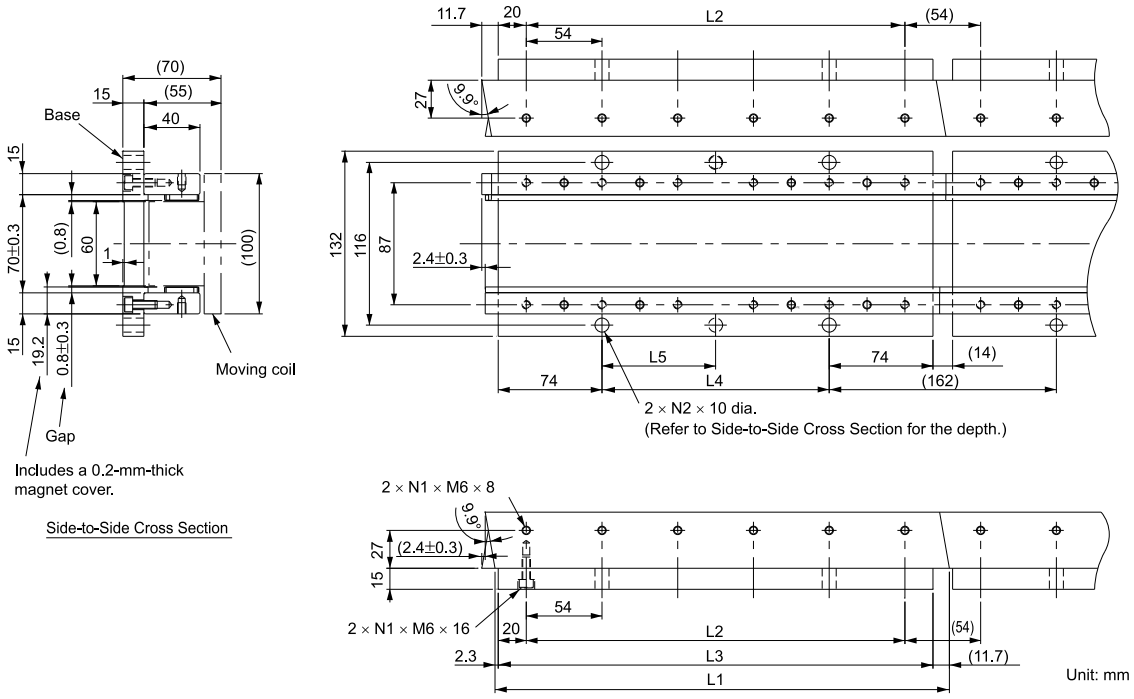


Note:

1. Two magnetic way tracks are used together as a set. For safety, when they are shipped, the two tracks are secured to a mounting spacer made from aluminum.
2. More than one magnetic way can be connected.
3. Dimensions with asterisks are the distances between the magnetic way tracks. Install the tracks according to the specified dimensions. Observe the dimensions given in mounting section details after installation. Dimensions when the magnetic way is shipped from the factory are indicated by ♣.
4. Use socket head screws of strength class 10.9 or higher for the magnetic way mounting screws. (Do not use stainless steel screws.)

Magnetic Way Model SGLTM-	L1	L2	LA	LB	LC	LD	N	Approx. Mass [kg]
20324A□	$324^{-0.1}_{-0.3}$	270 (54 × 5)	$31.7^{0}_{-0.2}$	$13.7^{0}_{-0.2}$	$40.3^{0}_{-0.2}$	$62^{+0.6}_{0}$	6	3.4
20540A□	$540^{-0.1}_{-0.3}$	486 (54 × 9)	$31.7^{0}_{-0.2}$	$13.7^{0}_{-0.2}$	$40.3^{0}_{-0.2}$	$62^{+0.6}_{0}$	10	5.7
20756A□	$756^{-0.1}_{-0.3}$	702 (54 × 13)	$31.7^{0}_{-0.2}$	$13.7^{0}_{-0.2}$	$40.3^{0}_{-0.2}$	$62^{+0.6}_{0}$	14	7.9

■ Magnetic Ways with Bases: SGLTM-20□□□AY



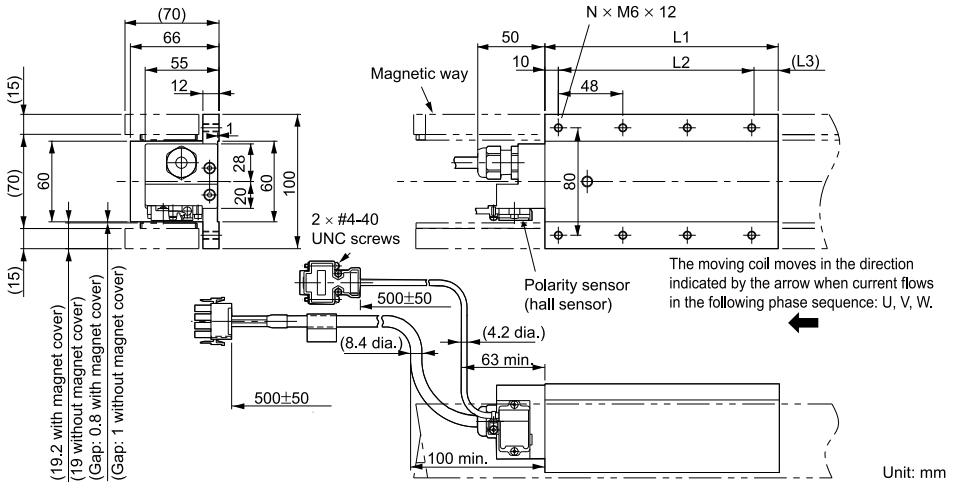
Note:

Two magnetic way tracks are used together as a set. More than one magnetic way can be connected.

Magnetic Way Model SGLTM-	L1	L2	L3	L4	L5	N1	N2	Approx. Mass [kg]
20324AY	$324^{-0.1}_{-0.3}$	270	310	162	162	6	2	5.1
20540AY	$540^{-0.1}_{-0.3}$	486	526	378	189	10	3	8.5
20756AY	$756^{-0.1}_{-0.3}$	702	742	594	198	14	4	12

SGLTW-35: Standard Models

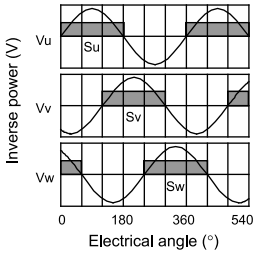
■ Moving Coils: SGLTW-35A□□□A□



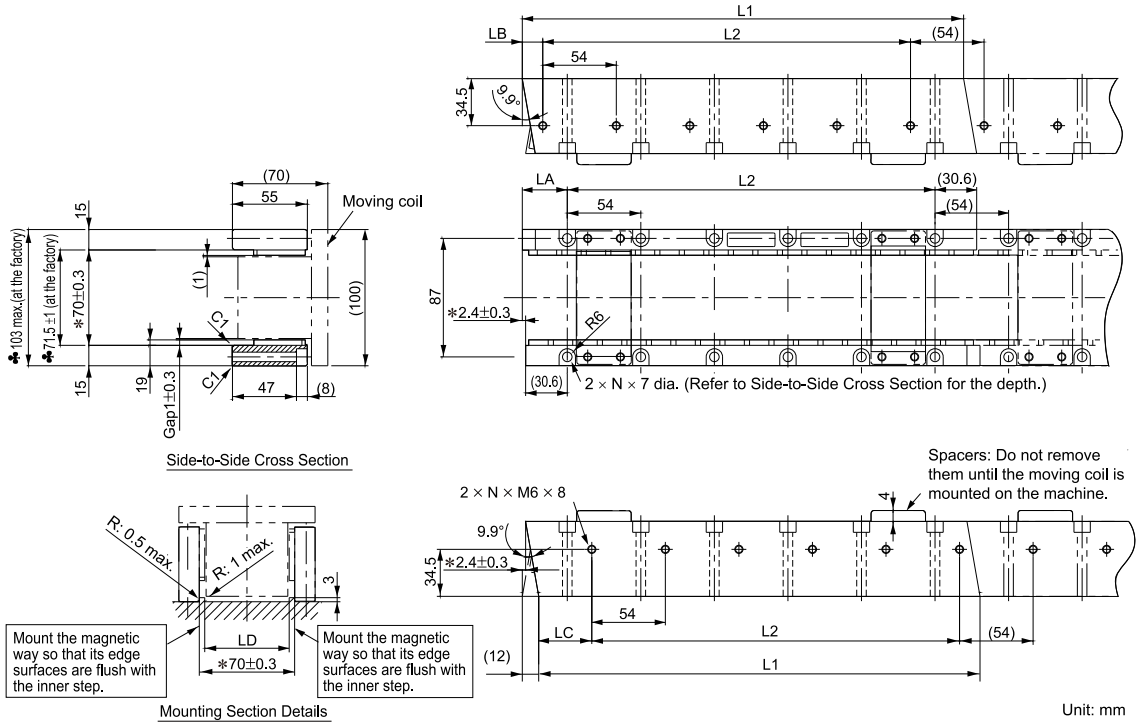
Moving Coil Model SGLTW-	L1	L2	(L3)	N	Approx. Mass [kg]
35A170A□	170	144 (48 × 3)	(16)	8	3.7
35A320A□	315	288 (48 × 6)	(17)	14	6.8
35A460A□	460	432 (48 × 9)	(18)	20	10

◆ Polarity Sensor (Hall Sensor) Output Signal

The figure on the right shows the relationship between the Su, Sv, and Sw polarity sensor (hall sensor) output signals and the inverse power of each motor phase Vu, Vv, and Vw when the moving coil moves in the direction indicated by the arrow in the dimensional drawings of the moving coil.



■ Magnetic Ways: SGLTM-35□□□A□

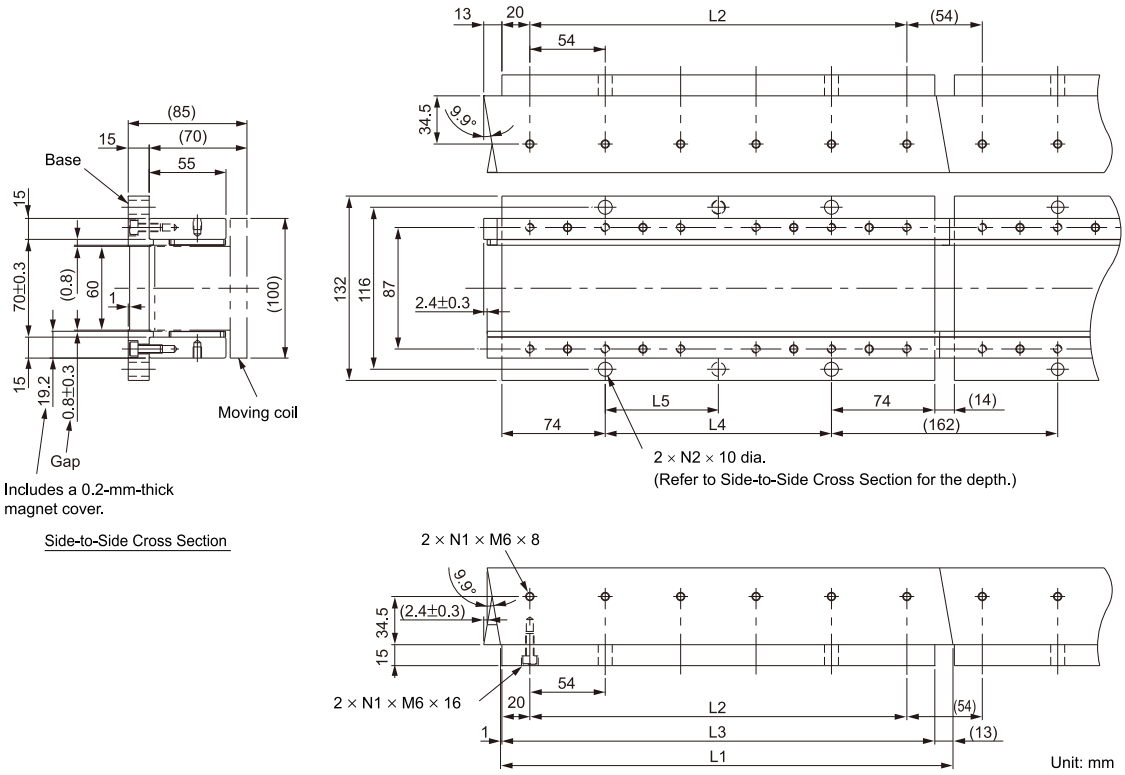


Note:

1. Two magnetic way tracks are used together as a set. For safety, when they are shipped, the two tracks are secured to a mounting spacer made from aluminum.
2. More than one magnetic way can be connected.
3. Dimensions with asterisks are the distances between the magnetic way tracks. Install the tracks according to the specified dimensions. Observe the dimensions given in mounting section details after installation. Dimensions when the magnetic way is shipped from the factory are indicated by ♣.
4. Use socket head screws of strength class 10.9 or higher for the magnetic way mounting screws. (Do not use stainless steel screws.)

Magnetic Way Model SGLTM-	L1	L2	LA	LB	LC	LD	N	Approx. Mass [kg]
35324A□	$324^{-0.1}_{-0.3}$	270 (54 × 5)	$33^{0}_{-0.2}$	$15^{0}_{-0.2}$	$39^{0}_{-0.2}$	$62^{+0.6}_{0}$	6	4.8
35540A□	$540^{-0.1}_{-0.3}$	486 (54 × 9)	$33^{0}_{-0.2}$	$15^{0}_{-0.2}$	$39^{0}_{-0.2}$	$62^{+0.6}_{0}$	10	8
35756A□	$756^{-0.1}_{-0.3}$	702 (54 × 13)	$33^{0}_{-0.2}$	$15^{0}_{-0.2}$	$39^{0}_{-0.2}$	$62^{+0.6}_{0}$	14	11

■ Magnetic Ways with Bases: SGLTM-35□□□AY



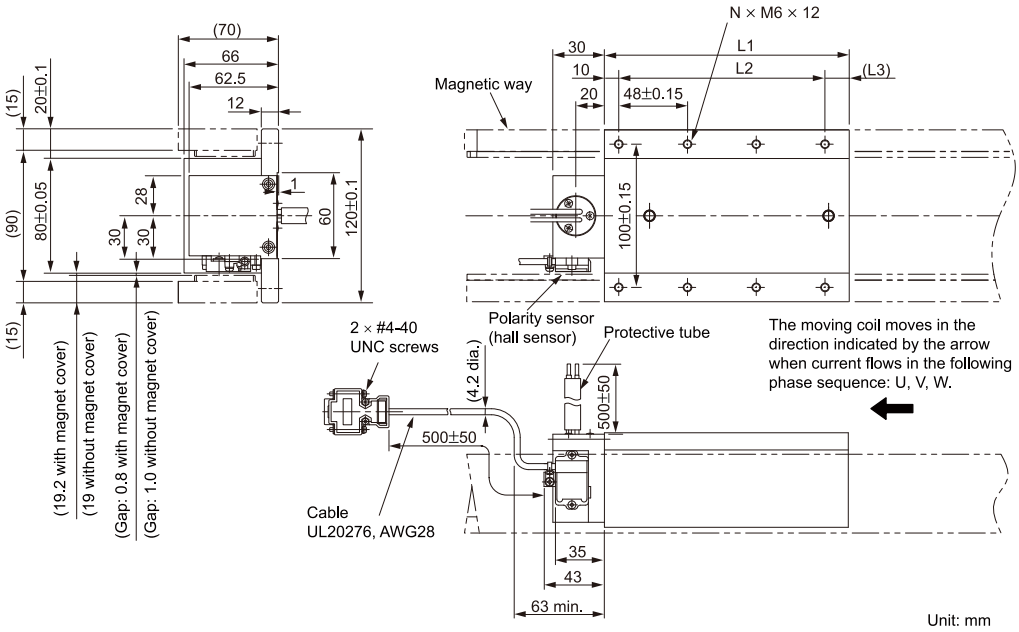
Note:

Two magnetic way tracks are used together as a set. More than one magnetic way can be connected.

Magnetic Way Model SGLTM-	L1	L2	L3	L4	L5	N1	N2	Approx. Mass [kg]
35324AY	$324^{-0.1}_{-0.3}$	270	310	162	162	6	2	6.4
35540AY	$540^{-0.1}_{-0.3}$	486	526	378	189	10	3	11
35756AY	$756^{-0.1}_{-0.3}$	702	742	594	198	14	4	15

SGLTW-35□□□□H□: High-efficiency Models

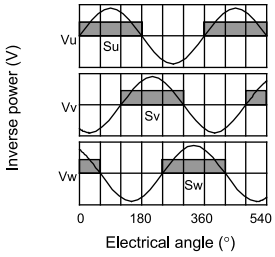
■ Moving Coils: SGLTW-35A□□□H□



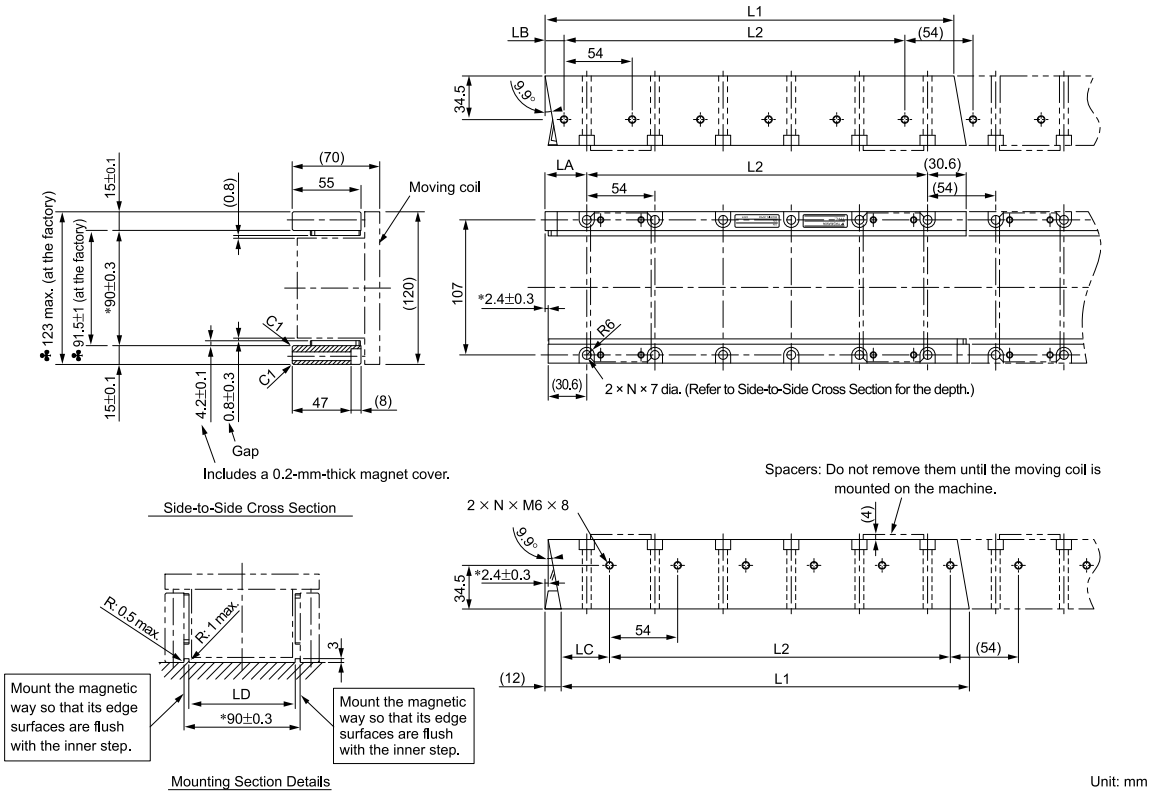
Moving Coil Model SGLTW-	L1	L2	L3	N	Approx. Mass [kg]
35A170H□	170	144 (48 × 3)	(16)	8	4.7
35A320H□	315	288 (48 × 6)	(17)	14	8.8

■ Polarity Sensor (Hall Sensor) Output Signal

The figure on the right shows the relationship between the Su, Sv, and Sw polarity sensor (hall sensor) output signals and the inverse power of each motor phase Vu, Vv, and Vw when the moving coil moves in the direction indicated by the arrow in the dimensional drawings of the moving coil.



■ Magnetic Ways: SGLTM-35□□□H□



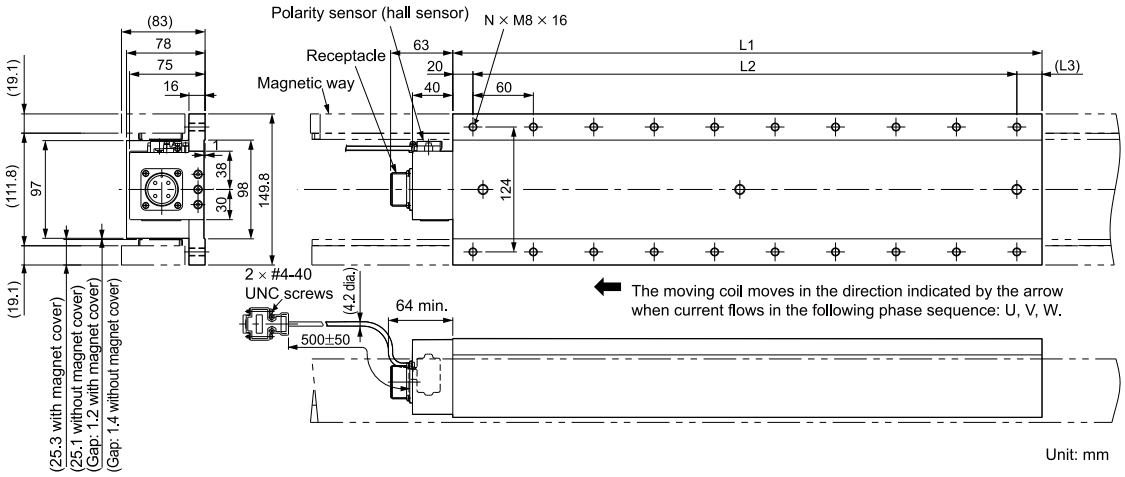
Note:

1. Two magnetic way tracks are used together as a set. For safety, when they are shipped, the two tracks are secured to a mounting spacer made from aluminum.
2. More than one magnetic way can be connected.
3. Dimensions with asterisks are the distances between the magnetic way tracks. Install the tracks according to the specified dimensions. Observe the dimensions given in mounting section details after installation. Dimensions when the magnetic way is shipped from the factory are indicated by ♣.
4. Use socket head screws of strength class 10.9 or higher for the magnetic way mounting screws. (Do not use stainless steel screws.)

Magnetic Way Model SGLTM-	L1	L2	LA	LB	LC	LD	N	Approx. Mass [kg]
35324H□	$324^{-0.1}_{-0.3}$	270 (54 × 5)	$33^{0}_{-0.2}$	$15^{0}_{-0.2}$	$39^{0}_{-0.2}$	$82^{+0.6}_{0}$	6	4.8
35540H□	$540^{-0.1}_{-0.3}$	486 (54 × 9)	$33^{0}_{-0.2}$	$15^{0}_{-0.2}$	$39^{0}_{-0.2}$	$82^{+0.6}_{0}$	10	8
35756H□	$756^{-0.1}_{-0.3}$	702 (54 × 13)	$33^{0}_{-0.2}$	$15^{0}_{-0.2}$	$39^{0}_{-0.2}$	$82^{+0.6}_{0}$	14	11

SGLTW-40: Standard Models

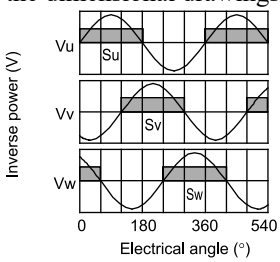
■ Moving Coils: SGLTW-40A□□□B□



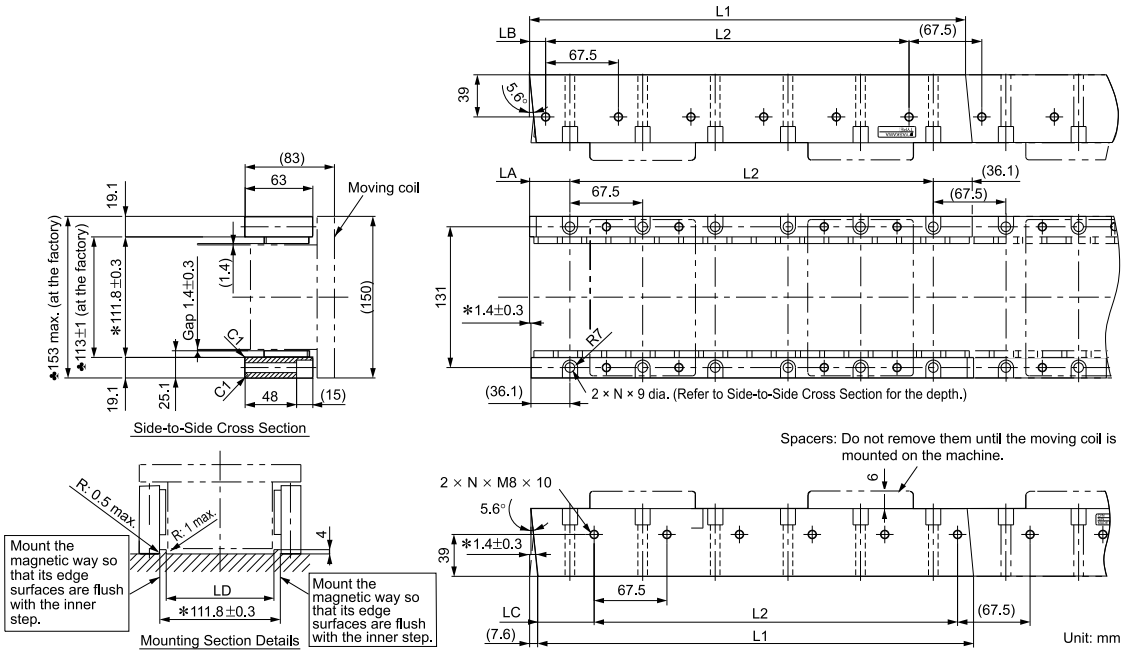
Moving Coil Model SGLTW-	L1	L2	(L3)	N	Approx. Mass [kg]
40A400B□	394.2	360 (60 × 6)	(15)	14	15
40A600B□	574.2	540 (60 × 9)	(15)	20	22

◆ Polarity Sensor (Hall Sensor) Output Signal

The figure on the right shows the relationship between the Su, Sv, and Sw polarity sensor (hall sensor) output signals and the inverse power of each motor phase Vu, Vv, and Vw when the moving coil moves in the direction indicated by the arrow in the dimensional drawings of the moving coil.



■ Magnetic Ways: SGLTM-40□□□A□

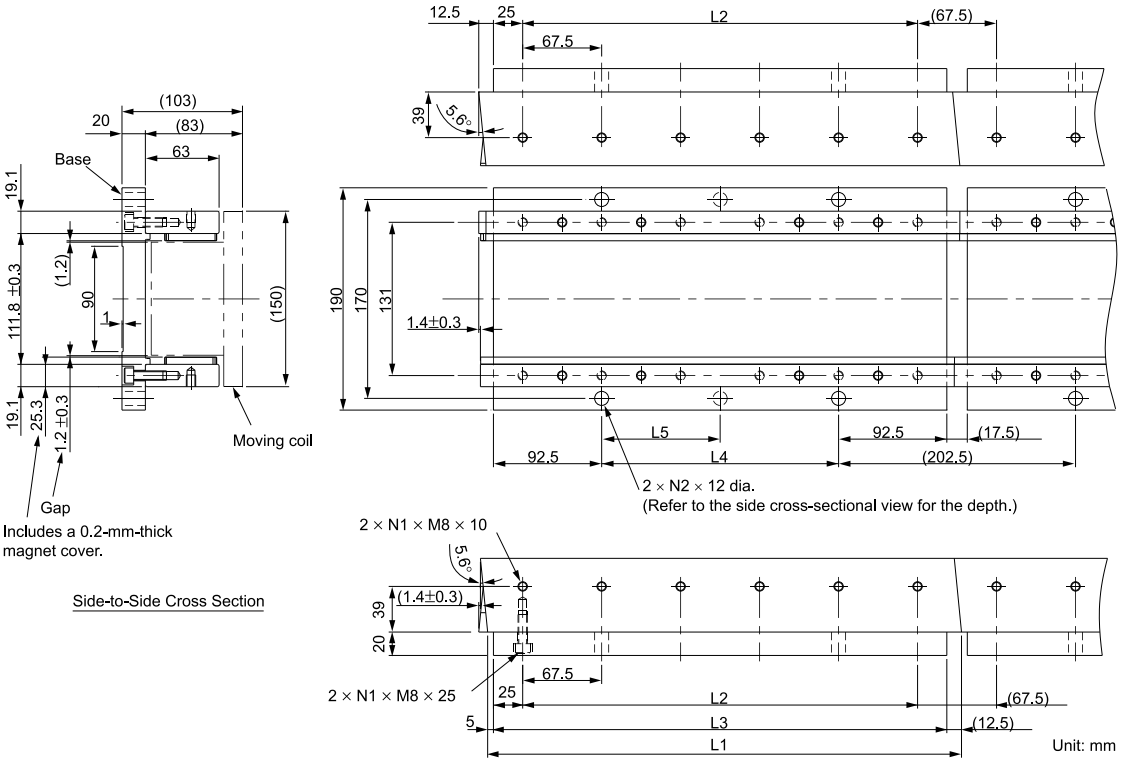


Note:

1. Two magnetic way tracks are used together as a set. For safety, when they are shipped, the two tracks are secured to a mounting spacer made from aluminum.
2. More than one magnetic way can be connected.
3. Dimensions with asterisks are the distances between the magnetic way tracks. Install the tracks according to the specified dimensions. Observe the dimensions given in mounting section details after installation. Dimensions when the magnetic way is shipped from the factory are indicated by ♣.
4. Use socket head screws of strength class 10.9 or higher for the magnetic way mounting screws. (Do not use stainless steel screws.)

Magnetic Way Model SGLTM-	L1	L2	LA	LB	LC	LD	N	Approx. Mass [kg]
40405A□	$405^{-0.1}_{-0.3}$	337.5 (67.5 × 5)	$37.5^{0}_{-0.2}$	$15^{0}_{-0.2}$	$52.5^{0}_{-0.2}$	$100^{+0.6}_{0}$	6	9
40675A□	$675^{-0.1}_{-0.3}$	607.5 (67.5 × 9)	$37.5^{0}_{-0.2}$	$15^{0}_{-0.2}$	$52.5^{0}_{-0.2}$	$100^{+0.6}_{0}$	10	15
40945A□	$945^{-0.1}_{-0.3}$	877.5 (67.5 × 13)	$37.5^{0}_{-0.2}$	$15^{0}_{-0.2}$	$52.5^{0}_{-0.2}$	$100^{+0.6}_{0}$	14	21

■ Magnetic Ways with Bases: SGLTM-40□□□AY



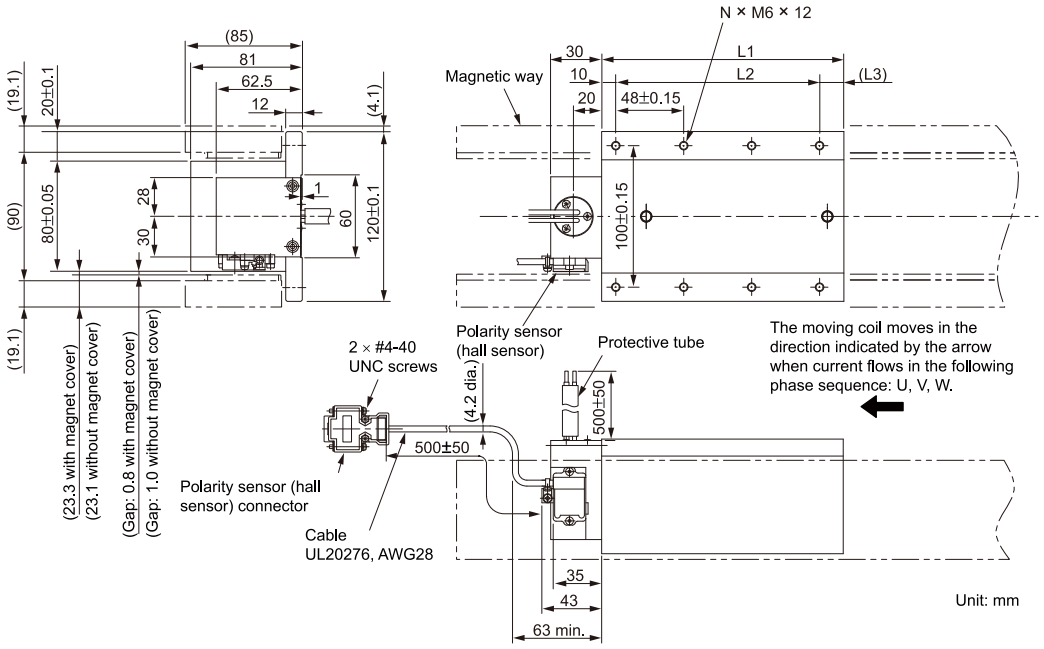
Note:

Two magnetic way tracks are used together as a set. More than one magnetic way can be connected.

Magnetic Way Model SGLTM-	L1	L2	L3	L4	L5	N1	N2	Approx. Mass [kg]
40405AY	$405^{-0.1}_{-0.3}$	337.5	387.5	202.5	202.5	6	2	13
40675AY	$675^{-0.1}_{-0.3}$	607.5	657.5	472.5	236.25	10	3	21
40945AY	$945^{-0.1}_{-0.3}$	877.5	927.5	742.5	247.5	14	4	30

SGLTW-50: High-efficiency Models

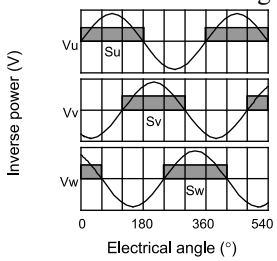
■ Moving Coils: SGLTW-50A□□□H□



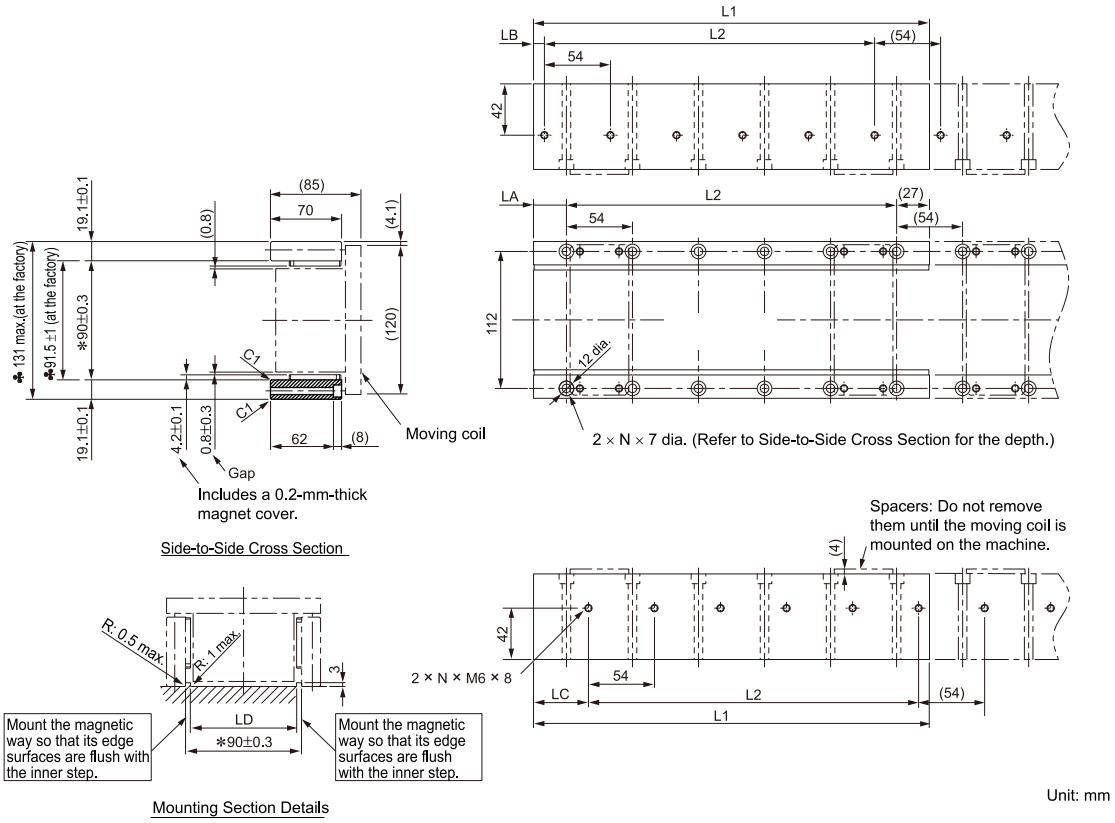
Moving Coil Model SGLTW-	L1	L2	(L3)	N	Approx. Mass [kg]
50A170H□	170	144 (48 × 3)	(16)	8	6
50A320H□	315	288 (48 × 6)	(17)	14	11

◆ Polarity Sensor (Hall Sensor) Output Signal

The figure on the right shows the relationship between the Su, Sv, and Sw polarity sensor (hall sensor) output signals and the inverse power of each motor phase Vu, Vv, and Vw when the moving coil moves in the direction indicated by the arrow in the dimensional drawings of the moving coil.



■ Magnetic Ways: SGLTM-50□□□H□



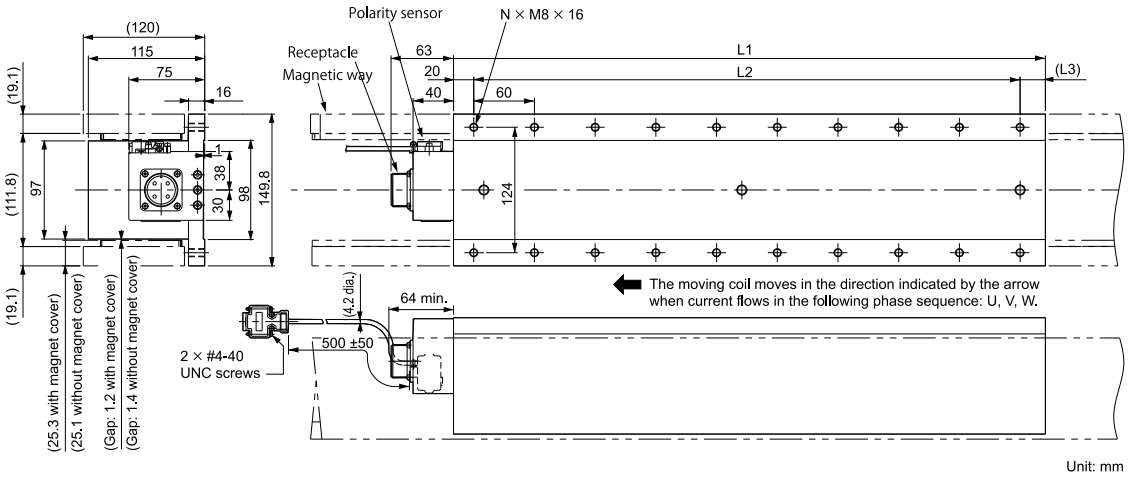
Note:

1. Two magnetic way tracks are used together as a set. For safety, when they are shipped, the two tracks are secured to a mounting spacer made from aluminum.
2. More than one magnetic way can be connected.
3. Dimensions with asterisks are the distances between the magnetic way tracks. Install the tracks according to the specified dimensions. Observe the dimensions given in mounting section details after installation. Dimensions when the magnetic way is shipped from the factory are indicated by ♣.
4. Use socket head screws of strength class 10.9 or higher for the magnetic way mounting screws. (Do not use stainless steel screws.)

Magnetic Way Model SGLTM-	L1	L2	LA	LB	LC	LD	N	Approx. Mass [kg]
50324H□	$324^{-0.1}_{-0.3}$	270 (54 × 5)	$27^{0}_{-0.2}$	$9^{0}_{-0.2}$	$45^{0}_{-0.2}$	$82^{+0.6}_{0}$	6	8
50540H□	$540^{-0.1}_{-0.3}$	486 (54 × 9)	$27^{0}_{-0.2}$	$9^{0}_{-0.2}$	$45^{0}_{-0.2}$	$82^{+0.6}_{0}$	10	13
50756H□	$756^{-0.1}_{-0.3}$	702 (54 × 13)	$27^{0}_{-0.2}$	$9^{0}_{-0.2}$	$45^{0}_{-0.2}$	$82^{+0.6}_{0}$	14	18

SGLTW-80: Standard Models

■ Moving Coils: SGLTW-80A□□□B□

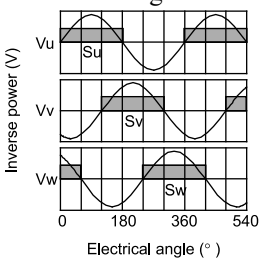


Unit: mm

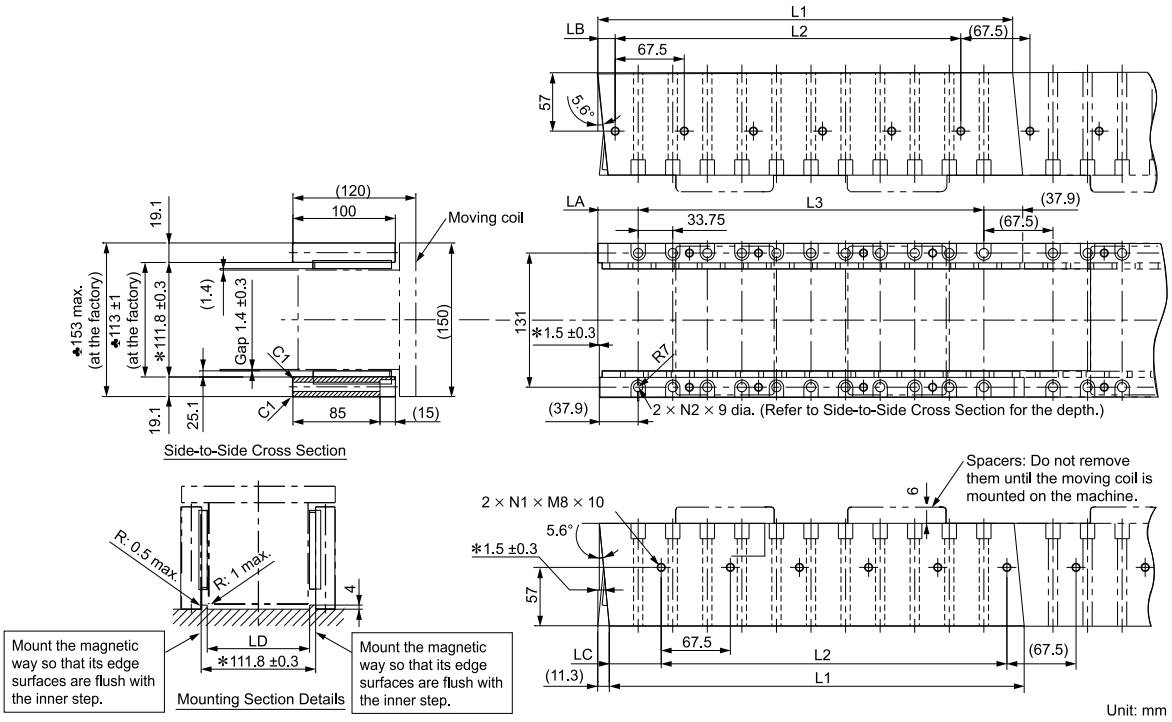
Moving Coil Model SGLTW-	L1	L2	L3	N	Approx. Mass [kg]
80A400B□	394.2	360 (60 × 6)	(15)	14	24
80A600B□	574.2	540 (60 × 9)	(15)	20	35

◆ Polarity Sensor Output Signal

The figure on the right shows the relationship between the Su, Sv, and Sw polarity sensor output signals and the inverse power of each motor phase Vu, Vv, and Vw when the moving coil moves in the direction indicated by the arrow in the dimensional drawings of the moving coil.



■ Magnetic Ways: SGLTM-80□□□A□

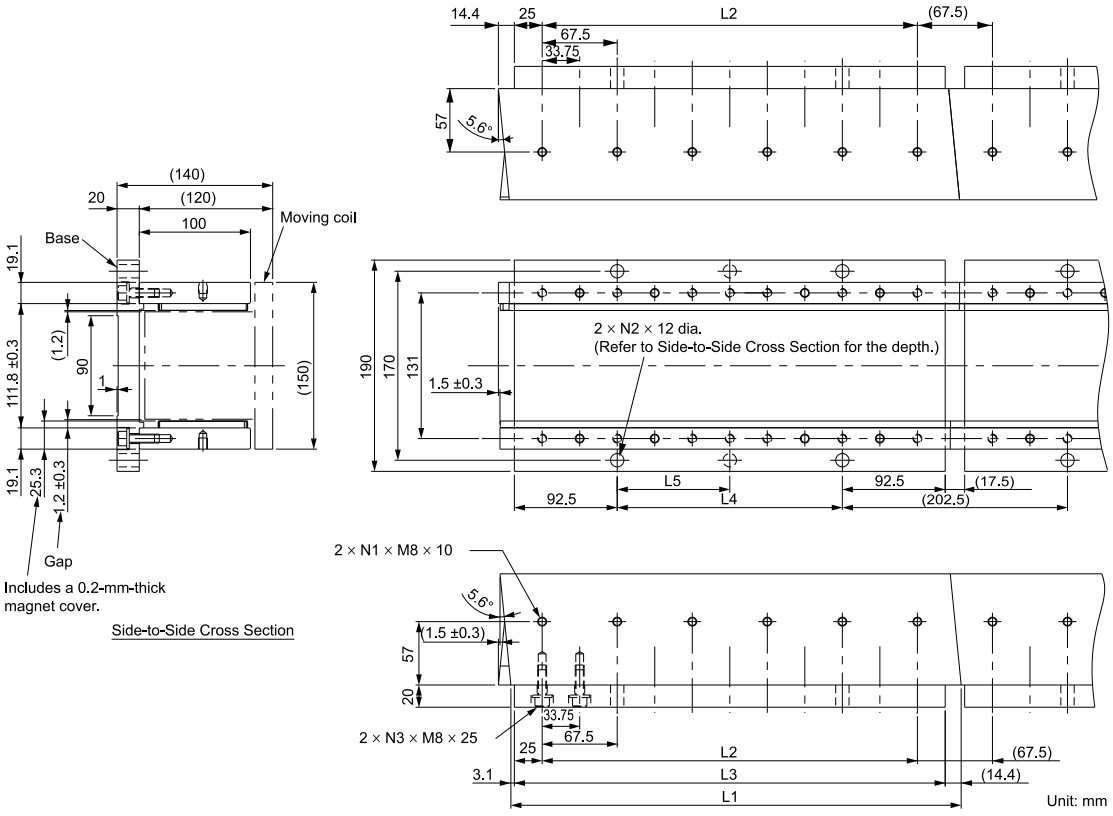


Note:

1. Two magnetic way tracks are used together as a set. For safety, when they are shipped, the two tracks are secured to a mounting spacer made from aluminum.
2. More than one magnetic way can be connected.
3. Dimensions with asterisks are the distances between the magnetic way tracks. Install the tracks according to the specified dimensions. Observe the dimensions given in mounting section details after installation. Dimensions when the magnetic way is shipped from the factory are indicated by ♣.
4. Use socket head screws of strength class 10.9 or higher for the magnetic way mounting screws. (Do not use stainless steel screws.)

Magnetic Way Model SGLTM-	L1	L2	L3	LA	LB	LC	LD	N1	N2	Approx. Mass [kg]
80405A□	$405^{-0.1}_{-0.3}$	337.5 (67.5 × 5)	337.5 (33.75 × 10)	$39.4^{0}_{-0.2}$	$16.9^{0}_{-0.2}$	$50.6^{0}_{-0.2}$	$100^{+0.6}_{0}$	6	11	14
80675A□	$675^{-0.1}_{-0.3}$	607.5 (67.5 × 9)	607.5 (33.75 × 18)	$39.4^{0}_{-0.2}$	$16.9^{0}_{-0.2}$	$50.6^{0}_{-0.2}$	$100^{+0.6}_{0}$	10	19	24
80945A□	$945^{-0.1}_{-0.3}$	877.5 (67.5 × 13)	887.5 (33.75 × 26)	$39.4^{0}_{-0.2}$	$16.9^{0}_{-0.2}$	$50.6^{0}_{-0.2}$	$100^{+0.6}_{0}$	14	27	34

■ Magnetic Ways with Bases: SGLTM-80□□□AY



Note:

Two magnetic way tracks are used together as a set. More than one magnetic way can be connected.

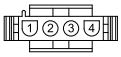
Magnetic Way Model SGLTM-	L1	L2	L3	L4	L5	N1	N2	N3	Approx. Mass [kg]
80405AY	$405^{-0.1}_{-0.3}$	337.5	387.5	202.5	202.5	6	2	11	18
80675AY	$675^{-0.1}_{-0.3}$	607.5	657.5	472.5	236.25	10	3	19	31
80945AY	$945^{-0.1}_{-0.3}$	877.5	927.5	742.5	247.5	14	4	27	43

Connector Specifications (200 V Specification)

SGLTW-20: Standard Models

■ SGLTW-20A□□□A□

• Servomotor Connector

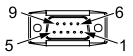


1	Phase U	Red	3	Phase W	Black
2	Phase V	White	4	FG	Green

Plug: 350779-1
Pins: 350218-3 or 350547-3 (No.1 to 3)
350654-1 or 350669-1 (No. 4)
From Tyco Electronics Japan G.K.

Mating Connector
Cap: 350780-1
Socket: 350537-3 or 350550-3

• Polarity Sensor (Hall Sensor) Connector



1	+5 V (DC)	6	Not used
2	Phase U	7	
3	Phase V	8	
4	Phase W	9	
5	0 V (power supply)	-	-

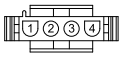
Pin connector: 17JE-23090-02 (D8C)-CG
From DDK Ltd.

Mating Connector
Socket connector: 17JE-13090-02 (D8C) A-CG
Studs: 17L-002C or 17L-002C1

SGLTW-35: Standard Models

■ SGLTW-35A□□□A□

• Servomotor Connector

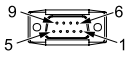


1	Phase U	Red	3	Phase W	Black
2	Phase V	White	4	FG	Green

Plug: 350779-1
Pins: 350218-3 or 350547-3 (No.1 to 3)
350654-1 or 350669-1 (No. 4)
From Tyco Electronics Japan G.K.

Mating Connector
Cap: 350780-1
Socket: 350537-3 or 350550-3

· Polarity Sensor (Hall Sensor) Connector



1	+5 V (DC)	6	Not used
2	Phase U	7	
3	Phase V	8	
4	Phase W	9	
5	0 V (power supply)	-	-

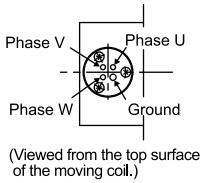
Pin connector: 17JE-23090-02 (D8C)-CG
From DDK Ltd.

Mating Connector
Socket connector: 17JE-13090-02 (D8C) A-CG
Studs: 17L-002C or 17L-002C1

SGLTW-35□□□□H□: High-efficiency Models

■ SGLTW-35A□□□H□

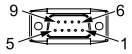
• Servomotor Connector



Phase U	Red	U	2 mm²
Phase V	White	V	
Phase W	Black	W	
Ground	Green	-	

Secure the lead from the moving coil of the linear servomotor so that it moves together with the moving coil.

• Polarity Sensor



1	+5 V (DC)	6	Not used
2	Phase U	7	
3	Phase V	8	
4	Phase W	9	
5	0 V (power supply)	-	-

Pin connector: 17JE-23090-02 (D8C)-CG
From DDK Ltd.

Mating Connector
Socket connector: 17JE-13090-02 (D8C) A-CG
Studs: 17L-002C or 17L-002C1

SGLTW-40: Standard Models

■ SGLTW-40A□□□B□

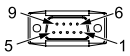
• Servomotor Connector

A	Phase U	C	Phase W
B	Phase V	D	Ground

Receptacle: MS3102A-22-22P
From DDK Ltd.

Mating Connector
Right-angle plug: MS3108B22-22S
Straight Plug: MS3106B22-22S
Cable Clamp: MS3057-12A

• Polarity Sensor (Hall Sensor) Connector



1	+5 V (DC)	6	Not used
2	Phase U	7	
3	Phase V	8	
4	Phase W	9	
5	0 V (power supply)	-	-

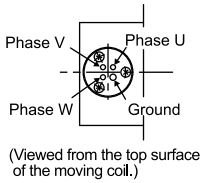
Pin connector: 17JE-23090-02 (D8C)-CG
From DDK Ltd.

Mating Connector
Socket connector: 17JE-13090-02 (D8C) A-CG
Studs: 17L-002C or 17L-002C1

SGLTW-50: High-efficiency Models

■ SGLTW-50A□□□H□

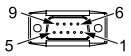
· Servomotor Connector



Phase U	Red	U	2 mm²
Phase V	White	V	
Phase W	Black	W	
Ground	Green	-	

Secure the lead from the moving coil of the linear servomotor so that it moves together with the moving coil.

• Polarity Sensor



1	+5 V (DC)	6	Not used
2	Phase U	7	
3	Phase V	8	
4	Phase W	9	
5	0 V (power supply)	-	-

Pin connector: 17JE-23090-02 (D8C)-CG
From DDK Ltd.

Mating Connector
Socket connector: 17JE-13090-02 (D8C) A-CG
Studs: 17L-002C or 17L-002C1

SGLTW-80: Standard Models

■ SGLTW-80A□□□B□

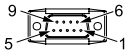
• Servomotor Connector

A	Phase U	C	Phase W
B	Phase V	D	Ground

Receptacle: MS3102A-22-22P
From DDK Ltd.

Mating Connector
Right-angle plug: MS3108B22-22S
Straight Plug: MS3106B22-22S
Cable Clamp: MS3057-12A

• Polarity Sensor (Hall Sensor) Connector



1	+5 V (DC)	6	Not used
2	Phase U	7	
3	Phase V	8	
4	Phase W	9	
5	0 V (power supply)	-	-

Pin connector: 17JE-23090-02 (D8C)-CG
From DDK Ltd.

Mating Connector
Socket connector: 17JE-13090-02 (D8C) A-CG
Studs: 17L-002C or 17L-002C1

Serial Converter Unit

Selection Table

Order Number

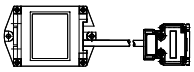
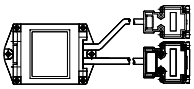
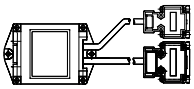
Use the following tables to select the serial converter unit.

JZDP - □00□ - □□□*1

Applicable Linear Servomotors

Serial Converter Unit Model

*1 When connecting to a fully-closed module, select JZDP-□00□-000.

Serial Converter Unit Model				
Symbol	Appearance	Applicable Linear Encoder	Polarity Sensor	Thermal Protector
H003 J003		From Dr. JOHANNES HEIDENHAIN GmbH	Not provided.	Not provided.
H005 J005		From Renishaw PLC	Not provided.	Not provided.
H006 J006		From Dr. JOHANNES HEIDENHAIN GmbH	Provided	Provided
H008 J008		From Renishaw PLC	Provided	Provided

Applicable Linear Servomotors		
Servomotor Model		Code
SGLGW- (Coreless models) For Standard-Force Magnetic Way	30A050C	250
	30A080C	251
	40A140C	252
	40A253C	253
	40A365C	254
	60A140C	258
	60A253C	259
	60A365C	260
	90A200C	264
	90A370C	265
	90A535C	266
SGLGW- + SGLGM - □-M (Coreless models) For High-Force Magnetic Way	40A140C	255
	40A253C	256
	40A365C	257
	60A140C	261
	60A253C	262
	60A365C	263

Continued on next page.

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Applicable Linear Servomotors		
SGLFW2 (With F-type Iron Cores)	30A070A	628
	30A120A	629
	30A230A	630
	45A200A	631
	45A380A	632
	90A200A□1	633
	90A380A□1	634
	90A560A□1	648
	1DA380A□1	649
	1DA560A□1	650
	90A200A□L	699
	90A380A□L	700
	90A560A□L	701
	1DA380A□L	702
	1DA560A□L	703
SGLTW- (Models with T-Type Iron Cores)	20A170A	011
	20A320A	012
	20A460A	013
	35A170A	014
	35A320A	015
	35A460A	016
	35A170H	105
	35A320H	106
	50A170H	108
	50A320H	109
	40A400B	185
	40A600B	186
	80A400B	187
	80A600B	188

Characteristics and Specifications

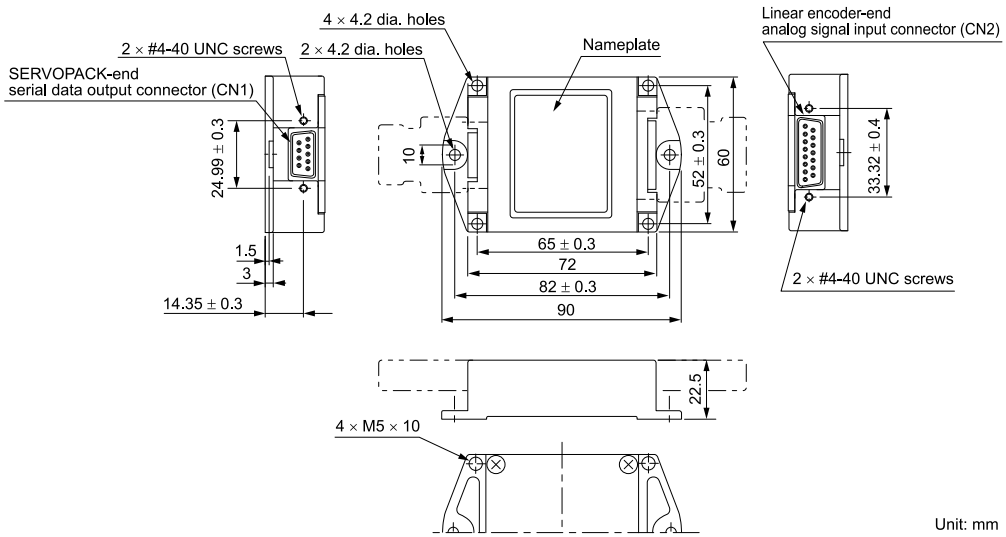
Item		JZDP-H00□-□□□	JZDP-J00□-□□□
Electrical Characteristics	Power Supply Voltage	+5.0 V ±5%, ripple content: 5% max.	
	Current Consumption *1	120 mA Typ, 160 mA max.	
	Signal Resolution	1/256 pitch of input two-phase sine wave	1/4096 pitch of input two-phase sine wave
	Maximum Response Frequency	250 kHz	100 kHz
	Analog Input Signals *2 (cos, sin, and Ref)	Differential input amplitude: 0.4 V to 1.2 V Input signal level: 1.5 V to 3.5 V	
	Polarity Sensor Input Signal	CMOS level	
	Thermal Protector Input Signal	Connect the thermal protector built into the linear servomotor *3	
	Output Signals	Position data, polarity sensor information, and alarms	
	Output Method	Serial data transmission	
	Output Circuit	Balanced transceiver (SN75LBC176 or the equivalent), internal terminating resistance: 120 Ω	
Mechanical Characteristics	Approx. Mass	150 g	
	Vibration Resistance	98 m/s max.^{2}(10 Hz to 2,500 Hz) in three directions	
	Impact Resistance	980 m/s^2, (11 ms) two times in three directions	
Environment	Surrounding Air Temperature	0°C to 55°C	
	Storage Temperature	-20°C to 80°C	
	Surrounding Air Humidity/Storage Humidity	20% to 90% relative humidity (with no condensation)	

*1 The current consumptions of the linear encoder and the polarity sensor are not included in this value. The current consumption of the polarity sensor is approximately 40 mA. Confirm the current consumption of the linear encoder that you will use and make sure that the current capacity of the SERVOPACK is not exceeded.
*2 If you input an out-of-range value, the correct position information will not be output. Also, the device may be damaged.
*3 Only SGLFW2 servomotors come equipped with thermal protectors.

External Dimensions

Serial Converter Unit without Polarity Sensor Cable (for linear encoder from Dr. JOHANNES HEIDENHAIN GmbH)

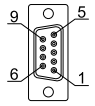
■ Model: JZDP-□003-□□□



Unit: mm

Pin No.	Signal
1	+ 5 V
2	Phase-S output
3	Not used
4	Not used
5	0 V
6	Phase-/S output
7	Not used
8	Not used
9	Not used
Case	Shield

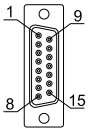
CN1
SERVOPACK-end
serial data outputs



17-series connector:
17LE-13090-27-FA
(socket)
from Fujikura Ltd.

Pin No.	Signal
1	cos input (A+)
2	0 V
3	sin input (B+)
4	+ 5 V
5	Not used
6	Not used
7	/Ref input (R-)
8	Not used
9	/cos input (A-)
10	0 V sensor
11	/sin input (B-)
12	5 V sensor
13	Not used
14	Ref input (R+)
15	Not used
Case	Shield

CN2
Linear encoder-end
analog signal inputs



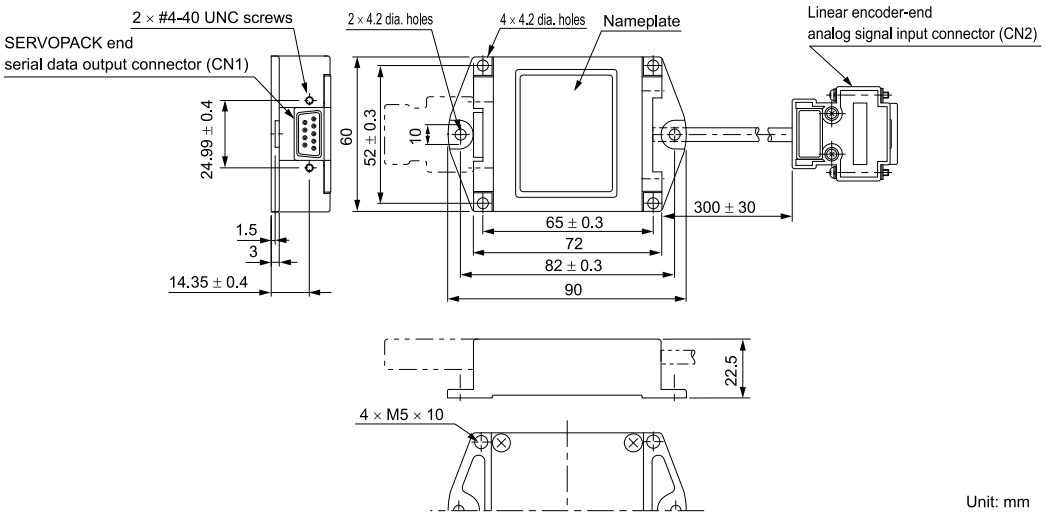
17-series connector:
17LE-13150-27-FA
(socket)
from Fujikura Ltd.

Note:

1. Do not connect the unused pins.
2. Contact Dr. JOHANNES HEIDENHAIN GmbH for details on cables (analog 1 Vp-p output, D-sub 15-pin, male) from Dr. JOHANNES HEIDENHAIN GmbH.

Serial Converter Unit without Polarity Sensor Cable (for linear encoder from Renishaw plc)

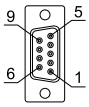
■ Model: JZDP-□005-□□□



Unit: mm

Pin No.	Signal
1	+ 5 V
2	Phase-S output
3	Not used
4	Not used
5	0 V
6	Phase-/S output
7	Not used
8	Not used
9	Not used
Case	Shield

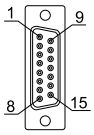
CN1
SERVOPACK-end
serial data outputs



17-series connector:
17LE-13090-27-FA
(socket)
from Fujikura Ltd.

Pin No.	Signal
1	cos input (V1-)
2	sin input (V2-)
3	Ref input (V0+)
4	+ 5 V
5	5 Vs
6	Not used
7	Not used
8	Not used
9	cos input (V1+)
10	sin input (V2+)
11	/Ref input (V0-)
12	0 V
13	0 Vs
14	Not used
15	Inner shield (0 V)
Case	Shield

CN2
Linear encoder-end
analog signal inputs



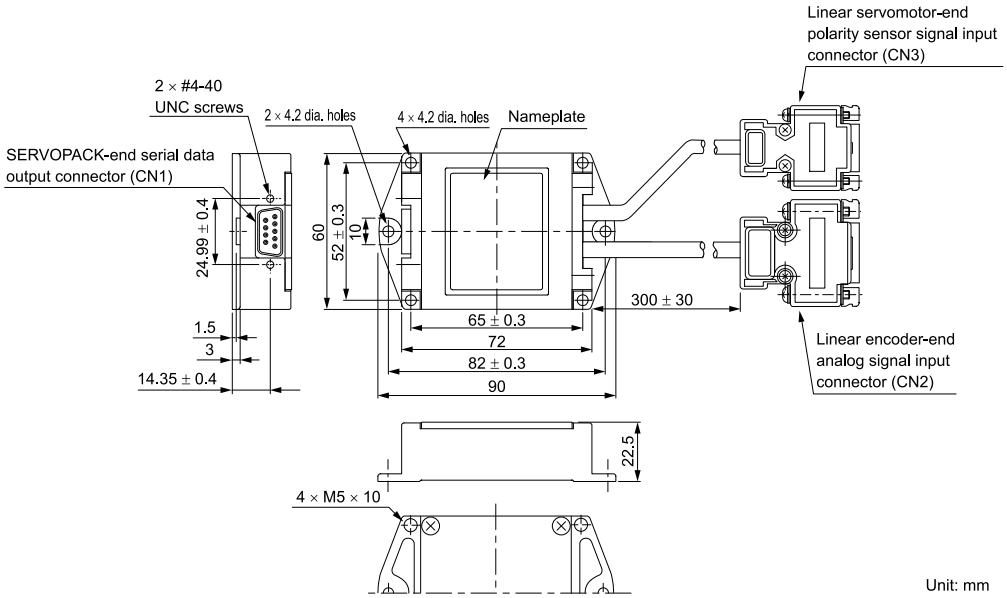
17-series connector:
17JE-13150-02 (D8C) A-CG
(socket)
from Fujikura Ltd.

Note:

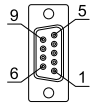
1. Do not connect the unused pins.
2. Contact Renishaw plc for details on cables (analog 1 Vp-p output, D-sub 15-pin, male) from Renishaw plc. However, the BID and DIR signals are not connected.
3. Use the linear encoder connector to change the origin position specifications of the linear encoder.

Serial Converter Unit with Polarity Sensor Cable (for linear encoder from Dr. JOHANNES HEIDENHAIN GmbH)

■ Model: JZDP-□006-□□□

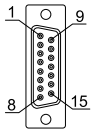


CN1
SERVOPACK-end serial data outputs



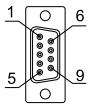
17-series connector:
17LE-13090-27-FA
(socket)
from Fujikura Ltd.

CN2
Linear encoder-end analog signal inputs



17-series connector:
17JE-13150-02 (D8C) A-CG
(socket)
from Fujikura Ltd.

CN3
Linear servomotor-end polarity sensor signal input



17-series connector:
17JE-13090-02 (D8C) A-CG
from Fujikura Ltd.

Pin No.	Signal
1	+5 V
2	Phase-S output
3	Not used
4	Not used
5	0 V
6	Phase-/S output
7	Not used
8	Not used
9	Not used
Case	Shield

Pin No.	Signal	Pin No.	Signal
1	cos input (A+)	9	/cos input (A-)
2	0 V	10	0 V sensor
3	sin input (B+)	11	/sin input (B-)
4	+5 V	12	5 V sensor
5	Not used	13	Not used
6	Not used	14	Ref input (R+)
7	/Ref input (R-)	15	Not used
8	Not used	Case	Shield

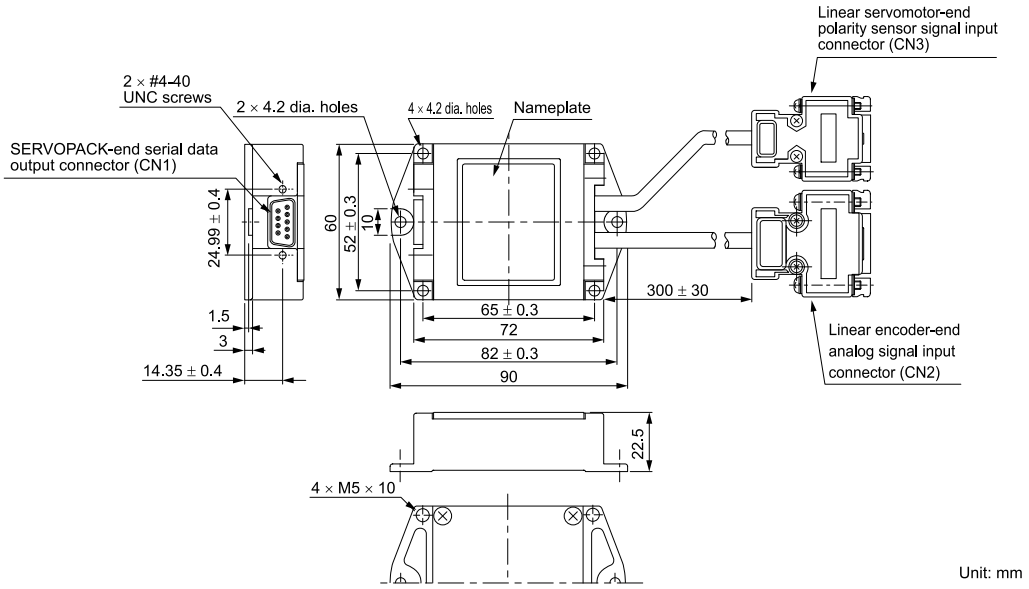
Pin No.	Signal
1	+5 V
2	Phase-U input
3	Phase-V input
4	Phase-W input
5	0 V
6	Not used
7	Not used
8	Not used
9	Thermal protector input
Case	Shield

Note:

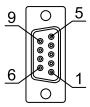
1. Do not connect the unused pins.
2. Contact Dr. JOHANNES HEIDENHAIN GmbH for details on cables (analog 1 Vp-p output, D-sub 15-pin, male) from Dr. JOHANNES HEIDENHAIN GmbH.
3. The phase U, V, and W inputs are internally pulled up with 10 kΩ.

Serial Converter Unit with Polarity Sensor Cable (for linear encoder from Renishaw plc)

■ Model: JZDP-□008-□□□

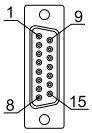


CN1
SERVOPACK-end serial data outputs



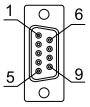
17-series connector:
17LE-13090-27-FA
(socket)
from Fujikura Ltd.

CN2
Linear encoder-end analog signal inputs



17-series connector:
17JE-13150-02 (D8C) A-CG
(socket)
from Fujikura Ltd.

CN3
Linear servomotor-end polarity sensor signal input



17-series connector:
17JE-13090-02 (D8C) A-CG
from Fujikura Ltd.

Pin No.	Signal
1	+5 V
2	Phase-S output
3	Not used
4	Not used
5	0 V
6	Phase-/S output
7	Not used
8	Not used
9	Not used
Case	Shield

Pin No.	Signal	Pin No.	Signal
1	/cos input (V1-)	9	cos input (V1+)
2	/sin input (V2-)	10	sin input (V2+)
3	Ref input (V0+)	11	/Ref input (V0-)
4	+5 V	12	0 V
5	5 Vs	13	0 Vs
6	Not used	14	Not used
7	Not used	15	Inner shield
8	Not used	Case	Shield

Pin No.	Signal
1	+5 V
2	Phase-U input
3	Phase-V input
4	Phase-W input
5	0 V
6	Not used
7	Not used
8	Not used
9	Thermal protector input
Case	Shield

Note:

1. Do not connect the unused pins.
2. Contact Renishaw plc for details on cables (analog 1 Vp-p output, D-sub 15-pin, male) from Renishaw plc. However, the BID and DIR signals are not connected.
3. Use the linear encoder connector to change the origin position specifications of the linear encoder.
4. The phase U, V, and W inputs are internally pulled up with 10 kΩ.

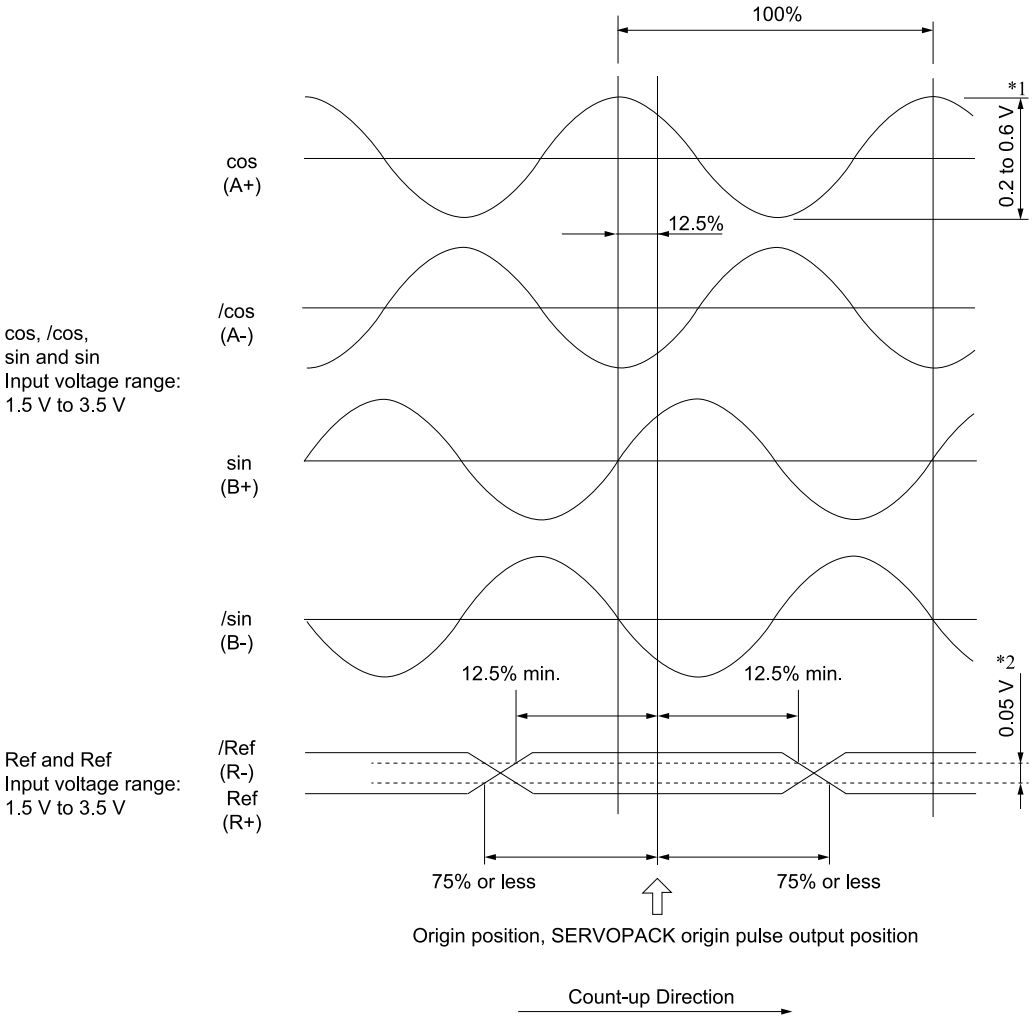
Analog Signal Input Timing

Input the analog signals with the timing shown in the following figure.

The /cos and /sin signals are the differential signals when the cos and sin signals are shifted 180°. The specifications of the cos, /cos, sin, and /sin signals are identical except for the phases.

The Ref and /Ref signals are input to the comparator. Input a signal that will exceed the hysteresis of the comparator (i.e., the broken lines in the following figure).

When they are crossed, the output data will be counted up.



*1 If the analog signal amplitude declines to approximately 0.35 V because of the differential amplitude, the serial converter unit will output an alarm.
*2 This is the hysteresis width.

Application Precautions

Important

1. Never perform insulation resistance or withstand voltage tests.
2. When analog signals are input to the serial converter unit, they are very weak signals, and therefore noise influence on the analog signals affects the unit's ability to output correct position information. Keep the analog signal cable as short as possible and implement proper shielding.
3. Use the serial converter unit in a location without gases such as H_2S.
4. Do not replace the unit while power is being supplied. There is a risk of device damage.
5. If you use more than one axis, use a shielded cable for each axis.
   Do not use one shielded cable for multiple axes.
6. If you use any linear encoder other than a recommended linear encoder, evaluate the system in advance before you use it.

Recommended Linear Encoders and Cables

Recommended Linear Encoders

Incremental Linear Encoders

Output Signals	Manufacturer	Linear Encoder Type	Model			Linear Encoder Pitch µm	Resolution nm	Maximum speed *3 m/s	Support for Polarity Sensor Input	Application to Linear Servomotors	Application to Fully-Closed Loop Control
			Scale	Sensor Head	Relay Device between SERVOPACK and Linear Encoder						
1Vp-p Analog voltage *1	Dr. JOHANNES HEIDENHAIN GmbH	Exposed	LIDA48□		JZDP-H003/-H006 *4	20	78.1	5	○	○	○
					JZDP-J003/-J006 *4		4.9	2	○	○	*6
			LIF48□		JZDP-H003/-H006 *4	4	15.6	1	○	○	○
					JZDP-J003/-J006 *4		1.0	0.4	○	*6	*6
	Renishaw PLC	Exposed	TONiC Series (Only Ti0000A00V)		JZDP-H005/-H008 *4	20	78.1	5	○	○	○
					JZDP-J005/-J008 *4		4.9	2			
Encoder for Yaskawa's Serial Interface *2	Magnescale Co., Ltd.	Exposed	SL7□0	PL101-RY *5		800	97.7	10	–	○	○
			SQ10	PQ10	MQ10-FLA	400	48.83	3	–	○	○
					MQ10-GLA				○	○	–

*1 You must also use a Yaskawa serial converter unit. The output signal will be multiplied by 8 bits (256 divisions) or 12 bits (4,096 divisions) in the serial converter unit.

*2 The multiplier (number of divisions) depends on the linear encoder. Also, you must write the servomotor constant file to the linear encoder in advance.

*3 The maximum speeds given in the above table are the maximum applicable speeds of the encoders when combined with a Yaskawa SERVOPACK. The actual speed will be restricted by either the maximum speed of the linear servomotor or the maximum speed of the linear encoder (given above).

*4 This is the model of the serial converter unit.

*5 This is the model of the sensor head with interpolator.

*6 Contact your Yaskawa representative.

Note:

Confirm detailed specifications, such as the tolerances, dimensions, and operating environment, with the manufacturer of the linear encoder before you use it.

Absolute Linear Encoders

The output signal is compatible with the Yaskawa serial interface. The multiplier (number of divisions) depends on the linear encoder. Also, you must write the servomotor constant file to the linear encoder in advance.

Manufacturer	Linear Encoder Type	Model			Linear Encoder Pitch *1 μm	Resolution nm	Maximum speed *2 m/s	Support for Polarity Sensor Input	Application to Linear Servomotors	Application to Fully-Closed Loop Control
		Scale	Sensor Head	Relay Device between SERVOPACK and Linear Encoder						
Magnescale Co., Ltd.	Exposed	SQ47-□□□□S□F□□□		–	20.48	5	3.33	–	○	○
		SQ47-□□□□T□F□□□								
		SQ47-□□□□A□F□□□		–	40.96	10	3.33	–	○	○
		SQ47-□□□□F□F□□□								
		SQ57-□□□□S□F□□□		–	20.48	5	3.33	–	○	○
		SQ57-□□□□T□F□□□								
		SQ57-□□□□A□F□□□		–	40.96	10	3.33	–	○	○
		SQ57-□□□□F□F□□□								
	Sealed	SR27A-□□□SAF□□□		–	40.96	10	3.33	–	○	○
		SR27A-□□□SBF□□□		–	204.8	50	3.33	–	○	○
		SR27A-□□□SLF□□□		–	80	9.8	3.33	–	○	○
		SR27A-□□□SMF□□□		–	80	78.1	3.33	–	○	○
Mitutoyo Corporation	Exposed	ST781A		–	256	500	5	–	○	○
		ST782A		–	256	500	5	–	○	○
		ST783A		–	51.2	100	5	–	○	○
		ST784A		–	51.2	100	5	–	○	○
		ST788A		–	51.2	100	5	–	○	○
		ST789A *3		–	25.6	50	5	–	○	○
		ST1381		–	5.12	10	8	–	○	○
		ST1382		–	0.512	1	3.6 *4	–	○	○
	Sealed	AT1383A		–	25.6	50	3	–	○	○
		AT1384A		–	5.12	10	3	–	○	○
		AT1387A		–	0.512	1	3	–	○	○

Continued on next page.

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Manufacturer	Linear Encoder Type	Model			Linear Encoder Pitch *1 μm	Resolution nm	Maximum speed *2 m/s	Support for Polarity Sensor Input	Application to Linear Servomotors	Application to Fully-Closed Loop Control
		Scale	Sensor Head	Relay Device between SERVOPACK and Linear Encoder						
Dr. JOHANNES HEIDENHAIN GmbH	Exposed	LIC4190 Series		–	40.96	10	10	–	○	○
				–	20.48	5	10	–	○	○
				–	4.096	1	10	–	○	○
		LIC3190 Series		–	409.6	100	10	–	○	○
				–	40.96	10	10	–	○	○
		LIC2190 Series		–	409.6	100	10	–	○	○
				–	204.8	50	10	–	○	○
	Sealed	LC115		EIB3391Y	40.96	10	3	–	○	○
		LC415		EIB3391Y	40.96	10	3	–	○	○
RSF Elektronik GmbH	Exposed	MC15Y Series		–	409.6	100	10	–	○	○
				–	204.8	50	10	–	○	○
Renishaw PLC	Exposed	EL36Y□□050F□□□		–	12.8	50	100	–	○	○
		EL36Y□□100F□□□		–	25.6	100	100	–	○	○
		EL36Y□□500F□□□		–	128	500	100	–	○	○
		RL36Y□□050□□□		–	12.8	50	100	–	○	○
		RL36Y□□001□□□		–	0.256	1	3.6	–	○	○
	Enclosed	FORTiS Series		–	12.8	50	4	–	○	○
				–	2.56	10	4	–	○	○
				–	0.256	1	3.6	–	○	○
Fagor Automation S. Coop.	Exposed	L2AK208		–	20	78.1	8.0	–	○	○
		L2AK211		–	20	9.8	8.0	–	○	○
	Sealed	LAK209		–	40	78.1	3.0	–	○	○
		LAK212		–	40	9.8	3.0	–	○	○
		S2AK208		–	20	78.1	3.0	–	○	○
		SV2AK208		–	20	78.1	3.0	–	○	○
		G2AK208		–	20	78.1	3.0	–	○	○
		S2AK211		–	20	9.8	3.0	–	○	○
		SV2AK211		–	20	9.8	3.0	–	○	○
		G2AK211		–	20	9.8	3.0	–	○	○

*1 These are reference values for setting SERVOPACK parameters. Contact the manufacturer for actual linear encoder scale pitches.
*2 The maximum speeds given in the above table are the maximum applicable speeds of the encoders when combined with a Yaskawa SERVOPACK. The actual speed will be restricted by either the maximum speed of the linear servomotor or the maximum speed of the linear encoder (given above).
*3 Contact Mitutoyo Corporation for details on the linear encoders.
*4 The speed is restricted for some SERVOPACKs.

Note:

Confirm detailed specifications, such as the tolerances, dimensions, and operating environment, with the manufacturer of the linear encoder before you use it.

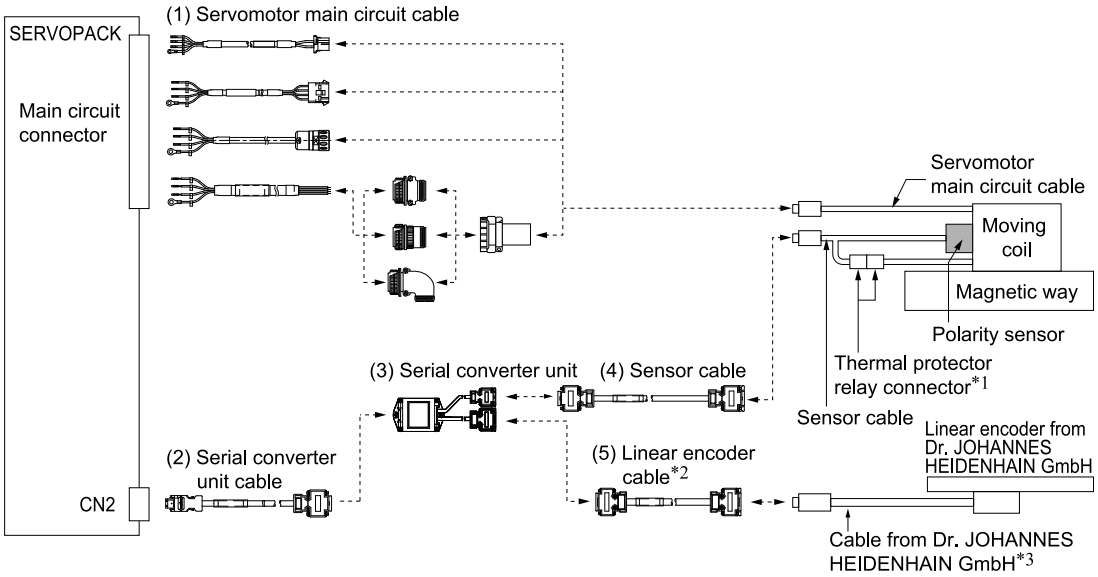
Cable Configurations

Connections to Linear Encoder from Dr. JOHANNES HEIDENHAIN GmbH

■ Connections for a 1 Vp-p Analog Voltage Output Signal

You must make the connections through a Yaskawa serial converter unit. The output signal will be multiplied by 8 bits (256 divisions) or 12 bits (4,096 divisions) in the serial converter unit.

◆ Connecting to a Linear Servomotor with a Polarity Sensor

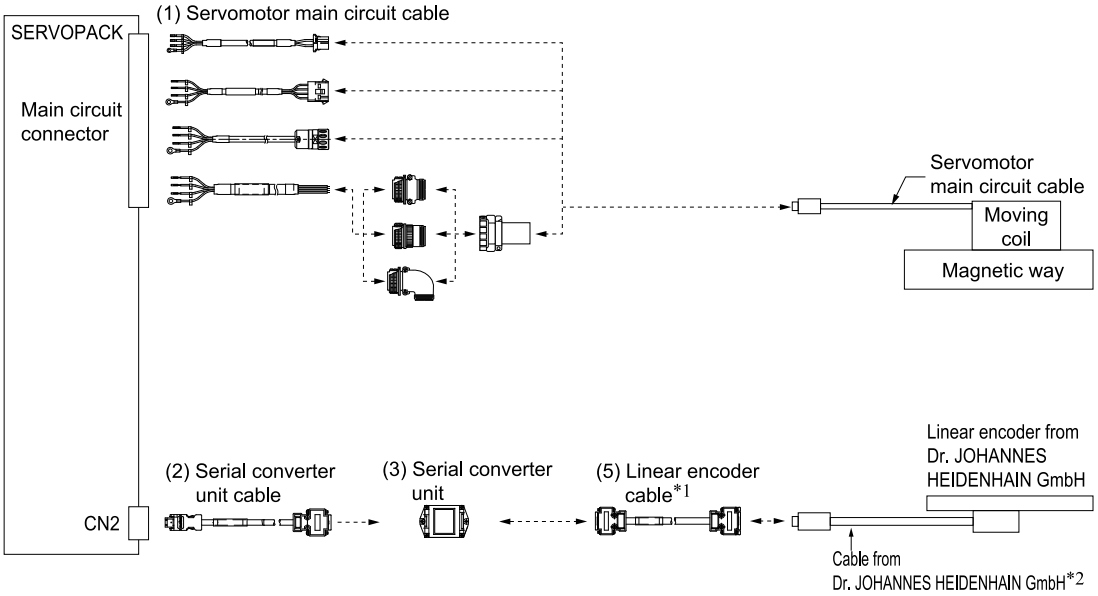


*1 Only SGLFW2 servomotors come equipped with thermal protector relay connectors.
*2 When using a JZDP-J00□-□□□ serial converter unit, do not use a Yaskawa linear encoder cable that is longer than 3 m.
*3 Contact Dr. JOHANNES HEIDENHAIN GmbH for details on cables (analog 1 Vp-p output, D-sub 15-pin, male) from Dr. JOHANNES HEIDENHAIN GmbH.

No.	Cable Type	Reference
(1)	Servomotor Main Circuit Cables	SGLGW: 307 SGLFW2: 309 SGLTW: 311
(2)	Serial Converter Unit Cables	314
(3)	Serial Converter Unit	280
(4)	Sensor Cables	315
(5)	Linear Encoder Cables	314

◆ Connecting to a Linear Servomotor without a Polarity Sensor

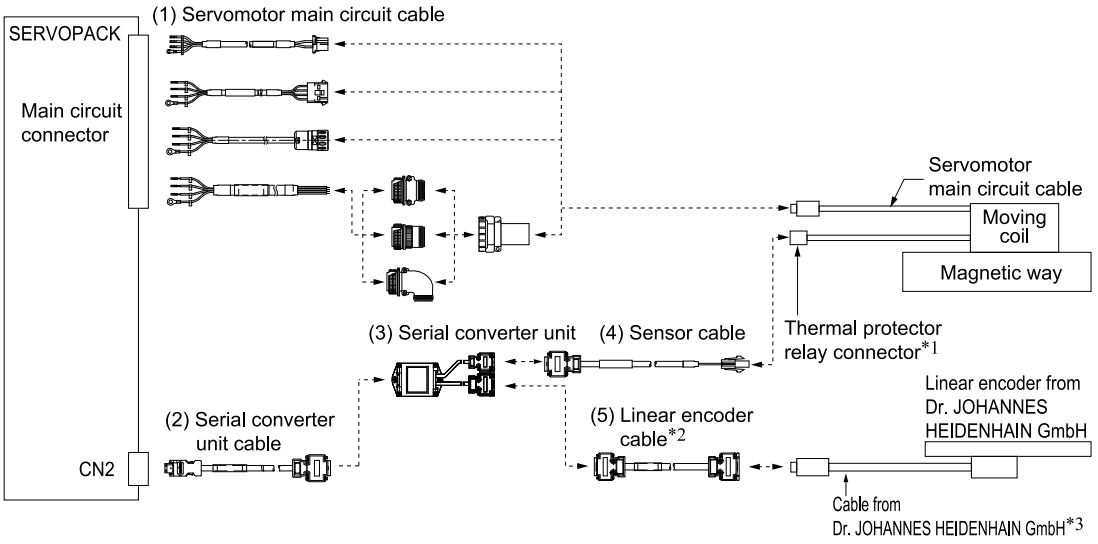
○ Servomotors Other Than the SGLFW2



*1 When using a JZDP-J00□-□□□ serial converter unit, do not use a Yaskawa linear encoder cable that is longer than 3 m.
*2 Contact Dr. JOHANNES HEIDENHAIN GmbH for details on cables (analog 1 Vp-p output, D-sub 15-pin, male) from Dr. JOHANNES HEIDENHAIN GmbH.

No.	Cable Type	Reference
(1)	Servomotor Main Circuit Cables	SGLGW: 307 SGLTW: 311
(2)	Serial Converter Unit Cables	314
(3)	Serial Converter Unit	280
(4)	Sensor Cables	315
(5)	Linear Encoder Cables	314

○ SGLFW2 Servomotors



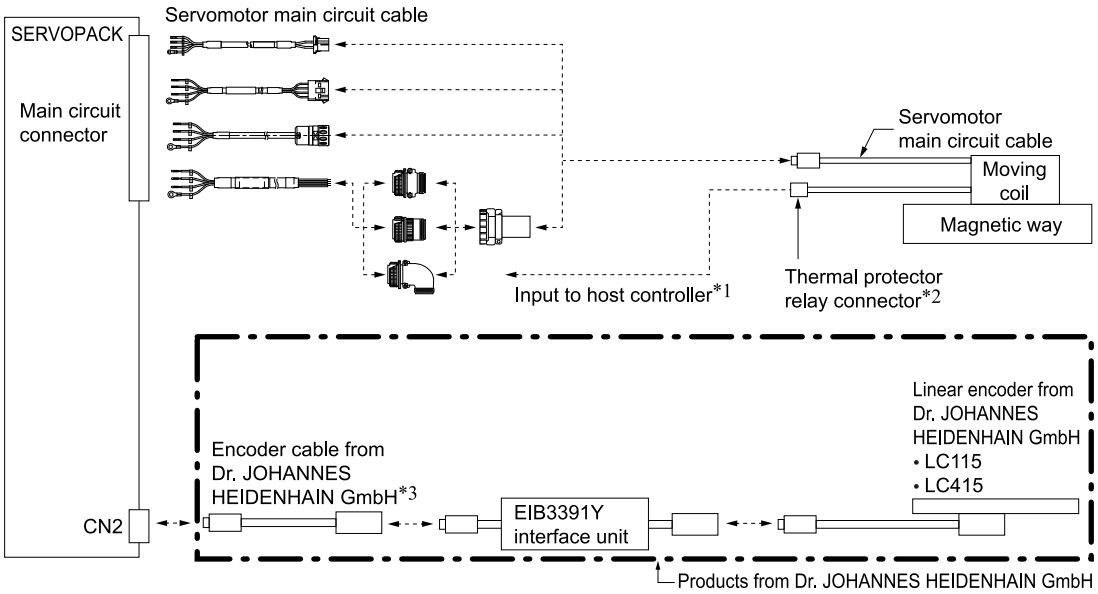
*1 Only SGLFW2 servomotors come equipped with thermal protector relay connectors.
*2 When using a JZDP-J00□-□□□ serial converter unit, do not use a Yaskawa linear encoder cable that is longer than 3 m.
*3 Contact Dr. JOHANNES HEIDENHAIN GmbH for details on cables (analog 1 Vp-p output, D-sub 15-pin, male) from Dr. JOHANNES HEIDENHAIN GmbH.

No.	Cable Type	Reference
(1)	Servomotor Main Circuit Cables	SGLFW2: 309
(2)	Serial Converter Unit Cables	314
(3)	Serial Converter Unit	280
(4)	Sensor Cables	315
(5)	Linear Encoder Cables	314

■ LC115 or LC415 Linear Encoder with EIB3391Y Interface Unit

Important

1. You cannot use an LC115 or LC415 linear encoder with a linear servomotor with a polarity sensor.
2. If you use an SGLFW2 servomotor, input the thermal protector signal from the linear servomotor to the host controller. The thermal protector signal is closed when the temperature is normal and open when the thermal protector is activated. Do not exceed 3 A or 30 V.



*1 Cables to connect to the host controller are not provided by Yaskawa.
Refer to the following section for information on connector models.
☞ *JZSP-CL2TH00-□□-E Sensor Cables on page 324*

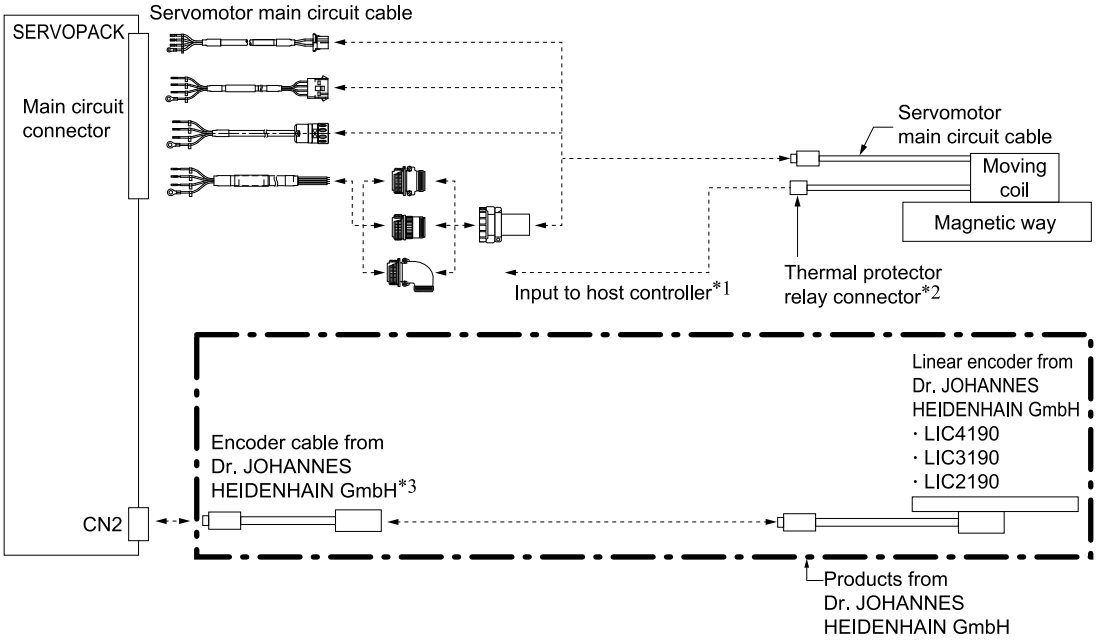
*2 Only SGLFW2 servomotors come equipped with thermal protector relay connectors.

