YASKAWA

SIGMA-7 200 V

PRODUCT CATALOG

Experience and Innovation

Since 1915 YASKAWA has manufactured and supplied products for machine building and industrial automation. Our standard products as well as tailor-made solutions are well known and have a high reputation for outstanding quality and reliability.

YASKAWA is the leading global manufacturer of inverter drives, servo drives, machine controllers, medium voltage inverters, and industrial robots.

We have always been a pioneer in motion control and drive technology, launching product innovations, which optimise the productivity and efficiency of both machines and systems.

YASKAWA Eschborn, Germany

Today we produce more than 1.8 million inverters per year. Considering this, YASKAWA is probably the biggest inverter manufacturer in the world.

YASKAWA Motoman Robots

Furthermore, with a yearly production of more than 800,000 servo motors and 20,000 robots we offer a wide range of products for drive automation processes in many different industries. YASKAWA technology is used in all fields of machine building and industrial automation.

Wherever You Are – Our Local Support is Near.

Employing more than 14,600 People Worldwide

More than 1,350 Employees in Worldwide Service Network
More than 1,300 Employees in Europe

The Ultimate Experience: The YASKAWA Sigma-7 Servo Drive Series

The YASKAWA Sigma-7 Servo Drive series offers standard rotary motors as well as linear and rotary direct drives and linear sliders. This broad variety of drive systems covers all market demands with regard to compact size, high dynamics, high efficiency, low maintenance and outstanding reliability.
YASKAWA has improved the function for tuning-free operation even further. Without adjusting gains reliable operation is assured. So a machine can run free of any vibrations even with a inertia-to-loads ratio of 30:1. The system also operates reliably with dynamic load changes. The tuning functions of the Sigma-5 series have also been significiantly improved and allow time-saving start-up.
The Sigma-7 servodrives comply with today's standards of functional safety. They are certified for SIL 3, PL-e Category 3 for Stop Category 0 (Safe Torque Off). Optionally, functions like stop categories 1 (SS1) and 2 (SS2) as well as Safely Limited Speed (SLS) are available.
The Sigma-7 motors provide high efficiency: the length is reduced by up to 20% compared to Sigma-5 motors with same capacity, and heat generation is significiantly reduced. The motors with their extremely high resolution of 24 bit fulfill the highest requirements of constant velocity and precision.
Result: Reduced cycle time – maximum throughput, improved product quality, enhanced machine wear resistance, shortened initial set-up time, lower life cycle cost.

- Servo Motors · SERVOPACKS
- Linear Motors · Linear Sliders
- Out-of-the-Box Solutions
- Programming Software
- Motion Control Solutions
- Flexible Connectivity

Seven Reasons for Sigma-7

The Sigma Series of Servo Drives has evolved into the Sigma-7 Servo Drives, which provides you with the ultimate experience in seven key areas and delivers the optimal solution that only YASKAWA can offer.

1 Comprehensive Motor and Amplifier Power Range

Wide power range

- Very compact motors from 50 W to 15 kW
- Linear motors iron core and ironless with a peak force up to 7560 N

2 Savings through Performance

Lower production costs

- Speed loop bandwidth of 3.1 kHz
- Shorter settling time, reduced positioning time, higher throughput

No additional cooling necessary

- Ambient temperature -5 – 55 °C (max. 60 °C with derating)

Energy savings and higher productivity

- High peak torque, fast acceleration, no amplifier oversizing
- Lightweight mechanics

Higher performance

- Overload 350% for 3 – 5 seconds
- High peak torque, fast acceleration

3 Safety Features

Smooth integration of mandatory legal safety standards

- The STO function is implemented by default in all Sigma-7 series servo amplifiers
- Build safer machines - Sigma-7 satisfies the requirements of SIL 3 and PL-e
- The safety functions SS1, SS2 and SLS are integrated by using the safety module SGDV-OSA01A

4 High Efficiency

Very low heat generation

- Optimized magnetic circuit improves motor efficiency
- Improved motor efficiency reduces heat generation by about 20%

5 High Accuracy

Next level 24-bit absolute encoder for maximum accuracy

- Resolution of 16 million pulses per revolution for extremely precice positioning

6 Impressive System Performance

Very high precision teamed up with fast, smooth operation

- Ripple compensation for highest demands in smoothness and dynamics
- Even for machines for which speed loop gains cannot be set high

7 Outstanding Reliability

Even more reliability for your production

- More than 9,000,000 servo systems in the field
- Improved machine reliability, reduced service and maintenance costs, less downtime

Servomotors

Rotary

SGM7A

- Low inertia, high speed
- 50 W - 7 kW

SGM7J

- Medium inertia, high speed
- 50 W - 750 W

SGM7G

- Medium inertia, large torque
- 300 W - 15 kW

Direct Drive

SGMCS

- Small capacity, coreless
- Rated: 2 Nm - 35 Nm
  Peak: 6 Nm - 105 Nm

SGMCV

- Small capacity, with iron core
- Rated: 4 Nm - 25 Nm
  Peak: 12 Nm - 75 Nm

SGMCS

- Medium capacity, with iron core
- Rated: 45 Nm - 200 Nm
  Peak: 135 Nm - 600 Nm

Linear

SGLG

- Coreless model
- Rated: 12.5 N - 750 N
  Peak: 40 N - 3000 N

SGLFW2

- Model with F-type iron core
- Rated: 45 N - 2520 N
  Peak: 135 N - 7560 N

SGLFW

- Model with F-type iron core
- Rated: 25 N - 1120 N
  Peak: 86 N - 2400 N

SGLT

- Model with T-type iron core
- Rated: 130 N - 2000 N
  Peak: 380 N - 7500 N

SERVOPACKS

SGD7S-□□□A00A

Analog Voltage/
Pulse Train
Reference

SGD7S-□□□A10A

MECHATROLINK-II
communication
Reference

SGD7S-□□□A20A

Single-axis
MECHATROLINK-III
communication
Reference

SGD7W-□□□A20A

Dual-axis
MECHATROLINK-III
communication
Reference

SGD7S-□□□AA0A

EtherCAT
communication
Reference

SGD7S-□□□AE0A

Command Option
Attachable Type

Option Modules

SGDV-OSA01A

Safety Module

SGD7V-OCA03A

INDEXER Module

SGDV-OCA□A

DeviceNet Module

Combination of SERVOPACKs and Option Modules

SERVOPACK Model			Option Module
			Safety Module (SGDV-OSA01A)
Single-axis Analog Voltage/Pulse Train Reference Type (SGD7S-□□□A00A)			✓
Single-axis MECHATROLINK- II Communications Reference Type (SGD7S-□□□A10A)			✓
Single-axis MECHATROLINK- III Communications Reference Type (SGD7S-□□□A20A)			✓
Single-axis EtherCAT Communications Reference Type (SGD7S-□□□AA0A)			✓
Single-axis Command Option Attachable Type (SGD7S-□□□AE0A)			✓
Dual-axis MECHATROLINK-III Communications Reference Type (SGD7W-□□□A20A)			–
SERVOPACK Model Designations	SERVOPACK Model	Command Option Module Model	
Single-axis INDEXER Module-Mounted Type (SGD7S□□□AE0A□□□10□)	Command Option Attachable Type (SGD7S-□□□AE0A)	INDEXER (SGDV-OCA03A)	–
Single-axis DeviceNet Module-Mounted Type (SGD7S□□□AE0A□□□50□)*1 (SGD7S□□□AE0A□□□60□)*2		DeviceNet*1 (SGDV-OCA04A)	–
		DeviceNet*2 (SGDV-OCA05A)	–

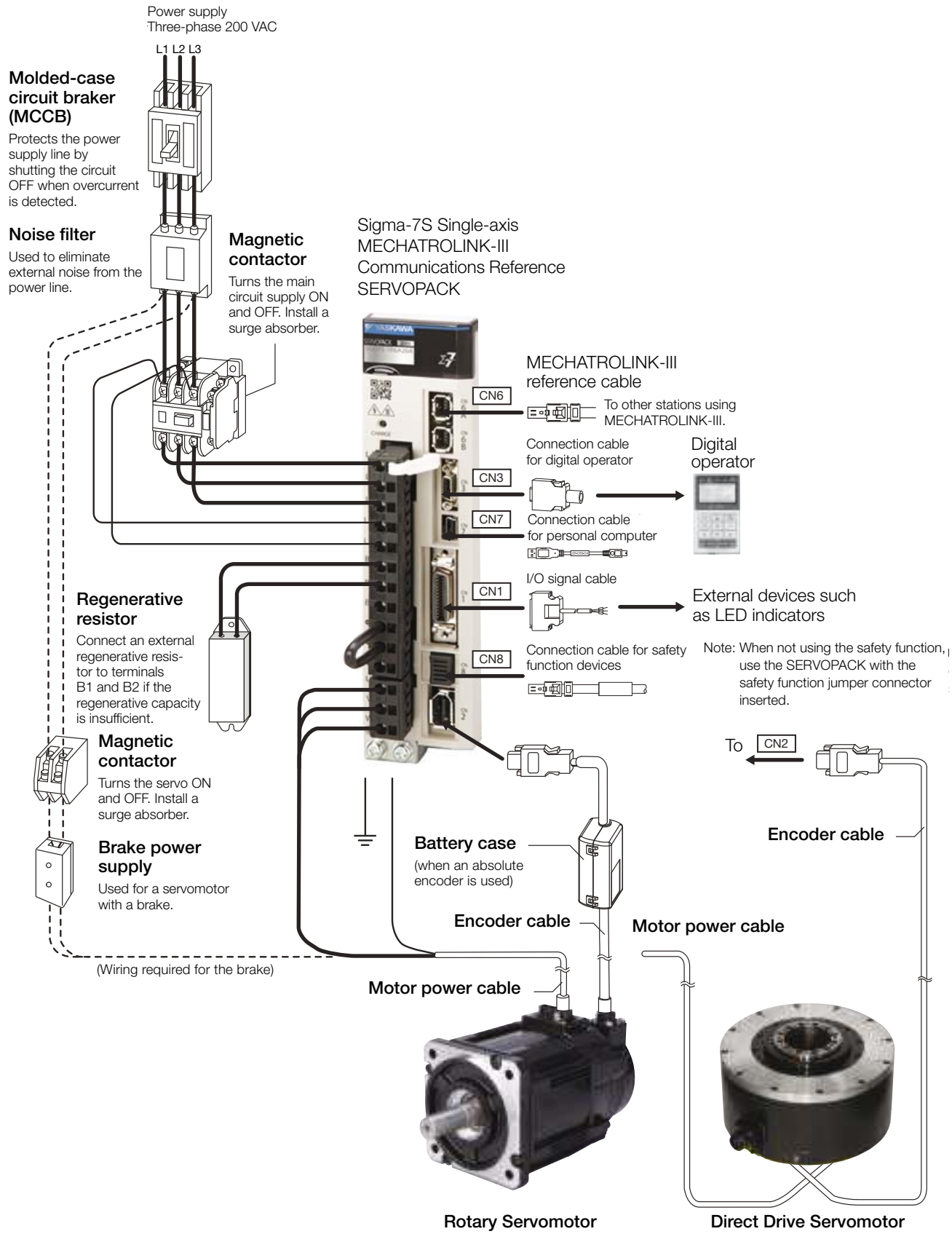
*1 : Driven by control power supply
*2 : Driven by external power supply

✓ : Possible – : Not Possible

Sigma-7S SERVOPACK and Rotary/Direct Drive Servomotor

For MECHATROLINK-III Communications

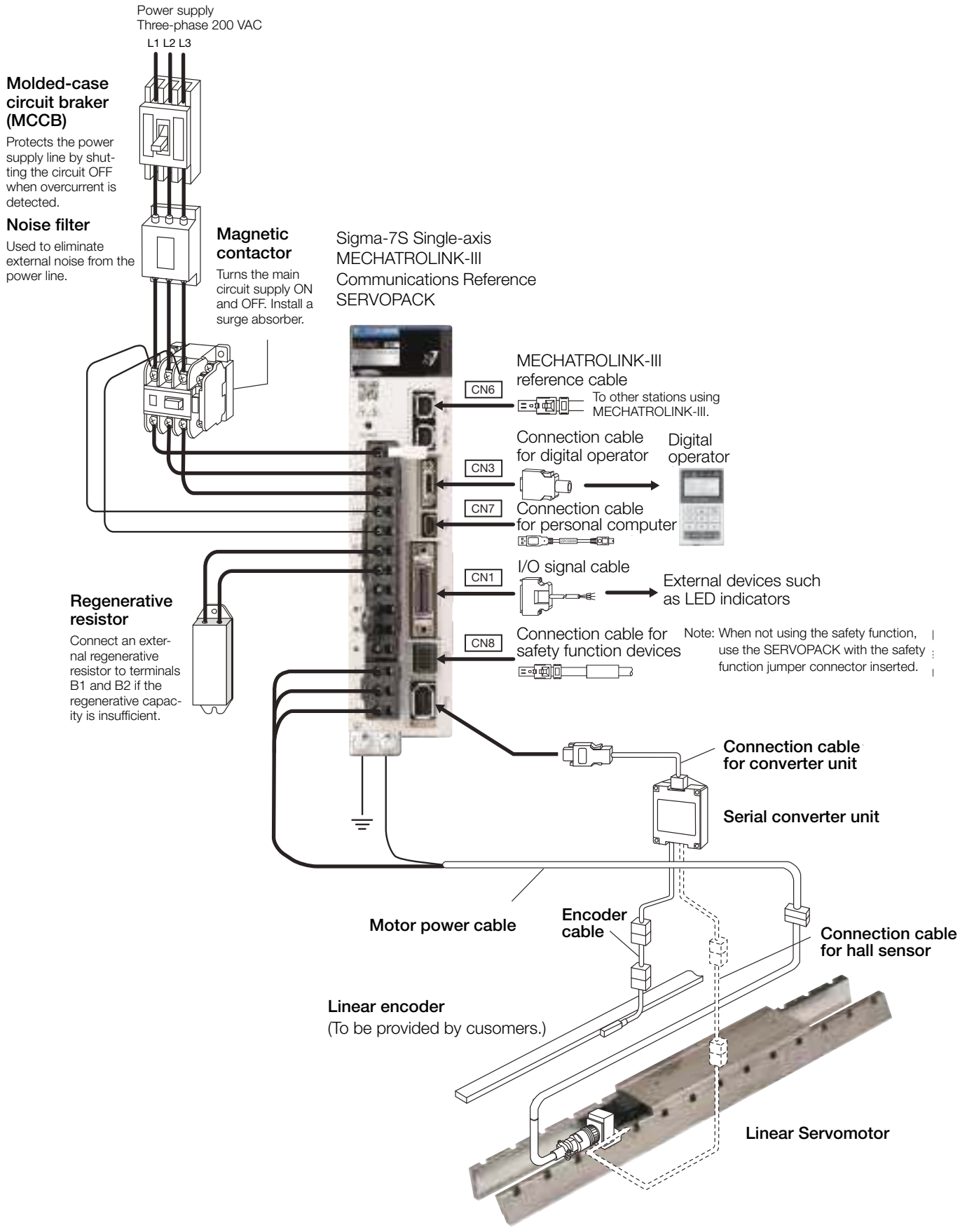
Three-phase 200 VAC



Sigma-7S SERVOPACK and Linear Servomotor

For MECHATROLINK-III Communications

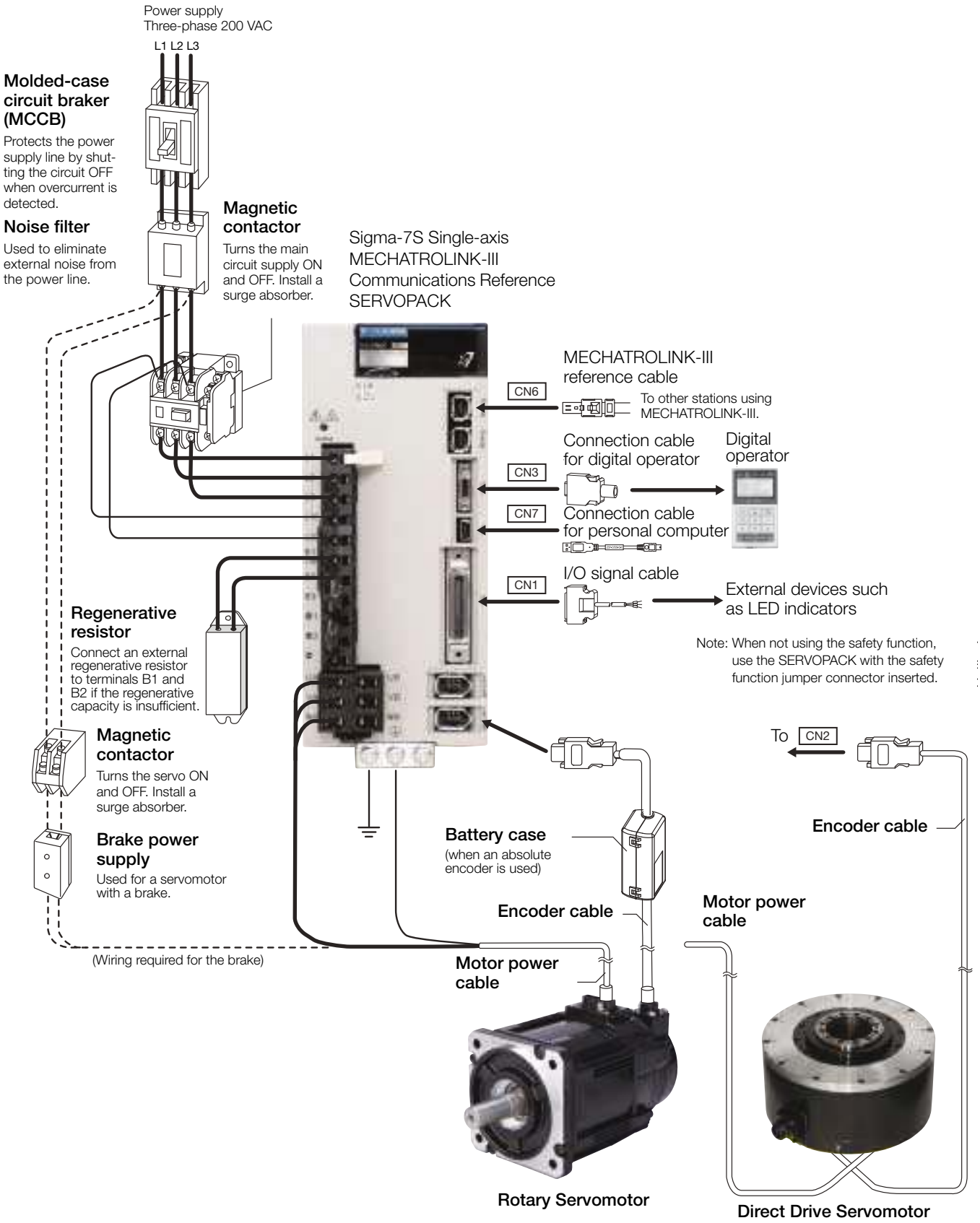
Three-phase 200 VAC



Sigma-7W SERVOPACK and Rotary/Direct Drive Servomotor

For MECHATROLINK-III Communications

Three-phase 200 VAC



Combination of Rotary Servomotors and SERVOPACKs

Rotary Servomotor Model		Rated Output [W]	SERVOPACK Model	
			SGD7S-□□□□	SGD7W-□□□□
SGM7J (Medium inertia, high speed) 3000 min^{-1}	SGM7J-A5A	50	R70A	1R6A*1, 2R8A*1
	SGM7J-01A	100	R90A	
	SGM7J-C2A	150	1R6A	1R6A, 2R8A*1
	SGM7J-02A	200		
	SGM7J-04A	400	2R8A	2R8A, 5R5A*1, 7R6A*1
	SGM7J-06A	600	5R5A	5R5A, 7R6A
	SGM7J-08A	750		
SGM7A (Low inertia, high speed) 3000 min^{-1}	SGM7A-A5A	50	R70A	1R6A*1, 2R8A*1
	SGM7A-01A	100	R90A	
	SGM7A-C2A	150	1R6A	1R6A*1, 2R8A*1
	SGM7A-02A	200		
	SGM7A-04A	400	2R8A	2R8A, 5R5A*1, 7R6A*1
	SGM7A-06A	600	5R5A	5R5A, 7R6A
	SGM7A-08A	750		
	SGM7A-10A	1,000	120A	–
	SGM7A-15A	1,500		
	SGM7A-20A	2,000	180A	
	SGM7A-25A	2,500	200A	
	SGM7A-30A	3,000		
	SGM7A-40A	4,000	330A	
	SGM7A-50A	5,000		
	SGM7A-70A	7,000	550A	
SGM7G (Medium inertia, large torque) 1500 min^{-1}	SGM7G-03A	300	3R8A	5R5A*1, 7R6A*1
	SGM7G-05A	450		
	SGM7G-09A	850	7R6A	
	SGM7G-13A	1,300	120A	–
	SGM7G-20A	1,800	180A	
	SGM7G-30A	2,900*2	330A	
	SGM7G-44A	4,400		
	SGM7G-55A	5,500	470A	
	SGM7G-75A	7,500	550A	
	SGM7G-1AA	11,000	590 A	
	SGM7G-1EA	15,000	780 A	

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

*2. The rated output is 2.4 kW if you combine the SGM7G-30A with the SGD7S-200A.

Combination of Direct Drive Servomotors and SERVOPACKs

Direct Drive Servomotor Model		Rated torque [Nm]	Instantaneous Max. Torque [Nm]	SERVOPACK Model	
				SGD7S-□□□□	SGD7W-□□□□
Small capacity, coreless (SGMCS)	SGMCS-02B	2	6	2R8A	
	SGMCS-05B	5	15		
	SGMCS-07B	7	21		
	SGMCS-04C	4	12		
	SGMCS-10C	10	30		
	SGMCS-14C	14	42		
	SGMCS-08D	8	24		
	SGMCS-17D	17	51		
	SGMCS-25D	25	75		
	SGMCS-16E	16	48	5R5A	
	SGMCS-35E	35	105		
Medium capacity, with core (SGMCS)	SGMCS-45M	45	135	7R6A	
	SGMCS-80M	80	240	120A	–
	SGMCS-80N	80	240		
	SGMCS-1AM	110	330	180A	
	SGMCS-1EN	150	450	200A	
	SGMCS-2ZN	200	600		
Small capacity, with core (SGMCV)	SGMCV-04B	4	12	2R8A	
	SGMCV-10B	10	30		
	SGMCV-14B	14	42	5R5A	
	SGMCV-08C	8	24	2R8A	
	SGMCV-17C	17	51	5R5A	
	SGMCV-25C	25	75	7R6A	

Combination of Linear Servomotors and SERVOPACKs

Linear Servomotor Model		Rated force [N]	Peak Force [N]	SERVOPACK Model	
				SGD7S-□□□□	SGD7W-□□□□
SGLG (Coreless model, with standard magnetic way)	SGLGW-30A050C	12.5	40	R70A	1R6A
	SGLGW-30A080C	25	80	R90A	1R6A *1
	SGLGW-40A140C	47	140		
	SGLGW-40A253C	93	280	1R6A	
	SGLGW-40A365C	140	420	2R8A	
	SGLGW-60A140C	70	220	1R6A	
	SGLGW-60A253C	140	440	2R8A	
	SGLGW-60A365C	210	660	5R5A	
	SGLGW-90A200C	325	1300	120A	–
	SGLGW-90A370C	550	2200	180A	
	SGLGW-90A535C	750	3000	200A	
SGLG (Coreless model, with high-force magnetic way)	SGLGW-40A140C	57	230	1R6A	
	SGLGW-40A253C	114	460	2R8A	
	SGLGW-40A365C	171	690	3R8A	5R5A *1
	SGLGW-60A140C	85	360	1R6A	
	SGLGW-60A253C	170	720	3R8A	5R5A *1
	SGLGW-60A365C	255	1080	7R6A	
SGLF (Model with F-type iron core)	SGLFW2-30A070A	45	135	1R6A	
	SGLFW2-30A120A	90	270		
	SGLFW2-30A230A	180	540	3R8A	–
		170	500	2R8A	
	SGLFW2-45A200A	280	840	5R5A	
	SGLFW2-45A380A	560	1680	180A	–
			1500	120A	
	SGLFW2-90A200A	560	1680		
	SGLFW2-90A380A	1120	3360	200A	
	SGLFW2-90A560A	1680	5040	330A	
	SGLFW2-1DA380A	1680	5040	200A	
	SGLFW2-1DA560A	2520	7560	330A	
	SGLFW-20A090A	25	86	1R6A	
	SGLFW-20A120A	40	125		
	SGLFW-35A120A	80	220		
	SGLFW-35A230A	160	440	3R8A	5R5A
	SGLFW-50A200B	280	600	5R5A	
	SGLFW-50A380B	560	1200	120A	–
	SGLFW-1ZA200B				
	SGLFW-1ZA380B	1120	2400	200A	
SGLT (Model with T-type iron core)	SGLTW-20A170A	130	380	3R8A	5R5A *1
	SGLTW-20A320A	250	760	7R6A	
	SGLTW-20A460A	380	1140	120A	–
	SGLTW-35A170A	220	660	5R5A	
	SGLTW-35A170H	300	600		
	SGLTW-35A320A	440	1320	120A	–
	SGLTW-35A320H	600	1200		
	SGLTW-35A460A	670	2000	180A	
	SGLTW-40A400B	670	2600		
	SGLTW-50A170H	450	900	5R5A	
	SGLTW-50A320H	900	1800	120A	–
	SGLTW-80A400B	1300	5000	330A	
	SGLTW-80A600B	2000	7500	550A	

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

Recommended Encoders

Incremental Linear Encoders

Output Signal	Manufacturer	Linear Encoder Type	Model			Linear Encoder Pitch [μm]	Resolution [nm]	Maximum Speed*3 [m/s]	Support for Polarity Sensor Input	Application to Linear Motors	Application to Fully-closed Loop Control
			Scale	Sensor Head	Interpolator (Serial Converter Unit)						
1Vp-p Analog Voltage*1	Heidenhain Corporation	Exposed	LIDA48□		(JZDP-H003/-H006)*5	20	78.1	5	●	●	●
					(JZDP-J003/-J006)*5		4.9	2	●	●	—
			LIF48□		(JZDP-H003/-H006)*5	4	15.6	1	●	●	●
					(JZDP-J003/-J006)*5		1.0	0.4	●	*8	—
	Renishaw plc*4	Exposed	RGS20	RGH22B	(JZDP-H005/-H008)*5	20	78.1	5	●	●	●
					(JZDP-J005/-J008)*5		4.9	2	●	●	—
Encoder for YASKAWA Serial Interface*2	Magnescale Co., Ltd.	Exposed	SL7□0	PL101-RY*6		800	97.7	5	—	●	●
				PL101	MJ620-T13*7				●	●	—
		Sealed	SR75-□□□□□LF		—	80	9.8	3.33	—	●	●
			SR75-□□□□□MF		—	80	78.1	3.33	—	●	●
			SR85-□□□□□LF		—	80	9.8	3.33	—	●	●
			SR85-□□□□□MF		—	80	78.1	3.33	—	●	●

Absolute Linear Encoder

Output Signal	Manufacturer	Linear Encoder Type	Model			Liner Encoder Pitch [μm]	Resolution [nm]	Maximum Speed*3 [m/s]	Support for Polarity Sensor Input	Application to Linear Motors	Application to Fully-closed Loop Control
			Scale	Sensor Head	Interpolator (Serial Converter Unit)						
Encoder for YASKAWA Serial Interface*2	Magnescale Co., Ltd.	Sealed	SR77-□□□□□LF		—	80	9.8	3.33	—	●	●
			SR77-□□□□□MF		—	80	78.1	3.33	—	●	●
			SR87-□□□□□LF		—	80	9.8	3.33	—	●	●
			SR87-□□□□□MF		—	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*9		—	25.6	50	5	—	●	●
	Heidenhain Corporation	Exposed	LIC4100 series		EIB339IY	—	5	5	—	●	●

Absolute Rotary Encoder

Output Signal	Manufacturer	Linear Encoder Type	Model			Resolution [Bits]	Maximum Speed*3 [min^{-1}]	Application to Linear Motors	Application to Fully-closed Loop Control
			Scale	Sensor Head	Interpolator (Serial Converter Unit)				
Encoder for YASKAWA Serial Interface	Magnescale Co., Ltd.	Sealed	RU77-4096ADF			20	2000	—	●
			RU77-4096AFFT01			22	2000	—	●

*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 motor 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: 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.

*5: Use this model number to purchase the Serial Converter Unit.

*6: Use this model number to purchase the Sensor Head with Interpolator.

*7. Use this model number to purchase the Interpolator.

*8. Contact your YASKAWA representative.

*9. Contact Mitutoyo Corporation for details on the Linear Encoders.

Note: Confirm detailed specifications, such as the tolerances, dimensions, and operating environment, with the manufacturer of the Encoder before you use it.

Rotary Servomotors

SGM7A

Sigma-7 Series
Servomotors:
SGM7A

SGM7A - 01 A 7 A 2 1

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

1st + 2nd digit - Rated Output

Code	Specification
A5	50 W
01	100 W
C2	150 W
02	200 W
04	400 W
06	600 W
08	750 kW
10	1.0 kW
15	1.5 kW
20	2.0 kW
30	3.0 kW
40	4.0 kW
50	5.0 kW
70	7.0 kW

3rd digit - Power Supply Voltage

Code	Specification
A	200 VAC

4th digit - Serial Encoder

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

5th digit - Design Revision Order

Code	Specification
A	

6th digit - Shaft End

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

7th digit - Options

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

SGM7J

Sigma-7 Series
Servomotors:
SGM7J

SGM7J - 01 A 7 A 2 1

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

1st + 2nd digit - Rated Output

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

3rd digit - Power Supply Voltage

Code	Specification
A	200 VAC

4th digit - Serial Encoder

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

5th digit - Design Revision Order

Code	Specification
A	

6th digit - Shaft End

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

7th digit - Options

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

SGM7G

Sigma-7 Series
Servomotors:
SGM7G

SGM7G - 03 A 7 A 2 1

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

1st + 2nd digit - Rated Output

Code	Specification
03	300 W
05	450 W
09	850 W
13	1.3 kW
20	1.8 kW
30	2.9 kW*
44	4.4 kW
55	5.5 kW
75	7.5 kW
1A	11 kW
1E	15 kW

* The rated output is 2.4 kW if you combine the SGM7G-30A with the SGD7S-200A.

3rd digit - Power Supply Voltage

Code	Specification
A	200 VAC

4th digit - Serial Encoder

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

5th digit - Design Revision Order

Code	Specification
A	

6th digit - Shaft End

Code	Specification	
2	Straight without Key	0.45 kW
		1.8 kW
		2.9 kW
6	Straight shaft with key and tap	0.85 kW
		1.3 kW

7th digit - Options

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

Direct Drive Servomotors

SGMCS - 02 B 3 C 1 1

Direct Drive Servomotors SGMCS — 1st + 2nd — 3rd — 4th — 5th — 6th — 7th — digit

1st + 2nd digit - Rated Output

Code	Specifications	Code	Specification	Code	Specification
Small-capacity Series				Medium-capacity Series	
02	2 Nm	14	14 Nm	45	45 Nm
04	4 Nm	16	16 Nm	80	80 Nm
05	5 Nm	17	17 Nm	1A	110 Nm
07	7 Nm	25	25 Nm	1E	150 Nm
08	8 Nm	35	35 Nm	2Z	200 Nm
10	10 Nm				

3rd digit - Servomotor Outer Diameter

Code	Specification	Code	Specification
B	135 mm dia.	E	290 mm dia.
C	175 mm dia.	M	280 mm dia.
D	230 mm dia.	N	360 mm dia.

4th digit - Serial Encoder

Code	Specification
3	20-bit single-turn absolute encoder
D	20-bit incremental encoder

5th digit - Design Revision Order

Code	Specification
A	Model with servomotor outer diameter code M or N
B	Model with servomotor outer diameter code E
C	Model with servomotor outer diameter code B, C, or D

6th digit - Flange

Code	Mounting	Servomotor Outer Diameter Code (3rd digit)					
		B	C	D	E	M	N
1	Non-load side	●	●	●	●	—	—
	Load side	—	—	—	—	●	●
3	Non-load side	—	—	—	—	●	●
4	Non-load side (with cable on side)	●	●	●	●	—	—

7th digit - Options

Code	Specification
1	Without options

SGMCV - 04 B E A 1 1

Direct Drive Servomotors SGMCV — 1st + 2nd — 3rd — 4th — 5th — 6th — 7th — digit

1st + 2nd digit - Rated Output

Code	Specification
04	4 Nm
08	8 Nm
10	10 Nm
14	14 Nm
17	17 Nm
25	25 Nm

3rd digit - Servomotor Outer Diameter

Code	Specification
B	135 mm dia.
D	175 mm dia.

4th digit - Serial Encoder

Code	Specification
E	22-bit single-turn absolute encoder
I	22-bit multiturn absolute encoder

5th digit - Design Revision Order

A	

6th digit - Flange

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

7th digit - Options

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

Note: Direct Drive Servomotors are not available with holding brakes.

Linear Servomotors SGLG (Coreless Models)

Moving Coil

SGL G W - 30 A 050 C P □

SGL	G	W	-	30	A	050	C	P	□
Linear Sigma Series Linear Servomotors	1st	2nd		3rd + 4th	5rd	6th - 8th	9th	10th	11th digit

1st digit - Servomotor Type

Code	Specifications
G	Coreless model

2nd digit - Moving Coil/Magnetic Way

Code	Specification
W	Moving Coil

3rd + 4th digit - Magnet Height

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

5th digit - Power Supply Voltage

Code	Specification
A	200 VAC

6th ... 8th digit - 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

9th digit - Design Revision Order

A, B...	

10th digit - Sensor Specification and Cooling Method

Code	Specifications		Applicable Models
	Polarity 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

11th digit - Connector for Servomotor Main Circuit Cable

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

Magnetic Way

SGL G M - 30 108 A □

SGL	G	M	-	30	108	A	□
Linear Sigma Series Linear Servomotors	1st	2nd		3rd + 4th	5th - 7th	8th	9th digit

1st digit - Servomotor Type

Code	Specifications
G	Coreless model

2nd digit - Moving Coil&Magnetic Way

Code	Specifications
M	Magnetic Way

3rd + 4th digit - Magnet Height

Code	Specifications
30	30 mm
40	40 mm
60	60 mm
90	86 mm

5rd ... 7th digit - Length of Magnetic Way

Code	Specifications
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

8th digit - Design Revision Order

Code	Specifications
A, B, C*	

9th digit - Options

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

*: 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.

SGLFW2 (Models with F-type Iron Cores)

Moving Coil

SGL F W2 - 30 A 070 A T □

SGL	F	W2	30	A	070	A	T	□
Linear Sigma Series Linear Servomotors	1st	2nd	3rd + 4th	5th	6th - 8th	9th	10th	11th

1st digit - Servomotor Type

Code	Specification
F	With F-type iron core

2nd digit - Moving Coil/Magnetic Way

Code	Specification
W2	Moving Coil

3rd + 4th digit - Magnet Height

Code	Specification
30	30 mm
45	45 mm
90	90 mm
1D	135 mm

5th digit - Power Supply Voltage

Code	Specification
A	200 VAC

6th ... 8th digit - Length of Moving Coil

Code	Specification
070	70 mm
120	125 mm
200	205 mm
230	230 mm
380	384 mm
560	563 mm

9th digit - Design Revision Order

Code	Specification
A	Initial Design

10th digit - Sensor Specification

Code	Specification
T	Without polarity sensor, with thermal protector
S	With polarity sensor and thermal protector

11th digit - Options

Code	Cooling Method
None	Self-cooled
L	Water-cooled*

Magnetic Way

SGL F M2 - 30 270 A

SGL	F	M2	30	270	A	
Linear Sigma Series Linear Servomotors	1st	2nd	3rd + 4th	5th - 7th	8th	digit

1st digit - Servomotor Type

Code	Specifications
F	With F-type iron core

2nd digit - Moving Coil/Magnetic Way

Code	Specifications
M2	Magnetic Way

3rd + 4th digit - Magnet Height

Code	Specifications
30	30 mm
45	45 mm
90	90 mm
1D	135 mm

5th ... 7th digit - Length of Magnetic Way

Code	Specifications
270	270 mm
306	306 mm
450	450 mm
510	510 mm
630	630 mm
714	714 mm

8th digit - Design Revision Order

Code	Specifications
A	Initial Design

* Contact your YASKAWA representative for information on water-cooled model.

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

SGLFW (Models with F-type Iron Cores)

Moving Coil

SGL F W - 20 A 090 A P □

Linear Sigma Series	1st	2nd	3rd + 4th	5rd	6th - 8th	9th	10th	11th	digit
Linear Servomotors SGLFW									

1st digit - Specification

Code	Servomotor Type
F	With F-type iron core

2nd digit - Moving Coil/Magnetic Way

Code	Specification
W	Moving Coil

3rd + 4th digit - Magnet Height

Code	Specification
20	20 mm
35	36 mm
50	47.5 mm
1Z	95 mm

5th digit - Voltage

Code	Specification
A	200 VAC

6th ... 8th digit - Length of Moving Coil

Code	Specifications
090	91 mm
120	127 mm
200	215 mm
230	235 mm
380	395 mm

9th digit - Design Revision Order

A, B…	

10th digit - Sensor Specification

Code	Specification
P	With polarity sensor
None	Without polarity sensor

11th digit - 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	SGLFW-35, -50, -1Z□200B

Magnetic Way

SGL F M - 20 324 A □

Linear Sigma Series	1st	2nd	3rd + 4th	5th - 7th	8th	9th	digit
Linear Servomotors SGLFM							

1st digit - Servomotor Type

Code	Specification
F	With F-type iron core

2st digit - Moving Coil/Magnetic Way

Code	Specification
M	Magnetic Way

3rd + 4th digit - Magnet Height

Code	Specification
20	20 mm
35	36 mm
50	47.5 mm
1Z	95 mm

5rd ... 7th digit - Length of Magnetic Way

Code	Specification
324	324 mm
405	405 mm
540	540 mm
675	675 mm
756	756 mm
945	945 mm

8th digit - Design Revision Order

Code	Specifications
A, B…	

9th digit - Options

Code	Specification
None	Without options
C	With magnet cover

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

SGLT (Models with T-type Iron Cores)

Moving Coil

SGL T W - 20 A 170 A P □

SGL	T	W	-	20	A	170	A	P	□	
Linear Sigma Series Linear Servomotors SGLTW	1st	2nd		3rd + 4th	5th	6th ... 8th	9th	10th	11th	digit

1st digit - Servomotor Type

Code	Specification
T	With T-type iron core

2nd digit - Moving Coil/Magnetic Way

Code	Specification
W	Moving Coil

3rd + 4th digit - Magnet Height

Code	Specification
20	20 mm
35	36 mm
40	40 mm
50	51 mm
80	76.5 mm

5th digit - Power Supply Voltage

Code	Specification
A	200 VAC

6th ... 8th digit - Length of Moving Coil

Code	Specification
170	170 mm
320	315 mm
400	394.2 mm
460	460 mm
600	574.2 mm

9th digit - Design Revision Order

A, B...	
H	High-efficiency model

10th digit - Sensor Specifications and Cooling Method

Code	Specifications		Applicable Models
	Polarity Sensor	Cooling Method	
None	None	Self-cooled	All models
C*	None	Water-cooled	SGLTW-40, -80
H*	Yes	Water-cooled	
P	Yes	Self-cooled	All models

11th digit - 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□

* 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 combination of codes.

Magnetic Way

SGL T M - 20 324 A □

SGL	T	M	-	20	324	A	□	
Linear Sigma Series Linear Servomotors SGLTM	1st	2nd		3rd + 4th	5th ... 7th	8th	9th	digit

1st digit - Servomotor Type

Code	Specification
T	With T-type iron core

2nd digit - Moving Coil/Magnetic Way

Code	Specification
M	Magnetic Way

3rd + 4th digit - Magnet Height

Code	Specification
20	20 mm
35	36 mm
40	40 mm
50	51 mm
80	76.5 mm

5th ... 7th digit - Length of Moving Coil

Code	Specification
324	324 mm
405	405 mm
540	540 mm
675	675 mm
756	756 mm
945	945 mm

8th digit - Design Revision Order

A, B...	
H	High-efficiency model

9th digit - Options

Code	Specification	Applicable Models
None	Without options	–
C	With magnet cover	All models
Y	With base and magnet cover	SGLTM-20, -35*, -40, -80

* The SGLTM-35□□□H (high-efficiency models) do not support this specification.

SERVOPACKs

SGD7S - R70 A 00 A 001

Sigma-7 Series Sigma-7S Models	1st ... 3rd	4th	5th + 6th	7th	8th ... 10th	digit

1st ... 3rd digit - Maximum Applicable Motor Capacity

Code	Specification
Three-phase, 200 V	
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	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

4th digit - Voltage

Code	Specification
A	200 VAC

5th + 6th digit - Interface*2

Code	Specification
00	Analog Voltage/ Pulse Train Reference
10	MECHATROLINK-II communication Reference
20	MECHATROLINK-III communication Reference
A0	EtherCAT communication Reference
E0	Command Option Attachable Type

7th digit - Design Revision Order

A	

8th ... 10th digit - Hardware Options Specifications

Code	Specifications	Applicable Models
None	Without Options	All models
001	Rack-mounted	SGD7S-R70A to -330A
001	Duct-mounted	SGD7S-470A to -780A
002	Varnished	All models
008	Single-phase, 200 V power input	1.5 kW
00A	Varnished and single- phase power input	All models

Note:

*1. You can use these models with either a single-phase or three-phase input.

*2. The same SERVOPACKs are used for both Rotary Servomotors and Linear Servomotors.

SGD7W - 1R6 A 20 A 001

Sigma-7 Series Sigma-7W Models	1st ... 3rd	4th	5th + 6th	7th	8th ... 10th	digit

1st ... 3rd digit - Maximum Applicable Motor Capacity per Axis

Code	Specification
Three-phase, 200 V	
1R6*1	0.2 kW
2R8*1	0.4 kW
5R5*1	0.75 kW
7R6	1.0 kW

4th digit - Voltage

Code	Specification
A	200 VAC

5th + 6th digit - Interface*2

Code	Specification
20	MECHATROLINK-III communication Reference

7th digit - Design Revision Order

A	

8th ... 10th digit - Hardware Options Specifications

Code	Specification	Applicable Models
None	Without Options	All models
001	Rack-mounted	
002	Varnished	

Note:

*1. You can use these models with either a single-phase or three-phase input.

*2. The same SERVOPACKs are used for both Rotary Servomotors and Linear Servomotors.

Related Documents

The documents that are related to the MP3300 Machine Controllers and Sigma-7 series AC Servo Drives are shown in the following table. Refer to these documents as required.

Catalog Name Catalog (No.)	Document Name (Document No.)	Description of Document
MP3300 Catalog Machine Controller MP3300 (KAEP C880725 03)	MP3000 Series Manual	Describes the functions, specifications, operating methods, maintenance, inspections, and troubleshooting of the MP3000-Series MP3300 Machine Controllers.
	MP3300 Product Manual (SIEP C880725 21)	
Sigma-7 Series Catalog AC Servo Drives Sigma-7 Series (KAEP S800001 23)	Sigma-7 Series Product Manual	Provide detailed information on selecting Sigma-7 Series SERVOPACKs and information on installing, connecting, setting, performing trial operation for, tuning, and monitoring the Servo Drives.
	Sigma-7 SERVOPACK with MECHATROLINK-III Communications References Product Manual (SIEP S800001 28)	
	Sigma-7 SERVOPACK with MECHATROLINK-II Communications References Product Manual (SIEP S800001 27)	
	Sigma-7 SERVOPACK with Analog Voltage/Pulse Train References Product Manual (SIEP S800001 26)	
	Sigma-7 SERVOPACK Command Option Attachable Type with INDEXER Module Product Manual (SIEP S800001 64)	
	Sigma-7 SERVOPACK Command Option Attachable Type with DeviceNet Module Product Manual (SIEP S800001 70)	
	Sigma-7 SERVOPACK with MECHATROLINK-III Communications References Product Manual (SIEP S800001 29)	
	Sigma-5-Series/ -Series for Large-Capacity Models/ Sigma-7-Series User's Manual Safety Module (SIEP C720829 06)	Provides details information required for the design and maintenance of a Safety Module.
	Series Servomotor Product Manual	Provides detailed information on selecting, installing, and connecting the Sigma-7 Series Servomotors.
	Rotary Servomotor Product Manual (SIEP S800001 36)	
	Linear Servomotor Product Manual (SIEP S800001 37)	
	Direct Drive Servomotor Product Manual (SIEP S800001 38)	
	Others	Describes the peripheral devices for a Sigma-7 Series Servo System.
	Peripheral Device Selection Manual (SIEP S800001 32)	
	MECHATROLINK-III Communications Standard Servo Profi le Command Manual (SIEP S800001 31)	Provides detailed information on the MECHATROLINK-III communications standard servo profi le commands that are used for a Sigma-7 Series Servo System.
	MECHATROLINK-II Communications Command Manual (SIEP S800001 30)	Provides detailed information on the MECHATROLINK-II communications commands that are used for a Sigma-7 Series Servo System.
	Digital Operator Operating Manual (SIEP S800001 33)	Describes the operating procedures for a Digital Operator for a Sigma-7 Series Servo System.
	Engineering Tool SigmaWin+ Online Manual Component (SIEP S800001 48)	Provides detailed operating procedures for the SigmaWin+ Engineering Tool for a Sigma-7 Series Servo System.

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SGM7A

- Low inertia, high speed
- 50 W - 7 kW

SGM7J

- Medium inertia, high speed
- 50 W - 750 W

SGM7G

- Medium inertia, large torque
- 300 W - 15 kW

Rotary Servomotors

SGM7A	28
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Model Designations

SGM7A - 01 A 7 A 2 1

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

1st + 2nd digit - Rated Output

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

3rd digit - Power Supply Voltage

Code	Specifications
A	200 VAC

4th digit - Serial Encoder

Code	Specifications
7	24-bit absolute
F	24-bit incremental

5th digit - Design Revision Order

Code	Specifications
A	Initial Design

6th digit - Shaft End

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

7th digit - Options

Code	Specifications
1	Without options
C*2	With holding brake (24 VDC)
E	With oil seal and holding brake (24 VDC)
S	With oil seal

Note:

*1. Code B is not supported for models with a rated output of 1.5 kW or higher.
*2. SGM7A-70A Servomotors with holding brakes are not available.

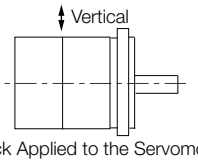
Specifications and Ratings

Specifications

Voltage		200 V	
Model SGM7A-		A5A to 70A	
Time Rating		Continuous	
Thermal Class		Models A5A to 10A: B; Models 15A to 70A: F	
Insulation Resistance		500 VDC, 10 MOhm min.	
Withstand Voltage		1,500 VAC for 1 minute	
Excitation		Permanent magnet	
Mounting		Flange mounted	
Drive Method		Direct drive	
Rotation Direction		Counterclockwise (CCW) for forward reference when viewed from the load side	
Vibration Class		V15	
Environmental Conditions	Surrounding Air Temperature	0 °C to 40 °C (With derating, usage is possible between 40 °C and 60 °C)	
	Surrounding Air Humidity	20% to 80% relative humidity (non-condensing)	
	Installation Site	• Must be indoors and free of corrosive and explosive gases. • Must be well-ventilated and free of dust and moisture. • Must facilitate inspection and cleaning. • Must have an altitude of 1,000 m or less. (With derating, usage is possible between 1,000 m and 2,000 m.)*5 • Must be free of strong magnetic fields.	
	Storage Environment	• Store the Servomotor in the following environment if you store it with the power cable disconnected. • Storage Temperature: -20 °C to 60 °C (with no freezing) • Storage Humidity: 20% to 80% relative humidity (non-condensing)	
Shock Resistance	Impact Acceleration Rate at Flange	490 m/s²	
	Number of Impacts	2 times	
Vibration Resistance	Vibration Acceleration Rate at Flange	A5A to 50A	49 m/s² (Models 15A to 50A: 24.5 m/s² front to back)
		70A	14.7 m/s
Applicable SERVOPACKS		Refer to section “Combination of Rotary Servomotors and SERVOPACKs” on page 11.	

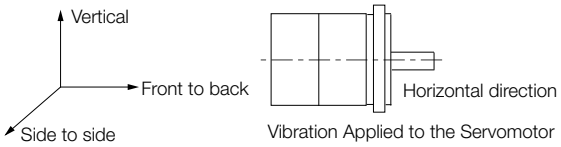
*1 A Vibration class of V15 indicates a vibration amplitude of 15 µm maximum on the Servomotor without a load at the rated motor speed.

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



Shock Applied to the Servomotor

*3 The vertical, side-to-side, and front-to-back vibration resistance for vibration in three directions when the Servomotor is mounted with the shaft in a horizontal position is given in the above table. The strength of the vibration that the Servomotor can withstand depends on the application. Always check the vibration acceleration rate that is applied to the Servomotor with the actual equipment.



Vibration Applied to the Servomotor

*4 If the surrounding air temperature will exceed 40°C, refer to section “Applications Where the Surrounding Air Temperature of the Servomotor Exceeds 40 °C” on page 38.

*5 If the altitude will exceed 1,000 m, refer to section “Applications Where the Altitude of the Servomotor Exceeds 1,000 m” on page 38.

Ratings

Voltage			200 V							
Model SGM7A-			A5A	01A	C2A	02A	04A	06A	08A	10A
Rated Output *1		W	50	100	150	200	400	600	750	1000
Rated Torque *1, *2		Nm	0.159	0.318	0.477	0.637	1.27	1.91	2.39	3.18
Instantaneous Maximum Torque *1		Nm	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 Motor Speed *1		min^{-1}	3000							
Maximum Motor Speed		min^{-1}	6000							
Torque Constant		Nm/Arms	0.307	0.387	0.335	0.461	0.582	0.461	0.590	0.547
Motor Moment of Inertia		$\times 10^{-4}$ kg m^2	0.0217 (0.0297)	0.0337 (0.0417)	0.0458 (0.0538)	0.139 (0.209)	0.216 (0.286)	0.315 (0.385)	0.775 (0.955)	0.971 (1.15)
Rated Power Rate *1		kW/s	11.7 (8.51)	30.0 (24.2)	49.7 (42.2)	29.2 (19.4)	74.7 (56.3)	115 (94.7)	73.7 (59.8)	104 (87.9)
Rated Angular Acceleration Rate *1		rad/s	73200 (53500)	94300 (76200)	104000 (88600)	45800 (30400)	58700 (44400)	60600 (49600)	30800 (25000)	32700 (27600)
Derating Rate for Servomotor with Oil Seal		%	80	90			95			
Heat Sink Size (Aluminium)		mm	200 × 200 × 6		250 × 250 × 6			300 × 300 × 12 *7	250 × 250 × 6	300 × 300 × 12
Protective Structure *3			Totally enclosed, self-cooled, IP67							
Holding Brake Specifications *4	Rated Voltage	V	24 VDC±10%							
	Capacity	W	5.5			6		6.5		
	Holding Torque	Nm	0.159	0.318	0.477	0.637	1.27	1.91	2.39	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 (Motor Moment of Inertia Ratio)			40 times			30 times	20 times		20 times	
	With External Regenerative Resistor and Dynamic Brake Resistor								30 times	
Allowable Shaft Load *5	LF	mm	20			25			35	
	Allowable Radial Load	N	78			245			392	
	Allowable Thrust Load	N	54			74			147	

Notes:

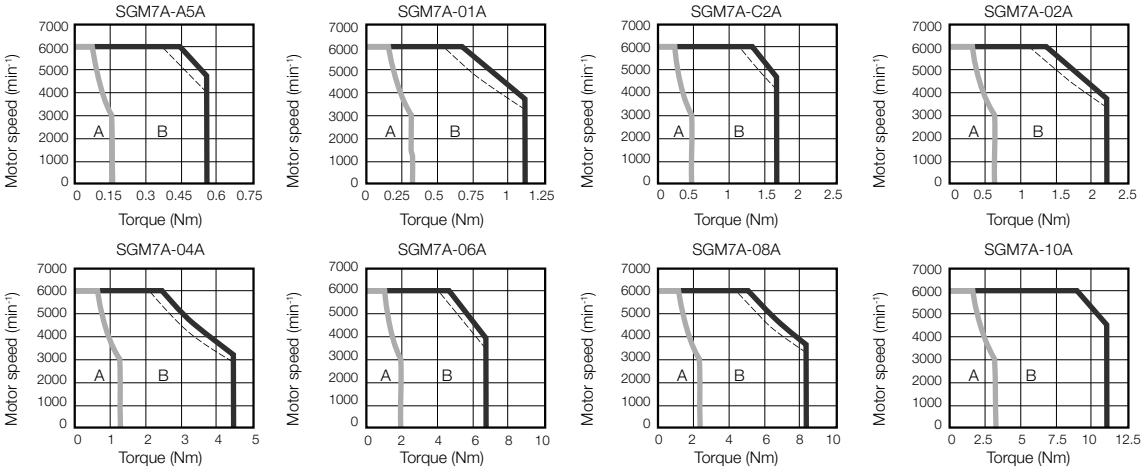
1 The values in parentheses are for Servomotors with Holding Brakes.

2 For footnotes *1 to *5 and *7 refer to chapter Notes for Servomotor Ratings on page 33.

Torque-Motor Speed Characteristics

A : Continuous duty zone
B : Intermittent duty zone

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



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

Notes:

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

2 The characteristics in the intermittent duty zone depend on the power supply voltage.

3 If the effective torque is within the allowable range for the rated torque, the Servomotor can be used within the intermittent duty zone.

4 If you use a Servomotor Main Circuit Cable that exceeds 20 m, the intermittent duty zone in the torquemotor speed characteristics will become smaller because the voltage drop increases.

Ratings

Voltage			200 V						
Model SGM7A-			15A	20A	25A	30A	40A	50A	70A
Rated Output *6		W	1.5	2.0	2.5	3.0	4.0	5.0	7.0
Rated Torque *2, *6		Nm	4.90	6.36	7.96	9.80	12.6	15.8	22.3
Instantaneous Maximum Torque *6		Nm	14.7	19.1	23.9	29.4	37.8	47.6	54.0
Rated Current *6		Arms	9.3	12.1	15.6	17.9	25.4	27.6	38.3
Instantaneous Maximum Current *6		Arms	28	42	51	56	77	84	105
Rated Motor Speed *6		min^{-1}	3000						
Maximum Motor Speed *6		min^{-1}	6000						
Torque Constant		Nm/Arms	0.590	0.561	0.538	0.582	0.519	0.604	0.604
Motor Moment of Inertia		$\times 10^{-4}$ kg m^2	2.00 (2.25)	2.47 (2.72)	3.19 (3.44)	7.00 (9.20)	9.60 (11.8)	12.3 (14.5)	12.3
Rated Power Rate *6		kW/s	120 (106)	164 (148)	199 (184)	137 (104)	165 (134)	203 (172)	404
Rated Angular Acceleration Rate *6		rad/s	24500 (21700)	25700 (23300)	24900 (23100)	14000 (10600)	13100 (10600)	12800 (10800)	18100
Derating Rate for Servomotor with Oil Seal		%	n/a						
Heat Sink Size		mm	300 × 300 × 12			400 × 400 × 20			
Protective Structure *3			Totally enclosed, self-cooled, IP67						Totally enclosed, separately cooled (with fan), IP22
Holding Brake Specifications *4	Rated Voltage	V	24 VDC $^{+10\%}_{0}$						-
	Capacity	W	12			10			
	Holding Torque	Nm	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 (Motor Moment of Inertia Ratio)			10 times			5 times			
	With External Regenerative Resistor and Dynamic Brake Resistor		20 times			15 times			
Allowable Shaft Load *5	LF	mm	45			63			
	Allowable Radial Load	N	686			980	1176		
	Allowable Thrust Load	N	196			392			

Notes:

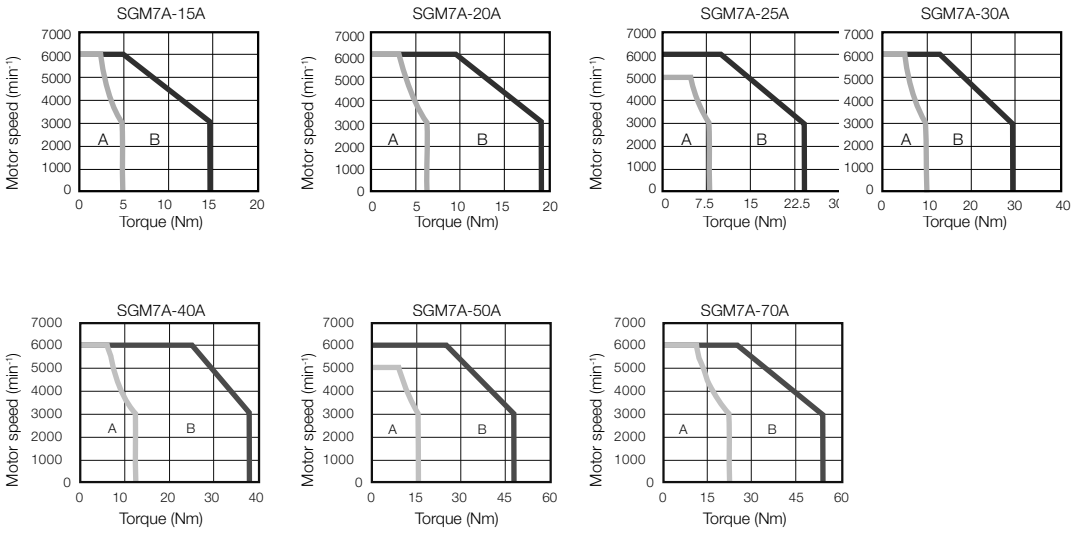
1 The values in parentheses are for Servomotors with Holding Brakes.

2 For footnotes *1 to *5 and *7 refer to chapter Notes for Servomotor Ratings on page 33.

Torque-Motor Speed Characteristics for Three-phase, 200 V

A : Continuous duty zone

B : Intermittent duty zone



Notes:

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 torquemotor speed characteristics will become smaller because the voltage drop increases.

Notes for Servomotor Ratings

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

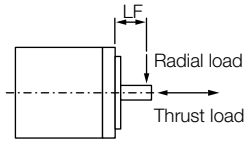
*2. The rated torques are the continuous allowable torque values at a surrounding air temperature of 40 °C with an aluminum heat sink of the dimensions given in the table.

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

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

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

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



*6. These values are for operation in combination with a SERVOPACK when the temperature of the armature winding is 20 °C. These are typical values.

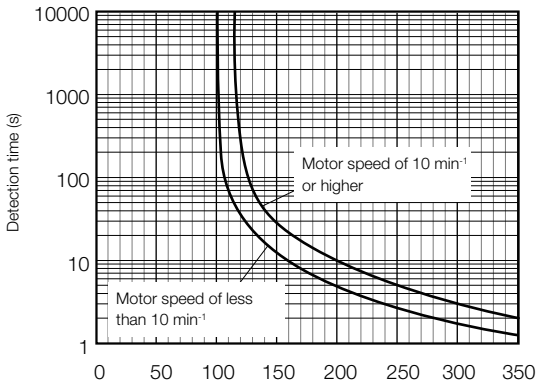
*7. If the heat sink is 250 mm × 250 mm × 6 mm, the rated output is 550 W and the rated torque is 1.75 Nm. Refer to the following section for details.

*8. For the SGM7A-25A or SGM7A-50A, the maximum motor speed for the continuous duty zone is 5,000 min^{-1}. Use the Servomotor within the continuous duty zone for the average motor speed and effective torque.

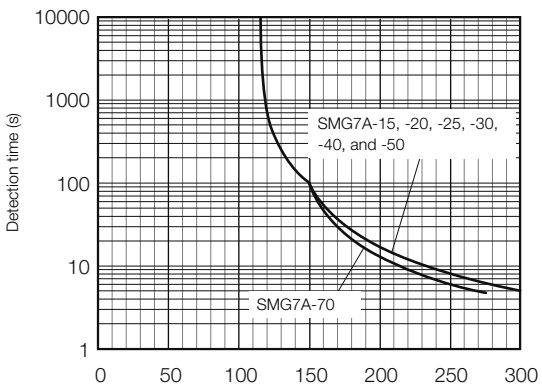
Servomotor Overload Protection Characteristics

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

SGM7A-A5, -01, C2, 02, 04, 06, 08, and -10



SGM7A-15, -20, 25, -30, -40, -50, and -70



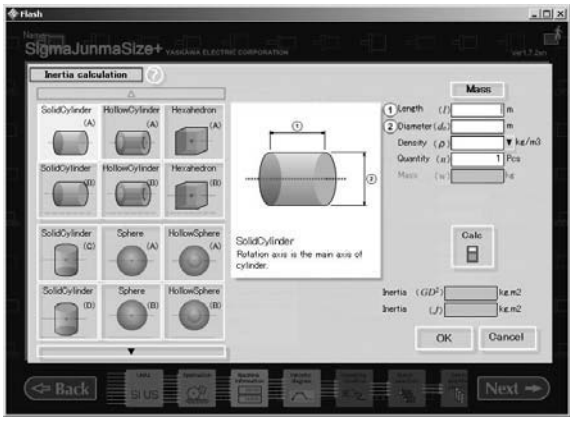
Note:

The above overload characteristics does not give permission to perform continuous duty operation with an output of 100% or higher. Use the Servomotor so that the effective torque remains within the continuous duty zone given in Torque-Motor Speed Characteristics on page 27 or in Torque-Motor Speed Characteristics for Three-phase, 200 V on page 33.

Load Moment of Inertia

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

Refer to Servomotor Ratings on page 30. This value is provided strictly as a guideline and results depend on Servomotor driving conditions. Use the SigmaJunmaSize+ AC Servo Drive Capacity Selection Program to check the driving conditions. Contact your YASKAWA representative for information on this program.



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

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

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

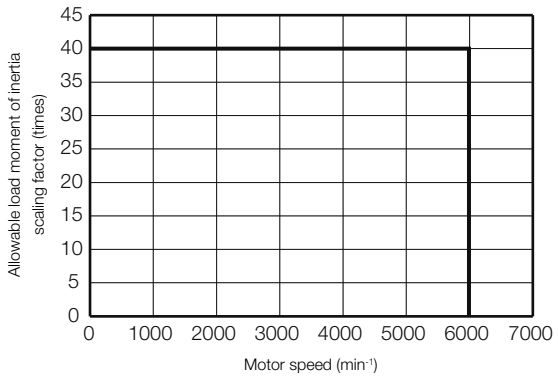
Allowable Load Moment of Inertia Scaling Factor for SERVOPACKs without Built-in Regenative Resistors

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

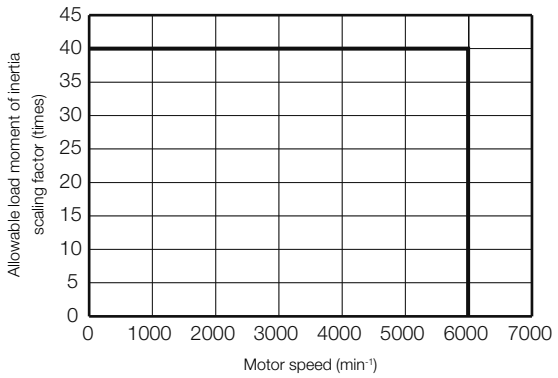
If the Servomotor exceeds the allowable load moment of inertia, an overvoltage alarm may occur in the SERVOPACK.

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

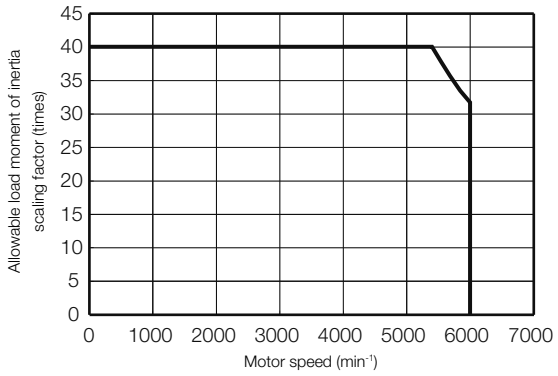
SGM7A-A5A



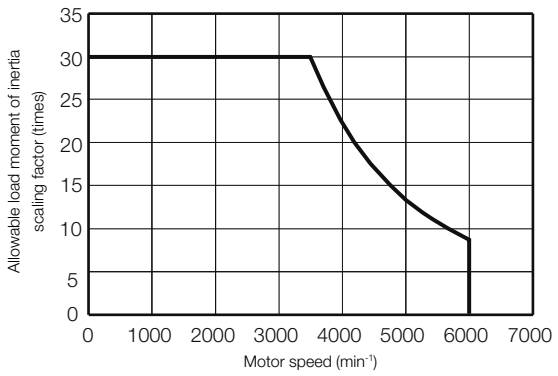
SGM7A-01A



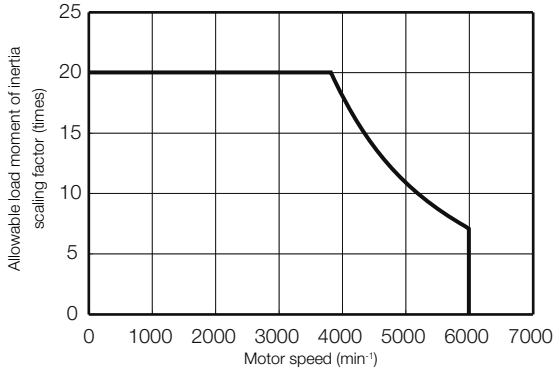
SGM7A-C2A



SGM7A-02A



SGM7A-04A



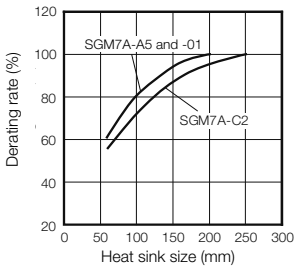
* Applicable SERVOPACK models: SGD7S-R70A, -R90A, -1R6A, or -2B8A.

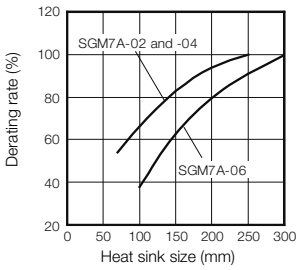
Servomotor Heat Dissipation Conditions

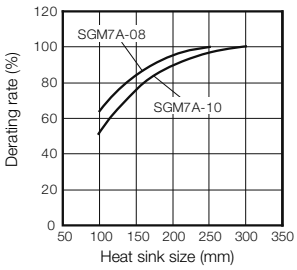
The Servomotor ratings are the continuous allowable values at a surrounding air temperature of 40 °C when a heat sink is installed on the Servomotor. If the Servomotor is mounted on a small device component, the Servomotor temperature may rise considerably because the surface for heat dissipation becomes smaller. Refer to the following graphs for the relation between the heat sink size and derating rate.

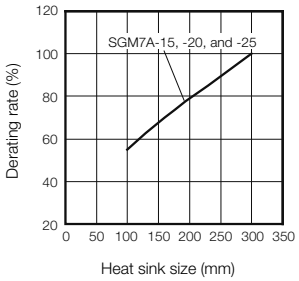
Note: The derating rates are applicable only when the average motor speed is less than or equal to the rated motor speed. If the average motor speed exceeds the rated motor speed, consult with your Yaskawa representative.

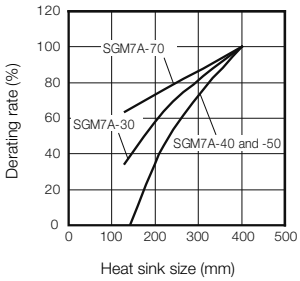
Important: The actual temperature rise depends on how the heat sink (i.e., the Servomotor mounting section) is attached to the installation surface, what material is used for the Servomotor mounting section, and the motor speed. Always check the Servomotor temperature with the actual equipment.







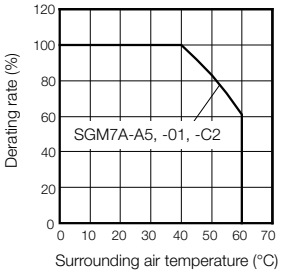


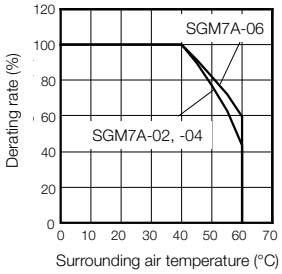


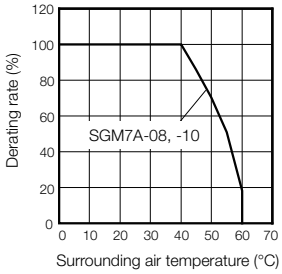
Applications Where the Surrounding Air Temperature of the Servomotor Exceeds 40 °C

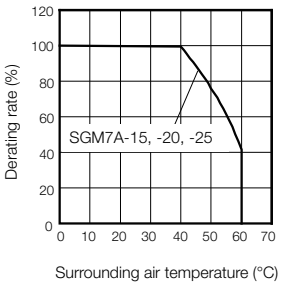
The Servomotor ratings are the continuous allowable values at a surrounding air temperature of 40 °C. If you use a Servomotor at a surrounding air temperature that exceeds 40 °C (60 °C max.), apply a suitable derating rate from the following graphs.

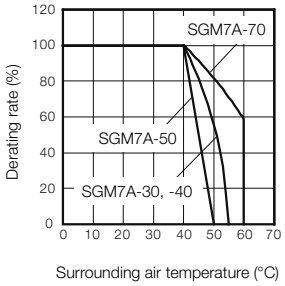
Note: The derating rates are applicable only when the average motor speed is less than or equal to the rated motor speed. If the average motor speed exceeds the rated motor speed, consult with your Yaskawa representative.







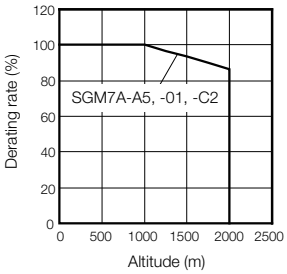


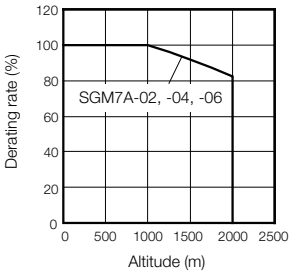


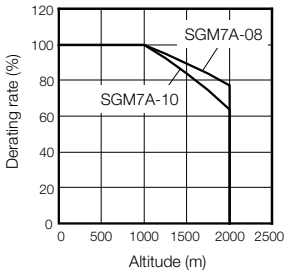
Applications Where the Altitude of the Servomotor Exceeds 1,000 m

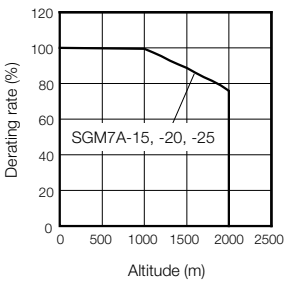
The Servomotor ratings are the continuous allowable values at an altitude of 1,000 m or less. If you use a Servomotor at an altitude that exceeds 1,000 m (2,000 m max.), the heat dissipation effect of the air is reduced. Apply the appropriate derating rate from the following graphs.

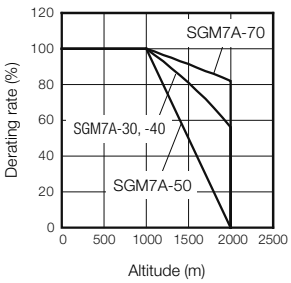
Note: The derating rates are applicable only when the average motor speed is less than or equal to the rated motor speed. If the average motor speed exceeds the rated motor speed, consult with your Yaskawa representative.







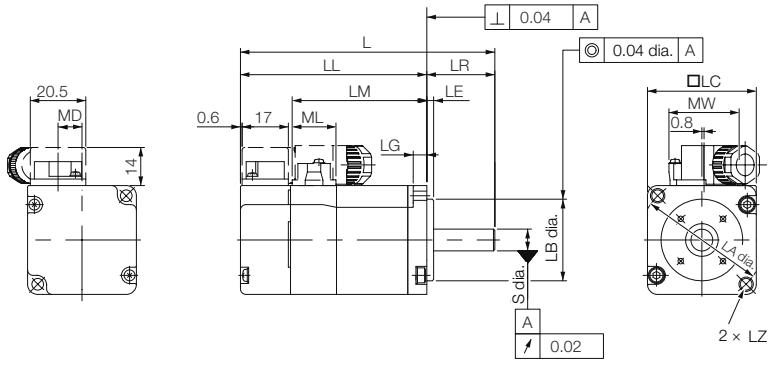




External Dimensions

Servomotors

SGM7A-A5, -01, -C2



Model SMG7A	L	LL	LM	Flange Dimensions							S
				LR	LE	LG	LC	LA	LB	LZ	
A5A□A2□	81.5 (122)	56.5 (97)	37.9	25	2.5	5	40	46	$30^{0}_{-0.021}$	4.3	$8^{0}_{-0.009}$
01A□A2□	93.5 (134)	68.5 (109)	49.9	25	2.5	5	40	46	$30^{0}_{-0.021}$	4.3	$8^{0}_{-0.009}$
C2A□A2□	105.5 (153.5)	80.5 (128.5)	61.9	25	2.5	5	40	46	$30^{0}_{-0.021}$	4.3	$8^{0}_{-0.009}$

Model SMG7A	MD	MW	ML	Approx. Mass [kg]
A5A□A2□	8.8	25.8	16.1	0.3 (0.6)
01A□A2□	8.8	25.8	16.1	0.4 (0.7)
C2A□A2□	8.8	25.8	16.1	0.5 (0.8)

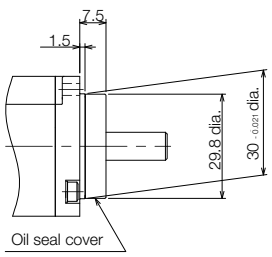
Notes:

1 The values in parentheses are for Servomotors with Holding Brakes.

2 For detailed shaft end specifications refer to chapter Shaft End Specifications for SGM7A-A5 to -10 on page 41.

Specification of Options

Oil Seal

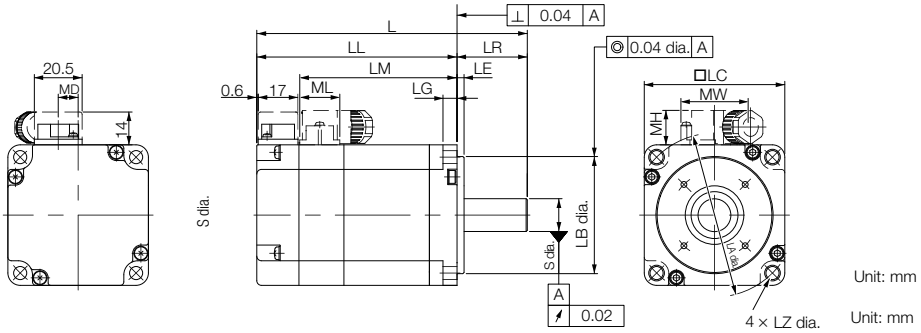


Unit: mm

External Dimensions

Servomotors

SGM7A-02 to -10



Unit: mm

Model SMG7A	L	LL	LM	Flange Dimensions							S
				LR	LE	LG	LC	LA	LB	LZ	
02A□A2□	99.5 (140)	69.5 (110)	51.2	30	3	6	60	70	$50^{0}_{-0.025}$	5.5	$14^{0}_{-0.011}$
04A□A2□	115.5 (156)	85.5 (126)	67.2	30	3	6	60	70	$50^{0}_{-0.025}$	5.5	$14^{0}_{-0.011}$
06A□A2□	137.5 (191.5)	107.5 (161)	89.2	30	3	6	60	70	$50^{0}_{-0.025}$	5.5	$14^{0}_{-0.011}$
08A□A2□	137 (184)	97 (144)	78.5	40	3	8	80	90	$70^{0}_{-0.030}$	7	$19^{0}_{-0.013}$
10A□A2□	162 (209)	122 (169)	103.5	40	3	8	80	90	$70^{0}_{-0.030}$	7	$19^{0}_{-0.013}$

Model SMG7A	MD	MW	ML	ML	Approx. Mass [kg]
02A□A2□	8.5	28.7	14.7	17.1	0.8 (1.4)
04A□A2□	8.5	28.7	14.7	17.1	1.2 (1.8)
06A□A2□	8.5	28.7	14.7	17.1	1.6 (2.2)
08A□A2□	13.6	38	14.7	19.3	2.3 (2.9)
10A□A2□	13.6	38	14.7	19.3	3.1 (3.7)

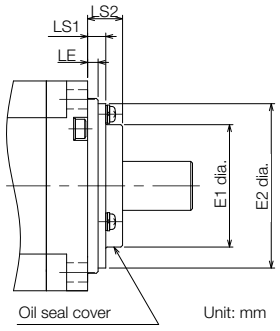
Notes:

1 The values in parentheses are for Servomotors with Holding Brakes.

2 For detailed shaft end specifications refer to chapter Shaft End Specifications for SGM7A-A5 to -10 on page 41.

Specification of Options

Oil Seal

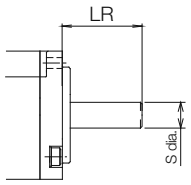
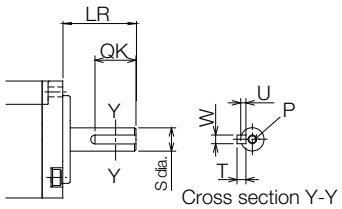
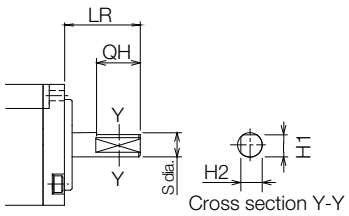


Model SMG7A	Dimensions with Oil Seal			
	E1	E2	LS1	LS2
02A, 04A, 06A	35	47	5.2	10
08A, 10A	47	61	5.5	11

Shaft End Specifications for SGM7A-A5 to -10

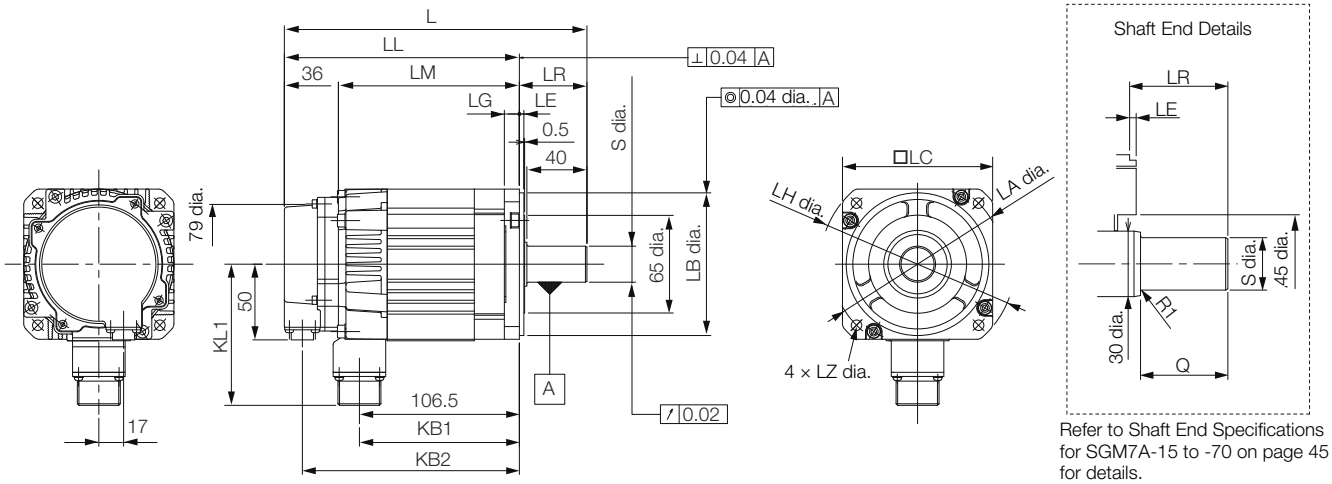
SGM7A-□□□□□□□

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

Shaft End Details		Servomotor Model SGM7A-							
		A5	01	C2	02	04	06	08	10
Code: 2 (Straight without Key)									
	LR	25			30			40	
	S	$8^{0}_{-0.009}$			$14^{0}_{-0.011}$			$19^{0}_{-0.013}$	
Code: 6 (Straight with Key and Tap)									
	LR	25			30			40	
	QK	14			14			22	
	S	$8^{0}_{-0.009}$			$14^{0}_{-0.009}$			$19^{0}_{-0.013}$	
	W	3			5			6	
	T	3			5			6	
	U	1.8			3			3.5	
	P	M3 × 6L			M5 × 8L			M6 × 10L	
Code: B (with Two Flat Seats)									
	LR	25			30			40	
	QH	15			15			22	
	S	$8^{0}_{-0.009}$			$14^{0}_{-0.011}$			$19^{0}_{-0.013}$	
	H1	7.5			13			18	
	H2	7.5			13			18	

Servomotors without Holding Brakes

SGM7A-15, -20, and -25



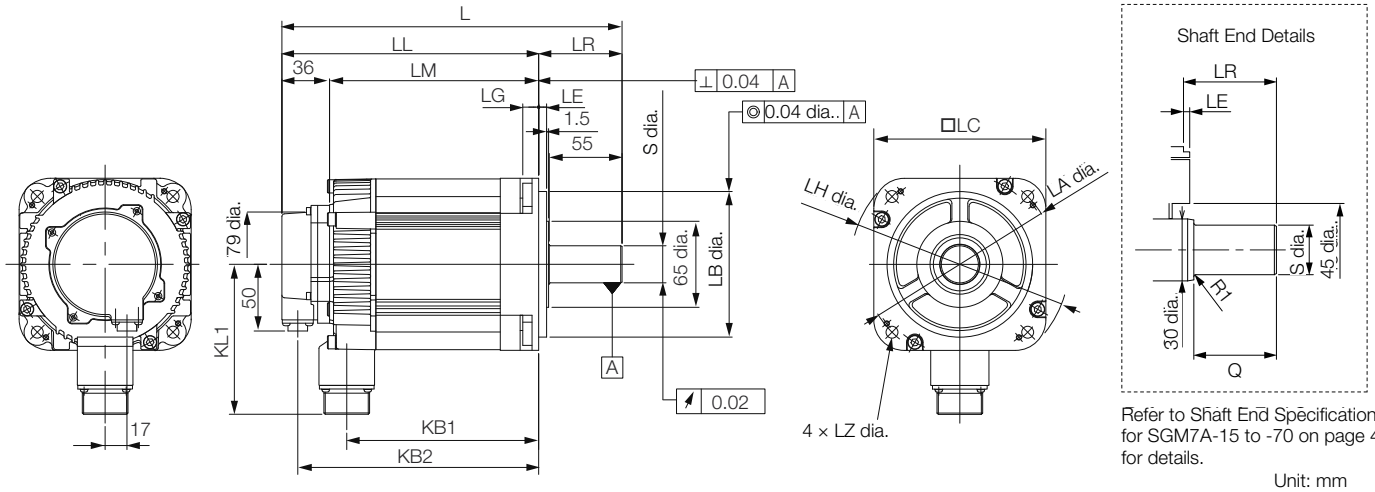
Refer to Shaft End Specifications for SGM7A-15 to -70 on page 45 for details.

Unit: mm

Model SGM7A-	L	LL	LM	LR	KB1	KB2	KL1
15A□A21	202	157	121	45	107	145	94
20A□A21	218	173	137	45	123	161	94
25A□A21	241	196	160	45	146	184	94

Model SGM7A-	Flange Dimensions							Shaft End Dimensions		Approx. Mass[kg]
	LA	LB	LC	LE	LG	LH	LZ	S	Q	
15A□A21	115	$95^{0}_{-0.035}$	100	3	10	130	7	$24^{0}_{-0.013}$	40	4.6
20A□A21	115	$95^{0}_{-0.035}$	100	3	10	130	7	$24^{0}_{-0.013}$	40	5.4
25A□A21	115	$95^{0}_{-0.035}$	100	3	10	130	7	$24^{0}_{-0.013}$	40	6.8

SGM7A-30, -40, and -50



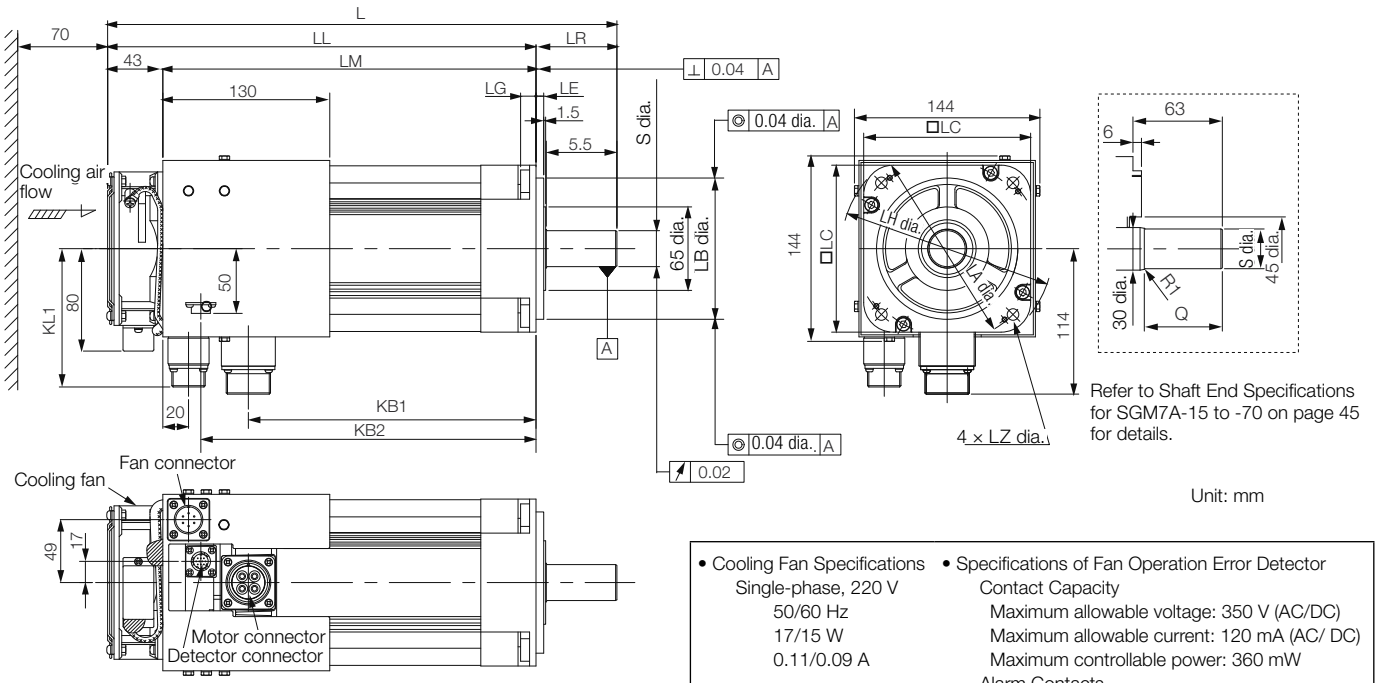
Refer to Shaft End Specifications for SGM7A-15 to -70 on page 45 for details.

Unit: mm

Model SGM7A-	L	LL	LM	LR	KB1	KB2	KL1
30A□A21	257	194	158	63	145	182	114
40A□A21	296	233	197	63	184	221	114
50A□A21	336	273	237	63	224	261	114

Model SGM7A-	Flange Dimensions							Shaft End Dimensions		Approx. Mass[kg]
	LA	LB	LC	LE	LG	LH	LZ	S	Q	
30A□A21	145	$110^{0}_{-0.035}$	130	6	12	165	9	$28^{0}_{-0.013}$	55	10.5
40A□A21	145	$110^{0}_{-0.035}$	130	6	12	165	9	$28^{0}_{-0.013}$	55	13.5
50A□A21	145	$110^{0}_{-0.035}$	130	6	12	165	9	$28^{0}_{-0.013}$	55	16.5

SGM7A-70



Refer to Shaft End Specifications for SGM7A-15 to -70 on page 45 for details.

Unit: mm

- Cooling Fan Specifications
  - Single-phase, 220 V
  - 50/60 Hz
  - 17/15 W
  - 0.11/0.09 A
- Specifications of Fan Operation Error Detector
  - Contact Capacity
    - Maximum allowable voltage: 350 V (AC/DC)
    - Maximum allowable current: 120 mA (AC/ DC)
    - Maximum controllable power: 360 mW
  - Alarm Contacts
    - ON for normal fan rotation.
    - OFF at 1,680 ± 100 min^{-1} max.
    - OFF for 3 seconds at startup.

Model SGM7A-	L	LL	LM	LR	KB1	KB2	KL1
70A□A21	397	334	291	63	224	261	108

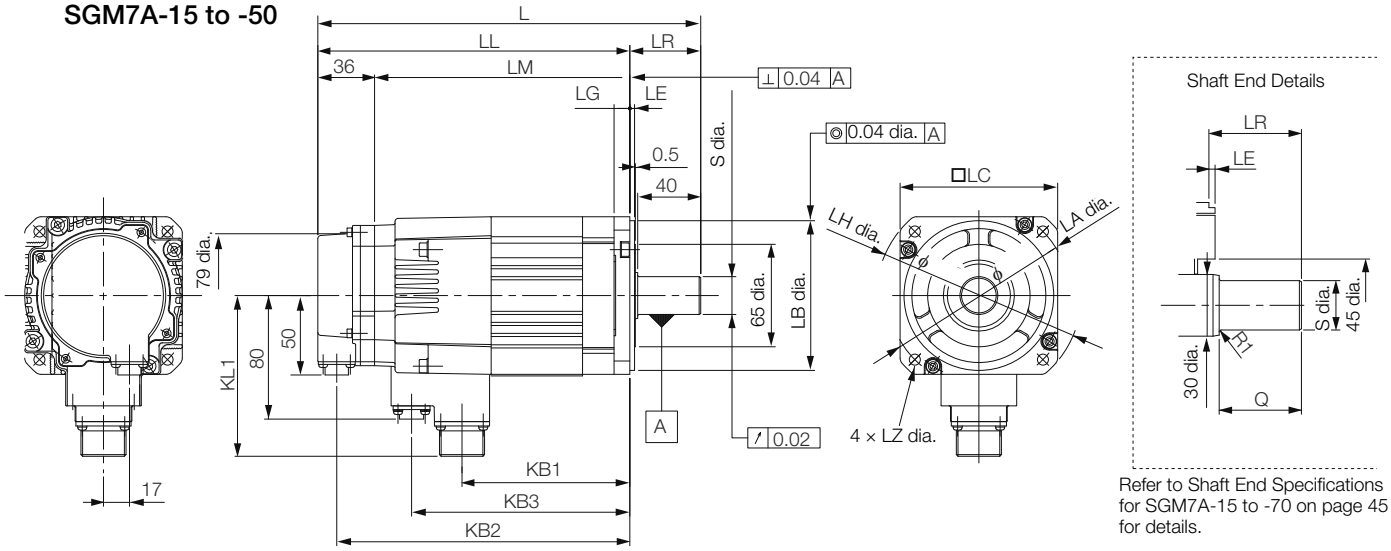
Model SGM7A-	Flange Dimensions							Shaft End Dimensions		Approx. Mass [kg]
	LA	LB	LC	LE	LG	LH	LZ	S	Q	
70A□A21	145	$110^{0}_{-0.035}$	130	6	12	165	9	$28^{0}_{-0.013}$	55	18.5

Notes: Leave a minimum space of 70 mm around the Servomotor from walls and other equipment to allow for a sufficient amount of cooling air.
Servomotors with Oil Seals have the same dimensions.

Refer to the following section for information on connectors or SGM7A-70 without Holding Brakes on page 46.

Servomotors with Holding Brakes

SGM7A-15 to -50



Refer to Shaft End Specifications for SGM7A-15 to -70 on page 45 for details.

Unit: mm

Model SGM7A-	L	LL	LM	LR	KB1	KB2	KB3	KL1
15A□A2C	243	198	162	45	107	186	139	102
20A□A2C	259	214	178	45	123	202	155	102
25A□A2C	292	247	211	45	156	235	188	102
30A□A2C	295	232	196	63	145	220	181	119
40A□A2C	332	269	233	63	184	257	220	119
50A□A2C	372	309	273	63	224	297	260	119

Model SGM7A-	Flange Dimensions							Shaft End Dimensions		Approx. Mass[kg]
	LA	LB	LC	LE	LG	LH	LZ	S	Q	
15A□A2C	115	$95^{0}_{-0.035}$	100	3	10	130	7	$24^{0}_{-0.013}$	40	6.0
20A□A2C	115	$95^{0}_{-0.035}$	100	3	10	130	7	$24^{0}_{-0.013}$	40	6.8
25A□A2C	115	$95^{0}_{-0.035}$	100	3	10	130	7	$24^{0}_{-0.013}$	40	8.7
30A□A2C	145	$110^{0}_{-0.035}$	130	6	12	165	9	$28^{0}_{-0.013}$	55	13
40A□A2C	145	$110^{0}_{-0.035}$	130	6	12	165	9	$28^{0}_{-0.013}$	55	16
50A□A2C	145	$110^{0}_{-0.035}$	130	6	12	165	9	$28^{0}_{-0.013}$	55	19

Note:

Servomotors with Oil Seals have the same dimensions.

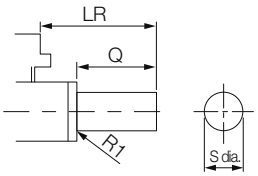
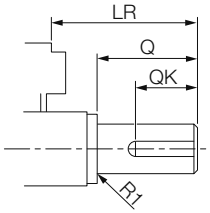
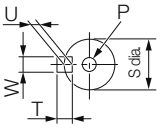
Refer to the following section for information on connectors or SGM7A-15 to -50 with Holding Brakes on page 46.

Shaft End Specifications for SGM7A-15 to -70

SGM7A-□□□□□□□

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

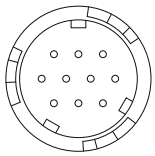
Unit: mm

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

Connector Specifications

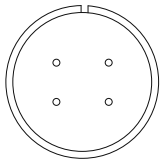
SGM7A-15 to -50 without Holding Brakes

- Encoder Connector Specifications (24-bit Encoder)



Receptacle: CM10-R10P-D
Applicable plug: Not provided by Yaskawa
Plug: CM10-AP10S-□-D for Right-angle Plug
CM10-SP10S-□-D for Straight Plug
(□ depends on the applicable cable size.
Manufacturer: DDK Ltd.

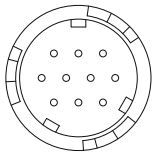
- Servomotor Connector Specifications



Manufacturer: DDK Ltd.

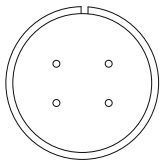
SGM7A-70 without Holding Brakes

- Encoder Connector Specifications (24-bit Encoder)



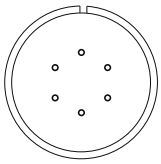
Receptacle: CM10-R10P-D
Applicable plug: Not provided by Yaskawa
Plug: CM10-AP10S-□-D for Right-angle Plug
CM10-SP10S-□-D for Straight Plug
(□ depends on the applicable cable size.
Manufacturer: DDK Ltd.

- Servomotor Connector Specifications



Manufacturer: DDK Ltd.

- FanConnectorSpecifications



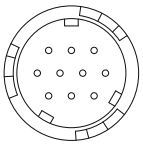
Receptacle: MS3102A14S-6P
Applicable Plug
Plug: MS3108B14S-6S
Cable Clamp: MS3057-6A

Note:

The Servomotor Connector (receptacle) is RoHS compliant.
Contact the connector manufacturer for RoHS-compliant cable-side connectors (not provided by Yaskawa).

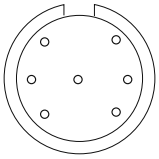
SGM7A-15 to -50 with Holding Brakes

- Encoder Connector Specifications (24-bit Encoder)



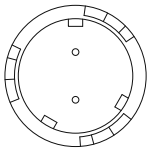
Receptacle: CM10-R10P-D
Applicable plug: Not provided by Yaskawa
Plug: CM10-AP10S-□-D for Right-angle Plug
CM10-SP10S-□-D for Straight Plug
(□ depends on the applicable cable size.
Manufacturer: DDK Ltd.

- Servomotor Connector Specifications



Manufacturer: DDK Ltd.

- Brake Connector Specifications



Receptacle: CM10-R2P-D
Applicable plug: Not provided by Yaskawa.
Plug: CM10-AP2S-□-D for Right-angle Plug
CM10-SP2S-□-D for Straight Plug
(□ depends on the applicable cable size.)
Manufacturer: DDK Ltd.

Model Designations

SGM7J	-	01	A	7	A	2	1
Sigma-7 Series Servomotors: SGM7J		1st + 2nd	3rd	4th	5th	6th	7th digit

1st + 2nd digit - Rated Output

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

3rd digit - Power Supply Voltage

Code	Specifications
A	200 VAC

4th digit - Serial Encoder

Code	Specifications
7	24-bit absolute
F	24-bit incremental

5th digit - Design Revision Order

Code	Specifications
A	Initial Design

6th digit - Shaft End

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

7th digit - Options

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

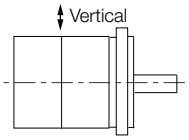
Specifications and Ratings

Specifications

Voltage		200 V						
Model SGM7J-		05A	01A	C2A	02A	04A	06A	08A
Time Rating		Continuous						
Thermal Class		B						
Insulation Resistance		500 VDC, 10 MOhm min.						
Withstand Voltage		1,500 VAC for 1 minute						
Excitation		Permanent magnet						
Mounting		Flange-mounted						
Drive Method		Direct drive						
Rotation Direction		Counterclockwise (CCW) for forward reference when viewed from the load side						
Vibration Class*1		V15						
Environmental Conditions	Surrounding Air Temperature	0 °C to 40 °C (With derating, usage is possible between 40 °C and 60 °C)*4						
	Surrounding Air Humidity	20% to 80% relative humidity (with no condensation)						
	Installation Site	• Must be indoors and free of corrosive and explosive gases. • Must be well-ventilated and free of dust and moisture. • Must facilitate inspection and cleaning. • Must have an altitude of 1,000 m or less. (With derating, usage is possible between 1,000 m and 2,000 m.)*5 • Must be free of strong magnetic fields.						
	Storage Environment	Store the Servomotor in the following environment if you store it with the power cable disconnected. Storage Temperature: -20 °C to 60 °C (with no freezing) Storage Humidity: 20% to 80% relative humidity (with no condensation)						
Shock Resistance*2	Impact Acceleration Rate at Flange	490 m/s²						
	Number of Impacts	2 times						
Vibration Resistance*3	Vibration Acceleration Rate at Flange	49 m/s²						
Applicable SERVOPACKS	SGD7S-	R70A	R70A	1R6A		2R8A	5R5A	
	SGD7W-	1R6A*6, 2R8A*6		1R6A*6, 2R8A*6		2R8A, 5R5A*6, 7R6A*6	5R5A, 7R6A	

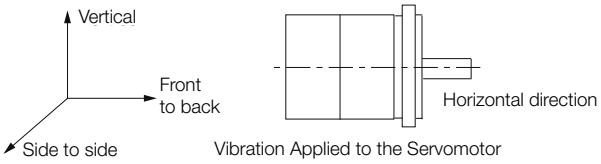
*1 A Vibration class of V15 indicates a vibration amplitude of 15 μm maximum on the Servomotor without a load at the rated motor speed.

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



Shock Applied to the Servomotor

*3 The vertical, side-to-side, and front-to-back vibration resistance for vibration in three directions when the Servomotor is mounted with the shaft in a horizontal position is given in the above table. The strength of the vibration that the Servomotor can withstand depends on the application. Always check the vibration acceleration rate that is applied to the Servomotor with the actual equipment.



Vibration Applied to the Servomotor

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

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

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

Ratings

Voltage			200 V						
Model SGM7J-			A5A	01A	C2A	02A	04A	06A	08A
Rated Output *1		W	50	100	150	200	400	600	750
Rated Torque *1, *2		Nm	0.159	0.318	0.477	0.637	1.27	1.91	2.39
Instantaneous Maximum Torque *1		Nm	0.557	1.11	1.67	2.23	4.46	6.69	8.36
Rated Current *1		Arms	0.55	0.85	1.6	1.6	2.5	4.2	4.4
Instantaneous Maximum Current *1		Arms	2.0	3.1	5.7	5.8	9.3	15.3	16.9
Rated Motor Speed *1		min^{-1}	3000						
Maximum Motor Speed		min^{-1}	6000						
Torque Constant		Nm/Arms	0.316	0.413	0.321	0.444	0.544	0.493	0.584
Motor Moment of Inertia		$\times 10^{-4}$ kg m^2	0.0395 (0.0475)	0.0659 (0.0739)	0.0915 0.0995)	0.263 (0.333)	0.486 (0.556)	0.800 (0.870)	1.59 (1.77)
Rated Power Rate *1		kW/s	6.40 (5.32)	15.3 (13.6)	24.8 (22.8)	15.4 (12.1)	33.1 (29.0)	45.6 (41.9)	35.9 (32.2)
Rated Angular Acceleration Rate *1		rad/s	40200 (33400)	48200 (43000)	52100 (47900)	24200 (19100)	26100 (22800)	23800 (21900)	15000 (13500)
Derating Rate for Servomotor with Oil Seal		%	80	90			95		
Heat Sink Size (Aluminium)		mm	200 × 200 × 6		250 × 250 × 6				
Protective Structure *3			Totally enclosed, self-cooled, IP67						
Holding Brake Specifications *4	Rated Voltage	V	24 VDC $\pm^{10\%}_{0}$						
	Capacity	W	5.5			6		6.5	
	Holding Torque	Nm	0.159	0.318	0.477	0.637	1.27	1.91	2.39
	Coil Resistance	Ω (at 20 °C)	104.8±10%			96±10%		88.6±10%	
	Rated Current	A (at 20 °C)	0.23			0.25		0.27	
	Time Required to Release Brake	ms	60					80	
	Time Required to Brake	ms	100						
Allowable Load Moment of Inertia (Motor Moment of Inertia Ratio)			35 times			15 times	10 times	20 times	12 times
	With External Regenerative Resistor and Dynamic Brake Resistor								
Allowable Shaft Load *5	LF	mm	20			25			35
	Allowable Radial Load	N	78			245			392
	Allowable Thrust Load	N	54			74			147

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

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

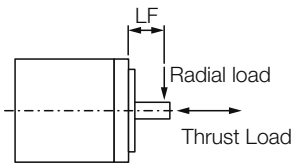
2 The rated torques are the continuous allowable torque values at a surrounding air temperature of 40°C with an aluminum heat sink of the dimensions given in the table.

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

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

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

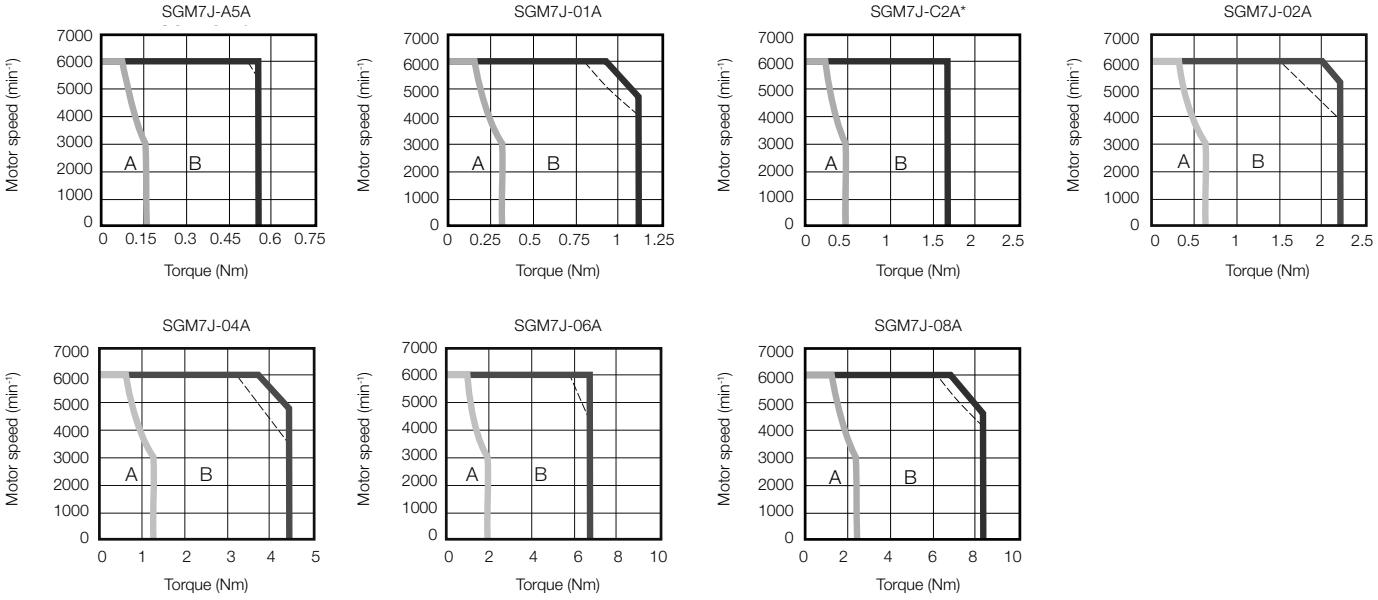
5 The allowable shaft loads are illustrated in the following figure. Design the mechanical system so that the thrust and radial loads applied to the Servomotor shaft end during operation do not exceed the values given in the table.



Torque-Motor Speed Characteristics

A : Continuous duty zone
B : Intermittent duty zone

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



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

Notes:

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

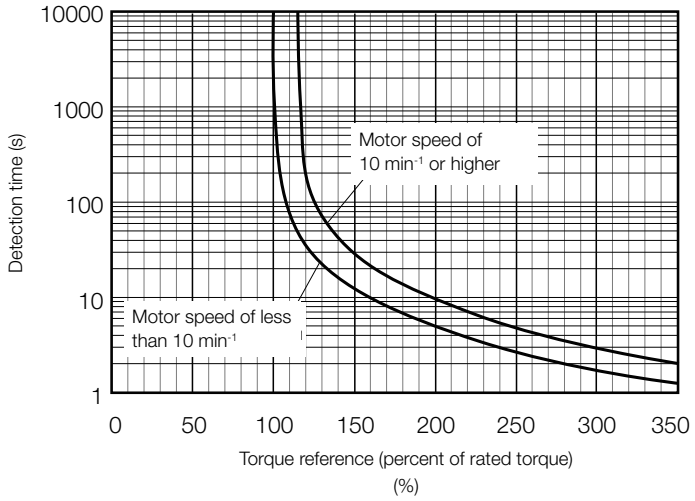
2 The characteristics in the intermittent duty zone depend on the power supply voltage.

3 If the effective torque is within the allowable range for the rated torque, the Servomotor can be used within the intermittent duty zone.

4 If you use a Servomotor Main Circuit Cable that exceeds 20 m, the intermittent duty zone in the torque-motor speed characteristics will become smaller because the voltage drop increases.

