YASKAWA

AC SERVO DRIVES
Σ-7 SERIES

e-motional
solution

Certified for
ISO9001 and
ISO14001

JQA-0422 JQA-EM0202

MECHATROLINK

Σ-7 Series of AC Servo Drives

Everyone's preferred choice of Servo Drives

Since the release of the first Σ series of Servo Drives in 1984, Yaskawa Electric has consistently made innovations to existing technologies to find solutions for problems that users experience. Users have always sought high-speed, high-accuracy, and easy-to-use products, and this demand rises every year.
In 2013, the Σ series of Servo Drives evolved into the Σ-7 Servo Drives, which provides users with the ultimate experience in seven key areas and delivers the optimal solutions that only Yaskawa can offer. With the superlative performance and outstanding ease of use of the Σ-7 series, Yaskawa can offer solutions that will make the Σ-7 Servo Drives the preferred choice of customers at any point in the life cycle of their systems.

1 Ultimate system performance pages M-4 to M-7

Superlative performance with improved efficiency and speed

Attention: developers/engineers

See pages M-6 and M-7 for examples of the high performance of the Σ-7 series in "pick and place" applications. Contact Yaskawa for details on this and additional applications.

2 Ultimately ease to use page M-8

No tuning required with the Σ-7 series upgraded tuning-less function to achieve stable movement with no vibration.

Attention: developers/engineers, production, maintenance personnel

You can check the level of performance of actual operations with the use of demonstration units. Contact Yaskawa for a demonstration.

3 Ultimate environmental performance page M-9

Each product has improved specifications to meet even the most stringent environmental requirements. Servo Drives can now be used in different countries and regions, and under a variety of conditions.

Attention: developers/engineers, operators

Are there any operating environments that you have given up on? The Σ-7 servos have an increased ability to cope with temperature rises in systems, comply with the IP67 resistance to water immersion rating, and have greater global support (AC 240 V input and operable at an altitude of 2,000 meters*). Compact and energy saving systems can also be easily built with the Σ-7W two-axis SERVOPACKs.

* : At this altitude, the servo drives will operate at reduced ratings.

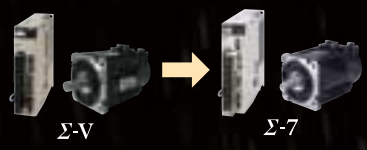
7 Ultimate compatibility

page M-13

Programs and parameters used with Σ-V SERVOPACKs are compatible with Σ-7 SERVOPACKs. The performance of your systems can be easily enhanced with a simple replacement.

Attention developers/engineers

There is no need to change your system design because the sizes of the Σ-V Servo Drives are the same as those of the Σ-7 series. The improved shape of the mounting screws makes them easier to secure. With the ensured compatibility of programs and parameters, it is easy to replace Σ-V Servo Drives with Σ-7 Servo Drives.



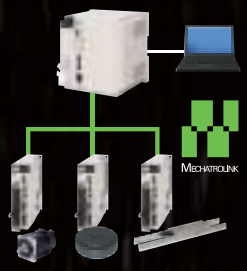
6 Ultimate lineup

page M-12

You can choose from a rich product lineup of the Σ-7 series as well as from the compatible products of Yaskawa's partner companies to easily build just the right system for your needs.

Attention developers/engineers

- Compatible products made by our partner companies are also available. You can prepare all the motion devices required for your system with our one-stop, all-in-one service.
- It is now possible to drive rotary, Linear, or Direct Drive Servomotors using the same SERVOPACK model in the Σ-7 series. This helps to reduce the number of Servo Drives that are put in storage.



5 Ultimate support

page M-11

Full support is available from selection to maintenance. Maintenance is easier because product information can be viewed by using a smartphone.

Attention developers/engineers maintenance personnel

Services that take full advantage of the latest technology, such as cloud storages, QR codes, and smartphones are readily available. They add another dimension of convenience and ease in terms of product information control and maintenance work. (Services are scheduled to start in April 2014.)

Note: QR code is a trademark of Denso Wave Incorporated.

4 Ultimate safety and security

page M-10

The Σ-7 Servo Drives satisfy the IEC 61508 safety integrity level 3 (SIL 3). Safety is also ensured with temperature sensors mounted in products. These Servo Drives can be used as system components with safety guaranteed.

Attention developers/engineers operators maintenance personnel

It is absolutely essential to ensure the safety of systems and protect against temperature increases. The Σ-7 Servo Drives are fully equipped with all the necessary safety measures, which reduces the amount of work required for system design and maintenance.

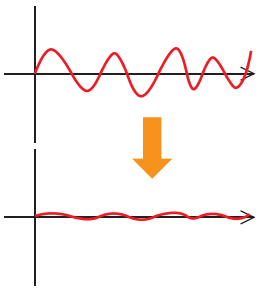
1 Ultimate system performance

The high-performance of Σ-7 SERVOPACKs translates into ultra-high-speed and ultra-high-accuracy control, which maximizes system performance.

Σ-7S Single-axis SERVOPACKs

★ 3.1 kHz response frequency
★ Optimized for specific applications:
New models in EX and FT series to be released
★ Improved vibration suppression

Ripple compensation



Σ-7 SERVOPACKs can reduce speed ripples caused by motor cogging, even for machines for which speed loop gains cannot be set high. This ensures smooth operation.

Enhanced vibration suppression function

- **Notch filter**
  Suppresses high-frequency vibrations of 500 Hz or higher.
  ⇒ Number of filters increased from 2 to 5.
- **Anti-resonance control adjustment**
  Suppresses vibrations at frequencies ranging from several hundred Hz to 1 kHz.
  ⇒ Vibrations can now be suppressed at two different frequencies (in comparison with one frequency in earlier models).
- **Vibration suppression**
  Suppresses vibrations at low frequencies (30 Hz and lower).
  ⇒ Vibrations can now be suppressed at two different frequencies (in comparison with one frequency in earlier models).

These functions can be adjusted automatically using the autotuning function.

Σ-7W 2-axis SERVOPACKs

★ 2-axis SERVOPACKs
(200 W x 2 axes to 1 kW x 2 axes)
★ 1.6 kHz response frequency
★ Improved vibration suppression

SERVOMOTOR

Model		
SGM7A	50W	7kW
SGM7J	50W	0.75kW
SGM7P	100W	1.5kW
SGM7G	300W	15kW

Σ-7 Servomotors

★ Compact dimensions
(approx. 80% smaller than our earlier models.)

★ High-resolution 24-bit encoder incorporated
(16,777,216 pulses/rev)

★ Maximum torque: 350%
(small capacity)

High-resolution, 24-bit encoder

Σ-7 Servomotors (50 W or greater) use encoders with a resolution that are 16 times higher than those used in Σ-V Servomotors.

Encoder resolution comparison

Σ-V series
20 bits =
1 million pulses/rev (approx.)

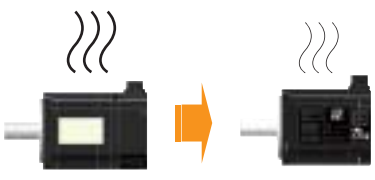
Σ-7 series
24 bits =
16 million pulses/rev (approx.)
16 times higher!

Solution for 50-W or greater models.

High efficiency and low heat generation

Σ-7 Servomotors use an optimized magnetic circuit that improves motor efficiency and reduces heat generation.
(comparison with typical models.)

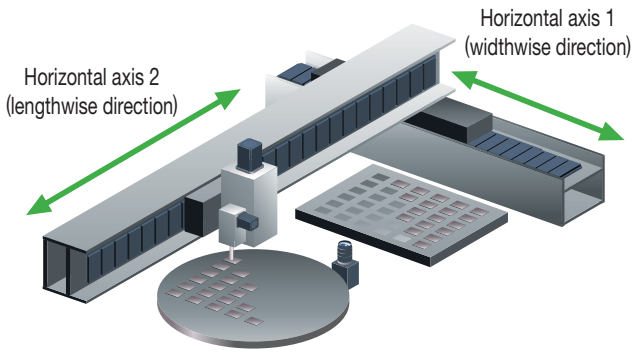
About 20% reduction in temperature increase!
(under the same conditions)



Σ-V series　　Σ-7 series

Example

Solving problems in “pick and place” applications



Issue How can we reduce takt times?

Issue How can we improve positioning accuracy?

Issue How can we suppress vibration created by speed acceleration?

Issue How can we achieve stable operation with or without workpieces?

“Pick and place” refers to the actions involved in picking up an object in one location and placing it in another location.

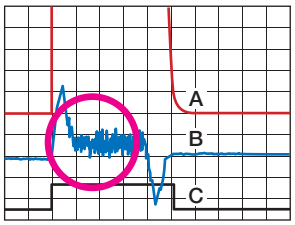
Issue 1 We need to reduce takt times.

Problem

Case 1

Vibration occurs after servo gain is increased.

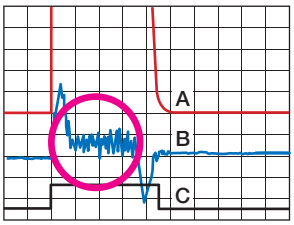
Without anti-resonance control adjustment



Case 2

Servo gain was successfully increased by first using the anti-resonance control adjustment, and then vibration occurred at a different frequency.

With anti-resonance control adjustment

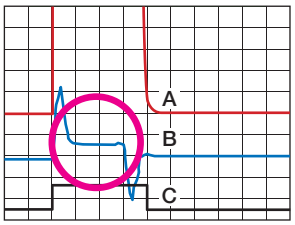


A Position deviation
B Torque reference
C Positioning Completion signal

Solution

Servo gain can be increased by using the enhanced anti-resonance control adjustment function.

With improved anti-resonance control adjustment

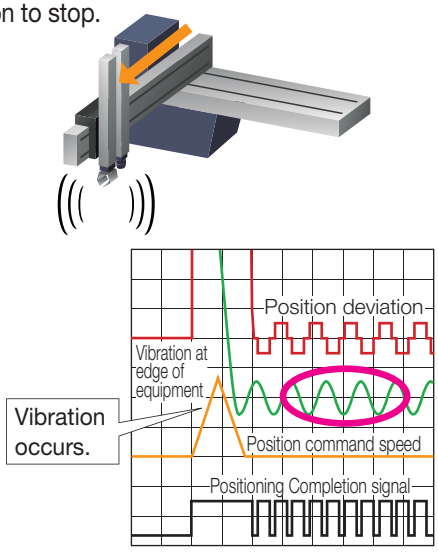


Reduces system takt times

Issue 2 We want to increase productivity by suppressing vibration of equipment.

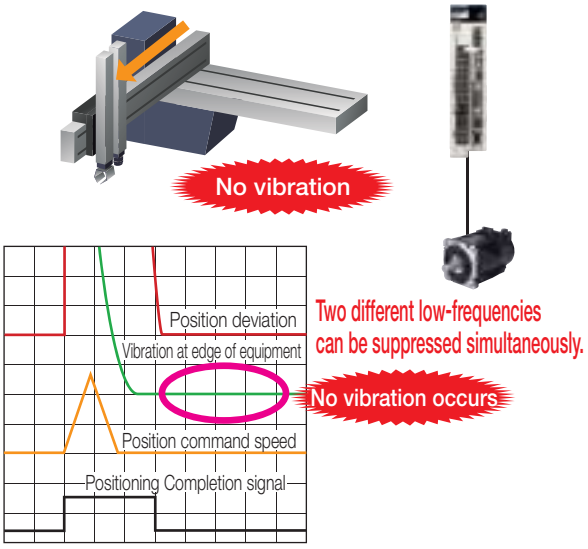
Problem

Vibration occurs at two different frequencies at the edges of equipment and it takes a while for the vibration to stop.



Solution

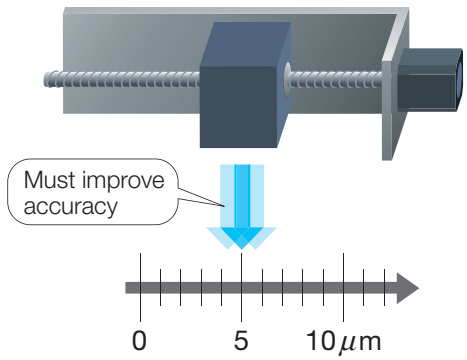
Vibration at two different low-frequencies is suppressed simultaneously with the automatic adjustment function.



Issue 2 We want to improve positioning accuracy to handle parts that are becoming increasingly smaller.

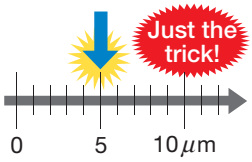
Problem

Positioning accuracy needs to be improved because parts that are handled are becoming increasingly smaller.



Solution

High-precision positioning becomes possible for precision workpieces by replacing the existing drive with the Σ-7 Servo Drive.



Vibration when stopped ±10nm level also possible

Note: This will depend on the installation conditions.

Σ-7S SERVOPACKs

Highest performance in the industry
- 3.1 kHz response frequency
- Improved vibration suppression

Σ-7 Servomotors

High-resolution encoders
24 bits = 16,777,216 pulses/rev

For 20 mm lead ball screws
1.2 nm resolution

2

Ultimately ease to use

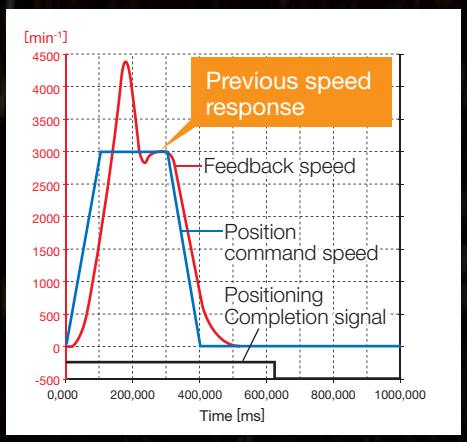
Yaskawa's original tuning-less function has undergone further development.
Stable operations can be achieved without having to adjust gains.

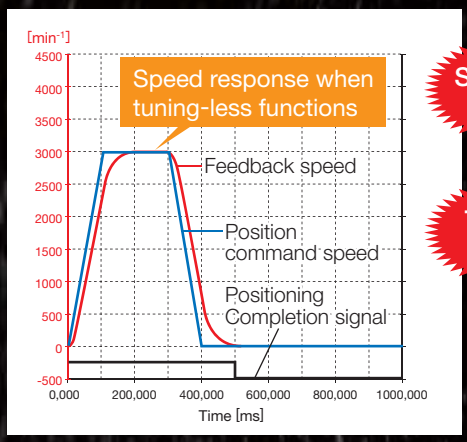
No need to adjust servo gains

With Yaskawa' s original tuning-less function, systems can run without vibration for a load with 30 times (max.) of load moment of inertia. Systems remain stable even with load changes during operation.

	Σ-V Series	Σ-7 Series
Allowable load moment of inertia ratio	30 times (max.)	30 times (max.)
Max. control gain	Speed loop gain 40 Hz (approx.)	Speed loop gain 70 Hz (approx.)

When the allowable load moment of inertia ratio is 30 times:

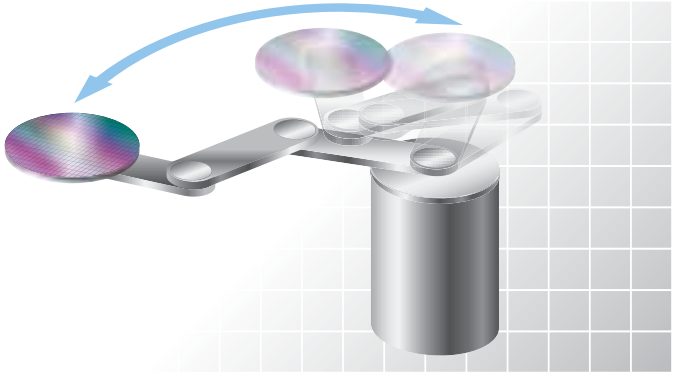




Solution Example Robot

The robot's arm maintains stable movements even when the moment of inertia changes due to changes in the robot's posture.

- **Improved response**
  Response is about twice as fast as before and requires no adjustment.
- **Improved stability**
  Stable operation is assured even in systems with load fluctuations.
- **No need for gain adjustments**
  High-level performance is assured although no tuning is required.



3 Ultimate environmental performance

The Σ-7 Servo Drives can be used in harsh environments and conserve energy.
Optimal systems can be easily set up in different countries and under a variety of conditions.

Satisfies specifications for use overseas and in harsh operating conditions

- 240 VAC supply voltage also supported
- High-altitude use increased to 2,000 meters above sea level*
- Maximum ambient temperature raised to 60°C*

* : Derating required.

Waterproof protective structure upgrade to IP67 rating

[SGM7A (IP22 for 7.0 kW), SGM7J and SGM7G models]

Protective Structure (IEC 144, 529, DIN40050, JEM1030)

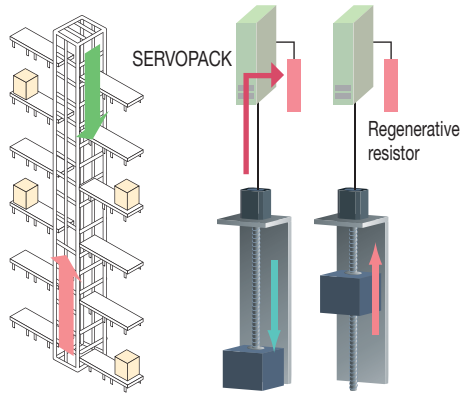
I P 67

◎ Rating for protection from water:
The units can be used even when they are immersed in water under specific conditions (immersed at a depth of 1 m below the surface of the water for 30 minutes).

◎ Rating for protection from contact and entry of solid foreign objects:
Safe dust-proof structure
Structure is completely protected from the entry of dust.

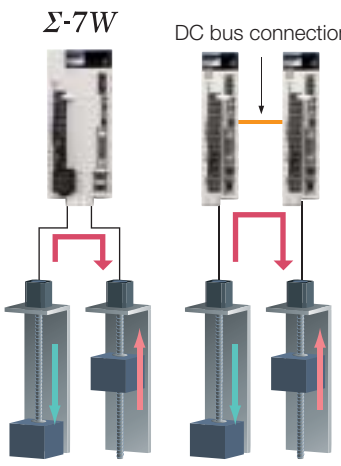
Solution Example Regenerative energy effectively used to help save energy

Issue



Regenerative power used to be converted to heat by using regenerative resistors. With global warming, CO_2 emissions must be cut by reducing power generation that produces CO_2, such as thermal power.

Solution



- By replacing the existing amplifiers with the Σ-7W 2-axis SERVOPACKs or using a DC bus connection, the regenerative energy of multiple axes can be used as the drive energy.
- This means that the energy inside the system can be utilized more effectively.
- Status of energy consumption in the system can be viewed on a display by using machine controllers.

Energy consumption monitoring display (image)

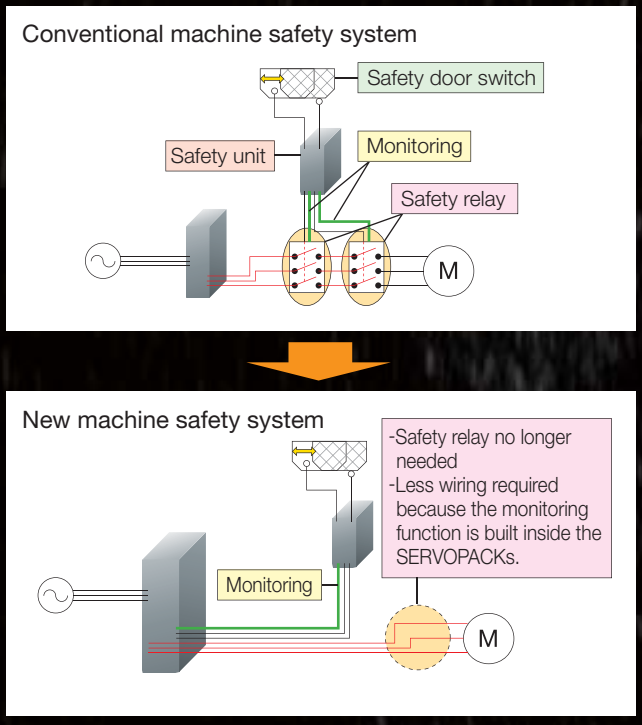
4 Ultimate safety and security

Systems can be operated safely because the Σ-7 Servo Drives comply with safety standards and safety is ensured by monitoring.

Satisfies requirements of the SIL 3 of the IEC 61508 functional safety standards* (first in Japan)

*: Certification scheduled for April 2014

Certification will make it easier to set up systems that conform to safety standards for press machines and other systems in Europe and other regions. Certification also helps reduce the number of hours required for wiring and of peripheral devices. Complies with Stop Category 0 (Safe Torque Off)



	Safety standards	Performance level & category
Safety of machinery	EN ISO13849-1	PLe (CAT3)
	IEC 60204-1	Stop Category 0
Functional safety	IEC 61508	SIL 3
	IEC 62061	SIL CL3
	IEC 61800-5-2	STO

- The safety function works even for a single problem.
- The safety function is enhanced with compliance with the EN ISO 13849-1 PLe (performance level e).

Note: Although the safety performance level of the Σ-V series Servo Drives is PLd (performance level d), the benefits described in the figure on the left apply.

Systems that need to satisfy the required performance level e (PLr e) can easily be configured.

Protect systems from high temperatures

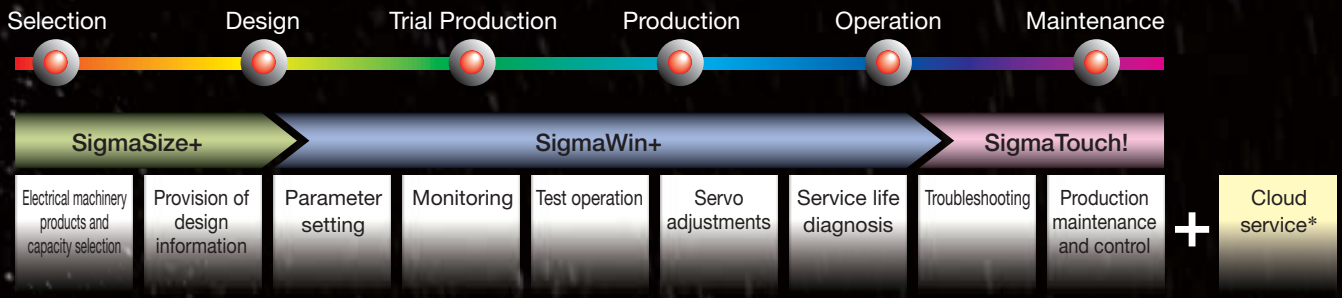
Σ-7 SERVOPACKs and Servomotors are equipped with temperature sensors that can directly monitor temperatures of machines and detect abnormalities to prevent failures. Real-time temperatures can be viewed on a display by using Machine Controllers.

Temperature monitoring display (image)

5 Ultimate support

Cloud-based storage of product data facilitates data retrieval when needed.

Maintenance throughout a product's service life is improved and simplified with SigmaTouch!*, Yaskawa's smartphone application.



Single or multiple orders possible after specifying parameters

Customers can now place single or multiple orders for SERVOPACKs in the Σ-7 series after specifying parameters at the factory shipment stage. No longer is it necessary to write the parameters at the system assembly site, which means that production lead times can be reduced.

Product management and maintenance service

Manufacturing information of each product can be easily viewed by using SigmaTouch!, Yaskawa's smartphone application. To view, simply hold your smartphone over the QR code of the product.

Improve troubleshooting

- If you have a smartphone, troubleshooting information can be accessed by reading a product's QR code.
- Automatic tracing is possible when a SERVOPACK alarm occurs. This allows you to detect and solve problems promptly.

Planned maintenance now available by monitoring the operational status

The service life of the maintenance can be estimated, and the users are notified when the parts should be replaced. System failure can be prevented because parts can be replaced before products break.

Features:
Simply access the MechatroCloud service* and hold your smartphone over the QR code of the product. You can access the product data stored in the MechatroCloud, and view the manual for that product.

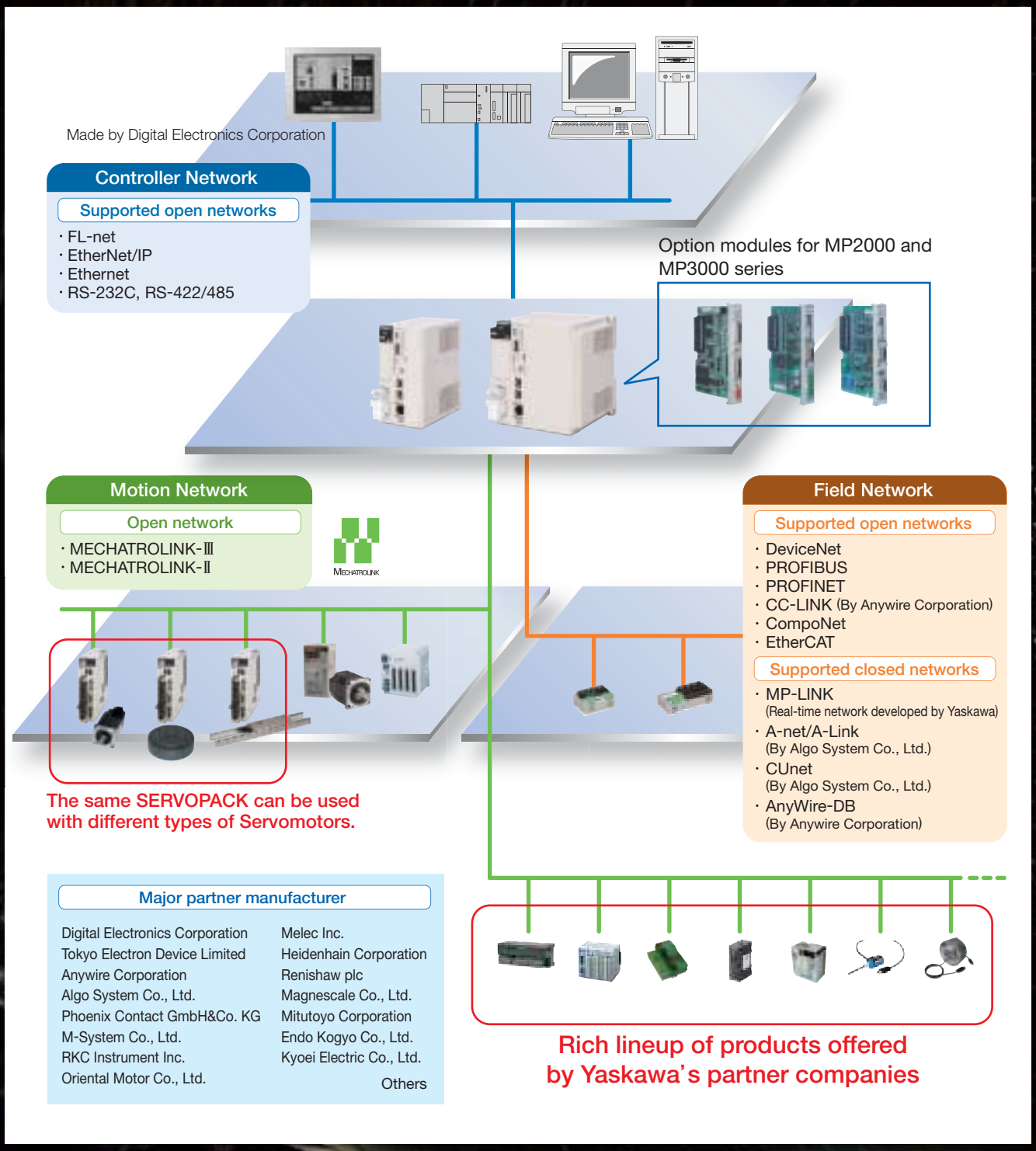
Note: MechatroCloud is a new colud service provided by the the Yaskawa Electric.

Display for total hours of use and remaining service life (image)

* Starts in spring 2014

6 Ultimate lineup

You can construct a system that exactly meets your requirements using communications networks and the rich lineup of products offered by Yaskawa's partner companies.



7 Ultimate compatibility

Compatibility with earlier series is assured. You can improve the performance of your system by replacing devices currently used with Σ-7 Servo Drives.

SERVOPACK

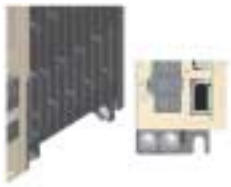
Installation interchangeability with the models in the Σ-V SERVOPOACK having the same capacity is featured for the SERVOPACKs.
The Σ-7 SERVOPACKs have improved shapes for mounting holes. With this new shape, it' s much easier to insert a screwdriver.