*3 Use an encoder cable from Dr. JOHANNES HEIDENHAIN GmbH. Contact Dr. JOHANNES HEIDENHAIN GmbH for detailed encoder cable specifications.

■ Linear Encoder LIC4190/LIC3190/LIC2190

Important

1. You cannot use an LIC4190, LIC3190, or LIC2190 linear encoder together with a linear servomotor with a polarity sensor.
2. If you use an SGLFW2 servomotor, input the thermal protector signal from the linear servomotor to the host controller. The thermal protector signal is closed when the temperature is normal and open when the thermal protector is activated. Do not exceed 3 A or 30 V.

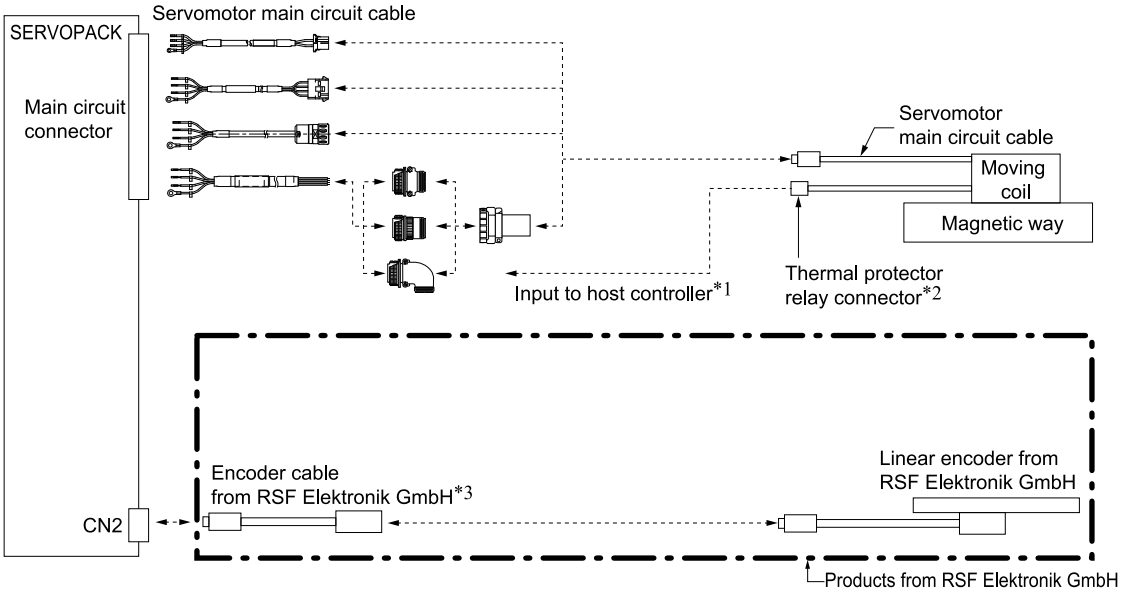


*1 Cables to connect to the host controller are not provided by Yaskawa.
Refer to the following section for information on connector models.
☞ *JZSP-CL2TH00-□□-E Sensor Cables on page 324*
*2 Only SGLFW2 servomotors come equipped with thermal protector relay connectors.
*3 Use an encoder cable from Dr. JOHANNES HEIDENHAIN GmbH. Contact Dr. JOHANNES HEIDENHAIN GmbH for detailed encoder cable specifications.

Connections to Linear Encoder from RSF Elektronik GmbH

Important

1. You cannot use a linear encoder from RSF Elektronik GmbH together with a linear servomotor with a polarity sensor.
2. If you use an SGLFW2 servomotor, input the thermal protector signal from the linear servomotor to the host controller. The thermal protector signal is closed when the temperature is normal and open when the thermal protector is activated. Do not exceed 3 A or 30 V.



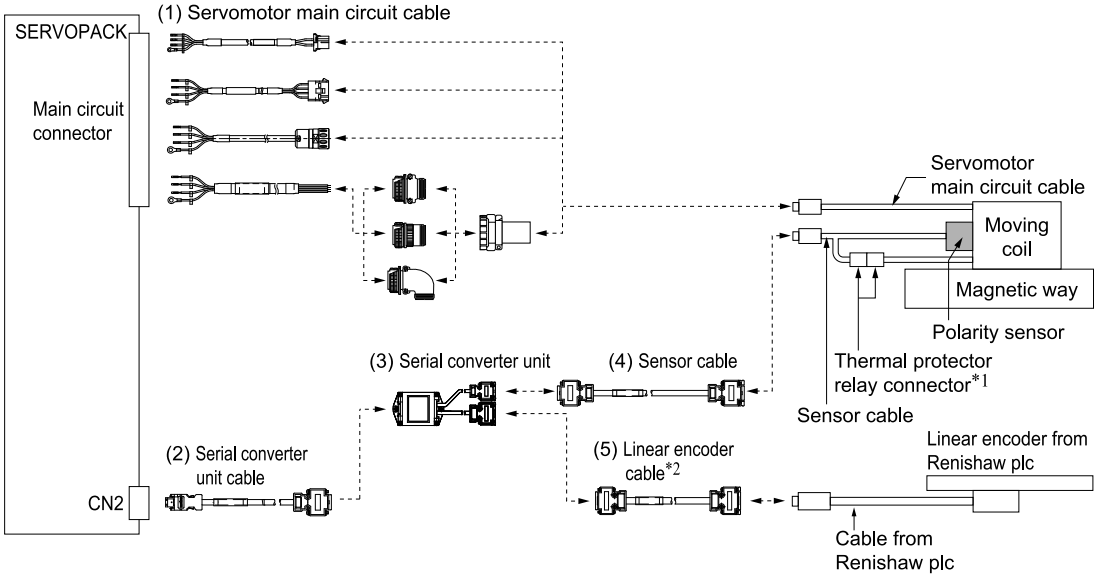
*1 Cables to connect to the host controller are not provided by Yaskawa.
Refer to the following section for information on connector models.
☞ *JZSP-CL2TH00-□□-E Sensor Cables on page 324*
*2 Only SGLFW2 servomotors come equipped with thermal protector relay connectors.
*3 Use an encoder cable from RSF Elektronik GmbH. Contact Dr. JOHANNES HEIDENHAIN GmbH for detailed encoder cable specifications.

Connections to Linear Encoder from Renishaw plc

■ Connections for a 1 Vp-p Analog Voltage Output Signal

You must make the connections through a Yaskawa serial converter unit. The output signal will be multiplied by 8 bits (256 divisions) or 12 bits (4,096 divisions) in the serial converter unit.

◆ Connecting to a Linear Servomotor with a Polarity Sensor

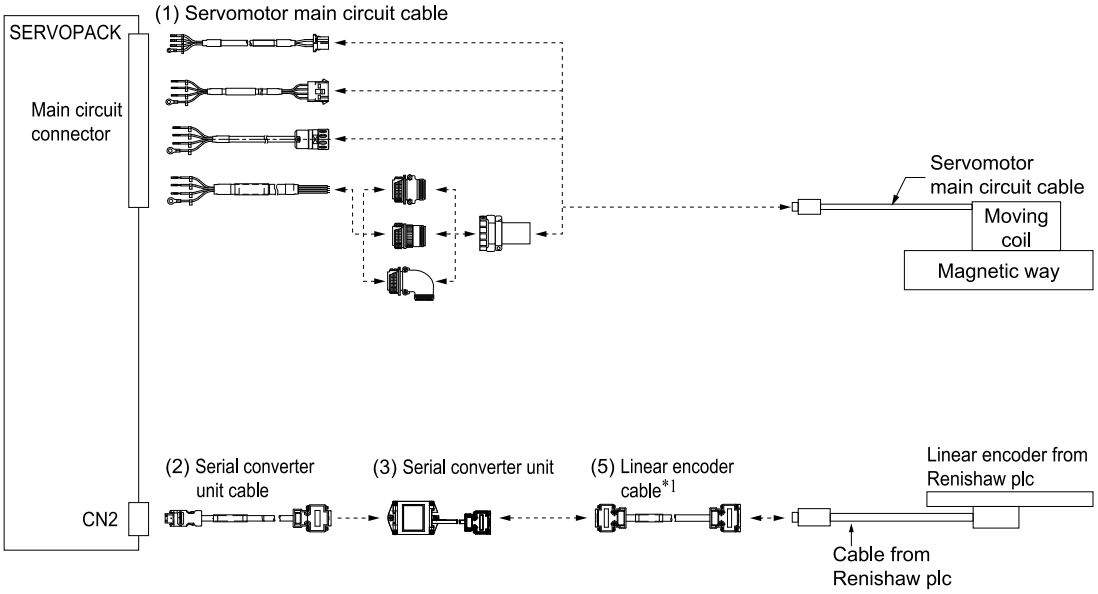


*1 Only SGLFW2 servomotors come equipped with thermal protector relay connectors.
*2 When using a JZDP-J00□-□□□ serial converter unit, do not use a Yaskawa linear encoder cable that is longer than 3 m.

No.	Cable Type	Reference
(1)	Servomotor Main Circuit Cables	SGLGW: 307 SGLFW2: 309 SGLTW: 311
(2)	Serial Converter Unit Cables	314
(3)	Serial Converter Unit	280
(4)	Sensor cable	315
(5)	Linear Encoder Cables	314

◆ Connecting to a Linear Servomotor without a Polarity Sensor

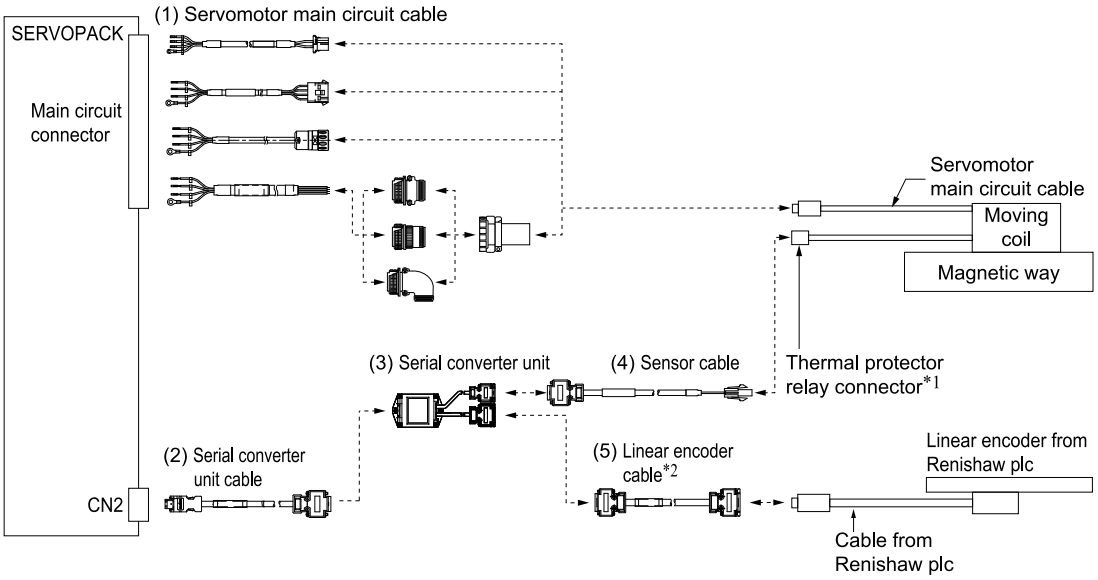
○ Servomotors Other Than the SGLFW2



*1 When using a JZDP-J00□-□□□ serial converter unit, do not use a Yaskawa linear encoder cable that is longer than 3 m.

No.	Cable Type	Reference
(1)	Servomotor Main Circuit Cables	SGLGW: 307 SGLTW: 311
(2)	Serial Converter Unit Cables	314
(3)	Serial Converter Unit	280
(4)	Sensor cable	315
(5)	Linear Encoder Cables	314

○ SGLFW2 Servomotors



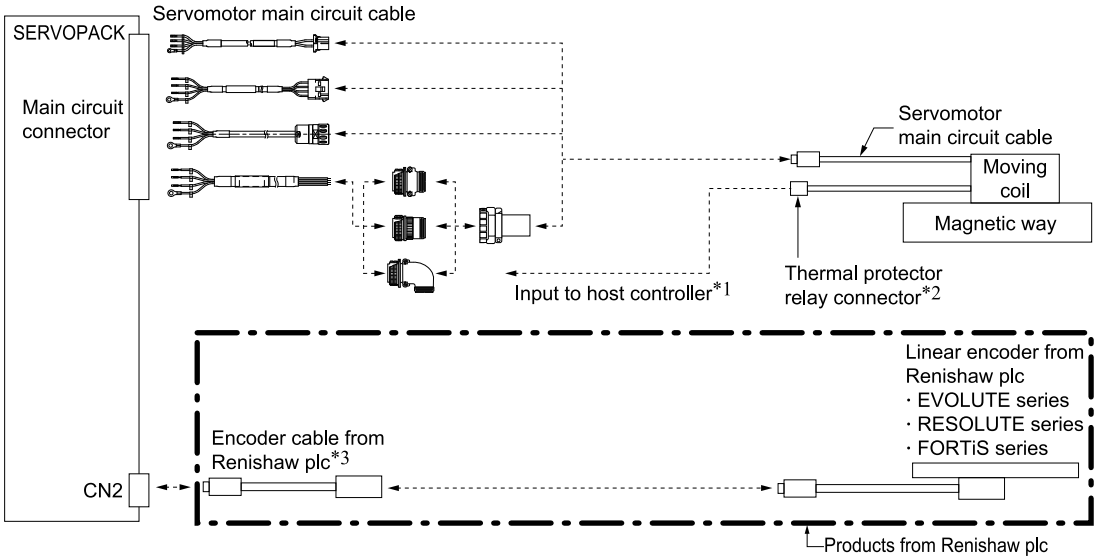
*1 Only SGLFW2 servomotors come equipped with thermal protector relay connectors.
*2 When using a JZDP-J00□-□□□ serial converter unit, do not use a Yaskawa linear encoder cable that is longer than 3 m.

No.	Cable Type	Reference
(1)	Servomotor Main Circuit Cables	SGLFW2: 309
(2)	Serial Converter Unit Cables	314
(3)	Serial Converter Unit	280
(4)	Sensor cable	315
(5)	Linear Encoder Cables	314

◆ EVOLUTE-Series Linear Encoder (model: EL36Y□□□□□□□□□), RESOLUTE-Series Linear Encoder (model: RL36Y□□□□□□□□), FORTiS-Series Linear Encoder

Important

1. You cannot use an EVOLUTE-series, RESOLUTE-series, or FORTiS-series linear encoder together with a linear servomotor with a polarity sensor.
2. If you use an SGLFW2 servomotor, input the thermal protector signal from the linear servomotor to the host controller. The thermal protector signal is closed when the temperature is normal and open when the thermal protector is activated. Do not exceed 3 A or 30 V.



*1 Cables to connect to the host controller are not provided by Yaskawa.
Refer to the following section for information on connector models.
☞ *JZSP-CL2TH00-□□-E Sensor Cables on page 324*

*2 Only SGLFW2 servomotors come equipped with thermal protector relay connectors.

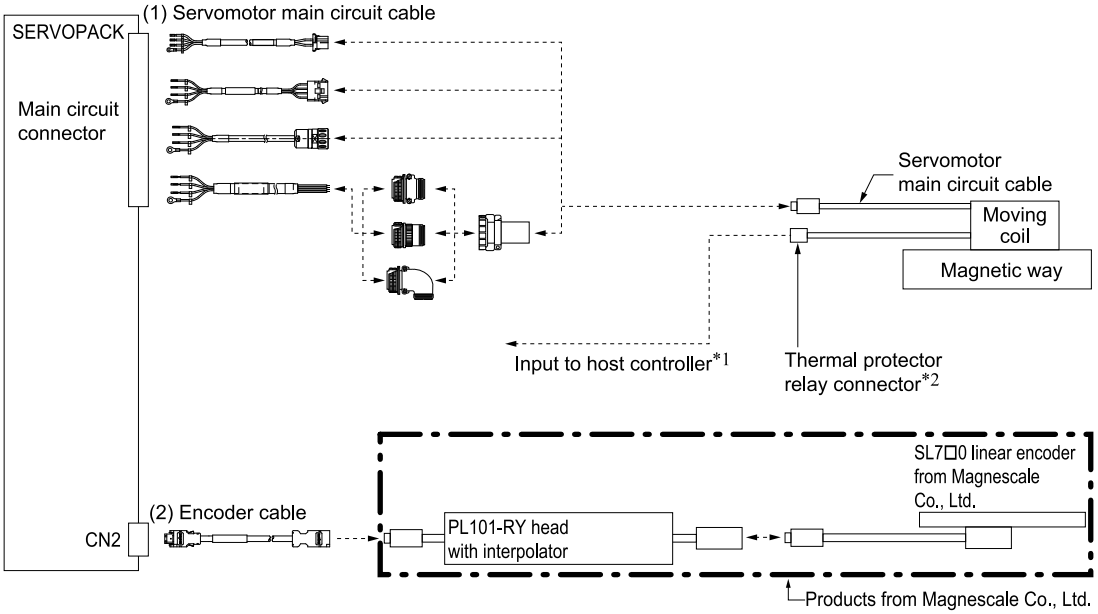
*3 Use an encoder cable from Renishaw plc. Contact Renishaw plc for detailed encoder cable specifications.

Connections to Linear Encoder from Magnescale Co., Ltd.

■ SL7□0 Linear Encoder and PL101-RY Sensor Head with Interpolator

Important

1. You cannot use a PL101-RY sensor head with an interpolator together with a linear servomotor with a polarity sensor.
2. If you use an SGLFW2 servomotor, input the thermal protector signal from the linear servomotor to the host controller. The thermal protector signal is closed when the temperature is normal and open when the thermal protector is activated. Do not exceed 3 A or 30 V.



*1 Cables to connect to the host controller are not provided by Yaskawa.
Refer to the following section for information on connector models.
☞ *JZSP-CL2TH00-□□-E Sensor Cables on page 324*

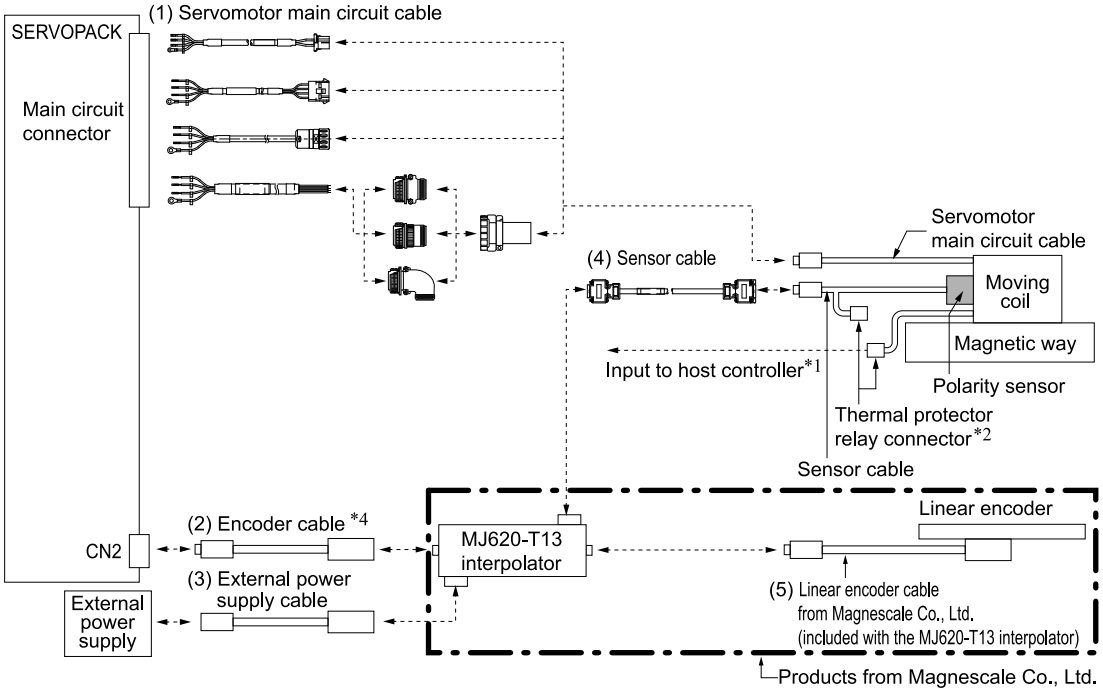
*2 Only SGLFW2 servomotors come equipped with thermal protector relay connectors.

No.	Cable Type	Reference
(1)	Servomotor Main Circuit Cables	SGLGW: 307 SGLFW2: 309 SGLTW: 311
(2)	Encoder Cables	315

■ SL7□0 Linear Encoder, PL101 Sensor Head, and MJ620-T13 Interpolator

Important

1. A 5-VDC power supply is required for the MJ620-T13. (The 5-VDC power supply is not provided by Yaskawa.)
2. Refer to the MJ620-T13 specifications from Magnescale Co., Ltd. for the current consumption of the MJ620-T13.
3. If you use an SGLFW2 servomotor, remove the thermal protector relay connector and input the thermal protector signal from the linear servomotor to the host controller. The thermal protector signal is closed when the temperature is normal and open when the thermal protector is activated. Do not exceed 3 A or 30 V.



*1 Cables to connect to the host controller are not provided by Yaskawa.
Refer to the following section for information on connector models.
☞ *JZSP-CL2TH00-□□-E Sensor Cables on page 324*

*2 Only SGLFW2 servomotors come equipped with thermal protector relay connectors.

No.	Cable Type		Reference
(1)	Servomotor Main Circuit Cables		SGLGW: 307 SGLFW2: 309 SGLTW: 311
(2)	Encoder Cables	These cables are not provided by Yaskawa.	299
(3)	External Power Supply Cables		300
(4)	Sensor Cables		315
(5)	Linear Encoder Cable	Use the cables that come with the MJ620-T13 Interpolator. For details, refer to the specifications for the MJ620-T13 interpolator.	–

◆ Encoder Cables

These cables are not provided by Yaskawa. Use a shielded cable. Refer to the following tables for the pin layouts.

○ SERVOPACK End of Cable (CN2)

- Plug connector: 55100-0670 (Molex Japan Co., Ltd.)
- Connector order number: JZSP-CMP9-1-E (SERVOPACK connector kit)

Pin No.	Signal	Function
1	PG 5 V	Encoder power supply +5 V
2	PG 0 V	Encoder power supply 0 V
3	–	–
4	–	–
5	PS	Serial data
6	/PS	
Shell	Shield	–

○ MJ620-T13 End of Cable

For details, refer to the specifications for the MJ620-T13 from Magnescale Co., Ltd..

- Receptacle: PCR-E20LMD+ (Honda Tsushin Kogyo Co., Ltd.)
- Plug: PCR-E20FS+ (Honda Tsushin Kogyo Co., Ltd.)
- Shell: PCS-E20L□ (Honda Tsushin Kogyo Co., Ltd.)

Pin No.	Signal	Function	Pin No.	Signal	Function
1	Do not connect.	–	12	0 V	0 V
2	Do not connect.	–	13	Do not connect.	–
3	Do not connect.	–	14	0 V	0 V
4	Do not connect.	–	15	Do not connect.	–
5	SD	Serial data	16	0 V	0 V
6	/SD		17	Do not connect.	–
7	Do not connect.	–	18	Do not connect.	–
8	Do not connect.	–	19	Do not connect.	–
9	Do not connect.	–	20	Do not connect.	–
10	Do not connect.	–	Shell	Shield	–
11	Do not connect.	–			

○ Cables without Connectors

Name	Length (L)	Order Number	
		Standard Cable	Flexible Cable
Cables without connectors	5 m	JZSP-CMP09-05-E	JZSP-CSP39-05-E
	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

Note:

We recommend that you use flexible cables.

◆ External Power Supply Cables

This cables are not provided by Yaskawa. Refer to the table on the right for the pin layout.

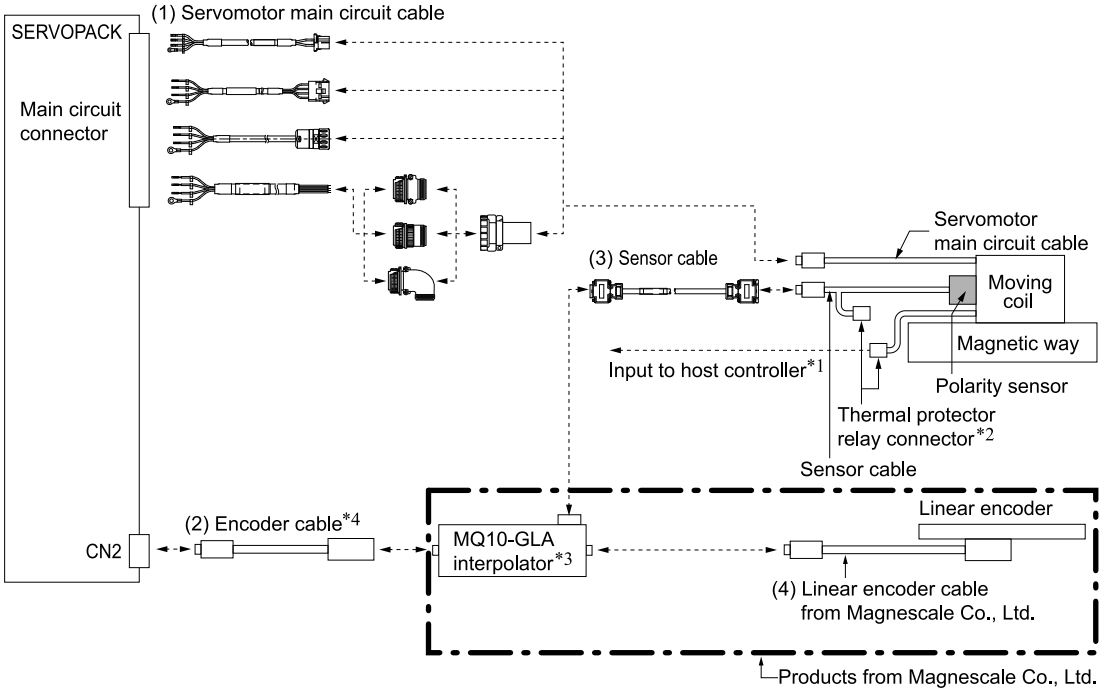
For details, refer to the specifications for the MJ620-T13 from Magnescale Co., Ltd..

- Connector header: MC1.5/2-GF-3.81 (Phoenix Contact)
- Connector plug: MC1.5/2-STF-3.81 (Phoenix Contact)

Pin No.	Signal	Function
1	+5 V	+5 V
2	0 V	0 V

■ SmartSCALE Linear Encoder (SQ10 Scale and MQ10-□LA Interpolator)

If you use an SGLFW2 servomotor, remove the thermal protector relay connector and input the thermal protector signal from the linear servomotor to the host controller. The thermal protector signal is closed when the temperature is normal and open when the thermal protector is activated. Do not exceed 3 A or 30 V.



*1 Cables to connect to the host controller are not provided by Yaskawa.
Refer to the following section for information on connector models.
☞ *JZSP-CL2TH00-□□-E Sensor Cables on page 324*

*2 Only SGLFW2 servomotors come equipped with thermal protector relay connectors.

*3 The above diagram shows the connections when a MQ10-GLA interpolator (equipped with an electromagnetic sensor input) is used.

*4 The maximum length of the encoder cable is 15 m.

No.	Cable Type		Reference
(1)	Servomotor Main Circuit Cables		SGLGW: 307 SGLFW2: 309 SGLTW: 311
(2)	Encoder Cables	These cables are not provided by Yaskawa.	301
(3)	Sensor Cables		315
(4)	Linear Encoder Cables	Use the cables that come with the MQ10-□LA interpolator. For details, refer to the specifications for the MQ10-□LA interpolator.	–

◆ Encoder Cables

These cables are not provided by Yaskawa. Use a shielded cable. Refer to the following tables for the pin layouts.

○ SERVOPACK End of Cable (CN2)

- Plug connector: 55100-0670 (Molex Japan Co., Ltd.)
- Connector order number: JZSP-CMP9-1-E (SERVOPACK connector kit)

Pin No.	Signal	Function
1	PG 5 V	Encoder power supply +5 V
2	PG 0 V	Encoder power supply 0 V
3	–	–
4	–	–
5	PS	Serial data
6	/PS	
Shell	Shield	–

○ MQ10-□LA End of Cable

For details, refer to the specifications for the MQ10-□LA from Magnescale Co., Ltd..

○ Cables without Connectors

Name	Length (L)	Order Number	
		Standard Cable	Flexible Cable
Cables without connectors	5 m	JZSP-CMP09-05-E	JZSP-CSP39-05-E
	10 m	JZSP-CMP09-10-E	JZSP-CSP39-10-E
	15 m	JZSP-CMP09-15-E	JZSP-CSP39-15-E

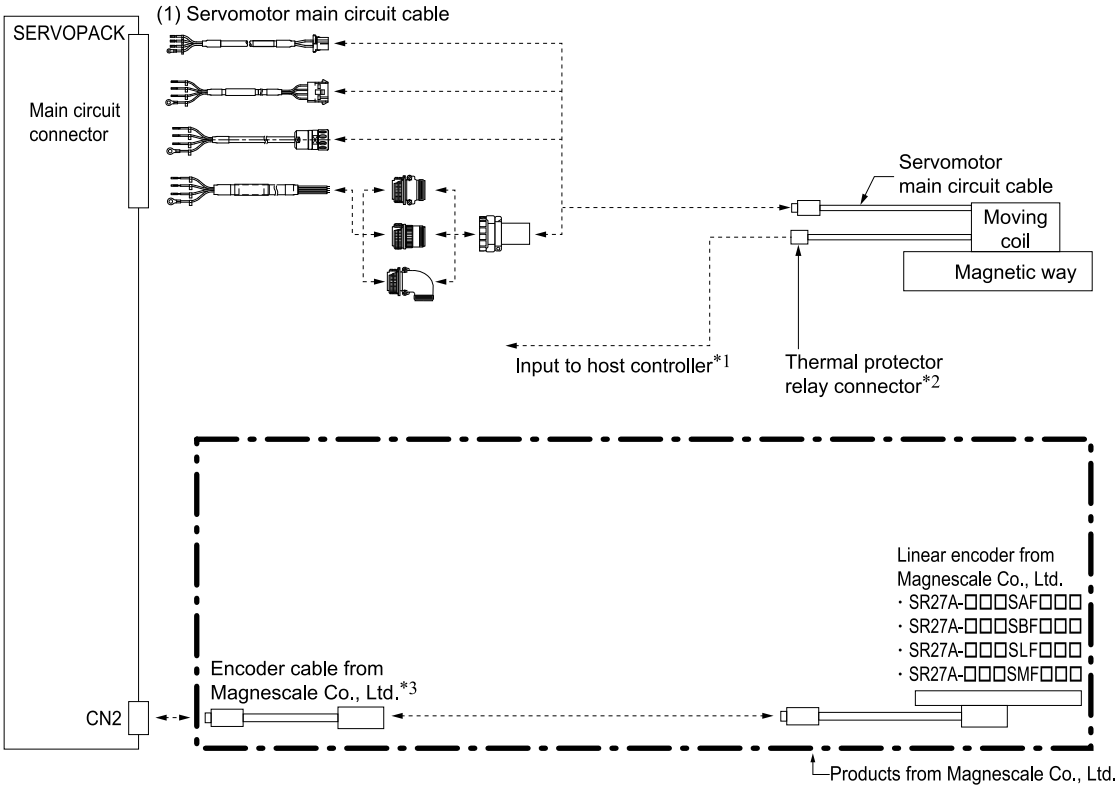
Note:

We recommend that you use flexible cables.

■ Linear Encoder SR27A

Important

1. You cannot use an SR27A linear encoder with a linear servomotor with a polarity sensor.
2. If you use an SGLFW2 servomotor, input the thermal protector signal from the linear servomotor to the host controller. The thermal protector signal is closed when the temperature is normal and open when the thermal protector is activated. Do not exceed 3 A or 30 V.



*1 Cables to connect to the host controller are not provided by Yaskawa.
Refer to the following section for information on connector models.
☞ *JZSP-CL2TH00-□□-E Sensor Cables on page 324*

*2 Only SGLFW2 servomotors come equipped with thermal protector relay connectors.

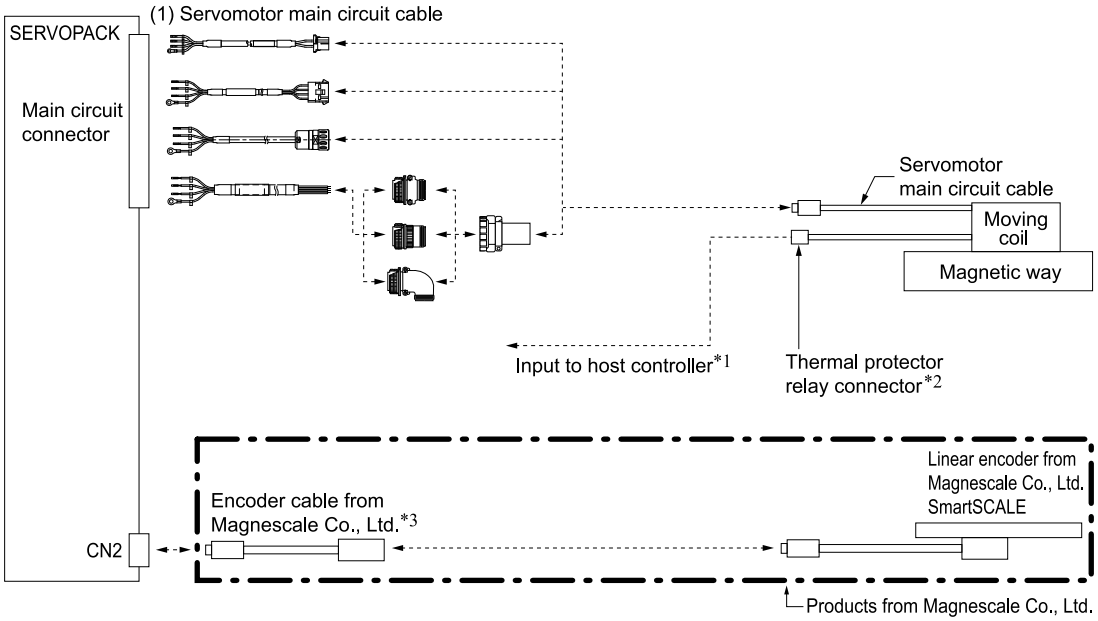
*3 Use an encoder cable from Magnescale Co., Ltd.. Contact Magnescale Co., Ltd. for details on encoder cable specifications.

No.	Cable Type	Reference
(1)	Servomotor Main Circuit Cables	SGLGW: 307 SGLFW2: 309 SGLTW: 311

■ SmartSCALE Linear Encoder (SQ47 or SQ57)

Important

1. You cannot use an SQ47 or SQ57 linear encoder with a linear servomotor with a polarity sensor.
2. If you use an SGLFW2 servomotor, input the thermal protector signal from the linear servomotor to the host controller. The thermal protector signal is closed when the temperature is normal and open when the thermal protector is activated. Do not exceed 3 A or 30 V.



*1 Cables to connect to the host controller are not provided by Yaskawa.
Refer to the following section for information on connector models.
☞ *JZSP-CL2TH00-□□-E Sensor Cables on page 324*

*2 Only SGLFW2 servomotors come equipped with thermal protector relay connectors.

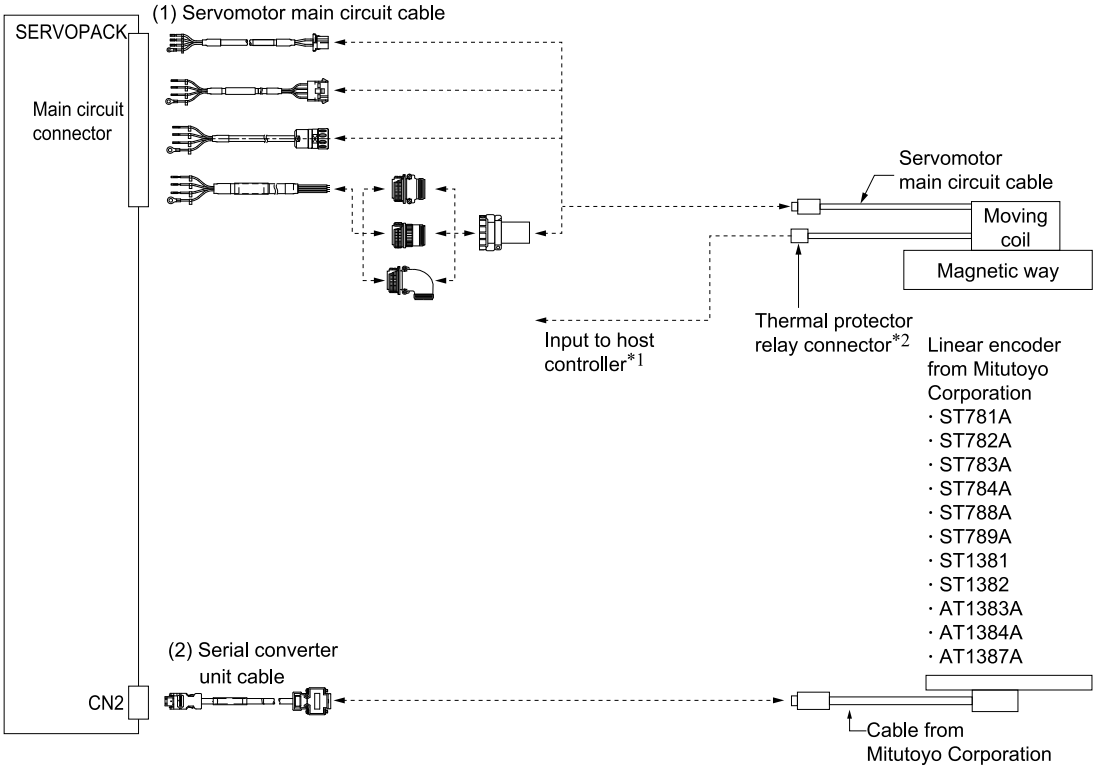
*3 Use an encoder cable from Magnescale Co., Ltd.. Contact Magnescale Co., Ltd. for details on encoder cable specifications.

No.	Cable Type	Reference
(1)	Servomotor Main Circuit Cables	SGLGW: 307 SGLFW2: 309 SGLTW: 311

Connections to Linear Encoder from Mitutoyo Corporation

Important

1. You cannot use a Mitutoyo linear encoder with a linear servomotor with a polarity sensor.
2. If you use an SGLFW2 servomotor, input the thermal protector signal from the linear servomotor to the host controller. The thermal protector signal is closed when the temperature is normal and open when the thermal protector is activated. Do not exceed 3 A or 30 V.



*1 Cables to connect to the host controller are not provided by Yaskawa.
Refer to the following section for information on connector models.
☞ *JZSP-CL2TH00-□□-E Sensor Cables on page 324*

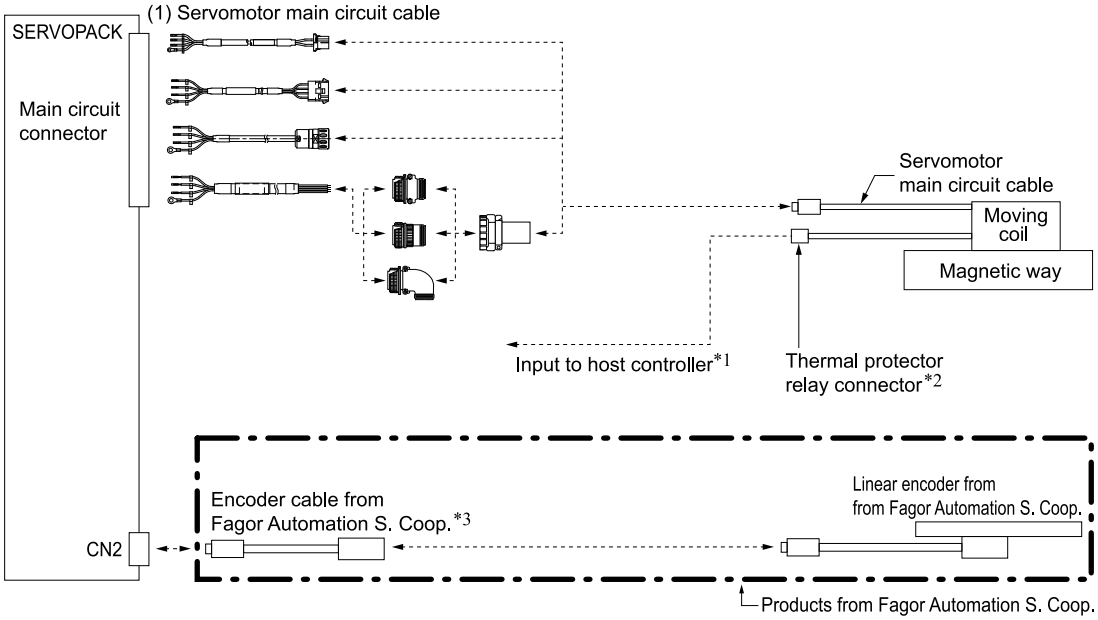
*2 Only SGLFW2 servomotors come equipped with thermal protector relay connectors.

No.	Cable Type	Reference
(1)	Servomotor Main Circuit Cables	SGLGW: 307 SGLFW2: 309 SGLTW: 311
(2)	Serial Converter Unit Cables	314

Connections to Linear Encoder from Fagor Automation S. Coop.

Important

1. You cannot use an linear encoder from Fagor Automation S. Coop. with a linear servomotor with a polarity sensor.
2. If you use an SGLFW2 servomotor, input the thermal protector signal from the linear servomotor to the host controller. The thermal protector signal is closed when the temperature is normal and open when the thermal protector is activated. Do not exceed 3 A or 30 V.



*1 Cables to connect to the host controller are not provided by Yaskawa.
Refer to the following section for information on connector models.
☞ *JZSP-CL2TH00-□□-E Sensor Cables on page 324*

*2 Only SGLFW2 servomotors come equipped with thermal protector relay connectors.

*3 Use encoder cables from Fagor Automation S. Coop. For detailed specifications of the encoder cables, consult Fagor Automation S. Coop. or its sales representative.

No.	Cable Type	Reference
(1)	Servomotor Main Circuit Cables	SGLGW: 307 SGLFW2: 309 SGLTW: 311

Cables and Connectors

This chapter describes the cables that are used to connect one linear servomotor to the SERVOPACK and provides related precautions.

Cables for the SGLGW Servomotors

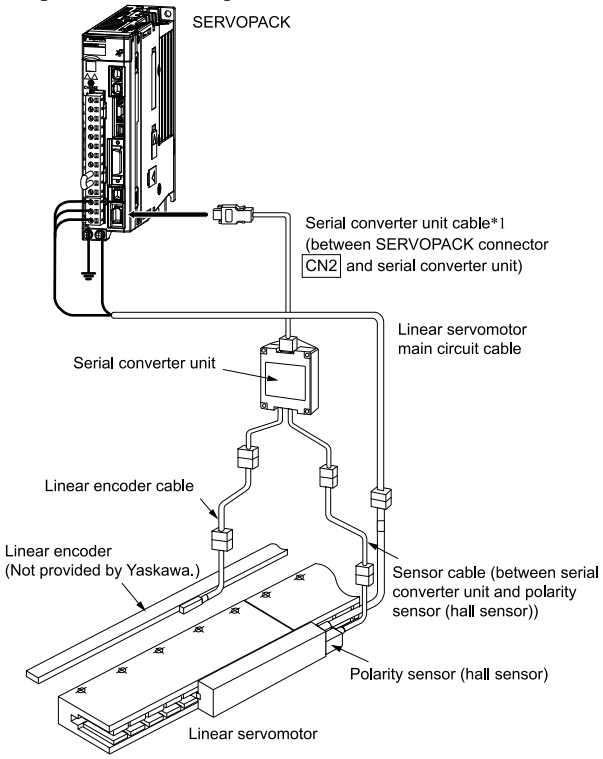
Information Refer to the following manual for details on connecting multiple devices to the SERVOPACK.

Σ-X-Series Peripheral Device Selection Manual (Manual No.: SIEP C710812 12)

Cable Configurations

Refer to *Recommended Linear Encoders on page 288* to select a linear encoder.

Prepare the cable required for the encoder.



*1 You can connect directly to an absolute linear encoder.

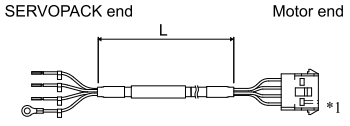
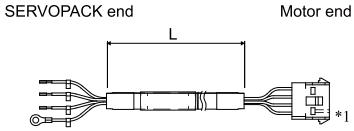
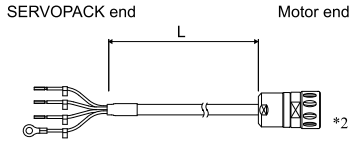
Note:

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

Σ-X-Series AC Servo Drive Peripheral Device Selection Manual (Manual No.: SIEP C710812 12)

Linear Servomotor Main Circuit Cables

Linear Servomotor Model	Length (L)	Order Number	Appearance	Details
SGLGW-30A, SGLGW-40A, SGLGW-60A	1 m	JZSP-CLN11-01-E		316
	3 m	JZSP-CLN11-03-E		
	5 m	JZSP-CLN11-05-E		
	10 m	JZSP-CLN11-10-E		
	15 m	JZSP-CLN11-15-E		
	20 m	JZSP-CLN11-20-E		
SGLGW-90A	1 m	JZSP-CLN21-01-E		316
	3 m	JZSP-CLN21-03-E		
	5 m	JZSP-CLN21-05-E		
	10 m	JZSP-CLN21-10-E		
	15 m	JZSP-CLN21-15-E		
	20 m	JZSP-CLN21-20-E		
SGLGW-30A□□□□□D, SGLGW-40A□□□□□D, SGLGW-60A□□□□□D	3 m	DP9325252-03G		317
	5 m	DP9325252-05G		
	10 m	DP9325252-10G		
	15 m	DP9325252-15G		
	20 m	DP9325252-20G		

*1 Connector from Tyco Electronics Japan G.K.
*2 Connector from Interconnectron GmbH

Cables for the SGLFW2 Servomotors

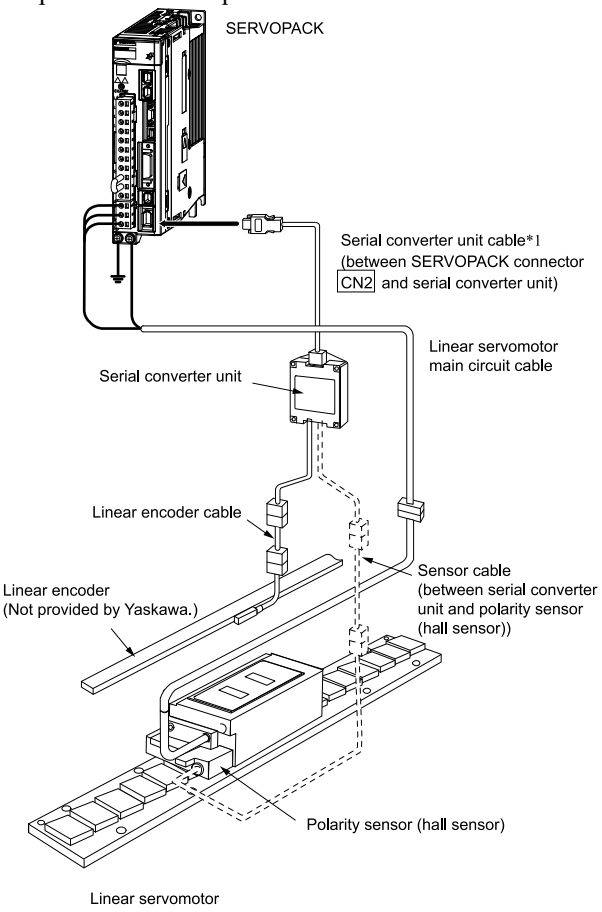
Information Refer to the following manual for details on connecting multiple devices to the SERVOPACK.

Σ-X-Series Peripheral Device Selection Manual (Manual No.: SIEP C710812 12)

Cable Configurations

Refer to *Recommended Linear Encoders on page 288* to select a linear encoder.

Prepare the cable required for the encoder.



*1 You can connect directly to an absolute linear encoder.

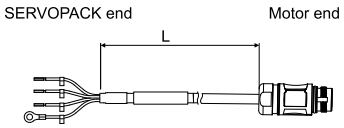
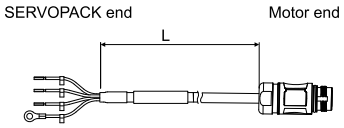
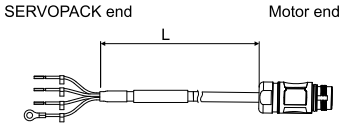
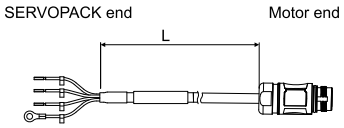
Note:

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

Σ-X-Series AC Servo Deive Peripheral Device Selection Manual (Manual No.: SIEP C710812 12)

Linear Servomotor Main Circuit Cables

Linear Servomotor Model	Length (L)	Order Number	Appearance	Details
SGLFW2-30A070A□ SGLFW2-30A120A□ SGLFW2-30A230A□	3 m	JZSP-C7M143-03-E-G6		320
	5 m	JZSP-C7M143-05-E-G6		
	10 m	JZSP-C7M143-10-E-G6		
	15 m	JZSP-C7M143-15-E-G6		
	20 m	JZSP-C7M143-20-E-G6		
SGLFW2-45A200A□	3 m	JZSP-C7M144-03-E-G6		320
	5 m	JZSP-C7M144-05-E-G6		
	10 m	JZSP-C7M144-10-E-G6		
	15 m	JZSP-C7M144-15-E-G6		
	20 m	JZSP-C7M144-20-E-G6		
SGLFW2-45A380A□ SGLFW2-90A200A□	3 m	JZSP-C7M154-03-E-G6		319
	5 m	JZSP-C7M154-05-E-G6		
	10 m	JZSP-C7M154-10-E-G6		
	15 m	JZSP-C7M154-15-E-G6		
	20 m	JZSP-C7M154-20-E-G6		
SGLFW2-90A380A□ SGLFW2-90A560A□ SGLFW2-1DA380A□ SGLFW2-1DA560A□	3 m	JZSP-C7M164-03-E-G6		321
	5 m	JZSP-C7M164-05-E-G6		
	10 m	JZSP-C7M164-10-E-G6		
	15 m	JZSP-C7M164-15-E-G6		
	20 m	JZSP-C7M164-20-E-G6		

Note:

Estimates are available for models other than those listed above (SGLFW2-90A380A□L□, -90A560A□L□, SGLFW2-1DA□□□A□L□).

Cables for the SGLTW Servomotors

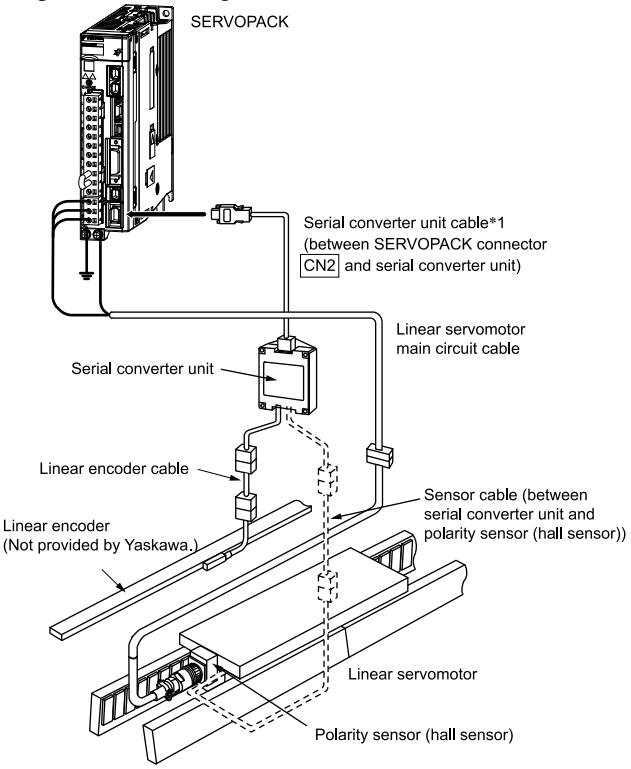
Information Refer to the following manual for details on connecting multiple devices to the SERVOPACK.

Σ-X-Series Peripheral Device Selection Manual (Manual No.: SIEP C710812 12)

Cable Configurations

Refer to *Recommended Linear Encoders on page 288* to select a linear encoder.

Prepare the cable required for the encoder.



*1 You can connect directly to an absolute linear encoder.

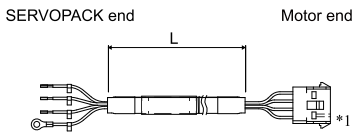
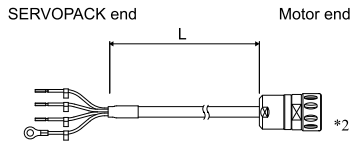
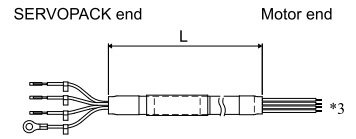
Note:

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

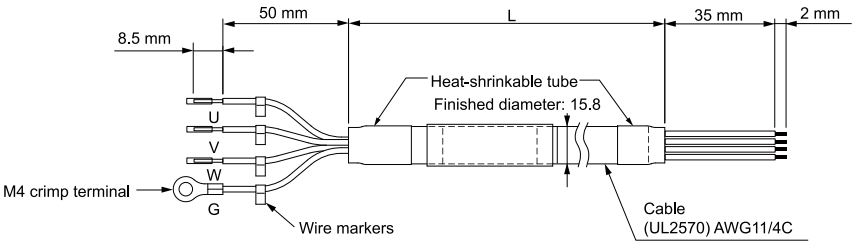
Σ-X-Series AC Servo Deive Peripheral Device Selection Manual (Manual No.: SIEP C710812 12)

Linear Servomotor Main Circuit Cables

Linear Servomotor Model	Length (L)	Order Number	Appearance	Details
SGLTW-20A, SGLTW-35A	1 m	JZSP-CLN21-01-E		316
	3 m	JZSP-CLN21-03-E		
	5 m	JZSP-CLN21-05-E		
	10 m	JZSP-CLN21-10-E		
	15 m	JZSP-CLN21-15-E		
	20 m	JZSP-CLN21-20-E		
SGLTW-□□A□□□□□D	3 m	DP9325254-03G		317
	5 m	DP9325254-05G		
	10 m	DP9325254-10G		
	15 m	DP9325254-15G		
	20 m	DP9325254-20G		
SGLTW-40□□□□B□, SGLTW-80□□□□B□	1 m	JZSP-CLN39-01-E		318
	3 m	JZSP-CLN39-03-E		
	5 m	JZSP-CLN39-05-E		
	10 m	JZSP-CLN39-10-E		
	15 m	JZSP-CLN39-15-E		
	20 m	JZSP-CLN39-20-E		

*1 Connector from Tyco Electronics Japan G.K.
*2 Connector from Interconnectron GmbH
*3 A connector is not provided on the linear servomotor end. Obtain a connector according to your specifications. Refer to 311 for information on connectors.

■ JZSP-CLN39-□□-E Cables



◆ Wiring Specifications

SERVOPACK Leads

Wire Color	Signal
Red	Phase U
White	Phase V
Blue	Phase W
Green/yellow	FG

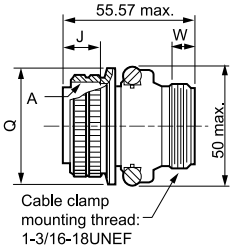
Servomotor Connector

Signal	Pin
Phase U	A
Phase V	B
Phase W	C
FG	D

◆ JZSP-CLN39 Cable Connectors

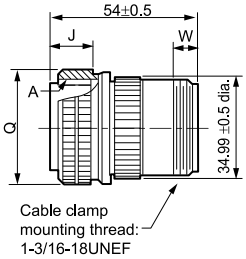
Applicable Linear Servomotor	Connector Provided with Linear Servomotor	Plug		Cable Clamp
		Straight	Right-Angle	
SGLTW-40 or -80	MS3102A22-22P	MS3106B22-22S or MS3106A22-22S	MS3108B22-22S	MS3057-12A

◆ MS3106B22-2S: Straight Plug with Two-Piece Shell



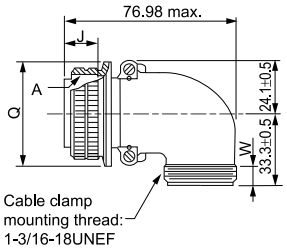
Shell Size	Joint Thread A	Length of Joint J ± 0.12	Joint Nut Outer Diameter Q	Effective Thread Length W min.
22	1-3/8-18UNEF	18.26	40.48	9.53

◆ MS3106A22-2S: Straight Plug with Solid Shell



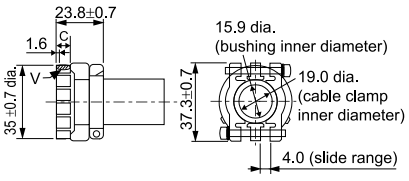
Shell Size	Joint Thread A	Length of Joint J ± 0.12	Joint Nut Outer Diameter Q	Effective Thread Length W min.
22	1-3/8-18UNEF	18.26	40.48	9.53

◆ MS3108B22-2S: Right-angle Plug with Two-piece Shell



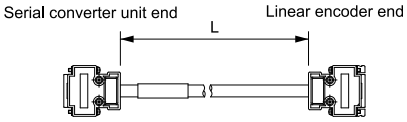
Shell Size	Joint Thread A	Length of Joint J ± 0.12	Joint Nut Outer Diameter Q	Effective Thread Length W min.
22	1-3/8-18UNEF	18.26	40.48	9.53

◆ MS3057-12A: Cable Clamp with Rubber Bushing



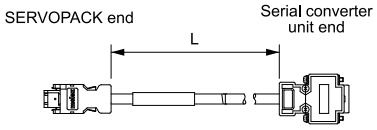
Applicable Connector Shell Size	Effective Thread Length C	Mounting Screws V	Attached Bushing Name
20.22	10.3	1-3/16-18UNEF	AN3420-12

Linear Encoder Cables

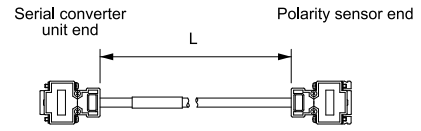
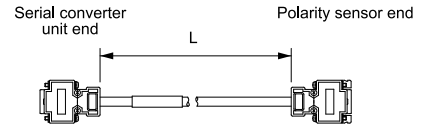
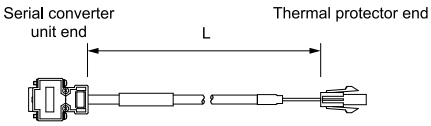
Name	Servomotor Model	Length (L) *1	Order Number	Appearance	Details
For linear encoder from Renishaw plc	All models	1 m	JZSP-CLL00-01-E		321
		3 m	JZSP-CLL00-03-E		
		5 m	JZSP-CLL00-05-E		
		10 m	JZSP-CLL00-10-E		
		15 m	JZSP-CLL00-15-E		
For linear encoder from Dr. JOHANNES HEIDENHAIN GmbH		1 m	JZSP-CLL30-01-E		
		3 m	JZSP-CLL30-03-E		
		5 m	JZSP-CLL30-05-E		
		10 m	JZSP-CLL30-10-E		
		15 m	JZSP-CLL30-15-E		

*1 When using a JZDP-J00□-□□□-E serial converter unit, do not exceed a cable length of 3 m.

Serial Converter Unit Cables

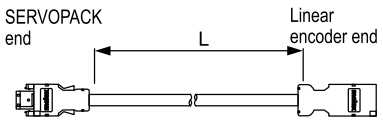
Servomotor Model	Length (L)	Order Number	Appearance	Details
All models	1 m	JZSP-CLP70-01-E		322
	3 m	JZSP-CLP70-03-E		
	5 m	JZSP-CLP70-05-E		
	10 m	JZSP-CLP70-10-E		
	15 m	JZSP-CLP70-15-E		
	20 m	JZSP-CLP70-20-E		

Sensor Cables

Servomotor Model	Length (L)	Order Number	Appearance	Details
SGLGW-□□A SGLTW-□□A	1 m	JZSP-CLL10-01-E		323
	3 m	JZSP-CLL10-03-E		
	5 m	JZSP-CLL10-05-E		
	10 m	JZSP-CLL10-10-E		
	15 m	JZSP-CLL10-15-E		
SGLFW2-□□A□□□AS□ (with polarity sensor)	1 m	JZSP-CL2L100-01-E		323
	3 m	JZSP-CL2L100-03-E		
	5 m	JZSP-CL2L100-05-E		
	10 m	JZSP-CL2L100-10-E		
	15 m	JZSP-CL2L100-15-E		
SGLFW2-□□A□□□AT□ (without polarity sensor)	1 m	JZSP-CL2TH00-01-E		324
	3 m	JZSP-CL2TH00-03-E		
	5 m	JZSP-CL2TH00-05-E		
	10 m	JZSP-CL2TH00-10-E		
	15 m	JZSP-CL2TH00-15-E		

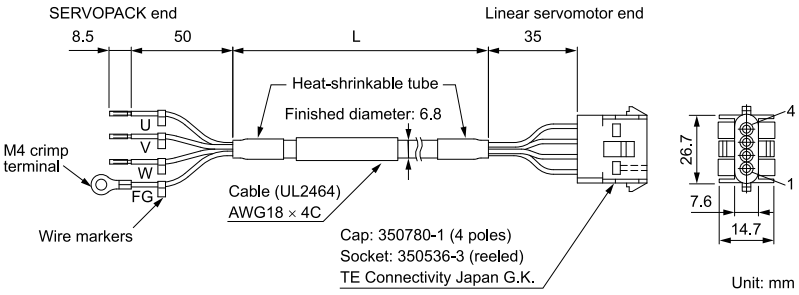
Encoder Cables

The cables in the following table can be used either for absolute linear encoders or incremental linear encoders.

Servomotor Model	Length (L)	Order Number		Appearance	Details
		Standard Cable	Flexible Cable		
All models	3 m	JZSP-CMP00-03-E	JZSP-CMP10-03-E		324
	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 Dimensional Drawings and Wiring Specifications

JZSP-CLN11-□□-E Servomotor Main Circuit Cables



- Wiring Specifications

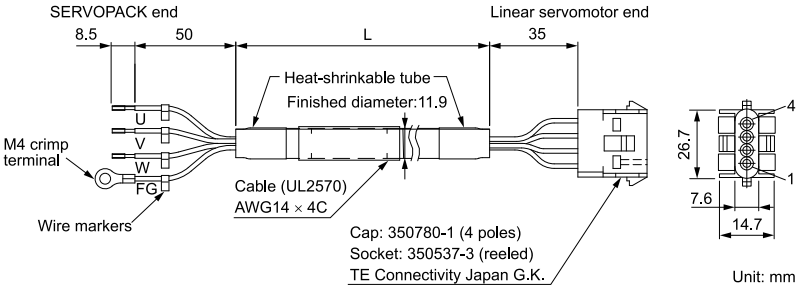
SERVOPACK leads

Wire Color	Signal
Red	Phase U
White	Phase V
Blue	Phase W
Green/yellow	FG

Servomotor connector

Signal	Pin
Phase U	1
Phase V	2
Phase W	3
FG	4

JZSP-CLN21-□□-E Servomotor Main Circuit Cables



- Wiring Specifications

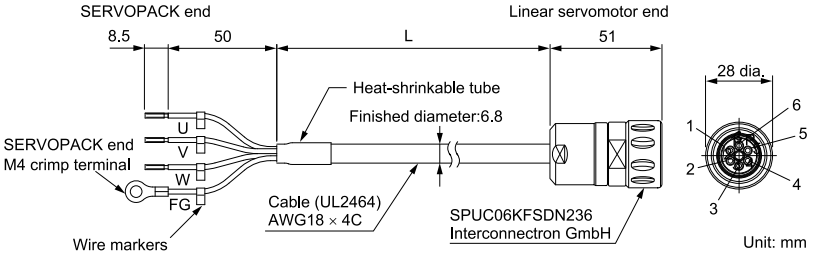
SERVOPACK leads

Wire Color	Signal
Red	Phase U
White	Phase V
Blue	Phase W
Green/yellow	FG

Servomotor connector

Signal	Pin
Phase U	1
Phase V	2
Phase W	3
FG	4

JZSP-CLN14-□□-E Servomotor Main Circuit Cables

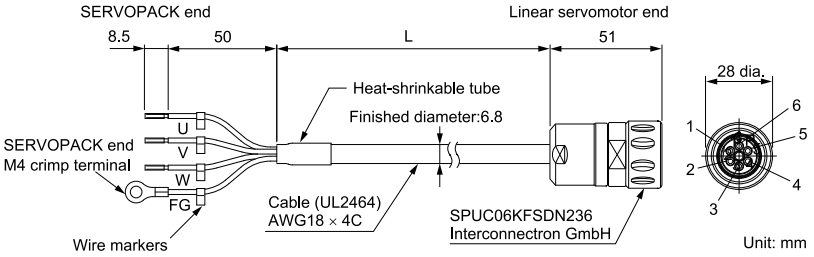


- Wiring Specifications

SERVOPACK leads / Servomotor connector

Wire Color	Pin	Signal	Pin
Black (white 1)	Phase U	Phase U	1
Black (white 2)	Phase V	Phase V	2
Black (white 3)	Phase W	Phase W	3
Green/yellow	FG	—	4
		—	5
		FG	6

DP9325252-□□G Servomotor Main Circuit Cables

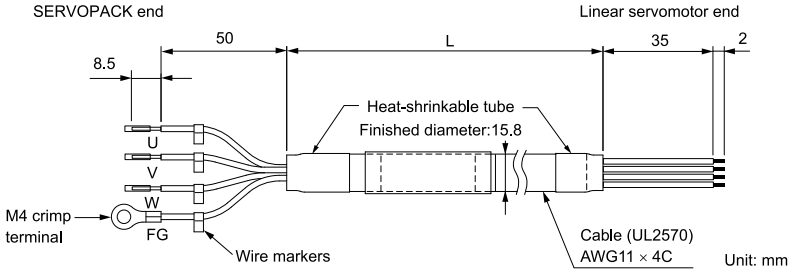


- Wiring Specifications

SERVOPACK leads / Servomotor connector

Wire Color	Pin	Signal	Pin
Black (white 1)	Phase U	Phase U	1
Black (white 2)	Phase V	Phase V	2
Black (white 3)	Phase W	Phase W	3
Green/yellow	FG	—	4
		—	5
		FG	6

JZSP-CLN39-□□-E Servomotor Main Circuit Cables



- Wiring Specifications

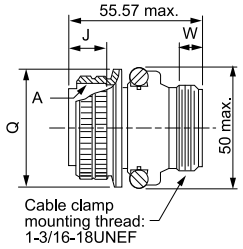
SERVOPACK leads / Servomotor connector

Wire Color	Signal	Signal	Pin
Red	Phase U	Phase U	A
White	Phase V	Phase V	B
Blue	Phase W	Phase W	C
Green/yellow	FG	FG	D

■ JZSP-CLN39 Cable Connectors

Applicable Servomotor	Connector Provided with Servomotor	Plug		Cable Clamp
		Straight	Right-Angle	
SGLTW-40 or -80	MS3102A22-22P	MS3106B22-22S or MS3106A22-22S	MS3108B22-22S	MS3057-12A

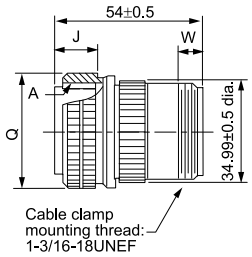
◆ MS3106B22-22S: Straight Plug with Two-Piece Shell



Unit: mm

Shell Size	Joint Thread A	Length of Joint J ± 0.12	Connecting Nut Outer Diameter Q dia. $^{+0}_{-0.38}$	Effective Thread Length W Min.
22	1-3/8-18UNEF	18.26	40.48	9.53

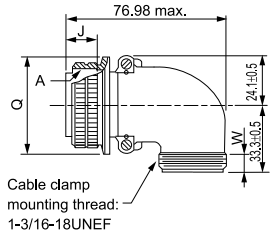
◆ MS3106A22-22S: Straight Plug with Solid Shell



Unit: mm

Shell Size	Joint Thread A	Length of Joint J ± 0.12	Connecting Nut Outer Diameter Q dia. $^{+0}_{-0.38}$	Effective Thread Length W Min.
22	1-3/8-18UNEF	18.26	40.48	9.53

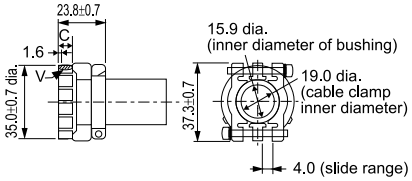
◆ MS3108B22-22S: Right-Angle Plug with Two-Piece Shell



Unit: mm

Shell Size	Joint Thread A	Length of Joint J ± 0.12	Connecting Nut Outer Diameter Q dia. $^{+0}_{-0.38}$	Effective Thread Length W Min.
22	1-3/8-18UNEF	18.26	40.48	9.53

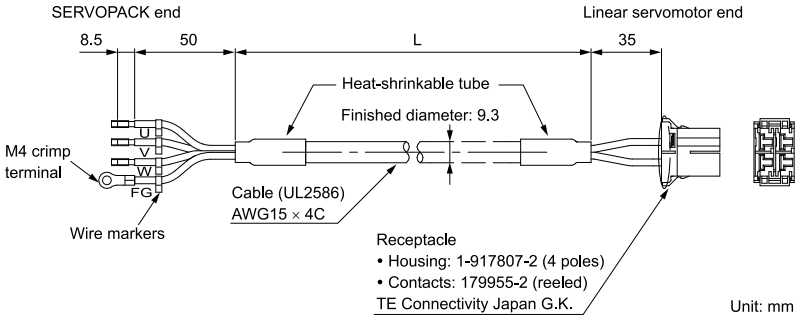
◆ MS3057-12A: Cable Clamp with Rubber Bushing



Unit: mm

Applicable Connector Shell Size	Effective Thread Length C	Mounting Screws V	Attached Bushing
20.22	10.3	1-3/16-18UNEF	AN3420-12

JZSP-CL2N803-□□-E Servomotor Main Circuit Cables



- Wiring Specifications

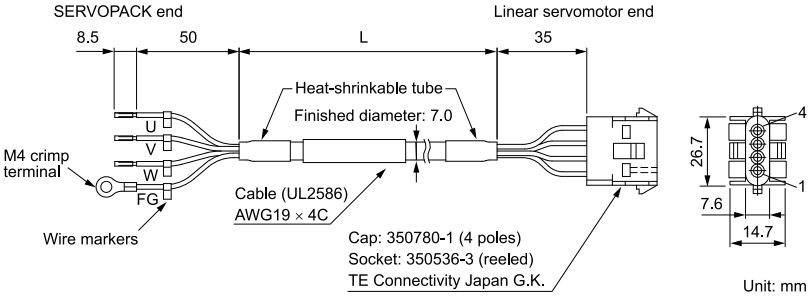
SERVOPACK leads

Wire Color	Signal
Red	Phase U
White	Phase V
Black	Phase W
Green	FG

Servomotor connector

Signal	Pin
Phase U	A1
Phase V	A2
Phase W	B1
FG	B2

JZSP-CL2N703-□□-E Servomotor Main Circuit Cables

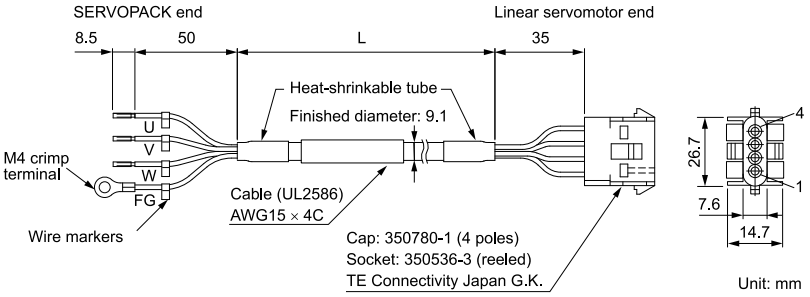


- Wiring Specifications

SERVOPACK leads / Servomotor connector

Wire Color	Signal	Signal	Pin
Red	Phase U	Phase U	1
White	Phase V	Phase V	2
Black	Phase W	Phase W	3
Green	FG	FG	4

JZSP-CL2N603-□□-E Servomotor Main Circuit Cables

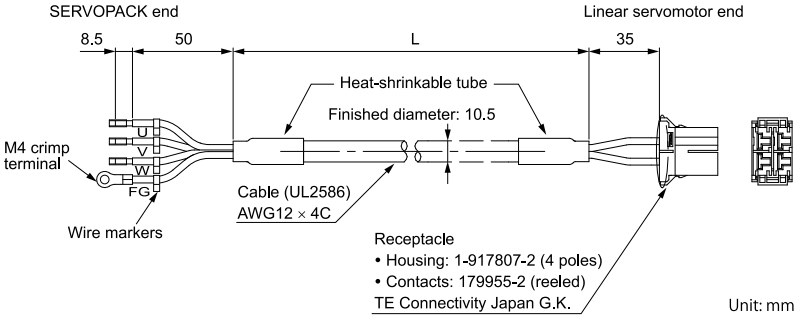


- Wiring Specifications

SERVOPACK leads / Servomotor connector

Wire Color	Signal	Signal	Pin
Red	Phase U	Phase U	1
White	Phase V	Phase V	2
Black	Phase W	Phase W	3
Green	FG	FG	4

JZSP-CL2N503-□□-E Servomotor Main Circuit Cables



- Wiring Specifications

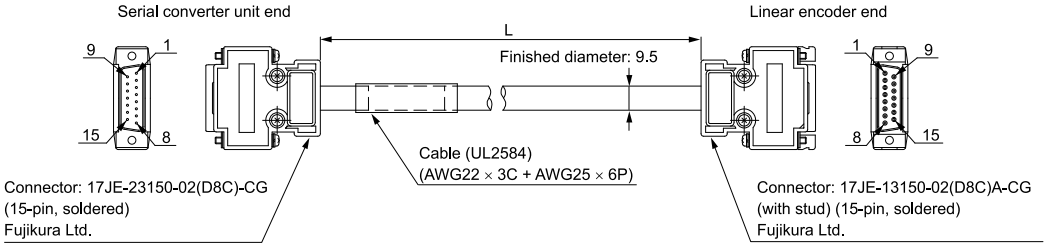
SERVOPACK leads

Wire Color	Signal
Red	Phase U
White	Phase V
Black	Phase W
Green	FG

Servomotor connector

Signal	Pin
Phase U	A1
Phase V	A2
Phase W	B1
FG	B2

JZSP-CLL00-□□-E Linear Encoder Cables



- Wiring Specifications

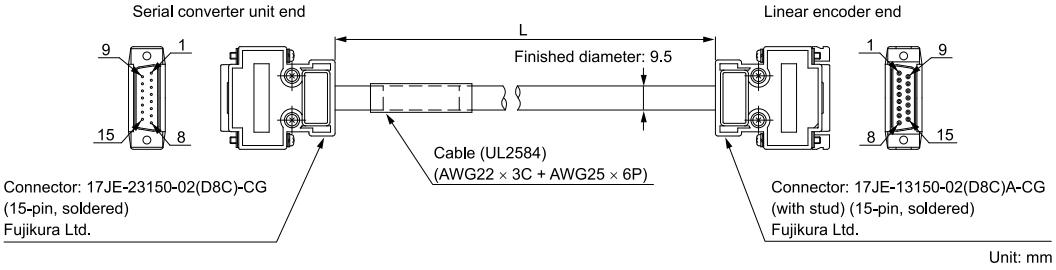
Serial converter unit end

Pin	Signal
1	/cos (V1-)
2	/sin (V2-)
3	Ref (V0+)
4	+5 V
5	5 Vs
6	BID
7	Vx
8	Vq
9	cos (V1+)
10	sin (V2+)
11	/Ref (V0+)
12	0 V
13	0 Vs
14	DIR
15	Inner shield
Case	Shield

Linear encoder end

Pin	Signal
1	/cos (V1-)
2	/sin (V2-)
3	Ref (V0+)
4	+5 V
5	5 Vs
6	BID
7	Vx
8	Vq
9	cos (V1+)
10	sin (V2+)
11	/Ref (V0-)
12	0 V
13	0 Vs
14	DIR
15	Inner shield
Case	Shield

JZSP-CLL30-□□-E Linear Encoder Cables



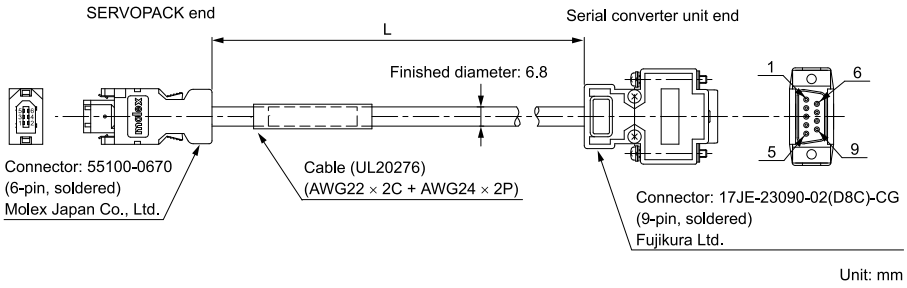
Unit: mm

- Wiring Specifications

Serial converter unit end / Linear encoder end

Pin	Signal	Pin	Signal
1	cos (A+)	1	cos (A+)
2	0 V	2	0 V
3	sin (B+)	3	sin (B+)
4	+5 V	4	+5 V
5	–	5	–
6	–	6	–
7	/Ref (R-)	7	/Ref (R-)
8	–	8	–
9	/cos (A-)	9	/cos (A-)
10	0 Vs	10	0 Vs
11	/sin (B-)	11	/sin (B-)
12	5 Vs	12	5 Vs
13	–	13	–
14	Ref (R+)	14	Ref (R+)
15	–	15	–
Case	Shield	Case	Shield

JZSP-CLP70-□□-E Serial Converter Unit Cables



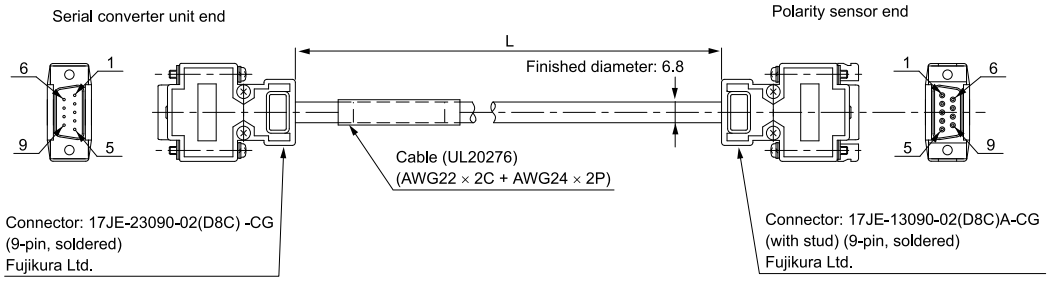
Unit: mm

- Wiring Specifications

SERVOPACK end / Serial converter unit end

Pin	Signal	Wire Color	Pin	Signal	Wire Color
1	PG5 V	Orange	1	+5 V	Orange
2	PG0 V	Green	5	0 V	Green
3	–	–	3	–	–
4	–	–	4	–	–
5	PS	Light blue/red	2	Phase-S output	Light blue/red
6	/PS	Light blue/black	6	/Phase-S output	Light blue/black
Shell	Shield	–	Case	Shield	–
			7	–	–
			8	–	–
			9	–	–

JZSP-CLL10-□□-E Sensor Cables



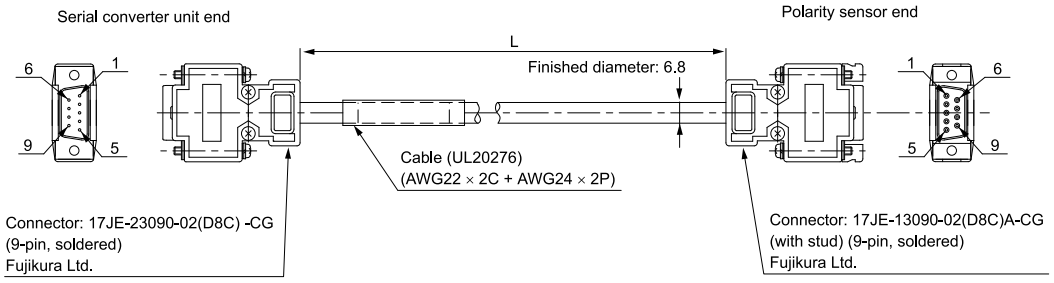
Unit: mm

- Wiring Specifications

Serial converter unit end / Polarity sensor end

Pin	Signal	Pin	Signal
1	+5 V	1	+5 V
2	Phase-U input	2	Phase-U input
3	Phase-V input	3	Phase-V input
4	Phase-W input	4	Phase-W input
5	0 V	5	0 V
6	–	6	–
7	–	7	–
8	–	8	–
9	–	9	–
Case	Shield	Case	Shield

JZSP-CL2L100-□□-E Sensor Cables



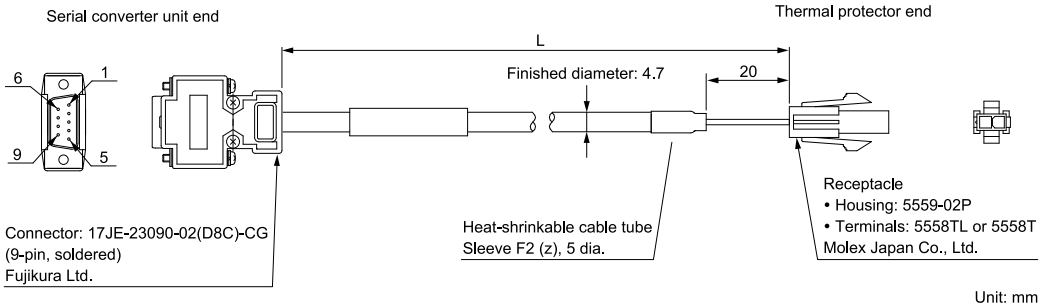
Unit: mm

- Wiring Specifications

Serial converter unit end / Polarity sensor end

Pin	Signal	Pin	Signal
1	+5 V, Thermal protector	1	+5 V, Thermal protector
2	Phase-U input	2	Phase-U input
3	Phase-V input	3	Phase-V input
4	Phase-W input	4	Phase-W input
5	0 V	5	0 V
6	–	6	–
7	–	7	–
8	–	8	–
9	Thermal protector	9	Thermal protector
Case	Shield	Case	Shield

JZSP-CL2TH00-□□-E Sensor Cables



- Wiring Specifications

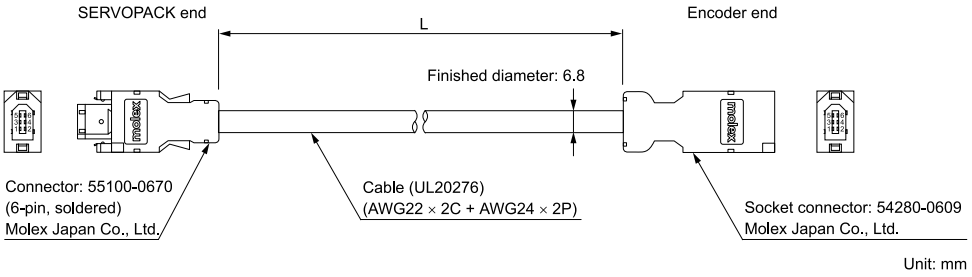
Serial converter unit end

Pin	Signal
1	+5V, Thermal protector
2	–
3	–
4	–
5	–
6	–
7	–
8	–
9	Thermal protector

Thermal protector end

Pin	Signal
1	+5V, Thermal protector
2	Thermal protector

Encoder Cables: JZSP-CMP00-□□-E (standard cables) and JZSP-CMP10-□□-E (flexible cables)



- Wiring Specifications

Standard Cable

SERVOPACK end

Pin	Signal
1	PG 5 V
2	PG 0 V
5	PS
6	/PS
Shell	FG

Shield wire

Encoder end

Pin	Wire Color
1	Red
2	Black
5	Light blue
6	Light blue/white
7	FG shield wire

Flexible Cable

SERVOPACK end

Pin	Signal
1	PG 5 V
2	PG 0 V
5	PS
6	/PS
Shell	FG

Shield wire

Encoder end

Pin	Wire Color
1	Orange
2	Light green
5	Red/light blue
6	Black/light blue
7	FG shield wire

Note:

Always connect the shield wire from the encoder cable to the connector case (shell).

Wiring Precautions

Precautions for Standard Cables

Do not use standard cables in applications that require a high degree of flexibility, such as twisting and turning, or in which the cables themselves must move. When you use standard cables, observe the recommended bending radius given in the following table and perform all wiring so that stress is not applied to the cables. Use the cables so that they are not repeatedly bent.

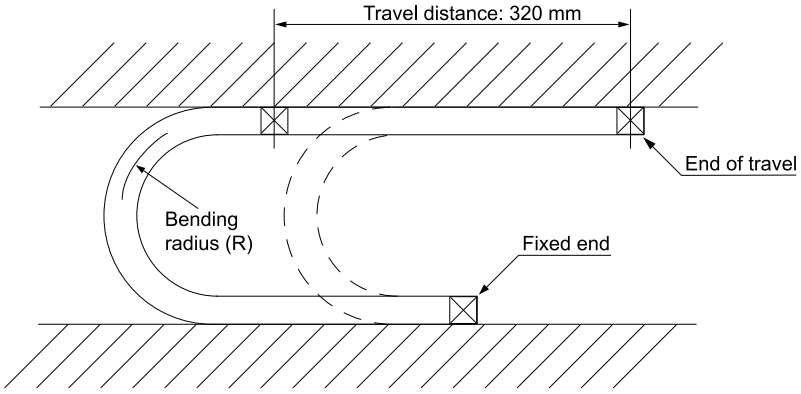
Cable Diameter	Recommended Bending Radius (R)
Less than 8 mm	15 mm min.
8 mm	20 mm min.
Over 8 mm	Cable diameter × 3 mm min.

Precautions for Flexible Cables

The flexible cables have a service life of 10,000,000 operations minimum when used at the recommended bending radius (R) or larger under the following test conditions. The service life of a flexible cable is reference data under the following test conditions. The service life of a flexible cable greatly depends on the amount of mechanical shock, how the cable is attached, and how the cable is secured.

■ Test Conditions

- One end of the cable is repeatedly moved forward and backward for 320 mm using the test equipment shown in the following figure.
- The fixed end is connected to a non-moving part, the moving end is connected to the moving part, and the number of cable return operations until a lead wire breaks are counted. One round trip is counted as one bend.



Note:

The service life of a flexible cable indicates the number of bends while the lead wires are electrically charged for which no cracks or damage that affects the performance of the cable sheathing occurs.

■ Recommended Cable Bending Radius

Type	Model	Recommended Bending Radius (R) [mm]
Linear Servomotor Main Circuit Cables	JZSP-CLN11-□□-E	35
	JZSP-CLN21-□□-E	75
	JZSP-CLN39-□□-E	100
	JZSP-CLN14-□□-E	35
	JZSP-CL2N803-□□-E	70
	JZSP-CL2N703-□□-E	50
	JZSP-CL2N603-□□-E	60
	JZSP-CL2N503-□□-E	70
	DP9325252-□G	70
Linear Encoder Cables	JZSP-CLL00-□□-E	57
	JZSP-CLL30-□□-E	
Sensor Cables	JZSP-CLL10-□□-E	46
	JZSP-CL2L100-□□-E	
	JZSP-CL2TH00-□□-E	
Serial Converter Unit Cables	JZSP-CLP70-□□-E	
Cables with Connectors on Both Ends (For Incremental or Absolute Encoder)	JZSP-CMP10-□□-E	46
Cables without Connectors	JZSP-CSP39-□□-E	

SERVOPACK

Σ-XS Models with Analog Voltage/Pulse Train References

Interpreting SERVOPACK Model Numbers

SGDXS - R70 A 00 A 0001 00 B

Σ-X-Series
Σ-XS model

❶ ❷ ❸ ❹ ❺ ❻ ❼

❶ Maximum Applicable Motor Capacity

Voltage	Code	Specification
Three-Phase, 200 VAC	R70*1	0.05 kW
	R90*1	0.1 kW
	1R6*1	0.2 kW
	2R8*1	0.4 kW
	3R8	0.5 kW
	5R5*1	0.75 kW
	7R6	1.0 kW
	120*2	1.5 kW
	180	2.0 kW
	200	3.0 kW
	330	5.0 kW
	470	6.0 kW
	550	7.5 kW
	590	11 kW
	780	15 kW

❷ Voltage

Code	Specification
A	200 VAC

❸ Interface*3

Code	Specification
00	Analog voltage/pulse train reference

❹ Design Revision Order

A

❺ Hardware Options Specification

Code	Specification	Applicable Models
None	Without options	All models
0000		
0001	Rack-mounted	SGDXS-R70A to -330A
	Duct-ventilated	SGDXS-470A to -780A
0002	Varnished	All models
0008	Single-phase, 200-VAC power supply input	SGDXS-120A
0020*4	No dynamic brake	SGDXS-R70A to -2R8A
	External dynamic brake resistor	SGDXS-3R8A to -780A

❻ FT Specification

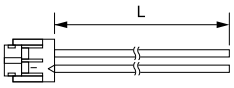
Code	Specification
None	None
00	

❼ BTO Specification (under development)

Code	Specification
None	None
B	BTO specification

*1 You can use these models with either a single-phase or three-phase input.
*2 A model with a single-phase, 200-VAC power supply input is available as a hardware option specification. (Model: SGDXS-120A00A0008)
*3 The same SERVOPACKs are used for both rotary servomotors and linear servomotors.
*4 Refer to the following manual for details.

Σ-X-Series Σ-XS/Σ-XW/Σ-XT SERVOPACK with Dynamic Brake Hardware Option Specifications Product Manual (Manual No.: SIEP C710812 14)

Length (L)	Order Number	Appearance
1 m	JZSP-CA01-E	

Ratings and Specifications

This section gives the ratings and specifications of SERVOPACKs.

Ratings

■ Three-phase, 200 VAC

Model SGDXS-			R70A	R90A	1R6A	2R8A	3R8A	5R5A	7R6A	120A	180A	200A	330A
Maximum Applicable Motor Capacity [kW]			0.05	0.1	0.2	0.4	0.5	0.75	1.0	1.5	2.0	3.0	5.0
Continuous Output Current [Arms]			0.66	0.91	1.6	2.8	3.8	5.5	7.6	11.6	18.5	19.6	32.9
Instantaneous Maximum Output Current [Arms]			2.1	3.2	5.9	9.3	11	16.9	17	28	42	56	84
Main Circuit	Power Supply		200 VAC to 240 VAC, 50 Hz/60 Hz										
	Allowable Voltage Fluctuation		-15% to +10%										
	Input Current [Arms] *1		0.4	0.8	1.3	2.5	3.0	4.1	5.7	7.3	10	15	25
Control	Power Supply		200 VAC to 240 VAC, 50 Hz/60 Hz										
	Allowable Voltage Fluctuation		-15% to +10%										
	Input Current [Arms] *1		0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.25	0.25	0.3
Power Supply Capacity [kVA] *1			0.2	0.3	0.5	1.0	1.3	1.6	2.3	3.2	4.0	5.9	7.5
Power Loss *1	Main Circuit Power Loss [W]		5.0	7.0	11.9	22.5	28.5	38.9	49.2	72.6	104.2	114.2	226.6
	Control Circuit Power Loss [W]		12	12	12	12	14	14	14	15	16	16	19
	Total Power Loss [W]		17.0	19.0	23.9	34.5	42.5	52.9	63.2	87.6	120.2	130.2	245.6
Regenerative Resistor	Built-In Regenerative Resistor	Resistance [Ω]	–	–	–	–	35	35	35	20	12	10	6
		Capacity [W]	–	–	–	–	60	60	60	60	60	60	180
		Allowable Power Consumption [W]	–	–	–	–	15	15	15	30	30	30	36
	Minimum Allowable External Resistance [Ω]		40	40	40	40	35	35	35	20	12	10	6
Overvoltage Category			III										

*1 This is the net value at the rated load.

Model SGDXS-		470A	550A	590A	780A
Maximum Applicable Motor Capacity [kW]		6.0	7.5	11	15
Continuous Output Current [Arms]		46.9	54.7	58.6	78.0
Instantaneous Maximum Output Current [Arms]		110	130	140	170
Main Circuit	Power Supply	200 VAC to 240 VAC, 50 Hz/60 Hz			
	Allowable Voltage Fluctuation	-15% to +10%			
	Input Current [Arms] *1	29	37	54	73
Control	Power Supply	200 VAC to 240 VAC, 50 Hz/60 Hz			
	Allowable Voltage Fluctuation	-15% to +10%			
	Input Current [Arms] *1	0.3	0.3	0.4	0.4
Power Supply Capacity [kVA] *1		10.7	14.6	21.7	29.6
Power Loss *1	Main Circuit Power Loss [W]	271.7	326.9	365.3	501.4
	Control Circuit Power Loss [W]	21	21	28	28
	Total Power Loss [W]	292.7	347.9	393.3	529.4
External Regenerative Resistor Unit	Resistance [Ω]	5 *2	3.13 *3	3.13 *3	3.13 *3
	Capacity [W]	880 *2	1760 *3	1760 *3	1760 *3
	Allowable Power Consumption [W]	180 *2	350 *3	350 *3	350 *3
	Minimum Allowable External Resistance [Ω]	5	2.9	2.9	2.9
Overvoltage Category		III			

*1 This is the net value at the rated load.
*2 This value is for the optional JUSP-RA29-E regenerative resistor unit.
*3 This value is for the optional JUSP-RA05-E regenerative resistor unit.

■ Single-Phase, 200 VAC

Model SGDXS-		R70A	R90A	1R6A	2R8A	5R5A	120A
Maximum Applicable Motor Capacity [kW]		0.05	0.1	0.2	0.4	0.75	1.5
Continuous Output Current [Arms]		0.66	0.91	1.6	2.8	5.5	11.6
Instantaneous Maximum Output Current [Arms]		2.1	3.2	5.9	9.3	16.9	28
Main Circuit	Power Supply	200 VAC to 240 VAC, 50 Hz/60 Hz					
	Allowable Voltage Fluctuation	-15% to +10%					
	Input Current [Arms] *1	0.8	1.6	2.4	5.0	8.7	16 *2
Control	Power Supply	200 VAC to 240 VAC, 50 Hz/60 Hz					
	Allowable Voltage Fluctuation	-15% to +10%					
	Input Current [Arms] *1	0.2	0.2	0.2	0.2	0.2	0.2
Power Supply Capacity [kVA] *1		0.2	0.3	0.6	1.2	1.9	4.0

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Model SGDXS-			R70A	R90A	1R6A	2R8A	5R5A	120A
Power Loss *1	Main Circuit Power Loss [W]		5.0	7.1	12.1	23.7	39.2	72.6
	Control Circuit Power Loss [W]		12	12	12	12	14	15
	Total Power Loss [W]		17.0	19.1	24.1	35.7	53.2	87.6
Regenerative Resistor	Built-In Regenerative Resistor	Resistance [Ω]	–	–	–	–	35	20
		Capacity [W]	–	–	–	–	60	60
		Allowable Power Consumption [W]	–	–	–	–	15	30
	Minimum Allowable External Resistance [Ω]		40	40	40	40	35	20
Overvoltage Category			III					

*1 This is the net value at the rated load.
*2 Derate to 12 Arms for UL certification.