Servomotor Overload Protection Characteristics

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



Note:

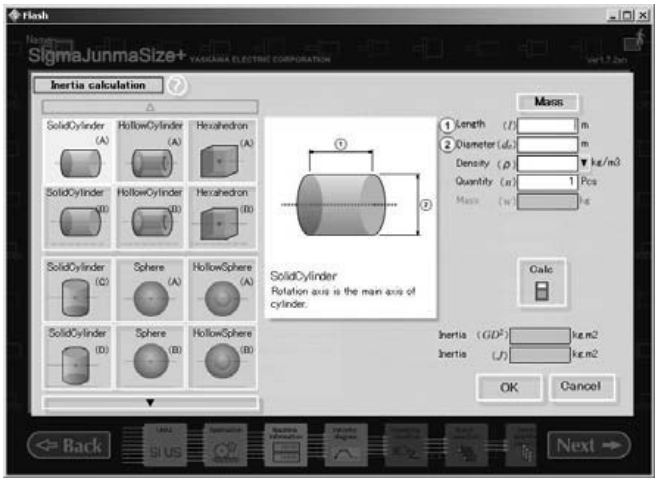
The above overload characteristics does not give permission to perform continuous duty operation with an output of 100% or higher. Use the Servomotor so that the effective torque remains within the continuous duty zone given in Torque-Motor Speed Characteristics on page 51.

Load Moment of Inertia

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

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

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



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

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

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

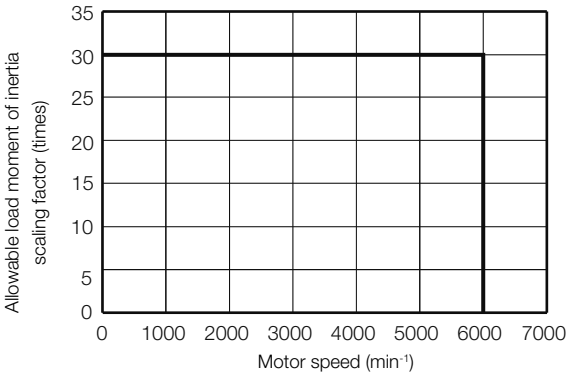
Allowable Load Moment of Inertia Scaling Factor for SERVO-PACKs without Built-in Regenerative Resistors

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

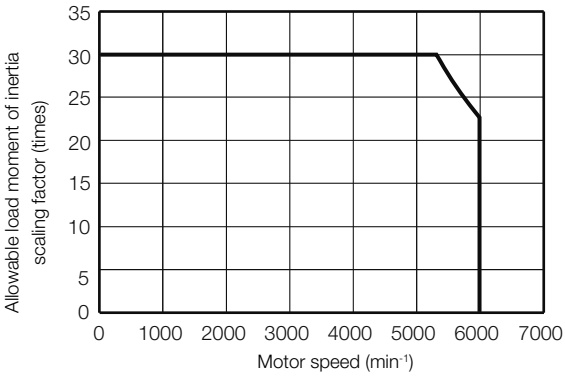
If the Servomotor exceeds the allowable load moment of inertia, an overvoltage alarm may occur in the SERVOPACK.

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

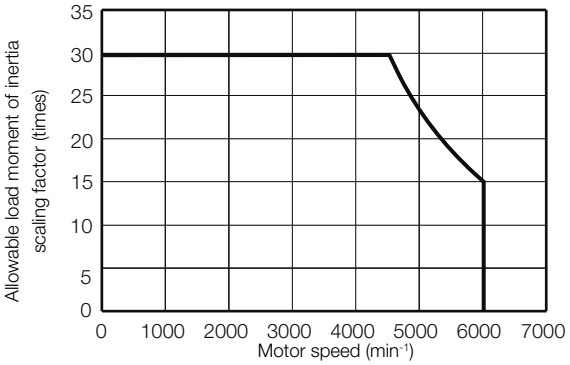
SGM7J-A5A



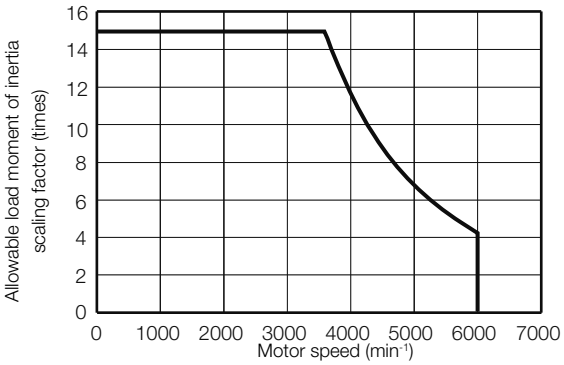
SGM7J-01A



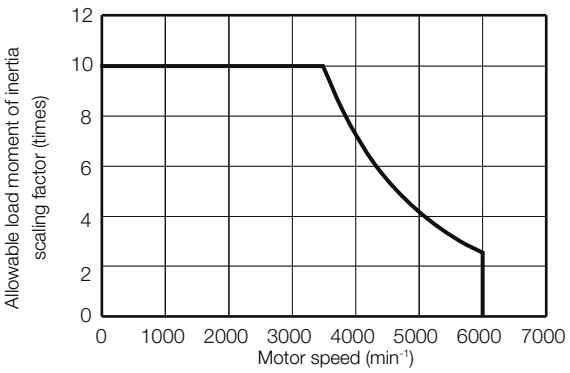
SGM7J-C2A



SGM7J-02A



SGM7J-04A



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

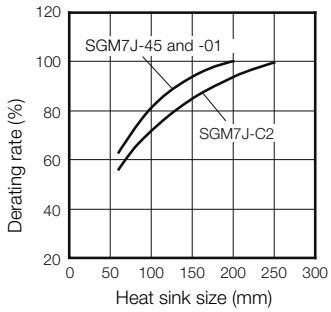
Servomotor Heat Dissipation Conditions

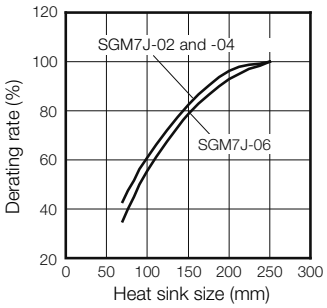
The Servomotor ratings are the continuous allowable values at a surrounding air temperature of 40°C when a heat sink is installed on the Servomotor. If the Servomotor is mounted on a small device component, the Servomotor temperature may rise considerably because the surface for heat dissipation becomes smaller. Refer to the following graphs for the relation between the heat sink size and derating rate.
When using Servomotors with derating, change the detection timing of overload warnings and overload alarms by referring to the motor overload detection level described in the following manual.
Sigma-7-Series AC Servo Drive Rotary Servomotor Product Manual (Manual No.: SIEP S800001 36)

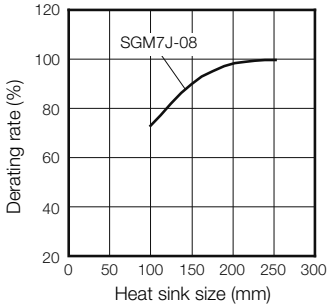
Note:

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

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





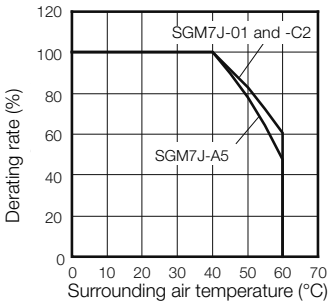


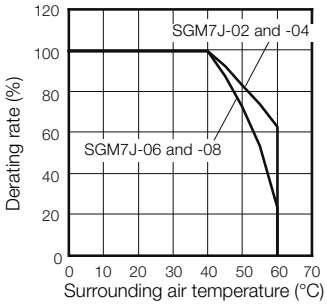
Applications Where the Surrounding Air Temperature of the Servomotor Exceeds 40°C

The Servomotor ratings are the continuous allowable values at a surrounding air temperature of 40°C. If you use a Servomotor at a surrounding air temperature that exceeds 40°C (60°C max.), apply a suitable derating rate from the following graphs.
When using Servomotors with derating, change the detection timing of overload warnings and overload alarms by referring to the motor overload detection level described in the following manual.
Sigma-7-Series AC Servo Drive Rotary Servomotor Product Manual (Manual No.: SIEP S800001 36)

Note:

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





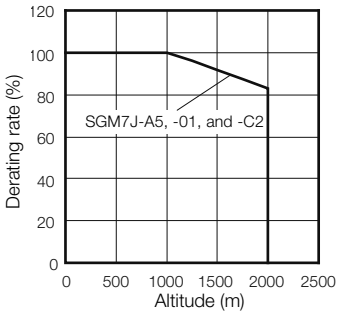
Applications Where the Altitude of the Servomotor Exceeds 1,000 m

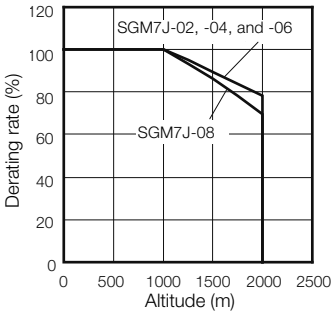
The Servomotor ratings are the continuous allowable values at an altitude of 1,000 m or less. If you use a Servomotor at an altitude that exceeds 1,000 m (2,000 m max.), the heat dissipation effect of the air is reduced. Apply the appropriate derating rate from the following graphs.
When using Servomotors with derating, change the detection timing of overload warnings and overloadalarms by referring to the motor overload detection level described in the following manual.

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

Note:

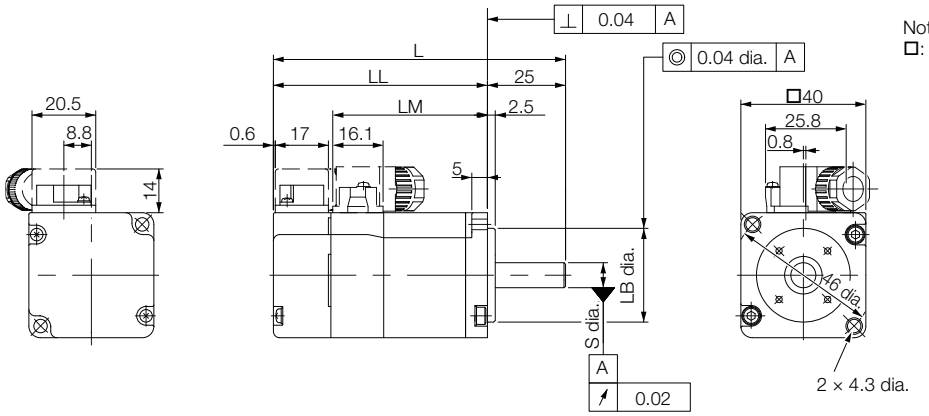
The derating rates are applicable only when the average motor speed is less than or equal to the rated motor speed. If the average motor speed exceeds the rated motor speed, consult with your YASKAWA representative.





Dimensions

SGM7J-A5, -01, and -C2



Notation
□: Square dimensions

Unit: mm

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

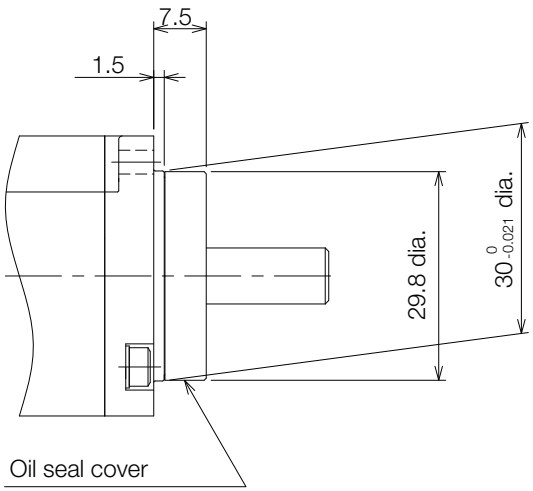
Notes:

1 The values in parentheses are for Servomotors with Holding Brakes.

2 Refer to the following section for detailed shaft end specifications.

Specifications of Options

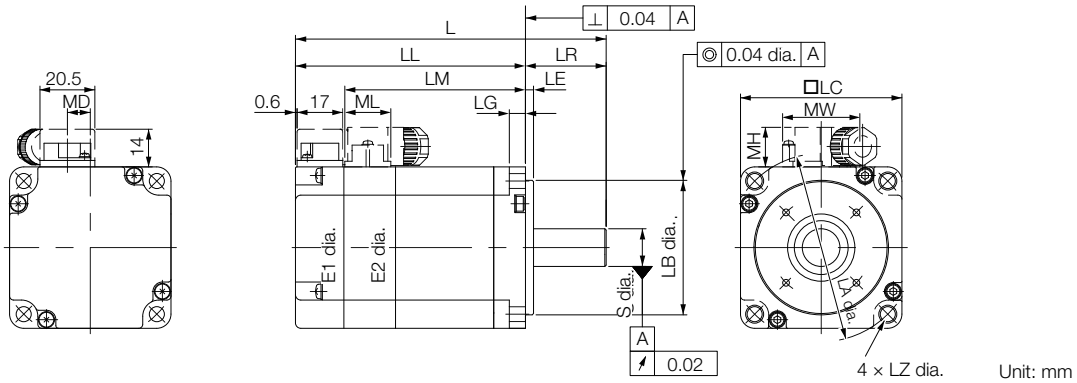
Oil Seal



Unit: mm

Dimensions

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



Unit: mm

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

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

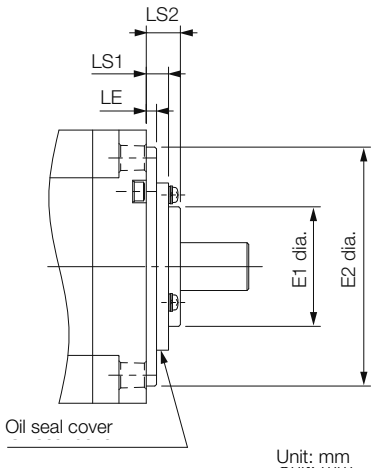
Notes:

1 The values in parentheses are for Servomotors with Holding Brakes.

2 Refer to the following section for detailed shaft end specifications.

Specifications of Options

Oil Seal



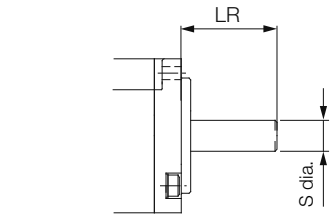
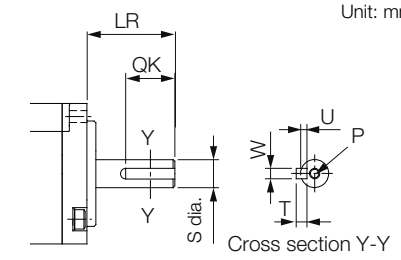
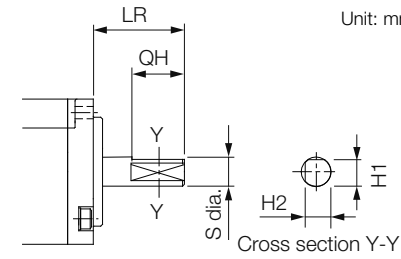
Unit: mm

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

Shaft End Specifications

SGM7J-□□□□□□□

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

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

Model Designations

SGM7G	-	03	A	7	A	2	1
Sigma-7 Series Servomotors: SGM7G		1st + 2nd	3rd	4th	5th	6th	7th digit

1st + 2nd digit - Rated Output

Code	Specifications
03	300 W
05	450 W
09	850 W
13	1.3 kW
20	1.8 kW
30	2.9 kW*
44	4.4 kW
55	5.5 kW
75	7.5 kW
1A	11 kW
1E	15 kW

3rd digit - Power Supply Voltage

Code	Specifications
A	200 VAC

4th digit - Serial Encoder

Code	Specifications
7	24-bit absolute
F	24-bit incremental

5th digit - Design Revision Order

Code	Specifications
A	Initial Design

6th digit - Shaft End

Code	Specifications
2	Straight without key
6	Straight with key and tap

7th digit - Options

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

* The rated output is 2.4 kW if you combine the SGM7G-30A with the SGD7S-200A.

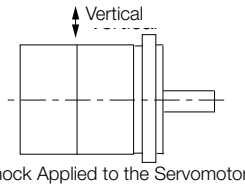
Specifications and Ratings

Specifications

Voltage		200 V									
Model SGM7G-		03A	05A	09A	13A	20A	30A	44A	55A	75A	1AA	1EA
Time Rating		Continuous										
Thermal Class		UL:F, CE:F										
Insulation Resistance		500 VDC, 10 MOhm min.										
Withstand Voltage		1,500 VAC for 1 minute										
Excitation		Permanent magnet										
Mounting		Flange-mounted										
Drive Method		Direct drive										
Rotation Direction		Counterclockwise (CCW) for forward reference when viewed from the load side										
Vibration Class*1		V15										
Environmental Conditions	Surrounding Air Temperature	0 °C to 40 °C (With derating, usage is possible between 40 °C and 60 °C)*4										
	Surrounding Air Humidity	20% to 80% relative humidity (with no condensation)										
	Installation Site	• Must be indoors and free of corrosive and explosive gases. • Must be well-ventilated and free of dust and moisture. • Must facilitate inspection and cleaning. • Must have an altitude of 1,000 m or less. (With derating, usage is possible between 1,000 m and 2,000 m.)*5 • Must be free of strong magnetic fields.										
	Storage Environment	Store the Servomotor in the following environment if you store it with the power cable disconnected. Storage Temperature: -20 °C to 60 °C (with no freezing) Storage Humidity: 20% to 80% relative humidity (with no condensation)										
Shock Resistance*2	Impact Acceleration Rate at Flange	490 m/s²										
	Number of Impacts	2 times										
Vibration Resistance*3	Vibration Acceleration Rate at Flange	49 m/s² (24.5 m/s² front to back)							24.5 m/s²			
Applicable SERVOPACKs	SGD7S-	3R8A		7R6A	120A	180A	330A		470A	550A	590A	780A
	SGD7W-	5R5A*6, 7R6A*6		7A6A	–							

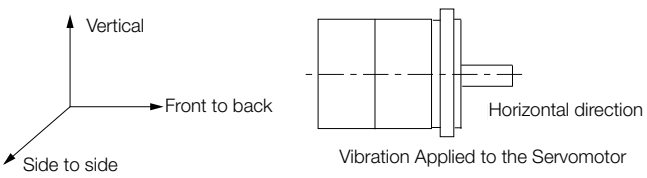
*1 A Vibration class of V15 indicates a vibration amplitude of 15 µm maximum on the Servomotor without a load at the rated motor speed.

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



Shock Applied to the Servomotor

*3 The vertical, side-to-side, and front-to-back vibration resistance for vibration in three directions when the Servomotor is mounted with the shaft in a horizontal position is given in the above table. The strength of the vibration that the Servomotor can withstand depends on the application. Always check the vibration acceleration rate that is applied to the Servomotor with the actual equipment.



Vibration Applied to the Servomotor

*4 If the surrounding air temperature will exceed 40°C, refer to the following section or Applications Where the Surrounding Air Temperature of the Servomotor Exceeds 40°C on page 69.

*5 If the altitude will exceed 1,000 m, refer to the following section or Applications Where the Altitude of the Servomotor Exceeds 1,000 m on page 70.

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

Servomotor Ratings

Voltage			200 V				
Model SGM7G-			03A	05A	09A	13A	20A
Rated Output *1		kW	0.3	0.45	0.85	1.3	1.8
Rated Torque *1, *2		Nm	1.96	2.86	5.39	8.34	11.5
Instantaneous Maximum Torque *1		Nm	5.88	8.92	14.2	23.3	28.7
Rated Current *1		Arms	2.8	3.8	6.9	10.7	16.7
Instantaneous Maximum Current *1		Arms	8.0	11	17	28	42
Rated Motor Speed *1		min^{-1}	1500				
Maximum Motor Speed *1		min^{-1}	3000				
Torque Constant		Nm/Arms	0.776	0.854	0.859	0.891	0.748
Motor Moment of Inertia		$\times 10^{-4}$ kg m^2	2.48 (2.73)	3.33 (3.58)	13.9 (16.0)	19.9 (22.0)	26.0 (28.1)
Rated Power Rate *1		kW/s	15.5 (14.1)	24.6 (22.8)	20.9 (18.2)	35.0 (31.6)	50.9 (47.1)
Rated Angular Acceleration Rate *1		rad/s^2	7900 (7180)	8590 (7990)	3880 (3370)	4190 (3790)	4420 (4090)
Heat Sink Size		mm	250 × 250 × 6 (aluminium)			400 × 400 × 20 (steel)	
Protective Structure *3			Totally enclosed, self-cooled, IP67				
Holding Brake Specifications *4	Rated Voltage	V	24 VDC $^{+10\%}_{0}$				
	Capacity	W	10				
	Holding Torque	Nm	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 (Motor Moment of Inertia Ratio)			15 times	15 times	5 times		
	With External Regenerative Resistor and Dynamic Brake Resistor				10 times		
Allowable Shaft Load *5	LF	mm	40		58		
	Allowable Radial Load	N	490			686	980
	Allowable Thrust Load	N	98			343	392

Notes:

1 The values in parentheses are for Servomotors with Holding Brakes.

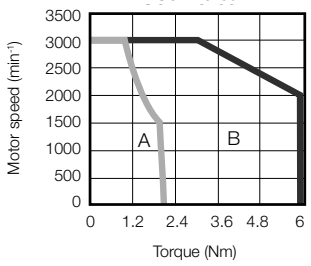
2 Refer to the following section for footnotes *1 to *5 or chapter Notes for the Servomotor Ratings Tables on page 66.

Torque-Motor Speed Characteristics for Three-phase, 200 V

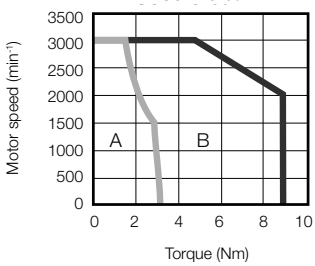
A : Continuous duty zone
B : Intermittent duty zone

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

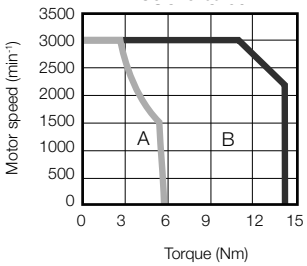
SGM7G-03A



SGM7G-05A



SGM7G-09A



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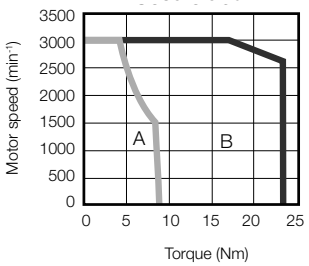
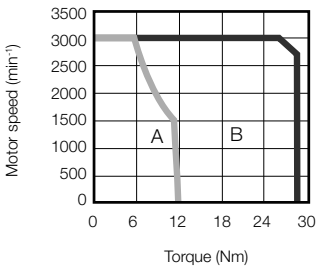


SGM7G-20A



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 Ratings

Voltage			200 V						
Model SGM7G-			30A	30A*6	44A	55A	75A	1AA	1EA
Rated Output *1		kW	2.9	2.4	4.4	5.5	7.5	11	15
Rated Torque *1, *2		Nm	18.6	15.1	28.4	35.0	48.0	70.0	95.4
Instantaneous Maximum Torque *1		Nm	54.0	45.1	71.6	102	119	175	224
Rated Current *1		Arms	23.8	19.6	32.8	37.2	54.7	58.6	78.0
Instantaneous Maximum Current *1		Arms	70	56	84	110	130	140	170
Rated Motor Speed *1		min^{-1}	1500	1500	1500	1500	1500	1500	1500
Maximum Motor Speed *1		min^{-1}	3000	3000	3000	3000	3000	2000	2000
Torque Constant		Nm/Arms	0.848	0.848	0.934	1.00	0.957	1.38	1.44
Motor Moment of Inertia		$\times 10^{-4}$ kg m^2	46.0 (53.9)	46.0 (53.9)	67.5 (75.4)	89.0 (96.9)	125 (133)	242 (261)	303 (341)
Rated Power Rate *1		kW/s	75.2 (64.2)	49.5 (42.2)	119 (107)	138 (126)	184 (173)	202 (188)	300 (267)
Rated Angular Acceleration Rate *1		rad/s^2	4040 (3450)	3280 (2800)	4210 (3370)	3930 (3610)	3840 (3610)	2890 (2680)	3150 (2800)
Heat Sink Size		mm	500 × 500 × 30 (steel)					650 × 650 × 35 (steel)	
Protective Structure *3			Totally enclosed, self-cooled, IP67						
Holding Brake Specifications *4	Rated Voltage	V	24 VDC $^{+10\%}_{0}$						
	Capacity	W	18.5			25		32	35
	Holding Torque	Nm	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			
Allowable Load Moment of Inertia (Motor Moment of Inertia Ratio)			5 times	3 times	5 times				
	With External Regenerative Resistor and Dynamic Brake Resistor		10 times	7 times	10 times				
Allowable Shaft Load *5	LF	mm	79			113		116	
	Allowable Radial Load	N	1470			1764			4998
	Allowable Thrust Load	N	490			588			2156

Notes:

1 The values in parentheses are for Servomotors with Holding Brakes.

2 Refer to the following section for footnotes *1 to *6 or chapter Notes for the Servomotor Ratings Tables on page 65.

Notes for the Servomotor Ratings Tables

*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.

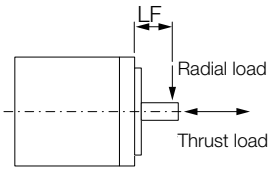
*2 The rated torques are the continuous allowable torque values at a surrounding air temperature of 40°C with an aluminum or steel heat sink of the dimensions given in the table.

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

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

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

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

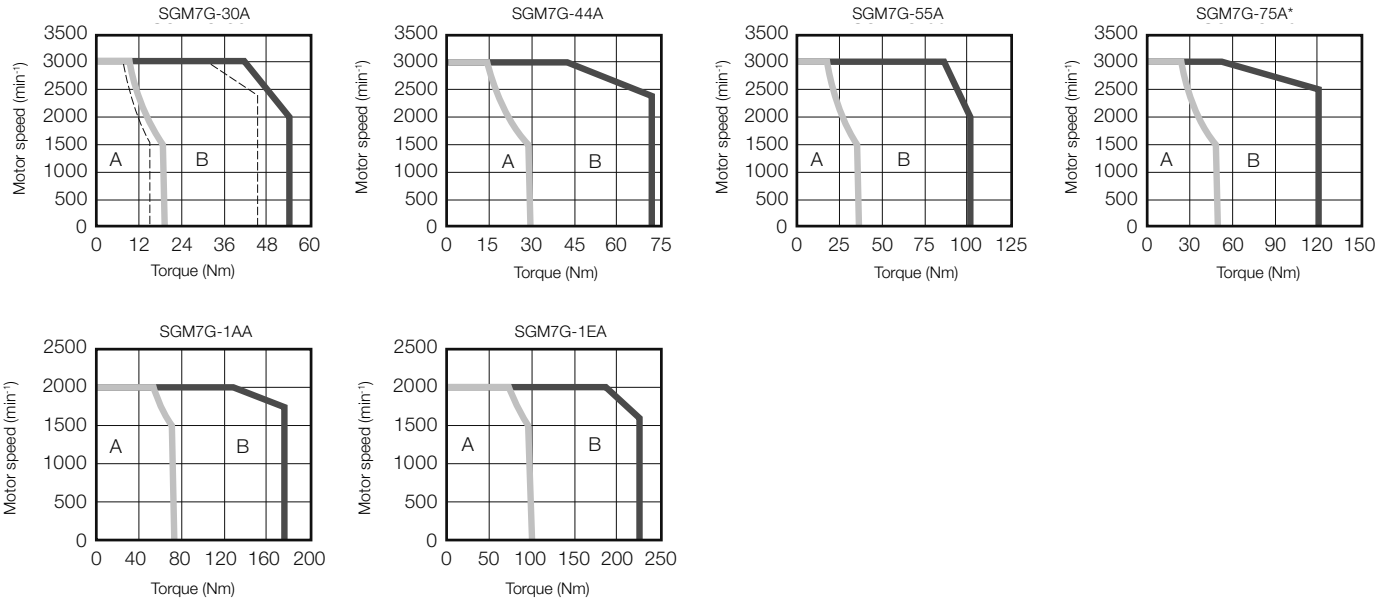


*6. This is the value if you combine the SGM7G-30A with the SGD7S-200A.

Torque-Motor Speed Characteristics

A : Continuous duty zone
B : Intermittent duty zone

——— (solid lines): With three-phase 200-V input
- - - - - - - - (dotted lines): When combined with the SGD7S-200A



* Use an SGM7G-75A Servomotor with a Holding Brake with an output torque of 14.4 Nm (30% of the rated torque) or lower when using the Servomotor in continuous operation at the maximum motor speed of 3,000 min^{-1}.

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.

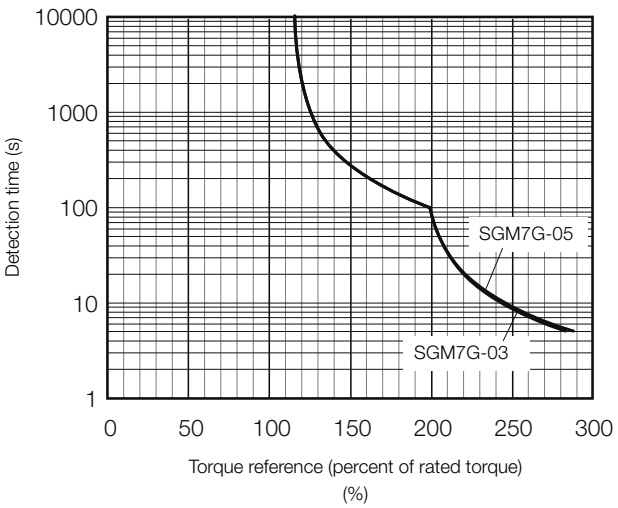
3 If the effective torque is within the allowable range for the rated torque, the Servomotor can be used within the intermittent duty zone.

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.

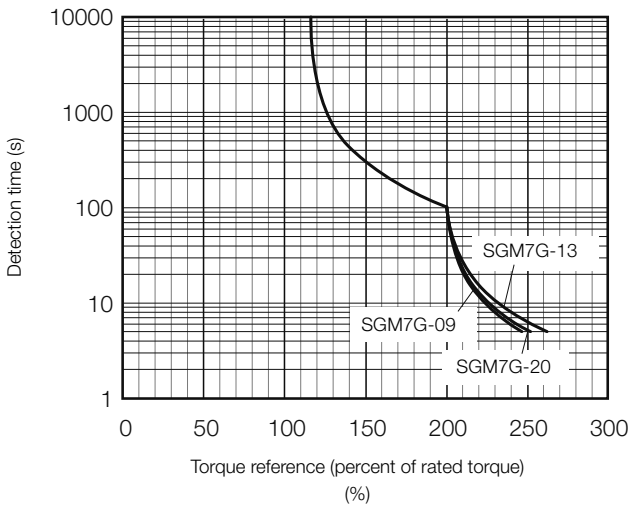
Servomotor Overload Protection Characteristics

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

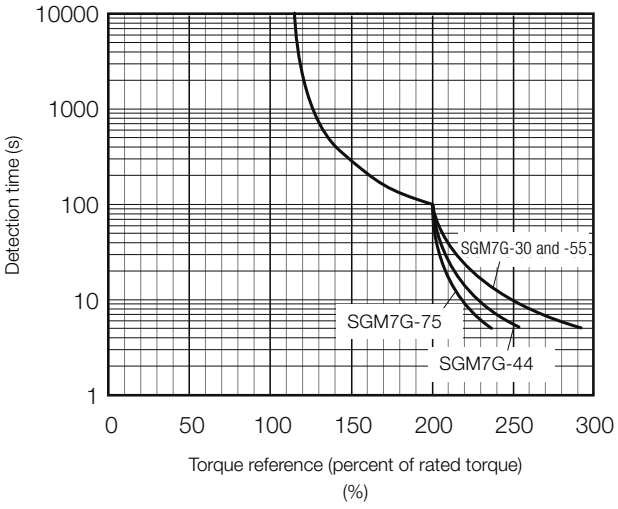
SGM7G-03 and -05



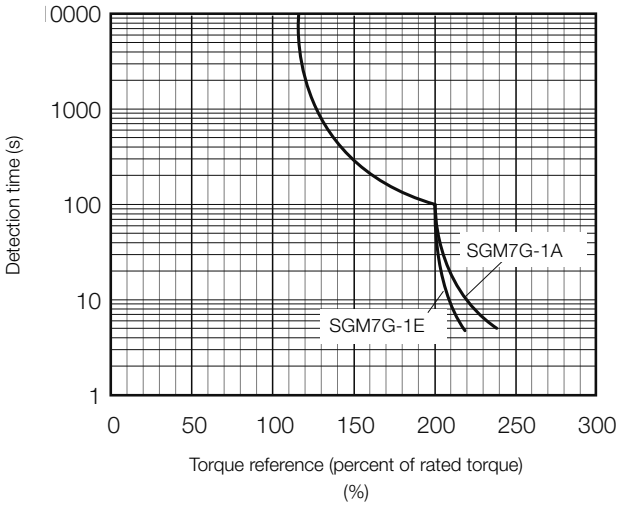
SGM7G-09, -13, and -20



SGM7G-30, -44, -55, and -75



SGM7G-1A and -1E



Note:

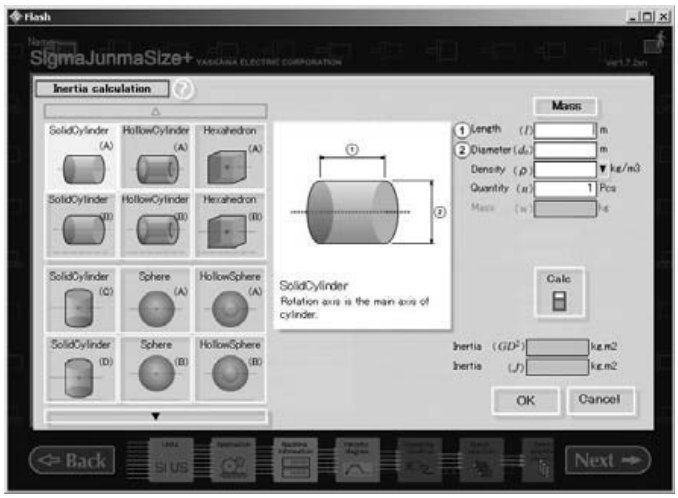
The above overload characteristics does not give permission to perform continuous duty operation with an output of 100% or higher. Use the Servomotor so that the effective torque remains within the continuous duty zone given in Torque-Motor Speed Characteristics for Three-phase, 200 V on page 66.

Load Moment of Inertia

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

The allowable size of the load moment of inertia (J_L) for the Servomotor is restricted. Refer to Servomotor Ratings on page 65. This value is provided strictly as a guideline and results depend on Servomotor driving conditions.

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



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

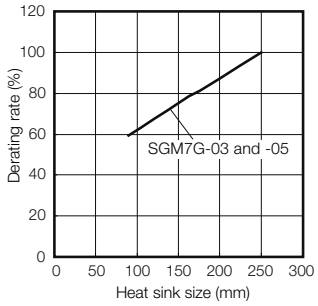
- Reduce the torque limit.
- Reduce the deceleration rate.
- Reduce the maximum motor speed.
- Install an External Regenerative Resistor if the alarm cannot be cleared using the above steps.

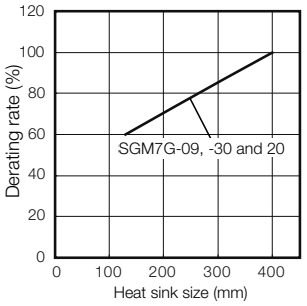
Servomotor Heat Dissipation Conditions

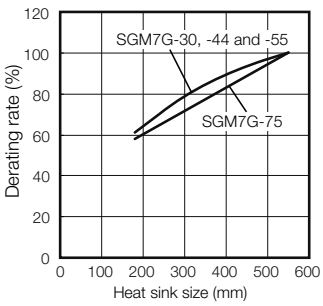
The Servomotor ratings are the continuous allowable values at a surrounding air temperature of 40°C when a heat sink is installed on the Servomotor. If the Servomotor is mounted on a small device component, the Servomotor temperature may rise considerably because the surface for heat dissipation becomes smaller. Refer to the following graphs for the relation between the heat sink size and derating rate.

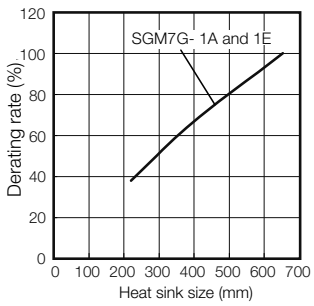
Note: The derating rates are applicable only when the average motor speed is less than or equal to the rated motor speed. If the average motor speed exceeds the rated motor speed, consult with your YASKAWA representative.

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





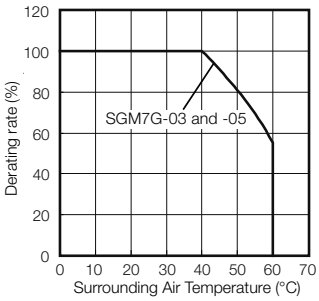


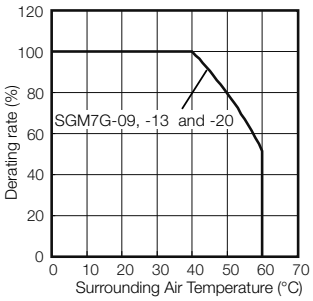


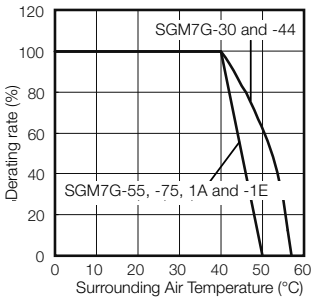
Applications Where the Surrounding Air Temperature of the Servomotor Exceeds 40°C

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

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



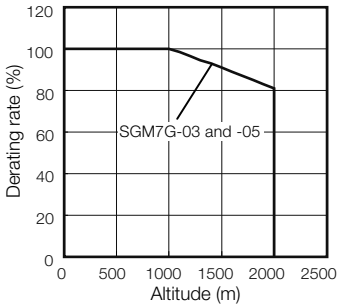


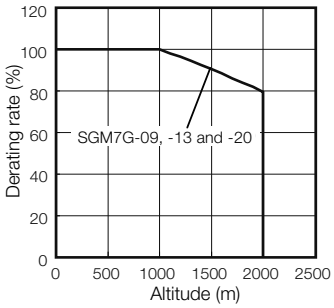


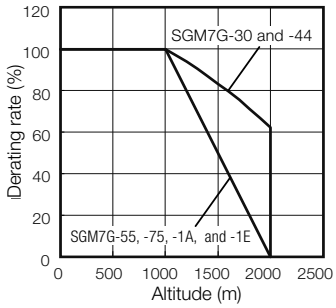
Applications Where the Altitude of the Servomotor Exceeds 1,000 m

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

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

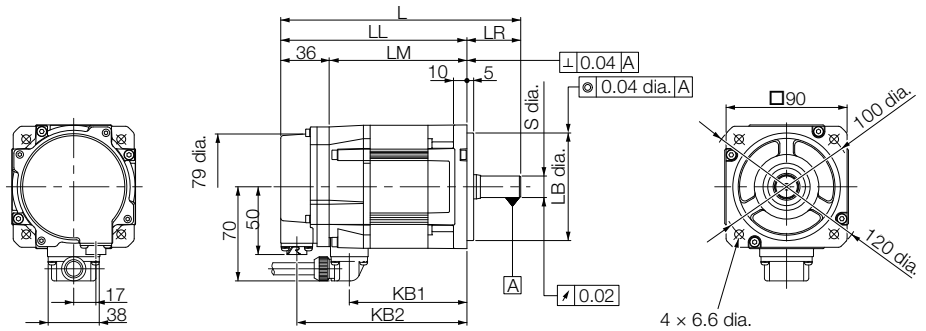




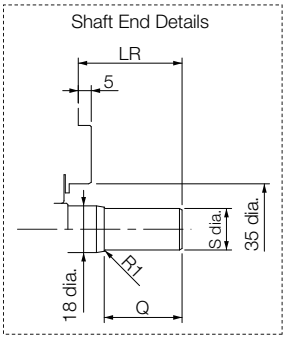


Servomotors without Holding Brakes

SGM7G-03 and -05



Notation
□: Square dimensions



Refer to Shaft End Specifications on page 75 for details.

Unit: mm

Model SGM7G-	L	LL	LM	LR	KB1	KB2	KL1	Flange Dimensions			
								LA	LB	LC	LE
03A□A21	166*	126	90	40*	75	114	70	100	$80^{0}_{-0.030}$	90	5
05A□A21	179	139	103	40	88	127	70	100	$80^{0}_{-0.030}$	90	5

Model SGM7G-	Flange Dimensions			Shaft End Dimensions		Approx. Mass [kg]
	LG	LH	LZ	S	Q	
03A□A21	10	120	6.6	$16^{0}_{-0.011*}$	30*	2.6
05A□A21	10	120	6.6	$16^{0}_{-0.013}$	30	3.2

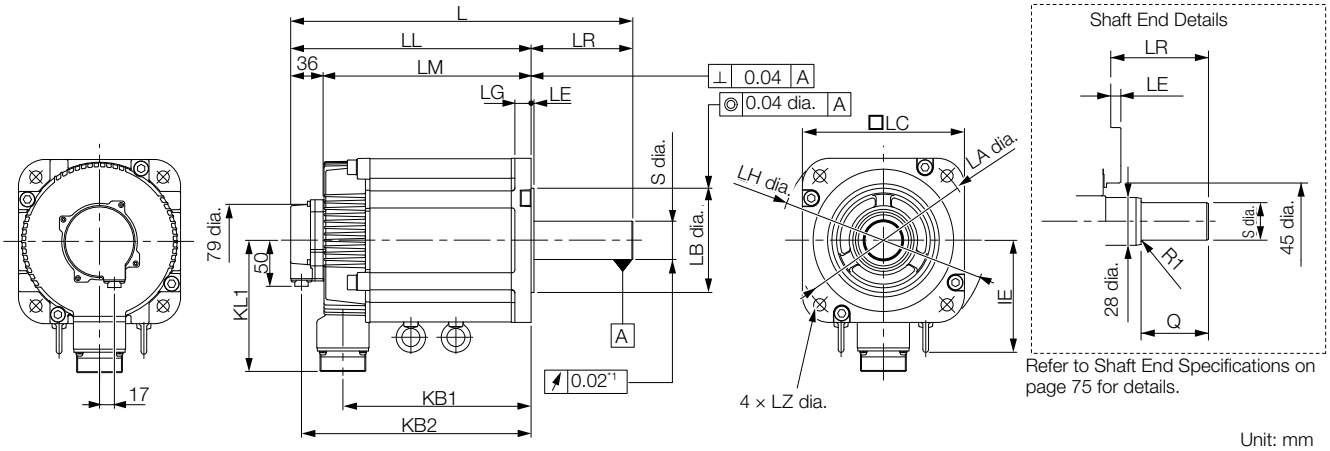
Note:

Servomotors with Oil Seals have the same dimensions.

* The L, LR, S, and Q dimensions of these Servomotors are different from those of the Sigma-V-series SGMGV Servomotors. Models that have the same installation dimensions as the SGMGV Servomotors are also available. Contact your YASKAWA representative for details.

Refer to the following section for information on connectors or SGM7G-03 and -05 without Holding Brakes on page 76.

SGM7G-09 to -75



Refer to Shaft End Specifications on page 75 for details.

Unit: mm

Model SGM7G-	L	LL	LM	LR	KB1	KB2	IE	KL1	Flange Dimensions							Shaft End Dimensions		Approx. Mass [kg]
									LA	LB	LC	LE	LG	LH	LZ	S	Q	
09A□A21	195	137	101	58	83	125	–	104	145	$110^{0}_{-0.035}$	130	6	12	165	9	$24^{0}_{-0.013*2}$	40	5.5
13A□A21	211	153	117	58	99	141	–	104	145	$110^{0}_{-0.035}$	130	6	12	165	9	$24^{0}_{-0.013*2}$	40	7.1
20A□A21	229	171	135	58	117	159	–	104	145	$110^{0}_{-0.035}$	130	6	12	165	9	$24^{0}_{-0.013}$	40	8.6
30A□A21	239	160	124	79	108	148	–	134	200	$114.3^{0}_{-0.025}$	180	3.2	18	230	13.5	$35^{+0.01}_{0}$	76	13.5
44A□A21	263	184	148	79	132	172	–	134	200	$114.3^{0}_{-0.025}$	180	3.2	18	230	13.5	$35^{+0.01}_{0}$	76	17.5
55A□A21	334	221	185	113	163	209	123	144	200	$114.3^{0}_{-0.025}$	180	3.2	18	230	13.5	$42^{0}_{-0.016}$	110	21.5
75A□A21	380	267	231	113	209	255	123	144	200	$114.3^{0}_{-0.025}$	180	3.2	18	230	13.5	$42^{0}_{-0.016}$	110	29.5

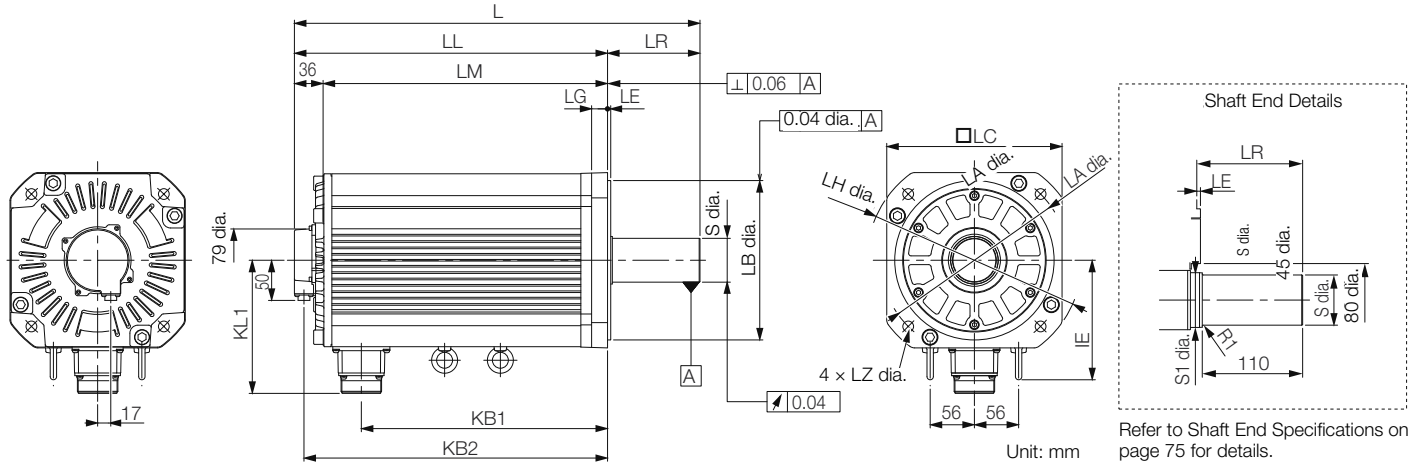
Note:

Servomotors with Oil Seals have the same dimensions.

*1 This is 0.04 for the SGM7G-55 or SGM7G-75.

*2 The S dimensions of these Servomotors are different from those of the Sigma-V-series SGMGV Servomotors. Models that have the same installation dimensions as the SGMGV Servomotors are also available. Contact your YASKAWA representative for details.

SGM7G-1A and -1E



Refer to Shaft End Specifications on page 75 for details.

Unit: mm

Model SGM7G-	L	LL	LM	LR	KB1	KB2	IE	KL1	Flange Dimensions							Shaft End Dimensions		Approx. Mass [kg]
									LA	LB	LC	LE	LG	LH	LZ	S	S1	
1AA□A21	447	331	295	116	247	319	150	168	235	$200^{0}_{-0.046}$	220	4	20	270	13.5	$42^{0}_{-0.016}$	50	57
1EA□A21	509	393	357	116	309	381	150	168	235	$200^{0}_{-0.046}$	220	4	20	270	13.5	$55^{+0.030}_{+0.011}$	60	67

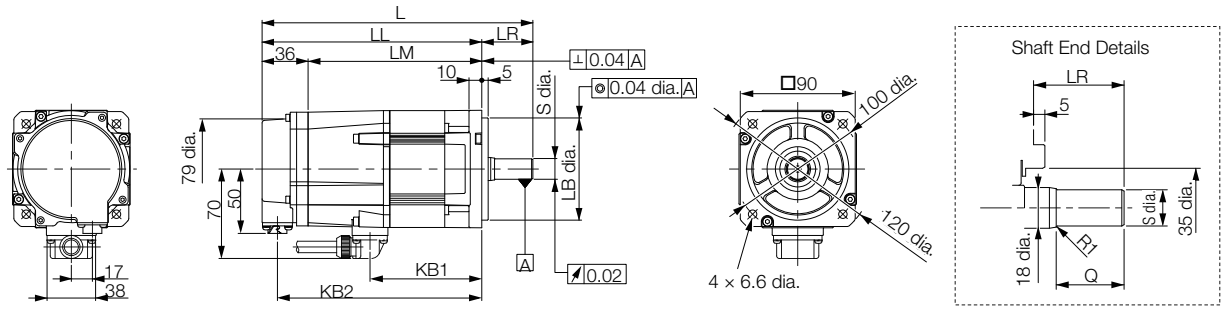
Note:

Servomotors with Oil Seals have the same dimensions.

Refer to the following section for information on connectors or SGM7G-09 to -1E without Holding Brakes on page 76.

Servomotors with Holding Brakes

SGM7G-03 and -05



Refer to Shaft End Specifications on page 75 for details.

Unit: mm

Model SGM7G-	L	LL	LM	LR	KB1	KB2	KL1	Flange Dimensions			
								LA	LB	LC	LE
03A□A2C	199*	159	123	40*	75	147	70	100	$80^{0}_{-0.030}$	90	5
05A□A2C	212	172	136	40	88	160	70	100	$80^{0}_{-0.030}$	90	5

Model SGM7G-	Flange Dimensions			Shaft End Dimensions		Approx. Mass[kg]
	LG	LH	LZ	S	Q	
03A□A2C	10	120	6.6	$16^{0}_{-0.011*}$	30*	3.6
05A□A2C	10	120	6.6	$16^{0}_{-0.011}$	30	4.2

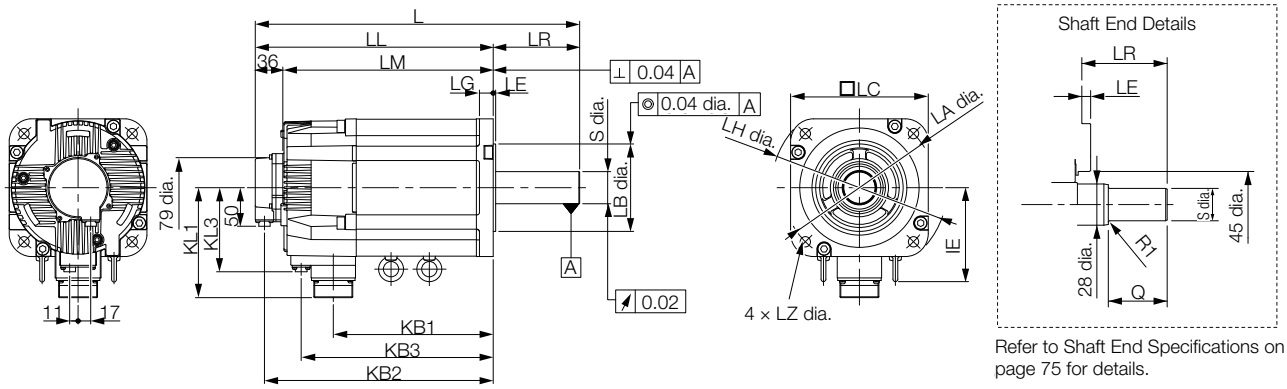
Note:

Servomotors with Oil Seals have the same dimensions.

* The L, LR, S, and Q dimensions of these Servomotors are different from those of the Sigma-V-series SGMGV Servomotors. Models that have the same installation dimensions as the SGMGV Servomotors are also available. Contact your Yaskawa representative for details.

Refer to the following section for information on connectors or SGM7G-03 and -05 with Holding Brakes on page 77.

SGM7G-09 to -75



Refer to Shaft End Specifications on page 75 for details.

Unit: mm

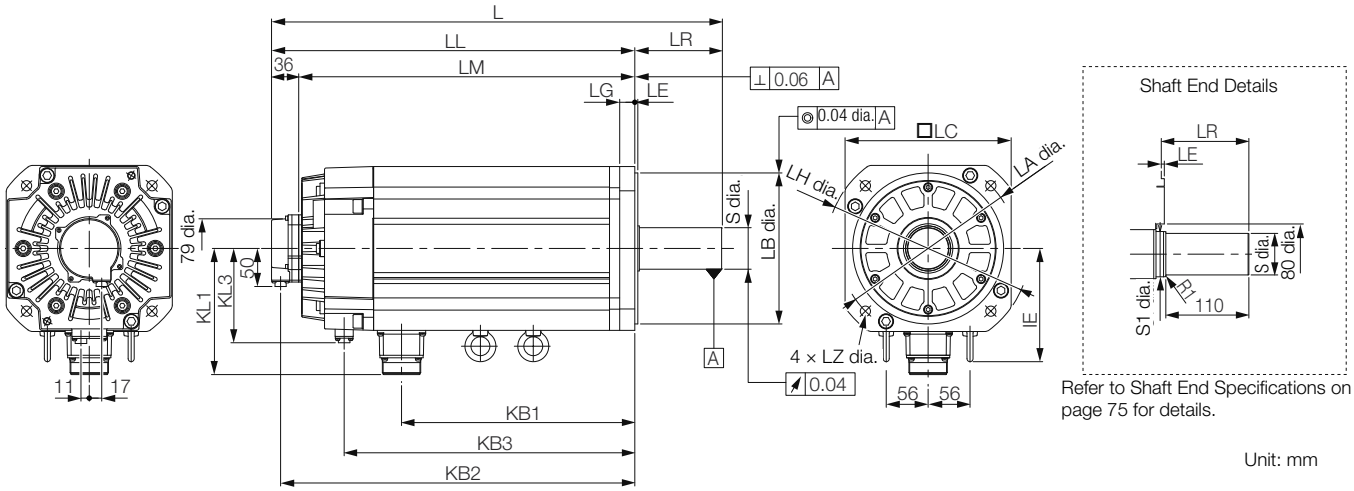
Model SGM7G-	L	LL	LM	LR	KB1	KB2	KB3	IE	KL1	KL3	Flange Dimensions							Shaft End Dimensions		Approx. Mass[kg]
											LA	LB	LC	LE	LG	LH	LZ	S	Q	
09A□A2C	231	173	137	58	83	161	115	–	104	80	145	$110^{0}_{-0.035}$	130	6	12	165	9	$24^{0}_{-0.013*}$	40	7.5
13A□A2C	247	189	153	58	99	177	131	–	104	80	145	$110^{0}_{-0.035}$	130	6	12	165	9	$24^{0}_{-0.013*}$	40	9.0
20A□A2C	265	207	171	58	117	195	149	–	104	80	145	$110^{0}_{-0.035}$	130	6	12	165	9	$24^{0}_{-0.013}$	40	11.0
30A□A2C	287	208	172	79	108	196	148	–	134	110	200	$114.3^{0}_{-0.025}$	180	3.2	18	230	13.5	$35^{+0.01}_{0}$	76	19.5
44A□A2C	311	232	196	79	132	220	172	–	134	110	200	$114.3^{0}_{-0.025}$	180	3.2	18	230	13.5	$35^{+0.01}_{0}$	76	23.5
55A□A2C	378	265	229	113	163	253	205	123	144	110	200	$114.3^{0}_{-0.025}$	180	3.2	18	230	13.5	$42^{0}_{-0.016}$	110	27.5
75A□A2C	424	311	275	113	209	299	251	123	144	110	200	$114.3^{0}_{-0.025}$	180	3.2	18	230	13.5	$42^{0}_{-0.016}$	110	35.0

Note:

Servomotors with Oil Seals have the same dimensions.

* The S dimensions of these Servomotors are different from those of the Sigma-V-series SGMGV Servomotors. Models that have the same installation dimensions as the SGMGV Servomotors are also available. Contact your YASKAWA representative for details.

SGM7G-1A and -1E



Refer to Shaft End Specifications on page 75 for details.

Unit: mm

Model SGM7G-	L	LL	LM	LR	KB1	KB2	KB3	IE	KL1	KL3	Flange Dimensions							Shaft End Dimensions		Approx. Mass[kg]
											LA	LB	LC	LE	LG	LH	LZ	S	Q	
1AA□A2C	498	382	346	116	247	370	315	150	168	125	235	$200^{0}_{-0.046}$	220	4	20	270	13.5	$42^{0}_{-0.016}$	50	65
1EA□A2C	598	482	446	116	309	470	385	150	168	125	235	$200^{0}_{-0.046}$	220	4	20	270	13.5	$55^{+0.030}_{+0.011}$	60	85

Note:

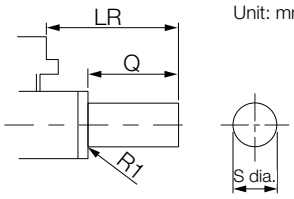
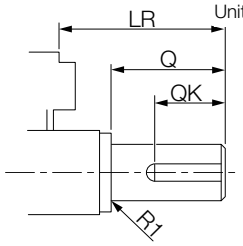
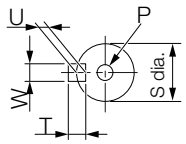
Servomotors with Oil Seals have the same dimensions.

Refer to the following section for information on connectors or SGM7G-09 to -1E with Holding Brakes on page 77.

Shaft End Specifications

SGM7G-□□□□□□□

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

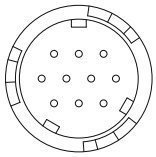
Shaft End Details		Servomotor Model SGM7G-										
		03	05	09	13	20	30	44	55	75	1A	1E
Code: 2 (Straight without Key)												
 Unit: mm	LR	40*	40	58	58	58	79	79	113	113	116	116
	Q	30*	30	40	40	40	76	76	110	110	110	110
	S	$16^{0}_{-0.011}$	$16^{0}_{-0.011}$	$24^{0}_{-0.013*}$	$24^{0}_{-0.013*}$	$24^{0}_{-0.013}$	$35^{+0.01}_{0}$	$35^{+0.01}_{0}$	$42^{0}_{-0.016}$	$42^{0}_{-0.016}$	$42^{0}_{-0.016}$	$55^{+0.030}_{+0.011}$
Code: 6 (Straight with Key and Tap)												
 Unit: mm	LR	40*	40	58	58	58	79	79	113	113	116	116
	Q	30*	30	40	40	40	76	76	110	110	110	110
	QK	20*	20	25	25	25	60	60	90	90	90	90
	S	$16^{0}_{-0.011}$	$16^{0}_{-0.011}$	$24^{0}_{-0.013}$	$24^{0}_{-0.013}$	$24^{0}_{-0.013}$	$35^{+0.01}_{0}$	$35^{+0.01}_{0}$	$42^{0}_{-0.016}$	$42^{0}_{-0.016}$	$42^{0}_{-0.016}$	$55^{+0.030}_{+0.011}$
	W	5	5	8*	8*	8	10	10	12	12	12	16
	T	5	5	7*	7*	7	8	8	8	8	8	10
	U	3	3	4*	4*	4	5	5	5	5	5	6
	P	M5 screw, Depth: 12					M12 screw, Depth: 25		M16 screw, Depth: 32			M20 screw, Depth: 40

* The shaft end dimensions of these Servomotors are different from those of the Sigma-V-series SGMGV Servomotors. Models that have the same installation dimensions as the SGMGV Servomotors are also available. Contact your YASKAWA representative for details.

Connector Specifications

SGM7G-03 and -05 without Holding Brakes

- Encoder Connector Specifications (24-bit Encoder)



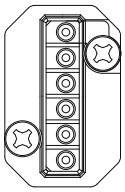
Receptacle: CM10-R10P-D

Applicable plug: Not provided by Yaskawa.

Plug: CM10-AP10S-☐-D for Right-angle Plug
CM10-SP10S-☐-D for Straight Plug
(☐ depends on the applicable cable size.)

Manufacturer: DDK Ltd.

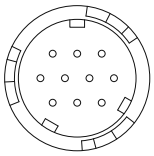
- Servomotor Connector Specifications



Manufacturer: Japan Aviation Electronics Industry, Ltd.

SGM7G-09 to -1E without Holding Brakes

- Encoder Connector Specifications (24-bit Encoder)



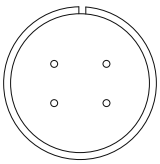
Receptacle: CM10-R10P-D

Applicable plug: Not provided by Yaskawa.

Plug: CM10-AP10S-☐-D for Right-angle Plug
CM10-SP10S-☐-D for Straight Plug
(☐ depends on the applicable cable size.)

Manufacturer: DDK Ltd.

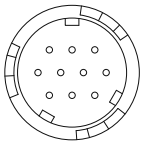
- Servomotor Connector Specifications



Manufacturer: DDK Ltd.

SGM7G-03 and -05 with Holding Brakes

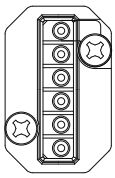
- Encoder Connector Specifications (24-bit Encoder)



Receptacle: CM10-R10P-D
Applicable plug: Not provided by Yaskawa.
Plug: CM10-AP10S-□-D for Right-angle Plug
CM10-SP10S-□-D for Straight Plug
(□ depends on the applicable cable size.)
Manufacturer: DDK Ltd.

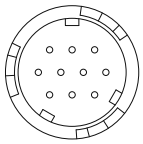
- Encoder Connector Specifications

Manufacturer: Japan Aviation Electronics Industry, Ltd.



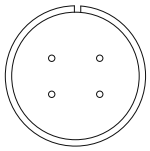
SGM7G-09 to -1E with Holding Brakes

- Encoder Connector Specifications (24-bit Encoder)



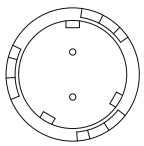
Receptacle: CM10-R10P-D
Applicable plug: Not provided by Yaskawa.
Plug: CM10-AP10S-□-D for Right-angle Plug
CM10-SP10S-□-D for Straight Plug
(□ depends on the applicable cable size.)
Manufacturer: DDK Ltd.

- Servomotor Connector Specifications



Manufacturer: DDK Ltd.

- Brake Connector Specifications



Receptacle: CM10-R2P-D
Applicable plug: Not provided by Yaskawa.
Plug: CM10-AP2S-□-D for Right-angle Plug
CM10-SP2S-□-D for Straight Plug
(□ depends on the applicable cable size.)
Manufacturer: DDK Ltd.

SGMCS

- Small capacity, coreless
- Rated force: 2 Nm - 35 Nm
  Peak force: 6 Nm - 105 Nm

SGMCS

- Medium capacity, with iron core
- Rated force: 45 Nm - 200 Nm
  Peak force: 135 Nm - 600 Nm

SGMCV

- Small capacity, with iron core
- Rated force: 4 Nm - 25 Nm
  Peak force: 12 Nm - 75 Nm

Direct Drive Servomotors

SGMCS	80
SGMCV	101

Model Designations

SGMCS - 02 B 3 C 1 1

Direct Drive Servomotors SGMCS	1st + 2nd	3rd	4th	5th	6th	7th	digit

1st + 2nd digit - Rated Output

Code	Specifications	Code	Specification	Code	Specification
Small-capacity Series				Medium-capacity Series	
02	2 Nm	14	14 Nm	45	45 Nm
04	4 Nm	16	16 Nm	80	80 Nm
05	5 Nm	17	17 Nm	1A	110 Nm
07	7 Nm	25	25 Nm	1E	150 Nm
08	8 Nm	35	35 Nm	2Z	200 Nm
10	10 Nm				

3rd digit - Servomotor Outer Diameter

Code	Specification	Code	Specification
B	135 mm dia.	E	290 mm dia.
C	175 mm dia.	M	280 mm dia.
D	230 mm dia.	N	360 mm dia.

4th digit - Serial Encoder

Code	Specification
3	20-bit single-turn absolute encoder
D	20-bit incremental encoder

5th digit - Design Revision Order

Code	Specification
A	Model with servomotor outer diameter code M or N
B	Model with servomotor outer diameter code E
C	Model with servomotor outer diameter code B, C, or D

6th digit - Flange

Code	Mounting	Servomotor Outer Diameter Code (3rd digit)					
		B	C	D	E	M	N
1	Non-load side	●	●	●	●	—	—
	Load side	—	—	—	—	●	●
3	Non-load side	—	—	—	—	●	●
4	Non-load side (with cable on side)	●	●	●	●	—	—

● Applicable models

7th digit - Options

Code	Specification
1	Without options

Note: Direct Drive Servomotors are not available with holding brakes.

Ratings and Specifications

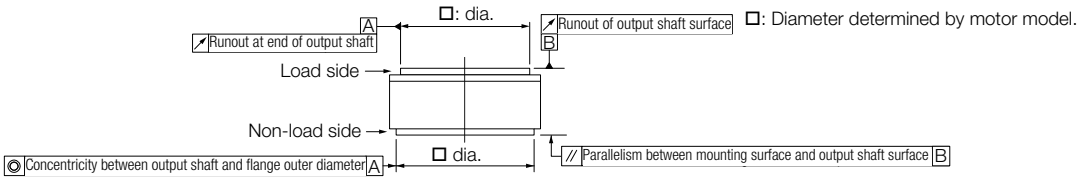
Small-Capacity Coreless Servomotors: Specifications

Voltage			200 V									
Model SGMCS-			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			1,500 VAC for 1 minute									
Excitation			Permanent magnet									
Mounting			Flange-mounted									
Drive Method			Direct drive									
Rotation Direction			Counterclockwise (CCW) for forward run 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									
Environmental Conditions	Ambient Air Temperature		0°C to 40°C (without freezing)									
	Ambient Air Humidity		20% to 80% relative humidity (without 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.									
	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 (without freezing) Storage Humidity: 20% to 80% relative humidity (without condensation)									
Mechanical Tolerances *3	Runout of Output Shaft Surface	mm	0.02									
	Runout at End of Output Shaft	mm	0.04									
	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			
Shock Resistance *4	Impact Acceleration Rate at Flange		490 m/s²									
	Number of Impacts		2 times									
Vibration Resistance *5	Vibration Acceleration Rate at Flange		49 m/s²									
Applicable SERVOPACKs		SGD7S-	2R8A									5R5A
		SGD7W-										

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

*2. The 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.

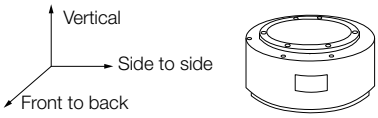
*3. Refer to the following figure for the relevant locations on the Servomotor. Refer to the dimensional drawings of the individual Servomotors for more information on tolerances.



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

Shock Applied to the Servomotor

*5. The vertical, side-to-side, and front-to-back vibration resistance for vibration in three directions when the Servomotor is mounted with the shaft in a horizontal position is given in the above table. The strength of the vibration that the Servomotor can withstand depends on the application. Always confirm the vibration acceleration rate.



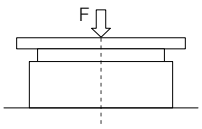
Small-Capacity Coreless Servomotors: Ratings

Voltage			200 V									
Model SGMCS-			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 *1, *2		Nm	2.00	5.00	7.00	4.00	10.0	14.0	8.0	17.0	25.0	16.0	35.0
Instantaneous Maximum Torque *1		Nm	6.0	15.0	21.0	12.0	30.0	42.0	24.0	51.0	75.0	48.0	105.0
Stall Torque *1		Nm	2.05	5.15	7.32	4.09	10.1	14.2	8.23	17.4	25.4	16.6	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 Motor Speed *1		min^{-1}	200			200			200		150	200	150
Maximum Motor Speed *1		min^{-1}	500			500	400	300	500	350	250	500	250
Torque Constant		Nm/Arms	1.18	3.17	5.44	2.04	5.05	5.39	5.10	7.79	10.8	5.58	11.1
Motor Moment of Inertia		$\times 10\text{-}4\ kg \cdot m^2$	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 Rate *1		rad/s^2	710	980	910	520	710	640	280	330		170	240
Heat Sink Size		mm	350 x 350 x 12			450 x 450 x 12			550 x 550 x 12			650 x 650 x 12	
Allowable Load Moment of Inertia (Motor Moment of Inertia Ratio)			10 times				5 times	3 times					
Allowable Load *3	Allowable Thrust Load	N	1500			3300			4000			11000	
	Allowable Moment Load	Nm	40	50	64	70	75	90	93	103	135	250	320

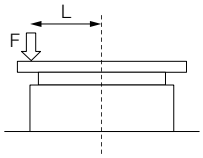
*1. These values are for operation in combination with a SERVOPACK when the temperature of the armature winding is 100°C. The values for other items are at 20°C. These are typical values.

*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.

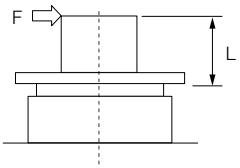
*3. The thrust loads and moment loads that are applied while a Servomotor is operating are roughly classified into the following patterns. Design the machine so that the thrust loads or moment loads will not exceed the values given in the table.



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



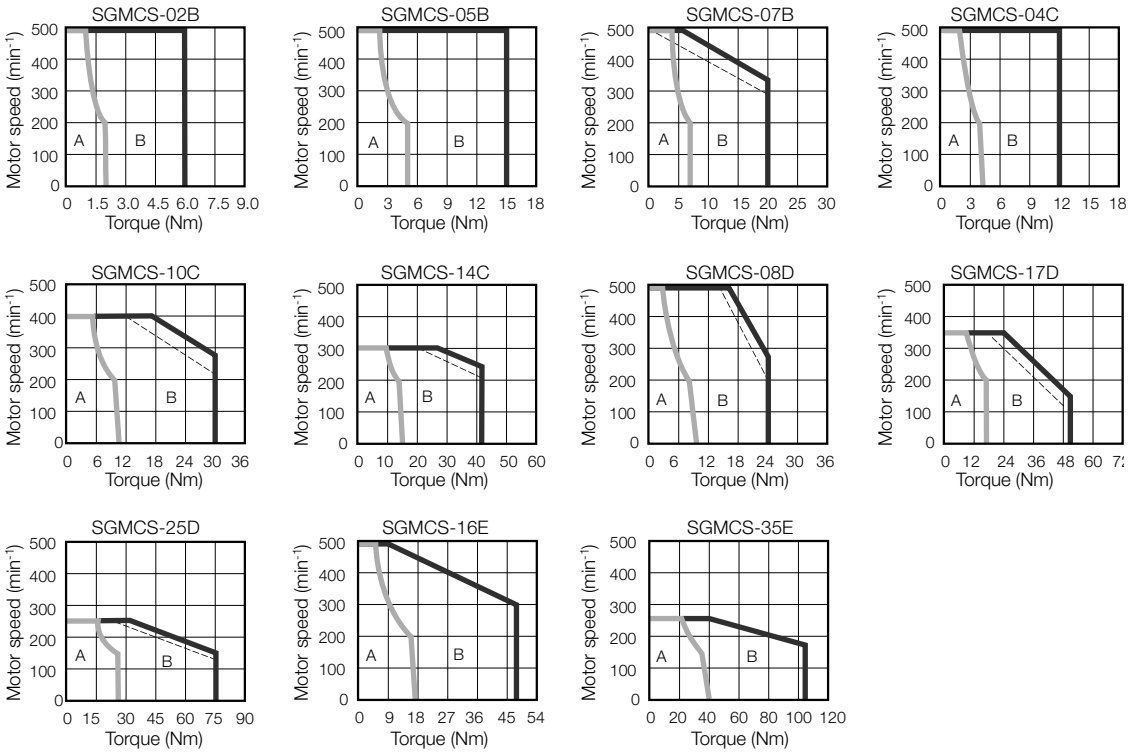
Where F is the external force
Thrust load = Load mass
Moment load = F × L

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.

Small-Capacity Coreless Servomotors: Torque-Motor Speed Characteristics

A : Continuous duty zone
B : Intermittent duty zone
——— (solid lines): With three-phase 200-V input
- - - - - - - - (dotted lines): With single-phase 100-V input



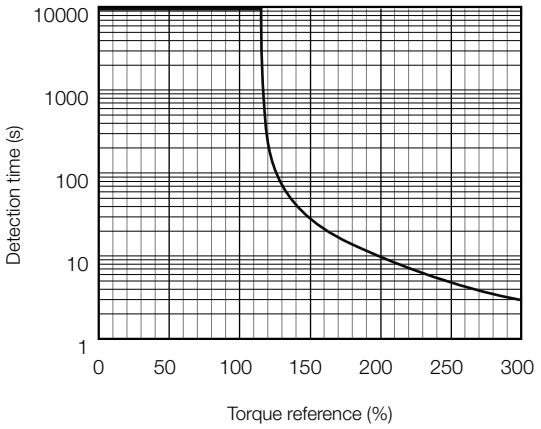
Note:

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 torque is within the allowable range for the rated torque, the Servomotor can be used within the intermittent duty zone.
4. If the length of the Servomotor Main Circuit Cable exceeds 20 m, the intermittent duty zone in the torque-motor speed characteristics will become smaller because the voltage drop increases.

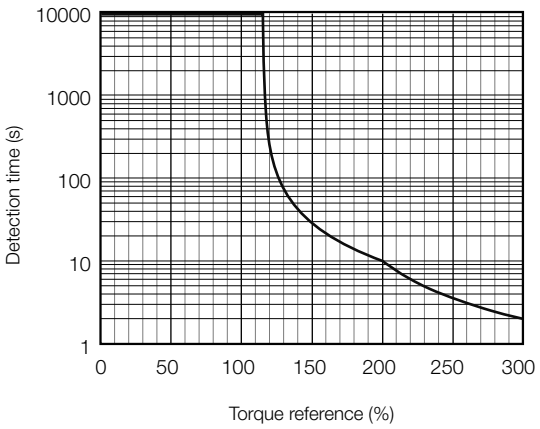
Small-Capacity, Coreless Servomotors: Servomotor Overload Protection Characteristics

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

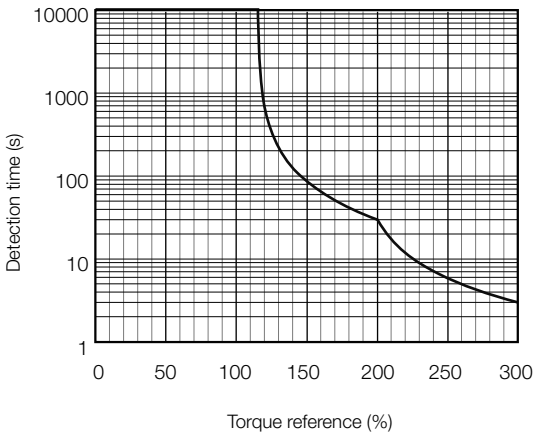
SGMCS-02B, -05B, -07B, -10C, -17D, and -35E



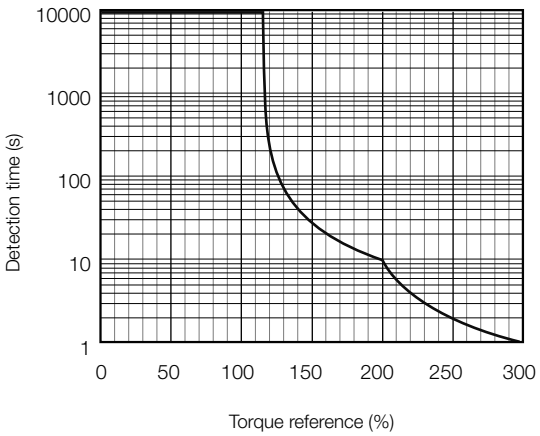
SGMCS-04C



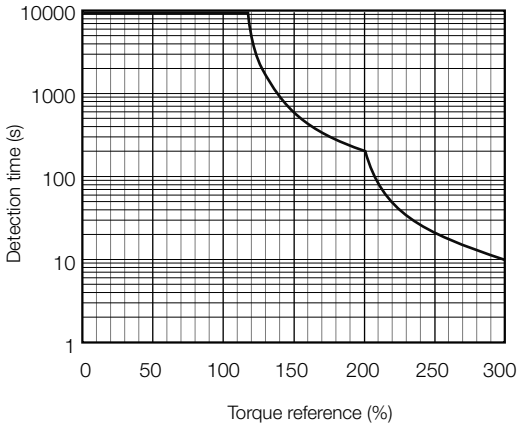
SGMCS-14C



SGMCS-08D and -16E



SGMCS-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 given in Small Capacity, Coreless Servomotors: Torque-Motor Speed Characteristics on page 84.

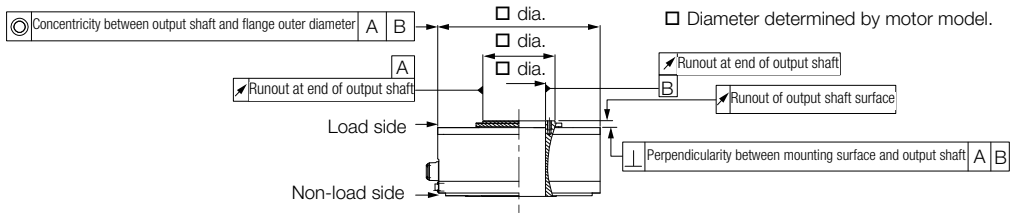
Medium-Capacity Servomotors with Cores: Specifications

Voltage			200 V					
Model SGMCS-			45M	80M	1AM	80N	1EN	2ZN
Time Rating			Continuous					
Thermal Class			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 run 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					
Environmental Conditions	Ambient Air Temperature		0°C to 40°C (without freezing)					
	Ambient Air Humidity		20% to 80% relative humidity (without 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.					
	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 (withoutfreezing) Storage Humidity: 20% to 80% relative humidity (without condensation)					
Mechanical Tolerances *3	Runout of Output Shaft Surface	mm	0.02					
	Runout at End of Output Shaft	mm	0.04					
	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					
Shock Resistance *4	Impact Acceleration Rate at Flange		490 m/s²					
	Number of Impacts		2 times					
Vibration Resistance *5	Vibration Acceleration Rate at Flange		24.5 m/s²					
Applicable SERVOPACKs		SGD7S-	7R6A	120A	180A	120A	200A	
		SGD7W-	7R6A	–				

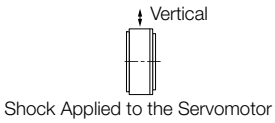
*1. A vibration class of V15 indicates a vibration amplitude of 15 μm maximum on the Servomotor without a load at the rated motor speed.

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



*5. The vertical, side-to-side, and front-to-back vibration resistance for vibration in three directions when the Servomotor is mounted with the shaft in a horizontal position is given in the above table. The strength of the vibration that the Servomotor can withstand depends on the application. Always confirm the vibration acceleration rate.

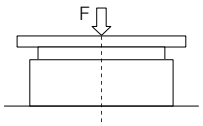
Medium-Capacity Servomotors with Cores: Ratings

Voltage			200 V					
Model SGMCS-			45M	80M	1AM	80N	1EN	2ZN
Rated Output *1		W	707	1260	1730	1260	2360	3140
Rated Torque *1, *2		Nm	45.0	80.0	110	80.0	150	200
Instantaneous Maximum Torque *1		Nm	135	240	330	240	450	600
Stall Torque *1		Nm	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 Motor Speed *1		min^{-1}	150			150		
Maximum Motor Speed *1		min^{-1}	300			300	250	
Torque Constant		Nm/Arms	8.39	8.91	8.45	9.08	9.05	11.5
Motor 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 Rate *1		rad/s^2	1160	1280	1270	588	607	654
Heat Sink Size		mm	750 x 750 x 45					
Allowable Load Moment of Inertia (Motor Moment of Inertia Ratio)			3 times					
Allowable Load *3	A	mm	33			37.5		
	Allowable Thrust Load	N	9000			16000		
	Allowable Moment Load	Nm	180			350		

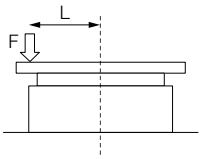
*1. These values are for operation in combination with a SERVOPACK when the temperature of the armature winding is 20°C. These are typical values.

*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.

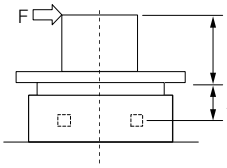
*3. The thrust loads and moment loads that are applied while a Servomotor is operating are roughly classified into the following patterns. Design the machine so that the thrust loads or moment loads will not exceed the values given in the table.



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



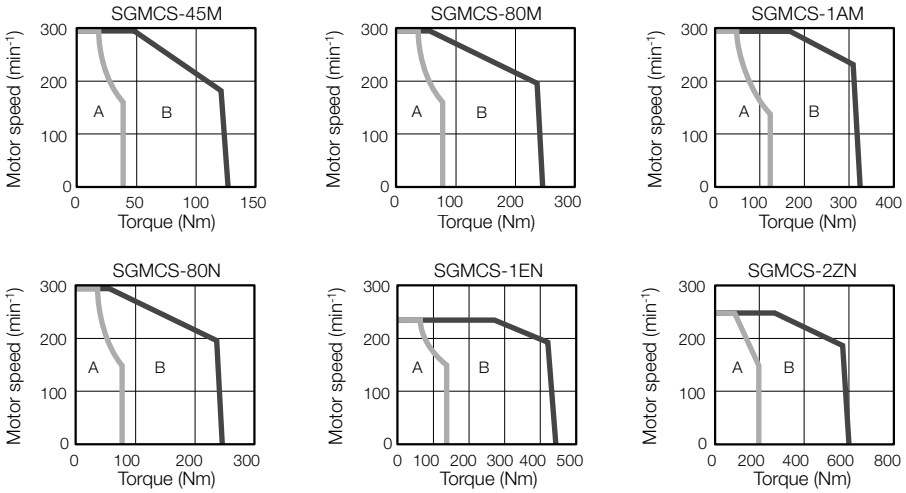
Where F is the external force
Thrust load = Load mass
Moment load = F × (L+A)

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.

Medium-Capacity Servomotors with Cores: Torque-Motor Speed Characteristics

A : Continuous duty zone
B : Intermittent duty zone



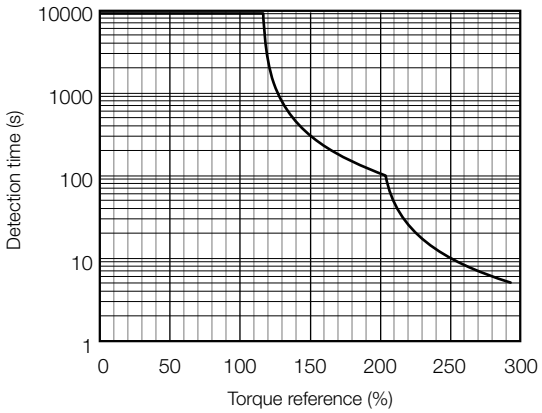
Note:

1. These values are for operation in combination with a SERVOPACK when the temperature of the armature winding is 20°C. These are typical values.
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 the length of the Servomotor Main Circuit Cable exceeds 20 m, the intermittent duty zone in the torque-motor speed characteristics will become smaller because the voltage drop increases.

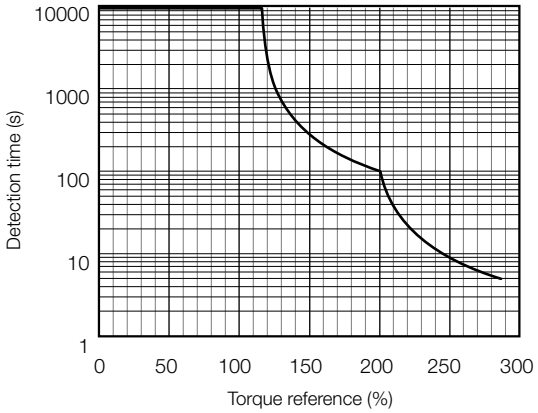
Medium-Capacity Servomotors with Cores: Servomotor Overload Protection Characteristics

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

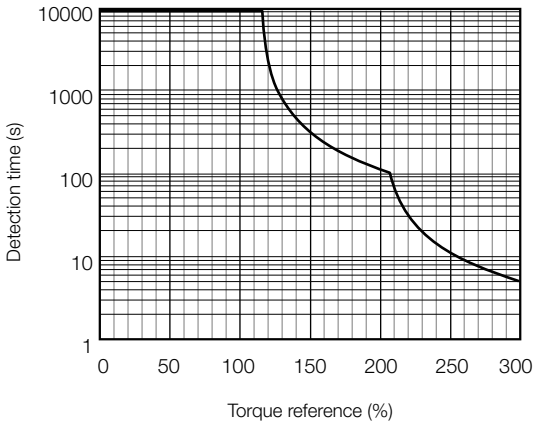
SGMCS-45M□A



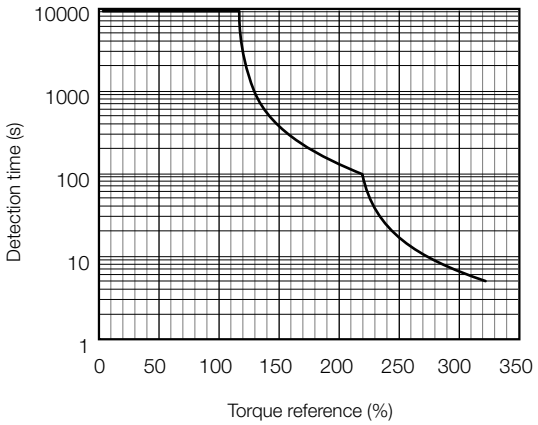
SGMCS-80M□A



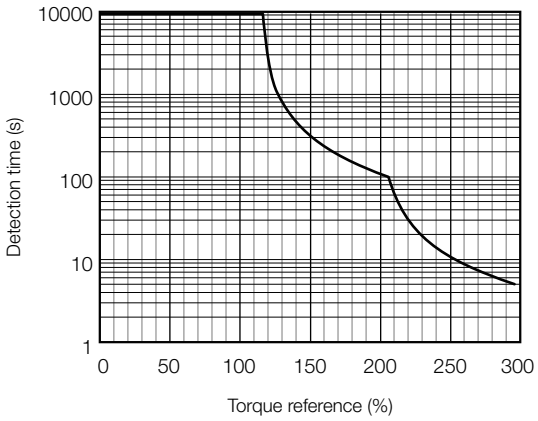
SGMCS-1AM□A and -80N□A



SGMCS-1EN□A



SGMCS-2ZN□A



Note:

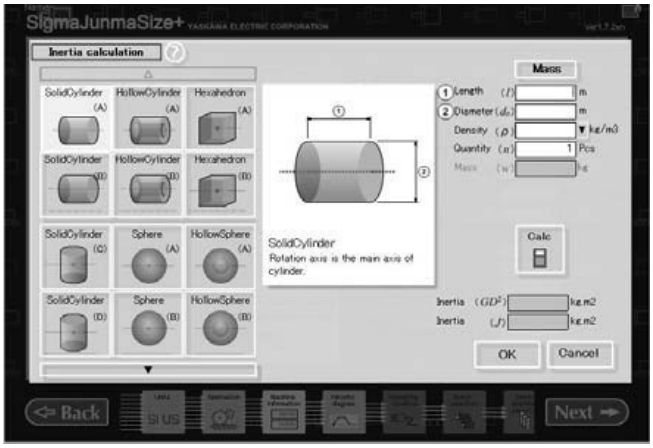
The above overload protection characteristics do not mean that you can perform continuous duty operation with an output of 100% or higher. Use the Servomotor so that the effective torque remains within the continuous duty zone given in Medium-Capacity Servomotors with Cores: Torque-Motor Speed Characteristics on page 89.

Load Moment of Inertia

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

The allowable size of the load moment of inertia (J_L) for the Servomotor is restricted. Refer to Small- Capacity, Coreless Servomotors: Ratings on page 83 or Medium-Capacity Servomotors with Cores: Specifications on page 86. This value is provided strictly as a guideline and results depend on Servomotor driving conditions.

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



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

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

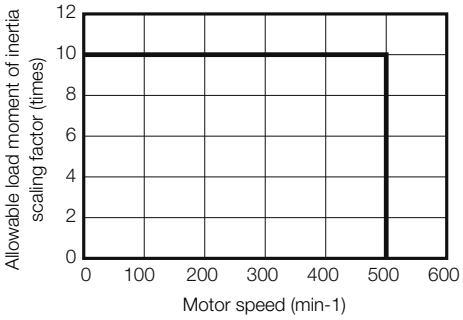
Regenerative resistors are not built into SERVOPACKs for 400-W Servomotors or smaller Servomotors. Even for SERVOPACKs with built-in regenerative resistors, an External Regenerative Resistor is required if the energy that results from the regenerative driving conditions exceeds the allowable loss capacity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

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

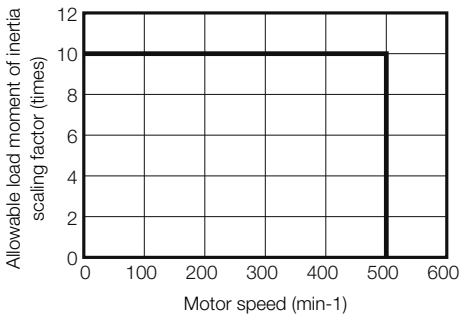
The following graphs show the allowable load moment of inertia scaling factor of the motor speed for SERVOPACKs without built-in regenerative resistors when an External Regenerative Resistor is not connected (applicable SERVOPACK: SGD7S-2R8A).

If the Servomotor exceeds the allowable load moment of inertia, an overvoltage alarm may occur in the SERVOPACK. These graphs provide reference data for deceleration at the rated torque or higher with a 200-VAC power supply input.

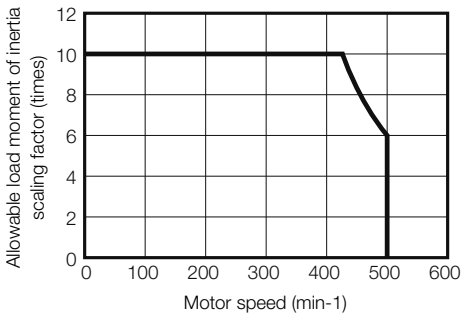
SGMCS-02B□C



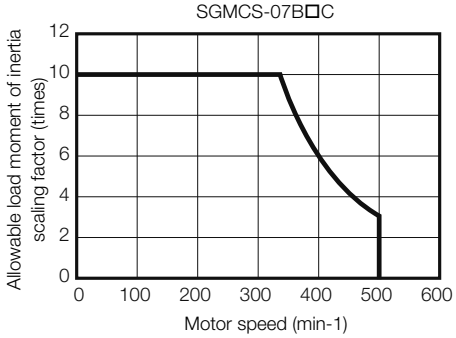
SGMCS-04C□C



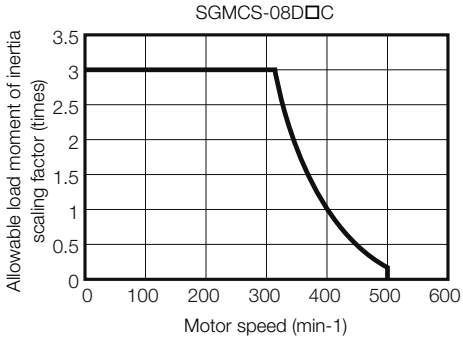
SGMCS-05B□C



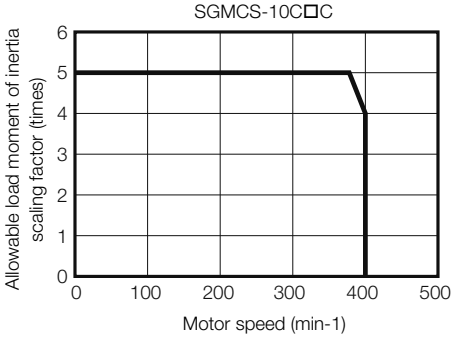
SGMCS-07B□C



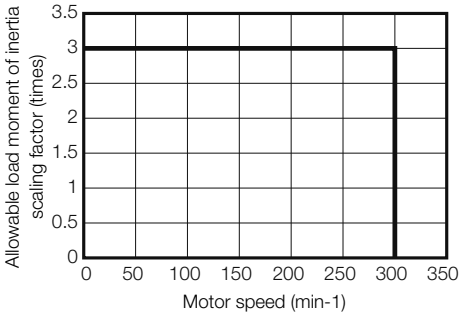
SGMCS-08D□C



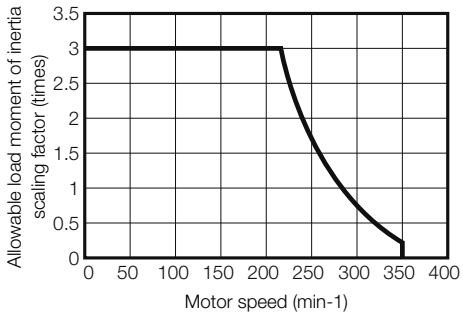
SGMCS-10C□C



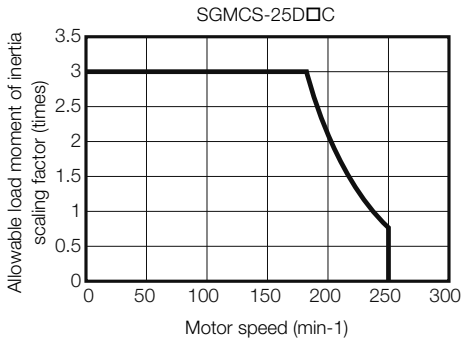
SGMCS-14C□C



SGMCS-17D□C



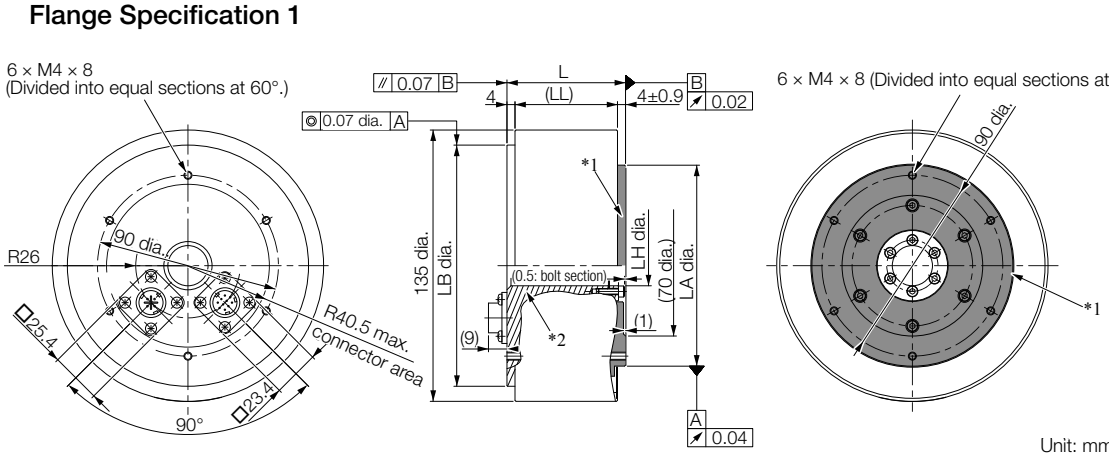
SGMCS-25D□C



Direct Drive Servomotors SGMCS External Dimensions
Small-Capacity, Coreless Servomotors

SGMCS-☐☐B

Flange Specification 1

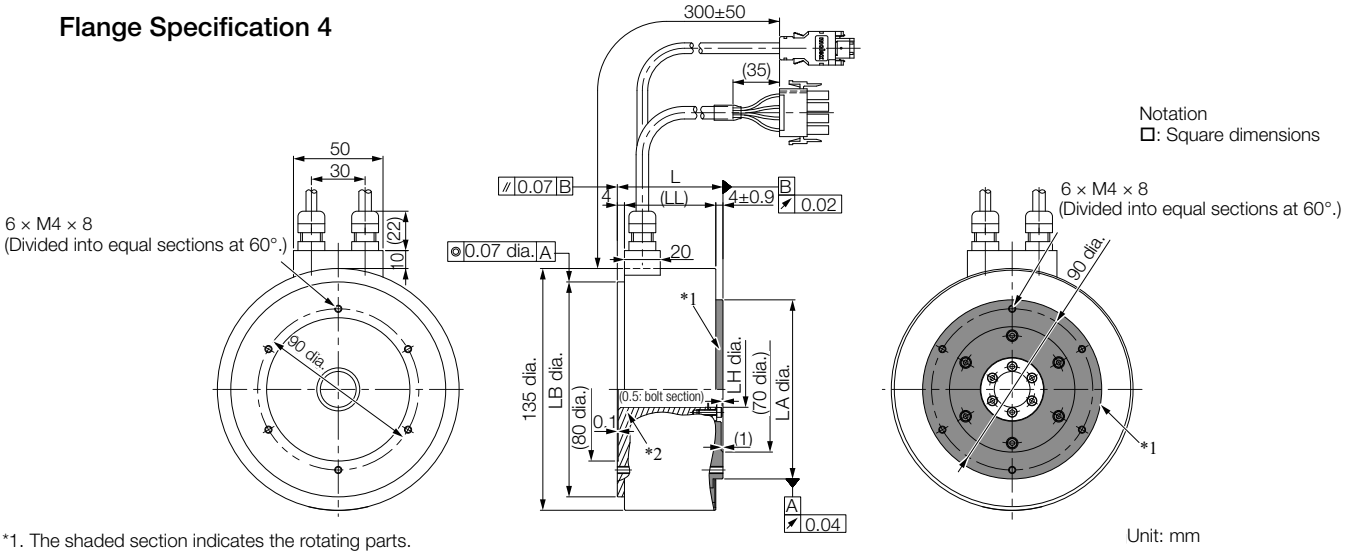


*1. The shaded section indicates the rotating parts.
*2. The hatched section indicates the non-rotating parts.

Note:
Values in parentheses are reference dimensions.

Model SGMCS-	L	(LL)	LB	LH	LA	Approx. Mass [kg]
02B☐C11	59	51	$120^{0}_{-0.035}$	$20^{+0.4}_{0}$	$100^{0}_{-0.035}$	4.8
05B☐C11	88	80	$120^{0}_{-0.035}$	$20^{+0.4}_{0}$	$100^{0}_{-0.035}$	5.8
07B☐C11	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.
*2. The hatched section indicates the non-rotating parts.

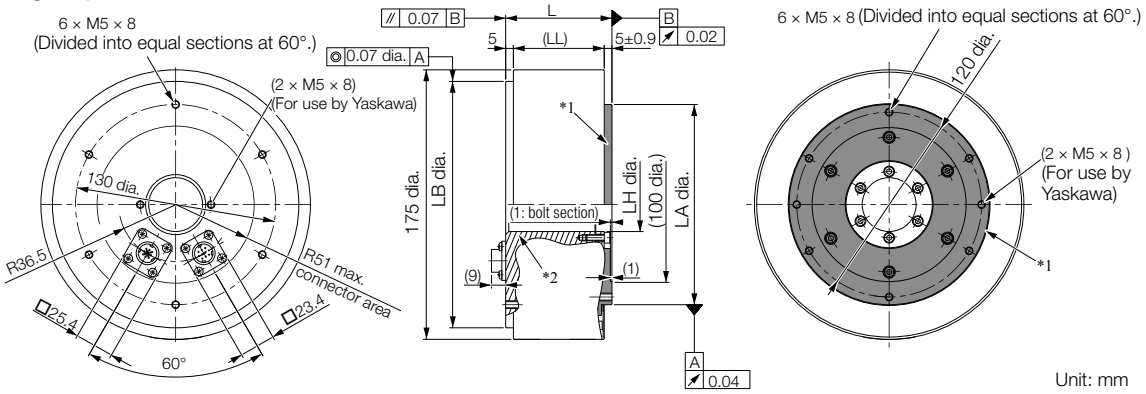
Note:
Values in parentheses are reference dimensions.

Model SGMCS-	L	(LL)	LB	LH	LA	Approx. Mass [kg]
02B☐C41	59	51	$120^{0}_{-0.035}$	$20^{+0.4}_{0}$	$100^{0}_{-0.035}$	4.8
05B☐C41	88	80	$120^{0}_{-0.035}$	$20^{+0.4}_{0}$	$100^{0}_{-0.035}$	5.8
07B☐C41	128	120	$120^{0}_{-0.035}$	$20^{+0.4}_{0}$	$100^{0}_{-0.035}$	8.2

Refer to the following section for information on connectors in Connector Specifications on page 99.

SGMCS-□□C

Flange Specification 1



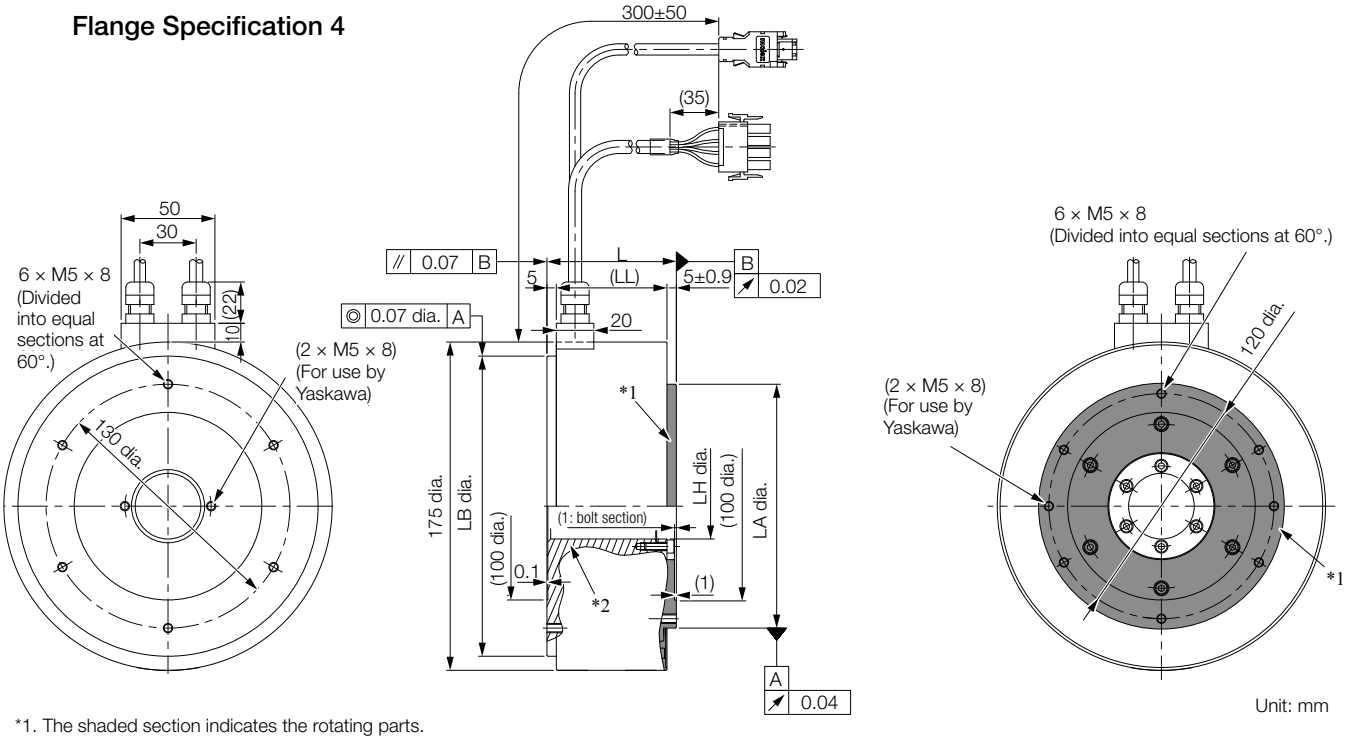
Unit: mm

*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 SGMCS-	L	(LL)	LB	LH	LA	Approx. Mass [kg]
04C□C11	69	59	$160^{0}_{-0.040}$	$35^{+0.4}_{0}$	$130^{0}_{-0.040}$	7.2
10C□C11	90	80	$160^{0}_{-0.040}$	$35^{+0.4}_{0}$	$130^{0}_{-0.040}$	10.2
14C□C11	130	120	$160^{0}_{-0.040}$	$35^{+0.4}_{0}$	$130^{0}_{-0.040}$	14.2

Flange Specification 4



Unit: mm

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

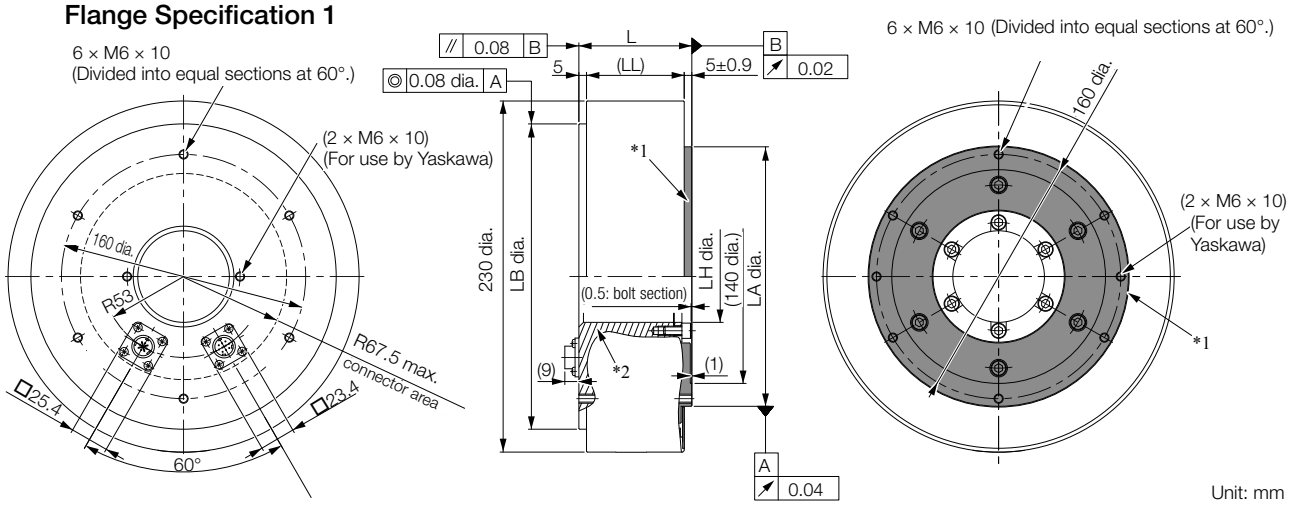
Note:
Values in parentheses are reference dimensions.

Model SGMCS-	L	(LL)	LB	LH	LA	Approx. Mass [kg]
04C□C41	69	59	$160^{0}_{-0.040}$	$35^{+0.4}_{0}$	$130^{0}_{-0.040}$	7.2
10C□C41	90	80	$160^{0}_{-0.040}$	$35^{+0.4}_{0}$	$130^{0}_{-0.040}$	10.2
14C□C41	130	120	$160^{0}_{-0.040}$	$35^{+0.4}_{0}$	$130^{0}_{-0.040}$	14.2

Refer to the following section for information on connectors in Connector Specifications on page 99.