Mounting holes on Σ-V top

Mounting holes on Σ-7 top

Mounting holes on Σ-V bottom

Mounting holes on Σ-7 bottom



A parameter conversion mode is provided. The parameters of the Σ-V SERVOPACKs can be used with the Σ-7 SERVOPACKs, when using the SigmaWin+ parameter converter.

Servomotor

The Σ-7 SERVOPACKs are compatible with models of the same capacity in the Σ-V series SERVOPACKs.

Σ-V

200 W □60 mm

Σ-7

200 W □60 mm

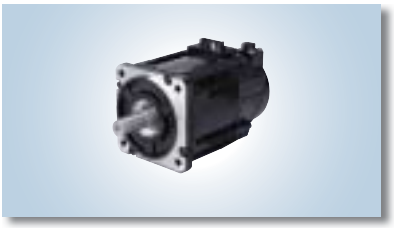
Product Lineup

Servomotors

◆ Rotary Servomotors*

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 Servomotors

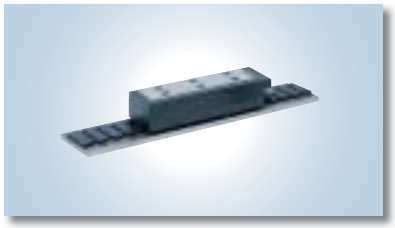
Small capacity, coreless (SGMCS)
2 N・m －35 N・m

Small capacity, with iron core (SGMCV)
4 N・m －25 N・m

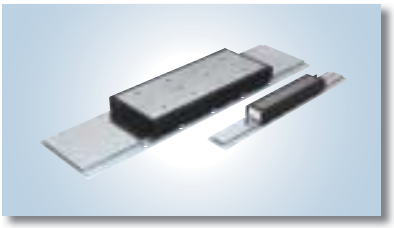
Medium capacity, with iron core (SGMCS)
45 N・m －200 N・m

◆ Linear Servomotors

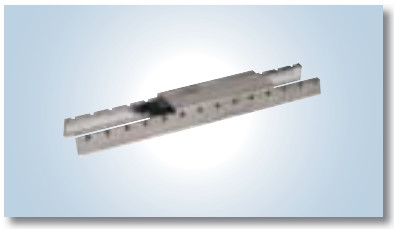
SGLG (Coreless model)
12.5 N－750 N



SGLFW (Model with F-type iron core)
25 N－1120 N



SGLFW2 (Model with F-type iron core)
45 N－1680 N



SGLT (Model with T-type iron core)
130 N－900 N

SGLC (Cylinder model)
17 N－180 N

∗: 3 kW and above to be released in spring 2014. SGM7P model (Medium capacity, flat type) is also available.

SERVOPACKs

◆ Analog voltage/pulse train reference

SGD7S-□□□A00A

◆ MECHATROLINK-Ⅱ communications reference

SGD7S-□□□A10A

◆ Single-axis MECHATROLINK-Ⅲ communications reference

SGD7S-□□□A20A

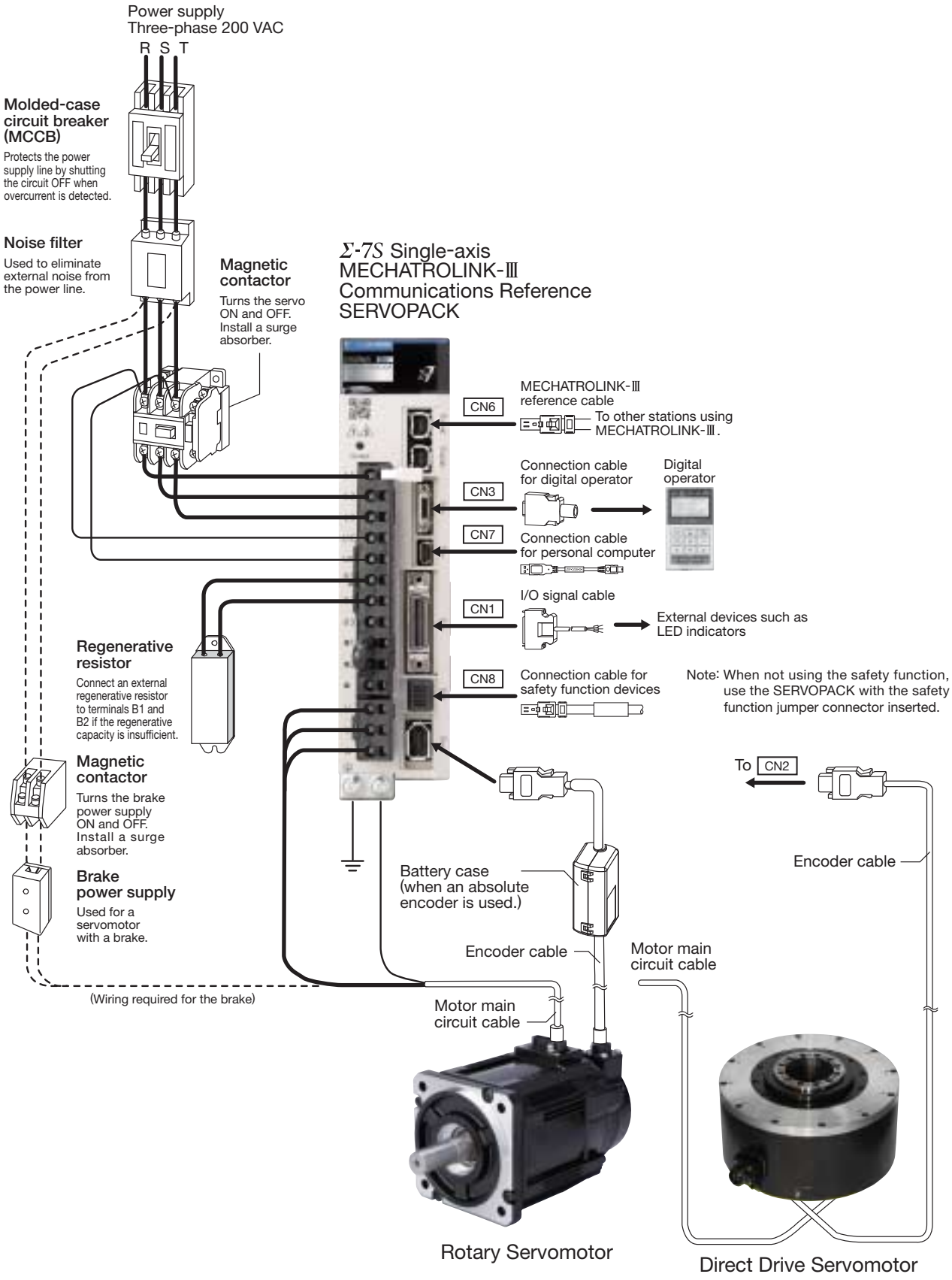
◆ Two-axis MECHATROLINK-Ⅲ communications reference

SGD7W-□□□A20A

System Configuration Example

Combination of Σ-7S SERVOPACK and Rotary Servomotor/Direct Drive Servomotor

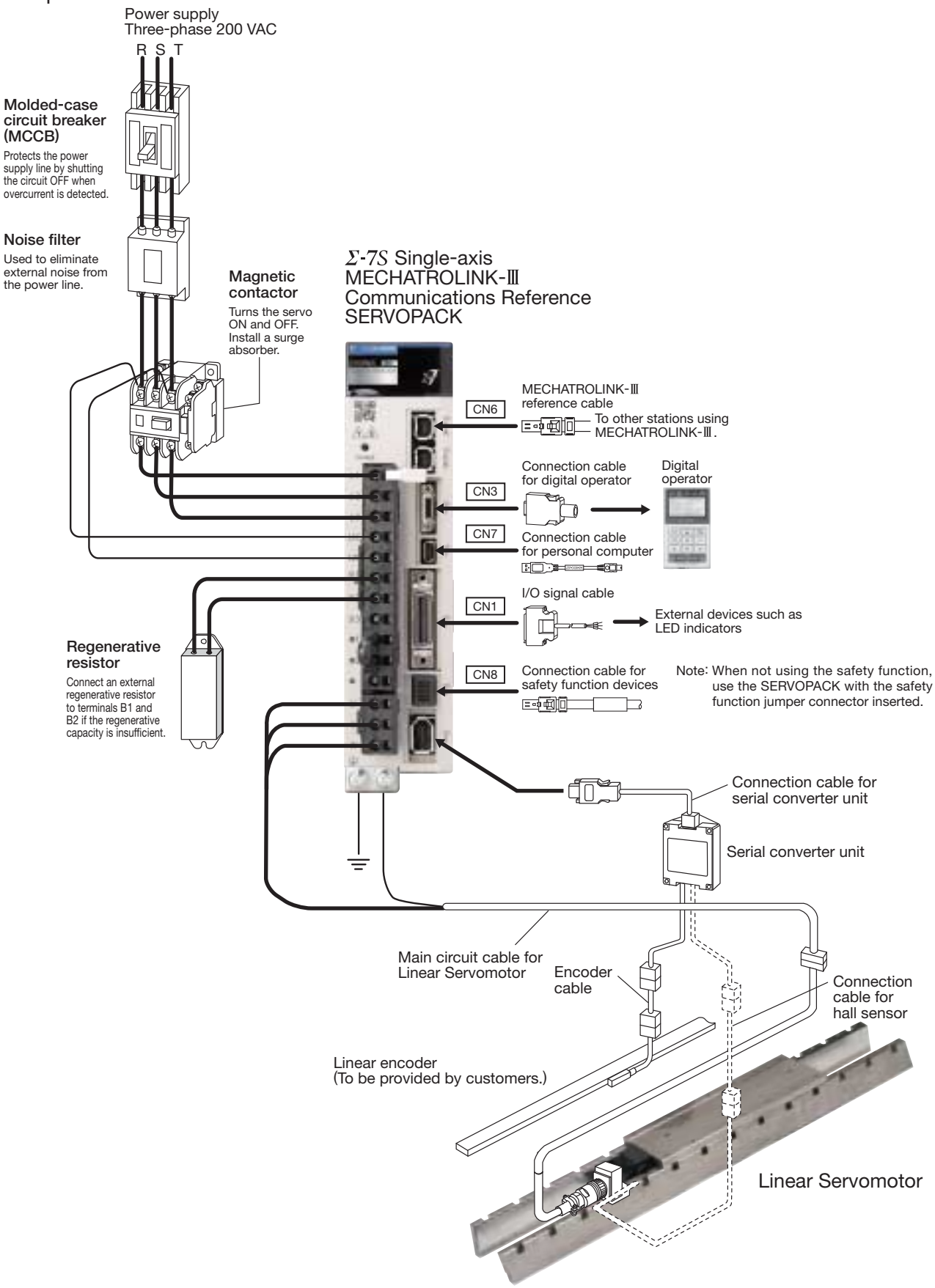
●For MECHATROLINK-Ⅲ Communications
Three-phase 200 VAC



System Configuration Example

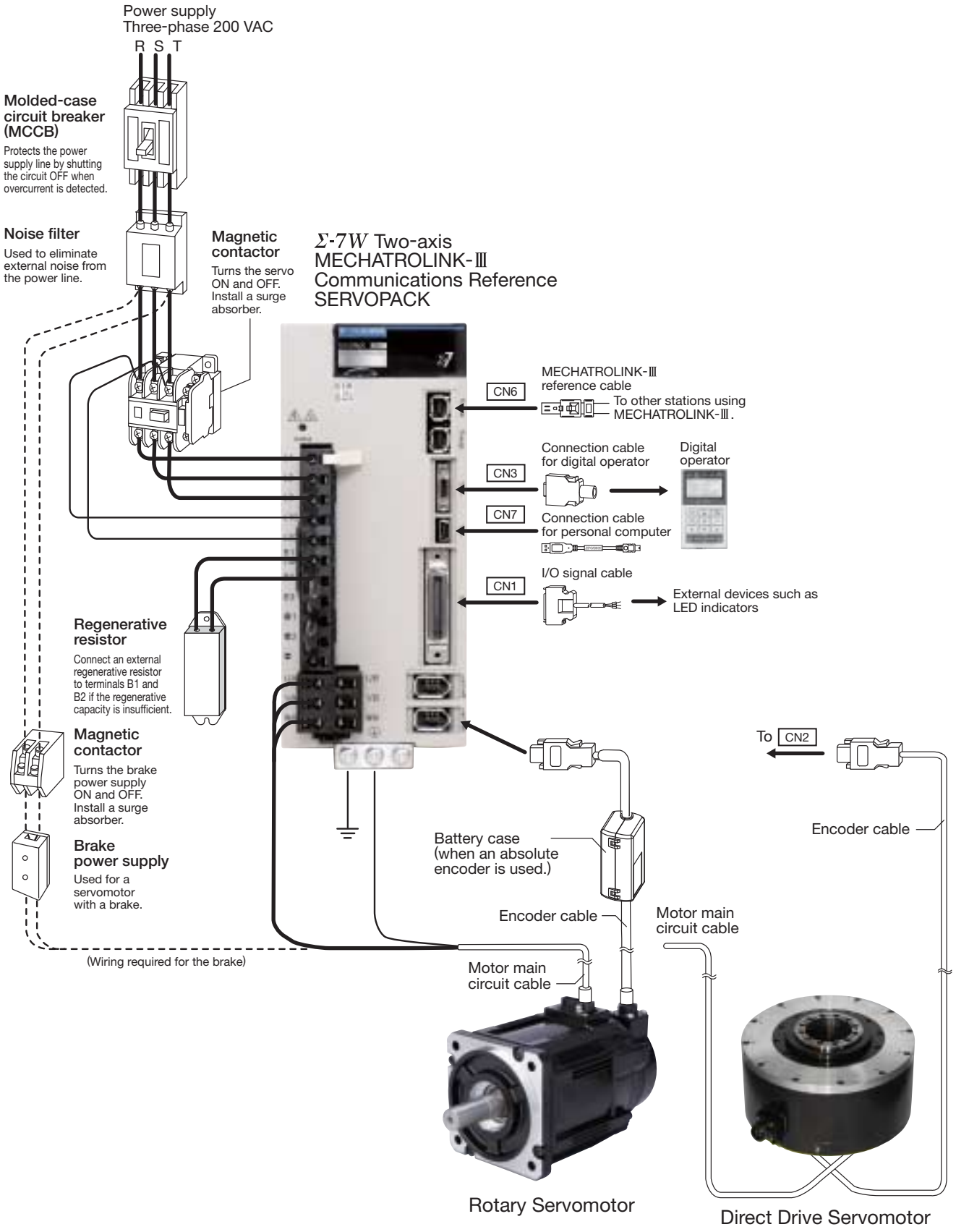
Combination of Σ-7S SERVOPACK and Linear Servomotor

●For MECHATROLINK-Ⅲ Communications
Three-phase 200 VAC



Combination of Σ-7W SERVOPAK and Rotary Servomotor/Direct Drive Servomotor

● For MECHATROLINK-Ⅲ Communications
Three-phase 200 VAC



●Combination of Rotary Servomotors and SERVOPACKs

Rotary Servomotor Model		Rated Output	SERVOPACK Model	
			SGD7S-□□□□	SGD7W-□□□□
SGM7A (Low inertia, high speed) 3000 min^{-1}	SGM7A-A5A	50 W	R70A	1R6A
	SGM7A-01A	100 W	R90A	1R6A
	SGM7A-C2A	150 W	1R6A	
	SGM7A-02A	200 W		
	SGM7A-04A	400 W	2R8A	
	SGM7A-06A	600 W	5R5A	
	SGM7A-08A	750 W		
	SGM7A-10A	1.0 kW	120A	–
	SGM7A-15A	1.5 kW		
	SGM7A-20A	2.0 kW	180A	
	SGM7A-25A	2.5 kW	200A	
	SGM7A-30A	3.0 kW		
SGM7J (Medium inertia, high speed) 3000 min^{-1}	SGM7J-A5A	50 W	R70A	1R6A
	SGM7J-01A	100 W	R90A	1R6A
	SGM7J-C2A	150 W	1R6A	
	SGM7J-02A	200 W	1R6A	
	SGM7J-04A	400 W	2R8A	
	SGM7J-06A	600 W	5R5A	
	SGM7J-08A	750 W		
SGM7G (Medium inertia, large torque) 1500 min^{-1}	SGM7G-03A	300 W	3R8A	5R5A
	SGM7G-05A	450 W		
	SGM7G-09A	850 W	7R6A	
	SGM7G-13A	1.3 kW	120A	–
	SGM7G-20A	1.8 kW	180A	

●Combination of Direct Drive Servomotors and SERVOPACKs

Direct Drive Servomotor Model		Rated Torque N · m	Instantaneous Peak Torque N · m	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 iron 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 iron 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
	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
	SGLGW-60A140C	85	360	1R6A	
	SGLGW-60A253C	170	720	3R8A	5R5A
	SGLGW-60A365C	255	1080	7R6A	
SGLF (Model with F-type iron core)	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	
	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	
	SGLFW2-1DA380A	1680	5040		
SGLT (Model with T-type iron core)	SGLTW-20A170A	130	380	3R8A	5R5A
	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	–
SGLC (Cylinder model)	SGLC-D16A085A	17	60	R70A	1R6A
	SGLC-D16A115A	25	90		
	SGLC-D16A145A	34	120	R90A	
	SGLC-D20A100A	30	150	1R6A	
	SGLC-D20A135A	45	225		
	SGLC-D20A170A	60	300	2R8A	
	SGLC-D25A125A	70	280	1R6A	
	SGLC-D25A170A	105	420	2R8A	
	SGLC-D25A215A	140	560	5R5A	
	SGLC-D32A165A	90	420	2R8A	
	SGLC-D32A225A	135	630	5R5A	
	SGLC-D32A285A	180	840		

✻ : Can be combined with two different SERVOPACKs. Rated force and peak force will differ depending on SERVOPACK combination.

Recommended Linear Encoders

◆Incremental Linear Encoder

✓: Possible –: Not possible

Output Signal	Manufacturer	Encoder Type	Model			Scale Pitch μm	Resolution nm	Maximum Speed*3 m/s	Hall Sensor Input	Linear Motor	Fully-closed Loop Control
			Scale	Sensor Head	Interpolator (serial converter unit)						
1Vp-p Analog Voltage*1	Heidenhain Corporation	Open Type	LIDA48□		(JZDP-D003/-D006)	20	78.1	5	✓	✓	✓
					(JZDP-G003/-G006)		4.9	2	✓	✓	–
			LIF48□		(JZDP-D003/-D006)	4	15.6	1	✓	✓	✓
					(JZDP-G003/-G006)		1.0	0.4	✓	*5	–
	Renishaw plc*4	Open Type	RGS20	RGH22B	(JZDP-D005/-D008)	20	78.1	5	✓	✓	✓
					(JZDP-G005/-G008)		4.9	2	✓	✓	–
Applicable for Yaskawa's Serial Interface*2	Magnescale Co., Ltd.	Open Type	SL7□0	PL101-RY		800	97.7	5	–	✓	✓
				PL101	MJ620-T13				✓	✓	–
		Sealed Type	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	Encoder Type	Model			Scale Pitch μm	Resolution nm	Maximum Speed*3 m/s	Hall Sensor Input	Linear Motor	Fully-closed Loop Control
			Scale	Sensor Head	Interpolator (serial converter unit)						
Applicable for Yaskawa's Serial Interface*2	Magnescale Co., Ltd.	Sealed Type	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	Open Type	ST781A		–	256	500	5	–	✓	✓
			ST782A		–	256	500	5	–	✓	✓
			ST783A		–	51.2	100	5	–	✓	✓
			ST784A		–	51.2	100	5	–	✓	✓
			ST788A		–	51.2	100	5	–	✓	✓
			ST789A*6		–	25.6	50	5	–	✓	✓
	Heidenhain Corporation	Open Type	LIC4100 series		EIB339IY	–	5	5	–	✓	✓

◆Absolute Rotary Encoder

Output Signal	Manufacturer	Encoder Type	Model			Scale Pitch μm	Resolution bit/rev	Maximum Speed*3 min^{-1}	Linear Motor	Fully-closed Loop Control
			Scale	Sensor Head	Interpolator (serial converter unit)					
Applicable for Yaskawa's Serial Interface	Magnescale Co., Ltd.	Sealed Type	RU77-4096ADF			–	20	2000	–	✓
			RU77-4096AFFT01			–	22	2000	–	✓

*1: The use of Yaskawa serial converter units is required. Output signals are divided into 256 (8-bits multiplier) or 4096 (12-bits multiplier) in the serial converter units.
*2: Each linear scale has a different multiplier (number of divisions). Before use, write the parameters of the linear servomotors into the linear scales.
*3: The maximum speed shown is for the linear scale when combined with a Yaskawa SERVOPACK.
Either the maximum speed of the linear servomotor or that of the linear scale in this table limits the maximum speed.
*4: If the zero-point signal is used with the Renishaw linear scale, the accuracy might be affected, and the zero point might be detected as being at a different position. If so, use BID and DIR signals to send the zero point in one direction.
*5: Contact your Yaskawa representative.
*6: For details, contact Mitutoyo Corporation.
Note: Before using the linear scales, contact the manufacturer of the scale for specifications including accuracy, dimensions, and recommended operating conditions.

Model Designations

●Rotary Servomotors

SGM7A

●Without Gears

SGM7A - 01 A 7 A 2 1

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

Σ-7 Series Servomotors: SGM7A

1st+2nd digits Rated Output

Code	Specification
A5	50 W
01	100 W
C2	150 W
02	200 W
04	400 W
06	600 W
08	750 W
10	1.0 kW
15	1.5 kW
20	2.0 kW
25	2.5 kW
30	3.0 kW

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

A

6th digit Shaft End

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

∗ Code B is not supported for models with a rated output of 1.5 kW or higher.

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

●With Gears

SGM7A - 01 A 7 A H 1 2 1

1st+2nd 3rd 4th 5th 6th 7th 8th 9th digit

Σ-7 Series Servomotors: SGM7A

1st+2nd digits Rated Output

Code	Specification
A5	50 W
01	100 W
C2	150 W
02	200 W
04	400 W
06	600 W
08	750 W
10	1.0 kW

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

A

6th digit Gear Type

Code	Specification
H	HDS planetary low-backlash gear

7th digit Gear Ratio

Code	Specification
B	1/11*1
C	1/21
1	1/5
2	1/9*2
7	1/33

∗1. This specification is not supported for models with a rated output of 50 W.
∗2. This specification is supported only for models with a rated output of 50 W.

8th digit Shaft End

Code	Specification
0	Flange output
2	Straight without key
6	Straight with key and tap

9th digit Options

Code	Specification
1	Without options
C	With holding brake (24 VDC)

SGM7J

●Without Gears

SGM7J - 01 A 7 A 2 1

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

Σ-7 Series Servomotors: SGM7J

1st+2nd digits 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

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

●With Gears

SGM7J - 01 A 7 A H 1 2 1

1st+2nd 3rd 4th 5th 6th 7th 8th 9th digit

Σ-7 Series Servomotors: SGM7J

1st+2nd digits 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

A

6th digit Gear Type

Code	Specification
H	HDS planetary low-backlash gear

7th digit Gear Ratio

Code	Specification
B	1/11*1
C	1/21
1	1/5
2	1/9*2
7	1/33

∗1. This specification is not supported for models with a rated output of 50 W.
∗2. This specification is supported only for models with a rated output of 50 W.

8th digit Shaft End

Code	Specification
0	Flange output
2	Straight without key
6	Straight with key and tap

9th digit Options

Code	Specification
1	Without options
C	With holding brake (24 VDC)

SGM7G

SGM7G - 03 A 7 A 2 1

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

Σ-7 Series Servomotors: SGM7G

1st+2nd digits Rated Output

Code	Specification
03	300 W
05	450 W
09	850 W
13	1.3 kW
20	1.8 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

A

6th digit Shaft End

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

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

Model Designations

●Direct Drive Servomotors

SGMCS

SGMCS - 02 B 3 C 1 1

Direct Drive Servomotors: SGMCS

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

1st+2nd digits Rated Output

• Small-capacity Series

Code	Specification	Code	Specification
02	2 N·m	14	14 N·m
04	4 N·m	16	16 N·m
05	5 N·m	17	17 N·m
07	7 N·m	25	25 N·m
08	8 N·m	35	35 N·m
10	10 N·m		

• Medium-capacity Series

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

3rd digit Servomotor Outer Diameter

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

4th digit Serial Encoder

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

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

✓: Applicable models.

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

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

SGMCV

SGMCV - 04 B E A 1 1

Direct Drive Servomotors: SGMCV

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

1st+2nd digits Rated Output

Code	Specification
04	4 N·m
08	8 N·m
10	10 N·m
14	14 N·m
17	17 N·m
25	25 N·m

3rd digit Servomotor Outer Diameter

Code	Specification
B	135-mm dia.
C	175-mm dia.

4th digit Serial Encoder

Code	Specification
E	20-bit single-turn data
I	22-bit multiturn data

5th digit Design Revision Order

A

6th digit Flange

Code	Specification
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

SGLGW - 30 A 050 C P □

Linear Σ Series Linear Servomotors

1st 2nd 3rd+4th 5th 6th+7th+8th 9th 10th 11th digit

1st digit Servomotor Type

Code	Specification
G	Coreless model

2nd digit Moving Coil/Magnetic Way

Code	Specification
W	Moving Coil

3rd+4th digits 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+7th+8th digits 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	Specification	Applicable Models
None	Connector from Tyco Electronics Japan G.K.	All models
D	Connector from Interconnectron GmbH	SGLGW-30A, -40A, -60A

• Magnetic Way

SGLGM - 30 108 A □

Linear Σ Series Linear Servomotors

1st 2nd 3rd+4th 5th+6th+7th 8th 9th digit

1st digit Servomotor Type

Code	Specification
G	Coreless model

2nd digit Moving Coil/Magnetic Way

Code	Specification
M	Magnetic Way

3rd+4th digits Magnet Height

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

5th+6th+7th digits Length of Magnetic Way

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

8th digit Design Revision Order

A, B, C*···

9th digit Options

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

* The SGLGM-40 and SGLGM-60 also have a CT code.
·C = Without mounting holes on the bottom
·CT = With mounting holes on the bottom

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

●Linear Servomotors

SGLFW (Models with F-type Iron Cores)

●Moving Coil

S G L F W - 20 A 090 A P □

Linear Σ Series Linear Servomotors

1st 2nd 3rd+4th 5th 6th+7th+8th 9th 10th 11th digit

1st digit Servomotor Type

Code	Specification
F	With F-type iron core

2nd digit Moving Coil/Magnetic Way

Code	Specification
W	Moving Coil

3rd+4th digits 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+7th+8th digits Length of Moving Coil

Code	Specification
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

S G L F M - 20 324 A □

Linear Σ Series Linear Servomotors

1st 2nd 3rd+4th 5th+6th+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 digits Magnet Height

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

5th+6th+7th digits 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···

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.

SGLFW2 (Models with F-type Iron Cores)

●Moving Coil

S G L F W2 - 30 A 070 A T □

Linear Σ Series Linear Servomotors

1st 2nd 3rd+4th 5th 6th+7th+8th 9th 10th 11th digit

1st digit Servomotor Type

Code	Specification
F	With F-type iron core

2nd digit Moving Coil/Magnetic Way

Code	Specification
W	Moving Coil

3rd+4th digits 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+7th+8th digits Length of Moving Coil

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

9th digit Design Revision Order
A

10th digit Sensor Specification

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

11th digit Cooling Method

Code	Specification
None	Self-cooled
L	Water-cooled*

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

●Magnetic Way

S G L F M2 - 30 270 A

Linear Σ Series Linear Servomotors

1st 2nd 3rd+4th 5th+6th+7th 8th 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 digits Magnet Height

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

5th+6th+7th digits Length of Magnetic Way

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

8th digit Design Revision Order
A

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

●Linear Servomotors (Con' d)

SGLT (Models with T-type Iron Cores)

●Moving Coil

S G L T W - 20 A 170 A P □

Linear Σ Series Linear Servomotors

1st 2nd 3rd+4th 5th 6th+7th+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 digits Magnet Height

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

5th digit Power Supply Voltage

Code	Specification
A	200 VAC

6th+7th+8th digits 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 Specification and Cooling Method

Code	Specifications		Applicable Models
	Polarity Sensor	Cooling Method	
None	None	Self-cooled	All models
C*	None	Water-cooled	SGLTW-40
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□□□□□ -50A□□□□□
	MS connector	SGLTW-40□□□□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.

●Magnetic Way

S G L T M - 20 324 A □

Linear Σ Series Linear Servomotors

1st 2nd 3rd+4th 5th+6th+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 digits Magnet Height

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

5th+6th+7th digits 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

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

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

SGLC (Cylinder Models)

● Combination of Moving Coil and Magnetic Way

S G L C - D16 A 085 A P - 750 A

Linear Σ Series Linear Servomotors

1st | 2nd+3rd+4th | 5th | 6th+7th+8th | 9th | 10th | 11th+12th+13th | 14th digit

Note: This code contains four digits if the length of the Magnetic Way is 1,000 or longer.