■ 270 VDC

Model SGDXS-		R70A	R90A	1R6A	2R8A	3R8A	5R5A	7R6A	120A
Maximum Applicable Motor Capacity [kW]		0.05	0.1	0.2	0.4	0.5	0.75	1.0	1.5
Continuous Output Current [Arms]		0.66	0.91	1.6	2.8	3.8	5.5	7.6	11.6
Instantaneous Maximum Output Current [Arms]		2.1	3.2	5.9	9.3	11.0	16.9	17.0	28.0
Main Circuit	Power Supply	270 VDC to 324 VDC							
	Allowable Voltage Fluctuation	-15% to +10%							
	Input Current [Arms] *1	0.5	1.0	1.5	3.0	3.8	4.9	6.9	11
Control	Power Supply	270 VDC to 324 VDC							
	Allowable Voltage Fluctuation	-15% to +10%							
	Input Current [Arms] *1	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
Power Supply Capacity [kVA] *1		0.2	0.3	0.6	1	1.4	1.6	2.3	3.2
Power Loss *1	Main Circuit Power Loss [W]	4.4	5.9	9.8	17.5	23.0	30.7	38.7	55.8
	Control Circuit Power Loss [W]	12	12	12	12	14	14	14	15
	Total Power Loss [W]	16.4	17.9	21.8	29.5	37.0	44.7	52.7	70.8
Overvoltage Category		III							

*1 This is the net value at the rated load.

Model SGDXS-	180A	200A	330A	470A	550A	590A	780A
Maximum Applicable Motor Capacity [kW]	2.0	3.0	5.0	6.0	7.5	11.0	15.0
Continuous Output Current [Arms]	18.5	19.6	32.9	46.9	54.7	58.6	78.0
Instantaneous Maximum Output Current [Arms]	42.0	56.0	84.0	110	130	140	170

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Model SGDXS-		180A	200A	330A	470A	550A	590A	780A
Main Circuit	Power Supply	270 VDC to 324 VDC						
	Allowable Voltage Fluctuation	-15% to +10%						
	Input Current [Arms] *1	14	20	34	36	48	68	92
Control	Power Supply	270 VDC to 324 VDC						
	Allowable Voltage Fluctuation	-15% to +10%						
	Input Current [Arms] *1	0.25	0.25	0.3	0.3	0.3	0.4	0.4
Power Supply Capacity [kVA] *1		4.0	5.9	7.5	10.7	14.6	21.7	29.6
Power Loss *1	Main Circuit Power Loss [W]	82.7	83.5	146.2	211.6	255.3	243.6	343.4
	Control Circuit Power Loss [W]	16	16	19	21	21	28	28
	Total Power Loss [W]	98.7	99.5	165.2	232.6	276.3	271.6	371.4
Overvoltage Category		III						

*1 This is the net value at the rated load.

SERVOPACK Overload Protection Characteristics

The overload detection level is set for hot start conditions with a SERVOPACK surrounding air temperature of 55°C.

A.710 or A.720 (an overload alarm) will occur if overload operation that exceeds the overload protection characteristics shown in the following diagram (i.e., operation on the right side of the applicable line) is performed.

The actual overload detection level will be the detection level of the connected SERVOPACK or servomotor that has the lower overload protection characteristics.

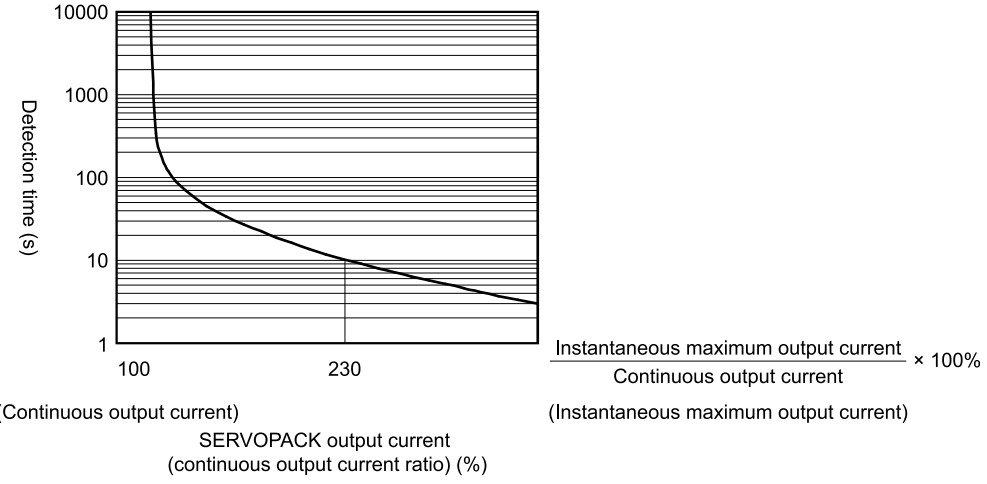


Figure .1 SGDXS-R70A, -R90A, -1R6A, -2R8A

Note:

- The above overload protection characteristics do not mean that you can perform continuous duty operation with an output of 100% or higher. For a Yaskawa-specified combination of SERVOPACK and servomotor, maintain the effective torque within the continuous duty zone of the torque-motor speed characteristic of the servomotor.
- This overload protection function is not a protection function related to speed. This product does not have a built-in thermal memory hold function.

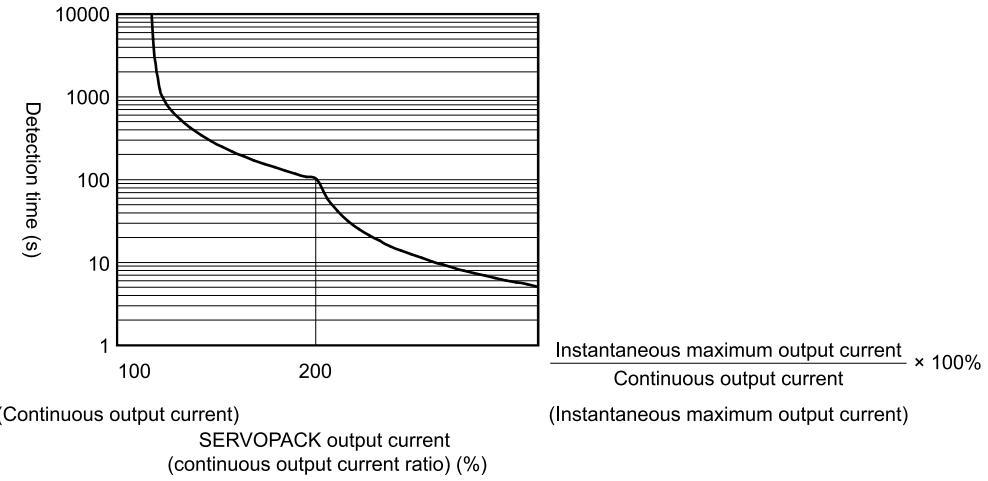


Figure .2 SGDXS-3R8A, -5R5A, -7R6A, -120A, -180A, -200A, -330A, -470A, -550A, -590A, -780A, -□□□D

Note:

- The above overload protection characteristics do not mean that you can perform continuous duty operation with an output of 100% or higher. For a Yaskawa-specified combination of SERVOPACK and servomotor, maintain the effective torque within the continuous duty zone of the torque-motor speed characteristic of the servomotor.
- This overload protection function is not a protection function related to speed. This product does not have a built-in thermal memory hold function.

Specification

■ Environmental Conditions

Item	Specification
Surrounding Air Temperature	-5°C to 55°C (With derating, usage is possible between 55°C and 60°C.) Refer to the following section for derating specifications. ☞ *Derating Specifications on page 337*
Storage Temperature *1	-20°C to 85°C
Surrounding Air Humidity	95% relative humidity max. (with no freezing or condensation)
Storage Humidity	95% relative humidity max. (with no freezing or condensation)
Vibration Resistance	When there is continuous vibration: 10 Hz to 55 Hz, acceleration amplitude 5.9 m/s^2 (0.6G)
Impact Resistance	19.6 m/s^2
Degree of Protection	IP20: Models SGDXS-R70A, -R90A, -1R6A, -2R8A, -3R8A, -5R5A, -7R6A, -120A IP10: Models SGDXS-180A, -200A, -330A, -470A, -550A, -590A, -780A, -□□□D
Pollution Degree	2 • Must be no corrosive or flammable gases. • Must be no exposure to water, oil, or chemicals. • Must be no dust, salts, or iron dust.
Altitude *1	1000 m max. (With derating, usage is possible between 1000 m and 2000 m.) Refer to the following section for derating specifications. ☞ *Derating Specifications on page 337*
Others	Do not use the SERVOPACK in the following locations: Locations subject to static electricity noise, strong electromagnetic/magnetic fields, or radioactivity

*1 If you combine a Σ-X-series SERVOPACK with a Σ-V-series option module, the following Σ-V-series SERVOPACKs specifications must be used: a surrounding air temperature of 0°C to 55°C and an altitude of 1000 m max. Also, the applicable surrounding range cannot be increased by derating.

■ I/O Signals

Item		Specification
Encoder Divided Pulse Output		Phase A, phase B, phase C: Line-driver output Number of divided output pulses: Any setting is allowed.
Overheat Protection Input		Number of input points: 1 Input voltage range: 0 V to +5 V
Sequence Input Signals	Fixed Input	Allowable voltage range: 5 VDC ±5% Number of input points: 1 (input method: sink inputs or source inputs)
		Input signal: SEN (Absolute Data Request Input) signal
	Input Signals That Can Be Allocated	Allowable voltage range: 24 VDC ±20% Number of input points: 7 (input method: sink inputs or source inputs)
		Input signals: • /S-ON (Servo ON Input) signal • /P-CON (Proportional Control Input) signal • P-OT (Forward Drive Prohibit Input) and N-OT (Reverse Drive Prohibit Input) signals • /ALM-RST (Alarm Reset Input) signal • /P-CL (Forward External Torque Limit Input) and /N-CL (Reverse External Torque Limit Input) signals • /SPD-D (Motor Direction Input) signal • /SPD-A and /SPD-B (Internal Set Speed Selection Input) signals • /C-SEL (Control Selection Input) signal • /ZCLAMP (Zero Clamping Input) signal • /INHIBIT (Reference Pulse Inhibit Input) signal • /G-SEL (Gain Selection Input) signal • /P-DET (Polarity Detection Input) signal • SEN (Absolute Data Request Input) signal • /PSEL (Reference Pulse Input Multiplication Switch Input) Signal • FSTP (Forced Stop Input) signal A signal can be allocated and the positive and negative logic can be changed.
Sequence Output Signals	Fixed Output	Allowable voltage range: 5 VDC to 30 VDC Number of output points: 1 (output method: a photocoupler output (isolated))
		Output signal: ALM (Servo Alarm Output) signal
	Output Signals That Can Be Allocated	Allowable voltage range: 5 VDC to 30 VDC Number of output points: 6 (3: output method: a photocoupler output (isolated)) (3: output method: an open-collector output (non-isolated))
		Output signals: • /COIN (Positioning Completion Output) signal • /V-CMP (Speed Coincidence Detection Output) signal • /TGON (Rotation Detection Output) Signal • /S-RDY (Servo Ready Output) Signal • /CLT (Torque Limit Detection Output) signal • /VLT (Speed Limit Detection Output) signal • /BK (Brake Output) signal • /WARN (Warning Output) signal • /NEAR (Near Output) signal • /PSELA (Reference Pulse Input Multiplication Switching Output) signal • ALO1, ALO2, and ALO3 (Alarm Code Output) signals A signal can be allocated and the positive and negative logic can be changed.

■ Function

Item			Specification
Communications	RS-422A Communications (CN3)	Interfaces	Digital Operator (JUSP-OP05A-1-E) and personal computer (with SigmaWin+)
		1:N Communications	Up to N = 15 stations possible for RS-422A port
		Axis Address Setting	Set with parameters.
	USB Communications (CN7)	Interfaces	Personal computer (with SigmaWin+), digital operator (JUSP-OP07A-E)
		Communications Standard	Conforms to USB2.0 standard (12 Mbps).
Displays/Indicators			CHARGE indicator and five-digit seven-segment display
Panel Operator			Four push switches
Analog Monitor (CN5)			Number of points: 2 Output voltage range: ±10 VDC (effective linearity range: ±8 V) Resolution: 16 bits Accuracy: ±20 mV (Typ) Maximum output current: ±10 mA
Dynamic Brake (DB)			Activated when a servo alarm or overtravel (OT) occurs, or when the power to the main circuit or servo is OFF.
Regenerative Processing			Built-in (An external resistor must be connected to the SGDXS-470A to -780A and -210D to -370D.)
Overtravel (OT) Prevention			Stopping with dynamic brake, deceleration to a stop, or coasting to a stop for the P-OT (Forward Drive Prohibit Input) or N-OT (Reverse Drive Prohibit Input) signal
Protective Functions			Overcurrent, overvoltage, undervoltage, overload, regeneration error, etc.
Utility Functions			Gain tuning, alarm history, program jogging, origin search, etc.
Safety Functions	Inputs		/HWBB1 and /HWBB2: Base block signals for power modules
	Output		EDM1: Monitors the status of built-in safety circuit (fixed output). *1
	Applicable Standards *2		ISO13849-1 PLe (Category 3) and IEC61508 SIL3

*1 Whether or not you use the EDM1 signal does not affect the performance level of safety parameters.
*2 Always perform risk assessment for the system and confirm that the safety requirements are met.

■ Option

Item	Specification
Applicable Option Modules	• Fully-Closed Modules • Advanced Safety Module (Model Number: SGDXS-OSA□□□)

Note:

Refer to the following manual for details regarding the restrictions when using an advanced safety module together with with a fully-closed module.

Σ-X-Series Advanced Safety Module Digital I/O Product Manual (Manual No.: SIEP C710812 26)

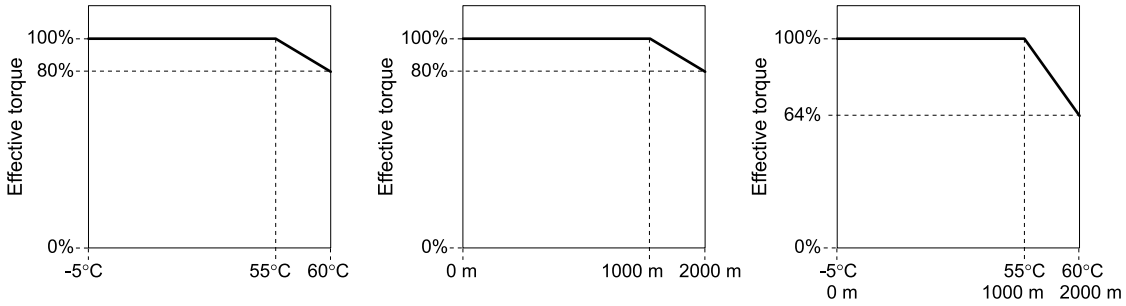
■ Control

Item				Specification
Speed Control	Soft Start Time Setting			0 s to 10 s (Can be set separately for acceleration and deceleration.)
	Input Signal		Reference Voltage	• Maximum input voltage: ±12 V (forward motor rotation for positive reference). • 6 VDC at rated speed (default setting). Input gain setting can be changed.
			Input Impedance	30 kΩ
			Circuit Time Constant	30 μs
	Internal Set Speed Control		Rotation Direction Selection	With /P-CON (Proportional Control Input) signal.
			Speed Selection	With Forward/Reverse External Torque Limit signals (speed 1 to 3 selection). Servomotor stops or another control method is used when both signals are OFF.
Position Control	Feedforward Compensation			0% to 100%
	Output Signal Positioning Completed Width Setting			0 to 1073741824 reference units
	Input Signal	Reference Pulses	Reference Pulse Form	One of the following is selected: Sign + pulse train, CW + CCW pulse trains, and two-phase pulse trains with 90° phase differential
			Input Form	Line driver or open collector
			Maximum Input Frequency	• Line Driver Sign + pulse train or CW + CCW pulse trains: 4 Mpps Two-phase pulse trains with 90° phase differential: 1 Mpps • Open Collector Sign + pulse train or CW + CCW pulse trains: 200 kpps Two-phase pulse trains with 90° phase differential: 200 kpps
			Input Multiplication Switching	1 to 100 times
		Clear Signal		Position deviation clear Line driver or open collector
Torque Control	Input Signal		Reference Voltage	• Maximum input voltage: ±12 V (forward torque output for positive reference). • 3 VDC at rated torque (default setting). Input gain setting can be changed.
			Input Impedance	30 kΩ
			Circuit Time Constant	16 μs

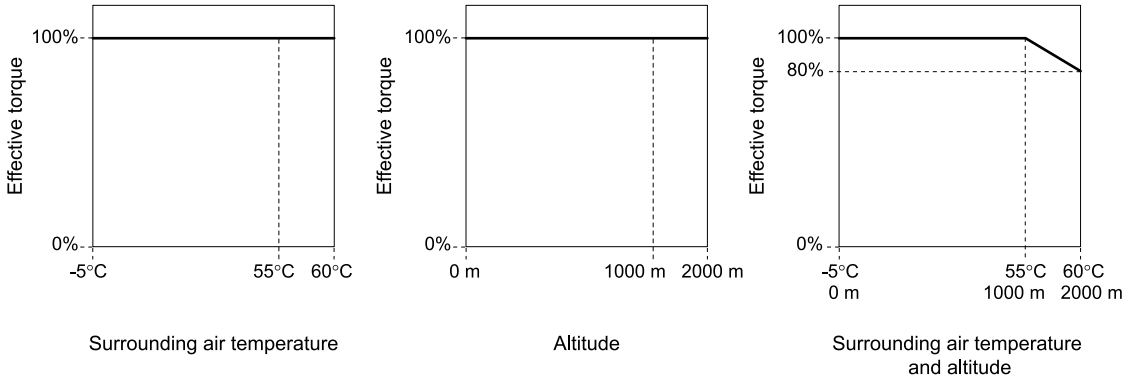
Derating Specifications

If you use the SERVOPACK at a surrounding air temperature of 55°C to 60°C or at an altitude of 1000 m to 2000 m, you must apply the derating rates given in the following graphs.

■ SGDXS-R70A, -R90A, -1R6A, -2R8A, -□□□D



■ SGDXS-3R8A, -5R5A, -7R6A, -120A, -180A, -200A, -330A, -470A, -550A, -590A, -780A

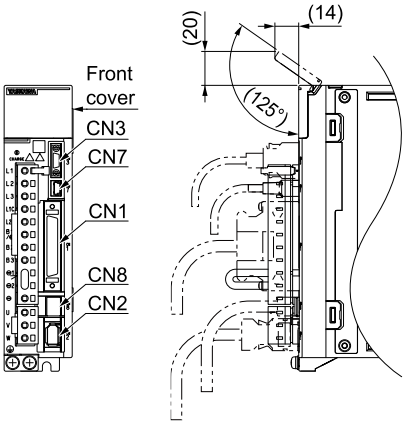


External Dimensions

Front Cover Dimensions and Connector Specifications

The connector shapes and pin assignments depend on the interfaces of the SERVOPACK. Refer to the following figures and table.

■ Front Cover Dimensions



■ Connector Specifications

Connector No.	Model	Number of Pins	Manufacturer
CN1	10250-52A2PL	50	3M Japan Limited
CN2	53984-0681	6	Molex Japan Co., Ltd.
CN3	HDR-EC14LFDTN-SLD-PLUS	14	Honda Tsushin Kogyo Co., Ltd.
CN7	2342993-1	5	TE Connectivity Japan G.K.
CN8	2294415-1	8	TE Connectivity Japan G.K.

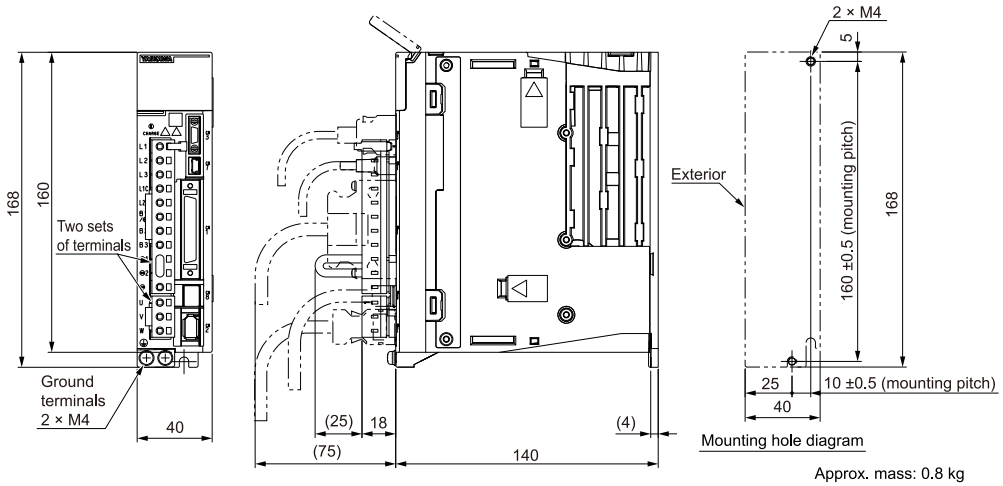
Note:

The above connectors or their equivalents are used for the SERVOPACKs.

SERVOPACK External Dimensions

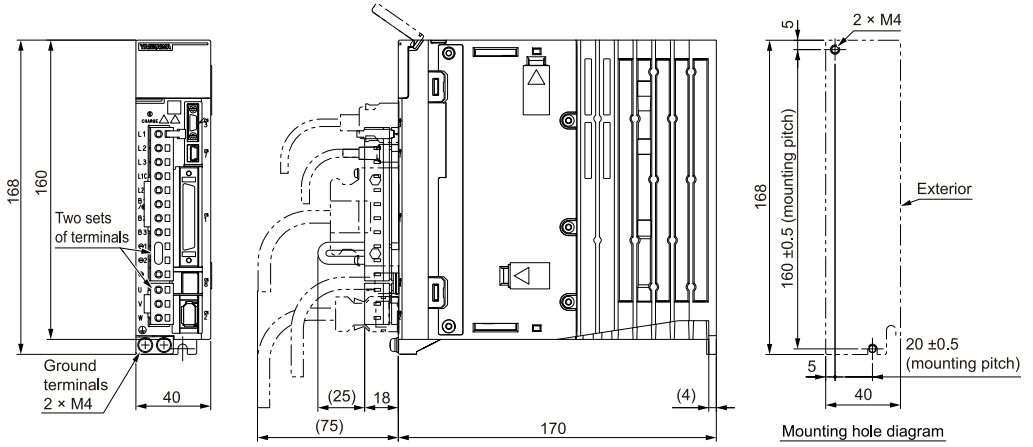
■ Base-mounted SERVOPACKs

◆ SGDXS-R70A, -R90A, -1R6A



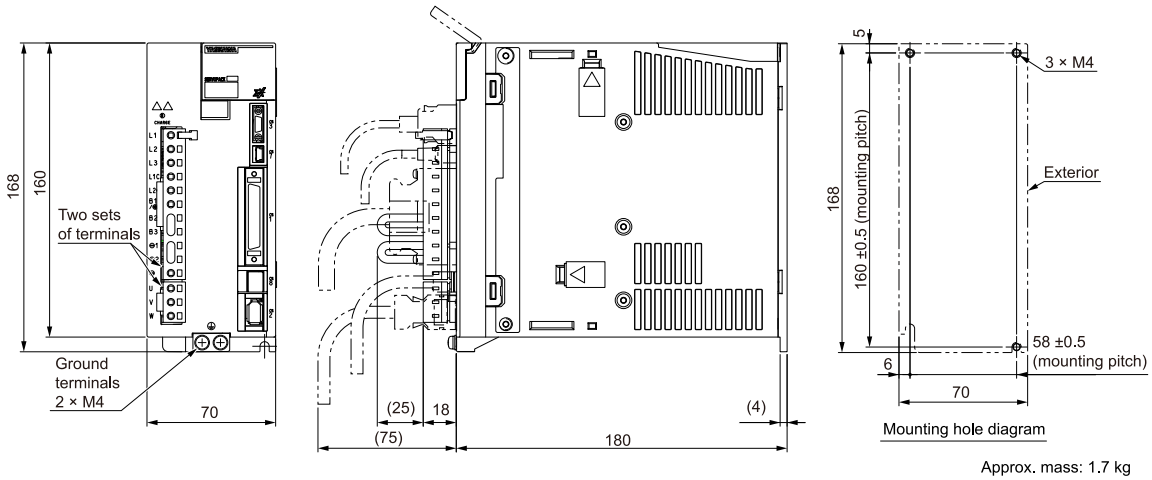
Approx. mass: 0.8 kg
Unit: mm

◆ SGDXS-2R8A



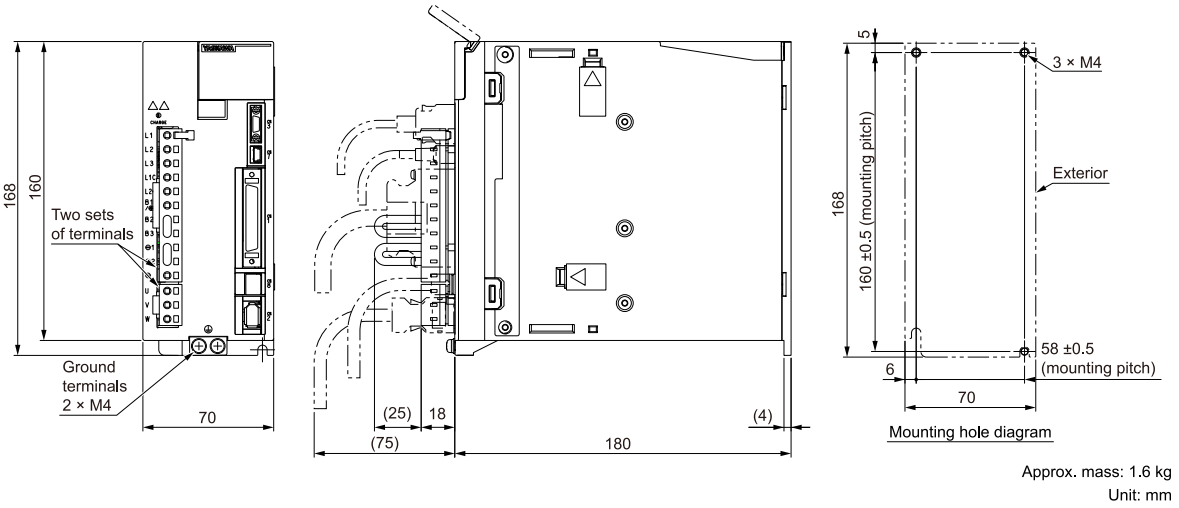
Approx. mass: 1.1 kg
Unit: mm

◆ SGDXS-3R8A



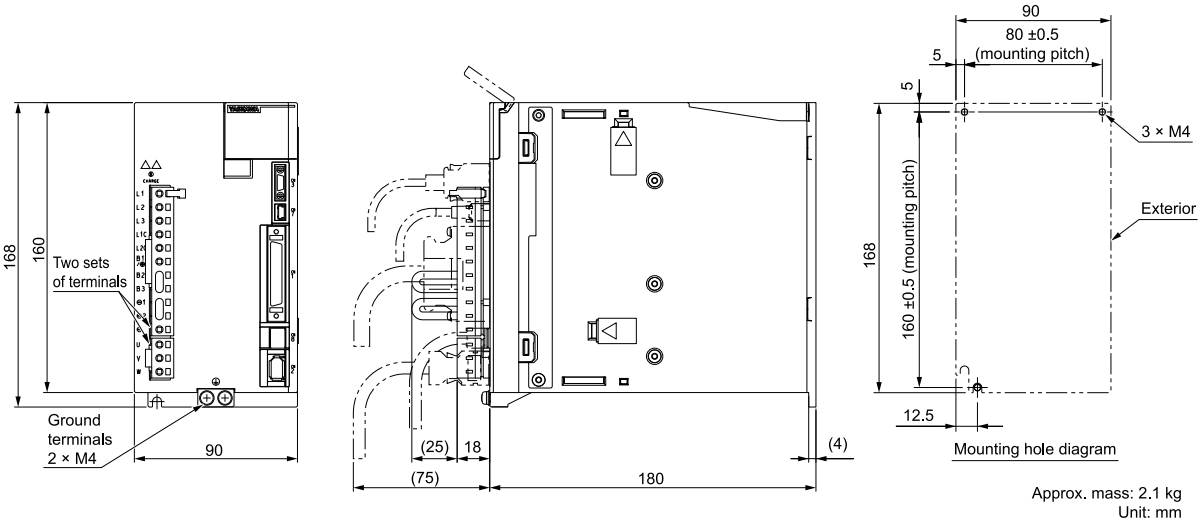
Approx. mass: 1.7 kg
Unit: mm

◆ SGDXS-5R5A, -7R6A



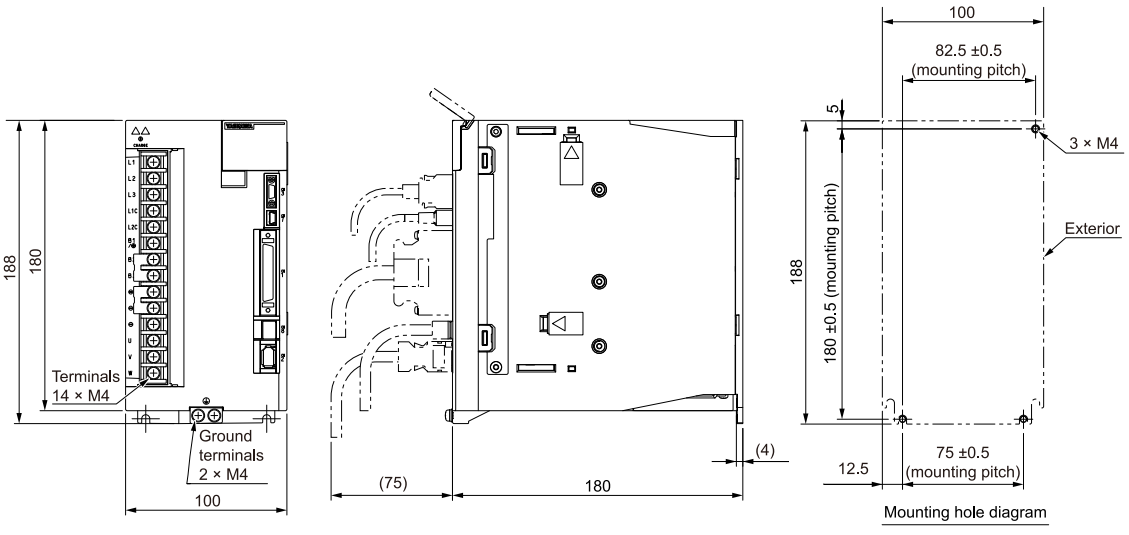
Approx. mass: 1.6 kg
Unit: mm

◆ SGDXS-120A



Approx. mass: 2.1 kg
Unit: mm

◆ SGDXS-180A, -200A

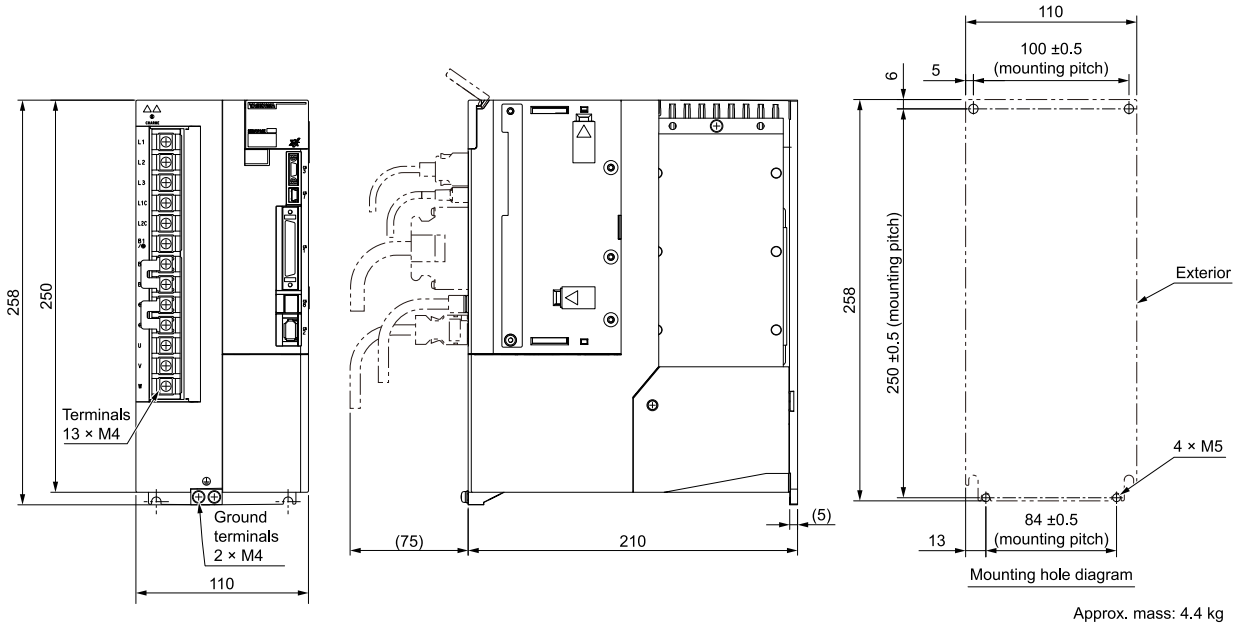


Approx. mass: 2.8 kg
Unit: mm

Note:

These drawings show the SERVOPACK with the terminal cover removed.

◆ SGDXS-330A

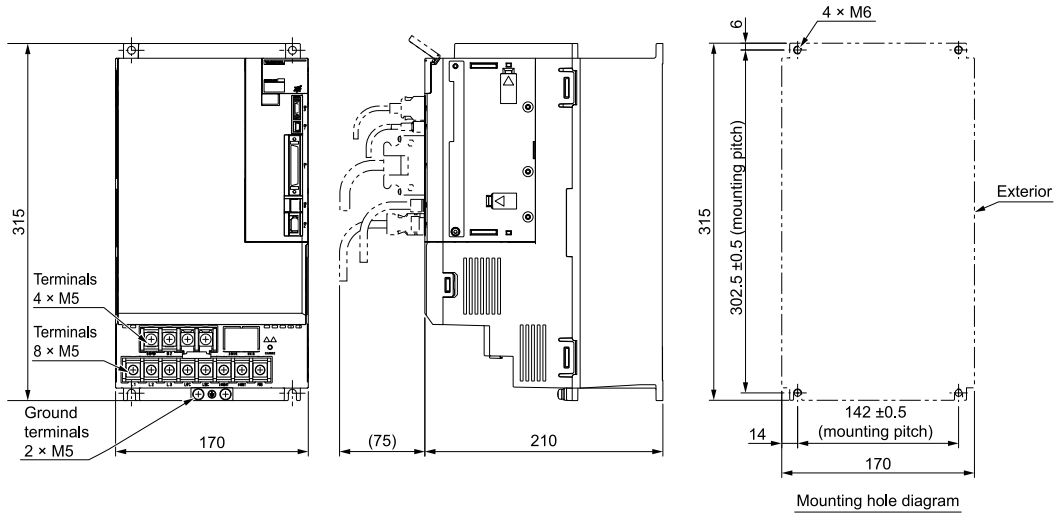


Approx. mass: 4.4 kg
Unit: mm

Note:

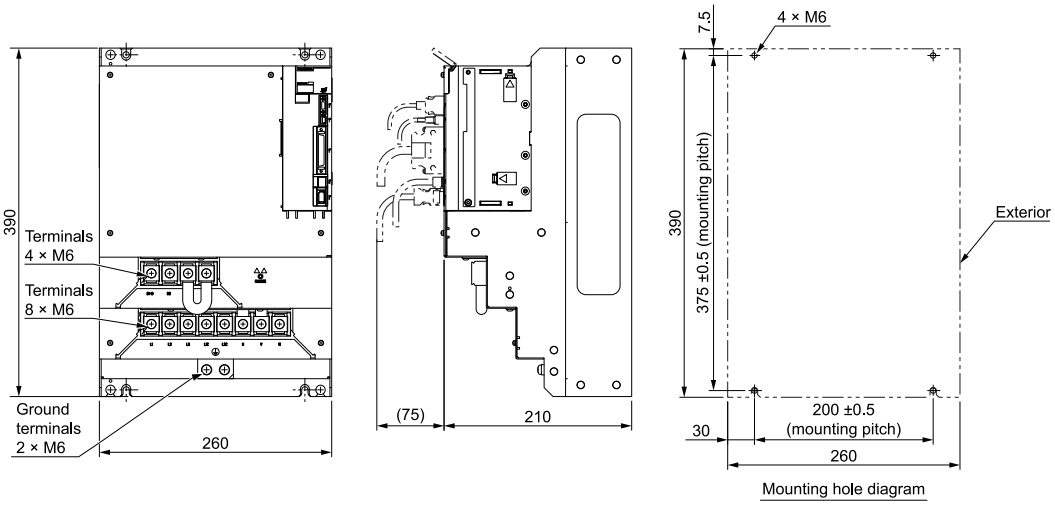
These drawings show the SERVOPACK with the terminal cover removed.

◆ SGDXS-470A, -550A



Approx. mass: 9.0 kg
Unit: mm

◆ SGDXS-590A, -780A

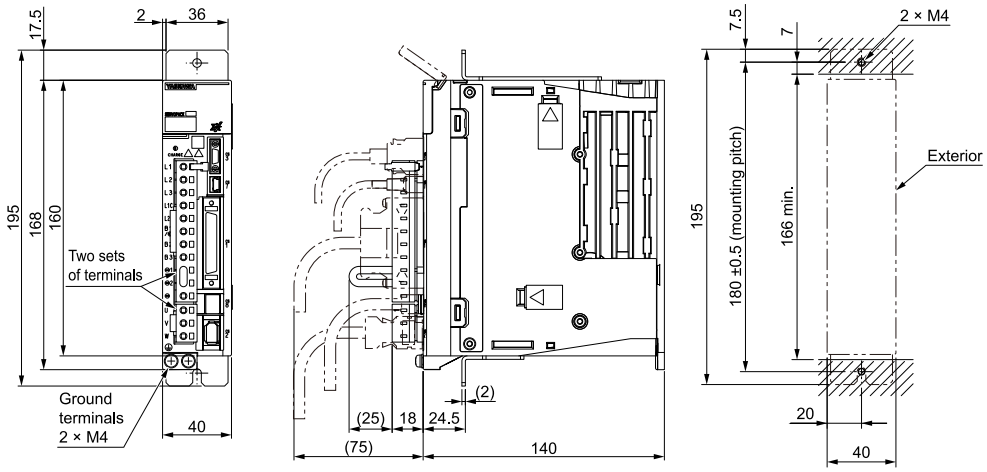


Approx. mass: 16 kg
Unit: mm

■ Rack-mounted SERVOPACKs

Hardware Option Code: 0001

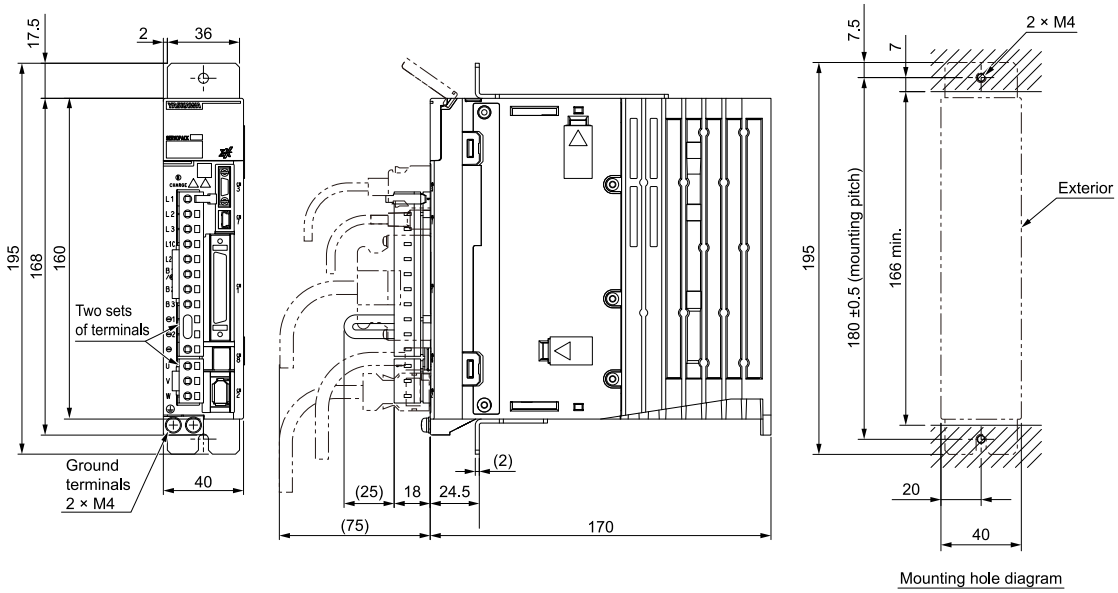
◆ SGDXS-R70A, -R90A, -1R6A



Mounting hole diagram

Approx. mass: 0.9 kg
Unit: mm

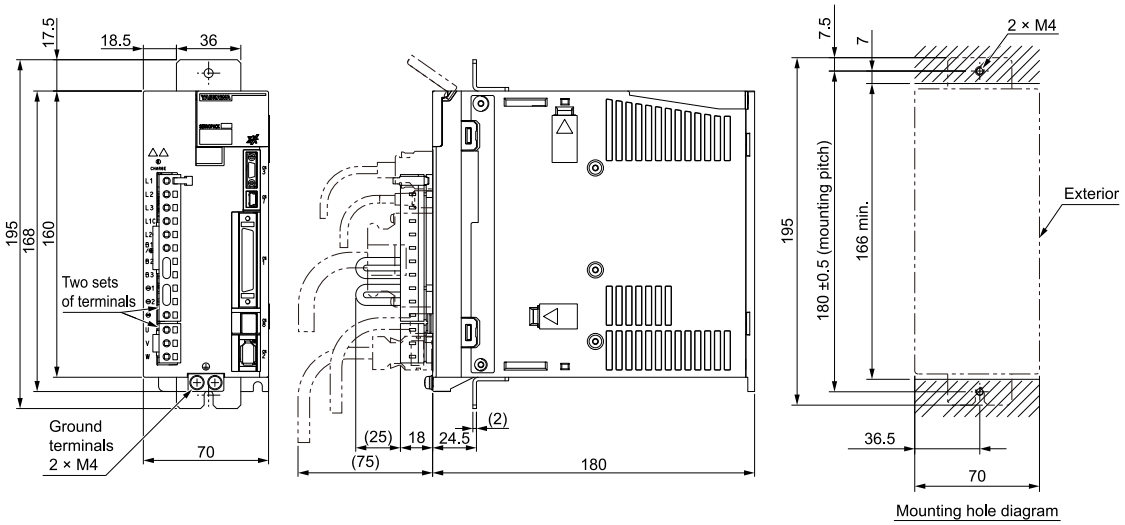
◆ SGDXS-2R8A



Mounting hole diagram

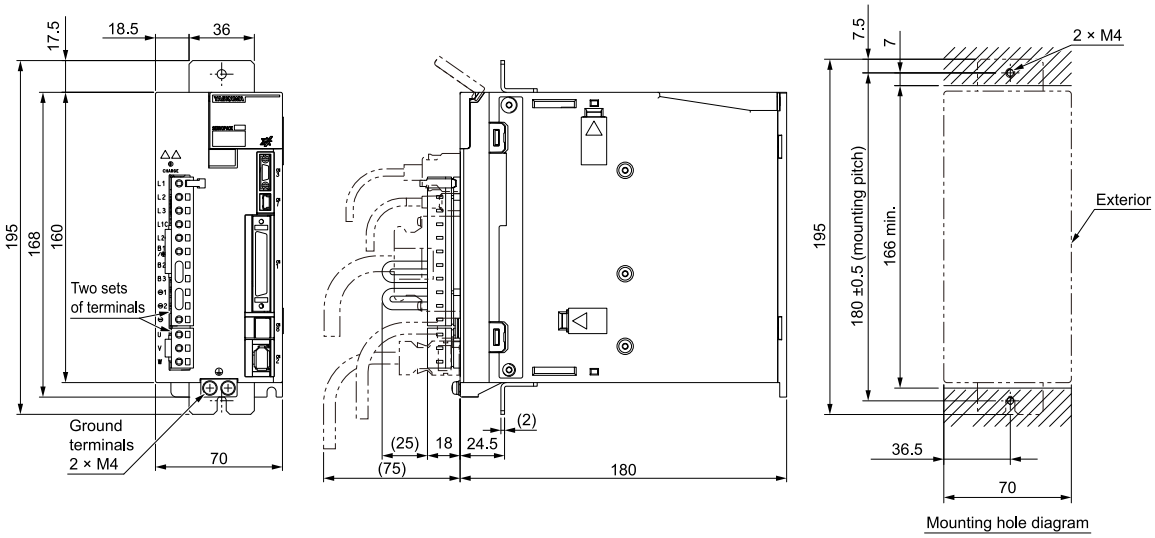
Approx. mass: 1.1 kg
Unit: mm

◆ SGDXS-3R8A



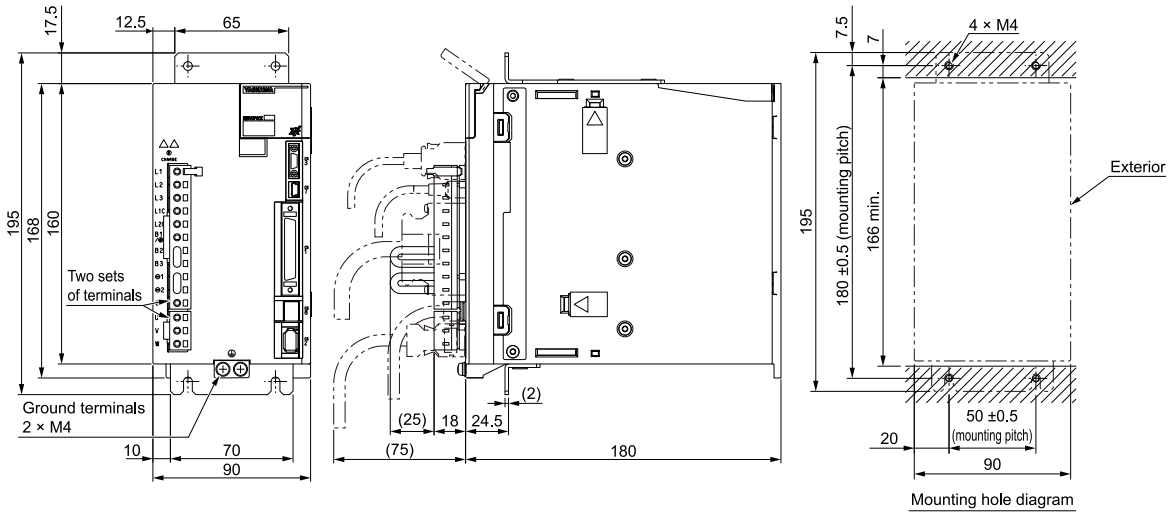
Approx. mass: 1.7 kg
Unit: mm

◆ SGDXS-5R5A, -7R6A



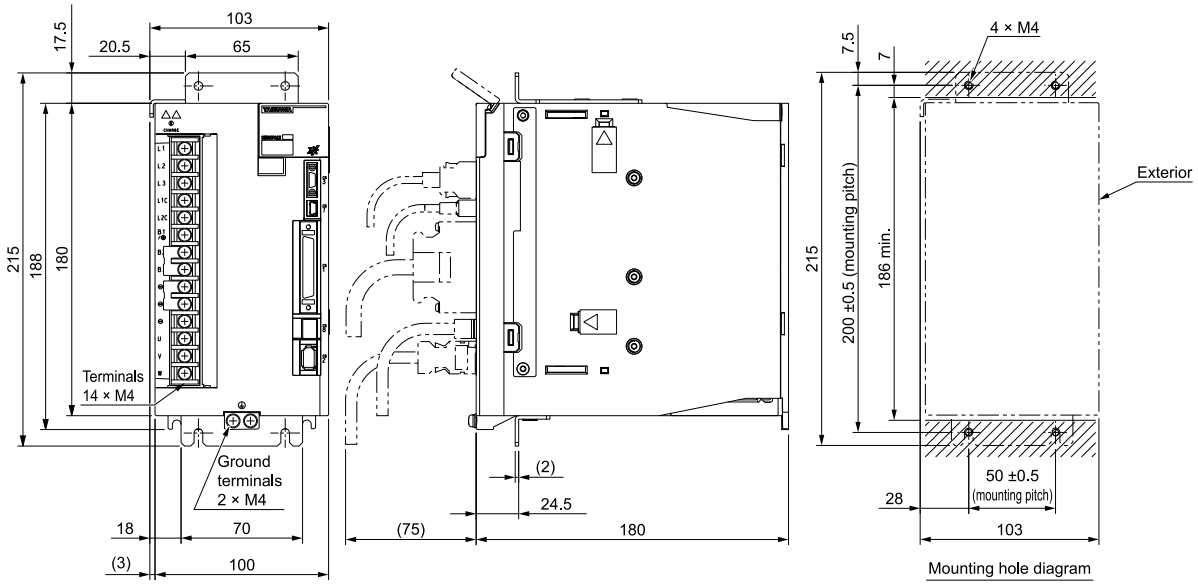
Approx. mass: 1.7 kg
Unit: mm

◆ SGDXS-120A



Approx. mass: 2.2 kg
Unit: mm

◆ SGDXS-180A, -200A

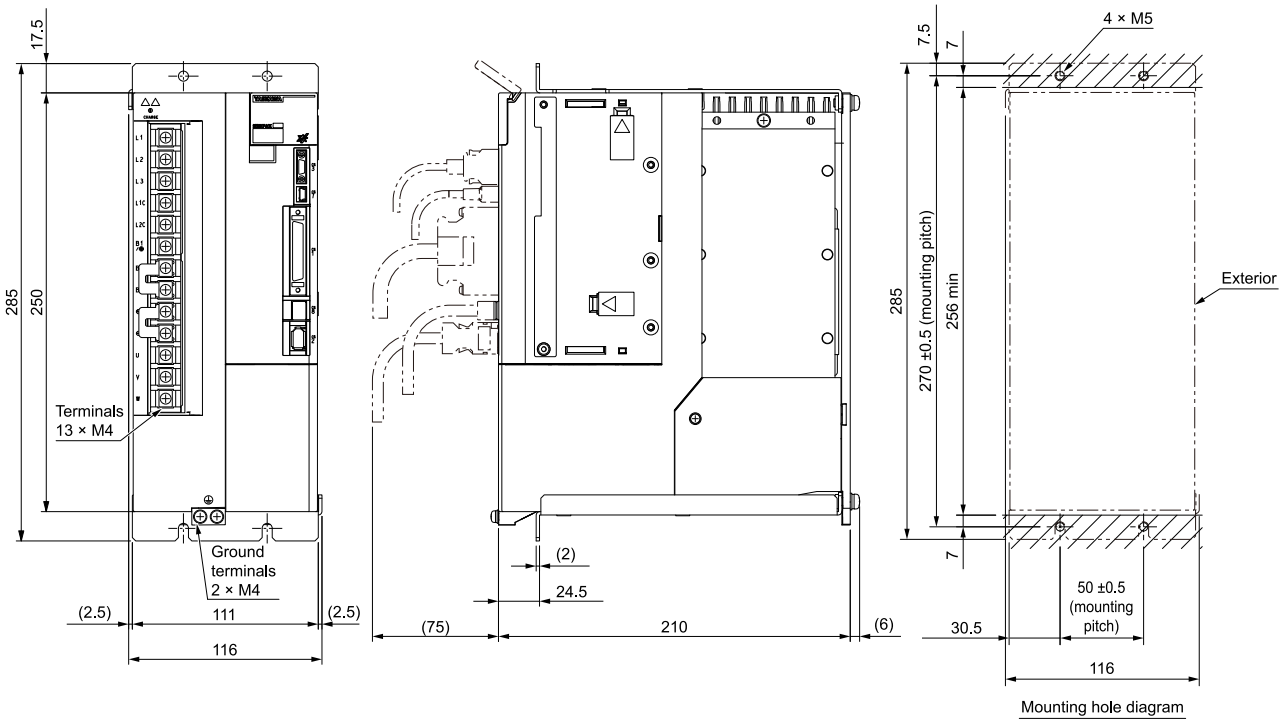


Approx. mass: 2.9 kg
Unit: mm

Note:

These drawings show the SERVOPACK with the terminal cover removed.

◆ SGDXS-330A



Approx. mass: 4.9 kg
Unit: mm

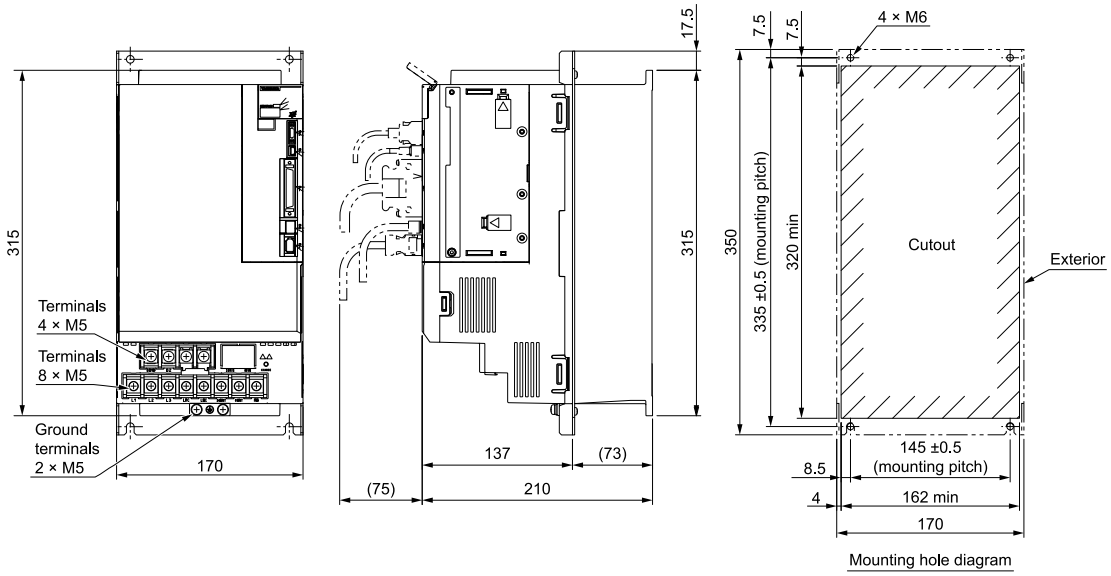
Note:

These drawings show the SERVOPACK with the terminal cover removed.

■ Duct-ventilated SERVOPACKs

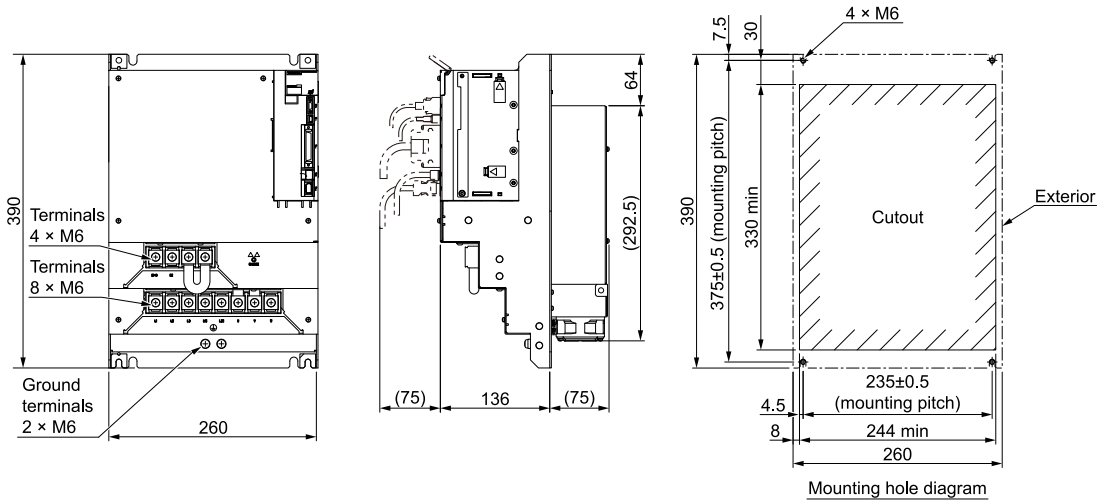
Hardware Option Code: 0001

◆ SGDXS-470A, -550A



Approx. mass: 9.0 kg
Unit: mm

◆ SGDXS-590A, -780A



Approx. mass: 15 kg
Unit: mm

Σ-XS Models with MECHATROLINK-4/III Communications

Interpreting SERVOPACK Model Numbers

SGDXS - R70 ❶ A ❷ 40 ❸ A ❹ 0001 ❺ 00 ❻ B ❼

Σ-X-Series
Σ-XS model

❶ Maximum Applicable Motor Capacity

Voltage	Code	Specification
Three-Phase, 200 VAC	R70*1	0.05 kW
	R90*1	0.1 kW
	1R6*1	0.2 kW
	2R8*1	0.4 kW
	3R8	0.5 kW
	5R5*1	0.75 kW
	7R6	1.0 kW
	120*2	1.5 kW
	180	2.0 kW
	200	3.0 kW
	330	5.0 kW
	470	6.0 kW
	550	7.5 kW
	590	11 kW
	780	15 kW

❷ Voltage

Code	Specification
A	200 VAC

❸ Interface*3

Code	Specification
40	MECHATROLINK-4/III communications reference

❹ Design Revision Order

A

❺ Hardware Options Specification

Code	Specification	Applicable Models
None	Without options	All models
0000		
0001	Rack-mounted	SGDXS-R70A to -330A
	Duct-ventilated	SGDXS-470A to -780A
0002	Varnished	All models
0008	Single-phase, 200-VAC power supply input	SGDXS-120A
0020*4	No dynamic brake	SGDXS-R70A to -2R8A
	External dynamic brake resistor	SGDXS-3R8A to -780A

❻ FT Specification

Code	Specification
None	None
00	

❼ BTO Specification (under development)

Code	Specification
None	None
B	BTO specification

*1 You can use these models with either a single-phase or three-phase input.
*2 A model with a single-phase, 200-VAC power supply input is available as a hardware option specification. (model: SGDXS-120A40A0008)
*3 The same SERVOPACKs are used for both rotary servomotors and linear servomotors.
*4 Refer to the following manual for details.

Σ-X-Series Σ-XS/Σ-XW/Σ-XT SERVOPACK with Dynamic Brake Hardware Option Specifications Product Manual (Manual No.: SIEP C710812 14)

Ratings and Specifications

This section gives the ratings and specifications of SERVOPACKs.

Ratings

■ Three-phase, 200 VAC

Model SGDXS-			R70A	R90A	1R6A	2R8A	3R8A	5R5A	7R6A	120A	180A	200A	330A
Maximum Applicable Motor Capacity [kW]			0.05	0.1	0.2	0.4	0.5	0.75	1.0	1.5	2.0	3.0	5.0
Continuous Output Current [Arms]			0.66	0.91	1.6	2.8	3.8	5.5	7.6	11.6	18.5	19.6	32.9
Instantaneous Maximum Output Current [Arms]			2.1	3.2	5.9	9.3	11	16.9	17	28	42	56	84
Main Circuit	Power Supply		200 VAC to 240 VAC, 50 Hz/60 Hz										
	Allowable Voltage Fluctuation		-15% to +10%										
	Input Current [Arms] *1		0.4	0.8	1.3	2.5	3.0	4.1	5.7	7.3	10	15	25
Control	Power Supply		200 VAC to 240 VAC, 50 Hz/60 Hz										
	Allowable Voltage Fluctuation		-15% to +10%										
	Input Current [Arms] *1		0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.25	0.25	0.3
Power Supply Capacity [kVA] *1			0.2	0.3	0.5	1.0	1.3	1.6	2.3	3.2	4.0	5.9	7.5
Power Loss *1	Main Circuit Power Loss [W]		5.0	7.0	11.9	22.5	28.5	38.9	49.2	72.6	104.2	114.2	226.6
	Control Circuit Power Loss [W]		12	12	12	12	14	14	14	15	16	16	19
	Total Power Loss [W]		17.0	19.0	23.9	34.5	42.5	52.9	63.2	87.6	120.2	130.2	245.6
Regenerative Resistor	Built-In Regenerative Resistor	Resistance [Ω]	–	–	–	–	35	35	35	20	12	10	6
		Capacity [W]	–	–	–	–	60	60	60	60	60	60	180
		Allowable Power Consumption [W]	–	–	–	–	15	15	15	30	30	30	36
	Minimum Allowable External Resistance [Ω]		40	40	40	40	35	35	35	20	12	10	6
Overvoltage Category			III										

*1 This is the net value at the rated load.

Model SGDXS-		470A	550A	590A	780A
Maximum Applicable Motor Capacity [kW]		6.0	7.5	11	15
Continuous Output Current [Arms]		46.9	54.7	58.6	78.0
Instantaneous Maximum Output Current [Arms]		110	130	140	170
Main Circuit	Power Supply	200 VAC to 240 VAC, 50 Hz/60 Hz			
	Allowable Voltage Fluctuation	-15% to +10%			
	Input Current [Arms] *1	29	37	54	73
Control	Power Supply	200 VAC to 240 VAC, 50 Hz/60 Hz			
	Allowable Voltage Fluctuation	-15% to +10%			
	Input Current [Arms] *1	0.3	0.3	0.4	0.4
Power Supply Capacity [kVA] *1		10.7	14.6	21.7	29.6
Power Loss *1	Main Circuit Power Loss [W]	271.7	326.9	365.3	501.4
	Control Circuit Power Loss [W]	21	21	28	28
	Total Power Loss [W]	292.7	347.9	393.3	529.4
External Regenerative Resistor Unit	Resistance [Ω]	5 *2	3.13 *3	3.13 *3	3.13 *3
	Capacity [W]	880 *2	1760 *3	1760 *3	1760 *3
	Allowable Power Consumption [W]	180 *2	350 *3	350 *3	350 *3
	Minimum Allowable External Resistance [Ω]	5	2.9	2.9	2.9
Overvoltage Category		III			

*1 This is the net value at the rated load.
*2 This value is for the optional JUSP-RA29-E regenerative resistor unit.
*3 This value is for the optional JUSP-RA05-E regenerative resistor unit.

■ Single-Phase, 200 VAC

Model SGDXS-		R70A	R90A	1R6A	2R8A	5R5A	120A
Maximum Applicable Motor Capacity [kW]		0.05	0.1	0.2	0.4	0.75	1.5
Continuous Output Current [Arms]		0.66	0.91	1.6	2.8	5.5	11.6
Instantaneous Maximum Output Current [Arms]		2.1	3.2	5.9	9.3	16.9	28
Main Circuit	Power Supply	200 VAC to 240 VAC, 50 Hz/60 Hz					
	Allowable Voltage Fluctuation	-15% to +10%					
	Input Current [Arms] *1	0.8	1.6	2.4	5.0	8.7	16 *2
Control	Power Supply	200 VAC to 240 VAC, 50 Hz/60 Hz					
	Allowable Voltage Fluctuation	-15% to +10%					
	Input Current [Arms] *1	0.2	0.2	0.2	0.2	0.2	0.2
Power Supply Capacity [kVA] *1		0.2	0.3	0.6	1.2	1.9	4.0

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Model SGDXS-			R70A	R90A	1R6A	2R8A	5R5A	120A
Power Loss *1	Main Circuit Power Loss [W]		5.0	7.1	12.1	23.7	39.2	72.6
	Control Circuit Power Loss [W]		12	12	12	12	14	15
	Total Power Loss [W]		17.0	19.1	24.1	35.7	53.2	87.6
Regenerative Resistor	Built-In Regenerative Resistor	Resistance [Ω]	–	–	–	–	35	20
		Capacity [W]	–	–	–	–	60	60
		Allowable Power Consumption [W]	–	–	–	–	15	30
	Minimum Allowable External Resistance [Ω]		40	40	40	40	35	20
Overvoltage Category			III					

*1 This is the net value at the rated load.
*2 Derate to 12 Arms for UL certification.

■ 270 VDC

Model SGDXS-		R70A	R90A	1R6A	2R8A	3R8A	5R5A	7R6A	120A
Maximum Applicable Motor Capacity [kW]		0.05	0.1	0.2	0.4	0.5	0.75	1.0	1.5
Continuous Output Current [Arms]		0.66	0.91	1.6	2.8	3.8	5.5	7.6	11.6
Instantaneous Maximum Output Current [Arms]		2.1	3.2	5.9	9.3	11.0	16.9	17.0	28.0
Main Circuit	Power Supply	270 VDC to 324 VDC							
	Allowable Voltage Fluctuation	-15% to +10%							
	Input Current [Arms] *1	0.5	1.0	1.5	3.0	3.8	4.9	6.9	11
Control	Power Supply	270 VDC to 324 VDC							
	Allowable Voltage Fluctuation	-15% to +10%							
	Input Current [Arms] *1	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
Power Supply Capacity [kVA] *1		0.2	0.3	0.6	1	1.4	1.6	2.3	3.2
Power Loss *1	Main Circuit Power Loss [W]	4.4	5.9	9.8	17.5	23.0	30.7	38.7	55.8
	Control Circuit Power Loss [W]	12	12	12	12	14	14	14	15
	Total Power Loss [W]	16.4	17.9	21.8	29.5	37.0	44.7	52.7	70.8
Overvoltage Category		III							

*1 This is the net value at the rated load.

Model SGDXS-	180A	200A	330A	470A	550A	590A	780A
Maximum Applicable Motor Capacity [kW]	2.0	3.0	5.0	6.0	7.5	11.0	15.0
Continuous Output Current [Arms]	18.5	19.6	32.9	46.9	54.7	58.6	78.0
Instantaneous Maximum Output Current [Arms]	42.0	56.0	84.0	110	130	140	170

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Model SGDXS-		180A	200A	330A	470A	550A	590A	780A
Main Circuit	Power Supply	270 VDC to 324 VDC						
	Allowable Voltage Fluctuation	-15% to +10%						
	Input Current [Arms] *1	14	20	34	36	48	68	92
Control	Power Supply	270 VDC to 324 VDC						
	Allowable Voltage Fluctuation	-15% to +10%						
	Input Current [Arms] *1	0.25	0.25	0.3	0.3	0.3	0.4	0.4
Power Supply Capacity [kVA] *1		4.0	5.9	7.5	10.7	14.6	21.7	29.6
Power Loss *1	Main Circuit Power Loss [W]	82.7	83.5	146.2	211.6	255.3	243.6	343.4
	Control Circuit Power Loss [W]	16	16	19	21	21	28	28
	Total Power Loss [W]	98.7	99.5	165.2	232.6	276.3	271.6	371.4
Overvoltage Category		III						

*1 This is the net value at the rated load.

SERVOPACK Overload Protection Characteristics

The overload detection level is set for hot start conditions with a SERVOPACK surrounding air temperature of 55°C.

A.710 or A.720 (an overload alarm) will occur if overload operation that exceeds the overload protection characteristics shown in the following diagram (i.e., operation on the right side of the applicable line) is performed.

The actual overload detection level will be the detection level of the connected SERVOPACK or servomotor that has the lower overload protection characteristics.

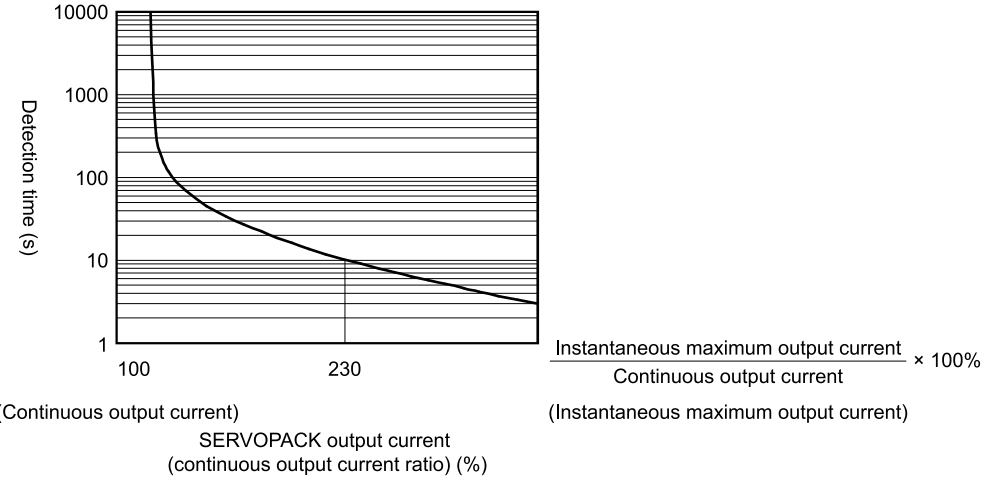


Figure .3 SGDXS-R70A, -R90A, -1R6A, -2R8A

Note:

- The above overload protection characteristics do not mean that you can perform continuous duty operation with an output of 100% or higher. For a Yaskawa-specified combination of SERVOPACK and servomotor, maintain the effective torque within the continuous duty zone of the torque-motor speed characteristic of the servomotor.
- This overload protection function is not a protection function related to speed. This product does not have a built-in thermal memory hold function.

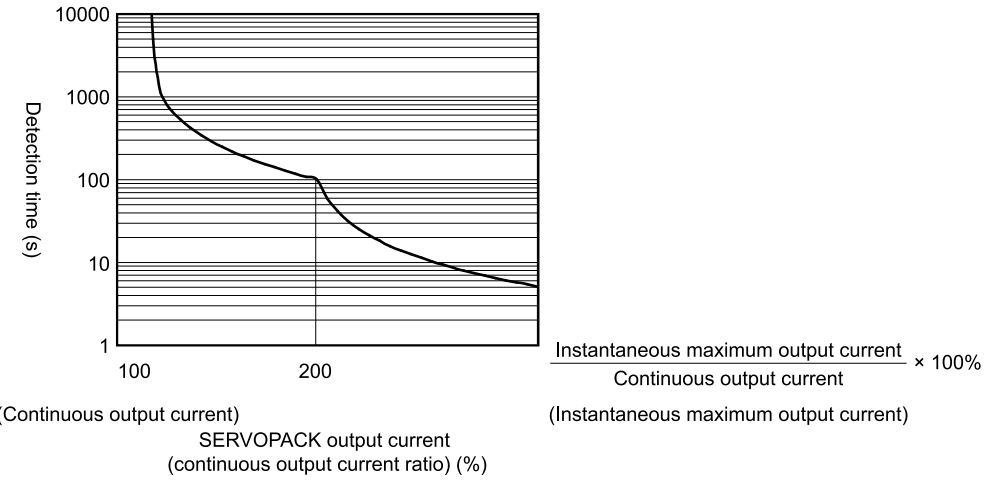


Figure .4 SGDXS-3R8A, -5R5A, -7R6A, -120A, -180A, -200A, -330A, -470A, -550A, -590A, -780A, -□□□D

Note:

- The above overload protection characteristics do not mean that you can perform continuous duty operation with an output of 100% or higher.
  For a Yaskawa-specified combination of SERVOPACK and servomotor, maintain the effective torque within the continuous duty zone of the torque-motor speed characteristic of the servomotor.
- This overload protection function is not a protection function related to speed. This product does not have a built-in thermal memory hold function.

Specification

■ Environmental Conditions

Item	Specification
Surrounding Air Temperature	-5°C to 55°C (With derating, usage is possible between 55°C and 60°C.) Refer to the following section for derating specifications. ☞ *Derating Specifications on page 356*
Storage Temperature *1	-20°C to 85°C
Surrounding Air Humidity	95% relative humidity max. (with no freezing or condensation)
Storage Humidity	95% relative humidity max. (with no freezing or condensation)
Vibration Resistance	When there is continuous vibration: 10 Hz to 55 Hz, acceleration amplitude 5.9 m/s^2 (0.6G)
Impact Resistance	19.6 m/s^2
Degree of Protection	IP20: Models SGDXS-R70A, -R90A, -1R6A, -2R8A, -3R8A, -5R5A, -7R6A, -120A IP10: Models SGDXS-180A, -200A, -330A, -470A, -550A, -590A, -780A, -□□□D
Pollution Degree	2 • Must be no corrosive or flammable gases. • Must be no exposure to water, oil, or chemicals. • Must be no dust, salts, or iron dust.
Altitude *1	1000 m max. (With derating, usage is possible between 1000 m and 2000 m.) Refer to the following section for derating specifications. ☞ *Derating Specifications on page 356*
Others	Do not use the SERVOPACK in the following locations: Locations subject to static electricity noise, strong electromagnetic/magnetic fields, or radioactivity

*1 If you combine a Σ-X-series SERVOPACK with a Σ-V-series option module, the following Σ-V-series SERVOPACKs specifications must be used: a surrounding air temperature of 0°C to 55°C and an altitude of 1000 m max. Also, the applicable surrounding range cannot be increased by derating.

■ I/O Signals

Item		Specification
Encoder Divided Pulse Output		Phase A, phase B, phase C: Line-driver output Number of divided output pulses: Any setting is allowed.
Overheat Protection Input		Number of input points: 1 Input voltage range: 0 V to +5 V
Outputs for Triggers at Preset Positions		Number of output points: 3 (output method: a line driver output) Output signals: High-Speed Output Signal for Triggers at Preset Positions 1 to 3 (HSO1 to 3) **Note:** Normal Output Signal for Triggers at Preset Positions 1 to 3 (/NSO1 to 3) are used by allocating the signals to sequence output signals.
Sequence Input Signals	Input Signals That Can Be Allocated	Allowable voltage range: 24 VDC ±20% Number of input points: 7 (input method: sink inputs or source inputs)
		Input signals: • P-OT (Forward Drive Prohibit Input) and N-OT (Reverse Drive Prohibit Input) signals • /P-CL (Forward External Torque Limit Input) and /N-CL (Reverse External Torque Limit Input) signals • /DEC (Origin Return Deceleration Switch Input) signal • /EXT1 to /EXT3 (External Latch Input 1 to 3) signals • FSTP (Forced Stop Input) signal A signal can be allocated and the positive and negative logic can be changed.
Sequence Output Signals	Fixed Output	Allowable voltage range: 5 VDC to 30 VDC Number of output points: 1 (output method: a photocoupler output (isolated))
		Output signal: ALM (Servo Alarm Output) signal
	Output Signals That Can Be Allocated	Allowable voltage range: 5 VDC to 30 VDC Number of output points: 3 (output method: a photocoupler output (isolated))
		Output signals: • /COIN (Positioning Completion Output) signal • /V-CMP (Speed Coincidence Detection Output) signal • /TGON (Rotation Detection Output) signal • /S-RDY (Servo Ready Output) signal • /CLT (Torque Limit Detection Output) signal • /VLT (Speed Limit Detection Output) signal • /BK (Brake Output) signal • /WARN (Warning Output) signal • /NEAR (Near Output) signal • /NSO1 to 3 (Normal Output for Triggers at Preset Positions 1 to 3) signals A signal can be allocated and the positive and negative logic can be changed.

■ Function

Item			Specification
Communications	USB Communications (CN7)	Interfaces	Personal computer (with SigmaWin+), digital operator (JUSP-OP07A-E)
		Communications Standard	Conforms to USB2.0 standard (12 Mbps).
Displays/Indicators			CHARGE, PWR, CN, L1, L2, and one-digit seven-segment LED

Continued on next page.

Continued from previous page.

Item		Specification
MECHATROLINK-4 Communications *1	Communications Protocol	MECHATROLINK-4
	Station Address Settings	01h to FFh (maximum number of slaves: 127) The rotary switches (S1 and S2) are used to set the station address.
	Transmission Speed	100 Mbps
	Transmission Cycle *2	62.5 µs, 125 µs, 250 µs, 500 µs, 750 µs, 1.0 ms to 4.0 ms (multiples of 0.5 ms)
	Number of Transmission Bytes	16 to 80 bytes/station
Reference Methods for MECHATROLINK-4 Communications	Performance	Position, speed, or torque control with MECHATROLINK-4 communications
	Reference Input	MECHATROLINK-4 commands (sequence, motion, data setting, data access, monitoring, adjustment, etc.)
	Profile	MECHATROLINK-4 standard servo profile MECHATROLINK-III standard servo profile
MECHATROLINK-III Communications *1	Communications Protocol	MECHATROLINK-III
	Station Address Settings	03h to EFh (maximum number of slaves: 62) The rotary switches (S1 and S2) are used to set the station address.
	Transmission Speed	100 Mbps
	Transmission Cycle	125 µs, 250 µs, 500 µs, 750 µs, 1.0 ms to 4.0 ms (multiples of 0.5 ms)
	Number of Transmission Bytes	32 or 48 bytes/station A DIP switch (S3) is used to select the transmission bytes.
Reference Methods for MECHATROLINK-III Communications	Performance	Position, speed, or torque control with MECHATROLINK-III communications
	Reference Input	MECHATROLINK-III commands (sequence, motion, data setting, data access, monitoring, adjustment, etc.)
	Profile	MECHATROLINK-III standard servo profile
MECHATROLINK-4 and MECHATROLINK-III Communications Setting Switches		Rotary switch (S1 and S2) positions: 16
		Number of DIP switch (S3) pins: 4
Analog Monitor (CN5)		Number of points: 2 Output voltage range: ±10 VDC (effective linearity range: ±8 V) Resolution: 16 bits Accuracy: ±20 mV (Typ) Maximum output current: ±10 mA
Dynamic Brake (DB)		Activated when a servo alarm or overtravel (OT) occurs, or when the power to the main circuit or servo is OFF.
Regenerative Processing		Built-in (An external resistor must be connected to the SGDXS-470A to -780A, and -210D to -370D.)
Overtravel (OT) Prevention		Stopping with dynamic brake, deceleration to a stop, or coasting to a stop for the P-OT (Forward Drive Prohibit Input) or N-OT (Reverse Drive Prohibit Input) signal
Protective Functions		Overcurrent, overvoltage, undervoltage, overload, regeneration error, etc.
Utility Functions		Gain tuning, alarm history, jogging operation, origin search, etc.
Safety Functions	Inputs	/HWBB1 and /HWBB2: Base block signals for power modules
	Output	EDM1: Monitors the status of built-in safety circuit (fixed output). *3
	Applicable Standards *4	ISO13849-1 PLe (Category 3) and IEC61508 SIL3

*1 Use the DIP switch S3 to switch the communications protocol. For details, refer to the following manual.

Σ-X-Series AC Servo Drive Σ-XS SERVOPACK with MECHATROLINK-4/III Communications References Product Manual (Manual No.: SIEP C710812 01)

*2 Multiple transmission cycles are supported.
*3 Whether or not you use the EDM1 signal does not affect the performance level of safety parameters.
*4 Always perform risk assessment for the system and confirm that the safety requirements are met.

■ Option

Item	Specification
Applicable Option Modules	• Fully-Closed Modules • Advanced Safety Module (Model Number: SGDXS-OSA□□□)

Note:

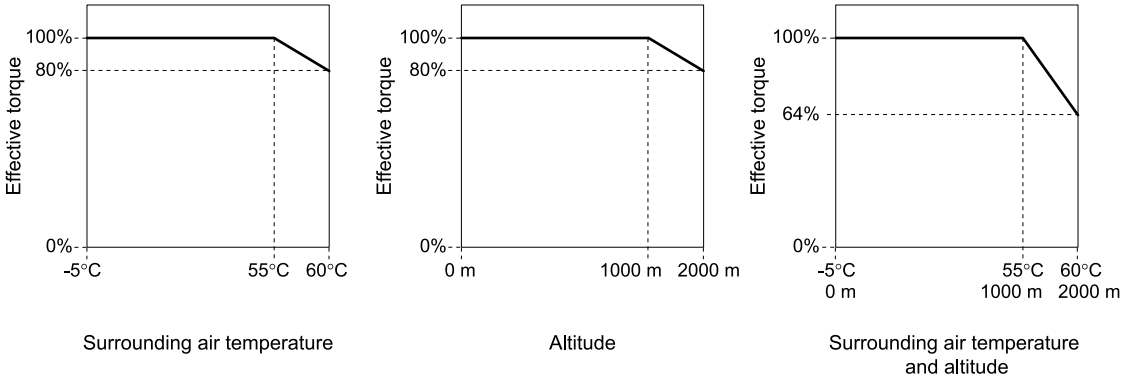
Refer to the following manual for details regarding the restrictions when using an advanced safety module together with with a fully-closed module.

Σ-X-Series Advanced Safety Module Digital I/O Product Manual (Manual No.: SIEP C710812 26)

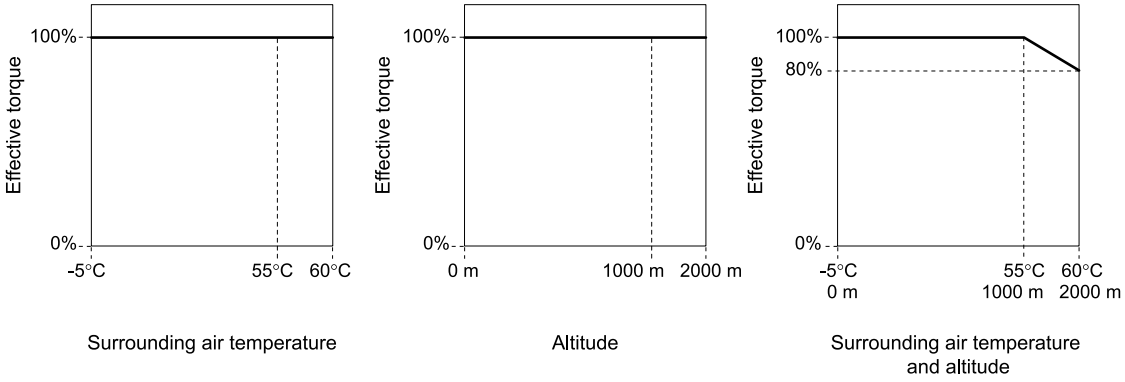
Derating Specifications

If you use the SERVOPACK at a surrounding air temperature of 55°C to 60°C or at an altitude of 1000 m to 2000 m, you must apply the derating rates given in the following graphs.

■ SGDXS-R70A, -R90A, -1R6A, -2R8A, -□□□D



■ SGDXS-3R8A, -5R5A, -7R6A, -120A, -180A, -200A, -330A, -470A, -550A, -590A, -780A

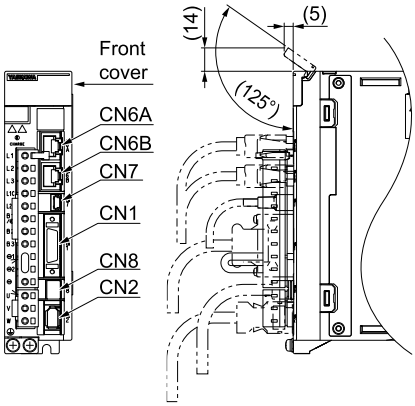


External Dimensions

Front Cover Dimensions and Connector Specifications

The connector shapes and pin assignments depend on the interfaces of the SERVOPACK. Refer to the following figures and table.

■ Front Cover Dimensions



■ Connector Specifications

Connector No.	Model	Number of Pins	Manufacturer
CN1	10226-59A3MB	26	3M Japan Limited
CN2	53984-0681	6	Molex Japan Co., Ltd.
CN6A/B	3-1734579-4	8	TE Connectivity Japan G.K.
CN7	2342993-1	5	TE Connectivity Japan G.K.
CN8	2294415-1	8	TE Connectivity Japan G.K.

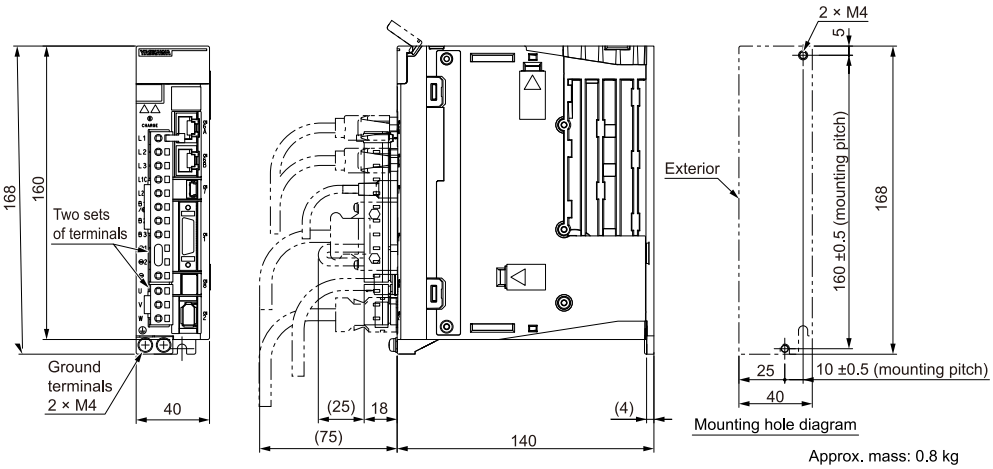
Note:

The above connectors or their equivalents are used for the SERVOPACKs.

SERVOPACK External Dimensions

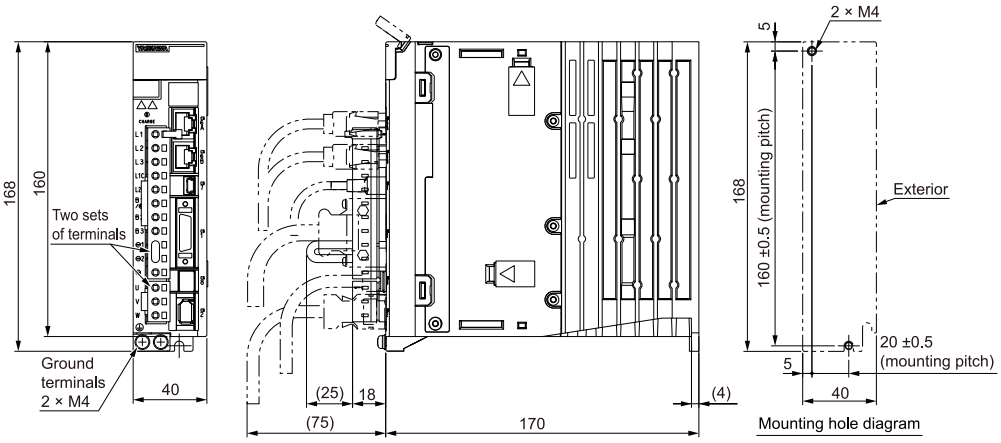
■ Base-mounted SERVOPACKs

◆ SGDXS-R70A, -R90A, -1R6A



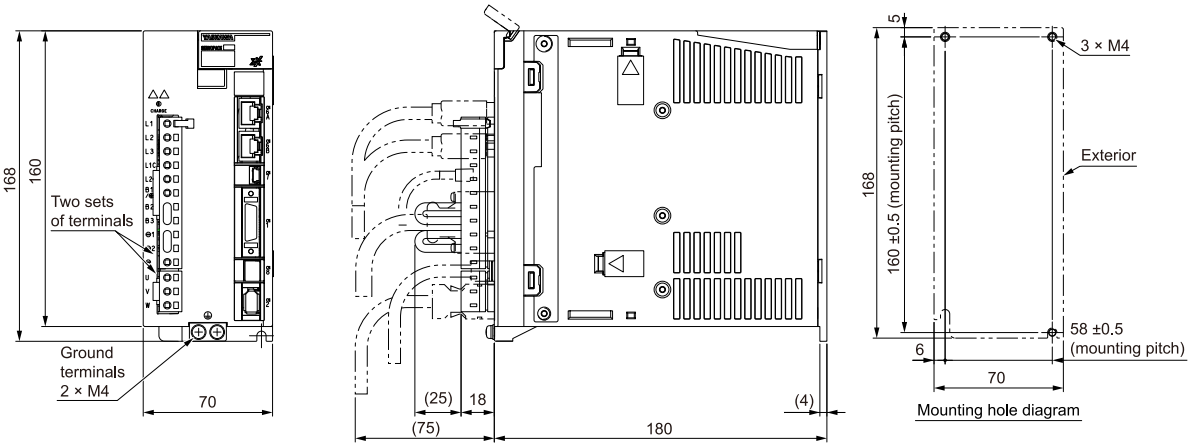
Approx. mass: 0.8 kg
Unit: mm

◆ SGDXS-2R8A



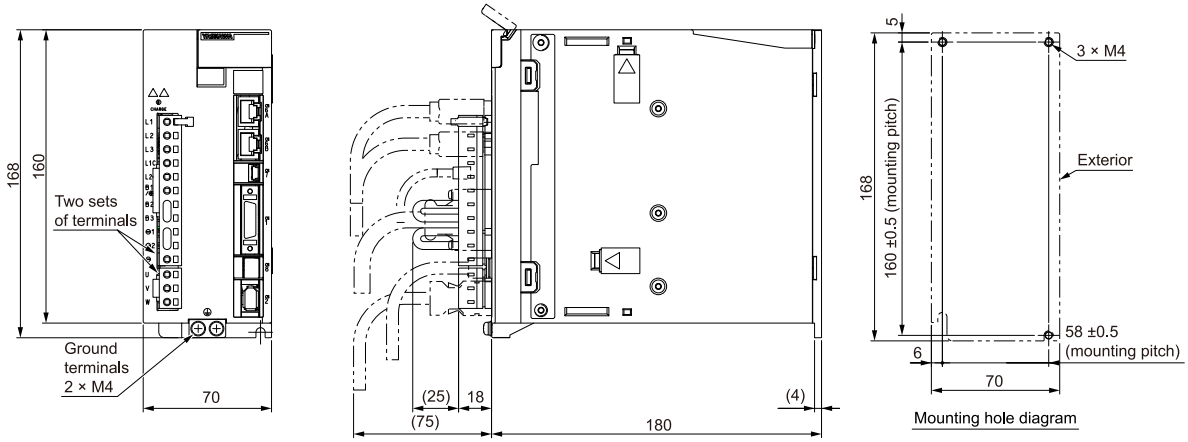
Approx. mass: 1.1 kg
Unit: mm

◆ SGDXS-3R8A



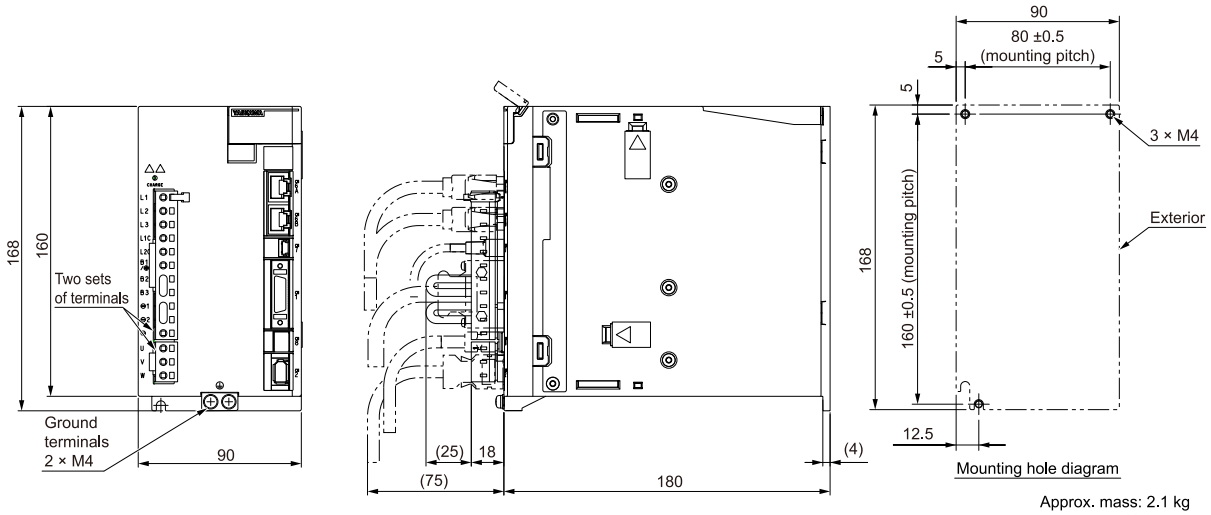
Approx. mass: 1.7 kg
Unit: mm

◆ SGDXS-5R5A, -7R6A



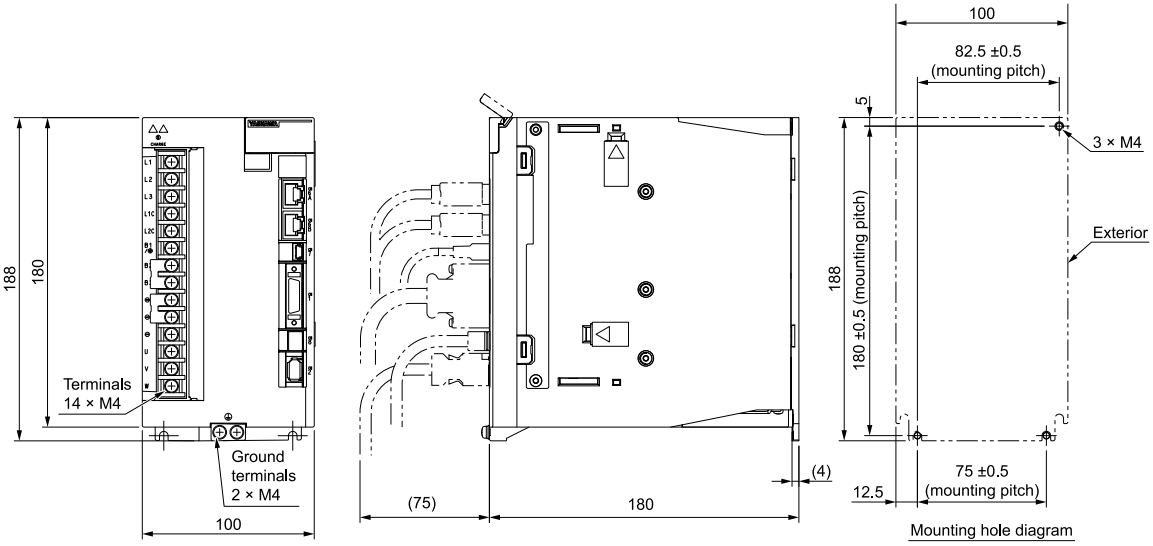
Approx. mass: 1.6 kg
Unit: mm

◆ SGDXS-120A



Approx. mass: 2.1 kg
Unit: mm

◆ SGDXS-180A, -200A

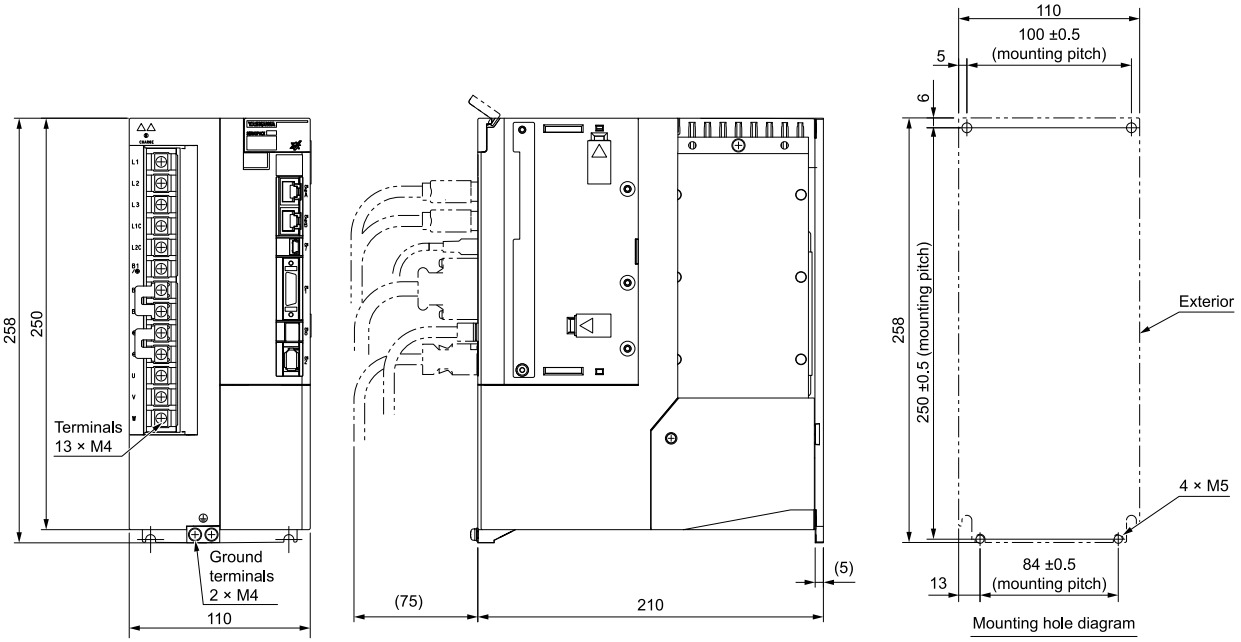


Approx. mass: 2.8 kg
Unit: mm

Note:

These drawings show the SERVOPACK with the terminal cover removed.