SGMCS-□□D

Flange Specification 1



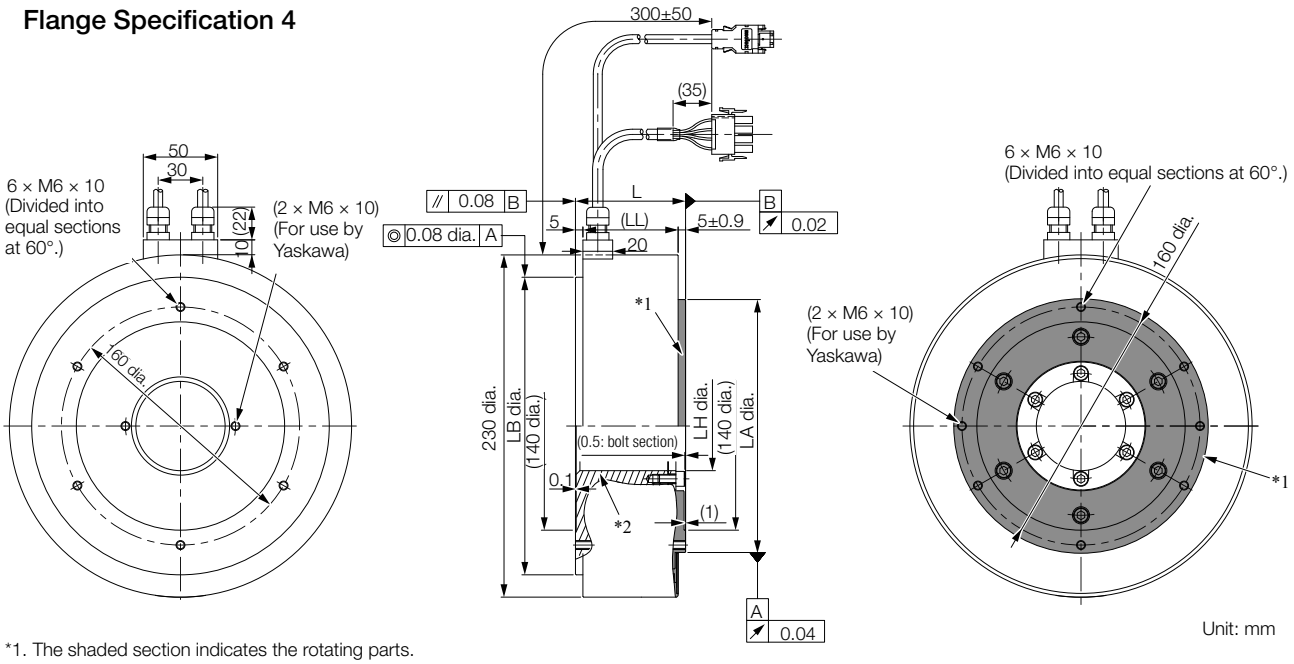
Unit: mm

*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 SGMCS-	L	(LL)	LB	LH	LA	Approx. Mass [kg]
08D□C11	74	64	$200^{0}_{-0.046}$	$60^{+0.4}_{0}$	$170^{0}_{-0.040}$	14.0
17D□C11	110	100	$200^{0}_{-0.046}$	$60^{+0.4}_{0}$	$170^{0}_{-0.040}$	22.0
25D□C11	160	150	$200^{0}_{-0.046}$	$60^{+0.4}_{0}$	$170^{0}_{-0.040}$	29.7

Flange Specification 4



Unit: mm

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

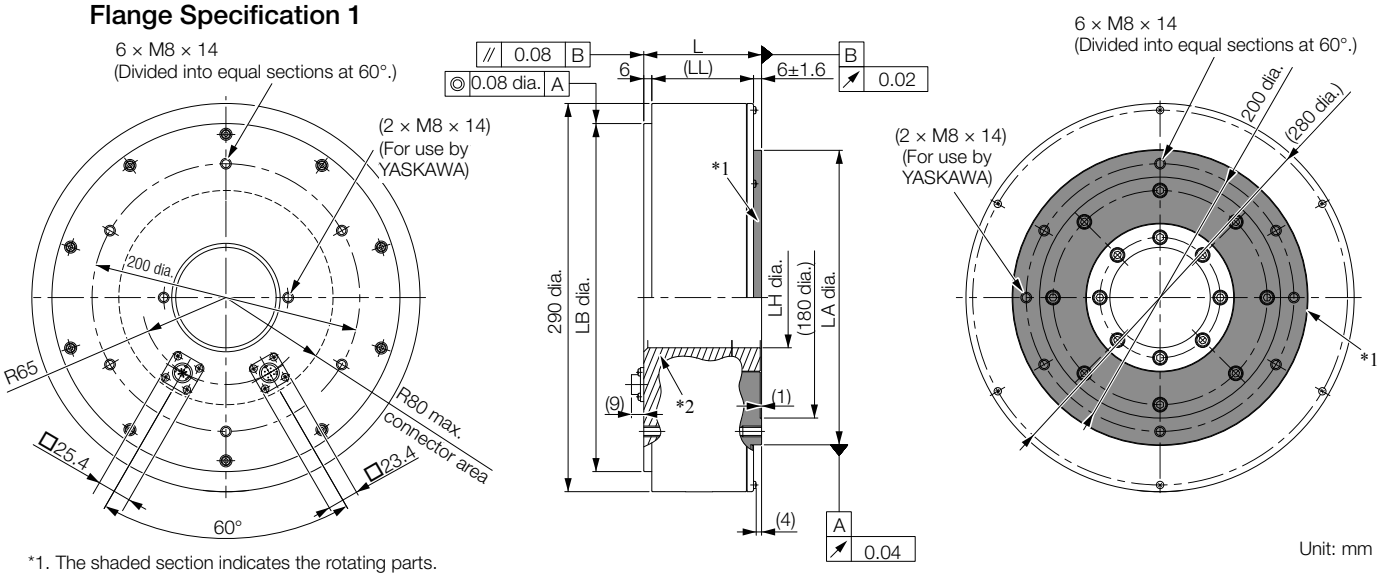
Note:
Values in parentheses are reference dimensions.

Model SGMCS-	L	(LL)	LB	LH	LA	Approx. Mass [kg]
08D□C41	74	64	$200^{0}_{-0.046}$	$60^{+0.4}_{0}$	$170^{0}_{-0.040}$	14.0
17D□C41	110	100	$200^{0}_{-0.046}$	$60^{+0.4}_{0}$	$170^{0}_{-0.040}$	22.0
25D□C41	160	150	$200^{0}_{-0.046}$	$60^{+0.4}_{0}$	$170^{0}_{-0.040}$	29.7

Refer to the following section for information on connectors in Connector Specifications on page 99.

SGMCS-□□E

Flange Specification 1



Unit: mm

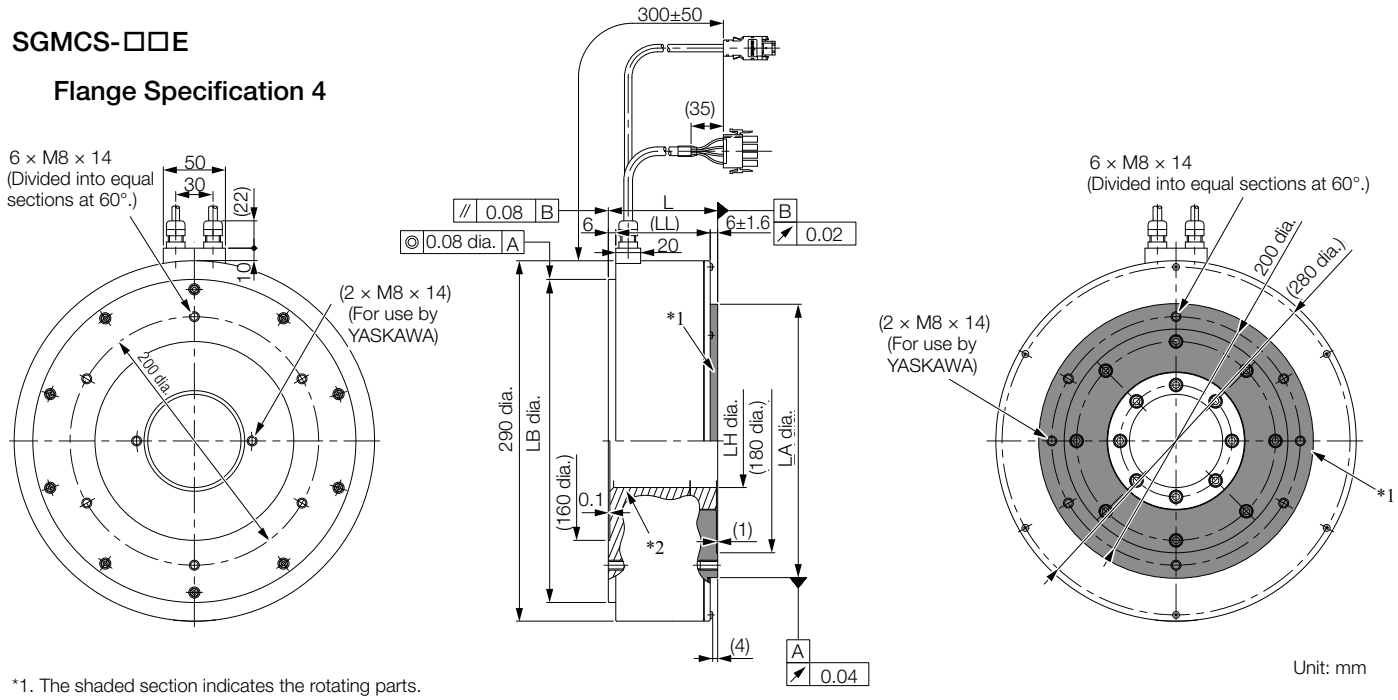
*1. The shaded section indicates the rotating parts.
*2. The hatched section indicates the non-rotating parts.

Note:
Values in parentheses are reference dimensions.

Model SGMCS-	L	(LL)	LB	LH	LA	Approx. Mass [kg]
16E□B11	88	76	$260^{0}_{-0.052}$	$75^{+0.4}_{0}$	$220^{0}_{-0.046}$	26.0
35E□B11	112	100	$260^{0}_{-0.052}$	$75^{+0.4}_{0}$	$220^{0}_{-0.046}$	34.0

SGMCS-□□E

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.

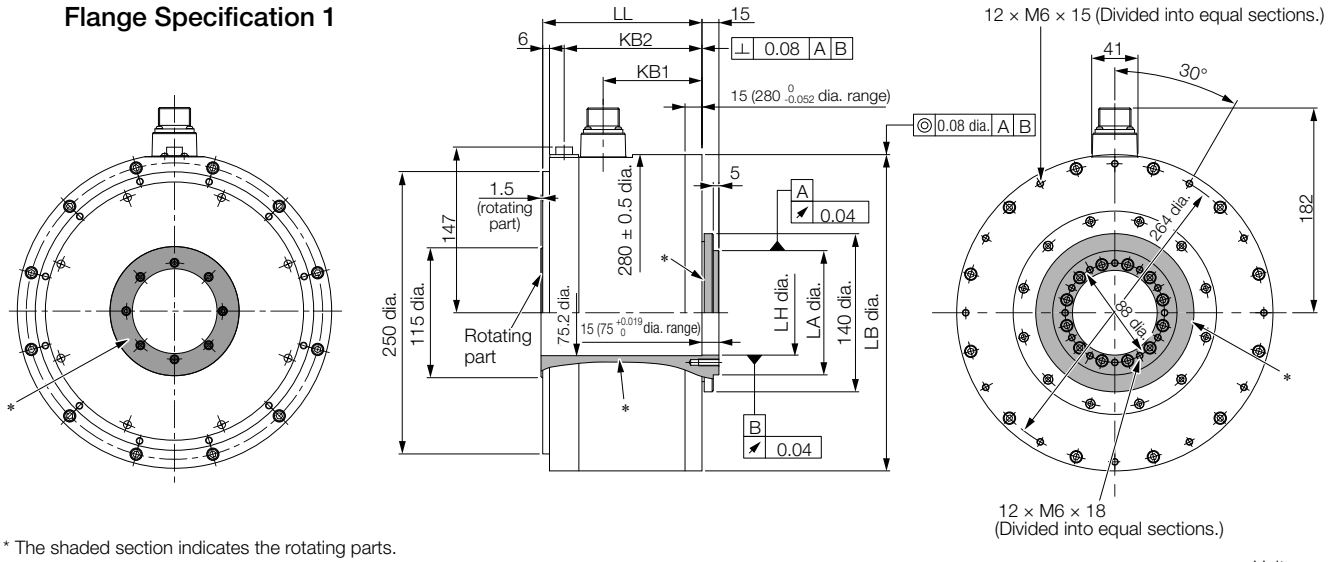
Model SGMCS-	L	(LL)	LB	LH	LA	Approx. Mass [kg]
16E□B41	88	76	$260^{0}_{-0.052}$	$75^{+0.4}_{0}$	$220^{0}_{-0.046}$	26.0
35E□B41	112	100	$260^{0}_{-0.052}$	$75^{+0.4}_{0}$	$220^{0}_{-0.046}$	34.0

Refer to the following section for information on connectors in Connector Specifications on page 99.

Direct Drive Servomotors SGMCS External Dimensions
Medium-Capacity Motors with Cores

SGMCS-☐☐M

Flange Specification 1

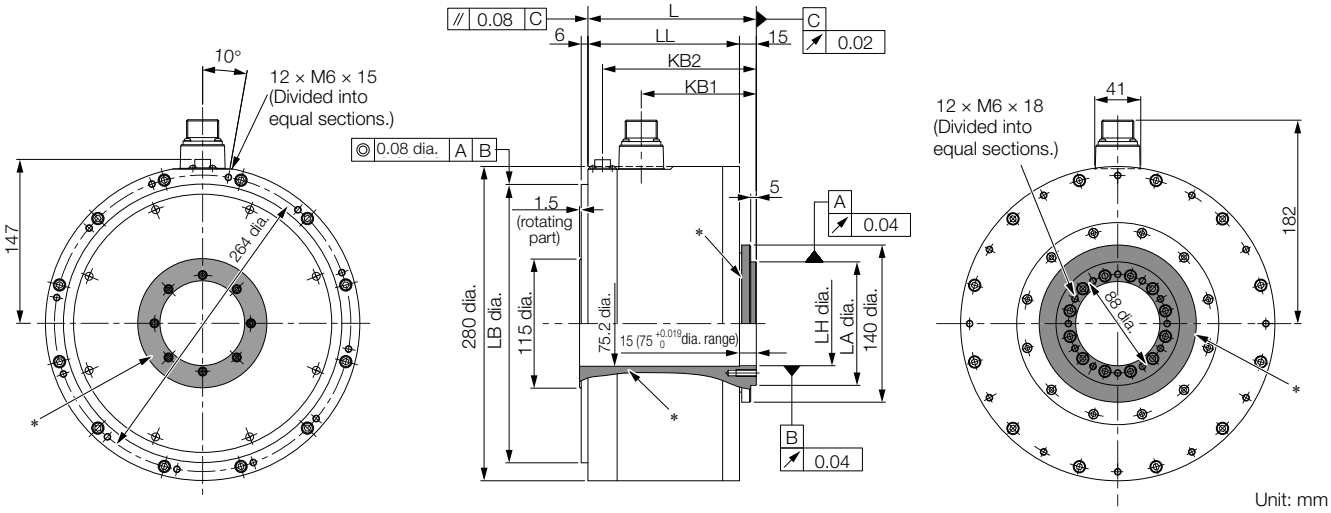


* The shaded section indicates the rotating parts.

Unit: mm

Model SGMCS-	L	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



* The shaded section indicates the rotating parts.

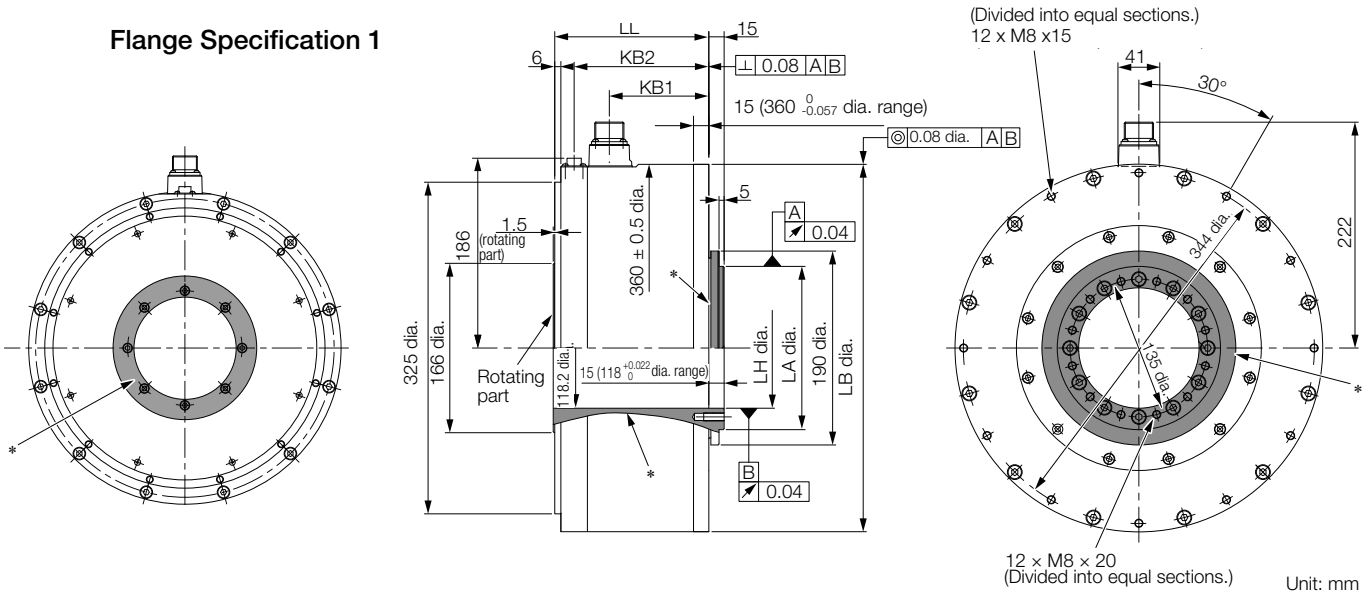
Unit: mm

Model SGMCS-	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 connectors in Connector Specifications on page 99.

SGMCS-□□N

Flange Specification 1

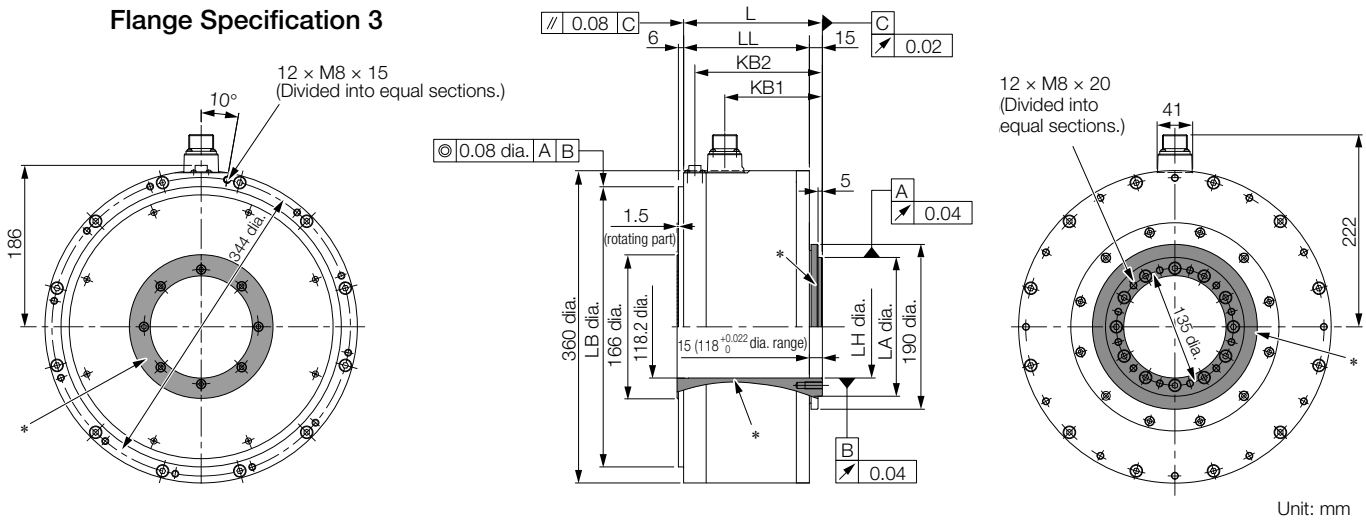


Unit: mm

* The shaded section indicates the rotating parts.

Model SGMCS-	L	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



Unit: mm

* The shaded section indicates the rotating parts.

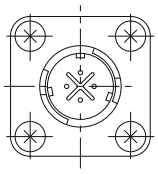
Model SGMCS-	L	LL	KB1	KB2	LB	LH	LA	Approx. Mass [kg]
80N□A31	160	145	113	147	$323^{0}_{-0.057}$	$118^{+0.022}_{0}$	$160^{0}_{-0.040}$	50
1EN□A31	210	195	163	197	$323^{0}_{-0.057}$	$118^{+0.022}_{0}$	$160^{0}_{-0.040}$	68
2ZN□A31	260	245	213	247	$323^{0}_{-0.057}$	$118^{+0.022}_{0}$	$160^{0}_{-0.040}$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

Refer to the following section for information on connectors in Connector Specifications on page 99.

Direct Drive Servomotors SGMCS
Connector Specifications

SGMCS-□□B, -□□C, -□□D, or -□□E with Flange Specification 1

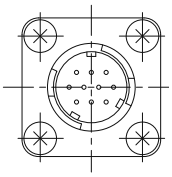
- Servomotor Connector Specifications



Model: JN1AS04MK2R
Manufacturer: Japan Aviation Electronics Industry, Ltd.

Mating connector: JN1DS04FK1
(Not provided by YASKAWA.)

- Encoder Connector Specifications

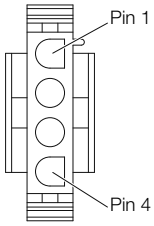


Model: JN1AS10ML1-R
Manufacturer: Japan Aviation Electronics Industry, Ltd.

Mating connector: JN1DS10SL1
(Not provided by YASKAWA.)

SGMCS-□□B, -□□C, -□□D, or -□□E with Flange Specification 4

- Servomotor Connector Specifications

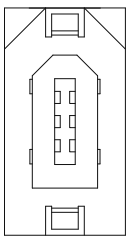


Model
- Plug: 350779-1
- Pins: 350561-3 or 350690-3 (No.1 to 3)
- Ground pin: 350654-1 or 350669-1 (No. 4)

Manufacturer: Tyco Electronics Japan G.K.

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

- Encoder Connector Specifications

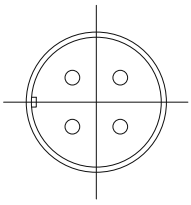


Model: 55102-0600
Manufacturer: Molex Japan Co., Ltd.

Mating connector: 54280-0609

SGMCS-□□M or -□□N with Flange Specification 1 or 3

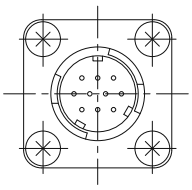
- Servomotor Connector Specifications



Model: CE05-2A18-10PD
Manufacturer: DDK Ltd.

Mating Connector
Plug: CE05-6A18-10SD-B-BSS
Cable clamp: CE3057-10A-□(D265)

- Encoder Connector Specifications



Model: JN1AS10ML1
Manufacturer: Japan Aviation Electronics Industry, Ltd.

Mating connector: JN1DS10SL1

Model Designations

SGMCV - 04 B E A 1 1

Direct Drive Servomotors SGMCV	1st + 2nd	3rd	4th	5th	6th	7th	digit

1st + 2nd digit - Rated Output

Code	Specification
04	4 Nm
08	8 Nm
10	10 Nm
14	14 Nm
17	17 Nm
25	25 Nm

3rd digit - Servomotor Outer Diameter

Code	Specification
B	135 mm dia.
D	175 mm dia.

4th digit - Serial Encoder

Code	Specification
E	22-bit single-turn absolute encoder
I	22-bit multiturn absolute encoder

5th digit - Design Revision Order

A	

6th digit - Flange

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

7th digit - Options

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

Note: Direct Drive Servomotors are not available with holding brakes.

Direct Drive Servomotors SGMCV

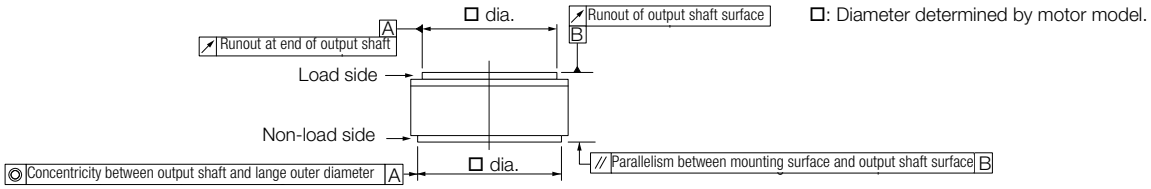
Specifications

Voltage			200 V					
Model SGMCV-			04B	10B	14B	08C	17C	25C
Time Rating			Continuous					
Thermal Class			A					
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 run 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					
Environmental Conditions	Ambient Air Temperature		0°C to 40°C (without freezing)					
	Ambient Air Humidity		20% to 80% relative humidity (without 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 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 (without freezing) Storage Humidity: 20% to 80% relative humidity (without 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					
	Concentricity between Output Shaft and Flange Outer Diameter	mm	0.07					
Shock Resistance*4	Impact Acceleration Rate at Flange		490 m/s^2					
	Number of Impacts		2 times					
Vibration Resistance*5	Vibration Acceleration Rate at Flange		49 m/s^2					
Applicable SERVOPACKs		SGD7S-	2R8A		5R5A	2R8A	5R5A	7R6A
		SGD7W-						

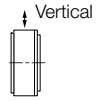
*1. A vibration class of V15 indicates a vibration amplitude of 15 μm maximum on the Servomotor without a load at the rated motor speed.

*2. The 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.

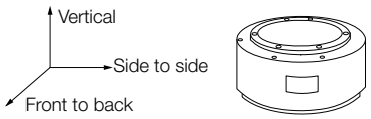


*4. The shock resistance for shocks in vertical direction, if the Servomotor is mounted with the shaft in a horizontal position is given in the above table.



Shock Applied to the Servomotor

*5. The vertical, side-to-side, and front-to-back vibration resistance for vibration in three directions when the Servomotor is mounted with the shaft in a horizontal position is given in the above table. The strength of the vibration that the Servomotor can withstand depends on the application. Always confirm the vibration acceleration rate.



Direct Drive Servomotors SGMCV

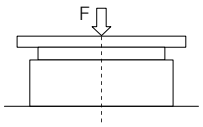
Ratings

Voltage			200 V					
Model SGMCV-			04B	10B	14B	08C	17C	25C
Rated Output *1		W	126	314	440	251	534	785
Rated Torque *1, *2		Nm	4.00	10.0	14.0	8.00	17.0	25.0
Instantaneous Maximum Torque *1		Nm	12.0	30.0	42.0	24.0	51.0	75.0
Stall Torque *1		Nm	4.00	10.0	14.0	8.00	17.0	25.0
Rated Current *1		Arms	1.8	2.8	4.6	2.3	4.5	
Instantaneous Maximum Current *1		Arms	5.6	8.9	14.1	7.3	14.7	13.9
Rated Motor Speed *1		min^{-1}	300			300		
Maximum Motor Speed *1		min^{-1}	600			600		500
Torque Constant		N·m/Arms	2.39	3.81	3.27	3.81	4.04	6.04
Motor Moment of Inertia		$\times 10^{-4}$ kg·m^2	16.2	25.2	36.9	56.5	78.5	111
Rated Power Rate *1		kW/s	9.88	39.7	53.1	11.3	36.8	56.3
Rated Angular Acceleration Rate *1		rad/s^2	2470	3970	3790	1420	2170	2250
Heat Sink Size		mm	350 × 350 × 12			450 × 450 × 12		
Allowable Load Moment of Inertia (Motor Moment of Inertia Ratio)			25 times	40 times	45 times	15 times	25 times	25 times
Allowable Load *3	Allowable Thrust Load	N	1500			3300		
	Allowable Moment Load	Nm	45	55	65	92	98	110

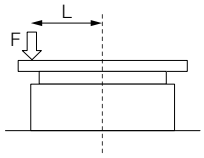
*1. These values are for operation in combination with a SERVOPACK when the temperature of the armature winding is 100°C. The values for other items are at 20°C. These are typical values.

*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.

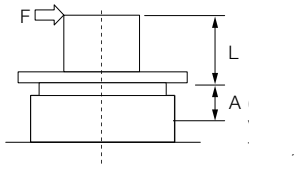
*3. The thrust loads and moment loads that are applied while a Servomotor is operating are roughly classified into the following patterns. Design the machine so that the thrust loads or moment loads will not exceed the values given in the table.



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



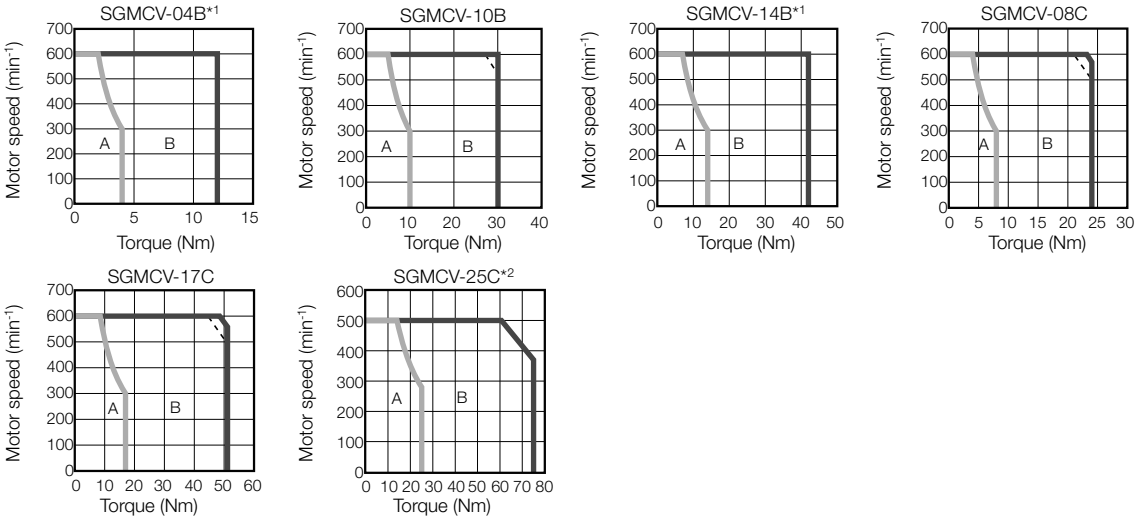
Where F is the external force
Thrust load = Load mass
Moment load = F × (L+A)

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 ——— (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



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

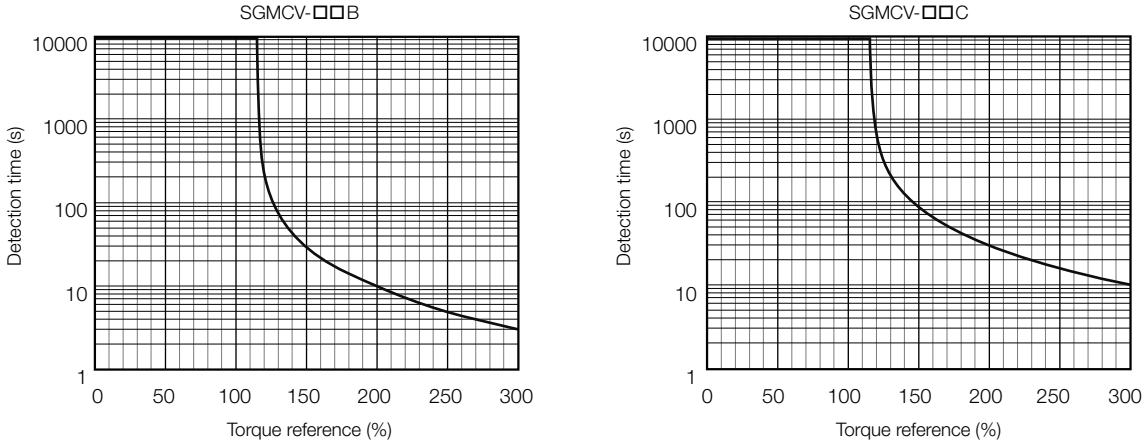
*2. Contact your YASKAWA representative for information on the SGMCV-25C.

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 length of the Servomotor Main Circuit Cable 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 ambient air temperature of 40°C.



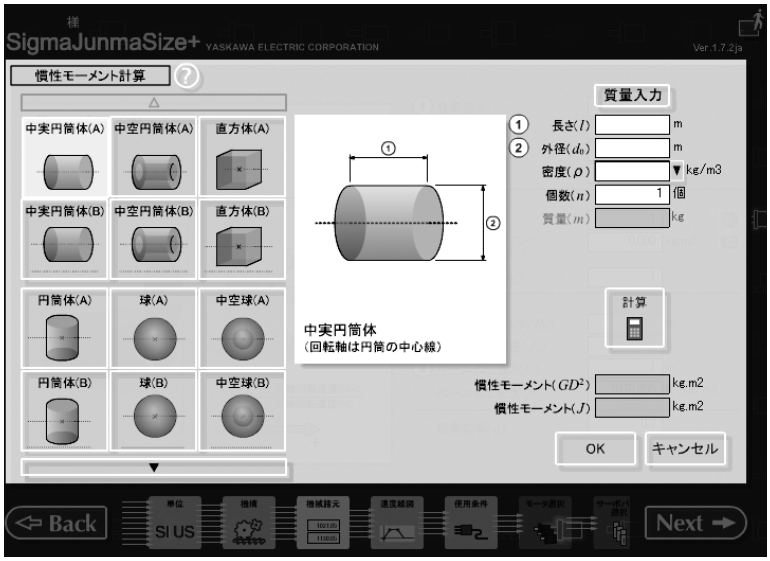
Note: The above overload protection characteristics do not mean that you can perform continuous duty operation with an output of 100% or higher. Use the Servomotor so that the effective torque remains within the continuous duty zone given in Torque-Motor Speed Characteristics on page 105.

Load Moment of Inertia

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

The allowable size of the load moment of inertia (J_L) for the Servomotor is restricted. Refer to Ratings on page 104. This value is provided strictly as a guideline and results depend on Servomotor driving conditions.

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



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

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

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

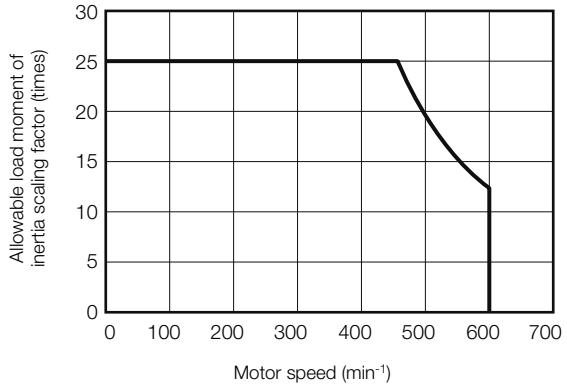
Allowable Load Moment of Inertia Scaling Factor for SERVOPACKs without Built-in Regenative Resistors

The following graphs show the allowable load moment of inertia scaling factor of the motor speed for SERVOPACKs without built-in regenerative resistors when an External Regenerative Resistor is not connected (applicable SERVOPACK: SGD7S-2R8A).

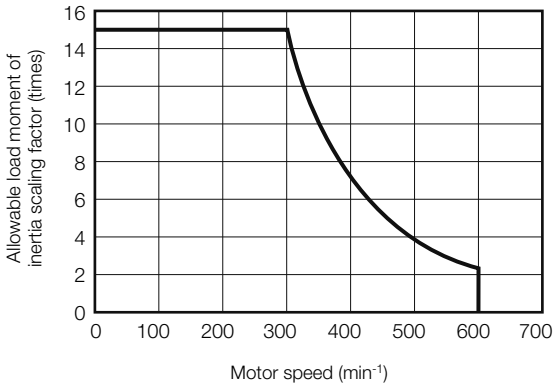
If the Servomotor exceeds the allowable load moment of inertia, an overvoltage alarm may occur in the SERVOPACK.

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

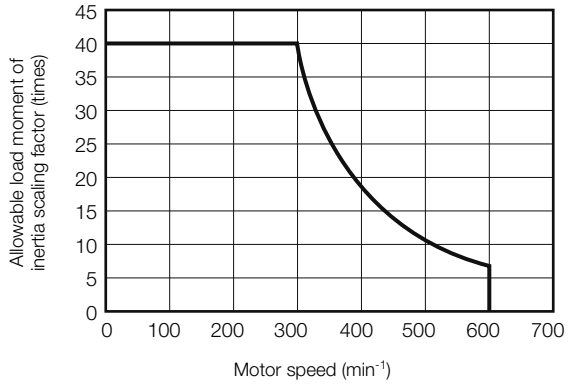
SGMCV-04B□A



SGMCV-08C□A



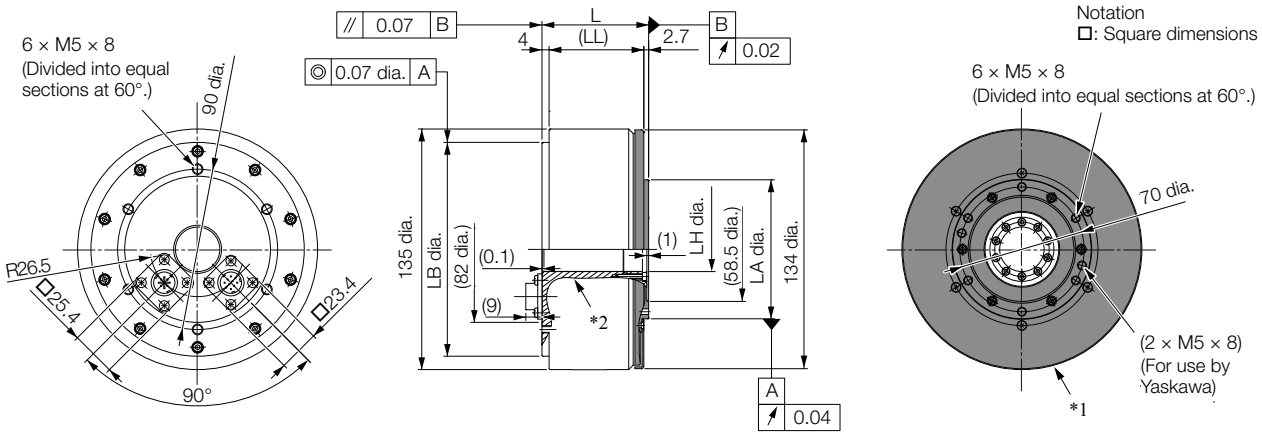
SGMCV-10B□A



External Dimensions

SGMCV-□□B

Flange Specification 1



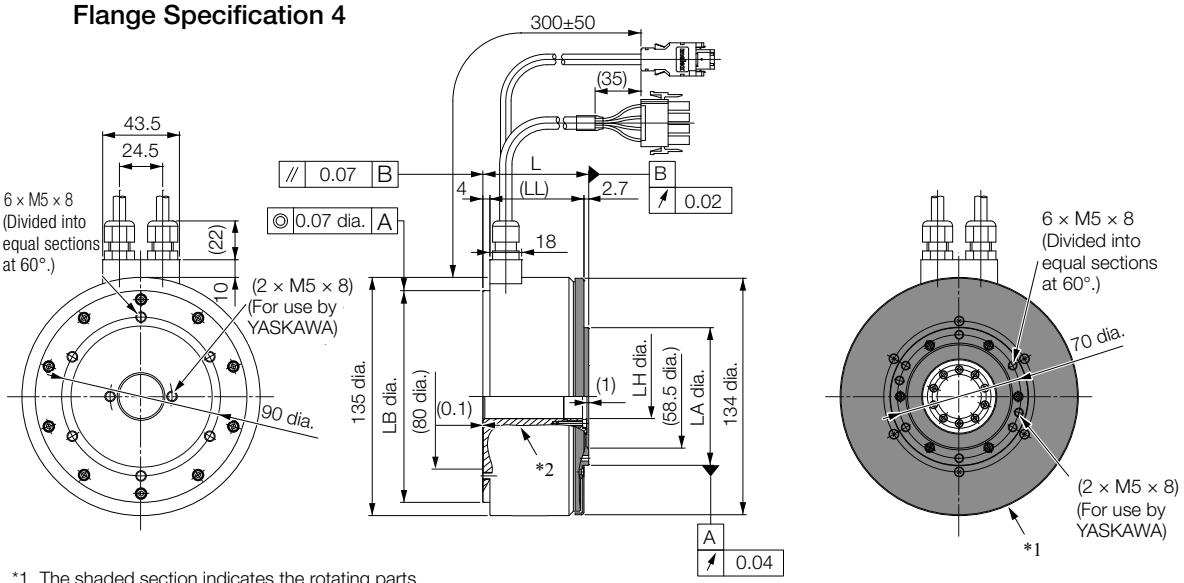
Unit: mm

*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 SGMCV-	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.

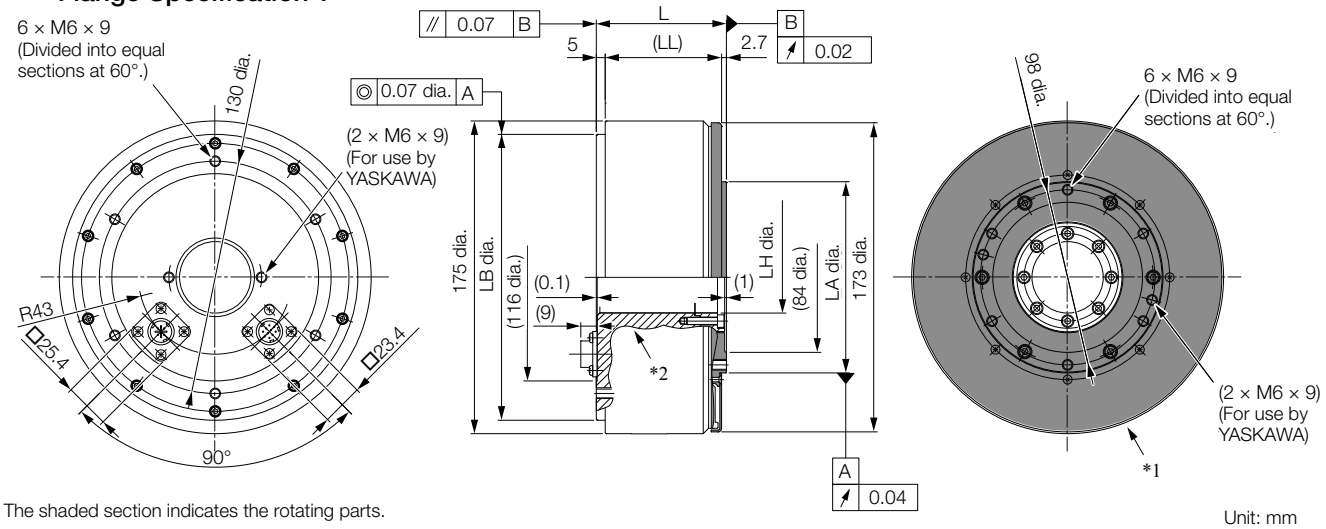
Note:
Values in parentheses are reference dimensions.

Model SGMCV-	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 connectors in Connector Specifications on page 110.

SGMCV-□□C

Flange Specification 1



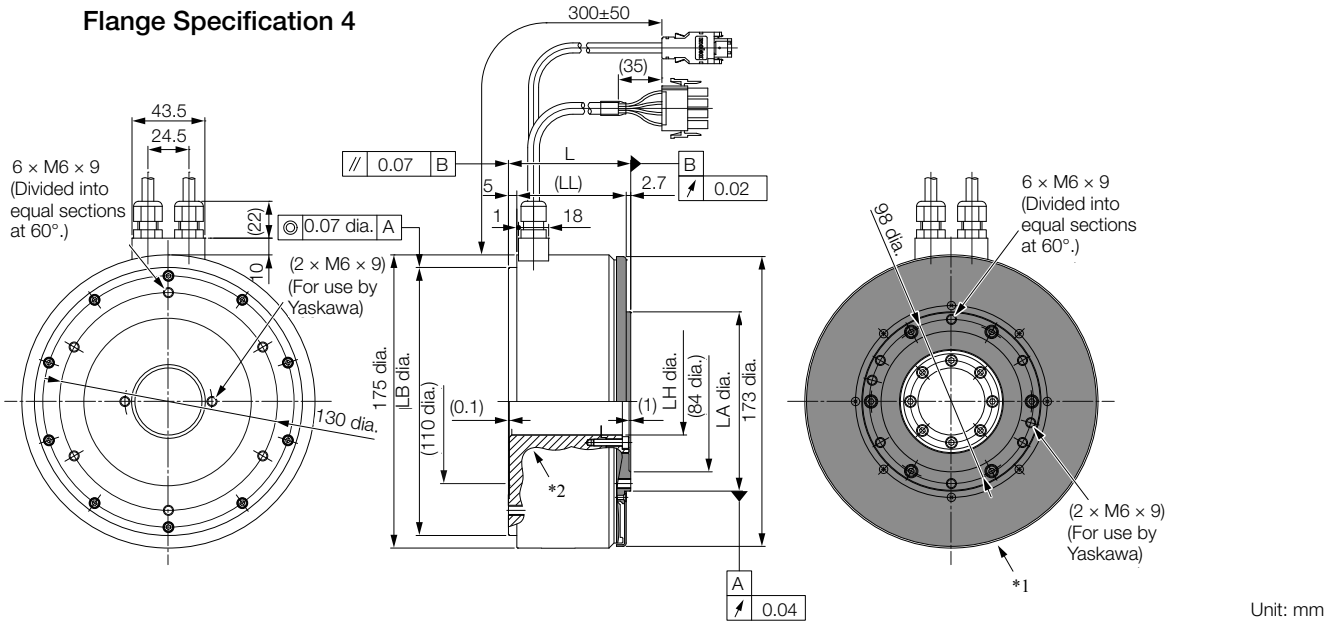
*1. The shaded section indicates the rotating parts.
*2. The hatched section indicates the non-rotating parts.

Unit: mm

Note:
Values in parentheses are reference dimensions.

Model SGMCV-	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



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

Unit: mm

Note:
Values in parentheses are reference dimensions.

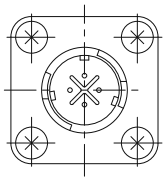
Model SGMCV-	L	(LL)	LB	LH	LA	Approx. Mass [kg]
08C□A41	73	65.3	$160^{0}_{-0.040}$	$40^{+0.3}_{+0.1}$	$107^{0}_{-0.035}$	9.0
17C□A41	87	79.3	$160^{0}_{-0.040}$	$40^{+0.3}_{+0.1}$	$107^{0}_{-0.035}$	11.0
25C□A41	117	109.3	$160^{0}_{-0.040}$	$40^{+0.3}_{+0.1}$	$107^{0}_{-0.035}$	15.0

Refer to the following section for information on connectors in Connector Specifications on page 110.

Direct Drive Servomotors SGMCV
Connector Specifications

Flange Specification 1

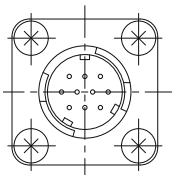
- Servomotor Connector Specifications



Model: JN1AS04MK2R
Manufacturer: Japan Aviation Electronics Industry, Ltd.

Mating connector: JN1DS04FK1
(Not provided by YASKAWA.)

- Encoder Connector Specifications

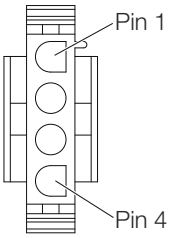


Model: JN1AS10ML1-R
Manufacturer: Japan Aviation Electronics Industry, Ltd.

Mating connector: JN1DS10SL1
(Not provided by YASKAWA.)

Flange Specification 4

- Servomotor Connector Specifications

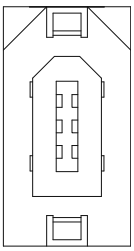


Model
- Plug: 350779-1
- Pins: 350561-3 or 350690-3 (No.1 to 3)
- Ground pin: 350654-1 or 350669-1 (No. 4)

Manufacturer: Tyco Electronics Japan G.K.

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

- Encoder Connector Specifications



Model: 55102-0600
Manufacturer: Molex Japan Co., Ltd.

Mating connector: 54280-0609

SGLG

- Coreless model
- Rated force: 12.5 N - 750 N
  Peak force: 40.0 N - 3000 N

SGLFW

- Model with
  F-type iron core
- Rated force: 25 N - 1120 N
  Peak force: 86 N - 2400 N

SGLFW2

- Model with
  F-type iron core
- Rated force: 45 N - 2520 N
  Peak force: 135 N - 7560 N

SGLT

- Model with
  T-type iron core
- Rated force:130 N - 2000 N
  Peak force: 380 N - 7500 N

Linear Servomotors

SGLG (Coreless Models)	114
SGLF (Models with F-Type Iron Cores)	138
SGLT (Models with T-Type Iron Cores)	181

SGLG (Coreless Models)

Model Designations

Moving Coil

SGL G W - 30 A 050 C P □

Linear Sigma Series Linear Servomotors (SGL) | 1st (G) | 2nd (W) | 3rd + 4th (30) | 5rd (A) | 6th - 8th (050) | 9th (C) | 10th (P) | 11th digit (□)

1st digit - Servomotor Type

Code	Specifications
G	Coreless model

2nd digit - Moving Coil/Magnetic Way

Code	Specification
W	Moving Coil

3rd + 4th digit - Magnet Height

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

5th digit - Power Supply Voltage

Code	Specification
A	200 VAC

6th ... 8th digit - 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

9th digit - Design Revision Order

A, B…	

10th digit - Sensor Specification and Cooling Method

Code	Specifications		Applicable Models
	Polarity 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

11th digit - Connector for Servomotor Main Circuit Cable

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

Magnetic Way

SGL G M - 30 108 A □

Linear Sigma Series Linear Servomotors (SGL) | 1st (G) | 2nd (M) | 3rd + 4th (30) | 5th - 7th (108) | 8th (A) | 9th (□) | digit

1st digit - Servomotor Type

Code	Specifications
G	Coreless model

2nd digit - Moving Coil&Magnetic Way

Code	Specifications
M	Magnetic Way

3rd + 4th digit - Magnet Height

Code	Specifications
30	30 mm
40	40 mm
60	60 mm
90	86 mm

5rd ... 7th digit - Length of Magnetic Way

Code	Specifications
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

8th digit - Design Revision Order

Code	Specifications
A, B, C*	

9th digit - Options

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

*: 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.

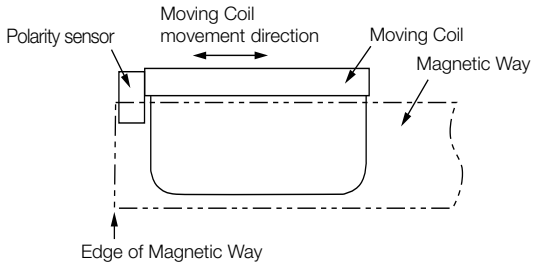
Precautions on Moving Coils with Polarity Sensors

Note:

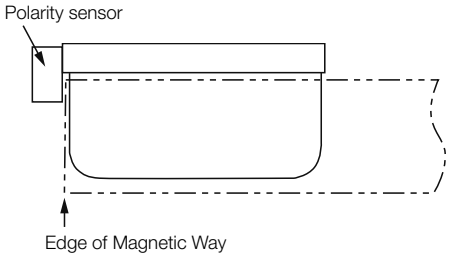
When you use a Moving Coil with a Polarity Sensor, the Magnetic Way must cover the bottom of the polarity sensor. Refer to the example that shows the correct installation.

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. Refer to the following table.

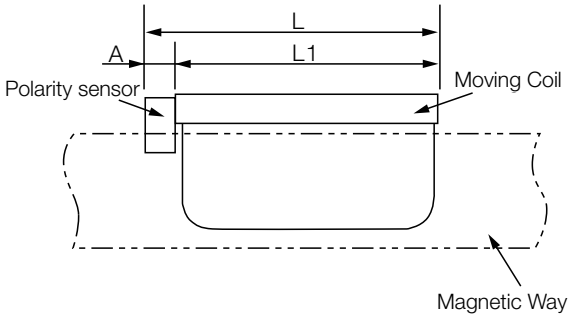
Correct Installation



Incorrect Installation



Total Length of Moving Coil with Polarity Sensor



Moving Coil Model SGLGW-	Length of Moving Coil, L1 (mm)	Length of Polarity 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		30A		40A			60A			90A		
Model SGLGW-		**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		1,500 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	Ambient Temperature	0°C to 40°C (without freezing)										
	Ambient Humidity	20% to 80% relative humidity (without 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 Standard-Force Magnetic Way

Linear Servomotor Moving Coil		30A		40A			60A			90A		
Model SGLGW-		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
Motor Constant	$N/\sqrt{W}$	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
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	SGD7S-	R70A	R90A	R90A	1R6A	2R8A	1R6A	2R8A	5R5A	120A	180A	200A
	SGD7W-	1R6A	1R6A	1R6A	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.

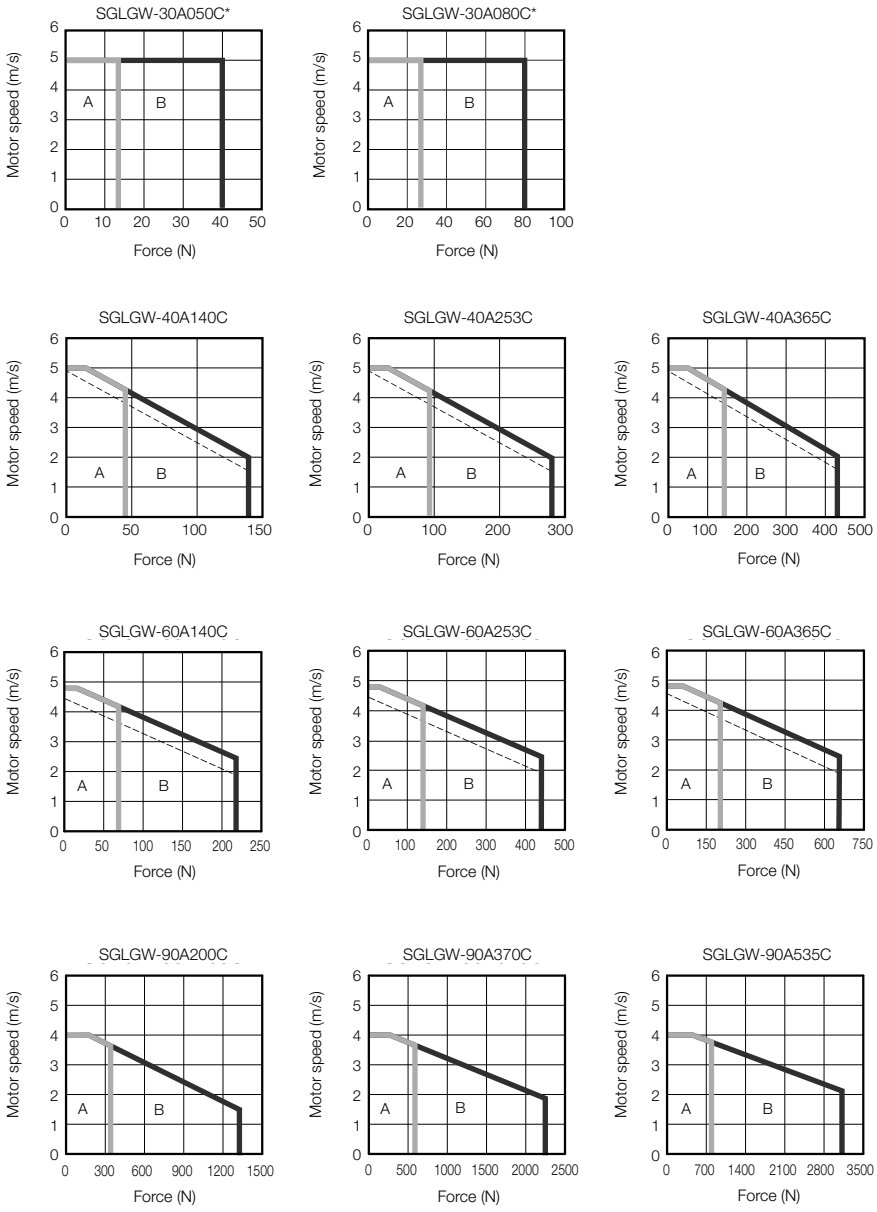
*2. The rated forces are the continuous allowable force values at a ambient air temperature of 40°C with an aluminum heat sink of the dimensions given in the following table.

- Heat Sink Dimensions
  - 200 mm × 300 mm × 12 mm: SGLGW-30A050C, -30A080C, -40A140C, and -60A140C
  - 300 mm × 400 mm × 12 mm: SGLGW-40A253C and -60A253C
  - 400 mm × 500 mm × 12 mm: SGLGW-40A365C and -60A365C
  - 800 mm × 900 mm × 12 mm: SGLGW-90A200C, -90A370C, and -90A535C

Force-Motor Speed Characteristics

A : Continuous duty zone
B : Intermittent duty zone

——— (solid lines): With three-phase 200-V input
- - - - - - - - (dotted lines): With single-phase 100-V input



* 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.

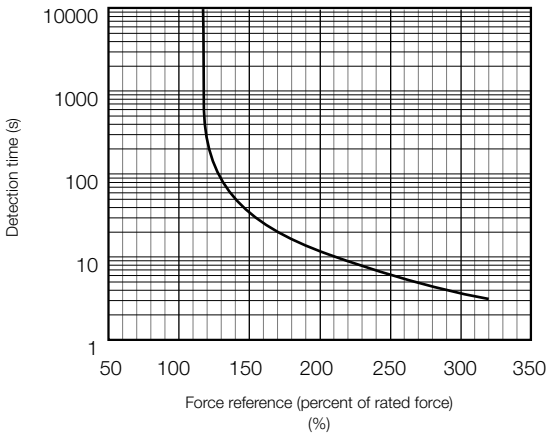
3 If the effective force is within the allowable range for the rated force, the Servomotor can be used within the intermittent duty zone.

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.

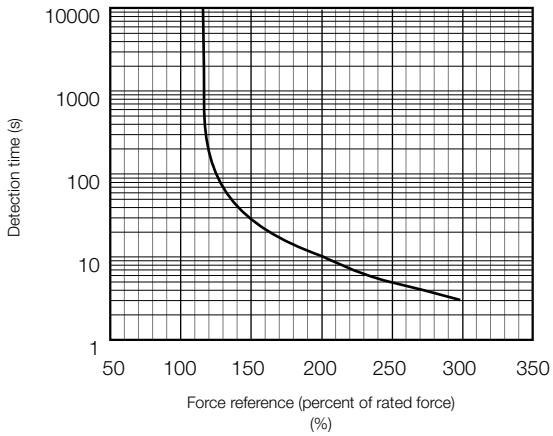
Servomotor Overload Protection Characteristics

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

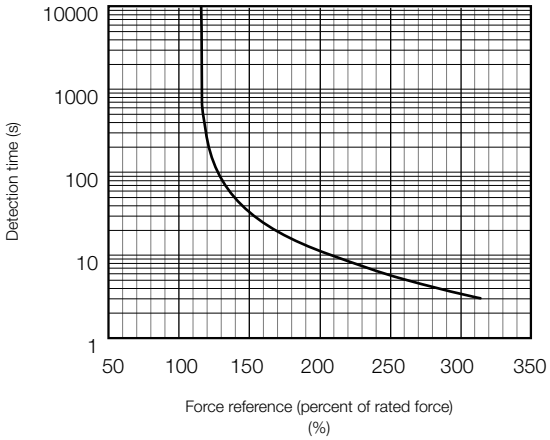
SGLGW-30A



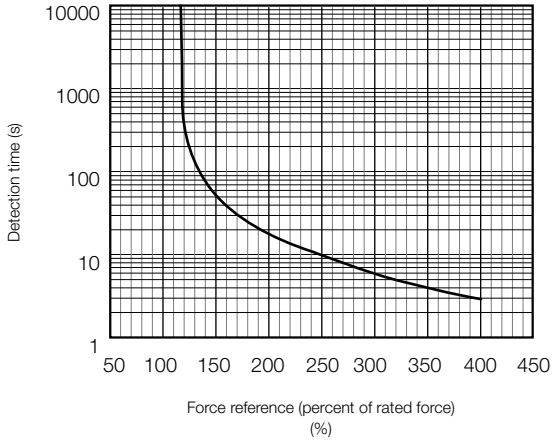
SGLGW-40A



SGLGW-60A



SGLGW-60A



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 116.

Specifications: With High-Force Magnetic Way

Linear Servomotor Moving Coil		40A			60A		
Model SGLGW-		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					
Environmental Conditions	Ambient Temperature	0°C to 40°C (without freezing)					
	Ambient Humidity	20% to 80% relative humidity (without 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		40A			60A		
Model SGLGW-		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
Combined Magnetic Way, SGLGM-		40□□□C□-M			60□□□C□-M		
Combined Serial Converter Unit, JZDP-□□□□-		255	256	257	261	262	263
Applicable SERVOPACKs	SGD7S-	1R6A	2R8A	3R8A	1R6A	3R8A	7R6A
	SGD7W-	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.

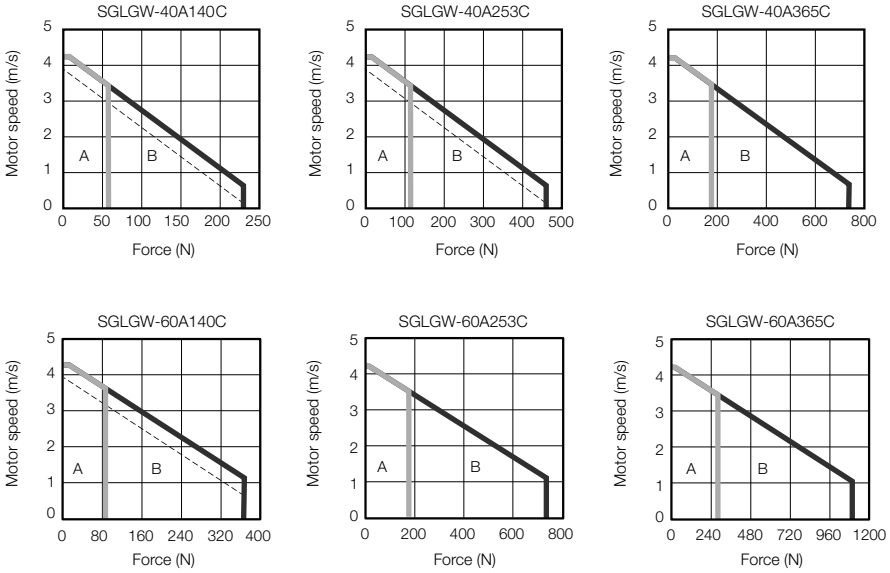
*2. The rated forces are the continuous allowable force values at a ambient temperature of 40°C with an aluminum heat sink of the dimensions given in the following table.

- Heat Sink Dimensions
  - 200 mm × 300 mm × 12 mm: SGLGW-40A140C and -60A140C
  - 300 mm × 400 mm × 12 mm: SGLGW-40A253C and -60A253C
  - 400 mm × 500 mm × 12 mm: SGLGW-40A365C and -60A365C

Force-Motor Speed Characteristics

A : Continuous duty zone
B : Intermittent duty zone

——— (solid lines): With three-phase 200-V input
- - - - - - - - (dotted lines): With single-phase 100-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.

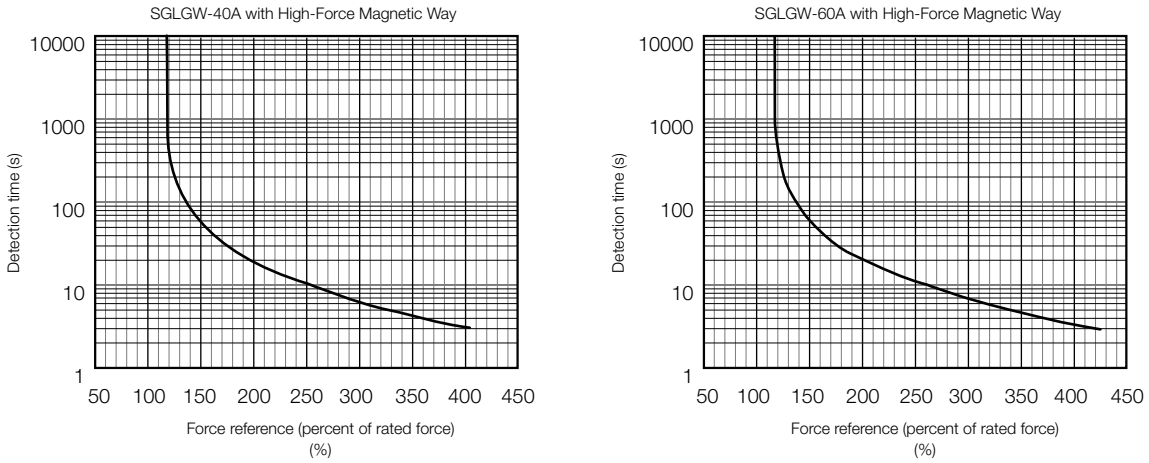
2 The characteristics in the intermittent duty zone depend on the power supply voltage.

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 ambient temperature of 40°C.



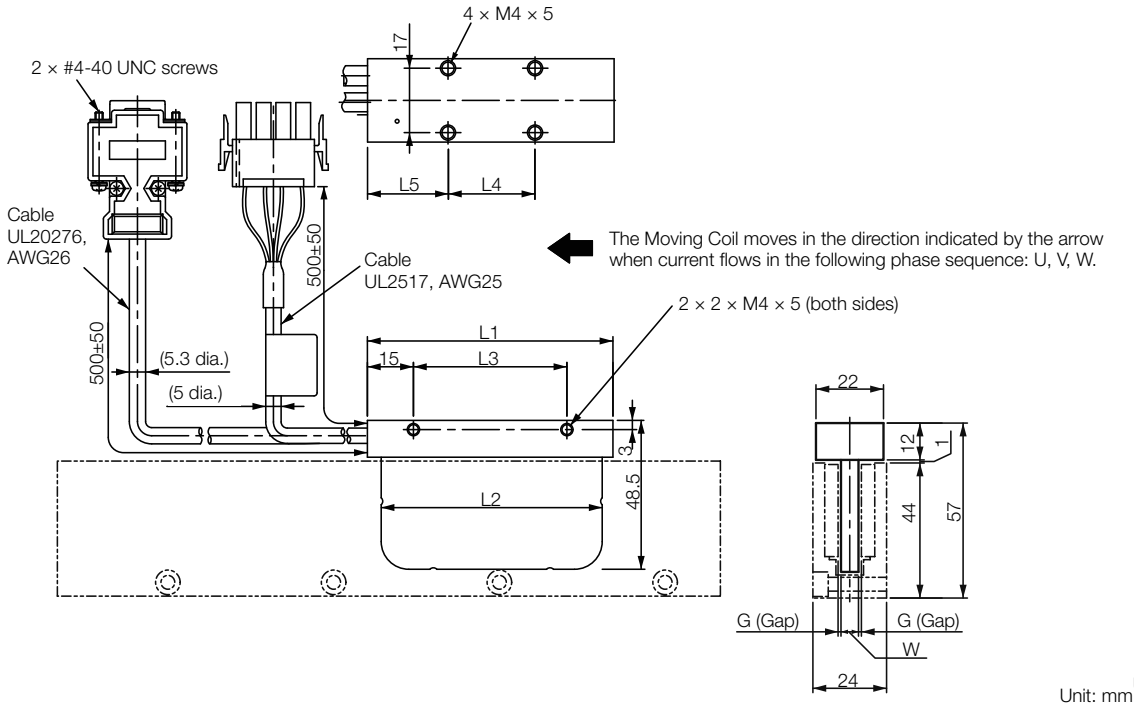
Note:

The above overload protection characteristics do not mean that you can perform continuous duty operation with an output of 100% or higher. Use the Servomotor so that the effective force remains within the continuous duty zone given in Force-Motor Speed Characteristics on page 119.

External Dimensions

SGLGW-30

Moving Coils: SGLGW-30A□□□C□



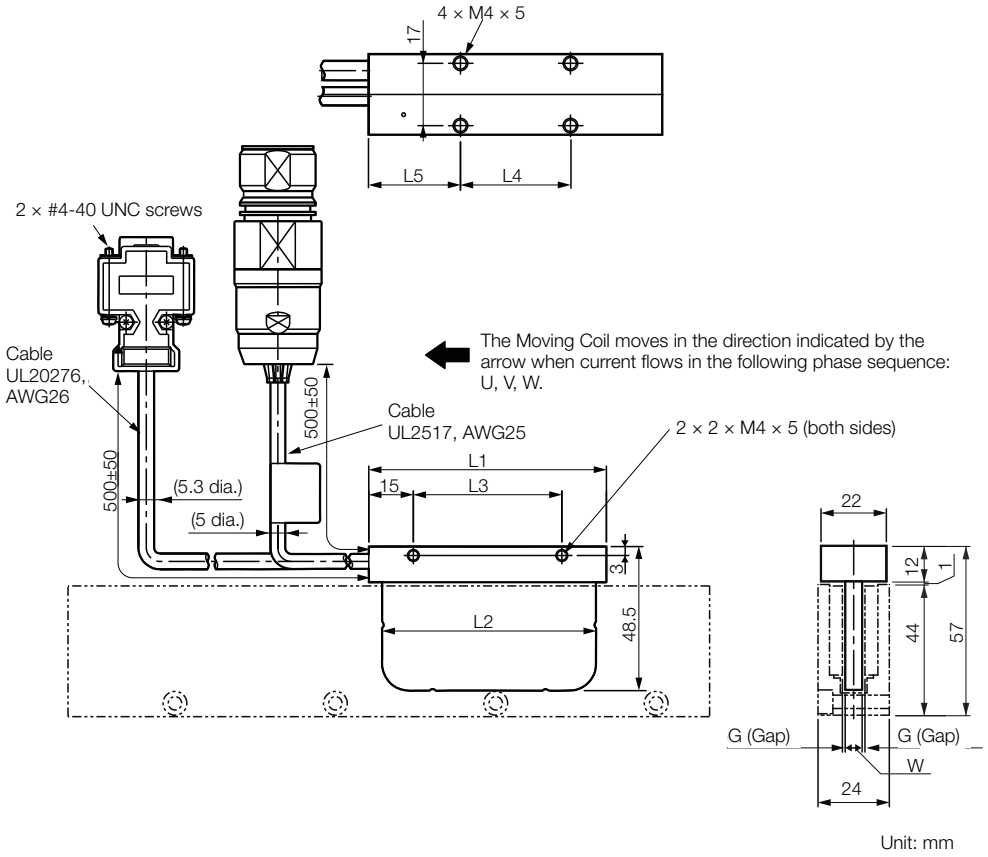
Unit: mm

Moving Coil Model SGLGW-	L1	L2	L3	L4	L5	W	G (Gap)	Approx. Mass* [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

* The mass is for a Moving Coil with a Polarity Sensor.

Refer to the following section for the connector specifications for the Sensor Cable and Servomotor Main Circuit Cable or SGLGW-30A□□□C□ Moving Coils on page 133.

Moving Coils: SGLGW-30A□□□C□D



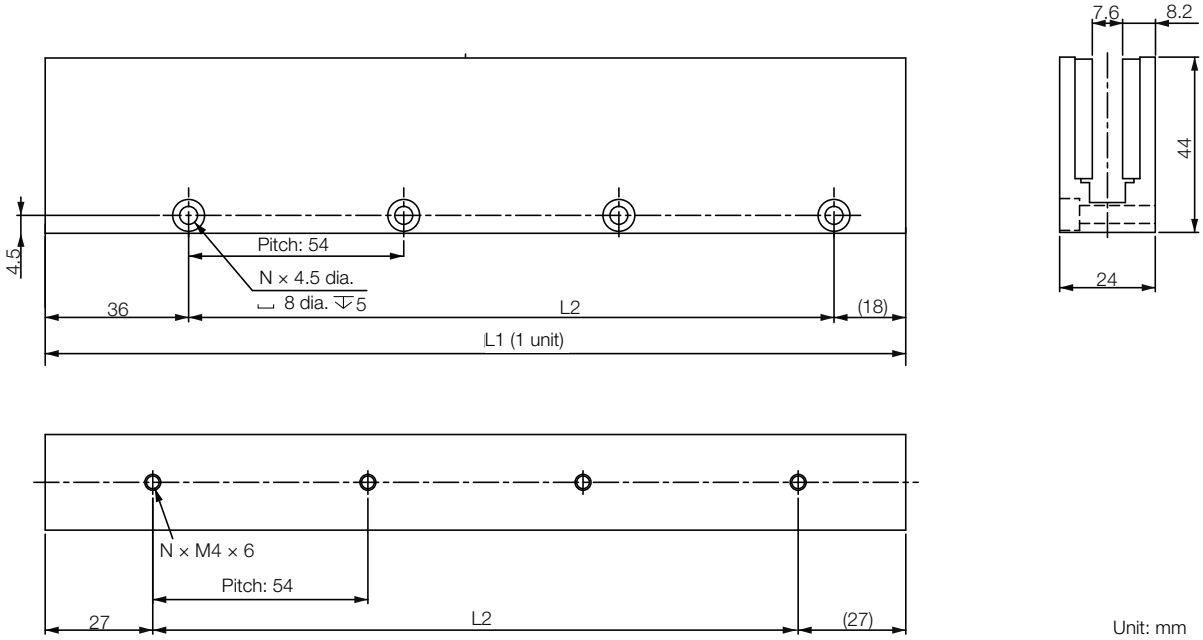
Unit: mm

Moving Coil Model SGLGW-	L1	L2	L3	L4	L5	W	G (Gap)	Approx. Mass* [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

* The mass is for a Moving Coil with a Polarity Sensor.

Refer to the following section for the connector specifications for the Sensor Cable and Servomotor Main Circuit Cable or SGLGW-30A□□□C□D Moving Coils on page 133.

Standard-Force Magnetic Ways: SGLGM-30□□□A



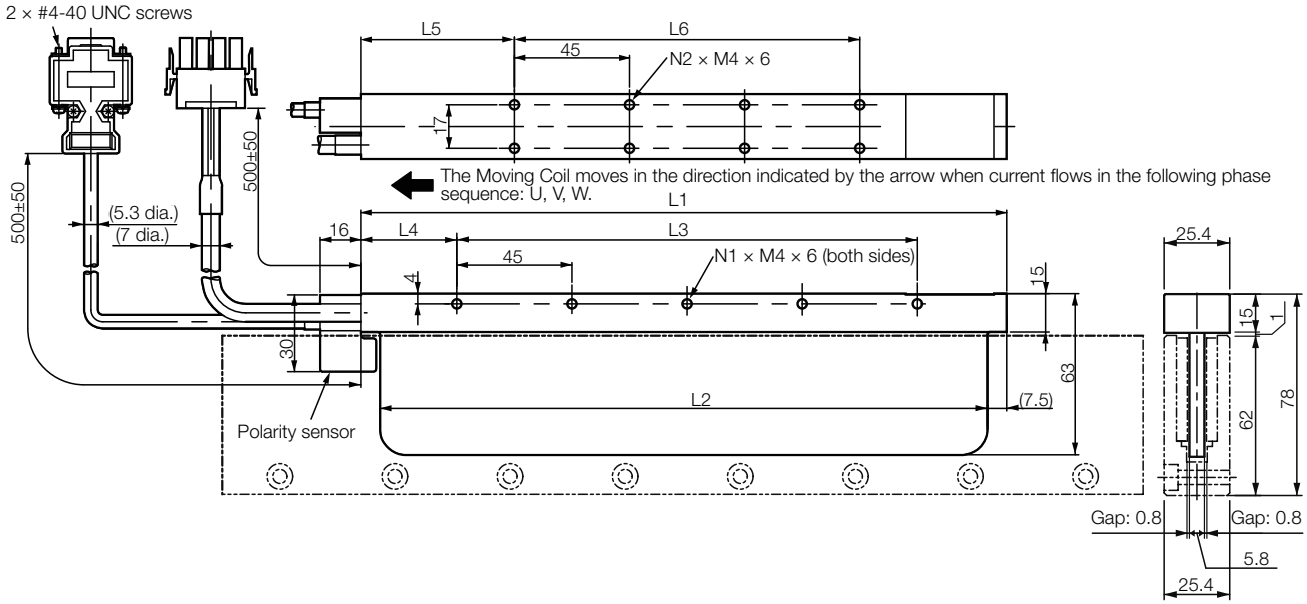
Unit: mm

Magnetic Way Model SGLGM-	L1	L2	N	Approx. Mass* [kg]
30108A	$108^{-0.1}_{-0.1}$	54	2	0.6
30216A	$216^{-0.1}_{-0.1}$	162	4	1.1
30432A	$432^{-0.1}_{-0.1}$	378	8	2.3

Refer to the following section for the connector specifications for the Sensor Cable and Servomotor Main Circuit Cable or SGLGW-30A□□□C□ Moving Coils on page 133.

SGLGW-40

Moving Coils: SGLGW-40A□□□C□



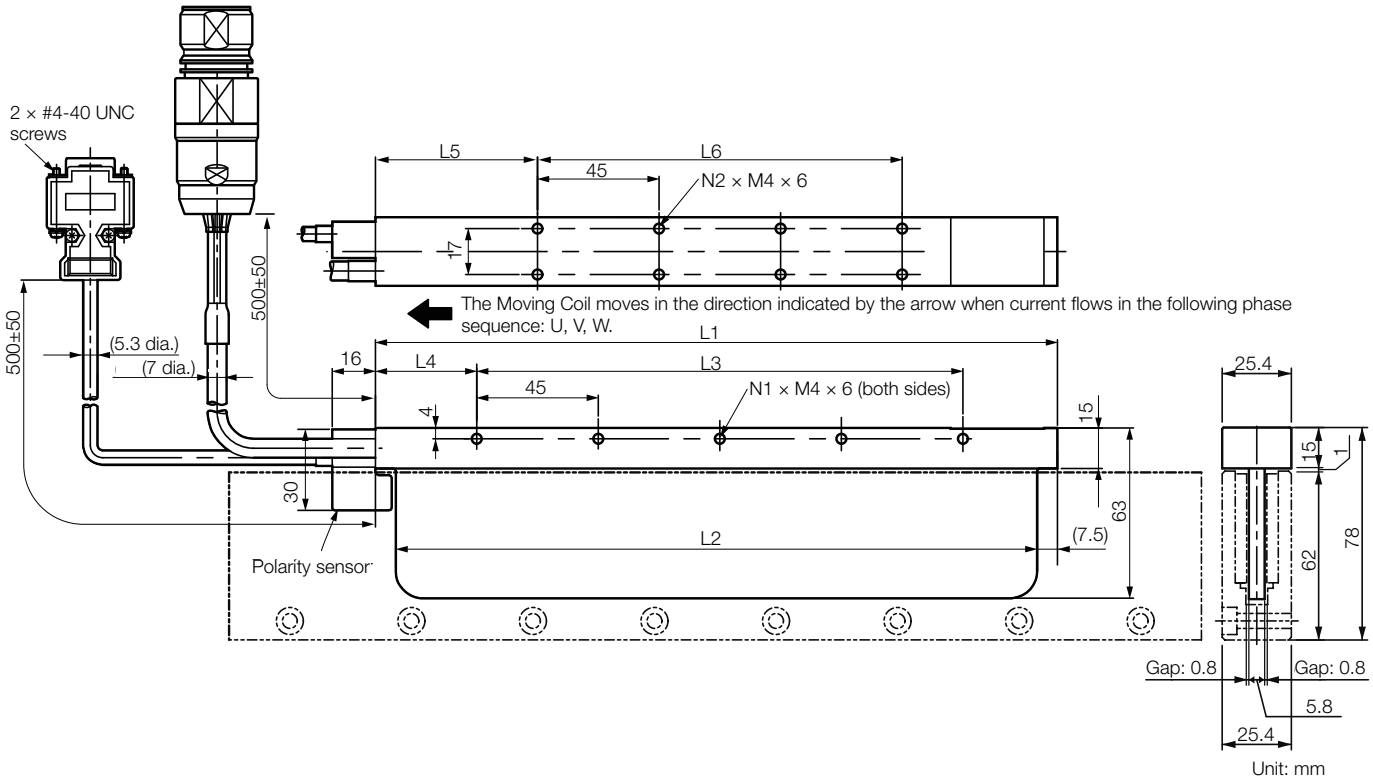
Unit: mm

Moving Coil Model SGLGW-	L1	L2	L3	L4	L5	L6	N1	N2	Approx. Mass* [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

* The mass is for a Moving Coil with a Polarity Sensor.

Refer to the following section for the connector specifications for the Sensor Cable and Servomotor Main Circuit Cable or SGLGW-40A□□□C□D and 60A□□□C□D Moving Coils on page 134.

Moving Coils: SGLGW-40A□□□C□D



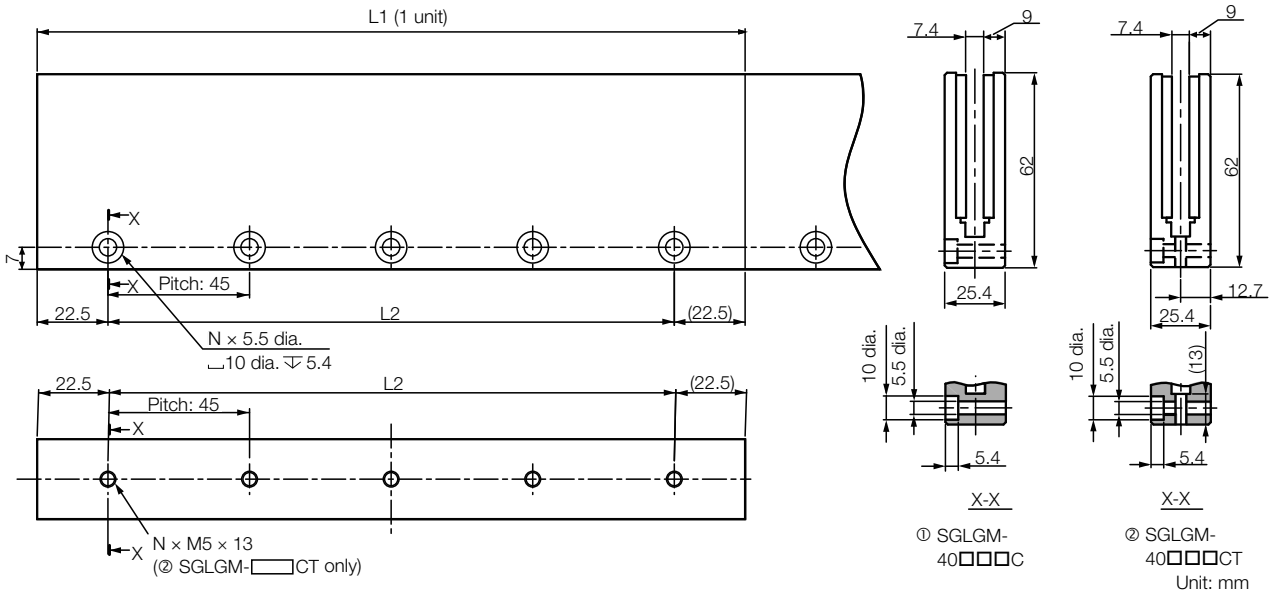
Moving Coil Model SGLGW-	L1	L2	L3	L4	L5	L6	N1	N2	Approx. Mass* [kg]
40A140C□D	140	125	90	30	52.5	45	3	4	0.40
40A253C□D	252.5	237.5	180	37.5	60	135	5	8	0.66
40A365C□D	365	350	315	30	52.5	270	8	14	0.93

* The mass is for a Moving Coil with a Polarity Sensor.

Refer to the following section for the connector specifications for the Sensor Cable and Servomotor Main Circuit Cable or SGLGW-40A□□□C□D and 60A□□□C□D Moving Coils on page 134.

Standard-Force Magnetic Ways:

SGLGM-40A□□□C□ (without Mounting Holes on the Bottom)
SGLGM-40A□□□C□D (with Mounting Holes on the Bottom)



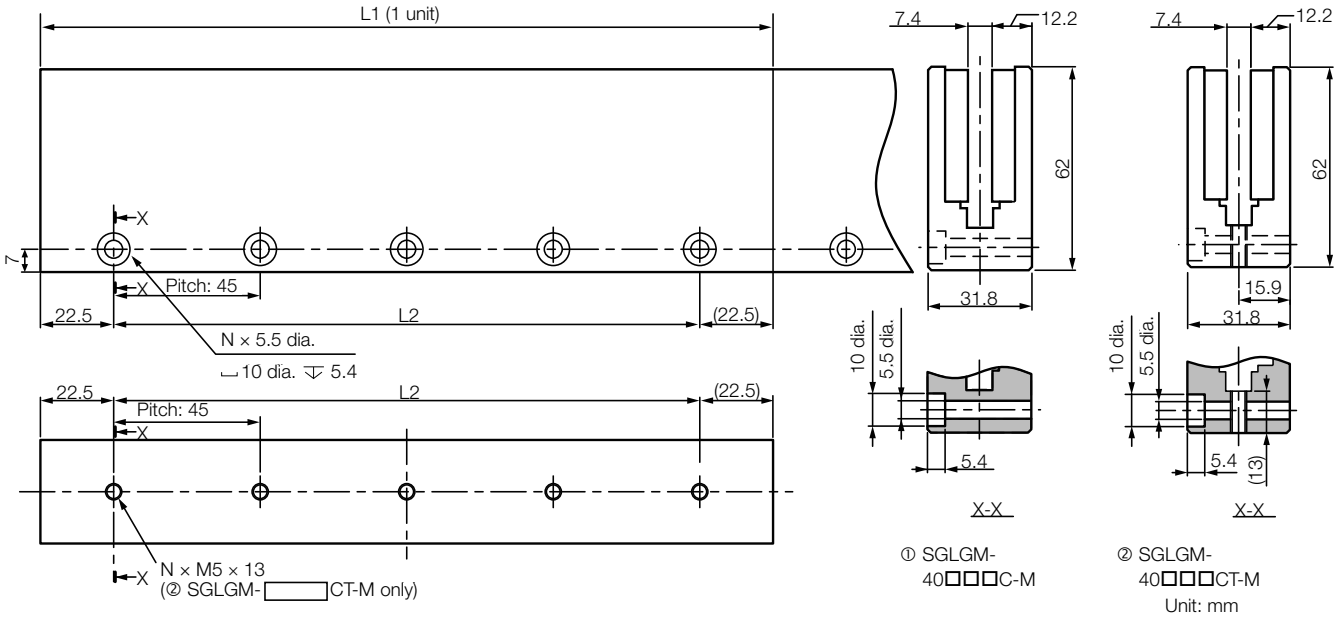
Type	Magnetic Way Model SGLGM-	L1	L2	N	Approx. Mass* [kg]
Standard-Force	40090C or 40090CT	90 $^{-0.1}_{-0.3}$	45	2	0.8
	40225C or 40225CT	225 $^{-0.1}_{-0.3}$	180	5	2.0
	40360C or 40360CT	360 $^{-0.1}_{-0.3}$	315	8	3.1
	40405C or 40405CT	405 $^{-0.1}_{-0.3}$	360	9	3.5
	40450C or 40450CT	450 $^{-0.1}_{-0.3}$	405	10	3.9

* The mass is for a Moving Coil with a Polarity Sensor.

Refer to the following section for the connector specifications for the Sensor Cable and Servomotor Main Circuit Cable or SGLGW-40A□□□C□ and 60A□□□C□ Connector on page 134.

High-Force Magnetic Ways:

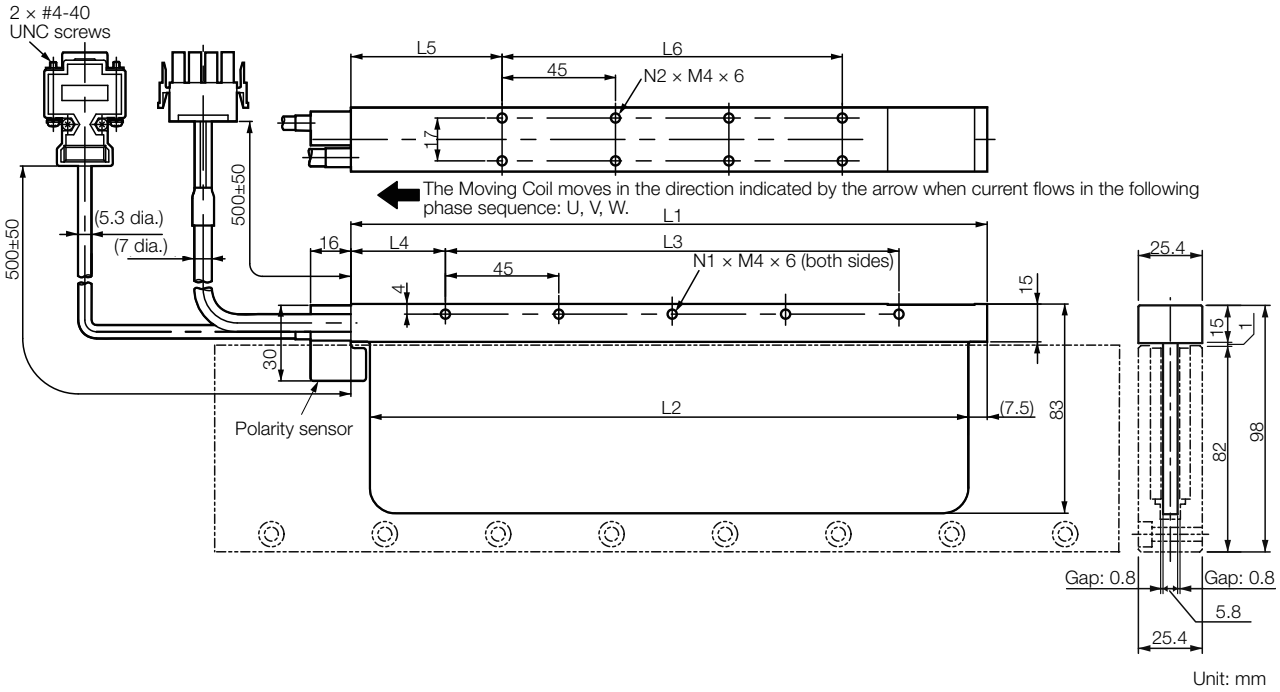
SGLGM-40A□□□C-M (without Mounting Holes on the Bottom)
SGLGM-40A□□□CT-M (with Mounting Holes on the Bottom)



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□

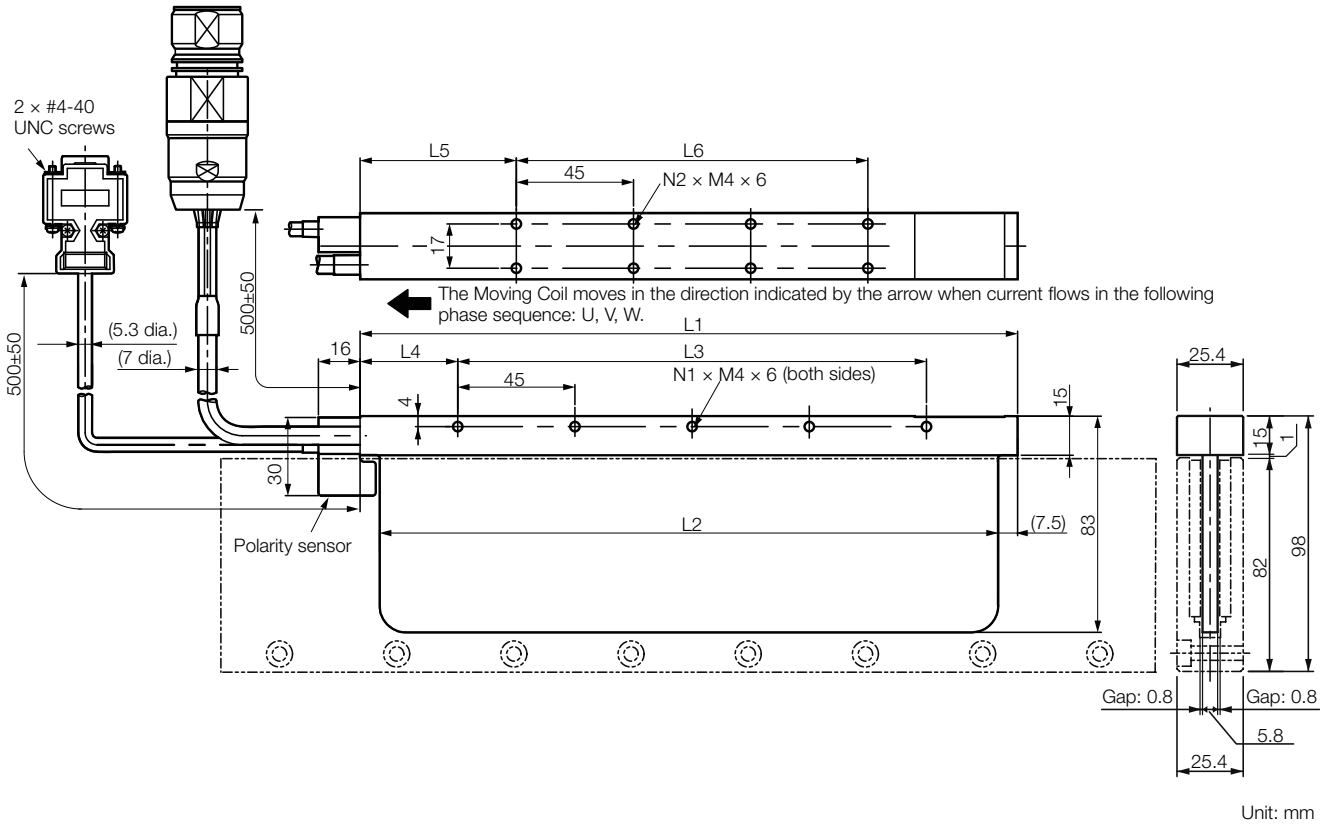


Moving Coil Model SGLGW-	L1	L2	L3	L4	L5	L6	N1	N2	Approx. Mass* [kg]
40A140C□	140	125	90	30	52.5	45	3	4	0.40
40A253C□	252.5	237.5	180	37.5	60	135	5	8	0.82
40A365C□	365	350	315	30	52.5	270	8	14	1.16

* The mass is for a Moving Coil with a Polarity Sensor.

Refer to the following section for the connector specifications for the Sensor Cable and Servomotor Main Circuit Cable or SGLGW-40A□□□C□ and -60A□□□C□ Moving Coils on page 134.

Moving Coils: SGLGW-60A□□□C□D



Unit: mm

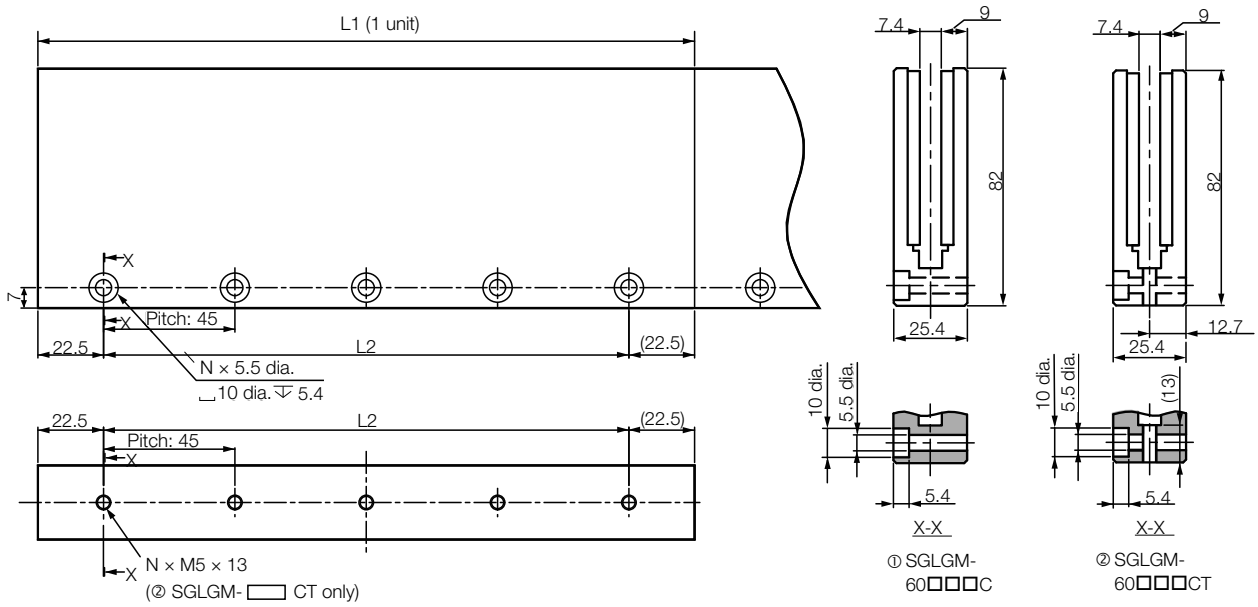
Moving Coil Model SGLGW-	L1	L2	L3	L4	L5	L6	N1	N2	Approx. Mass* [kg]
40A140C□D	140	125	90	30	52.5	45	3	4	0.48
40A253C□D	252.5	237.5	180	37.5	60	135	5	8	0.82
40A365C□D	365	350	315	30	52.5	270	8	14	1.16

* The mass is for a Moving Coil with a Polarity Sensor.

Refer to the following section for the connector specifications for the Sensor Cable and Servomotor Main Circuit Cable or SGLGW-40A□□□C□D and -60A□□□C□D Moving Coils on page 134.

Standard-Force Magnetic Ways:

SGLGM-60A□□□C□ (without Mounting Holes on the Bottom)
SGLGM-60A□□□C□D (with Mounting Holes on the Bottom)

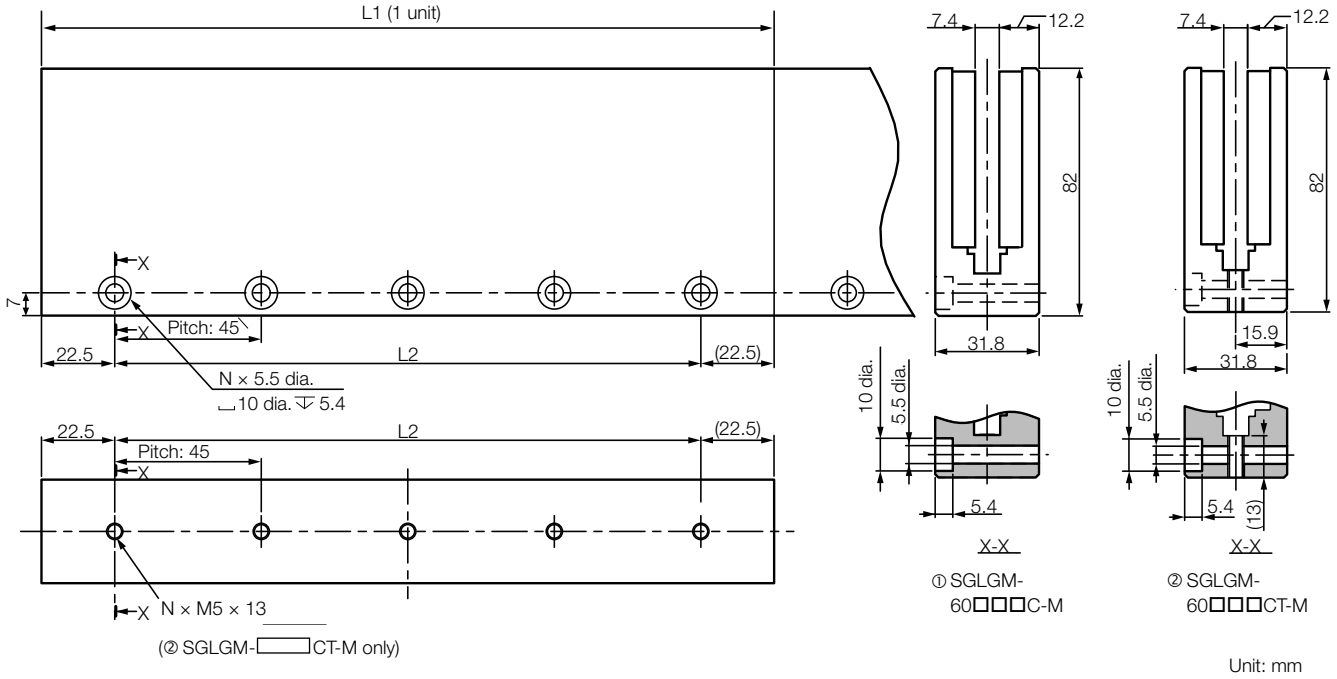


Unit: mm

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-60A□□□C-M (without Mounting Holes on the Bottom)
SGLGM-60A□□□CT-M (with Mounting Holes on the Bottom)

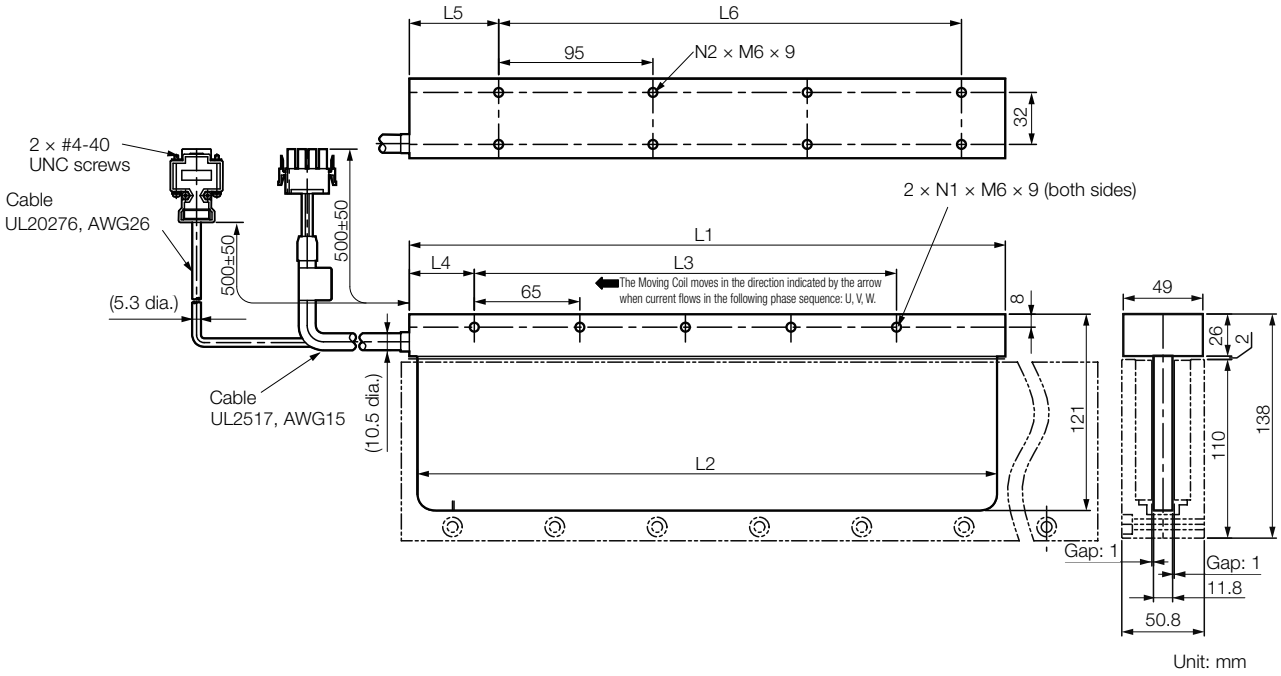


Unit: mm

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□



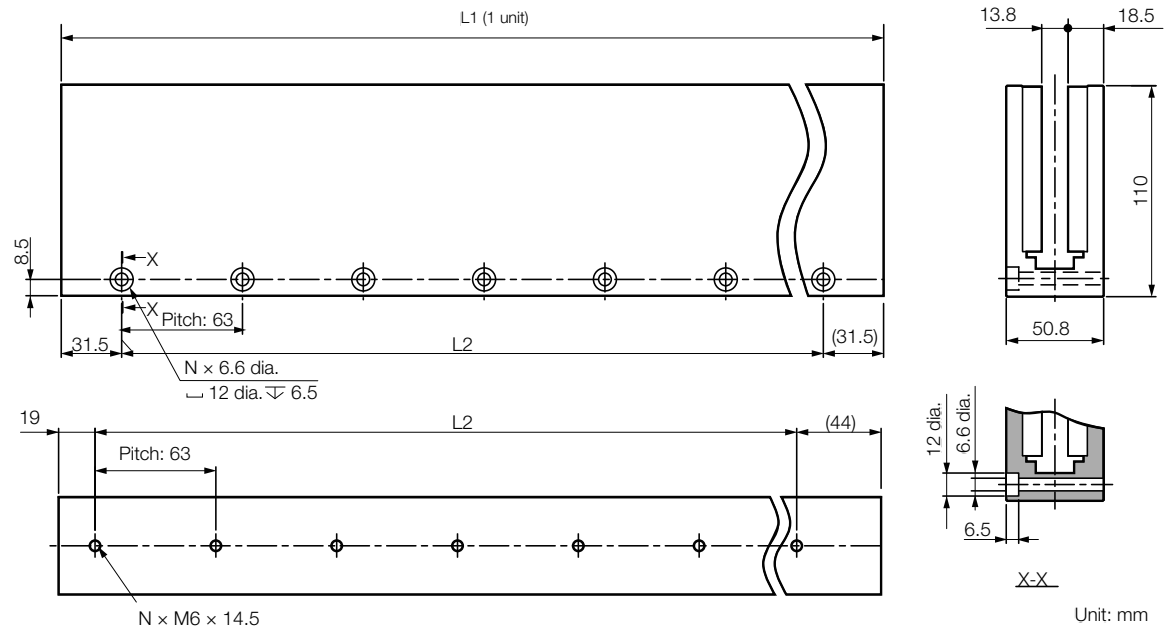
Moving Coil Model SGLGW-	L1	L2	L3	L4	L5	L6	N1	N2	Approx. Mass* [kg]
90A200C□	199	189	130	40	60	95	3	4	2.20
90A370C□	367	357	260	40	55	285	5	8	3.65
90A535C□	535	525	455	40	60	380	8	10	4.95

* The mass is for a Moving Coil with a Polarity Sensor.

Refer to the following section for the connector specifications for the Sensor Cable and Servomotor Main Circuit Cable or SGLGW-90A□□□C□ Moving Coils on page 135.

Standard-Force Magnetic Ways:

SGLGM-90□□□A

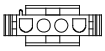


Magnetic Way Model SGLGM-	L1	L2	N	Approx. Mass* [kg]
90252A	$252^{-0.1}_{-0.3}$	189	4	7.3
90504A	$504^{-0.1}_{-0.3}$	441	8	14.7

Connector Specifications

SGLGW-30A□□□C□ Moving Coils

- Servomotor Connector



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

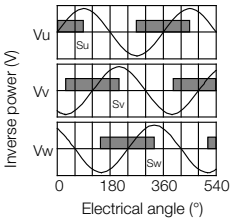
- Polarity Sensor Connector

Pin connector: 17 JE-13090-02 (D8C) - CG
DDK Ltd.

Mating Connector
Socket connector: 17JE-13090-02 (D8C) A-CG
Studs: 17L-002C or 17L-002C1

- Polarity 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.