1st digit Servomotor Type

Code	Specification
C	Cylinder type

2nd+3rd+4th digits Outer Diameter of Magnetic Way*1

Code	Specification
D16	16 mm
D20	20 mm
D25	25 mm
D32	32 mm

5th digit Power Supply Voltage

Code	Specification
A	200 VAC

6th+7th+8th digits Length of Moving Coil*1

Code	Specification	External Dimension Code of Magnetic Way
085	85 mm	D16
100	100 mm	D20
115	115 mm	D16
125	125 mm	D25
135	135 mm	D20
145	145 mm	D16
165	165 mm	D32
170	170 mm	D20, D25
215	215 mm	D25
225	225 mm	D32
285	285 mm	D32

9th digit Design Revision Order of Moving Coil

A, B···

10th digit Sensor Specification

Code	Specification
P	With polarity sensor

11th+12th+13th digits Length of Magnetic Way*1

Code	Specification	Special Orders*2
300	300 mm	240 mm to 420 mm (in 30-mm increments)
350	350 mm	280 mm to 490 mm (in 35-mm increments)
450	450 mm	360 mm to 630 mm (in 45-mm increments)
510	510 mm	480 mm to 750 mm (in 30-mm increments)
590	590 mm	555 mm to 870 mm (in 35-mm increments)
600	600 mm	480 mm to 840 mm (in 60-mm increments)
750	750 mm	For Magnetic Way with outer diameter of 16 mm: 480 mm to 750 mm (in 30-mm increments)
		For Magnetic Way with outer diameter of 25 mm: 705 mm to 1,110 mm (in 45-mm increments)
870	870 mm	555 mm to 870 mm (in 35-mm increments)
1020	1020 mm	960 mm to 1,500 mm (in 60-mm increments)
1110	1110 mm	705 mm to 1,110 mm (in 45-mm increments)
1500	1500 mm	960 mm to 1,500 mm (in 60-mm increments)

14th digit Design Revision Order of Magnetic Way

A, B···

*1. There are restrictions in the allowable combinations. Refer to List of Models (page 178) for details.
*2. Contact your Yaskawa representative when you make a special order.

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

S G L C W - D16 A 085 A P

Linear Σ Series Linear Servomotors

1st | 2nd | 3rd+4th+5th | 6th | 7th+8th+9th | 10th | 11th digit

1st digit Servomotor Type

Code	Specification
C	Cylinder type

2nd digit Moving Coil/Magnetic Way

Code	Specification
W	Moving Coil

3rd+4th+5th digits Outer Diameter of Magnetic Way

(Same as above combinations.)

6th digit Power Supply Voltage

(Same as above combinations.)

7th+8th+9th digits Length of Moving Coil

(Same as above combinations.)

10th digit Design Revision Order

A, B···

11th digit Sensor Specification

(Same as above combinations.)

● Magnetic Way

S G L C M - D16 750 A

Linear Σ Series Linear Servomotors

1st | 2nd | 3rd+4th+5th | 6th+7th+8th | 9th digit

1st digit Servomotor Type

Code	Specification
C	Cylinder type

2nd digit Moving Coil/Magnetic Way

Code	Specification
M	Magnetic Way

3rd+4th+5th digits Outer Diameter of Magnetic Way

(Same as above combinations.)

6th+7th+8th digits Length of Magnetic Way

(Same as above combinations.)

9th digit Design Revision Order

A, B···

Note: 1. Order the Moving Coil and Magnetic Way as a set. Contact your Yaskawa representative before purchasing a Moving Coil and Magnetic Way separately.
2. This information is provided to explain model numbers. It is not meant to imply that models are available for all combinations of codes.

Model Designations

●SERVOPACKs

Σ-7S Model

SGD7S - R70 A 00 A 001

1st+2nd+3rd 4th 5th+6th 7th 8th+9th+10th digit

Σ-7 Series SERVOPACKs: Σ-7S Models

1st+2nd+3rd digits Maximum Applicable Motor Capacity

Voltage	Code	Specification
Three-phase, 200 V	R70	0.05 kW
	R90	0.1 kW
	1R6	0.2 kW
	2R8	0.4 kW
	3R8	0.5 kW
	5R5	0.75 kW
	7R6	1.0 kW
	120	1.5 kW
	180	2.0 kW
	200	3.0 kW

4th digit Voltage

Code	Specification
A	200 VAC

5th+6th digits Interface*

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

7th digit Design Revision Order

A

8th+9th+10th digits Hardware Options Specification

Code	Specification	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.

Σ-7W Model

SGD7W - 1R6 A 20 A 001

1st+2nd+3rd 4th 5th+6th 7th 8th+9th+10th digit

Σ-7 Series SERVOPACKs: Σ-7W Models

1st+2nd+3rd digits Maximum Applicable Motor Capacity per Axis

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

4th digit Voltage

Code	Specification
A	200 VAC

5th+6th digits Interface*

Code	Specification
20	MECHATROLINK-Ⅲ communication reference

7th digit Design Revision Order

A

8th+9th+10th digits Hardware Options Specification

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

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

CONTENTS

Rotary Servomotors

Model Designations

Without Gears

SGM7A - 01 A 7 A 2 1

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

1st+2nd digits Rated Output

Code	Specification
A5	50 W
01	100 W
C2	150 W
02	200 W
04	400 W
06	600 W
08	750 W
10	1.0 kW
15	1.5 kW
20	2.0 kW
25	2.5 kW
30	3.0 kW

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

A

6th digit Shaft End

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

* Code B is not supported for models with a rated output of 1.5 kW or higher.

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

With Gears

SGM7A - 01 A 7 A H 1 2 1

Σ-7 Series Servomotors: SGM7A	1st+2nd digits	3rd digit	4th digit	5th digit	6th digit	7th digit	8th digit	9th digit

1st+2nd digits Rated Output

Code	Specification
A5	50 W
01	100 W
C2	150 W
02	200 W
04	400 W
06	600 W
08	750 W
10	1.0 kW

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

A

6th digit Gear Type

Code	Specification
H	HDS planetary low-backlash gear

7th digit Gear Ratio

Code	Specification
B	1/11*1
C	1/21
1	1/5
2	1/9*2
7	1/33

*1. This specification is not supported for models with a rated output of 50 W.

*2. This specification is supported only for models with a rated output of 50 W.

8th digit Shaft End

Code	Specification
0	Flange output
2	Straight without key
6	Straight with key and tap

9th digit Options

Code	Specification
1	Without options
C	With holding brake (24 VDC)

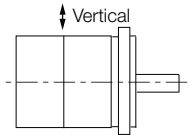
Ratings and Specifications

Specifications

Voltage		200 V
Model SGM7A-		A5A to 30A
Time Rating		Continuous
Thermal Class		Models A5A to 10A: B, Models 15A to 30A: F
Insulation Resistance		500 VDC, 10 MΩ min.
Withstand Voltage		1,500 VAC for 1 minute
Excitation		Permanent magnet
Mounting		Flange-mounted
Drive Method		Direct drive
Rotation Direction		Counterclockwise (CCW) for forward reference when viewed from the load side
Vibration Class*1		V15
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/s^2
	Number of Impacts	2 times
Vibration Resistance*3	Vibration Acceleration Rate at Flange	49 m/s^2 (Models 15A to 30A: 24.5 m/s^2 front to back)
Applicable SERVOPACKs		Refer to the following section. ☞ *Σ-7 Series Combination* (page M-18)

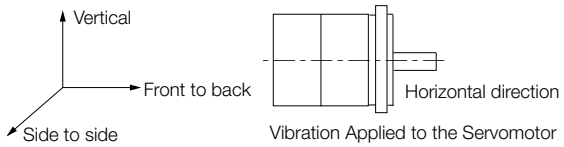
*1. A vibration class of V15 indicates a vibration amplitude of 15 μm maximum on the Servomotor without a load at the rated motor speed.

*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 ambient temperature will exceed 40°C, refer to the following section.
☞ *Applications Where the Ambient Temperature of the Servomotor Exceeds 40 °C* (page 15)

*5. If the altitude will exceed 1,000 m, refer to the following section.
☞ *Applications Where the Altitude of the Servomotor Exceeds 1,000 m* (page 15)

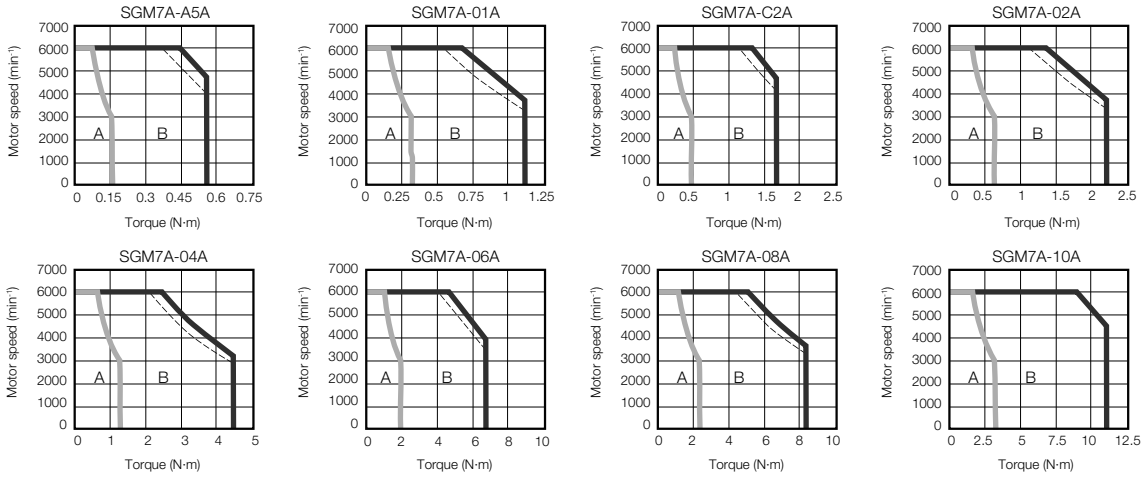
Ratings of Servomotors without Gears

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]		N·m	0.159	0.318	0.477	0.637	1.27	1.91	2.39	3.18
Instantaneous Maximum Torque[*1]		N·m	0.557	1.11	1.67	2.23	4.46	6.69	8.36	11.1
Rated Current[*1]		Arms	0.57	0.89	1.5	1.5	2.4	4.5	4.4	6.4
Instantaneous Maximum Current[*1]		Arms	2.1	3.2	5.6	5.9	9.3	16.9	16.8	23.2
Rated Motor Speed[*1]		min^{-1}	3000							
Maximum Motor Speed[*1]		min^{-1}	6000							
Torque Constant		N·m/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^2	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		mm	200 × 200 × 6		250 × 250 × 6					300 x 300 x 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	N·m	0.159	0.318	0.477	0.637	1.27	1.91	2.39	3.18
	Coil Resistance	Ω (at 20°C)	104.8±10%			96±10%		88.6±10%		
	Rated Current	A (at 20°C)	0.23			0.25		0.27		
	Time Required to Release Brake	ms	60					80		
	Time Required to Brake	ms	100							
Allowable Load Moment of Inertia (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 Loads[*5]	LF	mm	20			25			35	
	Allowable Radial Load	N	78			245			392	
	Allowable Thrust Load	N	54			74			147	

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

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



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 as the voltage drop increases.

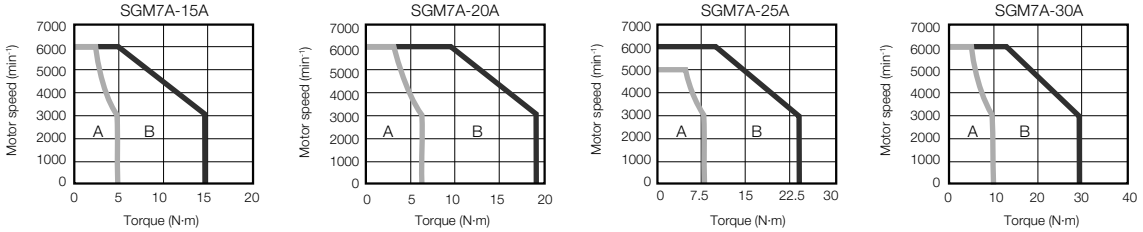
Servomotor Ratings

Voltage			200 V			
Model SGM7A-			15A	20A	25A	30A
Rated Output*6		kW	1.5	2.0	2.5	3.0
Rated Torque*2, *6		N·m	4.90	6.36	7.96	9.80
Instantaneous Maximum Torque*6		N·m	14.7	19.1	23.9	29.4
Rated Current*6		Arms	9.3	12.1	15.6	17.9
Instantaneous Maximum Current*6		Arms	28	42	51	56
Rated Motor Speed*6		min^{-1}	3000			
Maximum Motor Speed*6		min^{-1}	6000			
Torque Constant		N·m/Arms	0.590	0.561	0.538	0.582
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)
Rated Power Rate*6		kW/s	120 (106)	164 (148)	199 (184)	137 (104)
Rated Angular Acceleration Rate*6		rad/s^2	24500 (21700)	25700 (23300)	24900 (23100)	14000 (10600)
Heat Sink Size		mm	300 × 300 × 12			400 × 400 × 20
Protective Structure*3			Totally enclosed, self-cooled, IP67			
Holding Brake Specifications*4	Rated Voltage	V	24 VDC $^{+10\%}_{0}$			
	Capacity	W	12			10
	Holding Torque	N·m	7.84		10	20
	Coil Resistance	Ω (at 20°C)	48			59
	Rated Current	A (at 20°C)	0.5			0.41
	Time Required to Release Brake	ms	170			100
	Time Required to Brake	ms	80	100	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 Loads*5	LF	mm	45			63
	Allowable Radial Load	N	686			980
	Allowable Thrust Load	N	196			392

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

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

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. 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 as the voltage drop increases.

■ Notes for *Ratings of Servomotor without Gears* and *Servomotor Ratings*

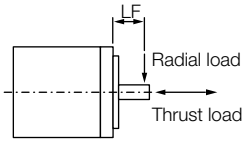
*1. These values are for operation in combination with a SERVOPACK when the temperature of the armature winding is 100°C. The values for other items are at 20°C. These are typical values.

*2. The rated torques are the continuous allowable torque values at 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.

Ratings of Servomotors with Gears

All Models	Gear Mechanism	Protective Structure	Lost Motion [arc-min]
	Planetary gear mechanism	Totally enclosed, self-cooled, IP55 (except for shaft opening)	3 max.

Servomotor Model SGM7A-	Servomotor					Gear Output				
	Rated Output [W]	Rated Motor Speed [min^{-1}]	Maximum Motor Speed [min^{-1}]	Rated Torque [N·m]	Instantaneous Maximum Torque [N·m]	Gear Ratio	Rated Torque/ Efficiency*1 [N·m/%]	Instantaneous Maximum Torque [N·m]	Rated Motor Speed [min^{-1}]	Maximum Motor Speed [min^{-1}]
A5A□AH1□	50	3000	6000	0.159	0.557	1/5	0.433/64*2	2.37	600	1200
A5A□AH2□						1/9	1.12/78	3.78*3	333	667
A5A□AHC□						1/21	2.84/85	10.6	143	286
A5A□AH7□						1/33	3.68/70	15.8	91	182
01A□AH1□	100	3000	6000	0.318	1.11	1/5	1.06/78*2	4.96	600	1200
01A□AHB□						1/11	2.52/72	10.7	273	545
01A□AHC□						1/21	5.35/80	20.8	143	286
01A□AH7□						1/33	7.35/70	32.7	91	182
C2A□AH1□	150	3000	6000	0.477	1.67	1/5	1.68/83*2	7.80	600	1200
C2A□AHB□						1/11	3.53/79*2	16.9	273	545
C2A□AHC□						1/21	6.30/70*2	31.0	143	286
C2A□AH7□						1/33	11.2/79*2	49.7	91	182
02A□AH1□	200	3000	6000	0.637	2.23	1/5	2.39/75	9.80	600	1200
02A□AHB□						1/11	5.74/82	22.1	273	545
02A□AHC□						1/21	10.2/76	42.1	143	286
02A□AH7□						1/33	17.0/81	67.6	91	182
04A□AH1□	400	3000	6000	1.27	4.46	1/5	5.35/84	20.1	600	1200
04A□AHB□						1/11	11.5/82	45.1	273	545
04A□AHC□						1/21	23.0/86	87.0	143	286
04A□AH7□						1/33	34.0/81	135	91	182
06A□AH1□	600	3000	6000	1.91	6.69	1/5	7.54/79	30.5	600	1200
06A□AHB□						1/11	18.1/86	68.6	273	545
06A□AHC□						1/21	32.1/80	129	143	286
06A□AH7□						1/33	53.6/85	206	91	182
08A□AH1□	750	3000	6000	2.39	8.36	1/5	10.0/84	38.4	600	1200
08A□AHB□						1/11	23.1/88	86.4	273	545
08A□AHC□						1/21	42.1/84	163	143	286
08A□AH7□						1/33	69.3/88	259	91	182
10A□AH1□	1000	3000	6000	3.18	11.1	1/5	13.7/86	52.5	600	1200
10A□AHB□						1/11	29.1/83	111	273	545
10A□AHC□						1/21	58.2/87	215	143	286
10A□AH7□						1/33	94.5/90	296*3	91	182

*1. The gear output torque is expressed by the following formula.

$$\text{Gear output torque} = \text{Servomotor output torque} \times \frac{1}{\text{Gear ratio}} \times \text{Efficiency}$$

The gear efficiency depends on operating conditions such as the output torque, motor speed, and temperature. The values in the table are typical values for the rated torque, rated motor speed, and a surrounding air temperature of 25°C. They are reference values only.

*2. When using an SGM7A-A5A, SGM7A-01A, or SGM7A-C2A Servomotor with a gear ratio of 1/5 or an SGM7A-C2A Servomotor with a gear ratio of 1/11, maintain an 85% maximum effective load ratio. For an SGM7A-C2A Servomotor with a gear ratio of 1/21 or 1/33, maintain a 90% maximum effective load ratio. The values in the table take the effective load ratio into consideration.

*3. The instantaneous maximum torque is 300% of the rated torque.

Note: 1. The gears that are mounted to Yaskawa Servomotors have not been broken in.
Break in the Servomotor if necessary. First, operate the Servomotor at low speed with no load. If no problems occur, gradually increase the speed and load.

2. The no-load torque for a Servomotor with a Gear is high immediately after the Servomotor starts, and it then decreases and becomes stable after a few minutes. This is a common phenomenon caused by grease circulation in the gears and it does not indicate faulty gears.

3. Contact your Yaskawa representative about Servomotors with Gears with a rated output of 1.5 kW or higher.

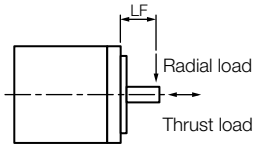
4. Other specifications are the same as those for Servomotors without Gears.

Important

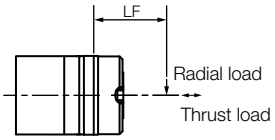
The SERVOPACK speed control range is 5,000:1. If you use Servomotors at extremely low speeds (0.02 min^{-1} or lower at the gear output shaft), if you use Servomotors with a one-pulse feed reference for extended periods, or under some other operating conditions, the gear bearing lubrication may be insufficient. That may cause deterioration of the bearing or increase the load ratio. Contact your Yaskawa representative if you use a Servomotor under these conditions.

Servomotor Model SGM7A-	Moment of Inertia [$\times 10^{-4}$ kg·m^2]				With Gears			Reference Diagram
	Shaft Output		Flange Output		Allowable Radial Load [N]	Allowable Thrust Load [N]	LF [mm]	
	Motor* + Gear	Gear	Motor* + Gear	Gear				
A5A□AH1□	0.0277	0.006	0.0267	0.005	95	431	37	
A5A□AH2□	0.0247	0.003	0.0247	0.003	113	514	37	
A5A□AHC□	0.0257	0.004	0.0257	0.004	146	663	37	
A5A□AH7□	0.0667	0.045	0.0667	0.045	267	1246	53	
01A□AH1□	0.0397	0.006	0.0387	0.005	95	431	37	
01A□AHB□	0.0937	0.060	0.0927	0.059	192	895	53	
01A□AHC□	0.0837	0.050	0.0837	0.050	233	1087	53	
01A□AH7□	0.0987	0.065	0.0977	0.064	605	2581	75	
C2A□AH1□	0.0518	0.006	0.0508	0.005	95	431	37	
C2A□AHB□	0.106	0.060	0.105	0.059	192	895	53	
C2A□AHC□	0.156	0.110	0.154	0.108	528	2254	75	
C2A□AH7□	0.111	0.065	0.110	0.064	605	2581	75	
02A□AH1□	0.346	0.207	0.340	0.201	152	707	53	
02A□AHB□	0.332	0.193	0.331	0.192	192	895	53	
02A□AHC□	0.629	0.490	0.627	0.488	528	2254	75	
02A□AH7□	0.589	0.450	0.588	0.449	605	2581	75	
04A□AH1□	0.423	0.207	0.417	0.201	152	707	53	
04A□AHB□	0.786	0.570	0.776	0.560	435	1856	75	
04A□AHC□	0.706	0.490	0.704	0.488	528	2254	75	
04A□AH7□	0.836	0.620	0.826	0.610	951	4992	128	
06A□AH1□	1.02	0.700	0.975	0.660	343	1465	75	
06A□AHB□	0.885	0.570	0.875	0.560	435	1856	75	
06A□AHC□	1.16	0.840	1.14	0.820	830	4359	128	
06A□AH7□	0.935	0.620	0.925	0.610	951	4992	128	
08A□AH1□	1.48	0.700	1.44	0.660	343	1465	75	
08A□AHB□	1.38	0.600	1.37	0.590	435	1856	75	
08A□AHC□	3.78	3.00	3.76	2.98	830	4359	128	
08A□AH7□	3.58	2.80	3.57	2.79	951	4992	128	
10A□AH1□	1.67	0.700	1.63	0.660	343	1465	75	
10A□AHB□	4.37	3.40	4.31	3.34	684	3590	128	
10A□AHC□	3.97	3.00	3.95	2.98	830	4359	128	
10A□AH7□	3.77	2.80	3.76	2.79	951	4992	128	

Shaft Output



Flange Output



* The moment of inertia for the Servomotor and gear is the value without a holding brake. You can calculate the moment of inertia for a Servomotor with a Gear and Holding Brake with the following formula.
Motor moment of inertia for a Servomotor with a Holding Brake from *Ratings of Servomotors without Gears* on page 6 + Moment of inertia for the gear from the above table.

Important

During operation, the gear generates the loss at the gear mechanism and oil seal. The loss depends on the torque and motor speed conditions. The temperature rise depends on the loss and heat dissipation conditions. For the heat dissipation conditions, always refer to the following table and check the gear and motor temperatures with the actual equipment. If the temperature is too high, implement the following measures.

- Decrease the load ratio.
- Change the heat dissipation conditions.
- Use forced-air cooling for the motor with a cooling fan or other means.

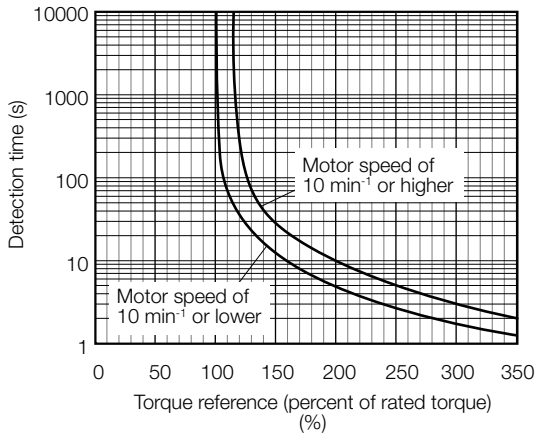
Model	Heat Sink Size			
	1/5	1/9 or 1/11	1/21	1/33
SGM7A-A5	A			
SGM7A-01	B			
SGM7A-C2				
SGM7A-02				
SGM7A-04	C			
SGM7A-06				
SGM7A-08				
SGM7A-10A				

- A: 250 mm × 250 mm × 6 mm, aluminum plate
- B: 300 mm × 300 mm × 12 mm, aluminum plate
- C: 350 mm × 350 mm × 12 mm, aluminum plate

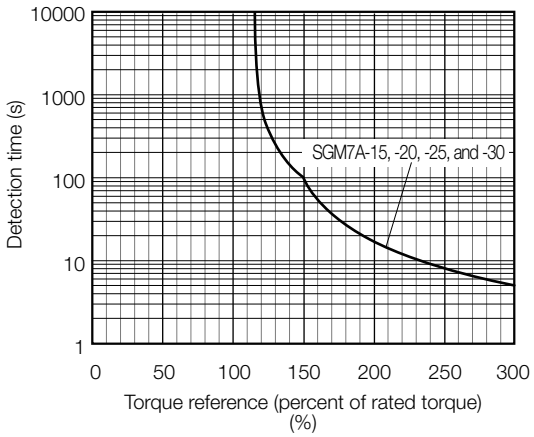
Servomotor Overload Protection Characteristics

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

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



SGM7A-15, -20, -25, and -30



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 7 or in *Torque-Motor Speed Characteristics for Three-phase, 200 V* on page 9.

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.

The allowable size of the load moment of inertia (J_L) for the Servomotor is restricted. Refer to *Ratings of Servomotors without Gears* on page 6 or to *Servomotor Ratings* on page 8. This value is provided strictly as a guideline and results depend on Servomotor driving conditions.

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

- Reduce the torque limit.
- Reduce the deceleration rate.
- Reduce the maximum motor speed.
- Install an external regenerative resistor if the alarm cannot be cleared using the above steps.

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.

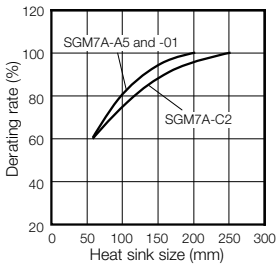
Servomotor Heat Dissipation Conditions

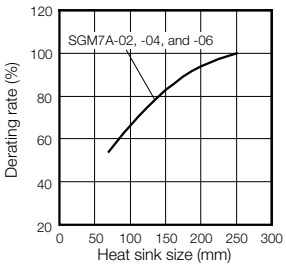
The Servomotor ratings are the continuous allowable values at an ambient temperature of 40°C when a heat sink is installed on the Servomotor. If the Servomotor is mounted on a small device component, the Servomotor temperature may rise considerably because the surface for heat dissipation becomes smaller.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

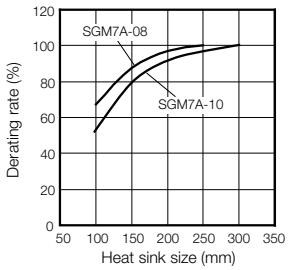
Note: The derating rates are applicable only when the average motor speed is less than or equal to the rated motor speed. If the average motor speed exceeds the rated motor speed, consult with your Yaskawa representative.

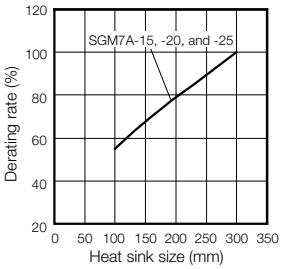
Important

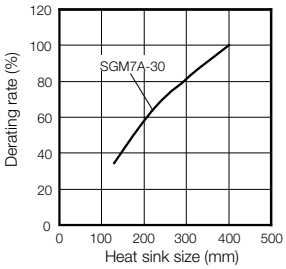
The actual temperature rise depends on how the heat sink (i.e., the Servomotor mounting section) is attached to the installation surface, what material is used for the Servomotor mounting section, and the motor speed. Always check the Servomotor temperature with the actual equipment.







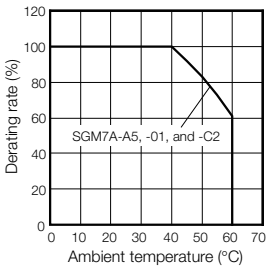


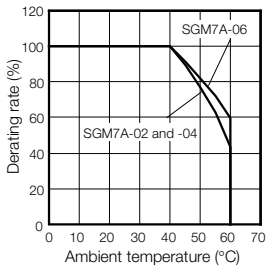


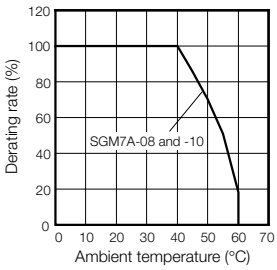
Applications Where the Ambient Temperature of the Servomotor Exceeds 40°C

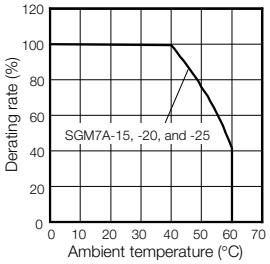
The Servomotor ratings are the continuous allowable values at an ambient temperature of 40°C. If you use a Servomotor at an ambient temperature that exceeds 40°C (60°C max.), apply a suitable derating rate from the following graphs.