◆ SGDXS-330A

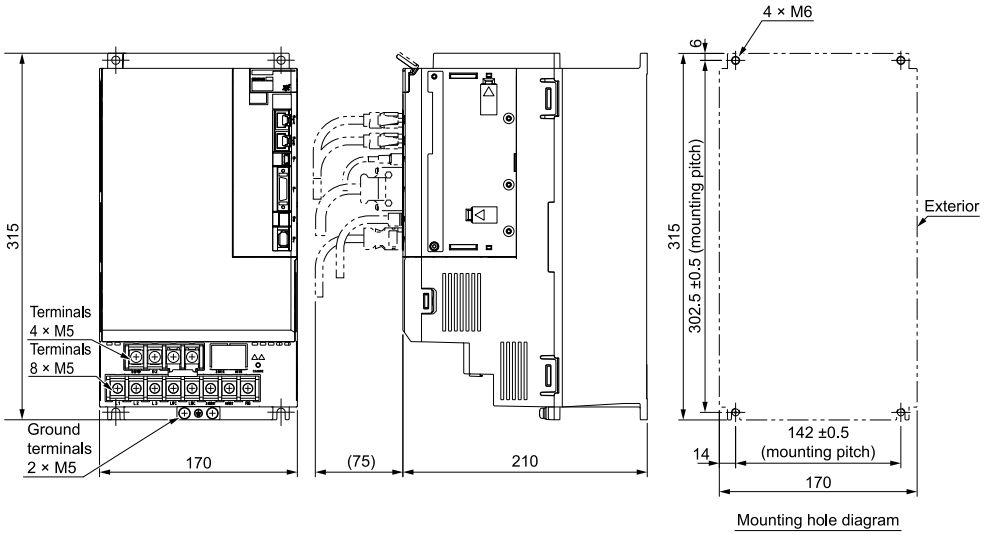


Approx. mass: 4.4 kg
Unit: mm

Note:

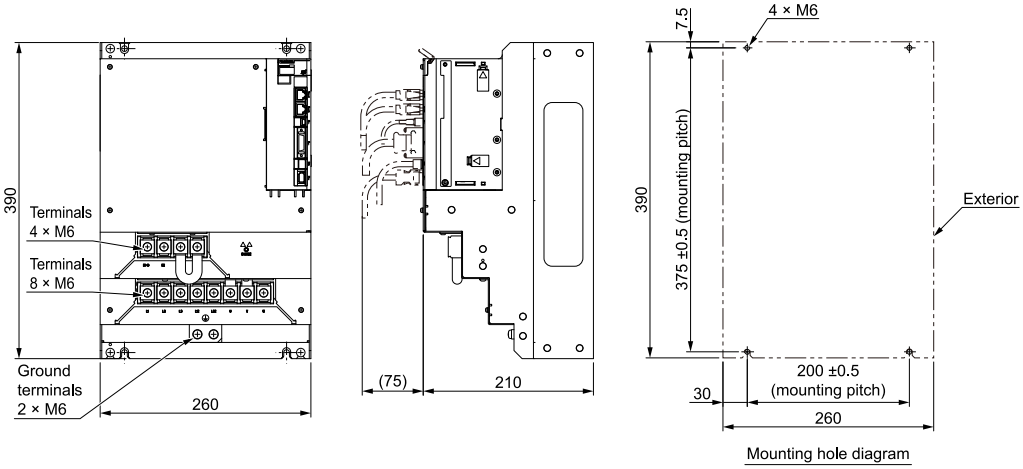
These drawings show the SERVOPACK with the terminal cover removed.

◆ SGDXS-470A, -550A



Approx. mass: 9.0 kg
Unit: mm

◆ SGDXS-590A, -780A

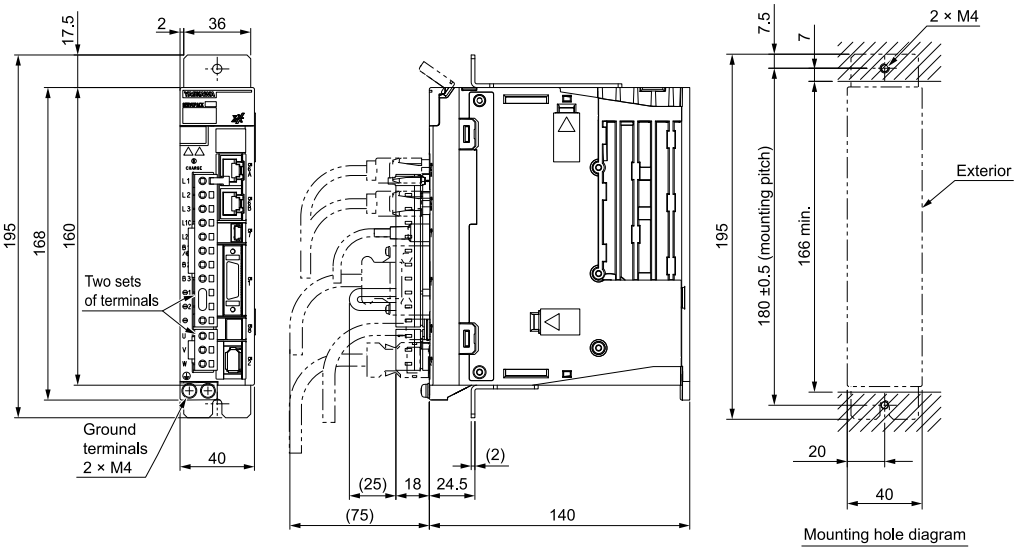


Approx. mass: 16 kg
Unit: mm

■ Rack-mounted SERVOPACKs

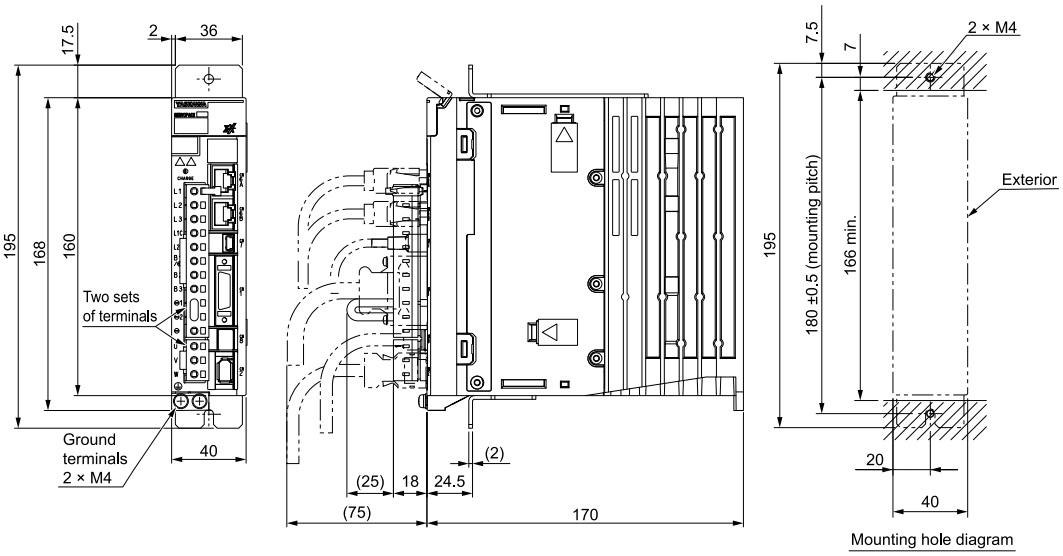
Hardware Option Code: 0001

◆ SGDXS-R70A, -R90A, -1R6A



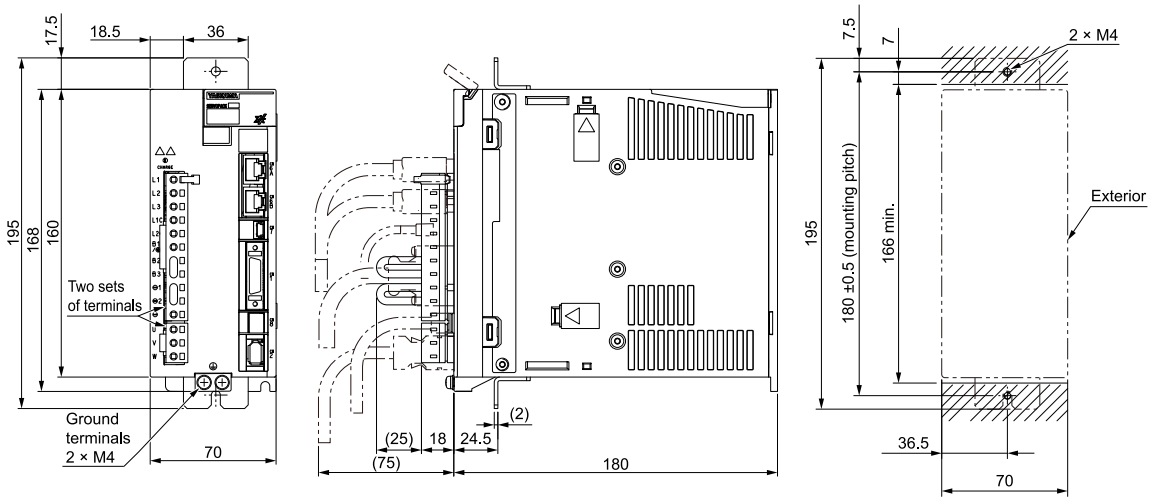
Approx. mass: 0.9 kg
Unit: mm

◆ SGDXS-2R8A



Approx. mass: 1.1 kg
Unit: mm

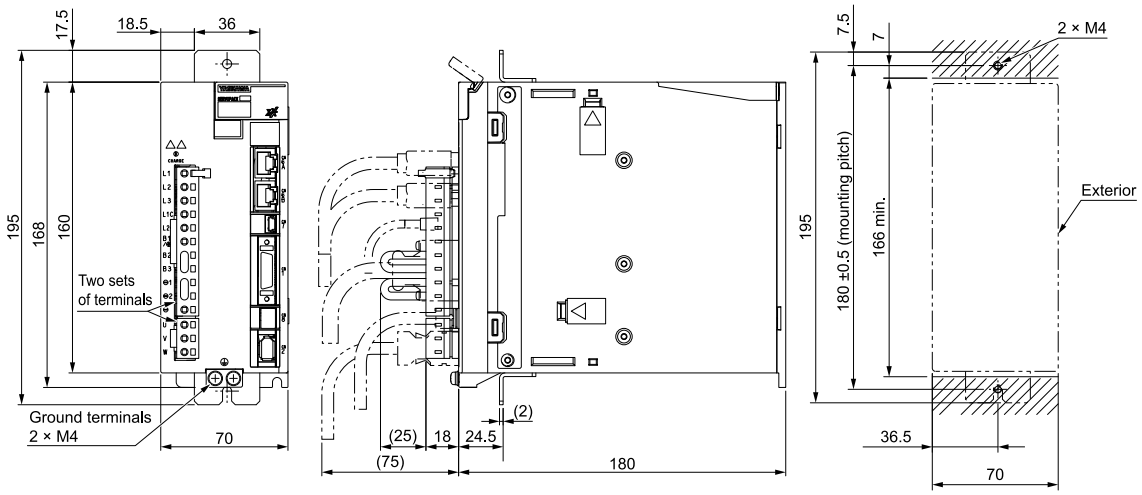
◆ SGDXS-3R8A



Mounting hole diagram

Approx. mass: 1.7 kg
Unit: mm

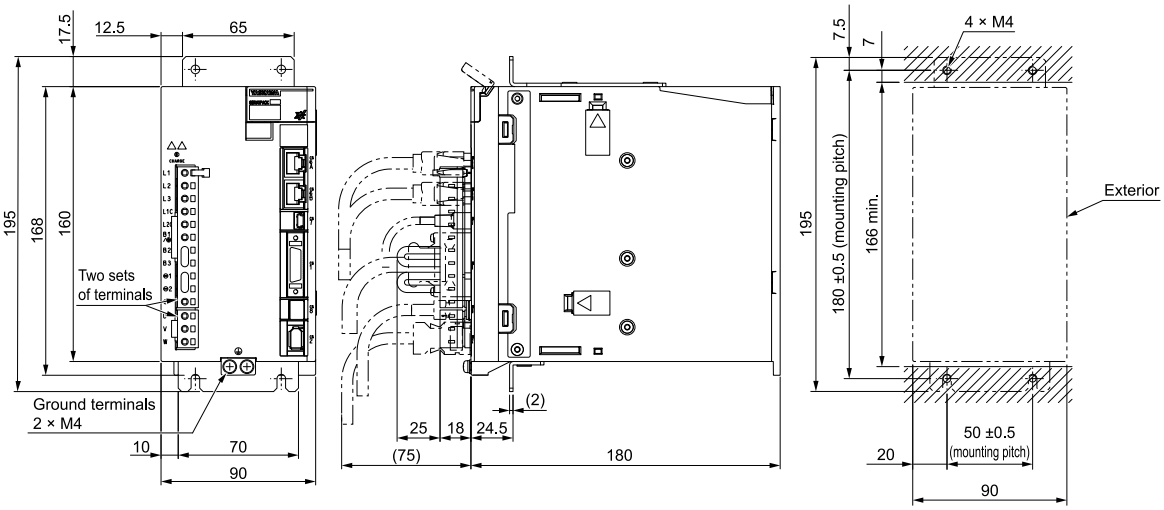
◆ SGDXS-5R5A, -7R6A



Mounting hole diagram

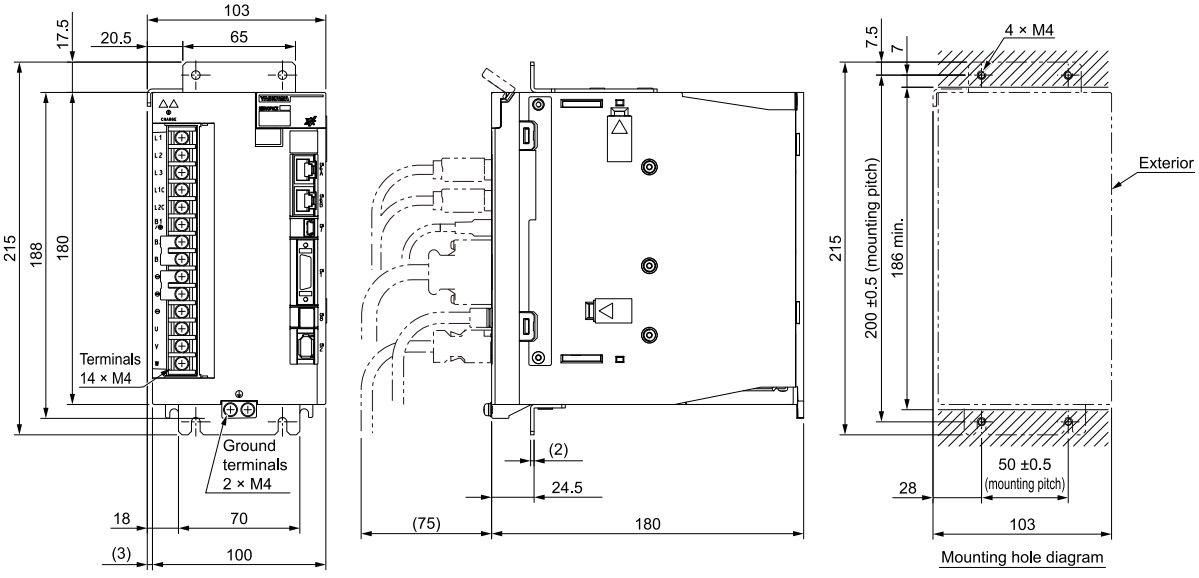
Approx. mass: 1.7 kg
Unit: mm

◆ SGDXS-120A



Approx. mass: 2.2 kg
Unit: mm

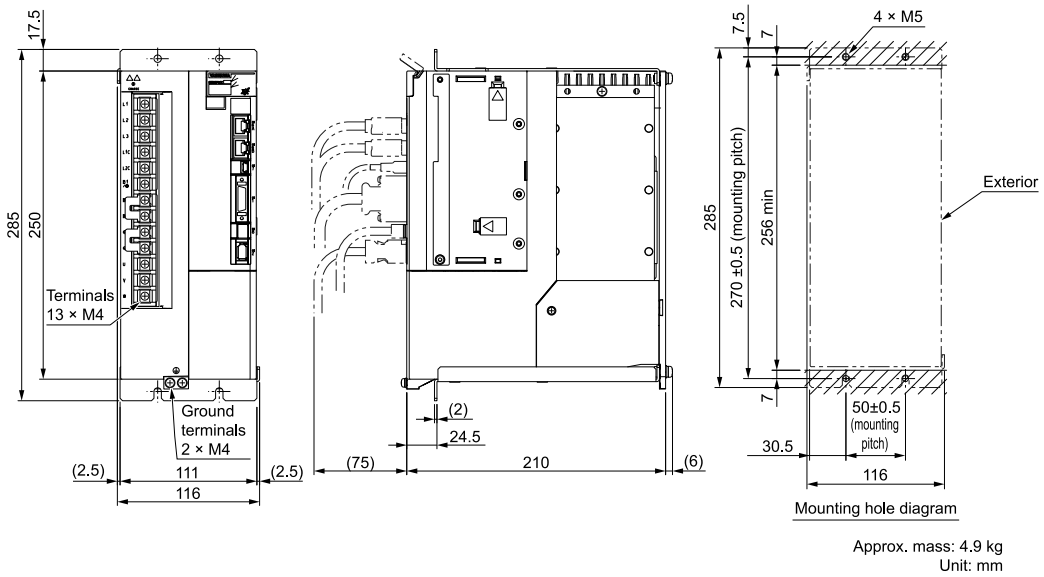
◆ SGDXS-180A, -200A



Approx. mass: 2.9 kg
Unit: mm

Note:
These drawings show the SERVOPACK with the terminal cover removed.

◆ SGDXS-330A



Approx. mass: 4.9 kg
Unit: mm

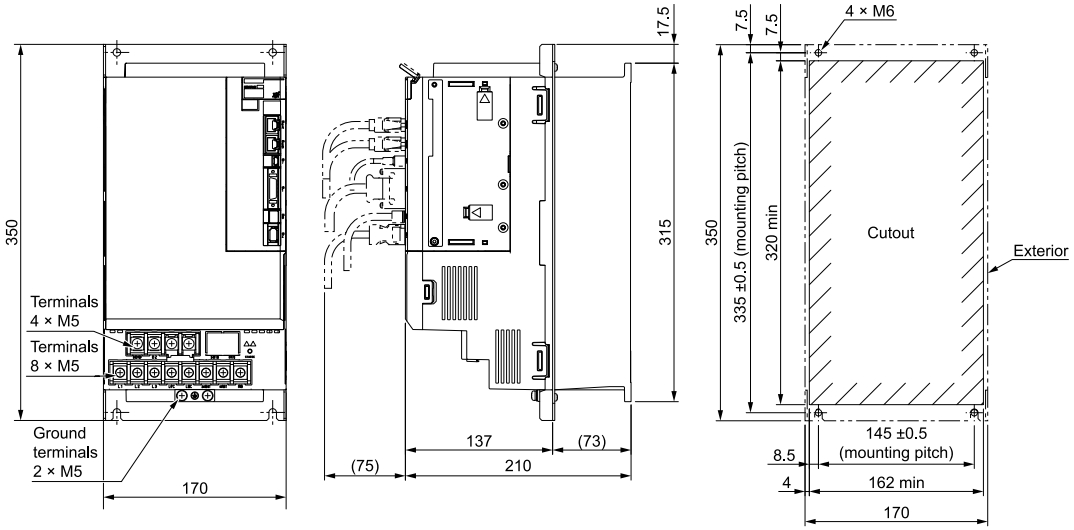
Note:

These drawings show the SERVOPACK with the terminal cover removed.

■ Duct-ventilated SERVOPACKs

Hardware Option Code: 0001

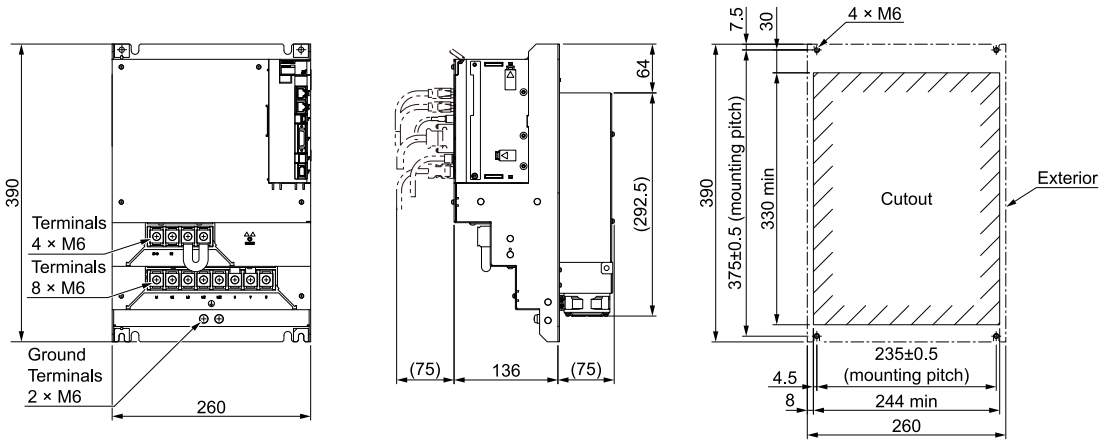
◆ SGDXS-470A, -550A



Mounting hole diagram

Approx. mass: 9.0 kg
Unit: mm

◆ SGDXS-590A, -780A



Mounting hole diagram

Approx. mass: 15 kg
Unit: mm

Σ-XS Models with EtherCAT Communications References

Interpreting SERVOPACK Model Numbers

SGDXS - R70 A A0 A 0001 00 B

Σ-X-Series
Σ-XS model

❶ ❷ ❸ ❹ ❺ ❻ ❼

❶ Maximum Applicable Motor Capacity

Voltage	Code	Specification
Three-Phase, 200 VAC	R70*1	0.05 kW
	R90*1	0.1 kW
	1R6*1	0.2 kW
	2R8*1	0.4 kW
	3R8	0.5 kW
	5R5*1	0.75 kW
	7R6	1.0 kW
	120*2	1.5 kW
	180	2.0 kW
	200	3.0 kW
	330	5.0 kW
	470	6.0 kW
	550	7.5 kW
	590	11 kW
	780	15 kW

❷ Voltage

Code	Specification
A	200 VAC

❸ Interface *3

Code	Specification
A0	EtherCAT communications reference

❹ Design Revision Order

A

❺ Hardware Options Specification

Code	Specification	Applicable Models
None	Without options	All models
0000		
0001	Rack-mounted	SGDXS-R70A to -330A
	Duct-ventilated	SGDXS-470A to -780A
0002	Varnished	All models
0008	Single-phase, 200-VAC power supply input	SGDXS-120A
0020*4	No dynamic brake	SGDXS-R70A to -2R8A
	External dynamic brake resistor	SGDXS-3R8A to -780A

❻ FT Specification

Code	Specification
None	None
00	

❼ BTO Specification (under development)

Code	Specification
None	None
B	BTO specification

*1 You can use these models with either a single-phase or three-phase input.
*2 A model with a single-phase, 200-VAC power supply input is available as a hardware option specification. (model: SGDXS-120AA0A0008)
*3 The same SERVOPACKs are used for both rotary servomotors and linear servomotors.
*4 Refer to the following manual for details.

Σ-X-Series Σ-XS/Σ-XW/Σ-XT SERVOPACK with Dynamic Brake Hardware Option Specifications Product Manual (Manual No.: SIEP C710812 14)

Ratings and Specifications

This section gives the ratings and specifications of SERVOPACKs.

Ratings

■ Three-phase, 200 VAC

Model SGDXS-			R70A	R90A	1R6A	2R8A	3R8A	5R5A	7R6A	120A	180A	200A	330A
Maximum Applicable Motor Capacity [kW]			0.05	0.1	0.2	0.4	0.5	0.75	1.0	1.5	2.0	3.0	5.0
Continuous Output Current [Arms]			0.66	0.91	1.6	2.8	3.8	5.5	7.6	11.6	18.5	19.6	32.9
Instantaneous Maximum Output Current [Arms]			2.1	3.2	5.9	9.3	11	16.9	17	28	42	56	84
Main Circuit	Power Supply		200 VAC to 240 VAC, 50 Hz/60 Hz										
	Allowable Voltage Fluctuation		-15% to +10%										
	Input Current [Arms] *1		0.4	0.8	1.3	2.5	3.0	4.1	5.7	7.3	10	15	25
Control	Power Supply		200 VAC to 240 VAC, 50 Hz/60 Hz										
	Allowable Voltage Fluctuation		-15% to +10%										
	Input Current [Arms] *1		0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.25	0.25	0.3
Power Supply Capacity [kVA] *1			0.2	0.3	0.5	1.0	1.3	1.6	2.3	3.2	4.0	5.9	7.5
Power Loss *1	Main Circuit Power Loss [W]		5.0	7.0	11.9	22.5	28.5	38.9	49.2	72.6	104.2	114.2	226.6
	Control Circuit Power Loss [W]		12	12	12	12	14	14	14	15	16	16	19
	Total Power Loss [W]		17.0	19.0	23.9	34.5	42.5	52.9	63.2	87.6	120.2	130.2	245.6
Regenerative Resistor	Built-In Regenerative Resistor	Resistance [Ω]	–	–	–	–	35	35	35	20	12	10	6
		Capacity [W]	–	–	–	–	60	60	60	60	60	60	180
		Allowable Power Consumption [W]	–	–	–	–	15	15	15	30	30	30	36
	Minimum Allowable External Resistance [Ω]		40	40	40	40	35	35	35	20	12	10	6
Overvoltage Category			III										

*1 This is the net value at the rated load.

Model SGDXS-		470A	550A	590A	780A
Maximum Applicable Motor Capacity [kW]		6.0	7.5	11	15
Continuous Output Current [Arms]		46.9	54.7	58.6	78.0
Instantaneous Maximum Output Current [Arms]		110	130	140	170
Main Circuit	Power Supply	200 VAC to 240 VAC, 50 Hz/60 Hz			
	Allowable Voltage Fluctuation	-15% to +10%			
	Input Current [Arms] *1	29	37	54	73
Control	Power Supply	200 VAC to 240 VAC, 50 Hz/60 Hz			
	Allowable Voltage Fluctuation	-15% to +10%			
	Input Current [Arms] *1	0.3	0.3	0.4	0.4
Power Supply Capacity [kVA] *1		10.7	14.6	21.7	29.6
Power Loss *1	Main Circuit Power Loss [W]	271.7	326.9	365.3	501.4
	Control Circuit Power Loss [W]	21	21	28	28
	Total Power Loss [W]	292.7	347.9	393.3	529.4
External Regenerative Resistor Unit	Resistance [Ω]	5 *2	3.13 *3	3.13 *3	3.13 *3
	Capacity [W]	880 *2	1760 *3	1760 *3	1760 *3
	Allowable Power Consumption [W]	180 *2	350 *3	350 *3	350 *3
	Minimum Allowable External Resistance [Ω]	5	2.9	2.9	2.9
Overvoltage Category		III			

*1 This is the net value at the rated load.
*2 This value is for the optional JUSP-RA29-E regenerative resistor unit.
*3 This value is for the optional JUSP-RA05-E regenerative resistor unit.

■ Single-Phase, 200 VAC

Model SGDXS-		R70A	R90A	1R6A	2R8A	5R5A	120A
Maximum Applicable Motor Capacity [kW]		0.05	0.1	0.2	0.4	0.75	1.5
Continuous Output Current [Arms]		0.66	0.91	1.6	2.8	5.5	11.6
Instantaneous Maximum Output Current [Arms]		2.1	3.2	5.9	9.3	16.9	28
Main Circuit	Power Supply	200 VAC to 240 VAC, 50 Hz/60 Hz					
	Allowable Voltage Fluctuation	-15% to +10%					
	Input Current [Arms] *1	0.8	1.6	2.4	5.0	8.7	16 *2
Control	Power Supply	200 VAC to 240 VAC, 50 Hz/60 Hz					
	Allowable Voltage Fluctuation	-15% to +10%					
	Input Current [Arms] *1	0.2	0.2	0.2	0.2	0.2	0.2
Power Supply Capacity [kVA] *1		0.2	0.3	0.6	1.2	1.9	4.0

Continued on next page.

Continued from previous page.

Model SGDXS-			R70A	R90A	1R6A	2R8A	5R5A	120A
Power Loss *1	Main Circuit Power Loss [W]		5.0	7.1	12.1	23.7	39.2	72.6
	Control Circuit Power Loss [W]		12	12	12	12	14	15
	Total Power Loss [W]		17.0	19.1	24.1	35.7	53.2	87.6
Regenerative Resistor	Built-In Regenerative Resistor	Resistance [Ω]	–	–	–	–	35	20
		Capacity [W]	–	–	–	–	60	60
		Allowable Power Consumption [W]	–	–	–	–	15	30
	Minimum Allowable External Resistance [Ω]		40	40	40	40	35	20
Overvoltage Category			III					

*1 This is the net value at the rated load.
*2 Derate to 12 Arms for UL certification.

■ 270 VDC

Model SGDXS-		R70A	R90A	1R6A	2R8A	3R8A	5R5A	7R6A	120A
Maximum Applicable Motor Capacity [kW]		0.05	0.1	0.2	0.4	0.5	0.75	1.0	1.5
Continuous Output Current [Arms]		0.66	0.91	1.6	2.8	3.8	5.5	7.6	11.6
Instantaneous Maximum Output Current [Arms]		2.1	3.2	5.9	9.3	11.0	16.9	17.0	28.0
Main Circuit	Power Supply	270 VDC to 324 VDC							
	Allowable Voltage Fluctuation	-15% to +10%							
	Input Current [Arms] *1	0.5	1.0	1.5	3.0	3.8	4.9	6.9	11
Control	Power Supply	270 VDC to 324 VDC							
	Allowable Voltage Fluctuation	-15% to +10%							
	Input Current [Arms] *1	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
Power Supply Capacity [kVA] *1		0.2	0.3	0.6	1	1.4	1.6	2.3	3.2
Power Loss *1	Main Circuit Power Loss [W]	4.4	5.9	9.8	17.5	23.0	30.7	38.7	55.8
	Control Circuit Power Loss [W]	12	12	12	12	14	14	14	15
	Total Power Loss [W]	16.4	17.9	21.8	29.5	37.0	44.7	52.7	70.8
Overvoltage Category		III							

*1 This is the net value at the rated load.

Model SGDXS-	180A	200A	330A	470A	550A	590A	780A
Maximum Applicable Motor Capacity [kW]	2.0	3.0	5.0	6.0	7.5	11.0	15.0
Continuous Output Current [Arms]	18.5	19.6	32.9	46.9	54.7	58.6	78.0
Instantaneous Maximum Output Current [Arms]	42.0	56.0	84.0	110	130	140	170

Continued on next page.

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Model SGDXS-		180A	200A	330A	470A	550A	590A	780A
Main Circuit	Power Supply	270 VDC to 324 VDC						
	Allowable Voltage Fluctuation	-15% to +10%						
	Input Current [Arms] *1	14	20	34	36	48	68	92
Control	Power Supply	270 VDC to 324 VDC						
	Allowable Voltage Fluctuation	-15% to +10%						
	Input Current [Arms] *1	0.25	0.25	0.3	0.3	0.3	0.4	0.4
Power Supply Capacity [kVA] *1		4.0	5.9	7.5	10.7	14.6	21.7	29.6
Power Loss *1	Main Circuit Power Loss [W]	82.7	83.5	146.2	211.6	255.3	243.6	343.4
	Control Circuit Power Loss [W]	16	16	19	21	21	28	28
	Total Power Loss [W]	98.7	99.5	165.2	232.6	276.3	271.6	371.4
Overvoltage Category		III						

*1 This is the net value at the rated load.

SERVOPACK Overload Protection Characteristics

The overload detection level is set for hot start conditions with a SERVOPACK surrounding air temperature of 55°C.

A.710 or A.720 (an overload alarm) will occur if overload operation that exceeds the overload protection characteristics shown in the following diagram (i.e., operation on the right side of the applicable line) is performed.

The actual overload detection level will be the detection level of the connected SERVOPACK or servomotor that has the lower overload protection characteristics.

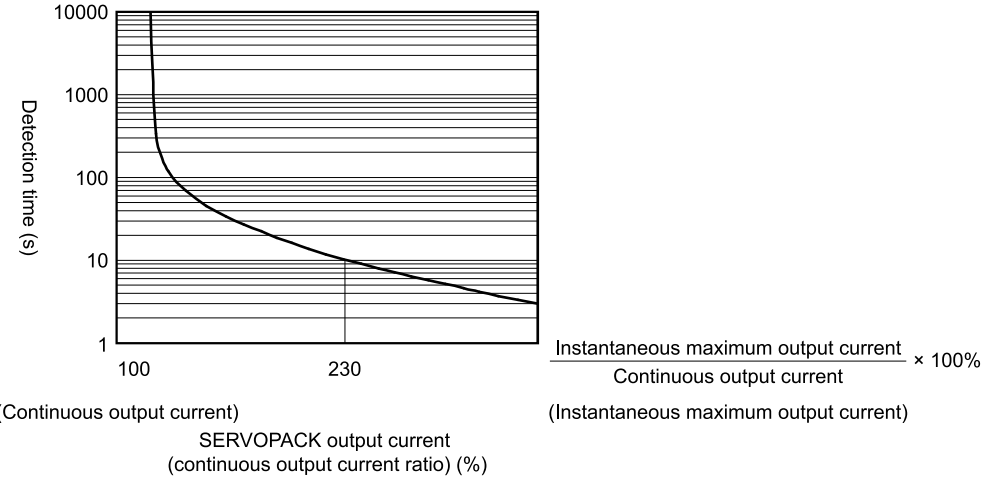

Figure .5 SGDXS-R70A, -R90A, -1R6A, -2R8A

Note:

- The above overload protection characteristics do not mean that you can perform continuous duty operation with an output of 100% or higher. For a Yaskawa-specified combination of SERVOPACK and servomotor, maintain the effective torque within the continuous duty zone of the torque-motor speed characteristic of the servomotor.
- This overload protection function is not a protection function related to speed. This product does not have a built-in thermal memory hold function.

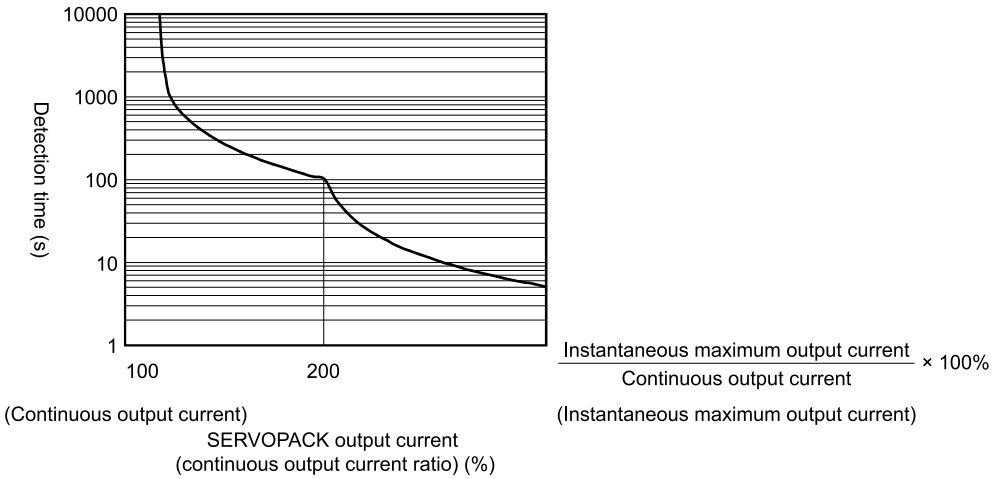

Figure .6 SGDXS-3R8A, -5R5A, -7R6A, -120A, -180A, -200A, -330A, -470A, -550A, -590A, -780A, -□□□D

Note:

- The above overload protection characteristics do not mean that you can perform continuous duty operation with an output of 100% or higher.
  For a Yaskawa-specified combination of SERVOPACK and servomotor, maintain the effective torque within the continuous duty zone of the torque-motor speed characteristic of the servomotor.
- This overload protection function is not a protection function related to speed. This product does not have a built-in thermal memory hold function.

Specification

■ Environmental Conditions

Item	Specification
Surrounding Air Temperature	-5°C to 55°C (With derating, usage is possible between 55°C and 60°C.) Refer to the following section for derating specifications. ☞ *Derating Specifications on page 376*
Storage Temperature *1	-20°C to 85°C
Surrounding Air Humidity	95% relative humidity max. (with no freezing or condensation)
Storage Humidity	95% relative humidity max. (with no freezing or condensation)
Vibration Resistance	When there is continuous vibration: 10 Hz to 55 Hz, acceleration amplitude 5.9 m/s^2 (0.6G)
Impact Resistance	19.6 m/s^2
Degree of Protection	IP20: Models SGDXS-R70A, -R90A, -1R6A, -2R8A, -3R8A, -5R5A, -7R6A, -120A IP10: Models SGDXS-180A, -200A, -330A, -470A, -550A, -590A, -780A, -□□□D
Pollution Degree	2 • Must be no corrosive or flammable gases. • Must be no exposure to water, oil, or chemicals. • Must be no dust, salts, or iron dust.
Altitude *1	1000 m max. (With derating, usage is possible between 1000 m and 2000 m.) Refer to the following section for derating specifications. ☞ *Derating Specifications on page 376*
Others	Do not use the SERVOPACK in the following locations: Locations subject to static electricity noise, strong electromagnetic/magnetic fields, or radioactivity

*1 If you combine a Σ-X-series SERVOPACK with a Σ-V-series option module, the following Σ-V-series SERVOPACKs specifications must be used: a surrounding air temperature of 0°C to 55°C and an altitude of 1000 m max. Also, the applicable surrounding range cannot be increased by derating.

■ I/O Signals

Item		Specification
Encoder Divided Pulse Output		Phase A, phase B, phase C: Line-driver output Number of divided output pulses: Any setting is allowed.
Overheat Protection Input		Number of input points: 1 Input voltage range: 0 V to +5 V
Outputs for Triggers at Preset Positions		Number of output points: 3 (output method: a line driver output) Output signals: High-Speed Output Signal for Triggers at Preset Positions 1 to 3 (HSO1 to 3) **Note:** Normal Output Signal for Triggers at Preset Positions 1 to 3 (/NSO1 to 3) are used by allocating the signals to sequence output signals.
Sequence Input Signals	Input Signals That Can Be Allocated	Allowable voltage range: 24 VDC ±20% Number of input points: 7 (input method: sink inputs or source inputs)
		Input signals: • P-OT (Forward Drive Prohibit Input) and N-OT (Reverse Drive Prohibit Input) signals • /Probe1 (Probe 1 Latch Input) Signal • /Probe2 (Probe 2 Latch Input) signal • /Home (Home Switch Input) Signal • /P-CL (Forward External Torque Limit Input) and /N-CL (Reverse External Torque Limit Input) signals • FSTP (Forced Stop Input) signal A signal can be allocated and the positive and negative logic can be changed.
Sequence Output Signals	Fixed Output	Allowable voltage range: 5 VDC to 30 VDC Number of output points: 1 (output method: a photocoupler output (isolated))
		Output signal: ALM (Servo Alarm Output) signal
	Output Signals That Can Be Allocated	Allowable voltage range: 5 VDC to 30 VDC Number of output points: 3 (output method: a photocoupler output (isolated))
		Output signals: • /COIN (Positioning Completion Output) signal • /V-CMP (Speed Coincidence Detection Output) signal • /TGON (Rotation Detection Output) Signal • /S-RDY (Servo Ready Output) Signal • /CLT (Torque Limit Detection Output) signal • /VLT (Speed Limit Detection Output) signal • /BK (Brake Output) signal • /WARN (Warning Output) signal • /NEAR (Near Output) signal • /NSO1 to 3 (Normal Output for Triggers at Preset Positions 1 to 3) signals A signal can be allocated and the positive and negative logic can be changed.

■ Function

Item			Specification
Communications	USB Communications (CN7)	Interfaces	Personal computer (with SigmaWin+), digital operator (JUSP-OP07A-E)
		Communications Standard	Conforms to USB2.0 standard (12 Mbps).
Displays/Indicators			CHARGE, RUN, ERR, L/A A, L/A B, and one-digit seven-segment LED
EtherCAT Communications Setting Switches			ID Selector (S1 and S2) positions: 16

Continued on next page.

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Item		Specification
EtherCAT Communications	Applicable Communications Standards	IEC 61158 Type 12, IEC 61800-7 CiA402 drive profile
	Physical Layer	100BASE-TX (IEEE802.3)
	Communications Connectors	CN6A (RJ45): ETHERCAT IN (EtherCAT input signal side) CN6B (RJ45): ETHERCAT OUT (EtherCAT output signal side)
	Cable	Category 5, 4 shielded twisted pairs The cable is automatically detected with AUTO MDIX.
	SyncManager	SM0: Mailbox output, SM1: Mailbox input, SM2: Process data output, and SM3: Process data input
	FMMU	FMMU 0: Mapped in process data output (RxPDO) area. FMMU 1: Mapped in process data input (TxPDO) area. FMMU 2: Mapped to mailbox status.
	EtherCAT Commands (Data Link Layer)	APRD, APWR, APRW, FPRD, FPWR, FPRW, BRD, BWR, BRW, LRD, LWR, LRW, ARMW, FRMW
	Process Data	Assignments can be changed with PDO mapping.
	Mailbox	Emergency messages, SDO requests, SDO responses
	Distributed Clocks	Free-run mode and DC mode (can be switched.) Applicable DC cycles: 62.5 μs to 4 ms in 62.5-μs increments
	SubDevice Information IF	4 KB
	LED Indicator	During EtherCAT communications: L/A x 2 EtherCAT communications status: RUN x 1 EtherCAT error status: ERR x 1
CiA402 Drive Profile		• Homing Mode • Profile Position Mode • Interpolated Position Mode • Profile Velocity Mode • Profile Torque Mode • Cyclic Synchronous Position Mode • Cyclic Synchronous Velocity Mode • Cyclic Synchronous Torque Mode • Touch Probe Function • Torque Limit Function
Analog Monitor (CN5)		Number of points: 2 Output voltage range: ±10 VDC (effective linearity range: ±8 V) Resolution: 16 bits Accuracy: ±20 mV (Typ) Maximum output current: ±10 mA
Dynamic Brake (DB)		Activated when a servo alarm or overtravel (OT) occurs, or when the power to the main circuit or servo is OFF.
Regenerative Processing		Built-in (An external resistor must be connected to the SGDXS-470A to -780A and -210D to -370D.)
Overtravel (OT) Prevention		Stopping with dynamic brake, deceleration to a stop, or coasting to a stop for the P-OT (Forward Drive Prohibit Input) or N-OT (Reverse Drive Prohibit Input) signal
Protective Functions		Overcurrent, overvoltage, undervoltage, overload, regeneration error, etc.
Utility Functions		Gain tuning, alarm history, program jogging, origin search, etc.

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Item		Specification
Safety Functions	Inputs	/HWBB1 and /HWBB2: Base block signals for power modules
	Output	EDM1: Monitors the status of built-in safety circuit (fixed output). *1
	Applicable Standards *2	ISO13849-1 PLe (Category 3) and IEC61508 SIL3

*1 Whether or not you use the EDM1 signal does not affect the performance level of safety parameters.
*2 Always perform risk assessment for the system and confirm that the safety requirements are met.

■ Option

Item	Specification
Applicable Option Modules	• Fully-Closed Modules • Advanced Safety Module (Model Number: SGDXS-OSA□□□)

Note:

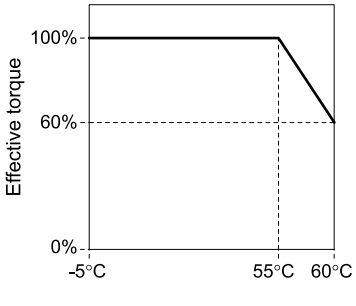
Refer to the following manual for details regarding the restrictions when using an advanced safety module together with with a fully-closed module.

Σ-X-Series Advanced Safety Module Digital I/O Product Manual (Manual No.: SIEP C710812 26)

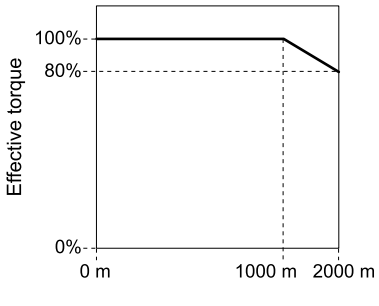
Derating Specifications

If you use the SERVOPACK at a surrounding air temperature of 55°C to 60°C or at an altitude of 1000 m to 2000 m, you must apply the derating rates given in the following graphs.

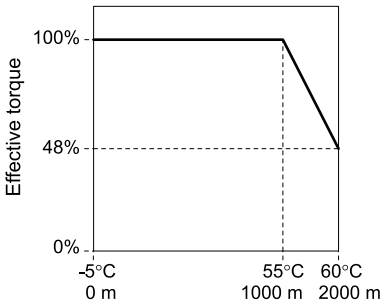
■ SGDXS-R70A, -R90A, -1R6A, -2R8A



Surrounding air temperature

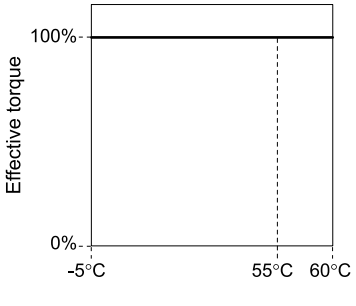


Altitude

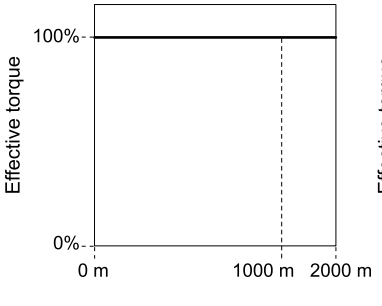


Surrounding air temperature and altitude

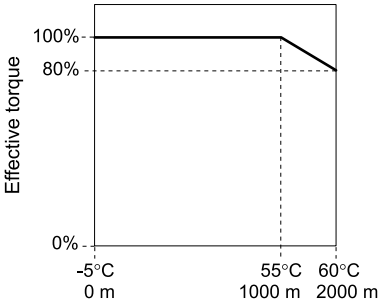
■ SGDXS-3R8A, -5R5A, -7R6A, -120A, -180A, -200A, -330A, -470A, -550A, -590A, -780A



Surrounding air temperature



Altitude



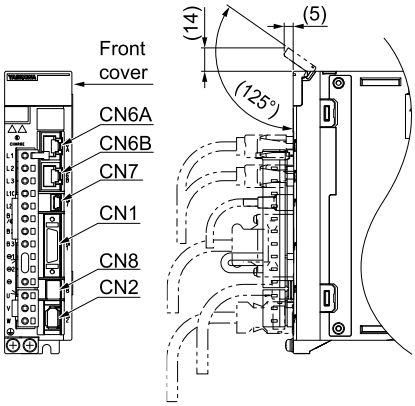
Surrounding air temperature and altitude

External Dimensions

Front Cover Dimensions and Connector Specifications

The connector shapes and pin assignments depend on the interfaces of the SERVOPACK. Refer to the following figures and table.

■ Front Cover Dimensions



■ Connector Specifications

Connector No.	Model	Number of Pins	Manufacturer
CN1	10226-59A3MB	26	3M Japan Limited
CN2	53984-0681	6	Molex Japan Co., Ltd.
CN6A/B	3-1734579-4	8	TE Connectivity Japan G.K.
CN7	2342993-1	5	TE Connectivity Japan G.K.
CN8	2294415-1	8	TE Connectivity Japan G.K.

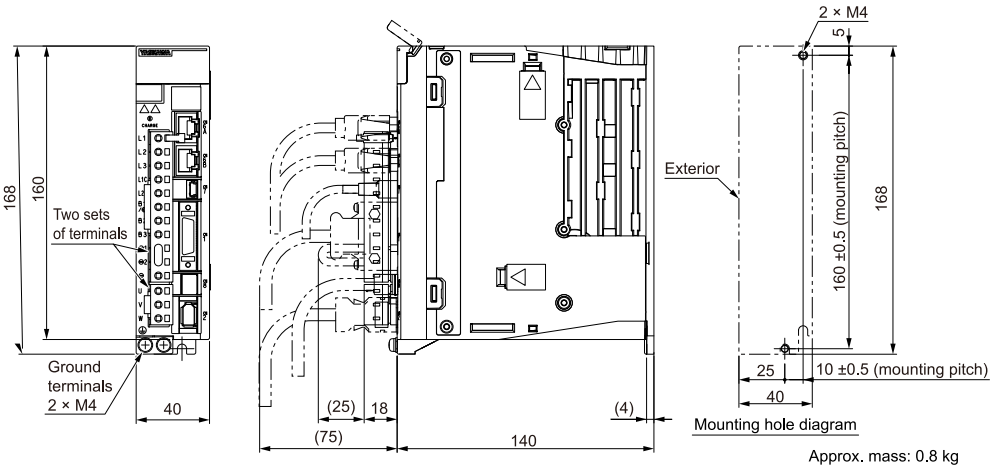
Note:

The above connectors or their equivalents are used for the SERVOPACKs.

SERVOPACK External Dimensions

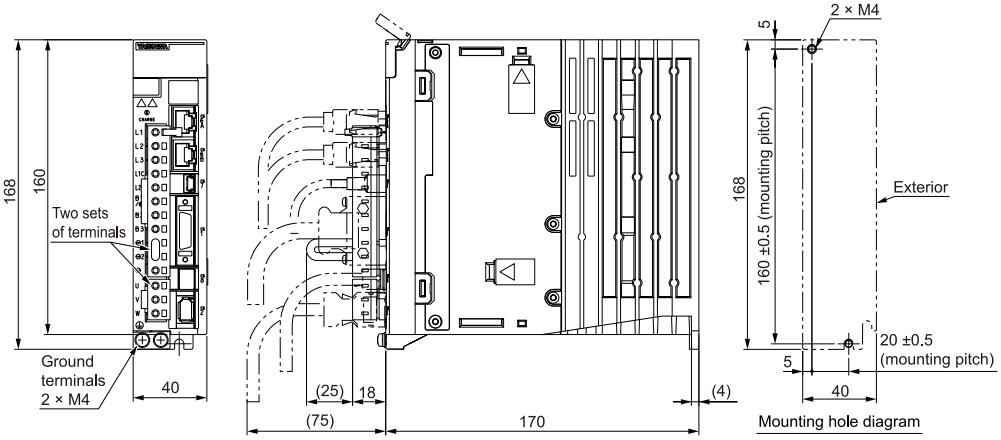
■ Base-mounted SERVOPACKs

◆ SGDXS-R70A, -R90A, -1R6A



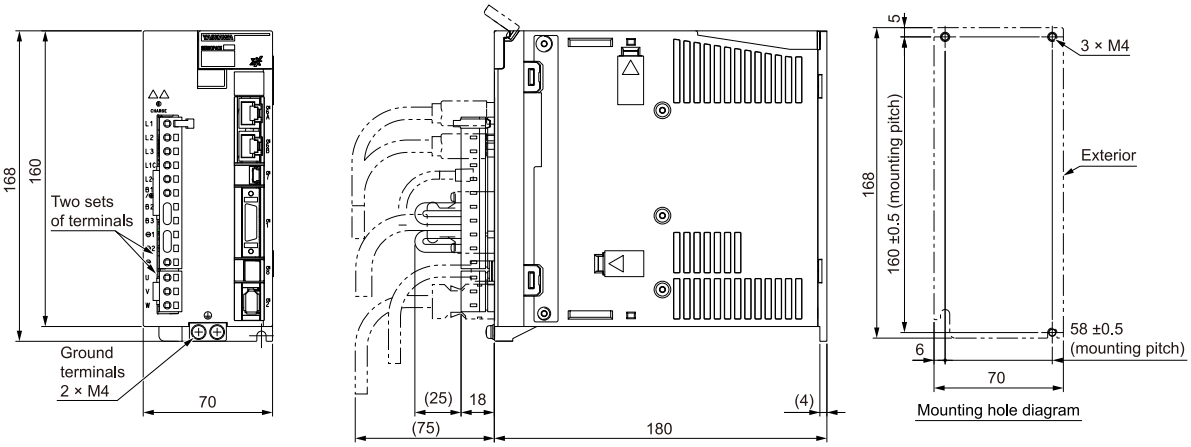
Approx. mass: 0.8 kg
Unit: mm

◆ SGDXS-2R8A



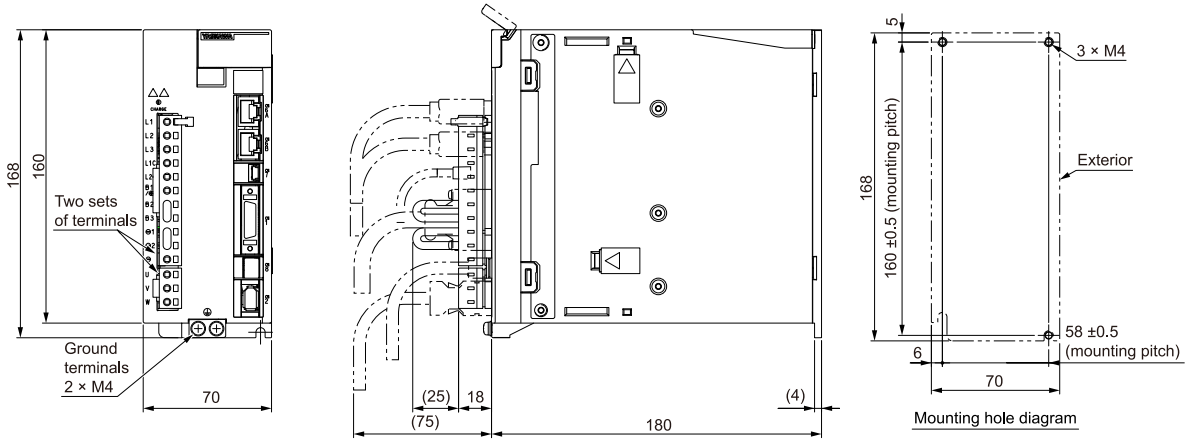
Approx. mass: 1.1 kg
Unit: mm

◆ SGDXS-3R8A



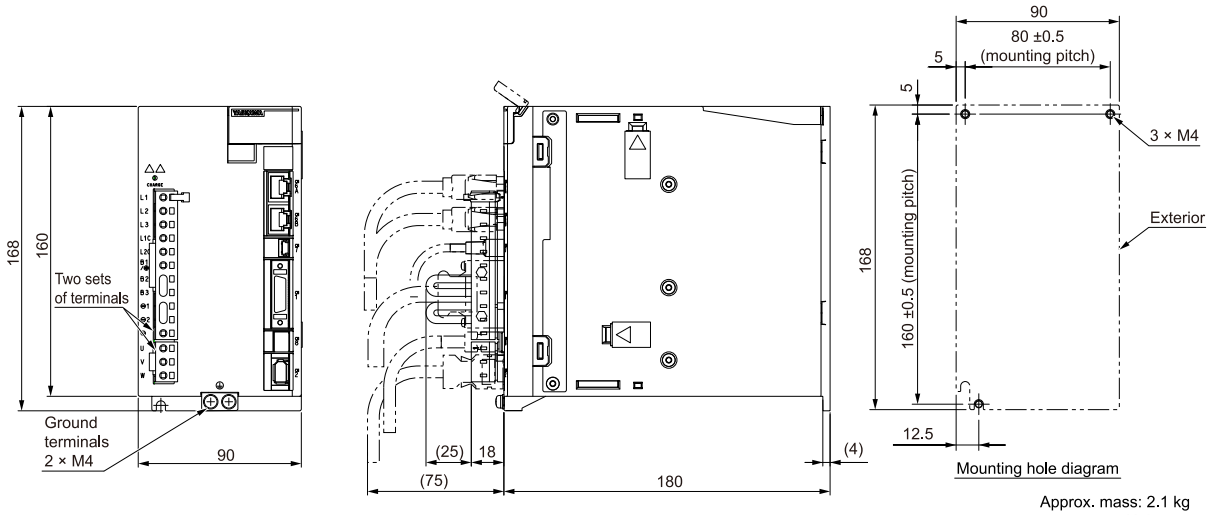
Approx. mass: 1.7 kg
Unit: mm

◆ SGDXS-5R5A, -7R6A



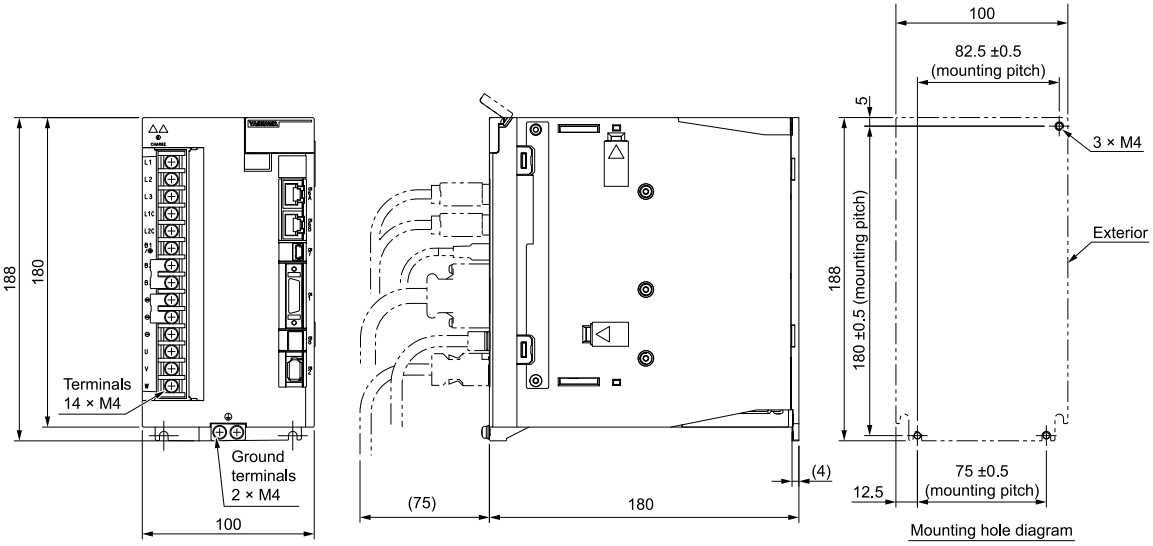
Approx. mass: 1.6 kg
Unit: mm

◆ SGDXS-120A



Approx. mass: 2.1 kg
Unit: mm

◆ SGDXS-180A, -200A

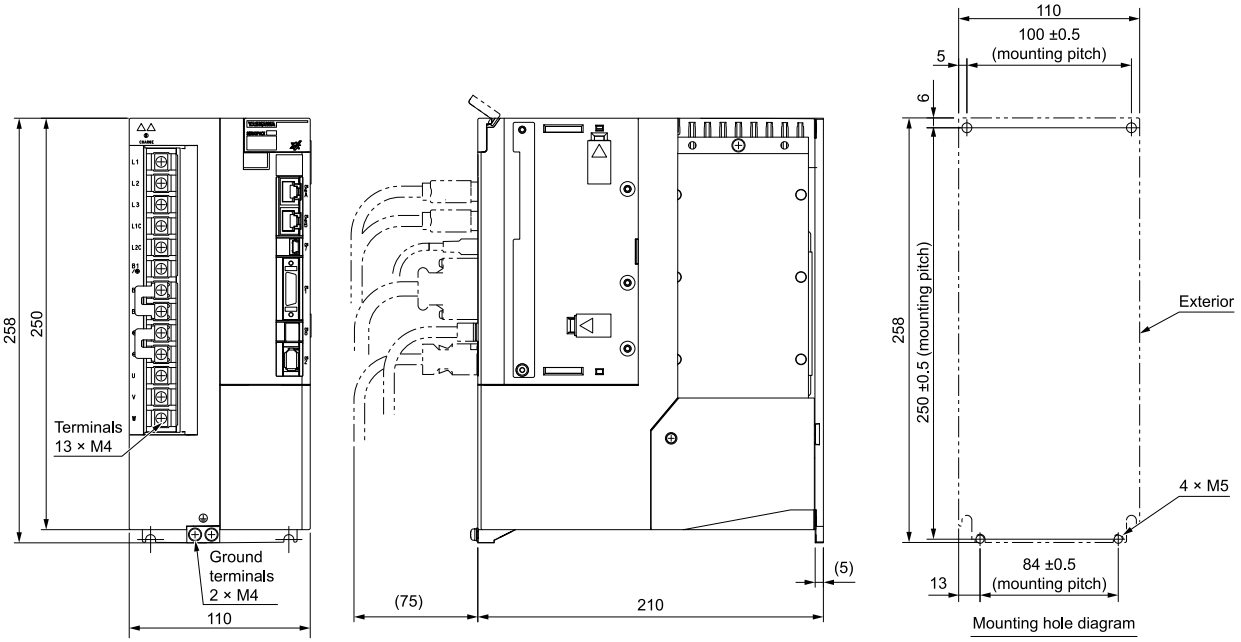


Approx. mass: 2.8 kg
Unit: mm

Note:

These drawings show the SERVOPACK with the terminal cover removed.

◆ SGDXS-330A

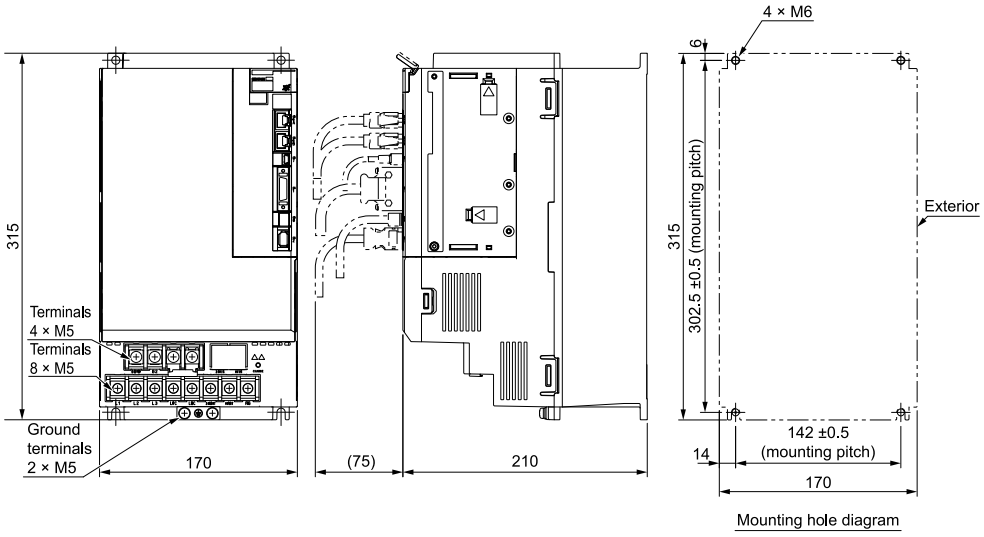


Approx. mass: 4.4 kg
Unit: mm

Note:

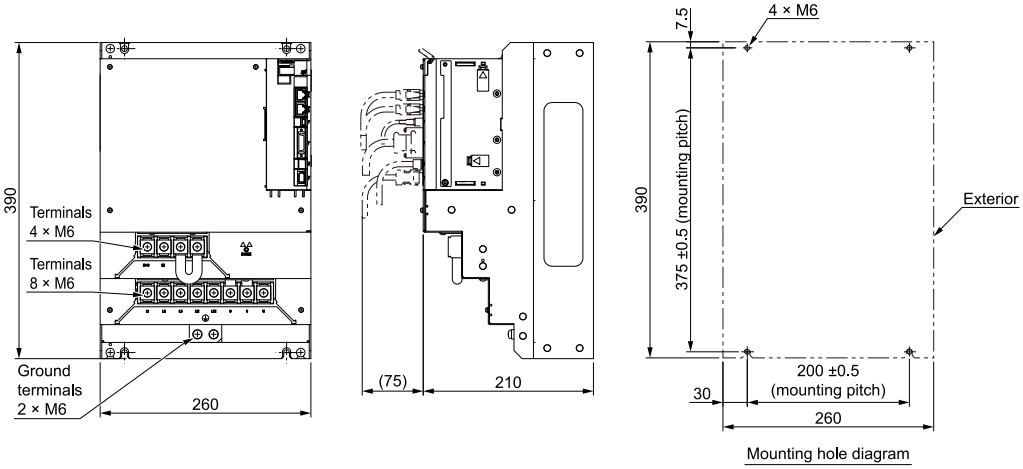
These drawings show the SERVOPACK with the terminal cover removed.

◆ SGDXS-470A, -550A



Approx. mass: 9.0 kg
Unit: mm

◆ SGDXS-590A, -780A

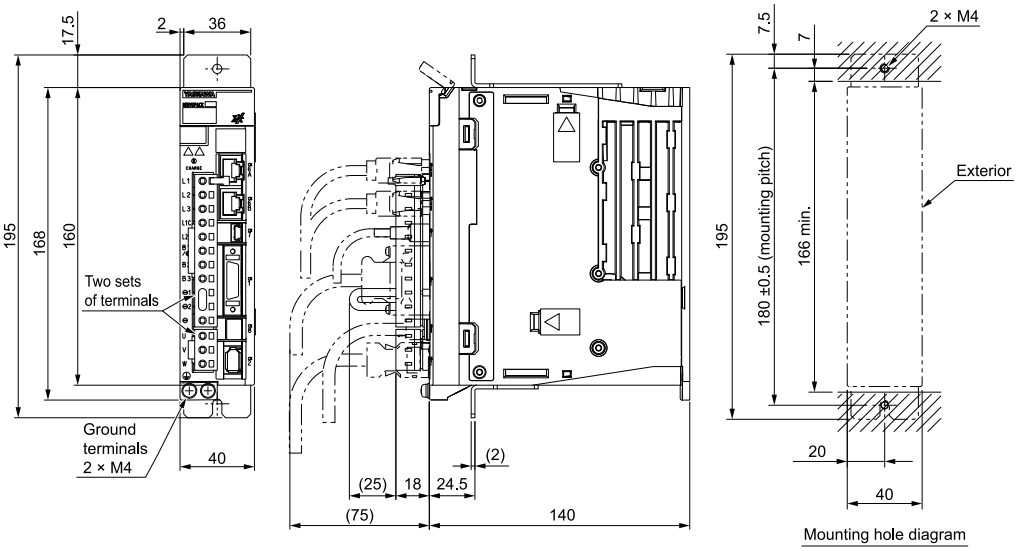


Approx. mass: 16 kg
Unit: mm

■ Rack-mounted SERVOPACKs

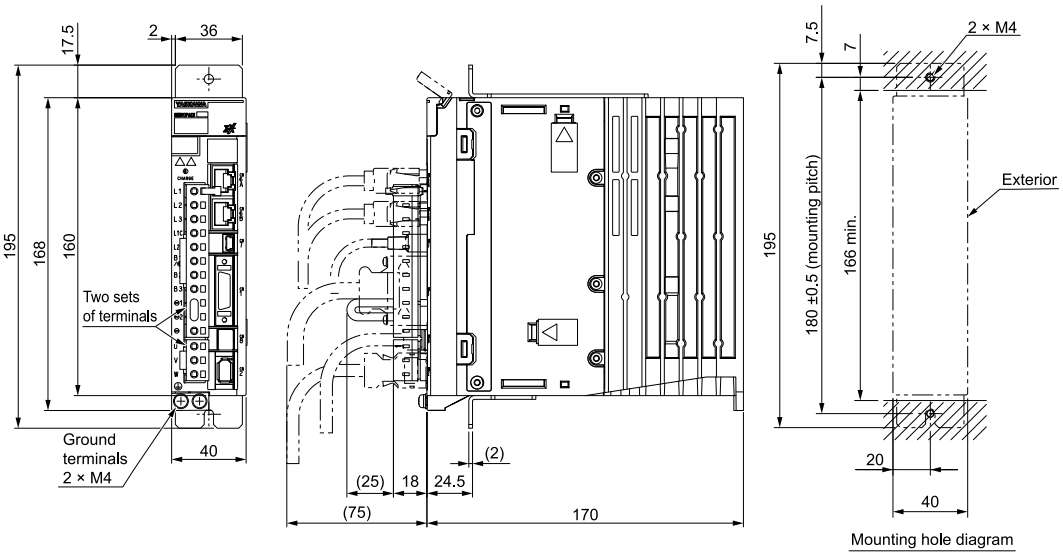
Hardware Option Code: 0001

◆ SGDXS-R70A, -R90A, -1R6A



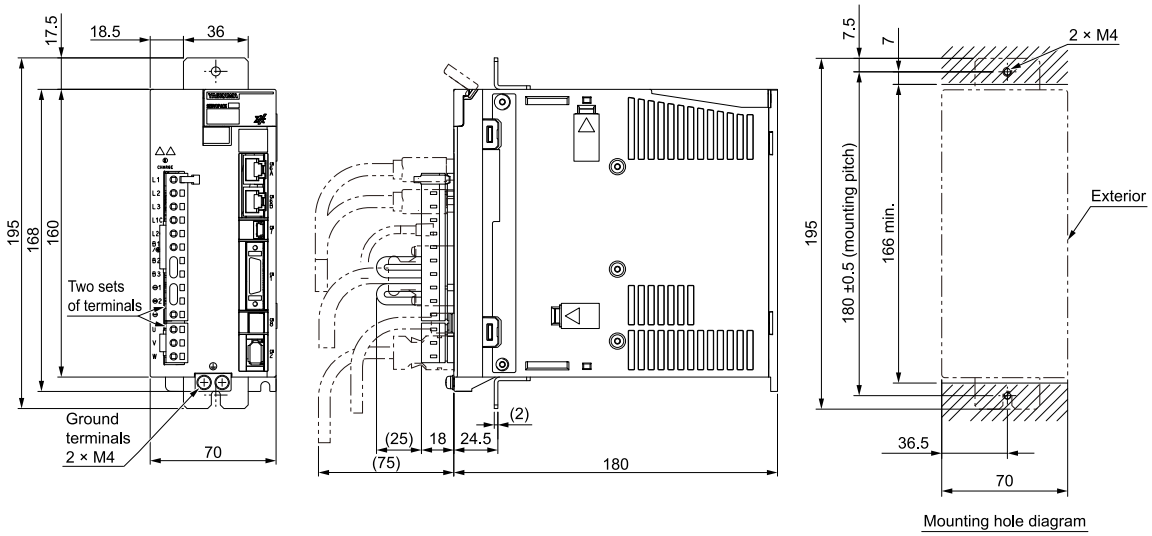
Approx. mass: 0.9 kg
Unit: mm

◆ SGDXS-2R8A



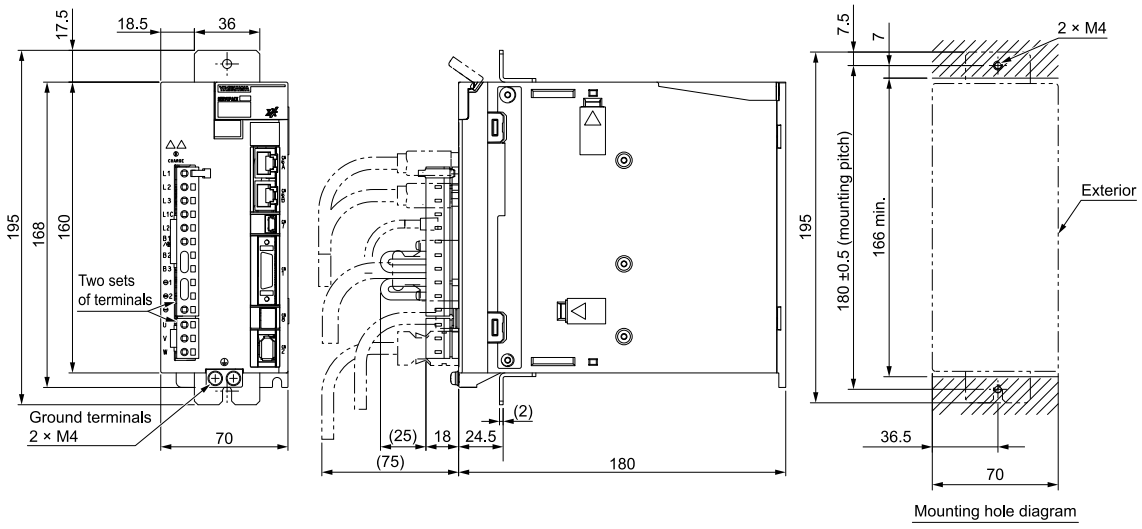
Approx. mass: 1.1 kg
Unit: mm

◆ SGDXS-3R8A



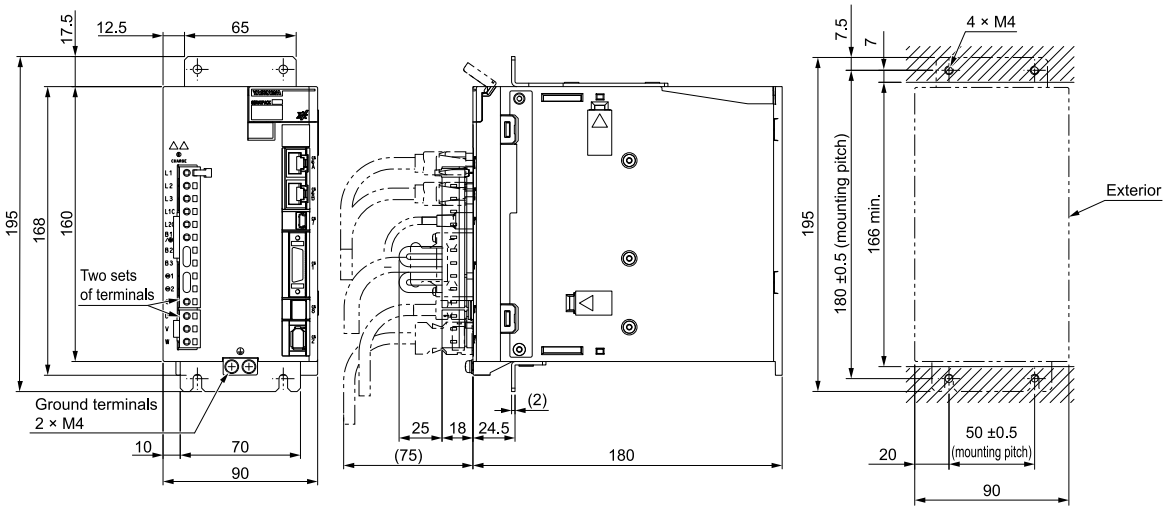
Approx. mass: 1.7 kg
Unit: mm

◆ SGDXS-5R5A, -7R6A



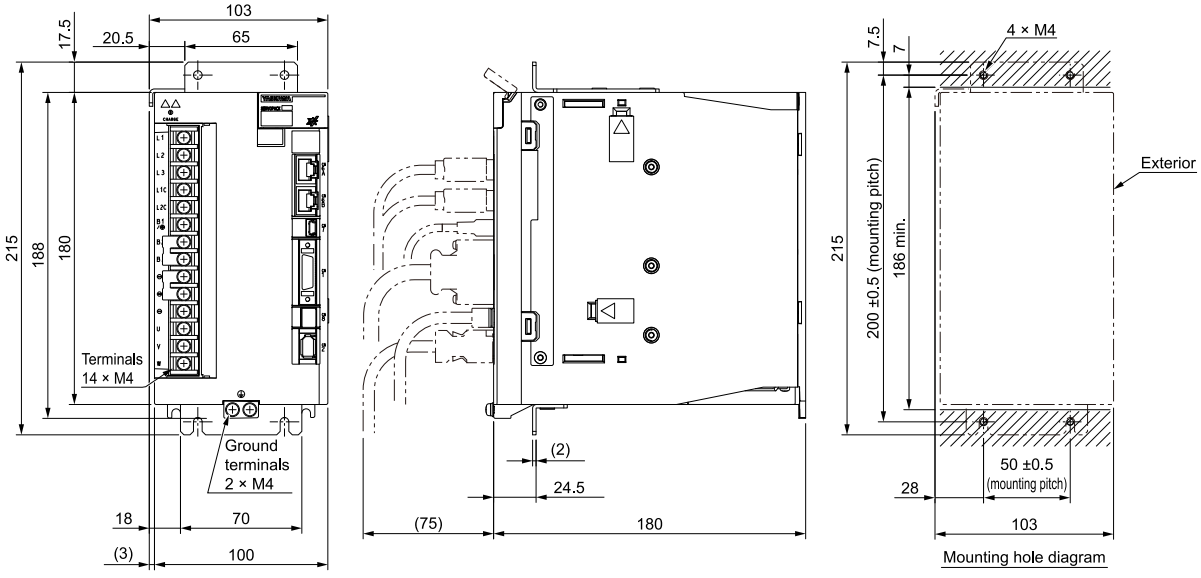
Approx. mass: 1.7 kg
Unit: mm

◆ SGDXS-120A



Approx. mass: 2.2 kg
Unit: mm

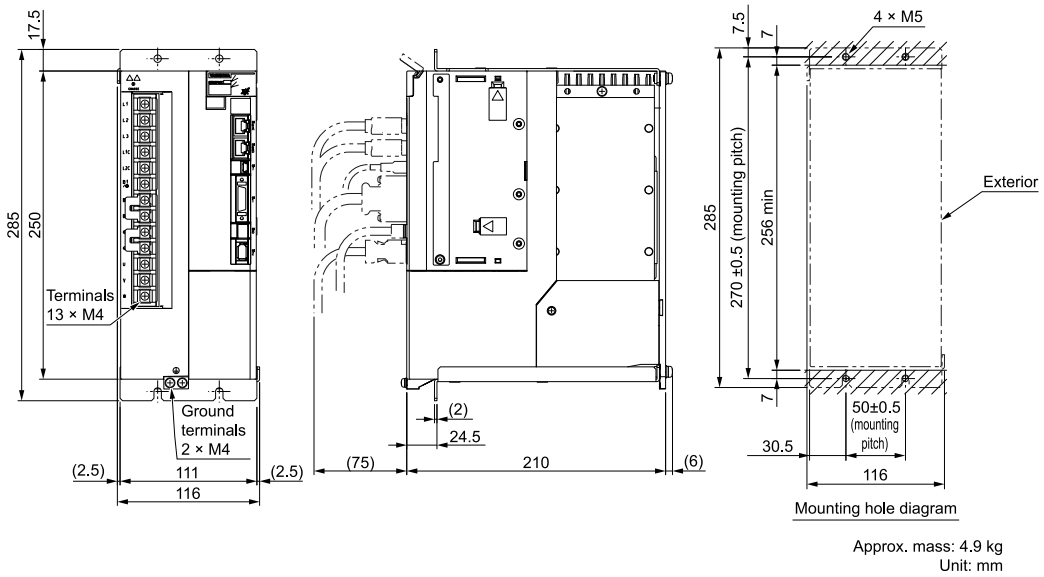
◆ SGDXS-180A, -200A



Approx. mass: 2.9 kg
Unit: mm

Note:
These drawings show the SERVOPACK with the terminal cover removed.

◆ SGDXS-330A



Approx. mass: 4.9 kg
Unit: mm

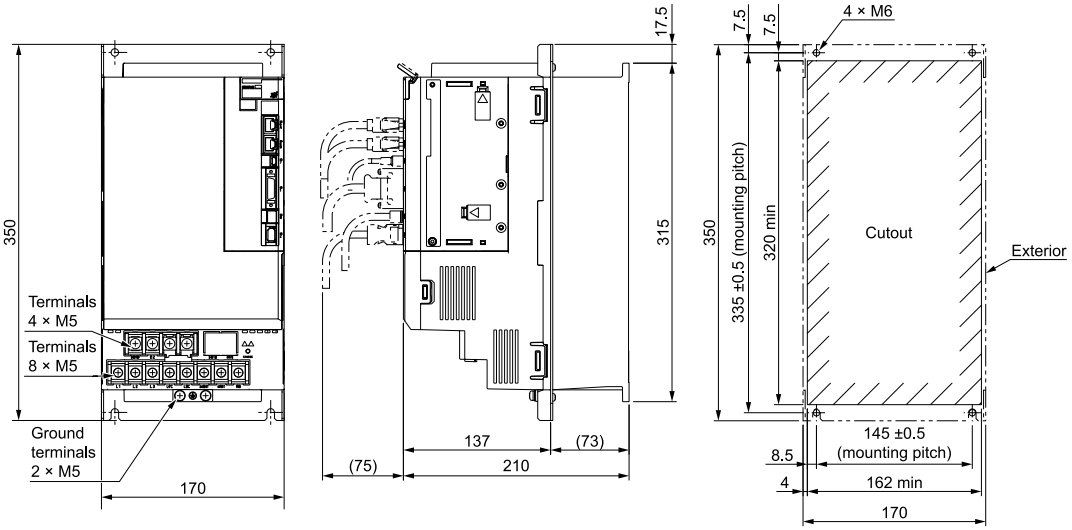
Note:

These drawings show the SERVOPACK with the terminal cover removed.

■ Duct-ventilated SERVOPACKs

Hardware Option Code: 0001

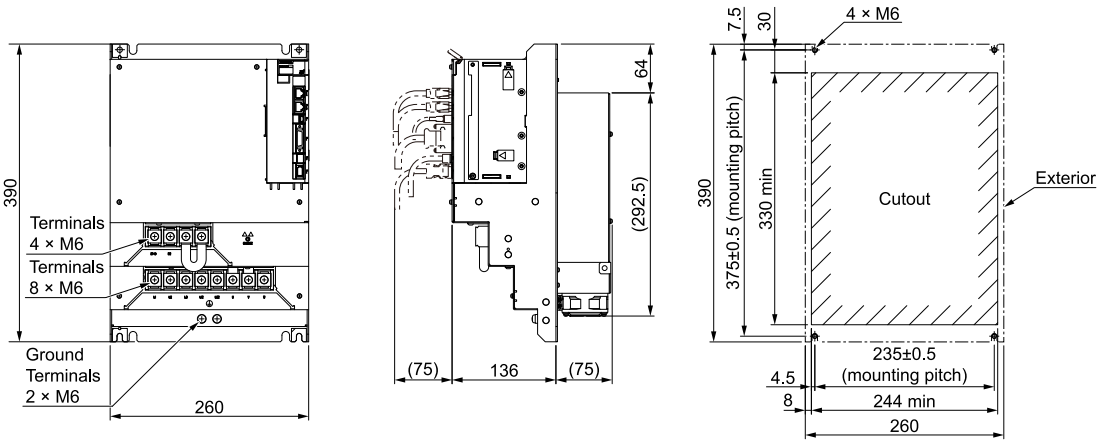
◆ SGDXS-470A, -550A



Mounting hole diagram

Approx. mass: 9.0 kg
Unit: mm

◆ SGDXS-590A, -780A



Mounting hole diagram

Approx. mass: 15 kg
Unit: mm

Σ-XW Models with MECHATROLINK-4/III Communications

Interpreting SERVOPACK Model Numbers

SGDXW - 1R6 A 40 A 0001 00 B

Σ-X-Series
Σ-XW model

❶ 1R6 ❷ A ❸ 40 ❹ A ❺ 0001 ❻ 00 ❼ B

❶ Maximum Applicable Motor Capacity per Axis

Voltage	Code	Specification
Three-Phase, 200 VAC	1R6*1	0.2 kW
	2R8*1	0.4 kW
	5R5*1, *2	0.75 kW
	7R6	1.0 kW

❷ Voltage

Code	Specification
A	200 VAC

❸ Interface*3

Code	Specification
40	MECHATROLINK-4/III communications reference

❹ Design Revision Order

A

❺ Hardware Options Specification

Code	Specification	Applicable Models
None	Without options	All models
0000		
0001	Rack-mounted	
0002	Varnished	
0020*4	No dynamic brake	SGDXW-1R6A to -2R8A
	External dynamic brake resistor	SGDXW-5R5A to -7R6A
1000*5	HWBB function	All models

❻ FT Specification

Code	Specification
None	None
00	

❼ BTO Specification (under development)

Code	Specification
None	None
B	BTO specification

*1 You can use these models with either a single-phase or three-phase input.

*2 If you use the SERVOPACK with a single-phase 200-VAC power supply input, derate the load ratio to 65%. An example is given below.
If the load ratio of the first axis is 90%, use a load ratio of 40% for the second axis so that average load ratio for both axes is 65%.
((90% + 40%)/2 = 65%)

*3 The same SERVOPACKs are used for both rotary servomotors and linear servomotors.

*4 For details, refer to the following manual.

Σ-X-Series Σ-XS/Σ-XW SERVOPACK with Dynamic Brake Hardware Option Specifications Product Manual (Manual No.: SIEP C710812 14)

*5 For details, refer to the following manual.

Σ-X-Series Σ-XW SERVOPACK with Hardware Option Specifications HWBB Function Product Manual (Manual No.: SIEP C710812 13)

Ratings and Specifications

This section gives the ratings and specifications of SERVOPACKs.

Ratings

■ Three-Phase, 200 VAC

Model SGDXW-			1R6A	2R8A	5R5A	7R6A
Maximum Applicable Motor Capacity (each axis) [kW]			0.2	0.4	0.75	1.0
Continuous Output Current (each axis) [Arms]			1.6	2.8	5.5	7.6
Instantaneous Maximum Output Current (each axis) [Arms]			5.9	9.3	16.9	17.0
Main Circuit	Power Supply		200 VAC to 240 VAC, 50 Hz/60 Hz			
	Allowable Voltage Fluctuation		-15% to +10%			
	Input Current [Arms] *1		2.5	4.7	7.8	11
Control	Power Supply		200 VAC to 240 VAC, 50 Hz/60 Hz			
	Allowable Voltage Fluctuation		-15% to +10%			
	Input Current [Arms] *1		0.25	0.25	0.25	0.25
Power Supply Capacity [kVA] *1			1.0	1.9	3.2	4.5
Power Loss *1	Main Circuit Power Loss [W]		24.0	43.3	78.9	94.2
	Control Circuit Power Loss [W]		17	17	17	17
	Total Power Loss [W]		41.0	60.3	95.9	111.2
Regenerative Resistor	Built-In Regenerative Resistor	Resistance [Ω]	35	35	12	12
		Capacity [W]	60	60	70	70
		Allowable Power Consumption [W]	20	20	25	25
	Minimum Allowable External Resistance [Ω]		35	35	12	12
Overvoltage Category			III			

*1 This is the net value at the rated load.

■ Single-Phase, 200 VAC

Model SGDXW-		1R6A	2R8A	5R5A *1
Maximum Applicable Motor Capacity (each axis) [kW]		0.2	0.4	0.75
Continuous Output Current (each axis) [Arms]		1.6	2.8	5.5
Instantaneous Maximum Output Current (each axis) [Arms]		5.9	9.3	16.9
Main Circuit	Power Supply	200 VAC to 240 VAC, 50 Hz/60 Hz		
	Allowable Voltage Fluctuation	-15% to +10%		
	Input Current [Arms] *2	5.5	11	12
Control	Power Supply	200 VAC to 240 VAC, 50 Hz/60 Hz		
	Allowable Voltage Fluctuation	-15% to +10%		
	Input Current [Arms] *2	0.25	0.25	0.25

Continued on next page.

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Model SGDXW-			1R6A	2R8A	5R5A *1*
Power Supply Capacity [kVA] *2*			1.3	2.4	2.7
Power Loss *2*	Main Circuit Power Loss [W]		24.1	43.6	54.1
	Control Circuit Power Loss [W]		17	17	17
	Total Power Loss [W]		41.1	60.6	71.1
Regenerative Resistor	Built-In Regenerative Resistor	Resistance [Ω]	35	35	12
		Capacity [W]	60	60	70
		Allowable Power Consumption [W]	20	20	25
	Minimum Allowable External Resistance [Ω]		35	35	12
Overvoltage Category			III		

*1 If you use the SGDXW-5R5A with a single-phase 200-VAC power supply input, derate the load ratio to 65%. An example is given below.
If the load ratio of the first axis is 90%, use a load ratio of 40% for the second axis so that average load ratio for both axes is 65%.
((90% + 40%)/2 = 65%)

*2 This is the net value at the rated load. However, a load ratio of 65% was used for the SGDXW-5R5A.

■ 270 VDC

Model SGDXW-		1R6A	2R8A	5R5A	7R6A
Maximum Applicable Motor Capacity (each axis) [kW]		0.2	0.4	0.75	1.0
Continuous Output Current (each axis) [Arms]		1.6	2.8	5.5	7.6
Instantaneous Maximum Output Current (each axis) [Arms]		5.9	9.3	16.9	17.0
Main Circuit	Power Supply	270 VDC to 324 VDC			
	Allowable Voltage Fluctuation	-15% to +10%			
	Input Current [Arms] *1*	3.0	5.8	9.7	14
Control	Power Supply	270 VDC to 324 VDC			
	Allowable Voltage Fluctuation	-15% to +10%			
	Input Current [Arms] *1*	0.25	0.25	0.25	0.25
Power Supply Capacity [kVA] *1*		1.2	2	3.2	4.6
Power Loss *1*	Main Circuit Power Loss [W]	18.7	33.3	58.4	73.7
	Control Circuit Power Loss [W]	17	17	17	17
	Total Power Loss [W]	35.7	50.3	75.4	90.7
Overvoltage Category		III			

*1 This is the net value at the rated load.

SERVOPACK Overload Protection Characteristics

The overload detection level is set for hot start conditions with a SERVOPACK surrounding air temperature of 55°C.

A.710 or A.720 (an overload alarm) will occur if overload operation that exceeds the overload protection characteristics shown in the following diagram (i.e., operation on the right side of the applicable line) is performed.

The actual overload detection level will be the detection level of the connected SERVOPACK or servomotor that has the lower overload protection characteristics.

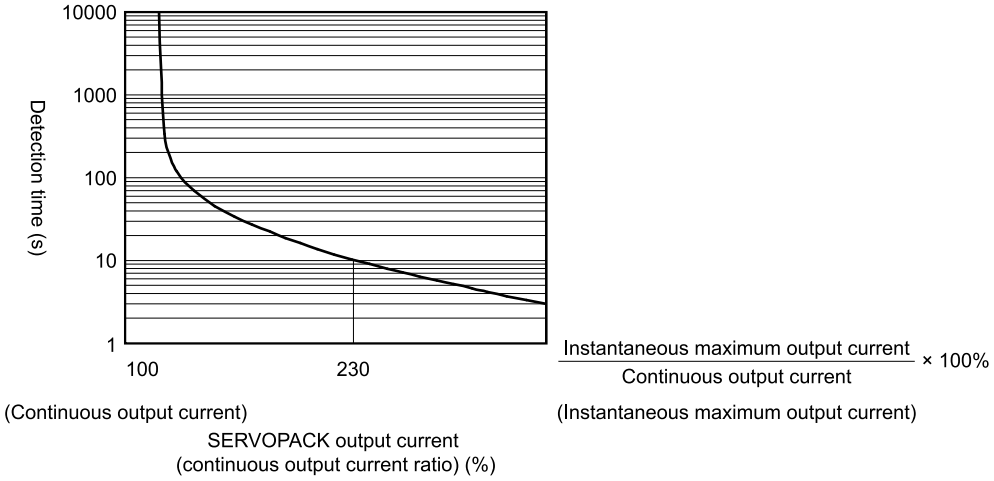

Figure .7 SGDXW-1R6, -2R8

Note:

- The above overload protection characteristics do not mean that you can perform continuous duty operation with an output of 100% or higher.
  For a Yaskawa-specified combination of SERVOPACK and servomotor, maintain the effective torque within the continuous duty zone of the torque-motor speed characteristic of the servomotor.
- This overload protection function is not a protection function related to speed. This product does not have a built-in thermal memory hold function.

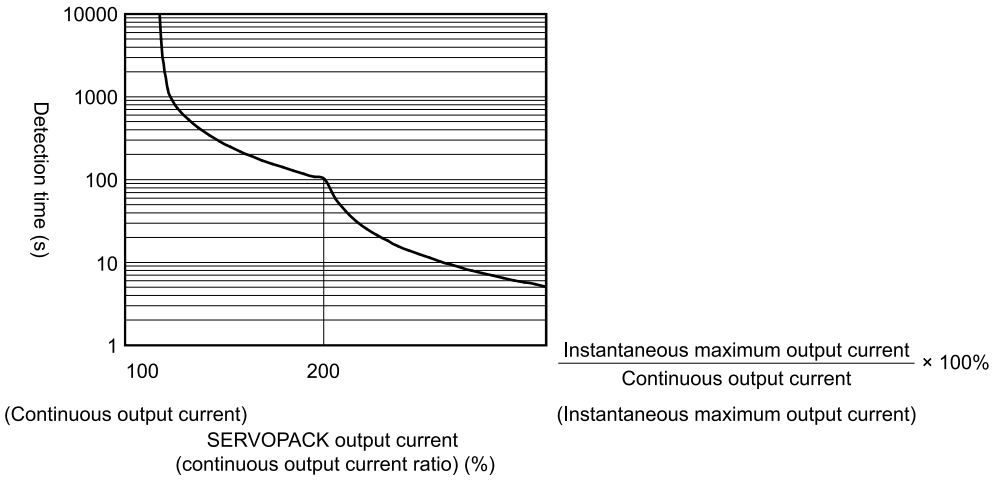

Figure .8 SGDXW-5R5, -7R6

Note:

- The above overload protection characteristics do not mean that you can perform continuous duty operation with an output of 100% or higher.
  For a Yaskawa-specified combination of SERVOPACK and servomotor, maintain the effective torque within the continuous duty zone of the torque-motor speed characteristic of the servomotor.
- This overload protection function is not a protection function related to speed. This product does not have a built-in thermal memory hold function.

Specification

■ Environmental Conditions

Item	Specification
Surrounding Air Temperature	-5°C to 55°C (With derating, usage is possible between 55°C and 60°C.) Refer to the following section for derating specifications. ☞ *Derating Specifications on page 394*
Storage Temperature	-20°C to 85°C
Surrounding Air Humidity	95% relative humidity max. (with no freezing or condensation)

Continued on next page.

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Item	Specification
Storage Humidity	95% relative humidity max. (with no freezing or condensation)
Vibration Resistance	When there is continuous vibration: 10 Hz to 55 Hz, acceleration amplitude 5.9 m/s^2 (0.6G)
Impact Resistance	19.6 m/s^2
Degree of Protection	IP20
Pollution Degree	2 • Must be no corrosive or flammable gases. • Must be no exposure to water, oil, or chemicals. • Must be no dust, salts, or iron dust.
Altitude	1000 m max. (With derating, usage is possible between 1000 m and 2000 m.) Refer to the following section for derating specifications. ☞ *Derating Specifications on page 394*
Others	Do not use the SERVOPACK in the following locations: Locations subject to static electricity noise, strong electromagnetic/magnetic fields, or radioactivity

■ I/O Signals

Item		Specification
Overheat Protection Input		Number of input points: 2 Input voltage range: 0 V to +5 V
Sequence Input Signals	Input Signals That Can Be Allocated	Allowable voltage range: 24 VDC ±20% Number of input points: 12 (input method: sink inputs or source inputs)
		Input signals: • P-OT (Forward Drive Prohibit Input) and N-OT (Reverse Drive Prohibit Input) signals • /P-CL (Forward External Torque Limit Input) and /N-CL (Reverse External Torque Limit Input) signals • /DEC (Origin Return Deceleration Switch Input) signal • /EXT1 to /EXT3 (External Latch Input 1 to 3) signals • FSTP (Forced Stop Input) signal A signal can be allocated and the positive and negative logic can be changed.
Sequence Output Signals	Fixed Output	Allowable voltage range: 5 VDC to 30 VDC Number of output points: 2 (output method: a photocoupler output (isolated))
		Output signal: ALM (Servo Alarm Output) signal
	Output Signals That Can Be Allocated	Allowable voltage range: 5 VDC to 30 VDC Number of output points: 5 (output method: a photocoupler output (isolated))
		Output signals: • /COIN (Positioning Completion Output) signal • /V-CMP (Speed Coincidence Detection Output) signal • /TGON (Rotation Detection Output) signal • /S-RDY (Servo Ready Output) signal • /CLT (Torque Limit Detection Output) signal • /VLT (Speed Limit Detection Output) signal • /BK (Brake Output) signal • /WARN (Warning Output) signal • /NEAR (Near Output) signal • /NSO1 to 3 (Normal Output for Triggers at Preset Positions 1 to 3) signals A signal can be allocated and the positive and negative logic can be changed.