SGLGW-30A□□□C□D Moving Coils

- Servomotor Connector

Extension: SROC06JMSCN169
Pins: 021.423.1020
From Interconnectron GmbH

Mating Connector
Plug: SPUC06KFSDN236
Socket: 020.030.1020

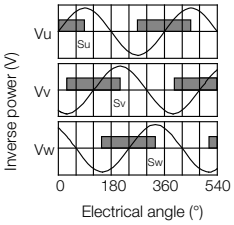
- Polarity Sensor Connector

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

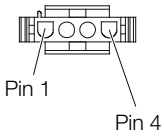
- Polarity Polarity Sensor Output Signal

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.



SGLGW-40A□□□C□ and -60A□□□C□ Moving Coils

- Servomotor Connector



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

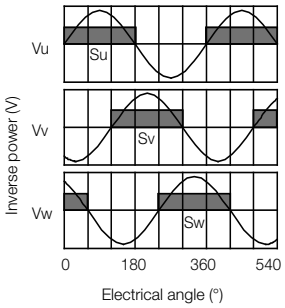
- Polarity Sensor Connector

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

- 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.



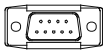
SGLGW-40A□□□C□D and -60A□□□C□D Moving Coils

- Servomotor Connector

Extension: SROC06JMSCN169
Pins: 021.423.1020
From Interconnectron GmbH

Mating Connector
Plug: SPUC06KFSDN236
Socket: 020.030.1020

- Polarity Sensor Connector

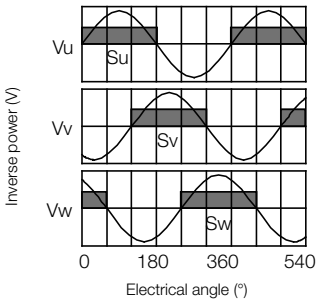


Pin connector: 17JE-23090-02 (D8C) -CG
From DDK Ltd.

Mating Connector
Socket connector: 17JE-13090-02 (D8C) A-CG
Studs: 17L-002C or 17L-002C1

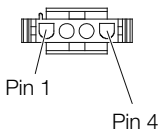
- Polarity Sensor Output Signal

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.



SGLGW-90A□□□C□ Moving Coils

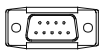
• Servomotor Connector



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 Connector

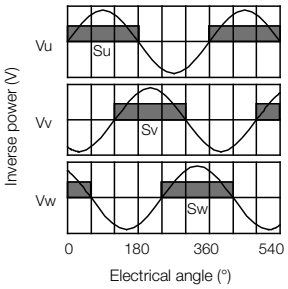


Pin connector: 17JE-23090-02 (D8C) -CG
From DDK Ltd.
Mating Connector

Socket connector: 17JE-13090-02 (D8C) A-CG
Stud: 17L-002C or 17L-002C1

• 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.



SGLF (Models with F-Type Iron Cores)

Model Designations

Moving Coil

SGL F W2 - 30 A 070 A T □

SGL	F	W2	30	A	070	A	T	□
Linear Sigma Series Linear Servomotors	1st	2nd	3rd + 4th	5th	6th - 8th	9th	10th	11th

1st digit - Servomotor Type

Code	Specification
F	With F-type iron core

2nd digit - Moving Coil/Magnetic Way

Code	Specification
W2	Moving Coil

3rd + 4th digit - Magnet Height

Code	Specification
30	30 mm
45	45 mm
90	90 mm
1D	135 mm

5th digit - Power Supply Voltage

Code	Specification
A	200 VAC

6th ... 8th digit - Length of Moving Coil

Code	Specification
070	70 mm
120	125 mm
200	205 mm
230	230 mm
380	384 mm
560	563 mm

9th digit - Design Revision Order

Code	Specification
A	Initial Design

10th digit - Sensor Specification

Code	Specification
T	Without polarity sensor, with thermal protector
S	With polarity sensor and thermal protector

11th digit - Options

Code	Cooling Method
None	Self-cooled
L	Water-cooled*

Magnetic Way

SGL F M2 - 30 270 A

SGL	F	M2	30	270	A	
Linear Sigma Series Linear Servomotors	1st	2nd	3rd + 4th	5th - 7th	8th	digit

1st digit - Servomotor Type

Code	Specifications
F	With F-type iron core

2nd digit - Moving Coil/Magnetic Way

Code	Specifications
M2	Magnetic Way

3rd + 4th digit - Magnet Height

Code	Specifications
30	30 mm
45	45 mm
90	90 mm
1D	135 mm

5th ... 7th digit - Length of Magnetic Way

Code	Specifications
270	270 mm
306	306 mm
450	450 mm
510	510 mm
630	630 mm
714	714 mm

8th digit - Design Revision Order

Code	Specifications
A	Initial Design

* Contact your YASKAWA representative for information on water-cooled model.

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

Moving Coil

SGL F W - 20 A 090 A P □

SGL	F	W	-	20	A	090	A	P	□
Linear Sigma Series Linear Servomotors SGLFW	1st	2nd		3rd + 4th	5rd	6th - 8th	9th	10th	11th digit

1st digit - Specification

Code	Servomotor Type
F	With F-type iron core

2nd digit - Moving Coil/Magnetic Way

Code	Specification
W	Moving Coil

3rd + 4th digit - Magnet Height

Code	Specification
20	20 mm
35	36 mm
50	47.5 mm
1Z	95 mm

5th digit - Voltage

Code	Specification
A	200 VAC

6th ... 8th digit - Length of Moving Coil

Code	Specifications
090	91 mm
120	127 mm
200	215 mm
230	235 mm
380	395 mm

9th digit - Design Revision Order

A, B…	

10th digit - Sensor Specification

Code	Specification
P	With polarity sensor
None	Without polarity sensor

11th digit - 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	SGLFW-35, -50, -1Z□200B

Magnetic Way

SGL F M - 20 324 A □

SGL	F	M	-	20	324	A	□
Linear Sigma Series Linear Servomotors SGLFM	1st	2nd		3rd + 4th	5th - 7th	8th	9th digit

1st digit - Servomotor Type

Code	Specification
F	With F-type iron core

2nd digit - Moving Coil/Magnetic Way

Code	Specification
M	Magnetic Way

3rd + 4th digit - Magnet Height

Code	Specification
20	20 mm
35	36 mm
50	47.5 mm
1Z	95 mm

5rd ... 7th digit - Length of Magnetic Way

Code	Specification
324	324 mm
405	405 mm
540	540 mm
675	675 mm
756	756 mm
945	945 mm

8th digit - Design Revision Order

Code	Specifications
A, B…	

9th digit - Options

Code	Specification
None	Without options
C	With magnet cover

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

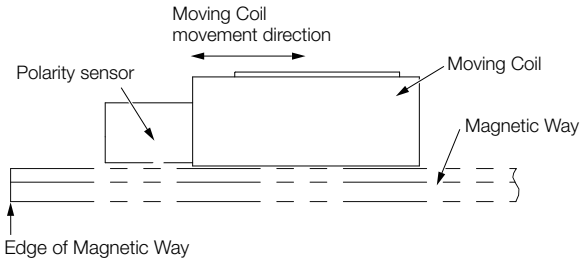
Precautions on Moving Coils with Polarity Sensors

Note:

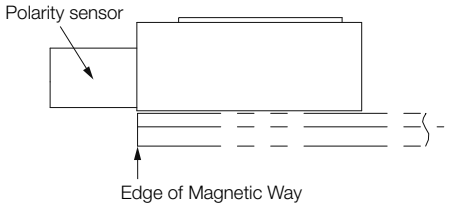
When you use a Moving Coil with a Polarity Sensor, the Magnetic Way must cover the bottom of the polarity sensor. Refer to the example that shows the correct installation.

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. Refer to the following table.

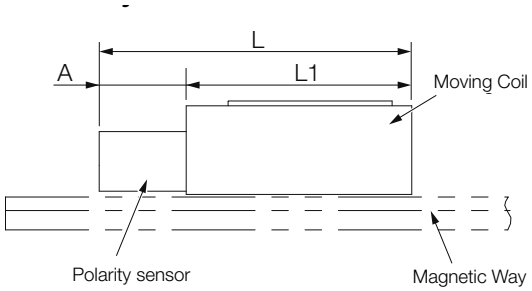
Correct Installation



Incorrect Installation



Total Length of Moving Coil with Polarity Sensor



Moving Coil Model SGLFW2-	Length of Moving Coil, L1 (mm)	Length of Polarity Sensor, A (mm)	Total Length, L (mm)
30A070AS	70	29	97
30A120AS	125		152
30A230AS	230		237
45A200AS	205	34	239
45A380AS	384		416
90A200AS	205	34	237
90A380AS	384		416
90A560AS	563		595
1DA380AS	384	32	416
1DA560AS	563		595

Moving Coil Model SGLFW-	Length of Moving Coil, L1 (mm)	Length of Polarity Sensor, A (mm)	Total Length, L (mm)
20A090AP	91	22	113
20A120AP	127		149
35A120AP□	127	22	149
35A230AP□	235		257
50A200BP□	215	22	237
50A380BP□	395		417
1ZA200BP□	215	22	237
1ZA380BP	395		417

Ratings and Specifications: SGLFW2 Models

Specifications

Linear Servomotor Moving Coil		30A			45A		90A			1DA	
Model SGLFW2-		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 or water-cooled*									
Protective Structure		IP00									
Environmental Conditions	Ambient Temperature	0°C to 40°C (without freezing)									
	Ambient Humidity	20% to 80% relative humidity (without 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)									

* Contact your YASKAWA representative for information on water-cooled models.

Ratings

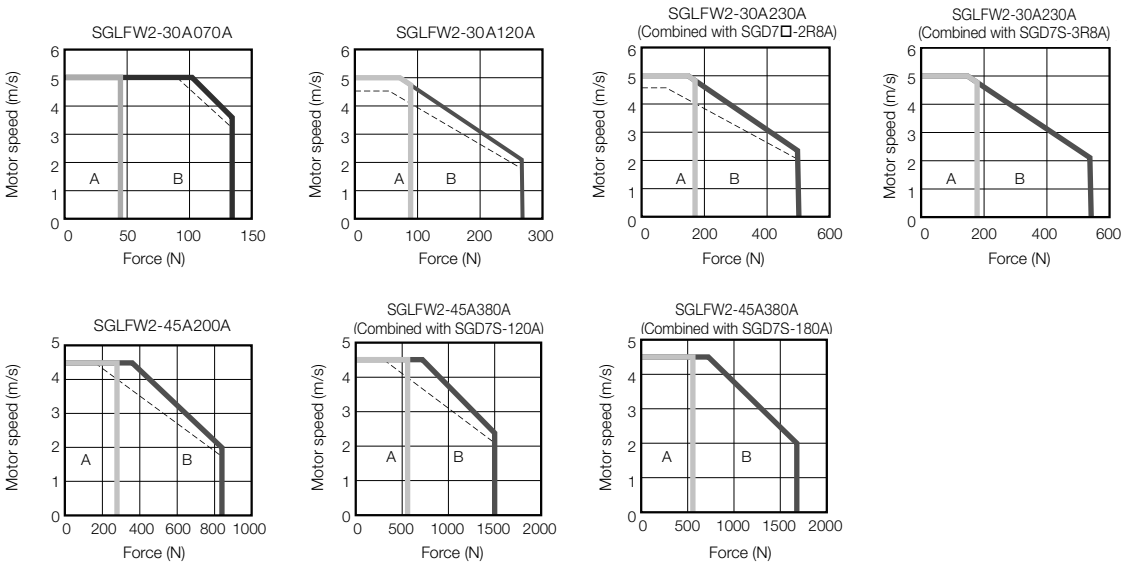
Linear Servomotor Moving Coil		30A				45A	
Model SGLFW2-		070A□	120A□	230A□		200A□	380A□	
Rated Motor Speed (Reference Speed during Speed Control)*1	m/s	4.0	4.0	4.0		4.0	4.0	
Maximum Speed*1	m/s	5.0	5.0	5.0		4.5	4.5	
Rated Force*1, *2	N	45	90	180	170	280	560	
Maximum Force*1	N	135	270	540	500	840	1680	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	
Motor Constant	$N/\sqrt{W}$	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	
Combined Magnetic Way, SGLFM2-		30□□□A				45□□□A		
Combined Serial Converter Unit, JZDP-□□□□-		628	629	630		631	632	
Applicable SERVOPACKs	SGD7S-	1R6A	1R6A	3R8A	2R8A	5R5A	180A	120A
	SGD7W-	1R6A	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 ambient 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 × 10 mm: SGLFW2-45A200A and -45A380A

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 100-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.

Ratings

Linear Servomotor Moving Coil		90A			1DA	
Model SGLFW2-		200A□	380A□	560A□	380A□	560A□
Rated Motor 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	$N/\sqrt{W}$	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
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
Combined Magnetic Way, SGLFM2-		90□□□A			1D□□□A	
Combined Serial Converter Unit, JZDP-□□□□-		633	634	648	649	650
Applicable SERVOPACKs	SGD7S-	120A	200A	330A	200A	330A
	SGD7W-	–	–	–	–	–

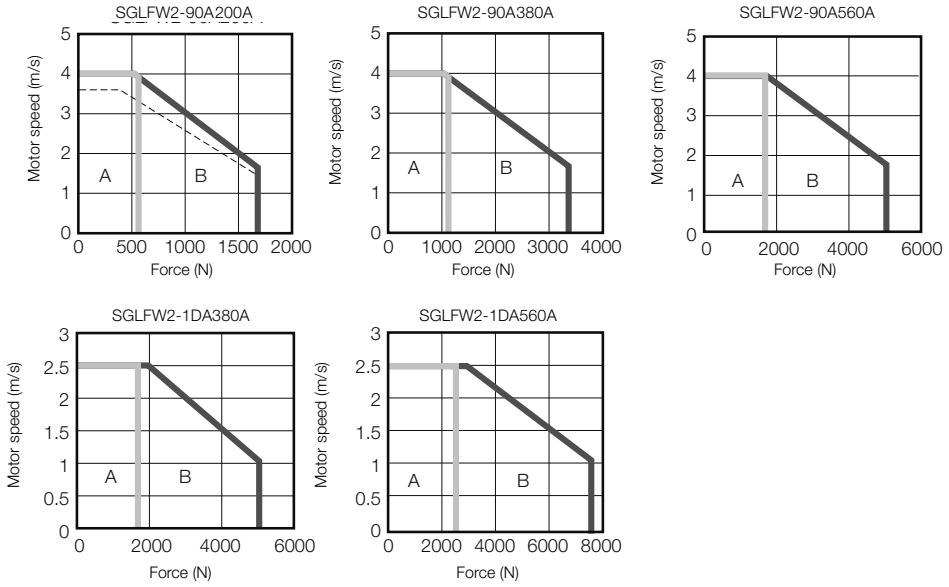
*1. These values are for operation in combination with a SERVOPACK when the temperature of the armature winding is 100°C. The values for other items are at 20°C. These are typical values.

*2. The rated forces are the continuous allowable force values at a ambient 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 × 10 mm: SGLFW2-90A200A
  - 609 mm × 762 mm × 10 mm: SGLFW2-90A380A
  - 900 mm × 762 mm × 10 mm: SGLFW2-90A560A and -1DA380A
  - 1200mm x 762 mm x 10 mm: SGLFW2-1DA560A

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 100-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.

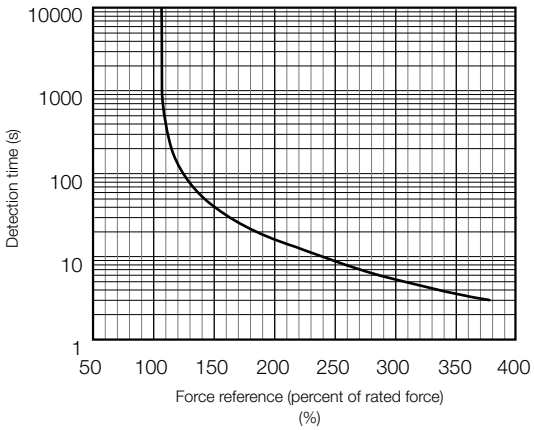
3 If the effective force is within the allowable range for the rated force, the Servomotor can be used within the intermittent duty zone.

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.

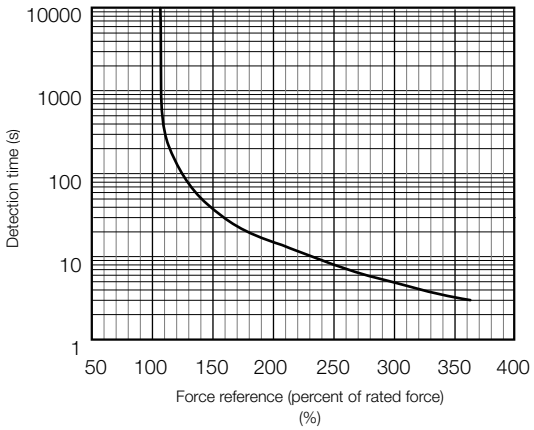
Servomotor Overload Protection Characteristics

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

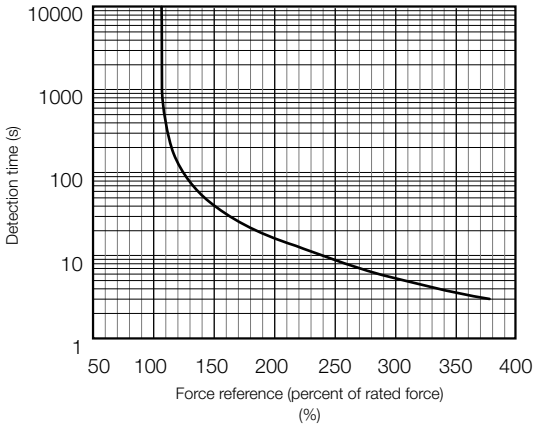
SGLFW2-30A070A



SGLFW2-30A120A and -230A



SGLFW2-45A, -90A, and -1DA



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 149.

Ratings and Specifications: SGLFW Models

Specifications

Linear Servomotor Moving Coil		20A		35A		50A		1ZA	
Model SGLFW-		**090A**	**120A**	**120A**	**230A**	**200B**	**380B**	**200B**	**380B**
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	Ambient Temperature	0°C to 40°C (without freezing)							
	Ambient Humidity	20% to 80% relative humidity (without 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

Linear Servomotor Moving Coil		20A		35A		50A		1ZA	
Model SGLFW-		090A	120A	120A	230A	200B	380B	200B	380B
Rated Motor Speed (Reference Speed during Speed Control)*1	m/s	5.0	3.5	2.5	3.0	1.5	1.5	1.5	1.5
Maximum Speed*1	m/s	5.0	5.0	5.0	5.0	5.0	5.0	4.9	4.9
Rated Force*1, *2	N	25	40	80	160	280	560	560	1120
Maximum Force*1	N	86	125	220	440	600	1200	1200	2400
Rated Current*1	Arms	0.70	0.80	1.4	2.8	5.0	10.0	8.7	17.5
Maximum Current*1	Arms	3.0	2.9	4.4	8.8	12.4	25.0	21.6	43.6
Moving Coil Mass	kg	0.70	0.90	1.3	2.3	3.5	6.9	6.4	12
Force Constant	N/Arms	36.0	54.0	62.4	62.4	60.2	60.2	69.0	69.0
BEMF Constant	Vrms / (m/s) / phase	12.0	18.0	20.8	20.8	20.1	20.1	23.0	23.0
Motor Constant	$N/\sqrt{W}$	7.95	9.81	14.4	20.4	34.3	48.5	52.4	74.0
Electrical Time Constant	ms	3.2	3.3	3.6	3.6	16	16	18	18
Mechanical Time Constant	ms	11	9.4	6.3	5.5	3.0	2.9	2.3	2.1
Thermal Resistance (with Heat Sink)	K/W	4.35	3.19	1.57	0.96	0.56	0.38	0.47	0.20
Thermal Resistance (without Heat Sink)	K/W	7.69	5.02	4.10	1.94	1.65	0.95	1.30	0.73
Magnetic Attraction	N	310	460	810	1590	1650	3260	3300	6520
Combined Magnetic Way, SGLFM-		20□□□A		35□□□A		50□□□A		1Z□□□A□	
Combined Serial Converter Unit, JZDP-□□□□-		017	018	019	020	181	182	183	184
Applicable SERVOPACKs	SGD7S-	1R6A	1R6A	1R6A	3R8A	5R5A	120A	120A	200A
	SGD7W-	1R6A	1R6A	1R6A	5R5A	5R5A	-	-	-

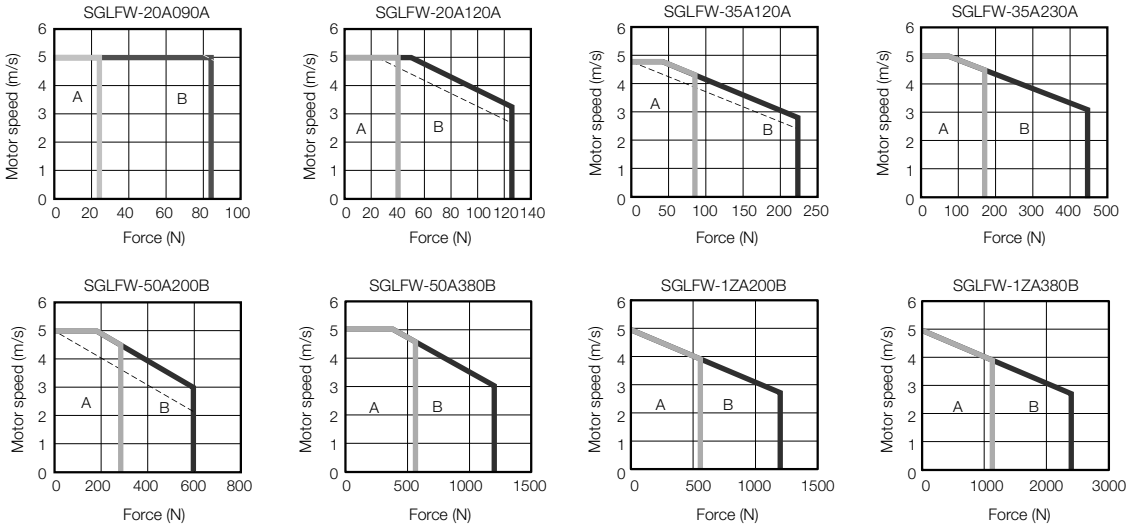
*1. These values are for operation in combination with a SERVOPACK when the temperature of the armature winding is 100°C. The values for other items are at 20°C. These are typical values.

*2. The rated forces are the continuous allowable force values at a ambient air temperature of 40°C with an aluminum heat sink of the dimensions given in the following table.

- Heat Sink Dimensions
  - 125 mm × 125 mm × 13 mm: SGLFW-20A090A and -20A120A
  - 254 mm × 254 mm × 25 mm: SGLFW-35A120A and -35A230A
  - 400 mm × 500 mm × 40 mm: SGLFW-50A200B, 50A380B, and -1ZA200B
  - 600 mm × 762 mm × 50 mm: SGLFW-1ZA380B

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 100-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.

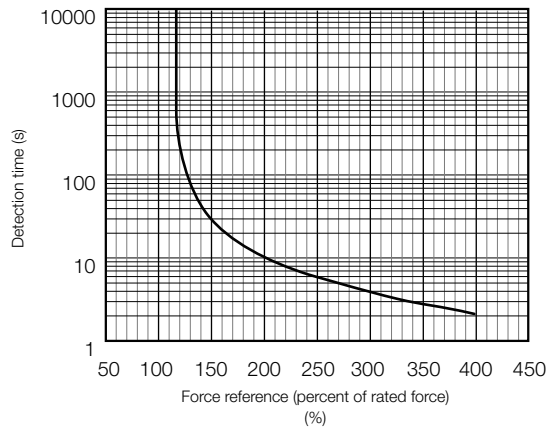
3 If the effective force is within the allowable range for the rated force, the Servomotor can be used within the intermittent duty zone.

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.

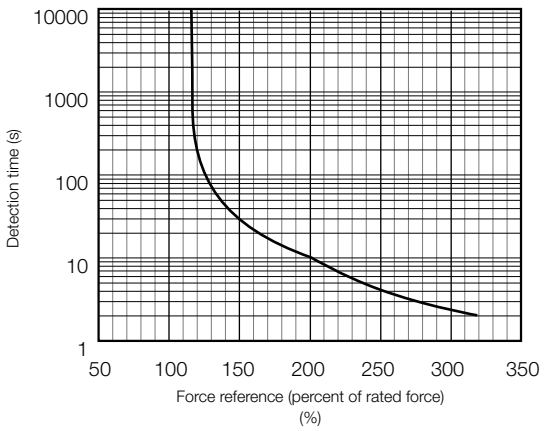
Servomotor Overload Protection Characteristics

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

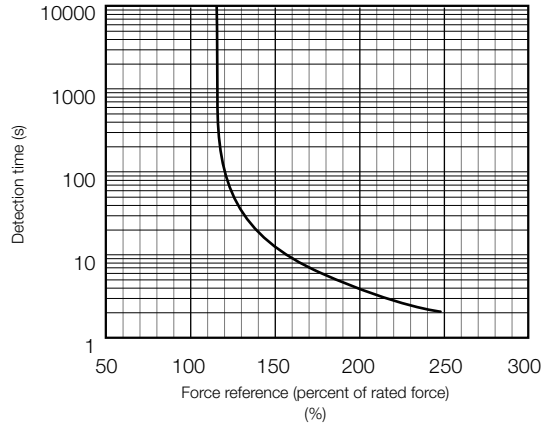
SGLFW-20A



SGLFW-35A



SGLFW-50A and -1ZA



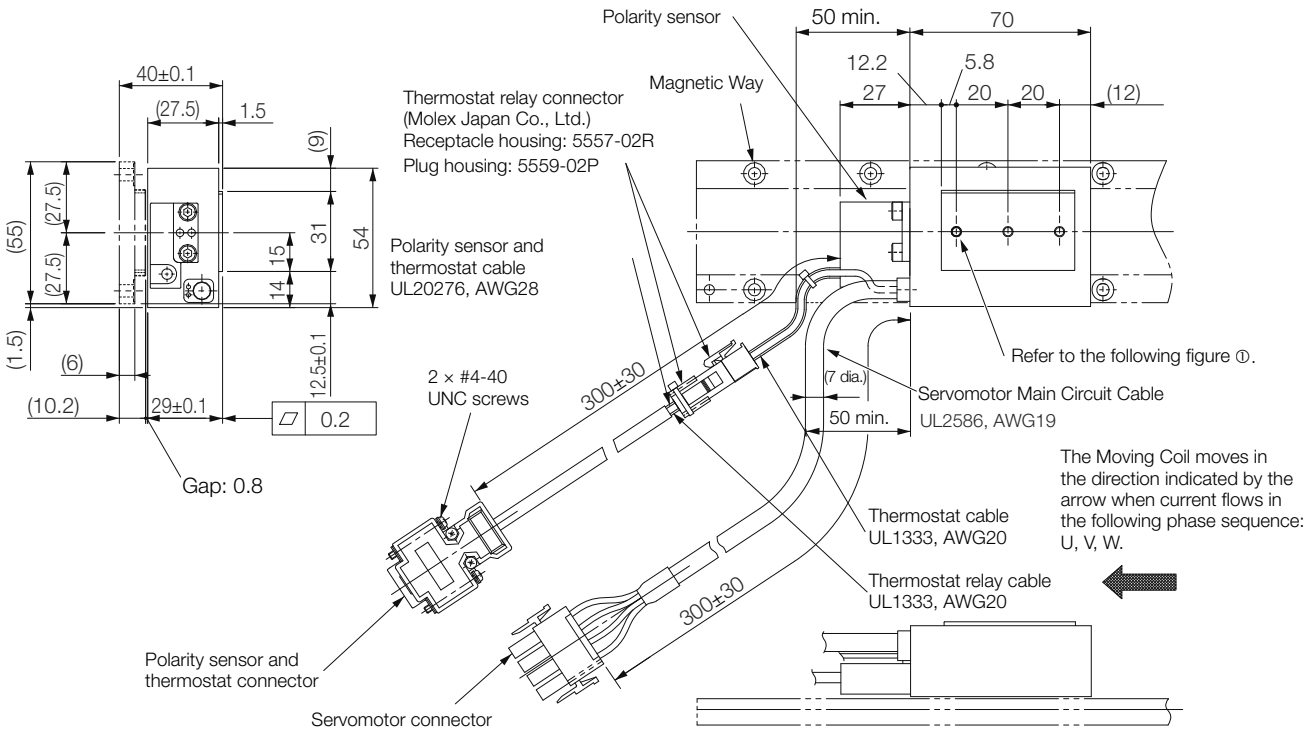
Note:

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 149.

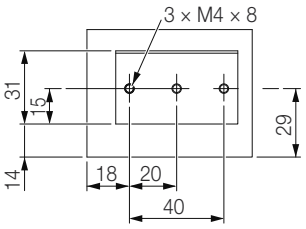
External Dimensions

SGLFW2-30

Moving Coil with Polarity Sensor: SGLFW2-30A070AS



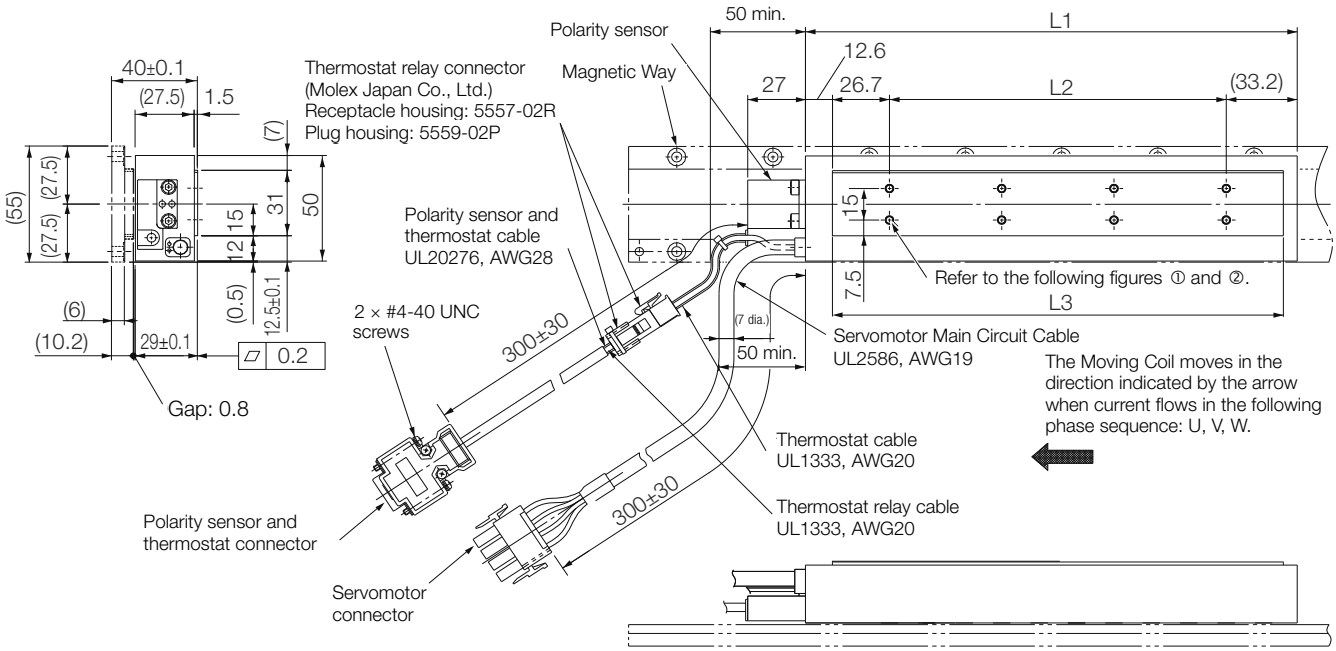
①SGLFW2-30A070AS



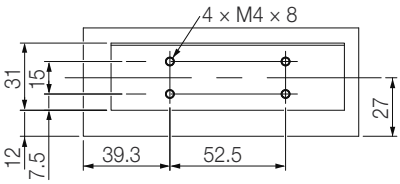
Approx. mass: 0.5 kg
Unit: mm

Refer to the following section for the connector specifications for the Sensor Cable and Servomotor Main Circuit Cable or Moving Coils with Polarity Sensors: SGLFW2-30 and -45 on page 176.

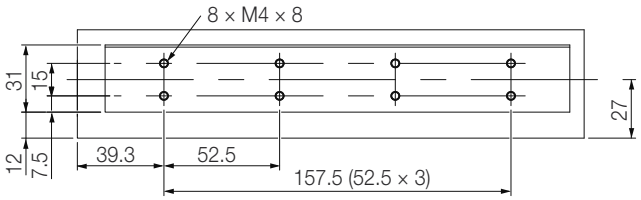
Moving Coils with Polarity Sensors: SGLFW2-30A□□□AS



①SGLFW2-30A120AS



②SGLFW2-30A230AS

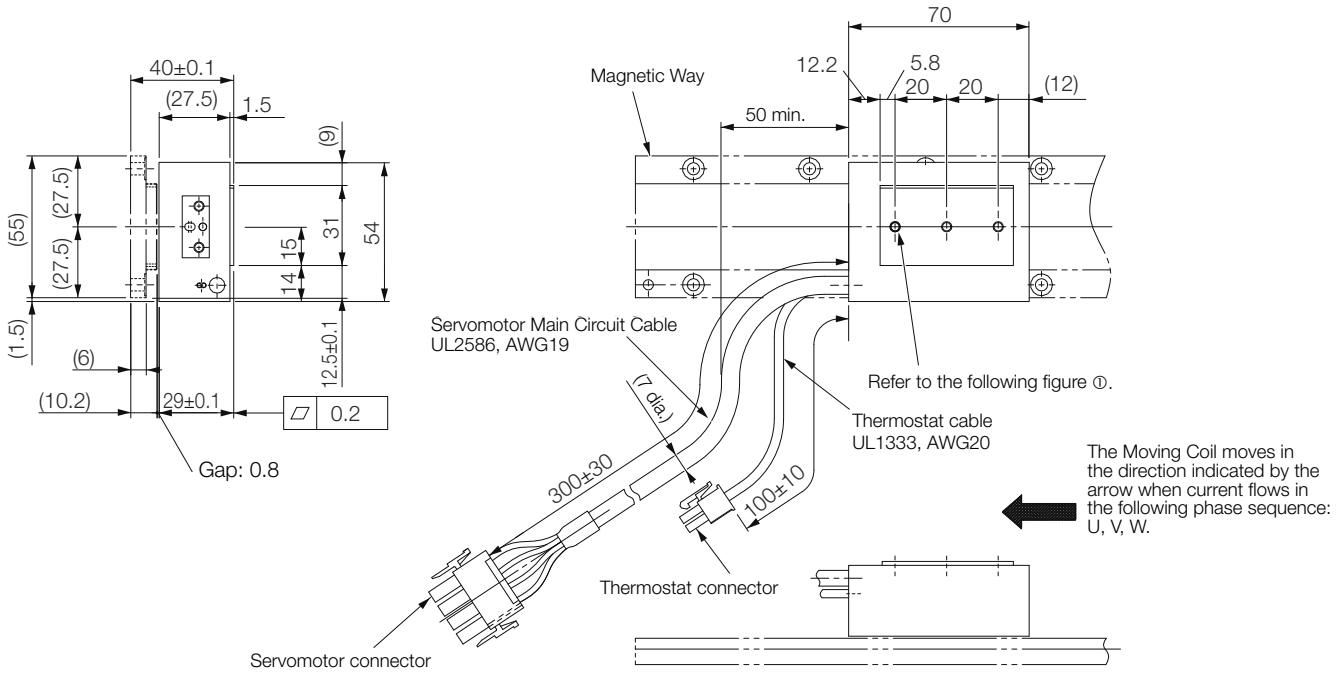


Unit: mm

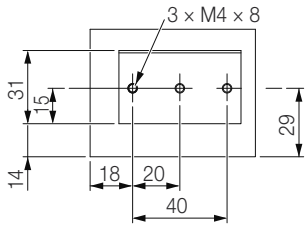
Moving Coil Model SGLGM-	L1	L2	L3	Approx. Mass [kg]
30A120AS	125	52.5	105.9	0.9
30A230AS	230	157.5	210.9	1.7

Refer to the following section for the connector specifications for the Sensor Cable and Servomotor Main Circuit Cable or Moving Coils with Polarity Sensors: SGLFW2-30 and -45 on page 176.

Moving Coil without Polarity Sensors: SGLFW2-30A070AT



①SGLFW2-30A070AT

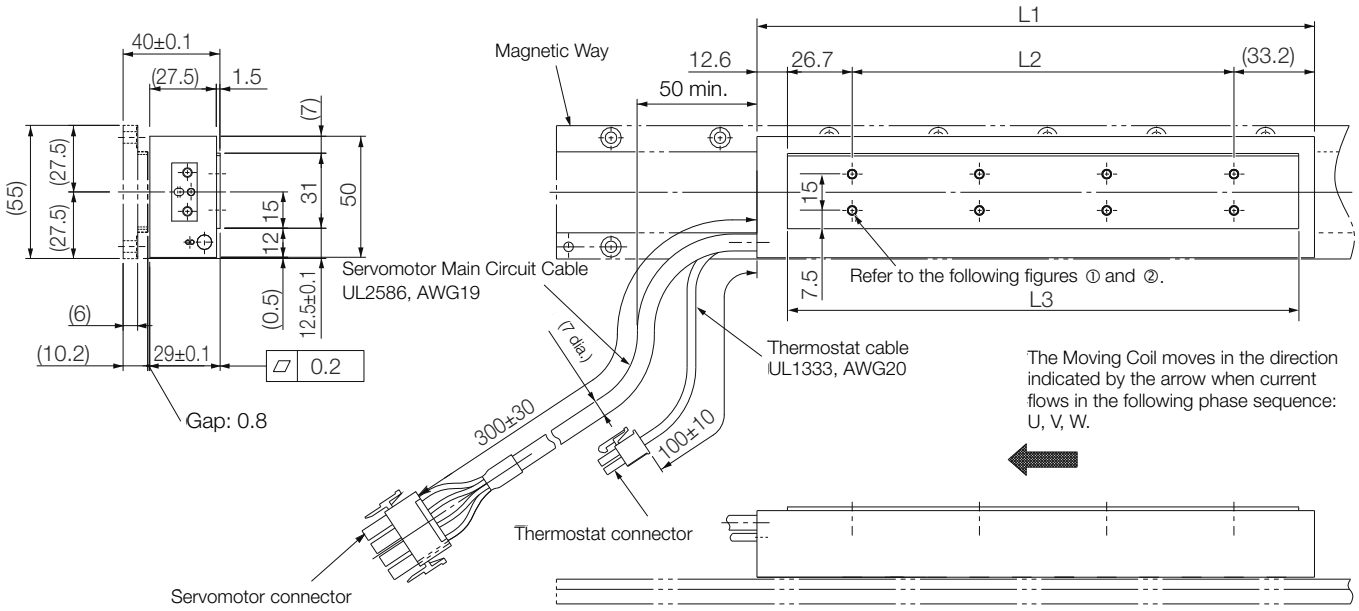


Approx. mass: 0.5 kg

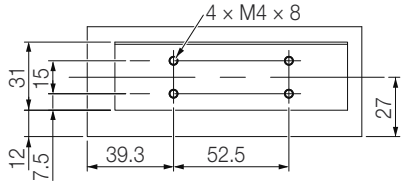
Unit: mm

Refer to the following section for the connector specifications for the Sensor Cable and Servomotor Main Circuit Cable or Moving Coils without Polarity Sensors: SGLFW2-30 and -45 on page 178.

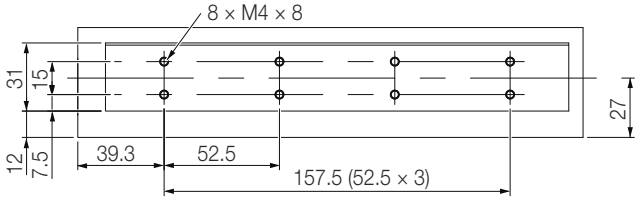
Moving Coils with Polarity Sensors: SGLFW2-30A□□□AT



①SGLFW2-30A120AT



②SGLFW2-30A230AT

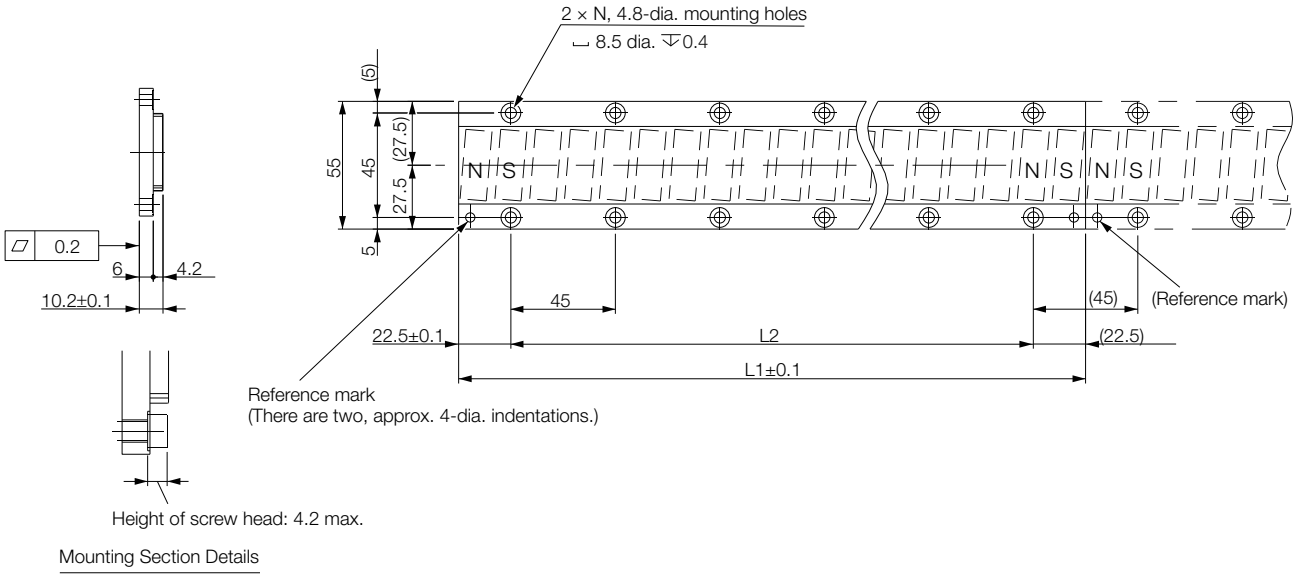


Unit: mm

Moving Coil Model SGLFW2-	L1	L2	L3	Approx. Mass* [kg]
30A120AT	125	52.5	105.9	0.9
30A230AT	230	157.5	210.9	1.7

Refer to the following section for the connector specifications for the Sensor Cable and Servomotor Main Circuit Cable or Moving Coils without Polarity Sensors: SGLFW2-30 and -45 on page 178.

Magnetic Ways: SGLFM2-30□□□A



Mounting Section Details

Unit: mm

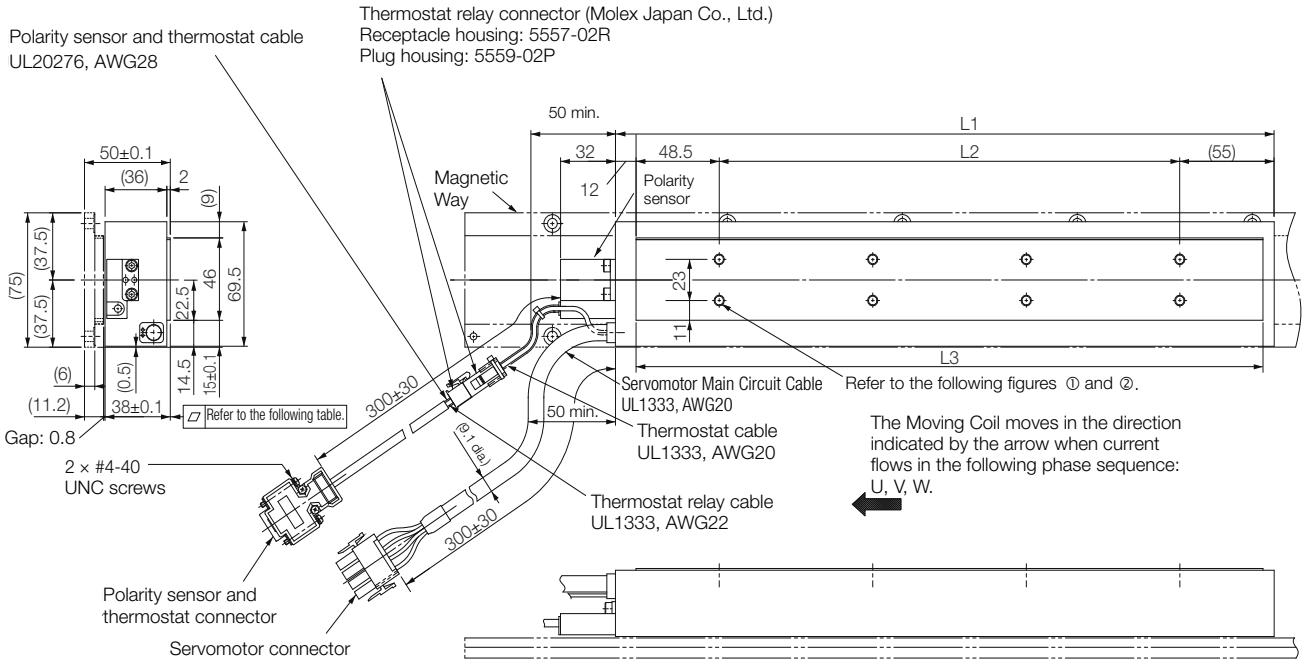
Note:

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.

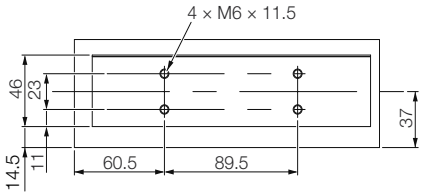
Mgnetic Way Model SGLFM2-	L1±0.1	L2	N	Approx. Mass [kg]
30270A	270	225 (45 × 5)	6	0.9
30450A	450	405 (45 × 9)	10	1.5
30630A	630	585 (45 × 13)	14	2.0

SGLFW2-45

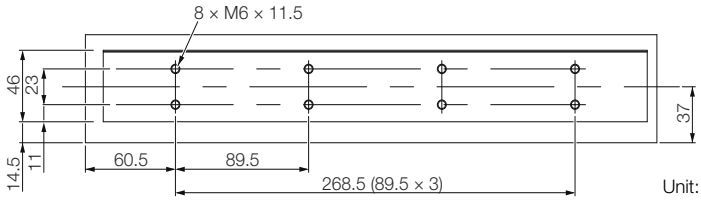
Moving Coils with Polarity Sensors: SGLFW2-45A□□□AS



①SGLFW2-45A200AS



②SGLFW2-45A380AS

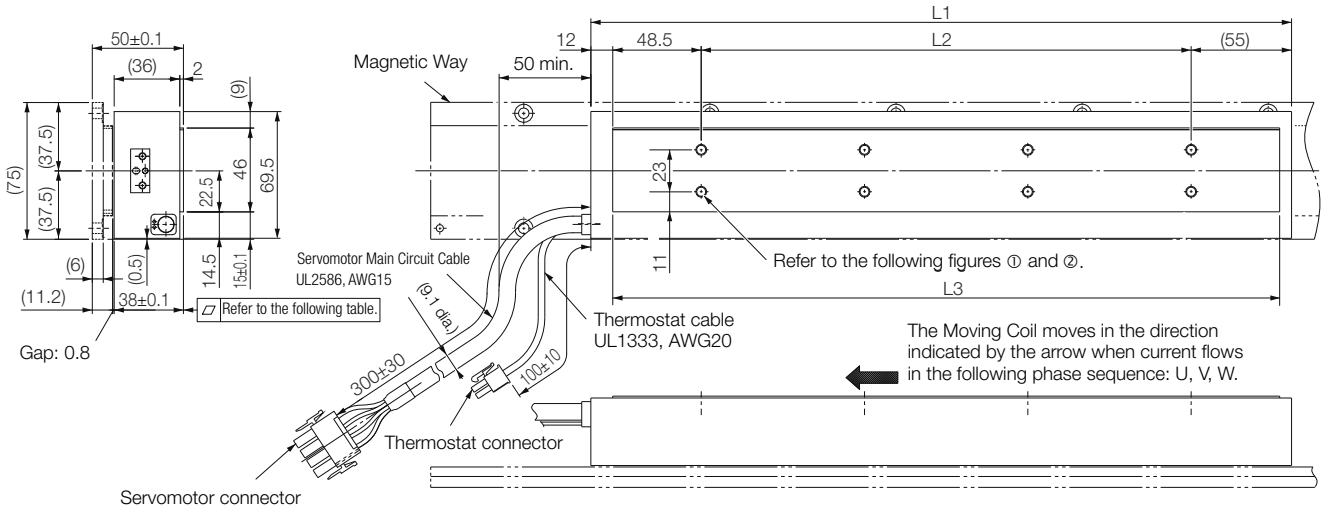


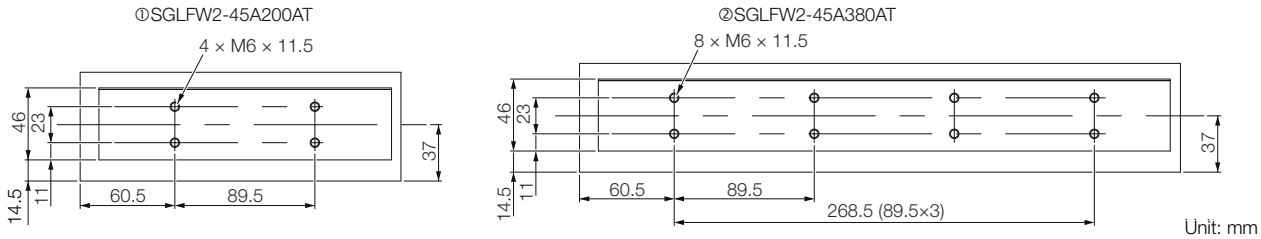
Unit: mm

Moving Coil Model SGLFW2-	L1	L2	L3	Flatness	Approx. Mass [kg]
45A200AS	205	89.5	187	0.2	2.9
45A380AS	384	268.5	365.5	0.3	5.5

Refer to the following section for the connector specifications for the Sensor Cable and Servomotor Main Circuit Cable or Moving Coils with Polarity Sensors: SGLFW2-30 and -45 on page 176.

Moving Coils without Polarity Sensors: SGLFW2-45A□□□AT

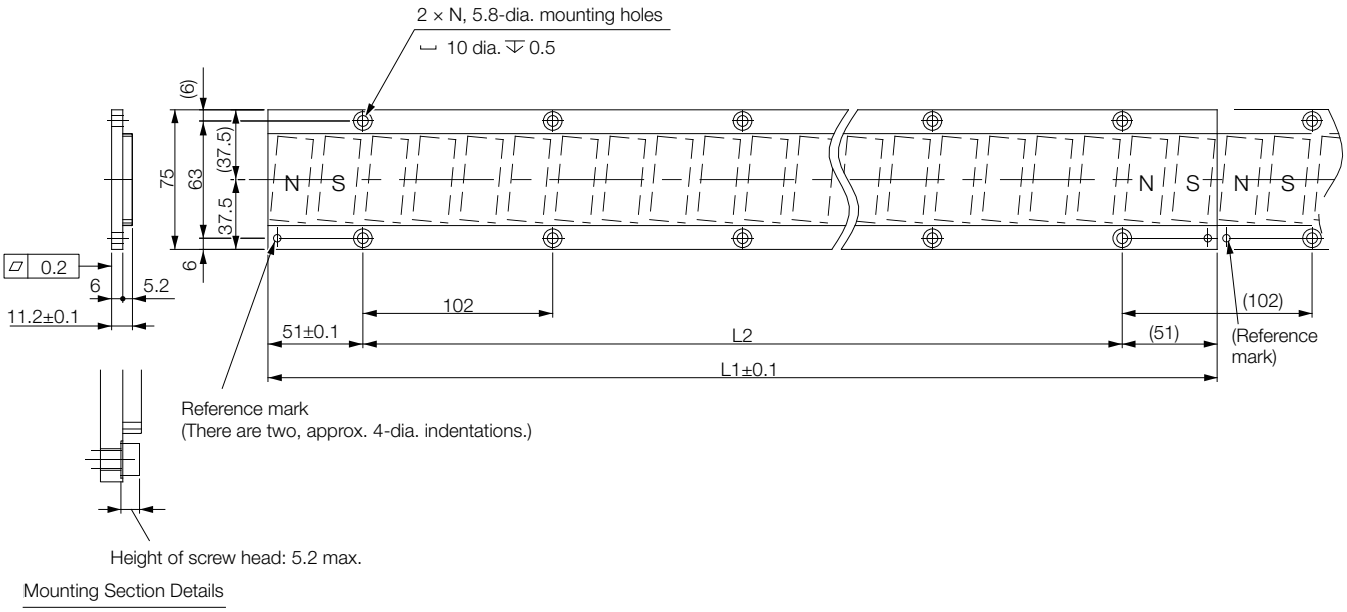




Moving Coil Model SGLFW2-	L1	L2	L3	Flatness	Approx. Mass [kg]
45A200AT	205	89.5	187	0.2	2.9
45A380AT	384	268.5	365.5	0.3	5.5

Refer to the following section for the connector specifications for the Sensor Cable and Servomotor Main Circuit Cable or Moving Coils without Polarity Sensors: SGLFW2-30 and -45 on page 178.

Magnetic Ways: SGLFM2-45□□□A



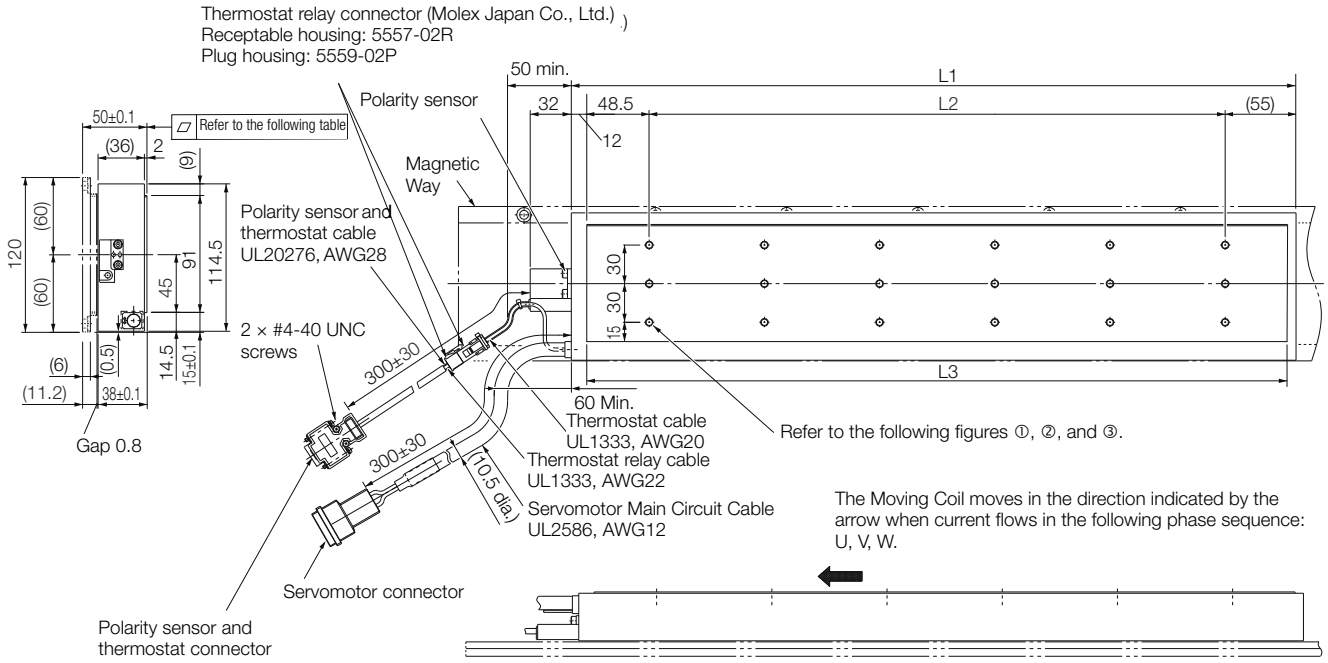
Unit: mm

Note:

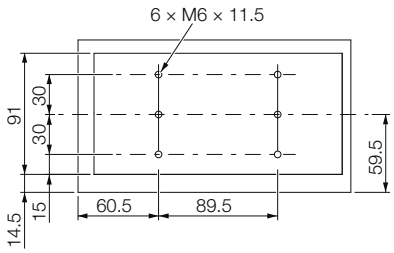
More than one Magnetic Way can be connected. Connect the Magnetic Ways so that the reference marks on them are aligned in the same direction as shown in the figure.

Mgnetic 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

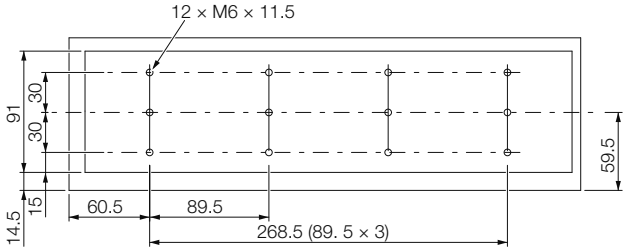
Moving Coils with Polarity Sensors: SGLFW2-90A□□□AS



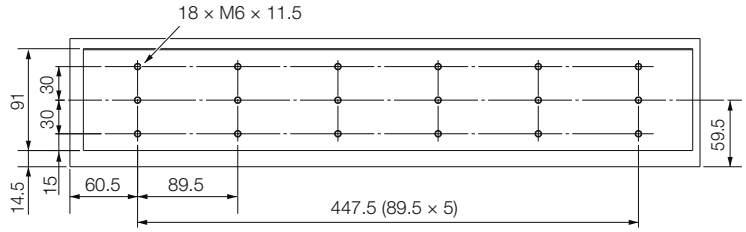
①SGLFW2-90A200AS



②SGLFW2-90A380AS



③SGLFW2-90A560AS

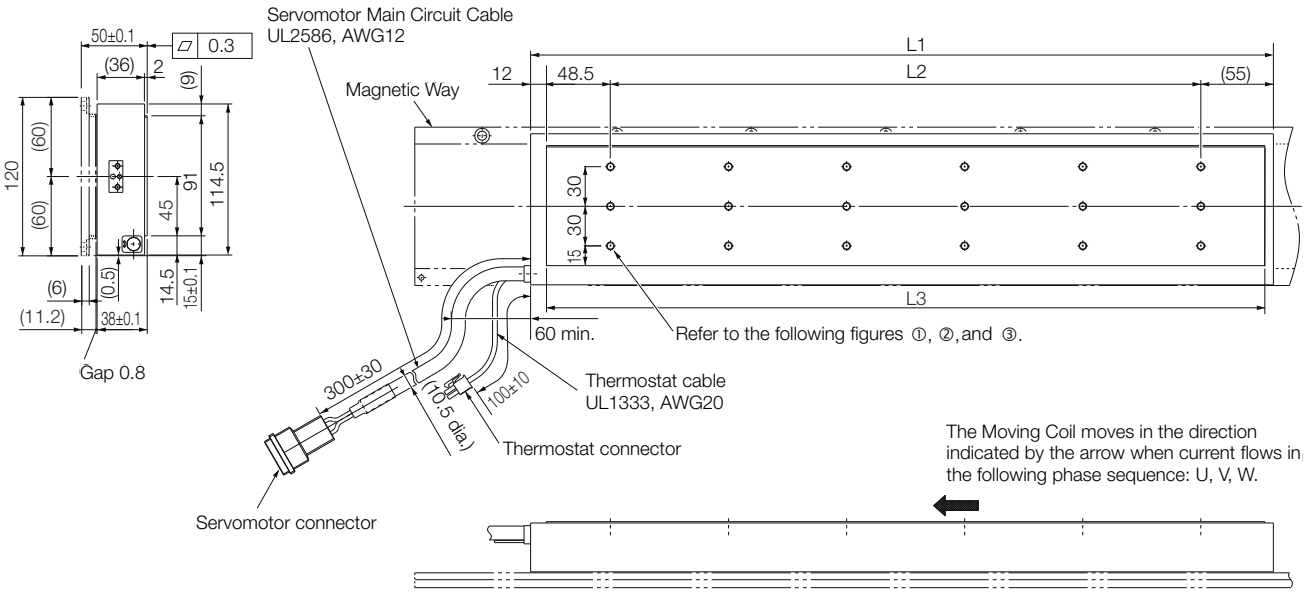


Unit: mm

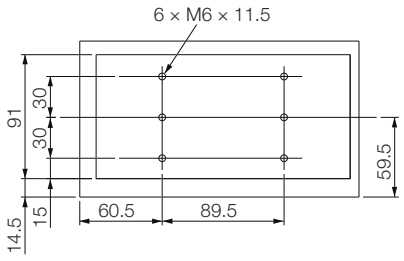
Moving Coil Model SGLFW2-	L1	L2	L3	Flatness	Approx. Mass [kg]
90A200AS	205	89.5	187	0.2	5.3
90A380AS	384	268.5	365.5	0.3	10.1
90A560AS	563	447.5	544	0.3	14.9

Refer to the following section for the connector specifications for the Sensor Cable and Servomotor Main Circuit Cable or Moving Coils with Polarity Sensors: SGLFW2-90 and -1D on page 177.

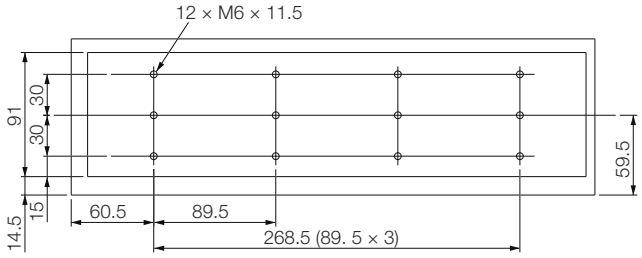
Moving Coils without Polarity Sensors: SGLFW2-90A□□□AT



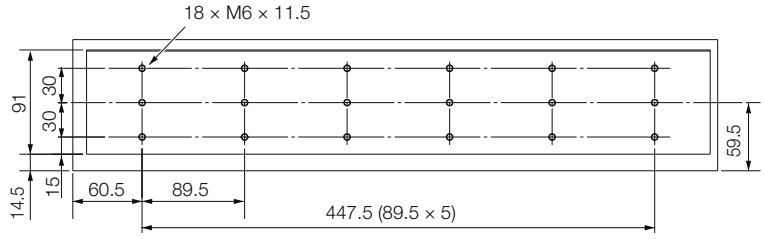
①SGLFW2-90A200AT



②SGLFW2-90A380AT



③SGLFW2-90A560AT

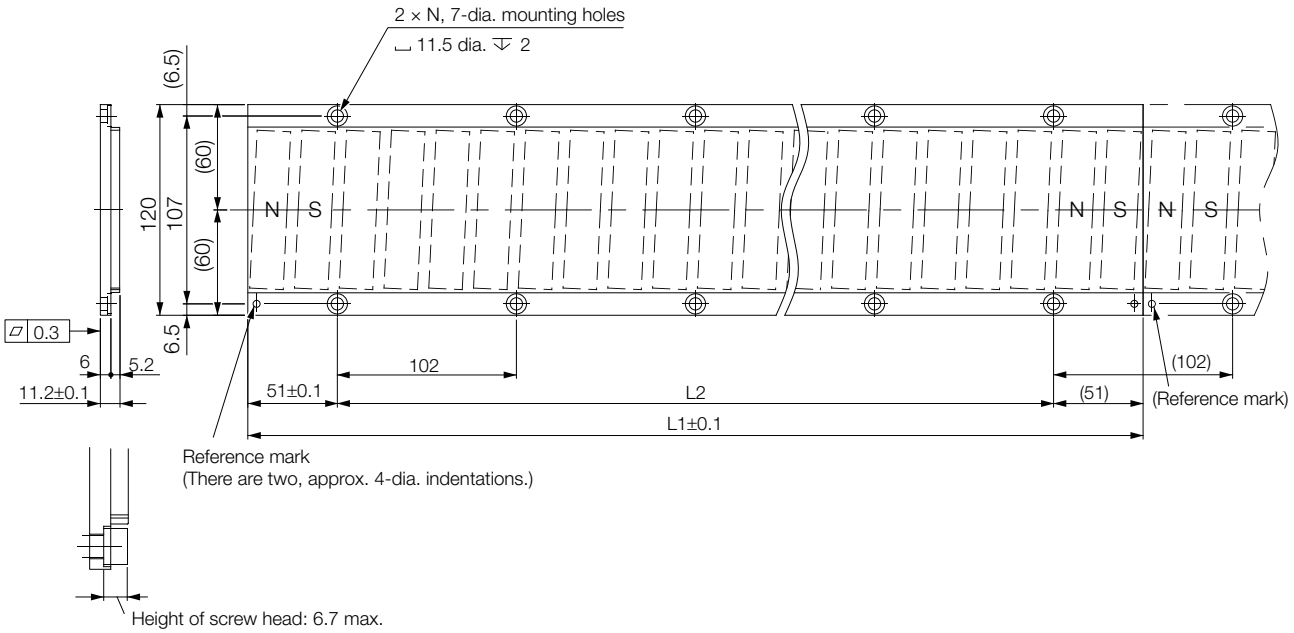


Unit: mm

Moving Coil Model SGLFW2-	L1	L2	L3	Flatness	Approx. Mass [kg]
90A200AT	205	89.5	187	0.2	5.3
90A380AT	384	268.5	365.5	0.3	10.1
90A560AT	563	447.5	544	0.3	14.9

Refer to the following section for the connector specifications for the Sensor Cable and Servomotor Main Circuit Cable or Moving Coils without Polarity Sensors: SGLFW2-90 and -1D on page 178.

Magnetic Ways: SGLFM2-90□□□A



Mounting Section Details

Unit: mm

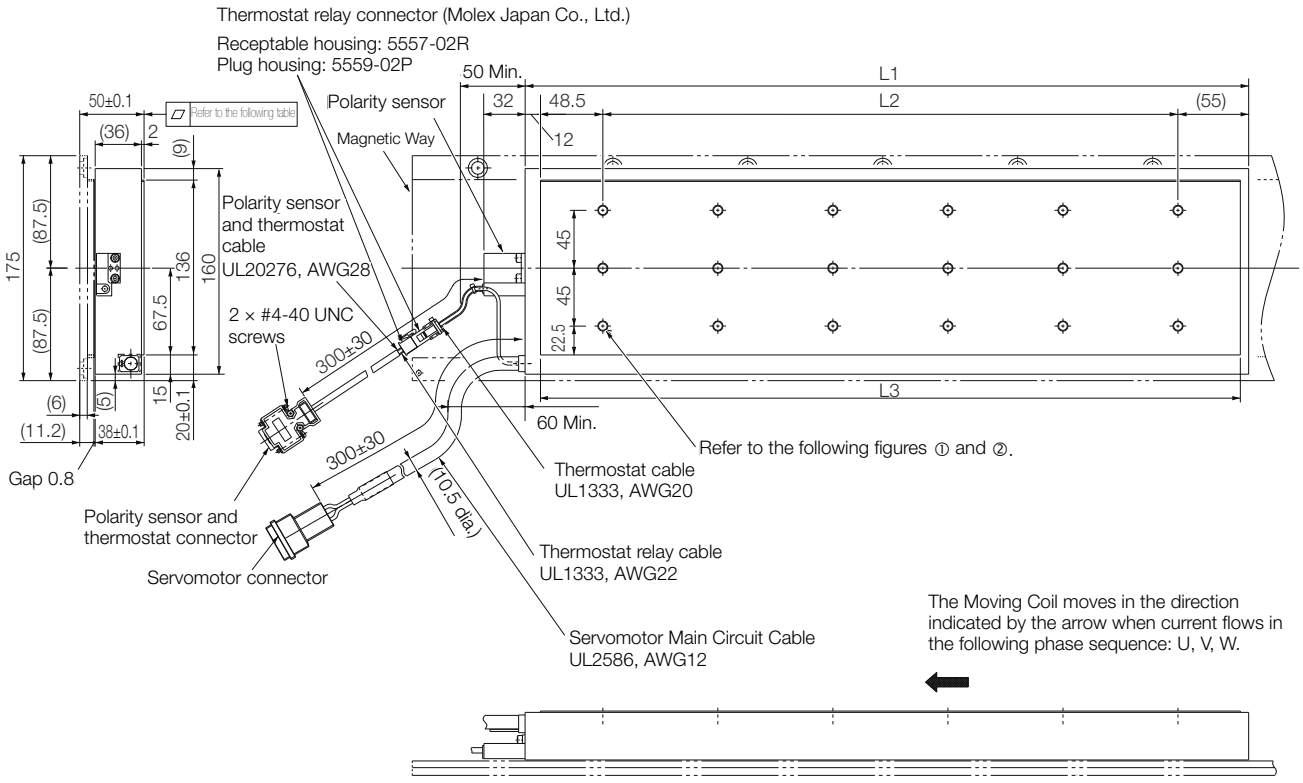
Note:

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.

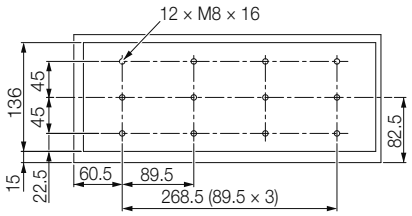
Magnetic Way Model SGLFM2-	L1 ±0.1	L2	N	Approx. Mass [kg]
90306A	306	204 (102 × 2)	3	2.6
90510A	510	408 (102 × 4)	5	4.2
90714A	714	612 (102 × 6)	7	5.9

SGLFW2-1D

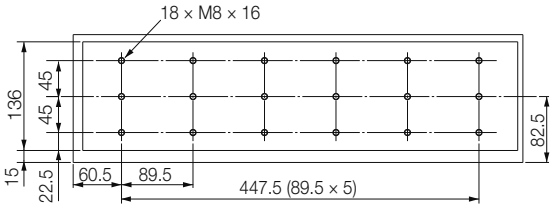
Moving Coils with Polarity Sensors: SGLFW2-1DA□□□AS



①SGLFW2-1DA380AS



②SGLFW2-1DA560AS

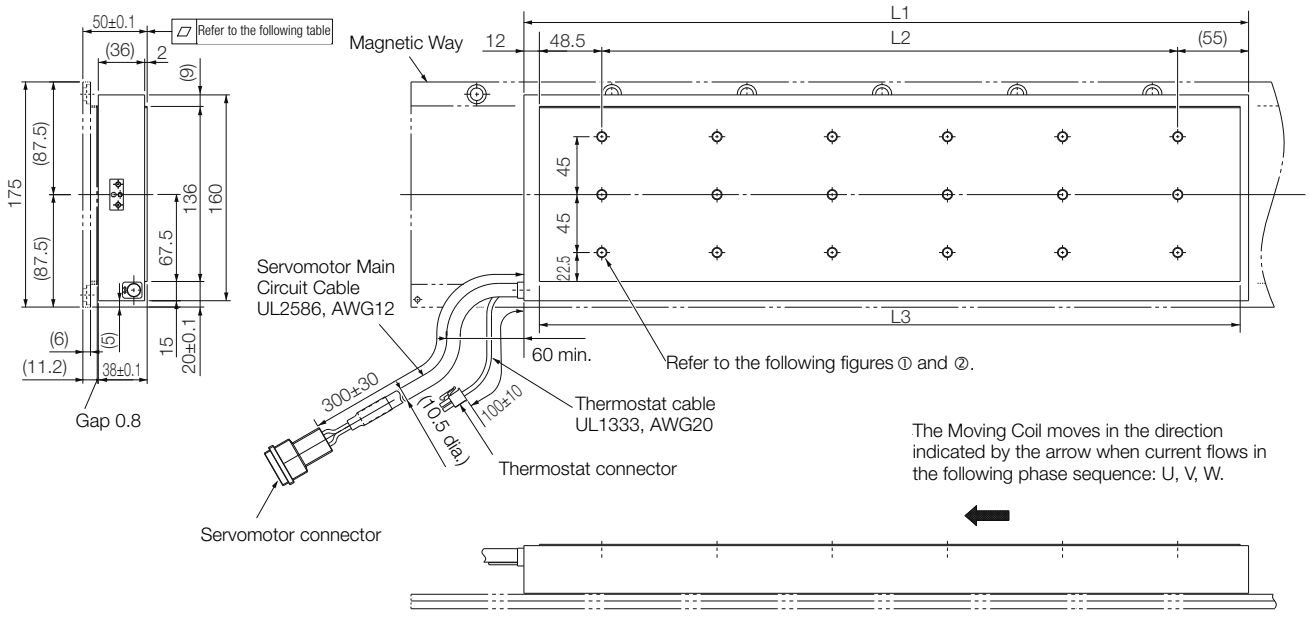


Unit: mm

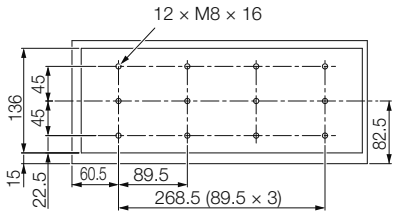
Moving Coil Model SGLFW2-	L1	L2	L3	Flatness	Approx. Mass [kg]
1DA380AS	384	268.5	365.5	0.3	14.6
1DA560AS	563	447.5	544	0.3	21.5

Refer to the following section for the connector specifications for the Sensor Cable and Servomotor Main Circuit Cable or Moving Coils with Polarity Sensors: SGLFW2-90 and -1D on page 177.

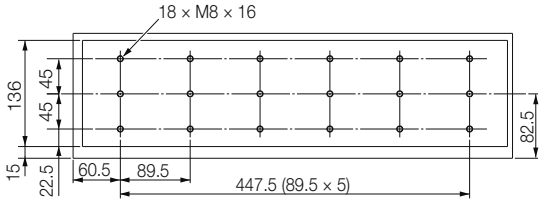
Moving Coils without Polarity Sensors: SGLFW2-1DA□□□AT



①SGLFW2-1DA380AT



②SGLFW2-1DA560AT

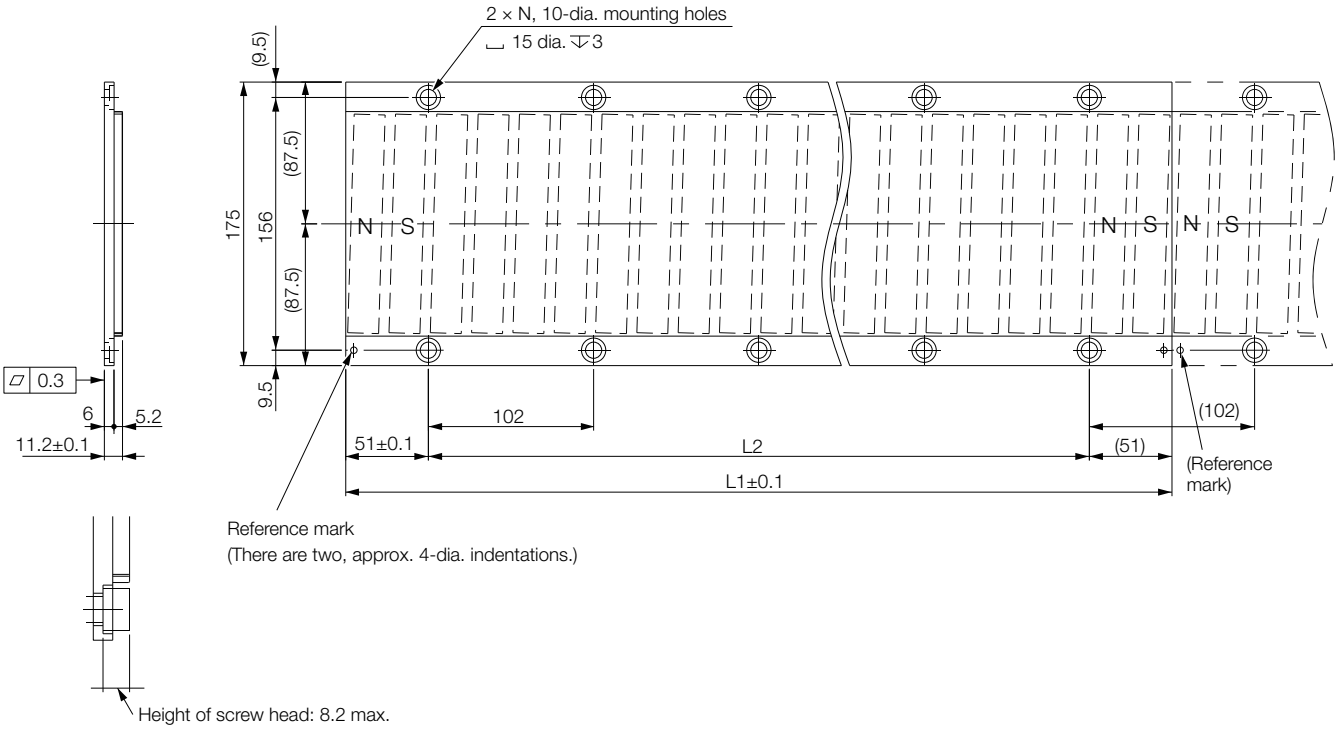


Unit: mm

Moving Coil Model SGLFW2-	L1	L2	L3	Flatness	Approx. Mass [kg]
1DA380AT	384	268.5	365.5	0.3	14.6
1DA560AT	563	447.5	544	0.3	21.5

Refer to the following section for the connector specifications for the Sensor Cable and Servomotor Main Circuit Cable or Moving Coils without Polarity Sensors: SGLFW2-90 and -1D on page 178.

Magnetic Ways: SGLFM2-1D□□□A



Unit: mm

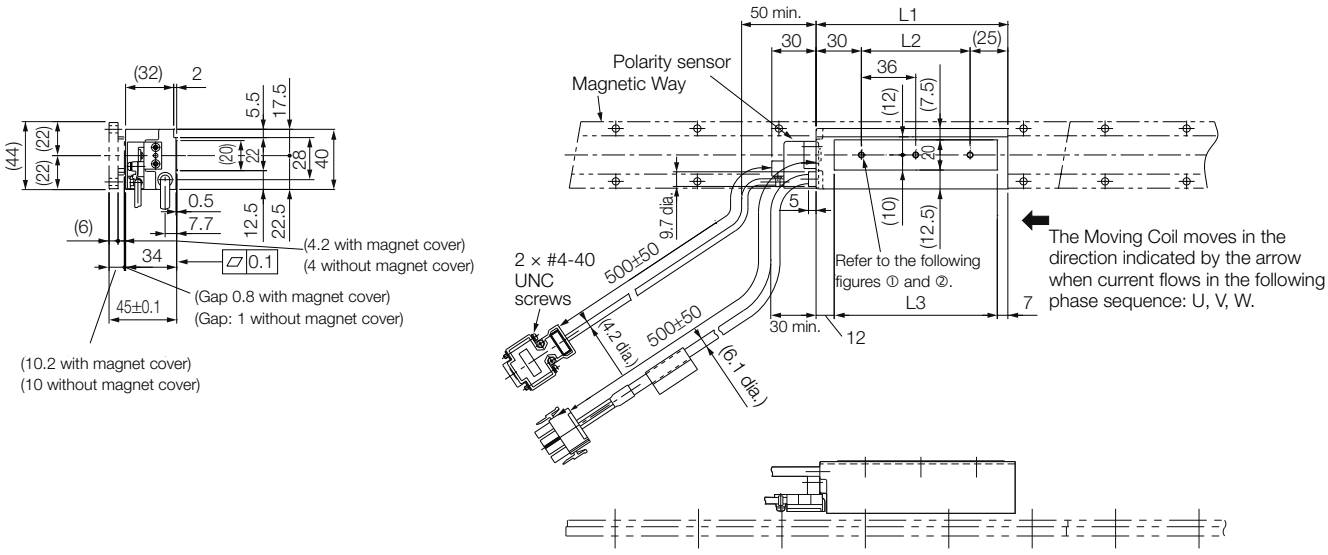
Mounting Section Details

Note:

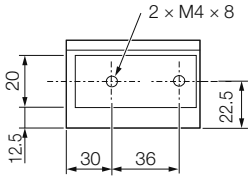
More than one Magnetic Way can be connected. Connect the Magnetic Ways so that the reference marks on them are aligned in the same direction as shown in the figure.

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

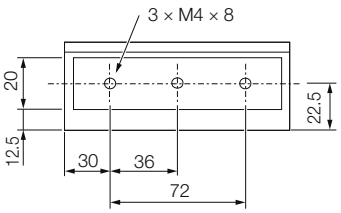
Moving Coils: SGLFW-20A□□□A



①SGLFW-20A090A□



②SGLFW-20A120A□



Unit: mm

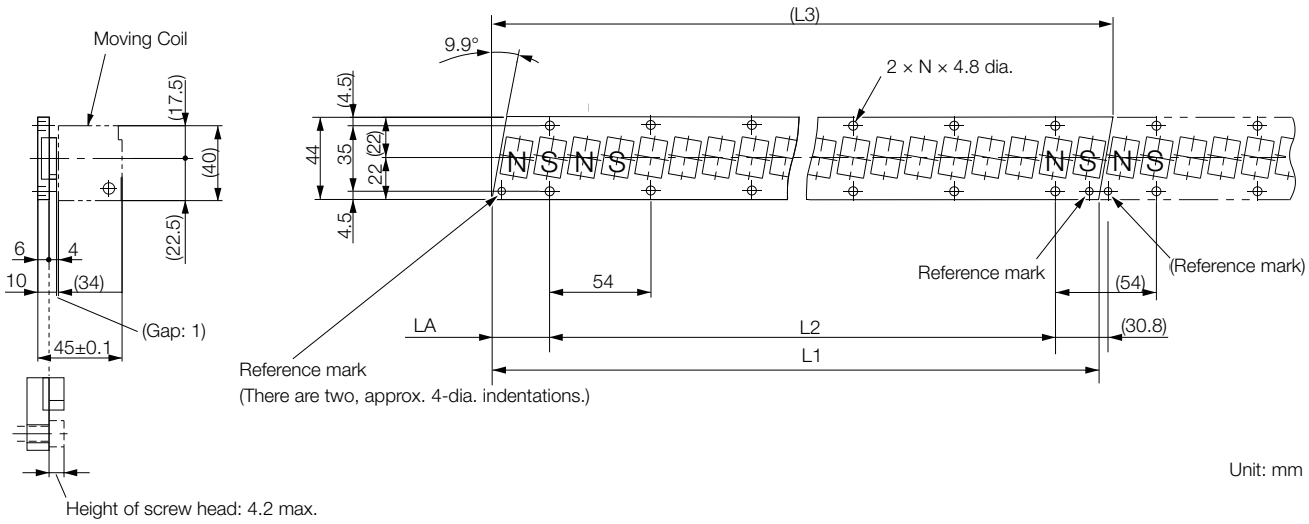
Moving Coil Model SGLFW-	L1	L2	L3	Approx. Mass [kg]
20A090A□	91	36	72	0.7
20A120A□	127	72	108	0.9

Note:

The above dimensional drawing gives the dimensions for both models with polarity sensors and models without polarity sensors.

Refer to the following section for the connector specifications for the Sensor Cable and Servomotor Main Circuit Cable or SGLFW-20A□□□A□ and -35A□□□A□ Moving Coils on page 178.

Magnetic Ways: SGLFM-20□□□A



Unit: mm

Mounting Section Details

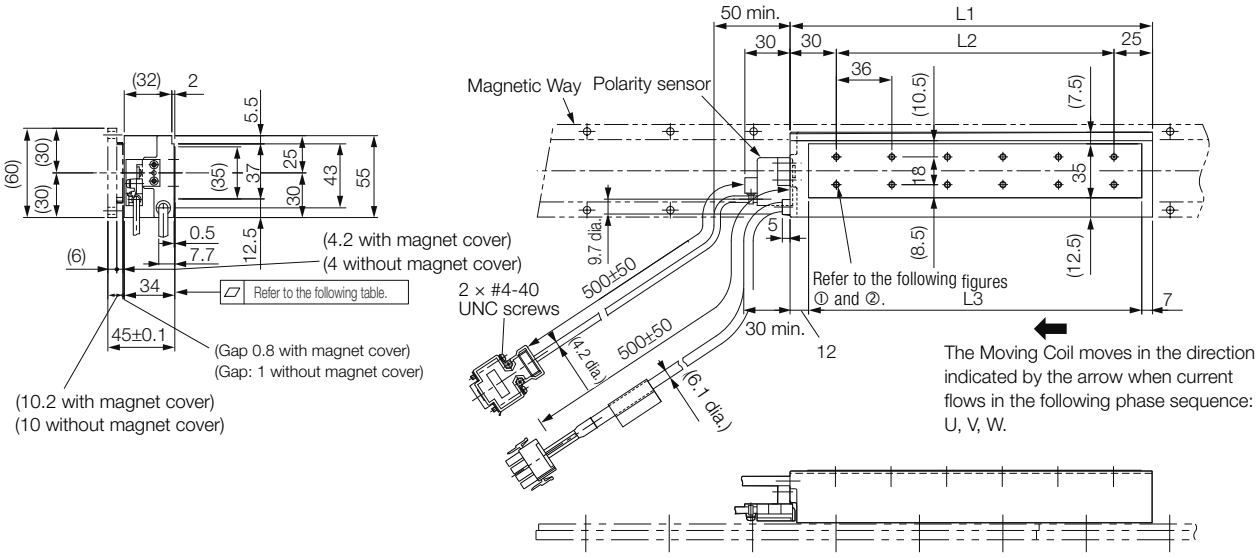
Note:

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.

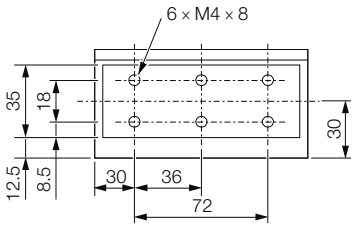
Magnetic Way SGLFM-	L1	L2	(L3)	LA	N	Approx. Mass [kg]
20324A	$324^{-0.1}_{-0.3}$	270 (54 × 5)	(331.6)	$30.8^{0}_{-0.2}$	6	0.9
20540A	$540^{-0.1}_{-0.3}$	486 (54 × 9)	(547.6)	$30.8^{0}_{-0.2}$	10	1.4
20756A	$756^{-0.1}_{-0.3}$	702 (54 × 13)	(763.6)	$30.8^{0}_{-0.2}$	14	2

SGLFW-35

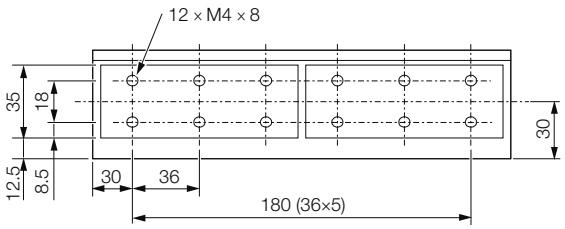
Moving Coils: SGLFW-35A□□□A□D



①SGLFW-35A120A□



②SGLFW-35A230A□



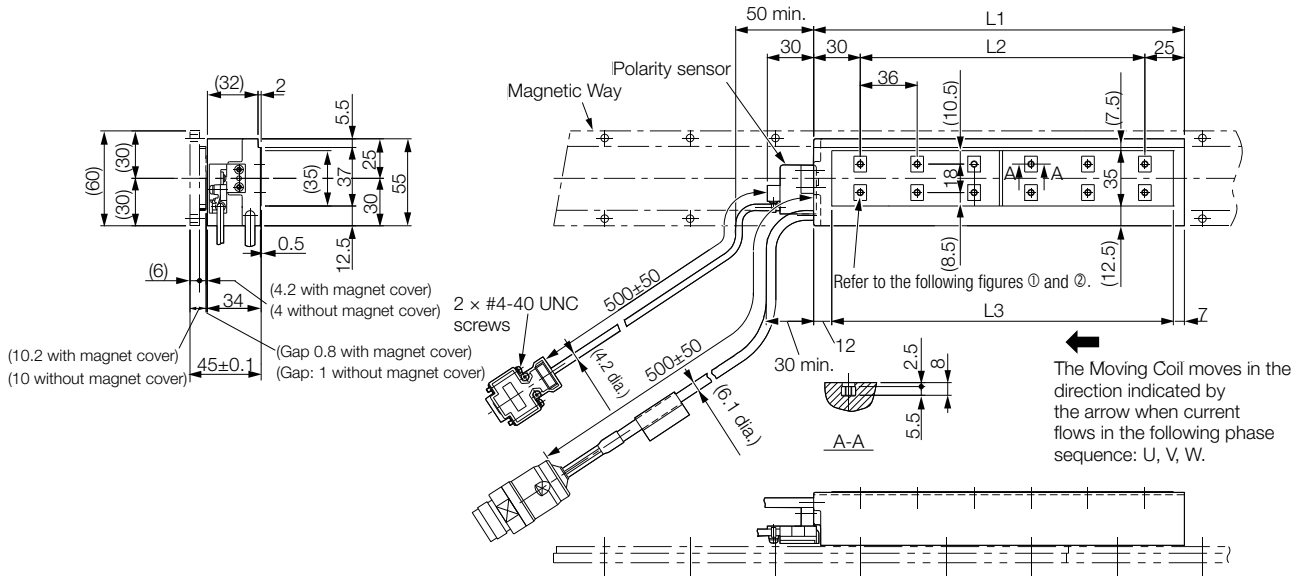
Unit: mm

Moving Coil Model SGLFW-	L1	L2	L3	Approx. Mass [kg]
35A120A□	127	72	108	1.3
35A230A□	235	180	216	2.3

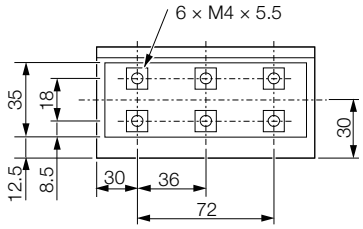
Note:
The above dimensional drawing gives the dimensions for both models with polarity sensors and models without polarity sensors.

Refer to the following section for the connector specifications for the Sensor Cable and Servomotor Main Circuit Cable or SGLFW-20A□□□A□ and -35A□□□A□ Moving Coils on page 178.

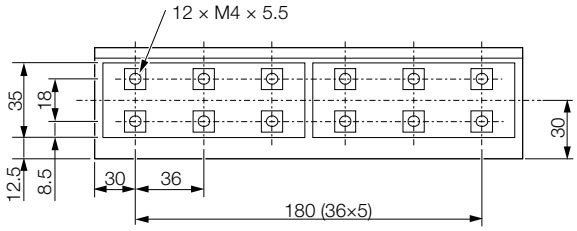
Moving Coils: SGLFW-35A□□□A□D



①SGLFW-35A120A□D



②SGLFW-35A230A□D



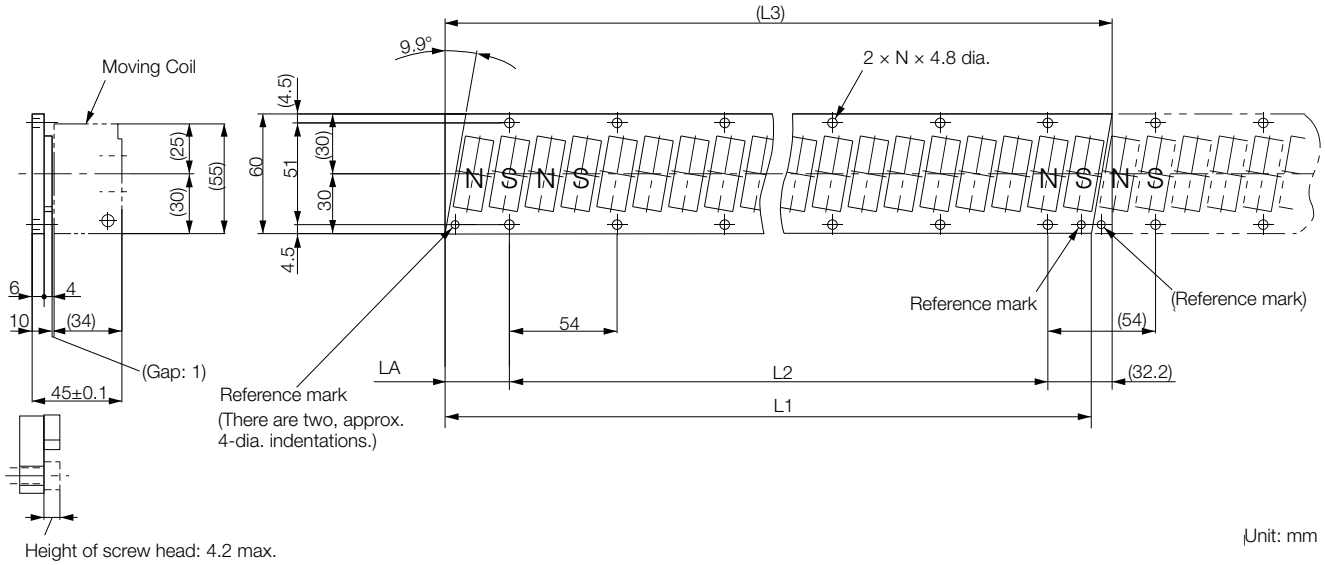
Unit: mm

Moving Coil Model SGLFW-	L1	L2	L3	Approx. Mass [kg]
35A120A□D	127	72	108	1.3
35A230A□D	235	180	216	2.3

Note:
The above dimensional drawing gives the dimensions for both models with polarity sensors and models without polarity sensors.

Refer to the following section for the connector specifications for the Sensor Cable and Servomotor Main Circuit Cable or SGLFW-20A□□□A□ and -35A□□□A□ Moving Coils on page xx.

Magnetic Ways: SGLFM-35□□□A



Unit: mm

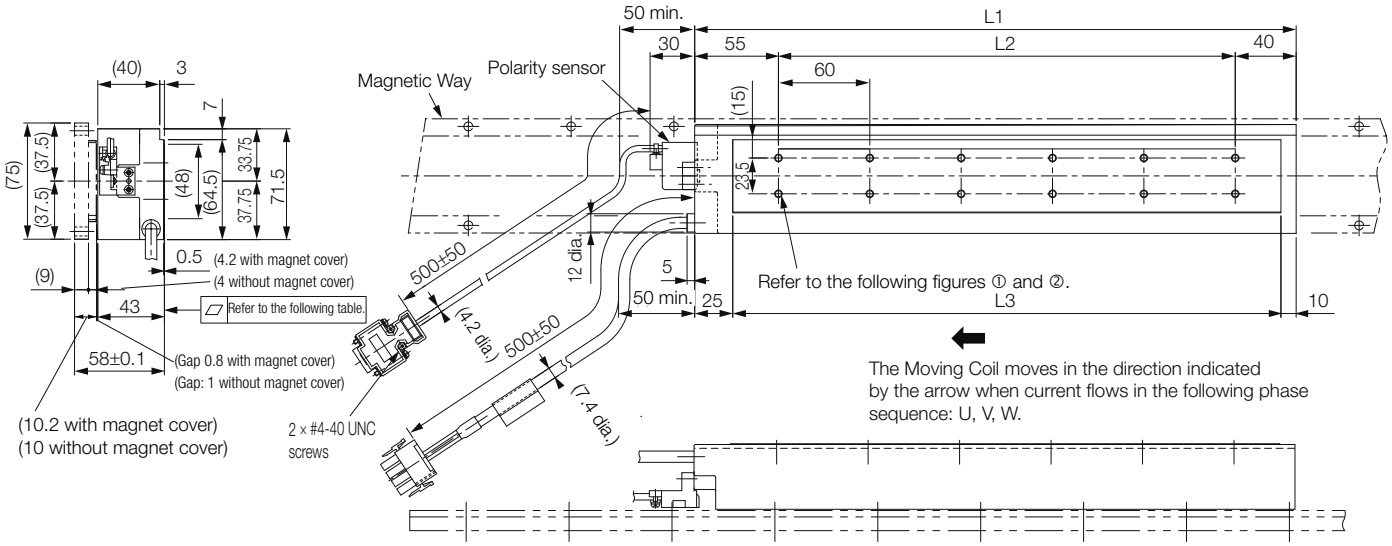
Mounting Section Details

Note:

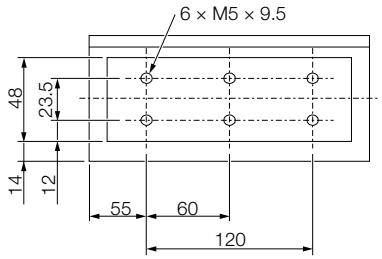
More than one Magnetic Way can be connected. Connect the Magnetic Ways so that the reference marks on them are aligned in the same direction as shown in the figure.

Magnetic Way SGLFM-	L1	L2	(L3)	LA	N	Approx. Mass [kg]
35324A	$324^{-0.1}_{-0.3}$	270 (54 × 5)	(334.4)	$32.2^{0}_{-0.2}$	6	1.2
35540A	$540^{-0.1}_{-0.3}$	486 (54 × 9)	(550.4)	$32.2^{0}_{-0.2}$	10	2
35756A	$756^{-0.1}_{-0.3}$	702 (54 × 13)	(763.4)	$32.2^{0}_{-0.2}$	14	2.9

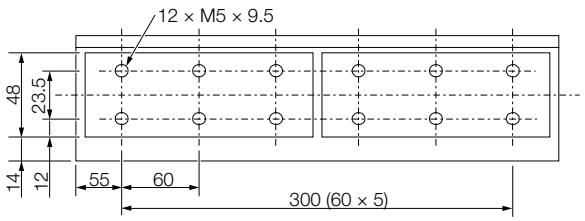
Moving Coils: SGLFW-50A□□□B□



①SGLFW-50A200B□



②SGLFW-50A380B□



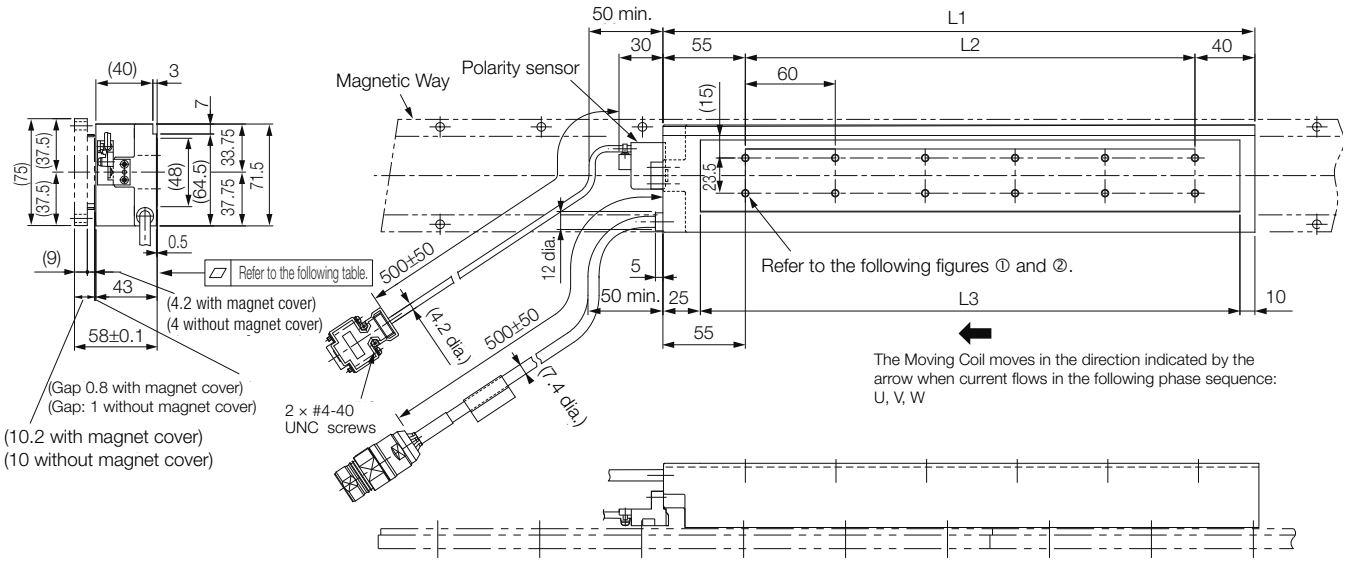
Unit: mm

Moving Coil Model SGLFW-	L1	L2	L3	Approx. Mass [kg]
50A200B□	215	120	180	3.5
50A380B□	395	300	360	6.9

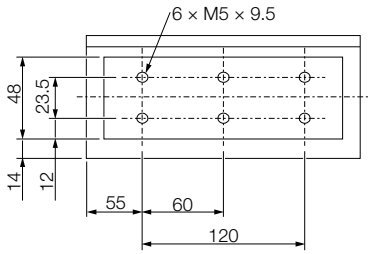
Note:
The above dimensional drawing gives the dimensions for both models with polarity sensors and models without polarity sensors.

Refer to the following section for the connector specifications for the Sensor Cable and Servomotor Main Circuit Cable or SGLFW-50A□□□B□ Moving Coils on page 179.

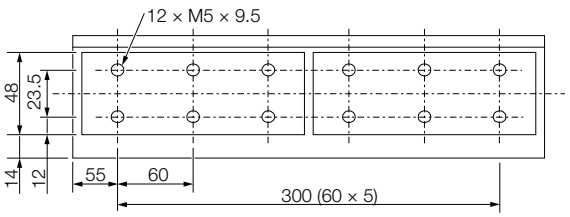
Moving Coils: SGLFW-50A□□□B□D



①SGLFW-50A200B□D



②SGLFW-50A380B□D



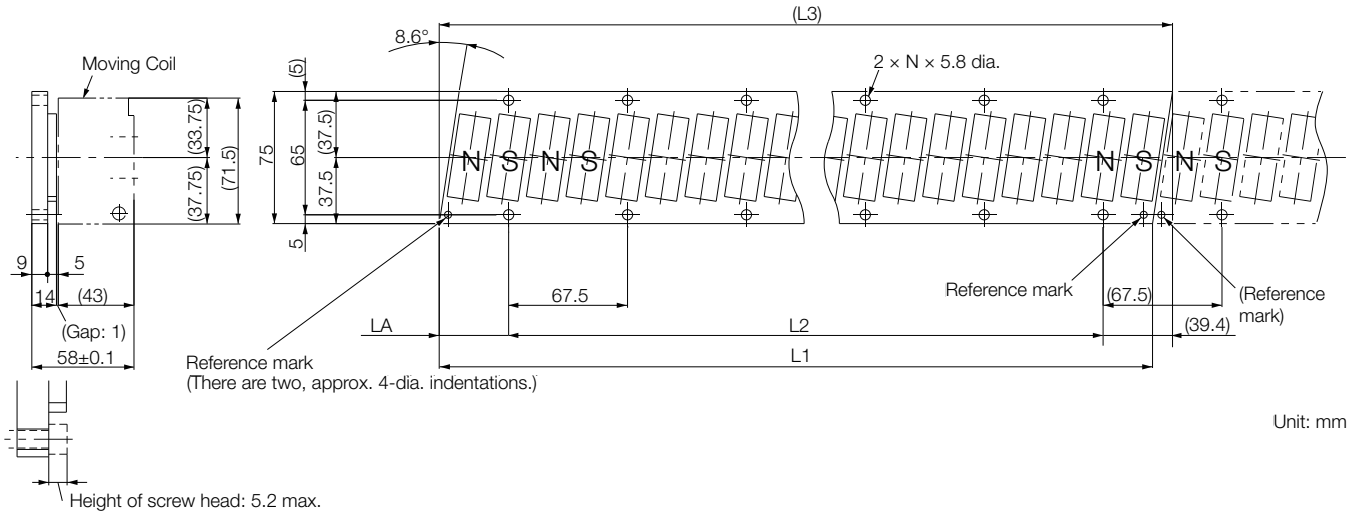
Unit: mm

Moving Coil Model SGLFW-	L1	L2	L3	Approx. Mass [kg]
50A200B□D	215	120	180	3.5
50A380B□D	395	300	360	6.9

Note:
The above dimensional drawing gives the dimensions for both models with polarity sensors and models without polarity sensors.

Refer to the following section for the connector specifications for the Sensor Cable and Servomotor Main Circuit Cable or SGLFW-35A□□□A□D and -50A□□□B□D Moving Coils on page 179.

Magnetic Ways: SGLFM-50□□□A



Unit: mm

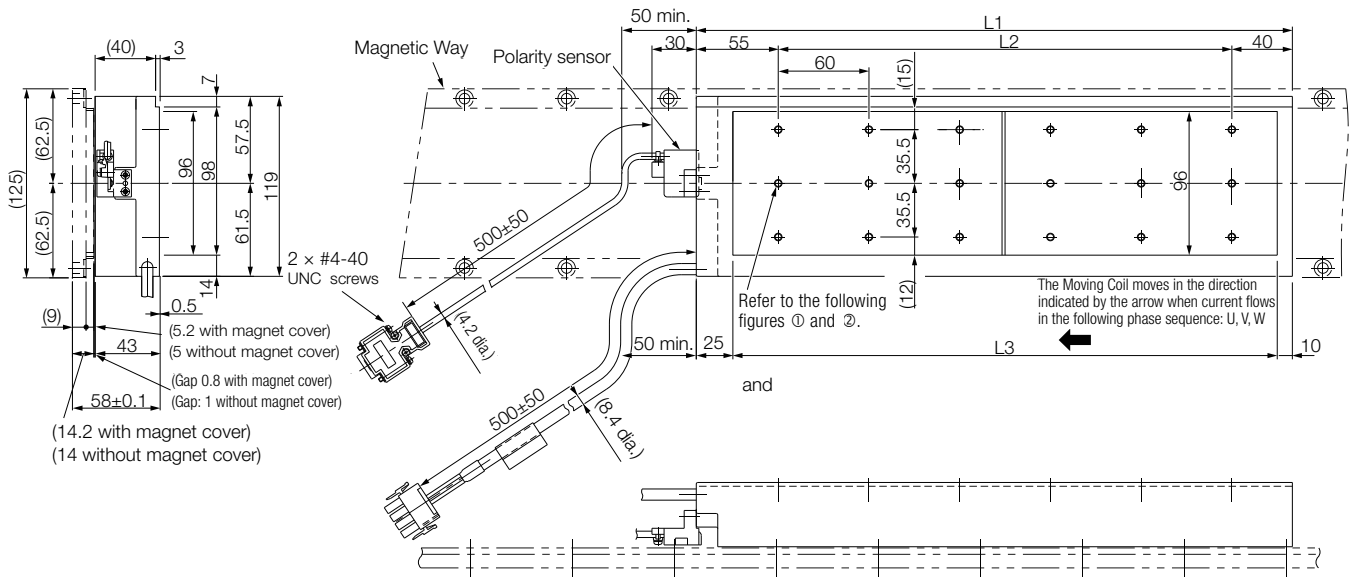
Mounting Section Details

Note:

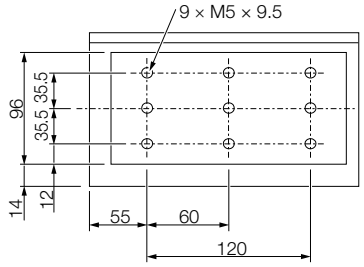
More than one Magnetic Way can be connected. Connect the Magnetic Ways so that the reference marks on them are aligned in the same direction as shown in the figure.