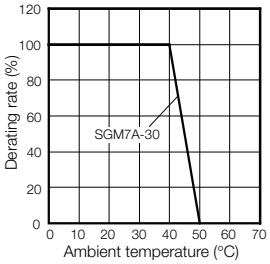
Note: The derating rates are applicable only when the average motor speed is less than or equal to the rated motor speed. If the average motor speed exceeds the rated motor speed, consult with your Yaskawa representative.







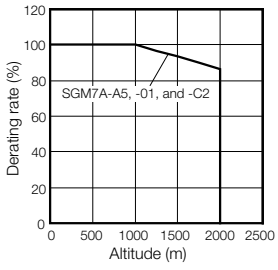


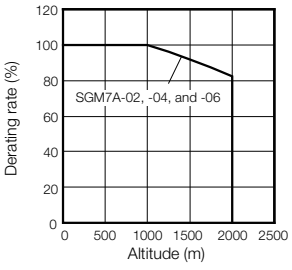


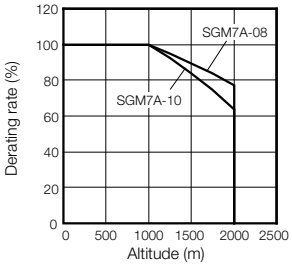
Applications Where the Altitude of the Servomotor Exceeds 1,000 m

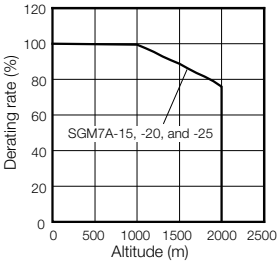
The Servomotor ratings are the continuous allowable values at an altitude of 1,000 m or less. If you use a Servomotor at an altitude that exceeds 1,000 m (2,000 m max.), the heat dissipation effect of the air is reduced. Apply the appropriate derating rate from the following graphs.

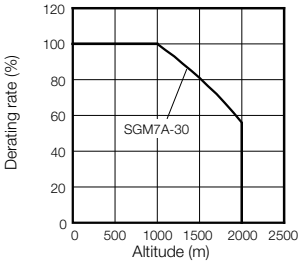
Note: The derating rates are applicable only when the average motor speed is less than or equal to the rated motor speed. If the average motor speed exceeds the rated motor speed, consult with your Yaskawa representative.







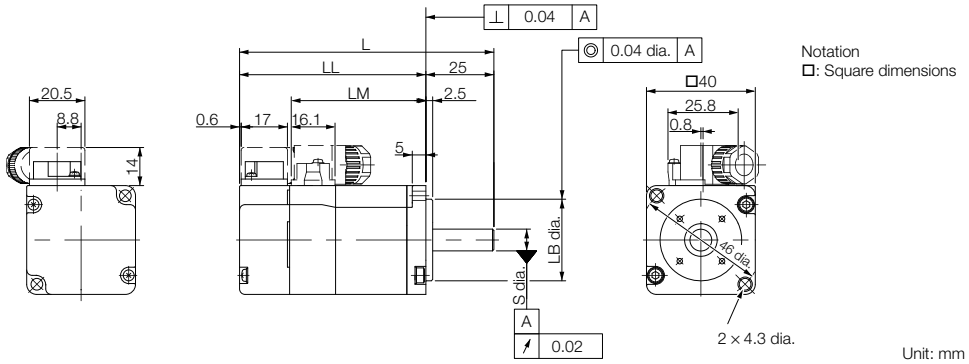




External Dimensions

Servomotors without Gears

◆ SGM7A-A5, -01, and -C2



Unit: mm

Model SGM7A-	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)

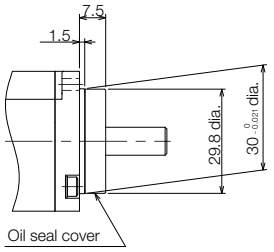
Note: 1. The values in parentheses are for Servomotors with Holding Brakes.

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

☞ *Shaft End Specifications for SGM7A-A5 to -10* (page 18)

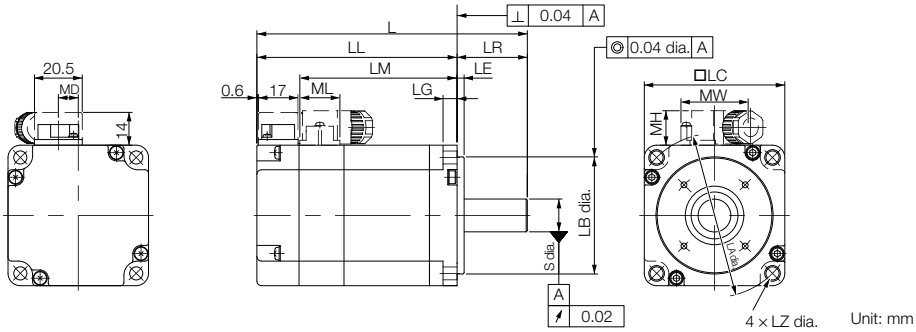
■ Specifications of Options

• Oil Seal



Unit: mm

◆ SGM7A-02 to -10



Unit: mm

Model SGM7A-	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	$19^{\ 0}_{-0.013}$
10A□A2□	162 (209)	122 (169)	103.5	40	3	8	80	90	$70^{\ 0}_{-0.030}$	7	$19^{\ 0}_{-0.013}$

Model SGM7A-	MD	MW	MH	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□	8.5	38	14.7	19.3	2.3 (2.9)
10A□A2□	8.5	38	14.7	19.3	3.1 (3.7)

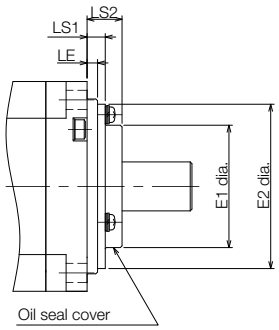
Note: 1. The values in parentheses are for Servomotors with Holding Brakes.

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

☞ *Shaft End Specifications for SGM7A-A5 to -10* (page 18)

■ Specifications of Options

• Oil Seal



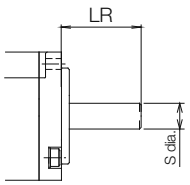
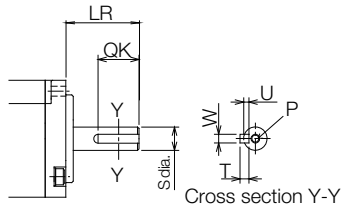
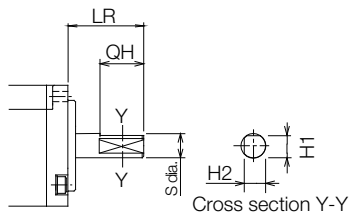
Unit: mm

Model SGM7A-	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

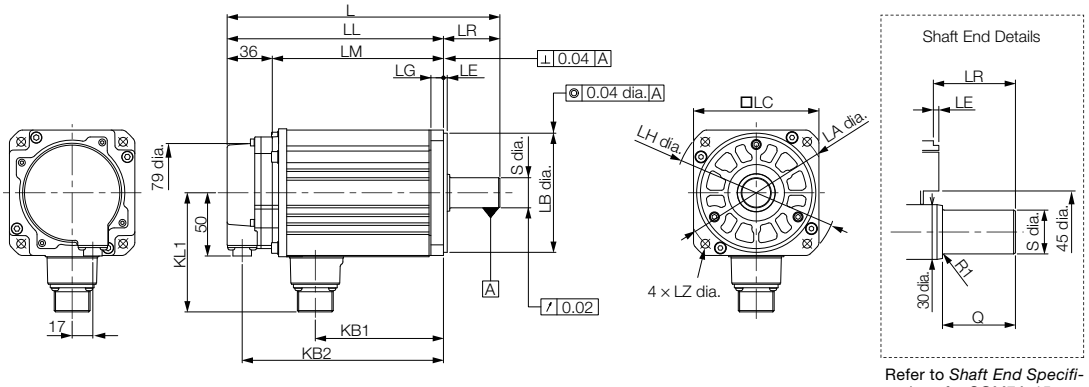
◆ SGM7A-□□□□□□□

Code	Specification
2	Straight without key
6	Straight with key and tap for one location (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	$8^{0}_{-0.009}$			$14^{0}_{-0.011}$			$19^{0}_{-0.013}$	
	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)									
	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 Gears and without Holding Brakes

◆ SGM7A-15, -20, and -25



Refer to *Shaft End Specifications for SGM7A-15 to -30* on page 21 for details.

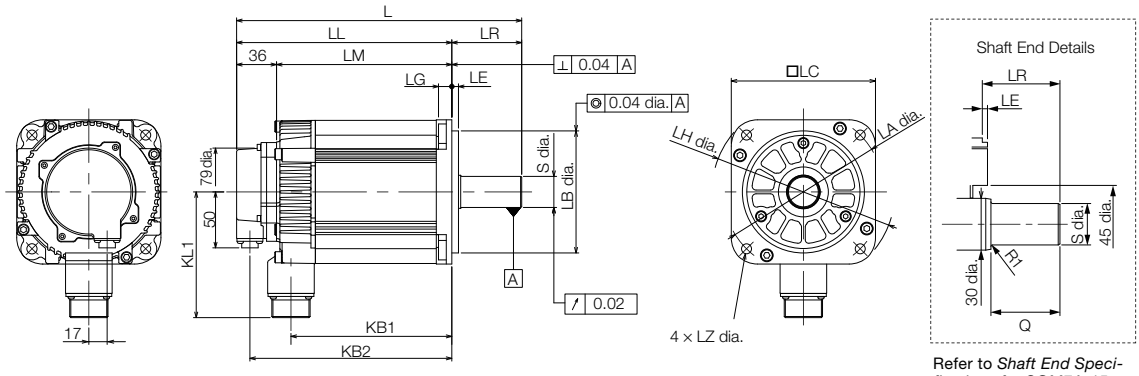
Unit: mm

Model SGM7A-	L	LL	LM	LR	KB1	KB2	KL1
15A□A21	202	157	121	45	86	145	96
20A□A21	218	173	137	45	102	161	96
25A□A21	241	196	160	45	125	184	96

Model SGM7A-	Flange Surface 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

Note: Servomotors with Oil Seals have the same dimensions.

◆ SGM7A-30



Refer to *Shaft End Specifications for SGM7A-15 to -30* on page 21 for details.

Unit: mm

Model SGM7A-	L	LL	LM	LR	KB1	KB2	KL1
30A□A21	257	194	158	63	145	182	114

Model SGM7A-	Flange Surface 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

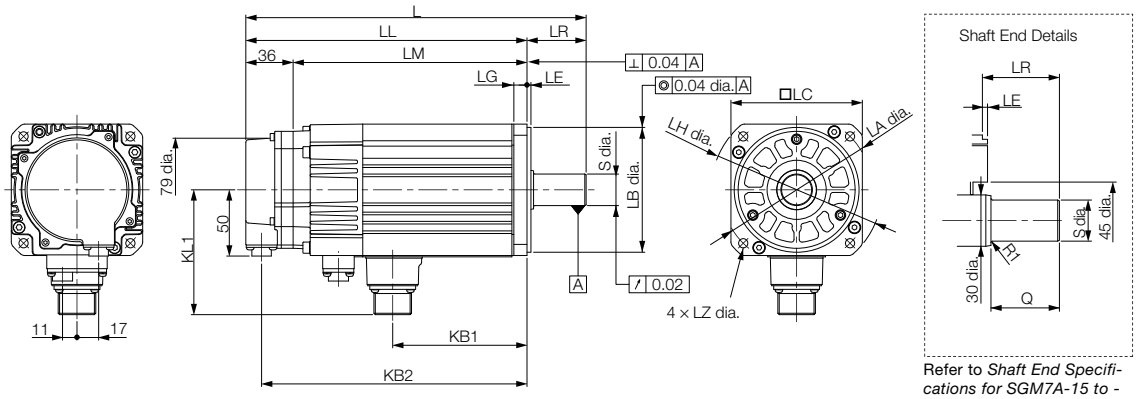
Note: Servomotors with Oil Seals have the same dimensions.

Refer to the following section for information on connectors.

☞ ◆ *SGM7A-15 to -30 without Holding Brakes* (page 28)

Servomotors without Gears and with Holding Brakes

◆ SGM7A-15 to -30



Refer to *Shaft End Specifications for SGM7A-15 to -30* on page 21 for details.

Unit: mm

Model SGM7A-	L	LL	LM	LR	KB1	KB2	KL1
15A□A2C	243	198	162	45	77	186	102
20A□A2C	259	214	178	45	93	202	102
25A□A2C	292	247	211	45	116	225	102
30A□A2C	295	232	196	63	114	220	119

Model SGM7A-	Flange Surface 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

Note: Servomotors with Oil Seals have the same dimensions.

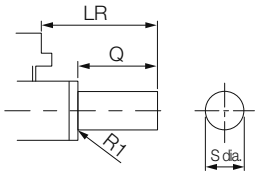
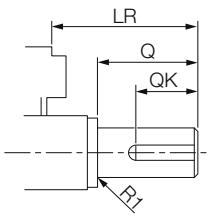
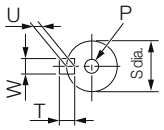
Refer to the following section for information on connectors.

☞ ◆ *SGM7A-15 to -30 with Holding Brakes* (page 28)

Shaft End Specifications for SGM7A-15 to -30

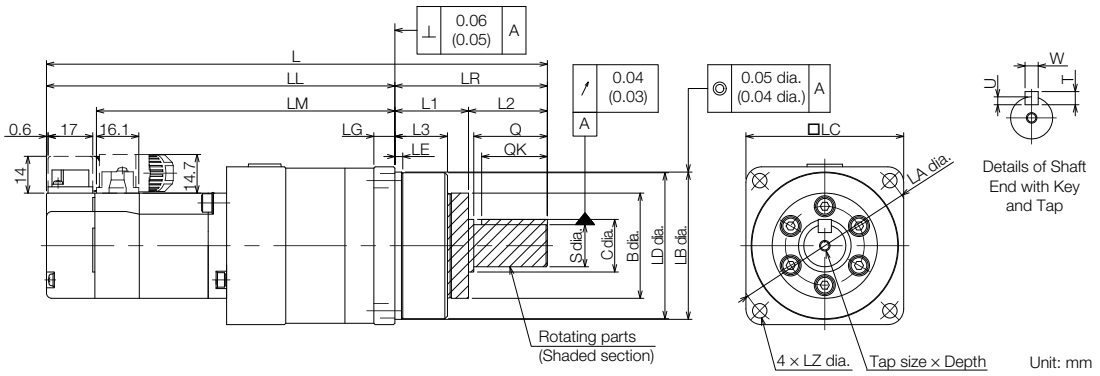
◆ SGM7A-□□□□□□□

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

Shaft End Details		Servomotor Model SGM7A-			
		15	20	25	30
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			

Servomotors with Gears

◆ SGM7A-A5, -01, and -C2



Model SGM7A-	Gear Ratio	L	LL	LM	Flange Surface Dimensions								
					LR	LE	LG	B	LD	LB	LC	LA	LZ
A5A□AH1⊛□	1/5	138 (178.5)	96 (136.5)	77.4	42	2.2	5	29	39.5	$40^{0}_{-0.025}$	40	46	3.4
A5A□AH2⊛□	1/9												
A5A□AHC⊛□	1/21	147 (187.5)	105 (145.5)	86.4									
A5A□AH7⊛□	1/33	178.5 (219)	120.5 (161)	101.9	58	2.5	8	40	55.5	$56^{0}_{-0.030}$	60	70	5.5
01A□AH1⊛□	1/5	150 (190.5)	108 (148.5)	89.4	42	2.2	5	29	39.5	$40^{0}_{-0.025}$	40	46	3.4
01A□AHB⊛□	1/11	190.5 (231)	132.5 (173)	113.9	58	2.5	8	40	55.5	$56^{0}_{-0.030}$	60	70	5.5
01A□AHC⊛□	1/21												
01A□AH7⊛□	1/33	215 (255.5)	135 (175.5)	116.4	80	7.5	10	59	84	$85^{0}_{-0.035}$	90	105	9
C2A□AH1⊛□	1/5	162 (210)	120 (168)	101.4	42	2.2	5	29	39.5	$40^{0}_{-0.025}$	40	46	3.4
C2A□AHB⊛□	1/11	202.5 (250.5)	144.5 (192.5)	125.9	58	2.5	8	40	55.5	$56^{0}_{-0.030}$	60	70	5.5
C2A□AHC⊛□	1/21	227 (275)	147 (195)	128.4	80	7.5	10	59	84	$85^{0}_{-0.035}$	90	105	9
C2A□AH7⊛□	1/33												

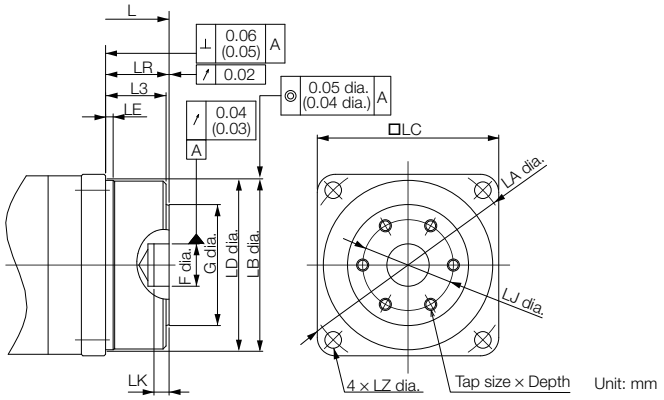
Model SGM7A-	Flange Surface Dimensions			Q	C	S	Tap Size × Depth	Key Dimensions				Approx. Mass [kg]
	L1	L2	L3					QK	U	W	T	
A5A□AH1⊛□	22	20	14.6	–	–	$10^{0}_{-0.015}$	M3 × 6L	15	2.5	4	4	0.6 (0.9)
A5A□AH2⊛□												
A5A□AHC⊛□												0.7 (1.0)
A5A□AH7⊛□	28	30	20	28	20	$16^{0}_{-0.018}$	M4 × 8L	25	3	5	5	1.3 (1.6)
01A□AH1⊛□	22	20	14.6	–	–	$10^{0}_{-0.015}$	M3 × 6L	15	2.5	4	4	0.7 (1.0)
01A□AHB⊛□	28	30	20	28	20	$16^{0}_{-0.018}$	M4 × 8L	25	3	5	5	1.4 (1.7)
01A□AHC⊛□												
01A□AH7⊛□	36	44	26	42	32	$25^{0}_{-0.021}$	M6 × 12L	36	4	8	7	2.8 (3.1)
C2A□AH1⊛□	22	20	14.6	–	–	$10^{0}_{-0.015}$	M3 × 6L	15	2.5	4	4	0.8 (1.1)
C2A□AHB⊛□	28	30	20	28	20	$16^{0}_{-0.018}$	M4 × 8L	25	3	5	5	1.5 (1.8)
C2A□AHC⊛□	36	44	26	42	32	$25^{0}_{-0.021}$	M6 × 12L	36	4	8	7	2.9 (3.2)
C2A□AH7⊛□												

* The asterisk (*) is replaced by shaft end code 6 (straight with key and tap) for the 8th digit of the model designation.
If a key and tap are not necessary, specify shaft end code 2 (without key and tap).

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

2. Gear dimensions are different from those of the Σ-I, Σ-II, and Σ-III Series.

■ Flange Output Face



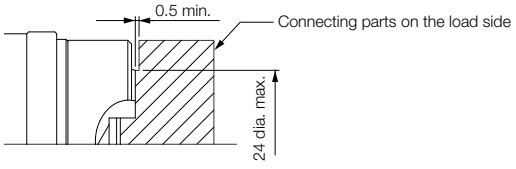
Note: The geometric tolerance in parentheses is the value for LC = 40.

Model SGM7A-	Gear Ratio	L	LR	LJ	F	G	LK	No. of Taps × Tap Size × Depth	Approx. Mass [kg]
A5A□AH10□	1/5	111 (151.5)	15	18	$5^{+0.012}_{0}$	24	3	3 × M4 × 6L	0.6 (0.9)
A5A□AH20□	1/9								
A5A□AHC0□	1/21	120 (160.5)							
A5A□AH70□	1/33	141.5 (182)	21	30	$14^{+0.018}_{0}$	40	5	6 × M4 × 7L	1.2 (1.5)
01A□AH10□	1/5	123 (163.5)	15	18	$5^{+0.012}_{0}$	24	3	3 × M4 × 6L	0.7 (1.0)
01A□AHB0□	1/11	153.5 (194)	21	30	$14^{+0.018}_{0}$	40	5	3 × M4 × 7L	1.3 (1.6)
01A□AHC0□	1/21								
01A□AH70□	1/33	162 (202.5)	27	45	$24^{+0.021}_{0}$	59		6 × M6 × 10L	2.4 (2.7)
02A□AH10□	1/5	135 (183)	15	18	$5^{+0.012}_{0}$	24	3	3 × M4 × 6L	0.8 (1.1)
02A□AHB0□	1/11	165.5 (213.5)	21	30	$14^{+0.018}_{0}$	40	5	6 × M4 × 7L	1.4 (1.7)
02A□AHC0□	1/21	174 (222)	27	45	$24^{+0.021}_{0}$	59	5	6 × M6 × 10L	2.5 (2.8)
02A□AH70□	1/33								

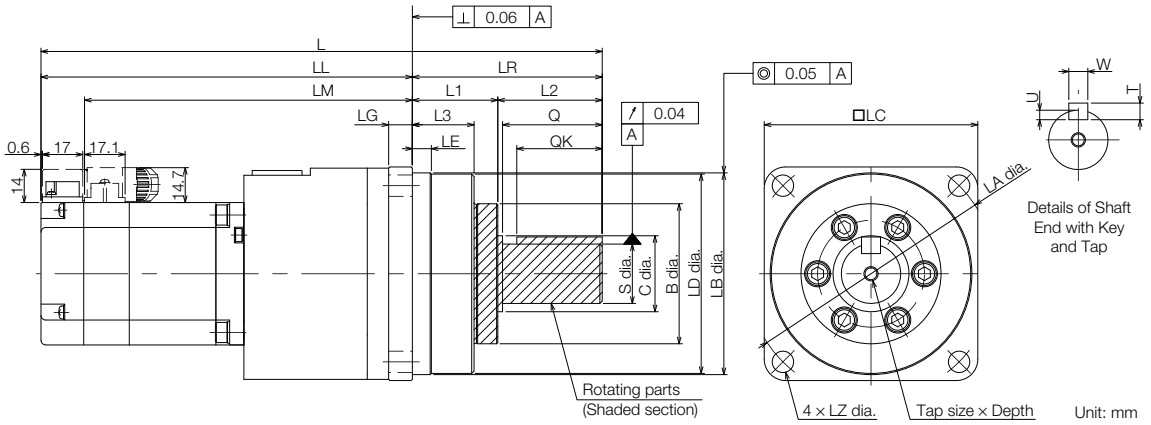
Note: 1. The values in parentheses are for Servomotors with Holding Brakes.
2. Dimensions not found in the above table are the same as those in the table on the previous page.

Important

For a Servomotor with a flange output that has square gear flange dimensions (□LC) of 40 mm, we recommend that you design the Servomotor with the dimensions shown in the following figure in order to secure a gap between the gear oil seal and the connecting parts on the load side.



◆ SGM7A-02, -04, and -06



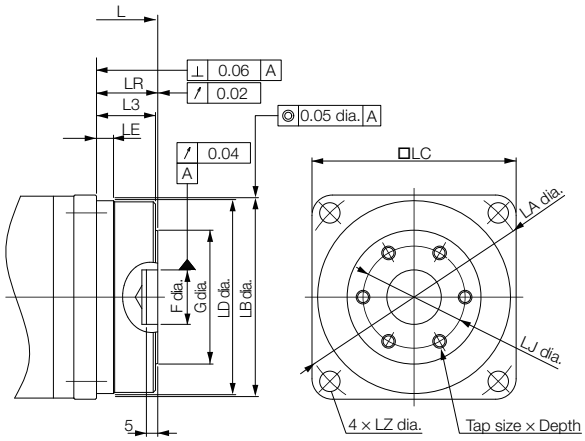
Model SGM7A-	Gear Ratio	L	LL	LM	Flange Surface Dimensions								
					LR	LE	LG	B	LD	LB	LC	LA	LZ
02A□AH1⊛□	1/5	191.5 (232)	133.5 (174)	115.2	58	2.5	8	40	55.5	$56^{\ 0}_{-0.030}$	60	70	5.5
02A□AH2⊛□	1/11												
02A□AHC⊛□	1/21	220.5 (261)	140.5 (181)	122.2	80	7.5	10	59	84	$85^{\ 0}_{-0.035}$	90	105	9
02A□AH7⊛□	1/33												
04A□AH1⊛□	1/5	207.5 (248)	149.5 (190)	131.2	58	2.5	8	40	55.5	$56^{\ 0}_{-0.030}$	60	70	5.5
04A□AHB⊛□	1/11	236.5 (277)	156.5 (197)	138.2	80	7.5	10	59	84	$85^{\ 0}_{-0.035}$	90	105	9
04A□AHC⊛□	1/21												
04A□AH7⊛□	1/33	322.5 (363)	189.5 (230)	171.2	133	12.5	13	84	114	$115^{\ 0}_{-0.035}$	120	135	11
06A□AH1⊛□	1/5	258.5 (312.5)	178.5 (232.5)	160.2	80	7.5	10	59	84	$85^{\ 0}_{-0.035}$	90	105	9
06A□AHB⊛□	1/11												
06A□AHC⊛□	1/21	344.5 (398.5)	211.5 (265.5)	193.2	133	12.5	13	84	114	$115^{\ 0}_{-0.035}$	120	135	11
06A□AH7⊛□	1/33												

Model SGM7A-	Flange Surface Dimensions			Q	C	S	Tap Size × Depth	Key Dimensions				Approx. Mass [kg]
	L1	L2	L3					QK	U	W	T	
02A□AH1⊛□	28	30	20	28	20	$16^{\ 0}_{-0.018}$	M4 × 8L	25	3	5	5	1.8 (2.4)
02A□AH2⊛□												1.9 (2.5)
02A□AHC⊛□	36	44	26	42	32	$25^{\ 0}_{-0.021}$	M6 × 12L	36	4	8	7	3.7 (4.3)
02A□AH7⊛□												
04A□AH1⊛□	28	30	20	28	20	$16^{\ 0}_{-0.018}$	M4 × 8L	25	3	5	5	2.1 (2.7)
04A□AHB⊛□	36	44	26	42	32	$25^{\ 0}_{-0.021}$	M6 × 12L	36	4	8	7	4.0 (4.6)
04A□AHC⊛□												
04A□AH7⊛□	48	85	33	82	44	$40^{\ 0}_{-0.025}$	M10 × 20L	70	5	12	8	8.6 (9.2)
06A□AH1⊛□	36	44	26	42	32	$25^{\ 0}_{-0.021}$	M6 × 12L	36	4	8	7	4.3 (4.9)
06A□AHB⊛□												4.5 (5.1)
06A□AHC⊛□	48	85	33	82	44	$40^{\ 0}_{-0.025}$	M10 × 20L	70	5	12	8	9.1 (9.7)
06A□AH7⊛□												

* The asterisk (*) is replaced by shaft end code 6 (straight with key and tap) for the 8th digit of the model designation.
If a key and tap are not necessary, specify shaft end code 2 (without key and tap).

Note: 1. The values in parentheses are for Servomotors with Holding Brakes.
2. Gear dimensions are different from those of the Σ-I, Σ-II, and Σ-III Series.