■ Function

Item			Specification
Communications	USB Communications (CN7)	Interfaces	Personal computer (with SigmaWin+), digital operator (JUSP-OP07A-E)
		Communications Standard	Conforms to USB2.0 standard (12 Mbps).
Displays/Indicators			CHARGE, PWR, CN, L1, and L2 indicators, and two, one-digit seven-segment displays
MECHATROLINK-4 Communications *1	Communications Protocol		MECHATROLINK-4
	Station Address Settings		01h to FFh (maximum number of slaves: 127) The rotary switches (S1 and S2) are used to set the station address.
	Extended Address Settings		Axis A: 00h, Axis B: 01h
	Transmission Speed		100 Mbps
	Transmission Cycle *2		62.5 µs, 125 µs, 250 µs, 500 µs, 750 µs, 1.0 ms to 4.0 ms (multiples of 0.5 ms)
	Number of Transmission Bytes		16 to 80 bytes/station
Reference Methods for MECHATROLINK-4 Communications	Performance		Position, speed, or torque control with MECHATROLINK-4 communications
	Reference Input		MECHATROLINK-4 commands (sequence, motion, data setting, data access, monitoring, adjustment, etc.)
	Profile		MECHATROLINK-4 standard servo profile MECHATROLINK-III standard servo profile
MECHATROLINK-III Communications *1	Communications Protocol		MECHATROLINK-III
	Station Address Settings		03h to EFh (maximum number of slaves: 62) The rotary switches (S1 and S2) are used to set the station address.
	Extended Address Settings		Axis A: 00h, Axis B: 01h
	Transmission Speed		100 Mbps
	Transmission Cycle		250 µs, 500 µs, 750 µs, 1.0 ms to 4.0 ms (multiples of 0.5 ms)
	Number of Transmission Bytes		32 or 48 bytes/station A DIP switch (S3) is used to select the transmission bytes.
Reference Methods for MECHATROLINK-III Communications	Performance		Position, speed, or torque control with MECHATROLINK-III communications
	Reference Input		MECHATROLINK-III commands (sequence, motion, data setting, data access, monitoring, adjustment, etc.)
	Profile		MECHATROLINK-III standard servo profile
MECHATROLINK-4 and MECHATROLINK-III Communications Setting Switches			Rotary switch (S1 and S2) positions: 16
			Number of DIP switch (S3) pins: 4
Analog Monitor (CN5)			Number of points: 2 Output voltage range: ±10 VDC (effective linearity range: ±8 V) Resolution: 16 bits Accuracy: ±20 mV (Typ) Maximum output current: ±10 mA
Dynamic Brake (DB)			Activated when a servo alarm or overtravel (OT) occurs, or when the power to the main circuit or servo is OFF.
Regenerative Processing			Built-in
Overtravel (OT) Prevention			Stopping with dynamic brake, deceleration to a stop, or coasting to a stop for the P-OT (Forward Drive Prohibit Input) or N-OT (Reverse Drive Prohibit Input) signal

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Item	Specification
Protective Functions	Overcurrent, overvoltage, undervoltage, overload, regeneration error, etc.
Utility Functions	Gain tuning, alarm history, jogging operation, origin search, etc.

*1 Use the DIP switch S3 to switch the communications protocol. For details, refer to the following manual.

Σ-X-Series AC Servo Drive Σ-XW SERVOPACK with MECHATROLINK-4/III Communications References Product Manual (Manual No.: SIEP C710812 04)

*2 Multiple transmission cycles are supported.

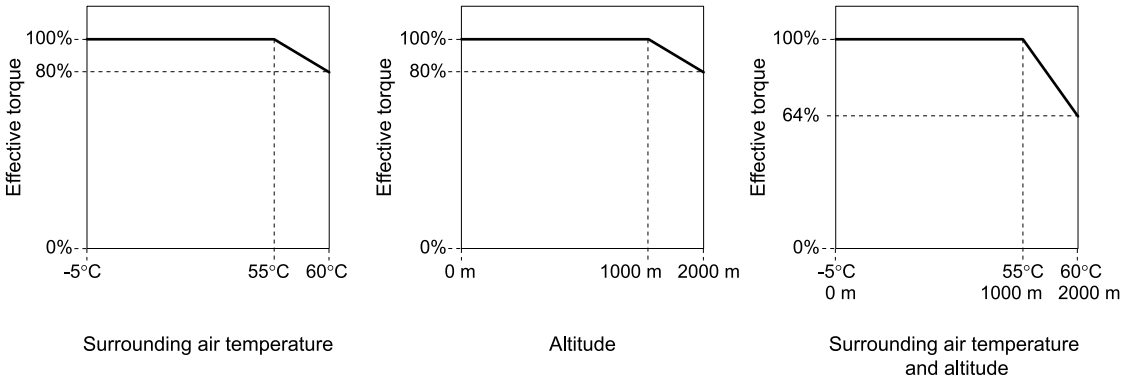
■ Option

Item	Specification
Applicable Option Modules	None

Derating Specifications

If you use the SERVOPACK at a surrounding air temperature of 55°C to 60°C or at an altitude of 1000 m to 2000 m, you must apply the derating rates given in the following graphs.

■ SGDXW-1R6A, -2R8A, -5R5A, -7R6A

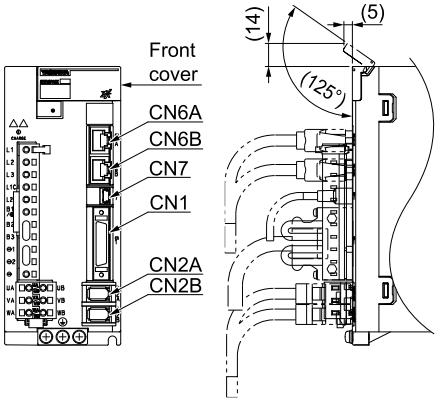


External Dimensions

Front Cover Dimensions and Connector Specifications

The connector shapes and pin assignments depend on the interfaces of the SERVOPACK. Refer to the following figures and table.

■ Front Cover Dimensions



■ Connector Specifications

Connector No.	Model	Number of Pins	Manufacturer
CN1	10236-59A3MB	36	3M Japan Limited
CN2A, CN2B	53460-0669	6	Molex Japan Co., Ltd.
CN6A, CN6B	3-1734579-4	8	TE Connectivity Japan G.K.
CN7	2342993-1	5	TE Connectivity Japan G.K.

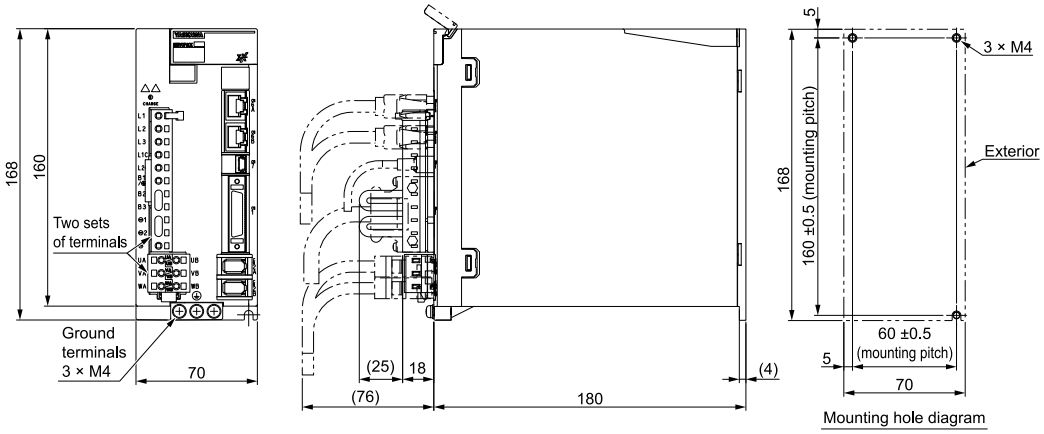
Note:

The above connectors or their equivalents are used for the SERVOPACKs.

SERVOPACK External Dimensions

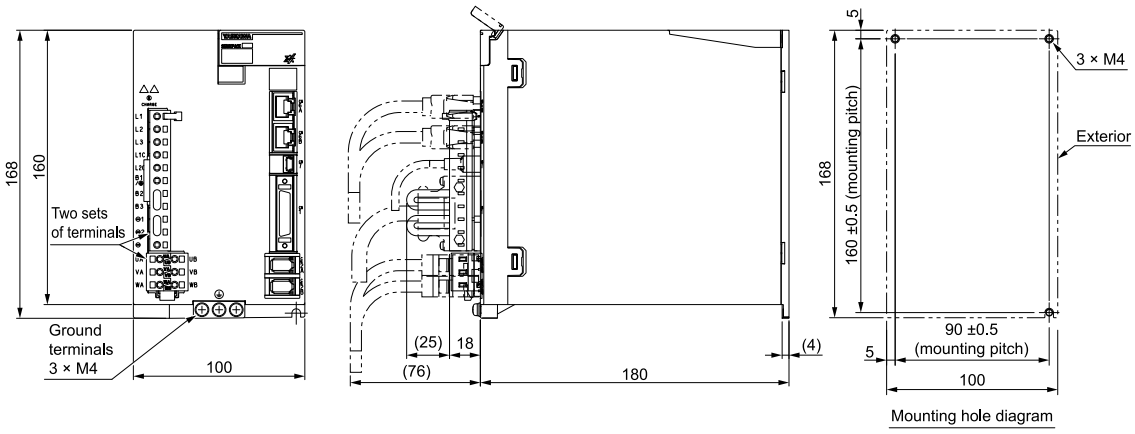
■ Base-mounted SERVOPACKs

◆ SGDXW-1R6A, -2R8A



Approx. mass: 1.7 kg
Unit: mm

◆ SGDXW-5R5A, -7R6A

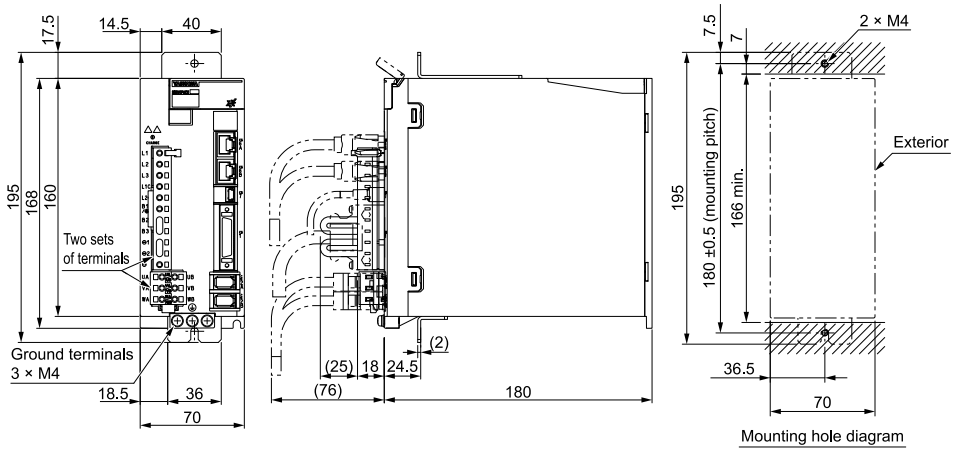


Approx. mass: 2.4 kg
Unit: mm

■ Rack-mounted SERVOPACKs

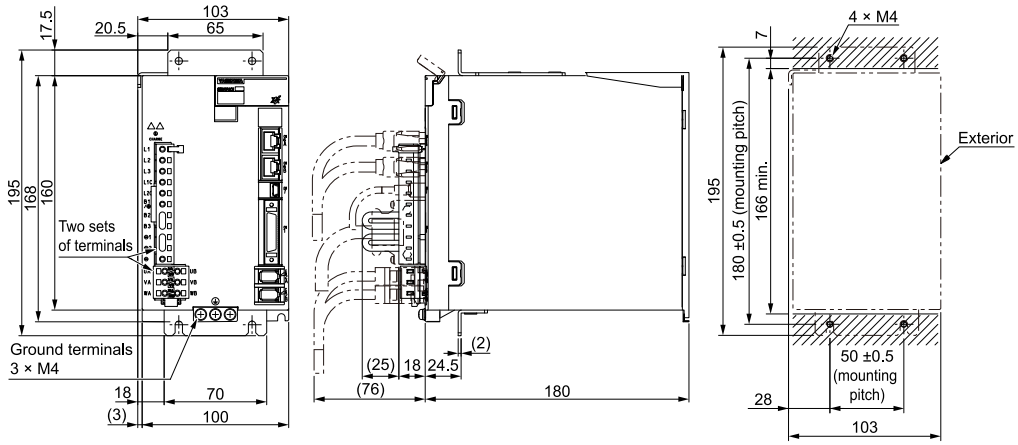
Hardware Option Code: 0001

◆ SGDXW-1R6A, -2R8A



Approx. mass: 1.8 kg
Unit: mm

◆ SGDXW-5R5A, -7R6A



Approx. mass: 2.6 kg
Unit: mm

Σ-XW Models with EtherCAT Communications References

Interpreting SERVOPACK Model Numbers

SGDXW - 1R6 A A0 A 0001 00 B

Σ-X-Series
Σ-XW model

❶ 2 ❸ ❹ ❺ ❻ ❼

❶ Maximum Applicable Motor Capacity per Axis

Voltage	Code	Specification
Three-Phase, 200 VAC	1R6*1	0.2 kW
	2R8*1	0.4 kW
	5R5*1, *2	0.75 kW
	7R6	1.0 kW

❷ Voltage

Code	Specification
A	200 VAC

❸ Interface *3

Code	Specification
A0	EtherCAT communications reference

❹ Design Revision Order

A

❺ Hardware Options Specification

Code	Specification	Applicable Models
None	Without options	All models
0000		
0001	Rack-mounted	
0002	Varnished	
0020*4	No dynamic brake	SGDXW-1R6A to -2R8A
	External dynamic brake resistor	SGDXW-5R5A to -7R6A
1000*5	HWBB function	All models

❻ FT Specification

Code	Specification
None	None
00	

❼ BTO Specification (under development)

Code	Specification
None	None
B	BTO specification

*1 You can use these models with either a single-phase or three-phase input.

*2 If you use the servomotor with a single-phase 200-VAC power supply input, derate the load ratio to 65%. An example is given below.
If the load ratio of the first axis is 90%, use a load ratio of 40% for the second axis so that average load ratio for both axes is 65%.
((90% + 40%)/2 = 65%)

*3 The same SERVOPACKs are used for both rotary servomotors and linear servomotors.

*4 For details, refer to the following manual.

Σ-X-Series Σ-XS/Σ-XW SERVOPACK with Dynamic Brake Hardware Option Specifications Product Manual (Manual No.: SIEP C710812 14)

*5 For details, refer to the following manual.

Σ-X-Series Σ-XW/Σ-XT SERVOPACK Hardware Option Specifications HWBB Function Product Manual (Manual No.: SIEP C710812 13)

Ratings and Specifications

This section gives the ratings and specifications of SERVOPACKs.

Ratings

■ Three-Phase, 200 VAC

Model SGDXW-			1R6A	2R8A	5R5A	7R6A
Maximum Applicable Motor Capacity (each axis) [kW]			0.2	0.4	0.75	1.0
Continuous Output Current (each axis) [Arms]			1.6	2.8	5.5	7.6
Instantaneous Maximum Output Current (each axis) [Arms]			5.9	9.3	16.9	17.0
Main Circuit	Power Supply		200 VAC to 240 VAC, 50 Hz/60 Hz			
	Allowable Voltage Fluctuation		-15% to +10%			
	Input Current [Arms] *1		2.5	4.7	7.8	11
Control	Power Supply		200 VAC to 240 VAC, 50 Hz/60 Hz			
	Allowable Voltage Fluctuation		-15% to +10%			
	Input Current [Arms] *1		0.25	0.25	0.25	0.25
Power Supply Capacity [kVA] *1			1.0	1.9	3.2	4.5
Power Loss *1	Main Circuit Power Loss [W]		24.0	43.3	78.9	94.2
	Control Circuit Power Loss [W]		17	17	17	17
	Total Power Loss [W]		41.0	60.3	95.9	111.2
Regenerative Resistor	Built-In Regenerative Resistor	Resistance [Ω]	35	35	12	12
		Capacity [W]	60	60	70	70
		Allowable Power Consumption [W]	20	20	25	25
	Minimum Allowable External Resistance [Ω]		35	35	12	12
Overvoltage Category			III			

*1 This is the net value at the rated load.

■ Single-Phase, 200 VAC

Model SGDXW-		1R6A	2R8A	5R5A *1
Maximum Applicable Motor Capacity (each axis) [kW]		0.2	0.4	0.75
Continuous Output Current (each axis) [Arms]		1.6	2.8	5.5
Instantaneous Maximum Output Current (each axis) [Arms]		5.9	9.3	16.9
Main Circuit	Power Supply	200 VAC to 240 VAC, 50 Hz/60 Hz		
	Allowable Voltage Fluctuation	-15% to +10%		
	Input Current [Arms] *2	5.5	11	12
Control	Power Supply	200 VAC to 240 VAC, 50 Hz/60 Hz		
	Allowable Voltage Fluctuation	-15% to +10%		
	Input Current [Arms] *2	0.25	0.25	0.25

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Model SGDXW-			1R6A	2R8A	5R5A *1*
Power Supply Capacity [kVA] *2*			1.3	2.4	2.7
Power Loss *2*	Main Circuit Power Loss [W]		24.1	43.6	54.1
	Control Circuit Power Loss [W]		17	17	17
	Total Power Loss [W]		41.1	60.6	71.1
Regenerative Resistor	Built-In Regenerative Resistor	Resistance [Ω]	35	35	12
		Capacity [W]	60	60	70
		Allowable Power Consumption [W]	20	20	25
	Minimum Allowable External Resistance [Ω]		35	35	12
Overvoltage Category			III		

*1 If you use the SGDXW-5R5A with a single-phase 200-VAC power supply input, derate the load ratio to 65%. An example is given below.
If the load ratio of the first axis is 90%, use a load ratio of 40% for the second axis so that average load ratio for both axes is 65%.
((90% + 40%)/2 = 65%)

*2 This is the net value at the rated load. However, a load ratio of 65% was used for the SGDXW-5R5A.

■ 270 VDC

Model SGDXW-		1R6A	2R8A	5R5A	7R6A
Maximum Applicable Motor Capacity (each axis) [kW]		0.2	0.4	0.75	1.0
Continuous Output Current (each axis) [Arms]		1.6	2.8	5.5	7.6
Instantaneous Maximum Output Current (each axis) [Arms]		5.9	9.3	16.9	17.0
Main Circuit	Power Supply	270 VDC to 324 VDC			
	Allowable Voltage Fluctuation	-15% to +10%			
	Input Current [Arms] *1*	3.0	5.8	9.7	14
Control	Power Supply	270 VDC to 324 VDC			
	Allowable Voltage Fluctuation	-15% to +10%			
	Input Current [Arms] *1*	0.25	0.25	0.25	0.25
Power Supply Capacity [kVA] *1*		1.2	2	3.2	4.6
Power Loss *1*	Main Circuit Power Loss [W]	18.7	33.3	58.4	73.7
	Control Circuit Power Loss [W]	17	17	17	17
	Total Power Loss [W]	35.7	50.3	75.4	90.7
Overvoltage Category		III			

*1 This is the net value at the rated load.

SERVOPACK Overload Protection Characteristics

The overload detection level is set for hot start conditions with a SERVOPACK surrounding air temperature of 55°C.

A.710 or A.720 (an overload alarm) will occur if overload operation that exceeds the overload protection characteristics shown in the following diagram (i.e., operation on the right side of the applicable line) is performed.

The actual overload detection level will be the detection level of the connected SERVOPACK or servomotor that has the lower overload protection characteristics.

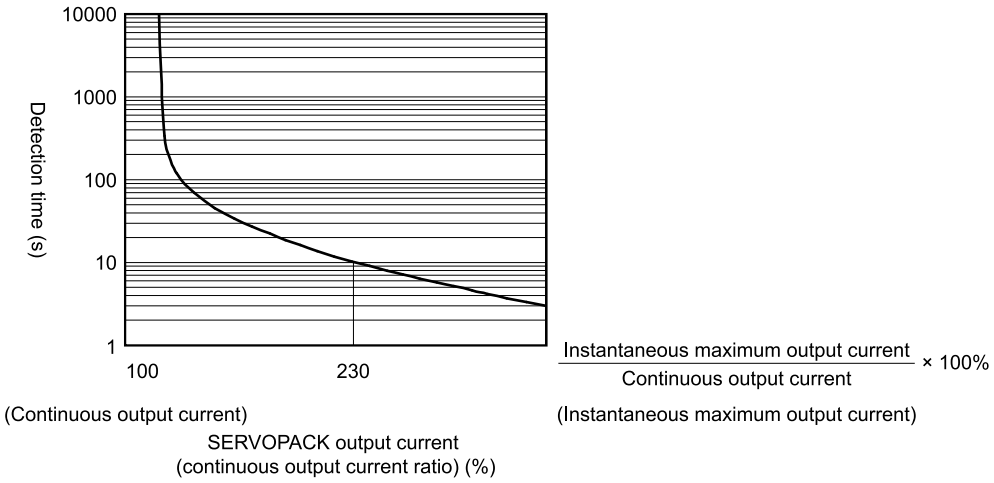

Figure .9 SGDXW-1R6, -2R8

Note:

- The above overload protection characteristics do not mean that you can perform continuous duty operation with an output of 100% or higher.
  For a Yaskawa-specified combination of SERVOPACK and servomotor, maintain the effective torque within the continuous duty zone of the torque-motor speed characteristic of the servomotor.
- This overload protection function is not a protection function related to speed. This product does not have a built-in thermal memory hold function.

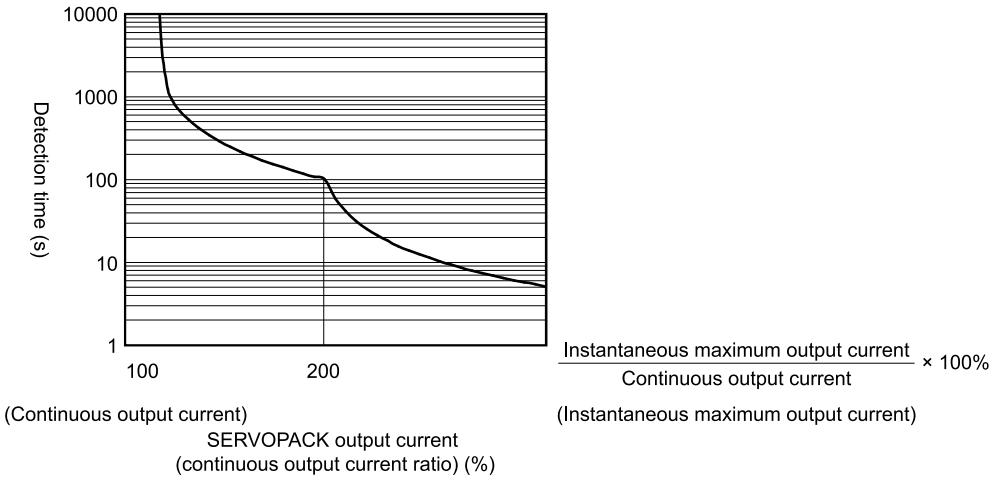

Figure .10 SGDXW-5R5, -7R6

Note:

- The above overload protection characteristics do not mean that you can perform continuous duty operation with an output of 100% or higher.
  For a Yaskawa-specified combination of SERVOPACK and servomotor, maintain the effective torque within the continuous duty zone of the torque-motor speed characteristic of the servomotor.
- This overload protection function is not a protection function related to speed. This product does not have a built-in thermal memory hold function.

Specification

■ Environmental Conditions

Item	Specification
Surrounding Air Temperature	-5°C to 55°C (With derating, usage is possible between 55°C and 60°C.) Refer to the following section for derating specifications. ☞ *Derating Specifications on page 405*
Storage Temperature	-20°C to 85°C
Surrounding Air Humidity	95% relative humidity max. (with no freezing or condensation)

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Item	Specification
Storage Humidity	95% relative humidity max. (with no freezing or condensation)
Vibration Resistance	When there is continuous vibration: 10 Hz to 55 Hz, acceleration amplitude 5.9 m/s^2 (0.6G)
Impact Resistance	19.6 m/s^2
Degree of Protection	IP20
Pollution Degree	2 • Must be no corrosive or flammable gases. • Must be no exposure to water, oil, or chemicals. • Must be no dust, salts, or iron dust.
Altitude	1000 m max. (With derating, usage is possible between 1000 m and 2000 m.) Refer to the following section for derating specifications. ☞ *Derating Specifications on page 405*
Others	Do not use the SERVOPACK in the following locations: Locations subject to static electricity noise, strong electromagnetic/magnetic fields, or radioactivity

■ I/O Signals

Item		Specification
Overheat Protection Input		Number of input points: 2 Input voltage range: 0 V to +5 V
Sequence Input Signals	Input Signals That Can Be Allocated	Allowable voltage range: 24 VDC ±20% Number of input points: 12 (input method: sink inputs or source inputs)
		Input signals: • P-OT (Forward Drive Prohibit Input) and N-OT (Reverse Drive Prohibit Input) signals • /Probe1 (Probe 1 Latch Input) Signal • /Probe2 (Probe 2 Latch Input) signal • /Home (Home Switch Input) Signal • /P-CL (Forward External Torque Limit Input) and /N-CL (Reverse External Torque Limit Input) signals • FSTP (Forced Stop Input) signal A signal can be allocated and the positive and negative logic can be changed.

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Item		Specification
Sequence Output Signals	Fixed Output	Allowable voltage range: 5 VDC to 30 VDC Number of output points: 2 (output method: a photocoupler output (isolated))
		Output signal: ALM (Servo Alarm Output) signal
	Output Signals That Can Be Allocated	Allowable voltage range: 5 VDC to 30 VDC Number of output points: 5 (output method: a photocoupler output (isolated))
		Output signals: • /COIN (Positioning Completion Output) signal • /V-CMP (Speed Coincidence Detection Output) signal • /TGON (Rotation Detection Output) Signal • /S-RDY (Servo Ready Output) Signal • /CLT (Torque Limit Detection Output) signal • /VLT (Speed Limit Detection Output) signal • /BK (Brake Output) signal • /WARN (Warning Output) signal • /NEAR (Near Output) signal • /NSO1 to 3 (Normal Output for Triggers at Preset Positions 1 to 3) signals A signal can be allocated and the positive and negative logic can be changed.

■ Function

Item			Specification
Communications	USB Communications (CN7)	Interfaces	Personal computer (with SigmaWin+), digital operator (JUSP-OP07A-E)
		Communications Standard	Conforms to USB2.0 standard (12 Mbps).
Displays/Indicators			CHARGE, RUN, ERR, L/A A, L/A B, and two one-digit seven-segment LED
EtherCAT Communications Setting Switches			ID Selector (S1 and S2) positions: 16

Continued on next page.

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Item		Specification
EtherCAT Communications	Applicable Communications Standards	IEC 61158 Type 12, IEC 61800-7 CiA402 drive profile
	Physical Layer	100BASE-TX (IEEE802.3)
	Communications Connectors	CN6A (RJ45): ETHERCAT IN (EtherCAT input signal side) CN6B (RJ45): ETHERCAT OUT (EtherCAT output signal side)
	Cable	Category 5, 4 shielded twisted pairs The cable is automatically detected with AUTO MDIX.
	SyncManager	SM0: Mailbox output, SM1: Mailbox input, SM2: Process data output, and SM3: Process data input
	FMMU	FMMU 0: Mapped in process data output (RxPDO) area. FMMU 1: Mapped in process data input (TxPDO) area. FMMU 2: Mapped to mailbox status.
	EtherCAT Commands (Data Link Layer)	APRD, APWR, APRW, FPRD, FPWR, FPRW, BRD, BWR, BRW, LRD, LWR, LRW, ARMW, FRMW
	Process Data	Assignments can be changed with PDO mapping.
	Mailbox	Emergency messages, SDO requests, SDO responses
	Distributed Clocks	Free-run mode and DC mode (can be switched.) Applicable DC cycles: 125 μs to 4 ms in 125-μs increments
	SubDevice Information IF	4 KB
	LED Indicator	During EtherCAT communications: L/A x 2 EtherCAT communications status: RUN x 1 EtherCAT error status: ERR x 1
CiA402 Drive Profile		• Homing Mode • Profile Position Mode • Interpolated Position Mode • Profile Velocity Mode • Profile Torque Mode • Cyclic Synchronous Position Mode • Cyclic Synchronous Velocity Mode • Cyclic Synchronous Torque Mode • Touch Probe Function • Torque Limit Function
Analog Monitor (CN5)		Number of points: 2 Output voltage range: ±10 VDC (effective linearity range: ±8 V) Resolution: 16 bits Accuracy: ±20 mV (Typ) Maximum output current: ±10 mA
Dynamic Brake (DB)		Activated when a servo alarm or overtravel (OT) occurs, or when the power to the main circuit or servo is OFF.
Regenerative Processing		Built-in
Overtravel (OT) Prevention		Stopping with dynamic brake, deceleration to a stop, or coasting to a stop for the P-OT (Forward Drive Prohibit Input) or N-OT (Reverse Drive Prohibit Input) signal
Protective Functions		Overcurrent, overvoltage, undervoltage, overload, regeneration error, etc.
Utility Functions		Gain tuning, alarm history, program jogging, origin search, etc.

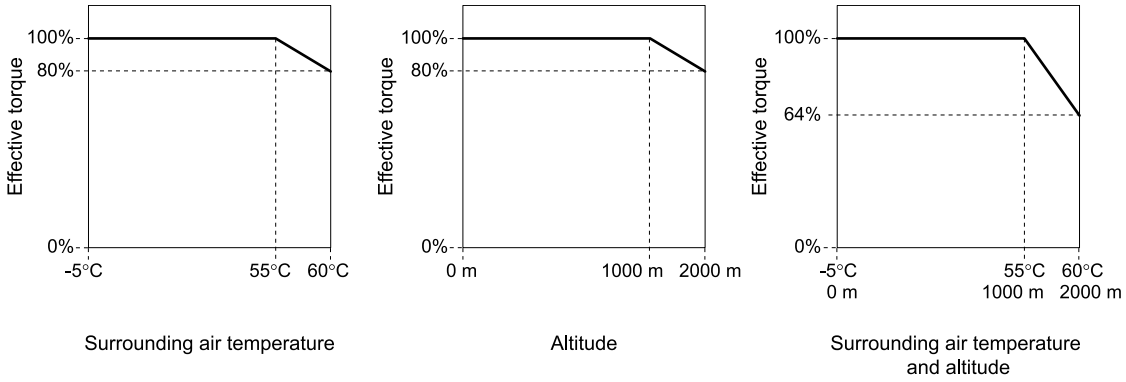
■ Option

Item	Specification
Applicable Option Modules	None

Derating Specifications

If you use the SERVOPACK at a surrounding air temperature of 55°C to 60°C or at an altitude of 1000 m to 2000 m, you must apply the derating rates given in the following graphs.

SGDXW-1R6A, -2R8A, -5R5A, -7R6A

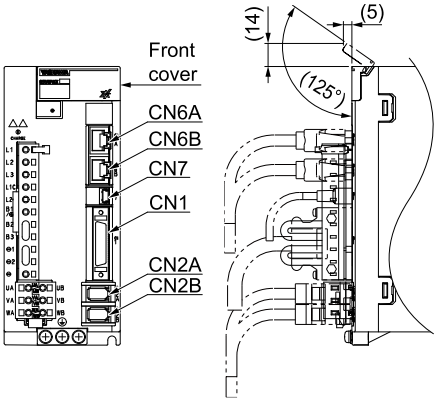


External Dimensions

Front Cover Dimensions and Connector Specifications

The connector shapes and pin assignments depend on the interfaces of the SERVOPACK. Refer to the following figures and table.

■ Front Cover Dimensions



■ Connector Specifications

Connector No.	Model	Number of Pins	Manufacturer
CN1	10236-59A3MB	36	3M Japan Limited
CN2A, CN2B	53460-0669	6	Molex Japan Co., Ltd.
CN6A, CN6B	3-1734579-4	8	TE Connectivity Japan G.K.
CN7	2342993-1	5	TE Connectivity Japan G.K.

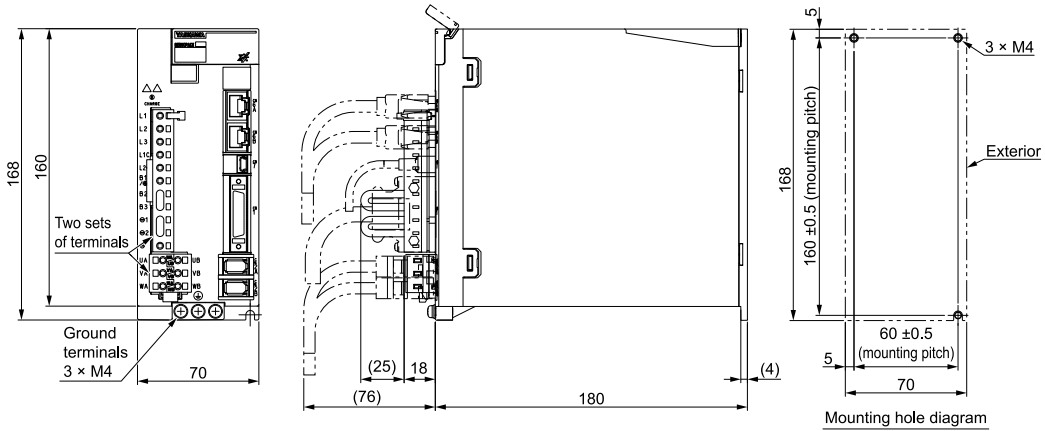
Note:

The above connectors or their equivalents are used for the SERVOPACKs.

SERVOPACK External Dimensions

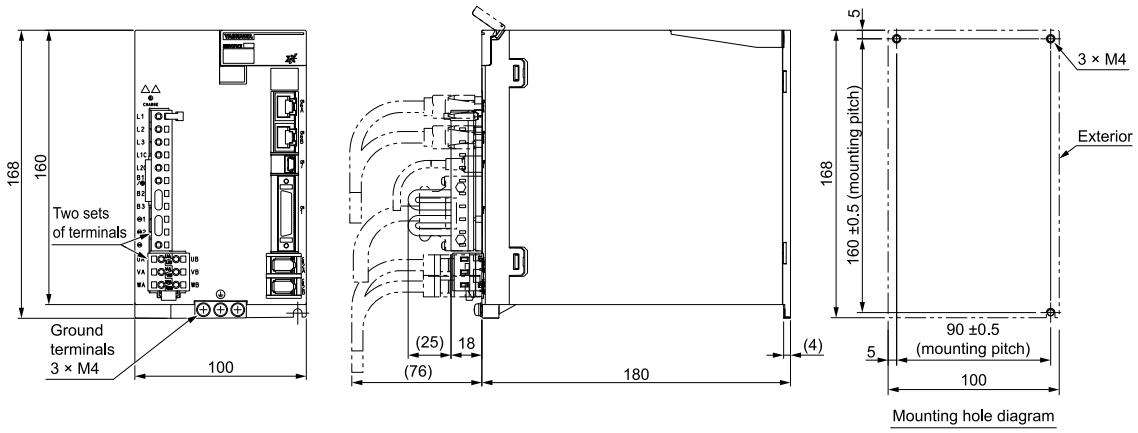
■ Base-mounted SERVOPACKs

◆ SGDXW-1R6A, -2R8A



Approx. mass: 1.7 kg
Unit: mm

◆ SGDXW-5R5A, -7R6A

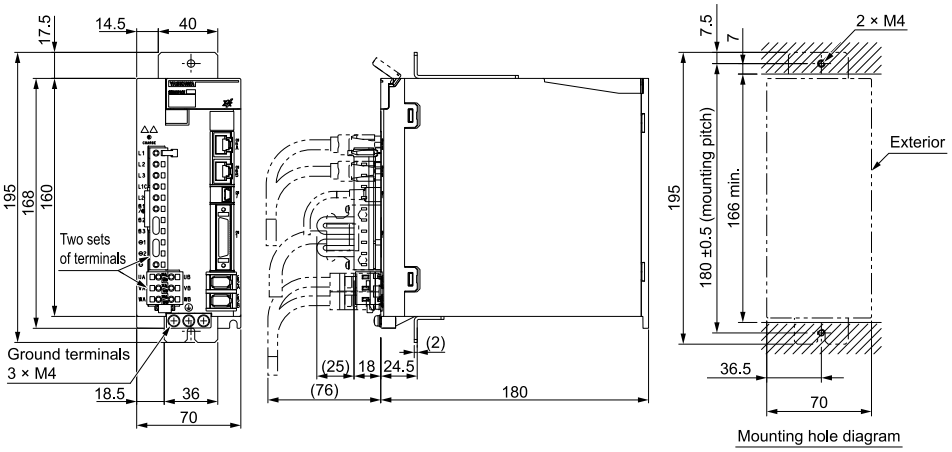


Approx. mass: 2.4 kg
Unit: mm

■ Rack-mounted SERVOPACKs

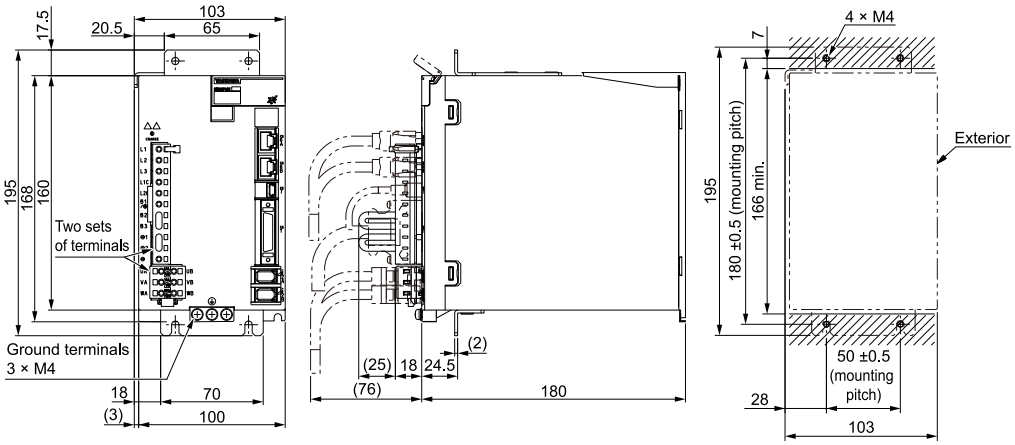
Hardware Option Code: 0001

◆ SGDXW-1R6A, -2R8A



Approx. mass: 1.8 kg
Unit: mm

◆ SGDXW-5R5A, -7R6A



Approx. mass: 2.6 kg
Unit: mm

Σ-XT Models with MECHATROLINK-4/III Communications

Interpreting SERVOPACK Model Numbers

SGDXT - 1R6 A 40 A 0001 00 B

Σ-X-Series
Σ-XT model

1 Maximum Applicable Motor Capacity

Voltage	Code	Specification
Three-Phase, 200 VAC	1R6*1	0.2 kW
	2R8*1,*2	0.4 kW

2 Voltage

Code	Specification
A	200 VAC

3 Interface*3

Code	Specification
40	MECHATROLINK-4/III communications reference

4 Design Revision Order

A

5 Hardware Options Specification

Code	Specification
None	Without options
0000	
0001	Rack-mounted
0002	Varnished
0020*4	No dynamic brake
1000*5	HWBB function

6 FT Specification

Code	Specification
None	None
00	

7 BTO Specification (under development)

Code	Specification
None	None
B	BTO specification

*1 You can use these models with either a single-phase or three-phase input.

*2 If you use the servomotor with a single-phase power supply input, derate the total continuous output of the motors to 65% of maximum applicable motor capacity × number of axes.
Example: For the SGDXT-2R8A, make the output 0.4 kW × 3 axes × 65% = 0.78 kW or less. To perform operation at an output of 0.4 kW for the first axis and 0.2 kW for the second axis, you must limit the output for the third axis to 0.18 kW or less.

*3 The same SERVOPACKs are used for both rotary servomotors and linear servomotors.

*4 For details, refer to the following manual.

Σ-X-Series Σ-XS/Σ-XW/Σ-XT SERVOPACK with Dynamic Brake Hardware Option Specifications Product Manual (Manual No.: SIEP C710812 14)

*5 For details, refer to the following manual.

Σ-X-Series Σ-XW/Σ-XT SERVOPACK Hardware Option Specifications HWBB Function Product Manual (Manual No.: SIEP C710812 13)

Ratings and Specifications

This section gives the ratings and specifications of SERVOPACKs.

Ratings

■ Three-Phase, 200 VAC

Model SGDXT-			1R6A	2R8A
Maximum Applicable Motor Capacity (each axis) [kW]			0.2	0.4
Continuous Output Current (each axis) [Arms]			1.6	2.8
Instantaneous Maximum Output Current (each axis) [Arms]			5.9	9.3
Main Circuit	Power Supply		200 VAC to 240 VAC, 50 Hz/60 Hz	
	Allowable Voltage Fluctuation		-15% to +10%	
	Input Current [Arms] *1		3.9	7.5
Control	Power Supply		200 VAC to 240 VAC, 50 Hz/60 Hz	
	Allowable Voltage Fluctuation		-15% to +10%	
	Input Current [Arms] *1		0.3	
Power Supply Capacity [kVA] *1			1.5	3.0
Power Loss *1	Main Circuit Power Loss [W]		33.3	60.4
	Control Circuit Power Loss [W]		17	
	Total Power Loss [W]		50.3	77.4
Regenerative Resistor	Built-In Regenerative Resistor	Resistance [Ω]	12	
		Capacity [W]	70	
		Allowable Power Consumption [W]	14	
	Minimum Allowable External Resistance [Ω]		12	
Overvoltage Category			III	

*1 This is the net value at the rated load.

■ Single-Phase, 200 VAC

Model SGDXT-		1R6A	2R8A
Maximum Applicable Motor Capacity (each axis) [kW]		0.2	0.4 *1
Continuous Output Current (each axis) [Arms]		1.6	2.8
Instantaneous Maximum Output Current (each axis) [Arms]		5.9	9.3
Main Circuit	Power Supply	200 VAC to 240 VAC, 50 Hz/60 Hz	
	Allowable Voltage Fluctuation	-15% to +10%	
	Input Current [Arms] *2	7.2	12
Control	Power Supply	200 VAC to 240 VAC, 50 Hz/60 Hz	
	Allowable Voltage Fluctuation	-15% to +10%	
	Input Current [Arms] *2	0.3	
Power Supply Capacity [kVA] *2		1.8	3.6

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Model SGDXT-			1R6A	2R8A
Power Loss *2	Main Circuit Power Loss [W]		36.2	60.7
	Control Circuit Power Loss [W]		17	
	Total Power Loss [W]		53.2	77.7
Regenerative Resistor	Built-In Regenerative Resistor	Resistance [Ω]	12	
		Capacity [W]	70	
		Allowable Power Consumption [W]	14	
	Minimum Allowable External Resistance [Ω]		12	
Overvoltage Category			III	

*1 If you use the servomotor with a single-phase power supply input, derate the total continuous output of the motors to 65% of maximum applicable motor capacity × number of axes.
Example: For the SGDXT-2R8A, make the output 0.4 kW × 3 axes × 65% = 0.78 kW or less. To perform operation at an output of 0.4 kW for the first axis and 0.2 kW for the second axis, you must limit the output for the third axis to 0.18 kW or less.
*2 This is the net value at the rated load (when derated for the SGDXT-2R8A).

■ 270 VDC

Model SGDXT-		1R6A	2R8A
Maximum Applicable Motor Capacity (each axis) [kW]		0.2	0.4
Continuous Output Current (each axis) [Arms]		1.6	2.8
Instantaneous Maximum Output Current (each axis) [Arms]		5.9	9.3
Main Circuit	Power Supply	270 VDC to 324 VDC	
	Allowable Voltage Fluctuation	-15% to +10%	
	Input Current [Arms] *1	4.5	9.0
Control	Power Supply	270 VDC to 324 VDC	
	Allowable Voltage Fluctuation	-15% to +10%	
	Input Current [Arms] *1	0.3	
Power Supply Capacity [kVA] *1		1.8	3.0
Power Loss *1	Main Circuit Power Loss [W]	28.1	50.4
	Control Circuit Power Loss [W]	17	
	Total Power Loss [W]	45.1	67.4
Overvoltage Category		III	

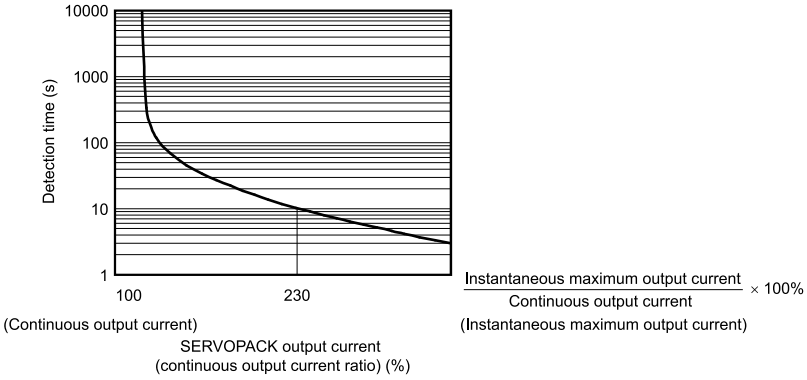
*1 This is the net value at the rated load.

SERVOPACK Overload Protection Characteristics

The overload detection level is set for hot start conditions with a SERVOPACK surrounding air temperature of 55°C.

A.710 or A.720 (an overload alarm) will occur if overload operation that exceeds the overload protection characteristics shown in the following diagram (i.e., operation on the right side of the vertical line) is performed.

The actual overload detection level will be the detection level of the connected SERVOPACK or servomotor that has the lower overload protection characteristics.



Note:

- The above overload protection characteristics do not mean that you can perform continuous duty operation with an output of 100% or higher. For a Yaskawa-specified combination of SERVOPACK and servomotor, maintain the effective torque within the continuous duty zone of the torque-motor speed characteristic of the servomotor.
- This overload protection function is not a protection function related to speed. This product does not have a built-in thermal memory hold function.

In addition, the model that requires derating when using with single-phase power supply input (applicable model: SGDXT-2R8A) has separate overload protection characteristics (= SERVOPACK overload detection) in addition to the overload protection characteristics listed above. SERVOPACK overload detection will activate A.729 (Overload 2 Alarm) if operation that exceeds the derated value is continuously performed. Use the following values as guidelines for continuous operation that will exceed the derated value.

- Operation for a long period of time at a load of 115% or more of the derated value.
- Operation for 5 s at a load of 200% of the derated value.

Even if the above conditions are satisfied, the above alarm may not be activated when the SERVOPACK is producing a low amount of heat.

Specification

■ Environmental Conditions

Item	Specification
Surrounding Air Temperature	-5°C to 55°C (With derating, usage is possible between 55°C and 60°C.) Refer to the following section for derating specifications. ☞ *Derating Specifications on page 416*
Storage Temperature	-20°C to 85°C
Surrounding Air Humidity	95% relative humidity max. (with no freezing or condensation)
Storage Humidity	95% relative humidity max. (with no freezing or condensation)
Vibration Resistance	When there is continuous vibration: 10 Hz to 55 Hz, acceleration amplitude 5.9 m/s^2 (0.6G)
Impact Resistance	19.6 m/s^2
Degree of Protection	IP20
Pollution Degree	2 • Must be no corrosive or flammable gases. • Must be no exposure to water, oil, or chemicals. • Must be no dust, salts, or iron dust.

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Item	Specification
Altitude	1000 m max. (With derating, usage is possible between 1000 m and 2000 m.) Refer to the following section for derating specifications. ☞ *Derating Specifications on page 416*
Others	Do not use the SERVOPACK in the following locations: Locations subject to static electricity noise, strong electromagnetic/magnetic fields, or radioactivity

■ I/O Signals

Item		Specification
Outputs for Triggers at Preset Positions		Number of output points: 3 (output method: a line driver output) Output signals: High-Speed Output Signal for Triggers at Preset Positions 1 to 3 (HSO1 to 3) **Note:** Normal Output Signal for Triggers at Preset Positions 1 to 5 (/NSO1 to 5) are used by allocating the signals to sequence output signals.
Sequence Input Signals	Input Signals That Can Be Allocated	Allowable voltage range: 24 VDC ±20% Number of input points: 16 (input method: sink inputs or source inputs)
		Input signals: • P-OT (Forward Drive Prohibit Input) and N-OT (Reverse Drive Prohibit Input) signals • /P-CL (Forward External Torque Limit Input) and /N-CL (Reverse External Torque Limit Input) signals • /DEC (Origin Return Deceleration Switch Input) signal • /EXT1 to /EXT3 (External Latch Input 1 to 3) signals • FSTP (Forced Stop Input) signal A signal can be allocated and the positive and negative logic can be changed.
Sequence Output Signals	Fixed Output	Allowable voltage range: 5 VDC to 30 VDC Number of output points: 3 (output method: a photocoupler output (isolated)) Output signal: ALM (Servo Alarm Output) signal
	Output Signals That Can Be Allocated	Allowable voltage range: 5 VDC to 30 VDC Number of output points: 5 (output method: a photocoupler output (isolated))
		Output signals: • /COIN (Positioning Completion Output) signal • /V-CMP (Speed Coincidence Detection Output) signal • /TGON (Rotation Detection Output) signal • /S-RDY (Servo Ready Output) signal • /CLT (Torque Limit Detection Output) signal • /VLT (Speed Limit Detection Output) signal • /BK (Brake Output) signal • /WARN (Warning Output) signal • /NEAR (Near Output) signal • /NSO1 to 5 (Normal Output for Triggers at Preset Positions 1 to 5) signals A signal can be allocated and the positive and negative logic can be changed.

■ Function

Item			Specification
Communications	USB Communications (CN7)	Interfaces	Personal computer (with SigmaWin+), digital operator (JUSP-OP07A-E)
		Communications Standard	Conforms to USB2.0 standard (12 Mbps).
Displays/Indicators			CHARGE, PWR, CN, L1, and L2 indicators, and three, one-digit seven-segment displays
MECHATROLINK-4 Communications *1	Communications Protocol		MECHATROLINK-4
	Station Address Settings		01h to FFh (maximum number of slaves: 127) The rotary switches (S1 and S2) are used to set the station address.
	Extended Address Settings		Axis A: 00h, Axis B: 01h, Axis C: 02h
	Transmission Speed		100 Mbps
	Transmission Cycle *2		125 µs, 250 µs, 500 µs, 750 µs, 1.0 ms to 4.0 ms (multiples of 0.5 ms)
	Number of Transmission Bytes		16 to 80 bytes/station
Reference Methods for MECHATROLINK-4 Communications	Performance		Position, speed, or torque control with MECHATROLINK-4 communications
	Reference Input		MECHATROLINK-4 commands (sequence, motion, data setting, data access, monitoring, adjustment, etc.)
	Profile		MECHATROLINK-4 standard servo profile MECHATROLINK-III standard servo profile
MECHATROLINK-III Communications *1	Communications Protocol		MECHATROLINK-III
	Station Address Settings		03h to EFh (maximum number of slaves: 62) The rotary switches (S1 and S2) are used to set the station address.
	Extended Address Settings		Axis A: 00h, Axis B: 01h, Axis C: 02h
	Transmission Speed		100 Mbps
	Transmission Cycle		250 µs, 500 µs, 750 µs, 1.0 ms to 4.0 ms (multiples of 0.5 ms)
	Number of Transmission Bytes		32 or 48 bytes/station A DIP switch (S3) is used to select the transmission bytes.
Reference Methods for MECHATROLINK-III Communications	Performance		Position, speed, or torque control with MECHATROLINK-III communications
	Reference Input		MECHATROLINK-III commands (sequence, motion, data setting, data access, monitoring, adjustment, etc.)
	Profile		MECHATROLINK-III standard servo profile
MECHATROLINK-4 and MECHATROLINK-III Communications Setting Switches			Rotary switch (S1 and S2) positions: 16
			Number of DIP switch (S3) pins: 4
Analog Monitor (CN5)			Number of points: 2 Output voltage range: ±10 VDC (effective linearity range: ±8 V) Resolution: 16 bits Accuracy: ±20 mV (Typ) Maximum output current: ±10 mA
Dynamic Brake (DB)			Activated when a servo alarm or overtravel (OT) occurs, or when the power to the main circuit or servo is OFF.
Regenerative Processing			Built-in
Overtravel (OT) Prevention			Stopping with dynamic brake, deceleration to a stop, or coasting to a stop for the P-OT (Forward Drive Prohibit Input) or N-OT (Reverse Drive Prohibit Input) signal

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Item	Specification
Protective Functions	Overcurrent, overvoltage, undervoltage, overload, regeneration error, etc.
Utility Functions	Gain tuning, alarm history, jogging operation, origin search, etc.

*1 Use the DIP switch S3 to switch the communications protocol. For details, refer to the following manual.

Σ-X-Series AC Servo Drive Σ-XT SERVOPACK with MECHATROLINK-4/III Communications References Product Manual (Manual No.: SIEP C710812 16)

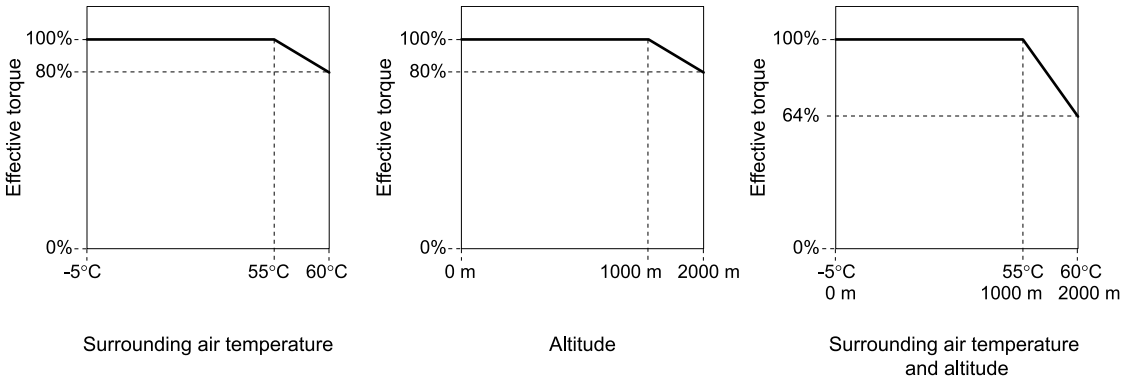
*2 Multiple transmission cycles are supported.

■ Option

Item	Specification
Applicable Option Modules	None

Derating Specifications

If you use the SERVOPACK at a surrounding air temperature of 55°C to 60°C or at an altitude of 1000 m to 2000 m, you must apply the derating rates given in the following graphs.

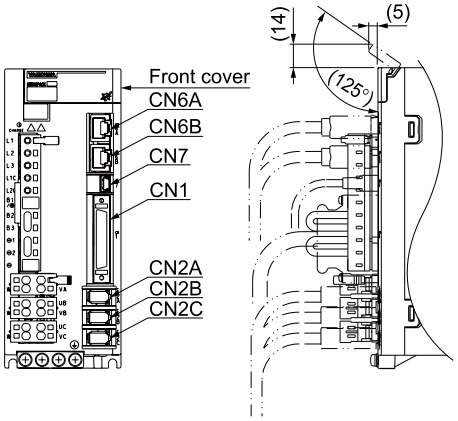


External Dimensions

Front Cover Dimensions and Connector Specifications

The front cover dimensions and panel connector section are the same for all capacities. Refer to the following figures and table.

■ Front Cover Dimensions



■ コネクタ仕様

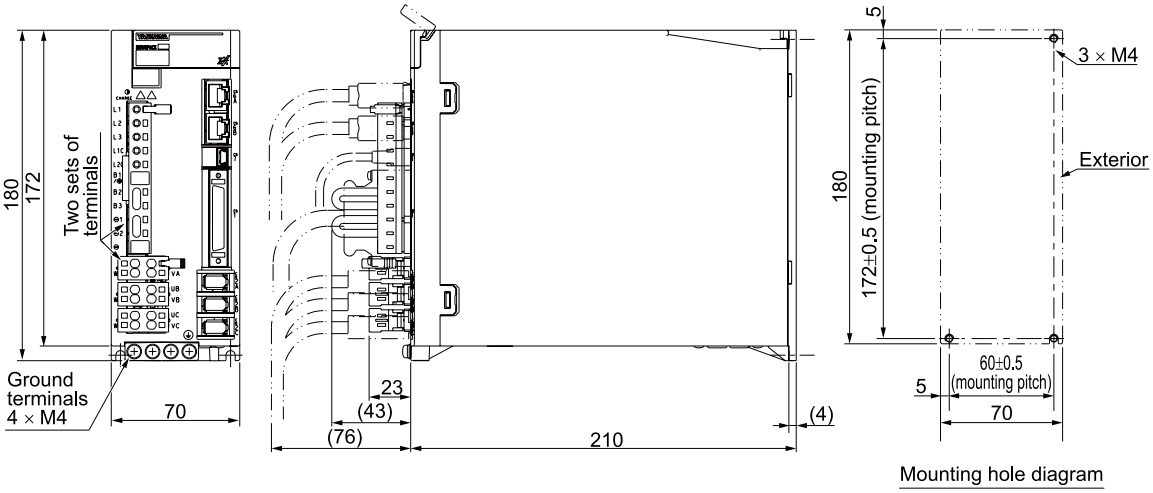
コネクタ番号	形式	極数	メーカー
CN1	10250-52A2PL	50	スリーエムジャパン（株）
CN2A, CN2B, CN2C	53460-0669	6	日本モレックス（同）
CN6A, CN6B	3-1734579-4	8	TE Connectivity Japan（同）
CN7	2342993-1	5	TE Connectivity Japan（同）

Note:
上記もしくは相当品を使用しています。

SERVOPACK External Dimensions

■ Base-mounted SERVOPACKs

◆ SGDXT-1R6A, -2R8A

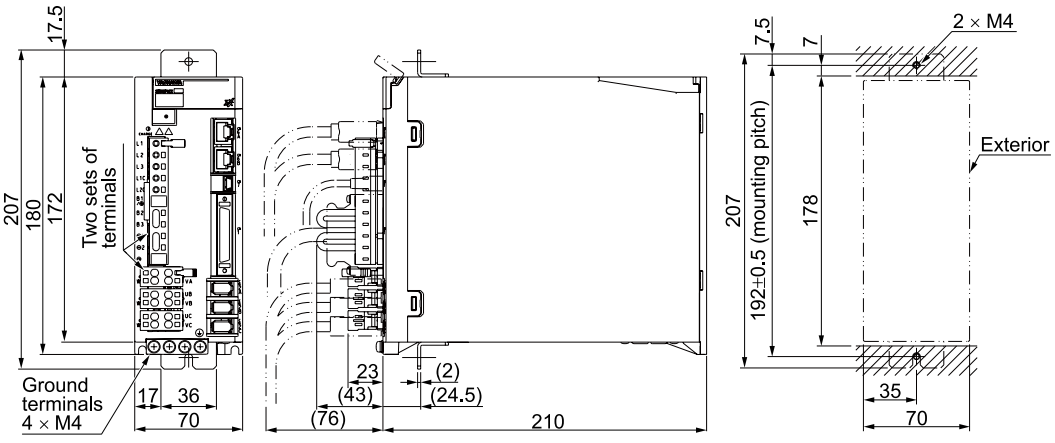


Approx. mass: 2.3 kg
Unit: mm

■ Rack-mounted SERVOPACKs

Hardware Option Code: 0001

◆ SGDXT-1R6A, -2R8A



Approx. mass: 2.3 kg
Unit: mm

Σ-XT Models with EtherCAT Communications References

Interpreting SERVOPACK Model Numbers

SGDXT - 1R6 A A0 A 0001 00 B

Σ-X-Series
Σ-XT model

1 Maximum Applicable Motor Capacity

Voltage	Code	Specification
Three-Phase, 200 VAC	1R6*1	0.2 kW
	2R8*1,*2	0.4 kW

2 Voltage

Code	Specification
A	200 VAC

3 Interface*3

Code	Specification
A0	EtherCAT communications reference

4 Design Revision Order

A

5 Hardware Options Specification

Code	Specification
None	Without options
0000	
0001	Rack-mounted
0002	Varnished
0020*4	No dynamic brake
1000*5	HWBB function

6 FT Specification

Code	Specification
None	None
00	

7 BTO Specification (under development)

Code	Specification
None	None
B	BTO specification

*1 You can use these models with either a single-phase or three-phase input.

*2 If you use the servomotor with a single-phase power supply input, derate the total continuous output of the motors to 65% of maximum applicable motor capacity × number of axes.
Example: For the SGDXT-2R8A, make the output 0.4 kW × 3 axes × 65% = 0.78 kW or less. To perform operation at an output of 0.4 kW for the first axis and 0.2 kW for the second axis, you must limit the output for the third axis to 0.18 kW or less.

*3 The same SERVOPACKs are used for both rotary servomotors and linear servomotors.

*4 For details, refer to the following manual.

Σ-X-Series Σ-XS/Σ-XW/Σ-XT SERVOPACK with Dynamic Brake Hardware Option Specifications Product Manual (Manual No.: SIEP C710812 14)

*5 For details, refer to the following manual.

Σ-X-Series Σ-XW/Σ-XT SERVOPACK Hardware Option Specifications HWBB Function Product Manual (Manual No.: SIEP C710812 13)

Ratings and Specifications

This section gives the ratings and specifications of SERVOPACKs.

Ratings

■ Three-Phase, 200 VAC

Model SGDXT-			1R6A	2R8A
Maximum Applicable Motor Capacity (each axis) [kW]			0.2	0.4
Continuous Output Current (each axis) [Arms]			1.6	2.8
Instantaneous Maximum Output Current (each axis) [Arms]			5.9	9.3
Main Circuit	Power Supply		200 VAC to 240 VAC, 50 Hz/60 Hz	
	Allowable Voltage Fluctuation		-15% to +10%	
	Input Current [Arms] *1		3.9	7.5
Control	Power Supply		200 VAC to 240 VAC, 50 Hz/60 Hz	
	Allowable Voltage Fluctuation		-15% to +10%	
	Input Current [Arms] *1		0.3	
Power Supply Capacity [kVA] *1			1.5	3.0
Power Loss *1	Main Circuit Power Loss [W]		33.3	60.4
	Control Circuit Power Loss [W]		17	
	Total Power Loss [W]		50.3	77.4
Regenerative Resistor	Built-In Regenerative Resistor	Resistance [Ω]	12	
		Capacity [W]	70	
		Allowable Power Consumption [W]	14	
	Minimum Allowable External Resistance [Ω]		12	
Overvoltage Category			III	

*1 This is the net value at the rated load.

■ Single-Phase, 200 VAC

Model SGDXT-		1R6A	2R8A
Maximum Applicable Motor Capacity (each axis) [kW]		0.2	0.4 *1
Continuous Output Current (each axis) [Arms]		1.6	2.8
Instantaneous Maximum Output Current (each axis) [Arms]		5.9	9.3
Main Circuit	Power Supply	200 VAC to 240 VAC, 50 Hz/60 Hz	
	Allowable Voltage Fluctuation	-15% to +10%	
	Input Current [Arms] *2	7.2	12
Control	Power Supply	200 VAC to 240 VAC, 50 Hz/60 Hz	
	Allowable Voltage Fluctuation	-15% to +10%	
	Input Current [Arms] *2	0.3	
Power Supply Capacity [kVA] *2		1.8	3.6

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Model SGDXT-			1R6A	2R8A
Power Loss *2	Main Circuit Power Loss [W]		36.2	60.7
	Control Circuit Power Loss [W]		17	
	Total Power Loss [W]		53.2	77.7
Regenerative Resistor	Built-In Regenerative Resistor	Resistance [Ω]	12	
		Capacity [W]	70	
		Allowable Power Consumption [W]	14	
	Minimum Allowable External Resistance [Ω]		12	
Overvoltage Category			III	

*1 If you use the servomotor with a single-phase power supply input, derate the total continuous output of the motors to 65% of maximum applicable motor capacity × number of axes.
Example: For the SGDXT-2R8A, make the output 0.4 kW × 3 axes × 65% = 0.78 kW or less. To perform operation at an output of 0.4 kW for the first axis and 0.2 kW for the second axis, you must limit the output for the third axis to 0.18 kW or less.
*2 This is the net value at the rated load (when derated for the SGDXT-2R8A).

■ 270 VDC

Model SGDXT-		1R6A	2R8A
Maximum Applicable Motor Capacity (each axis) [kW]		0.2	0.4
Continuous Output Current (each axis) [Arms]		1.6	2.8
Instantaneous Maximum Output Current (each axis) [Arms]		5.9	9.3
Main Circuit	Power Supply	270 VDC to 324 VDC	
	Allowable Voltage Fluctuation	-15% to +10%	
	Input Current [Arms] *1	4.5	9.0
Control	Power Supply	270 VDC to 324 VDC	
	Allowable Voltage Fluctuation	-15% to +10%	
	Input Current [Arms] *1	0.3	
Power Supply Capacity [kVA] *1		1.8	3.0
Power Loss *1	Main Circuit Power Loss [W]	28.1	50.4
	Control Circuit Power Loss [W]	17	
	Total Power Loss [W]	45.1	67.4
Overvoltage Category		III	

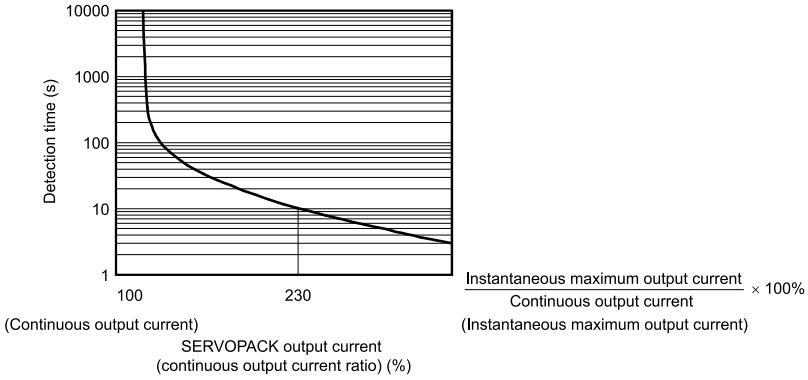
*1 This is the net value at the rated load.

SERVOPACK Overload Protection Characteristics

The overload detection level is set for hot start conditions with a SERVOPACK surrounding air temperature of 55°C.

A.710 or A.720 (an overload alarm) will occur if overload operation that exceeds the overload protection characteristics shown in the following diagram (i.e., operation on the right side of the vertical line) is performed.

The actual overload detection level will be the detection level of the connected SERVOPACK or servomotor that has the lower overload protection characteristics.



Note:

- The above overload protection characteristics do not mean that you can perform continuous duty operation with an output of 100% or higher. For a Yaskawa-specified combination of SERVOPACK and servomotor, maintain the effective torque within the continuous duty zone of the torque-motor speed characteristic of the servomotor.
- This overload protection function is not a protection function related to speed. This product does not have a built-in thermal memory hold function.

In addition, the model that requires derating when using with single-phase power supply input (applicable model: SGDXT-2R8A) has separate overload protection characteristics (= SERVOPACK overload detection) in addition to the overload protection characteristics listed above. SERVOPACK overload detection will activate A.729 (Overload 2 Alarm) if operation that exceeds the derated value is continuously performed. Use the following values as guidelines for continuous operation that will exceed the derated value.

- Operation for a long period of time at a load of 115% or more of the derated value.
- Operation for 5 s at a load of 200% of the derated value.

Even if the above conditions are satisfied, the above alarm may not be activated when the SERVOPACK is producing a low amount of heat.

Specification

■ Environmental Conditions

Item	Specification
Surrounding Air Temperature	-5°C to 55°C (With derating, usage is possible between 55°C and 60°C.) Refer to the following section for derating specifications. ☞ *Derating Specifications on page 426*
Storage Temperature	-20°C to 85°C
Surrounding Air Humidity	95% relative humidity max. (with no freezing or condensation)
Storage Humidity	95% relative humidity max. (with no freezing or condensation)
Vibration Resistance	When there is continuous vibration: 10 Hz to 55 Hz, acceleration amplitude 5.9 m/s^2 (0.6G)
Impact Resistance	19.6 m/s^2
Degree of Protection	IP20
Pollution Degree	2 • Must be no corrosive or flammable gases. • Must be no exposure to water, oil, or chemicals. • Must be no dust, salts, or iron dust.

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Item	Specification
Altitude	1000 m max. (With derating, usage is possible between 1000 m and 2000 m.) Refer to the following section for derating specifications. ☞ *Derating Specifications on page 426*
Others	Do not use the SERVOPACK in the following locations: Locations subject to static electricity noise, strong electromagnetic/magnetic fields, or radioactivity

■ I/O Signals

Item		Specification
Outputs for Triggers at Preset Positions		Number of output points: 3 (output method: a photocoupler output) Output signals: High-Speed Output Signal for Triggers at Preset Positions 1 to 3 (HSO1 to 3) **Note:** Normal Output Signal for Triggers at Preset Positions 1 to 5 (/NSO1 to 5) are used by allocating the signals to sequence output signals.
Sequence Input Signals	Input Signals That Can Be Allocated	Allowable voltage range: 24 VDC ±20% Number of input points: 16 (input method: sink inputs or source inputs)
		Input signals: • P-OT (Forward Drive Prohibit Input) and N-OT (Reverse Drive Prohibit Input) signals • /Probe1 (Probe 1 Latch Input) Signal • /Probe2 (Probe 2 Latch Input) signal • /Home (Home Switch Input) Signal • /P-CL (Forward External Torque Limit Input) and /N-CL (Reverse External Torque Limit Input) signals • FSTP (Forced Stop Input) signal A signal can be allocated and the positive and negative logic can be changed.
Sequence Output Signals	Fixed Output	Allowable voltage range: 5 VDC to 30 VDC Number of output points: 3 (output method: a photocoupler output (isolated)) Output signal: ALM (Servo Alarm Output) signal
	Output Signals That Can Be Allocated	Allowable voltage range: 5 VDC to 30 VDC Number of output points: 5 (output method: a photocoupler output (isolated))
		Output signals: • /COIN (Positioning Completion Output) signal • /V-CMP (Speed Coincidence Detection Output) signal • /TGON (Rotation Detection Output) Signal • /S-RDY (Servo Ready Output) Signal • /CLT (Torque Limit Detection Output) signal • /VLT (Speed Limit Detection Output) signal • /BK (Brake Output) signal • /WARN (Warning Output) signal • /NEAR (Near Output) signal • /NSO1 to 5 (Normal Output for Triggers at Preset Positions 1 to 5) signals A signal can be allocated and the positive and negative logic can be changed.

■ 機能

項目			仕様
通信機能	USB通信(CN7)	接続機器	パソコン（SigmaWin+対応），ディジタルオペレータ(JUSP-OP07A-E)
		通信規格	USB2.0規格に準拠(12 Mbps)
表示機能			CHARGE, RUN, ERR, L/A A, L/A B, 7セグメントLED × 1桁 × 3個
EtherCAT通信設定用スイッチ			IDセレクタ(S1, S2)，ポジション：16ポジション
EtherCAT通信	適合通信規格		IEC 61158 Type12, IEC 61800-7 CiA402ドライブプロファイル
	物理層		100BASE-TX (IEEE802.3)
	通信コネクタ		CN6A (RJ45)：ETHERCAT IN（EtherCAT信号入力側） CN6B (RJ45)：ETHERCAT OUT（EtherCAT信号出力側）
	ケーブル		CAT5 STP 4ペア ケーブルはAUTO MDIX機能により自動判別されます。
	SyncManager		SM0：メールボックス出力，SM1：メールボックス入力，SM2：プロセスデータ出力，SM3：プロセスデータ入力
	FMMU		FMMU 0：プロセスデータ出力(RxPDO)領域にマッピング FMMU 1：プロセスデータ入力(TxPDO)領域にマッピング FMMU 2：メールボックスステータスにマッピング
	EtherCATコマンド（データリンク層）		APRD, APWR, APRW, FPRD, FPWR, FPRW, BRD, BWR, BRW, LRD, LWR, LRW, ARMW, FRMW
	プロセスデータ		PDOマッピングにより割付け変更可能
	メールボックス		エマージェンシーメッセージ，SDOリクエスト，SDOレスポンス
	Distributed Clocks		フリーラン，DCモード（切替え可能） 対応DCサイクル（125 µs ~ 4 ms，125 µs刻み）
	SubDevice Information IF		4キロバイト
	LED表示		EtherCAT通信中：L/A × 2 EtherCAT通信状態：RUN × 1 EtherCAT エラー状態：ERR × 1
CiA402ドライブプロファイル			• Homing mode • Profile position mode • Interpolated position mode • Profile velocity mode • Profile torque mode • Cyclic synchronous position mode • Cyclic synchronous velocity mode • Cyclic synchronous torque mode • Touch probe function • Torque limit function
観測用アナログモニタ機能(CN5)			点数：2点 出力電圧範囲：DC±10 V（直線性有効範囲±8 V） 分解能：16ビット 精度：±20 mV (Typ) 最大出力電流：±10 mA
ダイナミックブレーキ(DB)			主回路電源オフ，サーボアラーム，サーボオフ，オーバートラベル(OT)時に動作
回生処理			機能内蔵
オーバートラベル(OT)防止			正転側駆動禁止入力(P-OT)信号，逆転側駆動禁止入力(N-OT)信号によりダイナミックブレーキ(DB)，減速停止またはフリーラン停止

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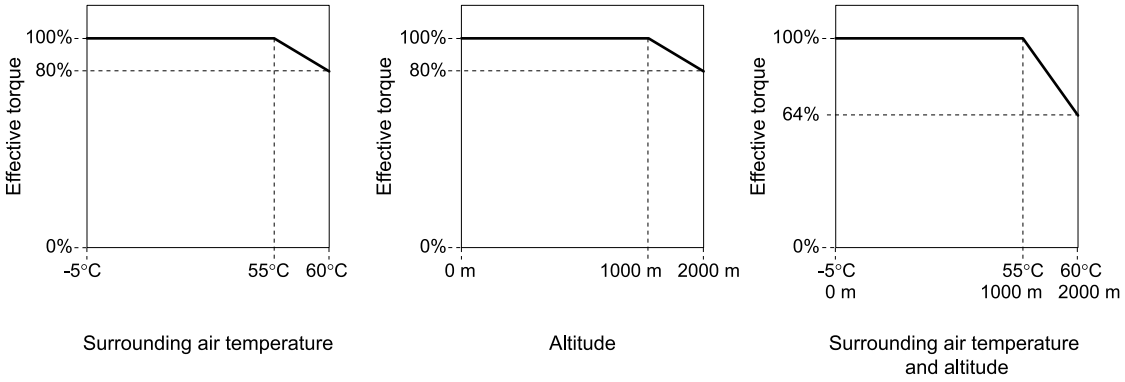
項目	仕様
保護機能	過電流，過電圧，不足電圧，過負荷，回生異常など
補助機能	ゲイン調整，アラーム履歴，JOG運転，原点サーチなど

■ Option

Item	Specification
Applicable Option Modules	None

Derating Specifications

If you use the SERVOPACK at a surrounding air temperature of 55°C to 60°C or at an altitude of 1000 m to 2000 m, you must apply the derating rates given in the following graphs.

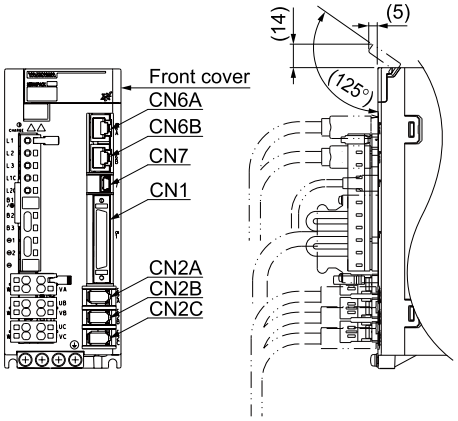


External Dimensions

Front Cover Dimensions and Connector Specifications

The front cover dimensions and panel connector section are the same for all capacities. Refer to the following figures and table.

■ Front Cover Dimensions



■ コネクタ仕様

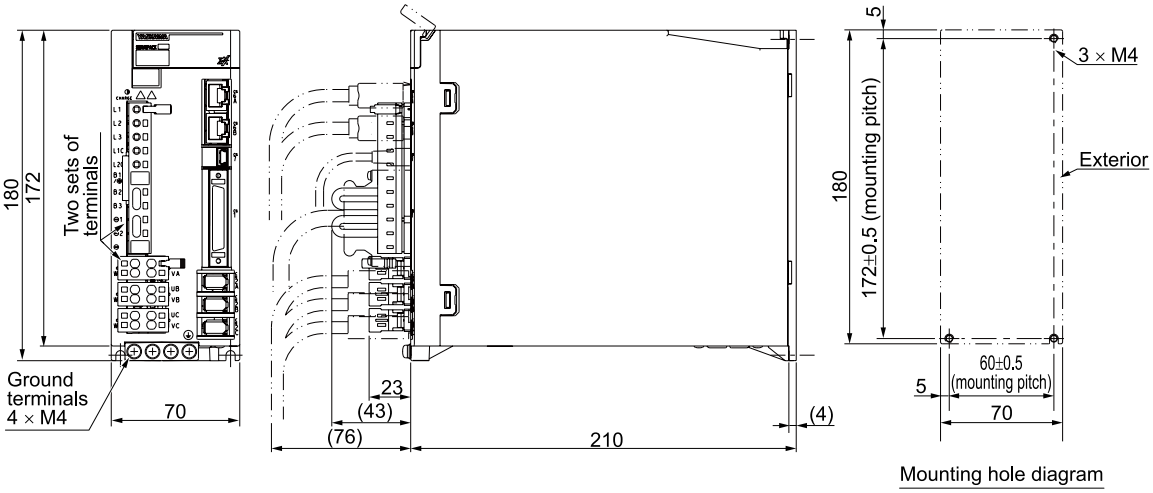
コネクタ番号	形式	極数	メーカー
CN1	10250-52A2PL	50	スリーエムジャパン（株）
CN2A, CN2B, CN2C	53460-0669	6	日本モレックス（同）
CN6A, CN6B	3-1734579-4	8	TE Connectivity Japan（同）
CN7	2342993-1	5	TE Connectivity Japan（同）

Note:
上記もしくは相当品を使用しています。

SERVOPACK External Dimensions

■ Base-mounted SERVOPACKs

◆ SGDXT-1R6A, -2R8A

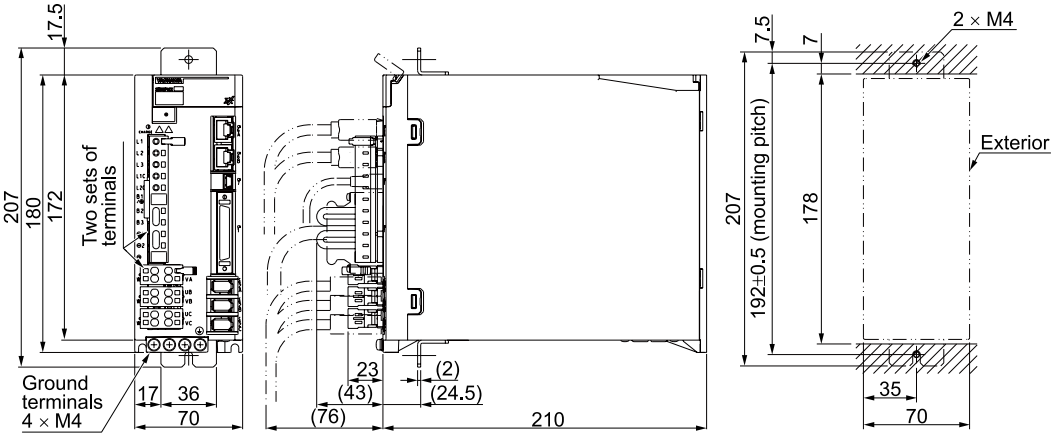


Approx. mass: 2.3 kg
Unit: mm

■ Rack-mounted SERVOPACKs

Hardware Option Code: 0001

◆ SGDXT-1R6A, -2R8A

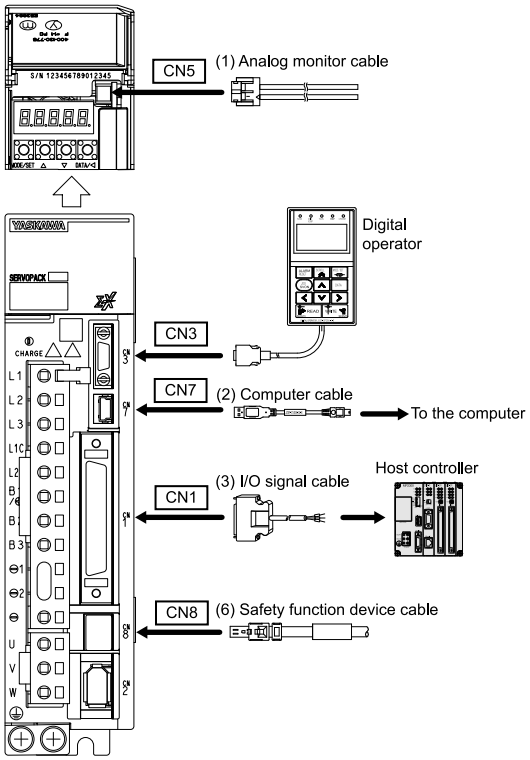


Approx. mass: 2.3 kg
Unit: mm

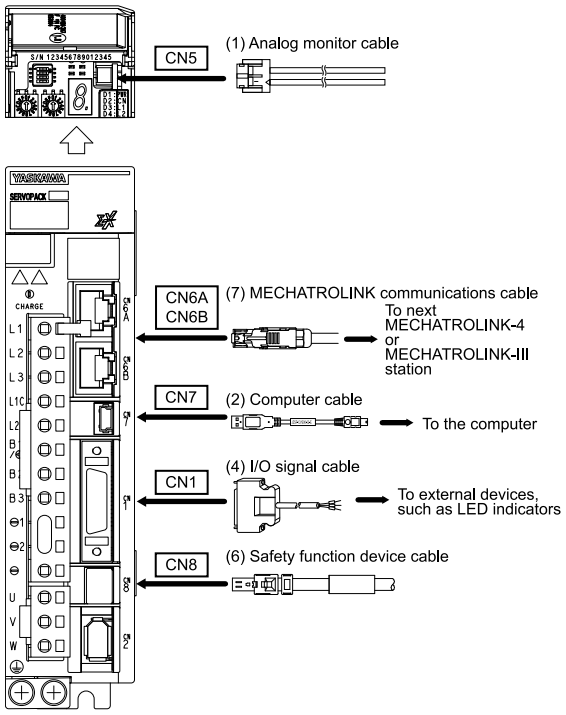
SERVOPACK Cables

Device Configuration Diagrams

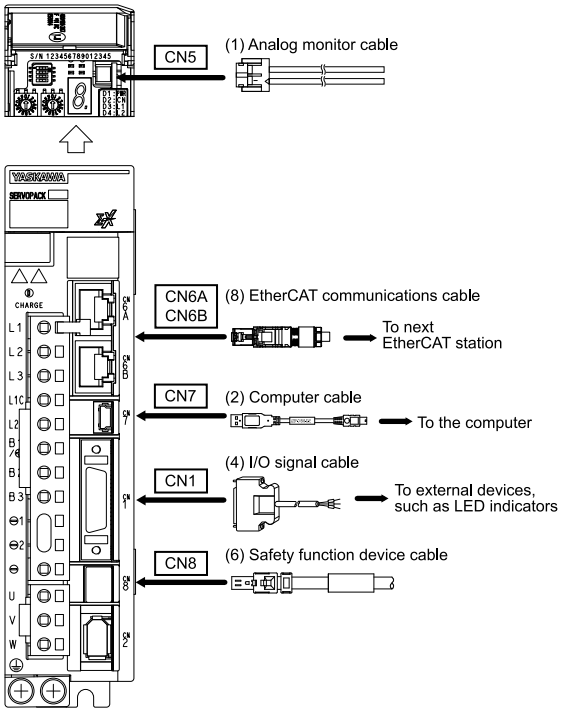
■ Σ-XS SERVOPACKs with Analog Voltage/Pulse Train Reference



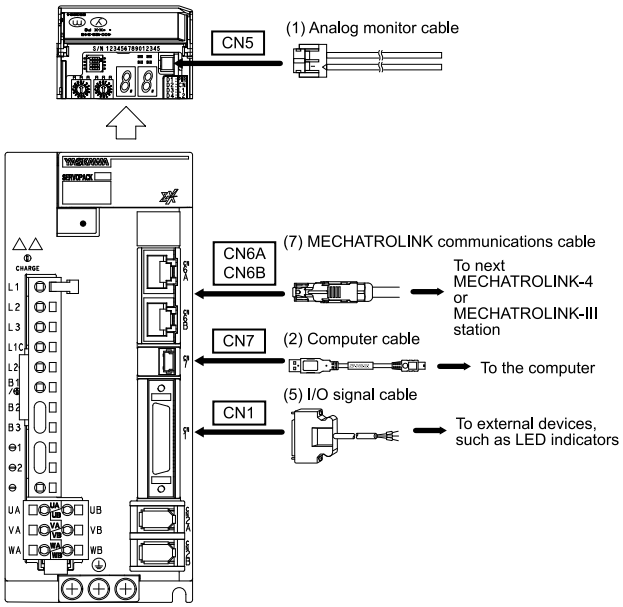
■ Σ-XS SERVOPACKs with MECHATORLINK-4/III Communications Reference



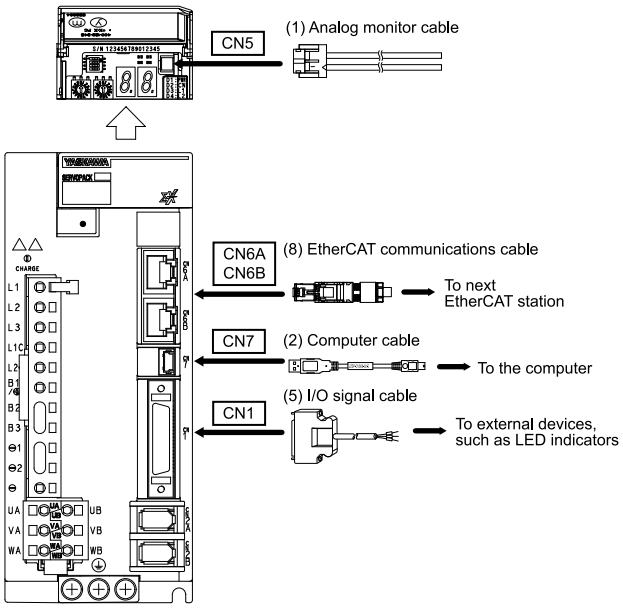
■ Σ-XS SERVOPACKs with EtherCAT Communications Reference



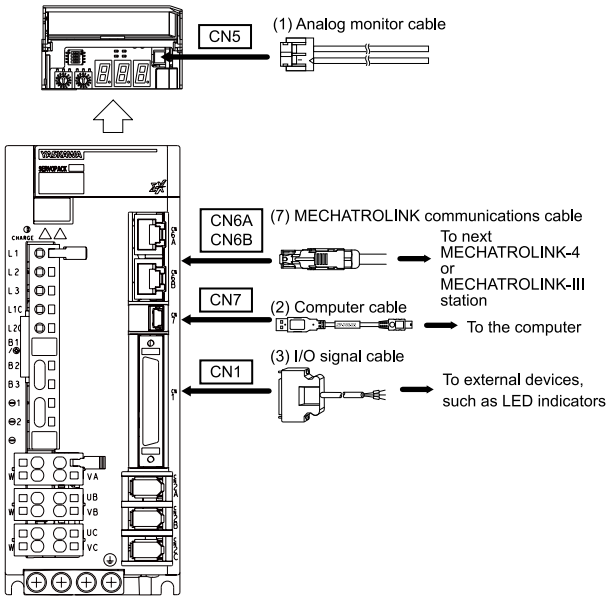
■ Σ-XW SERVOPACKs with MECHATORLINK-4/III Communications Reference



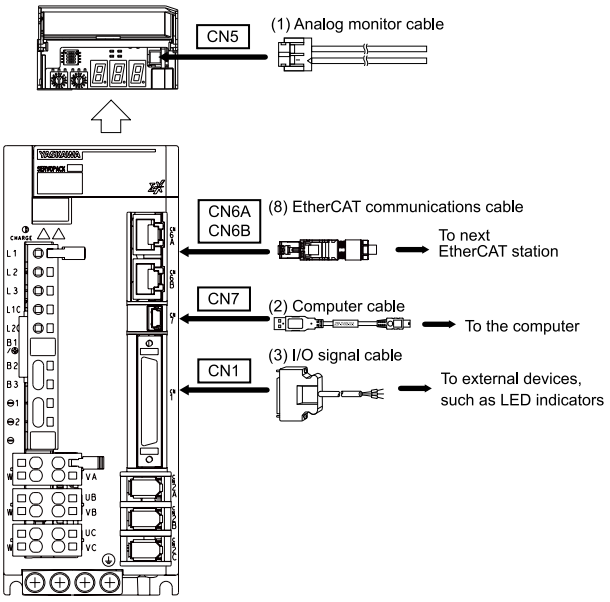
■ Σ-XW SERVOPACKs with EtherCAT Communications Reference



■ Σ-XT SERVOPACKs with MECHATORLINK-4/III Communications Reference

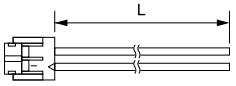


■ Σ-XT SERVOPACKs with EtherCAT Communications Reference



Selection Table

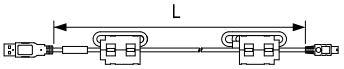
1. Analog Monitor Cable

Length (L)	Order Number	Appearance
1 m	JZSP-CA01-E	

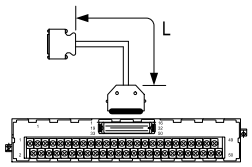
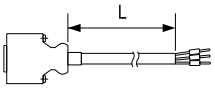
2. Computer Cable

Important

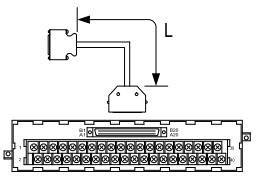
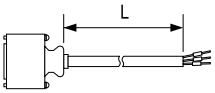
Use the Yaskawa-specified cable for the computer cable. Operation will not be dependable with any other cable.

Length (L)	Order Number	Appearance
2.5 m	JZSP-CVS06-02-E	

3. I/O Signal Cables for Σ-XS SERVOPACKs with Analog Voltage/Pulse Train Reference, Σ-XT SERVOPACKs with MECHATROLINK-4/III Communications Reference, and Σ-XT SERVOPACKs with EtherCAT Communications Reference

Name	Length (L)	Order Number	Appearance
Connector Kits (soldered)	–	JZSP-CSI9-1-E	
Connector-Terminal Block Converter Unit (with cable)	0.5 m	JUSP-TA50PG-E	
	1 m	JUSP-TA50PG-1-E	
	2 m	JUSP-TA50PG-2-E	
Cables with Loose Wires at One End (loose wires on peripheral device end)	1 m	JZSP-CSI01-1-E	
	2 m	JZSP-CSI01-2-E	
	3 m	JZSP-CSI01-3-E	

4. I/O Signal Cables for Σ-XS SERVOPACKs with MECHATROLINK-4/III Communications Reference and EtherCAT Communications Reference

Name	Length (L)	Order Number	Appearance
Connector Kits (soldered)	–	JZSP-CSI9-2-E	
Connector-Terminal Block Converter Unit (with cable)	0.5 m	JUSP-TA26P-E	
	1 m	JUSP-TA26P-1-E	
	2 m	JUSP-TA26P-2-E	
Cables with Loose Wires at One End (loose wires on peripheral device end)	1 m	JZSP-CSI02-1-E	
	2 m	JZSP-CSI02-2-E	
	3 m	JZSP-CSI02-3-E	

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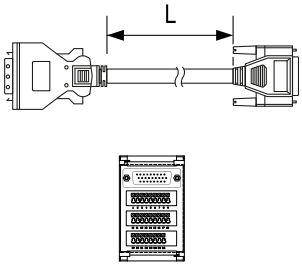
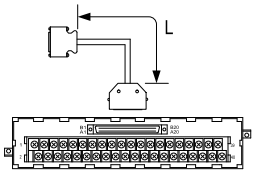
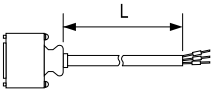
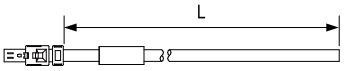
Name	Length (L)	Order Number	Appearance
Terminal Block Kit for SERVOPACK, other Network Type, MECHATROLINK II & III, with cable	0.5 m	SBK-U-VBA-A5EU	
	1 m	SBK-U-VBA-01EU	
	2 m	SBK-U-VBA-02EU	

5. I/O Signal Cables for Σ-XW SERVOPACKs with MECHATROLINK-4/III Communications Reference and EtherCAT Communications Reference

Name	Length (L)	Order Number	Appearance
Connector Kits (soldered)	–	DP9420007-E	
Connector-Terminal Block Converter Unit (with cable)	0.5 m	JUSP-TA36P-E	
	1 m	JUSP-TA36P-1-E	
	2 m	JUSP-TA36P-2-E	
Cables with Loose Wires at One End (loose wires on peripheral device end)	1 m	JZSP-CSI03-1-E	
	2 m	JZSP-CSI03-2-E	
	3 m	JZSP-CSI03-3-E	

6. Safety Function Device Cable

Name	Length (L)	Order Number	Appearance
Cables with Connectors *1	1 m	JZSP-CVH03-01-E-G□	
	3 m	JZSP-CVH03-03-E-G□	
Connector Kits *2	–	Manufacturer: Tyco Electronics Japan G.K. Inquiries: Global Electronics Corporation Product name: Industrial Mini I/O D-Shape Type 1 Plug Connector Kit Model number: 2013595-1	

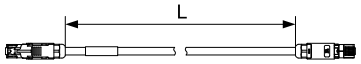
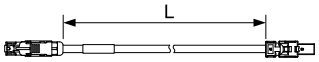
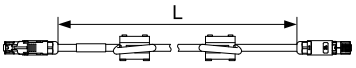
*1 When using safety functions, connect this cable to the safety function devices.
When not using safety functions, connect the enclosed safety jumper connector (JZSP-CVH05-E) to the SERVOPACK.
*2 Use the connector kit when you make cables yourself.

7. MECHATROLINK Communications Cables

Important

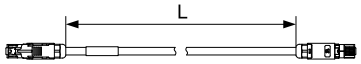
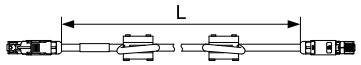
Use the Yaskawa-specified cables for the MECHATROLINK communications cables. Operation will not be dependable due to low noise resistance with any other cable.

The MECHATROLINK cable has connectors on both ends.