Magnetic Way SGLFM-	L1	L2	(L3)	LA	N	Approx. Mass [kg]
50405A	$405^{-0.1}_{-0.3}$	337.5 (67.5 × 5)	(416.3)	$39.4^{0}_{-0.2}$	6	2.8
50675A	$675^{-0.1}_{-0.3}$	607.5 (67.5 × 9)	(686.3)	$39.4^{0}_{-0.2}$	10	4.6
50945A	$945^{-0.1}_{-0.3}$	877.5 (67.5 × 13)	(956.3)	$39.4^{0}_{-0.2}$	14	6.5

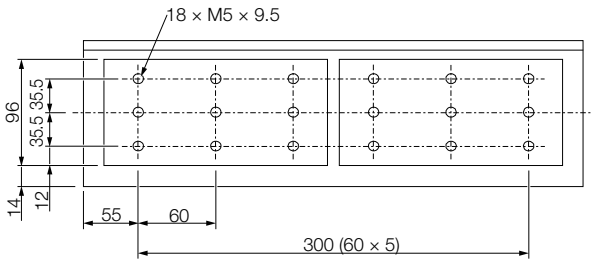
Moving Coils: SGLFW-1ZA□□□B□



①SGLFW-1ZA200B□



②SGLFW-1ZA380B□



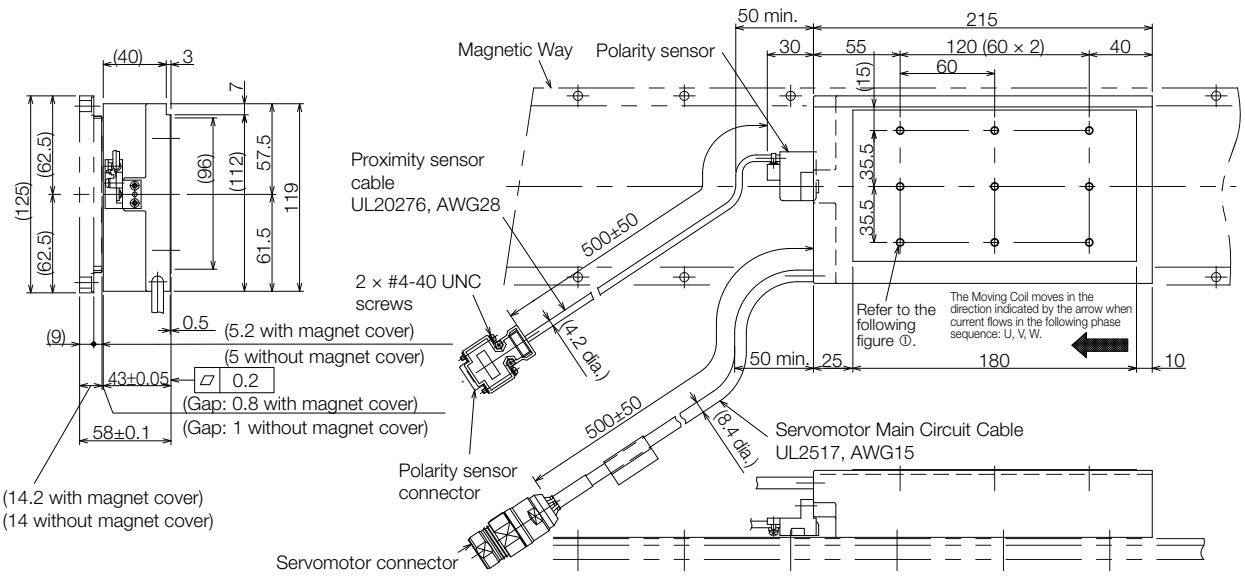
Unit: mm

Moving Coil Model SGLFW-	L1	L2	L3	Approx. Mass [kg]
1ZA200B□	215	120	180	6.4
1ZA380B□	395	300	360	11.5

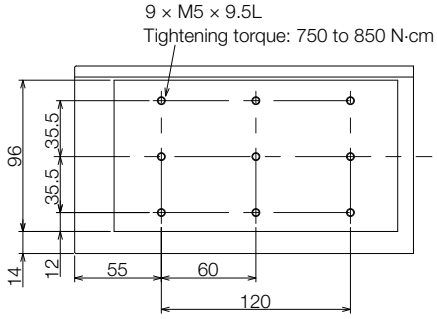
Note:
The above dimensional drawing gives the dimensions for both models with polarity sensors and models without polarity sensors.

Refer to the following section for the connector specifications for the Sensor Cable and Servomotor Main Circuit Cable or SGLFW-1ZA□□□B□ Moving Coils on page 180.

Moving Coils: SGLFW-1ZA□□□B□D



①SGLFW-1ZA200B□D



Approx. mass: 6.4 kg

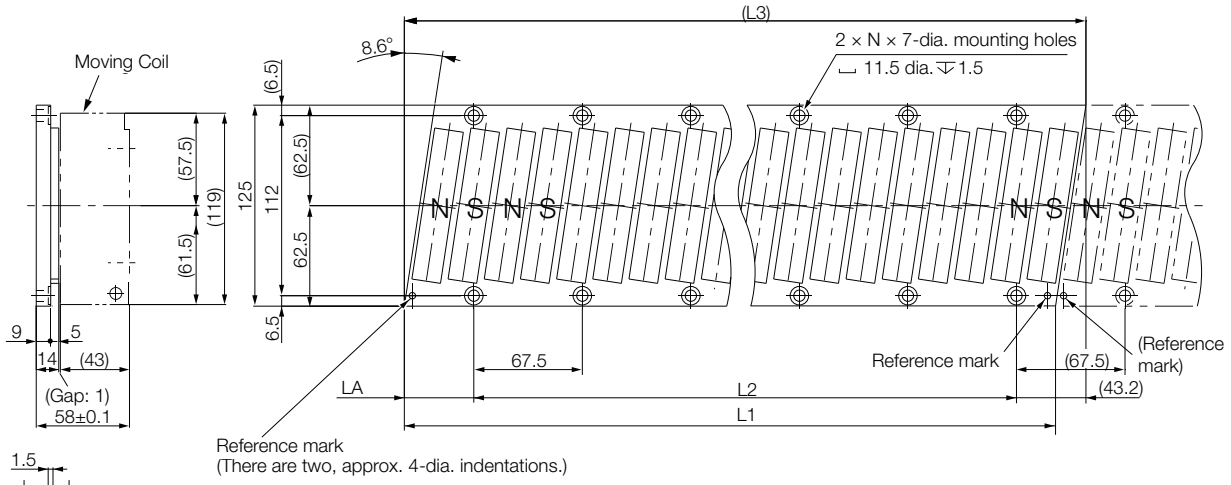
Unit: mm

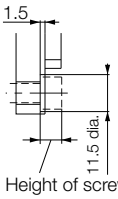
Note:

The above dimensional drawing gives the dimensions for both models with polarity sensors and models without polarity sensors.

Refer to the following section for the connector specifications for the Sensor Cable and Servomotor Main Circuit Cable or SGLFW-1ZA200B□D Moving Coils on page 180.

Magnetic Ways: SGLFM-1Z□□□A





Height of screw head: 6.7 max.

Mounting Section Details

Unit: mm

Note:

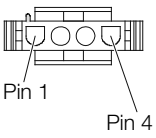
More than one Magnetic Way can be connected. Connect the Magnetic Ways so that the reference marks on them are aligned in the same direction as shown in the figure.

Magnetic Way SGLFM-	L1	L2	(L3)	LA	N	Approx. Mass [kg]
1Z405A	$405^{-0.1}_{-0.3}$	337.5 (67.5 × 5)	(423.9)	$43.2^{0}_{-0.2}$	6	5
1Z675A	$675^{-0.1}_{-0.3}$	607.5 (67.5 × 9)	(693.9)	$43.2^{0}_{-0.2}$	10	8.3
1Z945A	$945^{-0.1}_{-0.3}$	877.5 (67.5 × 13)	(963.9)	$43.2^{0}_{-0.2}$	14	12

Connector Specifications

Moving Coils with Polarity Sensors: SGLFW2-30 and -45

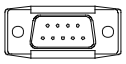
• Servomotor Connector



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

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

• Polarity Sensor and Thermostat Connector



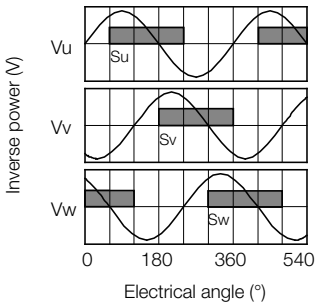
Pin connector: 17JE-23090-02 (D8C) -CG
From DDK Ltd.

Mating Connector
Socket connector: 17JE-13090-02 (D8C) A-CG
Studs: 17L-002C or 17L-002C1

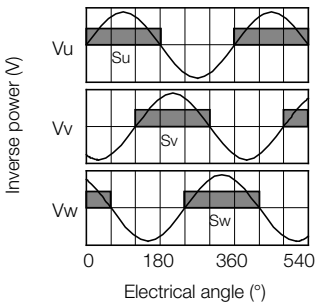
• Polarity Sensor Output Signal

The following figures show 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.

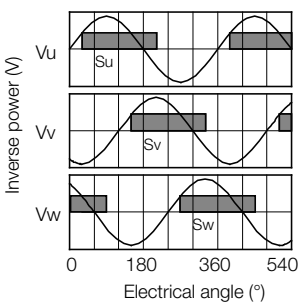
SGLFW2-30A070AS



SGLFW2-30A120AS
SGLFW2-30A230AS

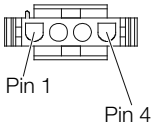


SGLFW2-45A200AS
SGLFW2-45A380AS



Moving Coils without Polarity Sensors: SGLFW2-30 and -45

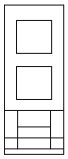
• Servomotor Connector



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

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

• Thermostat Connector

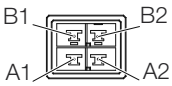


Receptacle housing: 5557-02R
Terminals: 5556T or 5556TL
From Molex Japan Co., Ltd.

Mating Connector
Plug housing: 5559-02P
Terminals: 5558T or 5558TL

Moving Coils with Polarity Sensors: SGLFW2-90 and -1D

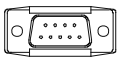
• Servomotor Connector



Tab housing: 1-917808-2
Contacts: 917803-2 (A1, A2, and B1)
84695-1 (B2)
Tyco Electronics Japan G.K.

Mating Connector
Receptacle housing: 1-917807-2
Contacts: 179956-2

• Polarity Sensor and Thermostat Connector

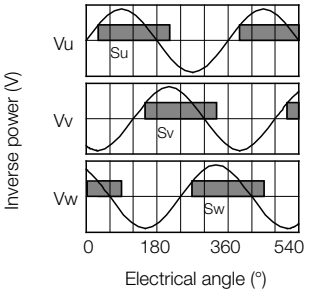


Pin connector: 17JE-23090-02 (D8C) -CG
From DDK Ltd.

Mating Connector
Socket connector: 17JE-13090-02 (D8C) A-CG
Studs: 17L-002C or 17L-002C1

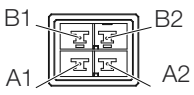
• Polarity Sensor Output Signal

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.



Moving Coils without Polarity Sensors: SGLFW2-90 and -1D

• Servomotor Connector

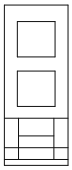


Tab housing: 1-917808-2
Contacts: 917803-2 (A1, A2, and B1)
84695-1 (B2)

Tyco Electronics Japan G.K.

Mating Connector
Receptacle housing: 1-917807-2
Contacts: 179956-2

• Thermostat Connector

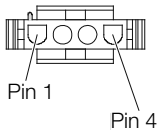


Receptacle housing: 5557-02R
Terminals: 5556T or 5556TL
From Molex Japan Co., Ltd.

Mating Connector
Plug housing: 5559-02P
Terminals: 5558T or 5558TL

SGLFW-20A□□□A□ and -35A□□□A□ Moving Coils

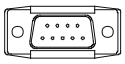
• Servomotor Connector



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

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

• Polarity Sensor Connector

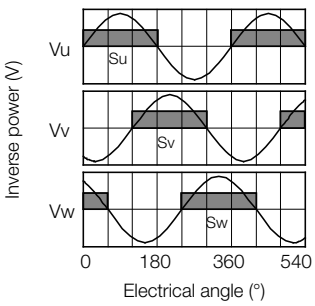


Pin connector: 17JE-23090-02 (D8C) -CG
From DDK Ltd.

Mating Connector
Socket connector: 17JE-13090-02 (D8C) A-CG
Studs: 17L-002C or 17L-002C1

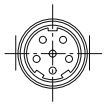
• Polarity Sensor Output Signal

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.



SGLFW-35A□□□A□D and -50A□□□B□D Moving Coils

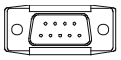
• Servomotor Connector



Extension: ARRA06AMRPN182
Pins: 021.279.1020
From Interconnectron GmbH

Mating Connector
Plug: APRA06BFRDN170
Socket: 020.105.1020

• Polarity Sensor Connector

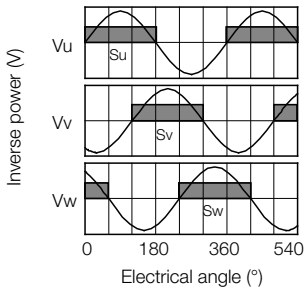


Pin connector: 17JE-23090-02 (D8C) -CG
From DDK Ltd.

Mating Connector
Socket connector: 17JE-13090-02 (D8C) A-CG
Studs: 17L-002C or 17L-002C1

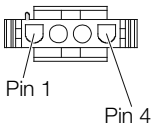
• Polarity Sensor Output Signal

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.



SGLFW-50A□□□B□ Moving Coils

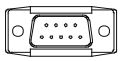
• Servomotor Connector



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

Mating Connector
Cap: 350780-1
Socket: 350537-3 or 350550-3

• Polarity Sensor Connector

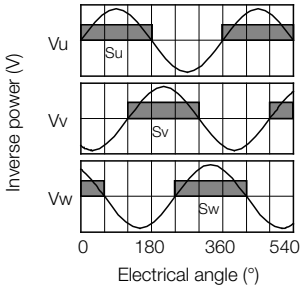


Pin connector: 17JE-23090-02 (D8C) -CG
From DDK Ltd.

Mating Connector
Socket connector: 17JE-13090-02 (D8C) A-CG
Studs: 17L-002C or 17L-002C1

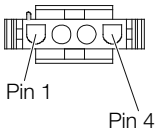
• Polarity Sensor Output Signal

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.



SGLFW-1ZA□□□B□ Moving Coils

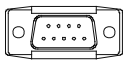
• Servomotor Connector



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

Mating Connector
Cap: 350780-1
Socket: 350537-3 or 350550-3

• Polarity Sensor Connector

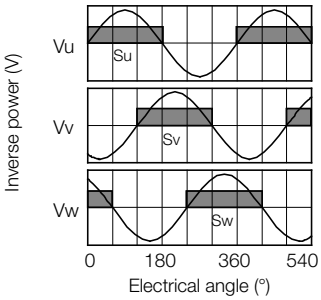


Pin connector: 17JE-23090-02 (D8C) -CG
From DDK Ltd.

Mating Connector
Socket connector: 17JE-13090-02 (D8C) A-CG
Studs: 17L-002C or 17L-002C1

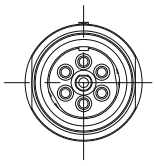
• Polarity Sensor Output Signal

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.



SGLFW-1ZA200B□D Moving Coils

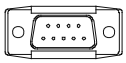
• Servomotor Connector



Extension: SROC06JMSCN169
Pins: 021.423.1020
From Interconnectron GmbH

Mating Connector
Plug: SPUC06KFSDN236
Socket: 020.030.1020

• Polarity Sensor Connector

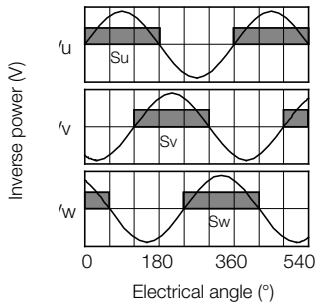


Pin connector: 17JE-23090-02 (D8C) -CG
From DDK Ltd.

Mating Connector
Socket connector: 17JE-13090-02 (D8C) A-CG
Studs: 17L-002C or 17L-002C1

• 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.



SGLT (Models with T-Type Iron Cores)

Model Designations

SGL T W - 20 A 170 A P □

SGL	T	W	-	20	A	170	A	P	□	
Linear Sigma Series Linear Servomotors SGLTW	1st	2nd		3rd + 4th	5th	6th ... 8th	9th	10th	11th	digit

1st digit - Servomotor Type

Code	Specification
T	With T-type iron core

2nd digit - Moving Coil/Magnetic Way

Code	Specification
W	Moving Coil

3rd + 4th digit - Magnet Height

Code	Specification
20	20 mm
35	36 mm
40	40 mm
50	51 mm
80	76.5 mm

5th digit - Power Supply Voltage

Code	Specification
A	200 VAC

6th ... 8th digit - Length of Moving Coil

Code	Specification
170	170 mm
320	315 mm
400	394.2 mm
460	460 mm
600	574.2 mm

9th digit - Design Revision Order

A, B...	
H	High-efficiency model

10th digit - Sensor Specifications and Cooling Method

Code	Specifications		Applicable Models
	Polarity Sensor	Cooling Method	
None	None	Self-cooled	All models
C*	None	Water-cooled	SGLTW-40, -80
H*	Yes	Water-cooled	
P	Yes	Self-cooled	All models

11th digit - 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□

* 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 combination of codes.

SGL T M - 20 324 A □

SGL	T	M	-	20	324	A	□	
Linear Sigma Series Linear Servomotors SGLTM	1st	2nd		3rd + 4th	5th ... 7th	8th	9th	digit

1st digit - Servomotor Type

Code	Specification
T	With T-type iron core

2nd digit - Moving Coil/Magnetic Way

Code	Specification
M	Magnetic Way

3rd + 4th digit - Magnet Height

Code	Specification
20	20 mm
35	36 mm
40	40 mm
50	51 mm
80	76.5 mm

5th ... 7th digit - Length of Magnetic Way

Code	Specification
324	324 mm
405	405 mm
540	540 mm
675	675 mm
756	756 mm
945	945 mm

8th digit - Design Revision Order

A, B...	
H	High-efficiency model

9th digit - Options

Code	Specification	Applicable Models
None	Without options	–
C	With magnet cover	All models
Y	With base and magnet cover	SGLTM-20, -35*, -40, -80

* The SGLTM-35□□□H (high-efficiency models) do not support this specification.

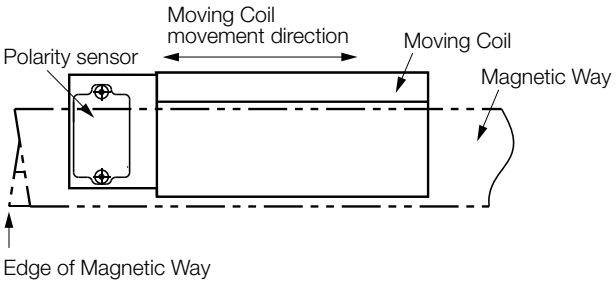
Precautions on Moving Coils with Polarity Sensors

Note:

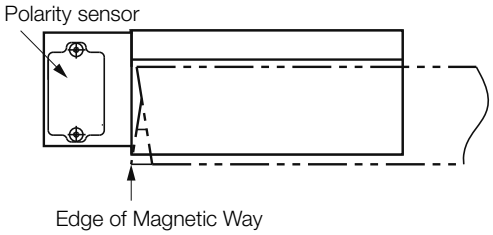
When you use a Moving Coil with a Polarity Sensor, the Magnetic Way must cover the bottom of the polarity sensor. Refer to the example that shows the correct installation.

When determining the length of the Moving Coil's stroke or the length of the Magnetic Way, consider the total length of the Moving Coil and the polarity sensor. Refer to the following table.

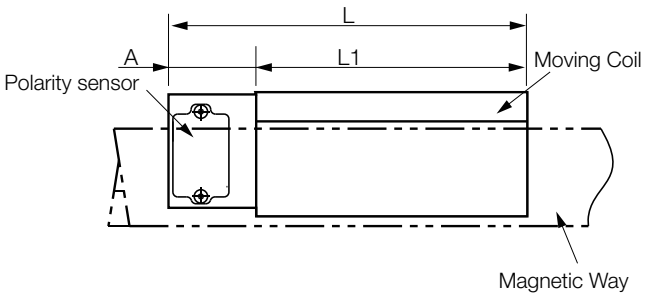
Correct Installation



Incorrect Installation



Total Length of Moving Coil with Polarity Sensor



Moving Coil Model SGLTW-	Length of Moving Coil, L1 (mm)	Length of Polarity Sensor, A (mm)	Total Length, L (mm)
20A170AP□	170	34	204
20A320AP□	315		349
20A460AP□	460		494
35A170AP□	170	34	204
35A320AP□	315		349
35A460AP□	460		494
35A170HP□	170	34	204
35A320HP□	315		349
50A170HP□	170	34	204
50A320HP□	315		349
40A400BH□ 40A400BP□	394.2	26	420.2
40A600BH□ 40A600BP□	574.2	26	600.2
80A400BH□ 80A400BP□	394.2	26	420.2
80A400BH□ 80A400BP□	574.2	26	600.2

Specifications and Ratings

Specifications

Linear Servomotor Moving Coil		Standard Models										High-efficiency Models			
		20A			35A			40A		80A		35A		50A	
Model SGLTW-		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	Ambient Temperature	0°C to 40°C (without freezing)													
	Ambient Humidity	20% to 80% relative humidity (without 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

Linear Servomotor Moving Coil		Standard Models										High-efficiency Models			
		20A			35A			40A		80A		35A		50A	
Model SGLTW-		**170A**	**320A**	**460A**	**170A**	**320A**	**460A**	**400B**	**600B**	**400B**	**600B**	**170H**	**320H**	**170H**	**320H**
Rated Motor Speed (Reference Speed during Speed Control)*1		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
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 on One Side*4	N	800	1590	2380	1400	2780	4170	3950	5890	7650	11400	1400	2780	2000	3980
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	SGD7S-	3R8A	7R6A	120A	5R5A	120A	180A	180A	330A	330A	550A	5R5A	120A	5R5A	120A
	SGD7W-	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 an ambient 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 and -35A170A
  - 400 mm × 500 mm × 40 mm: SGLTW-20A320A -20A460A, -35A170H, -35A320A, -35A320H, -35A460A, and -50A170H
  - 609 mm × 762 mm × 50 mm: SGLTW-40A400B, -40A600B, -50A320H, -80A400B, and -80A600B

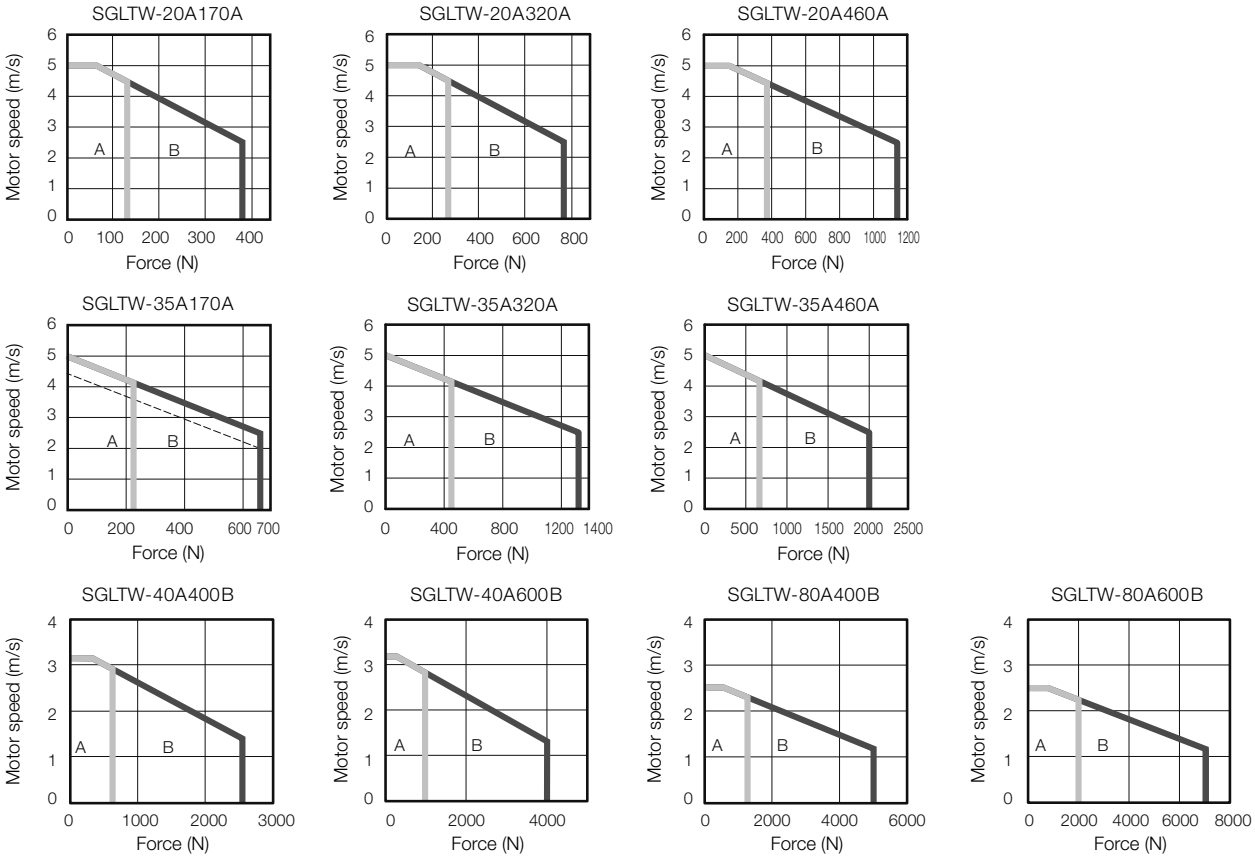
*3. The unbalanced magnetic gap that results from the Moving Coil installation condition causes a magnetic attraction on the Moving Coil.

*4. The value that is given is the magnetic attraction that is generated on one side of the Magnetic Way.

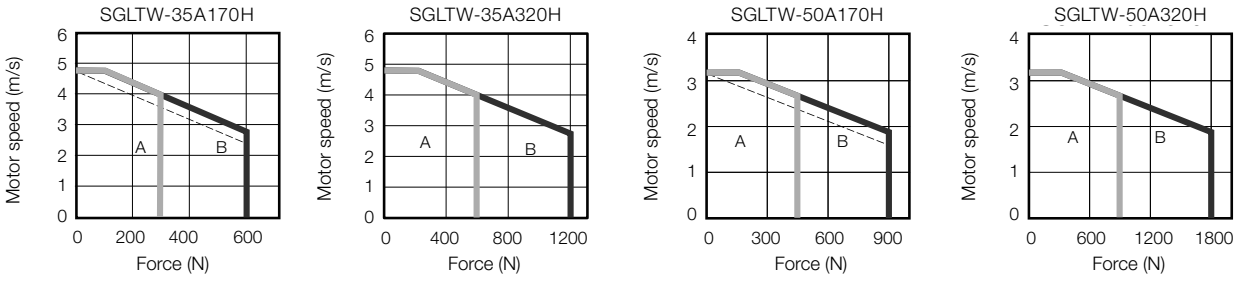
Force-Motor Speed Characteristics

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



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.

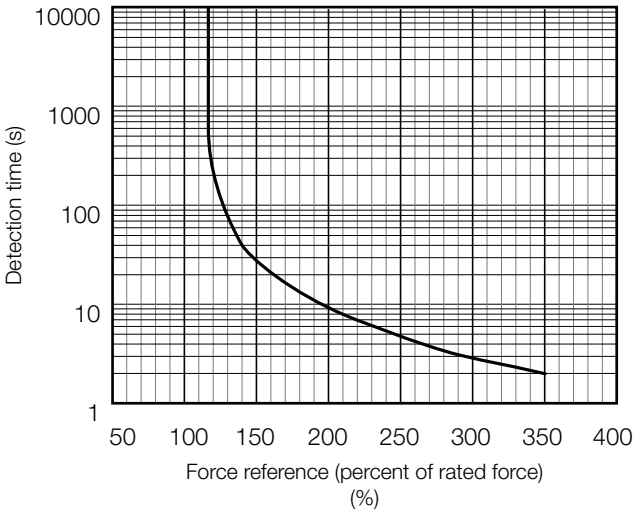
3 If the effective force is within the allowable range for the rated force, the Servomotor can be used within the intermittent duty zone.

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.

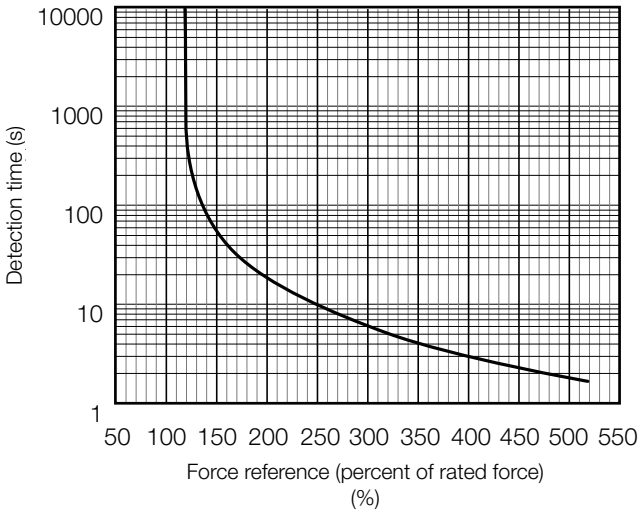
Servomotor Overload Protection Characteristics

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

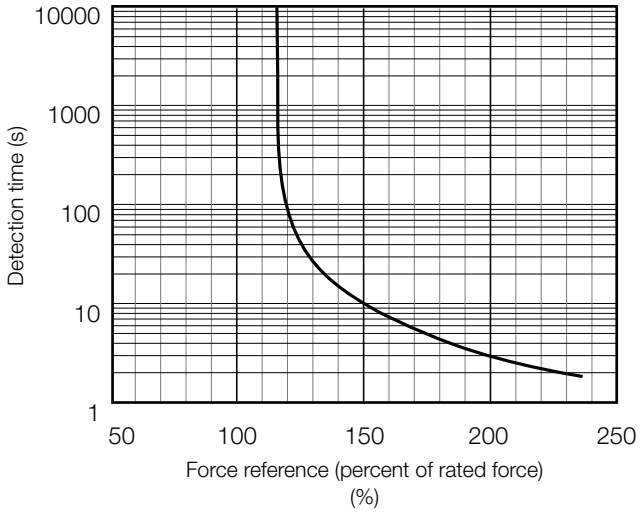
SGLTW-20A□□□A and -35A□□□A



SGLTW-40A□□□B and -80A□□□B



SGLTW-35A□□□H and -50A□□□H

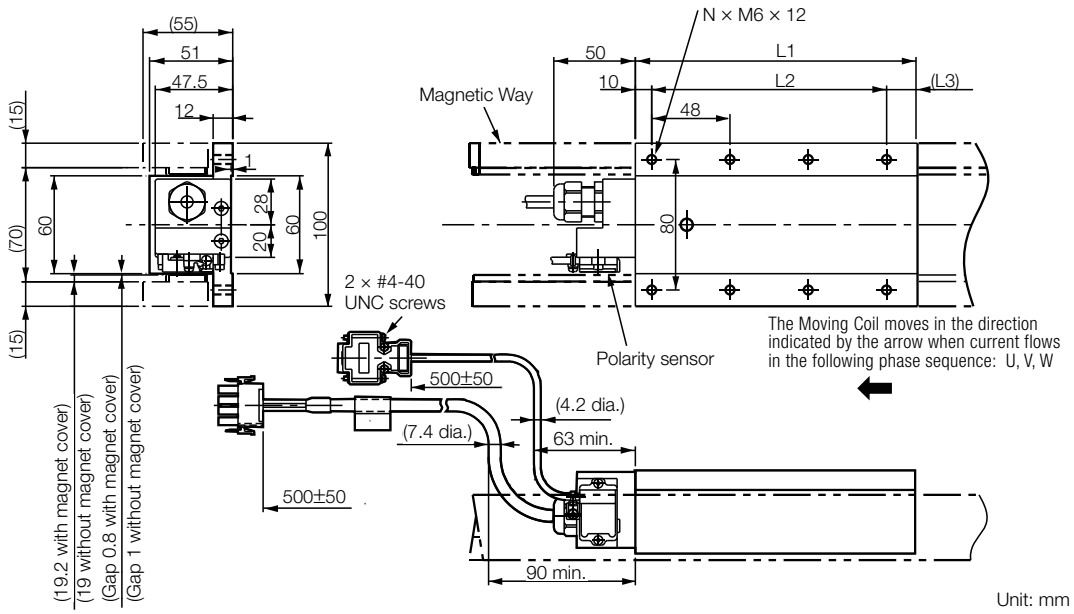


Note:

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 xx.

SGLTW-20: Standard Models

Moving Coils: SGLTW-20A□□□A□

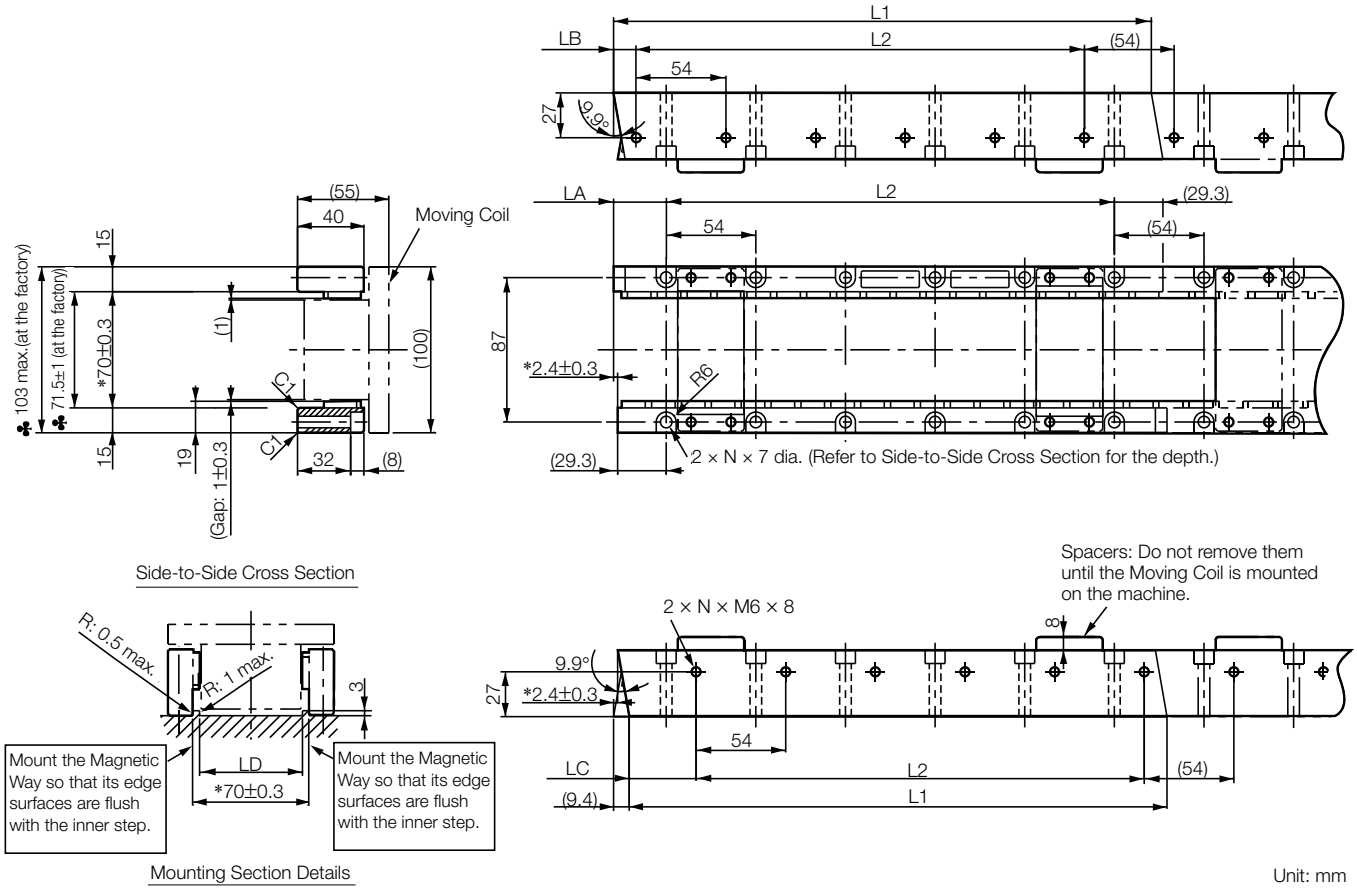


Unit: mm

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

Refer to the following section for the connector specifications for the Sensor Cable and Servomotor Main Circuit Cable or SGLTW-20A□□□A□ and -35A□□□A□ Moving Coils on page xx.

Magnetic Ways: SGLTM-20□□□A

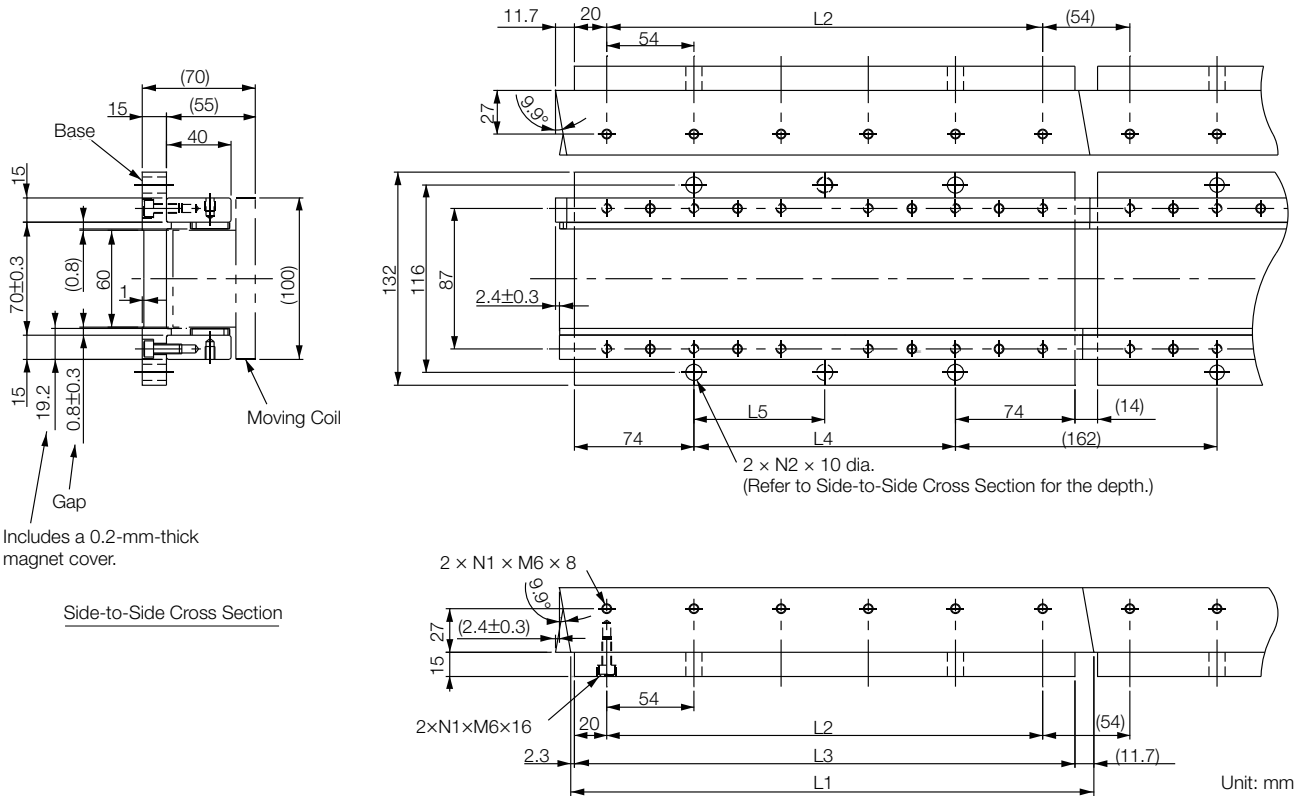


Note:

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 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



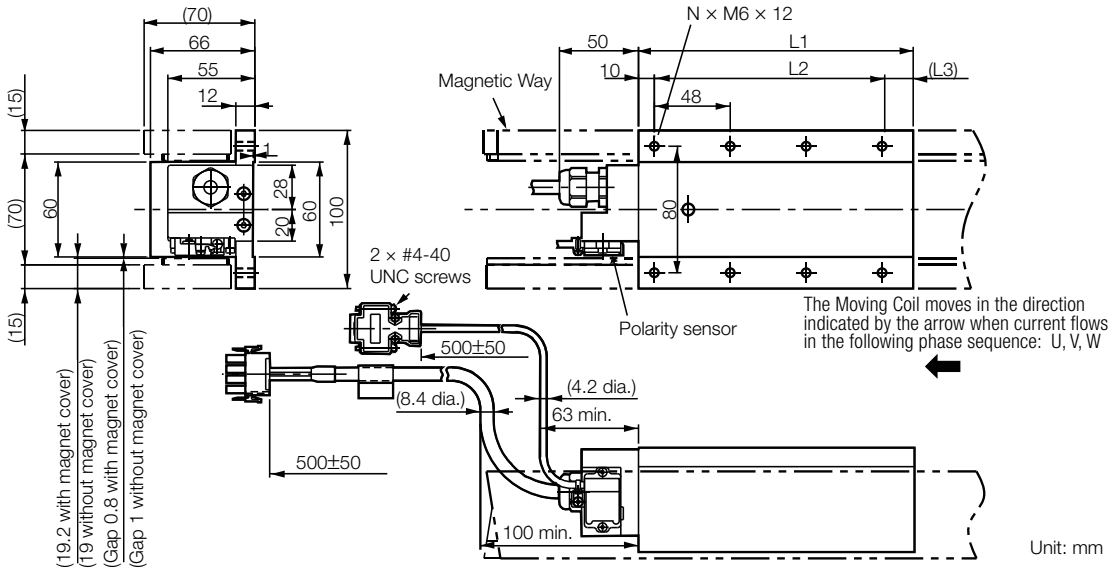
Note:

1. Two Magnetic Way tracks are used together as a set. More than one Magnetic Way can be connected.

Magnetic Way 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

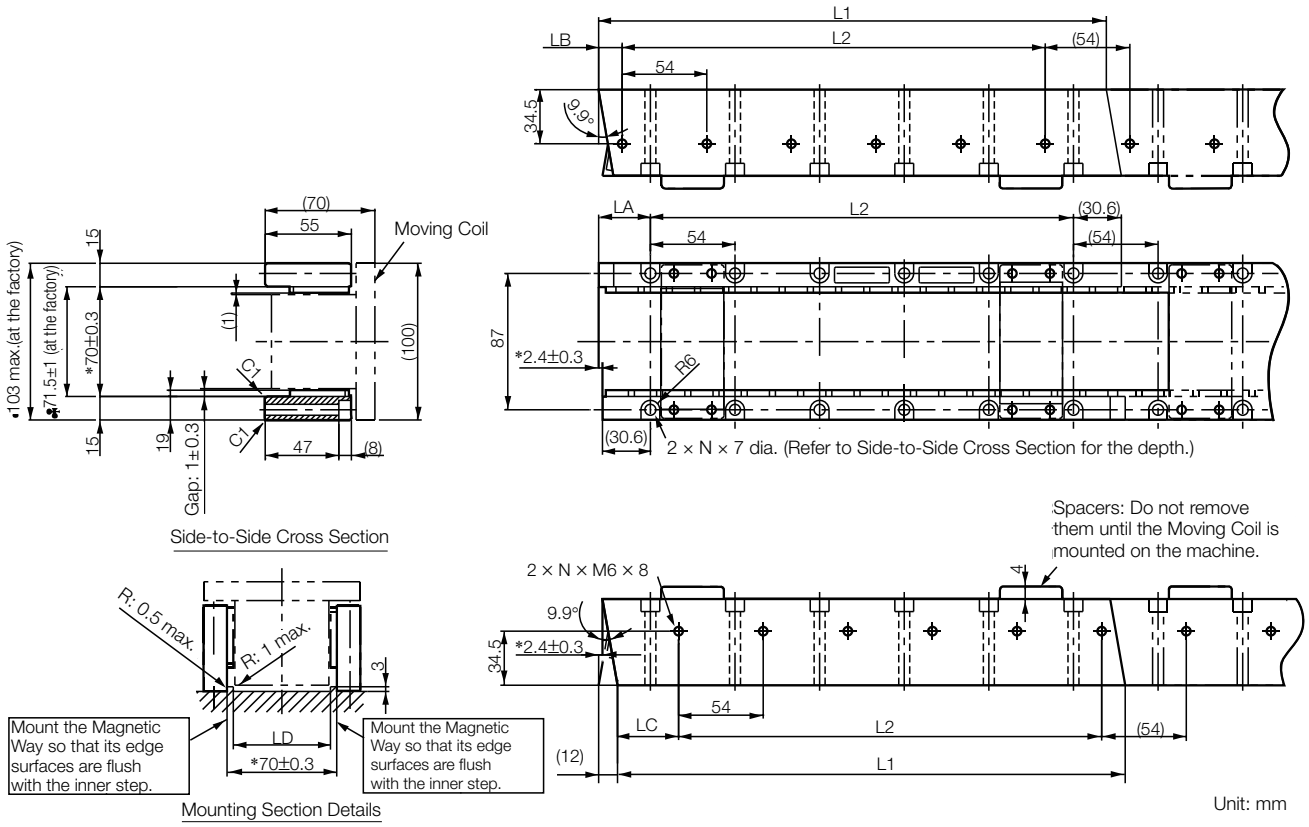
Moving Coils: SGLTW-35A□□□A□



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	6.7

Refer to the following section for the connector specifications for the Sensor Cable and Servomotor Main Circuit Cable or SGLTW-20A□□□A□ and -35A□□□A□ Moving Coils on page xx.

Magnetic Ways: SGLTM-35□□□A

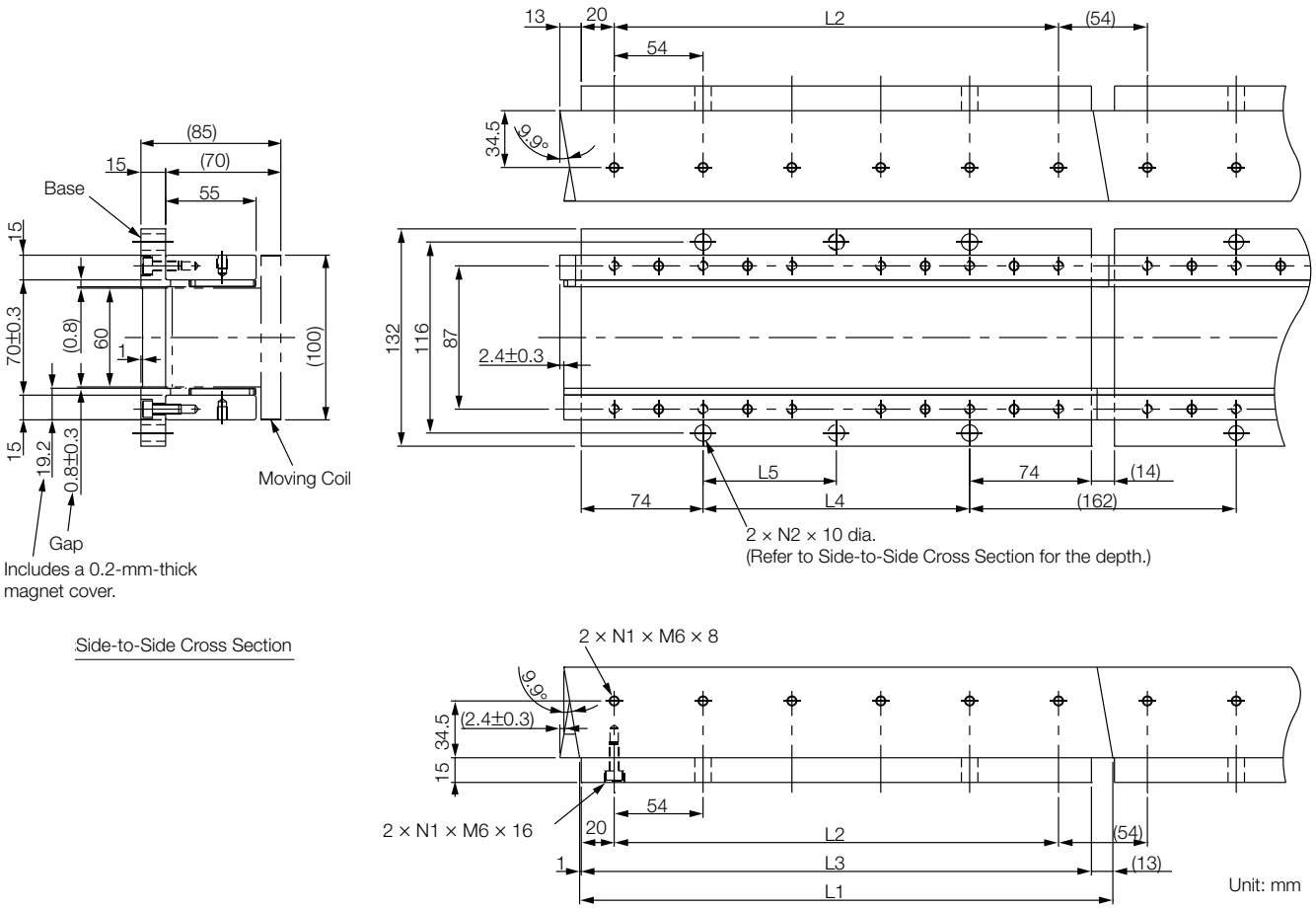


Note:

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



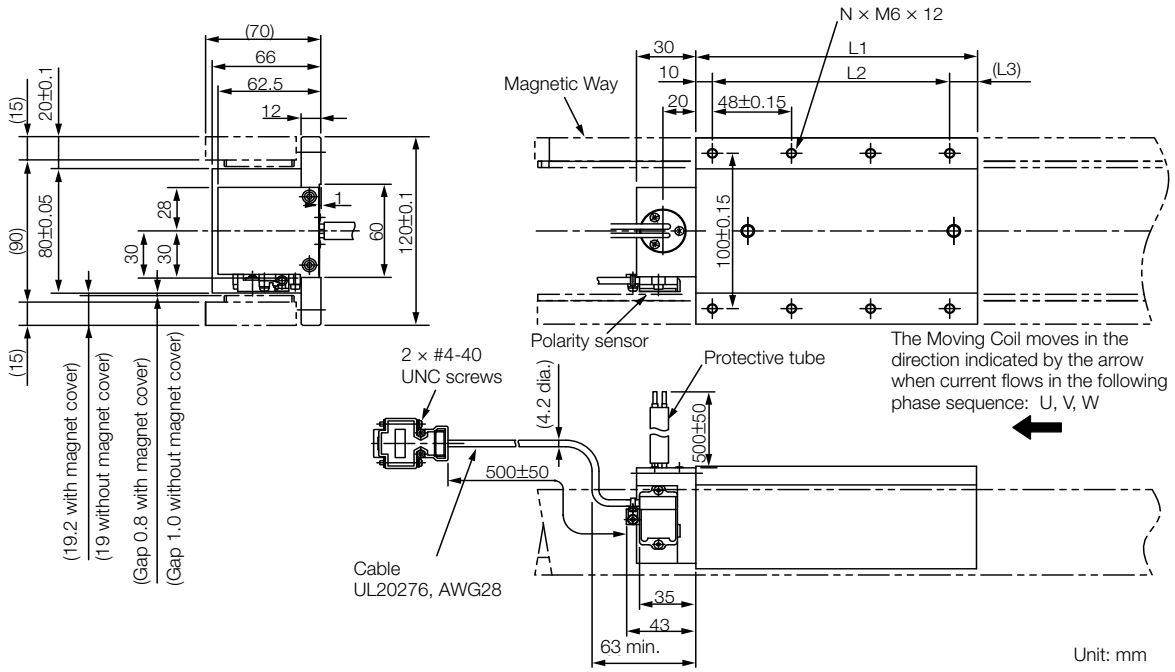
Note:

1. Two Magnetic Way tracks are used together as a set. More than one Magnetic Way can be connected.

Magnetic Way 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 35A□□□H□: High-Efficiency Models

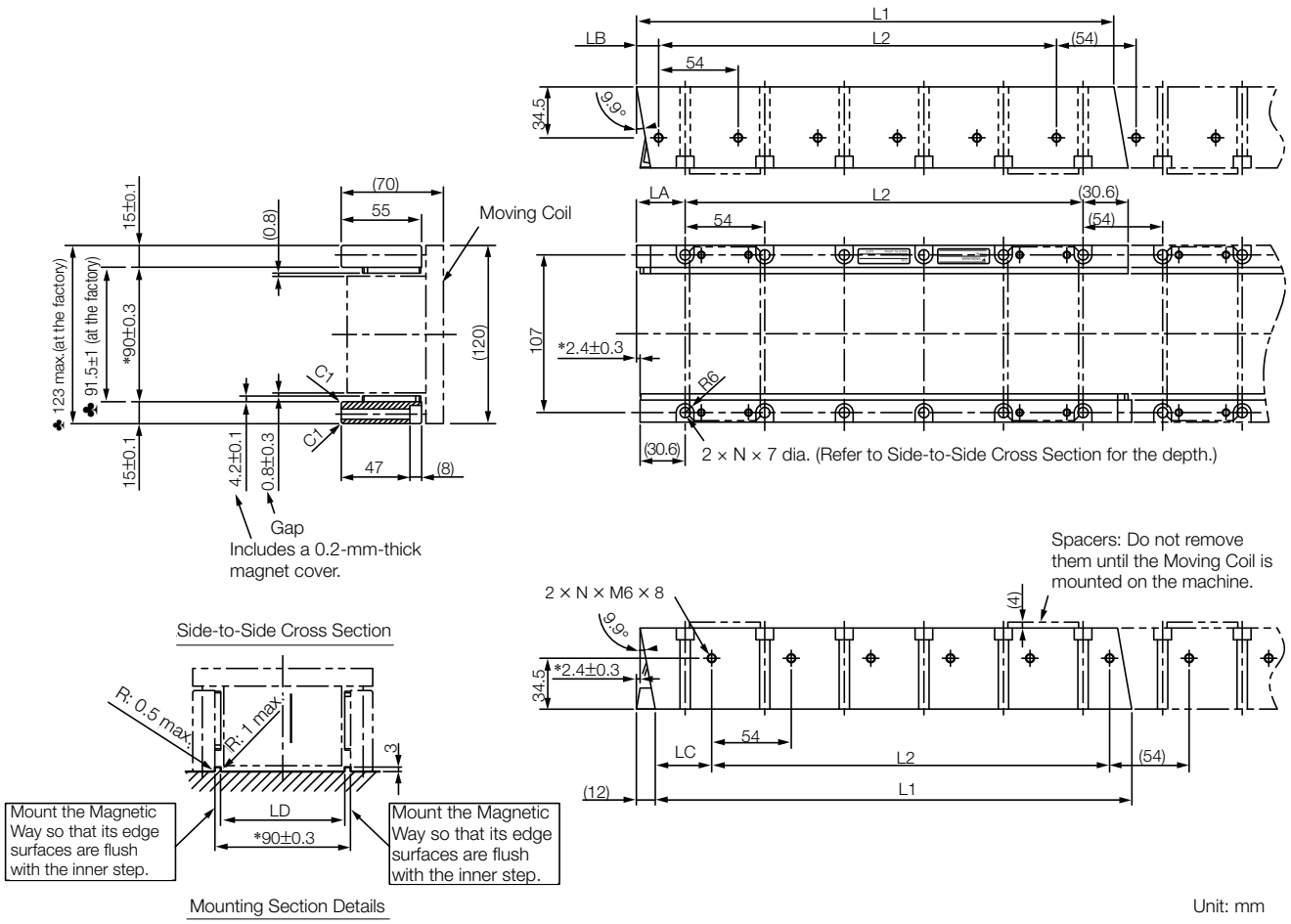
Moving Coils: SGLTW-35A□□□H□



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

Refer to the following section for the connector specifications for the Sensor Cable and Servomotor Main Circuit Cable or SGLTW-35A□□□H□ and -50A□□□H□ Moving Coils on page 202.

Magnetic Ways: SGLTM-35□□□H□



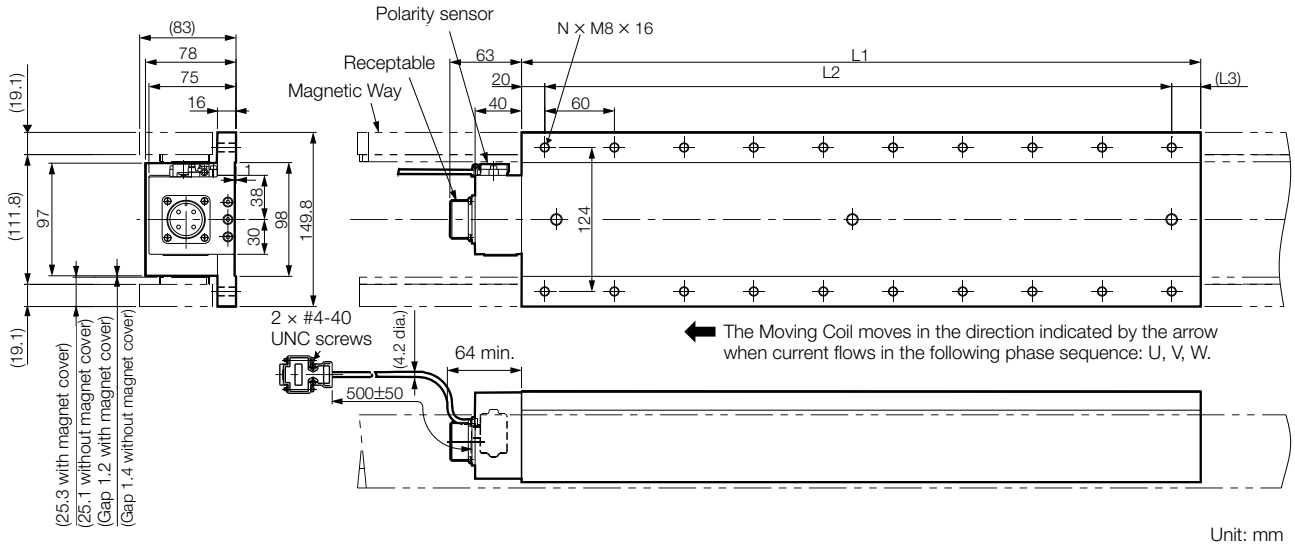
Note:

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□

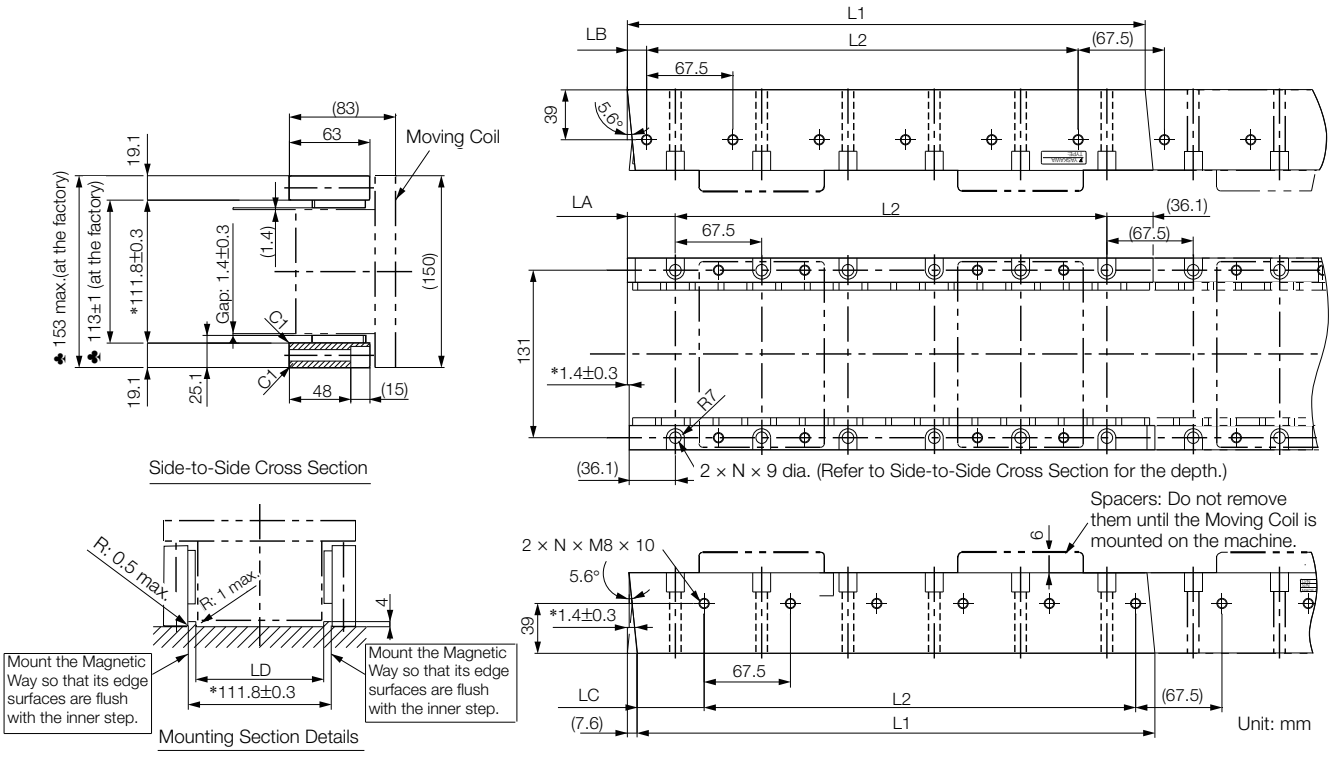


Unit: mm

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

Refer to the following section for the connector specifications for the Sensor Cable and Servomotor Main Circuit Cable or SGLTW-40A□□□B□ and -80A□□□B□ Moving Coils on page 201.

Magnetic Ways: SGLTM-40□□□A□

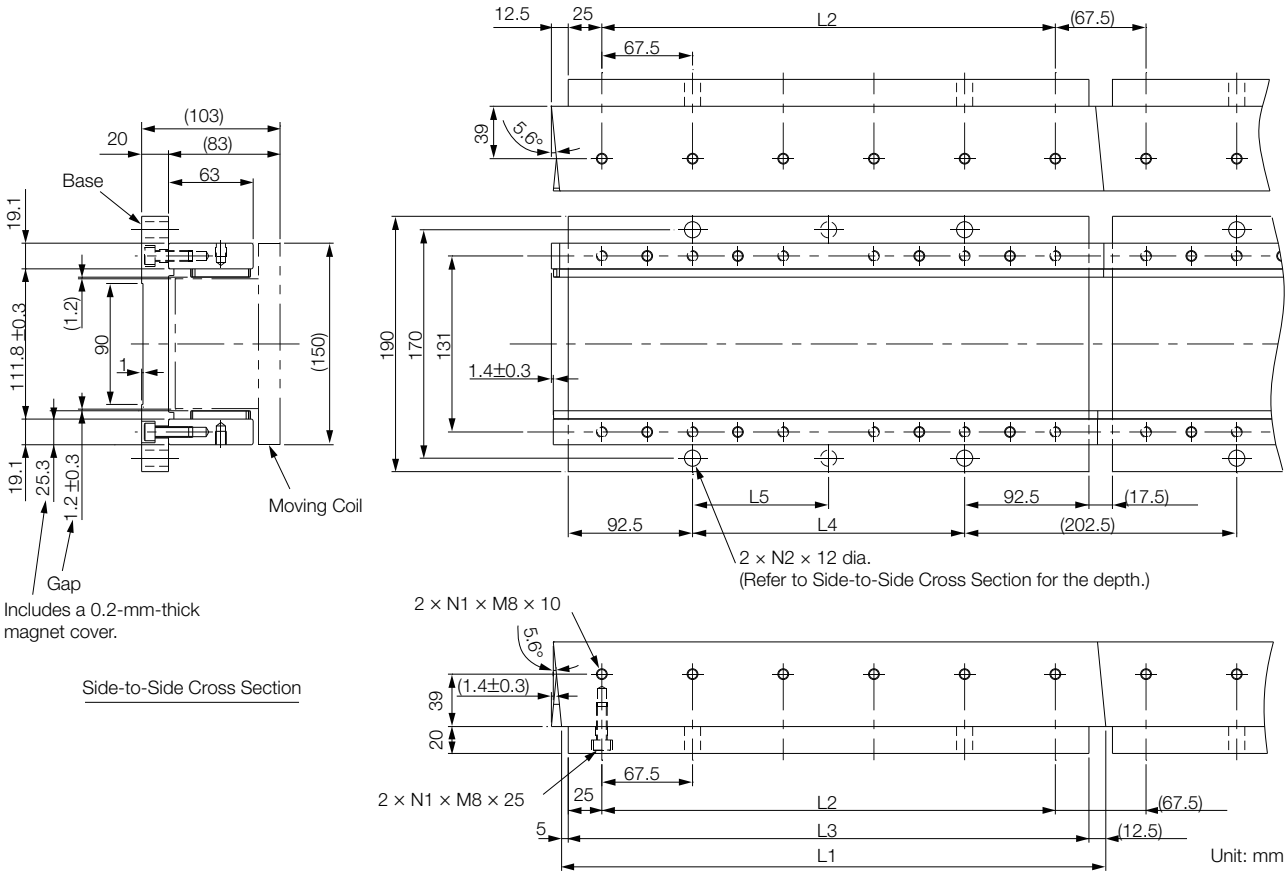


Note:

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)	$37.5^{0}_{-0.2}$	$15^{0}_{-0.2}$	$52.2^{0}_{-0.2}$	$100^{+0.6}_{0}$	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



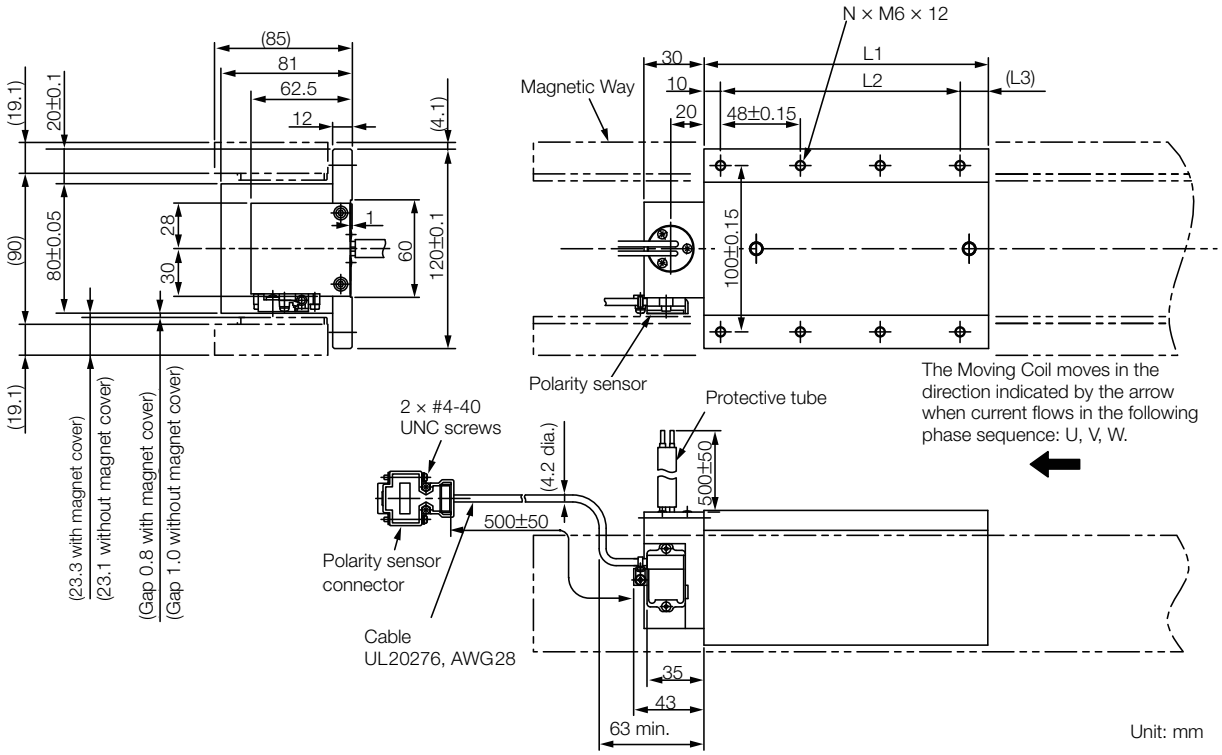
Note:

1. 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

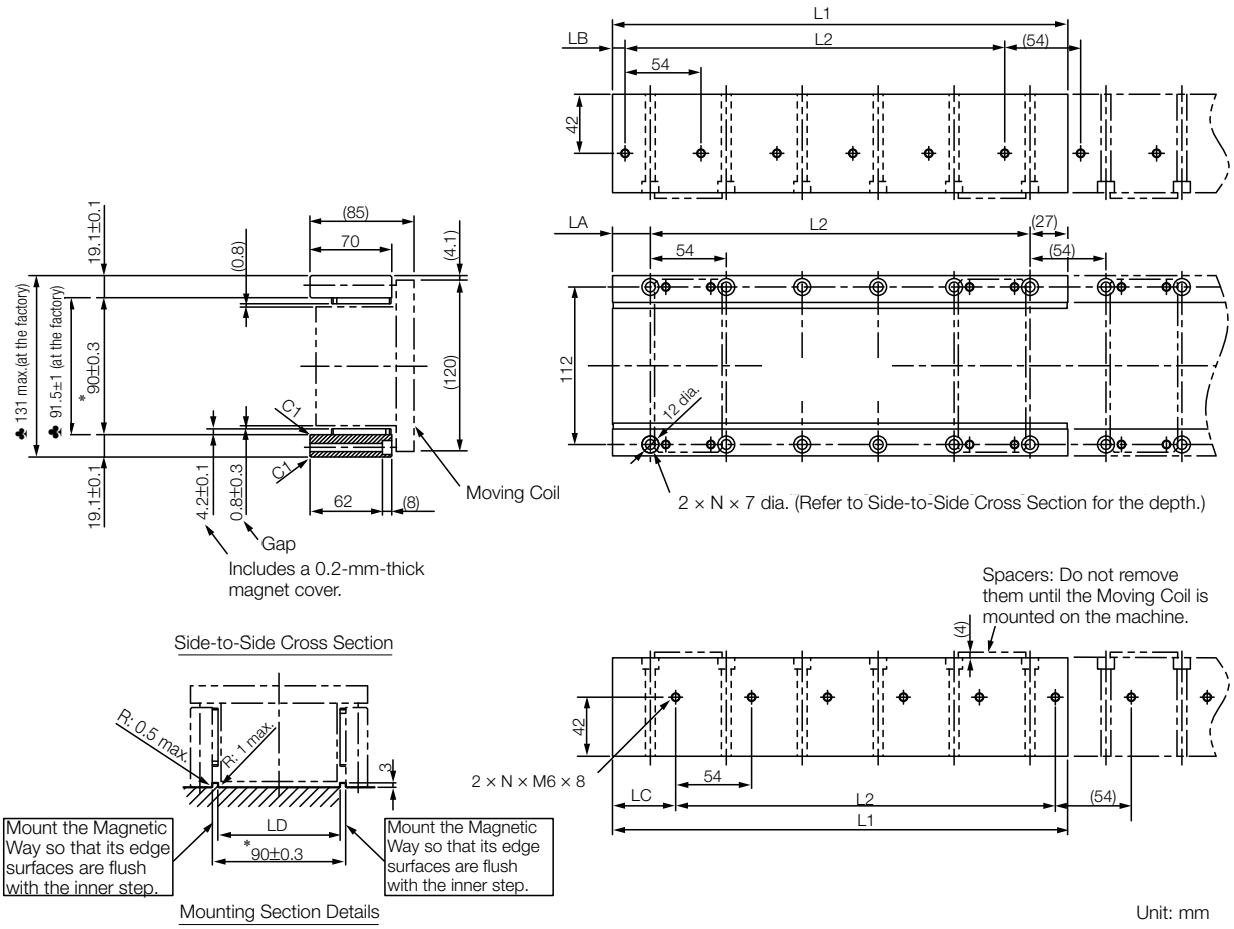
Moving Coils: SGLTW-50A□□□H□



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

Refer to the following section for the connector specifications for the Sensor Cable and Servomotor Main Circuit Cable or SGLTW-35A□□□H□ and -50A□□□H□ Moving Coils on page 202.

Magnetic Ways: SGLTM-50□□□H□



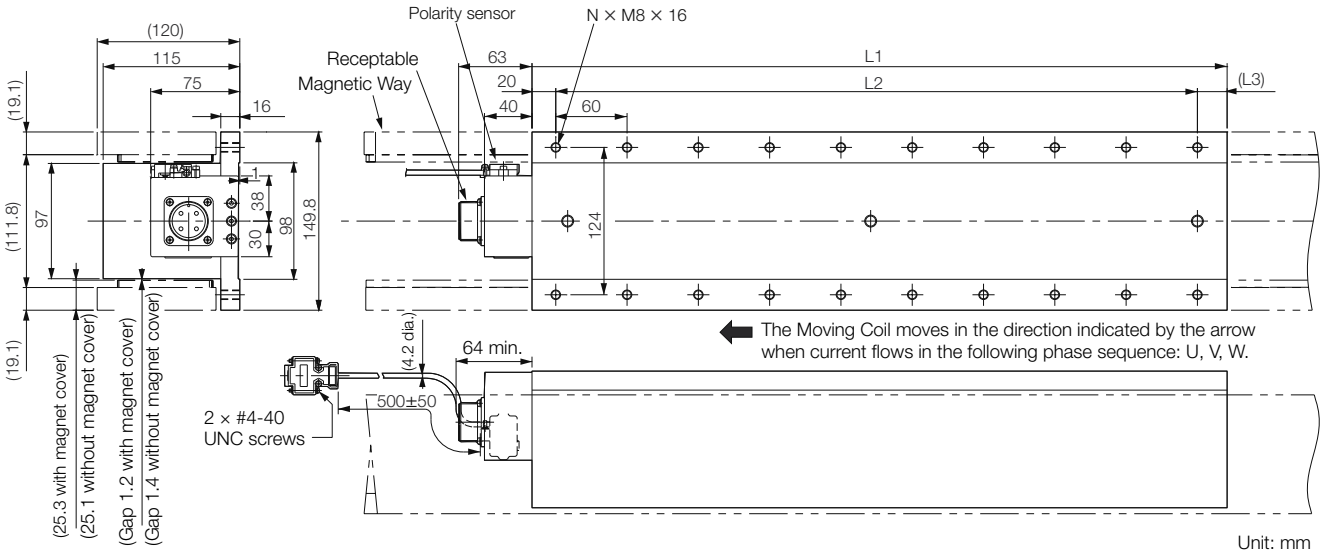
Note:

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□

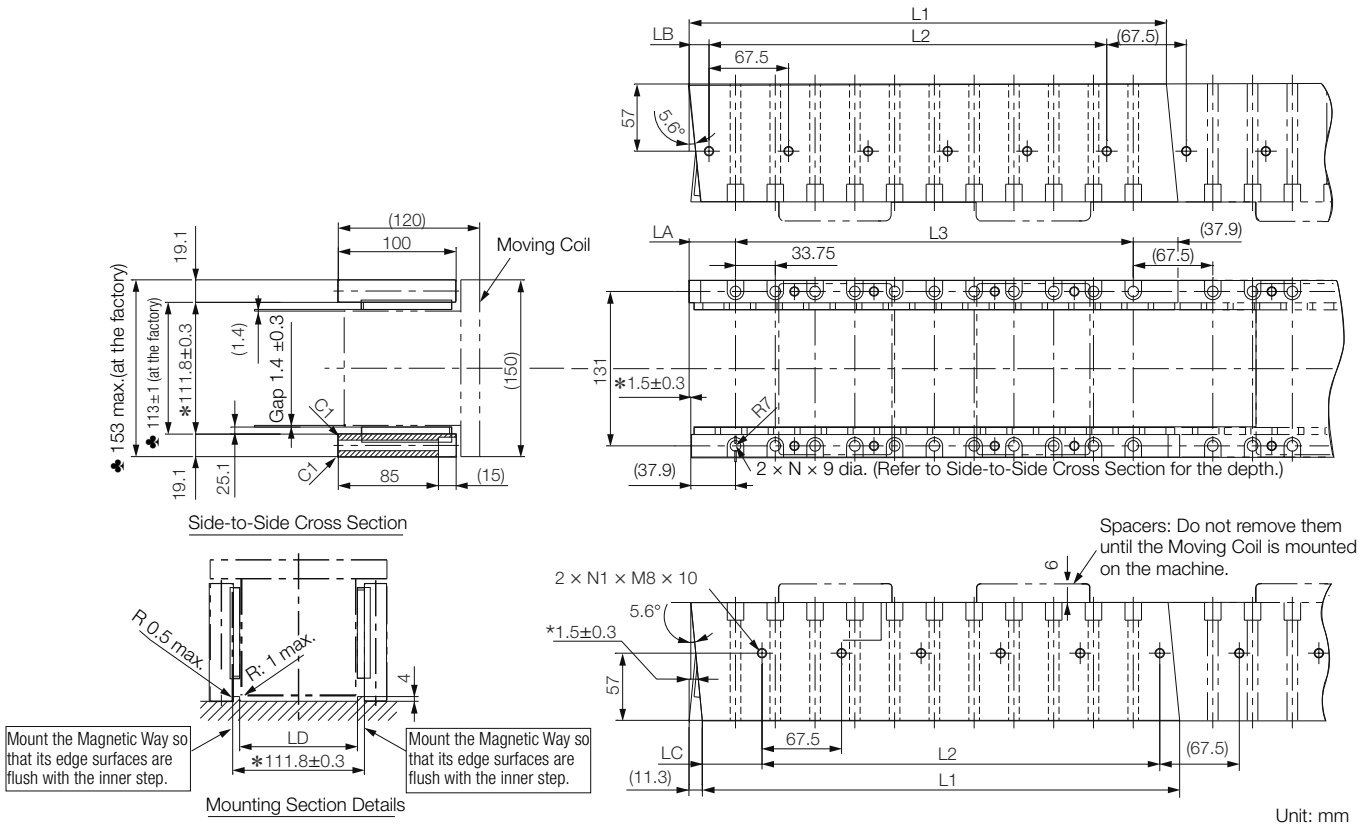


Unit: mm

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

Refer to the following section for the connector specifications for the Sensor Cable and Servomotor Main Circuit Cable or SGLTW-40A□□□B□ and -80A□□□B□ Moving Coils on page 201.

Magnetic Ways: SGLTM-80□□□A□



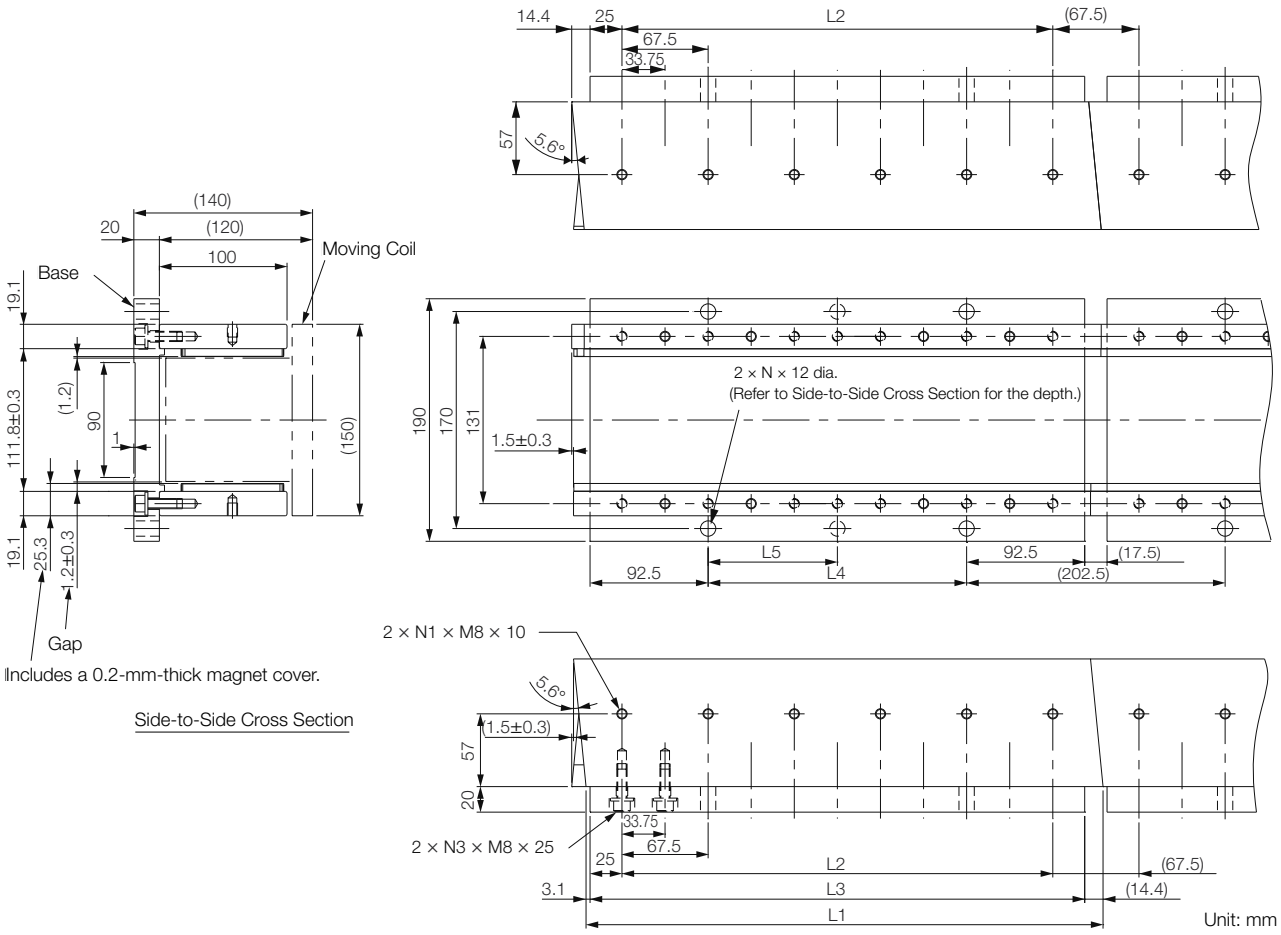
Unit: mm

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)	877.5 (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: SGLTM-80□□□AY



Note:

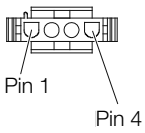
Two Magnetic Way tracks are used together as a set. More than one Magnetic Way can be connected.

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

SGLTW-20A□□□A□ and -35A□□□A□ Moving Coils

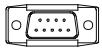
- Servomotor Connector



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

Mating Connector
Cap: 350780-1
Socket: 350537-3 or 350550-3

- Polarity Sensor Connector

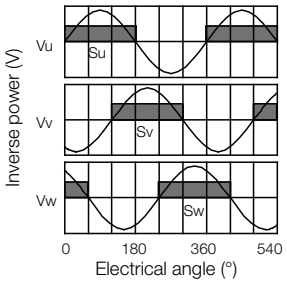


Pin connector: 17JE-23090-02 (D8C) -CG
From DDK Ltd.

Mating Connector
Socket connector: 17JE-13090-02 (D8C) A-CG
Studs: 17L-002C or 17L-002C1

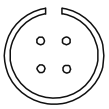
- Polarity Sensor Output Signal

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.



SGLTW-40A□□□B□ and -80A□□□B□ Moving Coils

- Servomotor Connector



Receptacle: MS3102A-22-22P
From DDK Ltd.

Mating Connector
Right-angle plug: MS3108B22-22S
Straight plug: MS3106B22-22S
Cable clamp: MS3057-12A

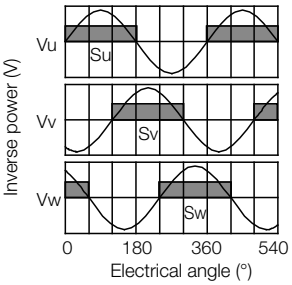
- Polarity Sensor Connector

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

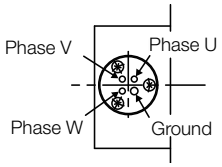
- Polarity Sensor Output Signal

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.



SGLTW-35A□□□H□ and -50A□□□H□ Moving Coils

- Moving Coil Lead
  Secure the lead from the Moving Coil of the Linear Servomotor so that it moves together with the Moving Coil.



(Viewed from the top surface of the Moving Coil.)

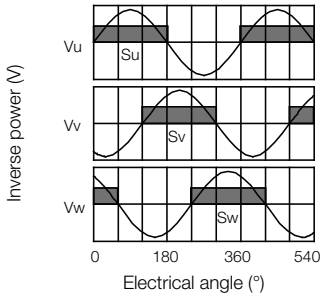
- Polarity Sensor Connector

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

- 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.



SGD7S-□□□A00A

Analog Voltage/
Pulse Train reference

SGD7S-□□□A10A

MECHATROLINK-II
communication
reference

SGD7S-□□□A20A

Single-axis
MECHATROLINK-III
communication
reference

SGD7S-□□□AA0A

EtherCAT
communication
reference

SGD7W-□□□A20A

Dual-axis
MECHATROLINK-III
communication
reference

SERVOPACKs

Sigma-7S Analog Voltage/Pulse Train	208
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Sigma-7S Analog Voltage/Pulse Train

Model Designations

SGD7S - R70 A 00 A 001

Sigma-7 Series Sigma-7S Models	1st ... 3rd	4th	5th + 6th	7th	8th ... 10th	digit

1st ... 3rd digit - Maximum Applicable Motor Capacity

Code	Specification
Three-phase, 200 V	
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	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

4th digit - Voltage

Code	Specification
A	200 VAC

5th + 6th digit - Interface

Code	Specification
00	Analog voltage/ pulse train reference
10	MECHATROLINK-II communication reference
20	MECHATROLINK-III communication reference
E0	Command Option Attachable Type
A0	EtherCAT communication reference

7th digit - Design Revision Order

A	

8th ... 10th digit - Hardware Options Specifications

Code	Specifications	Applicable Models
None	Without Options	All models
001	Rack-mounted	SGD7S-R70A to -330A
001	Duct-mounted	SGD7S-470A to -780A
002	Varnished	All models
008	Single-phase, 200 V power input	1.5 kW
00A	Varnished and single phase power input	All models

*1. You can use these models with either a single-phase or three-phase input.

Note: The same SERVOPACKs are used for both Rotary Servomotors and Linear Servomotors.

Ratings and Specifications

Ratings

Three-phase, 200 VAC

Model SGD7S-			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	84.0
Main Circuit	Power Supply		200 VAC to 240 VAC, -15% to +10%, 50 Hz/60 Hz										
	Input Current [Arms]*		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, -15% to +10%, 50 Hz/60 Hz										
Power Supply Capacity [kVA]*			0.2	0.3	0.5	1.0	1.3	1.6	2.3	3.2	4.0	5.9	7.5
Power Loss*	Main Circuit Power Loss [W]		5.1	7.3	13.5	24.0	20.1	43.8	53.6	65.8	111.9	113.8	263.7
	Control Circuit Power Loss [W]		17	17	17	17	17	17	17	22	22	22	27
	Built-in Regenerative Resistor Power Loss [W]		–	–	–	–	8	8	8	10	16	16	36.0
	Total Power Loss [W]		22.1	24.3	30.5	41.0	45.1	68.8	78.6	97.8	149.9	151.8	326.7
Regenerative Resistor	Built-In Regenerative Resistor	Resistance [Ω]	–	–	–	–	40	40	40	20	12	12	8
		Capacity [W]	–	–	–	–	40	40	40	60	60	60	180
	Minimum Allowable External Resistance [Ω]		40	40	40	40	40	40	40	20	12	12	8
Overvoltage Category			III										

* This is the net value at the rated load.

Model SGD7S-			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, -15% to +10%, 50 Hz/60 Hz			
	Input Current [Arms]*1		29	37	54	73
Control Power Supply			200 VAC to 240 VAC, -15% to +10%, 50 Hz/60 Hz			
Power Supply Capacity [kVA]* 1			10.7	14.6	21.7	29.6
Power Loss*1	Main Circuit Power Loss [W]		279.4	357.8	431.7	599.0
	Control Circuit Power Loss [W]		33	33	48	48
	External Regenerative Resistor Unit Power Loss [W]		180*2	180*3	350*3	350*3
	Total Power Loss [W]		312.4	390.8	479.7	647.0
External Regenerative Resistor Unit	External Regenerative Resistor Unit	Resistance [Ω]	6.25*2	3.13*3	3.13*3	3.13*3
		Capacity [W]	880*2	1760*3	1760*3	1760*3
	Minimum Allowable External Resistance [Ω]		5.8	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-RA04-E Regenerative Resistor Unit.

*3. This value is for the optional JUSP-RA05-E Regenerative Resistor Unit.

Single-phase, 200 VAC

Model SGD7S-			R70A	R90A	1R6A	2R8A	5R5A	120A *1
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, -15% to +10%, 50 Hz/60 Hz					
	Input Current [Arms]*		0.8	1.6	2.4	5.0	8.7	16
Control Power Supply			200 VAC to 240 VAC, -15% to +10%, 50 Hz/60 Hz					
Power Supply Capacity [kVA]*3			0.2	0.3	0.6	1.2	1.9	3.0
Power Loss* 3	Main Circuit Power Loss [W]		5.1	7.3	13.5	24.0	43.8	80.5
	Control Circuit Power Loss [W]		17	17	17	17	17	17
	Built-in Regenerative Resistor Power Loss [W]		–	–	–	–	8	10
	Total Power Loss [W]		22.1	24.3	30.5	41.0	68.8	107.5
Regenerative Resistor	Built-In Regenerative Resistor	Resistance [Ω]	–	–	–	–	40	20
		Capacity [W]	–	–	–	–	40	20
	Minimum Allowable External Resistance [Ω]		40	40	40	40	40	20
Overvoltage Category			III					

*1. Single-phase, 200-VAC power supply input is available as a hardware option.

*2. The ratings are 200 VAC to 240 VAC, -15% to +10%, 50 Hz/60 Hz

*3. This is the net value at the rated load.

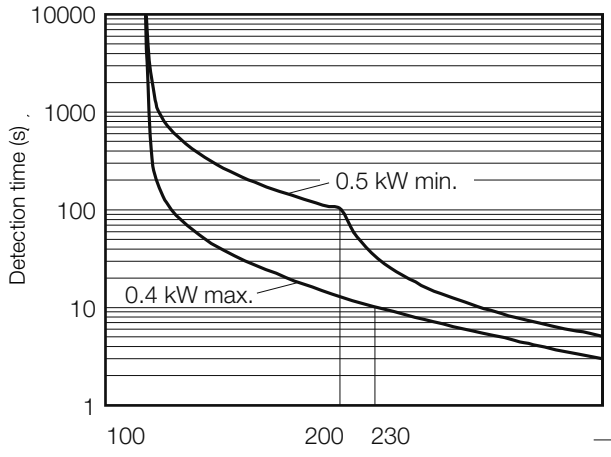
SERVOPACK Overload Protection Characteristics

The overload detection level is set for hot start conditions with a SERVOPACK surrounding air temperature of 55°C.

An overload alarm (A.710 or A.720) 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.

In most cases, that will be the overload protection characteristics of the Servomotor.



Note:

0.5 kW min.:
SERVOPACK model: SGD7S-3R8, -5R5, -7R6, -120, 180, -200, -330, -470, -550, -590, or -780

0.4 kW max.:
SERVOPACK model: SGD7S-R70, -R90, - 1R6, 2R8

$$\frac{\text{Instantaneous maximum output current}}{\text{Continuous output current}} \times 100\%$$

(Instantaneous maximum output current)

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.

Specifications

Item		Specification	
Control Method		IGBT-based PWM control, sine wave current drive	
Feedback	With Rotary Servomotor	Serial encoder: 20 bits or 24 bits (incremental encoder/absolute encoder) 22 bits (absolute encoder)	
	With Linear Servomotor	• Absolute linear encoder (The signal resolution depends on the absolute linear encoder.) • Incremental linear encoder (The signal resolution depends on the incremental linear encoder or Serial Converter Unit.)	
Environmental Conditions	Ambient 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 on page 212.	
	Storage Temperature	-20°C to 85°C	
	Ambient Air Humidity	95% relative humidity max. (with no freezing or condensation)	
	Storage Humidity	95% relative humidity max. (with no freezing or condensation)	
	Vibration Resistance	4.9 m/s^2	
	Shock Resistance	19.6 m/s^2	
	Protection Class	Class	SERVOPACK Model: SGD7S-
		IP20	R70A, R90A,1R6A, 2R8A, 3R8A, 5R5A, 7R6A,120A
		IP10	180A, 200A, 330A, 470A, 550A, 590A, 780A
	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	1,000 m or less With derating, usage is possible between 1,000 m and 2,000 m. Refer to the following section for Derating specifications on page 212.	
	Others	Do not use the SERVOPACK in the following locations: Locations subject to static electricity noise, strong electromagnetic/magnetic fields, or radioactivity	
Applicable Standards		UL 61800-5-1, EN 50178, CSA C22.2 No.14, EN 61800-5-1, EN 55011 group 1 class A, EN 61000-6-2, EN 61000-6-4, EN 61800-3, IEC 61508-1 to 4, IEC 61800-5-2, IEC 62061, ISO 13849-1, and IEC 61326-3-1	
Mounting		Mounting	SERVOPACK Model: SGD7S-
		Base-mounted	All models
		Rack-mounted	R70A, R90A, 1R6A, 2R8A, 3R8A, 5R5A, 7R6A, 120A, 180A, 200A
Performance	Speed Control Range	1:5000 (At the rated torque, the lower limit of the speed control range must not cause the Servomotor to stop.)	
	Coefficient of Speed Fluctuation*1	±0.01% of rated speed max. (for a load fluctuation of 0% to 100%)	
		0% of rated speed max. (for a voltage fluctuation of ±10%)	
		±0.1% of rated speed max. (for a temperature fluctuation of 25°C ±25°C)	
	Torque Control Precision (Repeatability)	±1%	
	Soft Start Time Setting	0 s to 10 s (Can be set separately for acceleration and deceleration.)	

Continued on next page.

Continued from previous page.

Item			Specification
I/O Signals	Encoder Divided Pulse Output		Phase A, phase B, phase C: Line-driver output Number of divided output pulses: Any setting is allowed.
	Linear Servomotor Overheat Protection Signal 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 Absolute Data Request (SEN)
		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: • Servo ON (/S-ON) • Proportional Control (/P-CON) • Forward Drive Prohibit (P-OT) and Reverse Drive Prohibit (N-OT) • Alarm Reset (/ALM-RST) • Forward External Torque Limit (/P-CL) and Reverse External Torque Limit (/N-CL) • Motor Direction (/SPD-D) • Internal Set Speed Selection (/SPD-A and /SPD-B) • Control Selection (/C-SEL) • Zero Clamping (/ZCLAMP) • Reference Pulse Inhibit (/INHIBIT) • Polarity Detection (/P-DET) • Gain Selection (/G-SEL) • Reference Pulse Input Multiplication Switch (/PSEL) • Absolute Data Request (SEN) 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 signal: Servo Alarm (ALM)
		Output Signals That Can Be Allocated	Allowable voltage range: 5 VDC to 30 VDC Number of output points: 6 (A photocoupler output (isolated) is used for three of the outputs.) (An open-collector output (non-isolated) is used for the other three outputs.)
			Output Signals: • Positioning Completion (/COIN) • Speed Coincidence Detection (/V-CMP) • Rotation Detection (/TGON) • Servo Ready Output (/S-RDY) • Torque Limit Detection (/CLT) • Speed Limit Detection (/VLT) • Brake (/BK) • Warning Output (/WARN) • Near Output (/NEAR) • Reference Pulse Input Multiplication Switching (/PSELA) • Alarm Code (ALO1, ALO2, and ALO3) A signal can be allocated and the positive and negative logic can be changed.
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)	Interface	Personal Computer (with SigmaWin+)
		Communications Standard	Conforms to USB 2.0 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 Settling time (±1%): 1.2 ms (Typ)
Dynamic Brake (DB)			Activated when a servo alarm or overtravel (OT) occurs, or when the power supply to the main circuit or servo is OFF.
Regenerative Processing			Built-in (An external resistor must be connected to the SGD7S-470A to -780A.) Refer to Built-In Regenerative Resistor on page 289.
Overtravel (OT) Prevention			Stopping with dynamic brake, deceleration to a stop, or coasting to a stop for the P-OT (Forward Drive Prohibit) or N-OT (Reverse Drive Prohibit) signal
Protective Functions			Overcurrent, overvoltage, low voltage, overload, regeneration error, etc.
Utility Functions			Gain adjustment, alarm history, 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).
	Applicable Standards*2		ISO13849-1 PLe (Category 3) and IEC61508 SIL3
Option Module			Fully-Closed Module and Safety Module

Continued from previous page.

Item					Specification
Controls	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		Approx. 14 kΩ
			Circuit Time Constant		30 μs
		Internal Set Speed Control	Rotation Direction Selection		With Proportional Control 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 1,073,741,824 reference units
		Input Signals	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
Controls	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	Approx. 14 kΩ
				Circuit Time Constant	16 μs

*1. The coefficient of speed fluctuation for load fluctuation is defined as follows:

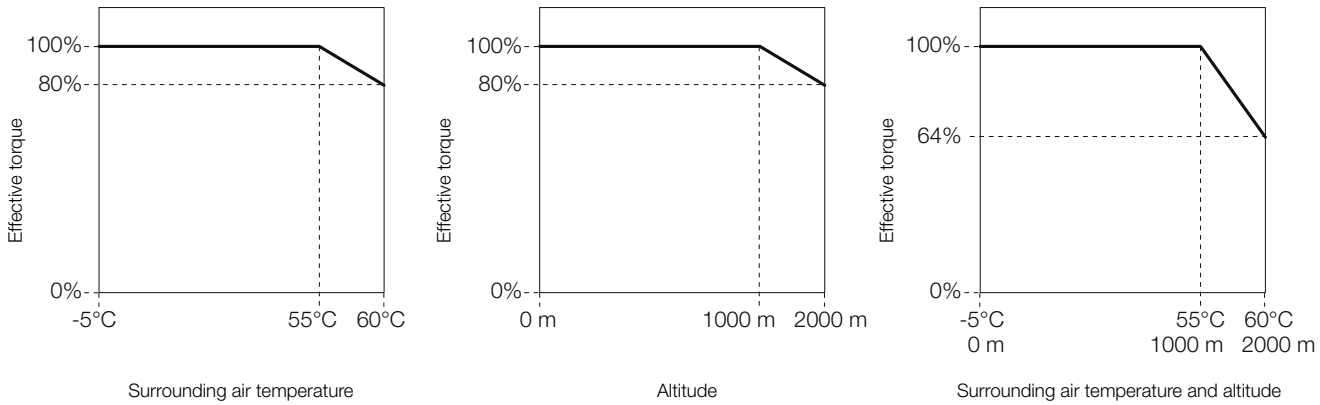
$$\text{Coeficient of speed fluctuation} = \frac{\text{No-load motor speed - Total-load motor speed}}{\text{Rated motor speed}} \times 100\%$$

*2. Always perform risk assessment for the system and confirm that the safety requirements are met.

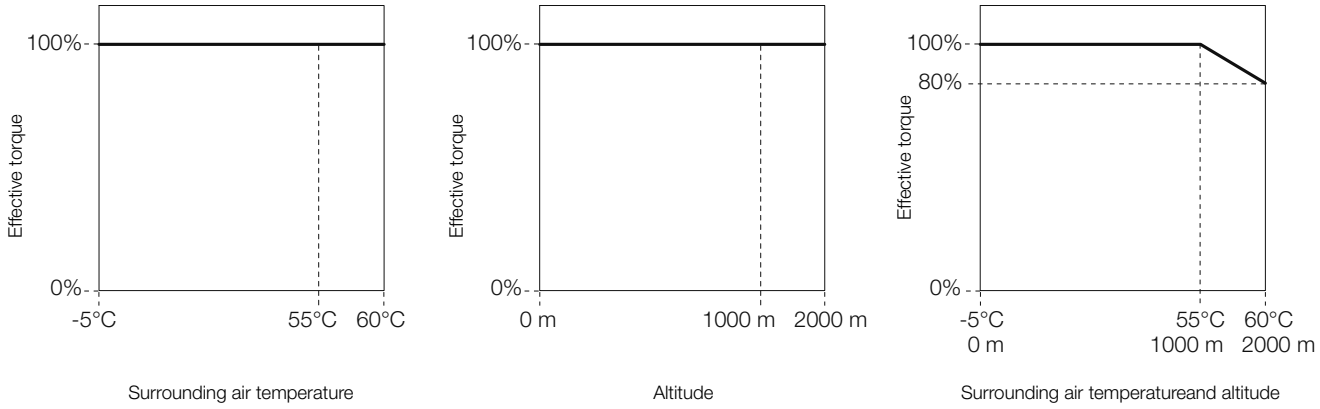
Derating Specifications

If you use the SERVOPACK at a surrounding air temperature of 55°C to 60°C or at an altitude of 1,000 m to 2,000 m, you must apply the derating rates given in the following graphs.

SGD7S-R70A, -R90A, -1R6A, and 2R8A



SGD7S-3R8A, -5R5A, -7R6A, -120A, -180A, -200A, -330A, -470A, -550A, -590A, and -780A



Model Designations

SGD7S - R70 A 10 A 001

Sigma-7 Series Sigma-7S Models	1st ... 3rd	4th	5th + 6th	7th	8th ... 10th	digit

1st ... 3rd digit - Maximum Applicable Motor Capacity

Code	Specification
Three-phase, 200 V	
R70*1	0.05 kW
R90*1	0.1 kW
1R6*1	0.2 kW
2R8	0.4 kW
3R8*1	0.5 kW
5R5*1	0.75 kW
7R6	1.0 kW
120	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

4th digit - Voltage

Code	Specification
A	200 VAC

5th + 6th digit - Interface*2

Code	Specification
00	Analog voltage/ pulse train reference
10	MECHATROLINK-II communication reference
20	MECHATROLINK-III communication reference
A0	EtherCAT communication reference

7th digit - Design Revision Order

A	

8th ... 10th digit - Hardware Options Specifications

Code	Specifications	Applicable Models
None	Without Options	All models
001	Rack-mounted	SGD7S-R70A to -330A
001	Duct-mounted	SGD7S-470A to -780A
002	Varnished	All models
008	Single-phase, 200 V power input	1.5 kW
00A	Varnished and single phase power input	All models

Note:

*1. You can use these models with either a single-phase or three-phase input.

*2. The same SERVOPACKs are used for both Rotary Servomotors and Linear Servomotors.

Ratings and Specifications

Ratings

Three-phase, 200 VAC

Model SGD7S-			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	84.0
Main Circuit	Power Supply		200 VAC to 240 VAC, -15% to +10%, 50 Hz/60 Hz										
	Input Current [Arms]*		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, -15% to +10%, 50 Hz/60 Hz										
Power Supply Capacity [kVA]*			0.2	0.3	0.5	1.0	1.3	1.6	2.3	3.2	4.0	5.9	7.5
Power Loss*	Main Circuit Power Loss [W]		5.1	7.3	13.5	24.0	20.1	43.8	53.6	65.8	111.9	113.8	263.7
	Control Circuit Power Loss [W]		17	17	17	17	17	17	17	22	22	22	27
	Built-in Regenerative Resistor Power Loss [W]		–	–	–	–	8	8	8	10	16	16	36.0
	Total Power Loss [W]		22.1	24.3	30.5	41.0	45.1	68.8	78.6	97.8	149.9	151.8	326.7
Regenerative Resistor	Built-In Regenerative Resistor	Resistance [Ω]	–	–	–	–	40	40	40	20	12	12	8
		Capacity [W]	–	–	–	–	40	40	40	60	60	60	180
	Minimum Allowable External Resistance [Ω]		40	40	40	40	40	40	40	20	12	12	8
Overvoltage Category			III										

* This is the net value at the rated load.

Model SGD7S-			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, -15% to +10%, 50 Hz/60 Hz			
	Input Current [Arms]*1		29	37	54	73
Control Power Supply			200 VAC to 240 VAC, -15% to +10%, 50 Hz/60 Hz			
Power Supply Capacity [kVA]* 1			10.7	14.6	21.7	29.6
Power Loss*1	Main Circuit Power Loss [W]		279.4	357.8	431.7	599.0
	Control Circuit Power Loss [W]		33	33	48	48
	External Regenerative Resistor Unit Power Loss [W]		180*2	180*3	350*3	350*3
	Total Power Loss [W]		312.4	390.8	479.7	647.0
External Regenerative Resistor Unit	External Regenerative Resistor Unit	Resistance [Ω]	6.25*2	3.13*3	3.13*3	3.13*3
		Capacity [W]	880*2	1760*3	1760*3	1760*3
	Minimum Allowable External Resistance [Ω]		5.8	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-RA04-E Regenerative Resistor Unit.

*3. This value is for the optional JUSP-RA05-E Regenerative Resistor Unit.

Single-phase, 200 VAC

Model SGD7S-			R70A	R90A	1R6A	2R8A	5R5A	120A *1
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, -15% to +10%, 50 Hz/60 Hz					
	Input Current [Arms]*3		0.8	1.6	2.4	5.0	8.7	16
Control Power Supply			200 VAC to 240 VAC, -15% to +10%, 50 Hz/60 Hz					
Power Supply Capacity [kVA]*3			0.2	0.3	0.6	1.2	1.9	3.0
Power Loss* 3	Main Circuit Power Loss [W]		5.1	7.3	13.5	24.0	43.8	80.5
	Control Circuit Power Loss [W]		17	17	17	17	17	17
	Built-in Regenerative Resistor Power Loss [W]		–	–	–	–	8	10
	Total Power Loss [W]		22.1	24.3	30.5	41.0	68.8	107.5
Regenerative Resistor	Built-In Regenerative Resistor	Resistance [Ω]	–	–	–	–	40	20
		Capacity [W]	–	–	–	–	40	20
	Minimum Allowable External Resistance [Ω]		40	40	40	40	40	20
Overvoltage Category			III					

*1. Single-phase, 200-VAC power supply input is available as a hardware option.

*2. The ratings are 220 VAC to 240 VAC, -15% to +10%, 50 Hz/60 Hz

*3. This is the net value at the rated load.