■ Flange Output Face



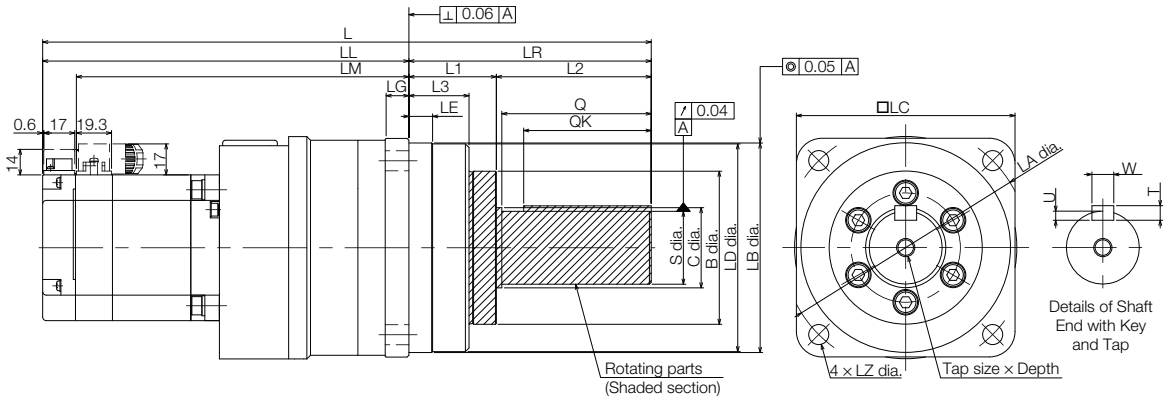
Unit: mm

Model SGM7A-	Gear Ratio	L	LR	LJ	F	G	No. of Taps × Tap Size × Depth	Approx. Mass [kg]
02A□AH10□	1/5	154.5 (195)	21	30	$14^{+0.018}_{0}$	40	6 × M4 × 7L	1.7 (2.3)
02A□AH20□	1/11							1.8 (2.4)
02A□AHC0□	1/21	167.5 (208)	27	45	$24^{+0.021}_{0}$	59	6 × M6 × 10L	3.3 (3.9)
02A□AH70□	1/33							
04A□AH10□	1/5	170.5 (211)	21	30	$14^{+0.018}_{0}$	40	6 × M4 × 7L	2.0 (2.6)
04A□AHB0□	1/11	183.5 (224)	27	45	$24^{+0.021}_{0}$	59	6 × M6 × 10L	3.6 (4.2)
04A□AHC0□	1/21							
04A□AH70□	1/33	224.5 (265)	35	60	$32^{+0.025}_{0}$	84	6 × M8 × 12L	7.2 (7.8)
06A□AH10□	1/5	205.5 (259.5)	27	45	$24^{+0.021}_{0}$	59	6 × M6 × 10L	3.9 (4.5)
06A□AHB0□	1/11							4.1 (4.7)
06A□AHC0□	1/21	246.5 (300.5)	35	60	$32^{+0.025}_{0}$	84	6 × M8 × 12L	7.7 (8.3)
06A□AH70□	1/33							

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

2. Dimensions not found in the above table are the same as those in the table on the previous page.

◆ SGM7A-08 and -10



Unit: mm

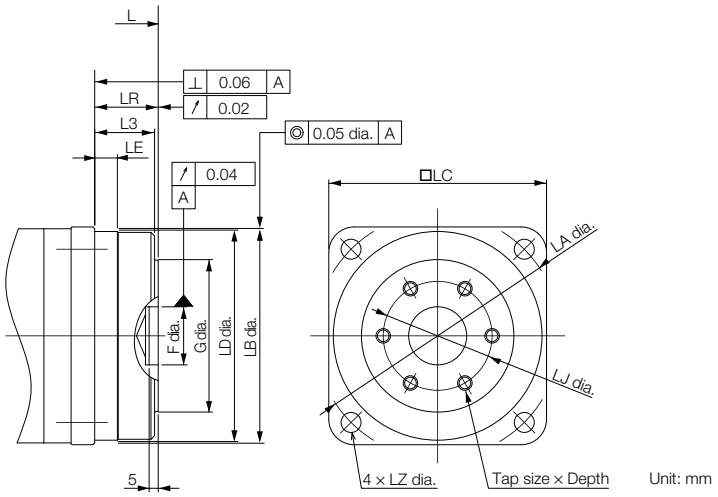
Model SGM7A-	Gear Ratio	L	LL	LM	Flange Surface Dimensions								
					LR	LE	LG	B	LD	LB	LC	LA	LZ
08A□AH1⊛□	1/5	255 (302)	175 (222)	156.5	80	7.5	10	59	84	$85^{\ 0}_{-0.035}$	90	105	9
08A□AHB⊛□	1/11												
08A□AHC⊛□	1/21	334 (381)	201 (248)	182.5	133	12.5	13	84	114	$115^{\ 0}_{-0.035}$	120	135	11
08A□AH7⊛□	1/33												
10A□AH1⊛□	1/5	280 (327)	200 (247)	181.5	80	7.5	10	59	84	$85^{\ 0}_{-0.035}$	90	105	9
10A□AHB⊛□	1/11	359 (406)	226 (273)	207.5	133	12.5	13	84	114	$115^{\ 0}_{-0.035}$	120	135	11
10A□AHC⊛□	1/21												
10A□AH7⊛□	1/33												

Model SGM7A-	Flange Surface Dimensions			Q	C	S	Tap Size × Depth	Key Dimensions				Approx. Mass [kg]
	L1	L2	L3					QK	U	W	T	
08A□AH1⊛□	36	44	26	42	32	$25^{\ 0}_{-0.021}$	M6 × 12L	36	4	8	7	4.9 (5.8)
08A□AHB⊛□												5.1 (6.0)
08A□AHC⊛□	48	85	33	82	44	$40^{\ 0}_{-0.025}$	M10 × 20L	70	5	12	8	9.8 (10.7)
08A□AH7⊛□												
10A□AH1⊛□	36	44	26	42	32	$25^{\ 0}_{-0.021}$	M6 × 12L	36	4	8	7	6.0 (6.6)
10A□AHB⊛□	48	85	33	82	44	$40^{\ 0}_{-0.025}$	M10 × 20L	70	5	12	8	10.9 (11.5)
10A□AHC⊛□												
10A□AH7⊛□												

* The asterisk (*) is replaced by shaft end code 6 (straight with key and tap) for the 8th digit of the model designation.
If a key and tap are not necessary, specify shaft end code 2 (without key and tap).

Note: 1. The values in parentheses are for Servomotors with Holding Brakes.
2. Gear dimensions are different from those of the Σ-I, Σ-II, and Σ-III Series.

■ Flange Output Face



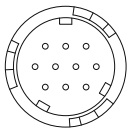
Model SGM7A-	Gear Ratio	L	LR	LJ	F	G	No. of Taps × Tap Size × Depth	Approx. Mass [kg]
08A□AH10□	1/5	202 (249)	27	45	$24^{+0.021}_{0}$	59	6 × M6 × 10L	4.7 (5.3)
08A□AHB0□	1/11							4.9 (5.5)
08A□AHC0□	1/21	236 (283)	35	60	$32^{+0.025}_{0}$	84	6 × M8 × 12L	8.6 (9.2)
08A□AH70□	1/33							
10A□AH10□	1/5	227 (274)	27	45	$24^{+0.021}_{0}$	59	6 × M6 × 10L	5.6 (6.3)
10A□AHB0□	1/11	261 (308)	35	60	$32^{+0.025}_{0}$	84	6 × M8 × 12L	9.5 (10.1)
10A□AHC0□	1/21							
10A□AH70□	1/33							

Note: 1. The values in parentheses are for Servomotors with Holding Brakes.
2. Dimensions not found in the above table are the same as those in the table on the previous page.

Connector Specifications

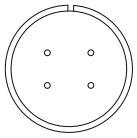
◆ SGM7A-15 to -30 without Holding Brakes

• 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.

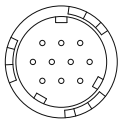
• Servomotor Connector Specifications



Manufacturer: DDK Ltd.

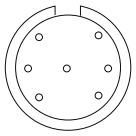
◆ SGM7A-15 to -30 with Holding Brakes

• 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: Japan Aviation Electronics Industry, Ltd.

Model Designations

Without Gears

SGM7J - 01 A 7 A 2 1

Σ-7 Series Servomotors: SGM7J	1st+2nd digits	3rd digit	4th digit	5th digit	6th digit	7th digit

1st+2nd digits 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

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

With Gears

SGM7J - 01 A 7 A H 1 2 1

Σ-7 Series Servomotors: SGM7J	1st+2nd digits	3rd digit	4th digit	5th digit	6th digit	7th digit	8th digit	9th digit

1st+2nd digits 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

A

6th digit Gear Type

Code	Specification
H	HDS planetary low-backlash gear

7th digit Gear Ratio

Code	Specification
B	1/11*1
C	1/21
1	1/5
2	1/9*2
7	1/33

*1. This specification is not supported for models with a rated output of 50 W.

*2. This specification is supported only for models with a rated output of 50 W.

8th digit Shaft End

Code	Specification
0	Flange output
2	Straight without key
6	Straight with key and tap

9th digit Options

Code	Specification
1	Without options
C	With holding brake (24 VDC)

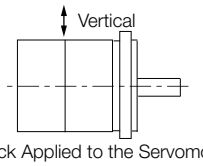
Ratings and Specifications

Specifications

Voltage		200 V						
Model SGM7J-		A5A	01A	C2A	02A	04A	06A	08A
Time Rating		Continuous						
Thermal Class		B						
Insulation Resistance		500 VDC, 10 MΩ min.						
Withstand Voltage		1,500 VAC for 1 minute						
Excitation		Permanent magnet						
Mounting		Flange-mounted						
Drive Method		Direct drive						
Rotation Direction		Counterclockwise (CCW) for forward reference when viewed from the load side						
Vibration Class*1		V15						
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/s^2						
	Number of Impacts	2 times						
Vibration Resistance*3	Vibration Acceleration Rate at Flange	49 m/s^2						
Applicable SERVOPACKs		Refer to the following section. ☞ *Σ-7 Series Combination* (page M-18)						

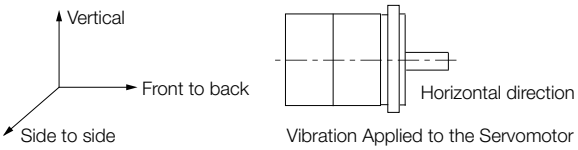
*1. A vibration class of V15 indicates a vibration amplitude of 15 μm maximum on the Servomotor without a load at the rated motor speed.

*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 ambient temperature will exceed 40°C, refer to the following section.
☞ *Applications Where the Ambient Temperature of the Servomotor Exceeds 40 °C* (page 37)

*5. If the altitude will exceed 1,000 m, refer to the following section.
☞ *Applications Where the Altitude of the Servomotor Exceeds 1,000 m* (page 37)

Ratings of Servomotors without Gears

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		N·m	0.159	0.318	0.477	0.637	1.27	1.91	2.39
Instantaneous Maximum Torque*1		N·m	0.557	1.11	1.67	2.23	4.46	6.69	8.36
Rated Current*1		Arms	0.55	0.85	1.6	1.6	2.5	4.2	4.4
Instantaneous Maximum Current*1		Arms	2.0	3.1	5.7	5.8	9.3	15.3	16.9
Rated Motor Speed*1		min^{-1}	3000						
Maximum Motor Speed*1		min^{-1}	6000						
Torque Constant		N·m/Arms	0.318	0.413	0.332	0.444	0.544	0.493	0.584
Motor Moment of Inertia		$\times10^{-4}$ 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^2	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		mm	200 × 200 × 6		250 × 250 × 6				
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	N·m	0.159	0.318	0.477	0.637	1.27	1.91	2.39
	Coil Resistance	Ω (at 20°C)	104.8±10%			96±10%		88.6±10%	
	Rated Current	A (at 20°C)	0.23			0.25		0.27	
	Time Required to Release Brake	ms	60					80	
	Time Required to Brake	ms	100						
Allowable Load Moment of Inertia (Motor Moment of Inertia Ratio)			35 times			15 times	10 times	20 times	12 times
	With External Regenerative Resistor and Dynamic Brake Resistor					25 times			15 times
Allowable Shaft Loads*5	LF	mm	20			25			35
	Allowable Radial Load	N	78			245			392
	Allowable Thrust Load	N	54			74			147

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

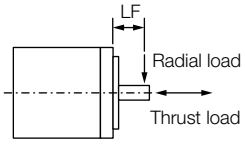
*1. These values are for operation in combination with a SERVOPACK when the temperature of the armature winding is 100°C. The values for other items are at 20°C. These are typical values.

*2. The rated torques are the continuous allowable torque values at 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.

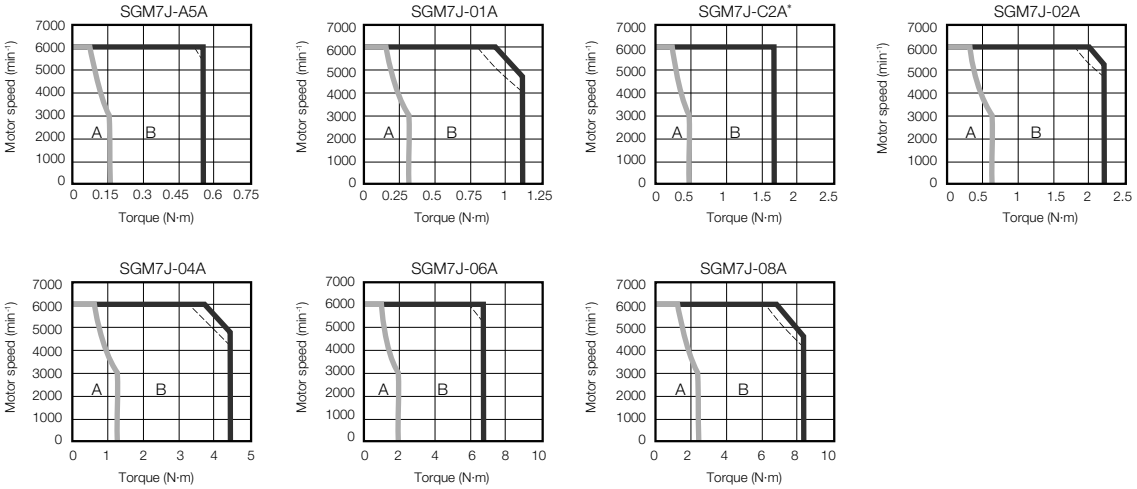
*4. Observe the following precautions if you use a Servomotor with a Holding Brake.
- The holding brake cannot be used to stop the Servomotor.
- The time required to release the brake and the time required to brake depend on which discharge circuit is used. Confirm that the operation delay time is appropriate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



* 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 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 as the voltage drop increases.

Ratings of Servomotors with Gears

All Models	Gear Mechanism	Protective Structure	Lost Motion [arc-min]
	Planetary gear mechanism	Totally enclosed, self-cooled, IP55 (except for shaft opening)	3 max.

Servomotor Model SGM7J-	Servomotor					Gear Output				
	Rated Output [W]	Rated Motor Speed [min^{-1}]	Maximum Motor Speed [min^{-1}]	Rated Torque [N·m]	Instantaneous Maximum Torque [N·m]	Gear Ratio	Rated Torque/ Efficiency*1 [N·m/%]	Instantaneous Maximum Torque [N·m]	Rated Motor Speed [min^{-1}]	Maximum Motor Speed [min^{-1}]
A5A□AH1□	50	3000	6000	0.159	0.557	1/5	0.433/64*2	2.37	600	1200
A5A□AH2□						1/9	1.12/78	3.78*3	333	667
A5A□AHC□						1/21	2.84/85	10.6	143	286
A5A□AH7□						1/33	3.68/70	15.8	91	182
01A□AH1□	100	3000	6000	0.318	1.11	1/5	1.06/78*2	4.96	600	1200
01A□AHB□						1/11	2.52/72	10.7	273	545
01A□AHC□						1/21	5.35/80	20.8	143	286
01A□AH7□						1/33	7.35/70	32.7	91	182
C2A□AH1□	150	3000	6000	0.477	1.67	1/5	1.68/83*2	7.80	600	1200
C2A□AHB□						1/11	3.53/79*2	16.9	273	545
C2A□AHC□						1/21	6.30/70*2	31.0	143	286
C2A□AH7□						1/33	11.2/79*2	49.7	91	182
02A□AH1□	200	3000	6000	0.637	2.23	1/5	2.39/75	9.80	600	1200
02A□AHB□						1/11	5.74/82	22.1	273	545
02A□AHC□						1/21	10.2/76	42.1	143	286
02A□AH7□						1/33	17.0/81	67.6	91	182
04A□AH1□	400	3000	6000	1.27	4.46	1/5	2.39/75	20.1	600	1200
04A□AHB□						1/11	5.74/82	45.1	273	545
04A□AHC□						1/21	10.2/76	87.0	143	286
04A□AH7□						1/33	17.0/81	135	91	182
06A□AH1□	600	3000	6000	1.91	6.69	1/5	7.54/79	30.5	600	1200
06A□AHB□						1/11	18.1/86	68.6	273	545
06A□AHC□						1/21	32.1/80	129	143	286
06A□AH7□						1/33	53.6/85	206	91	182
08A□AH1□	750	3000	6000	2.39	8.36	1/5	10.0/84	38.4	600	1200
08A□AHB□						1/11	23.1/88	86.4	273	545
08A□AHC□						1/21	42.1/84	163	143	286
08A□AH7□						1/33	69.3/88	259	91	182

*1. The gear output torque is expressed by the following formula.

$$\text{Gear output torque} = \text{Servomotor output torque} \times \frac{1}{\text{Gear ratio}} \times \text{Efficiency}$$

The gear efficiency depends on operating conditions such as the output torque, motor speed, and temperature. The values in the table are typical values for the rated torque, rated motor speed, and a surrounding air temperature of 25°C. They are reference values only.

*2. When using an SGM7J-A5A, SGM7J-01A, or SGM7J-C2A Servomotor with a gear ratio of 1/5 or an SGM7J-C2A Servomotor with a gear ratio of 1/11, maintain an 85% maximum effective load ratio. For an SGM7J-C2A Servomotor with a gear ratio of 1/21 or 1/33, maintain a 90% maximum effective load ratio. The values in the table take the effective load ratio into consideration.

*3. The instantaneous maximum torque is 300% of the rated torque.

Note: 1. The gears that are mounted to Yaskawa Servomotors have not been broken in.
Break in the Servomotor if necessary. First, operate the Servomotor at low speed with no load. If no problems occur, gradually increase the speed and load.

2. The no-load torque for a Servomotor with a Gear is high immediately after the Servomotor starts, and it then decreases and becomes stable after a few minutes.
This is a common phenomenon caused by grease circulation in the gears and it does not indicate faulty gears.

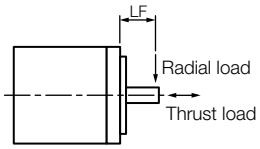
3. Other specifications are the same as those for Servomotors without Gears.

Important

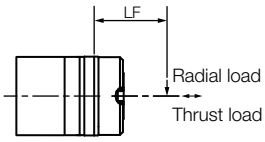
The SERVOPACK speed control range is 5,000:1. If you use Servomotors at extremely low speeds (0.02 min^{-1} or lower at the gear output shaft), if you use Servomotors with a one-pulse feed reference for extended periods, or under some other operating conditions, the gear bearing lubrication may be insufficient. That may cause deterioration of the bearing or increase the load ratio. Contact your Yaskawa representative if you use a Servomotor under these conditions.

Servomotor Model SGM7J-	Moment of Inertia [$\times10^{-4}$ kg·m^2]				With Gears			Reference Diagram
	Shaft Output		Flange Output		Allowable Radial Load [N]	Allowable Thrust Load [N]	LF [mm]	
	Motor* + Gear	Gear	Motor* + Gear	Gear				
A5A□AH1□	0.0455	0.006	0.0445	0.005	95	431	37	
A5A□AH2□	0.0425	0.003	0.0425	0.003	113	514	37	
A5A□AHC□	0.0435	0.004	0.0435	0.004	146	663	37	
A5A□AH7□	0.0845	0.045	0.0845	0.045	267	1246	53	
01A□AH1□	0.0719	0.006	0.0709	0.005	95	431	37	
01A□AHB□	0.126	0.060	0.125	0.059	192	895	53	
01A□AHC□	0.116	0.050	0.116	0.050	233	1087	53	
01A□AH7□	0.131	0.065	0.130	0.064	605	2581	75	
C2A□AH1□	0.0975	0.006	0.0965	0.005	95	431	37	
C2A□AHB□	0.152	0.060	0.151	0.059	192	895	53	
C2A□AHC□	0.202	0.110	0.200	0.108	528	2254	75	
C2A□AH7□	0.157	0.065	0.156	0.064	605	2581	75	
02A□AH1□	0.470	0.207	0.464	0.201	152	707	53	
02A□AHB□	0.456	0.193	0.455	0.192	192	895	53	
02A□AHC□	0.753	0.490	0.751	0.488	528	2254	75	
02A□AH7□	0.713	0.450	0.712	0.449	605	2581	75	
04A□AH1□	0.693	0.207	0.687	0.201	152	707	53	
04A□AHB□	1.06	0.570	1.05	0.560	435	1856	75	
04A□AHC□	0.976	0.490	0.974	0.488	528	2254	75	
04A□AH7□	1.11	0.620	1.10	0.610	951	4992	128	
06A□AH1□	1.50	0.700	1.46	0.660	343	1465	75	
06A□AHB□	1.37	0.570	1.36	0.560	435	1856	75	
06A□AHC□	1.64	0.840	1.62	0.820	830	4359	128	
06A□AH7□	1.42	0.620	1.41	0.610	951	4992	128	
08A□AH1□	2.29	0.700	2.25	0.660	343	1465	75	
08A□AHB□	2.19	0.600	2.18	0.590	435	1856	75	
08A□AHC□	4.59	3.00	4.57	2.98	830	4359	128	
08A□AH7□	4.39	2.80	4.37	2.78	951	4992	128	

Shaft Output



Flange Output



* The moment of inertia for the Servomotor and gear is the value without a holding brake. You can calculate the moment of inertia for a Servomotor with a Gear and Holding Brake with the following formula.
Motor moment of inertia for a Servomotor with a Holding Brake from *Ratings of Servomotors without Gears* on page 31 + Moment of inertia for the gear from the above table.

Important

During operation, the gear generates the loss at the gear mechanism and oil seal. The loss depends on the torque and motor speed conditions. The temperature rise depends on the loss and heat dissipation conditions. For the heat dissipation conditions, always refer to the following table and check the gear and motor temperatures with the actual equipment. If the temperature is too high, implement the following measures.

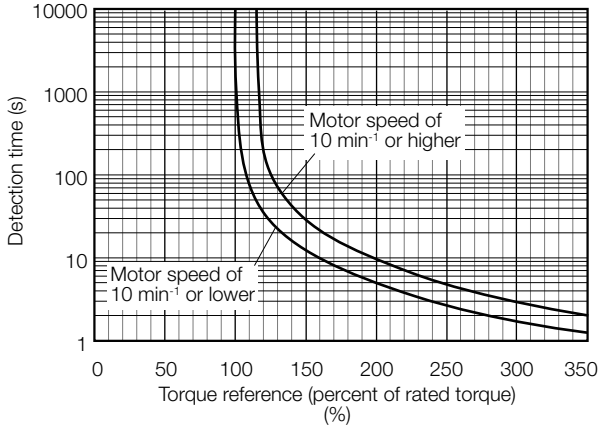
- Decrease the load ratio.
- Change the heat dissipation conditions.
- Use forced-air cooling for the motor with a cooling fan or other means.

Model	Heat Sink Size			
	1/5	1/9 or 1/11	1/21	1/33
SGM7J-A5	A			
SGM7J-01	B			
SGM7J-C2	B			
SGM7J-02	B			
SGM7J-04	B			
SGM7J-06	C			
SGM7J-08	C			

- A: 250 mm × 250 mm × 6 mm, aluminum plate
- B: 300 mm × 300 mm × 12 mm, aluminum plate
- C: 350 mm × 350 mm × 12 mm, aluminum plate

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 torque remains within the continuous duty zone given in *Torque-Motor Speed Characteristics* on page 32.

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.

The allowable size of the load moment of inertia (J_L) for the Servomotor is restricted. Refer to *Ratings of Servomotors without Gears* on page 31. This value is provided strictly as a guideline and results depend on Servomotor driving conditions.

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

- Reduce the torque limit.
- Reduce the deceleration rate.
- Reduce the maximum motor speed.
- Install an external regenerative resistor if the alarm cannot be cleared using the above steps.

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.

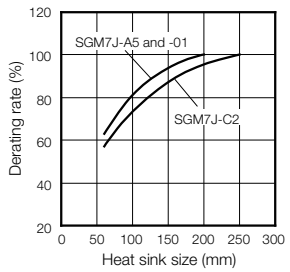
Servomotor Heat Dissipation Conditions

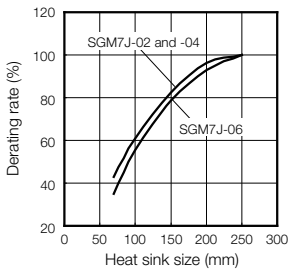
The Servomotor ratings are the continuous allowable values at an ambient temperature of 40°C when a heat sink is installed on the Servomotor. If the Servomotor is mounted on a small device component, the Servomotor temperature may rise considerably because the surface for heat dissipation becomes smaller.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

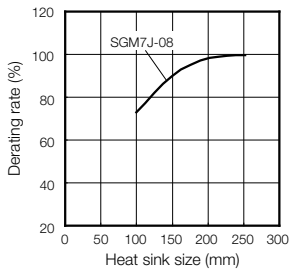
Note: The derating rates are applicable only when the average motor speed is less than or equal to the rated motor speed. If the average motor speed exceeds the rated motor speed, consult with your Yaskawa representative.

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.



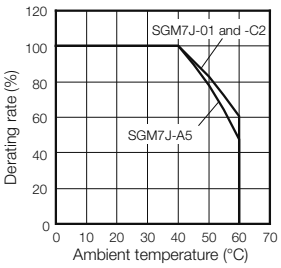


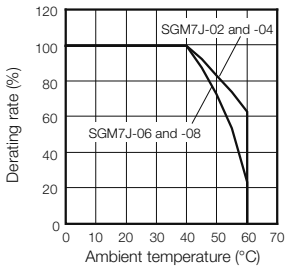


Applications Where the Ambient Temperature of the Servomotor Exceeds 40°C

The Servomotor ratings are the continuous allowable values at an ambient temperature of 40°C. If you use a Servomotor at an ambient 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.

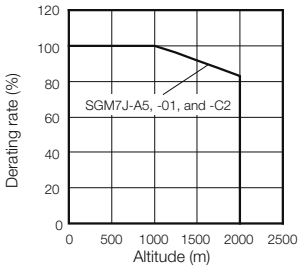


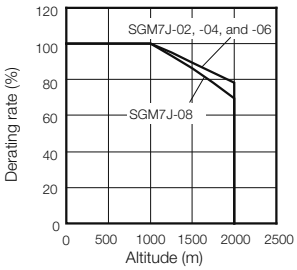


Applications Where the Altitude of the Servomotor Exceeds 1,000 m

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.