Type		Length (L)	Order Number	Appearance
Cables without Ferrite Cores	RJ-45 connectors on both ends	0.2 m	JZSP-CM3RRM0-00P2-E	
		0.5 m	JZSP-CM3RRM0-00P5-E	
		1 m	JZSP-CM3RRM0-01-E	
		2 m	JZSP-CM3RRM0-02-E	
		3 m	JZSP-CM3RRM0-03-E	
		4 m	JZSP-CM3RRM0-04-E	
		5 m	JZSP-CM3RRM0-05-E	
		10 m	JZSP-CM3RRM0-10-E	
		20 m	JZSP-CM3RR00-20-E	
		30 m	JZSP-CM3RR00-30-E	
	RJ-45 connector on one end Industrial mini I/O (IMI) connector on one end *1	0.2 m	JZSP-CM3RMM0-00P2-E	
		0.5 m	JZSP-CM3RMM0-00P5-E	
		1 m	JZSP-CM3RMM0-01-E	
		2 m	JZSP-CM3RMM0-02-E	
		3 m	JZSP-CM3RMM0-03-E	
		4 m	JZSP-CM3RMM0-04-E	
		5 m	JZSP-CM3RMM0-05-E	
		10 m	JZSP-CM3RMM0-10-E	
		20 m	JZSP-CM3RM00-20-E	
		30 m	JZSP-CM3RM00-30-E	
Cables with Ferrite Cores	RJ-45 connectors on both ends	0.3 m	JZSP-CM3RRM1-00P3-E	
		3 m	JZSP-CM3RRM1-03-E	
		10 m	JZSP-CM3RRM1-10-E	
		20 m	JZSP-CM3RR01-20-E	
		30 m	JZSP-CM3RR01-30-E	
		50 m	JZSP-CM3RR01-50-E	
	RJ-45 connector on one end Industrial mini I/O (IMI) connector on one end *1	0.3 m	JZSP-CM3RMM1-00P3-E	
		3 m	JZSP-CM3RMM1-03-E	
		10 m	JZSP-CM3RMM1-10-E	
		20 m	JZSP-CM3RM01-20-E	
		30 m	JZSP-CM3RM01-30-E	
		50 m	JZSP-CM3RM01-50-E	

*1 This is used when connecting to MECHATROLINK-III compliant products such as the Σ-7 series SERVOPACK MECHATROLINK-III communications reference (SGD7□-□□□□20□) products and the MP3000 series of machine controllers.

8. EtherCAT Communications Cables

Type		Length (L)	Order Number	Appearance
Cables without Ferrite Cores	RJ-45 connectors on both ends	0.2 m	JZSP-CM3RRM0-00P2-E	
		0.5 m	JZSP-CM3RRM0-00P5-E	
		1 m	JZSP-CM3RRM0-01-E	
		2 m	JZSP-CM3RRM0-02-E	
		3 m	JZSP-CM3RRM0-03-E	
		4 m	JZSP-CM3RRM0-04-E	
		5 m	JZSP-CM3RRM0-05-E	
		10 m	JZSP-CM3RRM0-10-E	
		20 m	JZSP-CM3RR00-20-E	
		30 m	JZSP-CM3RR00-30-E	
Cables with Ferrite Cores	RJ-45 connectors on both ends	0.3 m	JZSP-CM3RRM1-00P3-E	
		3 m	JZSP-CM3RRM1-03-E	
		10 m	JZSP-CM3RRM1-10-E	
		20 m	JZSP-CM3RR01-20-E	
		30 m	JZSP-CM3RR01-30-E	
		50 m	JZSP-CM3RR01-50-E	

The Ethernet cables with the following specifications can also be used to make the connections.

- Shielded: S/STP or S/UTP
- Category: CAT5e or better
- Length: 50 m max. (between nodes)

We recommend the following cable and connector.

Item	Manufacturer	Model
Ethernet Cable	Beckhoff	ZB9020
RJ-45 Connector	Beckhoff	ZS1090-0003

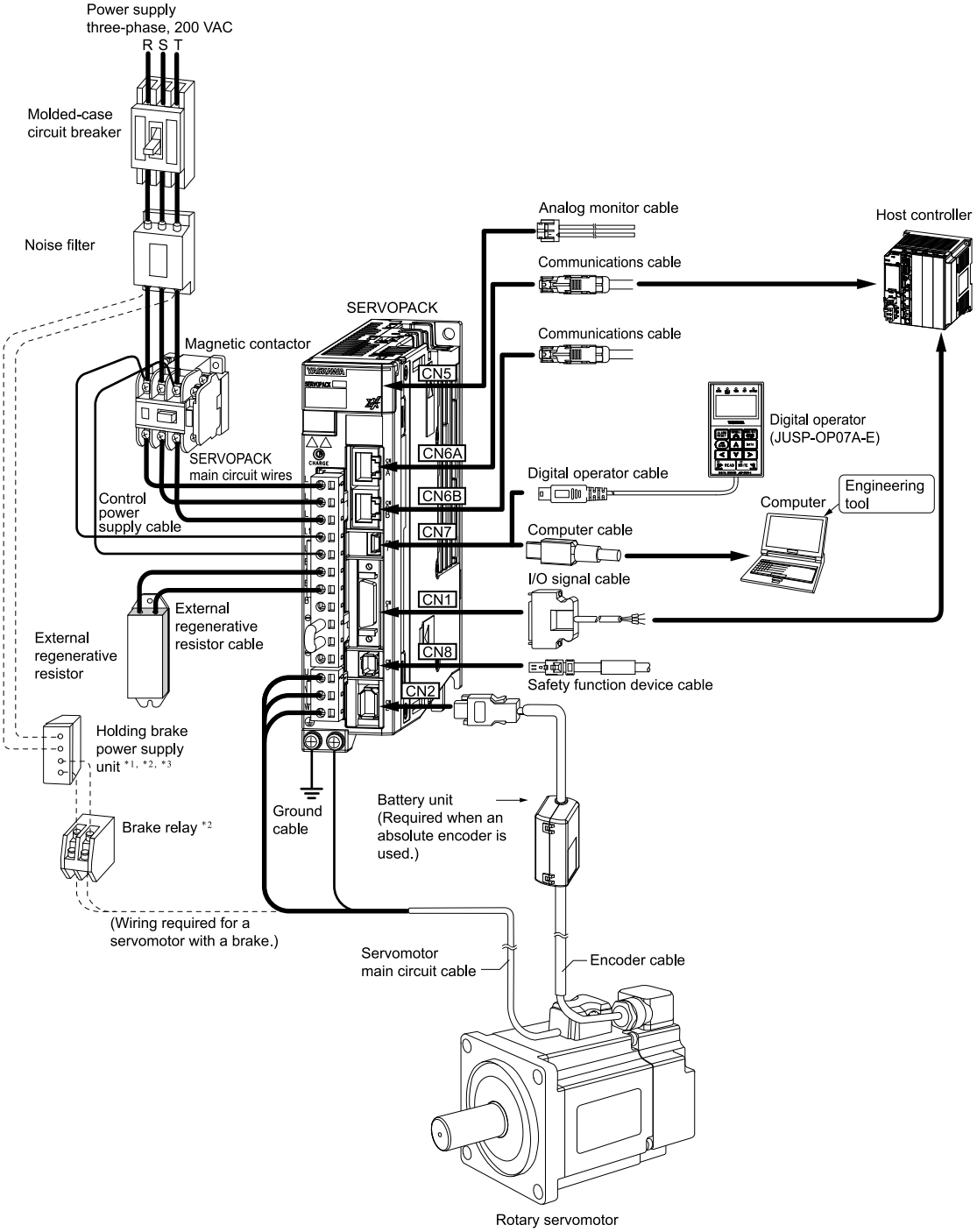
Connections between SERVOPACKs and Peripheral

Peripheral Devices and System Configurations

Configuration with a Rotary Servomotor

This section describes an example using a three-phase, 200-VAC power supply input SERVOPACK with MECHATROLINK-4/III communications references. The connector shapes and pin assignments depend on the power supply input specifications and interfaces of the SERVOPACK.

Refer to the product manual that corresponds to the references used by your SERVOPACK.



*1 A holding brake power supply unit is required to use a servomotor with a holding brake. Holding brake power supply units for 24 VDC are not provided by Yaskawa. Obtain these from other manufacturers.
Never connect holding brake power supply units with different output voltages to a SERVOPACK. Overcurrent may result in burning in the brake.

*2 If you use a servomotor with a holding brake, select a brake relay according to the power supply voltage and current of the brake. Select an appropriate brake relay using the selection method of the brake relay manufacturer.

*3 The holding brake power supply unit is not provided by Yaskawa. Select a power supply based on the holding brake specifications. If you use a 24-V brake, install a separate power supply for the 24-VDC power supply from other power supplies, such as the one for the I/O signals of the CN1 connector. If the power supply is shared, the I/O signals may malfunction.

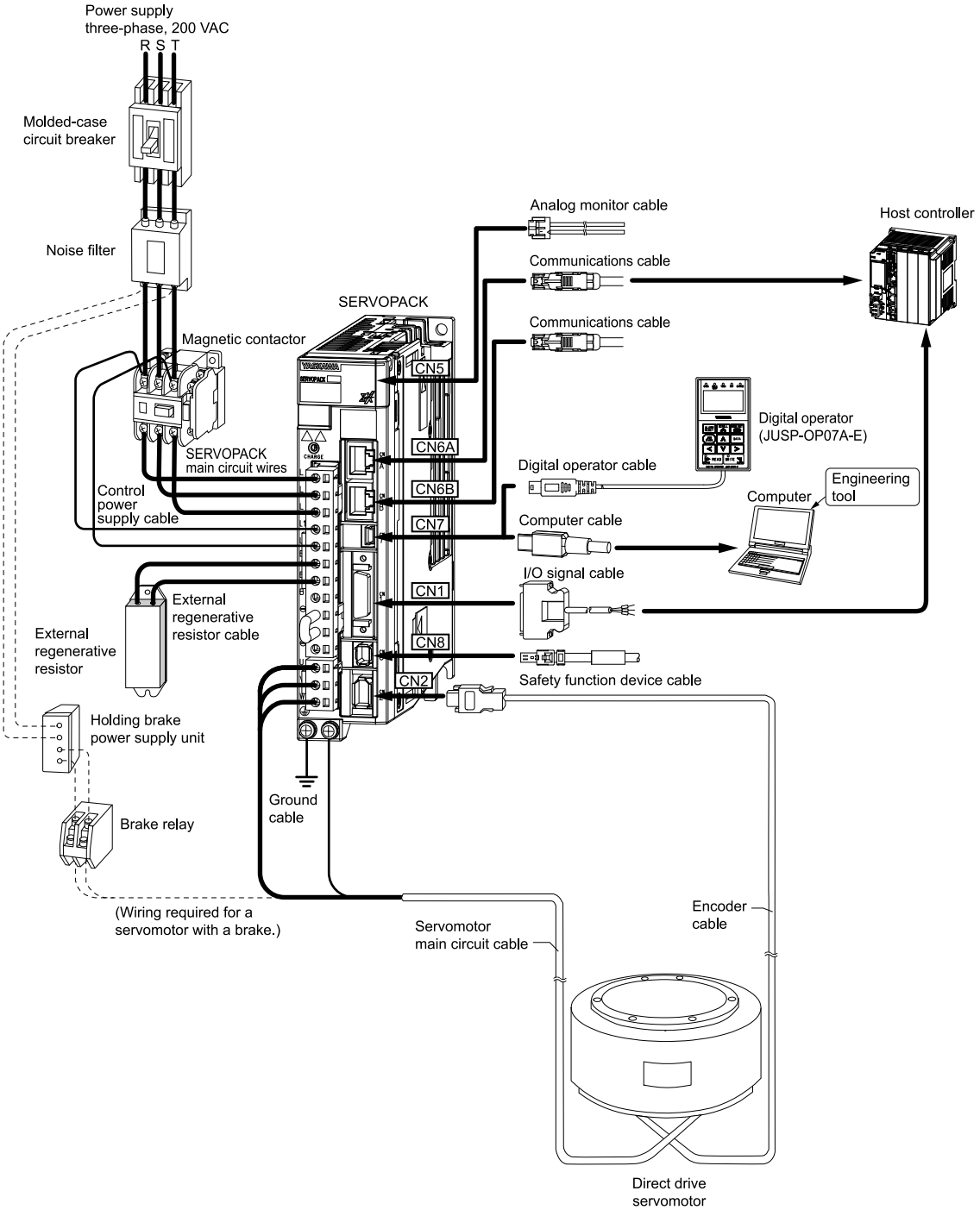
The following table gives the reference information for each device.

Item	Reference
Molded-case circuit breaker	*Molded-Case Circuit Breakers and Fuses on page 442*
Noise filter	*Noise Filter on page 467*
Magnetic contactor	*Magnetic Contactors on page 446*
External regenerative resistor	*Regenerative Resistor on page 478*
SERVOPACK main circuit wires	*SERVOPACK Main Circuit Wires on page 451*
Digital operator cable	The cable used to connect the digital operator is built into the digital operator.
Battery unit	*Batteries for Servomotors with Absolute Encoders on page 492*
Digital operator	*Digital Operators on page 484*
Engineering tool	*SigmaWin+: AC Servo Drive Engineering Tool on page 487*
Surge absorbers	*Surge Absorbers on page 477*
AC/DC reactors	*AC/DC Reactors on page 474*
Surge Absorbers (Varistors), Diodes, and Brake Relays for Holding Brake Power Supplies	*Surge Absorbers (Varistors), Diodes, and Brake Relays for Holding Brake Power Supplies on page 490*

Direct Drive Servomotors

This section describes an example using a three-phase, 200-VAC power supply input SERVOPACK with MECHATROLINK-4/III communications references. The connector shapes and pin assignments depend on the power supply input specifications and interfaces of the SERVOPACK.

Refer to the product manual that corresponds to the references used by your SERVOPACK.



The following table gives the reference information for each device.

Item	Reference
Molded-case circuit breaker	*Molded-Case Circuit Breakers and Fuses on page 442*
Noise filters	*Noise Filter on page 467*

Continued on next page.

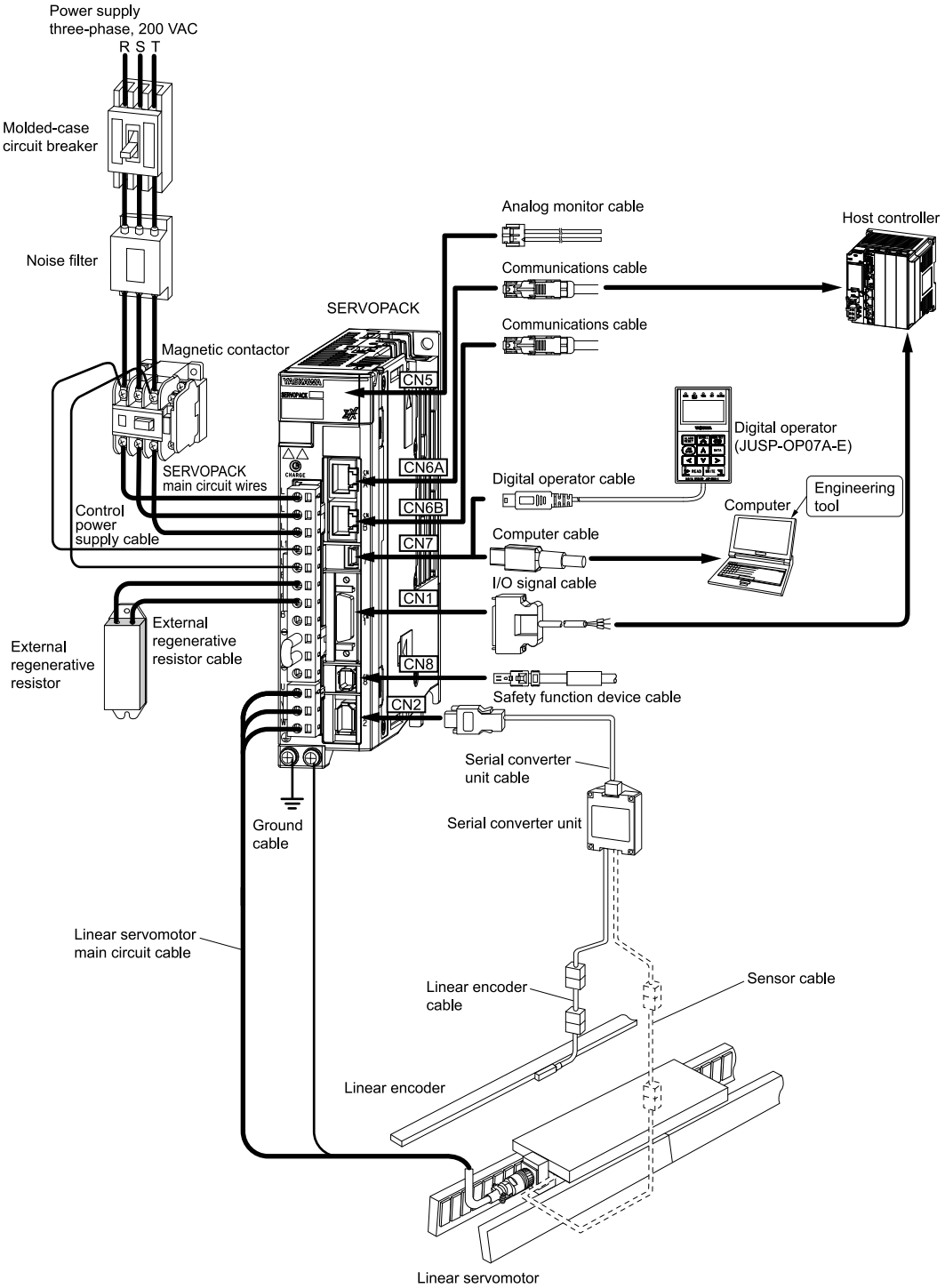
Continued from previous page.

Item	Reference
Magnetic contactor	*Magnetic Contactors on page 446*
External regenerative resistor	*Regenerative Resistor on page 478*
SERVOPACK main circuit wire	*SERVOPACK Main Circuit Wires on page 451*
Digital operator cable	The cable used to connect the digital operator is built into the digital operator.
Battery unit	*Batteries for Servomotors with Absolute Encoders on page 492*
Digital operator	*Digital Operators on page 484*
Engineering tool	*SigmaWin+: AC Servo Drive Engineering Tool on page 487*
Surge absorber	*Surge Absorbers on page 477*
Reactor for harmonic suppression	*AC/DC Reactors on page 474*

Linear Servomotors

This section describes an example using a three-phase, 200-VAC power supply input SERVOPACK with MECHATROLINK-4/III communications references. The connector shapes and pin assignments depend on the power supply input specifications and interfaces of the SERVOPACK.

Refer to the product manual that corresponds to the references used by your SERVOPACK.



The following table gives the reference information for each device.

Item	Reference
Molded-case circuit breaker	*Molded-Case Circuit Breakers and Fuses on page 442*
Noise filters	*Noise Filter on page 467*
Magnetic contactor	*Magnetic Contactors on page 446*
External regenerative resistor	*Regenerative Resistor on page 478*
SERVOPACK main circuit wire	*SERVOPACK Main Circuit Wires on page 451*
Digital operator cable	The cable used to connect the digital operator is built into the digital operator.
Linear servomotor main circuit cable	*Linear Servomotor Main Circuit Cables on page 307*
Linear encoder cable	*Linear Encoder Cables on page 314*
Serial converter unit cable	*Serial Converter Unit Cables on page 314*
Serial converter unit	*Serial Converter Unit on page 280*
Sensor cable	*Sensor Cables on page 315*
Digital operator	*Digital Operators on page 484*
Engineering tool	*SigmaWin+: AC Servo Drive Engineering Tool on page 487*
Surge absorber	*Surge Absorbers on page 477*
Reactor for harmonic suppression	*AC/DC Reactors on page 474*

Molded-Case Circuit Breakers and Fuses

Using an AC Power Supply

Use a molded-case circuit breaker and fuse to protect the power supply line. They protect the power line by shutting OFF the circuit when overcurrent is detected. Select these devices based on the information in the following tables.

Note:

The following tables provide the net values of the current capacity and inrush current. Select a fuse and a molded-case circuit breaker that meet the following conditions.

- Main circuit and control circuit: No breaking at three times the current value given in the table for 5 s.
- Inrush current: No breaking at the current value given in the table for 20 ms.

■ Σ-XS SERVOPACKs for Use with Three-Phase, 200-VAC or Single-Phase, 200-VAC

Main Circuit Power Supply	Maximum Applicable Motor Capacity [kW]	SERVOPACK Model: SGDXS-	Power Supply Capacity per SERVOPACK [kVA] *1	Current Capacity		Inrush Current		Rated Voltage	
				Main Circuit [Arms] *1	Control Power Supply [Arms]	Main Circuit [A0-p]	Control Power Supply [A0-p]	Fuse [V]	MCCB [V]
Three-phase, 200 VAC	0.05	R70A	0.2	0.4	0.2	29	34	250	240
	0.1	R90A	0.3	0.8					
	0.2	1R6A	0.5	1.3					
	0.4	2R8A	1.0	2.5					
	0.5	3R8A	1.3	3.0		34			
	0.75	5R5A	1.6	4.1					
	1.0	7R6A	2.3	5.7					
	1.5	120A	3.2	7.3					
	2.0	180A	4.0	10	0.25				
	3.0	200A	5.9	15					
	5.0	330A	7.5	25	0.3	68			
	6.0	470A	10.7	29					
	7.5	550A	14.6	37					
	11	590A	21.7	54	0.4	114			
	15	780A	29.6	73					
Single-phase, 200 VAC	0.05	R70A	0.2	0.8	0.2	29			
	0.1	R90A	0.3	1.6					
	0.2	1R6A	0.6	2.4					
	0.4	2R8A	1.2	5.0					
	0.75	5R5A	1.9	8.7		34			
	1.5	120A □□□ 0008	4.0	16	0.25				

*1 This is the net value at the rated load.

■ Σ-XW SERVOPACKs for Use with Three-Phase, 200-VAC or Single-Phase, 200-VAC

Main Circuit Power Supply	Maximum Applicable Motor Capacity (each axis) [kW]	SERVOPACK Model: SGDXW-	Power Supply Capacity per SERVOPACK [kVA] *1	Current Capacity		Inrush Current		Rated Voltage	
				Main Circuit [Arms] *1	Control Power Supply [Arms]	Main Circuit [A0-p]	Control Power Supply [A0-p]	Fuse [V]	MCCB [V]
Three-phase, 200 VAC	0.2	1R6A	1.0	2.5	0.25	34	34	250	240
	0.4	2R8A	1.9	4.7					
	0.75	5R5A	3.2	7.8					
	1.0	7R6A	4.5	11					
Single-phase, 200 VAC	0.2	1R6A	1.3	5.5					
	0.4	2R8A	2.4	11					
	0.75	5R5A *2	2.7	12					

*1 This is the net value at the rated load.

*2 If you use the SGDXW-5R5A with a single-phase 200-VAC power supply input, derate the load ratio to 65%. An example is given below.
If the load ratio of the first axis is 90%, use a load ratio of 40% for the second axis so that average load ratio for both axes is 65%.
((90% + 40%)/2 = 65%)

■ Σ-XT SERVOPACKs for Use with Three-Phase, 200-VAC or Single-Phase, 200-VAC

Main Circuit Power Supply	Maximum Applicable Motor Capacity (each axis) [kW]	SERVOPACK Model: SGDXT-	Power Supply Capacity per SERVOPACK [kVA] *1	Current Capacity		Inrush Current		Rated Voltage	
				Main Circuit [Arms] *1	Control Power Supply [Arms]	Main Circuit [A0-p]	Control Power Supply [A0-p]	Fuse [V]	MCCB [V]
Three-phase, 200 VAC	0.2	1R6A	1.5	3.9	0.3	34	57	250	240
	0.4	2R8A	3.0	7.5					
Single-phase, 200 VAC	0.2	1R6A	1.8	7.2					
	0.4	2R8A *2	3.6	12					

*1 This is the net value at the rated load.

*2 If you use the servomotor with a single-phase supply input, derate the total continuous output of the motor using the following equation: maximum applicable motor capacity × number of axes × 65%.
Example: When using the SGDXT-2R8A SERVOPACK, the total continuous output of the motor must be 0.78 kW or less (0.4 kW × 3 axes × 65% = 0.78 kW). When operating the first axis at an output of 0.4 kW and the second axis at 0.2 kW, the output of the third axis must be 0.18 kW or less.

Using a DC Power Supply

This section gives the power supply specifications for using a DC power supply input. Use the fuses given in the following tables to protect the power supply line and SERVOPACK. They protect the power line by shutting OFF the circuit when overcurrent is detected.

The SGDXS-□□□D does not require external fuses as its built-in fuse functions even with DC power input. However, if external fuses are required for compliance with safety standards or other requirements, use external fuses that meet those requirements.

Note:

The following tables provide the net values of the current capacity and inrush current.

■ Σ-XS SERVOPACKs for Use with 270-VDC Power Supply Input

Main Circuit Power Supply	SERVOPACK Model: SGDXS-	Power Supply Capacity per SERVOPACK [kVA] *1	Current Capacity		Inrush Current		External Fuse		
			Main Circuit [Arms] *1	Control Power Supply [Arms]	Main Circuit [A0-p]	Control Power Supply [A0-p]	Order Number *2	Current Rating [A]	Voltage Rating [Vdc]
270 VDC	R70A	0.2	0.5	0.2	29	34	3,5URGJ17/16UL	16	400
	R90A	0.3	1.0						
	1R6A	0.5	1.5						
	2R8A	1.0	3.0				3,5URGJ17/20UL	20	
	3R8A	1.3	3.8	0.2	34		3,5URGJ17/40UL	40	
	5R5A	1.6	4.9						
	7R6A	2.3	6.9						
	120A	3.2	11	0.2					
	120A □□□ 0008			0.25			3,5URGJ17/63UL	63	
	180A	4.0	14						
	200A	5.9	20						
	330A	7.5	34	0.3	68 *3 (External 5 Ω)		3,5URGJ17/100UL	100	
	470A	10.7	36				3,5URGJ23/160UL	160	
	550A	14.6	48						
	590A	21.7	68	0.4	114 *3 (External 3 Ω)		3,5URGJ23/200UL	200	
	780A	29.6	92						

*1 This is the net value at the rated load.
*2 These fuses are manufactured by Mersen Japan.
*3 If you use a DC power supply input with any of the following SERVOPACKs, externally connect an inrush current limiting circuit and use the power ON and OFF sequences recommended by Yaskawa: SGDXS-330A, -470A, -550A, -590A, and -780A.
There is a risk of equipment damage.
Refer to the manual for your SERVOPACK for the power ON and OFF sequences.

■ Σ-XW SERVOPACKs for Use with 270-VDC Power Supply Input

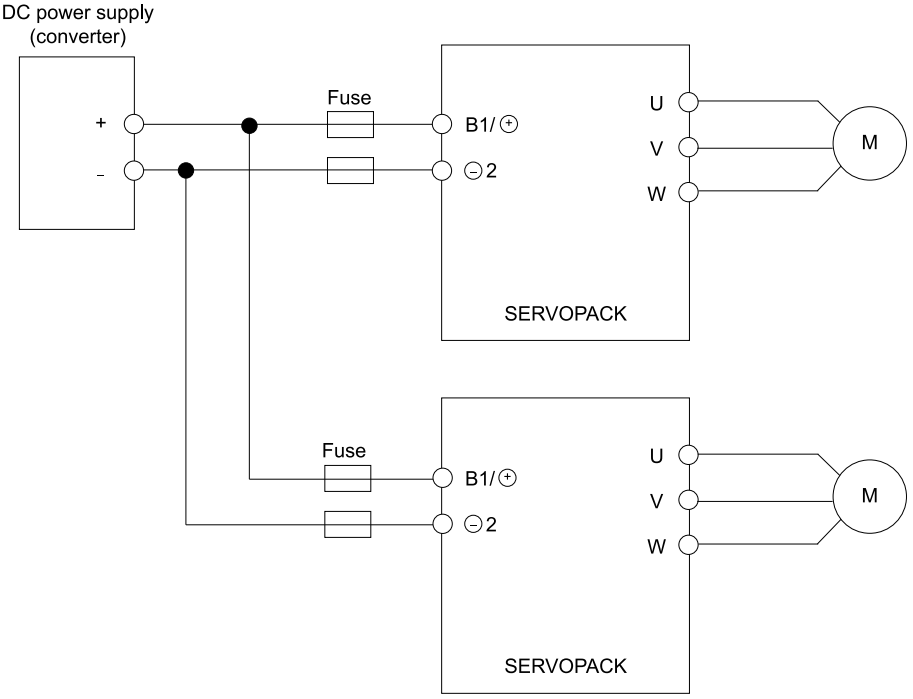
Main Circuit Power Supply	SERVOPACK Model: SGDXW-	Power Supply Capacity per SERVOPACK [kVA] *1	Current Capacity		Inrush Current		External Fuse		
			Main Circuit [Arms] *1	Control Power Supply [Arms]	Main Circuit [A0-p]	Control Power Supply [A0-p]	Order Number *2	Current Rating [A]	Voltage Rating [Vdc]
270 VDC	1R6A	1	3.0	0.25	34	34	3,5URGJ17/ 40UL	40	400
	2R8A	1.9	5.8						
	5R5A	3.2	9.7				3,5URGJ17/ 63UL	63	
	7R6A	4.5	14						

*1 This is the net value at the rated load.
*2 These fuses are manufactured by Mersen Japan.

■ Σ-XT SERVOPACKs for Use with 270-VDC Power Supply Input

Main Circuit Power Supply	SERVOPACK Model: SGDXT-	Power Supply Capacity per SERVOPACK [kVA] *1	Current Capacity		Inrush Current		External Fuse		
			Main Circuit [Arms] *1	Control Power Supply [Arms]	Main Circuit [A0-p]	Control Power Supply [A0-p]	Order Number *2	Current Rating [A]	Voltage Rating [Vdc]
270 VDC	1R6A	1.8	4.5	0.3	34	57	3,5URGJ17/ 40UL	40	400
	2R8A	3.0	9.0						

*1 This is the net value at the rated load.
*2 These fuses are manufactured by Mersen Japan.



Note:
If you connect more than one SERVOPACK to the same DC power supply, connect fuses for each SERVOPACK.

Magnetic Contactors

Use a magnetic contactor when you configure an external AC power supply sequence.

Note:

Always attach a surge absorber (e.g., a surge absorber unit) to the excitation coil of the magnetic contactor. Consult Fuji Electric FA Components & Systems Co., Ltd. for details.

Selection Table

■ Σ-XS SERVOPACKs for Use with Three-Phase, 200-VAC or Single-Phase, 200-VAC

Main Circuit Power Supply	SERVOPACK		Order Number	Manufacturer
	Maximum Applicable Motor Capacity [kW]	Model SGDXS-		
Three-phase, 200 VAC	0.05	R70A	SC-03	Fuji Electric FA Components & Systems Co., Ltd.
	0.1	R90A		
	0.2	1R6A		
	0.4	2R8A		
	0.5	3R8A		
	0.75	5R5A	SC-4-1	
	1.0	7R6A		
	1.5	120A		
	2.0	180A	SC-5-1	
	3.0	200A		
	5.0	330A	SC-N1	
	6.0	470A		
	7.5	550A	SC-N2	
	11	590A	SC-N2S	
	15	780A	SC-N3	
Single-phase, 200 VAC	0.05	R70A	SC-03	
	0.1	R90A		
	0.2	1R6A		
	0.4	2R8A		
	0.75	5R5A	SC-4-1	
	1.5	120A□□□0008	SC-5-1	

■ Σ-XW SERVOPACKs for Use with Three-Phase, 200-VAC or Single-Phase, 200-VAC

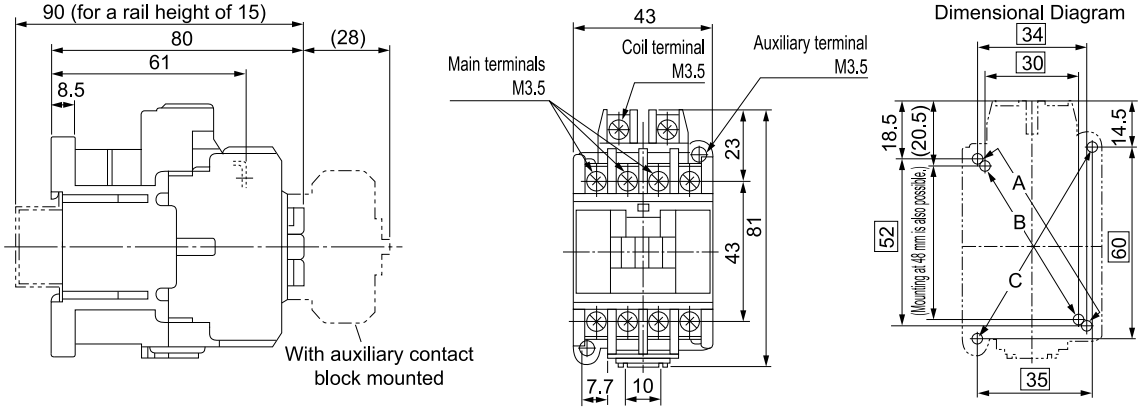
Main Circuit Power Supply	SERVOPACK		Order Number	Manufacturer
	Maximum Applicable Motor Capacity [kW]	Model SGDXW-		
Three-phase, 200 VAC	0.2	1R6A	SC-03	Fuji Electric FA Components & Systems Co., Ltd.
	0.75	2R8A	SC-4-1	
	0.75	5R5A		
	1.0	7R6A	SC-5-1	
Single-phase, 200 VAC	0.2	1R6A	SC-03	
	0.4	2R8A	SC-4-1	
	0.75	5R5A	SC-5-1	

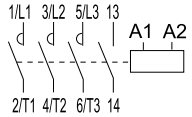
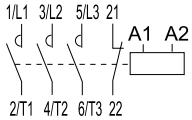
■ Σ-XT SERVOPACKs for Use with Three-Phase, 200-VAC or Single-Phase, 200-VAC

Main Circuit Power Supply	SERVOPACK		Order Number	Manufacturer
	Maximum Applicable Motor Capacity [kW]	Model SGDXT-		
Three-phase, 200 VAC	0.2	1R6A	SC-4-1	Fuji Electric FA Components & Systems Co., Ltd.
	0.4	2R8A		
Single-phase, 200 VAC	0.2	1R6A		
	0.4	2R8A	SC-5-1	

External Dimensions

■ Model: SC-03



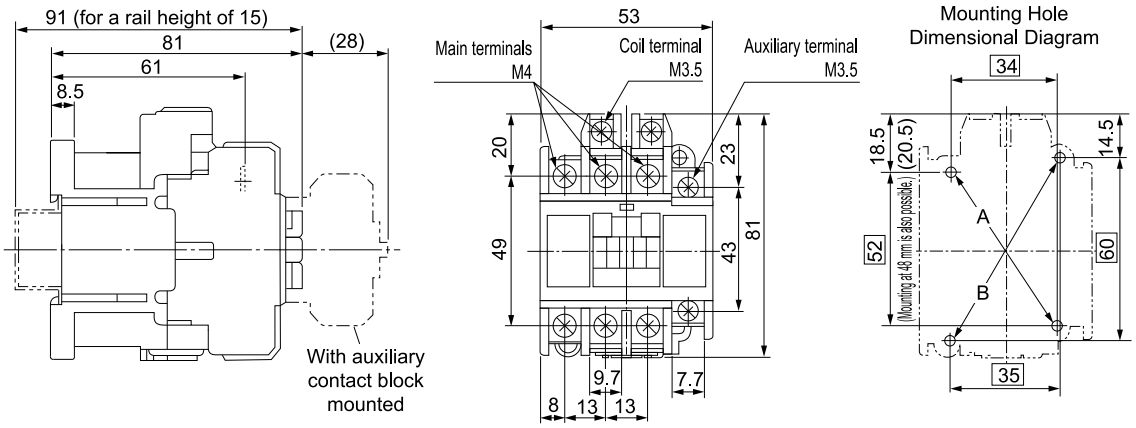
Auxiliary Contacts	Contact Structure
1a	
1b	

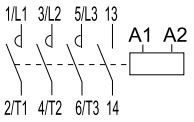
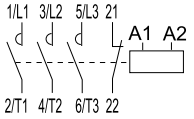
- You can use any of the following three mounting methods.
  A : 34 × (48 to) 52
  B : 30× 48
  C : 35× 60
- Mounting screws: 2 × M4
  Use two mounting holes in diagonally opposing corners to mount the magnetic contactor.

Unit: mm

Approx. mass: 0.32 kg

■ Model: SC-4-1



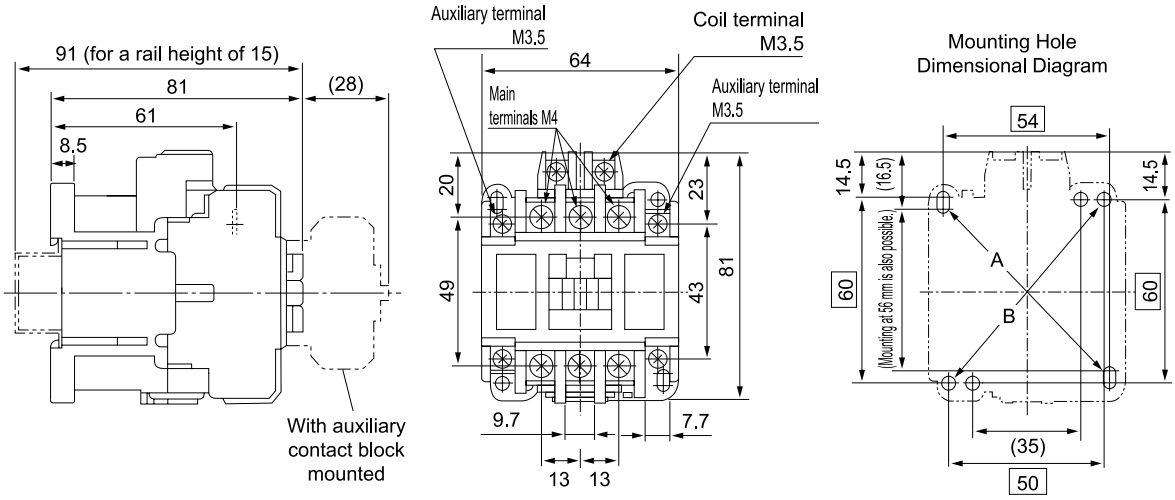
Auxiliary Contacts	Contact Structure
1a	
1b	

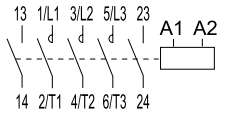
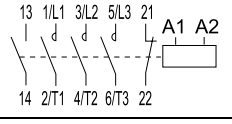
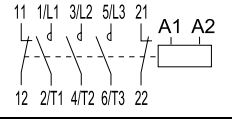
- You can use any of the following two mounting methods.
  A : 34 × (48 to) 52
  B : 35× 60
- Mounting screws: 2 × M4
  Use two mounting holes in diagonally opposing corners to mount the magnetic contactor.

Unit: mm

Approx. mass: 0.36 kg

■ Model: SC-5-1



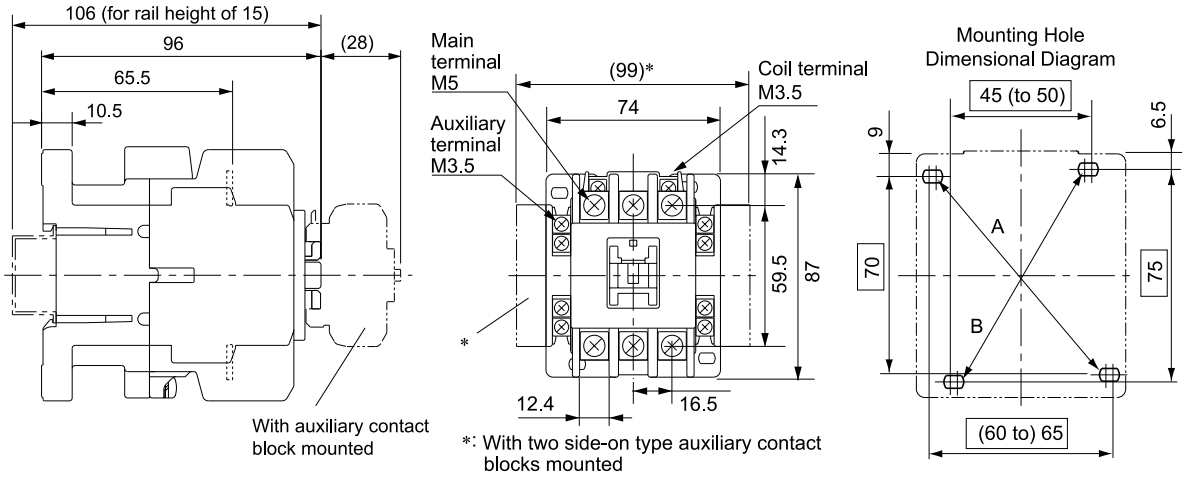
Auxiliary Contacts	Contact Structure
2a	
1a1b	
2b	

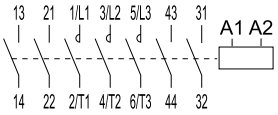
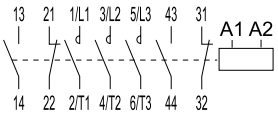
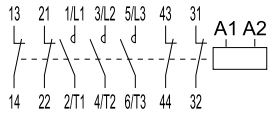
- You can use any of the following two mounting methods.
  A : 54 × (56 to) 60
  B : 50× 60
- Mounting screws: 2 × M4
  Use two mounting holes in diagonally opposing corners to mount the magnetic contactor.

Unit: mm

Approx. mass: 0.38 kg

■ Model: SC-N1, SC-N2



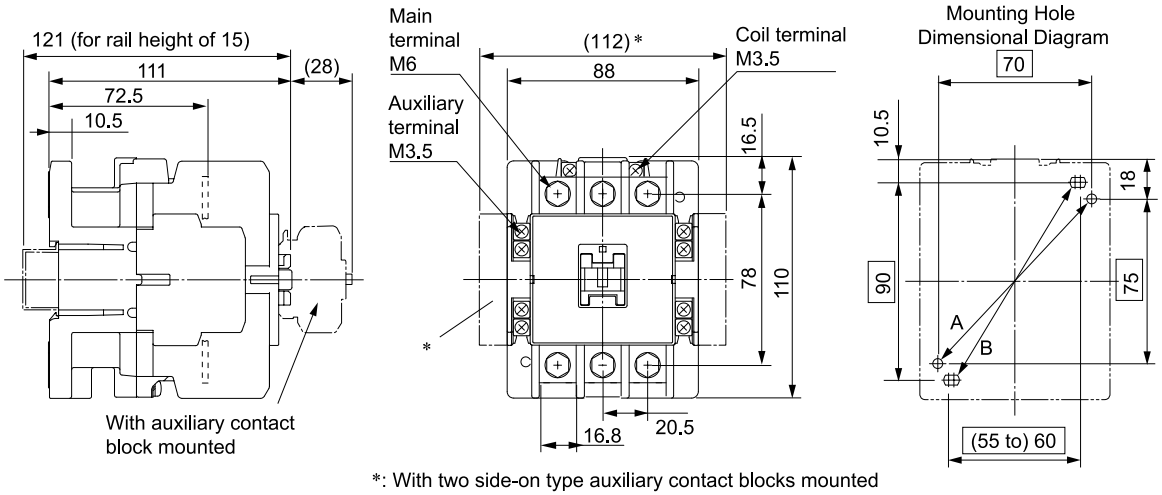
Auxiliary Contacts	Contact Structure
4a	
2a2b	
4b	

- You can use any of the following two mounting methods.
  A: 70 × 75
  B: (55 to) 65 × 90
- Mounting screws: 2 × M4
  Use two mounting holes in diagonally opposing corners to mount the magnetic contactor.

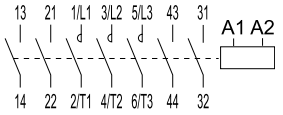
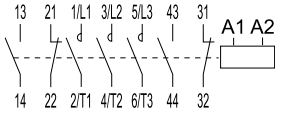
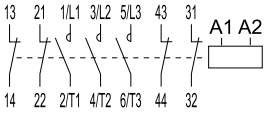
Unit: mm

Approx. mass: 0.59 kg

■ Model: SC-N2S, SC-N3



*: With two side-on type auxiliary contact blocks mounted

Auxiliary Contacts	Contact Structure
4a	
2a2b	
4b	

- You can use any of the following two mounting methods.
  A: 70 × 75
  B: (55 to) 60 × 90
- Mounting screws: 2 × M4
  Use two mounting holes in diagonally opposing corners to mount the magnetic contactor.

Unit: mm

Approx. mass: 1.1 kg

SERVOPACK Main Circuit Wires

This section describes the main circuit wires for SERVOPACKs.

Important

These specifications are based on IEC/EN 61800-5-1, UL 61800-5-1, and CSA C22.2 No.274.

1. To comply with UL standards, use UL-compliant wires.
2. Use copper wires with a rated temperature of 75°C or higher.
3. Use wires with a rated withstand voltage of 300 V or higher.

⚠ CAUTION

If there are separate safety regulations for equipment with a high-current protective grounding conductor, select the wire according to the minimum size for the protective grounding conductor specified in those regulations.

Note:

To use 600-V heat-resistant polyvinyl chloride-insulated wire (HIV), use the following table as reference for the applicable wires.

• The specified wire sizes are for three bundled leads when the rated current is applied with a surrounding air temperature of 40°C.

• Select the wires according to the surrounding air temperature.

Σ-XS SERVOPACKs for Use with Three-Phase, 200-VAC Power Supplies

SERVOPACK Model: SGDXS-	Terminal Symbols		Wire Size	Screw Size	Tightening Torque [N·m]
R70A	Main Circuit Power Supply Cables	L1, L2, L3	AWG16 (1.25 mm²)	–	–
	Servomotor Main Circuit Cables *1	U, V, W			
	Control Power Supply Cables	L1C, L2C			
	External Regenerative Resistor Cables	B1/⊕, B2			
	Ground Cable	⏚	AWG14 (2.0 mm²) or larger	M4	1.2 to 1.4
R90A	Main Circuit Power Supply Cables	L1, L2, L3	AWG16 (1.25 mm²)	–	–
	Servomotor Main Circuit Cables *1	U, V, W			
	Control Power Supply Cables	L1C, L2C			
	External Regenerative Resistor Cables	B1/⊕, B2			
	Ground Cable	⏚	AWG14 (2.0 mm²) or larger	M4	1.2 to 1.4
1R6A	Main Circuit Power Supply Cables	L1, L2, L3	AWG16 (1.25 mm²)	–	–
	Servomotor Main Circuit Cables *1	U, V, W			
	Control Power Supply Cables	L1C, L2C			
	External Regenerative Resistor Cables	B1/⊕, B2			
	Ground Cable	⏚	AWG14 (2.0 mm²) or larger	M4	1.2 to 1.4

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SERVOPACK Model: SGDXS-	Terminal Symbols		Wire Size	Screw Size	Tightening Torque [N·m]
2R8A	Main Circuit Power Supply Cables	L1, L2, L3	AWG16 (1.25 mm²)	–	–
	Servomotor Main Circuit Cables *1	U, V, W			
	Control Power Supply Cables	L1C, L2C			
	External Regenerative Resistor Cables	B1/⊕, B2			
	Ground Cable	⏚	AWG14 (2.0 mm²) or larger	M4	1.2 to 1.4
3R8A	Main Circuit Power Supply Cables	L1, L2, L3	AWG16 (1.25 mm²)	–	–
	Servomotor Main Circuit Cables *1	U, V, W			
	Control Power Supply Cables	L1C, L2C			
	External Regenerative Resistor Cables	B1/⊕, B2			
	Ground Cable	⏚	AWG14 (2.0 mm²) or larger	M4	1.2 to 1.4
5R5A	Main Circuit Power Supply Cables	L1, L2, L3	AWG16 (1.25 mm²)	–	–
	Servomotor Main Circuit Cables *1	U, V, W			
	Control Power Supply Cables	L1C, L2C			
	External Regenerative Resistor Cables	B1/⊕, B2			
	Ground Cable	⏚	AWG14 (2.0 mm²) or larger	M4	1.2 to 1.4
7R6A	Main Circuit Power Supply Cables	L1, L2, L3	AWG16 (1.25 mm²)	–	–
	Servomotor Main Circuit Cables *1	U, V, W			
	Control Power Supply Cables	L1C, L2C			
	External Regenerative Resistor Cables	B1/⊕, B2			
	Ground Cable	⏚	AWG14 (2.0 mm²) or larger	M4	1.2 to 1.4
120A	Main Circuit Power Supply Cables	L1, L2, L3	AWG14 (2.0 mm²)	–	–
	Servomotor Main Circuit Cables *1	U, V, W			
	Control Power Supply Cables	L1C, L2C	AWG16 (1.25 mm²)		
	External Regenerative Resistor Cables	B1/⊕, B2			
	Ground Cable	⏚	AWG14 (2.0 mm²) or larger	M4	1.2 to 1.4

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SERVOPACK Model: SGDXS-	Terminal Symbols		Wire Size	Screw Size	Tightening Torque [N·m]
180A	Main Circuit Power Supply Cables	L1, L2, L3	AWG14 (2.0 mm²)	M4	1.0 to 1.2
	Servomotor Main Circuit Cables *1	U, V, W	AWG10 (5.5 mm²)		
	Control Power Supply Cables	L1C, L2C	AWG16 (1.25 mm²)		
	External Regenerative Resistor Cables	B1/⊕, B2			
	Ground Cable	⏚	AWG14 (2.0 mm²) or larger	M4	1.2 to 1.4
200A	Main Circuit Power Supply Cables	L1, L2, L3	AWG12 (3.5 mm²)	M4	1.0 to 1.2
	Servomotor Main Circuit Cables *1	U, V, W	AWG10 (5.5 mm²)		
	Control Power Supply Cables	L1C, L2C	AWG16 (1.25 mm²)		
	External Regenerative Resistor Cables	B1/⊕, B2			
	Ground Cable	⏚	AWG14 (2.0 mm²) or larger	M4	1.2 to 1.4
330A	Main Circuit Power Supply Cables	L1, L2, L3	AWG8 (8.0 mm²)	M4	1.0 to 1.2
	Servomotor Main Circuit Cables *1	U, V, W			
	Control Power Supply Cables	L1C, L2C	AWG16 (1.25 mm²)		
	External Regenerative Resistor Cables	B1/⊕, B2	AWG14 (2.0 mm²)		
	Ground Cable	⏚	AWG14 (2.0 mm²) or larger	M4	1.2 to 1.4
470A	Main Circuit Power Supply Cables	L1, L2, L3	AWG8 (8.0 mm²)	M5	2.2 to 2.4
	Servomotor Main Circuit Cables *1	U, V, W	AWG6 (14 mm²)		
	Control Power Supply Cables	L1C, L2C	AWG16 (1.25 mm²)		
	External Regenerative Resistor Cables	B1/⊕, B2	AWG14 (2.0 mm²)		
	Ground Cable	⏚	AWG14 (2.0 mm²) or larger		
550A	Main Circuit Power Supply Cables	L1, L2, L3	AWG8 (8.0 mm²)		
	Servomotor Main Circuit Cables *1	U, V, W	AWG4 (22 mm²)		
	Control Power Supply Cables	L1C, L2C	AWG16 (1.25 mm²)		
	External Regenerative Resistor Cables	B1/⊕, B2	AWG10 (5.5 mm²)		
	Ground Cable	⏚	AWG14 (2.0 mm²) or larger		

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SERVOPACK Model: SGDXS-	Terminal Symbols		Wire Size	Screw Size	Tightening Torque [N·m]
590A	Main Circuit Power Supply Cables	L1, L2, L3	AWG4 (22 mm²)	M6	2.7 to 3.0
	Servomotor Main Circuit Cables *1	U, V, W	AWG4 (22 mm²)		
	Control Power Supply Cables	L1C, L2C	AWG16 (1.25 mm²)		
	External Regenerative Resistor Cables	B1/⊕, B2	AWG10 (5.5 mm²)		
	Ground Cable	⏚	AWG14 (2.0 mm²) or larger		
780A	Main Circuit Power Supply Cables	L1, L2, L3	AWG3 (30 mm²)		
	Servomotor Main Circuit Cables *1	U, V, W	AWG3 (30 mm²)		
	Control Power Supply Cables	L1C, L2C	AWG16 (1.25 mm²)		
	External Regenerative Resistor Cables	B1/⊕, B2	AWG8 (8.0 mm²)		
	Ground Cable	⏚	AWG14 (2.0 mm²) or larger		

*1 If you do not use the recommended servomotor main circuit cable, use this table to select wires.

Σ-XS SERVOPACKs with Single-Phase, 200-VAC

SERVOPACK Model: SGDXS-	Terminal Symbols		Wire Size	Screw Size	Tightening Torque [N·m]
R70A	Main Circuit Power Supply Cables	L1, L2	AWG16 (1.25 mm²)	–	–
	Servomotor Main Circuit Cables *1	U, V, W			
	Control Power Supply Cables	L1C, L2C			
	External Regenerative Resistor Cables	B1/⊕, B2			
	Ground Cable	⏚	AWG14 (2.0 mm²) or larger	M4	1.2 to 1.4
R90A	Main Circuit Power Supply Cables	L1, L2	AWG16 (1.25 mm²)	–	–
	Servomotor Main Circuit Cables *1	U, V, W			
	Control Power Supply Cables	L1C, L2C			
	External Regenerative Resistor Cables	B1/⊕, B2			
	Ground Cable	⏚	AWG14 (2.0 mm²) or larger	M4	1.2 to 1.4

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SERVOPACK Model: SGDXS-	Terminal Symbols		Wire Size	Screw Size	Tightening Torque [N·m]
1R6A	Main Circuit Power Supply Cables	L1, L2, L3	AWG16 (1.25 mm²)	–	–
	Servomotor Main Circuit Cables *1	U, V, W			
	Control Power Supply Cables	L1C, L2C			
	External Regenerative Resistor Cables	B1/⊕, B2			
	Ground Cable	⏚	AWG14 (2.0 mm²) or larger	M4	1.2 to 1.4
2R8A	Main Circuit Power Supply Cables	L1, L2, L3	AWG16 (1.25 mm²)	–	–
	Servomotor Main Circuit Cables *1	U, V, W			
	Control Power Supply Cables	L1C, L2C			
	External Regenerative Resistor Cables	B1/⊕, B2			
	Ground Cable	⏚	AWG14 (2.0 mm²) or larger	M4	1.2 to 1.4
5R5A	Main Circuit Power Supply Cables	L1, L2, L3	AWG14 (2.0 mm²)	–	–
	Servomotor Main Circuit Cables *1	U, V, W	AWG16 (1.25 mm²)		
	Control Power Supply Cables	L1C, L2C			
	External Regenerative Resistor Cables	B1/⊕, B2			
	Ground Cable	⏚	AWG14 (2.0 mm²) or larger	M4	1.2 to 1.4
120A□□□0008	Main Circuit Power Supply Cables	L1, L2	AWG14 (2.0 mm²)	M4	1.0 to 1.2
	Servomotor Main Circuit Cables *1	U, V, W			
	Control Power Supply Cables	L1C, L2C	AWG16 (1.25 mm²)		
	External Regenerative Resistor Cables	B1/⊕, B2			
	Ground Cable	⏚	AWG14 (2.0 mm²) or larger		1.2 to 1.4

*1 If you do not use the recommended servomotor main circuit cable, use this table to select wires.

Σ-XS SERVOPACKs for Use with 270-VDC Power Supply Input

SERVOPACK Model: SGDXS-	Terminal Symbols *1		Wire Size	Screw Size	Tightening Torque [N·m]
R70A	Servomotor Main Circuit Cables *2	U, V, W	AWG16 (1.25 mm²)	-	–
	Control Power Supply Cable	L1C, L2C	AWG16 (1.25 mm²)	-	–
	Main Circuit Power Supply Cables	B1/⊕, ⊖2	AWG16 (1.25 mm²)	-	–
	Ground Cable	⏚	AWG14 (2.0 mm²) or more	M4	1.2 to 1.4
R90A	Servomotor Main Circuit Cables *2	U, V, W	AWG16 (1.25 mm²)	-	–
	Control Power Supply Cable	L1C, L2C	AWG16 (1.25 mm²)	-	–
	Main Circuit Power Supply Cables	B1/⊕, ⊖2	AWG16 (1.25 mm²)	-	–
	Ground Cable	⏚	AWG14 (2.0 mm²) or more	M4	1.2 to 1.4
1R6A	Servomotor Main Circuit Cables *2	U, V, W *2	AWG16 (1.25 mm²)	-	–
	Control Power Supply Cable	L1C, L2C	AWG16 (1.25 mm²)	-	–
	Main Circuit Power Supply Cables	B1/⊕, ⊖2	AWG16 (1.25 mm²)	-	–
	Ground Cable	⏚	AWG14 (2.0 mm²) or more	M4	1.2 to 1.4
2R8A	Servomotor Main Circuit Cables *2	U, V, W	AWG16 (1.25 mm²)	-	–
	Control Power Supply Cable	L1C, L2C	AWG16 (1.25 mm²)	-	–
	Main Circuit Power Supply Cables	B1/⊕, ⊖2	AWG16 (1.25 mm²)	-	–
	Ground Cable	⏚	AWG14 (2.0 mm²) or more	M4	1.2 to 1.4
3R8A	Servomotor Main Circuit Cables *2	U, V, W	AWG16 (1.25 mm²)	-	–
	Control Power Supply Cable	L1C, L2C	AWG16 (1.25 mm²)	-	–
	Main Circuit Power Supply Cables	B1/⊕, ⊖2	AWG16 (1.25 mm²)	-	–
	Ground Cable	⏚	AWG14 (2.0 mm²) or more	M4	1.2 to 1.4
5R5A	Servomotor Main Circuit Cables *2	U, V, W	AWG16 (1.25 mm²)	-	–
	Control Power Supply Cable	L1C, L2C	AWG16 (1.25 mm²)	-	–
	Main Circuit Power Supply Cables	B1/⊕, ⊖2	AWG16 (1.25 mm²)	-	–
	Ground Cable	⏚	AWG14 (2.0 mm²) or more	M4	1.2 to 1.4
7R6A	Servomotor Main Circuit Cables *2	U, V, W	AWG16 (1.25 mm²)	-	–
	Control Power Supply Cable	L1C, L2C	AWG16 (1.25 mm²)	-	–
	Main Circuit Power Supply Cables	B1/⊕, ⊖2	AWG16 (1.25 mm²)	-	–
	Ground Cable	⏚	AWG14 (2.0 mm²) or more	M4	1.2 to 1.4

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SERVOPACK Model: SGDXS-	Terminal Symbols *1		Wire Size	Screw Size	Tightening Torque [N·m]
120A (Three-phase 200-VAC input)	Servomotor Main Circuit Cables *2	U, V, W	AWG14 (2.0 mm²)	-	–
	Control Power Supply Cable	L1C, L2C	AWG16 (1.25 mm²)	-	–
	Main Circuit Power Supply Cables	B1/⊕, ⊖2	AWG14 (2.0 mm²)	-	–
	Ground Cable	⏚	AWG14 (2.0 mm²) or more	M4	1.2 to 1.4
120A□□□0008 (Single-phase 200-VAC input)	Servomotor Main Circuit Cables *2	U, V, W	AWG14 (2.0 mm²)	M4	1.0 to 1.2
	Control Power Supply Cable	L1C, L2C	AWG16 (1.25 mm²)	M4	1.0 to 1.2
	Main Circuit Power Supply Cables	B1/⊕, ⊖2	AWG14 (2.0 mm²)	M4	1.0 to 1.2
	Ground Cable	⏚	AWG14 (2.0 mm²) or more	M4	1.2 to 1.4
180A	Servomotor Main Circuit Cables *2	U, V, W	AWG10 (5.5 mm²)	M4	1.0 to 1.2
	Control Power Supply Cable	L1C, L2C	AWG16 (1.25 mm²)	M4	1.0 to 1.2
	Main Circuit Power Supply Cables	B1/⊕, ⊖2	AWG10 (5.5 mm²)	M4	1.0 to 1.2
	Ground Cable	⏚	AWG14 (2.0 mm²) or more	M4	1.2 to 1.4
200A	Servomotor Main Circuit Cables *2	U, V, W	AWG10 (5.5 mm²)	M4	1.0 to 1.2
	Control Power Supply Cable	L1C, L2C	AWG16 (1.25 mm²)	M4	1.0 to 1.2
	Main Circuit Power Supply Cables	B1/⊕, ⊖2	AWG10 (5.5 mm²)	M4	1.0 to 1.2
	Ground Cable	⏚	AWG14 (2.0 mm²) or more	M4	1.2 to 1.4
330A	Servomotor Main Circuit Cables *2	U, V, W	AWG8 (8.0 mm²)	M4	1.0 to 1.2
	Control Power Supply Cable	L1C, L2C	AWG16 (1.25 mm²)	M4	1.0 to 1.2
	Main Circuit Power Supply Cables	B1/⊕, ⊖2	AWG8 (8.0 mm²)	M4	1.0 to 1.2
	Ground Cable	⏚	AWG14 (2.0 mm²) or more	M4	1.2 to 1.4
470A	Servomotor Main Circuit Cables *2	U, V, W	AWG6 (14 mm²)	M5	2.2 to 2.4
	Control Power Supply Cable	L1C, L2C	AWG16 (1.25 mm²)	M5	2.2 to 2.4
	Main Circuit Power Supply Cables	B1/⊕, ⊖2	AWG8 (8.0 mm²)	M5	2.2 to 2.4
	Ground Cable	⏚	AWG14 (2.0 mm²) or more	M5	2.2 to 2.4
550A	Servomotor Main Circuit Cables *2	U, V, W	AWG4 (22 mm²)	M5	2.2 to 2.4
	Control Power Supply Cable	L1C, L2C	AWG16 (1.25 mm²)	M5	2.2 to 2.4
	Main Circuit Power Supply Cables	B1/⊕, ⊖2	AWG6 (14 mm²)	M5	2.2 to 2.4
	Ground Cable	⏚	AWG14 (2.0 mm²) or more	M5	2.2 to 2.4

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SERVOPACK Model: SGDXS-	Terminal Symbols *1		Wire Size	Screw Size	Tightening Torque [N·m]
590A	Servomotor Main Circuit Cables *2	U, V, W	AWG4 (22 mm²)	M6	2.7 to 3.0
	Control Power Supply Cable	L1C, L2C	AWG16 (1.25 mm²)	M6	2.7 to 3.0
	Main Circuit Power Supply Cables	B1/⊕, ⊖2	AWG3 (30 mm²)	M6	2.7 to 3.0
	Ground Cable	⏚	AWG14 (2.0 mm²) or more	M6	2.7 to 3.0
780A	Servomotor Main Circuit Cables *2	U, V, W	AWG3 (30 mm²)	M6	2.7 to 3.0
	Control Power Supply Cable	L1C, L2C	AWG16 (1.25 mm²)	M6	2.7 to 3.0
	Main Circuit Power Supply Cables	B1/⊕, ⊖2	AWG3 (30 mm²)	M6	2.7 to 3.0
	Ground Cable	⏚	AWG14 (2.0 mm²) or more	M6	2.7 to 3.0

*1 Do not wire the following terminals: L1, L2, L3, B2, B3, -1, and - terminals.
*2 If you do not use the recommended servomotor main circuit cable, use this table to select wires.

Three-Phase, 200-VAC Wires for Σ-XW SERVOPACKs

SERVOPACK Model: SGDXW-	Terminal Symbols		Wire Size	Screw Size	Tightening Torque [N·m]
1R6A	Main Circuit Power Supply Cables	L1, L2, L3	AWG16 (1.25 mm²)	–	–
	Servomotor Main Circuit Cables *1	UA, VA, WA, UB, VB, WB			
	Control Power Supply Cables	L1C, L2C			
	External Regenerative Resistor Cables	B1/⊕, B2			
	Ground Cable	⏚	AWG14 (2.0 mm²) or larger	M4	1.2 to 1.4
2R8A	Main Circuit Power Supply Cables	L1, L2, L3	AWG14 (2.0 mm²)	–	–
	Servomotor Main Circuit Cables *1	UA, VA, WA, UB, VB, WB	AWG16 (1.25 mm²)		
	Control Power Supply Cables	L1C, L2C			
	External Regenerative Resistor Cables	B1/⊕, B2			
	Ground Cable	⏚	AWG14 (2.0 mm²) or larger	M4	1.2 to 1.4
5R5A	Main Circuit Power Supply Cables	L1, L2, L3	AWG14 (2.0 mm²)	–	–
	Servomotor Main Circuit Cables *1	UA, VA, WA, UB, VB, WB	AWG16 (1.25 mm²)		
	Control Power Supply Cables	L1C, L2C			
	External Regenerative Resistor Cables	B1/⊕, B2	AWG14 (2.0 mm²)		
	Ground Cable	⏚	AWG14 (2.0 mm²) or larger	M4	1.2 to 1.4

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SERVOPACK Model: SGDXW-	Terminal Symbols		Wire Size	Screw Size	Tightening Torque [N·m]
7R6A	Main Circuit Power Supply Cables	L1, L2, L3	AWG14 (2.0 mm²)	–	–
	Servomotor Main Circuit Cables *1	UA, VA, WA, UB, VB, WB	AWG16 (1.25 mm²)		
	Control Power Supply Cables	L1C, L2C			
	External Regenerative Resistor Cables	B1/⊕, B2	AWG14 (2.0 mm²)		
	Ground Cable	⏚	AWG14 (2.0 mm²) or larger	M4	1.2 to 1.4

*1 If you do not use the recommended servomotor main circuit cable, use this table to select wires.

Σ-XW SERVOPACKs with Single-Phase, 200-VAC

SERVOPACK Model: SGDXW-	Terminal Symbols		Wire Size	Screw Size	Tightening Torque [N·m]
1R6A	Main Circuit Power Supply Cables	L1, L2	AWG16 (1.25 mm²)	–	–
	Servomotor Main Circuit Cables *1	UA, VA, WA, UB, VB, WB			
	Control Power Supply Cables	L1C, L2C			
	External Regenerative Resistor Cables	B1/⊕, B2			
	Ground Cable	⏚	AWG14 (2.0 mm²)以上	M4	1.2 to 1.4
2R8A	Main Circuit Power Supply Cables	L1, L2	AWG14 (2.0 mm²)	–	–
	Servomotor Main Circuit Cables *1	UA, VA, WA, UB, VB, WB	AWG16 (1.25 mm²)		
	Control Power Supply Cables	L1C, L2C			
	External Regenerative Resistor Cables	B1/⊕, B2			
	Ground Cable	⏚	AWG14 (2.0 mm²)以上	M4	1.2 to 1.4
5R5A	Main Circuit Power Supply Cables	L1, L2	AWG14 (2.0 mm²)	–	–
	Servomotor Main Circuit Cables *1	UA, VA, WA, UB, VB, WB	AWG16 (1.25 mm²)		
	Control Power Supply Cables	L1C, L2C			
	External Regenerative Resistor Cables	B1/⊕, B2	AWG14 (2.0 mm²)		
	Ground Cable	⏚	AWG14 (2.0 mm²)以上	M4	1.2 to 1.4

*1 If you do not use the recommended servomotor main circuit cable, use this table to select wires.

Σ-XW SERVOPACKs for Use with 270-VDC Power Supply Input

SERVOPACK Model: SGDXW-	Terminal Symbols *1		Wire Size	Screw Size	Tightening Torque [N·m]
1R6A	Servomotor Main Circuit Cables *2	UA, VA, WA, UB, VB, WB	AWG16 (1.25 mm²)	-	–
	Control Power Supply Cable	L1C, L2C	AWG16 (1.25 mm²)	-	–
	Main Circuit Power Supply Cables	B1/⊕, ⊖2	AWG16 (1.25 mm²)	-	–
	Ground Cable	⏚	AWG14 (2.0 mm²) or more	M4	1.2 to 1.4
2R8A	Servomotor Main Circuit Cables *2	UA, VA, WA, UB, VB, WB	AWG16 (1.25 mm²)	-	–
	Control Power Supply Cable	L1C, L2C	AWG16 (1.25 mm²)	-	–
	Main Circuit Power Supply Cables	B1/⊕, ⊖2	AWG16 (1.25 mm²)	-	–
	Ground Cable	⏚	AWG14 (2.0 mm²) or more	M4	1.2 to 1.4
5R5A	Servomotor Main Circuit Cables *2	UA, VA, WA, UB, VB, WB	AWG16 (1.25 mm²)	-	–
	Control Power Supply Cable	L1C, L2C	AWG16 (1.25 mm²)	-	–
	Main Circuit Power Supply Cables	B1/⊕, ⊖2	AWG14 (2.0 mm²)	-	–
	Ground Cable	⏚	AWG14 (2.0 mm²) or more	M4	1.2 to 1.4
7R6A	Servomotor Main Circuit Cables *2	UA, VA, WA, UB, VB, WB	AWG16 (1.25 mm²)	-	–
	Control Power Supply Cable	L1C, L2C	AWG16 (1.25 mm²)	-	–
	Main Circuit Power Supply Cables	B1/⊕, ⊖2	AWG14 (2.0mm²)	-	–
	Ground Cable	⏚	AWG14 (2.0 mm²) or more	M4	1.2 to 1.4

*1 Do not wire the following terminals: L1, L2, L3, B2, B3, -1, and - terminals.
*2 If you do not use the recommended servomotor main circuit cable, use this table to select wires.

Σ-XT SERVOPACKs for Use with Three-Phase, 200-VAC Power Supplies

SERVOPACK Model: SGDXT-	Terminal Symbols		Wire Size	Screw Size	Tightening Torque [N·m]
1R6A	Main Circuit Power Supply Cables	L1, L2, L3	AWG16 (1.25 mm²)	–	–
	Servomotor Main Circuit Cables *1	UA, VA, WA, UB, VB, WB, UC, VC, WC	AWG16 (1.25 mm²)	–	–
	Control Power Supply Cables	L1C, L2C	AWG16 (1.25 mm²)	–	–
	External Regenerative Resistor Cables	B1/⊕, B2	AWG16 (1.25 mm²)	–	–
	Ground Cable	⏚	AWG14 (2.0 mm²) or larger	M4	1.2 to 1.4
2R8A	Main Circuit Power Supply Cables	L1, L2, L3	AWG14 (2.0 mm²)	–	–
	Servomotor Main Circuit Cables *1	UA, VA, WA, UB, VB, WB, UC, VC, WC	AWG16 (1.25 mm²)	–	–
	Control Power Supply Cables	L1C, L2C	AWG16 (1.25 mm²)	–	–
	External Regenerative Resistor Cables	B1/⊕, B2	AWG16 (1.25 mm²)	–	–
	Ground Cable	⏚	AWG14 (2.0 mm²) or larger	M4	1.2 to 1.4

*1 If you do not use the recommended servomotor main circuit cable, use this table to select wires.

Σ-XT SERVOPACKs for Use with Single-Phase, 200-VAC Power Supplies

SERVOPACK Model SGDXT-	Terminal Symbols		Wire Size	Screw Size	Tightening Torque [N·m]
1R6A	Main Circuit Power Supply Cables	L1, L2	AWG16 (1.25 mm²)	–	–
	Servomotor Main Circuit Cables *1	UA, VA, WA, UB, VB, WB, UC, VC, WC	AWG16 (1.25 mm²)	–	–
	Control Power Supply Cables	L1C, L2C	AWG16 (1.25 mm²)	–	–
	External Regenerative Resistor Cables	B1/⊕, B2	AWG16 (1.25 mm²)	–	–
	Ground Cable	⏚	AWG14 (2.0 mm²) or larger	M4	1.2 to 1.4
2R8A	Main Circuit Power Supply Cables	L1, L2	AWG14 (2.0 mm²)	–	–
	Servomotor Main Circuit Cables *1	UA, VA, WA, UB, VB, WB, UC, VC, WC	AWG16 (1.25 mm²)	–	–
	Control Power Supply Cables	L1C, L2C	AWG16 (1.25 mm²)	–	–
	External Regenerative Resistor Cables	B1/⊕, B2	AWG16 (1.25 mm²)	–	–
	Ground Cable	⏚	AWG14 (2.0 mm²) or larger	M4	1.2 to 1.4

*1 If you do not use the recommended servomotor main circuit cable, use this table to select wires.

Σ-XT SERVOPACKs for Use with 270-VDC Power Supply Input

SERVOPACK Model: SGDXT-	Terminal Symbols *1		Wire Size	Screw Size	Tightening Torque [N·m]
1R6A	Servomotor Main Circuit Cables *2	UA, VA, WA, UB, VB, WB, UC, VC, WC	AWG16 (1.25 mm²)	-	–
	Control Power Supply Cable	L1C, L2C	AWG16 (1.25 mm²)	-	–
	Main Circuit Power Supply Cables	B1/⊕, ⊖2	AWG16 (1.25 mm²)	-	–
	Ground Cable	⏚	AWG14 (2.0 mm²) or more	M4	1.2 to 1.4
2R8A	Servomotor Main Circuit Cables *2	UA, VA, WA, UB, VB, WB, UC, VC, WC	AWG16 (1.25 mm²)	-	–
	Control Power Supply Cable	L1C, L2C	AWG16 (1.25 mm²)	-	–
	Main Circuit Power Supply Cables	B1/⊕, ⊖2	AWG16 (1.25 mm²)	-	–
	Ground Cable	⏚	AWG14 (2.0 mm²) or more	M4	1.2 to 1.4

*1 Do not wire the following terminals: L1, L2, L3, B2, B3, ⊖1, and ⊖ terminals.
*2 If you do not use the recommended servomotor main circuit cable, use this table to select wires.

Wire Types

The following table shows the wire sizes and allowable currents for three bundled leads.

HIV Specifications *1		Allowable Current at Surrounding Air Temperatures [Arms]		
Nominal Cross-Sectional Area [mm²]	Configuration [Wires/mm]	30°C	40°C	50°C
0.9	7/0.4	15	13	11
1.25	7/0.45	16	14	12
2.0	7/0.6	23	20	17
3.5	7/0.8	32	28	24
5.5	7/1.0	42	37	31
8.0	7/1.2	52	46	39
14.0	7/1.6	75	67	56
22.0	7/2.0	98	87	73
38.0	7/2.6	138	122	103

*1 This is reference data based on JIS C3317 600-V-grade heat-resistant polyvinyl chloride-insulated wires (HIV).

Crimp Terminals and Insulating Sleeves

If you use crimp terminals for wiring, use insulating sleeves. Do not allow the crimp terminals to come close to adjacent terminals or the case.

To comply with UL standards, you must use UL-compliant closed-loop crimp terminals and insulating sleeves for the main circuit terminals. Use the tool recommended by the crimp terminal manufacturer to attach the crimp terminals.

The following tables give the recommended tightening torques, closed-loop crimp terminals, and insulating sleeves in sets. Use the set that is suitable for your model and wire size.

Σ-XS SERVOPACKs for Use with Three-Phase, 200-VAC or 270-VDC Power Supply Input

SERVOPACK Model: SGDXS-	Main Circuit Terminals	Screw Size	Tightening Torque [N·m]	Crimp Terminal Horizontal Width	Recommended Wire Size	Crimp Terminal Model *1	Crimping Tool *1	Die *1	Insulating Sleeve Model *2
R70A, R90A, 1R6A, 2R8A, 3R8A, 5R5A, 7R6A, 120A	Connectors	–							
	⏚	M4	1.2 to 1.4	10 mm max.	AWG14 (2.0 mm²)	R2-4	YHT-2210	–	–
180A, 200A	Terminal block	M4	1.0 to 1.2	7.7 mm max.	AWG10 (5.5 mm²)	5.5-S4	YHT-2210	–	TP-005
					AWG14 (2.0 mm²)	2-M4		–	TP-003
					AWG16 (1.25 mm²)			-	
	⏚	M4	1.2 to 1.4	10 mm max.	AWG14 (2.0 mm²)	R2-4	YHT-2210	–	–
330A	Terminal block	M4	1.0 to 1.2	9.9 mm max.	AWG8 (8.0 mm²)	8-4NS	YPT-60N	TD-121 TD-111	TP-008
					AWG14 (2.0 mm²)	R2-4	YHT-2210	–	TP-003
					AWG16 (1.25 mm²)			–	
	⏚	M4	1.2 to 1.4	10 mm max.	AWG14 (2.0 mm²)	R2-4	YHT-2210	–	–
470A, 550A	Terminal block	M5	2.2 to 2.4	13 mm max.	AWG4 (22 mm²)	22-S5	YPT-60N	TD-123 TD-112	TP-022
					AWG6 (14 mm²)	R14-5		TD-122 TD-111	TP-014
					AWG8 (8.0 mm²)	R8-5		TD-121 TD-111	TP-008
					AWG10 (5.5 mm²)	R5.5-5	YHT-2210	–	TP-005
					AWG14 (2.0 mm²)	R2-5		–	TP-003
					AWG16 (1.25 mm²)			–	
	⏚	M5	2.2 to 2.4	12 mm max.	AWG14 (2.0 mm²)	R2-5	YHT-2210	–	–

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SERVOPACK Model: SGDXS-	Main Circuit Terminals	Screw Size	Tightening Torque [N·m]	Crimp Terminal Horizontal Width	Recommended Wire Size	Crimp Terminal Model *1	Crimping Tool *1	Die *1	Insulating Sleeve Model *2
590A, 780A	Terminal block	M6	2.7 to 3.0	18 mm max.	AWG3 (30 mm²)	38-S6	YPT-60N	TD-124 TD-112	TP-038
					AWG4 (22 mm²)	R22-6		TD-123 TD-112	TP-022
					AWG8 (8.0 mm²)	R8-6		TD-121 TD-111	TP-008
					AWG10 (5.5 mm²)	R5.5-6	YHT-2210	–	TP-005
					AWG14 (2.0 mm²)	R2-6		–	TP-003
					AWG16 (1.25 mm²)			–	
	⏚	M6	2.7 to 3.0	12 mm max.	AWG14 (2.0 mm²)	R2-6	YHT-2210	–	–

*1 Manufactured by J.S.T. Mfg. Co., Ltd..
*2 Manufactured by Tokyo Dip Co., Ltd..

Σ-XS SERVOPACKs for Use with Single-Phase, 200-VAC

SERVOPACK Model: SGDXS-	Main Circuit Terminals	Screw Size	Tightening Torque [N·m]	Crimp Terminal Horizontal Width	Recommended Wire Size	Crimp Terminal Model *1	Crimping Tool *1	Die *1	Insulating Sleeve Model *2
R70A, R90A, 1R6A, 2R8A, 5R5A, 120A □□□0008	Connectors	-							
	⏚	M4	1.2 to 1.4	10 mm max.	AWG14 (2.0 mm²)	R2-4	YHT-2210	–	–

*1 Manufactured by J.S.T. Mfg. Co., Ltd..
*2 Manufactured by Tokyo Dip Co., Ltd..

Σ-XW SERVOPACKs for Use with Three-Phase, 200-VAC or 270-VDC Power Supply Input

SERVOPACK Model: SGDXW-	Main Circuit Terminals	Screw Size	Tightening Torque [N·m]	Crimp Terminal Horizontal Width	Recommended Wire Size	Crimp Terminal Model *1	Crimping Tool *1	Die *1	Insulating Sleeve Model *2
1R6A, 2R8A, 5R5A, 7R6A	Connectors	–							
	⏚	M4	1.2 to 1.4	10 mm max.	AWG14 (2.0 mm²)	R2-4	YHT-2210	–	–

*1 Manufactured by J.S.T. Mfg. Co., Ltd..
*2 Manufactured by Tokyo Dip Co., Ltd..

Σ-XW SERVOPACKs for Use with Single-Phase, 200-VAC

SERVOPACK Model: SGDXW-	Main Circuit Terminals	Screw Size	Tightening Torque [N·m]	Crimp Terminal Horizontal Width	Recommended Wire Size	Crimp Terminal Model *1	Crimping Tool *1	Die *1	Insulating Sleeve Model *2
1R6A, 2R8A, 5R5A	Connectors	–							
	⏚	M4	1.2 to 1.4	10 mm max.	AWG14 (2.0 mm²)	R2-4	YHT-2210	–	–

*1 Manufactured by J.S.T. Mfg. Co., Ltd..
*2 Manufactured by Tokyo Dip Co., Ltd..

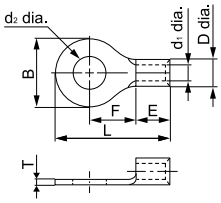
Σ-XT SERVOPACKs for Use with Three-Phase, 200-VAC, Single-Phase, 200-VAC or 270-VDC Power Supply Input

SERVOPACK Model: SGDXT-	Main Circuit Terminals	Screw Size	Tightening Torque [N·m]	Crimp Terminal Horizontal Width	Recommended Wire Size	Crimp Terminal Model *1	Crimping Tool *1	Die *1	Insulating Sleeve Model *2
1R6A or 2R8A	Connectors	–							
	⏚	M4	1.2 to 1.4	10 mm max.	AWG14 (2.0 mm²)	R2-4	YHT-2210	–	–

*1 Manufactured by J.S.T. Mfg. Co., Ltd..
*2 Manufactured by Tokyo Dip Co., Ltd..

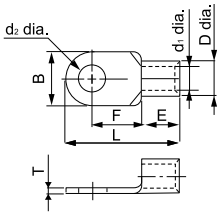
Crimp Terminal Dimensional Drawings

■ Crimp Terminal Model: R1.25-4, 2-M4, R2-4, R2-5, R2-6, 5.5-S4, R5.5-5, R5.5-6



Crimp Terminal Model	Dimensions (mm)							
	d_2 dia.	B	L	F	E	D dia.	d_1 dia.	T
R1.25-4	4.3	8.0	15.8	7.0	4.8	3.4	1.7	0.8
2-M4		6.6	14.4	6.3		4.1	2.3	
R2-4		8.5	16.8	7.8				
R2-5	5.3	9.5	16.8	7.3				
R2-6	6.4	12.0	21.8	11.0				
5.5-S4	4.3	7.2	15.7	5.9	6.2	5.6	3.4	1.0
R5.5-5	5.3	9.5	19.8	8.3	6.8			
R5.5-6	6.4	12.0	25.8	13.0				

■ Crimp Terminal Model: 8-4NS, R8-5, R8-6, R14-5, R14-6, 22-S5, R22-6, 38-S6



Crimp Terminal Model	Dimensions (mm)							
	d_2 dia.	B	L	F	E	D dia.	d_1 dia.	T
8-4NS	4.3	8.0	21.8	9.3	8.5	7.1	4.5	1.2
R8-5	5.3	12.0	23.8					
R8-6	6.4							
R14-5	5.3		29.8	13.3	10.5	9.0	5.8	1.5
R14-6	6.4							
22-S5	5.3		30.0	12.0	12.0	11.5	7.7	1.8
R22-6	6.4	16.5	33.7	13.5				
38-S6		15.5	38.0	16.0	14.0	13.3	9.4	

Noise Filter

Noise filters are used to reduce external noise that can enter on the power supply line or conductive noise from the SERVOPACK.

> **Important** Some noise filters have large leakage currents. The grounding conditions also affect the amount of the leakage current. If necessary, select an appropriate leakage detector or earth leakage circuit breaker taking into account the grounding conditions and the leakage current from the noise filter.

Selection Table

■ Σ-XS SERVOPACKs

Main Circuit Power Supply	SERVOPACK		Order Number	Specification	Mass	Leakage Current
	Maximum Applicable Motor Capacity [kW]	Model SGDXS-				
Three-phase, 200 VAC *1	0.05	R70A	HF3010C-SZC	Three-phase, 500 VAC, 10A	1.0 kg	4mA 200 VAC/60 Hz
	0.1	R90A				
	0.2	1R6A				
	0.4	2R8A				
	0.5	3R8A				
	0.75	5R5A	HF3020C-SZC	Three-phase, 500 VAC, 20A	1.4 kg	
	1.0	7R6A				
	1.5	120A				
	2.0	180A				
	3.0	200A	HF3030C-SZC	Three-phase, 500 VAC, 30A	1.4 kg	
	5.0	330A	HF3050C-SZC-47EDD	Three-phase, 500 VAC, 50A	2.0 kg	8mA 200 VAC/60 Hz
	6.0	470A				
	7.5	550A	HF3060C-SZC	Three-phase, 500 VAC, 60A	2.1 kg	4mA 200 VAC/60 Hz
	11	590A	HF3100C-SZC	Three-phase, 500 VAC, 100A	5.8 kg	
	15	780A				
Single-phase, 200 VAC *1	0.05	R70A	HF2010A-UPF	Single-phase, 250 VAC, 10 A	0.5 kg	1.2mA 250 VAC/60 Hz
	0.1	R90A				
	0.2	1R6A				
	0.4	2R8A				
	0.75	5R5A	HF2020A-UPF-2BB	Single-phase, 250 VAC, 20 A	0.8 kg	3mA 250 VAC/60 Hz
	1.5	120A□□□0008	HF2030A-UPF-2BB	Single-phase, 250 VAC, 30 A	0.8 kg	

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Main Circuit Power Supply	SERVOPACK		Order Number	Specification	Mass	Leakage Current
	Maximum Applicable Motor Capacity [kW]	Model SGDXS-				
Single-phase, 200 VAC *2	0.05	R70A	FESS-B005A	Single-phase, 250 VAC, 10 A	0.4 kg	2.9mA 250 VAC/60 Hz
	0.1	R90A				
	0.2	1R6A				
	0.4	2R8A				
	0.75	5R5A	FESS-B009A	Single-phase, 250 VAC, 20 A	0.5 kg	2.9mA 250 VAC/60 Hz
	1.5	120A□□□0008	FESS-B016A	Single-phase, 250 VAC, 30 A	1.0 kg	

*1 Manufacturer: Soshin Electric Co., Ltd.
*2 Manufacturer: EPA GmbH

Consult your Yaskawa representative for any inquiries.

■ Σ-XW SERVOPACKs

Main Circuit Power Supply	SERVOPACK		Order Number	Specification	Mass	Leakage Current
	Maximum Applicable Motor Capacity [kW]	Model SGDXW-				
Three-phase, 200 VAC *1	0.2	1R6A	HF3010C-SZC	Three-phase, 500 VAC, 10A	1.0 kg	4mA 200 VAC/60 Hz
	0.4	2R8A	HF3020C-SZC	Three-phase, 500 VAC, 20A	1.4 kg	
	0.75	5R5A				
	1.0	7R6A				
Single-phase, 200 VAC *1	0.2	1R6A	HF2010A-UPF	Single-phase, 250 VAC, 10 A	0.5 kg	1.2mA 250 VAC/60 Hz
	0.4	2R8A	HF2020A-UPF-2BB	Single-phase, 250 VAC, 20 A	0.8 kg	3mA 250 VAC/60 Hz
	0.75	5R5A	HF2030A-UPF-2BB	Single-phase, 250 VAC, 30 A	0.8 kg	
Single-phase, 200 VAC *2	0.2	1R6A	FESW-B005A	Single-phase, 250 VAC, 10 A	0.6 kg	2.9mA 250 VAC/60 Hz
	0.4	2R8A	FESW-B011A	Single-phase, 250 VAC, 20 A	0.6 kg	2.9mA 250 VAC/60 Hz
	0.75	5R5A	FESW-B012A	Single-phase, 250 VAC, 30 A	1.0 kg	

*1 Manufacturer: Soshin Electric Co., Ltd.
*2 Manufacturer: EPA GmbH

Consult your Yaskawa representative for any inquiries.

■ Σ-XT SERVOPACKs

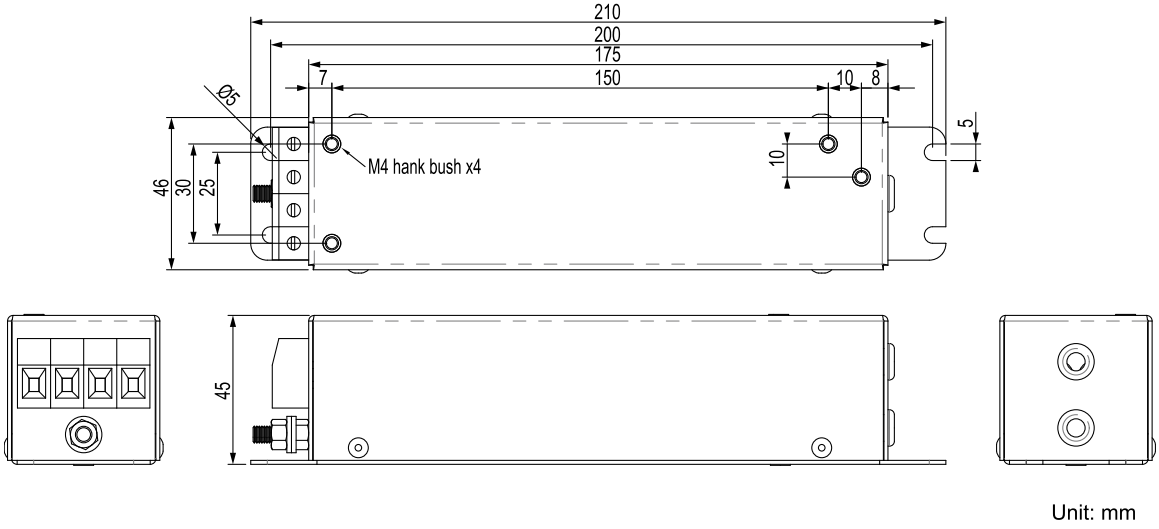
Main Circuit Power Supply	SERVOPACK		Order Number	Specification	Mass	Leakage Current
	Maximum Applicable Motor Capacity [kW]	Model SGDXT-				
Three-phase, 200 VAC *1	0.2	1R6A	HF3020C-SZC	Three-phase, 500 VAC, 20A	1.4 kg	4mA 200 VAC/60 Hz
	0.4	2R8A				
Single-phase, 200 VAC *1	0.2	1R6A	HF2020A-UPF-2BB	Single-phase, 250 VAC, 20 A	0.8 kg	3mA 250 VAC/60 Hz
	0.4	2R8A	HF2030A-UPF-2BB	Single-phase, 250 VAC, 30 A	0.8 kg	

*1 Manufacturer: Soshin Electric Co., Ltd.

Consult your Yaskawa representative for any inquiries.