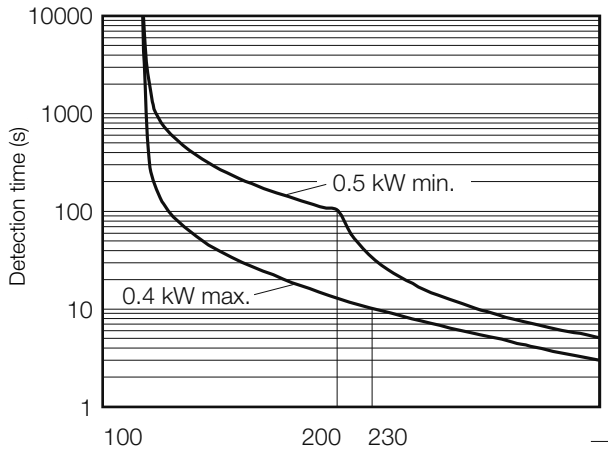
SERVOPACK Overload Protection Characteristics

The overload detection level is set for hot start conditions with a SERVOPACK surrounding air temperature of 55°C.

An overload alarm (A.710 or A.720) 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.

In most cases, that will be the overload protection characteristics of the Servomotor.



Note:

0.5 kW min.:
SERVOPACK model: SGD7S-3R8, -5R5, -7R6, -120, 180, -200, -330, -470, -550, -590, or -780

0.4 kW max.:
SERVOPACK model: SGD7S-R70, -R90, - 1R6, 2R8

$$\frac{\text{Instantaneous maximum output current}}{\text{Continuous output current}} \times 100\%$$

(Instantaneous maximum output current)

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.

Specifications

Item		Specification	
Control Method		IGBT-based PWM control, sine wave current drive	
Feedback	With Rotary Servomotor	Serial encoder: 20 bits or 24 bits (incremental encoder/absolute encoder) 22 bits (absolute encoder)	
	With Linear Servomotor	• Absolute linear encoder (The signal resolution depends on the absolute linear encoder.) • Incremental linear encoder (The signal resolution depends on the incremental linear encoder or Serial Converter Unit.)	
Environmental Conditions	Ambient 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 on page 219.	
	Storage Temperature	-20°C to 85°C	
	Ambient Air Humidity	95% relative humidity max. (with no freezing or condensation)	
	Storage Humidity	95% relative humidity max. (with no freezing or condensation)	
	Vibration Resistance	4.9 m/s^2	
	Shock Resistance	19.6 m/s^2	
	Protection Class	Class	SERVOPACK Model: SGD7S-
		IP20	R70A, R90A,1R6A, 2R8A, 3R8A, 5R5A, 7R6A,120A
		IP10	180A, 200A, 330A, 470A, 550A, 590A, 780A
	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	1,000 m or less With derating, usage is possible between 1,000 m and 2,000 m. Refer to the following section for Derating specifications on page 219.	
	Others	Do not use the SERVOPACK in the following locations: Locations subject to static electricity noise, strong electromagnetic/magnetic fields, or radioactivity	
Applicable Standards		UL 61800-5-1, EN 50178, CSA C22.2 No.14, EN 61800-5-1, EN 55011 group 1 class A, EN 61000-6-2, EN 61000-6-4, EN 61800-3, IEC 61508-1 to 4, IEC 61800-5-2, IEC 62061, ISO 13849-1, and IEC 61326-3-1	
Mounting		Mounting	SERVOPACK Model: SGD7S-
		Base-mounted	All models
		Rack-mounted	R70A, R90A, 1R6A, 2R8A, 3R8A, 5R5A, 7R6A, 120A, 180A, 200A
Performance	Speed Control Range	1:5000 (At the rated torque, the lower limit of the speed control range must not cause the Servomotor to stop.)	
	Coefficient of Speed Fluctuation*1	±0.01% of rated speed max. (for a load fluctuation of 0% to 100%)	
		0% of rated speed max. (for a voltage fluctuation of ±10%)	
		±0.1% of rated speed max. (for a temperature fluctuation of 25°C ±25°C)	
	Torque Control Precision (Repeatability)	±1%	
	Soft Start Time Setting	0 s to 10 s (Can be set separately for acceleration and deceleration.)	

Continued on next page.

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Item			Specification
I/O Signals	Encoder Divided Pulse Output		Phase A, phase B, phase C: Line-driver output Number of divided output pulses: Any setting is allowed.
	Linear Servomotor Overheat Protection Signal Input		Number of input points: 1 Input voltage range: 0 V to +5 V
		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: • Origin Return Deceleration Switch (/DEC) • External Latch 1 to 3 (/EXT 1 to 3) • Forward Drive Prohibit (P-OT) and Reverse Drive Prohibit (N-OT) • Forward External Torque Limit (/P-CL) and Reverse External Torque Limit (/N-CL) • Polarity Detection (/P-DET) 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 signal: Servo Alarm (ALM)
		Output Signals That Can Be Allocated	Allowable voltage range: 5 VDC to 30 VDC Number of output points: 3 (A photocoupler output (isolated) is used.)
			Output Signals: • Positioning Completion (/COIN) • Speed Coincidence Detection (/V-CMP) • Rotation Detection (/TGON) • Servo Ready Output (/S-RDY) • Torque Limit Detection (/CLT) • Speed Limit Detection (/VLT) • Brake (/BK) • Warning Output (/WARN) • Near Output (/NEAR) A signal can be allocated and the positive and negative logic can be changed.
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)	Interface	Personal Computer (with SigmaWin+)
		Communications Standard	Conforms to USB 2.0 standard (12 Mbps).
Displays/ Indicators			CHARGE, PWR, and COM indicators, and one-digit seven-segment display
Panel Operator			Four push switches

Continued on next page.

Item		Specification
MECHATROLINK-II Communications	Communications Protocol	MECHATROLINK-II
	Station Address Settings	41 to 5F hex (maximum number of slaves: 30) Selected with the combination of a rotary switch (S2) and DIP switch (S3).
	Baud Rate	10 Mbps, 4 Mbps
	Transmission Cycle	250 µs or 0.5 ms to 4.0 ms (multiples of 0.5 ms)
	Number of Transmission Bytes	17 or 32 bytes/station A DIP switch (S3) is used to select the number of transmission bytes.
Reference Method	Performance	Position, speed, or torque control with MECHATROLINK-II communications
	Reference Input	MECHATROLINK-I or MECHATROLINK-II commands (sequence, motion, data setting, data access, monitoring, adjustment, etc.)
MECHATROLINK-II Communications Setting Switches		Rotary switch (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 Settling time (±1%): 1.2 ms (Typ)
Dynamic Brake (DB)		Activated when a servo alarm or overtravel (OT) occurs, or when the power supply to the main circuit or servo is OFF.
Regenerative Processing		Built-in (An external resistor must be connected to the SGD7S-470A to -780A.) Refer to Built-In Regenerative Resistor on page 289.
Overtravel (OT) Prevention		Stopping with dynamic brake, deceleration to a stop, or coasting to a stop for the P-OT (Forward Drive Prohibit) or N-OT (Reverse Drive Prohibit) signal
Protective Functions		Overcurrent, overvoltage, low voltage, overload, regeneration error, etc.
Utility Functions		Gain adjustment, alarm history, 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).
	Applicable Standards*2	ISO13849-1 PLe (Category 3) and IEC61508 SIL3
Option Module		Fully-Closed Module and Safety Module

*1. The coefficient of speed fluctuation for load fluctuation is defined as follows:

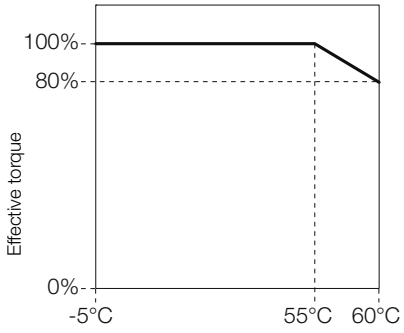
$$\text{Coeficient of speed fluctuation} = \frac{\text{No-load motor speed - Total-load motor speed}}{\text{Rated motor speed}} \times 100\%$$

*2. Always perform risk assessment for the system and confirm that the safety requirements are met.

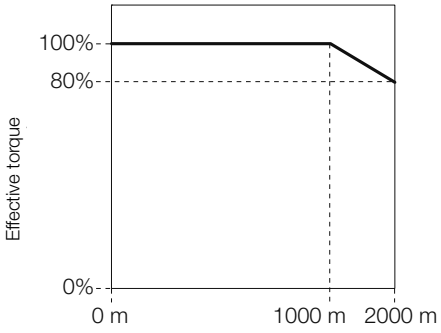
Derating Specifications

If you use the SERVOPACK at a surrounding air temperature of 55°C to 60°C or at an altitude of 1,000 m to 2,000 m, you must apply the derating rates given in the following graphs.

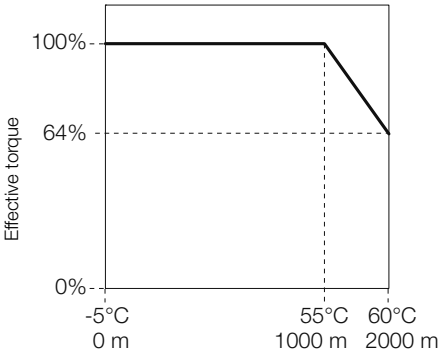
SGD7S-R70A, -R90A, -1R6A, and -2R8A



Surrounding air temperature

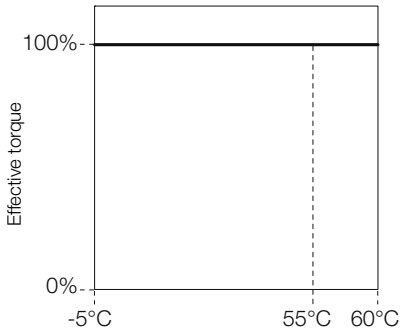


Altitude

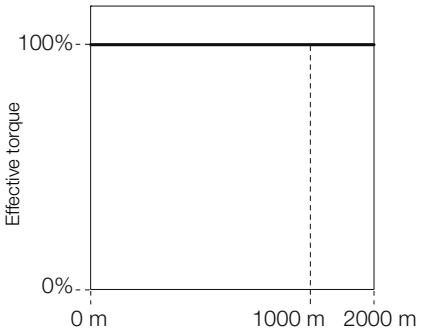


Surrounding air temperature and altitude

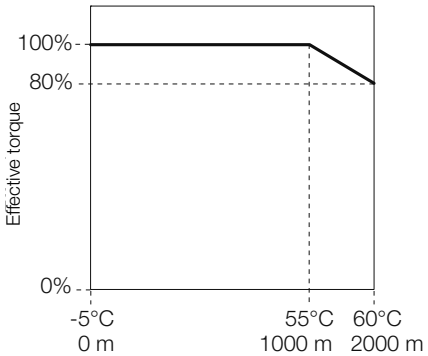
SGD7S-3R8A, -5R5A, -7R6A, -120A, -180A, -200A, -330A, -470A, -550A, -590A, and -780A



Surrounding air temperature



Altitude



Surrounding air temperature and altitude

Model Designations

SGD7S - R70 A 20 A 001

Sigma-7 Series SERVOPACKs Single-axis	1st ... 3rd	4th	5th + 6th	7th	8th ... 10th	digit

1st ... 3rd digit - Maximum Applicable Motor Capacity

Code	Specifications
	Three-phase, 200 V
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	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

4th digit - Voltage

Code	Specifications
A	200 VAC

5th + 6th digit - Interface *

Code	Specifications*
00	Analog voltage/pulse train reference
10	MECHATROLINK-II communication reference
20	MECHATROLINK-III communication reference
A0	EtherCAT communication reference

7th digit - Design Revision Order

Code	Specifications
A	

8th ... 10th digit - Hardware Options Specifications

Code	Specifications	Applicable Models
None	Without Options	All models
001	Rack-mounted	SGD7S-R70Ato -330A
001	Duct-mounted	SGD7S-470A to -780A
002	Varnished	All models
008	Single-phase, 200 V power input	1.5 kW
00A	Varnished and single phase power input	All models

Note:

*1 You can use these models with either a single-phase or three-phase power supply input.

*2 The same SERVOPACKs are used for both Rotary Servomotors and Linear Servomotors.

Ratings and Specifications

Ratings

Three-phase, 200 VAC

Model SGD7S-			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	84.0
Main Circuit	Power Supply		200 VAC to 240 VAC, -15% to +10%, 50 Hz/60 Hz										
	Input Current [Arms]*		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, -15% to +10%, 50 Hz/60 Hz										
Power Supply Capacity [kVA]*			0.2	0.3	0.5	1.0	1.3	1.6	2.3	3.2	4.0	5.9	7.5
Power Loss*	Main Circuit Power Loss [W]		5.1	7.3	13.5	24.0	20.1	43.8	53.6	65.8	111.9	113.8	263.7
	Control Circuit Power Loss [W]		17	17	17	17	17	17	17	22	22	22	27
	Built-in Regenerative Resistor Power Loss [W]		–	–	–	–	8	8	8	10	16	16	36.0
	Total Power Loss [W]		22.1	24.3	30.5	41.0	45.1	68.8	78.6	97.8	149.9	151.8	326.7
Regenerative Resistor	Built-In Regenerative Resistor	Resistance [Ω]	–	–	–	–	40	40	40	20	12	12	8
		Capacity [W]	–	–	–	–	40	40	40	60	60	60	180
	Minimum Allowable External Resistance [Ω]		40	40	40	40	40	40	40	20	12	12	8
Overvoltage Category			III										

* This is the net value at the rated load.

Model SGD7S-			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, -15% to +10%, 50 Hz/60 Hz			
	Input Current [Arms]*1		29	37	54	73
Control Power Supply			200 VAC to 240 VAC, -15% to +10%, 50 Hz/60 Hz			
Power Supply Capacity [kVA]* 1			10.7	14.6	21.7	29.6
Power Loss*1	Main Circuit Power Loss [W]		279.4	357.8	431.7	599.0
	Control Circuit Power Loss [W]		33	33	48	48
	External Regenerative Resistor Unit Power Loss [W]		180*2	180*3	350*3	350*3
	Total Power Loss [W]		312.4	390.8	479.7	647.0
External Regenerative Resistor Unit	External Regenerative Resistor Unit	Resistance [Ω]	6.25*2	3.13*3	3.13*3	3.13*3
		Capacity [W]	880*2	1760*3	1760*3	1760*3
	Minimum Allowable External Resistance [Ω]		5.8	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-RA04-E Regenerative Resistor Unit.

*3. This value is for the optional JUSP-RA05-E Regenerative Resistor Unit.

Single-phase, 200 VAC

Model SGD7S-			R70A	R90A	1R6A	2R8A	5R5A	120A *1
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, -15% to +10%, 50 Hz/60 Hz					
	Input Current [Arms]*3		0.8	1.6	2.4	5.0	8.7	16
Control Power Supply			200 VAC to 240 VAC, -15% to +10%, 50 Hz/60 Hz					
Power Supply Capacity [kVA]*3			0.2	0.3	0.6	1.2	1.9	3.0
Power Loss* 3	Main Circuit Power Loss [W]		5.1	7.3	13.5	24.0	43.8	80.5
	Control Circuit Power Loss [W]		17	17	17	17	17	17
	Built-in Regenerative Resistor Power Loss [W]		–	–	–	–	8	10
	Total Power Loss [W]		22.1	24.3	30.5	41.0	68.8	107.5
Regenerative Resistor	Built-In Regenerative Resistor	Resistance [Ω]	–	–	–	–	40	20
		Capacity [W]	–	–	–	–	40	20
	Minimum Allowable External Resistance [Ω]		40	40	40	40	40	20
Overvoltage Category			III					

*1. Single-phase, 200-VAC power supply input is available as a hardware option.

*2. The ratings are 220 VAC to 240 VAC, -15% to +10%, 50 Hz/60 Hz

*3. This is the net value at the rated load.

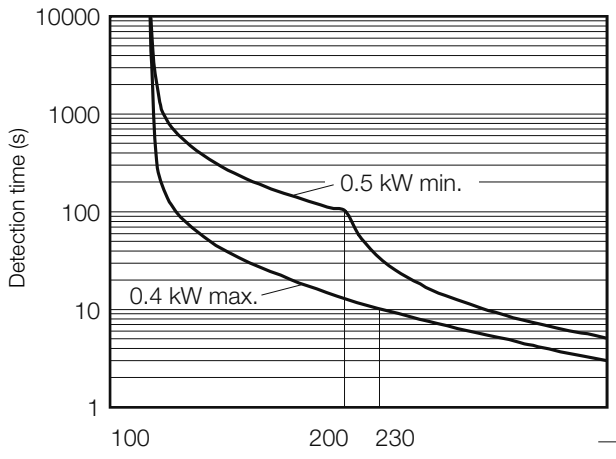
SERVOPACK Overload Protection Characteristics

The overload detection level is set for hot start conditions with a SERVOPACK surrounding air temperature of 55°C.

An overload alarm (A.710 or A.720) 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.

In most cases, that will be the overload protection characteristics of the Servomotor.



Note:

0.5 kW min.:
SERVOPACK model: SGD7S-3R8, -5R5, -7R6, -120, 180, -200, -330, -470, -550, -590, or -780

0.4 kW max.:
SERVOPACK model: SGD7S-R70, -R90, - 1R6, 2R8

$$\frac{\text{Instantaneous maximum output current}}{\text{Continuous output current}} \times 100\%$$

(Instantaneous maximum output current)

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.

Specifications

Item		Specification	
Drive Method		IGBT-based PWM control, sine wave current drive	
Feedback	With Rotary Servomotor	Serial encoder: 20 bits or 24 bits (incremental encoder/absolute encoder) 22 bits (absolute encoder)	
	With Linear Servomotor	• Absolute linear encoder (The signal resolution depends on the absolute linear encoder.) • Incremental linear encoder (The signal resolution depends on the incremental linear encoder or Serial Converter Unit.)	
Environmental Conditions	Ambient 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 on page 226.	
	Storage Temperature	-20°C to 85°C	
	Ambient Air Humidity	95% relative humidity max. (with no freezing or condensation)	
	Storage Humidity	95% relative humidity max. (with no freezing or condensation)	
	Vibration Resistance	4.9 m/s^2	
	Shock Resistance	19.6 m/s^2	
	Protection Class	Class	SERVOPACK Model: SGD7S-
		IP20	R70A, R90A,1R6A, 2R8A, 3R8A, 5R5A, 7R6A,120A
		IP10	180A, 200A, 330A, 470A, 550A, 590A, 780A
	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	1,000 m or less With derating, usage is possible between 1,000 m and 2,000 m. Refer to the following section for Derating specifications on page 226.	
	Others	Do not use the SERVOPACK in the following locations: Locations subject to static electricity noise, strong electromagnetic/magnetic fields, or radioactivity	
Applicable Standards		UL 61800-5-1, EN 50178, CSA C22.2 No.14, EN 61800-5-1, EN 55011 group 1 class A, EN 61000-6-2, EN 61000-6-4, EN 61800-3, IEC 61508-1 to 4, IEC 61800-5-2, IEC 62061, ISO 13849-1, and IEC 61326-3-1	
Mounting		Mounting	SERVOPACK Model: SGD7S-
		Base-mounted	All models
		Rack-mounted	R70A, R90A, 1R6A, 2R8A, 3R8A, 5R5A, 7R6A, 120A, 180A, 200A
Performance	Speed Control Range	1:5000 (At the rated torque, the lower limit of the speed control range must not cause the Servomotor to stop.)	
	Coefficient of Speed Fluctuation*1	±0.01% of rated speed max. (for a load fluctuation of 0% to 100%)	
		0% of rated speed max. (for a voltage fluctuation of ±10%)	
		±0.1% of rated speed max. (for a temperature fluctuation of 25°C ±25°C)	
	Torque Control Precision (Repeatability)	±1%	
	Soft Start Time Setting	0 s to 10 s (Can be set separately for acceleration and deceleration.)	

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Item			Specification
I/O Signals	Encoder Divided Pulse Output		Phase A, phase B, phase C: Line-driver output Number of divided output pulses: Any setting is allowed.
	Linear Servomotor Overheat Protection Signal Input		Number of input points: 1 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: 7
			Input method: Sink inputs or source inputs Input Signals: • Origin Return Deceleration Switch (/DEC) • External Latch 1 to 3 (/EXT 1 to 3) • Forward Drive Prohibit (P-OT) and Reverse Drive Prohibit (N-OT) • Forward External Torque Limit (/P-CL) and Reverse External Torque Limit (/N-CL) • Polarity Detection (/P-DET) 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 signal: Servo Alarm (ALM)
		Output Signals That Can Be Allocated	Allowable voltage range: 5 VDC to 30 VDC Number of output points: 3 (A photocoupler output (isolated) is used.)
			Output Signals: • Positioning Completion (/COIN) • Speed Coincidence Detection (/V-CMP) • Rotation Detection (/TGON) • Servo Ready Output (/S-RDY) • Torque Limit Detection (/CLT) • Speed Limit Detection (/VLT) • Brake (/BK) • Warning Output (/WARN) • Near Output (/NEAR) A signal can be allocated and the positive and negative logic can be changed.
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)	Interface	Personal Computer (with SigmaWin+)
		Communications Standard	Conforms to USB 2.0 standard (12 Mbps).
Displays/ Indicators			CHARGE, PWR, COM, L1, and L2 indicators, and one-digit seven-segment display

Continued on next page.

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Item		Specification
MECHATROLINK-II Communications	Communications Protocol	MECHATROLINK-II
	Station Address Settings	03 to EF hex (maximum number of slaves: 62) The rotary switches (S1 and S2) are used to set the station address.
	Baud Rate	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	16, 32, or 48 bytes/station A DIP switch (S3) is used to select the number of transmission bytes.
Reference Method	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-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 Settling time (±1%): 1.2 ms (Typ)
Dynamic Brake (DB)		Activated when a servo alarm or overtravel (OT) occurs, or when the power supply to the main circuit or servo is OFF.
Regenerative Processing		Built-in (An external resistor must be connected to the SGD7S-470A to -780A.) Refer to Built-In Regenerative Resistor on page 289.
Overtravel (OT) Prevention		Stopping with dynamic brake, deceleration to a stop, or coasting to a stop for the P-OT (Forward Drive Prohibit) or N-OT (Reverse Drive Prohibit) signal
Protective Functions		Overcurrent, overvoltage, low voltage, overload, regeneration error, etc.
Utility Functions		Gain adjustment, alarm history, 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).
	Applicable Standards*2	ISO13849-1 PLe (Category 3), IEC61508 SIL3
Option Module		Fully-Closed Module and Safety Module

*1. The coefficient of speed fluctuation for load fluctuation is defined as follows:

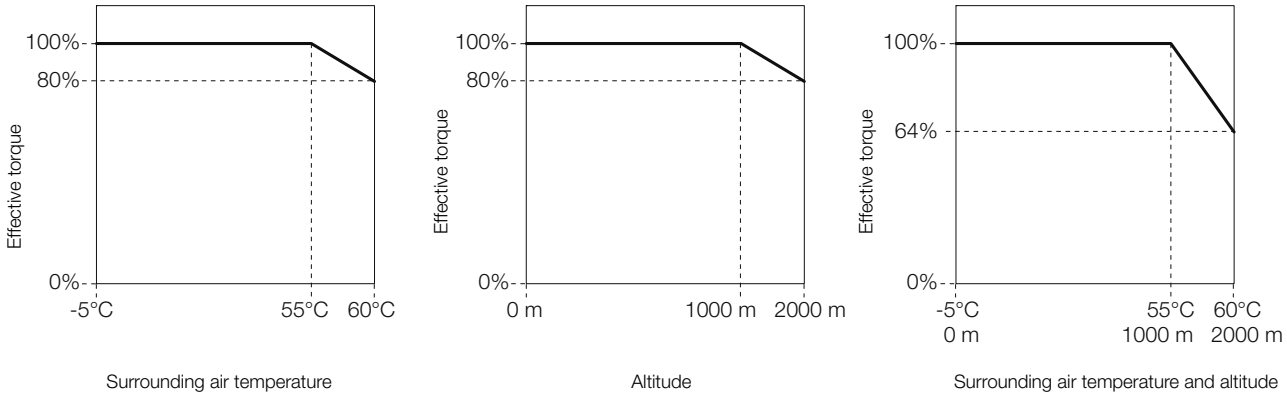
$$\text{Coeficient of speed fluctuation} = \frac{\text{No-load motor speed - Total-load motor speed}}{\text{Rated motor speed}} \times 100\%$$

*2. Always perform risk assessment for the system and confirm that the safety requirements are met.

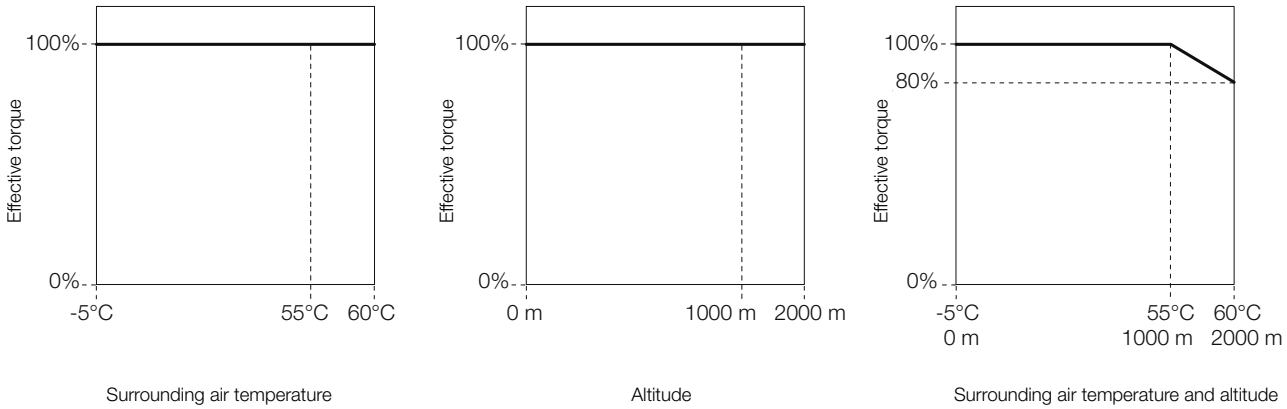
Derating Specifications

If you use the SERVOPACK at a surrounding air temperature of 55°C to 60°C or at an altitude of 1,000 m to 2,000 m, you must apply the derating rates given in the following graphs.

SGD7S-R70A, -R90A, -1R6A, and -2R8A



SGD7S-3R8A, -5R5A, -7R6A, -120A, -180A, -200A, -330A, -470A, -550A, -590A and -780A



Model Designations

SGD7W - 1R6 A 20 A 001

Sigma-7 Series Sigma-7W Models	1st ... 3rd	4th	5th + 6th	7th	8th ... 10th	digit

1st ... 3rd digit - Maximum Applicable Motor Capacity per Axis

Code	Specification
Three-phase, 200 V	
1R6*1	0.2 kW
2R8*1	0.4 kW
5R5*1	0.75 kW
7R6	1.0 kW

4th digit - Voltage

Code	Specification
A	200 VAC

5th + 6th digit - Interface*2

Code	Specification
20	MECHATROLINK-III communication reference

7th digit - Design Revision Order

A	

8th ... 10th digit - Hardware Options Specifications

Code	Specification	Applicable Models
None	Without Options	All models
001	Rack-mounted	
002	Varnished	

Note:

*1. You can use these models with either a single-phase or three-phase input.

*2. The same SERVOPACKs are used for both Rotary Servomotors and Linear Servomotors.

Ratings and Specifications

Ratings

Three-phase, 200 VAC

Model SGD7W-			1R6A	2R8A	5R5A	7R6A
Maximum Applicable Motor Capacity per Axis [kW]			0.2	0.4	0.75	1.0
Continuous Output Current per Axis [Arms]			1.6	2.8	5.5	7.6
Instantaneous Maximum Output Current per Axis [Arms]			5.9	9.3	16.9	17.0
Main Circuit	Power Supply		200 VAC to 240 VAC, -15% to +10%, 50 Hz/60 Hz			
	Input Current [Arms]*		2.5	4.7	7.8	11
Control Power Supply			200 VAC to 240 VAC, -15% to +10%, 50 Hz/60 Hz			
Power Supply Capacity [kVA]*			1.0	1.9	3.2	4.5
Power Loss*	Main Circuit Power Loss [W]		27.0	48.0	87.6	107.2
	Control Circuit Power Loss [W]		24	24	24	24
	Built-in Regenerative Resistor Power Loss [W]		8	8	16	16
	Total Power Loss [W]		59.0	80.0	127.6	147.2
Regenerative Resistor	Built-In Regenerative Resistor	Resistance [Ω]	40	40	12	12
		Capacity [W]	40	40	60	60
	Minimum Allowable External Resistance [Ω]		40	40	40	40
Overvoltage Category			III			

* This is the net value at the rated load.

Single-phase, 200 VAC

Model SGD7W-			1R6A	2R8A	5R5A*1
Maximum Applicable Motor Capacity per Axis [kW]			0.2	0.4	0.75
Continuous Output Current per Axis [Arms]			1.6	2.8	5.5
Instantaneous Maximum Output Current per Axis [Arms]			5.9	9.3	16.9
Main Circuit	Power Supply		200 VAC to 240 VAC, -15% to +10%, 50 Hz/60 Hz		
	Input Current [Arms]*2		5.5	11	12
Control Power Supply			200 VAC to 240 VAC, -15% to +10%, 50 Hz/60 Hz		
Power Supply Capacity [kVA]* 2			1.3	2.4	2.7
Power Loss*2	Main Circuit Power Loss [W]		27.0	48.0	87.6
	Control Circuit Power Loss [W]		24	24	24
	Built-in Regenerative Resistor Power Loss [W]		8	8	16
	Total Power Loss [W]		59.0	80.0	127.6
Regenerative Resistor	Built-In Regenerative Resistor	Resistance [Ω]	40	40	12
		Capacity [W]	40	40	60
	Minimum Allowable External Resistance [Ω]		40	40	40
Overvoltage Category			III		

*1. If you use the SGD7W-5R5A with a single-phase 200-VAC power supply input, use a load ratio of 65% max.

*2. This is the net value at the rated load.

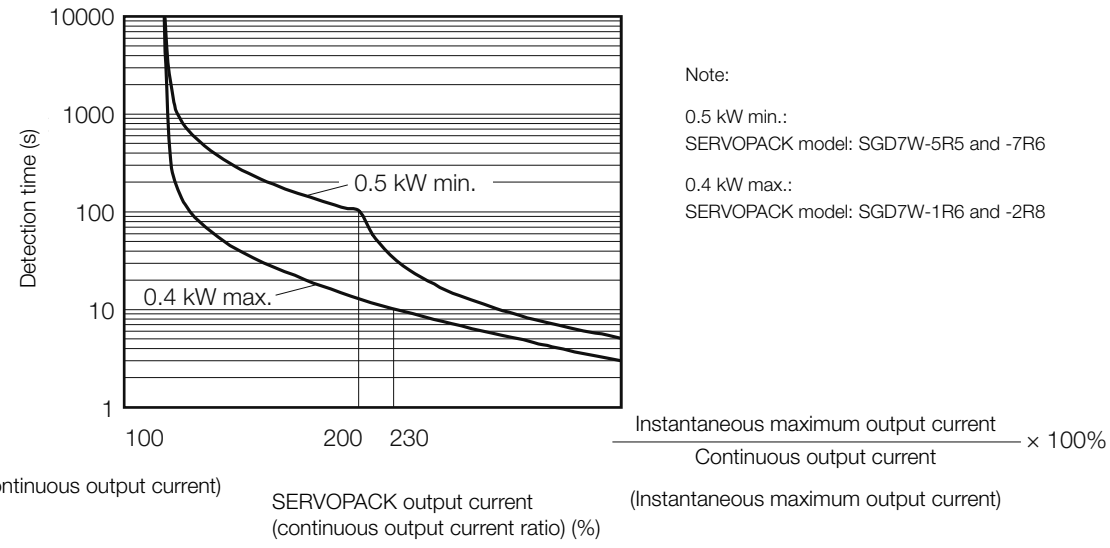
SERVOPACK Overload Protection Characteristics

The overload detection level is set for hot start conditions with a SERVOPACK surrounding air temperature of 55°C.

An overload alarm (A.710 or A.720) 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.

In most cases, that will be the overload protection characteristics of the Servomotor.



Note:

0.5 kW min.:
SERVOPACK model: SGD7W-5R5 and -7R6

0.4 kW max.:
SERVOPACK model: SGD7W-1R6 and -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.

Specifications

Item		Specification
Control Method		IGBT-based PWM control, sine wave current drive
Feedback	With Rotary Servomotor	Serial encoder: 20 bits or 24 bits (incremental encoder/absolute encoder) 22 bits (absolute encoder)
	With Linear Servomotor	• Absolute linear encoder (The signal resolution depends on the absolute linear encoder.) • Incremental linear encoder (The signal resolution depends on the incremental linear encoder or Serial Converter Unit.)
Environmental Conditions	Ambient 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 on page 232.
	Storage Temperature	-20°C to 85°C
	Ambient Air Humidity	95% relative humidity max. (with no freezing or condensation)
	Storage Humidity	95% relative humidity max. (with no freezing or condensation)
	Vibration Resistance	4.9 m/s^2
	Shock Resistance	19.6 m/s^2
	Protection Class	IP 20
	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	1,000 m or less With derating, usage is possible between 1,000 m and 2,000 m. Refer to the following section for Derating specifications on page 232.
	Others	Do not use the SERVOPACK in the following locations: Locations subject to static electricity noise, strong electromagnetic/magnetic fields, or radioactivity
Applicable Standards		UL 61800-5-1, EN50178, CSA C22.2 No.14, EN 61800-5-1, EN 55011 group 1 class A, EN 61000-6-2, EN 61000-6-4, and EN 61800-3
Mounting		Base-mounted or rack-mounted
Performance	Speed Control Range	1:5000 (At the rated torque, the lower limit of the speed control range must not cause the Servomotor to stop.)
	Coefficient of Speed Fluctuation*	±0.01% of rated speed max. (for a load fluctuation of 0% to 100%)
		0% of rated speed max. (for a voltage fluctuation of ±10%)
		±0.1% of rated speed max. (for a temperature fluctuation of 25°C ± 25°C)
	Torque Control Precision (Repeatability)	±1%
	Soft Start Time Setting	0 s to 10 s (Can be set separately for acceleration and deceleration.)

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Item			Specification
	Linear Servomotor Overheat Protection Signal 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 • Origin Return Deceleration Switch (/DEC) • External Latch (/EXT 1 to 3) • Forward Drive Prohibit (P-OT) and Reverse Drive Prohibit (N-OT) • Forward External Torque Limit (/P-CL) and Reverse External Torque Limit (/N-CL) • Polarity Detection (/P-DET) 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 signal: Servo Alarm (ALM)
		Output Signals That Can Be Allocated	Allowable voltage range: 5 VDC to 30 VDC Number of output points: 3 (A photocoupler output (isolated) is used.)
			Output Signals: • Positioning Completion (/COIN) • Speed Coincidence Detection (/V-CMP) • Rotation Detection (/TGON) • Servo Ready (/S-RDY) • Torque Limit Detection (/CLT) • Speed Limit Detection (/VLT) • Brake (/BK) • Warning Output (/WARN) • Near Output (/NEAR) A signal can be allocated and the positive and negative logic can be changed.
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)	Interface	Personal Computer (with SigmaWin+)
		Communications Standard	Conforms to USB 2.0 standard (12 Mbps).
Displays/ Indicators			CHARGE, PWR, COM, L1, and L2 indicators, and one-digit seven-segment display

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Item		Specification
MECHATROLINK-II Communications	Communications Protocol	MECHATROLINK-III
	Station Address Settings	03 to EF hex (maximum number of slaves: 62) The rotary switches (S1 and S2) are used to set the station address.
	Extended Address Setting	Axis 1: 00 hex, Axis 2: 01 hex
	Baud Rate	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	16, 32, or 48 bytes/station A DIP switch (S3) is used to select the number of transmission bytes.
Reference Method	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-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 Settling time (±1%): 1.2 ms (Typ)
Dynamic Brake (DB)		Activated when a servo alarm or overtravel (OT) occurs, or when the power supply 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) or N-OT (Reverse Drive Prohibit) signal
Protective Functions		Overcurrent, overvoltage, low voltage, overload, regeneration error, etc.
Utility Functions		Gain adjustment, alarm history, jogging, origin search, etc.

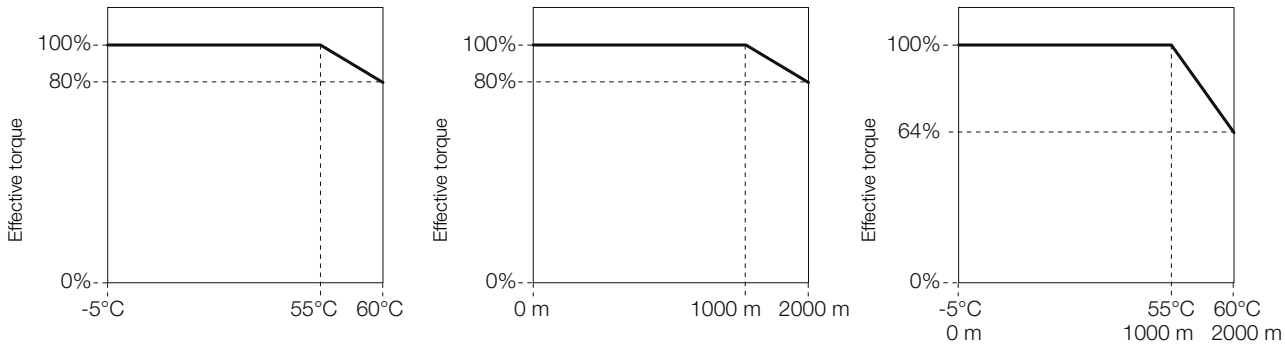
* The coefficient of speed fluctuation for load fluctuation is defined as follows:

$$\text{Coeficient of speed fluctuation} = \frac{\text{No-load motor speed - Total-load motor speed}}{\text{Rated motor speed}} \times 100\%$$

Derating Specifications

If you use the SERVOPACK at a surrounding air temperature of 55°C to 60°C or at an altitude of 1,000 m to 2,000 m, you must apply the derating rates given in the following graphs.

SGD7W-1R6A, -2R8A, -5R5A, and -7R6A



Model Designations

SGD7S - R70 A A0 A 001

Sigma-7 Series SERVOPACKs	1st ... 3rd	4th	5th + 6th	7th	8th ... 10th	digit

1st ... 3rd digit - Maximum Applicable Motor Capacity	
Code	**Specifications**
Three-phase, 200 V	
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	0.75 kW
7R6	1.0 kW
120	1.5 kW

*1: You can use these models with either a single-phase or three-phase power supply input.

4th digit - Voltage	
Code	**Specifications**
A	200 VAC

5th + 6th digit - Interface *	
Code	**Specifications**
00	Analog voltage/pulse train reference
10	MECHATROLINK-II communication reference
20	MECHATROLINK-III communication reference
A0	EtherCAT communication reference

7th digit - Design Revision Order	
Code	**Specifications**
A	

8th ... 10th digit - Hardware Options Specifications		
Code	**Specifications**	**Applicable Models**
None	Without Options	All models
001	Rack-mounted	
002	Varnished	

* The same SERVOPACKs are used for both Rotary Servomotors and Linear Servomotors.

Ratings and Specifications

Ratings

Three-phase, 200 VAC

Model SGD7S-			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, -15% to +10%, 50 Hz/60 Hz										
	Input Current [Arms]*		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, -15% to +10%, 50 Hz/60 Hz										
Power Supply Capacity [kVA]*			0.2	0.3	0.5	1.0	1.3	1.6	2.3	3.2	4.0	5.9	7.5
Power Loss*	Main Circuit Power Loss [W]		5.1	7.3	13.5	24.0	20.1	43.8	53.6	65.8	111.9	113.8	263.7
	Control Circuit Power Loss [W]		17	17	17	17	17	17	17	22	22	22	27
	Built-in Regenerative Resistor Power Loss [W]		–	–	–	–	8	8	8	10	16	16	36
	Total Power Loss [W]		22.1	24.3	30.5	41.0	45.1	68.8	78.6	97.8	149.9	151.8	326.7
Regenerative Resistor	Built-In Regenerative Resistor	Resistance [Ω]	–	–	–	–	40	40	40	20	12	12	8
		Capacity [W]	–	–	–	–	40	40	40	60	60	60	180
	Minimum Allowable External Resistance [Ω]		40	40	40	40	40	40	40	20	12	12	8
Overvoltage Category			III										

* This is the net value at the rated load.

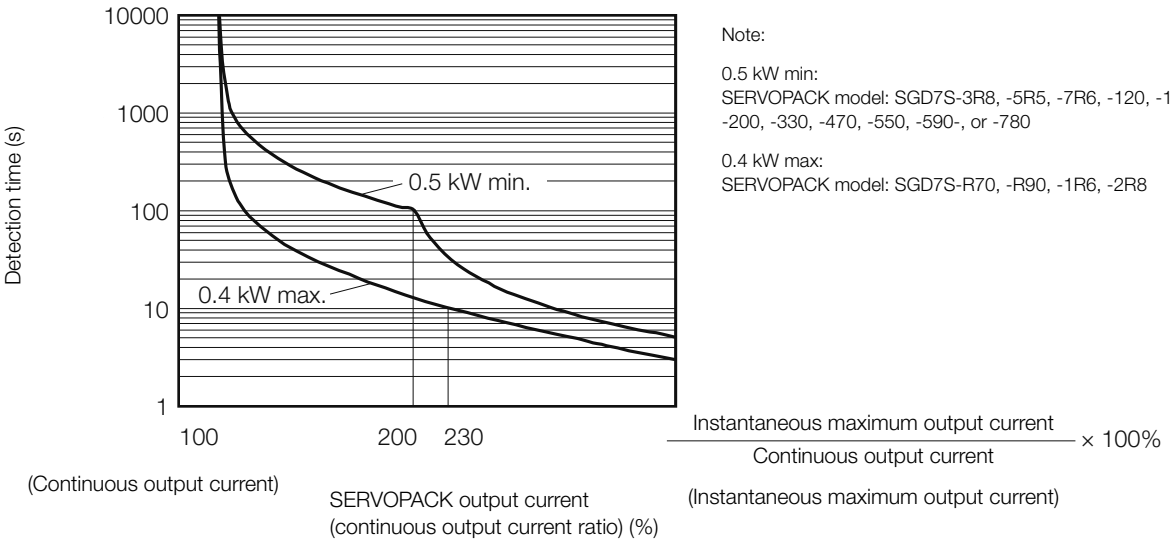
SERVOPACK Overload Protection Characteristics

The overload detection level is set for hot start conditions with a SERVOPACK surrounding air temperature of 55°C.

An overload alarm (A.710 or A.720) 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.

In most cases, that will be the overload protection characteristics of the Servomotor.



Note:

0.5 kW min:
SERVOPACK model: SGD7S-3R8, -5R5, -7R6, -120, -180, -200, -330, -470, -550, -590-, or -780

0.4 kW max:
SERVOPACK model: SGD7S-R70, -R90, -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.

Specifications

Item		Specification	
Control Method		IGBT-based PWM control, sine wave current drive	
Feedback	With Rotary Servomotor	Serial encoder: 20 bits or 24 bits (incremental encoder/absolute encoder) 22 bits (absolute encoder)	
	With Linear Servomotor	• Absolute linear encoder (The signal resolution depends on the absolute linear encoder.) • Incremental linear encoder (The signal resolution depends on the incremental linear encoder or Serial Converter Unit.)	
Environmental Conditions	Ambient 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 on page 238.	
	Storage Temperature	-20°C to 85°C	
	Ambient Air Humidity	95% relative humidity max. (with no freezing or condensation)	
	Storage Humidity	95% relative humidity max. (with no freezing or condensation)	
	Vibration Resistance	4.9 m/s^2	
	Shock Resistance	19.6 m/s^2	
	Degree of Protection	Degree	SERVPOACK Model: SGD7S-
		IP 20	R70A, R90A, 1R6A, 2R8A, 3R8A, 5R5A, 7R6A, 120A
		IP 10	180A, 200A, 330A, 470A, 550A, 590A, 780A
	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	1,000 m or less With derating, usage is possible between 1,000 m and 2,000 m. Refer to the following section for Derating specifications on page 238.	
	Others	Do not use the SERVOPACK in the following locations: Locations subject to static electricity noise, strong electromagnetic/magnetic fields, or radioactivity	
Applicable Standards		UL 61800-5-1, EN50178, CSA C22.2 No.14, EN 61800-5-1, EN 55011 group 1 class A, EN 61000-6-2, EN 61000-6-4, and EN 61800-3	
Mounting		Mounting	SERVOPACK Model: SGD7S
		Base-mounted	All Models
		Rack-mounted	R70A, R90A, 1R6A, 2R8A, 3R8A, 5R5A, 7R6A, 120A, 180A, 200A, 330A
		Duct-ventilated	470A, 550A, 590A, 780A
Performance	Speed Control Range	1:5000 (At the rated torque, the lower limit of the speed control range must not cause the Servomotor to stop.)	
	Coefficient of Speed Fluctuation*	±0.01% of rated speed max. (for a load fluctuation of 0% to 100%)	
		0% of rated speed max. (for a voltage fluctuation of ±10%) Continued on next page.	
		±0.1% of rated speed max. (for a temperature fluctuation of 25°C ± 25°C)	
	Torque Control Precision (Repeatability)	±1%	
	Soft Start Time Setting	0 s to 10 s (Can be set separately for acceleration and deceleration.)	

Specifications

Item		Specification
EtherCAT Communications	Applicable Communications Standards	IEC 61158 Type 12, IEC 61800-7 CiA402 Drive Profile
	Physical Layer	100BASE-TX (IEEE 802.3)
	Communications Connectors	CN6A (RJ45): EtherCAT signal input connector CN6B (RJ45): EtherCAT signal output connector
	Cable	Category 5, 4 shielded twisted pairs * The cable is automatically detected with AUTO MDIX.
	Sync Manager	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, FPRD, BRD, LRD, APWR, FPWR, BWR, LWR, ARMW, and FRMW (APRW, FPRW, BRW, and LRW commands are not supported.)
	Process Data	Assignments can be changed with PDO mapping.
	Mailbox (CoE)	Emergency messages, SDO requests, SDO responses, and SDO information (TxPDO/RxPDO and remote TxPDO/RxPDO are not supported.)
	Distributed Clocks	Free-Run Mode and DC Mode (Can be switched.) Applicable DC cycles: 125 µs to 4 ms in 125-µs increments
	Slave Information Interface	256 bytes (read-only)
	Indicators	EtherCAT communications in progress: Link/Activity 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 Settling time (±1%): 1.2 ms (Typ)
Dynamic Brake (DB)		Activated when a servo alarm or overtravel (OT) occurs, or when the power supply to the main circuit or servo is OFF.
Regenerative Processing		Built-in Refer to the catalog for details.
Overtravel (OT) Prevention		Stopping with dynamic brake, deceleration to a stop, or coasting to a stop for the P-OT (Forward Drive Prohibit) or N-OT (Reverse Drive Prohibit) signa
Protective Functions		Overcurrent, overvoltage, low voltage, overload, regeneration error , etc.
Utility Functions		Gain adjustment, alarm history, 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).
	Applicable Standards*3	ISO13849-1 PLe (Category 3), IEC61508 SIL3
Applicable Option Modules		Fully-closed Modules

Note:

*1. If you combine a Sigma-7-Series SERVOPACK with a Sigma-V-Series Option Module, the following Sigma-V-Series SERVOPACKs specifications must be used: a surrounding air temperature of 0°C to 55°C and an altitude of 1,000 m max. Also, the applicable surrounding range cannot be increased by derating.

*2. The coefficient of speed fluctuation for load fluctuation is defined as follows:

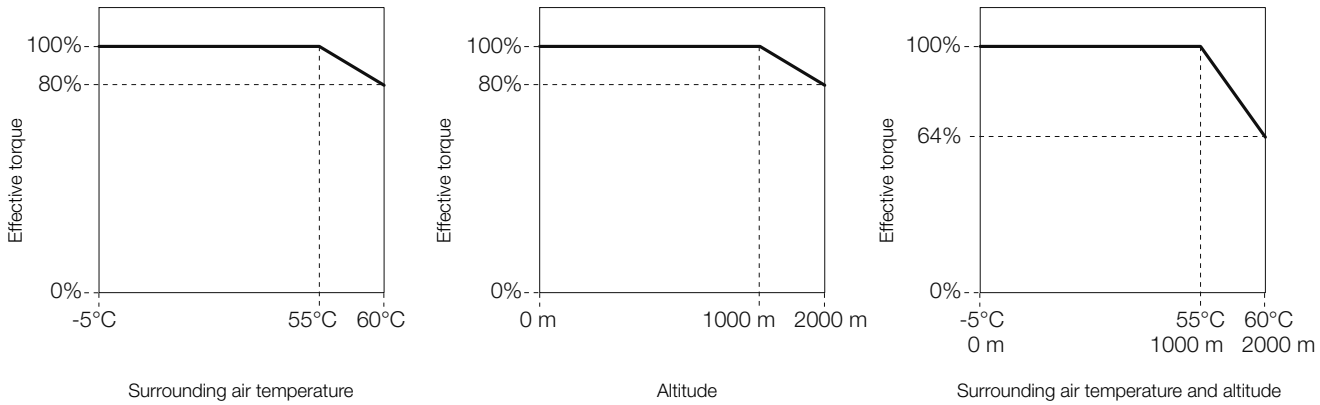
$$\text{Coeficient of speed fluctuation} = \frac{\text{No-load motor speed - Total-load motor speed}}{\text{Rated motor speed}} \times 100\%$$

*3. Always perform risk assessment for the system and confirm that the safety requirements are met.

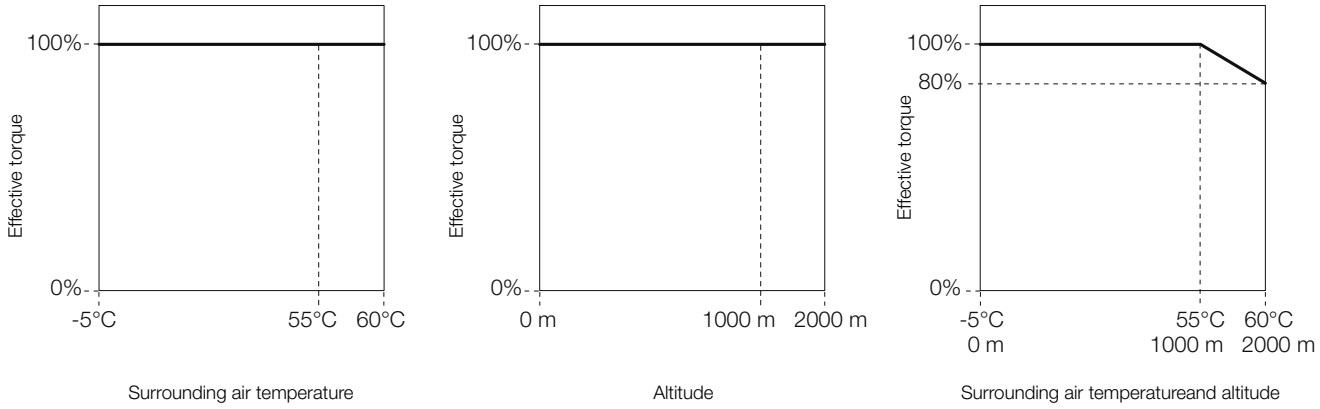
Derating Specifications

If you use the SERVOPACK at a surrounding air temperature of 55°C to 60°C or at an altitude of 1,000 m to 2,000 m, you must apply the derating rates given in the following graphs.

SGD7S-R70A, -R90A, -1R6A, and -2R8A



SGD7S-3R8A, -5R5A, -7R6A and -120A

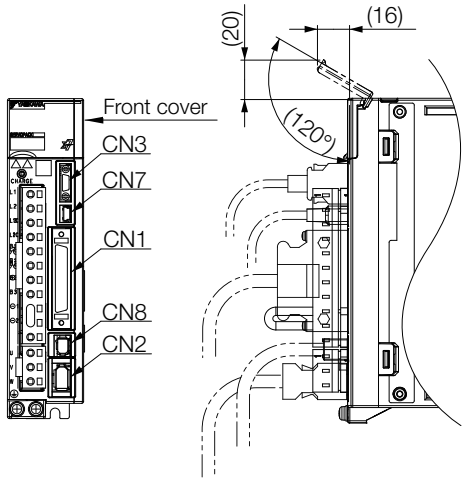


Front Cover Dimensions and Connector Specifications

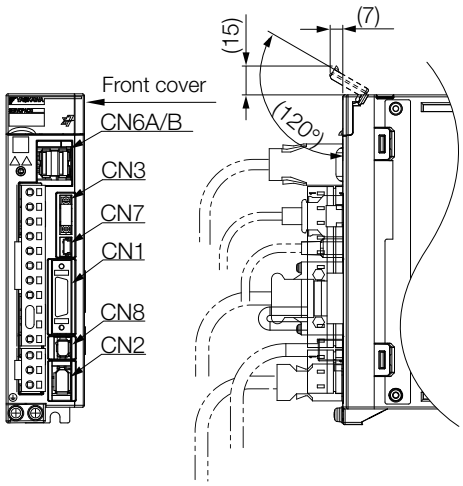
The front cover dimensions and panel connectors depend on the SERVOPACK interface. Refer to the following figures.

Front Cover Dimensions

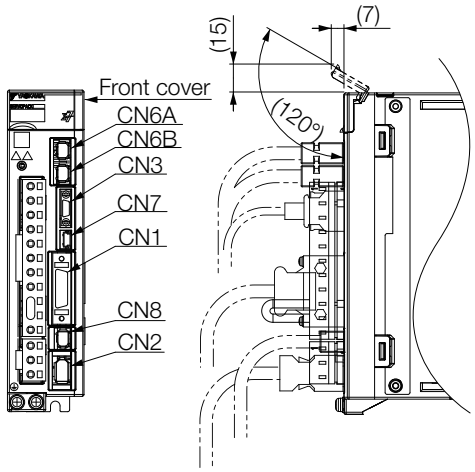
Sigma-7S
Analog Voltage/Pulse Train Reference SERVOPACKs



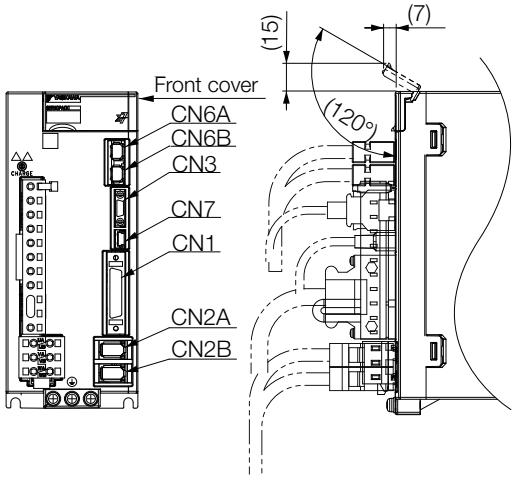
Sigma-7S
MECHATROLINK-II Communications Reference SERVOPACKs



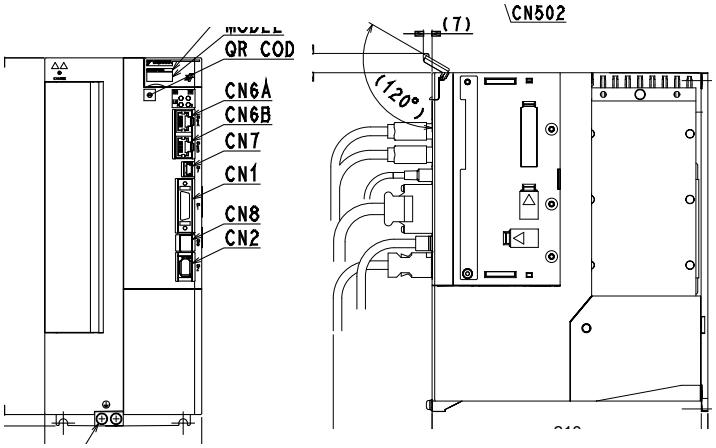
Sigma-7S
MECHATROLINK-III Communications Reference SERVOPACKs



Sigma-7W
MECHATROLINK-III Communications Reference SERVOPACKs



Sigma-7S
EtherCAT Communications Reference SERVOPACKs



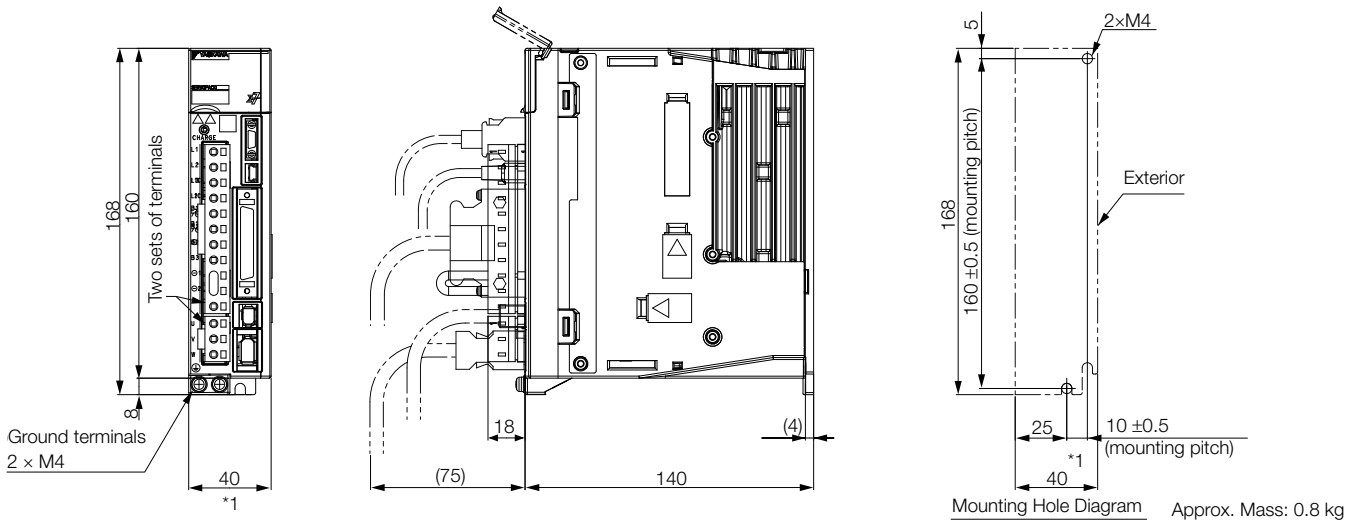
Connector Specifications

SERVOPACK	Connector No.	Model	Number of Pins	Manufacturer
Sigma-7S Analog Voltage/Pulse Train Reference SERVOPACK	CN1	10250-59A3MB	50	Sumitomo 3M Ltd.
	CN2	3E106-0220KV	6	Sumitomo 3M Ltd.
	CN3	HDR-EC14LFDTN- SLD-PLUS	14	Honda Tsushin Kogyo Co., Ltd.
	CN7	2172034-1	5	Tyco Electronics Japan G.K.
	CN8	1981080-1	8	Tyco Electronics Japan G.K.
Sigma-7S MECHATROLINK-II Communications Reference SERVOPACK	CN1	10226-59A3MB	26	Sumitomo 3M Ltd.
	CN2	3E106-0220KV	6	Sumitomo 3M Ltd.
	CN3	HDR-EC14LFDTN- SLD-PLUS	14	Honda Tsushin Kogyo Co., Ltd.
	CN6A/B	1903815-1	8	Tyco Electronics Japan G.K.
	CN7	2172034-1	5	Tyco Electronics Japan G.K.
	CN8	1981080-1	8	Tyco Electronics Japan G.K.
Sigma-7S MECHATROLINK-III Communications Reference SERVOPACK	CN1	10226-59A3MB	26	Sumitomo 3M Ltd.
	CN2	3E106-0220KV	6	Sumitomo 3M Ltd.
	CN3	HDR-EC14LFDTN- SLD-PLUS	14	Honda Tsushin Kogyo Co., Ltd.
	CN6A, CN6B	1981386-1	8	Tyco Electronics Japan G.K.
	CN7	2172034-1	5	Tyco Electronics Japan G.K.
	CN8	1981080-1	8	Tyco Electronics Japan G.K.
Sigma-7W MECHATROLINK-III Communications Reference SERVOPACK	CN1	10236-59A3MB	36	Sumitomo 3M Ltd.
	CN2A, CN2B	3E106-2230KV	6	Sumitomo 3M Ltd.
	CN3	HDR-EC14LFDTN- SLD-PLUS	14	Honda Tsushin Kogyo Co., Ltd.
	CN6A, CN6B	1981386-1	8	Tyco Electronics Japan G.K.
	CN7	2172034-1	5	Tyco Electronics Japan G.K.
	CN8	1981080-1	8	Tyco Electronics Japan G.K.
Sigma-7S EtherCATCommunications Reference SERVOPACK	CN1	10226-59A3MB	29	Sumitomo 3M Ltd.
	CN2	3E106-0220KV	6	Sumitomo 3M Ltd.
	CN6A, CN6B	1-1734579-4	8	Tyco Electronics Japan G.K.
	CN7	2172034-1	5	Tyco Electronics Japan G.K.
	CN8	1981080-1	8	Tyco Electronics Japan G.K.

Note: The above connectors or their equivalents are used for the SERVOPACKs.

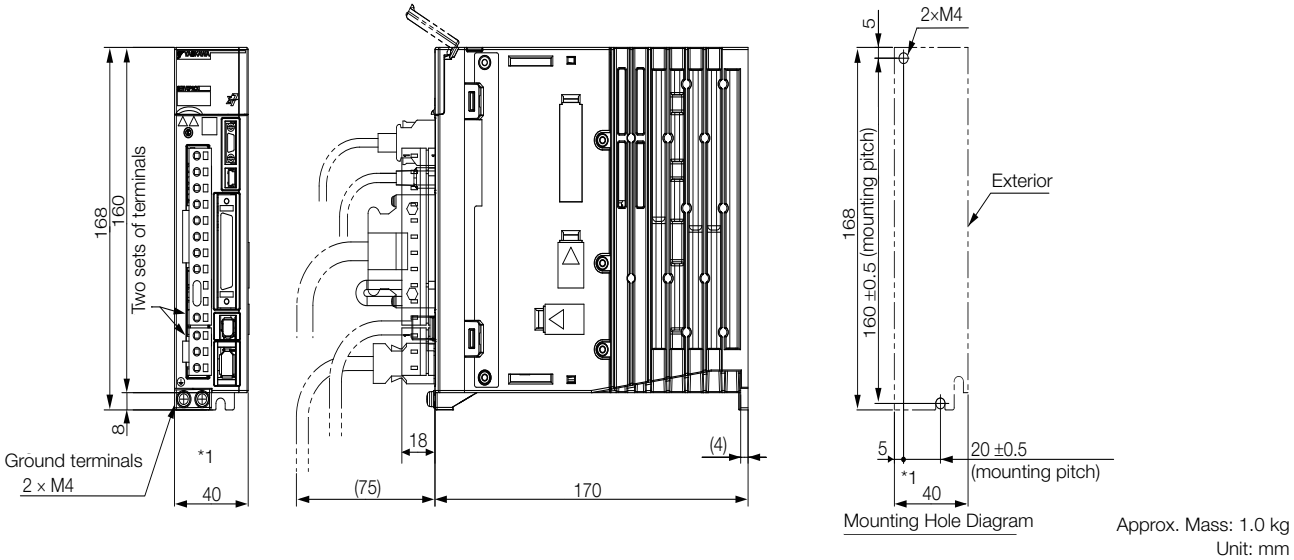
Sigma-7S SERVOPACKs: Base-mounted

Single/Three-phase, 200 VAC: SGD7S-R70A, -R90A, and -1R6A



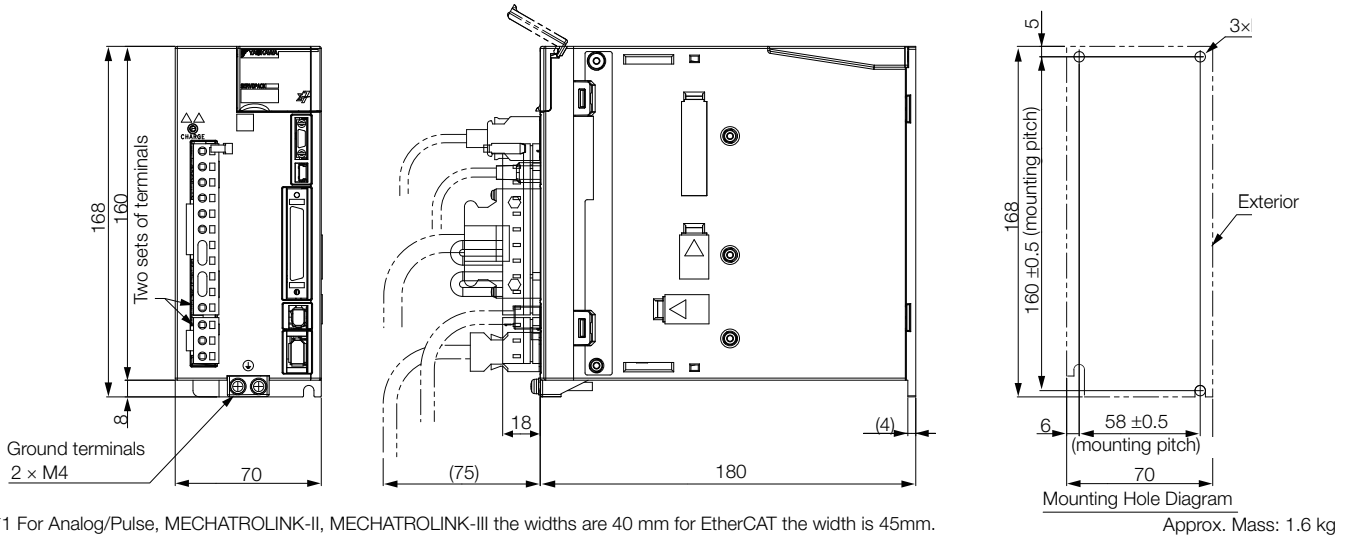
Approx. Mass: 0.8 kg
Unit: mm

Single/Three-phase, 200 VAC: SGD7S-2R8A



Approx. Mass: 1.0 kg
Unit: mm

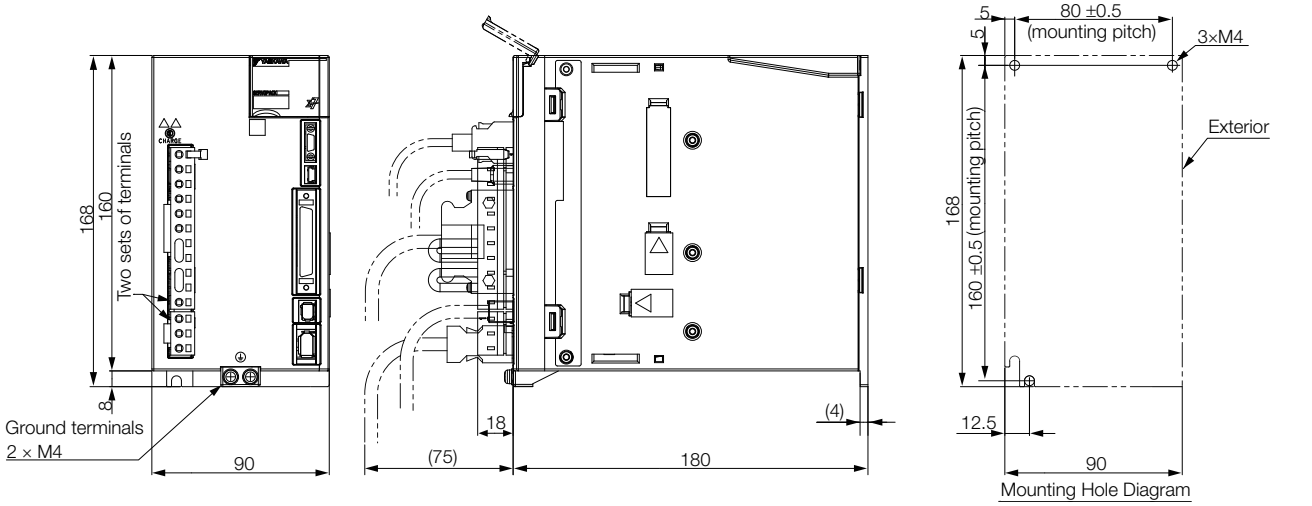
Single/Three phase 200VAC SGD7S-SGD7S-5R5A
Three phase 200VAC SGD7S-3R8A and SGD7S-7R6A



*1 For Analog/Pulse, MECHATROLINK-II, MECHATROLINK-III the widths are 40 mm for EtherCAT the width is 45mm.

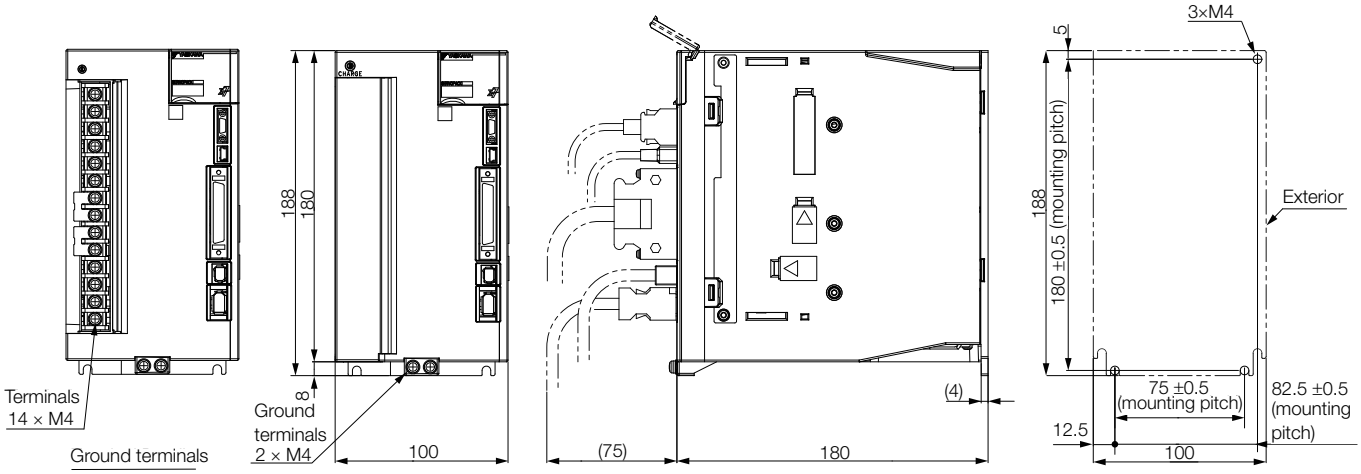
Approx. Mass: 1.6 kg
Unit: mm

Three-phase, 200 VAC: SGD7S-120A



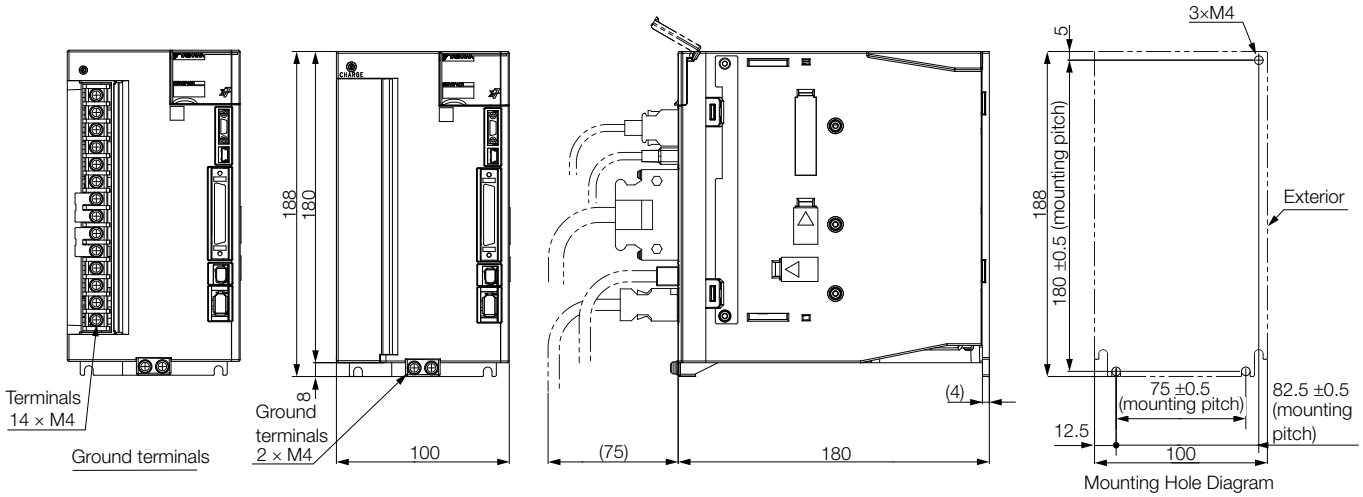
Approx. Mass: 2 kg
Unit: mm

Single-phase, 200 VAC: SGD7S-120A...08



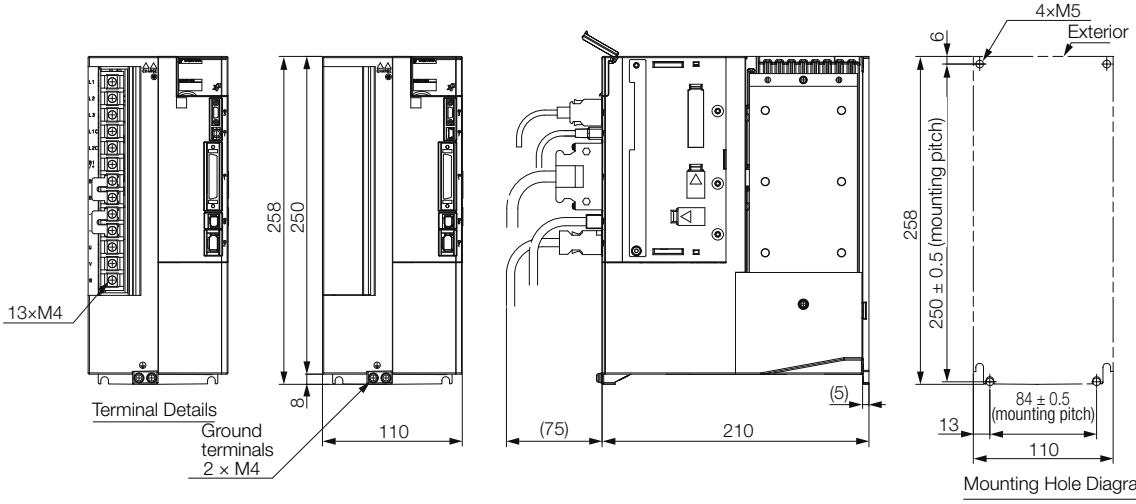
Approx. Mass: 2.7 kg
Unit: mm

Three-phase, 200 VAC: SGD7S-180A and -200A



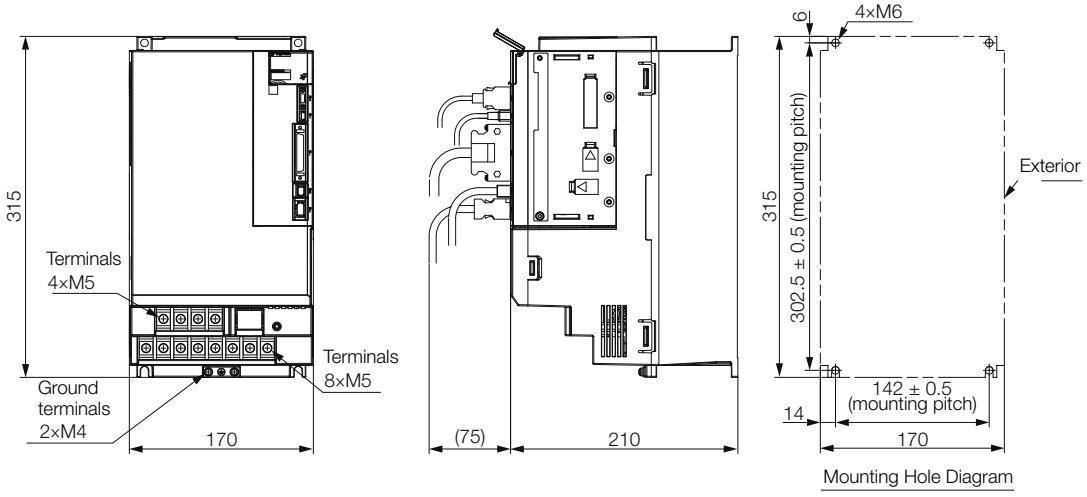
Approx. Mass: 2.7 kg
Unit: mm

Three-phase, 200 VAC: SGD7S-330A



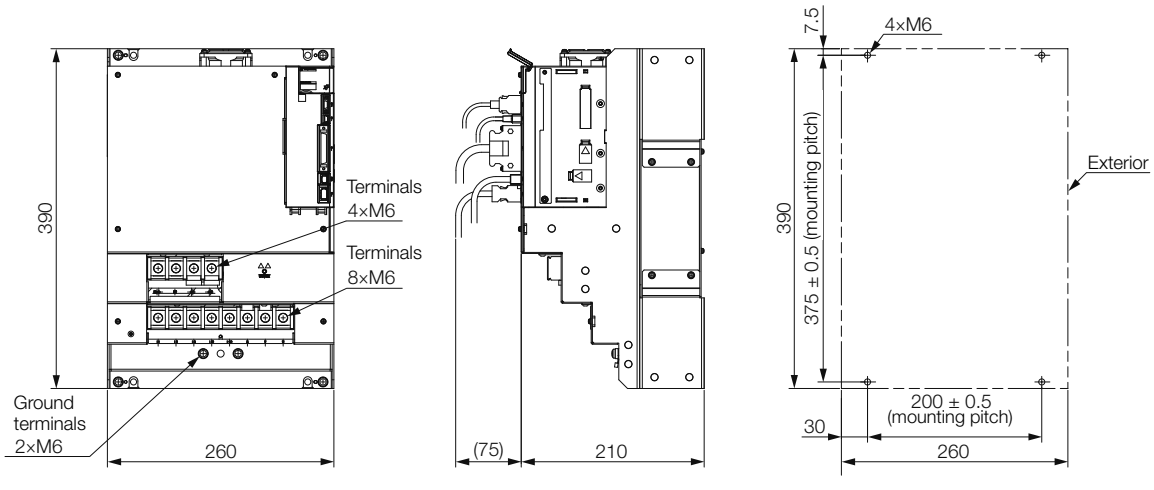
Approx. Mass: 4.4 kg
Unit: mm

Three-phase, 200 VAC: SGD7S-470A and -550A



Approx. Mass: 8.2 kg
Unit: mm

Three-phase, 200 VAC: SGD7S-590A and -780A

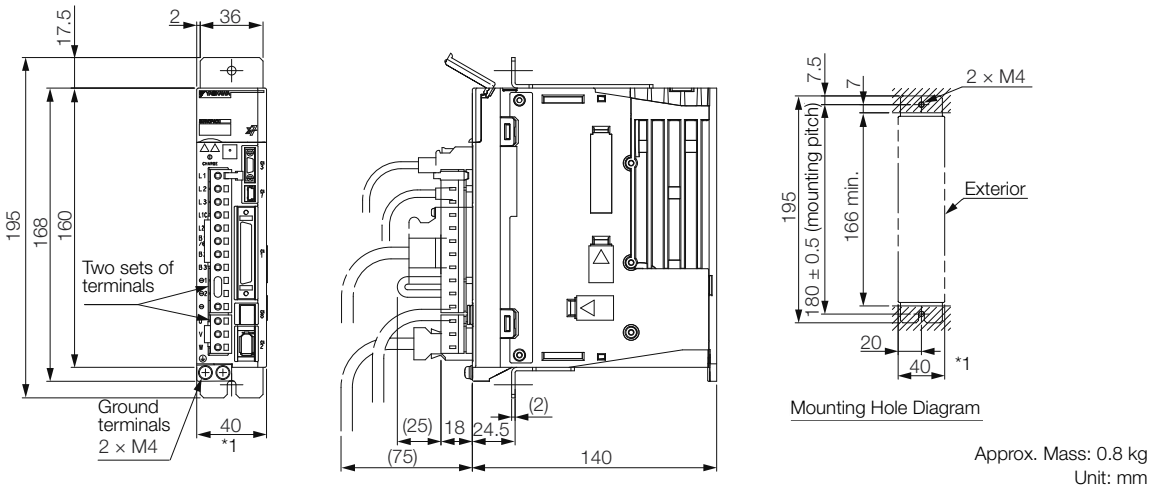


Approx. Mass: 15.5 kg
Unit: mm

Sigma-7S SERVOPACKs: Rack-mounted

Hardware Option Code: 001

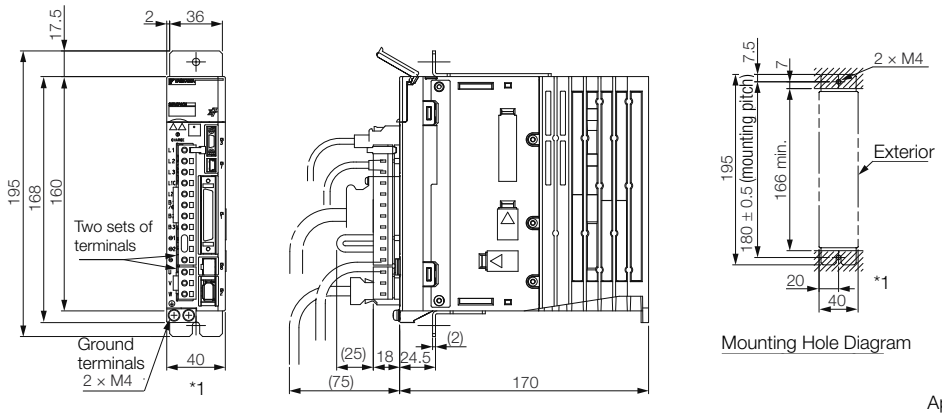
Single-/Three-phase, 200 VAC: SGD7S-R70A, -R90A, and -1R6A



Approx. Mass: 0.8 kg
Unit: mm

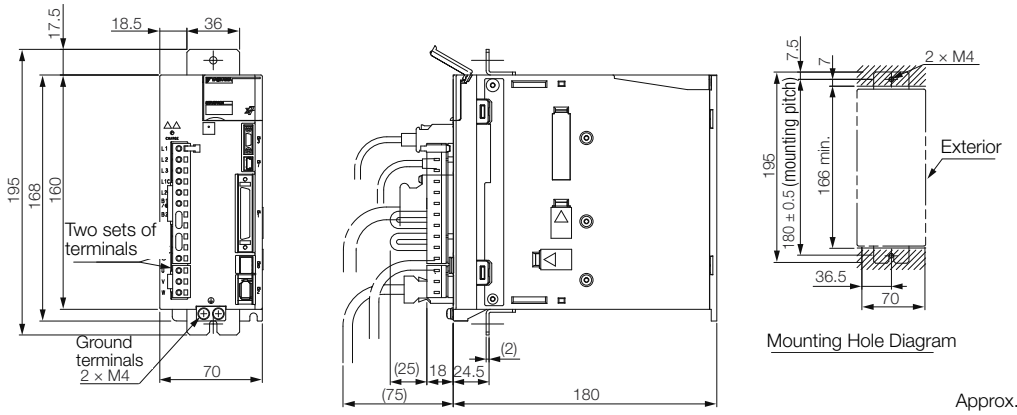
*1 For Analog/Pulse, MECHATROLINK-II, MECHATROLINK-III the widths are 40 mm for EtherCAT the width is 45mm.

Single-/Three-phase, 200 VAC: SGD7S-2R8A



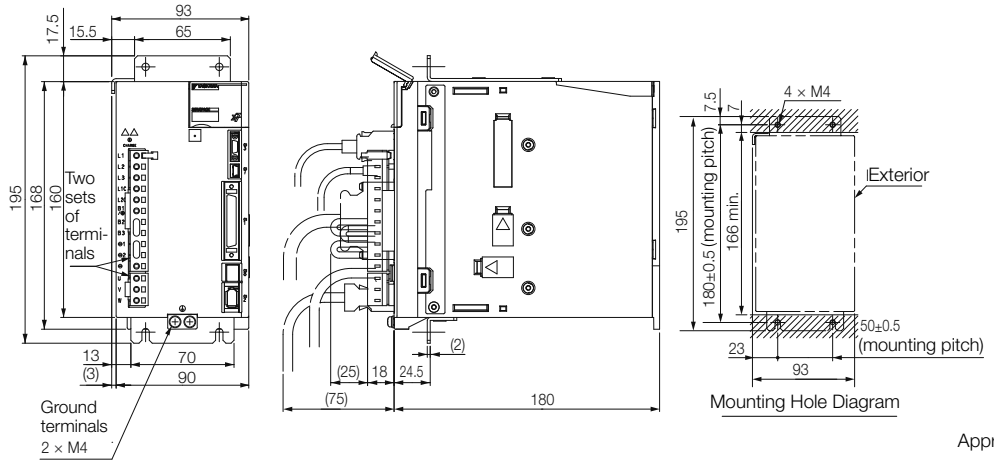
Approx. Mass: 1.0 kg
Unit: mm

Single/Three phase 200VAC SGD7S-SGD7S-5R5A
Three phase 200VAC SGD7S-3R8A and SGD7S-7R6A



Approx. Mass: 1.6 kg
Unit: mm

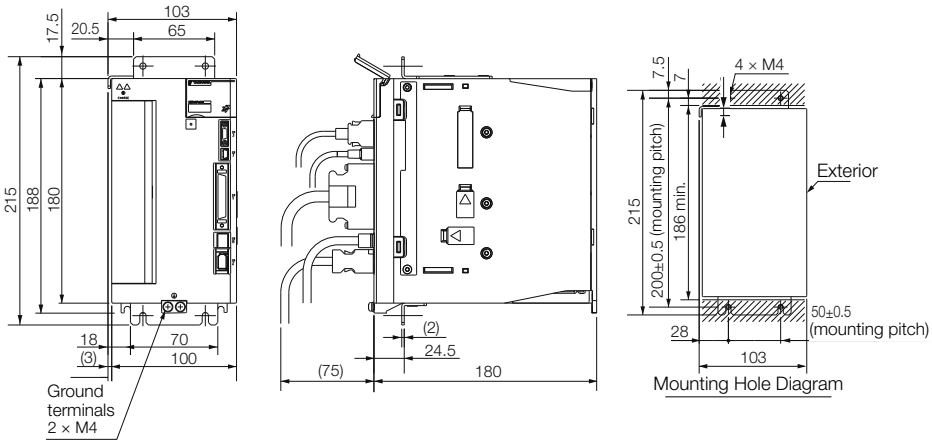
Three-phase, 200 VAC: SGD7S-120A



Approx. Mass: 2.2 kg
Unit: mm

*1 For Analog/Pulse, MECHATROLINK-II, MECHATROLINK-III the widths are 40 mm for EtherCAT the width is 45mm.

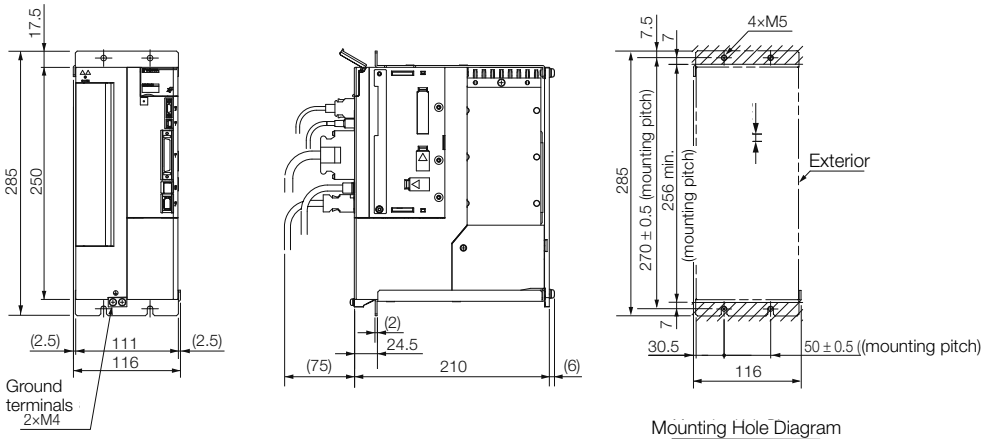
Three-phase, 200 VAC: SGD7S-180A and -200A



Approx. Mass: 2.7 kg
Unit: mm

*1 For Analog/Pulse, MECHATROLINK-II, MECHATROLINK-III the widths are 40 mm for EtherCAT the width is 45mm.

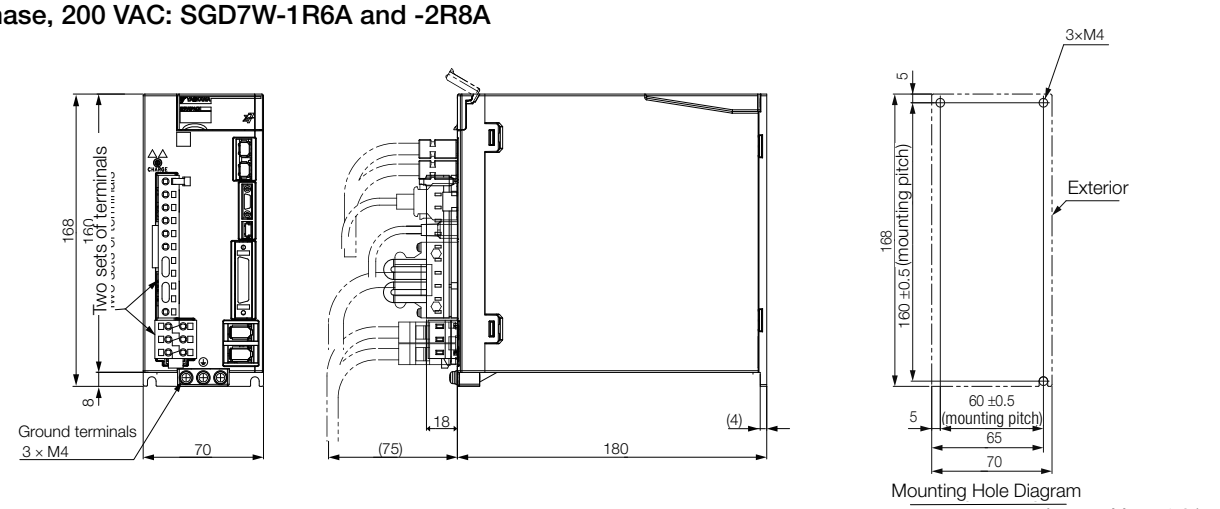
Three-phase, 200 VAC: SGD7S-330A



Approx. Mass: 4.9 kg
Unit: mm

Sigma-7W SERVOPACKs: Base-mounted

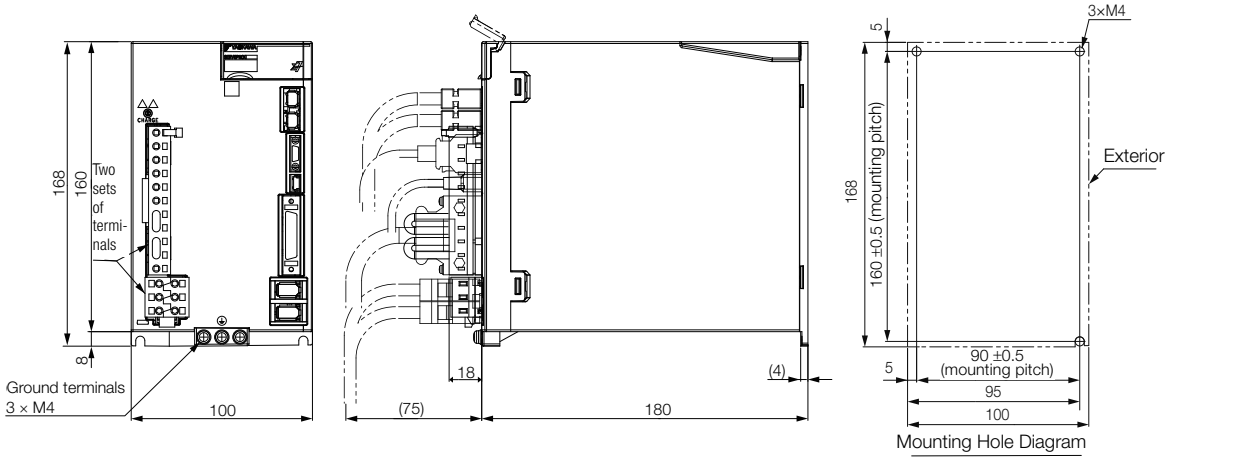
Three-phase, 200 VAC: SGD7W-1R6A and -2R8A



Mounting Hole Diagram

Approx. Mass: 1.6 kg
Unit: mm

Three-phase, 200 VAC: SGD7W-5R5A and -7R6A

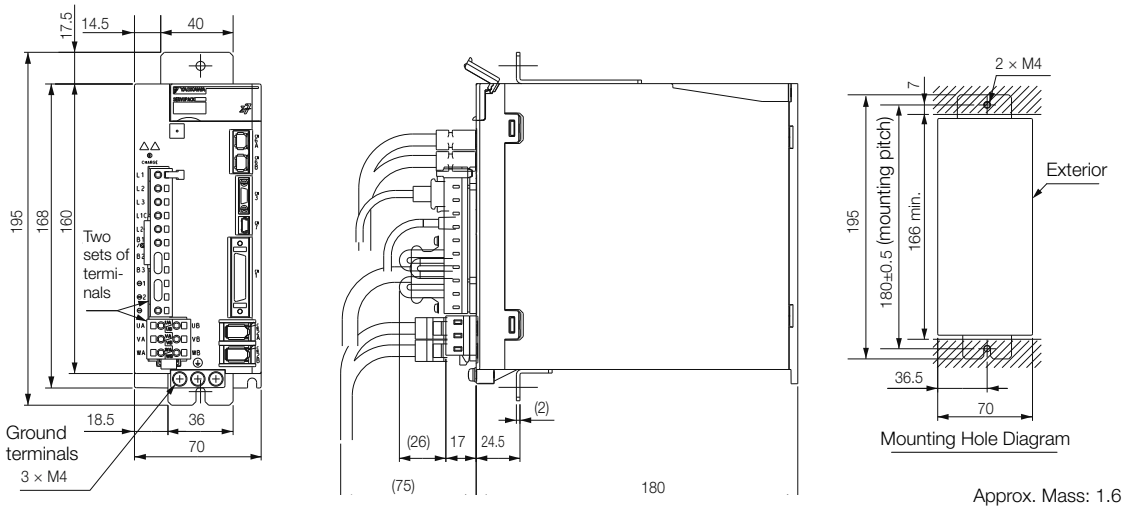


Mounting Hole Diagram

Approx. Mass: 2.3 kg
Unit: mm

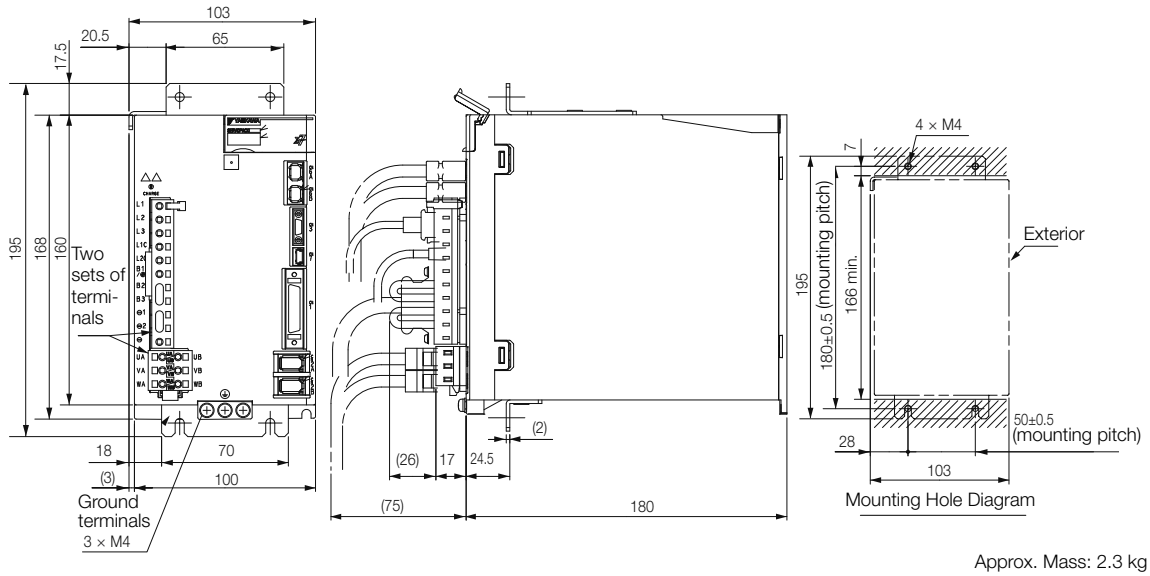
Sigma-7W SERVOPACKs: Rack-mounted

Three-phase, 200 VAC: SGD7W-1R6A and -2R8A



Approx. Mass: 1.6 kg
Unit: mm

Three-phase, 200 VAC: SGD7W-5R5A and -7R6A



Approx. Mass: 2.3 kg
Unit: mm

Option Modules

Feedback Option Module	252
Safety Module	258
Indexer Module	262
DeviceNet Module	274
Dimensions	284

Feedback Option Modules

Fully-Closed Module

With fully-closed control, an externally installed encoder is used to detect the position of the controlled machine and the machine's position information is fed back to the SERVOPACK. High-precision positioning is possible because the actual machine position is fed back directly. To perform fully-closed loop control, a Fully-Closed Module and SERVOPACK are required.

Model Designations

Purchasing the SERVOPACK separately

SGD7S *1	-	R70	A	00	A	000	001	
Sigma-7 Series SERVOPACKs Single-axis		1st ... 3rd	4th	5th + 6th	7th	8th ... 10th	11th ... 13th	digit

1st ... 3rd digit - Maximum Applicable Motor Capacity

Code	Specifications
Three-phase, 200 V	
R70*2	0.05 kW
R90*2	0.1 kW
1R6*2	0.2 kW
2R8*2	0.4 kW
3R8	0.5 kW
5R5*2	0.75 kW
7R6	1.0 kW
120	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

4th digit - Voltage

Code	Specifications
A	200 VAC

5th + 6th digit - Interface *

Code	Specifications *2
00	Analog voltage/pulse train reference
10	MECHATROLINK-II communication reference
20	MECHATROLINK-III communication reference
A0	EtherCAT communication reference
E0	Command Option Attachable Type

7th digit - Design Revision Order

Code	Specifications
A	

8th ... 10th digit - Hardware Options Specifications

Code	Specifications	Applicable Models
None	Without Options	All models
001	Rack-mounted	
002	Varnished	
008	Single-phase, 200 V power input	1.5 kW
00A	Varnished and single phase power input	All models

* The same SERVOPACKs are used for both Rotary Servomotors and Linear Servomotors.

*1. The model number of a SERVOPACK with an Option Module is not hyphenated after SGD7S.
*2. You can use these models with either a single-phase or three-phase power supply input.
Note: Contact your YASKAWA representative for information on combining options.

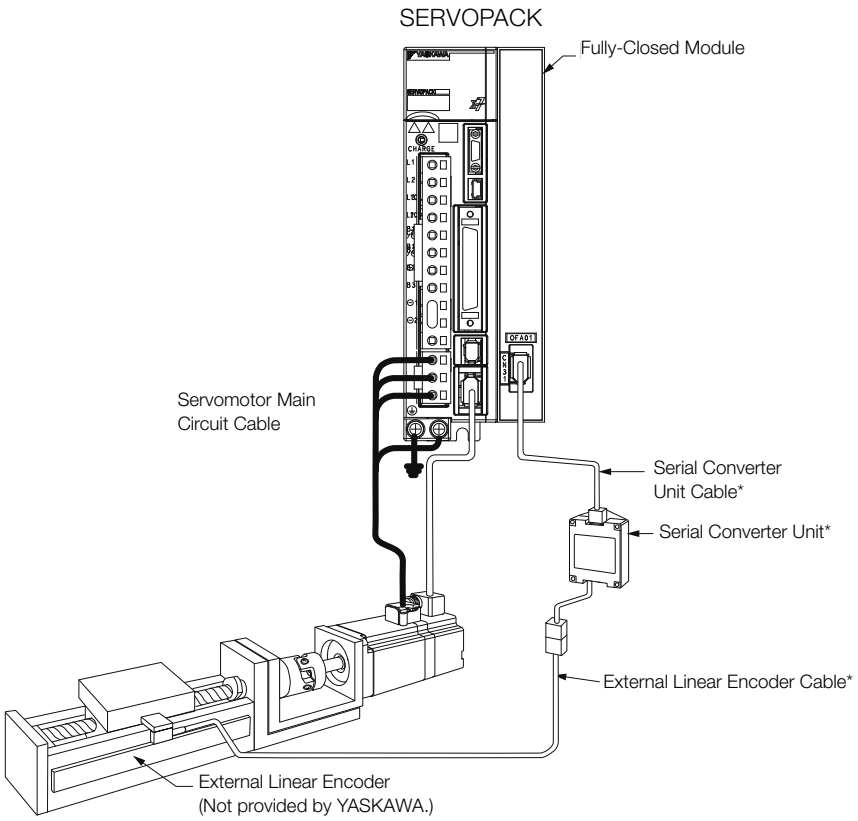
When ordering a SERVOPACK and a Fully-Closed Module separately, use the following Fully-Closed Module model number.

SGDV-OFA01A

1. One Option Case Kit is required for each SERVOPACK.
   Option Case Kit model: SGDV-OZA01A

2. Refer to the following pages when using these Command Option Modules with Fully-Closed Module.
   INDEXER Module: Page 257
   DeviceNet Module: Page 269

System Configuration



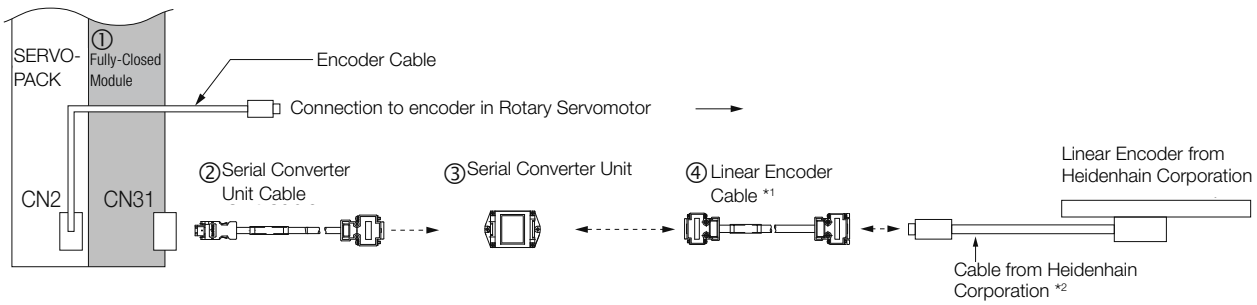
* The connected devices and cables depend on the type of external Linear Encoder that is used.

Note:
Refer to the following section for the information on peripheral devices or chapter Peripheral Devices on page 313.

Connections to Linear Encoder from Heidenhain Corporation

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 Heidenhain Corporation for details on cables (analog 1 Vp-p output, D-sub 15-pin, male) from Heidenhain Corporation.

No.	Item	Model	Reference
①	Fully-closed Module	Without options: SGD7S□□□□□□0A□□1*1	–
	Fully-Closed Module (Purchased alone)	Fully-Closed Module*2 SGDV-OFA01A	–
		Option Case Kit*3 SGDV-OZA01A	–
②	Serial Converter Unit Cable	JZSP-CLP70-□□-E	page 303
③	Serial Converter Unit	JZDP-H003-000	page 305
④	Fully-closed Module (Purchased as a set with the SERVOPACK)	JZSP-CLL30-□□-E	page 303

*1 The model number of a set that includes the SERVOPACK and an Option Module is not hyphenated after "SGD7S."

*2 When ordering a SERVOPACK and a Fully-Closed Module separately, use this Fully-Closed Module model number.

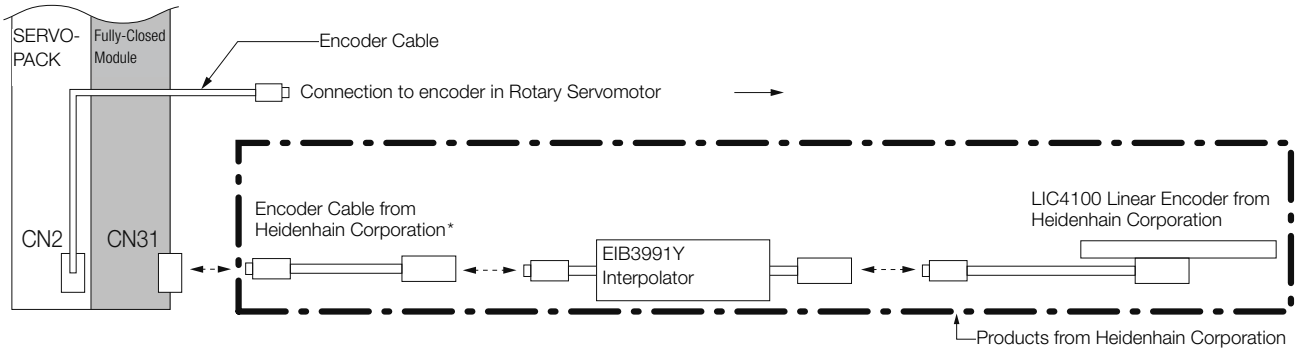
*3 One Option Case Kit is required for each SERVOPACK.
The set includes the module cover, PCB mounting plate, and two mounting screws.

Note:

1. Refer to the following section for recommended Linear Encoders or chapter Recommended Linear Encoders on page 14.
2. Refer to the following section for the specifications of the Serial Converter Units or to Sigma-7-Series AC Servo Drive Peripheral Device Selection Manual (Manual No.: SIEP S800001 32).
3. Refer to the following section for information on Servomotor Main Circuit Cables and Encoder Cables or to chapter Cables and Peripheral Devices on page 286.

Connections When Using a YASKAWA Serial Interface for the Output Signals

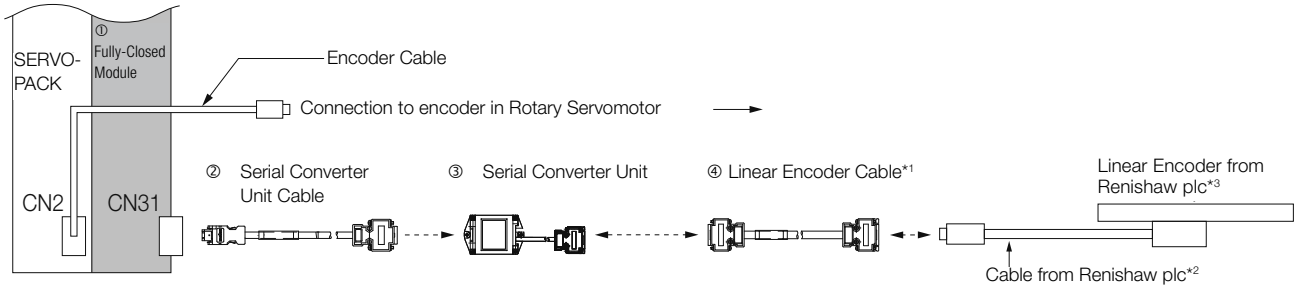
LIC4100 Linear Encoder with EIB3391Y Interpolator



* Use an Encoder Cable from Heidenhain Corporation. Contact Heidenhain Corporation for detailed Encoder Cable specifications.