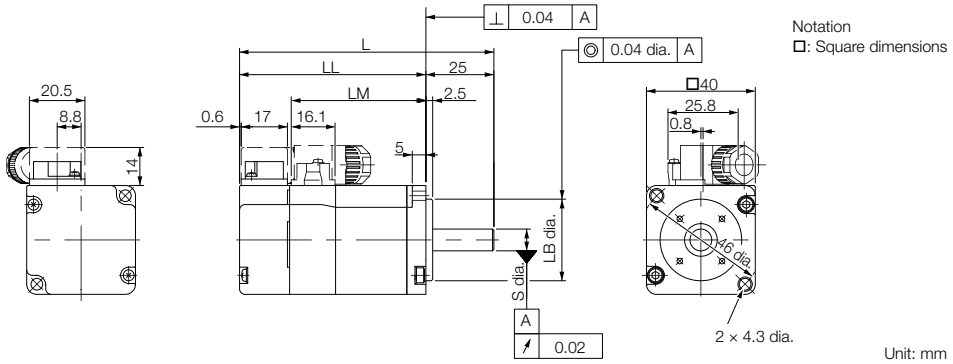




External Dimensions

Servomotors without Gears

◆ SGM7J-A5, -01, and -C2



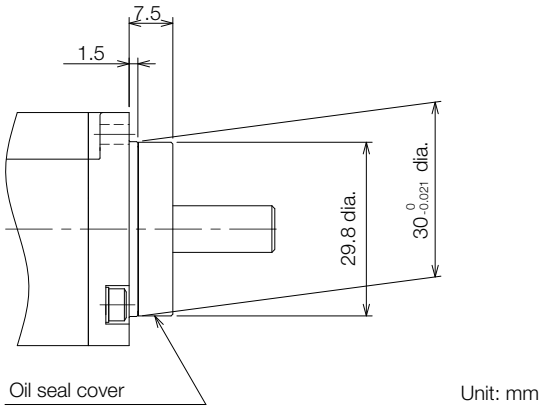
Unit: mm

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)

Note: 1. The values in parentheses are for Servomotors with Holding Brakes.
2. Refer to the following section for detailed shaft end specifications.
☞ *Shaft End Specifications* (page 40)

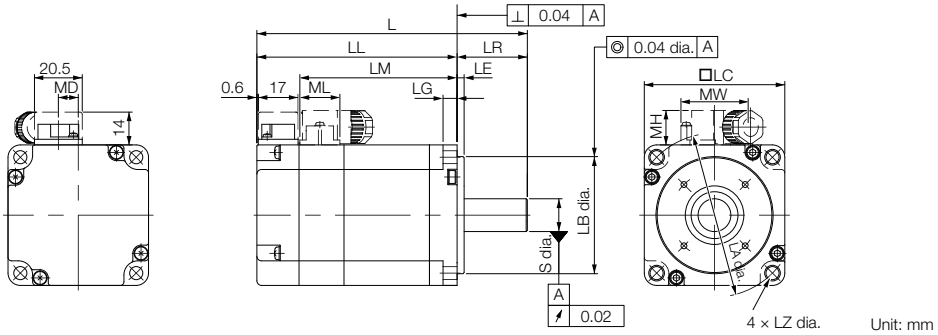
■ Specifications of Options

• Oil Seal



Unit: mm

◆ SGM7J-02, -04, -06, and -08



Unit: mm

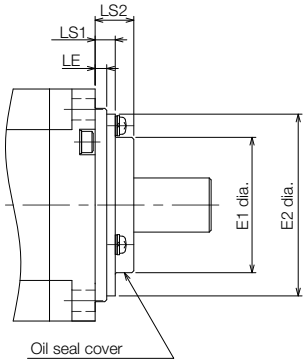
Model SGM7J-	L	LL	LM	Flange Dimensions							S
				LR	LE	LG	LC	LA	LB	LZ	
02A□A2□	99.5 (140)	69.5 (110)	51.2	30	3	6	60	70	$50^{0}_{-0.025}$	5.5	$14^{0}_{-0.011}$
04A□A2□	115.5 (156)	85.5 (126)	67.2	30	3	6	60	70	$50^{0}_{-0.025}$	5.5	$14^{0}_{-0.011}$
06A□A2□	137.5 (191.5)	107.5 (161.5)	89.2	30	3	6	60	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	MH	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□	8.5	38	14.7	19.3	2.2 (2.8)

Note: 1. The values in parentheses are for Servomotors with Holding Brakes.
2. Refer to the following section for detailed shaft end specifications.
☞ *Shaft End Specifications* (page 40)

■ Specifications of Options

• Oil Seal



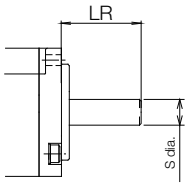
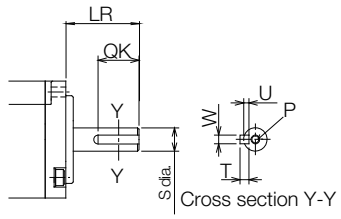
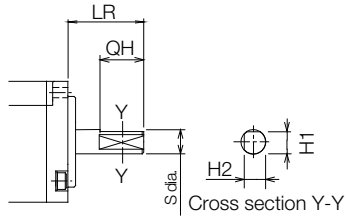
Unit: mm

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

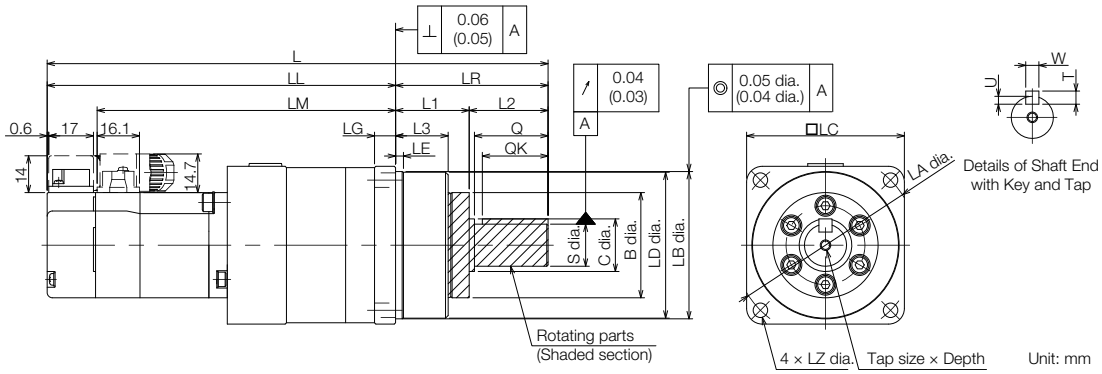
◆ SGM7J-□□□□□□□

Code	Specification
2	Straight without key
6	Straight with key and tap for one location (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)								
	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	$8^{0}_{-0.009}$			$14^{0}_{-0.011}$			$19^{0}_{-0.013}$
	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)								
	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 with Gears

◆ SGM7J-A5, -01, and -C2



Model SGM7J-	Gear Ratio	L	LL	LM	Flange Surface Dimensions								
					LR	LE	LG	B	LD	LB	LC	LA	LZ
A5A□AH1⊛□	1/5	138 (178.5)	96 (136.5)	77.4	42	2.2	5	29	39.5	40 $^{0}_{-0.025}$	40	46	3.4
A5A□AH2⊛□	1/9												
A5A□AHC⊛□	1/21	147 (187.5)	105 (145.5)	86.4									
A5A□AH7⊛□	1/33	178.5 (219)	120.5 (161)	101.9	58	2.5	8	40	55.5	56 $^{0}_{-0.030}$	60	70	5.5
01A□AH1⊛□	1/5	150 (190.5)	108 (148.5)	89.4	42	2.2	5	29	39.5	40 $^{0}_{-0.025}$	40	46	3.4
01A□AHB⊛□	1/11	190.5 (231)	132.5 (173)	113.9	58	2.5	8	40	55.5	56 $^{0}_{-0.030}$	60	70	5.5
01A□AHC⊛□	1/21												
01A□AH7⊛□	1/33	215 (255.5)	135 (175.5)	116.4	80	7.5	10	59	84	85 $^{0}_{-0.035}$	90	105	9
C2A□AH1⊛□	1/5	162 (210)	120 (168)	101.4	42	2.2	5	29	39.5	40 $^{0}_{-0.025}$	40	46	3.4
C2A□AHB⊛□	1/11	202.5 (250.5)	144.5 (192.5)	125.9	58	2.5	8	40	55.5	56 $^{0}_{-0.030}$	60	70	5.5
C2A□AHC⊛□	1/21	227 (275)	147 (195)	128.4	80	7.5	10	59	84	85 $^{0}_{-0.035}$	90	105	9
C2A□AH7⊛□	1/33												

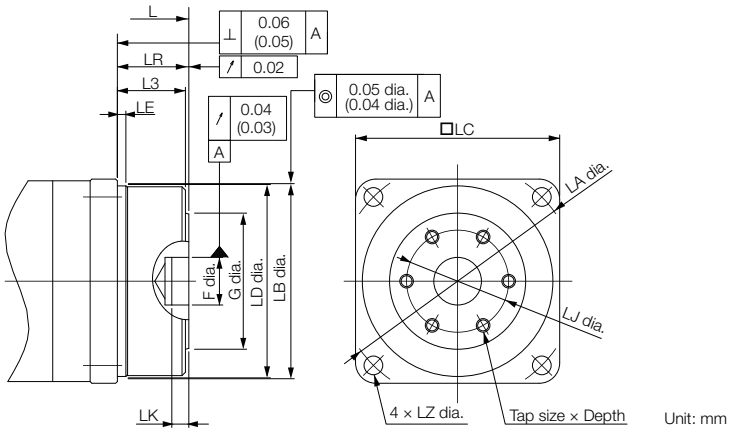
Model SGM7J-	Flange Surface Dimensions			Q	C	S	Tap Size × Depth	Key Dimensions				Approx. Mass [kg]
	L1	L2	L3					QK	U	W	T	
A5A□AH1⊛□	22	20	14.6	–	–	10 $^{0}_{-0.015}$	M3 × 6L	15	2.5	4	4	0.6 (0.9)
A5A□AH2⊛□												
A5A□AHC⊛□												0.7 (1.0)
A5A□AH7⊛□	28	30	20	28	20	16 $^{0}_{-0.018}$	M4 × 8L	25	3	5	5	1.3 (1.6)
01A□AH1⊛□	22	20	14.6	–	–	10 $^{0}_{-0.015}$	M3 × 6L	15	2.5	4	4	0.7 (1.0)
01A□AHB⊛□	28	30	20	28	20	16 $^{0}_{-0.018}$	M4 × 8L	25	3	5	5	1.4 (1.7)
01A□AHC⊛□												
01A□AH7⊛□	36	44	26	42	32	25 $^{0}_{-0.021}$	M6 × 12L	36	4	8	7	2.8 (3.1)
C2A□AH1⊛□	22	20	14.6	–	–	10 $^{0}_{-0.015}$	M3 × 6L	15	2.5	4	4	0.8 (1.1)
C2A□AHB⊛□	28	30	20	28	20	16 $^{0}_{-0.018}$	M4 × 8L	25	3	5	5	1.5 (1.8)
C2A□AHC⊛□	36	44	26	42	32	25 $^{0}_{-0.021}$	M6 × 12L	36	4	8	7	2.9 (3.2)
C2A□AH7⊛□												

* The asterisk (*) is replaced by shaft end code 6 (straight with key and tap) for the 8th digit of the model designation.
If a key and tap are not necessary, specify shaft end code 2 (without key and tap).

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

2. Gear dimensions are different from those of the Σ-I, Σ-II, and Σ-III Series.

■ Flange Output Face



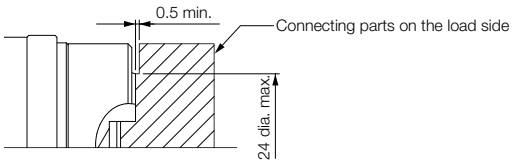
Note: The geometric tolerance in parentheses is the value for LC = 40.

Model SGM7J-	Gear Ratio	L	LR	LJ	F	G	LK	No. of Taps × Tap Size × Depth	Approx. Mass [kg]
A5A□AH10□	1/5	111 (151.5)	15	18	$5^{+0.012}_{0}$	24	3	3 × M4 × 6L	0.6 (0.9)
A5A□AH20□	1/9								
A5A□AHC0□	1/21	120 (160.5)							
A5A□AH70□	1/33	141.5 (182)	21	30	$14^{+0.018}_{0}$	40	5	6 × M4 × 7L	1.2 (1.5)
01A□AH10□	1/5	123 (163.5)	15	18	$5^{+0.012}_{0}$	24	3	3 × M4 × 6L	0.7 (1.0)
01A□AHB0□	1/11	153.5 (194)	21	30	$14^{+0.018}_{0}$	40	5	3 × M4 × 7L	1.3 (1.6)
01A□AHC0□	1/21								
01A□AH70□	1/33	162 (202.5)	27	45	$24^{+0.021}_{0}$	59		6 × M6 × 10L	2.4 (2.7)
C2A□AH10□	1/5	135 (183)	15	18	$5^{+0.012}_{0}$	24	3	3 × M4 × 6L	0.8 (1.1)
C2A□AHB0□	1/11	165.5 (213.5)	21	30	$14^{+0.018}_{0}$	40	5	6 × M4 × 7L	1.4 (1.7)
C2A□AHC0□	1/21	174 (222)	27	45	$24^{+0.021}_{0}$	59	5	6 × M6 × 10L	2.5 (2.8)
C2A□AH70□	1/33								

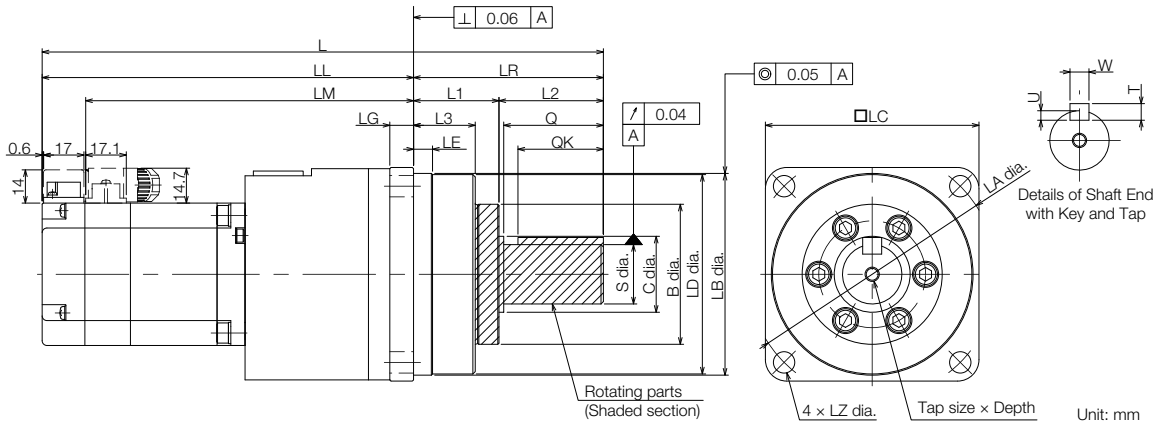
Note: 1. The values in parentheses are for Servomotors with Holding Brakes.
2. Dimensions not found in the above table are the same as those in the table on the previous page.

Important

For a Servomotor with a flange output that has square gear flange dimensions (□LC) of 40 mm, we recommend that you design the Servomotor with the dimensions shown in the following figure in order to secure a gap between the gear oil seal and the connecting parts on the load side.



◆ SGM7J-02, -04, and -06



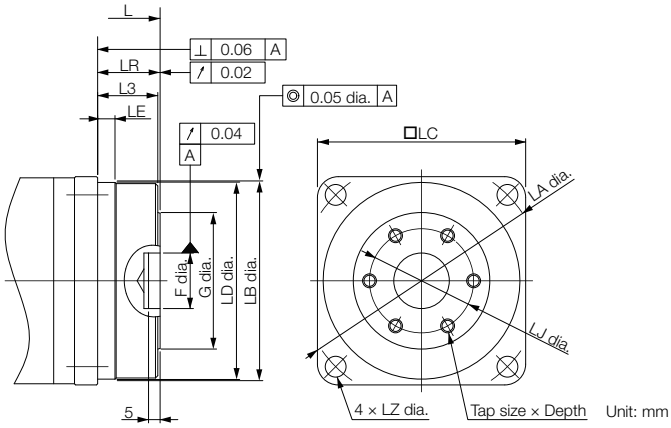
Model SGM7J-	Gear Ratio	L	LL	LM	Flange Surface Dimensions								
					LR	LE	LG	B	LD	LB	LC	LA	LZ
02A□AH1⊛□	1/5	191.5 (232)	133.5 (174)	115.2	58	2.5	8	40	55.5	56 $^{0}_{-0.030}$	60	70	5.5
02A□AH2⊛□	1/11												
02A□AHC⊛□	1/21	220.5 (261)	140.5 (181)	122.2	80	7.5	10	59	84	85 $^{0}_{-0.035}$	90	105	9
02A□AH7⊛□	1/33												
04A□AH1⊛□	1/5	207.5 (248)	149.5 (190)	131.2	58	2.5	8	40	55.5	56 $^{0}_{-0.030}$	60	70	5.5
04A□AHB⊛□	1/11	236.5 (277)	156.5 (197)	138.2	80	7.5	10	59	84	85 $^{0}_{-0.035}$	90	105	9
04A□AHC⊛□	1/21												
04A□AH7⊛□	1/33	322.5 (363)	189.5 (230)	171.2	133	12.5	13	84	114	115 $^{0}_{-0.035}$	120	135	11
06A□AH1⊛□	1/5	258.5 (312.5)	178.5 (232.5)	160.2	80	7.5	10	59	84	85 $^{0}_{-0.035}$	90	105	9
06A□AHB⊛□	1/11												
06A□AHC⊛□	1/21	344.5 (398.5)	211.5 (265.5)	193.2	133	12.5	13	84	114	115 $^{0}_{-0.035}$	120	135	11
06A□AH7⊛□	1/33												

Model SGM7J-	Flange Surface Dimensions			Q	C	S	Tap Size × Depth	Key Dimensions				Approx. Mass [kg]
	L1	L2	L3					QK	U	W	T	
02A□AH1⊛□	28	30	20	28	20	16 $^{0}_{-0.018}$	M4 × 8L	25	3	5	5	1.8 (2.4)
02A□AH2⊛□												1.9 (2.5)
02A□AHC⊛□	36	44	26	42	32	25 $^{0}_{-0.021}$	M6 × 12L	36	4	8	7	3.7 (4.3)
02A□AH7⊛□												
04A□AH1⊛□	28	30	20	28	20	16 $^{0}_{-0.018}$	M4 × 8L	25	3	5	5	2.1 (2.7)
04A□AHB⊛□	36	44	26	42	32	25 $^{0}_{-0.021}$	M6 × 12L	36	4	8	7	4.0 (4.6)
04A□AHC⊛□												
04A□AH7⊛□	48	85	33	82	44	40 $^{0}_{-0.025}$	M10 × 20L	70	5	12	8	8.6 (9.2)
06A□AH1⊛□	36	44	26	42	32	25 $^{0}_{-0.021}$	M6 × 12L	36	4	8	7	4.3 (4.9)
06A□AHB⊛□												4.5 (5.1)
06A□AHC⊛□	48	85	33	82	44	40 $^{0}_{-0.025}$	M10 × 20L	70	5	12	8	9.1 (9.7)
06A□AH7⊛□												

* The asterisk (*) is replaced by shaft end code 6 (straight with key and tap) for the 8th digit of the model designation.
If a key and tap are not necessary, specify shaft end code 2 (without key and tap).

Note: 1. The values in parentheses are for Servomotors with Holding Brakes.
2. Gear dimensions are different from those of the Σ-I, Σ-II, and Σ-III Series.

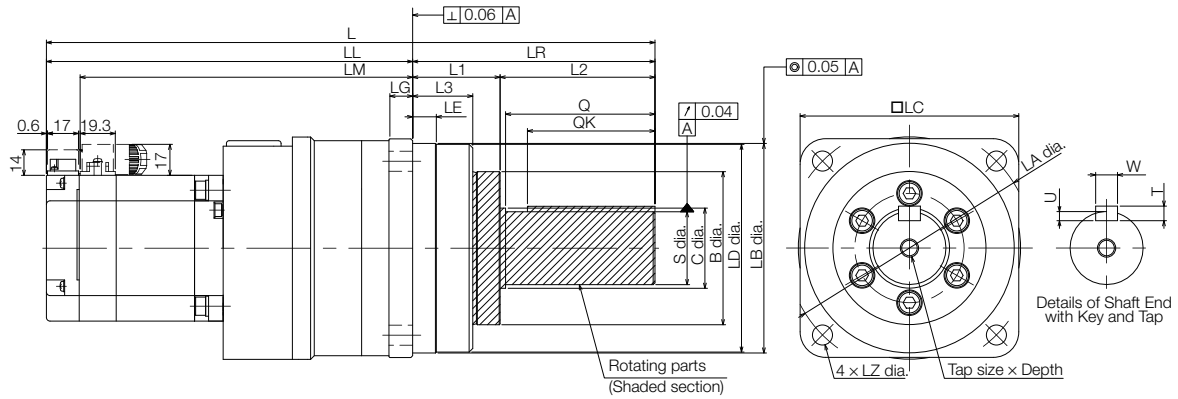
■ Flange Output Face



Model SGM7J-	Gear Ratio	L	LR	LJ	F	G	No. of Taps × Tap Size × Depth	Approx. Mass [kg]
02A□AH10□	1/5	154.5 (195)	21	30	$14^{+0.018}_{0}$	40	6 × M4 × 7L	1.7 (2.3)
02A□AH20□	1/11							1.8 (2.4)
02A□AHC0□	1/21	167.5 (208)	27	45	$24^{+0.021}_{0}$	59	6 × M6 × 10L	3.3 (3.9)
02A□AH70□	1/33							
04A□AH10□	1/5	170.5 (211)	21	30	$14^{+0.018}_{0}$	40	6 × M4 × 7L	2.0 (2.6)
04A□AHB0□	1/11	183.5 (224)	27	45	$24^{+0.021}_{0}$	59	6 × M6 × 10L	3.6 (4.2)
04A□AHC0□	1/21							
04A□AH70□	1/33	224.5 (265)	35	60	$32^{+0.025}_{0}$	84	6 × M8 × 12L	7.2 (7.8)
06A□AH10□	1/5	205.5 (259.5)	27	45	$24^{+0.021}_{0}$	59	6 × M6 × 10L	3.9 (4.5)
06A□AHB0□	1/11							4.1 (4.7)
06A□AHC0□	1/21	246.5 (300.5)	35	60	$32^{+0.025}_{0}$	84	6 × M8 × 12L	7.7 (8.3)
06A□AH70□	1/33							

Note: 1. The values in parentheses are for Servomotors with Holding Brakes.
2. Dimensions not found in the above table are the same as those in the table on the previous page.

◆ SGM7J-08



Unit: mm

Model SGM7J-	Gear Ratio	L	LL	LM	Flange Surface Dimensions								
					LR	LE	LG	B	LD	LB	LC	LA	LZ
08A□AH1⊛□	1/5	255 (302)	175 (222)	156.5	80	7.5	10	59	84	$85^{\ 0}_{-0.035}$	90	105	9
08A□AHB⊛□	1/11												
08A□AHC⊛□	1/21	334 (381)	201 (248)	182.5	133	12.5	13	84	114	$115^{\ 0}_{-0.035}$	120	135	11
08A□AH7⊛□	1/33												

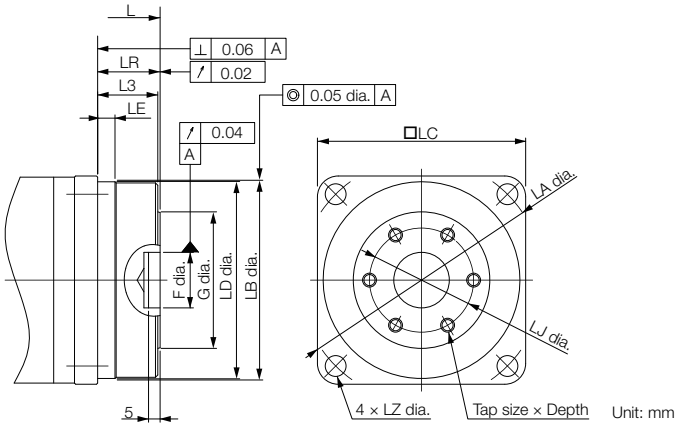
Model SGM7J-	Flange Surface Dimensions			Q	C	S	Tap Size × Depth	Key Dimensions				Approx. Mass [kg]
	L1	L2	L3					QK	U	W	T	
08A□AH1⊛□	36	44	26	42	32	$25^{\ 0}_{-0.021}$	M6 × 12L	36	4	8	7	5.1 (5.7)
08A□AHB⊛□												5.3 (5.9)
08A□AHC⊛□	48	85	33	82	44	$40^{\ 0}_{-0.025}$	M10 × 20L	70	5	12	8	10 (10.6)
08A□AH7⊛□												

* The asterisk (*) is replaced by shaft end code 6 (straight with key and tap) for the 8th digit of the model designation.
If a key and tap are not necessary, specify shaft end code 2 (without key and tap).

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

2. Gear dimensions are different from those of the Σ-I, Σ-II, and Σ-III Series.

■ Flange Output Face



Model SGM7J-	Gear Ratio	L	LR	LJ	F	G	No. of Taps × Tap Size × Depth	Approx. Mass [kg]
08A□AH101	1/5	202 (249)	27	45	$24^{+0.021}_{0}$	59	6 × M6 × 10L	4.7 (5.3)
08A□AHB01	1/11							4.9 (5.5)
08A□AHC01	1/21	236 (283)	35	60	$32^{+0.025}_{0}$	84	6 × M8 × 12L	8.6 (9.2)
08A□AH701	1/33							

Note: 1. The values in parentheses are for Servomotors with Holding Brakes.
2. Dimensions not found in the above table are the same as those in the table on the previous page.

Model Designations

SGM7G - 03 A 7 A 2 1

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

Σ-7 Series Servomotors: SGM7G

1st+2nd digits Rated Output

Code	Specification
03	300 W
05	450 W
09	850 W
13	1.3 kW
20	1.8 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

A

6th digit Shaft End

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

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

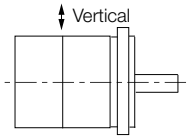
Ratings and Specifications

Specifications

Voltage		200 V				
Model SGM7G-		03A	05A	09A	13A	20A
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 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/s^2				
	Number of Impacts	2 times				
Vibration Resistance*3	Vibration Acceleration Rate at Flange	49 m/s^2 (24.5 m/s^2 front to back)				
Applicable SERVOPACKs		Refer to the following section. ☞ *Σ-7 Series Combination* (page M-18)				

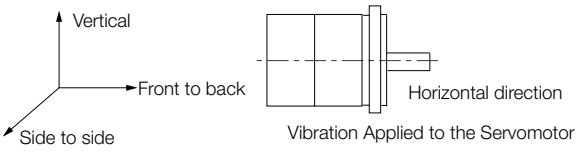
*1. A vibration class of V15 indicates a vibration amplitude of 15 μm maximum on the Servomotor without a load at the rated motor speed.

*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 ambient temperature will exceed 40°C, refer to the following section.
☞ *Applications Where the Ambient Temperature of the Servomotor Exceeds 40 °C* (page 52)

*5. If the altitude will exceed 1,000 m, refer to the following section.
☞ *Applications Where the Altitude of the Servomotor Exceeds 1,000 m* (page 53)

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		N·m	1.96	2.86	5.39	8.34	11.5
Instantaneous Maximum Torque*1		N·m	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		N·m/Arms	0.776	0.854	0.859	0.891	0.748
Motor Moment of Inertia		$\times10^{-4}$ 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 (aluminum)		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	N·m	4.5		12.7	19.6	
	Coil Resistance	Ω (at 20°C)	56		59		
	Rated Current	A (at 20°C)	0.42		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 Loads*5	LF	mm	40		58		
	Allowable Radial Load	N	490			686	980
	Allowable Thrust Load	N	98			343	392

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

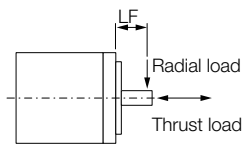
*1. These values are for operation in combination with a SERVOPACK when the temperature of the armature winding is 20°C. These are typical values.

*2. The rated torques are the continuous allowable torque values at 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.

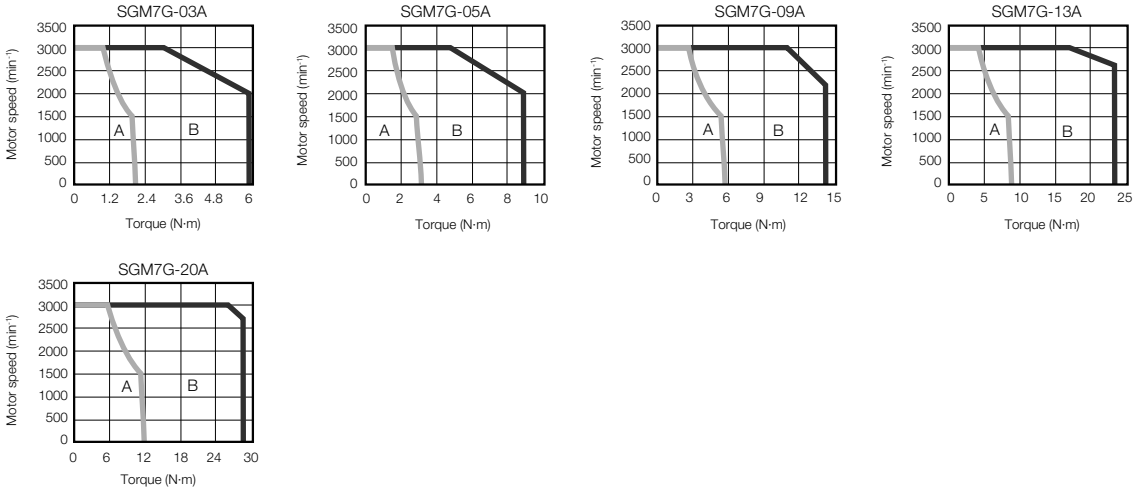
*4. Observe the following precautions if you use a Servomotor with a Holding Brake.
- The holding brake cannot be used to stop the Servomotor.
- The time required to release the brake and the time required to brake depend on which discharge circuit is used. Confirm that the operation delay time is appropriate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



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

A : Continuous duty zone
B : Intermittent duty zone

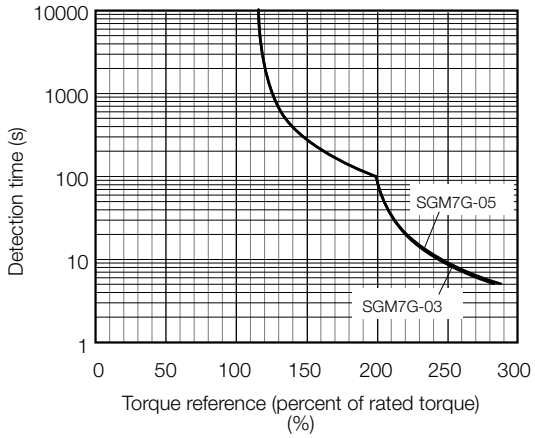


Note: 1. These values are for operation in combination with a SERVOPACK when the temperature of the armature winding is 20°C. These are typical values.
2. The characteristics in the intermittent duty zone depend on the power supply voltage.
3. If the effective torque is within the allowable range for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

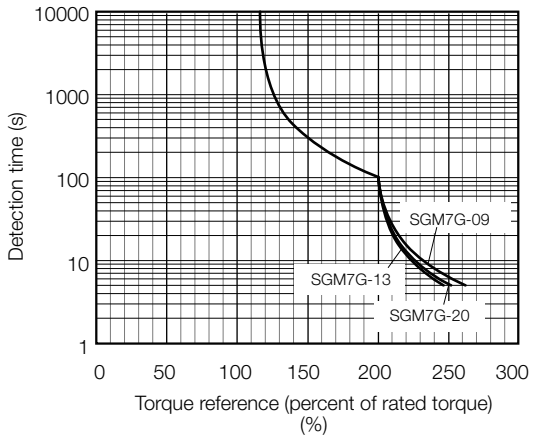
Servomotor Overload Protection Characteristics

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

SGM7G-03 and -05



SGM7G-09, -13, and -20



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 for Three-phase, 200 V* on page 50.