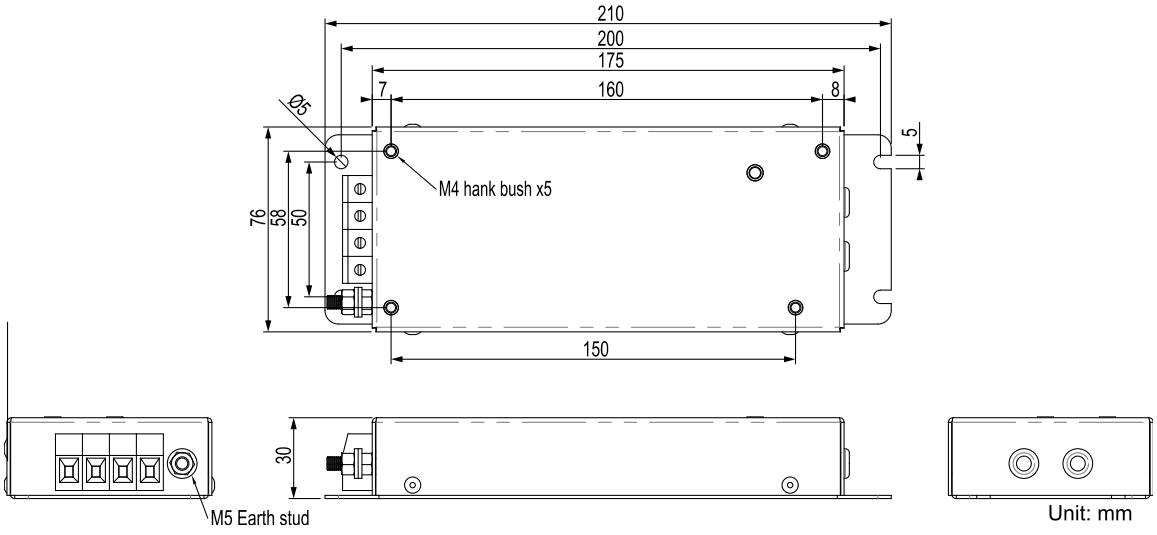
External Dimensions

■ Model: FESS-B005A



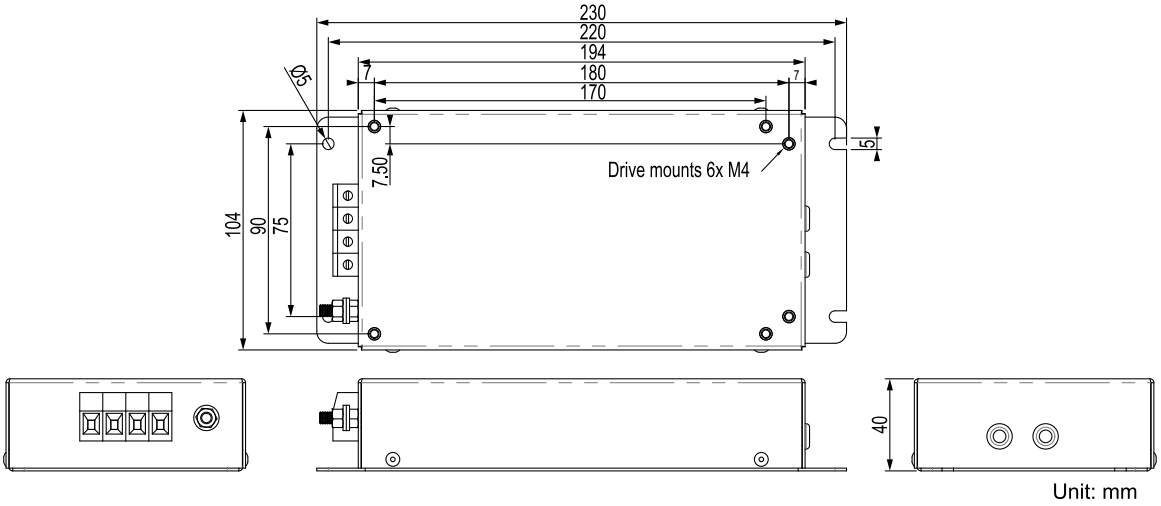
Unit: mm

■ Model: FESS-B009A



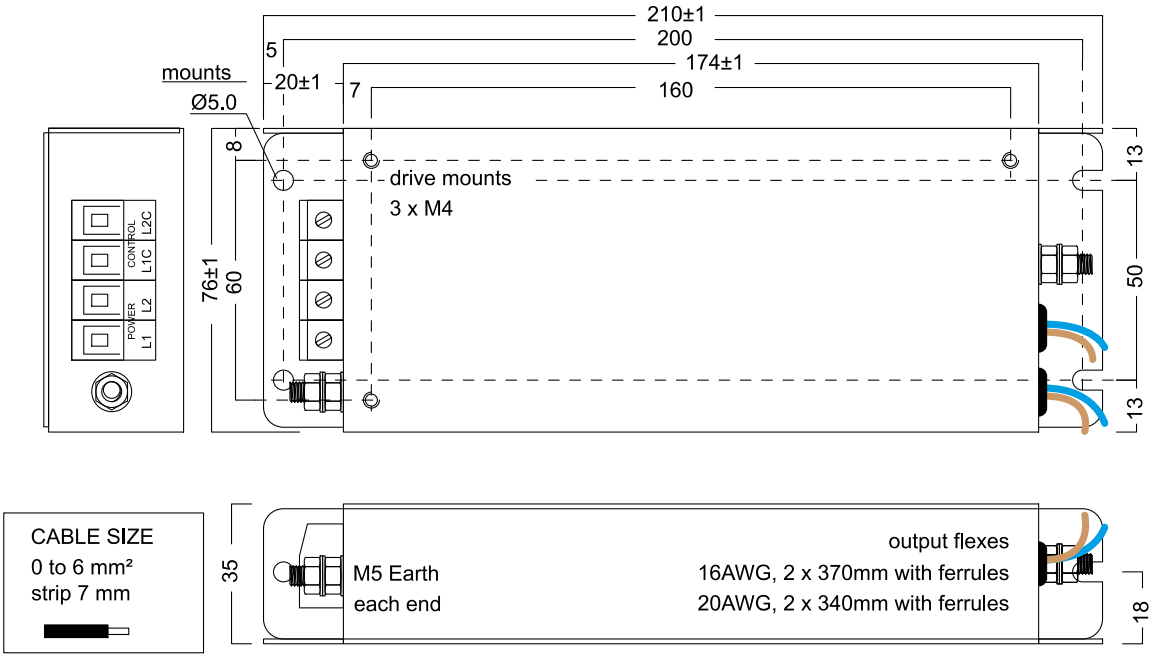
Unit: mm

■ Model: FESS-B016A

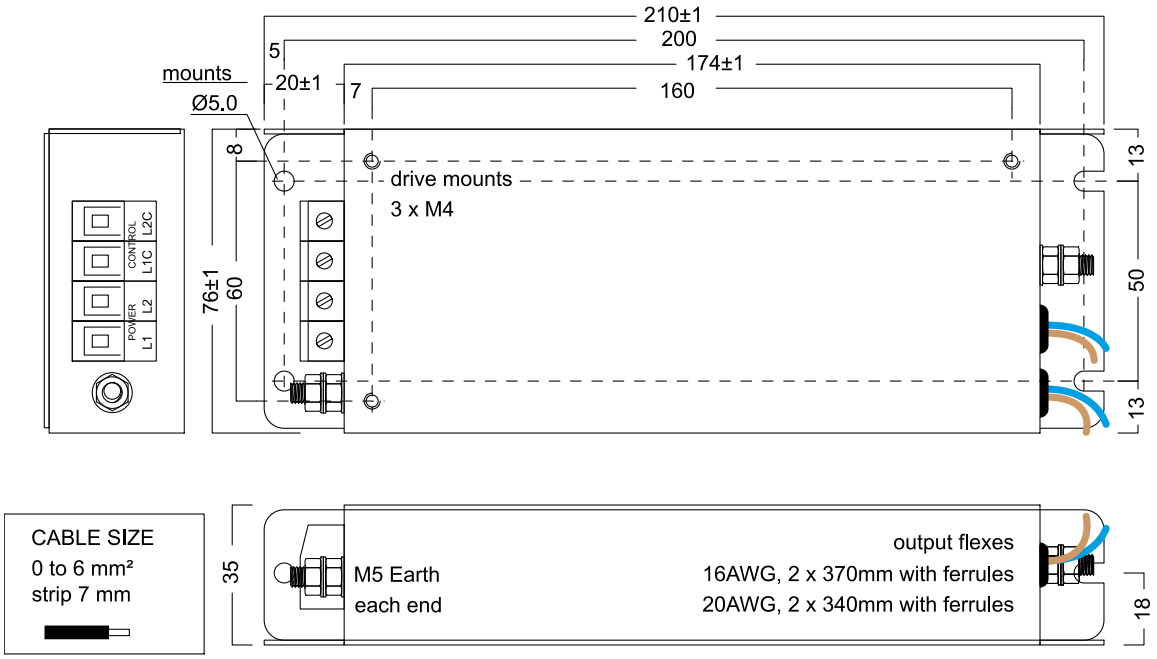


Unit: mm

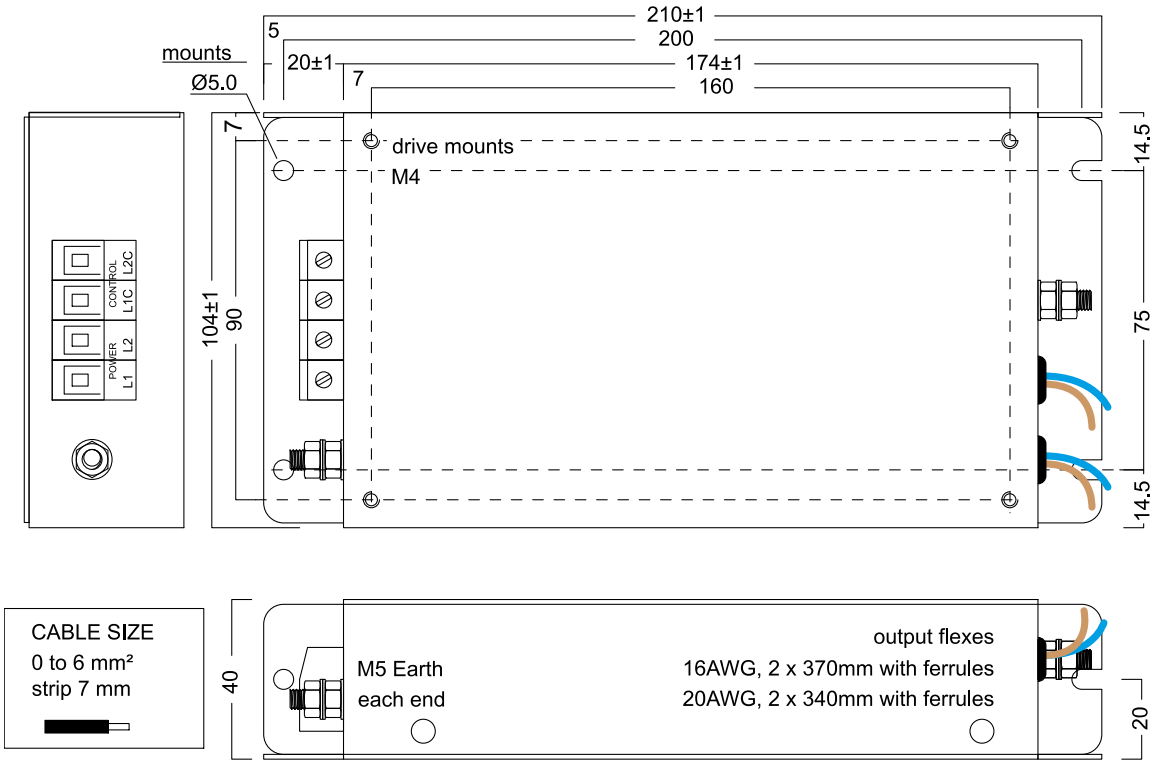
■ Model: FESW-B005A



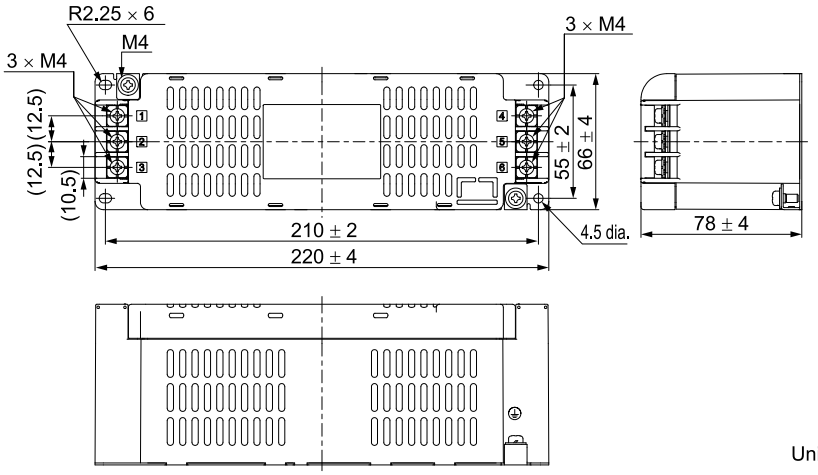
■ Model: FESW-B011A



■ Model: FESW-B012A

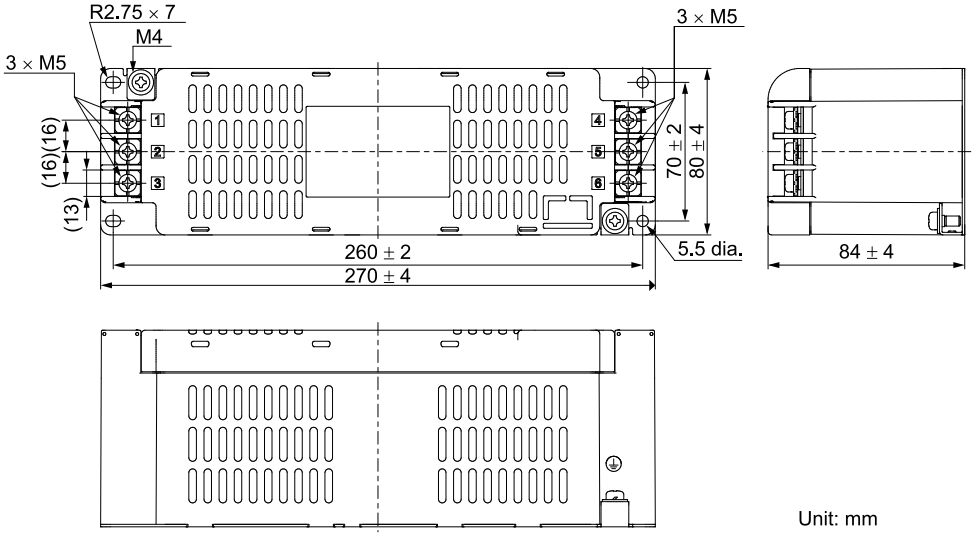


■ Model: HF3010C-SZC, HF3020C-SZC, HF3030C-SZC



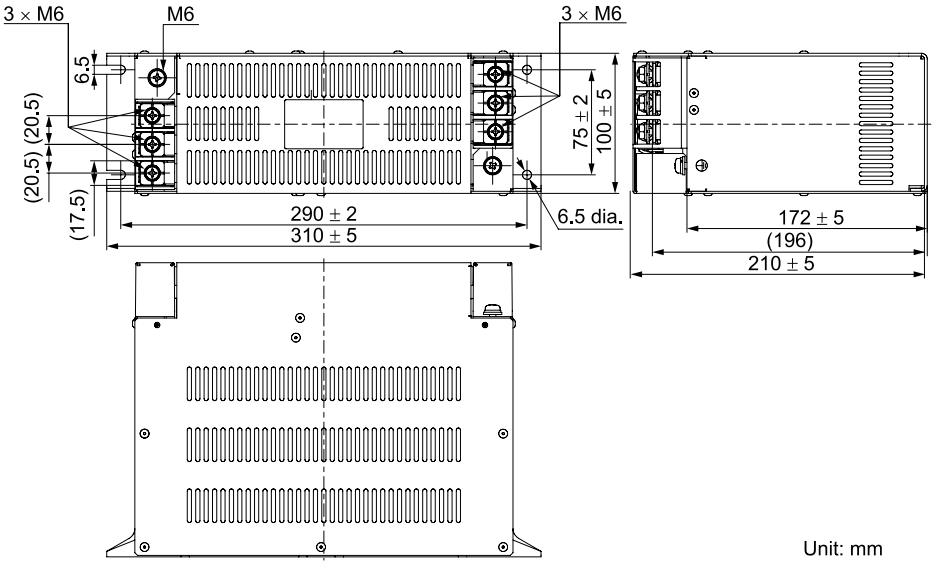
Unit: mm

■ Model: HF3050C-SZC-47EDD, HF3060C-SZC



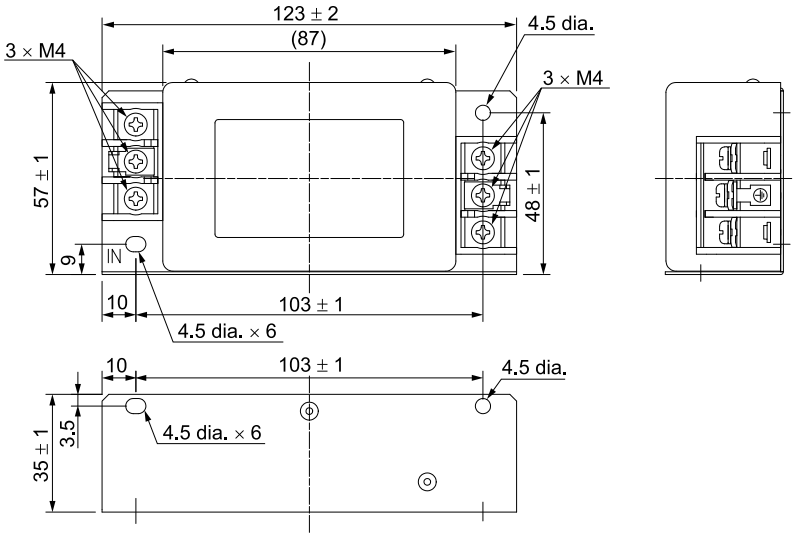
Unit: mm

■ Model: HF3100C-SZC



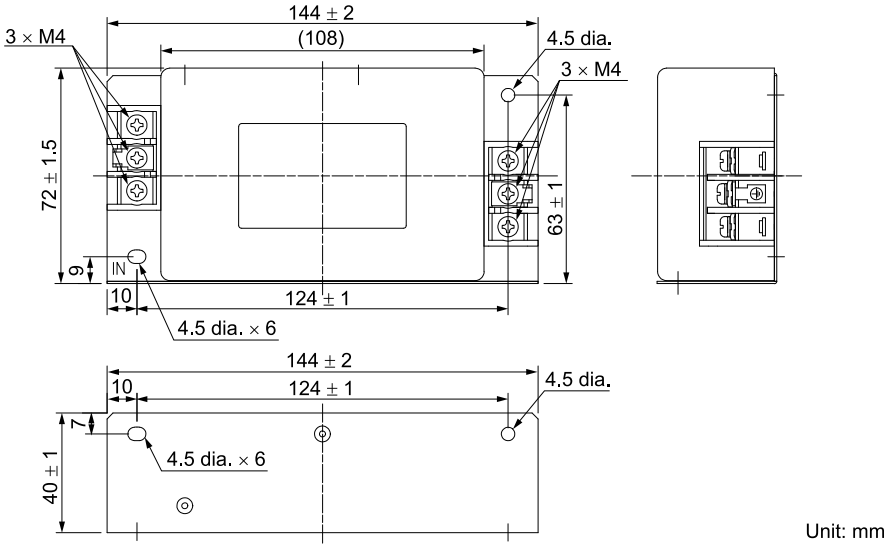
Unit: mm

■ Model: HF2010A-UPF



Unit: mm

■ Model: HF2020A-UPF-2BB, HF2030A-UPF-2BB



Unit: mm

AC/DC Reactors

Use the Reactors listed in the following tables if harmonic suppression is required.

Using a Three-Phase, 200-VAC Power Supply Input

■ Selection Table

◆ Σ-XS SERVOPACKs for Use with Three-Phase, 200-VAC

SERVOPACK		DC Reactors				
Maximum Applicable Motor Capacity [kW]	Model SGDXS-	Order Number	Inductance [mH]	Rated Current [Arms]	Mass	Terminal Screw Size
0.05	R70A	X5061	2.0	4.8	0.5 kg	M4
0.1	R90A					
0.2	1R6A					
0.4	2R8A					
0.5	3R8A					
0.75	5R5A					
1.0	7R6A					
1.5	120A	X5060	1.5	8.8	1.0 kg	M4
2.0	180A					
3.0	200A	X5059	1.0	14.0	1.1 kg	M5
5.0	330A	X5068	0.47	26.8	1.9 kg	M6
6.0	470A	X008025	0.49	28.3	2.6 kg	M6
7.5	550A	X008026	0.43	35.5	2.9 kg	M6
11	590A	X008027	0.32	49.7	3.5 kg	M6
15	780A	X008028	0.26	72.6	4.0 kg	M6

◆ Σ-XW SERVOPACKs for Use with Three-Phase, 200-VAC

SERVOPACK		DC Reactors				
Maximum Applicable Motor Capacity [kW]	Model SGDXW-	Order Number	Inductance [mH]	Rated Current [Arms]	Mass	Terminal Screw Size
0.2	1R6A	X5061	2.0	4.8	0.5 kg	M4
0.4	2R8A					
0.75	5R5A	X5060	1.5	8.8	1.0 kg	M4
1.0	7R6A					

◆ Σ-XT SERVOPACKs for Use with Three-Phase, 200-VAC

SERVOPACKs		DC Reactors				
Maximum Applicable Motor Capacity [kW]	Model SGDXT-	Order Number	Inductance [mH]	Rated Current [Arms]	Mass	Terminal Screw Size
0.2	1R6A	X5061	2.0	4.8	0.5 kg	M4
0.4	2R8A	X5060	1.5	8.8	1.0 kg	M4

Using a Single-Phase, 200-VAC Power Supply Input

■ Selection Table

◆ Σ-XS SERVOPACKs for Use with Single-Phase, 200-VAC

SERVOPACK		DC Reactors				
Maximum Applicable Motor Capacity [kW]	Model SGDXS-	Order Number	Inductance [mH]	Rated Current [Arms]	Mass	Terminal Screw Size
0.05	R70A	X5071	40.0	0.85	0.5 kg	M4
0.1	R90A					
0.2	1R6A	X5070	20.0	1.65	0.8 kg	M4
0.4	2R8A	X5069	10.0	3.3	1.0 kg	M4
0.75	5R5A	X5079	4.0	5.3	1.2 kg	M4
1.5	120A□□□0008	X5078	2.5	10.5	2.0 kg	M5

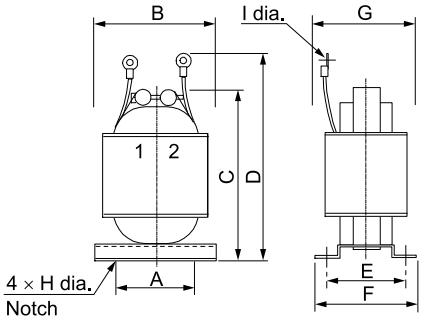
◆ Σ-XW SERVOPACKs for Use with Single-Phase, 200-VAC

SERVOPACK		DC Reactors				
Maximum Applicable Motor Capacity [kW]	Model SGDXW-	Order Number	Inductance [mH]	Rated Current [Arms]	Mass	Terminal Screw Size
0.2	1R6A	X5069	10.0	3.3	1.0 kg	M4
0.4	2R8A	X5079	4.0	5.3	1.2 kg	M4
0.75	5R5A	X5078	2.5	10.5	2.0 kg	M5

◆ Σ-XT SERVOPACKs for Use with Single-Phase, 200-VAC

SERVOPACKs		DC Reactors				
Maximum Applicable Motor Capacity [kW]	Model SGDXT-	Order Number	Inductance [mH]	Rated Current [Arms]	Mass	Terminal Screw Size
0.2	1R6A	X5079	4.0	5.3	1.2 kg	M4
0.4	2R8A	X5078	2.5	10.5	2.0 kg	M5

External Dimensions



Unit: mm

AC/DC Reactors Order Number	External Dimensions [mm]									Approx. mass [kg]
	A	B	C	D	E	F	G	H	I	
X5059	50	74	125	140	35	45	60	5	5.3	1.1
X5060	40	59	105	125	45	60	65	4	4.3	1.0
X5061	35	52	80	95	35	45	50	4	4.3	0.5
X5068	50	74	125	155	53	66	75	5	6.4	1.9
X5069	40	59	105	125	45	60	65	4	4.3	1.0
X5070	40	59	100	120	35	45	50	4	4.3	0.8
X5071	35	52	80	95	30	40	45	4	4.3	0.5
X5074	30	47	70	85	28	38	45	4	4.3	0.3
X5075	40	59	100	120	40	50	55	4	4.3	0.9
X5076	50	74	125	140	35	45	60	5	4.3	1.1
X5077	50	74	125	155	53	66	75	5	5.3	1.9
X5078	50	74	125	155	60	70	80	5	5.3	2.0
X5079	50	74	125	140	35	45	60	5	4.3	1.2
X008025	75	95	155	225	55	70	76	4.5	6.4	2.6
X008026	75	95	155	225	60	75	81	4.5	6.4	2.9
X008027	75	95	155	215	70	85	91	4.5	6.4	3.5
X008028	75	95	160	225	80	95	101	4.5	6.4	4.0

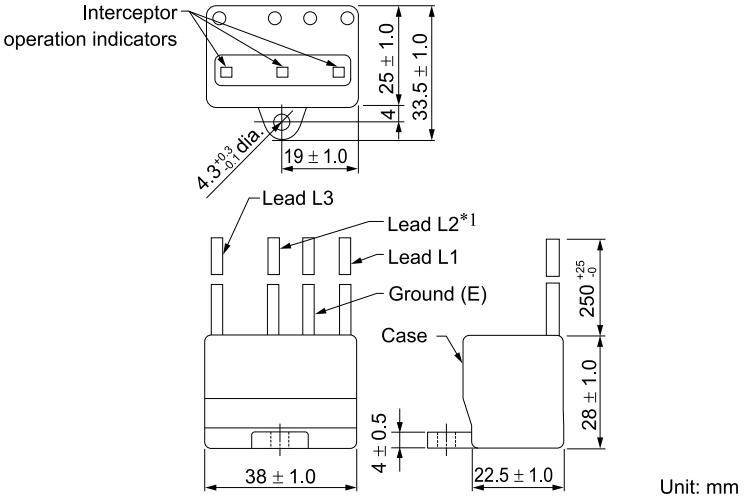
Surge Absorbers

A surge absorber absorbs lightning surge voltages and other abnormal voltages from the power supply input line to prevent faulty operation in or damage to electronic circuits.

Selection Table

Main Circuit Power Supply	SERVOPACK Model: SGDXS- SGDXW- SGDXT-	Order Number (Recommended Product)	Manufacturer	Inquiries
Three-phase, 200 VAC	□□□A	LT-C32G801WS	Soshin Electric Co., Ltd.	Yaskawa representative
Single-phase, 200 VAC		LT-C12G801WS		
Three-phase, 400 VAC	□□□D	LT-C35G102WS		

External Dimensions

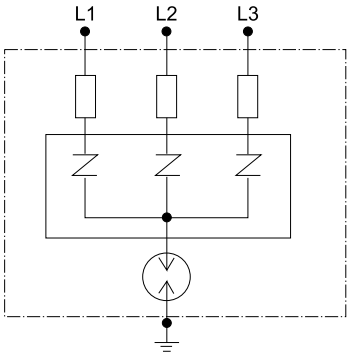


*1 The LT-C12G801WS does not have lead L2.

Note:

The wire size for all of the leads (L1, L2, and L3) and the ground wire (E) is AWG16 (UL1015).

Internal Cables Connections



Regenerative Resistor

If the regenerative power exceeds the amount that can be absorbed by charging the smoothing capacitor, a regenerative resistor is used.

Specifications of Built-in Regenerative Resistors in SERVOPACKs

The following table gives the specifications of the built-in regenerative resistors in the SERVOPACKs and the amount of regenerative power (average values) that they can process.

SERVOPACK Model:	Built-In Regenerative Resistor		Regenerative Power Processing Capacity of Built-in Regenerative Resistor [W]	Minimum Allowable Resistance [Ω]
SGDXS-	Resistance [Ω]	Capacity [W]		
R70A, R90A, 1R6A, or 2R8A	–	–	–	40
3R8A, 5R5A, or 7R6A	35	60	15	35
120A	20	60	30	20
180A	12	60	30	12
200A	10	60	30	10
330A	6	180	36	6
470A	(5) *1	(880) *1	(180) *1	5
550A, 590A, 780A	(3.13) *2	(1760) *2	(350) *2	2.9
1R9D, 3R5D, or 5R4D	56	70	14	56
8R4D or 120D	33	180	28	33
170D	22		36	22
210D or 260D	(12) *3	(880) *3	(180) *3	12
280D or 370D	(10) *4	(1760) *4	(350) *4	10

*1 The values in parentheses ( ) are for the optional JUSP-RA29-E regenerative resistor unit.
*2 The values in parentheses ( ) are for the optional JUSP-RA05-E regenerative resistor unit.
*3 The values in parentheses ( ) are for the optional JUSP-RA30-E regenerative resistor unit.
*4 The values in parentheses ( ) are for the optional JUSP-RA31-E regenerative resistor unit.

SERVOPACK Model:	Built-In Regenerative Resistor		Regenerative Power Processing Capacity of Built-in Regenerative Resistor [W]	Minimum Allowable Resistance [Ω]
SGDXW-	Resistance [Ω]	Capacity [W]		
1R6A or 2R8A	35	60	20	35
5R5A or 7R6A	12	70	25	12

SERVOPACK Model	Built-in Regenerative Resistor		Regenerative Power Processing Capacity of Built-in Regenerative Resistor [W]	Minimum Allowable Resistance [Ω]
SGDXT-	Resistance [Ω]	Capacity [W]		
1R6A or 2R8A	12	70	14	12

Specifications and Dimensions of External Regenerative Resistors

■ Selection Table

Model	Specification	Mass	Wire Size	Manufacturer
RH120	70 W, 1 Ω to 100 Ω	282 g	AWG16 (1.25 mm^2)	Iwaki Musen Kenkyusho Co., Ltd.
RH150	90 W, 1 Ω to 100 Ω	412 g	AWG14 (2.0 mm^2)	
RH220	120 W, 1 Ω to 100 Ω	500 g	AWG16 (1.25 mm^2)	
RH220B	120 W, 1 Ω to 100 Ω	495 g	AWG14 (2.0 mm^2)	
RH300C	200 W, 1 Ω to 10 kΩ	850 g	AWG14 (2.0 mm^2)	
RH450	150 W, 1 Ω to 100 Ω	880 g	AWG14 (2.0 mm^2)	
RH450FY	150 W, 2 Ω to 100 Ω	1.3 kg	AWG14 (2.0 mm^2)	
RH500	300 W, 2 Ω to 50 Ω	1.4 kg	AWG14 (2.0 mm^2)	

RH120 (Model) 10Ω (Resistance) J

Resistance Tolerance	
Code	Specification
K	±10%
J	±5%
H*1	±3%

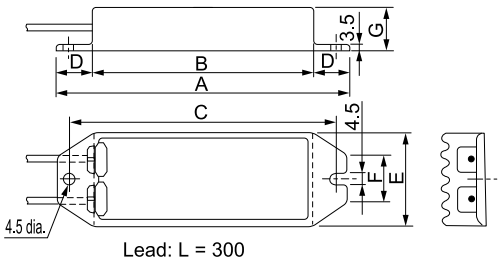
*1 An external regenerative resistor with resistance tolerance H (±3%) is not available for the RH450FY.

■ Specification

Item	Specification
Resistance Tolerance	K: ±10%, J: ±5%, H: ±3%
Temperature Resistance Characteristics	At less than 20 Ω: ±400 PPM/°C, at 20 Ω or higher: ±260 PPM/°C
Withstand Voltage	2,000 VAC/1 min, ΔR: ±(0.1% + 0.05 Ω)
Insulation Resistance	500 VDC, 20 MΩ min.
Short-Duration Overload	10 times the rated power applied for 5 s: ΔR: ±(2% + 0.05 Ω)
Service Life	1,000 hours at ratings, 90 min ON, 30 min OFF: ΔR: ±(5% + 0.05 Ω)
Flame Resistance	There must be no ignition when 10 times the rated power is applied for 1 min.
Surrounding Air Temperature Range	-25°C to 150°C

■ External Dimensions

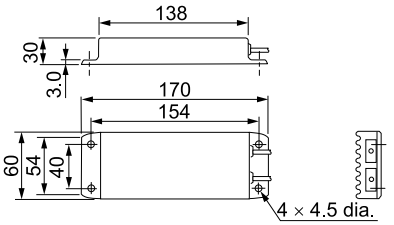
◆ Model: RH120, 150, 220



Model	Rated Power	Resistance Range	Wire Size
RH120	70 W	1 Ω to 100 Ω	AWG16 (1.25 mm²)
RH150	90 W		AWG14 (2.0 mm²)
RH220	120 W		AWG16 (1.25 mm²)

External Dimensions [mm]							Mass
A	B	C	D	E	F	G	
182	150	172	16	42	22	20	282 g
212	180	202	16	44	24	30	412 g
230	200	220	15	60	24	20	500 g

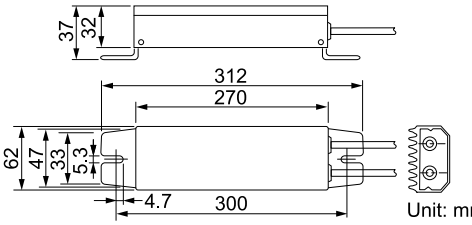
◆ Model: RH220B



Unit: mm

Lead: L = 500
Rated power: 120 W
Resistance range: 1 Ω to 100 Ω
Wire size: AWG14 (2.0 mm²)
Mass: 495 g

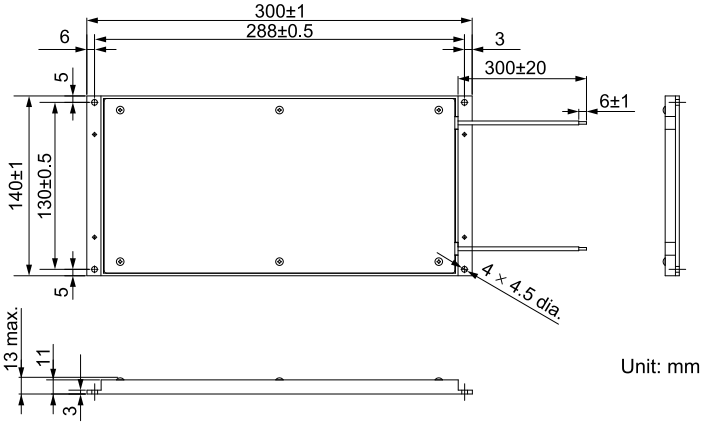
◆ Model: RH300C



Unit: mm

Lead: L = 300
Rated power: 200 W
Resistance range: 1 Ω to 10 kΩ
Wire size: AWG14 (2.0 mm²)
Mass: 850 g

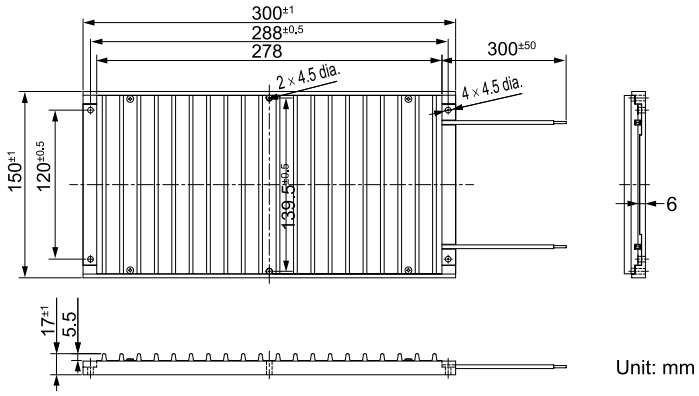
◆ Model: RH450



Unit: mm

Lead: L = 300
Rated power: 150 W
Resistance range: 1 Ω to 100 Ω
Wire size: AWG14 (2.0 mm²)
Mass: 880 g

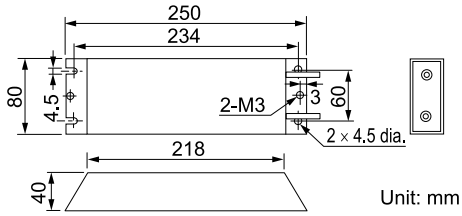
◆ Model: RH450FY



Lead: L = 300
Rated power: 150 W
Resistance range: 2 Ω to 100 Ω
Wire size: AWG14 (2.0 mm²)
Mass: 1.3 kg

Unit: mm

◆ Model: RH500



Lead: L = 450
Rated power: 300 W
Resistance range: 2 Ω to 50 Ω
Wire size: AWG14 (2.0 mm²)
Mass: 1.4 kg

Unit: mm

■ Regenerative Resistor Unit

Refer to the following table for the specifications of regenerative resistor units.

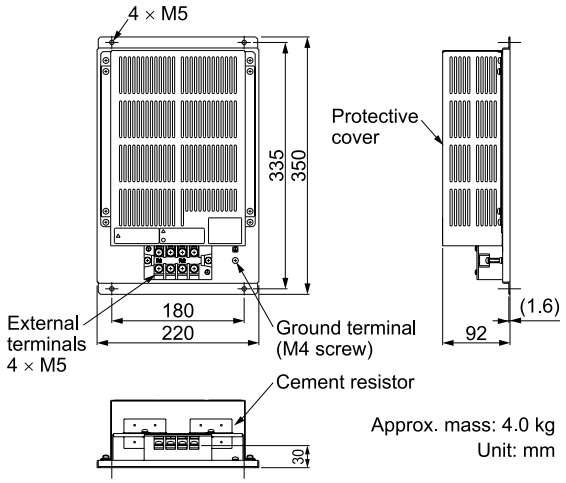
You do not need to change the setting of Pn600 (Regenerative Resistor Capacity) and Pn603 (Regenerative Resistance) when you use a regenerative resistor unit.

SERVOPACK Model: SGDXS-	Regenerative Resistor Unit Model	Specification	Allowable Power Loss
470A *1	JUSP-RA29-E	5 Ω, 880 W	180 W
550A, 590A, 780A	JUSP-RA05-E	3.13 Ω, 1760 W	350 W
210D, 260D	JUSP-RA30-E	12 Ω, 880 W	180 W
280D, 370D	JUSP-RA31-E	10 Ω, 1760 W	350 W

*1 When replacing from Σ-7 etc., if you use the servomotor at rotation speeds below the maximum rotation speed of the Σ-7 servomotor, JUSP-RA04-E (6.25 Ω, 880 W) can be used. You need to change the setting of Pn603 (Regenerative Resistance) when you use JUSP-RA04-E (6.25 Ω, 880 W).

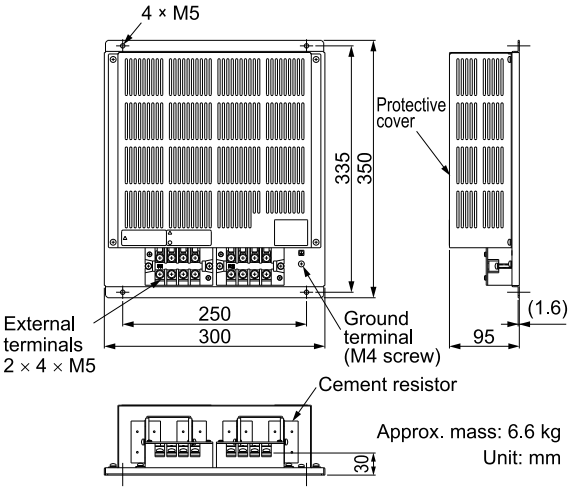
◆ External Dimensions

○ JUSP-RA29-E



Approx. mass: 4.0 kg
Unit: mm

○ JUSP-RA05-E


4 × M5
Protective cover
335
350
External terminals 2 × 4 × M5
250
300
Ground terminal (M4 screw)
95
(1.6)
Cement resistor
30
Approx. mass: 6.6 kg
Unit: mm

Motor Power Cable Shielding Clamp

Contact your Yaskawa representative for more information.

SERVOPACK Model	Order Number
SGDXS- 120A□□□□0008	KLBUE_4-13.5_SC
SGDXW- 5R5A	
SGDXS- R70A to 5R5A	KLBUE_4-13.5_SET
SGDXW- 1R6A to 2R8A	

SERVOPACK Connector Kit

Contact your Yaskawa representative for more information.

SERVOPACK Model	Order Number
SGDXS- R70A to 2R8A	EUOP-M92019
SGDXS- 5R5A	EUOP-M92020
SGDXW- 1R6A to 7R6A	EUOP-M92021

Digital Operators

A digital operator is used to display and set parameters in a SERVOPACK, and its main functions are as follows.

- Changing and accessing the settings of parameters in the SERVOPACK
- Reading, writing, and verifying the settings of parameters in the SERVOPACK
- Operating the SERVOPACK
- Adjustment with SERVOPACK utility functions
- Monitoring the operating conditions of the SERVOPACK

There are two types of digital operators.

- JUSP-OP07A-E
- JUSP-OP05A-1-E (can be used with analog voltage/pulse train reference SERVOPACKs only)

Information The JUSP-OP05A-1-E and JUSP-OP07A-E cannot be connected at the same time.

Important The digital operator is used for test operation and maintenance. It is not intended to be installed into equipment and used continuously together with the SERVOPACK.

Type: JUSP-OP07A-E

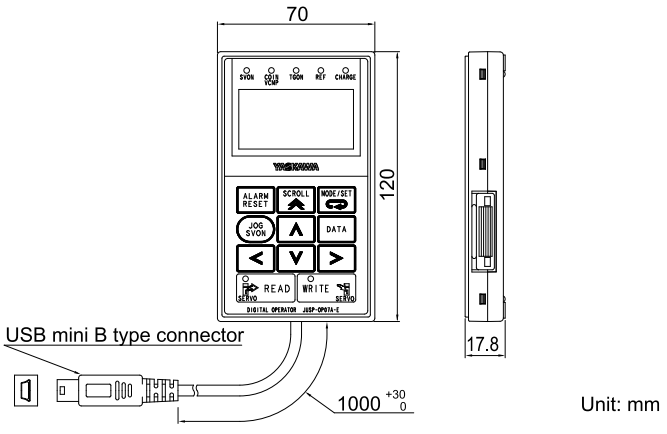
The JUSP-OP07A-E is used by connecting to the CN7 connector on the SERVOPACK.

Information If it is used in an environment with high levels of noise, implement noise countermeasures such as inserting a ferrite core.

■ Selection Table

Order Number	Accessories
JUSP-OP07A-E	Connection cable (1 m)

■ Dimensional Drawing



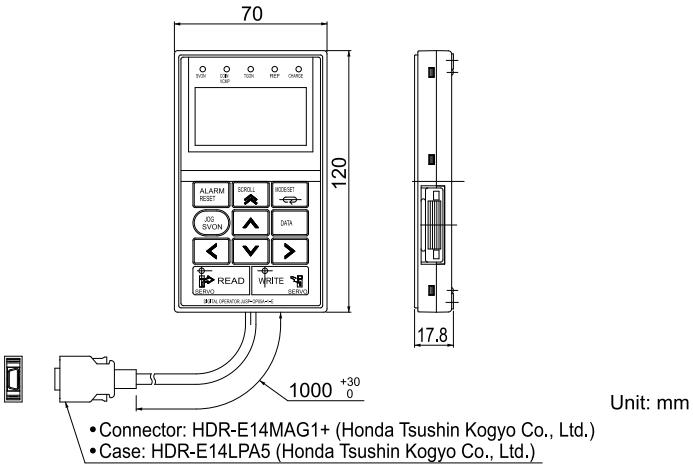
Type: JUSP-OP05A-1-E

The JUSP-OP05A-1-E is used by connecting to the Σ-XS SERVOPACK analog voltage/pulse train reference connector (CN3).

■ Selection Table

Order Number	Accessories
JUSP-OP05A-1-E	Connection cable (1 m)

■ Dimensional Drawing



Unit: mm

- Connector: HDR-E14MAG1+ (Honda Tsushin Kogyo Co., Ltd.)
- Case: HDR-E14LPA5 (Honda Tsushin Kogyo Co., Ltd.)

Software

SigmaSize+: AC Servo Capacity Selection Program

You can use the SigmaSize+ to select servomotors and SERVOPACKs. Applicable to all standard servo products sold by Yaskawa.

You can also calculate whether an external regenerative resistor is required and select one.

Note:

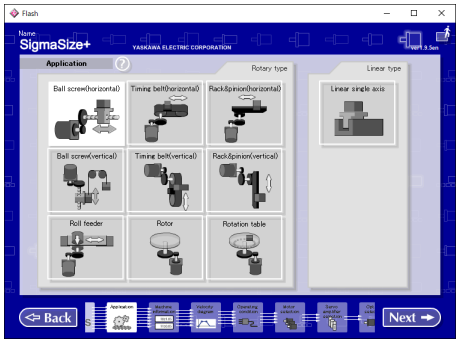
Contact your Yaskawa representative for information on SigmaSize+.

■ Features

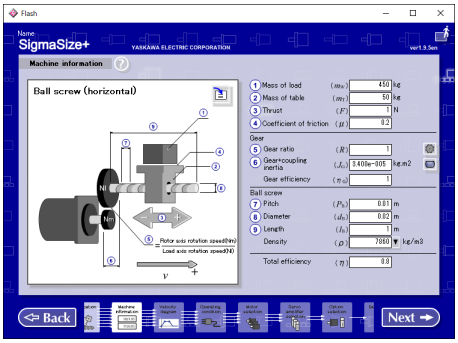
- Provides a vast amount of new product information.
- Lets you select servo products with a wizard.
- You can access and reuse previously entered data.

◆ Examples of the Servo Selection Interface

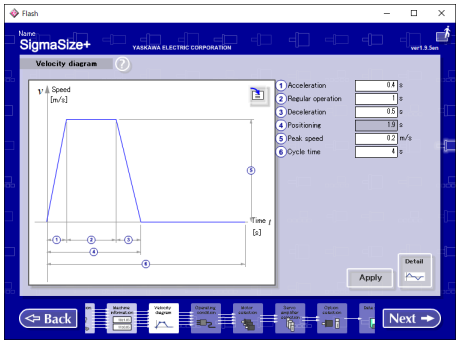
Mechanism Selection View



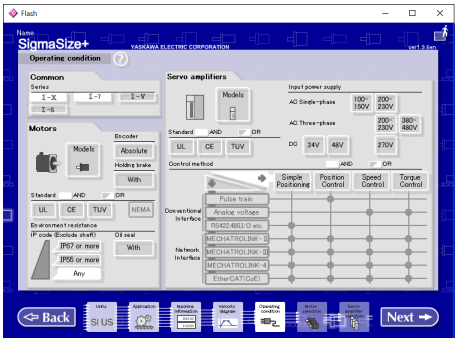
Machine Specification Entry View



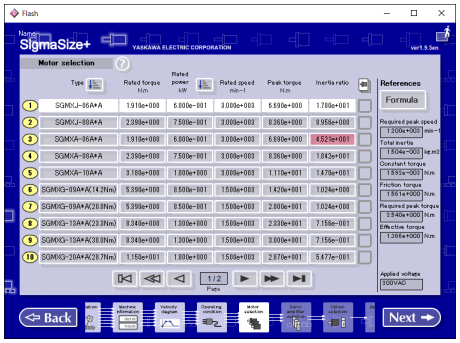
Speed Diagram Entry View



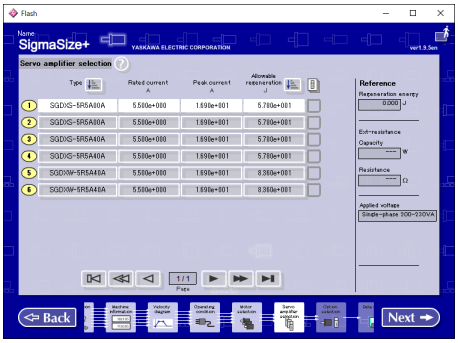
Operating Conditions Selection View



Servomotor Selection View



SERVOPACK Selection View



■ System Requirements

Item	System Requirement
Browser	Internet Explorer version 10 or later
OS	Windows Vista/Windows 7 (32-bit or 64-bit edition)
CPU	Pentium 200 Mhz min.
Memory	64 MB min. (96 MB or greater recommended)
Available Hard Disk Space	20 MB min.

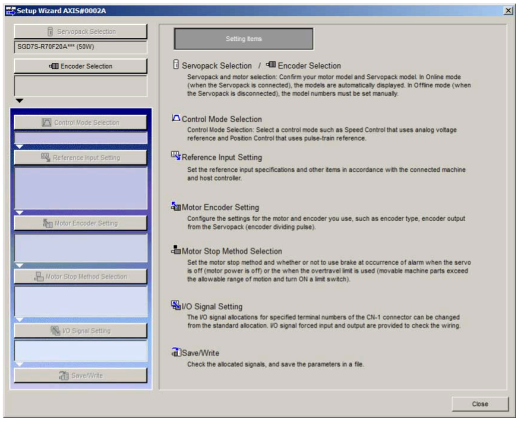
SigmaWin+: AC Servo Drive Engineering Tool

The SigmaWin+ engineering tool is used to set up and optimally tune Yaskawa Σ-series servo drives.

■ Features

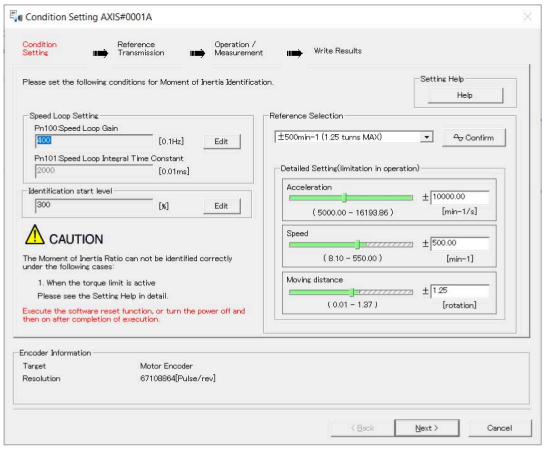
- Sets parameters with a wizard.
- Displays SERVOPACK data on a computer just like on a oscilloscope.
- Estimates moments of inertia and measure vibration frequencies.
- Displays alarms and provides alarm diagnostics.

Sets parameters with a wizard.

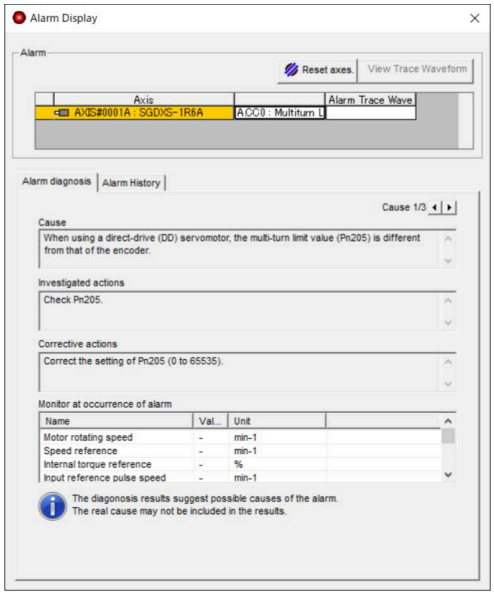


Displays SERVOPACK data on a computer just like on a oscilloscope.

Estimates moments of inertia and measure vibration frequencies.



Displays alarms and provides alarm diagnostics.



◆ System Requirements

Item	System Requirements
Version	7
Supported Languages	Japanese, English, and Chinese (simplified)
OS	Windows 10, Windows 8.1, Windows 8, or Windows 7 (32-bit or 64-bit edition)
Software Environment	Microsoft .NET Framework 4.5, .NET Framework 4.6
CPU	1 GHz min. (recommended)
Memory	1 GB min. (recommended)
Available Hard Disk Space	500 MB min.
Browser used to display Help	Internet Explorer 9 or higher

MPE720: System Integrated Engineering Tool

MPE720 version 7 is a system integrated engineering tool that provides the complete development functionality to set up, adjust, program, maintain, and inspect not only controller programs but also all of the devices necessary to design machine installations, including servo drives, AC drives, and distributed I/O devices.

It is installed in a PC and operated on a PC interface through a connection between the PC and machine controller.

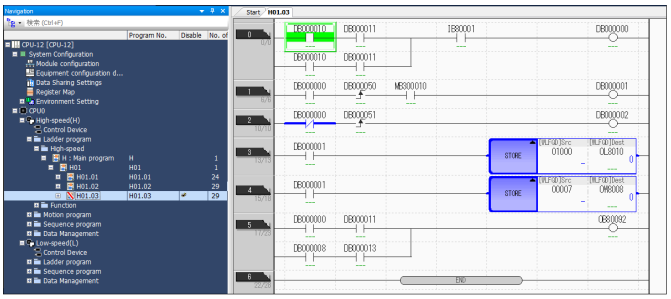
■ Features

◆ Performing Adjustment and Maintenance for All Equipment Drive Devices

MPE720 version 7 connected to the YRM-X or MP series enables one-stop setup, adjustment, and maintenance of AC servo drives, inverters, and I/O devices connected to the network. This eliminates the need change the connections, which improves efficiency.

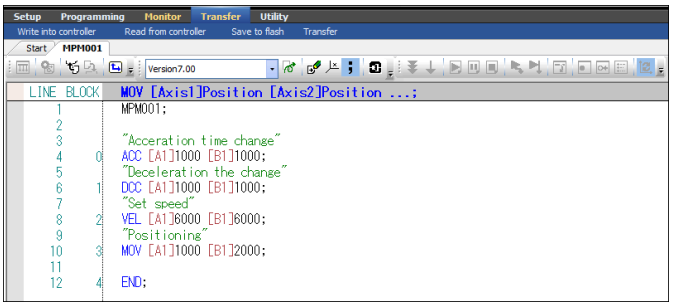
◆ Greater Efficiency with the Best Programming Method

Ladder Programming



- The new user interface lets just about anyone easily use the MPE720.
- An improved EXPRESSION instruction simplifies programming calculation in ladder diagrams.
- Support is provided for all types of control, including position, speed, torque, and phase control.

Motion Programming



- Positioning and interpolation can be programmed with one instruction.
- Programs can be very easily edited using expressions in a text format.
- New variable programming can provide PC-like programming.

■ System Requirements

Item	Specification
CPU	1 GHz or more recommended (manufactured by Intel or other companies)
Memory Capacity	1 GB or more recommended *1
Available Hard Disk Space	700 MB or more (includes standard workspace memory after installation of MPE720)

Continued on next page.

Continued from previous page.

Item	Specification
Display Resolution	1,280 × 800 pixels or more recommended
CD Drive	CD Drive
1 (only for installation)	RS-232C, Ethernet, MP2100 bus, and USB
OS	Windows 10, Windows 8, Windows 8.1, or Windows 7 (32-bit or 64-bit)
.NET Environment	.NET Framework 4.5
Supported Languages	English and Japanese

*1 Expand memory if other application programs are run simultaneously with MPE720 on the same computer.
Performance may be slow due to the use of memory by multiple application programs that are run simultaneously.

Other Peripheral Devices and Options

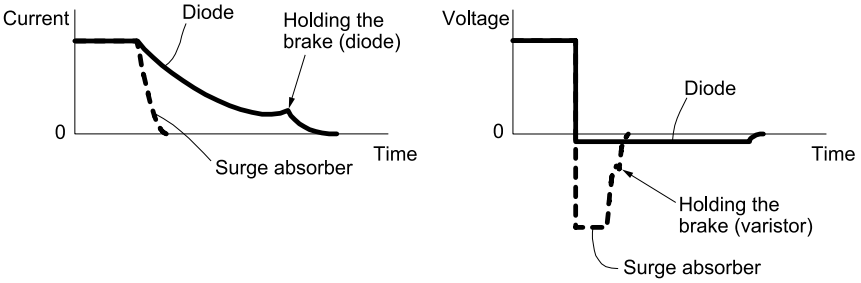
Surge Absorbers (Varistors), Diodes, and Brake Relays for Holding Brake Power Supplies

Surge absorbers (varistors) and diodes for holding brake power supplies help prevent damage to brake coils caused by voltage surges.

If you use a servomotor with a holding brake and switch the brake power supply circuit on the DC side, connect a surge absorber (varistor) or diode that is suitable for the brake power supply voltage and current.

Note:

1. When you select a surge absorber, varistor, or diode for your application, consider the service life and test all operations, including the brake timing, before you use the servomotor.
2. If you connect an SSR (i.e., a semiconductor relay) to switch the brake circuit, use a diode.
3. If you connect a diode, more time is required to brake than with a surge absorber. (Refer to the following figure.) If you use a diode, consider this in the application.



■ Surge Absorbers (Varistors) for Holding Brake Power Supplies

Use the following table as reference in selecting a surge absorber. Elements were selected for a surge absorber surrounding air temperature range of -20°C to 60°C and an ON/OFF switching frequency of 10 times or less per minute. The information in this table is for reference only, and does not ensure operation in combination with the holding brake.

Holding Brake Power Supply Voltage		24 VDC	
Manufacturer		Nippon Chemi-Con Corporation	Semitec Corporation
		Order Number	
Brake Rated Current	1 A max.	TND05V-121KB00AAA0	Z5D121
	2 A max.	TND07V-121KB00AAA0	Z7D121
	4 A max.	TND10V-121KB00AAA0	Z10D121
	8 A max.	TND14V-121KB00AAA0	Z15D121

■ Diodes for Holding Brake Power Supplies

Select a diode for the holding brake power supply with a rated current that is greater than that of the holding brake and with the recommended withstand voltage given in the following table.

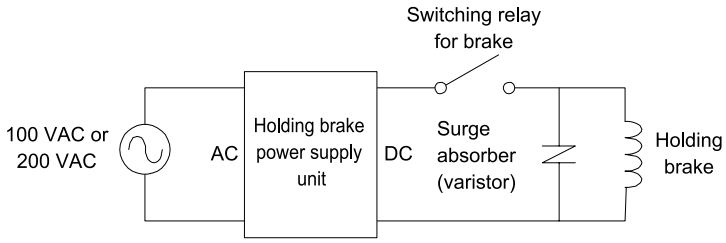
Diodes are not provided by Yaskawa.

Holding Brake Power Supply Unit Specifications		Withstand Voltage
Rated Output Voltage	Input Voltage	
24 VDC	200 V	100 V to 200 V

■ Circuit Diagrams

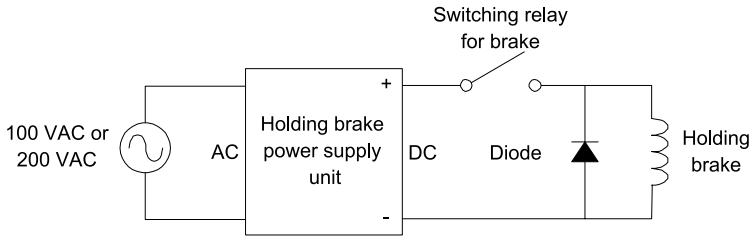
◆ Circuit for a Surge Absorber (varistor)

A surge absorber (varistor) has no polarity.



◆ Circuit for a Diode

A Diode has polarity. Refer to the following figure for connections.



Note:

Holding brake power supply units are not provided by Yaskawa.

■ Brake Relays

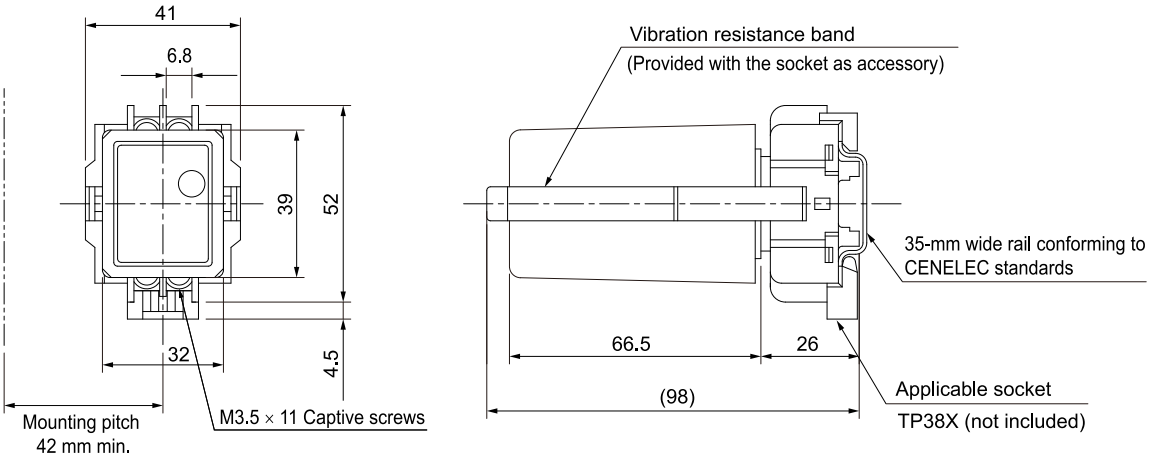
Brake relays are not provided by Yaskawa.

◆ Specification

Manufactured by BESTACT SOLUTIONS INC.

Item		Specification
Order Number		F2PE20/D24
Contact	Structure	2a
	Contact resistance	500 mΩ max.
	Rated operating voltage/current	110 VDC, 0.5 A (L/R=100 ms)/220 VAC, 1.0 A (inductive load)
	Rated insulation voltage	250 VAC
	Minimum operating voltage/current	24 VDC, 1 mA
Time	Operation	5 ms or less
	Recovery	3 ms or less
Contact life	Mechanical	100 million cycles or more
	Electrical life	3 million cycles are more (24 VDC, 0.5 A, L/R=10 ms)
Other	Failure rate (λ_{60})	4.6×10^{-9}(/cycle) or less
	Approx. mass	140 g
	Surrounding air temperature	-10°C to +60°C
	Connection method	External connection socket (TP38X)

◆ External Dimensions



Batteries for Servomotors with Absolute Encoders

If you use an absolute encoder, you can use an encoder cable with a battery unit connected to it to supply power and retain the absolute position data.

You can also retain the absolute position data by supplying power from a battery on the host controller.

Note:

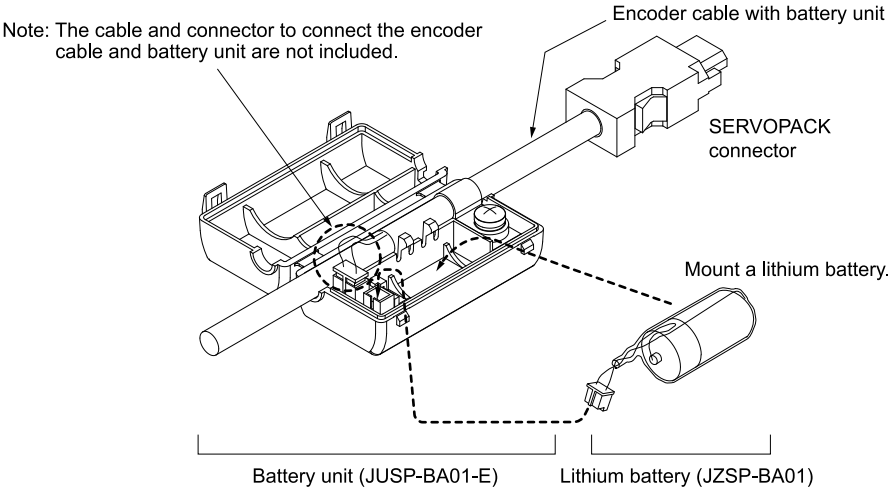
A battery unit is not required if you use a servomotor with a batteryless absolute encoder.

■ Using Encoder Cables with Battery Units

A battery unit is attached to an encoder cable with a battery unit. To replace the battery, obtain a lithium battery (JZSP-BA01) and mount it in the battery unit.

Important

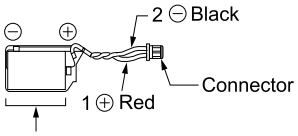
1. You cannot attach the battery unit to encoder cables for incremental encoders or batteryless absolute encoders.
2. Install the battery unit where the surrounding air temperature is between -5°C and 60°C.



◆ Selection Table

Name	Order Number	Remarks
Battery Unit (case only)	JUSP-BA01-E	The encoder cable and battery are not included. (This is a replacement part for a damaged battery unit.)
Lithium Battery	JZSP-BA01	This is a special battery that is mounted into the battery case.

◆ Lithium Battery Dimensional Drawing

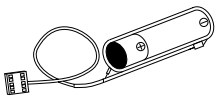


ER3V (3.6 V, 1,000 mAh, from Toshiba Battery Co., Ltd.)

■ When Installing a Battery on the Host Controller

Use a battery that meets the specifications of the host controller.

Use the recommended battery given in the following table or the equivalent.



◆ Selection Table

Order Number	Specification	Manufacturer
ER6VC3N	3.6 V, 2000 mAh	Toshiba Battery Co., Ltd.

Option Modules

Feedback Option Modules

Fully-Closed Modules

You can perform fully-closed loop control by combining a fully-closed module and SERVOPACK. Fully-closed loop control is used to perform high-accuracy, high-response position control by using a position feedback signal from a linear encoder or absolute rotary encoder mounted to the machine.

Model Designation

When ordering a SERVOPACK and a fully-closed module separately, use the following fully-closed module model number.

SGDV - OF A01 A

Option Module | ❶ | ❷ | ❸

❶ Module Type

Code	Specification
OF	Feedback Option Module

❷ Interface Specifications

Code	Specification
A01	For Yaskawa Serial Protocol
B01	Serial and Sin/Cos Encoders
B03	Pulse A quad B Encoders
B04	Resolver

❸ Design Revision Order

A

Important

- One option case kit is required for each SERVOPACK.
  Option case kit model: SGDXS-OZA01A
- A fully-closed module does not support Σ-LINK II communications.

Recommended Encoders

- Linear encoders
  Refer to the following section for the recommended linear encoder models and specifications.
  ☞ *Recommended Linear Encoders on page 288*
- Rotary Encoders
  - Absolute Rotary Encoders
    The following absolute rotary encoders are for fully-closed control. Do not use it to control the motor.

Output Signals	Manufacturer	Rotary Encoder Type	Model			Resolution Bits	Maximum Motor Speed *1 min-1
			Scale	Sensor Head	Relay Device between Fully-Closed Module and Rotary Encoder		
Encoder for Yaskawa's Serial Interface	Magnescale Co., Ltd.	Sealed	RU77-4096ADF *2		–	20	2000
			RU77-4096AFFT01 *2		–	22	2000
	Dr. JOHANNES HEIDENHAIN GmbH	Exposed	ECA4412 *2		EIB3391Y	27	1600
					EIB3391Y	28	800
					EIB3391Y	29	400
		Sealed	RCN2310 *2		EIB3391Y	26	3000
			RCN5510 *2		EIB3391Y	28	800
			RCN8310 *2		EIB3391Y	29	400
			ROC2310 *2		EIB3391Y	26	3000
			ROC7310 *2		EIB3391Y	28	800
	Renishaw PLC	Exposed	RA23Y-□□□□□□□□□ *2		–	23	14600
			RA26Y-□□□□□□□□□ *2		–	26	3250
			RA30Y-□□□□□□□□□ *2		–	30	200

*1 The maximum speeds given in the above table are the maximum applicable speeds of the encoders when combined with a Yaskawa SERVOPACK.
The actual speed will be restricted by either the maximum speed of the rotary servomotor or the maximum speed of the rotary encoder (given above).
*2 This is a single-turn absolute encoder.

Note:

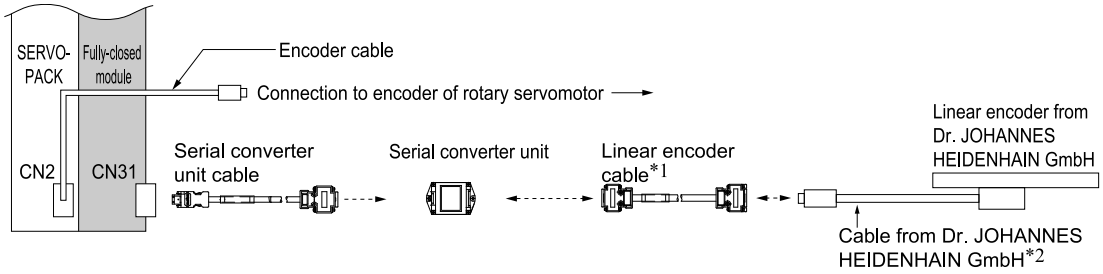
Confirm detailed specifications, such as the tolerances, dimensions, and operating environment, with the manufacturer of the rotary encoder before you use it.

Equipment Configurations

■ Connections to Linear Encoder from Dr. JOHANNES HEIDENHAIN GmbH

◆ Connections for a 1 Vp-p Analog Voltage Output Signal

You must make the connections through a Yaskawa serial converter unit. The output signal will be multiplied by 8 bits (256 divisions) in the serial converter unit.



*1 When using a JZDP-J00□-□□□ serial converter unit, do not use a Yaskawa linear encoder cable that is longer than 3 m.
*2 Contact Dr. JOHANNES HEIDENHAIN GmbH for details on cables (analog 1 Vp-p output, D-sub 15-pin, male) from Dr. JOHANNES HEIDENHAIN GmbH.

Item	Model	Reference
Fully-Closed Modules (Purchased as a set with the SERVOPACK)	Without options: SGDXS□□□□□0A000□□1 *1* With options: SGDXS□□□□□0A■■■□□1 *1* **Note:** When a hardware option is mounted, ■■■ is replaced with a three-digit number that specifies the type of option.	–
Fully-Closed Modules (Purchased alone)	Fully-Closed Modules *2* SGDV-OFA01A	504
	Option Case Kit *3* SGDXS-OZA01A	510
Serial Converter Unit Cables	JZSP-CLP70-□□-E	314
Serial Converter Unit	JZDP-H003-□□□	280
Linear Encoder Cables	JZSP-CLL30-□□-E	314

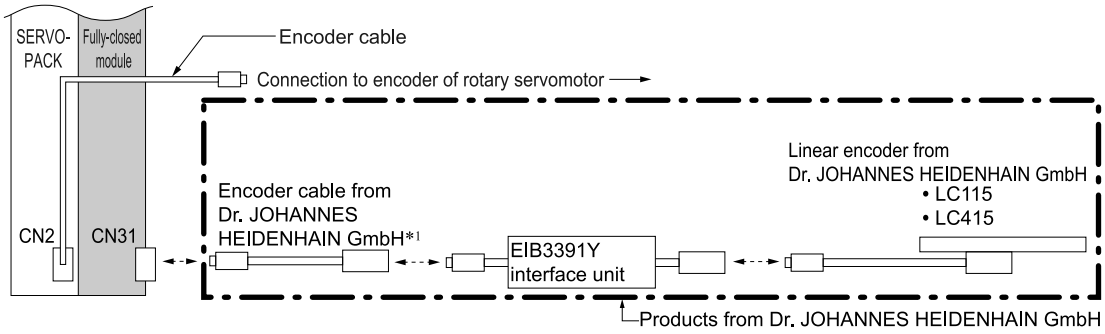
*1 The model number of a set that includes the SERVOPACK and an option module is not hyphenated after "SGDXS."
*2 When ordering a SERVOPACK and a fully-closed module separately, use this fully-closed module model number.
*3 One option case kit is required for each SERVOPACK. The set includes the module cover, PCB mounting plate, and two mounting screws.

Note:

1. Refer to the following section for a table of the recommended linear encoders.
   ☞ *Recommended Linear Encoders on page 288*
2. Refer to the following section for the specifications of the serial converter unit.
   ☞ *Serial Converter Unit on page 280*
3. Refer to the chapter for your rotary servomotor for information on servomotor main circuit cables and encoder cables.
4. If you purchase a fully-closed module by itself, refer to the following manual for the method to mount it to the SERVOPACK.
   🕮 Σ-V-Series/Σ-V-Series for Large-Capacity Models/Σ-7-Series/Σ-X-Series Installation Guide Fully-Closed Module (Manual No.: TOBP C720829 03)

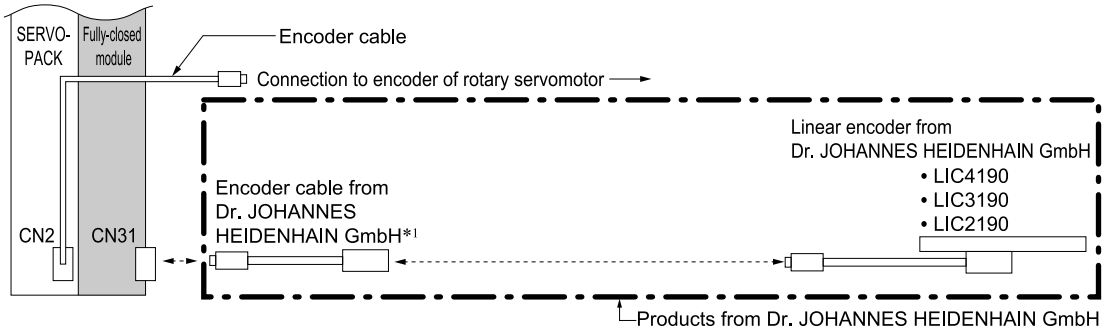
◆ Connections When Using a Yaskawa Serial Interface for the Output Signals

- LC115 or LC415 Linear Encoder with EIB3391Y Interface Unit



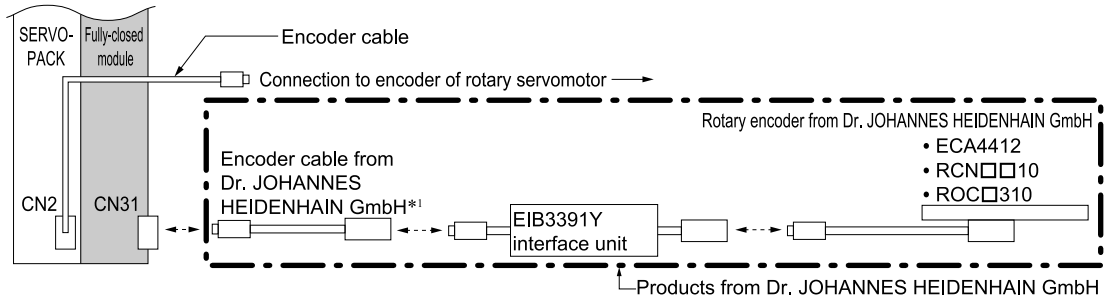
*1 Use an encoder cable from Dr. JOHANNES HEIDENHAIN GmbH. Contact Dr. JOHANNES HEIDENHAIN GmbH for detailed encoder cable specifications.

- LIC4190, LIC3190, or LIC2190 Linear Encoders



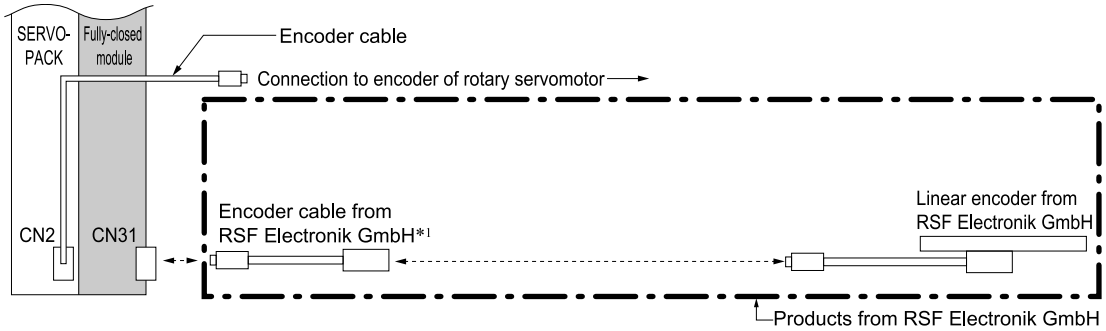
*1 Use an encoder cable from Dr. JOHANNES HEIDENHAIN GmbH. Contact Dr. JOHANNES HEIDENHAIN GmbH for detailed encoder cable specifications.

- ECA4412, RCN□□10, or ROC□310 Rotary Encoder with EIB3391Y Interface Unit



*1 Use an encoder cable from Dr. JOHANNES HEIDENHAIN GmbH. Contact Dr. JOHANNES HEIDENHAIN GmbH for detailed encoder cable specifications.

■ Connections to Linear Encoder from RSF Elektronik GmbH

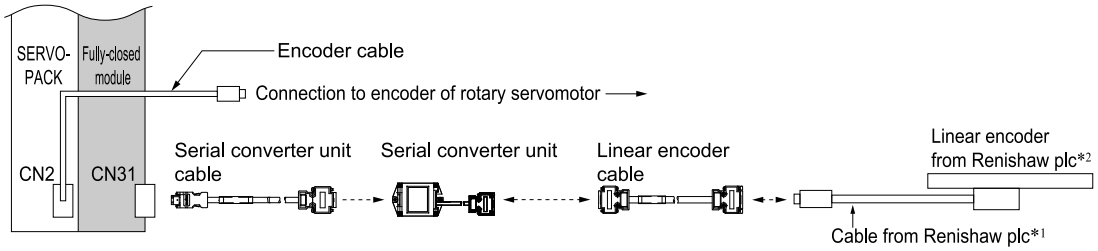


*1 Use an encoder cable from RSF Elektronik GmbH. Contact Dr. JOHANNES HEIDENHAIN GmbH for detailed encoder cable specifications.

■ Connections to Linear Encoder from Renishaw plc

◆ Connections for a 1 Vp-p Analog Voltage Output Signal

You must make the connections through a Yaskawa serial converter unit. The output signal will be multiplied by 8 bits (256 divisions) in the serial converter unit.



*1 Contact Renishaw plc for details on cables (analog 1 Vp-p output, D-sub 15-pin, male) from Renishaw plc. However, the BID and DIR signals are not connected.

*2 If you use the origin signals with a linear encoder from Renishaw plc, the origin may sometimes be falsely detected. If that occurs, use the BID/DIR signal to output the origin signal only in one direction.

Item	Model	Reference
Fully-Closed Modules (purchased as a set with the SERVOPACK)	Without options: SGDXS□□□□□0A000□□1 *1* With options: SGDXS□□□□□0A■■■□□1 *1* **Note:** When a hardware option is mounted, ■■■ is replaced with a three-digit number that specifies the type of option.	–
Fully-Closed Modules (purchased alone)	Fully-closed modules *2* SGDV-OFA01A	504
	Option case kit *3* SGDXS-OZA01A	510
Serial Converter Unit Cables	JZSP-CLP70-□□-E	314

Continued on next page.

Continued from previous page.

Item	Model	Reference
Serial Converter Unit	JZDP-H005-□□□	282
Linear Encoder Cables	JZSP-CLL00-□□-E	314

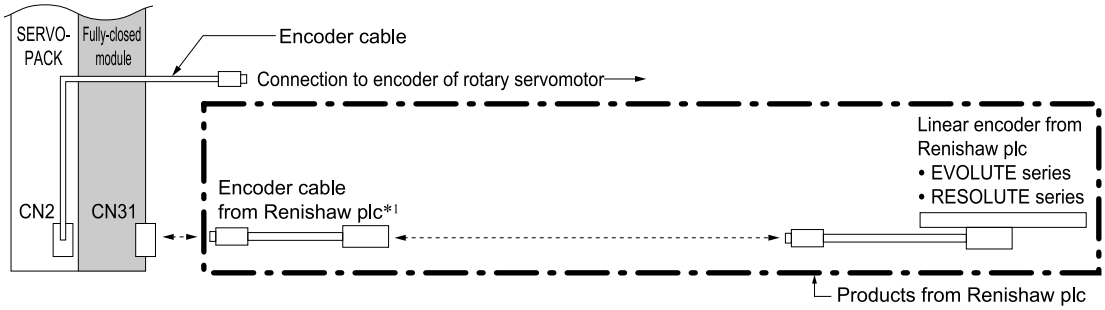
*1 The model number of a set that includes the SERVOPACK and an option module is not hyphenated after "SGDXS."
*2 When ordering a SERVOPACK and a fully-closed module separately, use this fully-closed module model number.
*3 One option case kit is required for each SERVOPACK. The set includes the module cover, PCB mounting plate, and two mounting screws.

Note:

1. Refer to the following section for a table of the recommended linear encoders.
   ☞ *Recommended Linear Encoders on page 288*
2. Refer to the following section for the specifications of the serial converter unit.
   ☞ *Serial Converter Unit on page 280*
3. Refer to the chapter for your rotary servomotor for information on servomotor main circuit cables and encoder cables.
4. If you purchase a fully-closed module by itself, refer to the following manual for the method to mount it to the SERVOPACK.
   🕮 Σ-V-Series/Σ-V Series for Large-Capacity Models/Σ-7 Series/Σ-X-Series Installation Guide Fully-Closed Module (Manual No.: TOBP C720829 03)

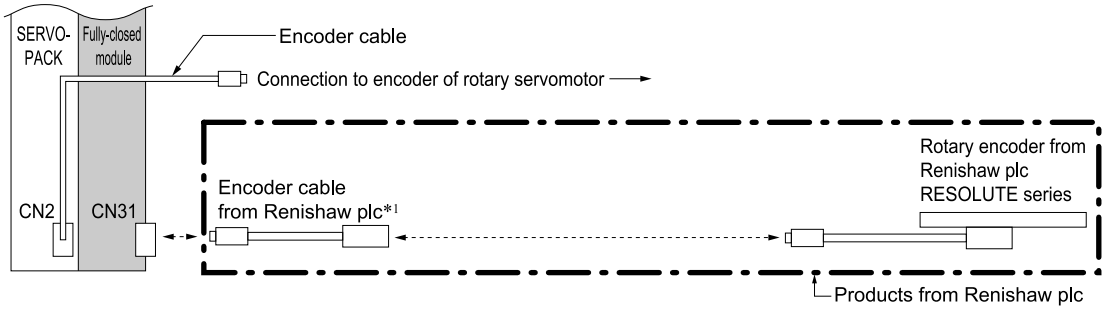
◆ Connections When Using a Yaskawa Serial Interface for the Output Signals

- EVOLUTE-Series or RESOLUTE-Series Linear Encoder



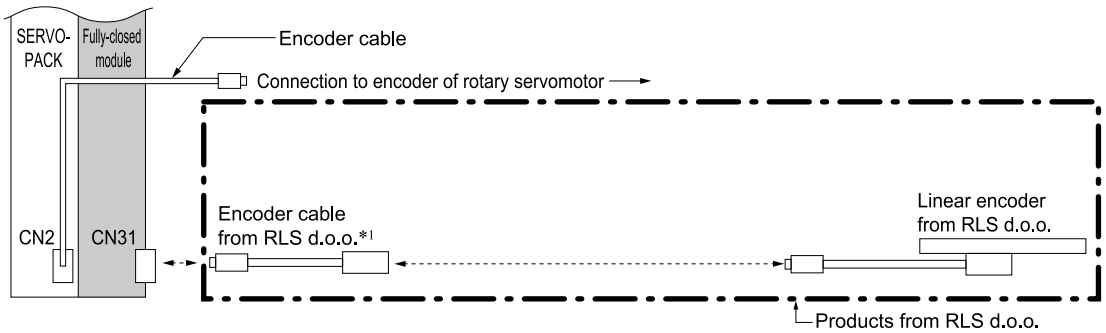
*1 Use an encoder cable from Renishaw plc. Contact Renishaw plc for detailed encoder cable specifications.

- RESOLUTE-Series Rotary Encoder



*1 Use an encoder cable from Renishaw plc. Contact Renishaw plc for detailed encoder cable specifications.

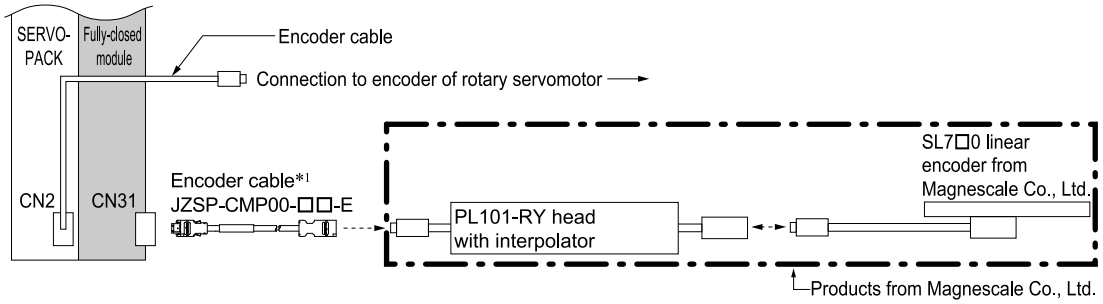
■ Connections to Linear Encoder from RLS d.o.o.



*1 Use an encoder cable from RLS d.o.o. Contact RLS d.o.o. or Renishaw plc for detailed encoder cable specifications.

■ Connections to Linear Encoder from Magnescale Co., Ltd.

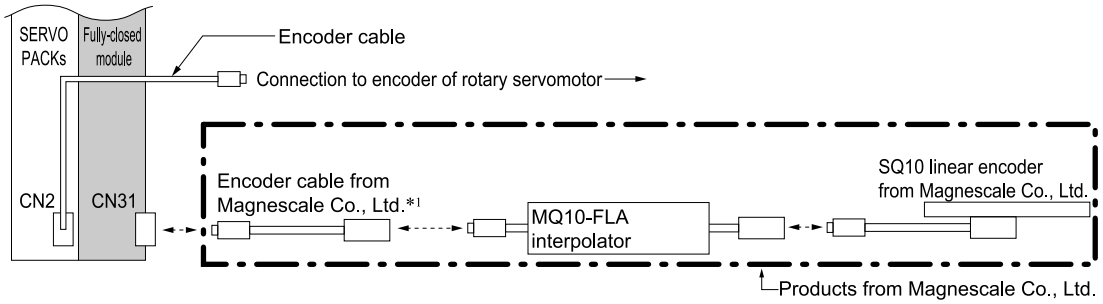
- SL7□0 Linear Encoder and PL101-RY Sensor Head with Interpolator



*1 Refer to the following section for details on encoder cables.

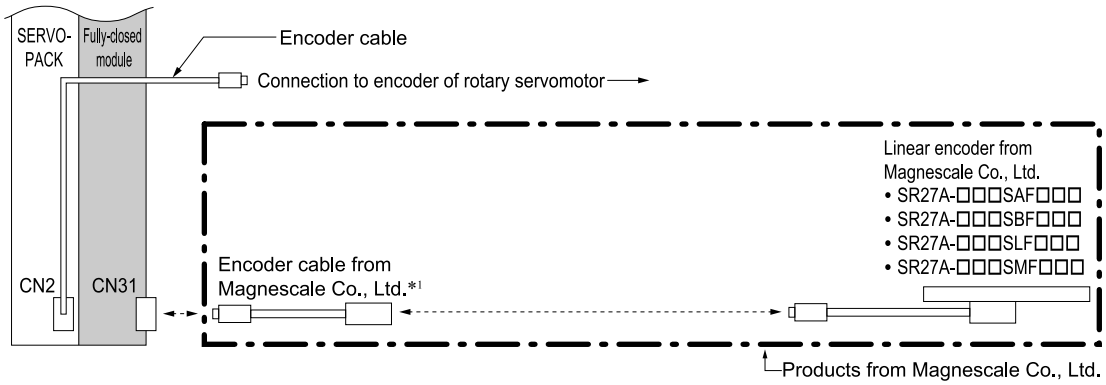
☞ *Encoder Cables on page 315*

- SmartSCALE Linear Encoder (SQ10 Scale and MQ10-FLA Interpolator)



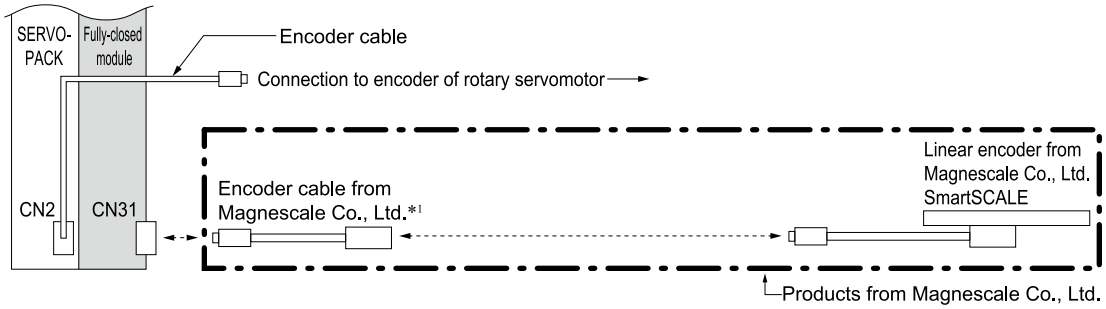
*1 Use an encoder cable from Magnescale Co., Ltd.. The maximum length of the encoder cable is 15 m. Contact Magnescale Co., Ltd. for specifications other than the cable length.

- SR27A Linear Encoder



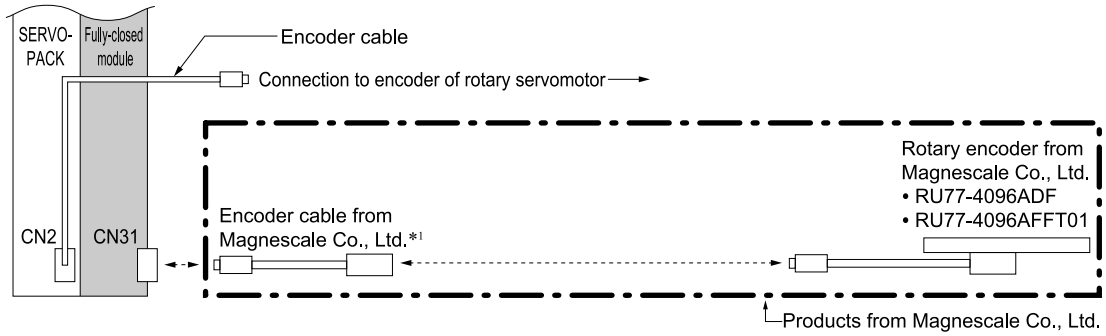
*1 Use a CH33-xx□□G cable from Magnescale Co., Ltd. (This cable has connectors designed for use with Yaskawa products.)

- SmartSCALE Linear Encoder (SQ47 or SQ57)



*1 Use an encoder cable from Magnescale Co., Ltd.. Contact Magnescale Co., Ltd. for details on encoder cable specifications.

- RU77-4096ADF or RU77-4096AFFT01 Absolute Rotary Encoders

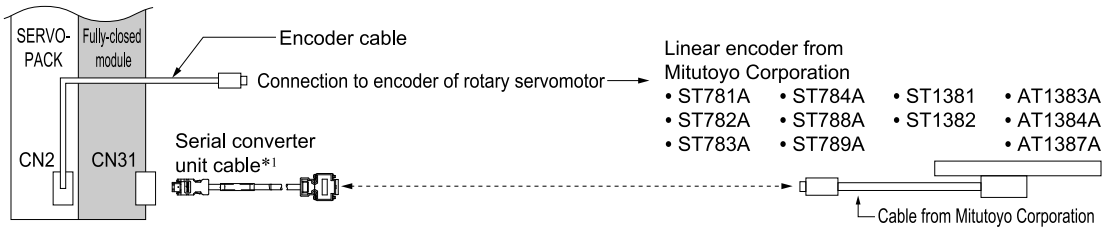


*1 Use a CE28-series extension cable for RU77 encoder from Magnescale Co., Ltd.

Note:

The RU77 is a single-turn absolute rotary encoder.

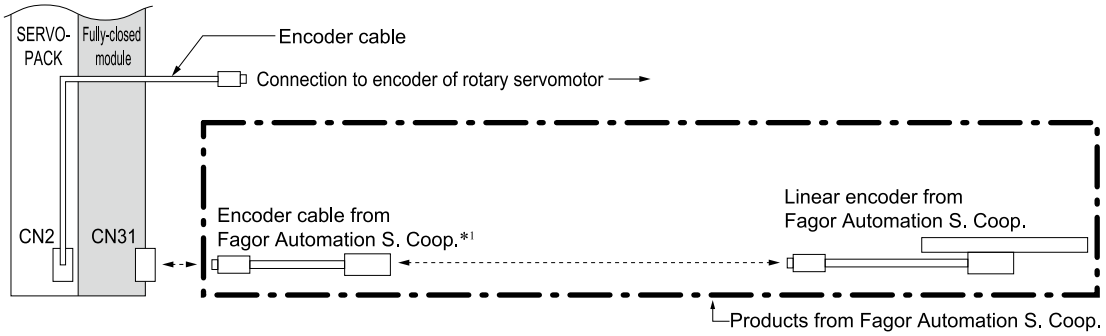
■ Connections to Linear Encoders from Mitutoyo Corporation



*1 Refer to the following section for details on serial converter unit cables.

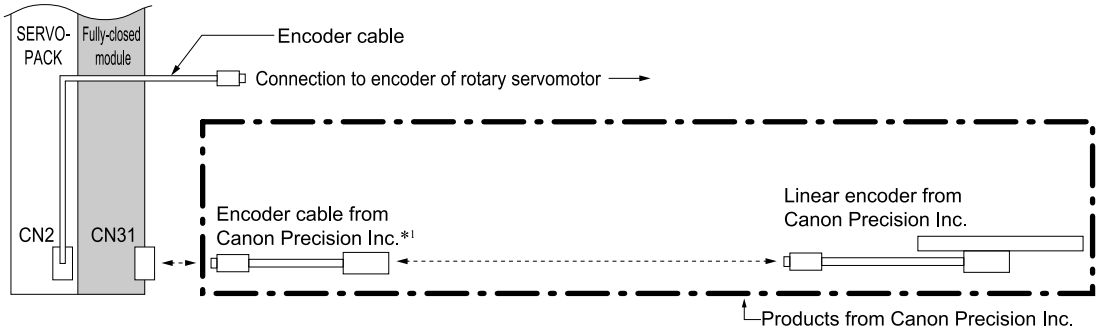
☞ *Serial Converter Unit Cables on page 314*

■ Connections to Linear Encoder from Fagor Automation S. Coop.



*1 Use encoder cables from Fagor Automation S. Coop. For detailed specifications of the encoder cables, consult Fagor Automation S. Coop. or its sales representative.

■ Connections to Linear Encoder from Canon Precision Inc.



*1 Use encoder cables from Canon Precision Inc. Contact Canon Precision Inc. for detailed encoder cable specifications.

General Specifications

Item		Specification		
		SGDV-OFB01A	SGDV-OFB03A	SGDV-OFB04A
Applicable SERVOPACK		All Sigma-X Series SERVOPACKs		
Applicable SERVOPACK Firmware Version		Version 0023 or later		
Placement		Attached to the SERVOPACK		
Power Specification	Power Supply Method	Supplied from the control power supply of the SERVOPACK		
Operating Conditions	Surrounding Air / Storage Temperature	0 °C to +55 °C / -20 °C to +85 °C		
	Ambient / Storage Humidity	max. 90% RH, non-condensing		
	Vibration / Shock Resistance	4.9 m/s^2 / 19.8 m/s^2		
	Protection Class / Pollution Degree	Protection class: IP10, Pollution degree: 2 An environment that satisfies the following conditions. • Free of corrosive or explosive gases • Free of exposure to water, oil or chemicals • Free of dust, salts or iron dust		
	Altitude	Max. 1,000 m		
	Others	Free of static electricity, strong electromagnetic fields, magnetic fields or exposure to radioactivity		
Supported motors		Permanent magnet, Synchronous AC rotary or linear motor		
Max. output frequency range		Must be lower than 500 [rev/sec]. **Note:** UL application: 400 [rev/sec] (200 V), 300 [rev/sec] (400 V). If UL is needed, the combination should be applied to UL on customer side.		Must be lower than 240 [rev/sec]. **Note:** UL application: 400 [rev/sec] (200 V), 300 [rev/sec] (400 V). If UL is needed, the combination should be applied to UL on customer side.
Supported scales for motor driving usage		EnDat2.1, EnDat2.2, HIPERFACE, Sin/Cos	A quad B	-
Supported scales for fully-closed usage		EnDat2.1, EnDat2.2, HIPERFACE, Sin/Cos	A quad B	-

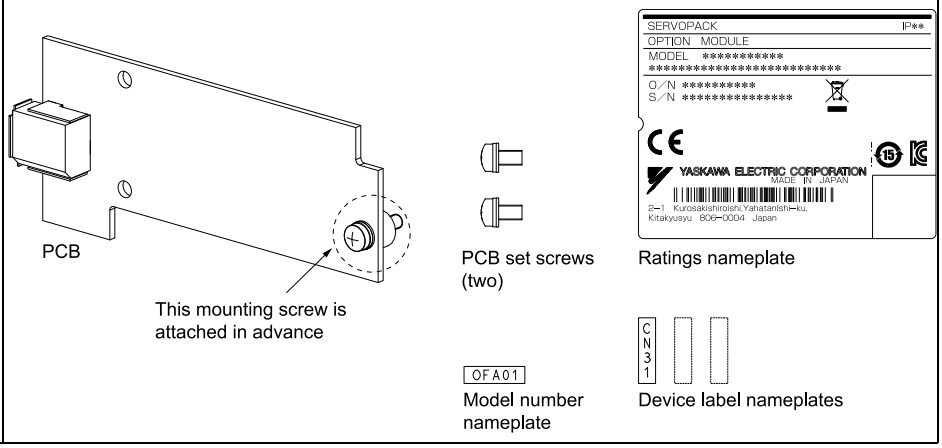
Continued on next page.

Continued from previous page.

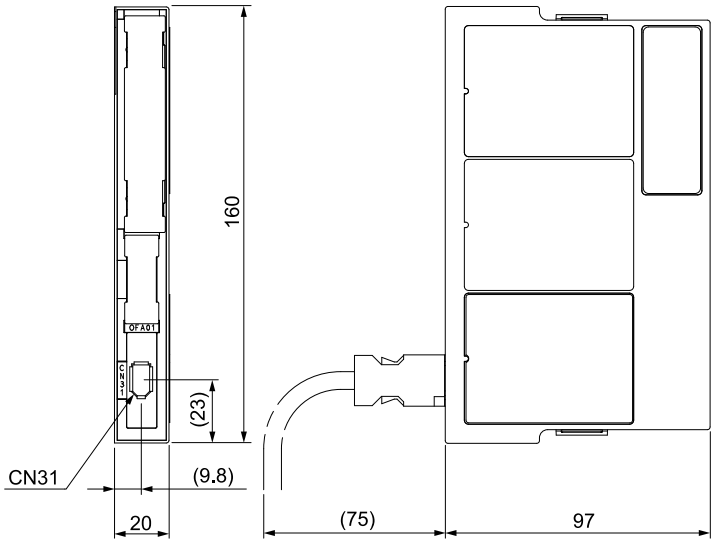
Item		Specification		
		SGDV-OFB01A	SGDV-OFB03A	SGDV-OFB04A
Motor pole information for motor driving	Without hall sensor signals	Sigma-5 detecting function is available. In case of EnDat2.1, EnDat2.2 and HIPERFACE, the function should be carried out once (after that, recognized data will be used). In other cases, the function should be carried out each boot-up.	Sigma-5 detecting function is available. In other cases, the function should be carried out each boot-up.	-
	With hall sensor signals	The data is used (any functions needed for the information).		-
	Incremental usage	-		Sigma-5 detecting function is available. In other cases, the function should be carried out each boot-up.
	Absolute usage	-		The data is used (any functions needed for the information). The pole detection function should be carried out only once after the card or the motor has been replaced.
Unsupported devices		Advanced option module safety: SGDV-OSA01A Fully-closed option module: SGDV-OFA01A		

Accessories

If you purchase a fully-closed module by itself, the following accessories will be packed with it.

Order Number	SGDV-OFA01A
Accessories	

External Dimensions



Unit: mm
Approx. mass: 0.1 kg

■ Connectors

Device Label	Model	Number of Pins	Manufacturer
CN31	3E106-0220KV	6	3M Japan Limited

Note:

The above connectors or their equivalents are used for the SERVOPACKs.

■ Pin Arrangement of External Encoder Connector (CN31)

The following table lists the signal names and functions.

Pin No.	Signal	Function
1	PG5V	Encoder power supply +5 V
2	PG0V	Encoder power supply 0 V
3	–	–
4	–	–
5	PS	Serial data (+)
6	/PS	Serial data (-)
Shell	Shield	–

Safety Option Modules

Safety Modules

This Safety Module implements safety functions that conform to EN ISO 13849-1 (the harmonized EU Machinery Directive) and are specified in the individual IEC 61800-5-2 standard. You can combine the module with an SGDXS SERVOPACK to design optimum safety in a machine system according to industry needs.

Model Designations

When ordering a SERVOPACK and a safety option module separately, use the following safety option module model number.

SGDXS - OS A A 1 A 0000

Σ-X series
Σ-XS model (single axis)

❶ ❷ ❸ ❹ ❺ ❻

❶ Module Type

Code	Specification
OS	Safety Option Module

❷ Regional Specification

Code	Specification
A	Japan
B	Europe
C	America
D	China

❸ Fieldbus Specification

Code	Specification
0	No safety fieldbus
A	Safety over EtherCAT (FSoE)

❹ I/O Device Specification

Code	Specification
0	ASM-X doesn't have I/O device
1	ASM-X has I/O device

❺ Design Revision Order

A

❻ Option Specification

Code	Specification
0000	Standard (can be omitted)
0002	Varnish coating

One option case kit is required for each SERVOPACK.
Option case kit model: SGDXS-OZA01A

Standards Compliance

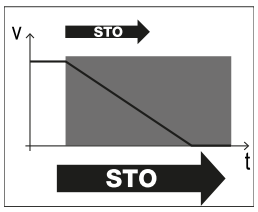
■ Compliance with Safety Standards

Item	Specification	Products
Safety Integrity Level	IEC 60508	SIL3
	IEC 62061	SILCL3 Maximum SIL3
Mission Time	IEC 60508	20 years
Probability of Dangerous Failure per Hour	IEC 60508 IEC 62061	Satisfies SIL3/SILC3 requirements
Performance Level	EN ISO 13849-1	PL e (Category 3)

■ Supported Safety Functions as defined in IEC61800-5-2

Safety functions are implemented by using the hard wire base block (HWBB) in the SERVOPACK.

- Safe Switch-Off (Safe BaseBlock Function)

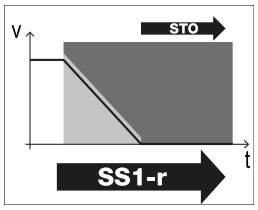


Safe Torque Off

This function shuts OFF the power supply to the motor by executing the HWBB function of the SERVOPACK according to the safety request input state. The drive cannot generate any hazardous movements.

If STO is activated when the drive is moving, the motor will run down in an uncontrolled manner.

- Safe Standstill

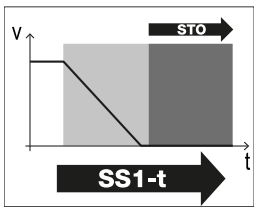


Safe Stop 1, deceleration monitored and time controlled

The safety module will activate STO:

– If the speed limit is exceeded during deceleration.