Connections to Linear Encoder from Renishaw Plc

Connections for a 1 Vp-p Analog Voltage Output Signal



*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 Renishaw plc for details on cables (analog 1 Vp-p output, D-sub 15-pin, male) from Renishaw plc.

*3 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.

No.	Item	Model	Reference
①	Fully-closed Module (Purchased as a set with the SERVOPACK)	Without options: SGD7S□□□□□□0A□□1*1 With options: SGD7S□□□□□□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 Module (Purchased alone)	Fully-Closed Module*2 SGDV-OFA01A	–
		Option Case Kit*3 SGDV-OZA01A	–
②	Serial Converter Unit Cable	JZSP-CLP70-□□-E	page 303
③	Serial Converter Unit	JZDP-H005-000	page 305
④	Linear Encoder Cable	JZSP-CLL00-□□-E	page 303

*1 The model number of a set that includes the SERVOPACK and an Option Module is not hyphenated after "SGD7S."

*2 When ordering a SERVOPACK and a Fully-Closed Module separately, use this Fully-Closed Module model number.

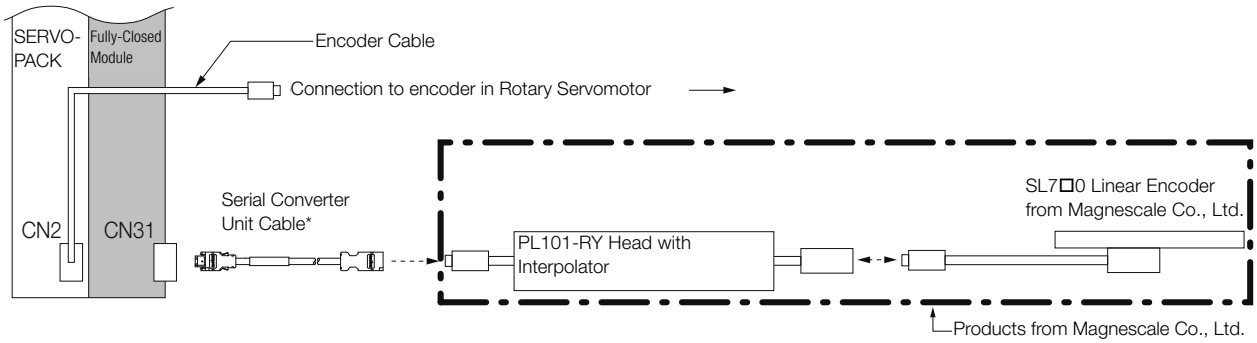
*3 One Option Case Kit is required for each SERVOPACK.
The set includes the module cover, PCB mounting plate, and two mounting screws.

Note:

1. Refer to the following section for recommended Linear Encoders or chapter Recommended Linear Encoders on page 14.
2. Refer to the following section for the specifications of the Serial Converter Units or to Sigma-7-Series AC Servo Drive Peripheral Device Selection Manual (Manual No.: SIEP S800001 32).
3. Refer to the following section for information on Servomotor Main Circuit Cables and Encoder Cables or to chapter Cables and Peripheral Devices on page 286.

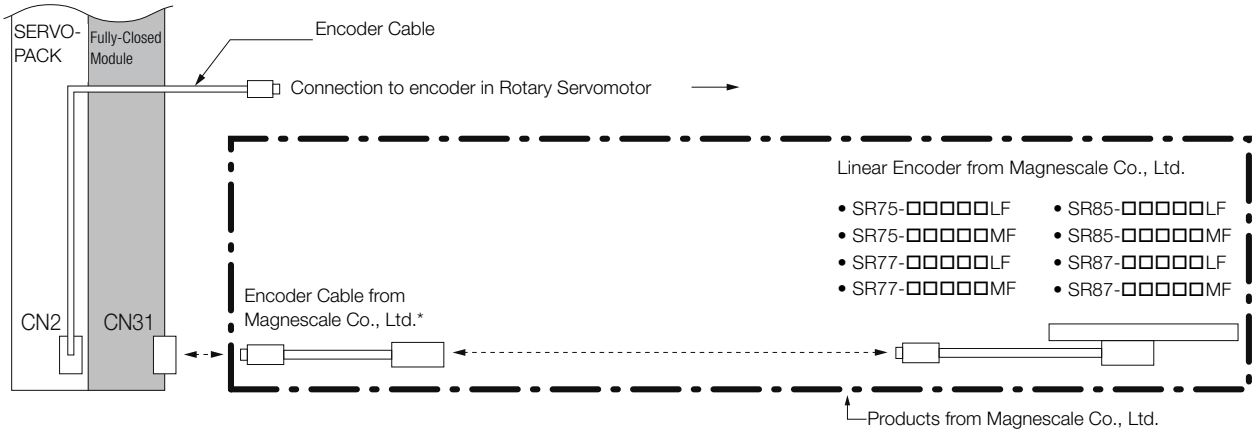
Connections to Linear Encoder from Magnescale Co., Ltd.

SL7□0 Linear Encoder and PL101-RY Sensor Head with Interpolator



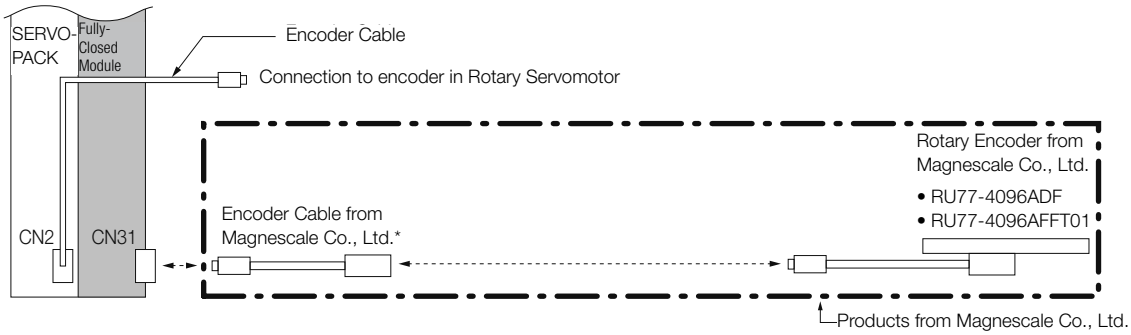
* Refer to the following section for information on cables to connect Fully-Closed Modules and Linear Encoders or chapter Serial Converter Unit Cables on page 307.

SR-75, SR-77, SR-85, and SR-87 Linear Encoders



* To connect the SERVOPACK and Linear Encoder, use a CH33-xx□□G Cable from Magnescale Co., Ltd. (This Cable has connectors designed for use with YASKAWA products.)

RU77-4096ADF/RU77-4096AFFT01 Absolute Rotary Encoders

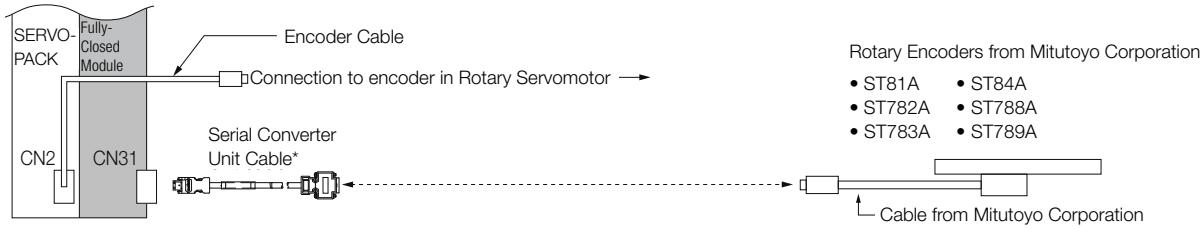


*To connect the SERVOPACK and Rotary Encoder, use a CE28-Series Extension Cable for RU77 from Magnescale Co., Ltd.

Note:
The RU77 is a single-turn absolute rotary encoder.

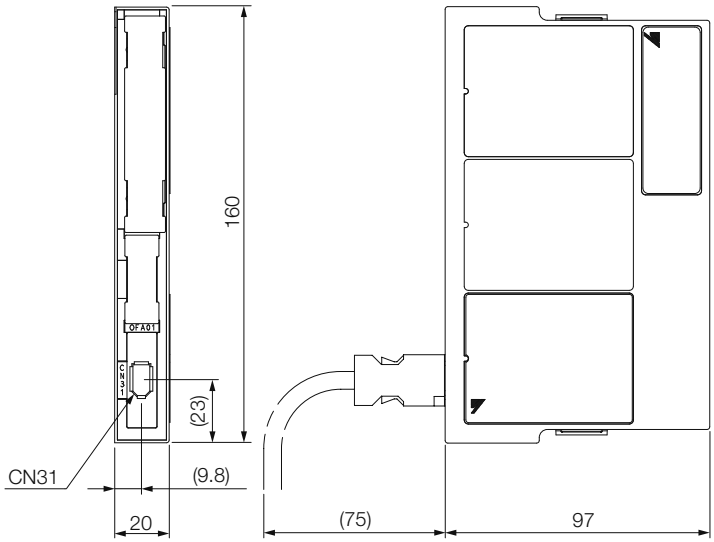
Connections to Linear Encoders from Mitutoyo Corporation

ST78□A Linear Encoders



* Refer to the following section for information on cables to connect Fully-Closed Modules and Linear Encoders or chapter Serial Converter Unit Cables on page 307.

External Dimensions



Unit: mm
Approx. Mass: 0.1 kg

Device Label	Model	Number of Pins	Manufacturer
CN31	3E106-0220KV	6	3M Japan Ltd.

Safety Option Module

Safety Module

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 it with an SGD7S SERVOPACK to design optimum safety in a machine system according to industry needs.

Model Designations

Purchasing the SERVOPACK separately

SGD7S [*1]	-	R70	A	00	A	001	
Sigma-7 Series SERVOPACKs Single-axis		1st ... 3rd	4th	5th + 6th	7th	8th ... 10th	digit

1st ... 3rd digit - Maximum Applicable Motor Capacity

Code	Specifications
Three-phase, 200 V	
R70[*2]	0.05 kW
R90[*2]	0.1 kW
1R6[*2]	0.2 kW
2R8[*2]	0.4 kW
3R8	0.5 kW
5R5[*2]	0.75 kW
7R6	1.0 kW
120	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

4th digit - Voltage

Code	Specifications
A	200 VAC

5th + 6th digit - Interface *

Code	Specifications
00	Analog voltage/pulse train reference
10	MECHATROLINK-II communication reference
20	MECHATROLINK-III communication reference
A0	EtherCAT communication reference
E0	Command Option Attachable Type

7th digit - Design Revision Order

Code	Specifications
A	

8th ... 10th digit - Hardware Options Specifications

Code	Specifications	Applicable Models
None	Without Options	All models
001	Rack-mounted	
002	Varnished	
008	Single-phase, 200 V power input	1.5 kW
00A	Varnished and single phase power input	All models

*1. The model number of a SERVOPACK with an Option Module is not hyphenated after SGD7S.
*2. You can use these models with either a single-phase or three-phase power supply input.
Note: Contact your YASKAWA representative for information on combining options.

When ordering a SERVOPACK and a Safety Module separately, use the following Safety Module model number.

SGDV-OSA01A

1. One Option Case Kit is required for each SERVOPACK.
   Option Case Kit model: SGDV-OZA01A
2. INDEXER Modules and DeviceNet Modules cannot be used with Safety Modules.

Applicable Standards and Functions

Compliance with Safety Standards

Safety Standards	Applicable Standards	Products	
		SERVOPACK	SERVOPACK + Safety Module
Safety of Machinery	EN ISO13849-1:2008/ AC:2009 EN 954-1 IEC 60204-1	✓	✓
Functional Safety	IEC 61508 Series IEC 62061 IEC 61800-5-2	✓	✓
EMC	IEC 61326-3-1	✓	✓

Support for Functions Defined in IEC61800-5-2

Safety functions are implemented by using the hard wire base block (HWBB) in the SERVOPACK.

Safety Function	Description	Applicable Products	
		SERVOPACK	SERVOPACK + Safety Module
Safe BaseBlock Function (SBB function)	This safety function is equivalent to an STO function. (It shuts OFF the power supply from the SERVOPACK to the motor.)	✓	✓
Safe BaseBlock with Delay Function (SBB-D function)	This safety function is equivalent to an SS1 function. (It monitors the deceleration operation of the motor for the specified time and then shuts OFF the power supply from the SERVOPACK to the motor.)	–	✓
Safe Position Monitor with Delay Function (SPM-D function)	This safety function is equivalent to an SS2 function. (It monitors the deceleration operation of the motor for the specified time and then monitors the position after the motor stops.)	–	✓–
Safely Limit Speed with Delay Function (SLS-D function)	This safety function is equivalent to an SLS function. (It monitors the deceleration operation of the motor for the specified time and then monitors the speed of the motor to confirm that it remains in the allowable range.)	–	✓

Specifications and Ratings

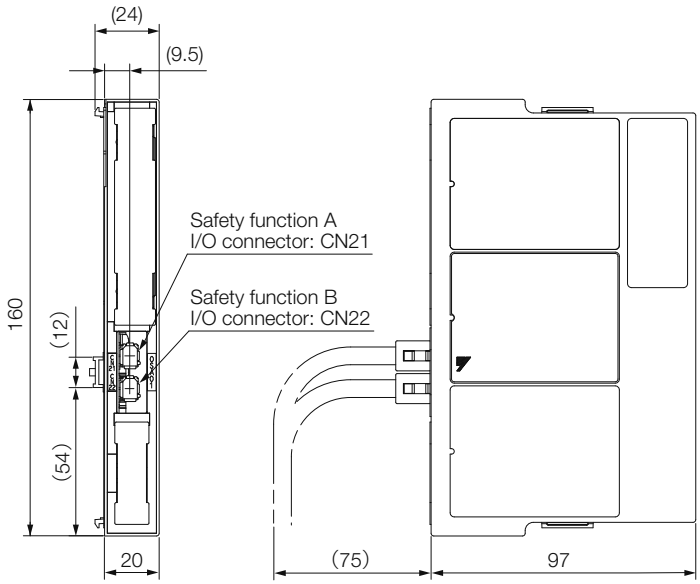
Basic Specifications

Item		Specification	
Operating Conditions	Ambient Air Temperature	0°C to +55°C	
	Storage Temperature	–20°C to +85°C	
	Surrounding Air Humidity	90% relative humidity max.	There must be no freezing or condensation.
	Storage Humidity	90% relative humidity max.	
	Vibration Resistance	4.9 m/s^2	
	Shock Resistance	19.6 m/s^2	
	Degree of Protection	IP10	- Must be no corrosive or flammable gases. - Must be no exposure to water, oil, or chemicals. - Must be no dust, salts, or iron dust.
	Pollution Degree	2	
	Altitude	1000 m max.	
	Others	Do not use the SERVOPACK in the following locations: Locations subject to static electricity noise, strong electromagnetic/ magnetic fields, or radioactivity	

Compliance with UL Standards, EU Directives, and Other Safety Standards (in Combination with SERVOPACK)

Item		Specification	
North American Safety Standards		UL61800-5-1 CSA C22.2 No.274	
European Directives	Machinery Directive (2006/42/EC)	EN ISO 13849-1: 2008/AC: 2009	
	EMC Directive (2004/108/EC)	EN 55011/A2 group 1, class A EN 61000-6-2 EN 61000-6-4 EN 61800-3	
	Low Voltage Directive (2006/95/EC)	EN 50178 EN 61800-5-1	
Safety Standards	Safety of Machinery	EN ISO 13849-1, IEC 60204-1	
	Functional Safety	IEC 61508-1 to IEC 61508-7, IEC 62061, and IEC 61800-5-2	
	EMC	IEC 61326-3-1	
Safety Function		IEC 61800-5-2	IEC 60204-1
		Safe Torque Off (STO)	Stop Category 0
		Safe Stop 1 (SS1)	Stop Category 1
		Safe Stop 2 (SS2)	Stop Category 2
		Safely Limited Speed (SLS)	
	Number of Blocks	2	
	Safety Function A	Input signals: 2 channels (redundant signals), output signals: 1 channel	
	Safety Function B	Input signals: 2 channels (redundant signals), output signals: 1 channel	
Safe Performance			
	Safety Integrity Level	SIL2, SILCL2	
	Probability of Dangerous Failure per Hour	PFH 3.3 ≥ 10^{-7} [1/h]	
	Category	Cat3	
	Performance Level	PLd (Category 2)	
	Mean Time to Dangerous Failure of Each Channel	MTTFd: High	
	Average Diagnostic Coverage	DCave: Medium	
	Proof Test Interval	10 years	

External Dimensions



Unit: mm
Approx. Mass: 0.11 kg

Device Label	Model	Number of Pins	Manufacturer
CN21	1981080-1	8	Tyco Electronics Japan G.K.
CN22	1981080-1	8	Tyco Electronics Japan G.K.

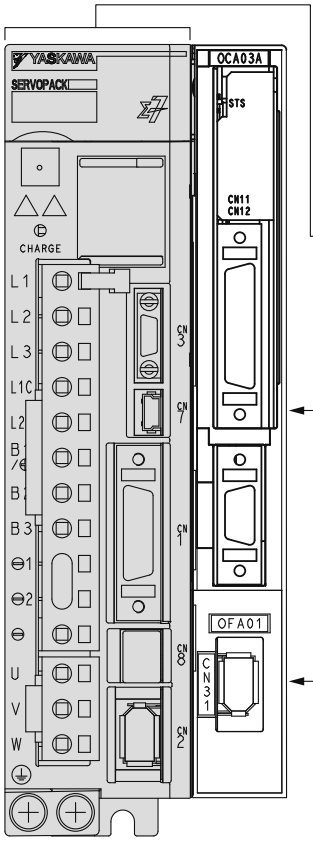
Note:

1. The above connectors or their equivalents are used for SERVOPACKs.
2. Refer to the user's manual of the Safety Module for installation standards.

INDEXER Module with Sigma-7S Command Option Attachable Type

Configuration

A Sigma-7S Single-axis INDEXER Module-Mounted SERVOPACK is a Command Option Attachable-Type SERVOPACK with an INDEXER Module mounted on the side of the SERVOPACK. Positioning with single-axis control can be performed by using program table operation and other functions.



Command Option Attachable-Type SERVOPACKs
SGD7S-□□□AE0A□□□

INDEXER Module
SGDV-OCA03A

Note: Firmware version 6 or later is required.

Fully-Closed Module*
SGDV-OFA01A

* Attach a Fully-Closed Module if fully-closed loop control is required.

Purchase Order Number

Purchasing the SERVOPACK separately

SGD7S - R70 A E0 A 001

Sigma-7 Series SERVOPACKs Single-axis	1st ... 3rd	4th	5th + 6th	7th	8th ... 10th	digit

1st ... 3rd digit - Maximum Applicable Motor Capacity

Code	Specifications
Three-phase, 200 V	
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	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

4th digit - Voltage

Code	Specifications
A	200 VAC

5th + 6th digit - Interface *2

Code	Specifications
E0	Command Option Attachable Type

7th digit - Design Revision Order

Code	Specifications
A	

8th ... 10th digit - Hardware Options Specifications

Code	Specifications	Applicable Models
None	Without Options	All models
001	Rack-mounted	
002	Varnished	
008	Single-phase, 200 V power input	1.5 kW
00A	Varnished and single phase power input	All models

*1. You can use these models with either a single-phase or three-phase power supply input.
*2. The same SERVOPACKs are used for both Rotary Servomotors and Linear Servomotors.

One Option Case Kit is required for each SERVOPACK.
Option Case Kit model: SGDV-OZA01A.

INDEXER Module
SGDV-OCA03A

Fully-Closed Module
SGDV-OFA01A

Sigma-7S Single-axis INDEXER Module

Ratings

Three-Phase, 200 VAC

Model SGD7S-			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, -15% to +10%, 50 Hz/60 Hz										
	Input Current [Arms]*		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, -15% to +10%, 50 Hz/60 Hz										
Power Supply Capacity [kVA]*			0.2	0.3	0.5	1.0	1.3	1.6	2.3	3.2	4.0	5.9	7.5
Power Loss*	Main Circuit Power Loss [W]		5.1	7.3	13.5	24.0	20.1	43.8	53.6	65.8	111.9	113.8	263.7
	Control Circuit Power Loss [W]		17	17	17	17	17	17	17	22	22	22	27
	Built-in Regenerative Resistor Power Loss [W]		–	–	–	–	8	8	8	10	16	16	36
	Total Power Loss [W]		22.1	24.3	30.5	41.0	45.1	68.8	78.6	97.8	149.9	151.8	326.7
Regenerative Resistor	Built-In Regenerative Resistor	Resistance [Ω]	–	–	–	–	40	40	40	20	12	12	8
		Capacity [W]	–	–	–	–	40	40	40	60	60	60	180
	Minimum Allowable External Resistance [Ω]		40	40	40	40	40	40	40	20	12	12	8
Overvoltage Category			III										

* This is the net value at the rated load.

Model SGD7S-			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, -15% to +10%, 50 Hz/60 Hz			
	Input Current [Arms]*1		29	37	54	73
Control Power Supply			200 VAC to 240 VAC, -15% to +10%, 50 Hz/60 Hz			
Power Supply Capacity [kVA]*1			10.7	14.6	21.7	29.6
Power Loss*1	Main Circuit Power Loss [W]		279.4	357.8	431.7	599.0
	Control Circuit Power Loss [W]		33	33	48	48
	External Regenerative Resistor Power Loss [W]		180*2	350*3	350*3	350*3
	Total Power Loss [W]		312.4	390.8	479.7	647.0
Regenerative Resistor	External Regenerative Resistor	Resistance [Ω]	6.25*2	3.13*3	3.13*3	3.13*3
		Capacity [W]	880*2	1760*3	1760*3	1760*3
	Minimum Allowable External Resistance [Ω]		5.8	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-RA04-E Regenerative Resistor Unit.
*3. This value is for the optional JUSP-RA05-E Regenerative Resistor Unit.

Single-phase, 200 VAC

Model SGD7S-			R70A	R90A	1R6A	2R8A	5R5A	120A *1
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, -15% to +10%, 50 Hz/60 Hz					
	Input Current [Arms]*3		0.8	1.6	2.4	5.0	8.7	16
Control Power Supply			200 VAC to 240 VAC, -15% to +10%, 50 Hz/60 Hz					
Power Supply Capacity [kVA]*3			0.2	0.3	0.6	1.2	1.9	3.0
Power Loss* 3	Main Circuit Power Loss [W]		5.1	7.3	13.5	24.0	43.8	80.5
	Control Circuit Power Loss [W]		17	17	17	17	17	17
	Built-in Regenerative Resistor Power Loss [W]		–	–	–	–	8	10
	Total Power Loss [W]		22.1	24.3	30.5	41.0	68.8	107.5
Regenerative Resistor	Built-In Regenerative Resistor	Resistance [Ω]	–	–	–	–	40	20
		Capacity [W]	–	–	–	–	40	20
	Minimum Allowable External Resistance [Ω]		40	40	40	40	40	20
Overvoltage Category			III					

*1. Single-phase, 200-VAC power supply input is available as a hardware option.

*2. The ratings are 220 VAC to 240 VAC, -15% to +10%, 50 Hz/60 Hz

*3. This is the net value at the rated load.

270 VDC

Model SGD7S-		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, -15% to +10%							
	Input Current [Arms]*	0.5	1.0	1.5	3.0	3.8	4.9	6.9	11
Control Power Supply		270 VDC to 324 VDC, -15% to +10%							
Power Supply Capacity [kVA]*		0.2	0.3	0.6	1	1.4	1.6	2.3	3.2
Power Loss*	Main Circuit Power Loss [W]	4.6	6.3	11.7	20.2	16.9	37.9	46.0	53.2
	Control Circuit Power Loss [W]	17	17	17	17	17	17	17	22
	Total Power Loss [W]	21.6	23.3	28.7	37.2	33.9	54.9	63.0	75.2
Overvoltage Category		III							

* This is the net value at the rated load.

Model SGD7S-		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
Main Circuit	Power Supply	270 VDC to 324 VDC, -15% to +10%						
	Input Current [Arms]*	14	20	34	36	48	68	92
Control Power Supply		270 VDC to 324 VDC, -15% to +10%						
Power Supply Capacity [kVA]*		4.0	5.9	7.5	10.7	14.6	21.7	29.6
Power Loss*	Main Circuit Power Loss [W]	95.8	87.6	163.7	203.4	261.2	246.6	346.5
	Control Circuit Power Loss [W]	22	22	27	33	33	48	48
	Total Power Loss [W]	117.8	109.6	190.7	236.4	294.2	294.6	394.5
Overvoltage Category		III						

* This is the net value at the rated load.

The power supply for an INDEXER Module is supplied from the control power supply of the SERVOPACK. The power loss is given in the following table.

Item	Specification
Power Supply Method	5.05 VDC
Maximum Operating Voltage	5.25 VDC
Maximum Operating Current	500 mA
Maximum Power Loss	2.6 W

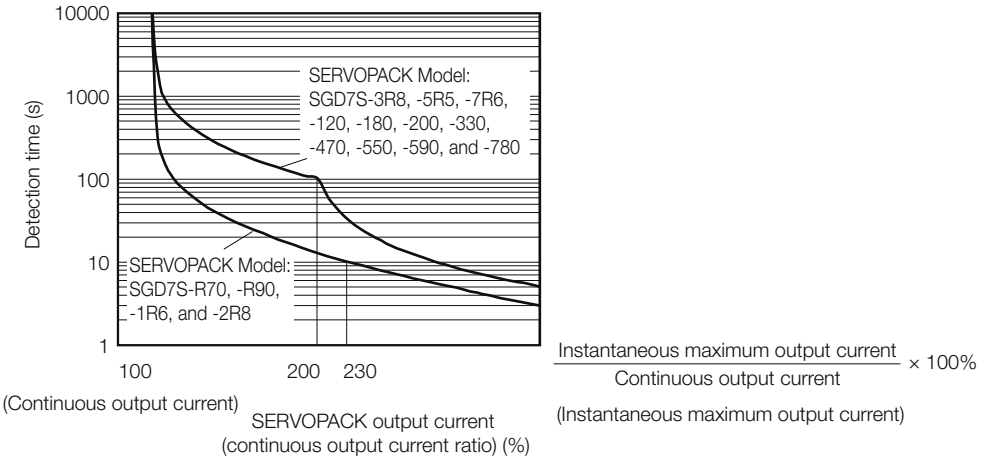
SERVOPACK Overload Protection Characteristics

The overload detection level is set for hot start conditions with a SERVOPACK surrounding air temperature of 55°C.

An overload alarm (A.710 or A.720) 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.

In most cases, that will be the overload protection characteristics of the Servomotor.



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 (or effective force) within the continuous duty zone of the torque-motor speed characteristic (or force-motor speed characteristics) of the Servomotor.

The specifications when the INDEXER Module is combined with a Command Option Attachable-Type SERVOPACK are given in the following table.

Item		Specification
Control Method		IGBT-based PWM control, sine wave current drive
Feedback	With Rotary Servomotor	Serial encoder: 20 bits or 24 bits (incremental encoder/absolute encoder) 22 bits (absolute encoder)
	With Linear Servomotor	• Absolute linear encoder (The signal resolution depends on the absolute linear encoder.) • Incremental linear encoder (The signal resolution depends on the incremental linear encoder or Serial Converter Unit.)
Environmental Conditions	Surrounding Air Temperature	0°C to 55°C
	Storage Temperature	-20°C to 85°C
	Surrounding Air Humidity	90% relative humidity max. (with no freezing or condensation)
	Storage Humidity	90% relative humidity max. (with no freezing or condensation)
	Vibration Resistance	4.9 m/s^2
	Shock Resistance	19.6 m/s^2
	Degree of Protection	IP10
	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	1,000 m max.
	Others	Do not use the SERVOPACK in the following locations: Locations subject to static electricity noise, strong electromagnetic/magnetic fields, or radioactivity
Applicable Standards		UL61800-5-1, CSA C22.2 No.274, EN50178, EN61800-5-1, EN55011 group1 class A, EN61000-6-2, EN61000-6-4, EN61800-3, IEC61508-1 to 4, IEC61800-5-2, IEC62061, ISO13849-1, IEC61326-3-1
Mounting		Base-mounted: All Models Rack-mounted: R70A, R90A, 1R6A, 2R8A, 3R8A, 5R5A, 7R6A, 120A, 180A, 200A, 330A Duct-ventilated: 470A, 550A, 590A, 780A
Performance	Speed Control Range	1:5000 (At the rated torque, the lower limit of the speed control range must not cause the Servomotor to stop.)
	Coefficient of Speed Fluctuation*1	±0.01% of rated speed max. (for a load fluctuation of 0% to 100%)
		0% of rated speed max. (for a voltage fluctuation of ±10%)
		±0.1% of rated speed max. (for a temperature fluctuation of 25°C ±25°C)
	Torque Control Precision (Repeatability)	±1%
	Soft Start Time Setting	0 s to 10 s (Can be set separately for acceleration and deceleration.)
I/O Signals	Encoder Divided Pulse Output	Phase A, phase B, phase C: Line-driver output Number of divided output pulses: Any setting is allowed.
	Linear Servomotor Overheat Protection Signal Input	Number of input points: 1 Input voltage range: 0 V to +5 V

Continued on next page.

Continued from previous page.

<table>
<tr><th colspan="4">Item</th><th>Specification</th></tr>
<tr><td rowspan="6">I/O Signals</td><td rowspan="4">Sequence Input Signals</td><td rowspan="2">SERVOPACK</td><td rowspan="4">Fixed Input</td><td>Allowable voltage range: 24 VDC ±20%
Number of input points: 6</td></tr>
<tr><td>Input method: Sink inputs or source inputs
Input Signals:
• Alarm Reset (/ALM-RST)
• Forward Drive Prohibited (P-OT)
• Reverse Drive Prohibited (N-OT)
• Origin Return Deceleration Switch (/DEC)
• Registration (/RGRT)
• Servo ON (/S-ON)
A signal can be allocated and the positive and negative logic can be changed.</td></tr>
<tr><td rowspan="3">INDEXER Module</td><td>Allowable voltage range: 24 VDC ±20%
Number of input points: 11</td></tr>
<tr><td>/MODE 0/1 (Mode Switch Input) signal
<table><tr><th>Mode 0</th><th>Mode 1</th></tr><tr><td>• /START-STOP (Program Table Operation Start-Stop Input) signal
• /PGMRES (Program Table Operation Reset Input) signal
• /SEL0 (Program Step Selection Input 0) signal
• /SEL1 (Program Step Selection Input 1) signal
• /SEL2 (Program Step Selection Input 2) signal
• /SEL3 (Program Step Selection Input 3) signal
• /SEL4 (Program Step Selection Input 4) signal
• /SEL5 (Program Step Selection Input 5) signal
• /SEL6 (Program Step Selection Input 6) signal
• /SEL7 (Program Step Selection Input 7) signal</td><td>• /HOME (Origin Return Input) signal
• /JOGP (Forward Jog Input) signal
• /JOGN (Reverse Jog Input) signal
• /JOG0 (Jog Speed Table Selection Input 0) signal
• /JOG1 (Jog Speed Table Selection Input 1) signal
• /JOG2 (Jog Speed Table Selection Input 2) signal
• /JOG3 (Jog Speed Table Selection Input 3) signal</td></tr></table></td></tr>
<tr><td rowspan="4">Sequence Output Signals</td><td rowspan="2">SERVOPACK</td><td>Fixed Input</td><td>Allowable voltage range: 5 VDC to 30 VDC
Number of output points: 1
Output signal: Servo Alarm (/ALM)</td></tr>
<tr><td rowspan="2">Output Signals for Which Allocations Can Be Changed</td><td>Allowable voltage range: 5 VDC to 30 VDC
Number of output points: 3
(A photocoupler output (isolated) is used.)</td></tr>
<tr><td>Output Signals:
• Warning Output (/WARN)
• Brake Output (/BK)
• Servo Ready Output (/S-RDY)
• Alarm Code Output (/ALO1, /ALO2, and /ALO3)
A signal can be allocated and the positive and negative logic can be changed.</td></tr>
<tr><td>INDEXER Module</td><td>Fixed Input</td><td>Allowable voltage range: 5 VDC to 30 VDC
Number of output points: 9
Output Signals:
• Positioning Completion Output (/INPOSITION)
• Programmable Output 0 (/POUT0)
• Programmable Output 1 (/POUT1)
• Programmable Output 2 (/POUT2)
• Programmable Output 3 (/POUT3)
• Programmable Output 4 (/POUT4)
• Programmable Output 5 (/POUT5)
• Programmable Output 6 (/POUT6)
• Programmable Output 7 (/POUT7)</td></tr>
</table>

Continued on next page.

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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	Interface Personal computer (with SigmaWin+)
		Communications Standard	Conforms to USB2.0 standard (12 Mbps).
Displays/ Indicators	SERVOPACK		CHARGE and PWR indicators, and one-digit seven-segment display
	INDEXER Module		Refer to the following manual for details. 📖 *Σ-7-Series AC Servo Drive Σ-7S SERVOPACK Command Option Attachable Type with INDEXER Module Product Manual* (Manual No.: SIEP S800001 64)
Operating Methods	Program Table Method		• Program table positioning in which steps are executed sequentially by commands given through contact input or serial communications • Positioning in which station numbers are specified by commands given through contact input or serial communications
		Max. Number of Steps	256
		Max. Number of Tables	256
		Max. Number of Stations	256
	Serial Communications Method		Serial command by 1-channel ASCII code Communications specifications: RS-422/485 (50 m max.) Connection topology: Multi-drop connection (16 axes max.) Baud rate: 9600, 19200, 38400 bps
	Other Functions		Registration (positioning by external signals), origin return
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 Settling time (±1%): 1.2 ms (Typ)
Dynamic Brake (DB)			Activated when a servo alarm or overtravel (OT) occurs, or when the power supply to the main circuit or servo is OFF.
Regenerative Processing			Built-in (An external resistor must be connected to the SGD7S-470A to -780A.) Refer to the following section for details. ☞ *Built-In Regenerative Resistor* (page 378)
Overtravel (OT) Prevention			Stopping with a dynamic brake (DB), coasting to a stop, performing a hard stop, or performing a smooth stop (decelerating to a stop) for a CCW-OT (CCW Drive Prohibit Input) signal or CW-OT (CW Drive Prohibit Input) signal.
Protective Functions			Overcurrent, overvoltage, low voltage, overload, regeneration error, etc.
Utility Functions			Gain adjustment, alarm history, 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).
	Applicable Standards*2	ISO13849-1 PLe (Category 3), IEC61508 SIL3
Applicable Option Modules		Fully-Closed Module Note: You cannot use a Safety Module if you are using an INDEXER Module.

*1. The coefficient of speed fluctuation for load fluctuation is defined as follows:

$$\text{Coefficient of speed fluctuation} = \frac{\text{No-load motor speed - Total-load motor speed}}{\text{Rated motor speed}} \times 100\%$$

*2. Always perform risk assessment for the system and confirm that the safety requirements are met.

Reference Methods

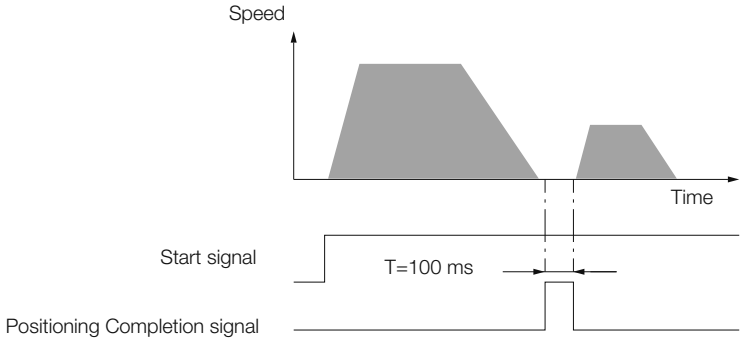
The INDEXER Module has two reference methods: digital I/O and serial commands. These command methods are described in the following sections.

Digital I/O is used with a program table (mode 0) or a jog speed table (mode 1). You can use a program table (mode 0) to execute the program steps that you select with I/O signal patterns (binary format). If the jog speed table (mode 1) is being used, the jog speed selected with the input signal pattern (binary format) can be executed.

- Program Table

256 steps

PGMSTEP	POS	SPD	RDST	RSPD	ACC*	DEC*	EVENT	LOOP	NEXT
0	I+400000	2000	500000	1000	200	100	T5000	1	1
1	I+100000	1000	200000	2000	100	50	IT0	1	END
⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮
n	I+400000	2000	500000	1000	100	50	IT100	1	n+1
n+1	I+100000	1000	200000	2000	⋮	⋮	NT0	1	END
⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮
254	I+400000	2000	500000	1000	100	50	SEL3T200	1	127
255	I+100000	1000	200000	2000	100	50	DT0	1	END

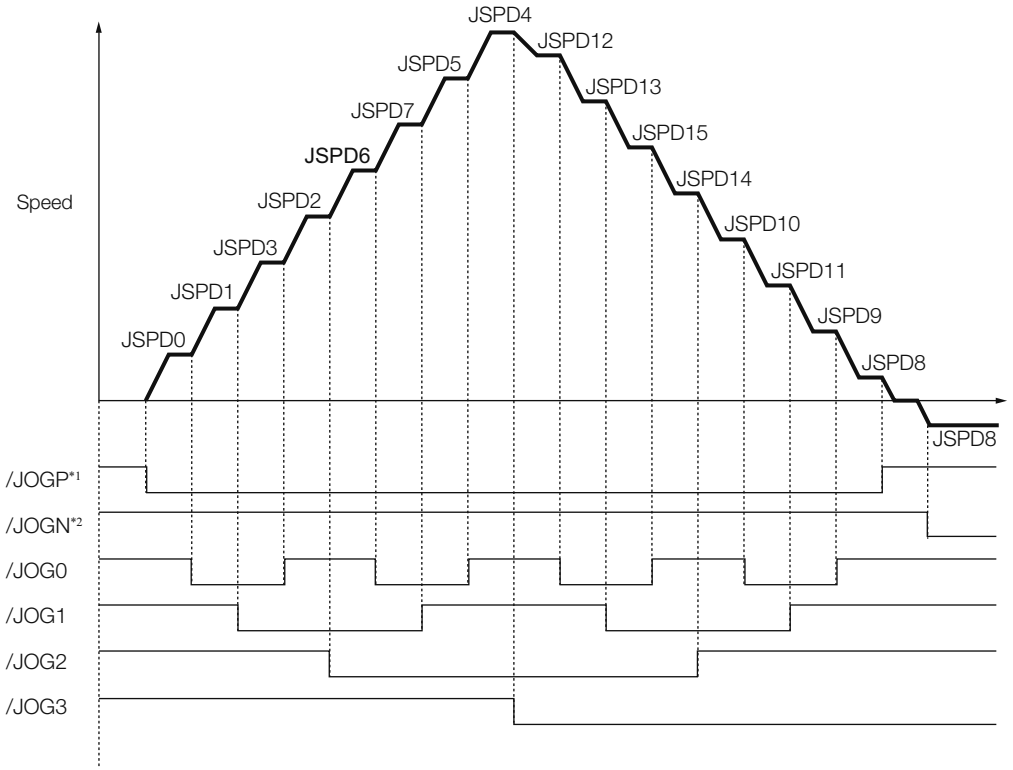


• Jog Speed Table

16 combinations

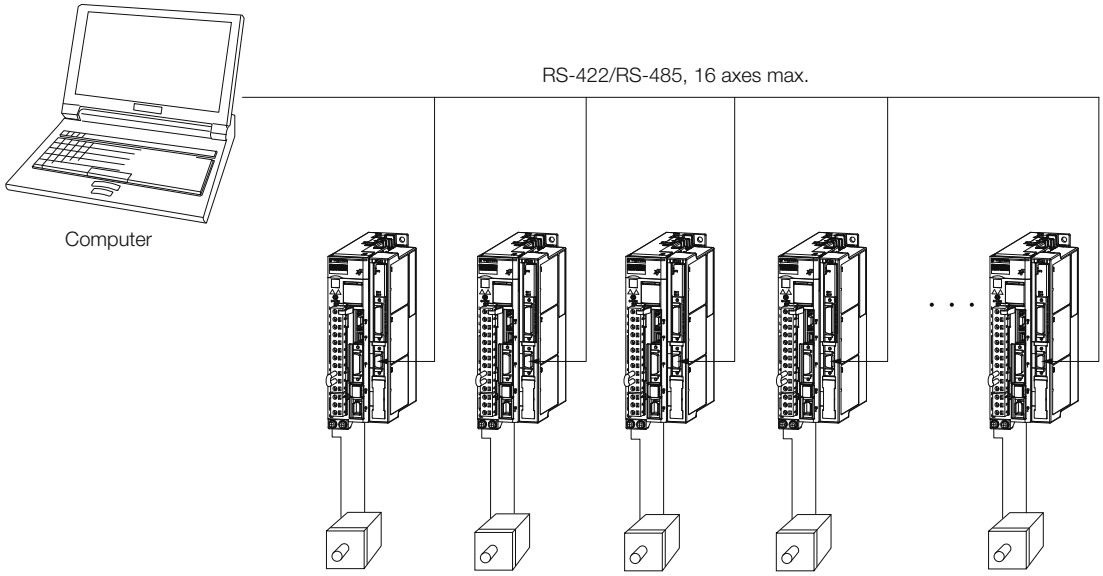
JSPD	JOG3	JOG2	JOG1	JOG0	Jog Speed
0	0	0	0	0	1000
1	0	0	0	1	2000
2	0	0	1	0	4000
⋮	⋮	⋮	⋮	⋮	⋮
⋮	⋮	⋮	⋮	⋮	⋮
⋮	⋮	⋮	⋮	⋮	⋮
15	1	1	1	1	5500

Note: 1: Signal is ON (active), 0: Signal is OFF (inactive).

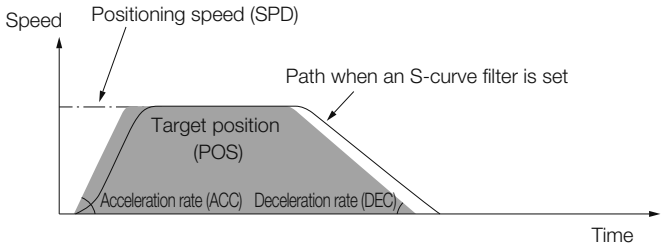


*1. Forward operation at the jog speed is performed while the /JOGP signal is ON.
*2. Reverse operation at the jog speed is performed while the /JOGN signal is ON.

With serial commands, ASCII command strings are sent to the INDEXER Module through RS-422 or RS-485 communications and these commands are interpreted and executed immediately. You can use general-purpose serial communications (RS422/RS485) to perform independent control of up to 16 axes from one host controller (e.g., PC or HMI).



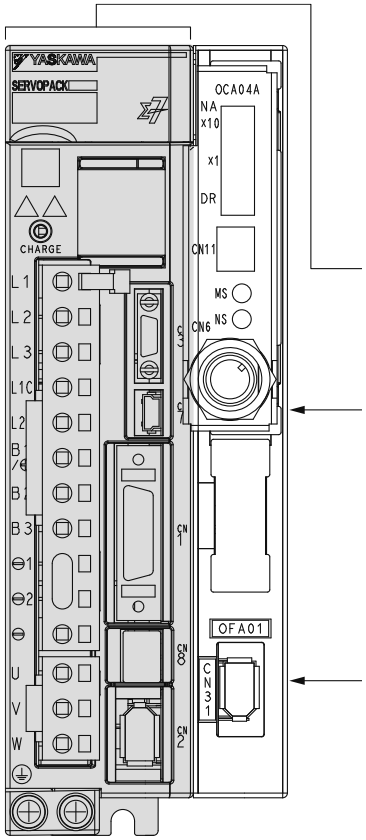

```
1SVON              # Servo turned ON.
1POSI=400000       # Set relative position to 400,000.
1SPD=2000          # Set speed to 2,000.
1ACC=200           # Set acceleration rate to 200.
1DEC=100           # Set deceleration rate to 100.
1ST                # Start operation.
 :
```



Single-axis DeviceNet Module

Configuration

A Sigma-7S Single-axis DeviceNet Module-Mounted SERVOPACK is a Command Option Attachable-Type SERVOPACK with a DeviceNet Module mounted on the side of the SERVOPACK. Positioning and origin returns can be performed by sending commands from the host controller (DeviceNet master).



Command Option Attachable-Type SERVOPACKs
SGD7S-□□□AE0A□□□

DeviceNet Modules with Option Case Kit
SGDV-OCA04A **(driven by control power supply)**
SGDV-OCA05A **(driven by external power supply)**

Fully-Closed Module*
SGDV-OFA01A

* Attach a Fully-Closed Module if fully-closed loop control is required.

Purchasing a Module Separately

Use the following model numbers to order the SERVOPACKs and DeviceNet Module separately.

SGD7S	-	R70	A	E0	A	001	000	
Sigma-7 Series SERVOPACKs Single-axis		1st ... 3rd	4th	5th + 6th	7th	8th ... 10th	11th ... 13th	digit

1st ... 3rd digit - Maximum Applicable Motor Capacity

Code	Specifications
Three-phase, 200 V	
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	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

4th digit - Voltage

Code	Specifications
A	200 VAC

5th + 6th digit - Interface *2

Code	Specifications
E0	Command Option Attachable Type

7th digit - Design Revision Order

Code	Specifications
A	

8th ... 10th digit - Hardware Options Specifications

Code	Specifications	Applicable Models
None	Without Options	All models
001	Rack-mounted	
002	Varnished	
008	Single-phase, 200 V power input	1.5 kW
00A	Varnished and single phase power input	All models

11th+12th+13th digits - FT/EX Specification

Code	Specifications
000	None

*1. You can use these models with either a single-phase or three-phase power supply input.
*2. The same SERVOPACKs are used for both Rotary Servomotors and Linear Servomotors.

The DeviceNet Module is equipped with an Option Case Kit.
(Option Case Kits do not need to be ordered separately.)

DeviceNet Modules
SGDV-OCA04A (driven by control power supply)
SGDV-OCA05A (driven by external power supply)

Fully-Closed Module
SGDV-OFA01A

Sigma-7S Single-axis DeviceNet Module

Ratings

Three-Phase, 200 VAC

Model SGD7S-			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, -15% to +10%, 50 Hz/60 Hz										
	Input Current [Arms]*		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, -15% to +10%, 50 Hz/60 Hz										
Power Supply Capacity [kVA]*			0.2	0.3	0.5	1.0	1.3	1.6	2.3	3.2	4.0	5.9	7.5
Power Loss*	Main Circuit Power Loss [W]		5.1	7.3	13.5	24.0	20.1	43.8	53.6	65.8	111.9	113.8	263.7
	Control Circuit Power Loss [W]		17	17	17	17	17	17	17	22	22	22	27
	Built-in Regenerative Resistor Power Loss [W]		–	–	–	–	8	8	8	10	16	16	36
	Total Power Loss [W]		22.1	24.3	30.5	41.0	45.1	68.8	78.6	97.8	149.9	151.8	326.7
Regenerative Resistor	Built-In Regenerative Resistor	Resistance [Ω]	–	–	–	–	40	40	40	20	12	12	8
		Capacity [W]	–	–	–	–	40	40	40	60	60	60	180
	Minimum Allowable External Resistance [Ω]		40	40	40	40	40	40	40	20	12	12	8
Overvoltage Category			III										

* This is the net value at the rated load.

Model SGD7S-			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, -15% to +10%, 50 Hz/60 Hz			
	Input Current [Arms]*1		29	37	54	73
Control Power Supply			200 VAC to 240 VAC, -15% to +10%, 50 Hz/60 Hz			
Power Supply Capacity [kVA]*1			10.7	14.6	21.7	29.6
Power Loss*1	Main Circuit Power Loss [W]		279.4	357.8	431.7	599.0
	Control Circuit Power Loss [W]		33	33	48	48
	External Regenerative Resistor Power Loss [W]		180*2	350*3	350*3	350*3
	Total Power Loss [W]		312.4	390.8	479.7	647.0
Regenerative Resistor	External Regenerative Resistor	Resistance [Ω]	6.25*2	3.13*3	3.13*3	3.13*3
		Capacity [W]	880*2	1760*3	1760*3	1760*3
	Minimum Allowable External Resistance [Ω]		5.8	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-RA04-E Regenerative Resistor Unit.
*3. This value is for the optional JUSP-RA05-E Regenerative Resistor Unit.

Single-Phase, 200 VAC

Model SGD7S-			R70A	R90A	1R6A	2R8A	5R5A
Maximum Applicable Motor Capacity [kW]			0.05	0.1	0.2	0.4	0.75
Continuous Output Current [Arms]			0.66	0.91	1.6	2.8	5.5
Instantaneous Maximum Output Current [Arms]			2.1	3.2	5.9	9.3	16.9
Main Circuit	Power Supply		200 VAC to 240 VAC, -15% to +10%, 50 Hz/60 Hz				
	Input Current [Arms]*		0.8	1.6	2.4	5.0	8.7
Control Power Supply			200 VAC to 240 VAC, -15% to +10%, 50 Hz/60 Hz				
Power Supply Capacity [kVA]*			0.2	0.3	0.6	1.2	1.9
Power Loss*	Main Circuit Power Loss [W]		5.1	7.3	13.5	24.0	43.8
	Control Circuit Power Loss [W]		17	17	17	17	17
	Built-in Regenerative Resistor Power Loss [W]		–	–	–	–	8
	Total Power Loss [W]		22.1	24.3	30.5	41.0	68.8
Regenerative Resistor	Built-In Regenerative Resistor	Resistance [Ω]	–	–	–	–	40
		Capacity [W]	–	–	–	–	40
	Minimum Allowable External Resistance [Ω]		40	40	40	40	40
Overvoltage Category			III				

* This is the net value at the rated load.

270 VDC

Model SGD7S-		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, -15% to +10%							
	Input Current [Arms]*	0.5	1.0	1.5	3.0	3.8	4.9	6.9	11
Control Power Supply		270 VDC to 324 VDC, -15% to +10%							
Power Supply Capacity [kVA]*		0.2	0.3	0.6	1	1.4	1.6	2.3	3.2
Power Loss*	Main Circuit Power Loss [W]	4.6	6.3	11.7	20.2	16.9	37.9	46.0	53.2
	Control Circuit Power Loss [W]	17	17	17	17	17	17	17	22
	Total Power Loss [W]	21.6	23.3	28.7	37.2	33.9	54.9	63.0	75.2
Overvoltage Category		III							

* This is the net value at the rated load.

Model SGD7S-		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
Main Circuit	Power Supply	270 VDC to 324 VDC, -15% to +10%						
	Input Current [Arms]*	14	20	34	36	48	68	92
Control Power Supply		270 VDC to 324 VDC, -15% to +10%						
Power Supply Capacity [kVA]*		4.0	5.9	7.5	10.7	14.6	21.7	29.6
Power Loss*	Main Circuit Power Loss [W]	95.8	87.6	163.7	203.4	261.2	246.6	346.5
	Control Circuit Power Loss [W]	22	22	27	33	33	48	48
	Total Power Loss [W]	117.8	109.6	190.7	236.4	294.2	294.6	394.5
Overvoltage Category		III						

* This is the net value at the rated load.

The power supply method and power loss of a DeviceNet Module depend on the model of the DeviceNet Module.

SGDV-OCA04A (Interface: Driven by Control Power Supply)

The specifications of the SGDV-OCA04A DeviceNet Module are given in the following table.

Item	Specification	
	DeviceNet Communications Section	Control Section
Power Supply Method	Supplied from the DeviceNet communications cable.	Supplied from the control power supply of a Command Option Attachable-Type SERVOPACK.
Minimum Operating Voltage	11 VDC	Included in the current consumption of the Command Option Attachable-Type SERVOPACK.
Maximum Operating Voltage	25 VDC	
Maximum Operating Current	25 mA	
Maximum Power Loss	625 mW	

SGDV-OCA05A (Interface: Driven by External Power Supply)

The specifications of the SGDV-OCA05A DeviceNet Module are given in the following table.

Item	Specification	
	DeviceNet Communications Section	Control Section
Power Supply Method	Supplied from the DeviceNet communications cable.	
Minimum Operating Voltage	11 VDC	
Maximum Operating Voltage	25 VDC	
Maximum Operating Current	100 mA for 24-VDC power supply 200 mA for 11-VDC power supply	
Maximum Power Loss	2.4 W	

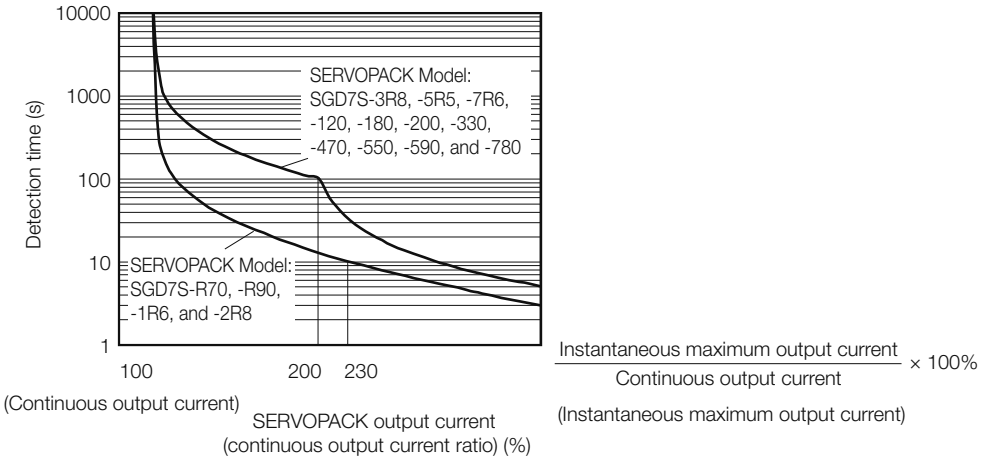
SERVOPACK Overload Protection Characteristics

The overload detection level is set for hot start conditions with a SERVOPACK surrounding air temperature of 55°C.

An overload alarm (A.710 or A.720) 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.

In most cases, that will be the overload protection characteristics of the Servomotor.



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 (or effective force) within the continuous duty zone of the torque-motor speed characteristic (or force-motor speed characteristics) of the Servomotor.

The specifications when the DeviceNet Module is combined with a Command Option Attachable-Type SERVOPACK are given in the following table.

<table>
<tr><th colspan="2">Item</th><th>Specification</th></tr>
<tr><td colspan="2">Control Method</td><td>IGBT-based PWM control, sine wave current drive</td></tr>
<tr><td rowspan="2">Feedback</td><td>With Rotary Servomotor</td><td>Serial encoder: 20 bits or 24 bits (incremental encoder/absolute encoder)
22 bits (absolute encoder)</td></tr>
<tr><td>With Linear Servomotor</td><td>• Absolute linear encoder (The signal resolution depends on the absolute linear encoder.)
• Incremental linear encoder (The signal resolution depends on the incremental linear encoder or Serial Converter Unit.)</td></tr>
<tr><td rowspan="8">Environmental Conditions</td><td>Surrounding Air Temperature</td><td>0°C to 55°C</td></tr>
<tr><td>Storage Temperature</td><td>-20°C to 85°C</td></tr>
<tr><td>Surrounding Air Humidity</td><td>90% relative humidity max. (with no freezing or condensation)</td></tr>
<tr><td>Storage Humidity</td><td>90% relative humidity max. (with no freezing or condensation)</td></tr>
<tr><td>Vibration Resistance</td><td>4.9 m/s^2</td></tr>
<tr><td>Shock Resistance</td><td>19.6 m/s^2</td></tr>
<tr><td>Degree of Protection</td><td>IP10</td></tr>
<tr><td>Pollution Degree</td><td>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.</td></tr>
<tr><td>Altitude</td><td>1,000 m max.</td></tr>
<tr><td>Others</td><td>Do not use the SERVOPACK in the following locations: Locations subject to static electricity noise, strong electromagnetic/magnetic fields, or radioactivity</td></tr>
<tr><td colspan="2">Applicable Standards</td><td>UL61800-5-1, CSA C22.2 No.274, EN50178, EN61800-5-1, EN55011 group1 class A, EN61000-6-2, EN61000-6-4, EN61800-3, IEC61508-1 to 4, IEC61800-5-2, IEC62061, ISO13849-1, IEC61326-3-1</td></tr>
<tr><td colspan="2">Mounting</td><td><table><tr><th>Mounting</th><th>SERVOPACK Model: SGD7S-</th></tr><tr><td>Base-mounted</td><td>All Models</td></tr><tr><td>Rack-mounted</td><td>R70A, R90A, 1R6A, 2R8A, 3R8A, 5R5A, 7R6A, 120A, 180A, 200A, 330A</td></tr><tr><td>Duct-ventilated</td><td>470A, 550A, 590A, 780A</td></tr></table></td></tr>
<tr><td rowspan="5">Performance</td><td>Speed Control Range</td><td>1:5000 (At the rated torque, the lower limit of the speed control range must not cause the Servomotor to stop.)</td></tr>
<tr><td rowspan="3">Coefficient of Speed Fluctuation*1</td><td>±0.01% of rated speed max. (for a load fluctuation of 0% to 100%)</td></tr>
<tr><td>0% of rated speed max. (for a voltage fluctuation of ±10%)</td></tr>
<tr><td>±0.1% of rated speed max. (for a temperature fluctuation of 25°C ±25°C)</td></tr>
<tr><td>Torque Control Precision (Repeatability)</td><td>±1%</td></tr>
<tr><td>Soft Start Time Setting</td><td>0 s to 10 s (Can be set separately for acceleration and deceleration.)</td></tr>
<tr><td rowspan="2">I/O Signals</td><td>Encoder Divided Pulse Output</td><td>Phase A, phase B, phase C: Line-driver output
Number of divided output pulses: Any setting is allowed.</td></tr>
<tr><td>Linear Servomotor Overheat Protection Signal Input</td><td>Number of input points: 1
Input voltage range: 0 V to +5 V</td></tr>
</table>

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Item			Specification
I/O Signals	Sequence Input Signals	Fixed Input	Allowable voltage range: 24 VDC ±20% Number of input points: 4
			Input method: Sink inputs or source inputs Input Signals • CCW-OT (CCW Drive Prohibit Input) signal • CW-OT (CW Drive Prohibit Input) signal • /HOME (Origin Signal Input) signal • EXSTOP (External Stop Input) Signal Positive or negative logic can be changed in the parameters.
	Sequence Output Signals	Fixed Output	Allowable voltage range: 5 VDC to 30 VDC Number of output points: 4
			Output Signals • ALM (Servo Alarm Output) signal • /WARN (Warning Signal Output) signal • /BK (Brake) signal • /S-RDY (Servo Ready Output) signal
Communications	RS-422A Communications (CN3)	Interfaces	Digital Operator (JUSP-OP05A-1-E)
	USB Communications (CN7)	Interface	Personal computer (with SigmaWin+)
		Communications Standard	Conforms to USB2.0 standard (12 Mbps).
Displays/ Indicators	SERVOPACK		CHARGE and PWR indicators, and one-digit seven-segment display
	DeviceNet Module		Refer to the following manual for details. 📖 *Σ-7-Series AC Servo Drive Σ-7S SERVOPACK Command Option Attachable Type with DeviceNet Module Product Manual* (Manual No.: SIEP S800001 70)

Continued on next page.

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Item			Specification
Operating Methods	Reference Method	Operation Specifications	Positioning via DeviceNet communications.
		Reference Inputs	DeviceNet communications Commands: Movement references (positioning or speed) and origin returns
	Position Control Functions	Acceleration/ Deceleration Methods	Linear, asymmetrical, exponential, and S-curve acceleration/deceleration
		Operating Methods	Simple positioning, origin returns, continuous operation, and switching to positioning
		Fully-Closed Loop Control	Supported.
	Built-in Functions	Position Data Latching	Position data can be latched on phase C, the origin signal, or an external signal.
	DeviceNet Communications	Communications Methods	DeviceNet I/O communications and explicit messages
		Topology	Multidrop or T-branching*2
		Baud Rate	125 kbps, 250 kbps, or 500 kbps (Set on rotary switch (DR).)
		Cables	Special cables (OMRON DCA1-5CN02F1 Cable with Connectors or the equivalent.)
		Maximum Number of Nodes	64 nodes (including the master, Maximum number of slaves: 63)
		Node Address Setting	0 to 63 (Set on NA x10 and x1 rotary 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 Settling time (±1%): 1.2 ms (Typ)
Dynamic Brake (DB)			Activated when a servo alarm or overtravel (OT) occurs, or when the power supply to the main circuit or servo is OFF.
Regenerative Processing			Built-in (An external resistor must be connected to the SGD7S-470A to -780A.) Refer to the following section for details. ☞ *Built-In Regenerative Resistor* (page 378)
Overtravel (OT) Prevention			Stopping with a dynamic brake (DB), coasting to a stop, performing a hard stop, or smooth stop (decelerating to a stop) for a CCW-OT (CCW Drive Prohibit Input) signal or CW-OT (CW Drive Prohibit Input) signal.
Protective Functions			Overcurrent, overvoltage, low voltage, overload, regeneration error, etc.
Utility Functions			Gain adjustment, alarm history, 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).
	Applicable Standards*3	ISO13849-1 PLe (Category 3), IEC61508 SIL3
Applicable Option Modules		Fully-Closed Module Note: You cannot use a Safety Module if you are using a DeviceNet Module.

*1. The coefficient of speed fluctuation for load fluctuation is defined as follows:

$$\text{Coefficient of speed fluctuation} = \frac{\text{No-load motor speed - Total-load motor speed}}{\text{Rated motor speed}} \times 100\%$$

*2. Externally connected terminating resistance is required.

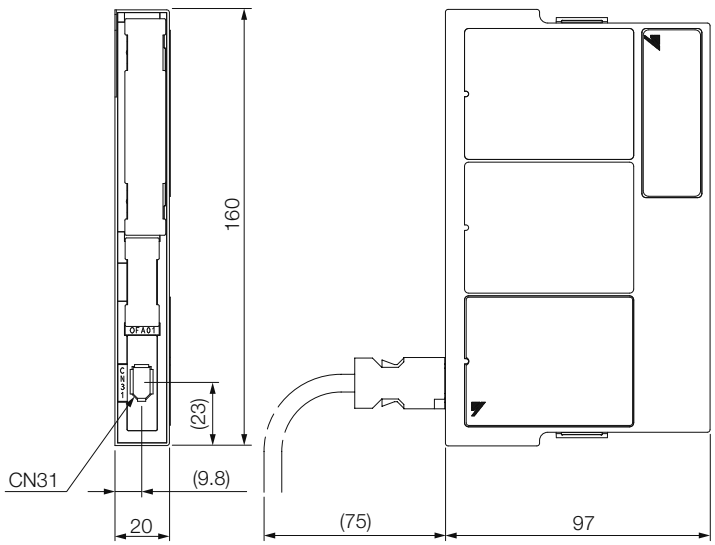
*3. Always perform risk assessment for the system and confirm that the safety requirements are met.

The following table gives the specifications of the DeviceNet Module.

Item		Specification	
		SGDV-OCA04A	SGDV-OCA05A
Mounting Location		Mounted to the side of a Command Option Attachable-Type SERVOPACK.	
Power Supply Method	Control Section	Supplied from the control power supply of a Command Option Attachable-Type SERVOPACK.	Supplied from the DeviceNet communications cable.
	DeviceNet Communications Section	Supplied from the DeviceNet communications cable.	
Current Consumption	Control Section	Included in the current consumption of the Command Option Attachable-Type SERVOPACK.	For 24-VDC power supply: 100 mA max., for 11-VDC power supply: 200 mA max.
	DeviceNet Communications Section	25 mA max.	

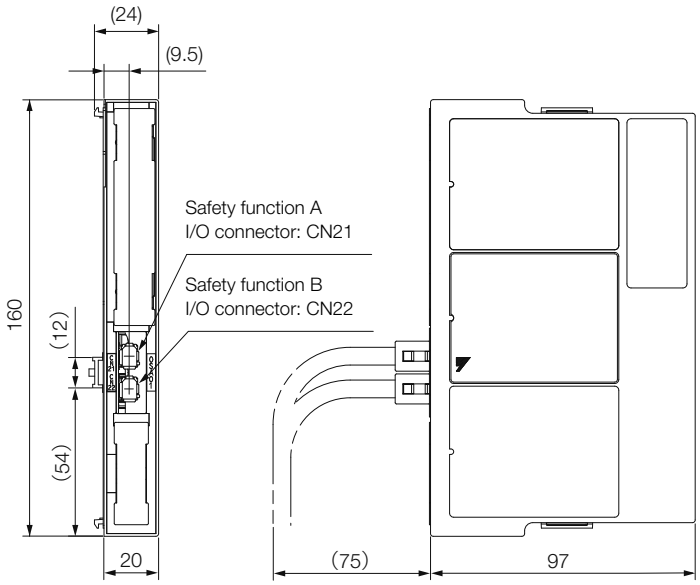
Option Modules External Dimensions

Feedback Option Module



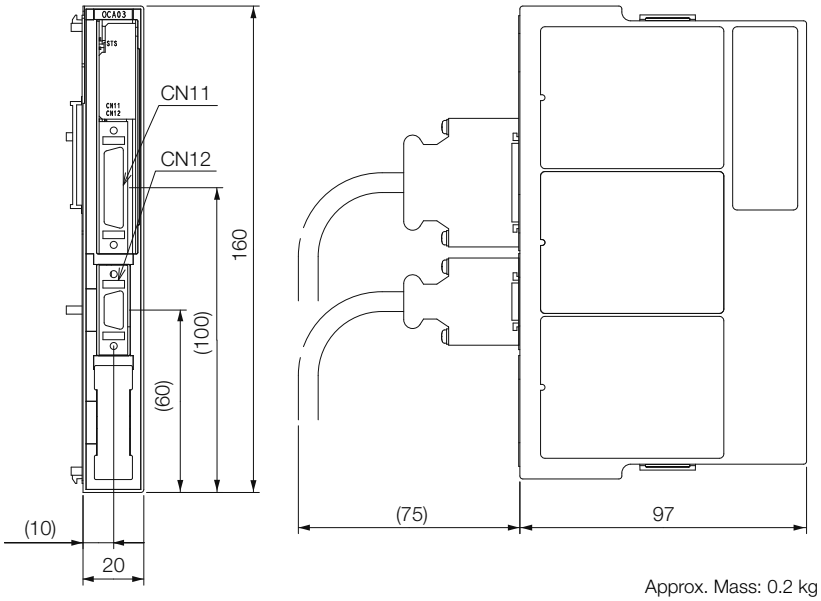
Approx. Mass: 0.1 kg
Unit: mm

Safety Module



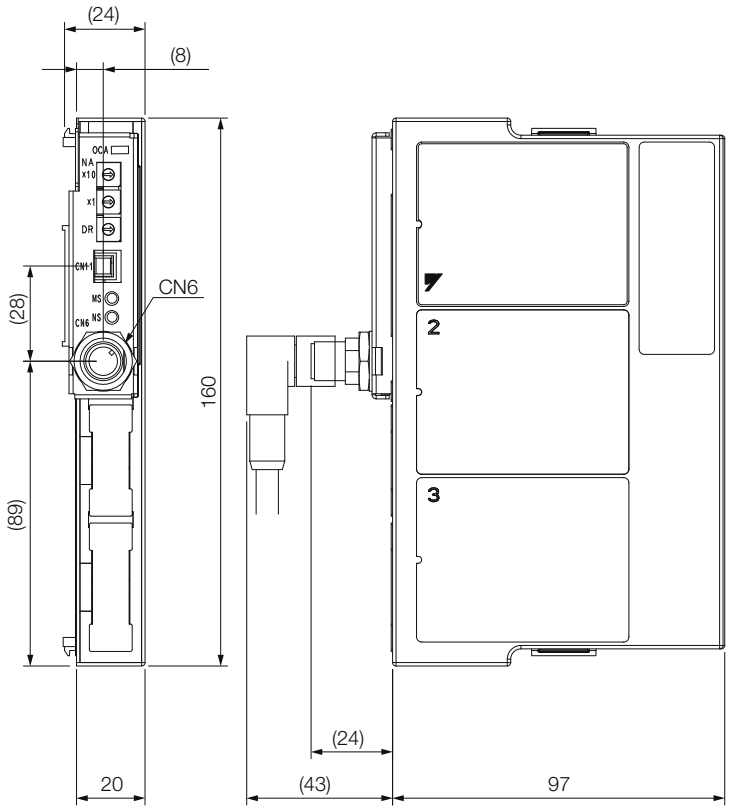
Approx. Mass: 0.11 kg
Unit: mm

INDEXER Module



Approx. Mass: 0.2 kg
Unit: mm

DeviceNet Module



Approx. Mass: 0.3 kg
Unit: mm

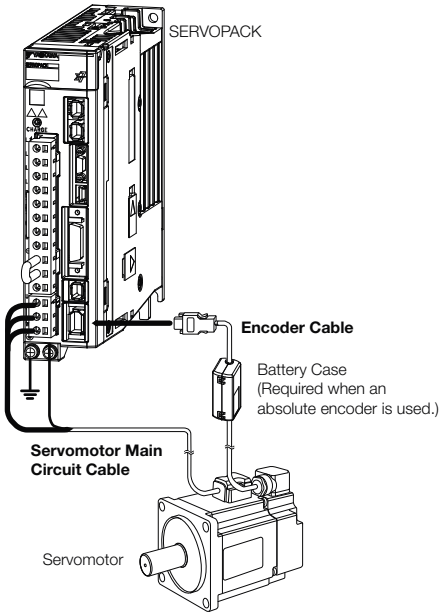
Cables & Periphery

Cables for SGM7A and SGM7J Servomotors	288
Cables for SGM7G Servomotors	294
Cables for Direct Drive Servomotors	298
Cables for Linear Servomotors	303
Serial Converter Units	308
Cables for SERVOPACKs	309
Periphery	315

Cables for SGM7A and SGM7J Servomotors

System Configurations

Encoder Cable of 20 m or Less

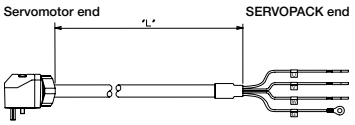
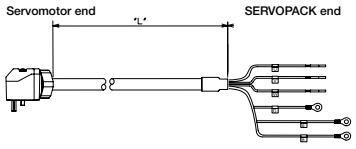


Notes:
1. If you use a Servomotor Main Circuit Cable that exceeds 20 m, the intermittent duty zone in the torquemotor speed characteristics will become smaller because the voltage drop increases.

2. Refer to the following manual for the following information.
- Cable dimensional drawings and cable connection specifications
- Order numbers and specifications of individual connectors for cables
- Order numbers and specifications for wiring materials

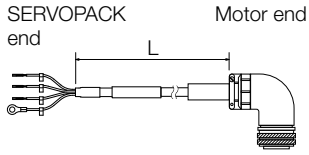
Sigma-7-Series AC Servo Drive Peripheral Device Selection Manual (Manual No.: SIEP S800001 32)

Cables for SGM7J and SGM7A rotary motors

Servomotor Model	Name	Length	Sigma-7 Flexible Cable	Appearance
SGM7J-A5 to -C2 SGM7A-A5 to -C2 50 W to 150 W	For Servomotors without Holding Brakes Cable installed toward load	3 m	JZSP-CSM21-03-E-G#	
		5 m	JZSP-CSM21-05-E-G#	
		10 m	JZSP-CSM21-10-E-G#	
		15 m	JZSP-CSM21-15-E-G#	
		20 m	JZSP-CSM21-20-E-G#	
SGM7J-02 to -06 SGM7A-02 to -06 200 W to 600 W		3 m	JZSP-CSM22-03-E-G#	
		5 m	JZSP-CSM22-05-E-G#	
		10 m	JZSP-CSM22-10-E-G#	
		15 m	JZSP-CSM22-15-E-G#	
		20 m	JZSP-CSM22-20-E-G#	
		30 m	JZSP-CSM22-30-E-G#	
SGM7J-08 SGM7A-08 and -10 750 W, 1.0 kW		3 m	JZSP-CSM23-03-E-G#	
		5 m	JZSP-CSM23-05-E-G#	
		10 m	JZSP-CSM23-10-E-G#	
		15 m	JZSP-CSM23-15-E-G#	
		20 m	JZSP-CSM23-20-E-G#	
		30 m	JZSP-CSM23-30-E-G#	
SGM7J-A5 to -C2 SGM7A-A5 to -C2 50 W to 150 W	For Servomotors with Holding Brakes Cable installed toward load	3 m	JZSP-CSM31-03-E-G#	
		5 m	JZSP-CSM31-05-E-G#	
		10 m	JZSP-CSM31-10-E-G#	
		15 m	JZSP-CSM31-15-E-G#	
		20 m	JZSP-CSM31-20-E-G#	
SGM7J-02 to -06 SGM7A-02 to -06 200 W to 600 W		3 m	JZSP-CSM32-03-E-G#	
		5 m	JZSP-CSM32-05-E-G#	
		10 m	JZSP-CSM32-10-E-G#	
		15 m	JZSP-CSM32-15-E-G#	
		20 m	JZSP-CSM32-20-E-G#	
SGM7J-08 SGM7A-08 and -10 750 W, 1.0 kW		3 m	JZSP-CSM33-03-E-G#	
		5 m	JZSP-CSM33-05-E-G#	
		10 m	JZSP-CSM33-10-E-G#	
		15 m	JZSP-CSM33-15-E-G#	
		20 m	JZSP-CSM33-20-E-G#	

Note: The digit „#“ of the order number represents the design revision.

Cables for SGM7J and SGM7A rotary motors

Servomotor Model	Name	Length	Sigma-7 Flexible Cable	Appearance
SGM7A-15A to 25A 1.5 kW to 2.5 kW	For Servo motor without Holding Breaks	3 m	JZSP-CVMCA12-03-E-G#	
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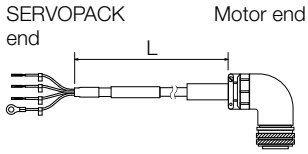
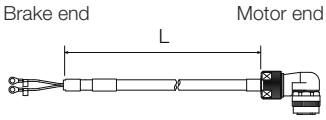
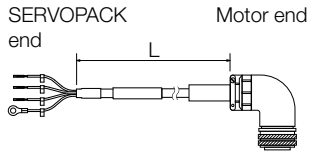
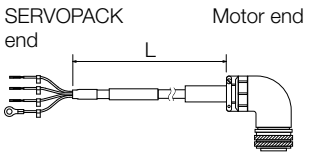
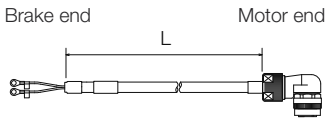
		10 m	JZSP-CVMCA12-10-E-G#	
		15 m	JZSP-CVMCA12-15-E-G#	
		20 m	JZSP-CVMCA12-20-E-G#	
	For Servo motor with Holding Breaks	3 m	JZSP-CVMCA12-03-E-G#	
		5 m	JZSP-CVMCA12-05-E-G#	
		10 m	JZSP-CVMCA12-10-E-G#	
		15 m	JZSP-CVMCA12-15-E-G#	
		20 m	JZSP-CVMCA12-20-E-G#	
		3 m	JZSP-CVB12Y-03-E-G#	
		5 m	JZSP-CVB12Y-05-E-G#	
		10 m	JZSP-CVB12Y-10-E-G#	
		15 m	JZSP-CVB12Y-15-E-G#	
		20 m	JZSP-CVB12Y-20-E-G#	

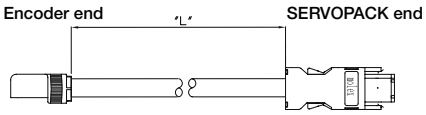
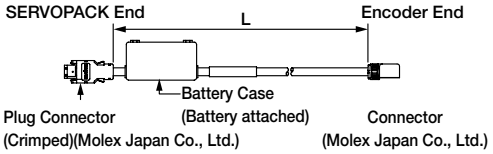
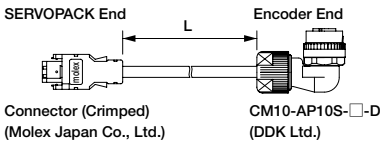
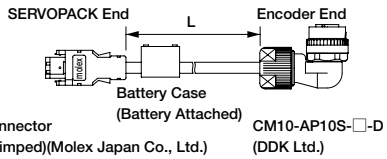
Note: The digit „#“ of the order number represents the design revision.

Cables for SGM7J and SGM7A rotary motors

Servomotor Model	Name	Length	Sigma-7 Flexible Cable	Appearance
SGM7A-30A 3.0 kW	For Servo motor without Holding Breaks	3 m	JZSP-CVMCA13-03-E-G#	
		5 m	JZSP-CVMCA13-05-E-G#	
		10 m	JZSP-CVMCA13-10-E-G#	
		15 m	JZSP-CVMCA13-15-E-G#	
		20 m	JZSP-CVMCA13-20-E-G#	
	For Servo motor with Holding Breaks	3 m	JZSP-CVMCA13-03-E-G#	
		5 m	JZSP-CVMCA13-05-E-G#	
		10 m	JZSP-CVMCA13-10-E-G#	
		15 m	JZSP-CVMCA13-15-E-G#	
		20 m	JZSP-CVMCA13-20-E-G#	
		3 m	JZSP-CVB12Y-03-E-G#	
		5 m	JZSP-CVB12Y-05-E-G#	
		10 m	JZSP-CVB12Y-10-E-G#	
		15 m	JZSP-CVB12Y-15-E-G#	
		20 m	JZSP-CVB12Y-20-E-G#	

Note: The digit „#“ of the order number represents the design revision.

Encoder Cables for SGM7J and SGM7A rotary motors up to 20m length

Servomotor Model	Name	Length	Sigma-7 Flexible Cable	Appearance
SGM7J-A5 to -08 50 W to 750 W SGM7A-A5 to -10 50 W to 1.0 kW	For incremental encoder Cable installed toward load	3 m	JZSP-CSP21-03-E-G#	
		5 m	JZSP-CSP21-05-E-G#	
		10 m	JZSP-CSP21-10-E-G#	
		15 m	JZSP-CSP21-15-E-G#	
		20 m	JZSP-CSP21-20-E-G#	
	For absolute encoder: With Battery Case *1 Cable installed toward load	3 m	JZSP-CSP25-03-E-G#	
		5 m	JZSP-CSP25-05-E-G#	
		10 m	JZSP-CSP25-10-E-G#	
		15 m	JZSP-CSP25-15-E-G#	
		20 m	JZSP-CSP25-20-E-G#	
SGM7A-15 to -30 1.5 kW to 3.0 kW	For incremental encoder	3 m	JZSP-CVP12-03-E-G#	
		5 m	JZSP-CVP12-05-E-G#	
		10 m	JZSP-CVP12-10-E-G#	
		15 m	JZSP-CVP12-15-E-G#	
		20 m	JZSP-CVP12-20-E-G#	
	For absolute encoder: With Battery Case *1	3 m	JZSP-CVP27-03-E-G#	
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		15 m	JZSP-CVP27-15-E-G#	
		20 m	JZSP-CVP27-20-E-G#	

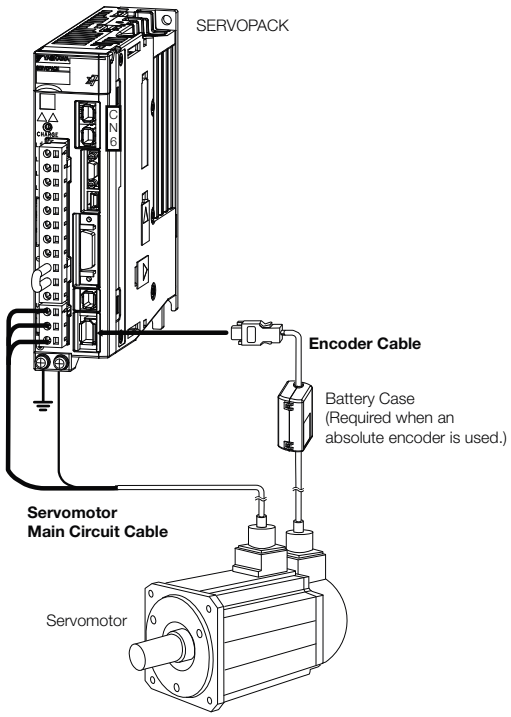
Note: The digit „#“ of the order number represents the design revision.

*1. If a battery is connected to the host controller, the Battery Case is not required. If so, use a cable for incremental encoders.

Cables for SGM7G Servomotors

System Configurations

Encoder Cable of 20 m or Less

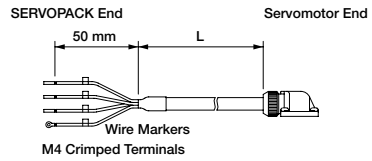


Note: 1. If you use a Servomotor Main Circuit Cable that exceeds 20 m, the intermittent duty zone in the torquemotor speed characteristics will become smaller because the voltage drop increases.

2. Refer to the following manual for the following information.
   - Cable dimensional drawings and cable connection specifications
   - Order numbers and specifications of individual connectors for cables
   - Order numbers and specifications for wiring materials

Sigma-7-Series AC Servo Drive Peripheral Device Selection Manual (Manual No.: SIEP S800001 32)

Cables for SGM7G rotary motors

Servomotor Model	Name	Length	Sigma-7 Flexible Cable	Appearance
SGM7G-03 to -05 0.3 kW 0.45 kW	For Servomotors without Holding Brakes	3 m	JZSP-CVM21-03-E-G#	
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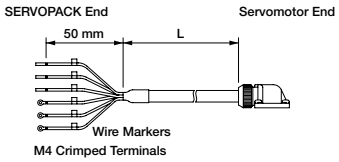
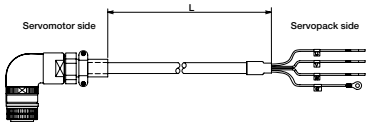
		10 m	JZSP-CVM21-10-E-G#	
		15 m	JZSP-CVM21-15-E-G#	
		20 m	JZSP-CVM21-20-E-G#	
		30 m	JZSP-CVM21-30-E-G#	
	For Servo motor with Holding Breaks	3 m	JZSP-CVM41-03-E-G#	
		5 m	JZSP-CVM41-05-E-G#	
		10 m	JZSP-CVM41-10-E-G#	
		15 m	JZSP-CVM41-15-E-G#	
		20 m	JZSP-CVM41-20-E-G#	
SGM7G-09, -20 850 W to 1.8 kW	For Servo motor without Holding Breaks	3 m	JZSP-CVMCA12-03-E-G#	
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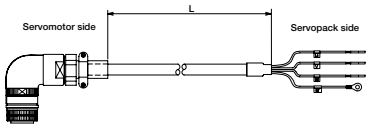
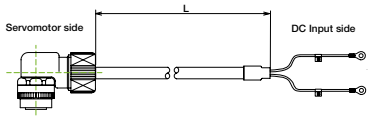
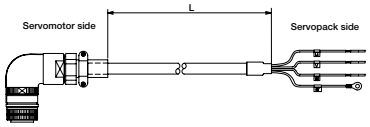
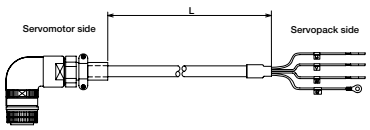
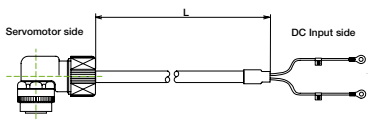
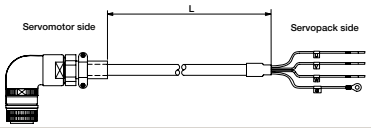
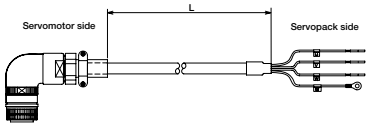
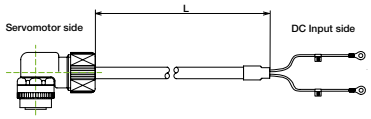
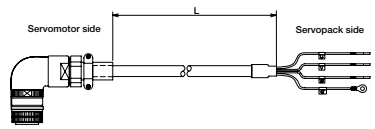
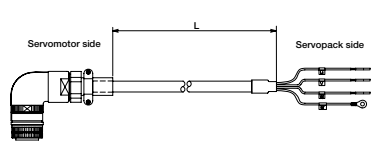
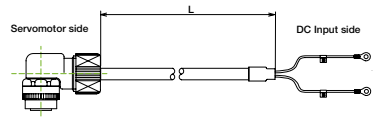
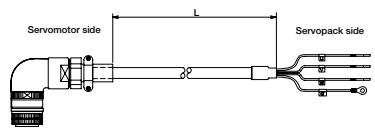
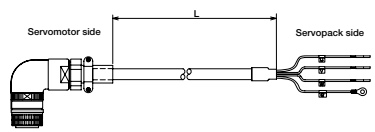
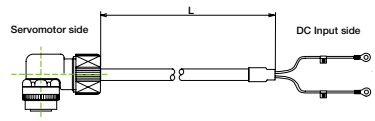
		15 m	JZSP-CVMCA12-15-E-G#	
		20 m	JZSP-CVMCA12-20-E-G#	
	For Servo motor with Holding Breaks Note: Set of two cables (Main Power Supply Cable and Holding Brake Cable)	3 m	JZSP-CVMCA12-03-E-G#	
			JZSP-CVB12Y-03-E-G#	
		5 m	JZSP-CVMCA12-05-E-G#	
			JZSP-CVB12Y-05-E-G#	
		10 m	JZSP-CVMCA12-10-E-G#	
			JZSP-CVB12Y-10-E-G#	
		15 m	JZSP-CVMCA12-15-E-G#	
			JZSP-CVB12Y-15-E-G#	
		20 m	JZSP-CVMCA12-20-E-G#	
			JZSP-CVB12Y-20-E-G#	
SGM7G-30, -44 2.9 kW to 4.4 kW	For Servo motor without Holding Breaks	3 m	JZSP-CVMCA13-03-E-G#	
		5 m	JZSP-CVMCA13-05-E-G#	
		10 m	JZSP-CVMCA13-10-E-G#	
		15 m	JZSP-CVMCA13-15-E-G#	
		20 m	JZSP-CVMCA13-20-E-G#	
	For Servo motor with Holding Breaks Note: Set of two cables (Main Power Supply Cable and Holding Brake Cable)	3 m	JZSP-CVMCA13-03-E-G#	
			JZSP-CVB12Y-03-E-G#	
		5 m	JZSP-CVMCA13-05-E-G#	
			JZSP-CVB12Y-05-E-G#	
		10 m	JZSP-CVMCA13-10-E-G#	
			JZSP-CVB12Y-10-E-G#	
		15 m	JZSP-CVMCA13-15-E-G#	
			JZSP-CVB12Y-15-E-G#	
		20 m	JZSP-CVMCA13-20-E-G#	
			JZSP-CVB12Y-20-E-G#	

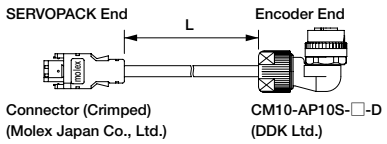
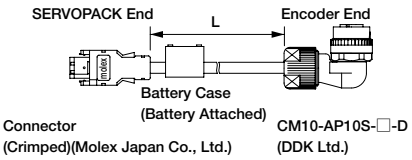
Note: The digit „#“ of the order number represents the design revision.

Cables for SGM7G rotary motors

Servomotor Model	Name	Length	Sigma-7 Flexible Cable	Appearance
SGM7G-55 5.5 kW	For Servo motor without Holding Breaks	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 Servo motor with Holding Breaks Note: Set of two cables (Main Power Supply Cable and Holding Brake Cable)	3 m	JZSP-CVMCA14-03-E-G#	
			JZSP-CVB12Y-03-E-G#	
		5 m	JZSP-CVMCA14-05-E-G#	
			JZSP-CVB12Y-05-E-G#	
		10 m	JZSP-CVMCA14-10-E-G#	
			JZSP-CVB12Y-10-E-G#	
		15 m	JZSP-CVMCA14-15-E-G#	
			JZSP-CVB12Y-15-E-G#	
		20 m	JZSP-CVMCA14-20-E-G#	
			JZSP-CVB12Y-20-E-G#	
SGM7G-75, -1A 7.5 kW to 11 kW	For Servo motor without Holding Breaks	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 Servo motor with Holding Breaks Note: Set of two cables (Main Power Supply Cable and Holding Brake Cable)	3 m	JZSP-CVMCA15-03-E-G#	
			JZSP-CVB12Y-03-E-G#	
		5 m	JZSP-CVMCA15-05-E-G#	
			JZSP-CVB12Y-05-E-G#	
		10 m	JZSP-CVMCA15-10-E-G#	
			JZSP-CVB12Y-10-E-G#	
		15 m	JZSP-CVMCA15-15-E-G#	
			JZSP-CVB12Y-15-E-G#	
		20 m	JZSP-CVMCA15-20-E-G#	
			JZSP-CVB12Y-20-E-G#	
SGM7G-1E 15 kW	For Servo motor without Holding Breaks	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 Servo motor with Holding Breaks Note: Set of two cables (Main Power Supply Cable and Holding Brake Cable)	3 m	JZSP-CVMCA16-03-E-G#	
			JZSP-CVB12Y-03-E-G#	
		5 m	JZSP-CVMCA16-05-E-G#	
			JZSP-CVB12Y-05-E-G#	
		10 m	JZSP-CVMCA16-10-E-G#	
			JZSP-CVB12Y-10-E-G#	
		15 m	JZSP-CVMCA16-15-E-G#	
			JZSP-CVB12Y-15-E-G#	
		20 m	JZSP-CVMCA16-20-E-G#	
			JZSP-CVB12Y-20-E-G#	

Note: The digit „#“ of the order number represents the design revision.

Encoder Cables for SGM7G rotary motors up to 20m length

Servomotor Model	Name	Length	Sigma-7 Flexible Cable	Appearance
SGM7G-03 to -1E 0.3 kW to 15 kW	For incremental encoder	3 m	JZSP-CVP12-03-E-G#	
		5 m	JZSP-CVP12-05-E-G#	
		10 m	JZSP-CVP12-10-E-G#	
		15 m	JZSP-CVP12-15-E-G#	
		20 m	JZSP-CVP12-20-E-G#	
	For absolute encoder: With Battery Case (*2)	3 m	JZSP-CVP27-03-E-G#	
		5 m	JZSP-CVP27-05-E-G#	
		10 m	JZSP-CVP27-10-E-G#	
		15 m	JZSP-CVP27-15-E-G#	
		20 m	JZSP-CVP27-20-E-G#	

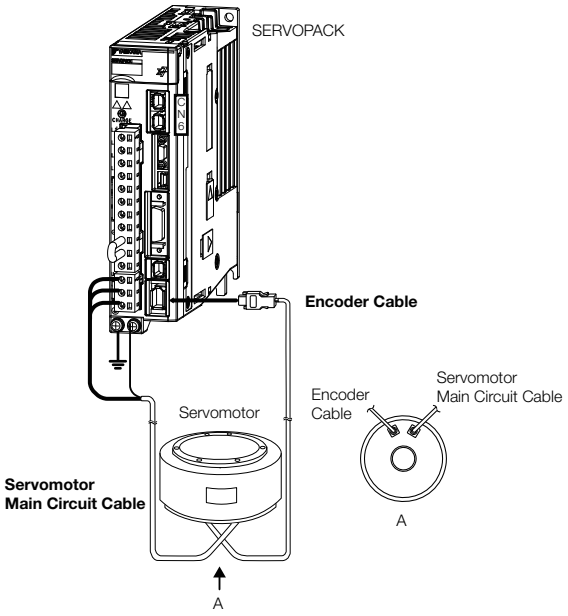
Note: The digit „#“ of the order number represents the design revision.

*1. If a battery is connected to the host controller, the Battery Case is not required. If so, use a cable for incremental encoders.

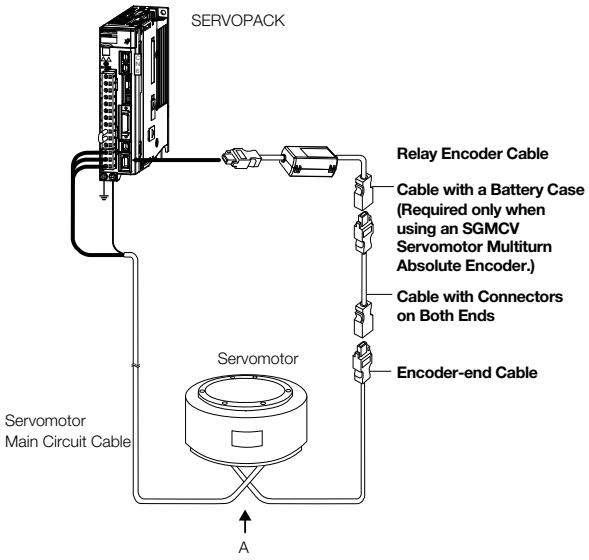
Cables for Direct Drive Servomotors

System Configurations

Encoder Cable of 20 m or Less



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

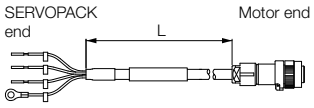
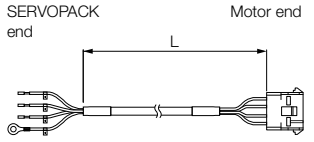


Note: 1. If the cable length exceeds 20 m, be sure to use a Relay Encoder Cable.
2.If you use a Servomotor Main Circuit Cable that exceeds 20 m, the intermittent duty zone in the torquemotor speed characteristics will become smaller because the voltage drop increases.

3. Refer to the following manual for the following information.
- Cable dimensional drawings and cable connection specifications
- Order numbers and specifications of individual connectors for cables
- Order numbers and specifications for wiring materials

Sigma-7-Series AC Servo Drive Peripheral Device Selection Manual (Manual No.: SIEP S800001 32)

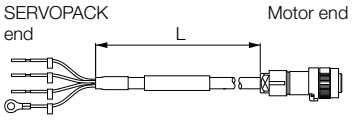
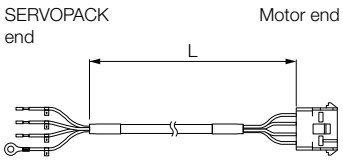
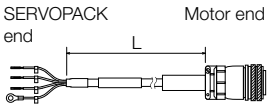
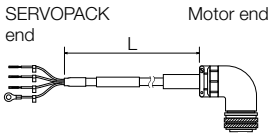
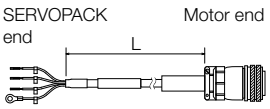
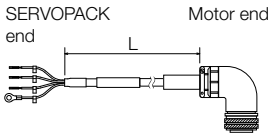
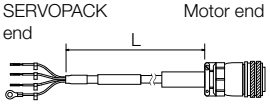
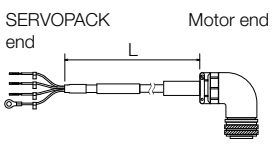
SGMCV Servomotor Main Circuit Cables

Servomotor Model	Length	Sigma-7 Standard Cable	Sigma-7 Flexible Cable	Appearance
SGMCV-□□B SGMCV-□□C Flange specification*2: 1 Non-load side installation	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	
SGMCV-□□B SGMCV-□□C Flange specification*2: 4 Non-load side installation (with cable on side)	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.
*2. Refer to the following section for information on flange specifications on page 301.

Note: Direct Drive Servomotors are not available with holding brakes.

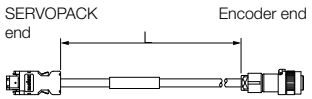
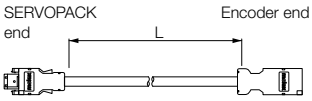
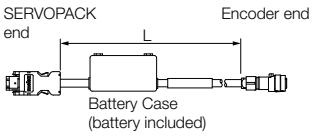
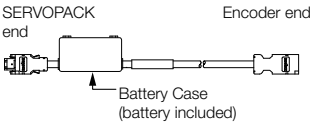
SGMCV Servomotor Main Circuit Cables

Servomotor Model	Length	Sigma-7 Standard Cable	Sigma-7 Flexible Cable	Appearance
SGMCS-□□B SGMCS-□□C SGMCS-□□D SGMCS-□□E Flange specification*2: 1 Non-load side installation	3 m	JZSP-CMM60-03-E	JZSP-CSM60-03-E	
	5 m	JZSP-CMM60-05-E	JZSP-CSM60-05-E	
	10 m	JZSP-CMM60-10-E	JZSP-CSM60-10-E	
	15 m	JZSP-CMM60-15-E	JZSP-CSM60-15-E	
	20 m	JZSP-CMM60-20-E	JZSP-CSM60-20-E	
SGMCS-□□B SGMCS-□□C SGMCS-□□D SGMCS-□□E Flange specification*2: 4 Non-load side installation (with cable on side)	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	
SGMCS-□□M SGMCS-□□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	
SGMCS-□□M SGMCS-□□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	JJZSP-USA302-20-E	JZSP-USA322-20-E	
SGMCS-□□M SGMCS-□□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	

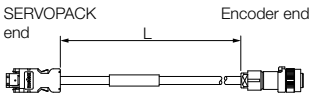
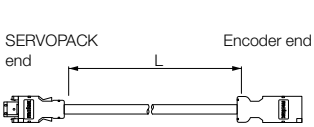
*1. Use Flexible Cables for moving parts of machines, such as robots.
*2. Refer to the following section for information on flange specifications on page 301.

Note: Direct Drive Servomotors are not available with holding brakes.

SGMCV Encoder Cables

Servomotor Model	Name	Length	Order Number		Appearance
			Standard Cable	Flexible Cable*1	
SGMCV-□□BE□1 SGMCV-□□CE□1 Flange specification*2: 1	For single-turn absolute encoder (without Battery Case)	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	
SGMCV-□□BE□4 SGMCV-□□CE□4 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	
SGMCV-□□BI□1 SGMCV-□□CI□1 Flange specification*2: 1	For multi-turn absolute encoder (with Battery Case)	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	
SGMCV-□□BI□4 SGMCV-□□CI□4 Flange specification*2: 4		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	

SGMCS Encoder Cables

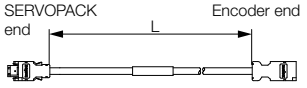
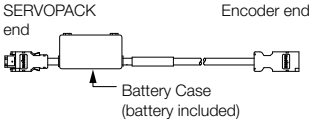
Servomotor Model	Name	Length	Order Number		Appearance
			Standard Cable	Flexible Cable*1	
SGMCS-□□ Flange specification*2: 1 or 3	For incremental/ absolute encoder	3 m	JZSP-CMP60-03-E	JZSP-CSP60-03-E	
		5 m	JZSP-CMP60-05-E	JZSP-CSP60-05-E	
		10 m	JZSP-CMP60-10-E	JZSP-CSP60-10-E	
		15 m	JZSP-CMP60-15-E	JZSP-CSP60-15-E	
		20 m	JZSP-CMP60-20-E	JZSP-CSP60-20-E	
SGMCS-□□ 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	

*1. Use Flexible Cables for moving parts of machines, such as robots.

*2. Refer to the following section for information on flange specifications on page 301.

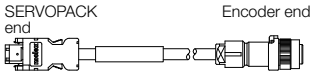
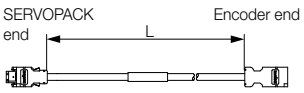
Relay Encoder Cables of 30 m to 50 m

◆ SGMCV-□□

Servomotor Model	Name	Length	Order Number*1	Appearance
SGMCV-□□BE SGMCV-□□BI SGMCV-□□CE SGMCV-□□CI Flange specification*2: 1	Encoder-end Cable (for single-turn/multiturn absolute encoder)	0.3 m	JZSP-C7PRC0-E	
SGMCV-□□BE SGMCV-□□BI SGMCV-□□CE SGMCV-□□CI Flange specification*2: 1 or 4	Cables with Connectors on Both Ends (for single-turn/multiturn absolute encoder)	30 m	JZSP-UCMP00-30-E	
		40 m	JZSP-UCMP00-40-E	
		50 m	JZSP-UCMP00-50-E	
SGMCV-□□BI SGMCV-□□CI Flange specification*2: 1 or 4	Cable with a Battery Case (for multiturn absolute encoder)	0.3 m	JZSP-CSP12-E	

*1. Flexible cables are not available.
*2. Refer to the following section for the flange specifications.

◆ SGMCS-□□

Servomotor Model	Name	Length	Order Number*1	Appearance
SGMCS-□□ Flange specification*2: 1 or 3	Encoder-end Cable (for incremental or absolute encoder)	0.3 m	JZSP-CSP15-E	
SGMCS-□□ Flange specification*2: 1, 3, or 4	Cables with Connectors on Both Ends (for incremental or absolute encoder)	30 m	JZSP-UCMP00-30-E	
		40 m	JZSP-UCMP00-40-E	
		50 m	JZSP-UCMP00-50-E	

*1. Flexible cables are not available.
*2. Refer to the following section for the flange specifications.

Flange Specifications

◆ SGMCV-□□

Flange Specification Code (6th Digit)	Flange Location	Servomotor Outer Diameter Code (3rd Digit)	
		B	C
1	Non-load side	○	○
4	Non-load side (with cable on side)	○	○

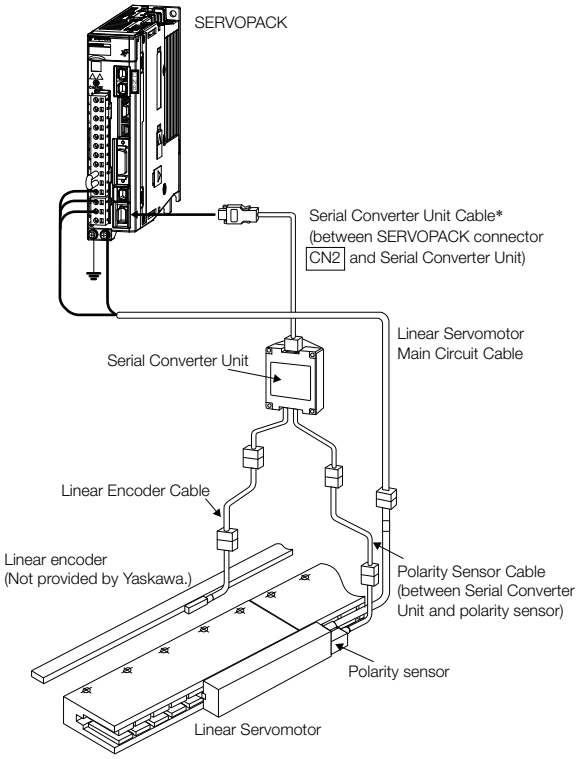
◆ SGMCS-□□

Flange Specification Code (6th Digit)	Flange Location	Servomotor Outer Diameter Code (3rd Digit)					
		B	C	D	E	M	N
1	Non-load side	○	○	○	○	–	–
	Load-side	–	–	–	–	○	○
3	Non-load side	–	–	–	–	○	○
4	Non-load side (with cable on side)	○	○	○	○	–	–

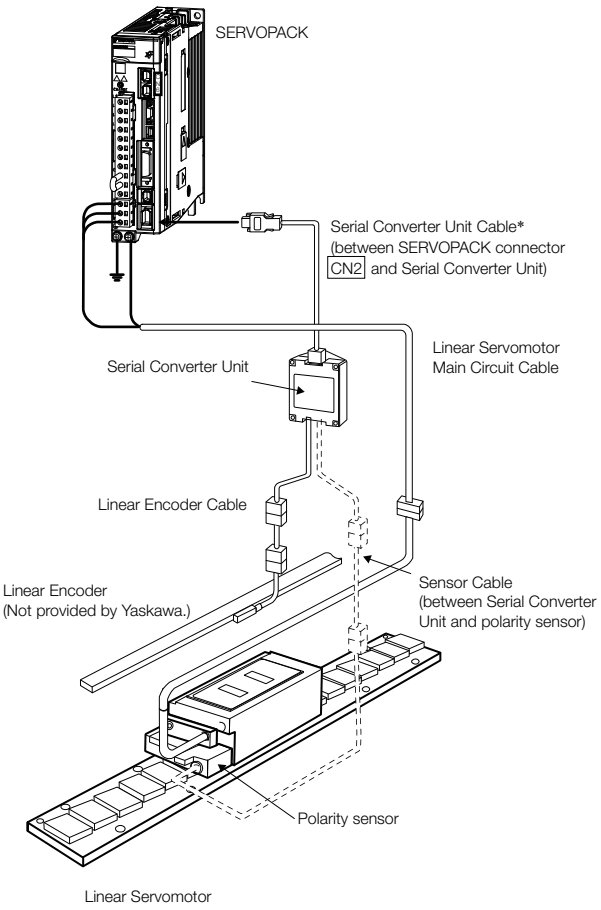
Cables for Linear Servomotors

System Configurations

Example: SGLG Coreless Servomotors



Example: SGLFW2 Servomotors with F-type Iron Cores (with Thermal Protectors)



* You can connect directly to an absolute linear encoder.

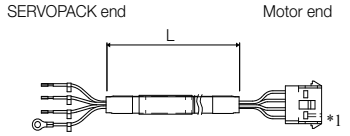
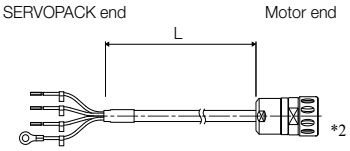
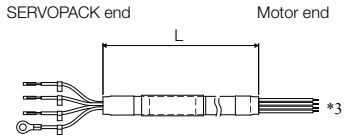
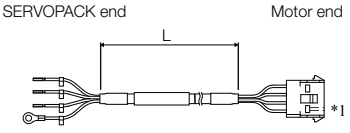
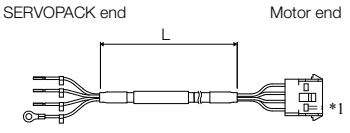
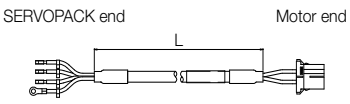
Note: 1. The above system configurations are for SGLG Coreless Servomotors or SGLFW2 Servomotors with Ftype Iron Cores (with thermal protectors). Refer to the manual for the Linear Servomotor for configurations with other models.