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.

The allowable size of the load moment of inertia (J_L) for the Servomotor is restricted. Refer to *Servomotor Ratings* on page 49. This value is provided strictly as a guideline and results depend on Servomotor driving conditions.

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

- Reduce the torque limit.
- Reduce the deceleration rate.
- Reduce the maximum motor speed.
- Install an external regenerative resistor if the alarm cannot be cleared using the above steps.

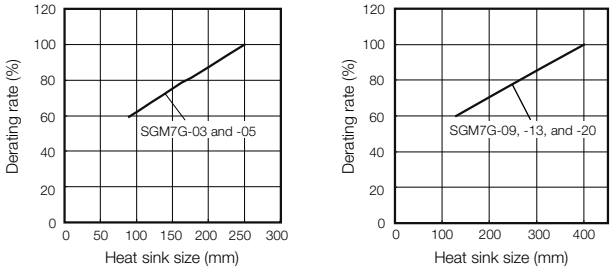
Servomotor Heat Dissipation Conditions

The Servomotor ratings are the continuous allowable values at an ambient 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

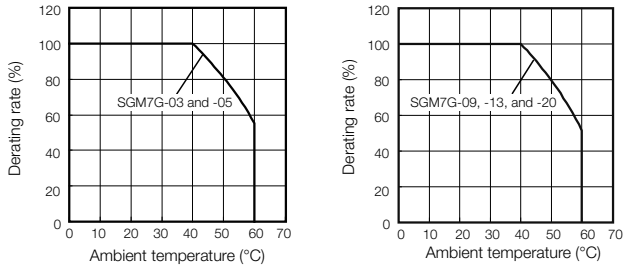
The actual temperature rise depends on how the heat sink (i.e., the Servomotor mounting section) is attached to the installation surface, what material is used for the Servomotor mounting section, and the motor speed. Always check the Servomotor temperature with the actual equipment.



Applications Where the Ambient Temperature of the Servomotor Exceeds 40°C

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

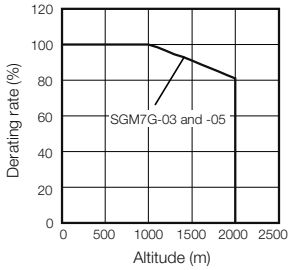
Note: The derating rates are applicable only when the average motor speed is less than or equal to the rated motor speed. If the average motor speed exceeds the rated motor speed, consult with your Yaskawa representative.

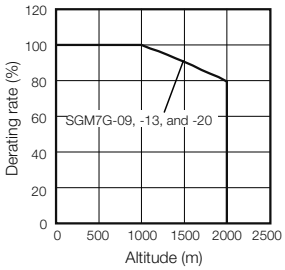


Applications Where the Altitude of the Servomotor Exceeds 1,000 m

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.

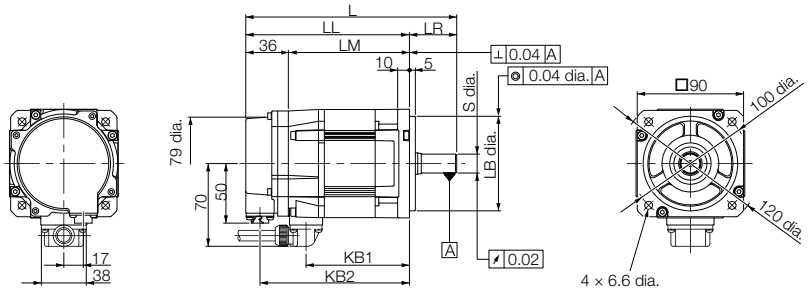




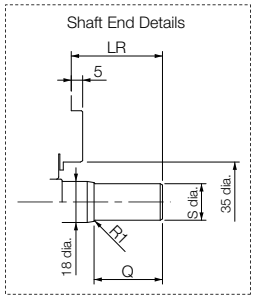
External Dimensions

Servomotors without Holding Brakes

◆ SGM7G-03 and -05



Notation
□: Square dimensions



Refer to *Shaft End Specifications* on page 56 for details.

Unit: mm

Model SGM7G-	L	LL	LM	LR	KB1	KB2	LB	Shaft End Dimensions		Approx. Mass [kg]
								S	Q	
03A□A21	166*	126	90	40*	75	114	$80^{\ 0}_{-0.030}$	$16^{\ 0}_{-0.011}$*	30*	2.6
05A□A21	179	139	103	40	88	127	$80^{\ 0}_{-0.030}$	$16^{\ 0}_{-0.011}$	30	3.2

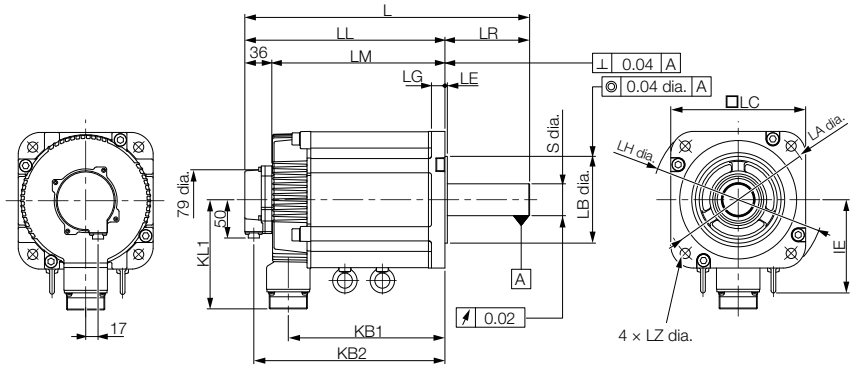
Note: Servomotors with Oil Seals have the same dimensions.

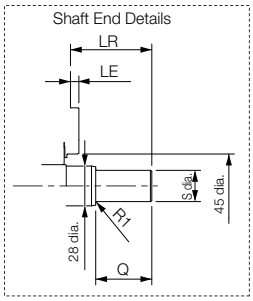
* The L, LR, S, and Q dimensions of these Servomotors are different from those of the Σ-V-series SGMGV Servomotors. Models that have the same installation dimensions as the SGMGV Servomotors are also available. Contact your Yaskawa representative for details.

Refer to the following section for information on connectors.

☞ ◆ *SGM7G-03 and -05 without Holding Brakes* (page 57)

◆ SGM7G-09, -13, and -20





Refer to *Shaft End Specifications* on page 56 for details.

Unit: mm

Model SGM7G-	L	LL	LM	LR	KB1	KB2	IE	KL1	Flange Surface 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	$24^{\ 0}_{-0.013}$*	40	5.5
13A□A21	211	153	117	58	99	141	–	104	145	$110^{\ 0}_{-0.035}$	130	6	12	165	9	$24^{\ 0}_{-0.013}$*	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

Note: Servomotors with Oil Seals have the same dimensions.

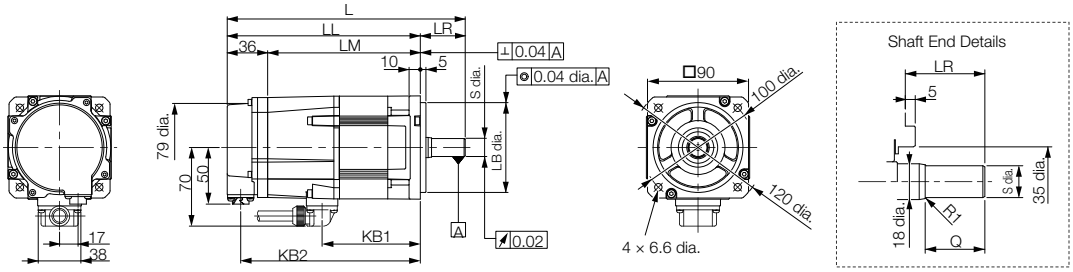
* The S dimensions of these Servomotors are different from those of the Σ-V-series SGMGV Servomotors. Models that have the same installation dimensions as the SGMGV Servomotors are also available. Contact your Yaskawa representative for details.

Refer to the following section for information on connectors.

☞ ◆ *SGM7G-09, -13, and -20 without Holding Brakes* (page 57)

Servomotors with Holding Brakes

◆ SGM7G-03 and -05



Refer to *Shaft End Specifications* on page 56 for details.

Unit: mm

Model SGM7G-	L	LL	LM	LR	KB1	KB2	LB	Shaft End Dimensions		Approx. Mass [kg]
								S	Q	
03A□A2C	199*	159	123	40*	75	147	$80^{\ 0}_{-0.030}$	$16^{\ 0}_{-0.011}$*	30*	3.6
05A□A2C	212	172	136	40	88	160	$80^{\ 0}_{-0.030}$	$16^{\ 0}_{-0.011}$	30	4.2

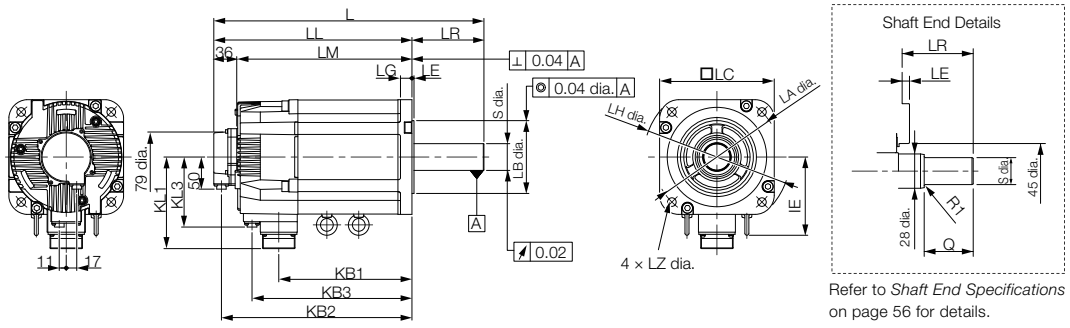
Note: Servomotors with Oil Seals have the same dimensions.

* The L, LR, S, and Q dimensions of these Servomotors are different from those of the Σ-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.

☞ ◆ *SGM7G-03 and -05 with Holding Brakes* (page 57)

◆ SGM7G-09, -13, and -20



Refer to *Shaft End Specifications* on page 56 for details.

Unit: mm

Model SGM7G-	L	LL	LM	LR	KB1	KB2	KB3	IE	KL1	KL3	Flange Surface 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

Note: Servomotors with Oil Seals have the same dimensions.

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

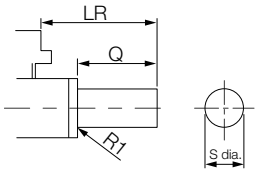
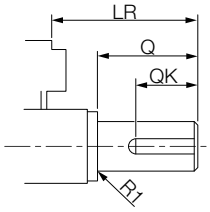
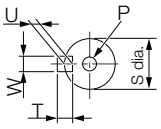
Refer to the following section for information on connectors.

☞ ◆ *SGM7G-09, -13, and -20 with Holding Brakes* (page 58)

Shaft End Specifications

◆ SGM7G-□□□□□□□

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

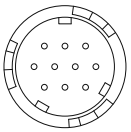
Shaft End Details		Servomotor Model SGM7G-				
		03	05	09	13	20
Code: 2 (Straight without Key)						
	LR	40*	40	58	58	58
	Q	30*	30	40	40	40
	S	$16^{0}_{-0.011}$*	$16^{0}_{-0.011}$	$24^{0}_{-0.013}$*	$24^{0}_{-0.013}$*	$24^{0}_{-0.013}$
Code: 6 (Straight with Key and Tap)						
	LR	40*	40	58	58	58
	Q	30*	30	40	40	40
	QK	20*	20	25	25	25
	S	$16^{0}_{-0.011}$*	$16^{0}_{-0.011}$	$24^{0}_{-0.013}$*	$24^{0}_{-0.013}$*	$24^{0}_{-0.013}$
	W	5	5	8*	8*	8
	T	5	5	7*	7*	7
	U	3	3	4*	4*	4
	P	M5 screw, Depth: 12				

* The shaft end dimensions of these Servomotors are different from those of the Σ-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

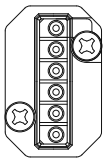
◆ SGM7G-03 and -05 without Holding Brakes

• 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.

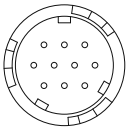
• Servomotor Connector Specifications



Manufacturer: Japan Aviation Electronics Industry, Ltd.

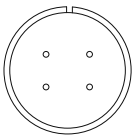
◆ SGM7G-09, -13, and -20 without Holding Brakes

• 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.

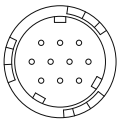
• Servomotor Connector Specifications



Manufacturer: DDK Ltd.

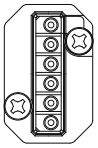
◆ SGM7G-03 and -05 with Holding Brakes

• 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.

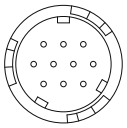
• Servomotor Connector Specifications



Manufacturer: Japan Aviation Electronics Industry, Ltd.

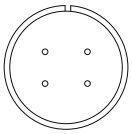
◆ SGM7G-09, -13, and -20 with Holding Brakes

• Encoder Connector Specifications (24-bit Encoder)



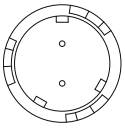
Receptacle: CM10-R10P-D
Applicable plug: Not provided by Yaskawa.
Plug: CM10-AP10S-□-D for Right-angle Plug
CM10-SP10S-□-D for Straight Plug
(□ depends on the applicable cable size.)
Manufacturer: DDK Ltd.

• 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.

Direct Drive Servomotors

Model Designations

SGMCS - 02 B 3 C 1 1

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

Direct Drive Servomotors: SGMCS

1st+2nd digits Rated Output

● Small-Capacity Series

Code	Specification
02	2 N·m
04	4 N·m
05	5 N·m
07	7 N·m
08	8 N·m
10	10 N·m
14	14 N·m
16	16 N·m
17	17 N·m
25	25 N·m
35	35 N·m

● Medium-Capacity Series

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

3rd digit Servomotor Outer Diameter

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

4th digit Serial Encoder

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

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

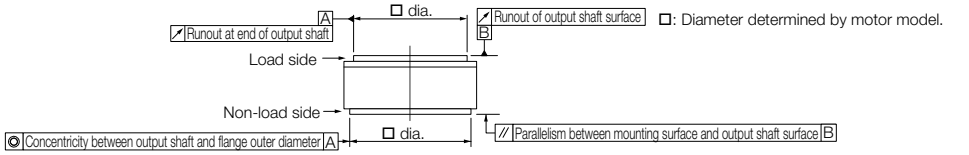
Note: Direct Drive Servomotors are not available with holding brakes.

Ratings and Specifications

Small-Capacity Series: 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 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	Surrounding Air Temperature		0°C to 40°C (with no freezing)									
	Surrounding Air Humidity		20% to 80% relative humidity (with no condensation)									
	Installation Site		• Must be indoors and free of corrosive and explosive gases. • Must be well-ventilated and free of dust and moisture. • Must facilitate inspection and cleaning. • Must have an altitude of 1,000 m or less. • Must be free of strong magnetic fields.									
	Storage Environment		Store the Servomotor in the following environment if you store it with the power cable disconnected. Storage Temperature: -20°C to 60°C (with no freezing) Storage Humidity: 20% to 80% relative humidity (with no condensation)									
Mechanical Tolerances*3	Runout of Output Shaft Surface	mm	0.02									
	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/s^2									
	Number of Impacts		2 times									
Vibration Resistance*5	Vibration Acceleration Rate at Flange		49 m/s^2									
Applicable SERVOPACKs			Refer to the following section. ☞ *Σ-7 Series Combination* (page M-18)									

*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.

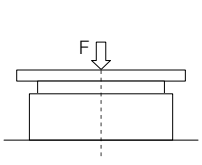
Small-Capacity Series: Ratings

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		N·m	2.00	5.00	7.00	4.00	10.0	14.0	8.00	17.0	25.0	16.0	35.0
Instantaneous Maximum Torque*1		N·m	6.00	15.0	21.0	12.0	30.0	42.0	24.0	51.0	75.0	48.0	105
Stall Torque*1		N·m	2.05	5.15	7.32	4.09	10.1	14.2	8.23	17.4	25.4	16.5	35.6
Rated Current*1		Arms	1.8	1.7	1.4	2.2		2.8	1.9	2.5	2.6	3.3	3.5
Instantaneous Maximum Current*1		Arms	5.4	5.1	4.1	7.0		8.3	5.6	7.5	8.0	9.4	10.0
Rated 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		N·m/Arms	1.18	3.17	5.44	2.04	5.05	5.39	5.10	7.79	10.8	5.58	11.1
Motor Moment of Inertia		$\times 10^{-4}$ kg·m^2	28.0	51.0	77.0	77.0	140	220	285	510	750	930	1430
Rated Power Rate*1		kW/s	1.43	4.90	6.36	2.08	7.14	8.91	2.25	5.67	8.33	2.75	8.57
Rated Angular Acceleration Rate*1		rad/s^2	710	980	910	520	710	640	280	330		170	240
Heat Sink Size		mm	350 × 350 × 12			450 × 450 × 12			550 × 550 × 12			650 × 650 × 12	
Allowable Load Moment of Inertia (Motor Moment of Inertia Ratio)			10 times				5 times	3 times					
Allowable Load*3	Allowable Thrust Load	N	1500			3300			4000			11000	
	Allowable Moment Load	N·m	40	50	64	70	75	90	93	103	135	250	320

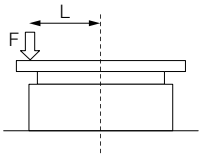
*1. These values are for operation in combination with a SERVOPACK when the temperature of the armature winding is 100°C. The values for other items are at 20°C. These are typical values.

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

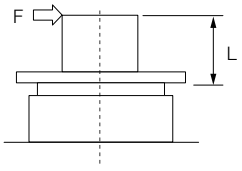
*3. The thrust loads and moment loads that are applied while a Servomotor is operating are roughly classified into the following patterns. Design the machine so that the thrust loads or moment loads will not exceed the values given in the table.



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

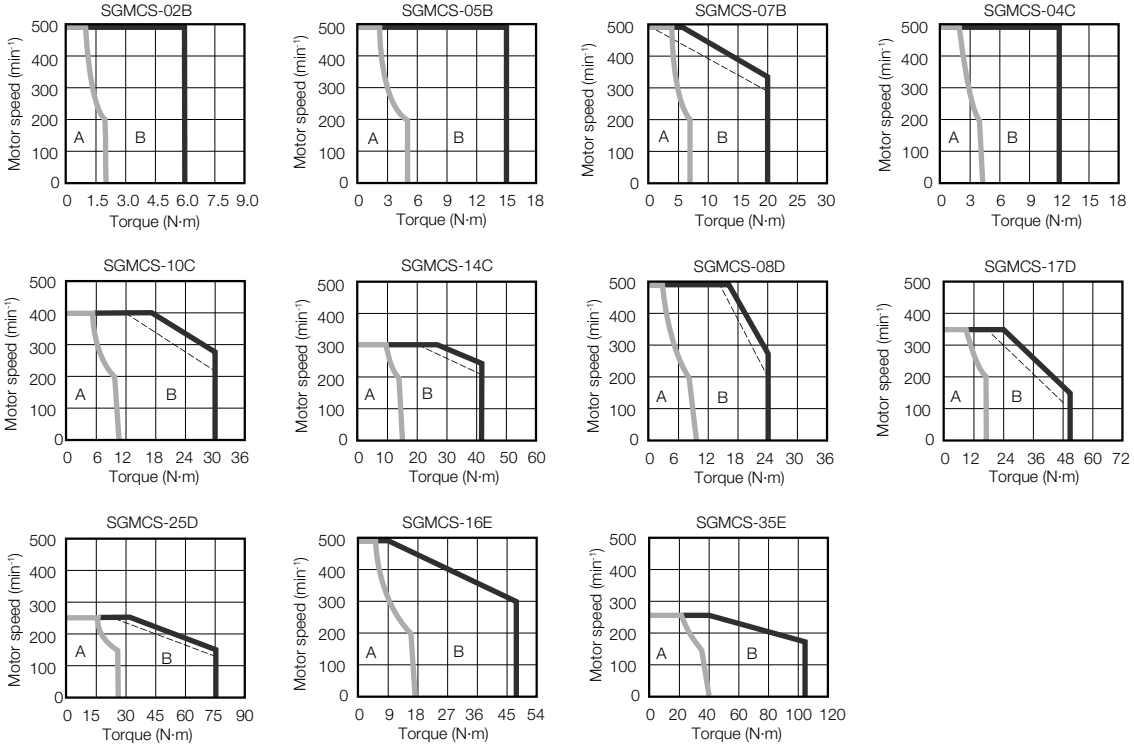


Where F is the external force
Thrust load = Load mass
Moment load = F × L

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 Series: Torque-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

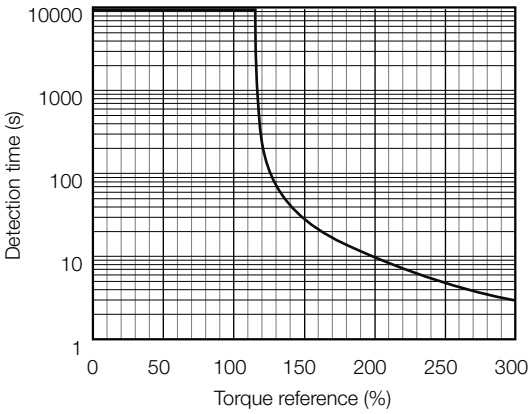


Note: 1. These values are for operation in combination with a SERVOPACK when the temperature of the armature winding is 100°C. These are typical values.
2. The characteristics in the intermittent duty zone depend on the power supply voltage.
3. If the effective torque is within the allowable range for 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 as the voltage drop increases.

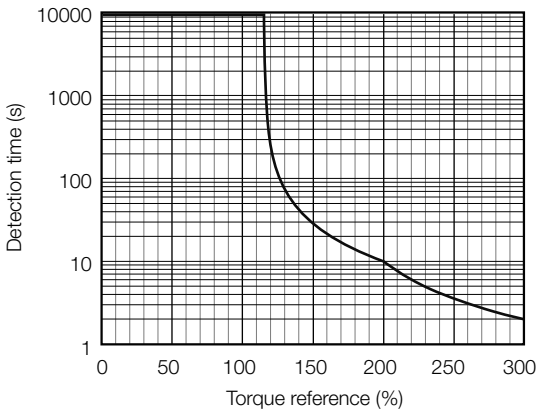
Small-Capacity Series: Servomotor Overload Protection Characteristics

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

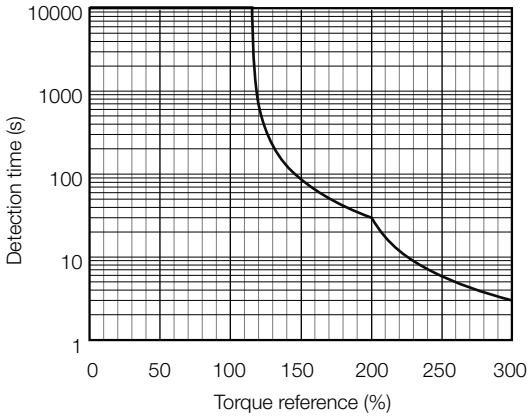
SGMCS-02B, -05B, -07B, -10C, -17D, and -35E



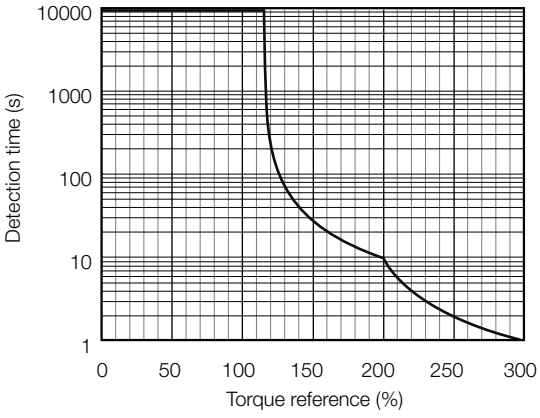
SGMCS-04C



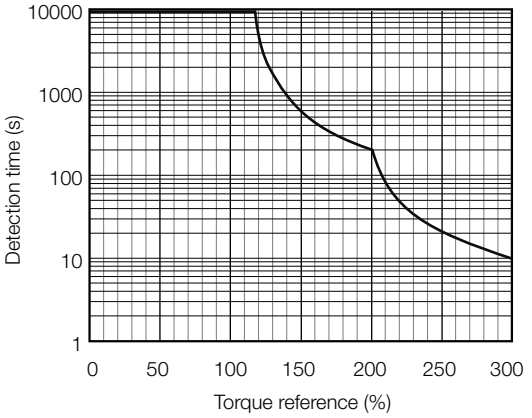
SGMCS-14C



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 Series: Torque-Motor Speed Characteristics* on page 64.

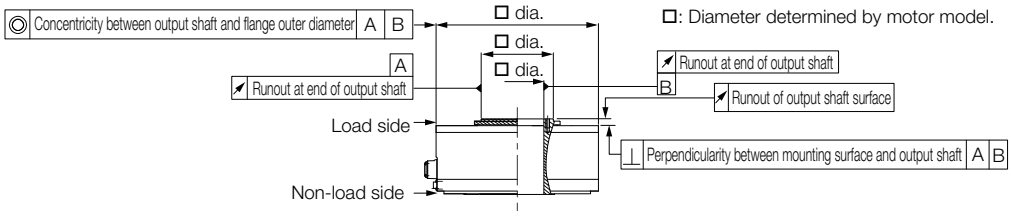
Medium-Capacity Series: Specifications

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 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	Surrounding Air Temperature		0°C to 40°C (with no freezing)					
	Surrounding Air Humidity		20% to 80% relative humidity (with no condensation)					
	Installation Site		• Must be indoors and free of corrosive and explosive gases. • Must be well-ventilated and free of dust and moisture. • Must facilitate inspection and cleaning. • Must have an altitude of 1,000 m or less. • Must be free of strong magnetic fields.					
	Storage Environment		Store the Servomotor in the following environment if you store it with the power cable disconnected. Storage Temperature: -20°C to 60°C (with no freezing) Storage Humidity: 20% to 80% relative humidity (with no condensation)					
Mechanical Tolerances*3	Runout of Output Shaft Surface	mm	0.02					
	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/s^2					
	Number of Impacts		2 times					
Vibration Resistance*5	Vibration Acceleration Rate at Flange		24.5 m/s^2					
Applicable SERVOPACKs			Refer to the following section. ☞ *Σ-7 Series Combination* (page M-18)					

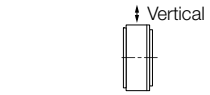
*1. A vibration class of V15 indicates a vibration amplitude of 15 μm maximum on the Servomotor without a load at the rated motor speed.

*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.

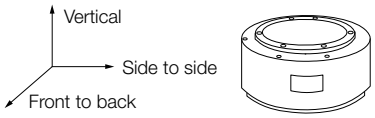


*4. The shock resistance for shock in the vertical direction when the Servomotor is mounted with the shaft in a horizontal position is given in the above table.



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.