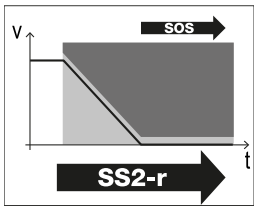
– After the monitoring time has elapsed.



Safe Stop 1, deceleration time controlled

The safety module will activate STO:

– After the monitoring time has elapsed.



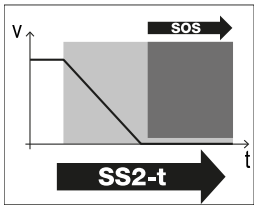
Safe Stop 2, deceleration monitored and position monitored

The safety module will activate STO:

– If the speed limit is exceeded during deceleration.

The safety module will activate SOS:

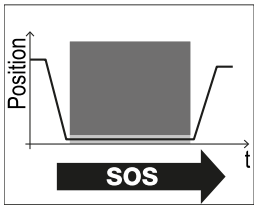
– After the monitoring time has elapsed (provided that no limit violation has occurred during deceleration).
If the position deviation exceeds the limit, the safety module will activate STO.



Safe Stop 2, deceleration time controlled and position monitored

The safety module will activate SOS:

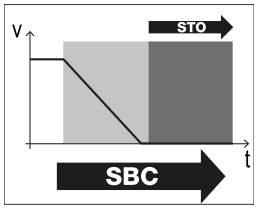
– After the monitoring time has elapsed.
If the position deviation exceeds the limit, the safety module will activate STO.



Safe Operating Stop

On safety function execution request, the safety module will switch to position monitoring.

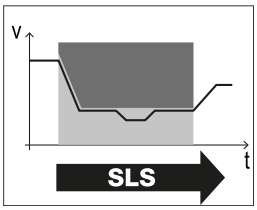
If the position deviation exceeds the limit, the safety module will activate STO.



Safe Brake Control

This output function can be used to control an external brake after a Safe Torque Off (STO) or a Safe Stop 1 (SS1).

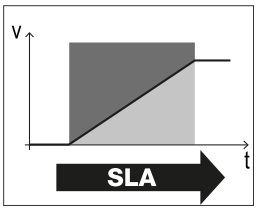
- Safe Motion



Safely Limited Speed

On safety function execution request, the safety module starts to monitor the speed (first deceleration monitoring, then constant speed monitoring).

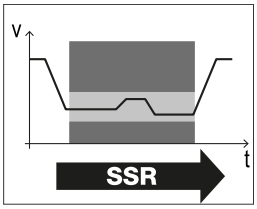
If any speed limit is violated, the safety module will activate the selected stopping method, for example STO (default).



Safely Limited Acceleration

This function monitors the acceleration operation of the motor according to the safety request input state.

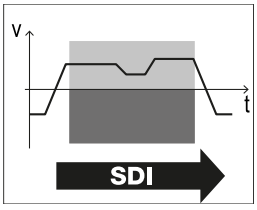
If the specified acceleration speed is exceeded, the selected motor stopping method will be applied, for example STO (default).



Safe Speed Range

This function adds minimum speed monitoring to the SLS function. In other words, the maximum speed must not exceed a certain value, and the minimum speed must not drop below a certain value.

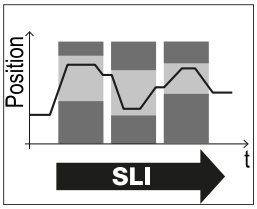
If either of these limits is violated, the selected motor stopping method will be applied, for example STO (default).



Safe Direction

This function prevents the motor from moving in an invalid direction, it can only move in one (defined) direction. If the specified direction is violated, the safety module will activate STO.

- Safe Positioning

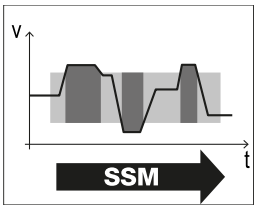


Safely Limited Increment

This function monitors the movements of the drive for compliance with a defined increment. The reference position is defined when monitoring is activated.

If a limit value is violated, the safety module will activate STO.

- Safe Monitoring



Safe Speed Monitor

This function provides a safe output signal to indicate whether speed is below or above a specified limit.

If the speed limit is violated during constant speed monitoring, the safety module will activate the configured safe output signal.

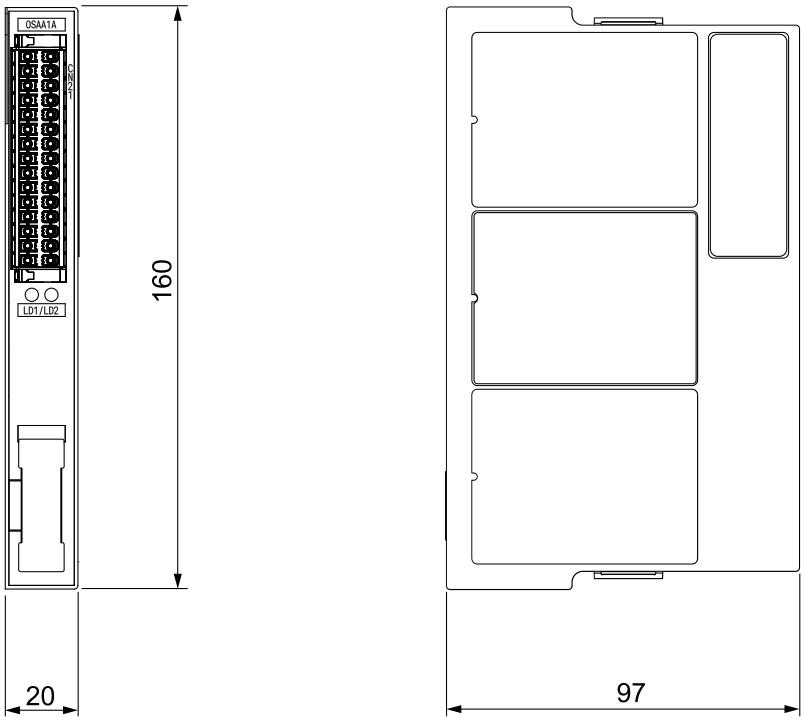
Note:

This function does not activate a stopping method after a limit violation.

The safety modules support different safety functions.

Safety Module	Description	Safety Functions Supported	I/Os	FSoE
SGDXS-OSA01A	Advanced Safety Module I/O only	STO, SS1-r, SS1-t, SS2-r, SS2-t, SOS, SLS, SSM, SDI, SLP, SSR, SLI, SCA, SLA, SBC	• 6 I/O dual channel SIL3/PLe Cat3 • 2 I/O single channel SIL2/PLd Cat3	No
SGDXS-OSAA0A	Advanced Safety Module FSoE only	STO, SS1-r, SS1-t, SS2-r, SS2-t, SOS, SLS, SSM, SDI, SLP, SSR, SLI, SCA, SLA	-	Yes
SGDXS-OSAA1A	Advanced Safety Module FSoE and I/O	STO, SS1-r, SS1-t, SS2-r, SS2-t, SOS, SLS, SSM, SDI, SLP, SSR, SLI, SCA, SLA, SBC	• 5 I/O dual channel SIL3/PLe Cat3	Yes

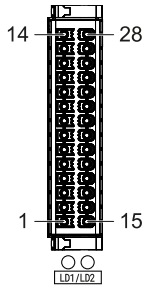
External Dimensions (including case)



Unit: mm
Approx. mass: 0.1 kg

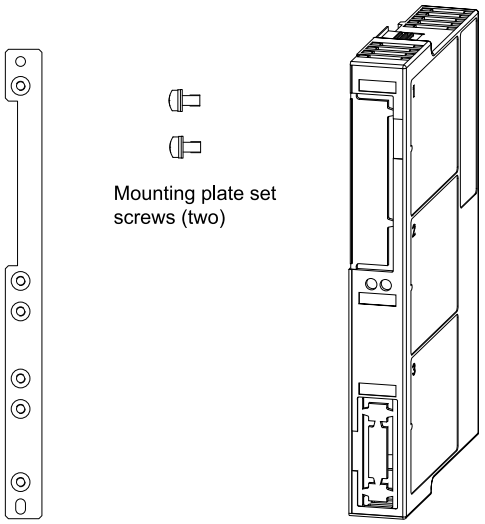
■ Connectors

PIN No.	Signal	Description	PIN No.	Signal	Description	Figure
1	N.C.	–	15	N.C.	–	
2	N.C.	–	16	N.C.	–	
3	N.C.	–	17	N.C.	–	
4	DOCOM	Digital output common	18	DICOM	Digital input common	
5	DOE2	Digital output port E, channel 2	19	DIE2	Digital input port E, channel 2	
6	DOD2	Digital output port D, channel 2	20	DID2	Digital input port D, channel 2	
7	DOC2	Digital output port C, channel 2	21	DIC2	Digital input port C, channel 2	
8	DOB2	Digital output port B, channel 2	22	DIB2	Digital input port B, channel 2	
9	DOA2	Digital output port A, channel 2	23	DIA2	Digital input port A, channel 2	
10	DOE1	Digital output port E, channel 1	24	DIE1	Digital input port E, channel 1	
11	DOD1	Digital output port D, channel 1	25	DID1	Digital input port D, channel 1	
12	DOC1	Digital output port C, channel 1	26	DIC1	Digital input port C, channel 1	
13	DOB1	Digital output port B, channel 1	27	DIB1	Digital input port B, channel 1	
14	DOA1	Digital output port A, channel 1	28	DIA1	Digital input port A, channel 1	



Option Case Kit

If you purchase the option module and SERVOPACK separately, one option case kit is required for each SERVOPACK.
The following accessories are packed with the option case kit.

Order Number	SGDXS-OZA01A
Accessories	

Additional Information

Capacity Selection for Servomotors

Selecting the Servomotor Capacity

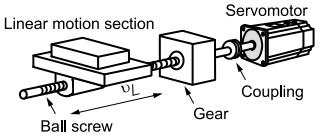
Use Yaskawa's SigmaSize+, an AC servo capacity selection program, to select the servomotor capacity. With the SigmaSize+, you can find the optimum servomotor capacity by simply selecting and entering information according to instructions from a wizard.

Contact your Yaskawa representative for information on this program.

Refer to the following selection examples to select servomotor capacities with manual calculations rather than with the above software.

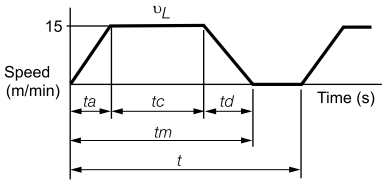
Capacity Selection Example for a Rotary Servomotor (Speed Control)

1. Machine Specifications



Item	Symbol	Value
Load Speed	υ_L	15 m/min
Linear Motion Section Mass	m	250 kg
Ball Screw Length	ℓ_B	1.0 m
Ball Screw Diameter	d_B	0.02 m
Ball Screw Lead	P_B	0.01 m
Ball Screw Material Density	ρ	7.87×10^3 kg/m^3
Gear Ratio	R	2 (gear ratio: 1/2)
External Force on Linear Motion Section	F	0 N
Gear and Coupling Moment of Inertia	J_G	0.40×10^{-4} kg·m^2
Number of Feeding Operations	n	40 rotations/min
Feeding Distance	ℓ	0.275 m
Feeding Time	tm	1.2 s max.
Friction Coefficient	μ	0.2
Mechanical Efficiency	η	0.9 (90%)

2. Operation Pattern



$$t = \frac{60}{n} = \frac{60}{40} = 1.5 \text{ (s)}$$

If $ta = td$,

$$ta = tm - \frac{60\ell}{\upsilon_L} = 1.2 - \frac{60 \times 0.275}{15} = 1.2 - 1.1 = 0.1 \text{ (s)}$$

$$tc = 1.2 - 0.1 \times 2 = 1.0 \text{ (s)}$$

3. Rotation Speed
   - Load Shaft Speed

$$n_L = \frac{\upsilon_L}{P_B} = \frac{15}{0.01} = 1500 \text{ (min}^{-1}\text{)}$$

   - Motor Shaft Speed

$n_M = n_L \cdot R = 1500 \times 2 = 3000$ (min^{-1})

4. Load Torque

$$T_L = \frac{(9.8 \cdot \mu \cdot m + F) \cdot P_B}{2\pi R \cdot \eta} = \frac{(9.8 \times 0.2 \times 250 + 0) \times 0.01}{2\pi \times 2 \times 0.9} = 0.43 \text{ (N·m)}$$

5. Load Moment of Inertia
   - Linear Motion Section

     $$J_{L1} = m\left(\frac{P_B}{2\pi R}\right)^2 = 250 \times \left(\frac{0.01}{2\pi \times 2}\right)^2 = 1.58 \times 10^{-4}\ (\text{kg·m}^2)$$

   - Ball Screw

     $$J_B = \frac{\pi}{32}\rho \cdot \ell_B \cdot d_B{}^4 \cdot \frac{1}{R^2} = \frac{\pi}{32} \times 7.87 \times 10^3 \times 1.0 \times (0.02)^4 \cdot \frac{1}{2^2} = 0.31 \times 10^{-4}\ (\text{kg·m}^2)$$

   - Coupling
     $J_G = 0.40 \times 10^{-4}(\text{kg·m}^2)$
   - Load Moment of Inertia at Motor Shaft
     $J_L = J_{L1} + J_B + J_G = (1.58 + 0.31 + 0.40) \times 10^{-4} = 2.29 \times 10^{-4}(\text{kg·m}^2)$
6. Load Moving Power

   $$P_O = \frac{2\pi n_M \cdot T_L}{60} = \frac{2\pi \times 3000 \times 0.43}{60} = 135\ (\text{W})$$

7. Load Acceleration Power

   $$Pa = \left(\frac{2\pi}{60} n_M\right)^2 \frac{J_L}{ta} = \left(\frac{2\pi}{60} \times 3000\right)^2 \times \frac{2.29 \times 10^{-4}}{0.1} = 226\ (\text{W})$$

8. Servomotor Provisional Selection
   a. Selection Conditions
      - $T_L \leq$ Motor rated torque
      - $\frac{(Po + Pa)}{2}$ < Provisionally selected servomotor rated output < $(Po + Pa)$
      - $n_M \leq$ Motor rated speed
      - $J_L \leq$ Allowable load moment of inertia

      The following servomotor meets the selection conditions.
      - SGMXJ-02A servomotor

   b. Specifications of the Provisionally Selected Servomotor

Item	Value
Rated Output	200 (W)
Rated Rotation Speed	3000 (min^{-1})
Rated Torque	0.637 (N·m)
Instantaneous Maximum Torque	2.23 (N·m)
Rotor Moment of Inertia	0.263×10^{-4} (kg·m^2)
Allowable Load Moment of Inertia	$0.263 \times 10^{-4} \times 15 = 3.94 \times 10^{-4}$ (kg·m^2)

9. Verification of the Provisionally Selected Servomotor
   - Verification of Required Acceleration Torque

     $$T_P = \frac{2\pi n_M (J_M + J_L)}{60ta} + T_L = \frac{2\pi \times 3000 \times (0.263 + 2.29) \times 10^{-4}}{60 \times 0.1} + 0.43$$

     $\approx$ 1.23 (N·m) < Maximum instantaneous torque...Satisfactory
   - Verification of Required Deceleration Torque

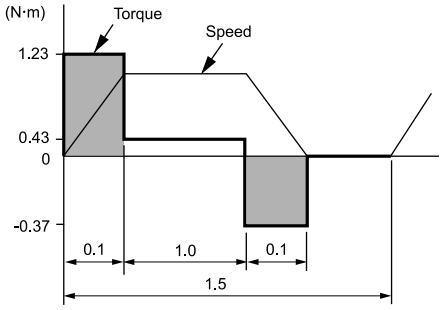
     $$T_S = \frac{2\pi n_M (J_M + J_L)}{60td} - T_L = \frac{2\pi \times 3000 \times (0.263 + 2.29) \times 10^{-4}}{60 \times 0.1} - 0.43$$

     $\approx$ 0.37 (N·m) < Maximum instantaneous torque...Satisfactory
   - Verification of Effective Torque Value

$$Trms = \sqrt{\frac{T_P^2 \cdot ta + T_L^2 \cdot tc + Ts^2 \cdot td}{t}} = \sqrt{\frac{(1.23)^2 \times 0.1 + (0.43)^2 \times 1.0 + (0.37)^2 \times 0.1}{1.5}}$$

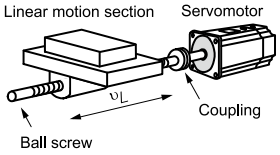
$$\approx 0.483 \text{ (N·m)} < \text{Rated torque...Satisfactory}$$

10. Selection Result
    It has been verified that the provisionally selected servomotor is applicable.
    The torque diagram is shown below.



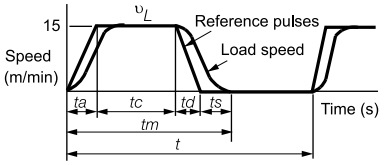
Capacity Selection Example for a Rotary Servomotor (Position Control)

1. Machine Specifications



Item	Symbol	Value
Load Speed	υ_L	15 m/min
Linear Motion Section Mass	m	80 kg
Ball Screw Length	ℓ_B	0.8 m
Ball Screw Diameter	d_B	0.016 m
Ball Screw Lead	P_B	0.005 m
Ball Screw Material Density	ρ	7.87×10^3 kg/m^3
External Force on Linear Motion Section	F	0 N
Coupling Mass	m_C	0.3 kg
Coupling Outer Diameter	d_C	0.03 m
Number of Feeding Operations	n	40 rotations/min
Feeding Distance	ℓ	0.25 m
Feeding Time	tm	1.2 s max.
Electrical Stopping Precision	δ	±0.01 mm
Friction Coefficient	μ	0.2
Mechanical Efficiency	η	0.9 (90%)

2. Speed Diagram



$t = \frac{60}{n} = \frac{60}{40} = 1.5$ (s)

If $ta = td$, $ts = 0.1$ (s)

$ta = tm - ts - \frac{60\ell}{\upsilon_L} = 1.2 - 0.1 - \frac{60 \times 0.25}{15} = 0.1$ (s)

$tc = 1.2 - 0.1 - 0.1 \times 2 = 0.9$ (s)

3. Rotation Speed
   - Load Shaft Speed
     $n_L = \frac{\upsilon_L}{P_B} = \frac{15}{0.005} = 3000$ (min^{-1})
   - Motor Shaft Speed
     Direct coupling gear ratio 1/R = 1/1
     Therefore, $n_M = n_L \cdot R = 3000 \times 1 = 3000$ (min^{-1})
4. Load Torque
   $T_L = \frac{(9.8\,\mu \cdot m + F) \cdot P_B}{2\pi R \cdot \eta} = \frac{(9.8 \times 0.2 \times 80 + 0) \times 0.005}{2\pi \times 1 \times 0.9} = 0.139$ (N·m)
5. Load Moment of Inertia
   - Linear Motion Section
     $J_{L1} = m\left(\frac{P_B}{2\pi R}\right)^2 = 80 \times \left(\frac{0.005}{2\pi \times 1}\right)^2 = 0.507 \times 10^{-4}$ (kg·m^2)
   - Ball Screw
     $J_B = \frac{\pi}{32}\rho \cdot \ell_B \cdot d_B{}^4 = \frac{\pi}{32} \times 7.87 \times 10^3 \times 0.8 \times (0.016)^4 = 0.405 \times 10^{-4}$ (kg·m^2)
   - Coupling
     $Jc = \frac{1}{8} m_C \cdot d_C{}^2 = \frac{1}{8} \times 0.3 \times (0.03)^2 = 0.338 \times 10^{-4}$ (kg·m^2)
   - Load Moment of Inertia at Motor Shaft
     $J_L = J_{L1} + J_B + J_C = 1.25 \times 10^{-4}$ (kg·m^2)
6. Load Moving Power
   $P_O = \frac{2\pi n_M \cdot T_L}{60} = \frac{2\pi \times 3000 \times 0.139}{60} = 43.7$ (W)
7. Load Acceleration Power
   $Pa = \left(\frac{2\pi}{60} n_M\right)^2 \frac{J_L}{ta} = \left(\frac{2\pi}{60} \times 3000\right)^2 \times \frac{1.25 \times 10^{-4}}{0.1} = 123.4$ (W)
8. Servomotor Provisional Selection
   a. Selection Conditions
      - $T_L \leq$ Motor rated torque
      - $\frac{(Po + Pa)}{2} <$ Provisionally selected servomotor rated output $< (Po + Pa)$
      - $n_M \leq$ Motor rated speed
      - $J_L \leq$ Allowable load moment of inertia

      The following servomotor meets the selection conditions.
      - SGMXJ-01A servomotor
   b. Specifications of the Provisionally Selected Servomotor

Item	Value
Rated Output	100 (W)
Rated Rotation Speed	3000 (min^{-1})
Rated Torque	0.318 (N·m)

Continued on next page.

Continued from previous page.

Item	Value
Instantaneous Maximum Torque	1.11 (N·m)
Rotor Moment of Inertia	0.0669×10^{-4} (kg·m^2)
Allowable Load Moment of Inertia	$0.0659 \times 10^{-4} \times 35 = 2.31 \times 10^{-4}$ (kg·m^2)
Encoder Resolution	67108864 (pulses/rev) (26 bits)

9. Verification of the Provisionally Selected Servomotor
   - Verification of Required Acceleration Torque

$$T_P = \frac{2\pi n_M (J_M + J_L)}{60ta} + T_L = \frac{2\pi \times 3000 \times (0.0659 + 1.25) \times 10^{-4}}{60 \times 0.1} + 0.139$$

$$\approx 0.552 \text{ (N·m)} < \text{Maximum instantaneous torque...Satisfactory}$$

   - Verification of Required Deceleration Torque

$$T_S = \frac{2\pi n_M (J_M + J_L)}{60td} - T_L = \frac{2\pi \times 3000 \times (0.0659 + 1.25) \times 10^{-4}}{60 \times 0.1} - 0.139$$

$$\approx 0.274 \text{ (N·m)} < \text{Maximum instantaneous torque...Satisfactory}$$

   - Verification of Effective Torque Value

$$Trms = \sqrt{\frac{T_P^2 \cdot ta + T_L^2 \cdot tc + Ts^2 \cdot td}{t}} = \sqrt{\frac{(0.552)^2 \times 0.1 + (0.139)^2 \times 0.9 + (0.274)^2 \times 0.1}{1.5}}$$

$$\approx 0.192 \text{ (N·m)} < \text{Rated torque...Satisfactory}$$

   It has been verified that the provisionally selected servomotor is applicable in terms of capacity. Position control is considered next.

10. Positioning Resolution
    The electrical stopping precision $\delta = \pm 0.01$ mm, so the positioning resolution $\Delta\ell = 0.01$ mm.
    The ball screw lead $P_B = 0.005$ m, so the number of pulses per motor rotation is calculated using the following formula.

$$\text{Number of pulses per rotation (pulses)} = \frac{P_B}{\Delta\ell} = \frac{5 \text{ mm/rev}}{0.01 \text{ mm}} = 500 \text{ (P/rev)} < \text{Encoder resolution〔67108864 (P/rev)〕}$$

    The number of pulses per motor rotation is less than the encoder resolution (pulses/rev), so the provisionally selected servomotor can be used.

11. Reference Pulse Frequency
    The load speed $v_L = 15$ m/min $= 1000 \times 15/60$ mm/s and the positioning resolution (travel distance per pulse) = 0.01 mm/pulse, so the reference pulse frequency is calculated with the following formula.

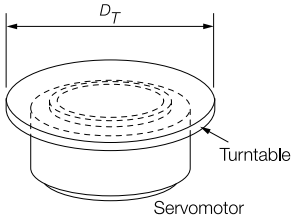
$$vs = \frac{1000\, v_L}{60 \times \Delta\ell} = \frac{1000 \times 15}{60 \times 0.01} = 25{,}000 \text{ (pps)}$$

    The reference pulse frequency is less than the maximum input pulse frequency *1, so the provisionally selected servomotor can be used.
    *1 Refer to the specifications in the SERVOPACK manual for the maximum input pulse frequency.

It has been verified that the provisionally selected servomotor is applicable for position control.

Capacity Selection Example for Direct Drive Servomotors

1. Machine Specifications

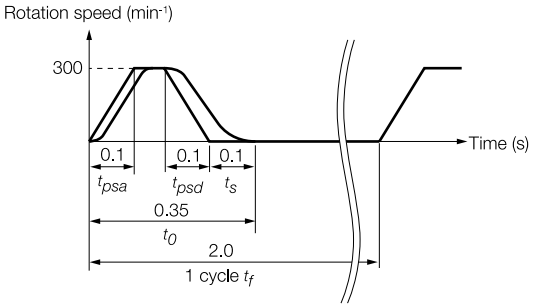


Item	Code	Value		Item	Code	Value
Turntable Mass	W	12 kg		Acceleration/Deceleration Time	t_p = t_{psa} = t_{psd}	0.1 s
Turntable Diameter	D_T	300 mm		Operating Frequency	t_f	2 s
Rotational Angle per Cycle	θ	270 deg		Load Torque	T_L	0 N· m
Positioning Time	t_0	0.35 s		Settling Time	t_s	0.1 s

2. Motor Speed of Direct Drive Servomotor

$$N_O = \frac{\theta}{360} \times \frac{60}{(t_0 - t_p - t_s)} = \frac{270}{360} \times \frac{60}{(0.35 - 0.1 - 0.1)} = 300\ (\text{min}^{-1})$$

3. Operation Pattern



4. Load Moment of Inertia

$$J_L = \frac{1}{8} \times D_T^2 \times W = \frac{1}{8} \times (300 \times 10^{-3})^2 \times 12 = 0.135\ (\text{kg·m}^2)$$

5. Load Acceleration/Deceleration Torque

$$T_a = J_L \times 2\pi \times \frac{N_O/60}{t_p} = 0.135 \times 2\pi \times \frac{300/60}{0.1} = 42.4\ (\text{N·m})$$

6. Provisional Selection of Direct Drive Servomotor

① Selection Conditions

- Load acceleration/deceleration torque < Instantaneous maximum torque of direct drive servomotor
- Load moment of inertia < Allowable load moment of inertia ratio (J_R) × Moment of inertia of direct drive servomotor (J_M)

The following servomotor meets the selection conditions.

- SGMCV-17CEA11

② Specifications of the Provisionally Selected Servomotor

Item	Value
Rated Torque	17 (N· m)
Instantaneous Maximum Torque	51 (N· m)
Moment of Inertia (J_M)	0.00785 (kg· m^2)
Allowable Load Moment of Inertia Ratio (J_R)	25

7. Verification of the Provisionally Selected Servomotor

- Verification of Required Acceleration Torque

$$T_{Ma} = \frac{(J_L + J_M) \times N_O}{9.55 \times t_{psa}} = \frac{(0.135 + 0.00785) \times 300}{9.55 \times 0.1}$$

$\fallingdotseq$ 44.9 (N·m)<Maximum instantaneous torque···Satisfactory

- Verification of Required Deceleration Torque

$$T_{Md} = -\frac{(J_L + J_M) \times N_O}{9.55 \times t_{psd}} = -\frac{(0.135 + 0.00785) \times 300}{9.55 \times 0.1}$$

$\fallingdotseq -44.9$ (N·m)<Maximum instantaneous torque···Satisfactory

- Verification of Effective Torque Value

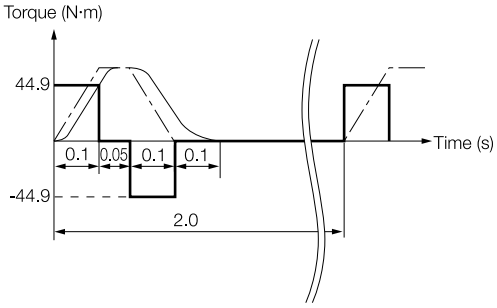
$$Trms = \sqrt{\frac{T_{Ma}^2 \times t_{psa} + T_L^2 \times t_c + T_{Md}^2 \times t_{psd}}{tf}} = \sqrt{\frac{44.9^2 \times 0.1 + 0^2 \times 0.05 + (-44.9)^2 \times 0.1}{2}}$$

$\fallingdotseq$ 14.2 (N·m) <Rated torque···Satisfactory

t_c= Time of constant rotation speed = $t_0 - t_s - t_{psa} - t_{psd}$

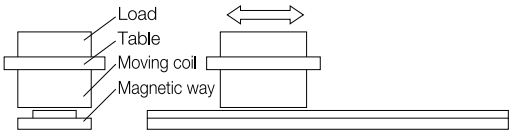
8. Result

It has been verified that the provisionally selected servomotor is applicable. The torque diagram is shown below.



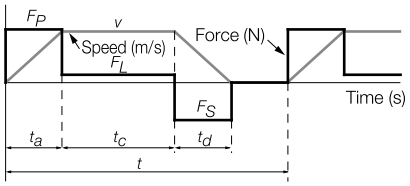
Capacity Selection Example for Linear Servomotors

1. Machine Specifications



Item	Code	Value		Item	Code	Value
Load Mass	m_W	1 kg		Acceleration Time	t_a	0.02 s
Table Mass	m_T	2 kg		Constant-speed Time	t_c	0.36 s
Motor Speed	v	2 m/s		Deceleration Time	t_d	0.02 s
Feeding Distance	l	0.76 m		Cycle Time	t	0.5 s
Friction Coefficient	μ	0.2		External Force on Linear Motion Section	F	0 N

2. Operation Pattern



3. Steady-State Force (Excluding Servomotor Moving Coil)

$F_L = \{9.8 \times \mu \times (m_W + m_T)\} + F = 9.8 \times 0.2 \times (1 + 2) + 0 = 5.88$ (N)

4. Acceleration Force (Excluding Servomotor Moving Coil)

$$F_P = (m_W + m_T) \times \frac{v}{t_a} + F_L = (1 + 2) \times \frac{2}{0.02} + 5.88 = 305.88 \text{ (N)}$$

5. Provisional Selection of Linear Servomotor

① Selection Conditions

- $F_p \leq$ Maximum force × 0.9

- $F_s \leq$ Maximum force × 0.9
- $F_{rms} \leq$ Rated force × 0.9

The following servomotor moving coil and magnetic way meet the selection conditions.

- SGLGW-60A253CP linear servomotor moving coil
- SGLGM-60□□□C linear servomotor magnetic way

② Specifications of the Provisionally Selected Servomotor

Item	Value
Maximum Force	440 (N)
Rated Force	140 (N)
Moving Coil Mass (m_M)	0.82 (kg)
Servomotor Magnetic Attraction (F_{att})	0 (N)

6. Verification of the Provisionally Selected Servomotor

- Steady-State Force
  $F_L = \mu \{9.8 \times (m_W + m_T + m_M) + F_{att}\} = 0.2 \{9.8 \times (1 + 2 + 0.82) + 0\} = 7.5$ (N)
- Verification of Acceleration Force

$$F_P = (m_W + m_T + m_M) \times \frac{v}{t_a} + F_L = (1 + 2 + 0.82) \times \frac{2}{0.02} + 7.5$$

$$= 389.5 \text{ (N)} \leqq \text{Maximum force} \times 0.9 \text{ (= 396 N)} \cdots \text{Satisfactory}$$

- Verification of Deceleration Force

$$F_S = (m_W + m_T + m_M) \times \frac{v}{t_a} - F_L = (1 + 2 + 0.82) \times \frac{2}{0.02} - 7.5$$

$$= 374.5 \text{ (N)} \leqq \text{Maximum force} \times 0.9 \text{ (= 396 N)} \cdots \text{Satisfactory}$$

- Verification of Effective Force

$$F_{rms} = \sqrt{\frac{F_P^2 \cdot t_a + F_L^2 \cdot t_c + F_S^2 \cdot t_d}{t}} = \sqrt{\frac{389.5^2 \times 0.02 + 7.5^2 \times 0.36 + 374.5^2 \times 0.02}{0.5}}$$

$$= 108.3 \text{ (N)} \leqq \text{Rated force} \times 0.9 \text{ (= 132.3 N)} \cdots \text{Satisfactory}$$

7. Result

It has been verified that the provisionally selected servomotor is applicable.

Capacity Selection for Regenerative Resistors

Regenerative Power and Regenerative Resistance

The rotational energy of a driven machine such as a servomotor that is returned to the SERVOPACK is called regenerative power. The regenerative power is absorbed by charging a smoothing capacitor. When the regenerative power exceeds the capacity of the capacitor, it is consumed by a regenerative resistor. (This is called resistance regeneration.)

The servomotor is driven in a regeneration state in the following circumstances:

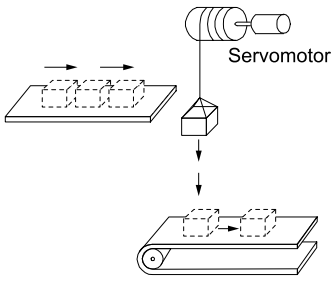
- While decelerating to a stop during acceleration/deceleration operation.
- While performing continuous downward operation on a vertical axis.
- During continuous operation in which the servomotor is rotated by the load (i.e., a negative load).

Important

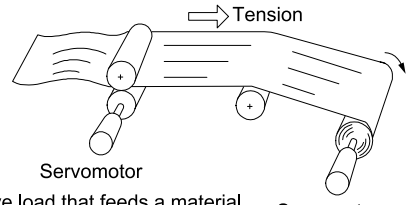
You cannot use the resistance regeneration provided by the SERVOPACK for continuous regeneration. For continuous operation with a negative load, you must design a system that also includes a power regenerative converter or power regenerative unit. If regenerative power is not appropriately processed, the regenerative energy from the load will exceed the allowable range and damage the SERVOPACK.

Examples of negative loads are shown below.

• Motor Drive to Lower Objects without a Counterweight



• Motor Drive for Feeding



Negative load that feeds a material at a constant speed under tension

Types of Regenerative Resistors

The following regenerative resistors can be used.

- Built-in regenerative resistor: A regenerative resistor that is built into the SERVOPACK. Not all SERVOPACKs have built in regenerative resistors.
- External regenerative resistor: A regenerative resistor that is connected externally to SERVOPACK. These resistors are used when the smoothing capacitor and built-in regenerative resistor in the SERVOPACK cannot consume all of the regenerative power.
  These resistors are also used when Yaskawa's SigmaSize+, an AC servo capacity selection program, determines an external regenerative resistor is necessary.

Note:

• Contact your Yaskawa representative for information on SigmaSize+.

• If you use an external regenerative resistor, you must change the setting of Pn600 (regenerative resistor capacity) and Pn603 (regenerative resistance).

Selection Table

SERVOPACK Model			Built-In Regenerative Resistor	External Regenerative Resistor	Description
SGDXS-	SGDXW-	SGDXT-			
R70A, R90A, 1R6A, or 2R8A	–	–	Not provided.	Basically not required.	There is no built-in regenerative resistor, but normally an external regenerative resistor is not required. Install an external regenerative resistor when the smoothing capacitor in the SERVOPACK cannot consume all the regenerative power. *1
3R8A, 5R5A, 7R6A, 120A, 180A, 200A, 330A, 1R9D, 3R5D, 5R4D, 8R4D, 120D, 170D	1R6A, 2R8A, 5R5A, 7R6A	1R6A or 2R8A	Standard feature *2	Basically not required.	A built-in regenerative resistor is provided as a standard feature. Install an external regenerative resistor when the built-in regenerative resistor cannot process all of the regenerative power. *1
470A, 550A, 590A, 780A, 210D, 260D, 280D, 370D	-	–	Not provided.	Required. *3	There is no built-in regenerative resistor. An external regenerative resistor is required. If an external regenerative resistor is not connected, Regeneration Error [A.300] will be displayed.

*1 Use Yaskawa's SigmaSize+, an AC servo capacity selection program, to select an external regenerative resistor. Contact your Yaskawa representative for information on SigmaSize+.

*2 Refer to the following section for the specifications of built-in regenerative resistors.
☞ *Specifications of Built-in Regenerative Resistors in SERVOPACKs on page 478*

*3 Regenerative resistor units are available from Yaskawa. For details, refer to the following section.
☞ *Regenerative Resistor Unit on page 481*

Selecting External Regenerative Resistor

You can use one of three methods to determine whether an external regenerative resistor is required.

☞ *Calculating With Yaskawa's Support Tool SigmaSize+: AC Servo Capacity Selection Program on page 521*
☞ *Simple Calculation on page 522*
☞ *Calculating the Regenerative Energy on page 529*

Calculating With Yaskawa's Support Tool SigmaSize+: AC Servo Capacity Selection Program

Using Yaskawa's support tool SigmaSize+, an AC servo capacity selection program, will allow you to use a wizard to calculate and select if external regenerative resistors are required or not.

Contact your Yaskawa representative for information on SigmaSize+.

Simple Calculation

When driving a servomotor with a horizontal shaft, check if an external regenerative resistor is required using the following calculation method. The calculation method depends on the model of the SERVOPACK.

■ SERVOPACK Models: SGDXS-R70A, -R90A, -1R6A, -2R8A,

Regenerative resistors are not built into the above SERVOPACKs. The total amount of energy that can be charged in the capacitors is given in the following table.

If the rotational energy (E_S) of the servomotor and load exceeds the processable regenerative energy, then connect an external regenerative resistor.

Applicable SERVOPACK		Processable Regenerative Energy (Joules)	Remarks
SGDXS-	R70A, R90A, 1R6A	24.2	Value when main circuit input voltage is 200 VAC
	2R8A	32.6	

Calculate the rotational energy (E_S) of the servo system with the following equation:

$E_S = J \times (n_M)^2/182$ (Joules)

- $J = J_M + J_L$
- J_M: Servomotor moment of inertia (kg·m^2)
- J_L: Load moment of inertia at motor shaft (kg·m^2)
- n_M: Servomotor operating motor speed (min^{-1})

■ For SERVOPACK Models: SGDXS-3R8A, -5R5A, -7R6A, -120A, -180A, -200A, -330A, -470A, -550A, -590A, -780A, -1R9D, -3R5D, -5R4D, -5R4D, -120D, -170D, -210D, -260D, -280D, -370D, SGDXW-1R6A, -2R8A, -5R5A, -7R6A, SGDXT-1R6A, -2R8A

For the above SERVOPACK models, an external regenerative resistor may be required depending on the allowable frequency for regenerative operation. (For SGDXS-470A, -550A, -590A, -780A, it is assumed that a regenerative resistor unit is connected.)

Use the following equation to calculate the allowable frequency for regenerative operation.

$$\text{Allowable frequency} = \frac{\text{Allowable frequency for regenerative operation for servomotor without load}}{(1+n)} \times \left(\frac{\text{Maximum motor speed}}{\text{Operating motor speed}}\right)^2 \text{(time/min)}$$

- $n = J_L/J_M$
- J_M: Servomotor moment of inertia (kg·m^2)
- J_L: Load moment of inertia at motor shaft (kg·m^2)

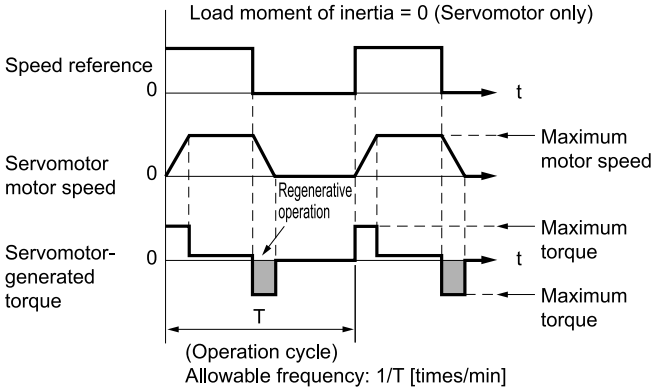
The allowable frequency for regenerative operation for a servomotor without load is explained below.

The operating conditions are acceleration and deceleration in an operation cycle with motor speed: 0 → specified motor speed → 0 (min^{-1}) as shown in the graph.

If the frequency (1/T) of the operation cycle is greater than the allowable frequency of the calculated result, an external regenerative resistor is required.

Finally, convert the data into the values for the actual motor speed and load moment of inertia to determine whether an external regenerative resistor is required.

If the specified motor speed is not designated, calculate by using the specified motor speed = maximum motor speed.



Operating Conditions for Calculating the Allowable Regenerative Frequency

Information **Allowable frequency for regenerative operation by a single servomotor without a load (described later)**

For SGDXS-470A, -550A, -590A, -780A, -210D, -260D, -280D, -370D, the values listed are with the optional regenerative resistor unit connected. Refer to the following sections for details on regenerative resistor unit.

☞ *Regenerative Resistor Unit on page 481*

◆ Rotary Servomotors

- SGMXJ Servomotors

Servomotor Model SGMXJ-	Specified Motor Speed	Allowable Frequency for Regenerative Operation for Servomotor Without Load (count/min)		
		Single-axis Operation	Simultaneous Operation of Two Axes	Simultaneous Operation of Three Axes
A5A	6000	–	300	300
01A	6000	–	180	180
C2A	6000	–	130	130
02A	6000	–	46	46
04A	6000	–	25	25
06A	6000	30	30	–
08A	6000	15	15	–

- SGMXA Servomotors

Servomotor Model SGMXA-	Specified Motor Speed	Allowable Frequency for Regenerative Operation for Servomotor Without Load (count/min)		
		Single-axis Operation	Simultaneous Operation of Two Axes	Simultaneous Operation of Three Axes
A5A	6000	–	560	560
01A	6000	–	360	360
C2A	6000	–	260	260
02A	6000	–	87	87
04A	6000	–	56	56
06A	6000	77	77	–
08A	6000	31	31	–
10A	6000	31	–	–
15A	6000	15	–	–
20A	6000	19	–	–
25A	6000	15	–	–

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Servomotor Model SGMXA-	Specified Motor Speed	Allowable Frequency for Regenerative Operation for Servomotor Without Load (count/min)		
		Single-axis Operation	Simultaneous Operation of Two Axes	Simultaneous Operation of Three Axes
30A	6000	6.9	–	–
40A	6000	11	–	–
50A	6000	8.8	–	–
70A	6000	86	–	–
15D	6000	21	–	–
20D	6000	34	–	–
25D	6000	26	–	–
30D	6000	12	–	–
40D	6000	11	–	–
50D	6000	8.8	–	–

- SGMXP Servomotors

Servomotor Model SGMXP-	Specified Motor Speed	Allowable Frequency for Regenerative Operation for Servomotor Without Load (count/min)		
		Single-axis Operation	Simultaneous Operation of Two Axes	Simultaneous Operation of Three Axes
01A	6000	–	200	200
02A	6000	–	46	46
04A	6000	–	29	29
08A	6000	11	11	–
15A	6000	7.5	–	–
02D	6000	160	–	–
04D	6000	100	–	–
08D	6000	20	–	–
15D	6000	10	–	–

- SGMXG Servomotors

Servomotor Model SGMXG-	Specified Motor Speed	Allowable Frequency for Regenerative Operation for Servomotor Without Load (count/min)	
		Single-axis Operation	Simultaneous Operation of Two Axes
03A	3000	39	39
05A	3000	29	29
09A	3000	6.9	6.9
13A	3000	6.1	–
20A	3000	7.4	–
30A	3000	9.5	–
44A	3000	6.4	–
55A	3000	24	–
75A	3000	34	–

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Servomotor Model SGMXG-	Specified Motor Speed	Allowable Frequency for Regenerative Operation for Servomotor Without Load (count/min)	
		Single-axis Operation	Simultaneous Operation of Two Axes
1AA	2000	39	–
1EA	2000	31	–
05D	3000	51	–
09D	3000	12	–
13D	3000	8.5	–
20D	3000	13	–
30D	3000	7.4	–
44D	3000	6.4	–
55D	3000	24	–
75D	3000	17	–
1AD	2000	39	–
1ED	2000	31	–

◆ Direct Drive Servomotors

- SGM7D Servomotors

Servomotor Model SGM7D-	Allowable Frequency for Regenerative Operation for Servomotor Without Load (count/min)	
	Single-axis Operation	Simultaneous Operation of Two Axes
01G	–	–
1AF	120	–
1CI	74	–
1ZI	91	–
02K	–	–
03H	–	–
05G	–	–
06J	350	–
06L	–	–
07K	–	–
08G	430	–
08K	–	–
09J	250	–
09J	–	–
12L	–	–
18G	350	–
18J	210	–
20J	200	–
24G	270	–

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Servomotor Model SGM7D-	Allowable Frequency for Regenerative Operation for Servomotor Without Load (count/min)	
	Single-axis Operation	Simultaneous Operation of Two Axes
28I	52	–
2BI	89	–
2DI	110	–
30F	210	–
30L	63	–
38J	150	–
34G	220	–
45G	190	–
58F	170	–
70I	100	–
90F	140	–

- SGM7E Servomotors

Servomotor Model SGM7E-	Allowable Frequency for Regenerative Operation for Servomotor Without Load (count/min)	
	Single-axis Operation	Simultaneous Operation of Two Axes
02B	–	62
05B	–	34
07B	–	22
04C	–	22
08D	–	6.1
10C	–	19
14C	–	22
17D	–	7
25D	–	9.3
16E	3.7	3.7
35E	9.7	9.7

- SGM7F Servomotors

Servomotor Model SGM7F-	Allowable Frequency for Regenerative Operation for Servomotor Without Load (count/min)	
	Single-axis Operation	Simultaneous Operation of Two Axes
02A	–	150
05A	–	83
07A	–	62
04B	–	75
08C	–	21
10B	–	48
14B	65	65

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Servomotor Model SGM7F-	Allowable Frequency for Regenerative Operation for Servomotor Without Load (count/min)	
	Single-axis Operation	Simultaneous Operation of Two Axes
16D	13	13
17C	30	30
25C	31	31
35D	19	19
45M	25	25
80M	19	–
1AM	8.9	–
80N	22	–
1EN	11	–
2ZN	9.1	–

◆ Linear Servomotors

- SGLGW Servomotors

Servomotor Model SGLGW-		Allowable Frequency for Regenerative Operation for Servomotor without Load (count/min)	
		Single-Axis Operation	Simultaneous Operation of Two Axes
Using a Standard-Force Magnetic Way	30A050C	–	190
	30A080C	–	120
	40A140C	–	56
	40A253C	–	32
	40A365C	–	22
	60A140C	–	49
	60A253C	–	27
	60A365C	37	37
	90A200C	34	–
	90A370C	33	–
	90A535C	24	–
Using a High-Force Magnetic Way	40A140C	–	80
	40A253C	–	45
	40A365C	62	62
	60A140C	–	64
	60A253C	71	71
	60A365C	49	49

- SGLFW2 Servomotors

Servomotor Model SGLFW2-	Allowable Frequency for Regenerative Operation for Servomotor without Load (count/min)	
	Single-Axis Operation	Simultaneous Operation of Two Axes
30A070A	–	38
30A120A	–	21
30A230A	22	11
45A200A	16	16
45A380A	10 *1	–
	17 *2	–
90A200A	14	–
90A380A	11	–
90A560A	18	–
1DA380A	21	–
1DA560A	32	–

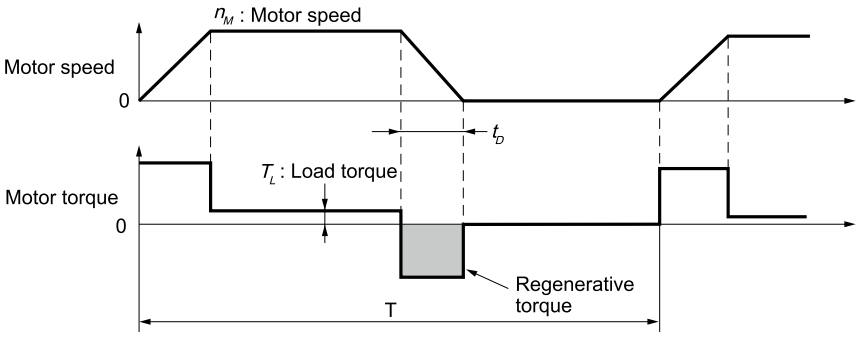
*1 This value is in combination with the SGDXS-120A.
*2 This value is in combination with the SGDXS-180A.

- SGLTW Servomotors

Servomotor Model SGLTW-	Allowable Frequency for Regenerative Operation for Servomotor without Load (count/min)	
	Single-Axis Operation	Simultaneous Operation of Two Axes
20A170A	15	15
20A320A	8.3	8.3
20A460A	7.1	–
35A170A	10	10
35A170H	8.5	8.5
35A320A	7	–
35A320H	5.9	–
35A460A	7.6	–
40A400B	13	–
40A600B	19	–
50A170H	15	15
50A320H	11	11

Calculating the Regenerative Energy

This section shows how to calculate the regenerative resistor capacity for the acceleration/deceleration operation shown in the following figure.



- Calculation Procedure for Regenerative Resistor Capacity

Step	Item	Symbol	Formula
1	Calculate the rotational energy of the servomotor.	E_S	$E_S = Jn_M^2/182$
2	Calculate the energy consumed by load loss during the deceleration period	E_L	$E_L = (\pi/60)\, n_M T_L t_D$
3	Calculate the energy lost from servomotor winding resistance.	E_M	(Value calculated from the graphs in *Servomotor Winding Resistance Loss on page 531*) × t_D
4	Calculate the energy that can be absorbed by the SERVOPACK.	E_C	Calculate from the graphs in *SERVOPACK-absorbable Energy on page 529*
5	Calculate the energy consumed by the regenerative resistor.	E_K	$E_K = E_S - (E_L + E_M + E_C)$
6	Calculate the required regenerative resistor capacity (W).	W_K	$W_K = E_K/(0.2 \times T)$

Note:

1. The 0.2 in the equation for calculating W_K is the value when the regenerative resistor's utilized load ratio is 20%.
2. The units for the various symbols are given in the following table.

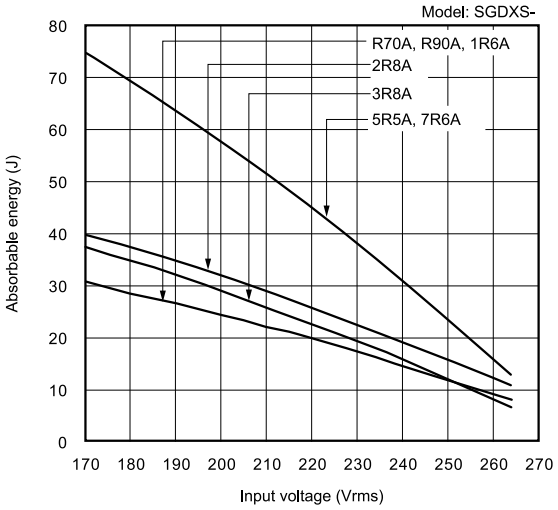
Symbol	Description
E_S to E_K	Energy in joules (J)
W_K	Required regenerative resistor capacity (W)
J	= J_M + J_L (kg·m^2)
n_M	Servomotor motor speed (min^{-1})
T_L	Load torque (N·m)
t_D	Deceleration stopping time (s)
T	Servomotor repeat operation cycle (s)

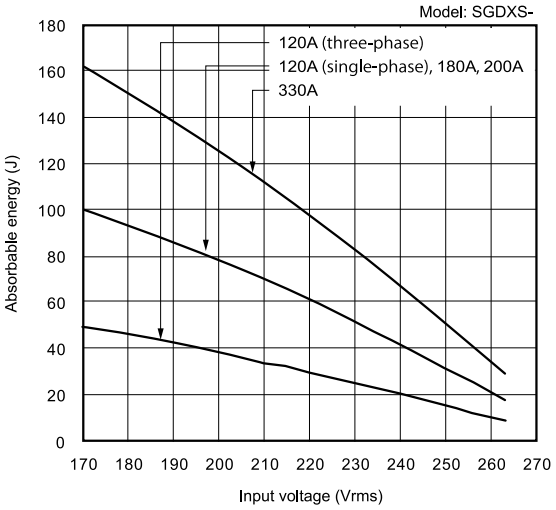
If the value of W_K does not exceed the capacity of the built-in regenerative resistor of the SERVOPACK, an external regenerative resistor is not required. For details on the built-in regenerative resisters, refer to the SERVOPACK specifications. If the value of W_K exceeds the capacity of the built-in regenerative resistor, install an external regenerative resistor with a capacity equal to the value for W calculated above.

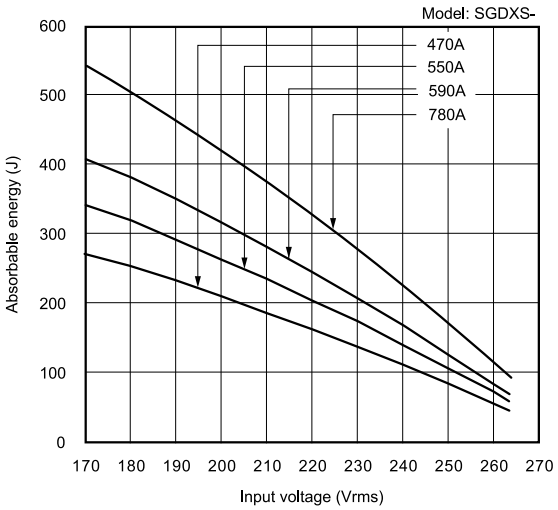
■ SERVOPACK-absorbable Energy

The following figures show the relationship between the SERVOPACK's input power supply voltage and its absorbable energy.

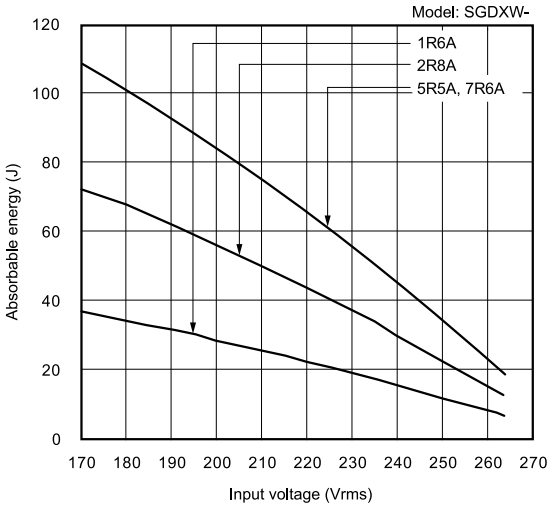
◆ Σ-XS SERVOPACKs (200 V Specification)



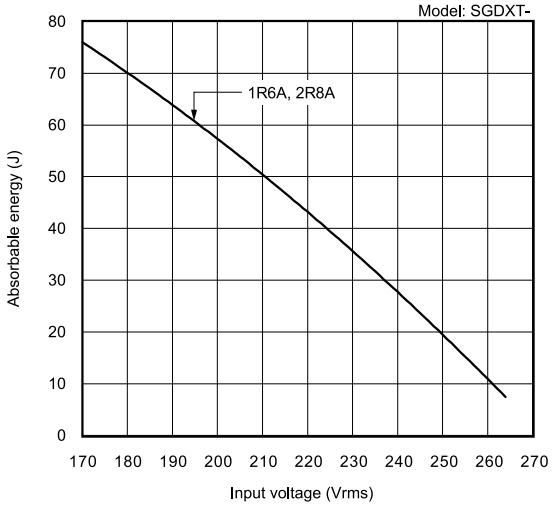




◆ Σ-XW SERVOPACKs (200 V Specification)



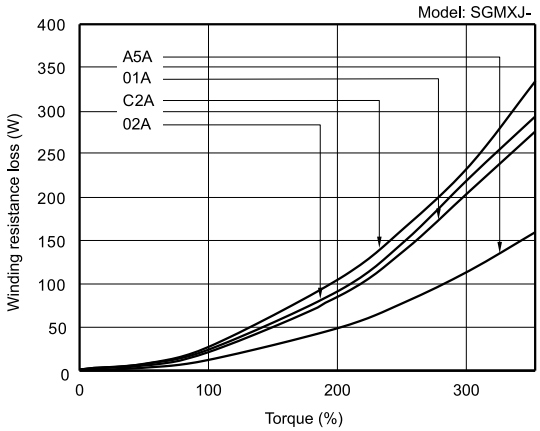
◆ Σ-XT SERVOPACKs (200 V Specification)

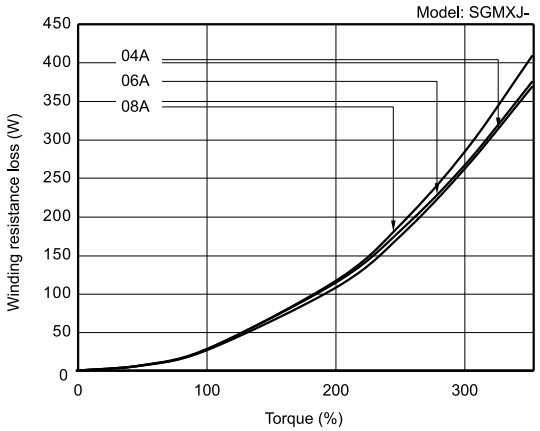


■ Servomotor Winding Resistance Loss

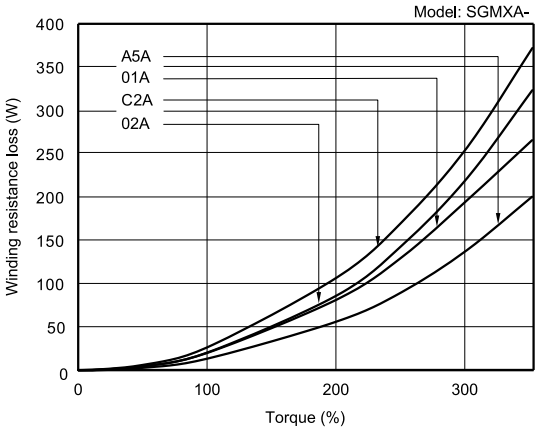
The following figures show the relationship for each servomotor between the servomotor's generated torque and the winding resistance loss.

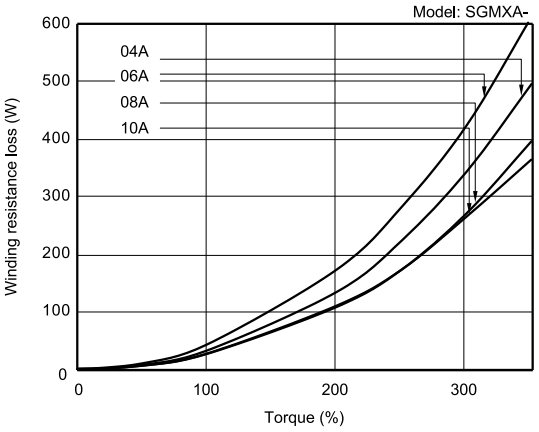
◆ SGMXJ Rotary Servomotors (200 V Specification)

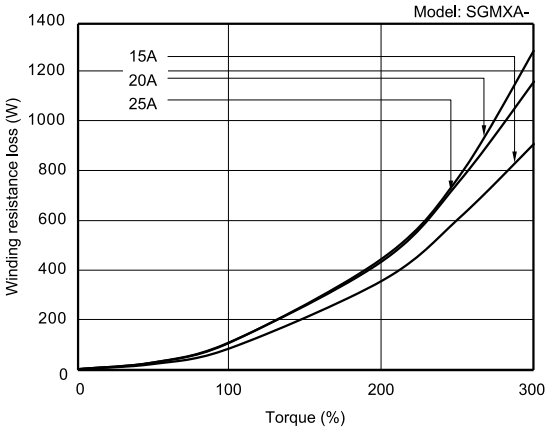


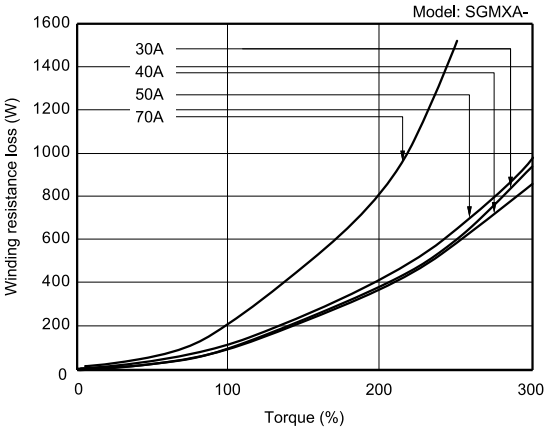


◆ SGMXA Rotary Servomotors (200 V Specification)

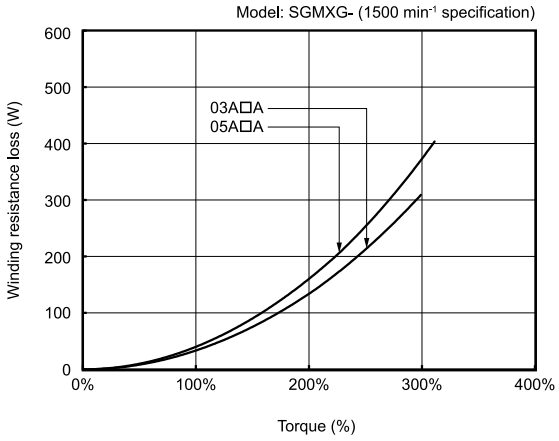


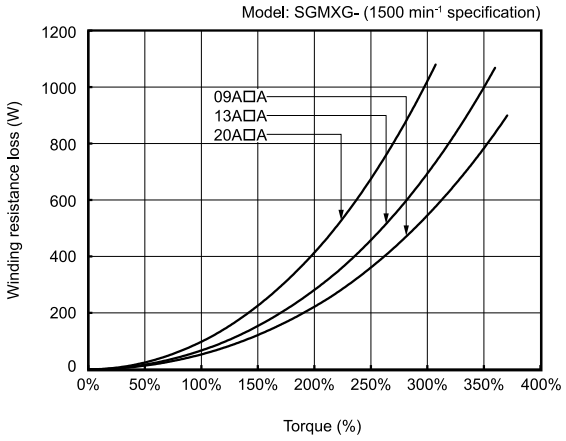


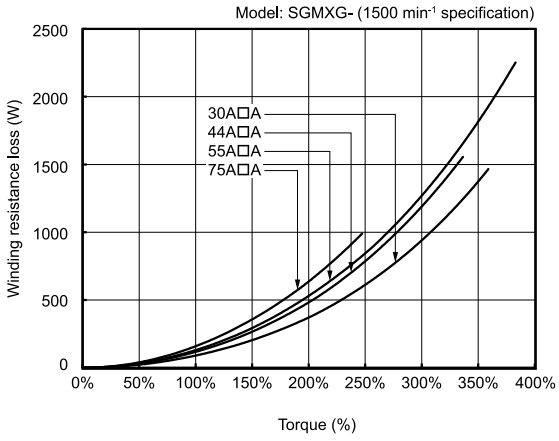


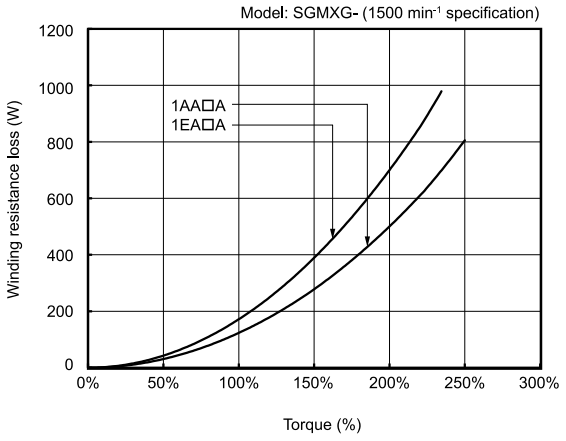


◆ SGMXG Rotary Servomotors (1500-min^{-1} Specification, 200 V Specification)

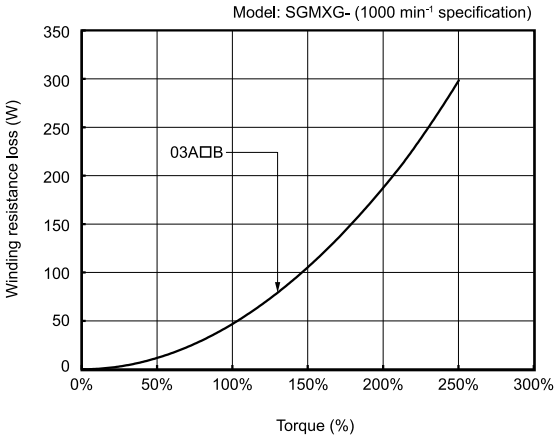


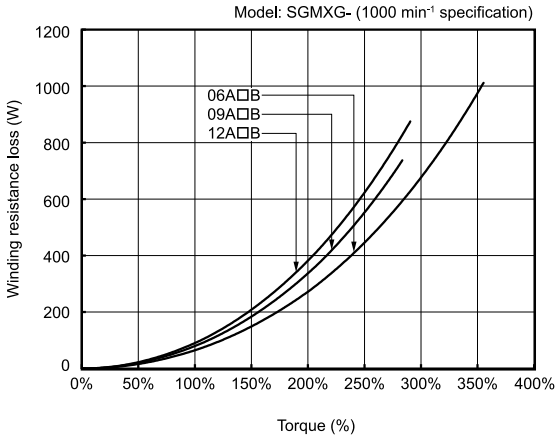


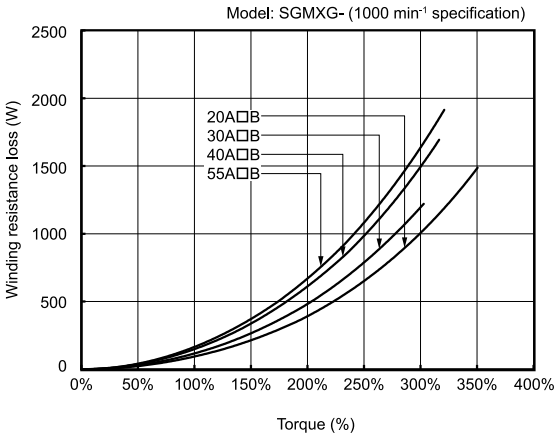




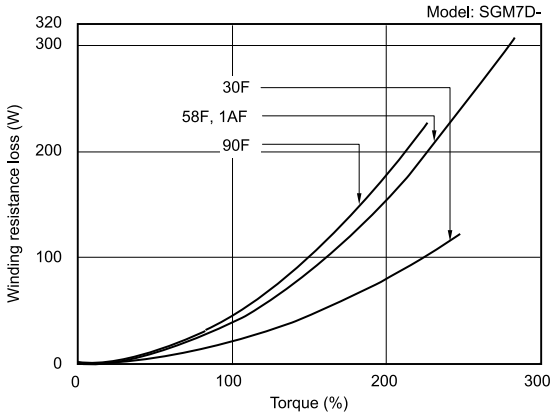
◆ SGMXG Rotary Servomotors (1000-min^{-1} Specification, 200 V Specification)

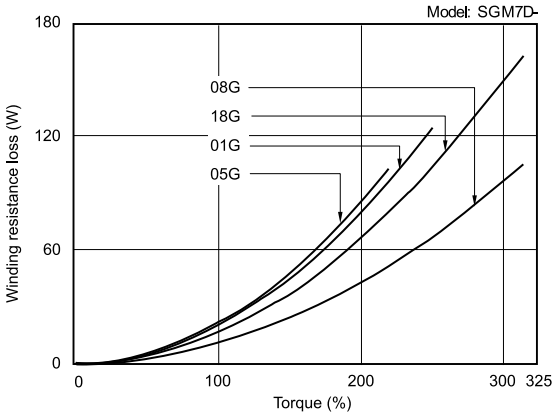


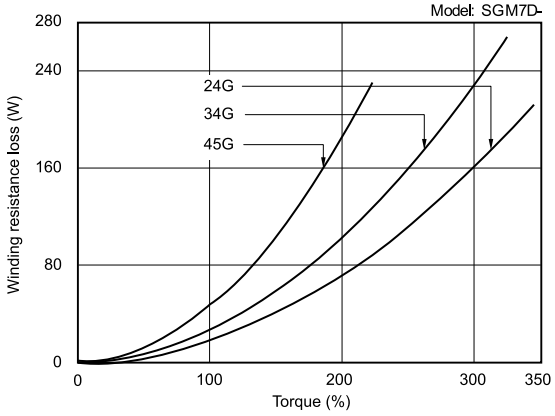


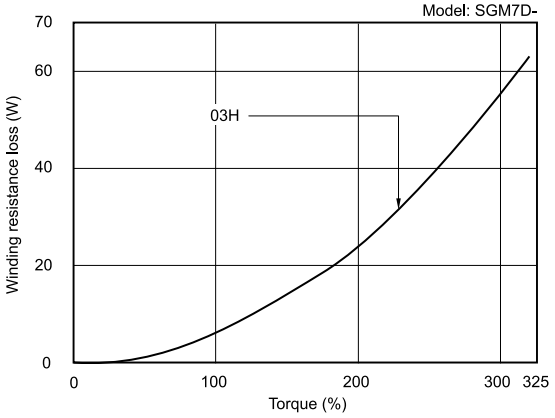


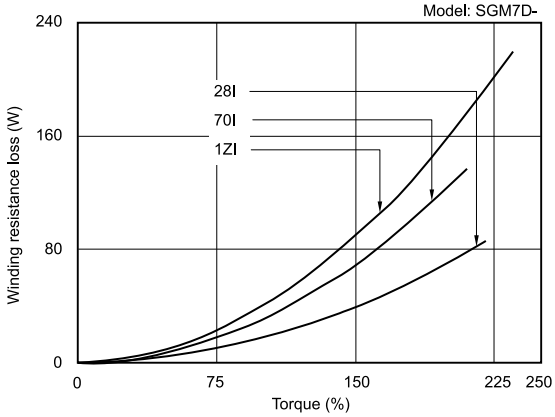
◆ SGM7D Direct Drive Servomotors

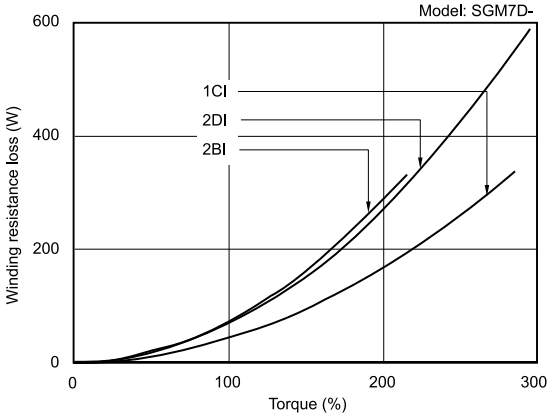


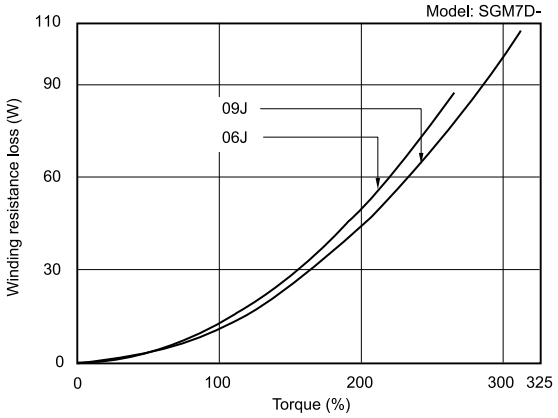


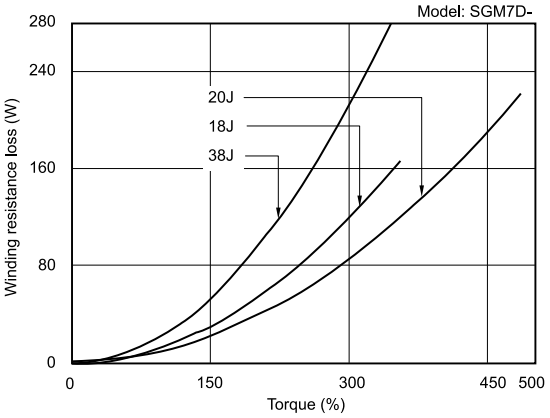


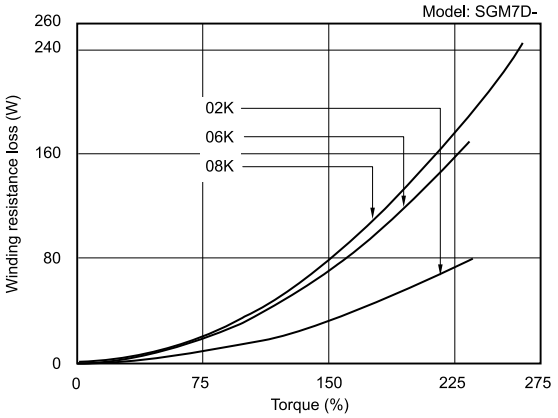


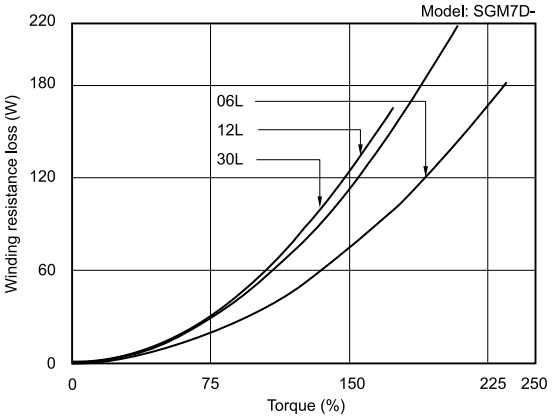




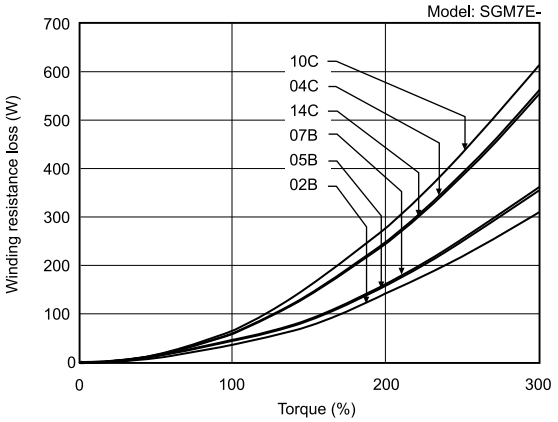


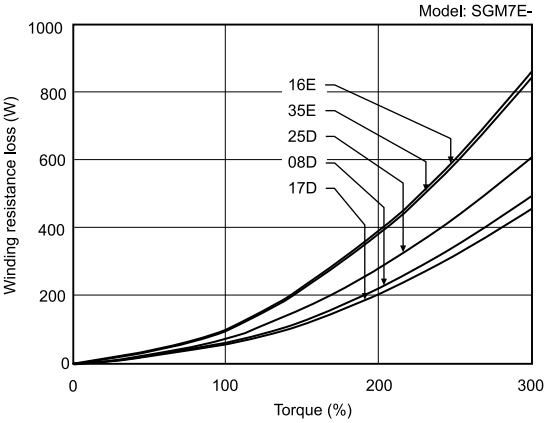




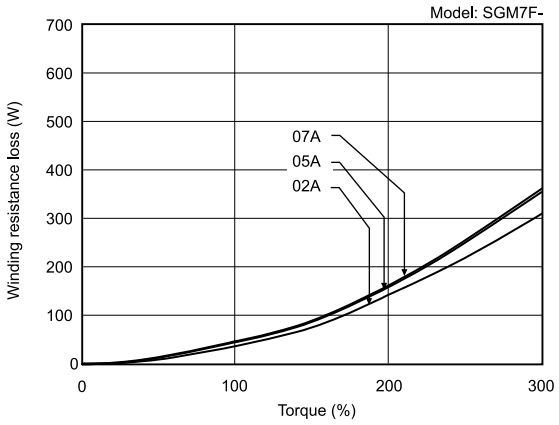


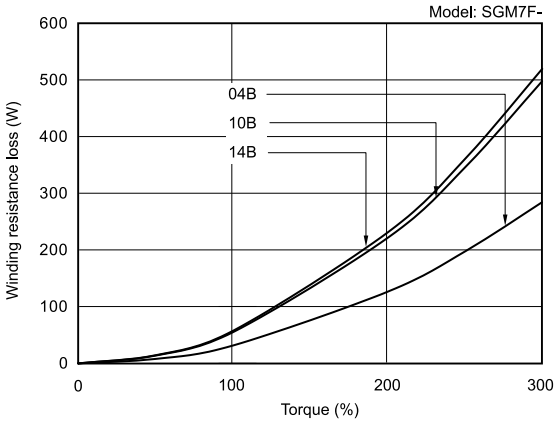
◆ SGM7E Direct Drive Servomotors

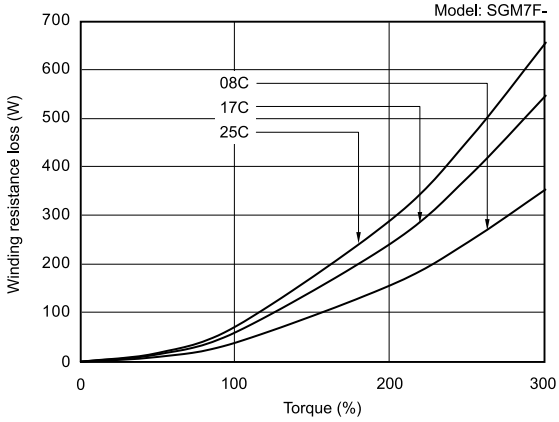


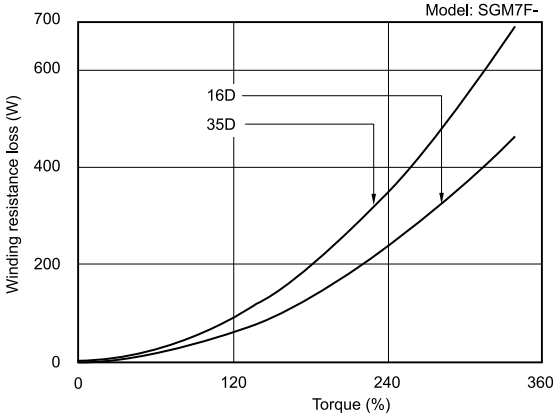


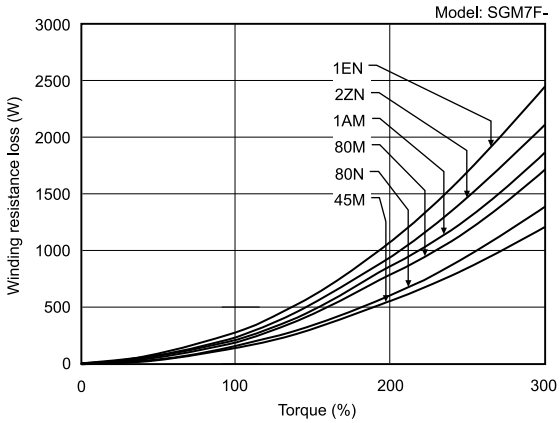
◆ SGM7F Direct Drive Servomotors



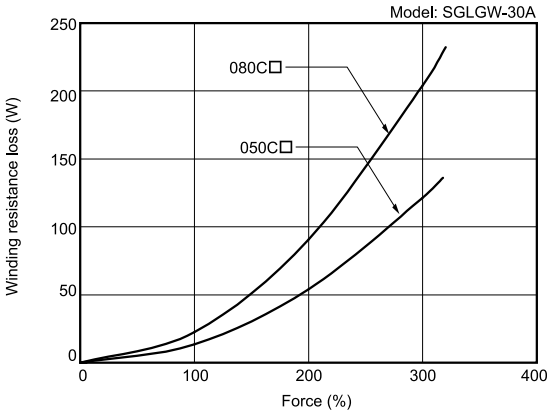


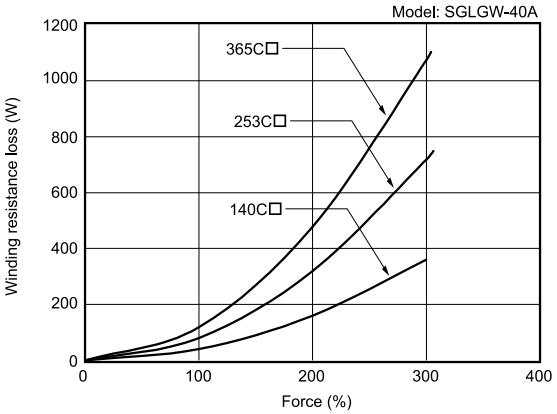


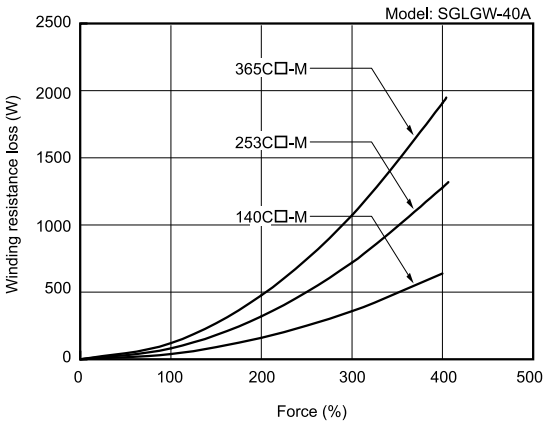


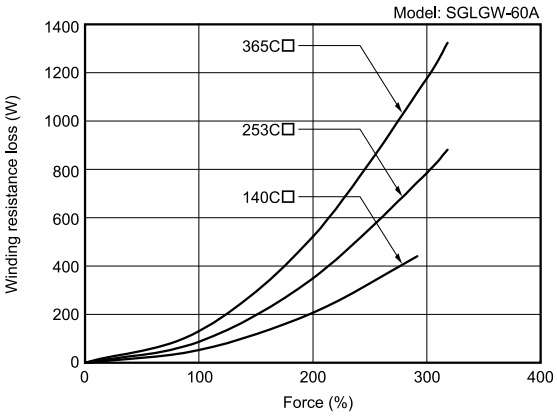


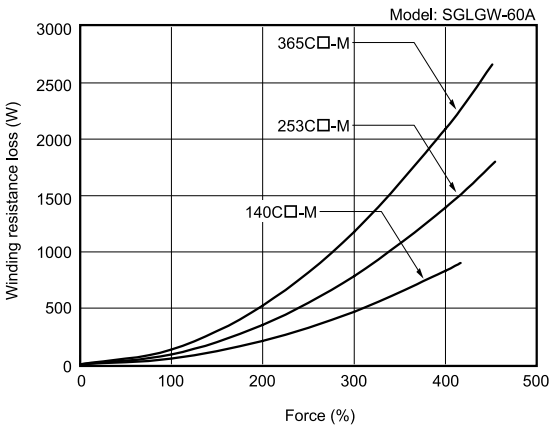
◆ SGLGW Linear Servomotors

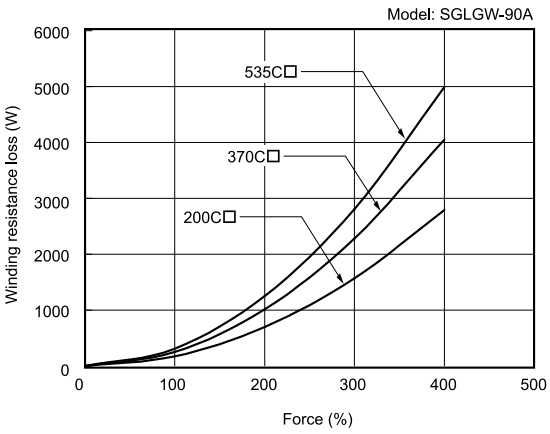




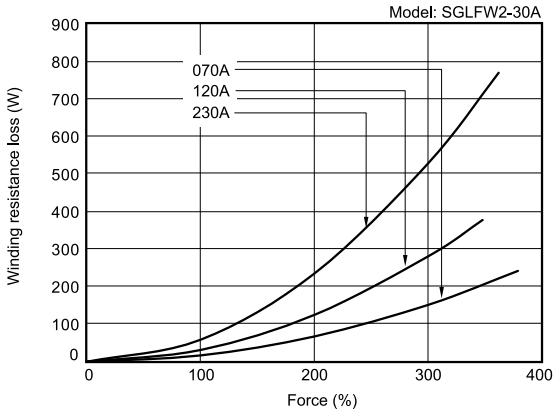


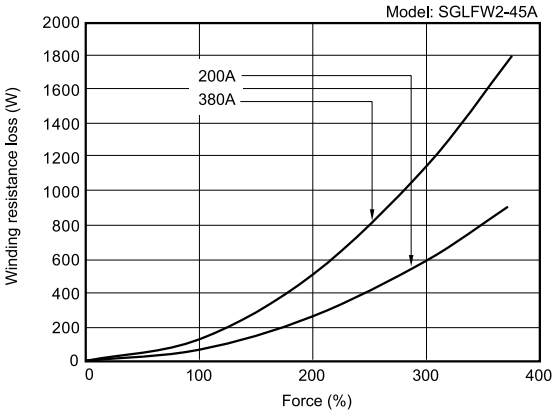


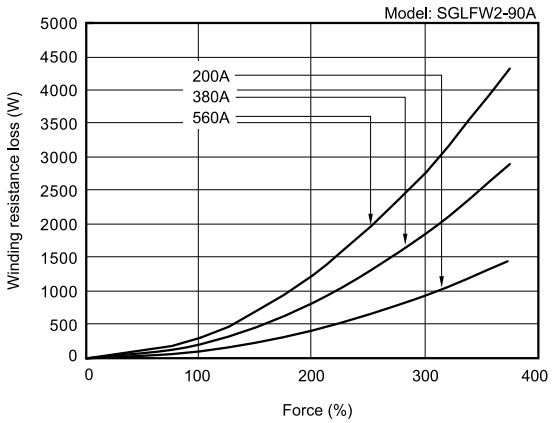


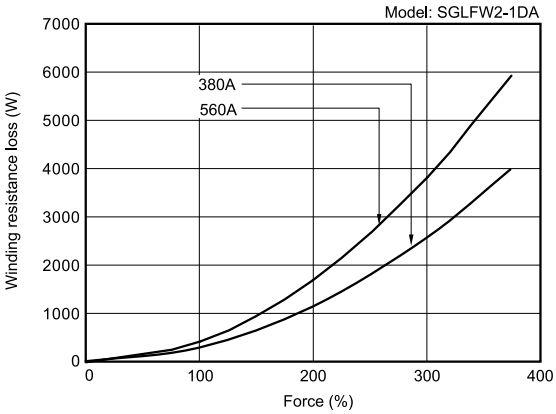


◆ SGLFW2 Linear Servomotors

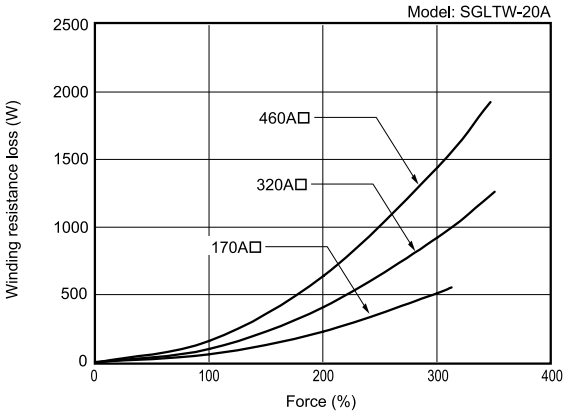


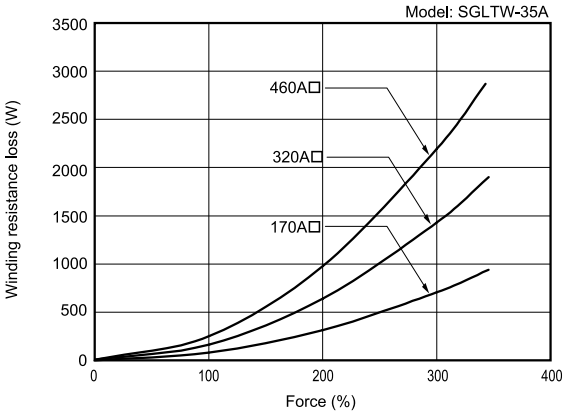


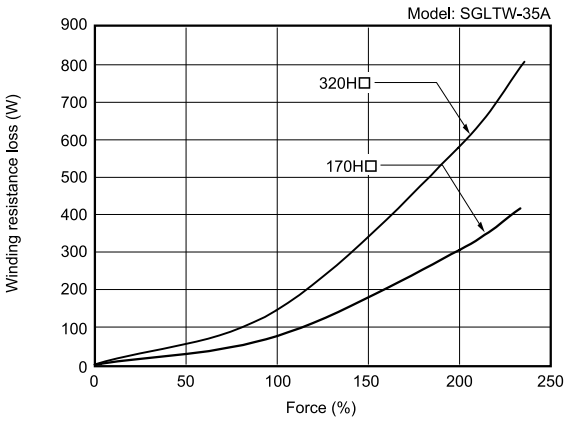


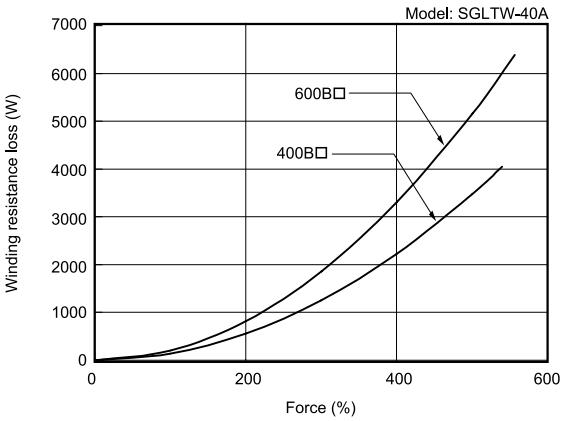


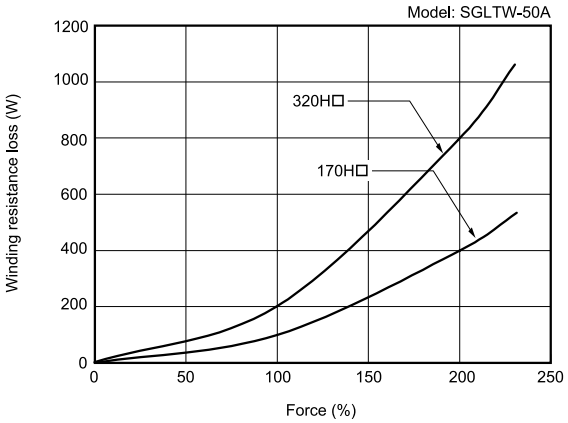
◆ SGLTW Linear Servomotors

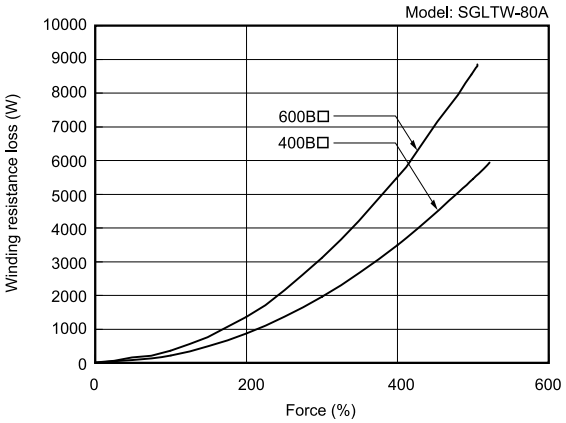












International Standards

●: Certified, △: Only Certified for Some Models, ○: Applied, – : Not Certified

Product Name		Model	UL/CSA Standards	EU Directives			KC Mark
			UL	CE	RoHS Directive	Safety Standards	KC
SERVOPACKs		SGDXS	●	○	○	○ *2*	△ *5*
		SGDXW	●	○	○	○ *3*	●
		SGDXT	●	○	○	○ *3*	△ *5*
Feedback Option	Fully-Closed Module	SGDV-OFA01A *1*	●	○	○	○ *4*	●

*1 Use this model number to purchase the option module separately.
*2 Refer to the specifications of the SERVOPACKs for details on applicable standards.
*3 Only hardware option specification 1000 complies with safety standards.
*4 Option modules are not certified individually, but they do comply with safety standards when combined with the SERVOPACK.
*5 Contact your Yaskawa representative.

Product Name	Model	UL/CSA Standards	EU Directives	
		c UL us	CE	RoHS Directive
Rotary Servomotors	SGMXJ	●	○	○
	SGMXA	●	○	○
	SGMXG	●	○	○
Direct Drive Servomotors	SGM7D	-	○	○
	SGM7E	●	○	○
	SGM7F	● *1*	○	○
Linear Servomotors	SGLGW (SGLGM) *2 *3*	●	*4*	○ *5*
	SGLFW2 (SGLFM2) *2 *3*	●	○	○
	SGLTW (SGLTM) *2 *3*	● *6*	*4*	○ *5*

*1 Only small-capacity servomotors with cores (SGM7F-□□A, -□□B, -□□C, -□□D) are in compliance with the UL standards. Medium-capacity servomotors with cores (SGM7F-□□M, -□□N) do not comply with the UL standards.
*2 The model numbers of the magnetic ways of linear servomotors are given in parentheses.
*3 Only products with derating specifications are in compliance with the standards. Estimates are available for those models. Contact your Yaskawa representative for details.
*4 CE marking certification has been received. Contact your Yaskawa representative if the CE marking label is required.
*5 Estimates are provided for RoHS-compliant products. The model numbers have an “-E” suffix.
*6 Certification has not yet been received for SGLTW-35A□□□H, -50A□□□H linear servomotors.

Warranty

Details of Warranty

Warranty Period

The warranty period for a product that was purchased (hereinafter called the “delivered product”) is one year from the time of delivery to the location specified by the customer or 18 months from the time of shipment from the Yaskawa factory, whichever is sooner.

Warranty Scope

Yaskawa shall replace or repair a defective product free of charge if a defect attributable to Yaskawa occurs during the above warranty period. This warranty does not cover defects caused by the delivered product reaching the end of its service life and replacement of parts that require replacement or that have a limited service life.

This warranty does not cover failures that result from any of the following causes.

- Improper handling, abuse, or use in unsuitable conditions or in environments not described in product catalogs or manuals, or in any separately agreed-upon specifications
- Causes not attributable to the delivered product itself
- Modifications or repairs not performed by Yaskawa
- Use of the delivered product in a manner in which it was not originally intended
- Causes that were not foreseeable with the scientific and technological understanding at the time of shipment from Yaskawa
- Events for which Yaskawa is not responsible, such as natural or human-made disasters

Limitations of Liability

- Yaskawa shall in no event be responsible for any damage or loss of opportunity to the customer that arises due to failure of the delivered product.
- Yaskawa shall not be responsible for any programs (including parameter settings) or the results of program execution of the programs provided by the user or by a third party for use with programmable Yaskawa products.
- The information described in product catalogs or manuals is provided for the purpose of the customer purchasing the appropriate product for the intended application. The use thereof does not guarantee that there are no infringements of intellectual property rights or other proprietary rights of Yaskawa or third parties, nor does it construe a license.
- Yaskawa shall not be responsible for any damage arising from infringements of intellectual property rights or other proprietary rights of third parties as a result of using the information described in catalogs or manuals.

Suitability for Use

- It is the customer’s responsibility to confirm conformity with any standards, codes, or regulations that apply if the Yaskawa product is used in combination with any other products.
- The customer must confirm that the Yaskawa product is suitable for the systems, machines, and equipment used by the customer.
- Consult with Yaskawa to determine whether use in the following applications is acceptable. If use in the application is acceptable, use the product with extra allowance in ratings and specifications, and provide safety measures to minimize hazards in the event of failure.
  - Outdoor use, use involving potential chemical contamination or electrical interference, or use in conditions or environments not described in product catalogs or manuals
  - Nuclear energy control systems, combustion systems, railroad systems, aviation systems, vehicle systems, medical equipment, amusement machines, and installations subject to separate industry or government regulations
  - Systems, machines, and equipment that may present a risk to life or property
  - Systems that require a high degree of reliability, such as systems that supply gas, water, or electricity, or systems that operate continuously 24 hours a day

– Other systems that require a similar high degree of safety

- Never use the product for an application involving serious risk to life or property without first ensuring that the system is designed to secure the required level of safety with risk warnings and redundancy, and that the Yaskawa product is properly rated and installed.
- The circuit examples and other application examples described in product catalogs and manuals are for reference. Check the functionality and safety of the actual devices and equipment to be used before using the product.
- Read and understand all use prohibitions and precautions, and operate the Yaskawa product correctly to prevent accidental harm to third parties.

Specifications Change

The names, specifications, appearance, and accessories of products in product catalogs and manuals may be changed at any time based on improvements and other reasons. The next editions of the revised catalogs or manuals will be published with updated code numbers. Consult with your Yaskawa representative to confirm the actual specifications before purchasing a product.

Revision History

Date of Publication	Rev. Code	Rev. No.	Web Rev. No.	Section	Revised Contents
November 2024	A	–	–	–	First edition

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