2. Refer to the following manual for the following information.
   - Cable dimensional drawings and cable connection specifications
   - Order numbers and specifications of individual connectors for cables
   - Order numbers and specifications for wiring materials

Sigma-7-Series AC Servo Drive Peripheral Device Selection Manual (Manual No.: SIEP S800001 32)

Servomotor Main Circuit Cables

Servomotor Model	Length	Sigma-7 Standard Cable	Appearance
SGLGW-30A, -40A,-60A SGLFW-20A, -35A All SGLC models	1 m	JZSP-CLN11-01-E	SERVOPACK end Motor end L *1
	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	

Servomotor Model	Length	Order Number	Appearance
SGLGW-90A SGLFW-50A, -1ZA SGLTW-20A, -35A	1 m	JZSP-CLN21-01-E	
	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 -40A□□□□□D -60A□□□□□D SGLFW-□□A□□□□□D SGLTW-□□A□□□□□D	1 m	JZSP-CLN14-01-E	
	3 m	JZSP-CLN14-03-E	
	5 m	JZSP-CLN14-05-E	
	10 m	JZSP-CLN14-10-E	
	15 m	JZSP-CLN14-15-E	
	20 m	JZSP-CLN14-20-E	
SGLTW-40□□□□B□ -80□□□□B□	1 m	JZSP-CLN39-01-E	
	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	
SGLFW2-30A070A □ SGLFW2-30A120A □ SGLFW2-30A230A □	1 m	JZSP-CL2N703-01-E	
	3 m	JZSP-CL2N703-03-E	
	5 m	JZSP-CL2N703-05-E	
	10 m	JZSP-CL2N703-10-E	
	15 m	JZSP-CL2N703-15-E	
	20 m	JZSP-CL2N703-20-E	
SGLFW2-45A200A □ SGLFW2-45A380A □	1 m	JZSP-CL2N603-01-E	
	3 m	JZSP-CL2N603-03-E	
	5 m	JZSP-CL2N603-05-E	
	10 m	JZSP-CL2N603-10-E	
	15 m	JZSP-CL2N603-15-E	
	20 m	JZSP-CL2N603-20-E	
SGLFW2-90A200A□ SGLFW2-90A380A□ SGLFW2-1DA380A□	1 m	JZSP-CL2N503-01-E	
	3 m	JZSP-CL2N503-03-E	
	5 m	JZSP-CL2N503-05-E	
	10 m	JZSP-CL2N503-10-E	
	15 m	JZSP-CL2N503-15-E	
	20 m	JZSP-CL2N503-20-E	

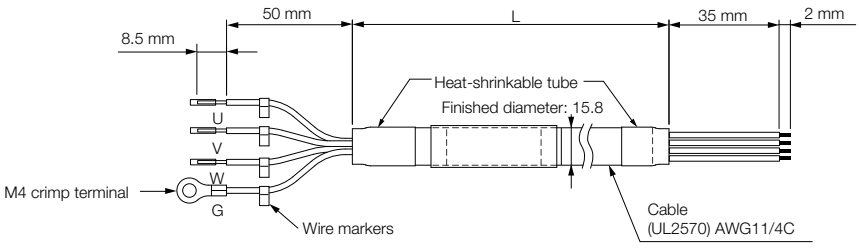
Note: Estimates are available for models other than those listed above (SGLFW2-90A□□□A□L and SGLFW2-1D□□□A□L).

*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 the next page 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

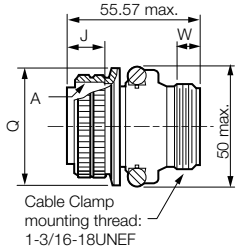
Signal	Pin
Phase U	A
Phase V	B
Phase W	C
FG	D

◆ JZSP-CLN39 Cable Connectors

Applicable Servomotor	Connector Provided with Servomotor	Plug		Cable Clamp
		Straight	Right-angle	
SGLTW-40 and -80	MS3102A22-22P	MS3106B22-22S or MS3106A22-22S	MS3108B22-22S	MS3057-12A

◆ MS3106B22-2S: Straight Plug with Two-piece Shell

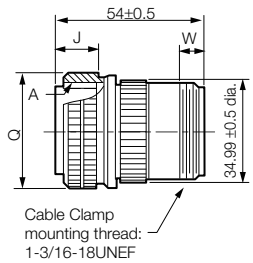
Unit: mm



Shell Size	Joint Thread A	Length of Joint J ±0.12	Joint Nut Outer Diameter Q $^{+0}_{-0.38}$	Effective Thread Length W min.
22	1-3/8-18UNEF	18.26	40.48	9.53

◆ MS3106A22-2S: Straight Plug with Solid Shell

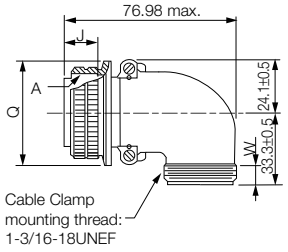
Unit: mm



Shell Size	Joint Thread A	Length of Joint J ±0.12	Joint Nut Outer Diameter Q $^{+0}_{-0.38}$	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

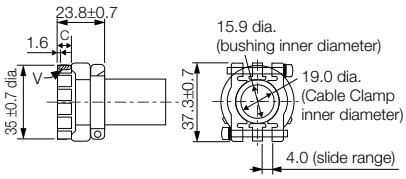
Unit: mm



Shell Size	Joint Thread A	Length of Joint J ± 0.12	Joint Nut Outer Diameter Q $^{+0}_{-0.38}$	Effective Thread Length W min.
22	1-3/8-18UNEF	18.26	40.48	9.53

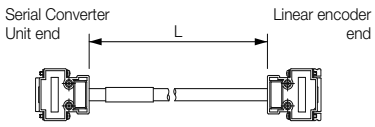
◆ Dimensional Drawings: MS3057-12A Cable Clamp with Rubber Bushing

Unit: mm



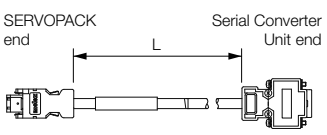
Applicable Connector Shell Size	Effective Thread Length C	Mounting Thread V	Attached Bushing
20.22	10.3	1-3/16-18UNEF	AN3420-12

Linear Encoder Cables

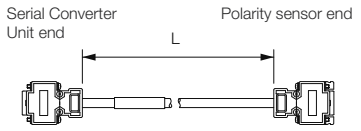
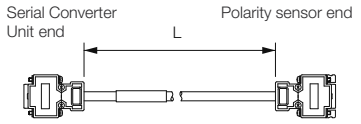
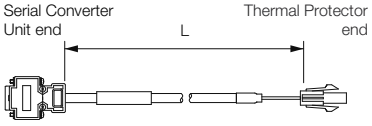
Name	Servomotor Model	Length* (L)	Order Number	Appearance
For linear encoder from Renishaw PLC	All Models	1 m	JZSP-CLL00-01-E	
		3 m	JZSP-CLL00-03-E	
		5 m	JZSP-CLL00-05-E	
		10 m	JZSP-CLL00-10-E	
		15 m	JZSP-CLL00-15-E	
For linear encoder from Heidenhain Corporation		1 m	JZSP-CLL30-01-E	
		3 m	JZSP-CLL30-03-E	
		5 m	JZSP-CLL30-05-E	
		10 m	JZSP-CLL30-10-E	
		15 m	JZSP-CLL30-15-E	

* 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
All Models	1 m	JZSP-CLP70-01-E	
	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	

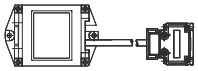
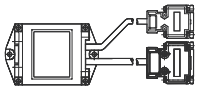
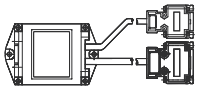
Sensor Cables

Servomotor Model	Length (L)	Order Number	Appearance
SGLGW-□□A SGLFW-□□A SGLTW-□□A SGLCW-□□A	1 m	JZSP-CLL10-01-E	
	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	
	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	
	3 m	JZSP-CL2TH00-03-E	
	5 m	JZSP-CL2TH00-05-E	
	10 m	JZSP-CL2TH00-10-E	
	15 m	JZSP-CL2TH00-15-E	

Model Designations

JZDP - H003 □□□

1st ... 4th digit | 5th ... 7th digit

1st ... 4th digit - Serial Converter Unit				
Code	**Appearance**	**Applicable Linear Encoder**	**Polarity Sensor**	**Temperature Sensor**
H003 J003		From Heidenhein Corp.	None	None
H005 J005		From Renishaw PLC	None	None
H006 J006		From Heidenhein Corp.	Yes	Yes
H008 J008		From Renishaw PLC	Yes	Yes

5th ... 7th digit - Applicable Linear Servomotor					
Servomotor Model		**Code**	**Servomotor Model**		**Code**
SGLGW (coreless with sandard magnetway)	30A050C	250	SGLTW (ironcore)	20A170A	011
	30A080C	251		20A320A	012
	40A140C	252		20A460A	013
	40A253C	253		35A170A	014
	40A365C	254		35A320A	015
	60A140C	258		35A460A	016
	60A253C	259		35A170H	105
	60A365C	260		35A320H	106
	90A200C	264		50A170H	108
	90A370C	265		50A320H	109
	90A535C	266		40A400B	185
SGLGW- + SGLGM- □-M (coreless with highforce magnetway)	40A140C	255		40A600B	186
	40A253C	256		80A400B	187
	40A365C	257		80A600B	188
	60A140C	261			
	60A253C	262			
	60A365C	263			
SGLFW (ironcore)	20A090A	017			
	20A120A	018			
	35A120A	019			
	35A230A	020			
	50A200B	181			
	50A380B	182			
	1ZA200B	183			
	1ZA380B	184			
SGLFW2 (ironcore)	30A070A	628			
	30A120A	629			
	30A230A	630			
	45A200A	631			
	45A380A	632			
	90A200A	633			
	90A380A	634			
	1DA380A	649			

Note: Refer to the Sigma-7 Series AC Servo Drive Peripheral Device Selection Manual (Manual No. SIEP S800001 32) for details on the Serial Converter Units.

Serial Converter Unit

Characteristics and Specifications

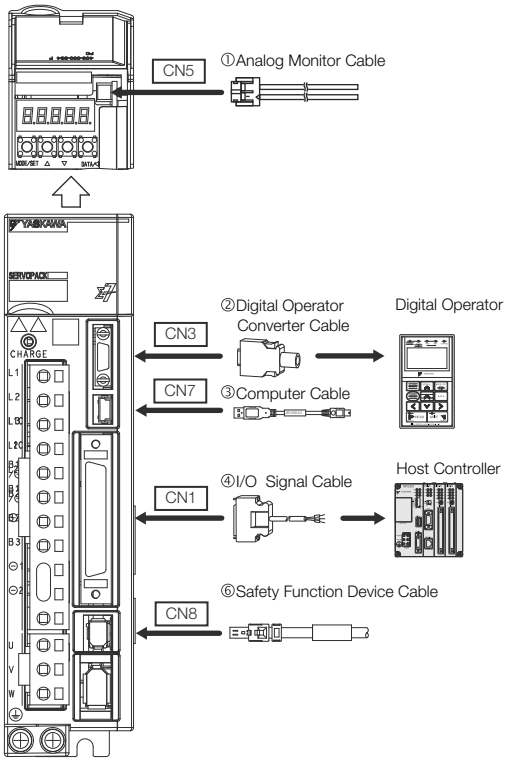
Item		JZDP-H00□-□□□	JZDP-J00□-□□□
Electrical Specifications	Power Supply Voltage	+5.0 V ± 5%, ripple content: 5% max.	
	Current Consumption*1	120 mA Typ, 160mA max.	
	Signal Resolution	1/256 pitch of input two-phase sine wave	1/4,096 pitch of input two-phase sine wave
	Maximum Response Frequency	250 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 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 terminationg resistance: 120 Ω	
Mechanical Charateristics	Approximate Mass	150 g	
	Vibration Resistance	98 m/s^2 max. (10 Hz to 2,500 Hz) in three directions	
	Shock Resistance	980 m/s^2 max. (11 ms) two times in three directions	
Environment	Operating Temperature Range	0 °C to 55 °C	
	Storage Temperature Range	-20 °C to 80 °C	
	Humidity Range	20% to 80% relative humidity (non-condensing)	

*1. The current consumption 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 have thermical protectors.

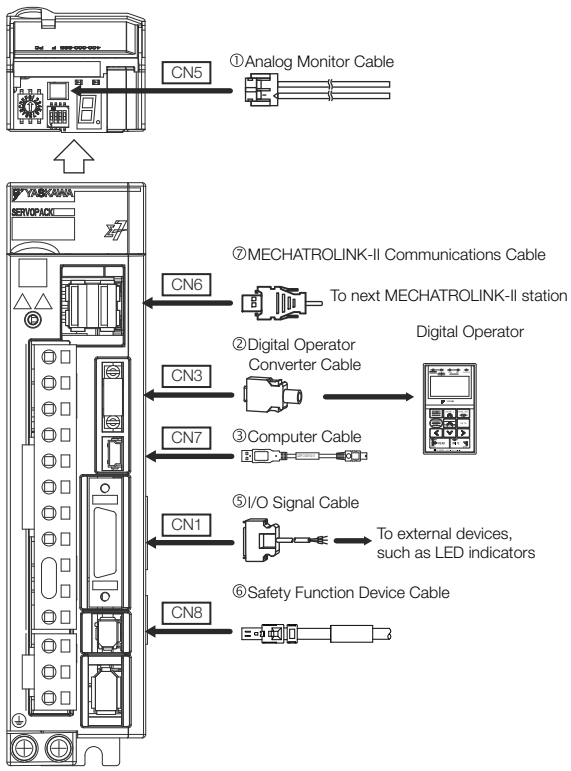
Cables for SERVOPACKs

System Configurations

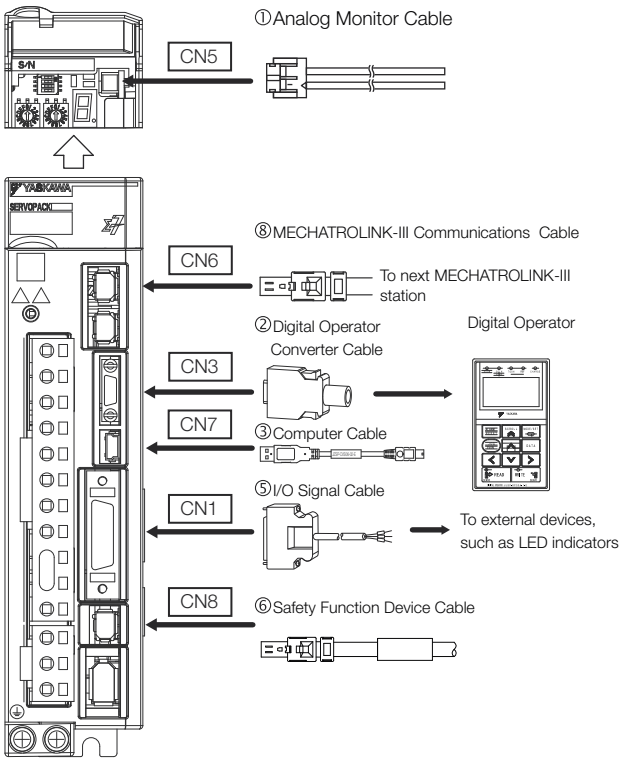
Sigma-7S Single-axis Analog Voltage/Pulse Train Reference SERVOPACKs



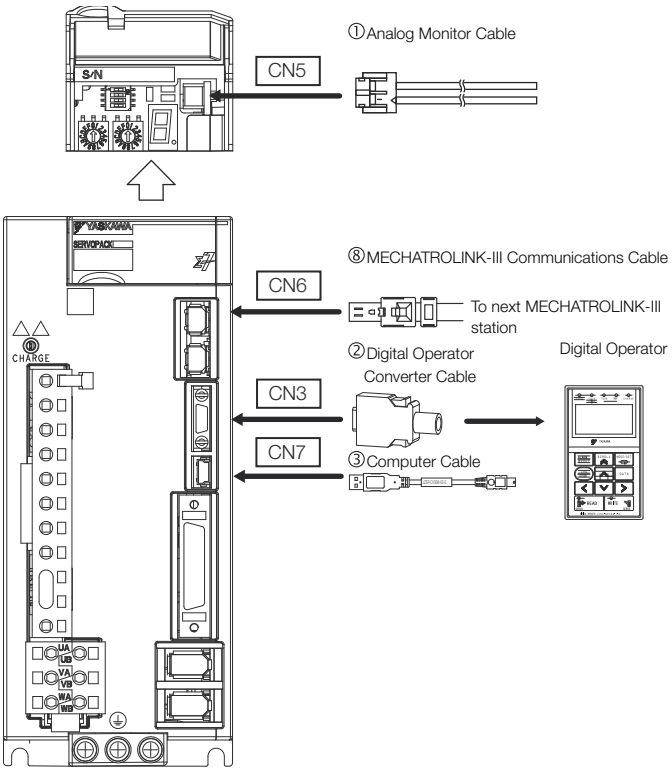
Sigma-7S Single-axis MECHATROLINK-II Communications Reference SERVOPACKs



Sigma-7S Single-axis MECHATROLINK-III Communications Reference SERVOPACKs



Sigma-7W Dual-axis MECHATROLINK-III Communications Reference SERVOPACKs



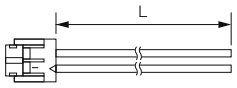
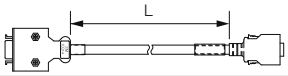
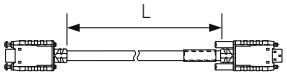
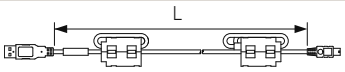
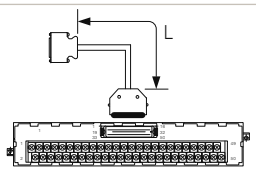
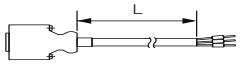
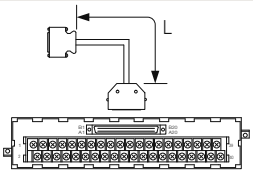
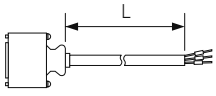
Cables for SERVOPACKs

Important

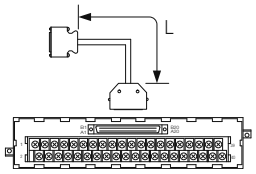
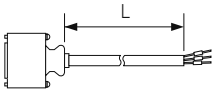
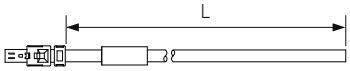
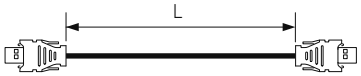
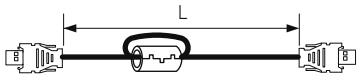
1. Use the cable specified by Yaskawa for the Computer Cable. Operation may not be dependable with any other cable.
2. Use the cable specified by Yaskawa for the MECHATROLINK Communications Cables.

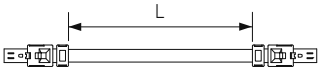
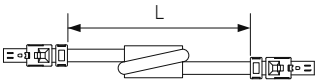
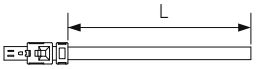
Note: Refer to the following manual for the following information.
Cable dimensional drawings and cable connection specifications
Order numbers and specifications of individual connectors for cables

Sigma-7-Series AC Servo Drive Peripheral Device Selection Manual (Manual No.: SIEP S800001 32)

Code	Name		Length (L)	Order Number	Appearance
①	Analog Monitor Cable		1 m	JZSP-CA01-E	
②	Digital Operator Converter Cable		0.3 m	JZSP-CVS05-A3-E*1	
				JZSP-CVS07-A3-E*2	
③	Computer Cable		2.5 m	JZSP-CVS06-02-E	
④	Soldered Connector Kit			JZSP-CVMCA12-20-E-G5	
	I/O Signal Cables	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	
		Cable 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	
⑤	Soldered Connector Kit			JZSP-CSI9-2-E	
	I/O Signal Cables	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	
		Cable 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	

Cables for SERVOPACKs

Code	Name		Length (L)	Order Number	Appearance
⑥	I/O Signal Cables	Soldered Connector Kit		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	
		Cable with Loose Wires at One End (loose wires on peripheral device end)	0.3 m	JZSP-CSI03-1-E	
			2 m	JZSP-CSI03-2-E	
			3 m	JZSP-CSI03-3-E	
⑦	Safety Function Device Cable	Cables with Connectors*3	1 m	JZSP-CVH03-01-E	
			3 m	JZSP-CVH03-03-E	
		Connector Kit*4		Contact Tyco Electronics Japan G.K. Product name: Industrial Mini I/O D-shape Type 1 Plug Connector Kit Model number: 2013595-1	
⑧	MECHATRO-LINK-II Communications Cables	Cables with Connectors on Both Ends	0.5 m	JEPMC-W6002-A5-E	
			1 m	JEPMC-W6002-01-E	
			3 m	JEPMC-W6002-03-E	
			5 m	JEPMC-W6002-05-E	
			10 m	JEPMC-W6002-10-E	
			20 m	JEPMC-W6002-20-E	
			30 m	JEPMC-W6002-30-E	
			40 m	JEPMC-W6002-40-E	
			50 m	JEPMC-W6002-50-E	
		Cables with Connectors on Both Ends (with ferrite cores)	0.5 m	JEPMC-W6003-A5-E	
			1 m	JEPMC-W6003-01-E	
			3 m	JEPMC-W6003-03-E	
			5 m	JEPMC-W6003-05-E	
			10 m	JEPMC-W6003-10-E	
			20 m	JEPMC-W6003-20-E	
			30 m	JEPMC-W6003-30-E	
			40 m	JEPMC-W6003-40-E	
			50 m	JEPMC-W6003-50-E	
		Terminators		JEPMC-W6022-E	

Code	Name		Length (L)	Order Number	Appearance
⑨	MECHATROLINK-III Communications Cables	Cables with Connectors on Both Ends	0.2 m	JEPMC-W6012-A2-E	
			0.5 m	JEPMC-W6012-A5-E	
			1 m	JEPMC-W6012-01-E	
			2 m	JEPMC-W6012-02-E	
			3 m	JEPMC-W6012-03-E	
			4 m	JEPMC-W6012-04-E	
			5 m	JEPMC-W6012-05-E	
			10 m	JEPMC-W6012-10-E	
			20 m	JEPMC-W6012-20-E	
			30 m	JEPMC-W6012-30-E	
			50 m	JEPMC-W6012-50-E	
		Cables with Connectors on Both Ends (with Core)	10 m	JEPMC-W6013-10-E	
			20 m	JEPMC-W6013-20-E	
			30 m	JEPMC-W6013-30-E	
			50 m	JEPMC-W6013-50-E	
		Cable with Loose Wires at One End	0.5 m	JEPMC-W6014-A5-E	
			1 m	JEPMC-W6014-01-E	
			3 m	JEPMC-W6014-03-E	
			5 m	JEPMC-W6014-05-E	
			10 m	JEPMC-W6014-10-E	
			30 m	JEPMC-W6014-30-E	
			50 m	JEPMC-W6014-50-E	

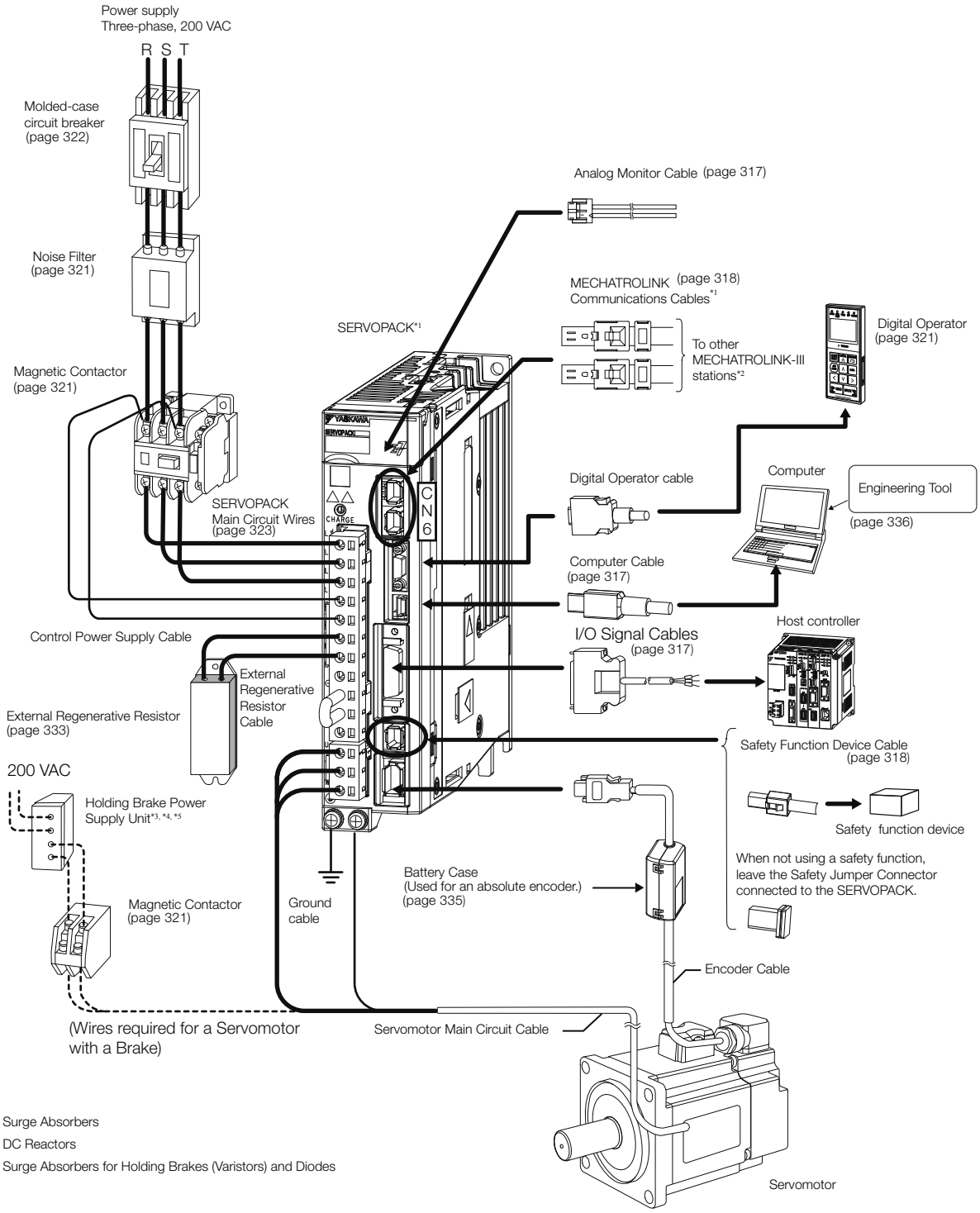
*1. This Converter Cable is required to use the Sigma-III-series Digital Operator (JUSP-OP05A) for Sigma-7-series SERVOPACKs.

*2. If you use a MECHATROLINK-III Communications Reference SERVOPACK, this Converter Cable is required to prevent the cable from disconnecting from the Digital Operator.

*3. When using safety functions, connect this Cable to the safety function devices. When not using safety functions, connect the enclosed Safety Jumper Connector to the SERVOPACK.

*4. Use the Connector Kit when you make cables yourself.

Peripheral Devices



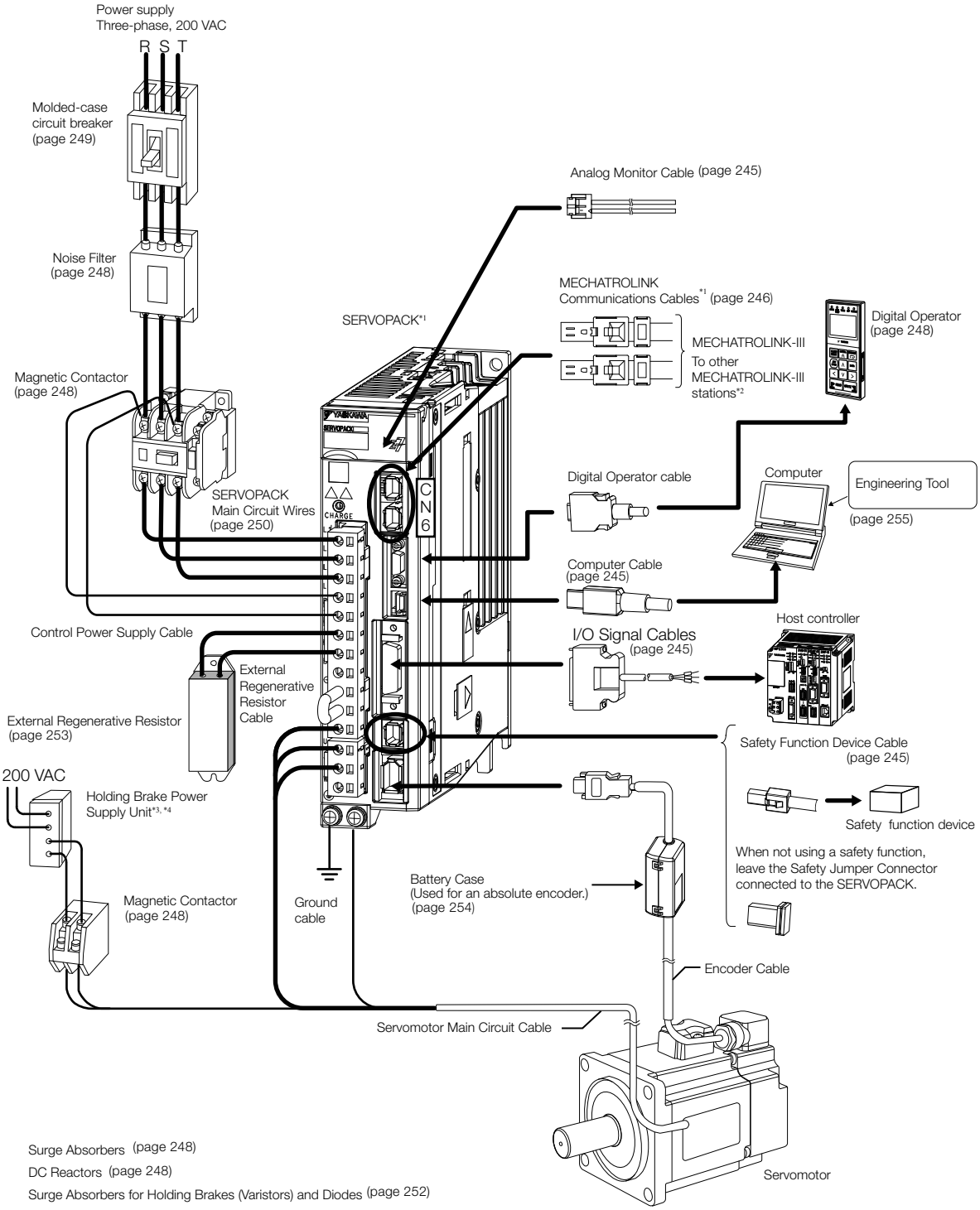
*1. The peripheral devices are described using a MECHATROLINK-III Communications Reference SERVOPACK as an example. The shapes of the connectors may be different for other interfaces.

*2. The connected devices depend on the interface.
For MECHATROLINK-II communications references: Other MECHATROLINK-II stations
For analog voltage/pulse train references: There is no CN6 connector.

*3. 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.

*4. If you use a Servomotor with a Holding Brake, select a brake relay according to the power supply voltage and current of the brake. Yaskawa does not recommend any particular brake relays. Select an appropriate brake relay using the selection method of the brake relay manufacturer.

*5. The power supply for the holding brake 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.



*1. The peripheral devices are described using a MECHATROLINK-III Communications Reference SERVOPACK as an example. The shapes of the connectors may be different for other interfaces.

*2. The connected devices depend on the interface.
For MECHATROLINK-II communications references: Other MECHATROLINK-II stations
For analog voltage/pulse train references: There is no CN6 connector.

*3. 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.

*4. If you use a Servomotor with a Holding Brake, select a brake relay according to the power supply voltage and current of the brake. Yaskawa does not recommend any particular brake relays. Select an appropriate brake relay using the selection method of the brake relay manufacturer.

Peripheral Device Selection Table

Main Circuit Power Supply	SERVOPACK			EMC Filter*1	DC Reactor*2	Magnetic Contactor	Surge Absorber	Digital Operator
	Maximum Applicable Motor Capacity [kW]	Model SGD7S-	SGD7SModel SGD7W-					
Three phase, 200 VAC	0.05	R70A	–	FN258L-7/07	X5061	SC-03	LTC32G801WS	JUSPOP05A-1-E
	0.1	R90A	–					
	0.2	1R6A	–					
	0.4	2R8A	–					
	0.5	3R8A	–					
	0.75	5R5A	–	FN258L-16/07		SC-4-1		
	1.0	7R6A	–					
	1.5	120A	–	HF3020C-UQC	X5060			
Single phase, 200 VAC	0.05	R70A	–	FESS-B005A	X5071	SC-03	LTC12G801WS	JUSPOP05A-1-E
	0.1	R90A	–					
	0.2	1R6A	–		X5070			
	0.4	2R8A	1R6A		X5069			
	0.75	5R5A	2R8A	FESS-B009A	X5079	SC-4-1		
	1.5	120A	5R5A	FESS-B016A	X5078	SC-5-1		

Device	Enquires
Noise Filters	EPA GmbH
Surge Absorbers	Yaskawa Controls Co., Ltd.
DC Reactors	
Magnetic Contactors	Fuji Electric FA Components & Systems Co., Ltd.

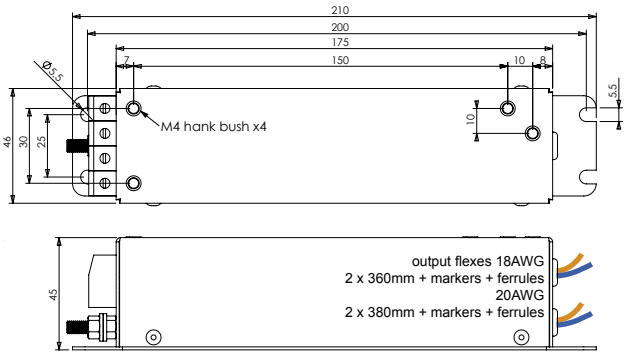
*1. Some Noise Filters have large leakage currents. The grounding conditions also affect the size of the leakage current. If necessary, select an appropriate leakage detector or leakage breaker taking into account the grounding conditions and the leakage current from the Noise Filter.

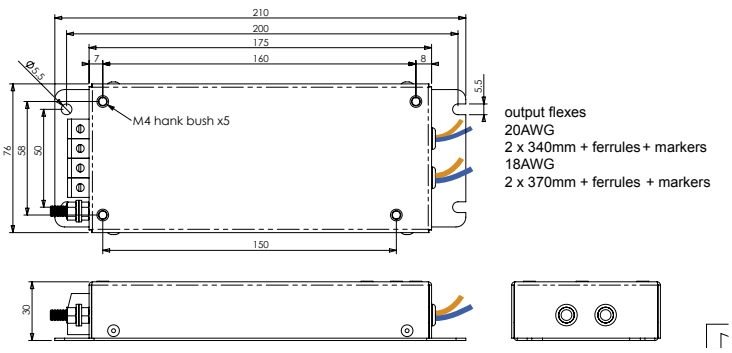
*2. The last digit of an RoHS-compliant serial number is R. Consult with Yaskawa Controls Co., Ltd. for RoHS-compliant reactors.

Note: 1. Consult the manufacturer for details on peripheral devices.

2. Refer to the following section for information on Digital Operator Converter Cables.

3. Refer to the *Σ-7 Series AC Servo Drive Peripheral Device Selection Manual* (Manual No. SIEP S800001 32) for the following information.
   • Dimensional drawings, ratings, and specifications of peripheral devices





Molded-case Circuit Breakers and Fuses

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: To comply with the Low Voltage Directive, always connect a fuse to the input side to protect against short-circuit accidents. Select fuses or molded-case circuit breakers that are compliant with UL standards.
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-7S SERVOPACKs

Main Circuit Power Supply	Maximum Applicable Motor Capacity [kW]	SERVOPACK Model SGD7S-	Power Supply Capacity per SERVOPACK [kVA]*	Current Capacity		Inrush Current	
				Main Circuit [Arms]*	Control Power Supply [Arms]	Main Circuit [A0-p]	Control Power Supply [A0-p]
Three-phase, 200 V	0.05	R70A	0.2	0.4	0.2	34	34
	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			
	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			
Single-phase, 200 V	0.05	R70A	0.2	0.8	0.2		
	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			
	1.50	120A	4.0	16	0.25		

* This is the net value at the rated load.

Σ-7W SERVOPACKs

Main Circuit Power Supply	Maximum Applicable Motor Capacity per Axis [kW]	SERVOPACK Model SGD7W-	Power Supply Capacity per SERVOPACK [kVA]*1	Current Capacity		Inrush Current	
				Main Circuit [Arms]*1	Control Power Supply [Arms]	Main Circuit [A0-p]	Control Power Supply [A0-p]
Three-phase, 200 V	0.2	1R6A	1.0	2.5	0.25	34	34
	0.4	2R8A	1.9	4.7			
	0.75	5R5A	3.2	7.8			
	1.0	7R6A	4.5	11			
Single-phase, 200 V	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 SGD7W-5R5A with a single-phase 200-V power supply input, derate the load ratio to 65%.

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.14.
1. To comply with UL standards, use UL-compliant wires.
2. Use copper wires with a rated temperature of 75° or higher.
3. Use copper wires with a rated withstand voltage of 300 V or higher.

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 ambient temperature.

Three-phase, 200-V Wires for Σ-7S SERVOPACKs

Cable	Connected Terminals	SERVOPACK Model SGD7S-									
		R70A	R90A	1R6A	2R8A	3R8A	5R5A	7R6A	120A	180A	200A
Main Circuit Power Supply Cable	L1, L2, L3	AWG16 (1.25 mm^2)							AWG14 (2.0 mm^2)		AWG12 (3.5 mm^2)
Servomotor Main Circuit Cable*	U, V, W	AWG16 (1.25 mm^2)							AWG14 (2.0 mm^2)	AWG10 (5.5 mm^2)	
Control Power Supply Cable	L1C, L2C	AWG16 (1.25 mm^2)									
External Regenerative Resistor Cable	B1/⊕, B2	AWG16 (1.25 mm^2)									
Ground cable	⏚	AWG14 (2.0 mm^2) or larger									

* If you do not use the recommended Servomotor Main Circuit Cable, use this table to select wires.

Single-phase, 200-V Wires for Σ-7S SERVOPACKs

Cable	Connected Terminals	SERVOPACK Model SGD7S-					
		R70A	R90A	1R6A	2R8A	5R5A	120A
Main Circuit Power Supply Cable	L1, L2	AWG16 (1.25 mm^2)				AGW14 (2.0 mm^2)	AWG12 (3.5 mm^2)
Servomotor Main Circuit Cable*	U, V, W	AWG16 (1.25 mm^2)					AGW14 (2.0 mm^2)
Control Power Supply Cable	L1C, L2C	AWG16 (1.25 mm^2)					
External Regenerative Resistor Cable	B1/⊕, B2	AWG16 (1.25 mm^2)					
Ground cable	⏚	AWG14 (2.0 mm^2) or larger					

* If you do not use the recommended Servomotor Main Circuit Cable, use this table to select wires.

Three-phase, 200-V Wires for Σ-7W SERVOPACKs

Cable	Connected Terminals	SERVOPACK Model SGD7W-			
		1R6A	2R8A	5R5A	7R6A
Main Circuit Power Supply Cable	L1, L2, L3	AWG16 (1.25 mm^2)	AWG14 (2.0 mm^2)		
Servomotor Main Circuit Cable*	UA, VA, WA, UB, VB, WB	AWG16 (1.25 mm^2)			
Control Power Supply Cable	L1C, L2C	AWG16 (1.25 mm^2)			
External Regenerative Resistor Cable	B1/⊕, B2	AWG16 (1.25 mm^2)		AWG14 (2.0 mm^2)	
Ground cable	⏚	AWG14 (2.0 mm^2) or larger			

* If you do not use the recommended Servomotor Main Circuit Cable, use this table to select wires.

Single-phase, 200-V Wires for Σ-7W SERVOPACKs

Cable	Connected Terminals	SERVOPACK Model SGD7W-		
		1R6A	2R8A	5R5A
Main Circuit Power Supply Cable	L1, L2	AWG16 (1.25 mm^2)	AWG14 (2.0 mm^2)	
Servomotor Main Circuit Cable*	UA, VA, WA, UB, VB, WB	AWG16 (1.25 mm^2)		
Control Power Supply Cable	L1C, L2C	AWG16 (1.25 mm^2)		
External Regenerative Resistor Cable	B1/⊕, B2	AWG16 (1.25 mm^2)		AWG14 (2.0 mm^2)
Ground cable	⏚	AWG14 (2.0 mm^2) or larger		

* 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*		Allowable Current at Ambient Temperatures [Arms]		
Nominal Cross-sectional Area [mm^2]	Configuration [Wires/mm^2]	30°C	40°C	50°C
0.9	37/0.18	15	13	11
1.25	50/0.18	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

* This is reference data based on JIS C3317 600-V-grade heat-resistant polyvinyl chloride-insulated wires (HIV).

Surge Absorbers for Holding Brakes (Varistors) and Diodes

Surge Absorbers for Holding Brakes (Varistors)

Select an appropriate Surge Absorber for the power supply voltage and current of the brake. Surge absorbers are not provided by Yaskawa.

Brake Power Supply Voltage		24 VDC	
Surge Absorber Manufacturer		Nippon Chemi-Con Corporation	SEMITEC Corporation
Brake Rated Current	1 A max.	TNR5V121K	Z5D121
	2 A max.	TNR7V121K	Z7D121
	4 A max.	TNR10V121K	Z10D121
	8 A max.	TNR14V121K	Z15D121

Diodes for Holding Brakes

Select a diode for a holding brake with a rated current that is greater than that of the 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

Regenerative Resistors

Types of Regenerative Resistors

The following regenerative resistors can be used.

- Built-in regenerative resistors: Some models of SERVOPACKs have regenerative resistors built into them.
- External regenerative resistors: These resistors are used when the smoothing capacitor and built-in regenerative resistor in the SERVOPACK cannot consume all of the regenerative power. Use Yaskawa's SigmaJunmaSize+, an AC Servo drive capacity selection program, to determine if a regenerative resistor is required.

Note: If you use an external regenerative resistor, you must change the setting of parameter Pn600.

Selection Table

SERVOPACK Model		Built-In Regenerative Resistor	External Regenerative Resistor	Contents
SGD7S-	SGD7W-			
R70A, R90A, 1R6A, 2R8A	–	None	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 process all the regenerative power.*
3R8A, 5R5A, 7R6A, 120A, 180A, 200A	1R6A, 2R8A, 5R5A, 7R6A	Standard feature	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 the regenerative power.*

* Use Yaskawa's SigmaJunmaSize+, an AC Servo drive capacity selection program, to select an external regenerative resistor.

Built-In Regenerative Resistor

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.

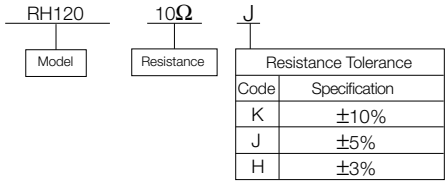
SERVOPACK Model		Built-In Regenerative Resistor		Regenerative Power Processing Capacity of Built-In Regenerative Resistor [W]	Minimum Allowable Resistance [Ω]
SGD7S-	SGD7W-	Resistance [Ω]	Capacity [W]		
R70A, R90A, 1R6A, 2R8A	–	–	–	–	40
3R8A, 5R5A, 7R6A	1R6A, 2R8A	40	40	8	40
120A	–	20	60	10	20
180A, 200A	5R5A, 7R6A	12	60	16	12

External Regenerative Resistors

Model	Specification	Enquires	Manufacturer
RH120	70 W, 1 Ω to 100 Ω	Yaskawa Controls Co., Ltd.	Iwaki Musen Kenkyusho Co., Ltd.
RH150	90 W, 1 Ω to 100 Ω		
RH220	120 W, 1 Ω to 100 Ω		
RH300C	200 W, 1 kΩ to 10 kΩ		
RH500	300 W, 10 Ω to 30 Ω		

Note: 1. Consult Yaskawa Controls Co., Ltd. if you require a RoHS-compliant resistor.

2. Consult Yaskawa Controls Co., Ltd. for the model numbers and specifications of resistors with thermostats.



Batteries for Servomotor with Absolute Encoders

If you use an absolute encoder, you can use an Encoder Cable with a Battery Case connected to it to supply power and retain the absolute position data.

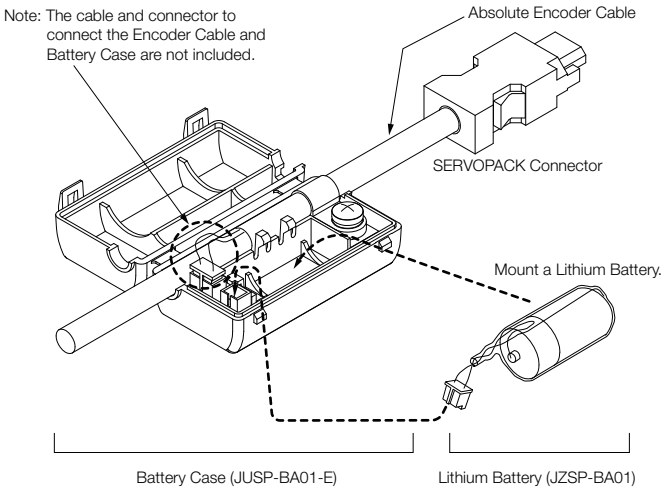
You can also retain the absolute position data by supplying power from a battery on the host controller.

The Battery Case is sold as a replacement part for the Battery Case that is included with an Absolute Encoder Cable.

Name	Order Number	Remarks
Battery Case (case only)	JUSP-BA01-E	The Encoder Cable and Battery are not included. (This is a replacement part for a damaged Battery Case.)
Lithium Battery	JZSP-BA01	This is a special battery that mounts into the Battery Case.

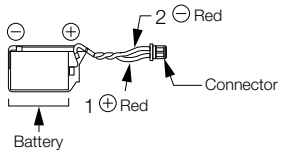
Important

1. You cannot attach the Battery Case to an Incremental Encoder Cable.
2. Install the Battery Case where the ambient temperature is between -5°C and 60°C.



◆ Mounting a Battery in the Battery Case

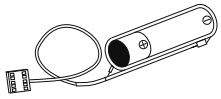
Obtain a Lithium Battery (JZSP-BA01) and mount it in the Battery Case.



ER3V (3.6 V, 1000 mAh) from Toshiba Battery Co., Ltd.

◆ Connecting a Battery to the Host Controller

Use a battery that meets the specifications of the host controller. Use an ER6VC3N Battery (3.6 V, 2,000 mAh) from Toshiba Battery Co., Ltd. or an equivalent battery.



Software

SigmaJunmaSize+: AC Servo Capacity Selection Program

You can use the SigmaJunmaSize + to select Servomotors and SERVOPACKs. There are two versions of the software: A Web-based version and a stand-alone version.

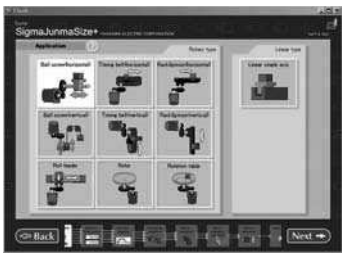
The software supports all standard servo products sold by Yaskawa.

◆ Features

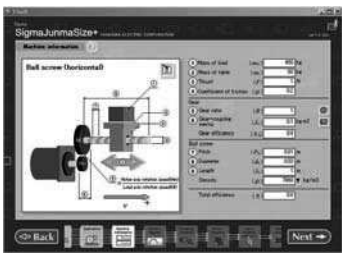
- Provides a vast amount of new product information.
- Lets you select servo products with a wizard.
- As long as you have a connection to the Internet, you can access and use the software anytime, anywhere. (Communications are encrypted for security.)
- You can access and reuse previously entered data.

■ Examples of the Servo Selection Interface

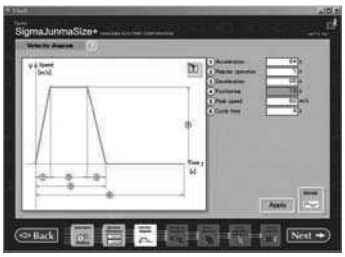
Mechanism Selection View



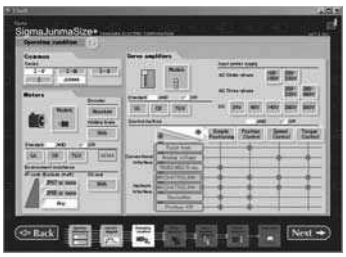
Machine Specification Entry View



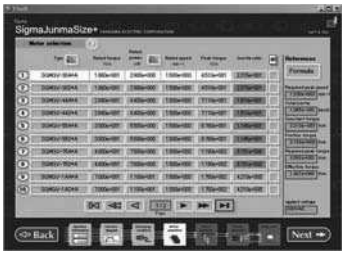
Speed Diagram Entry View



Operating Conditions Selection View



Servomotor Selection View



SERVOPACK Selection View

◆ System Requirements

Item	System Requirement
Browser (Required for Web-base Version Only)	Internet Explorer 5.0 SP1 or higher
OS	Windows XP, Windows Vista, or 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.

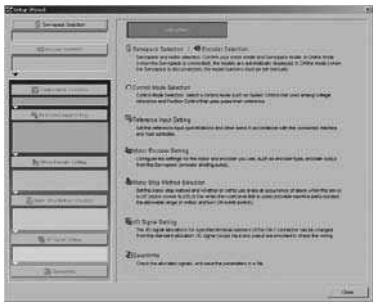
SigmaWin +: AC Servo Drive Engineering Tool

The SigmaWin+ Engineering Tool is used to set up and optimally tune Yaskawa Σ-series Servo Drives.

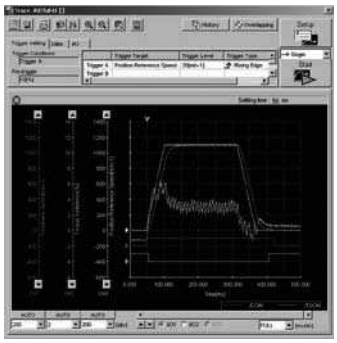
◆ Features

- Set parameters with a wizard.
- Display SERVOPACK data on a computer just like you would on a oscilloscope.
- Estimate moments of inertia and measure vibration frequencies.
- Display alarms and alarm diagnostics.

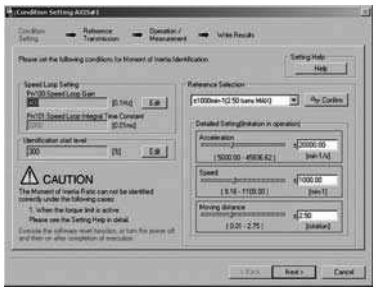
Setting Parameters with a Wizard



Displaying SERVOPACK Data on a Computer Just Like You Would on a Oscilloscope



Estimating Moments of Inertia and Measuring Vibration Frequencies



Displaying Alarms and Alarm Diagnostics

◆ System Requirements

Item	System Requirement
Supported Languages	English and Japanese
OS	Windows XP, Windows Vista, or 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	For Standard Setup: 350 MB min. (400 MB or greater recommended for installation)

Appendix

Capacity Selection for Servomotors 329
Capacity Selection for Regenerative Resistors 337
International Standards 348
Warranty 349

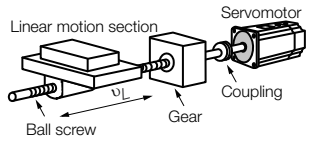
Selecting the Servomotor Capacity

Use Yaskawa's SigmaJunmaSize+, an AC servo drive capacity selection program, to select the Servomotor capacity. With the SigmaJunmaSize+, you can find the optimum Servomotor capacity by simply selecting and entering information according to instructions from a wizard.

If you select a Servomotor capacity with a formula, refer to the following selection examples.

Capacity Selection Example for a Rotary Servomotor: For Speed Control

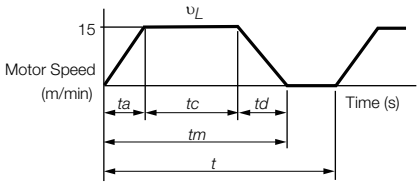
1. Mechanical Specifications



Item	Code	Value
Load Speed	v_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

Item	Code	Value
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. Speed Diagram



$$t = \frac{60}{n} = \frac{60}{40} = 1.5 \text{ (s)}$$

If ta = td,

$$ta = tm - \frac{60\ell}{v_L} = 1.2 - \frac{60 \times 0.275}{15} = 1.2 - 1.1 = 0.1 \text{ (s)}$$

$$tc = 1.2 - 0.1 \times 2 = 1.0 \text{ (s)}$$

3. Motor Speed

- Load shaft speed $n_L = \frac{v_L}{P_B} = \frac{15}{0.01} = 1{,}500$ (min^{-1})
- Motor shaft speed $n_M = n_L \cdot R = 1{,}500 \times 2 = 3{,}000$ (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 $J_G = 0.40 \times 10^{-4}$ (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

$$P_O = \frac{2\pi n_M \cdot T_L}{60} = \frac{2\pi \times 3{,}000 \times 0.43}{60} = 135\ (\text{W})$$

7. Load Acceleration Power

$$Pa = \left(\frac{2\pi}{60} n_M\right)^2 \frac{J_L}{ta} = \left(\frac{2\pi}{60} \times 3{,}000\right)^2 \times \frac{2.29 \times 10^{-4}}{0.1} = 226\ (\text{W})$$

8. Servomotor Provisional Selection

① Selection Conditions

- $T_L \leq$ Motor rated torque
- $\frac{(Po + Pa)}{2}$ < Provisionally selected Servomotor rated output < $(Po + Pa)$
- $n_M \leq$ Rated motor speed
- $J_L \leq$ Allowable load moment of inertia

The following Servomotor meets the selection conditions.

- SGM7J-02A Servomotor

② Specifications of the Provisionally Selected Servomotor

Item	Value
Rated Output	200 (W)
Rated Motor Speed	3,000 (min^{-1})
Rated Torque	0.637 (N·m)
Instantaneous Maximum Torque	2.23 (N·m)
Motor 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:

$$T_P = \frac{2\pi n_M (J_M + J_L)}{60ta} + T_L = \frac{2\pi \times 3{,}000 \times (0.263 + 2.29) \times 10^{-4}}{60 \times 0.1} + 0.43$$

≈ 1.23 (N·m) < Maximum instantaneous torque...Satisfactory

- Verification of required deceleration torque:

$$T_S = \frac{2\pi n_M (J_M + J_L)}{60td} - T_L = \frac{2\pi \times 3{,}000 \times (0.263 + 2.29) \times 10^{-4}}{60 \times 0.1} - 0.43$$

≈ 0.37 (N·m) < Maximum instantaneous torque...Satisfactory

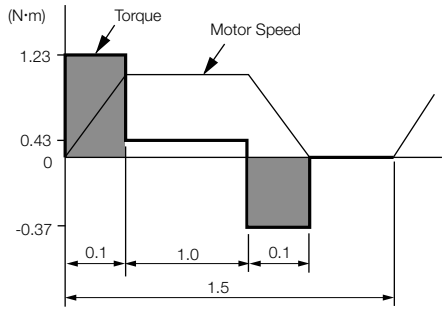
- Verification of effective torque value:

$$Trms = \sqrt{\frac{T_P^2 \cdot ta + T_L^2 \cdot tc + Ts^2 \cdot td}{t}} = \sqrt{\frac{(1.23)^2 \times 0.1 + (0.43)^2 \times 1.0 + (0.37)^2 \times 0.1}{1.5}}$$

$$\approx 0.483 \text{ (N·m)} < \text{Rated torque...Satisfactory}$$

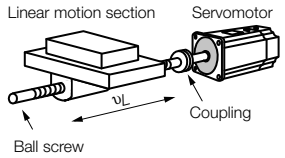
10. Result

It has been verified that the provisionally selected Servomotor is applicable.
The torque diagram is shown below.



Capacity Selection Example for a Rotary Servomotor: For Position Control

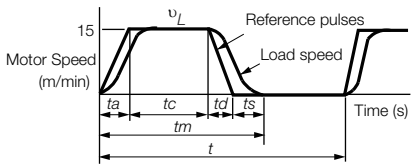
1. Mechanical Specifications



Item	Code	Value
Load Speed	v_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

Item	Code	Value
Coupling Outer Diameter	d_C	0.03 m
Number of Feeding Operations	n	40 rotation/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



$$t = \frac{60}{n} = \frac{60}{40} = 1.5 \text{ (s)}$$

If ta = td and ts = 0.1 (s),

$$ta = tm - ts - \frac{60\ell}{v_L} = 1.2 - 0.1 - \frac{60 \times 0.25}{15} = 0.1 \text{ (s)}$$

$$tc = 1.2 - 0.1 - 0.1 \times 2 = 0.9 \text{ (s)}$$

3. Motor Speed

- Load shaft speed

$$n_L = \frac{\upsilon_L}{P_B} = \frac{15}{0.005} = 3{,}000\ (\text{min}^{-1})$$

- Motor shaft speed Direct coupling gear ratio 1/R = 1/1
  Therefore, $n_M = n_L \cdot R = 3{,}000 \times 1 = 3{,}000\ (\text{min}^{-1})$

4. Load Torque

$$T_L = \frac{(9.8\,\mu \cdot m + F) \cdot P_B}{2\pi R \cdot \eta} = \frac{(9.8 \times 0.2 \times 80 + 0) \times 0.005}{2\pi \times 1 \times 0.9} = 0.139\ (\text{N·m})$$

5. Load Moment of Inertia

- Linear motion section

$$J_{L1} = m \left(\frac{P_B}{2\pi R}\right)^2 = 80 \times \left(\frac{0.005}{2\pi \times 1}\right)^2 = 0.507 \times 10^{-4}\ (\text{kg·m}^2)$$

- Ball screw $J_B = \frac{\pi}{32} \rho \cdot \ell_B \cdot d_B{}^4 = \frac{\pi}{32} \times 7.87 \times 10^3 \times 0.8 \times (0.016)^4 = 0.405 \times 10^{-4}\ (\text{kg·m}^2)$

- Coupling $Jc = \frac{1}{8} m_C \cdot d_C{}^2 = \frac{1}{8} \times 0.3 \times (0.03)^2 = 0.338 \times 10^{-4}\ (\text{kg·m}^2)$

- Load moment of inertia at motor shaft

$$J_L = J_{L1} + J_B + Jc = 1.25 \times 10^{-4}\ (\text{kg·m}^2)$$

6. Load Moving Power

$$P_O = \frac{2\pi n_M \cdot T_L}{60} = \frac{2\pi \times 3{,}000 \times 0.139}{60} = 43.7\ (\text{W})$$

7. Load Acceleration Power

$$Pa = \left(\frac{2\pi}{60} n_M\right)^2 \frac{J_L}{ta} = \left(\frac{2\pi}{60} \times 3{,}000\right)^2 \times \frac{1.25 \times 10^{-4}}{0.1} = 123.4\ (\text{W})$$

8. Servomotor Provisional Selection

① Selection Conditions

- $T_L \leq$ Motor rated torque
- $\frac{(Po + Pa)}{2}$ < Provisionally selected Servomotor rated output < $(Po + Pa)$
- $n_M \leq$ Rated motor speed
- $J_L \leq$ Allowable load moment of inertia

The following Servomotor meets the selection conditions.

- SGM7J-01A Servomotor

② Specifications of the Provisionally Selected Servomotor

Item	Value
Rated Output	100 (W)
Rated Motor Speed	3,000 (min^{-1})
Rated Torque	0.318 (N·m)
Instantaneous Maximum Torque	1.11 (N·m)
Motor Moment of Inertia	0.0659×10^{-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	24 bits (16,777,216 pulses/rev)

9. Verification of the Provisionally Selected Servomotor

- Verification of required acceleration torque:

$$T_P = \frac{2\pi n_M (J_M + J_L)}{60ta} + T_L = \frac{2\pi \times 3{,}000 \times (0.0659 + 1.25) \times 10^{-4}}{60 \times 0.1} + 0.139$$

$$\approx 0.552 \text{ (N·m)} < \text{Maximum instantaneous torque...Satisfactory}$$

- Verification of required deceleration torque:

$$T_S = \frac{2\pi n_M (J_M + J_L)}{60td} - T_L = \frac{2\pi \times 3{,}000 \times (0.0659 + 1.25) \times 10^{-4}}{60 \times 0.1} - 0.139$$

$$\approx 0.274 \text{ (N·m)} < \text{Maximum instantaneous torque...Satisfactory}$$

- 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. Position Detection Resolution

Position detection unit: $\Delta\ell = 0.01$ mm/pulse
The number of pulses per motor rotation must be less than the encoder resolution (pulses/rev).

$$\text{The number of pulses per revolution (pulses)} = \frac{P_B}{\Delta\ell} = \frac{5 \text{ mm}}{0.01 \text{ mm}} = 500 < \text{Encoder resolution [16777216 (pulses/rev)]}$$

11. Reference Pulse Frequency

$$vs = \frac{1{,}000\upsilon L}{60 \times \Delta\ell} = \frac{1{,}000 \times 15}{60 \times 0.01} = 25{,}000 \text{ (pps)}$$

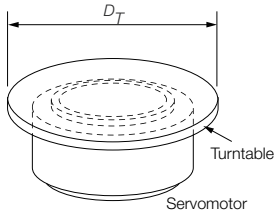
Confirm that the maximum input pulse frequency* is greater than the reference pulse frequency.

*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. Mechanical Specifications



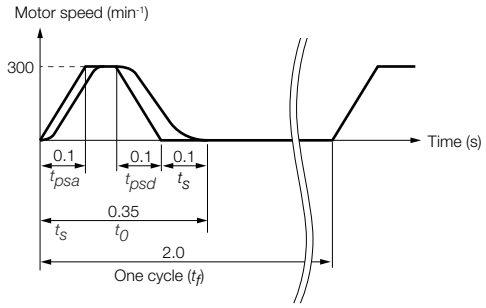
Item	Code	Value
Turntable Mass	w	12 kg
Turntable Diameter	D_T	300 mm
Rotational Angle per Cycle	θ	270 deg
Positioning Time	t_0	0.35 s

Item	Code	Value
Acceleration/ Deceleration Time	t_p = t_{psa} = t_{psd}	0.1 s
Operating Frequency	t_f	2 s
Load Torque	T_L	0 N·m
Stopping Settling Time	t_s	0.1 s

2. Motor Speed of Direct Drive Servomotor

$$N_O = \frac{\theta}{360} \times \frac{60}{(t_0 - t_p - t_s)} = \frac{270}{360} \times \frac{60}{(0.35 - 0.1 - 0.1)} = 300 \text{ (min}^{-1}\text{)}$$

3. Operation Pattern



4. Load Moment of Inertia

$$J_L = \frac{1}{8} \times D_T^2 \times W = \frac{1}{8} \times (300 \times 10^{-3})^2 \times 12 = 0.135 \text{ (kg·m}^2\text{)}$$

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:

$$T_{Ma} = \frac{(J_L + J_M) \times N_O}{9.55 \times t_{psa}} = \frac{(0.135 + 0.00785) \times 300}{9.55 \times 0.1}$$

$\approx$ 44.9 (N·m) < Maximum instantaneous torque...Satisfactory

- Verification of required deceleration torque:

$$T_{Md} = -\frac{(J_L + J_M) \times N_O}{9.55 \times t_{psd}} = -\frac{(0.135 + 0.00785) \times 300}{9.55 \times 0.1}$$

$\approx$ -44.9 (N·m) < Maximum instantaneous torque...Satisfactory

- Verification of effective torque value:

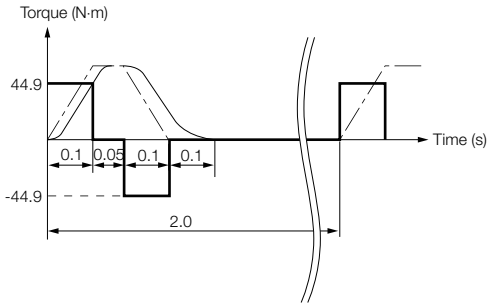
$$Trms = \sqrt{\frac{T_{Ma}^2 \times t_{psa} + T_L^2 \times t_c + T_{Md}^2 \times t_{psd}}{tf}} = \sqrt{\frac{44.9^2 \times 0.1 + 0^2 \times 0.05 + (-44.9)^2 \times 0.1}{2}}$$

$\approx$ 14.2 (N·m) < Rated torque...Satisfactory

t_c =Time of constant motor speed = $t_0 - t_s - t_{psa} - t_{psd}$

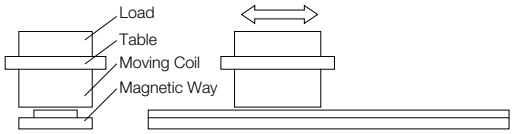
8. Result

It has been verified that the provisionally selected Servomotor is applicable.
The torque diagram is shown below.



Servomotor Capacity Selection Example for Linear Servomotors

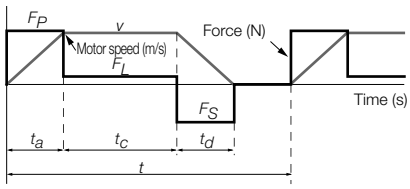
1. Mechanical Specifications



Item	Code	Value
Load Mass	m_W	1 kg
Table Mass	m_T	2 kg
Motor Speed	v	2 m/s
Feeding Distance	l	0.76 m
Friction Coefficient	μ	0.2

Item	Code	Value
Acceleration Time	t_a	0.02 s
Constant-speed Time	t_c	0.36 s
Deceleration Time	t_d	0.02 s
Cycle Time	t	0.5 s
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	147 (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

$$F_L = \mu \{9.8 \times (m_W + m_T + m_M) + F_{att}\} = 0.2 \{9.8 \times (1 + 2 + 0.82) + 0\} = 7.5 \text{ (N)}$$

- Verification of Acceleration Force

$$F_P = (m_W + m_T + m_M) \times \frac{v}{t_a} + F_L = (1 + 2 + 0.82) \times \frac{2}{0.02} + 7.5$$

$$= 389.5 \text{ (N)} \leq \text{Maximum force} \times 0.9 \text{ (= 396 N)} \ldots \text{Satisfactory}$$

- Verification of Deceleration Force

$$F_S = (m_W + m_T + m_M) \times \frac{v}{t_a} - F_L = (1 + 2 + 0.82) \times \frac{2}{0.02} - 7.5$$

$$= 374.5 \text{ (N)} \leq \text{Maximum force} \times 0.9 \text{ (= 396 N)} \ldots \text{Satisfactory}$$

- Verification of Effective Force

$$F_{rms} = \sqrt{\frac{F_P{}^2 \cdot t_a + F_L{}^2 \cdot t_c + F_S{}^2 \cdot t_d}{t}} = \sqrt{\frac{389.5^2 \times 0.02 + 7.5^2 \times 0.36 + 374.5^2 \times 0.02}{0.5}}$$

$$= 108.3 \text{ (N)} \leq \text{Rated force} \times 0.9 \text{ (= 132.3 N)} \ldots \text{Satisfactory}$$

7. Result

It has been verified that the provisionally selected Servomotor is applicable.

Capacity Selection for Regenerative Resistors

If the regenerative power exceeds the amount that can be absorbed by charging the smoothing capacitor, a regenerative resistor is used.

Regenerative Power and Regenerative Resistance

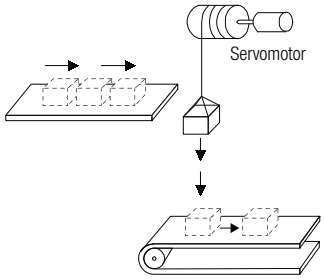
The rotational energy of a driven machine such as a Servomotor that is returned to the SERVOPACK is called regenerative power. The regenerative power is absorbed by charging a smoothing capacitor. When the regenerative power exceeds the capacity of the capacitor, it is consumed by a regenerative resistor. (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).

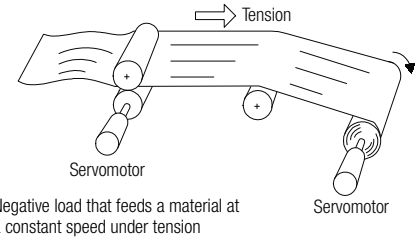
Important

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 (for example, YASKAWA model D1000 or R1000). 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 a SERVOPACK. These resistors are used when the smoothing capacitor and built-in regenerative resistor in the SERVOPACK cannot consume all of the regenerative power.

SERVOPACK Model		Built-in Regenerative Resistor	External Regenerative Resistor
SGD7S-	R70A, R90A, 1R6A, 2R8A	None	Basically not required
	3R8A, 5R5A, 7R6A, 120A, 180A, 200A	Standard feature	Basically not required
SGD7W-	1R6A, 2R8A, 5R5A, 7R6A	Standard feature	Basically not required

Selecting External Regenerative Resistor

Use Yaskawa's SigmaJunmaSize+, an AC servo drive capacity selection program, to determine if you need an External Regenerative Resistor.

You can use one of the following two methods to manually calculate whether an External Regenerative Resistor is required. Refer to the following information if you do not use the SigmaJunmaSize+.

❱ Also refer to chapter "Simple Calculation".

❱ Also refer to chapter "Calculating the Regenerative Energy".

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 SGD7S-R70A, -R90A, -1R6A, and -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.

SERVOPACK Model		Processable Regenerative Energy (Joules)	Remarks
SGD7S-	R70A, R90A, 1R6A	24.2	Value when main circuit input voltage is 200 VAC
	2R8A	31.7	

Calculate the rotational energy (E_S) of the servo system with the following equation:

$E_S = J \times (n_M)^2/182$ (Joules)

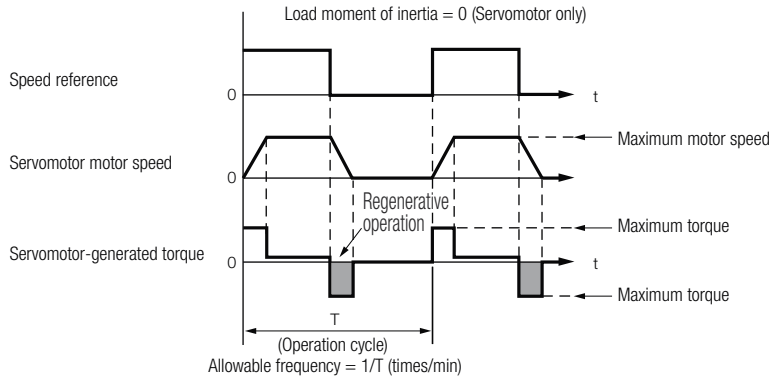
- $J = J_M + J_L$
- J_M: Servomotor moment of inertia (kg × m²)
- J_L: Load moment of inertia at motor shaft (kg × m²)
- n_M: Servomotor operating motor speed (min^{-1})

SERVOPACK Models SGD7S-3R8A, -5R5A, -7R6A, -120A, -180A, and -200A; SGD7W-1R6A, -2R8A, 5R5A, and -7R6A

These SERVOPACKs have built-in regenerative resistors. The allowable frequencies for regenerative operation of the Servomotor without a load in acceleration/deceleration operation during an operation cycle from 0 (min^{-1}) to the maximum motor speed and back to 0, are listed in the following table. 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.

SERVOPACK Model		Allowable Frequencies in Regenerative Operation (Rotations/Min)	
		SERVOPACK Model: SGD7S	SERVOPACK Model: SGD7W
SGM7J-	A5	-	15
	01	-	18
	C2	-	19
	02	-	13
	04	-	16
	06	29	10
	08	15	13
SGM7G-	03	39	9
	05	29	10
	09	6	6
	13	6	-
	20	7	-

SERVOPACK Model		Allowable Frequencies in Regenerative Operation (Rotations/Min)	
		SERVOPACK Model: SGD7S	SERVOPACK Model: SGD7W
SGM7A-	A5	-	23
	01	-	29
	C2	-	32
	02	-	19
	04	-	31
	06	79	27
	08	30	13
	10	31	14
	15	15	-
	20	19	-
	25	15	-
	30	6	-



Operating Conditions for Calculating the Allowable Regenerative Frequency

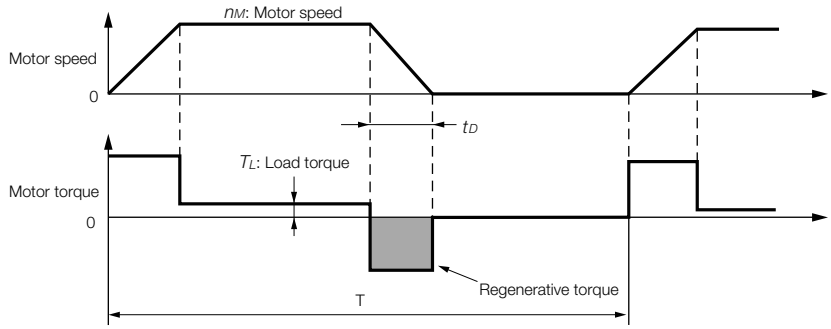
Use the following equation to calculate the allowable frequency for regenerative operation.

$$\text{Allowable frequency} \quad \frac{\text{Allowable frequency for regenerative operation for Servomotor without load}}{(1+n)} \times \left(\frac{\text{Maximum motor speed}}{\text{Operating motor speed}}\right)^2 \text{(time/min)}$$

- $n = J_L/J_M$
- J_M: Servomotor moment of inertia (kg × m^2)
- J_L: Load moment of inertia at motor shaft (kg × m^2)

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	Code	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	$E_L = (\pi/60)\, n_M T_L t_D$ Note: If the load loss is unknown, calculate the value with E_L set to 0.
3	Calculate the energy lost from Servomotor winding resistance.	E_M	(Value calculated from the graphs in ◆ *Servomotor Winding Resistance Loss* on page 271) $\times t_D$
4	Calculate the energy that can be absorbed by the SERVOPACK.	E_C	Calculate from the graphs in ◆ *SERVOPACK-absorbable Energy* on page 270
5	Calculate the energy consumed by the regenerative resistor.	E_K	$E_K = E_S - (E_L + E_M + E_C)$ $E_K = E_S - (E_L + E_M + E_C) + E_G$* Note: Use this formula if there will be continuous periods of regenerative operation, such as for a vertical axis.
6	Calculate the required regenerative resistor capacity (W).	W_K	$W_K = E_K/(0.2 \times T)$

* E_G (joules): Energy for continuous period of regenerative operation

$E_G = (2\pi/60)\, n_{MG} T_G t_G$

- T_G: Servomotor's generated torque in continuous period of regenerative operation (N·m)
- n_{MG}: Servomotor's motor speed for same operation period as above (min^{-1})
- t_G: Same operation period as above (s)

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.

Code	Description
E_S to E_K	Energy in joules (J)
W_K	Required regenerative resistor capacity (W)
J	$= J_M + J_L$ ($kg \cdot m^2$)
n_M	Servomotor motor speed (min^{-1})

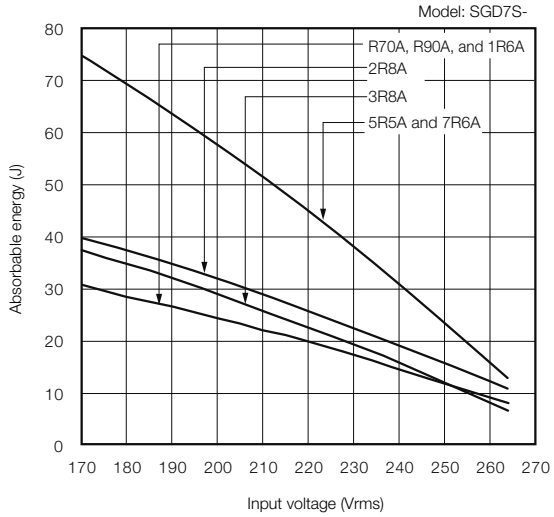
Code	Description
T_L	Load torque (N·m)
t_D	Deceleration stopping time (s)
T	Servomotor repeat operation cycle (s)

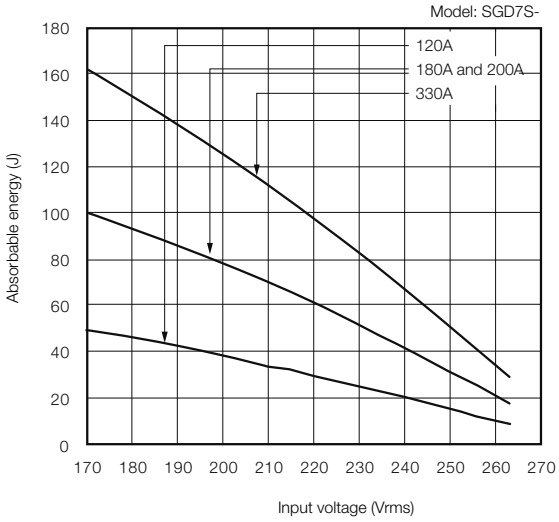
If the value of W_K does not exceed the capacity of the built-in regenerative resistor of the SERVOPACK, an External Regenerative Resistor is not required. For details on the built-in regenerative resisters, refer to the SERVOPACK specifications. If the value of W_K exceeds the capacity of the built-in regenerative resistor, install an External Regenerative Resistor with a capacity equal to the value for W calculated above.

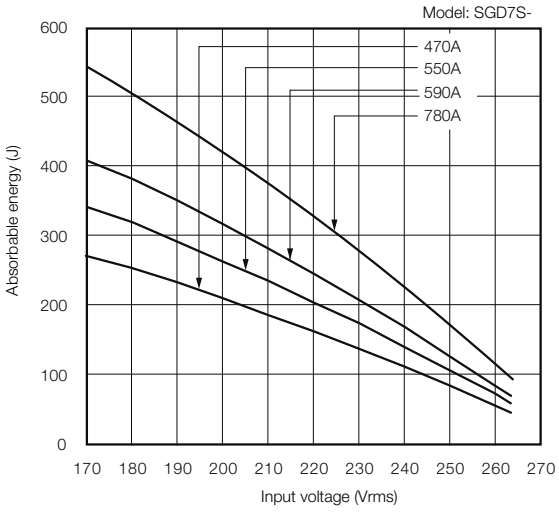
◆ SERVOPACK-absorbable Energy

The following figures show the relationship between the SERVOPACK's input power supply voltage and its absorbable energy.

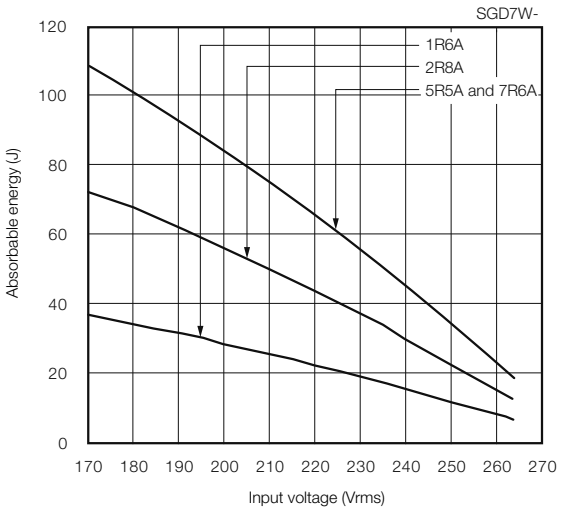
■ Σ-7S SERVOPACKs







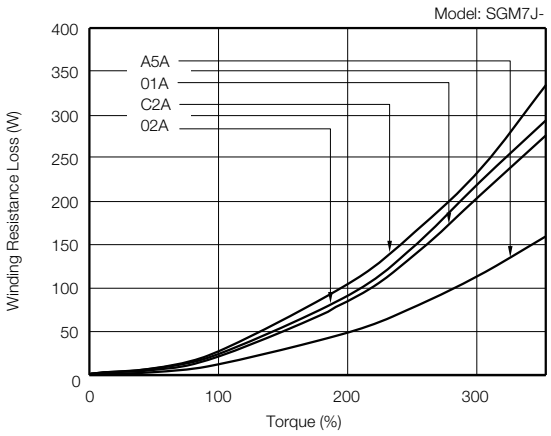
■ Σ-7W SERVOPACKs

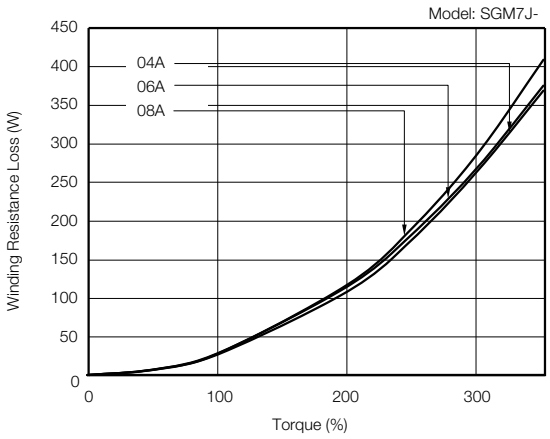


◆ Servomotor Winding Resistance Loss

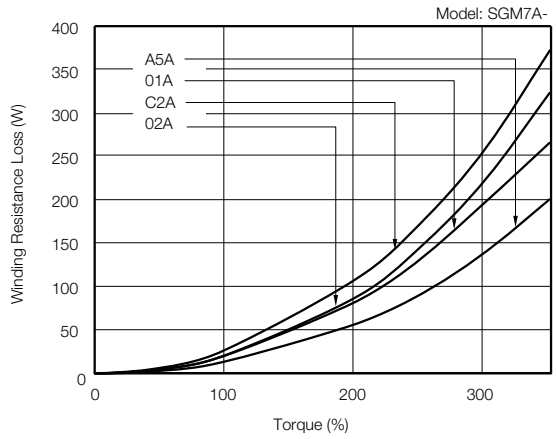
The following figures show the relationship for each Servomotor between the Servomotor's generated torque and the winding resistance loss.

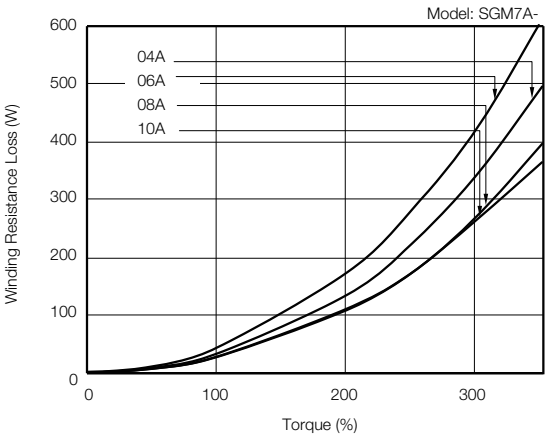
■ SGM7J Rotary Servomotors

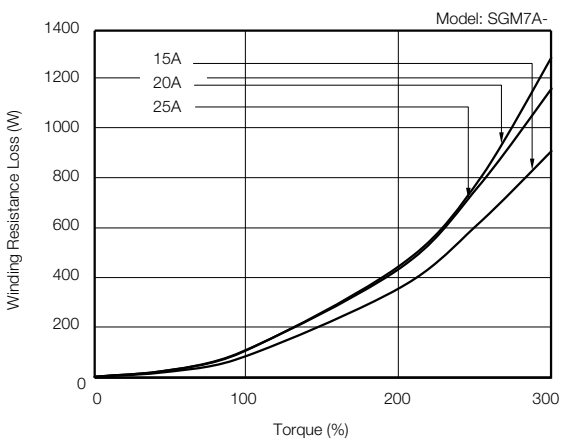


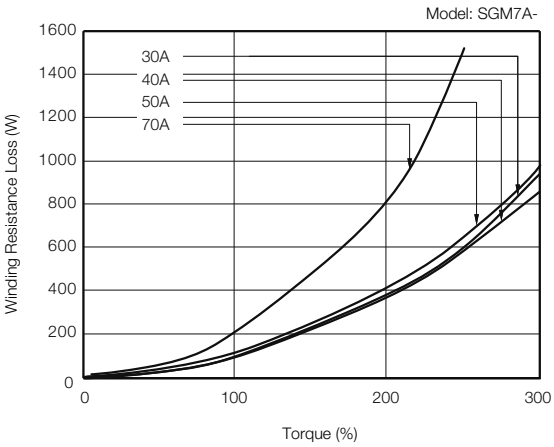


■ SGM7A Rotary Servomotors

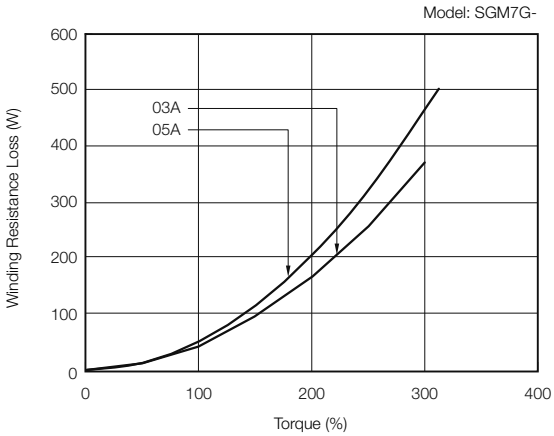


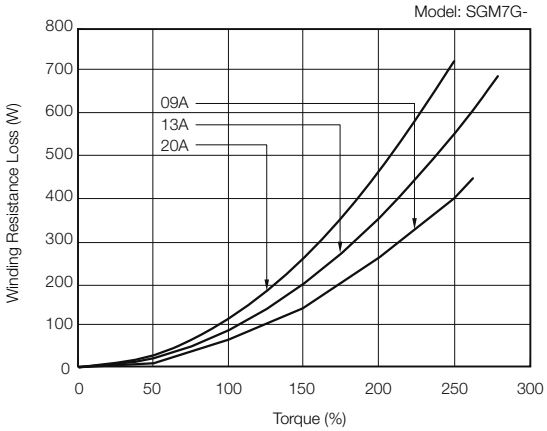


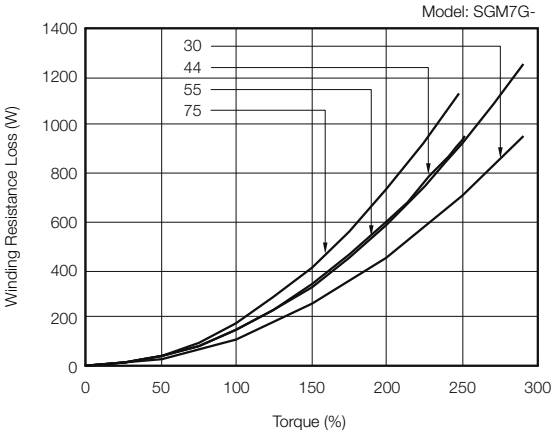


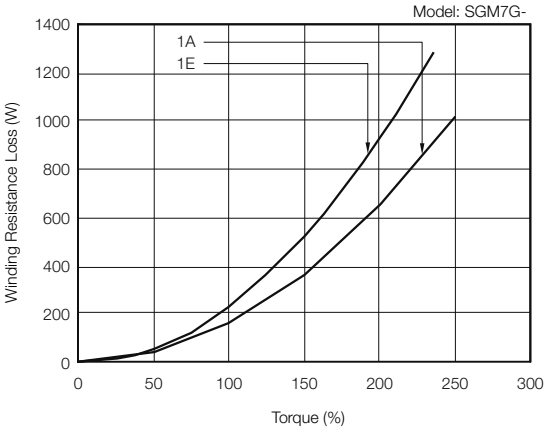


■ SGM7G Rotary Servomotors

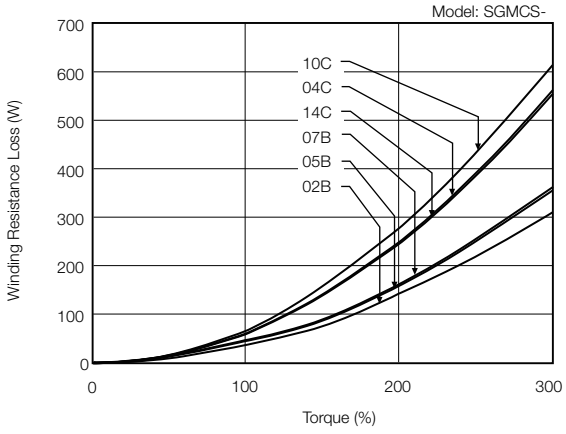


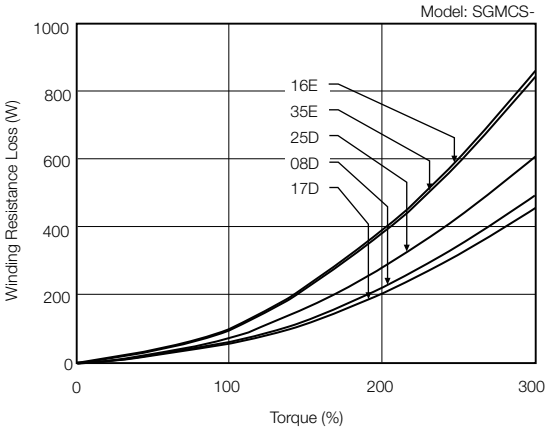


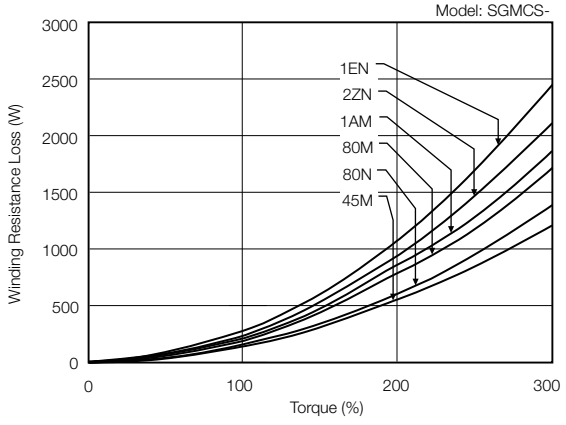




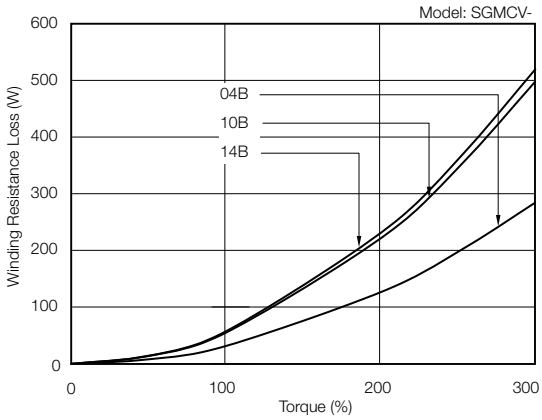
■ SGMCS Direct Drive Servomotors

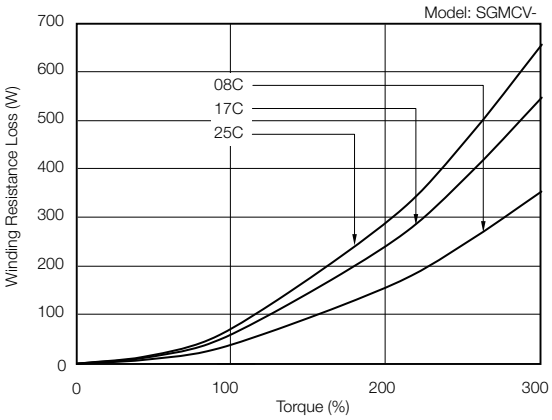




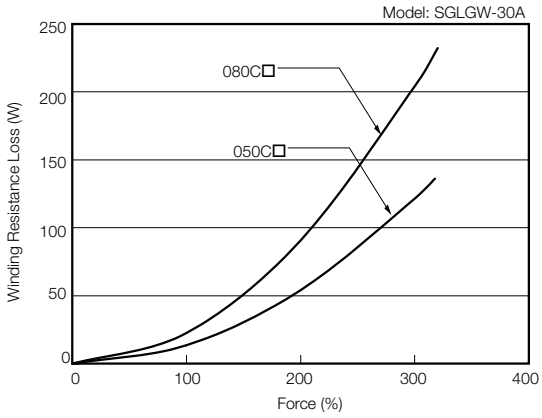


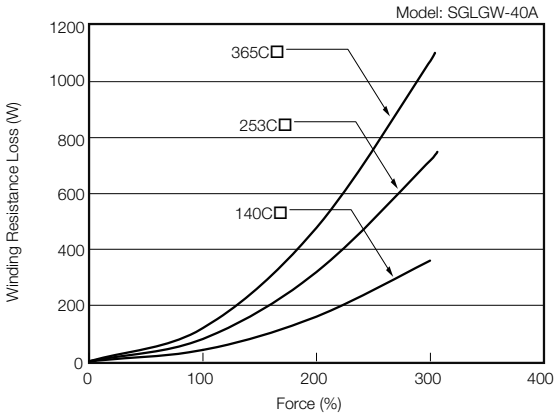
■ SGMCV Direct Drive Servomotors

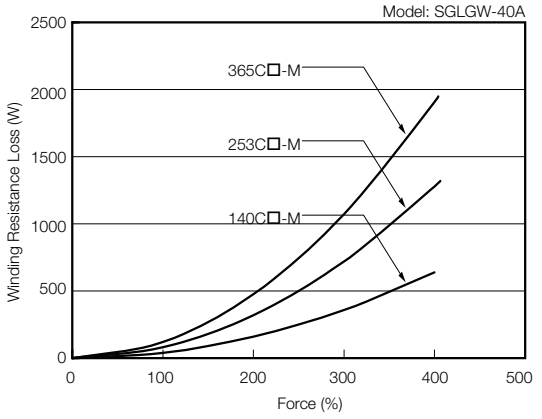


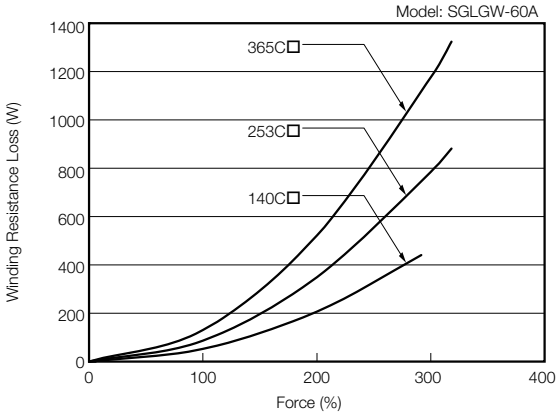


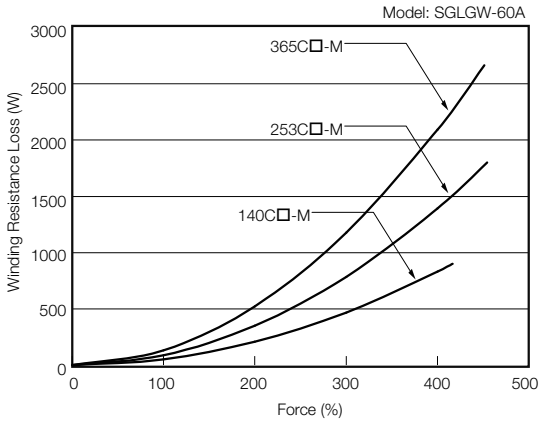
■ SGLGW Linear Servomotors

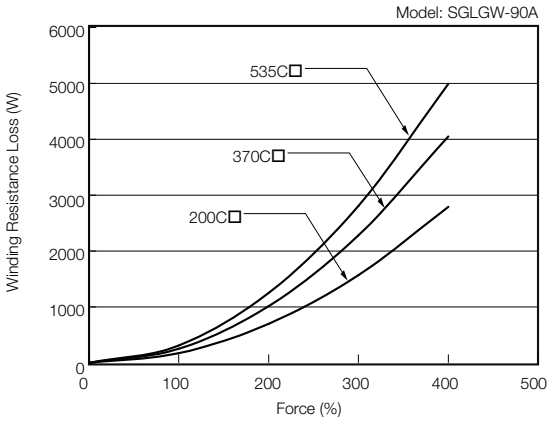




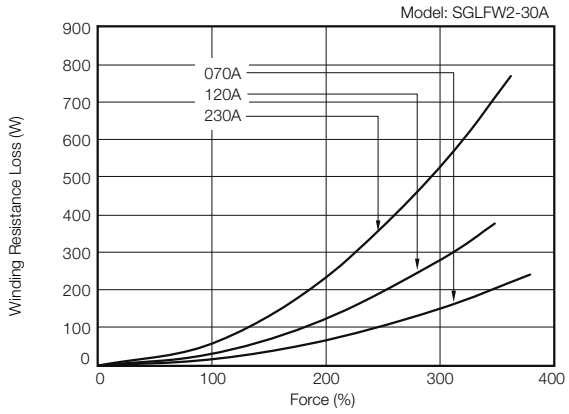


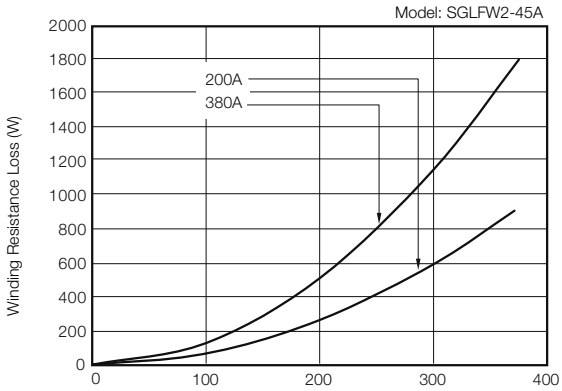


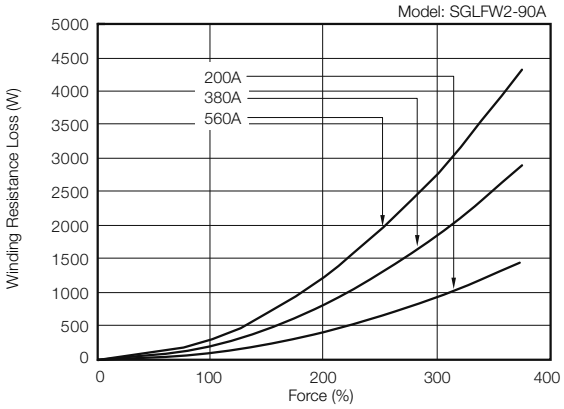


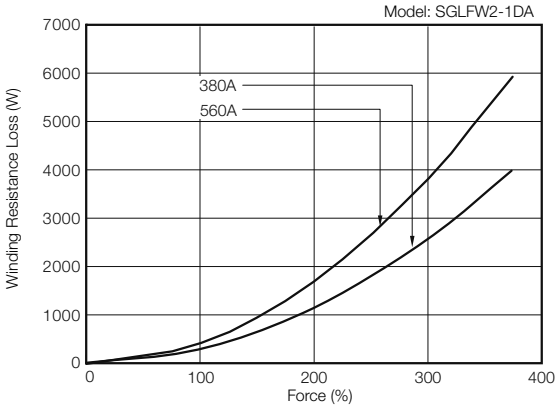


■ SGLFW2 Linear Servomotors

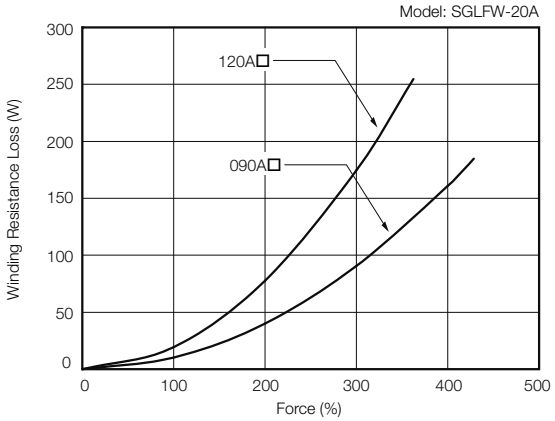


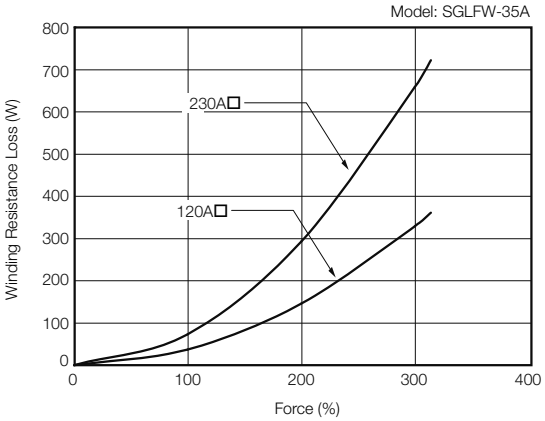


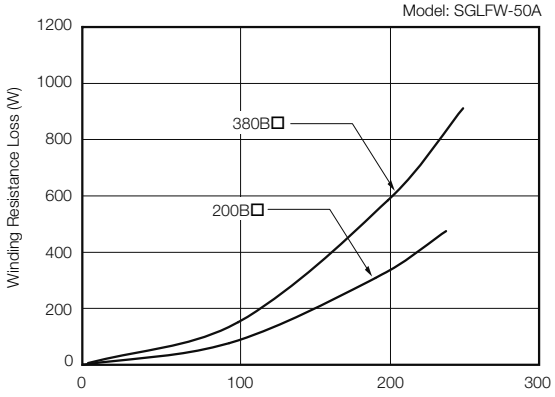


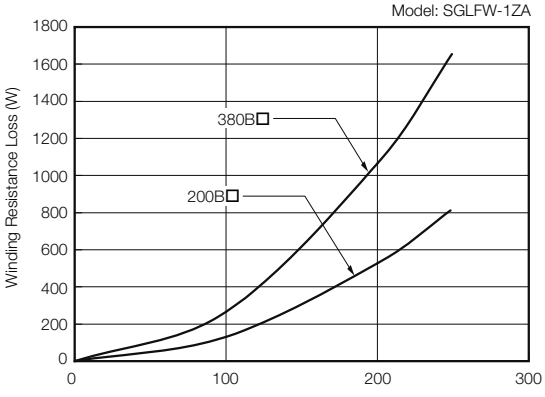


■ SGLFW Linear Servomotors

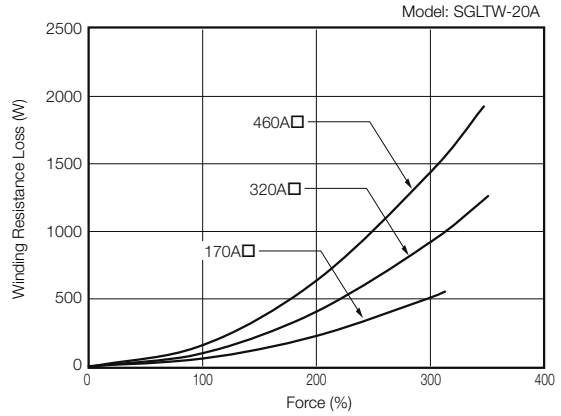


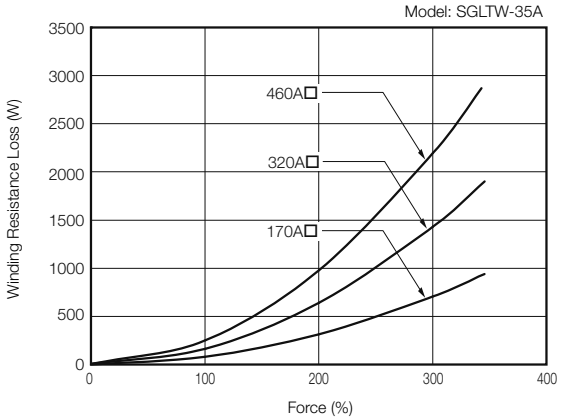


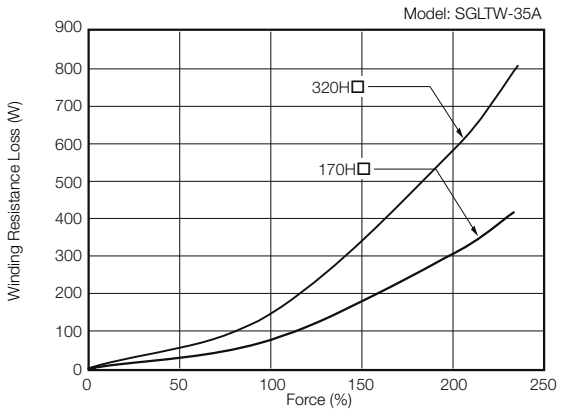


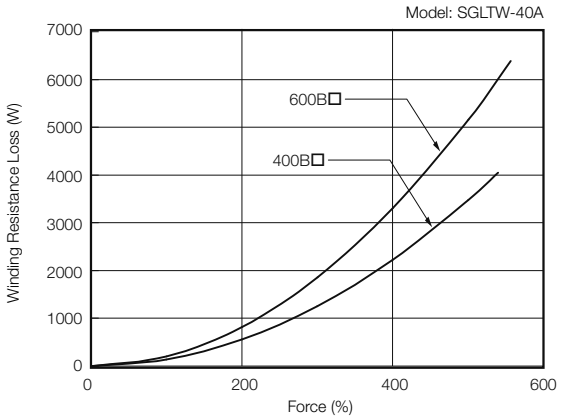


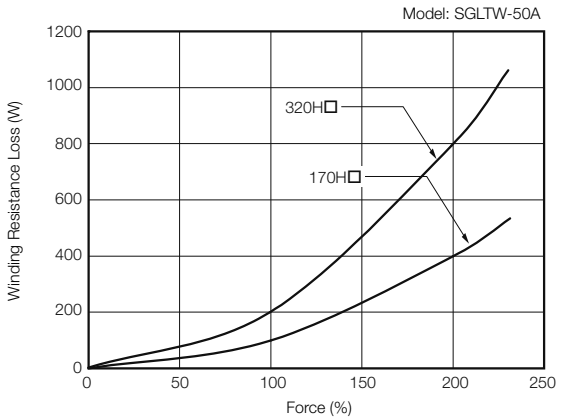
■ SGLTW Linear Servomotors

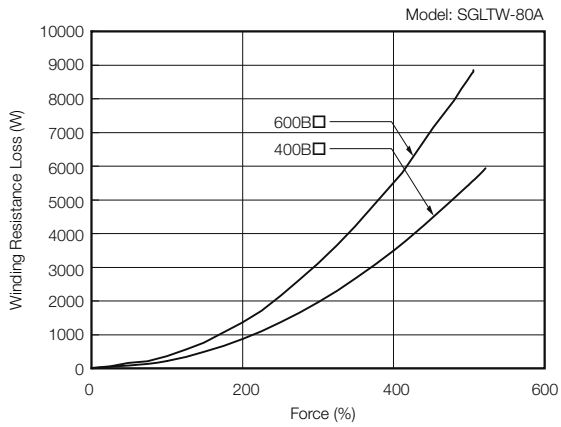












Appendix

● : Certified, – : Not Certified

Product		Model	UL/CSA Standards	CE Marking	KC Mark	RoHS Directive
			UL CERTIFIED	CE	KC	
SERVOPACKs		SGD7S	●	●	●	●
		SGD7W	●	●	●	●
Communications Options	INDEXER Module	SGDV-OCA03A*1	●	●	●	●
	DeviceNet Module	SGDV-OCA04A*1, OCA05A*1	●	●	●	●
Feedback Option	Fully-Closed Module	SGDV-OFA01A*1	●	●	●	●
Safety Option	Safety Module	SGDV-OSA01A*1	●	●	●	●

Product	Model	UL/CSA Standards	CE Marking	RoHS Directive
		c UL us	CE	
Rotary Servomotors	SGM7J	●	●	●
	SGM7A	●	●	●
	SGM7G	●	●	●
Direct Drive Servomotors	SGMCS	–	*3	●*2
	SGMCV	Scheduled for 2015	●	●
Linear Servomotors	SGLGW (SGLGM) *4	–	*5	●
	SGLFW (SGLFM)*4	–	*5	●
	SGLFW2 (SGLFM2)*4	Scheduled for 2015	Scheduled for 2015	●
	SGLTW (SGLTM)*4	–	*5	●

*1. Use this model number to purchase the Option Module separately.

*2. Estimates are provided for RoHS-compliant products. The model numbers have an “-E” suffix.

*3. CE Marking certification has not yet been received for SGMCS-□□M and SGMCS-□□N Direct Drive Servomotors.
CE Marking certification has been received for the following Direct Drive Servomotors: SGMCS-□□B, SGMCS-□□C, SGMCS-□□D, and SGMCS-□□E. Contact your Yaskawa representative if the CE Marking label is required.

*4. The model numbers of the Magnetic Ways of Linear Servomotors are given in parentheses.

*5. CE Marking certification has been received. Contact your Yaskawa representative if the CE Marking label is required.

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.

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for ongoing product modifications and improvements.
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