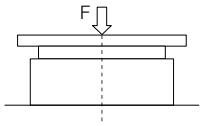
Medium-Capacity Series: Ratings

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		N·m	45.0	80.0	110	80.0	150	200
Instantaneous Maximum Torque*1		N·m	135	240	330	240	450	600
Stall Torque*1		N·m	45.0	80.0	110	80.0	150	200
Rated Current*1		Arms	5.8	9.7	13.4	9.4	17.4	18.9
Instantaneous Maximum Current*1		Arms	17.0	28.0	42.0	28.0	56.0	56.0
Rated Motor Speed*1		min^{-1}	150			150		
Maximum Motor Speed*1		min^{-1}	300			300	250	
Torque Constant		N·m/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 × 750 × 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	N·m	180			350		

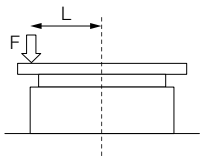
*1. These values are for operation in combination with a SERVOPACK when the temperature of the armature winding is 20°C. These are typical values.

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

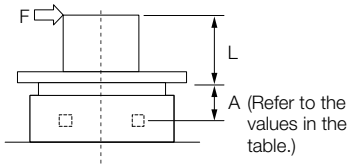
*3. The thrust loads and moment loads that are applied while a Servomotor is operating are roughly classified into the following patterns. Design the machine so that the thrust loads or moment loads will not exceed the values given in the table.



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

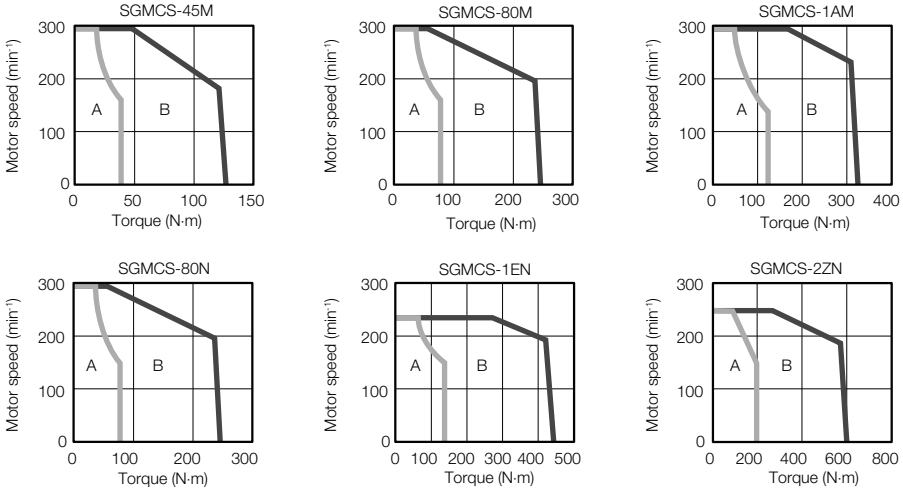


Where F is the external force,
Thrust load = Load mass
Moment load = F × (L + A)

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 Series: Torque-Motor Speed Characteristics

A : Continuous duty zone
B : Intermittent duty zone

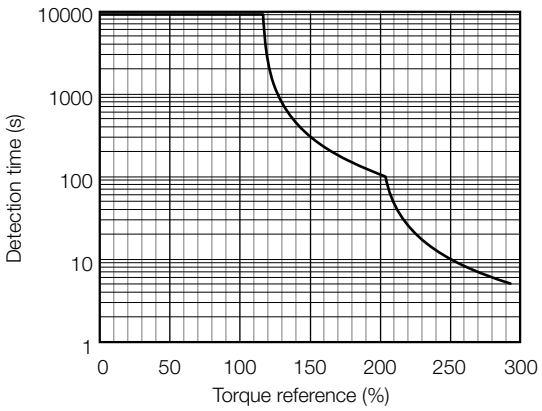


Note: 1. These values are for operation in combination with a SERVOPACK when the temperature of the armature winding is 20°C. These are typical values.
2. If the effective torque is within the allowable range for the rated torque, the Servomotor can be used within the intermittent duty zone.
3. If the length of the Servomotor Main Circuit Cable exceeds 20 m, the intermittent duty zone in the torque-motor speed characteristics will become smaller as the voltage drop increases.

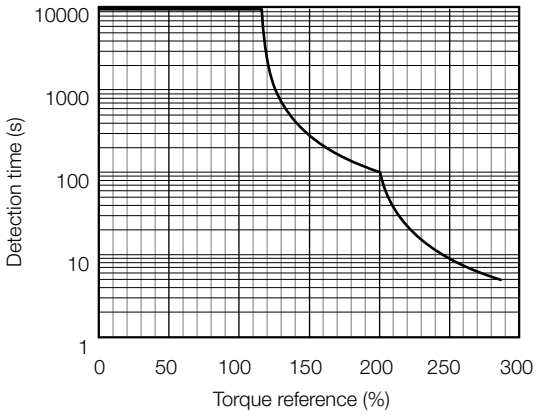
Medium-Capacity Series: Servomotor Overload Protection Characteristics

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

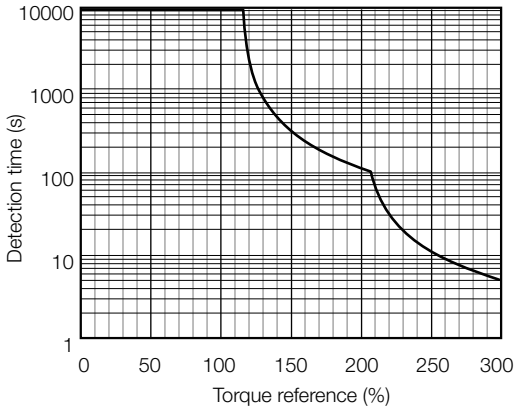
SGMCS-45M□A



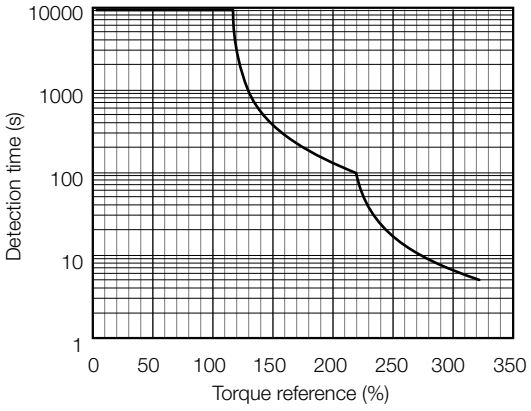
SGMCS-80M□A



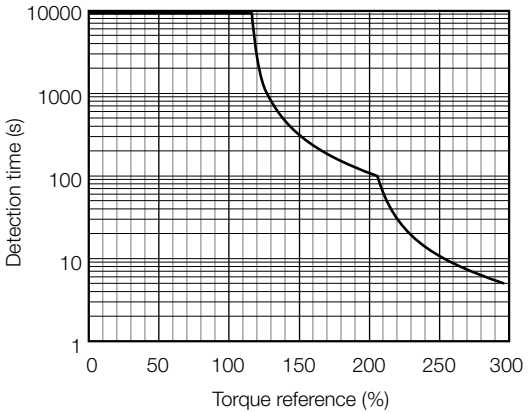
SGMCS-1AM□A and -80N□A



SGMCS-1EN□A



SGMCS-2ZN□A



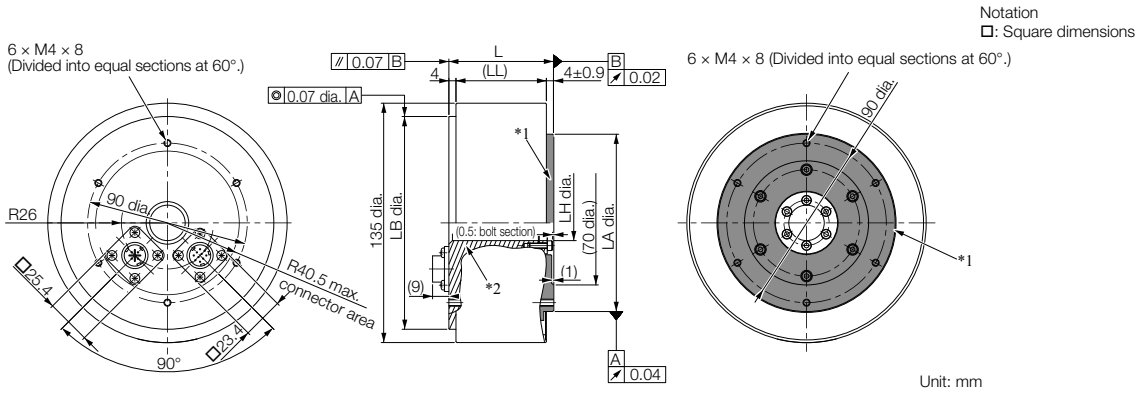
Note: The above overload protection characteristics do not mean that you can perform continuous duty operation with an output of 100% or higher. Use the Servomotor so that the effective torque remains within the continuous duty zone given in *Medium-Capacity Series: Torque-Motor Speed Characteristics* on page 69.

External Dimensions

Small-Capacity Series

◆ SGMCS-□□B

• Flange Specification: 1



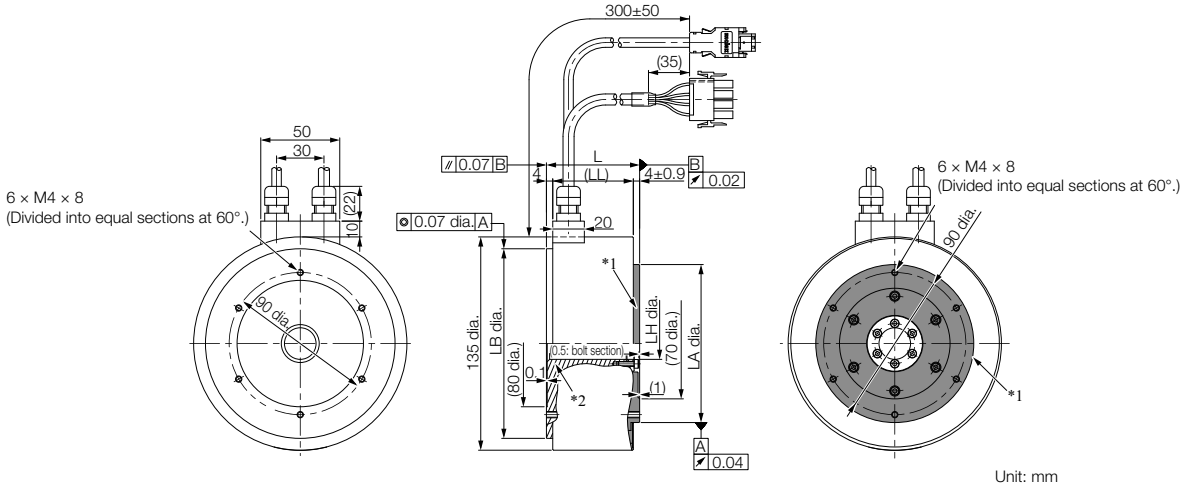
*1. The shaded section indicates the rotating parts.

*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.

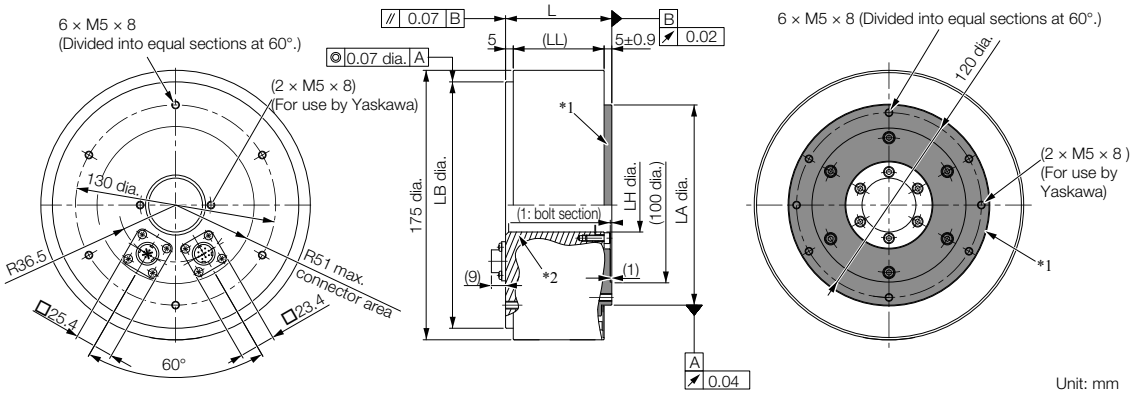
Model SGMCS-	L	(LL)	LB	LH	LA	Approx. Mass [kg]
02B□C41	59	51	$120^{\ 0}_{-0.035}$	$20^{+0.4}_{\ 0}$	$100^{\ 0}_{-0.035}$	4.8
05B□C41	88	80	$120^{\ 0}_{-0.035}$	$20^{+0.4}_{\ 0}$	$100^{\ 0}_{-0.035}$	5.8
07B□C41	128	120	$120^{\ 0}_{-0.035}$	$20^{+0.4}_{\ 0}$	$100^{\ 0}_{-0.035}$	8.2

Refer to the following section for information on connectors.

☞ *Connector Specifications* (page 77)

◆ SGMCS-□□C

• Flange Specification: 1



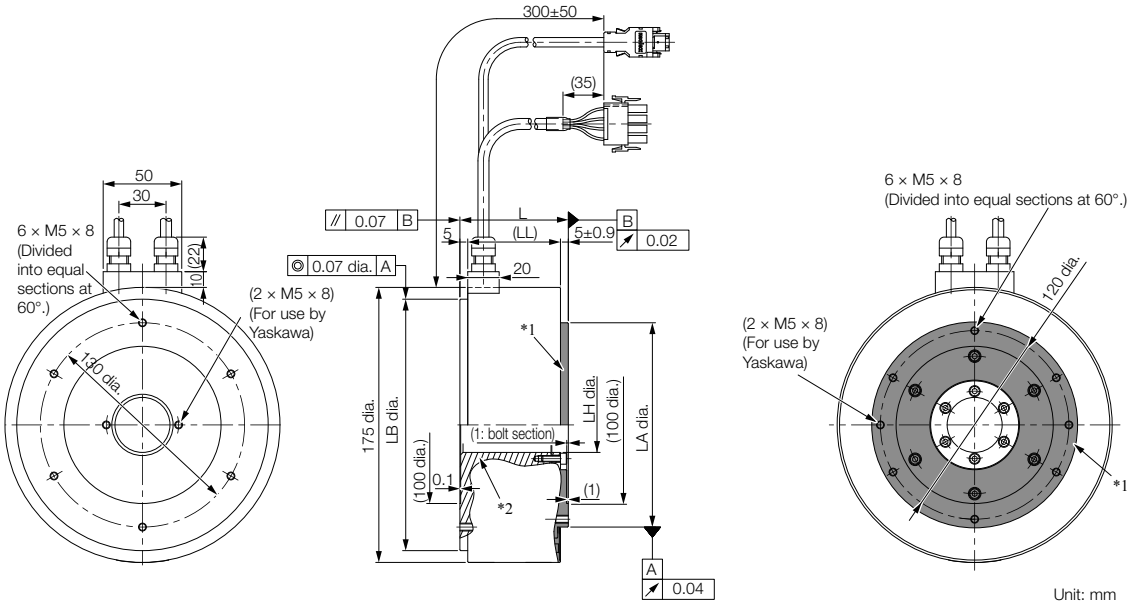
*1. The shaded section indicates the rotating parts.

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

Note: Values in parentheses are reference dimensions.

Model 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



*1. The shaded section indicates the rotating parts.

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

Note: Values in parentheses are reference dimensions.

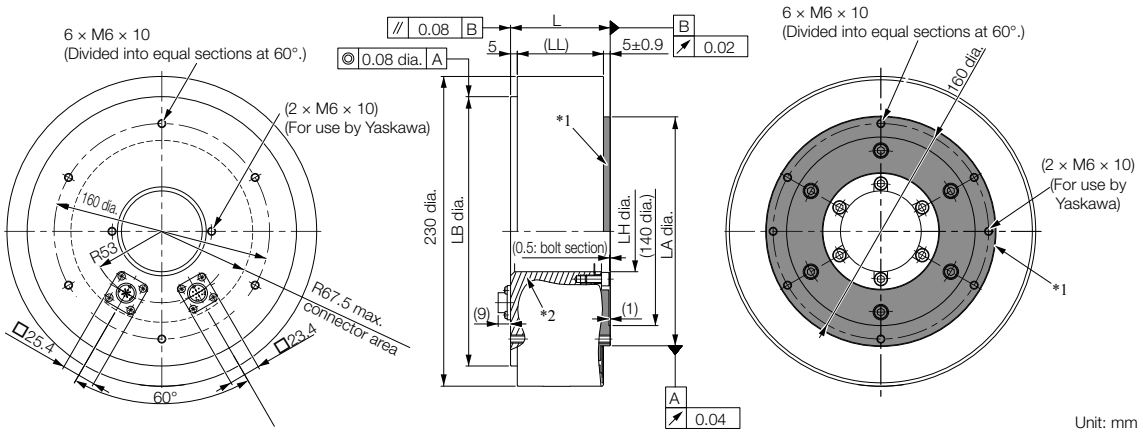
Model SGMCS-	L	(LL)	LB	LH	LA	Approx. Mass [kg]
04C□C41	69	59	$160^{\ 0}_{-0.040}$	$35^{+0.4}_{\ 0}$	$130^{\ 0}_{-0.040}$	7.2
10C□C41	90	80	$160^{\ 0}_{-0.040}$	$35^{+0.4}_{\ 0}$	$130^{\ 0}_{-0.040}$	10.2
14C□C41	130	120	$160^{\ 0}_{-0.040}$	$35^{+0.4}_{\ 0}$	$130^{\ 0}_{-0.040}$	14.2

Refer to the following section for information on connectors.

☞ *Connector Specifications* (page 77)

◆ SGMCS-□□D

• Flange Specification: 1



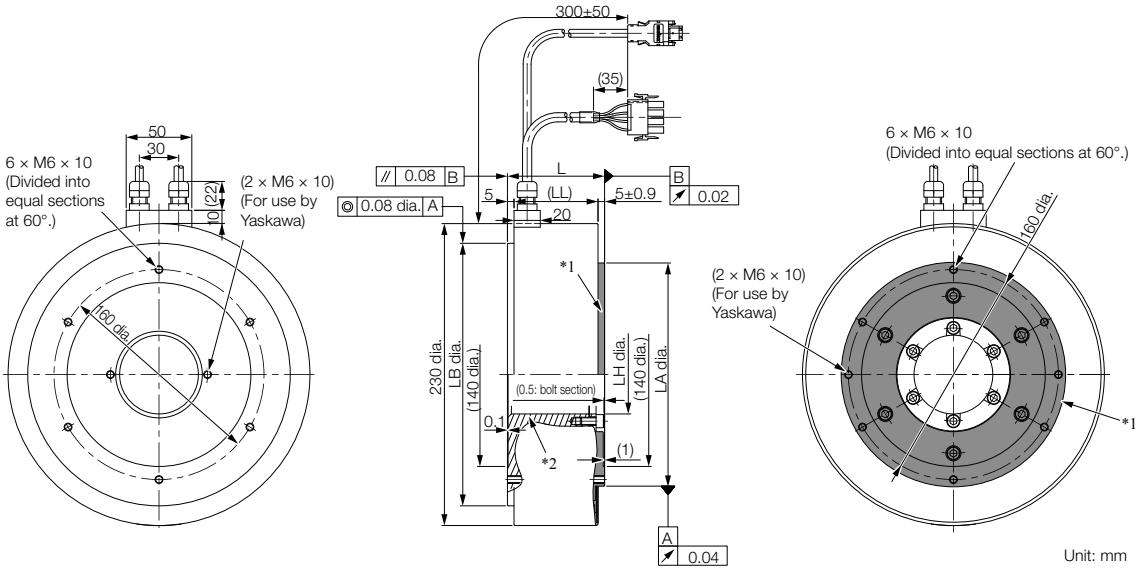
*1. The shaded section indicates the rotating parts.

*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]
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



*1. The shaded section indicates the rotating parts.

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

Note: Values in parentheses are reference dimensions.

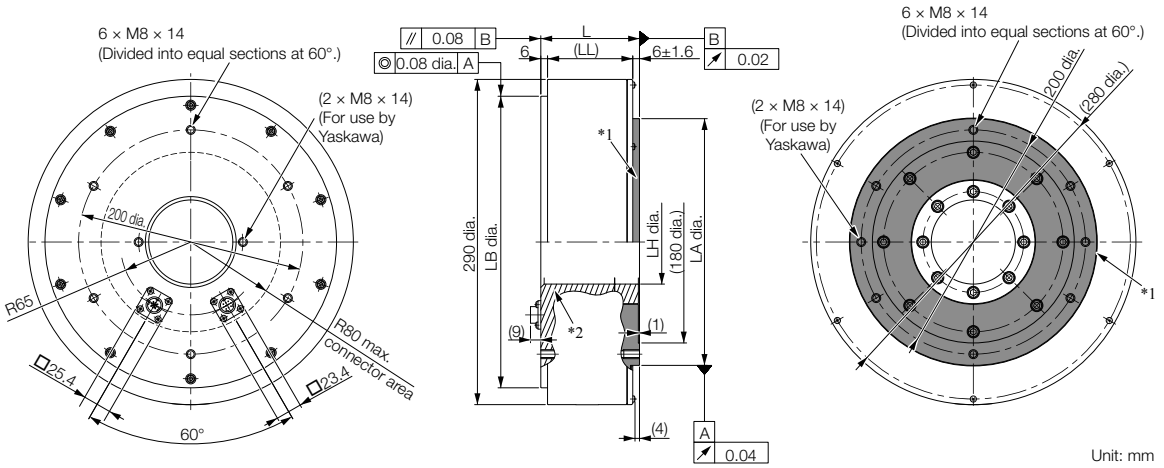
Model SGMCS-	L	(LL)	LB	LH	LA	Approx. Mass [kg]
08D□C41	74	64	$200^{\ 0}_{-0.046}$	$60^{+0.4}_{\ 0}$	$170^{\ 0}_{-0.040}$	14.0
17D□C41	110	100	$200^{\ 0}_{-0.046}$	$60^{+0.4}_{\ 0}$	$170^{\ 0}_{-0.040}$	22.0
25D□C41	160	150	$200^{\ 0}_{-0.046}$	$60^{+0.4}_{\ 0}$	$170^{\ 0}_{-0.040}$	29.7

Refer to the following section for information on connectors.

☞ *Connector Specifications* (page 77)

◆ SGMCS-□□E

• Flange Specification: 1



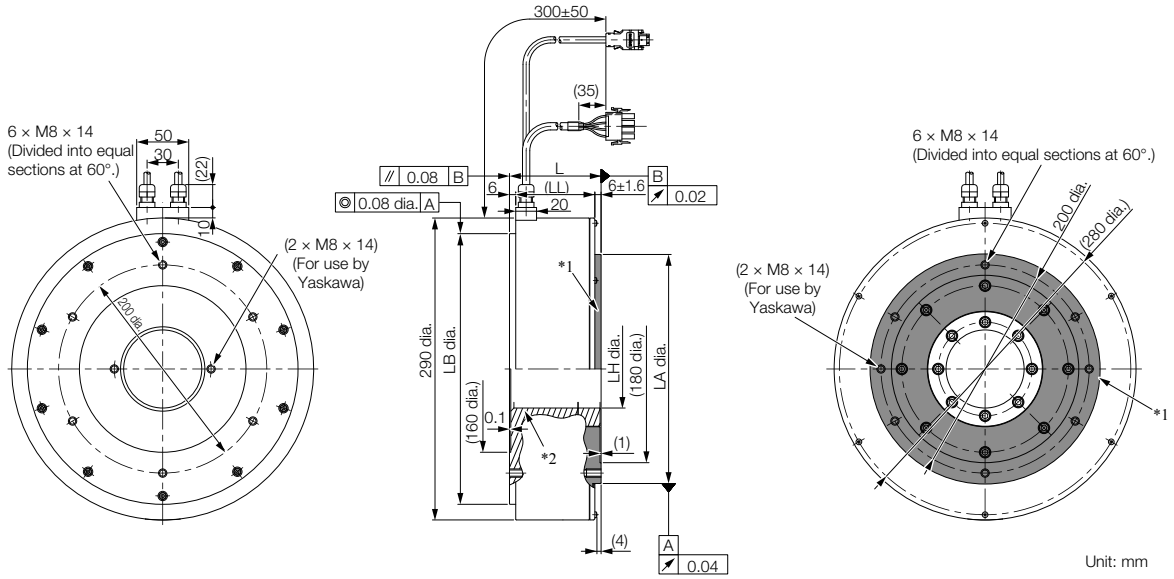
*1. The shaded section indicates the rotating parts.

*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]
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

• 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]
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

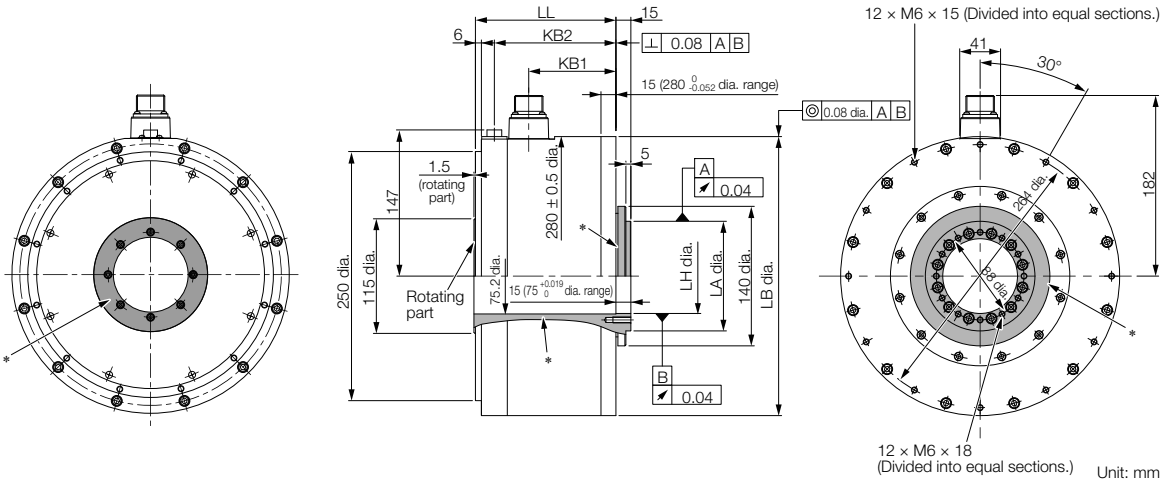
Refer to the following section for information on connectors.

☞ *Connector Specifications* (page 77)

Medium-Capacity Series

◆ SGMCS-□□M

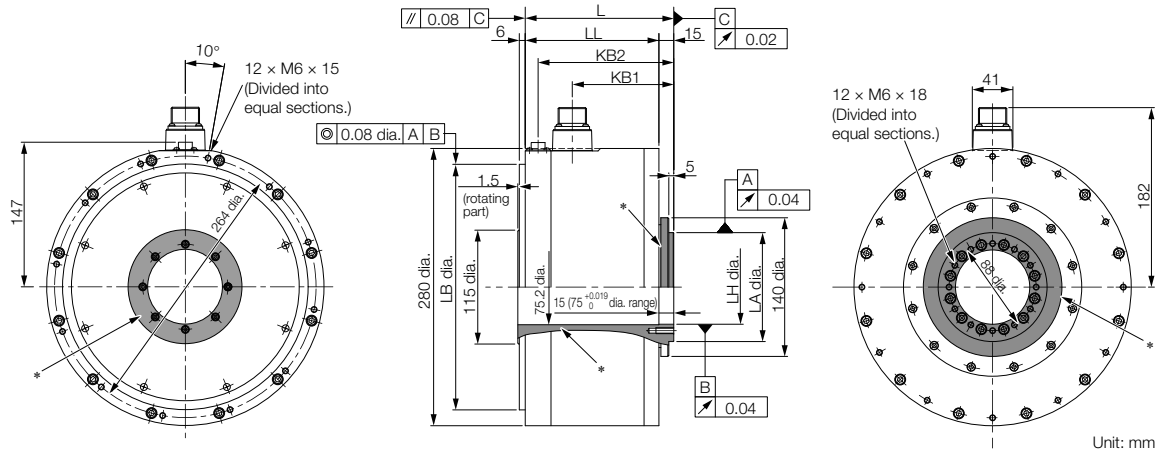
• Flange Specification: 1



* The shaded section indicates the rotating parts.

Model SGMCS-	LL	KB1	KB2	LB	LH	LA	Approx. Mass [kg]
45M□A11	141	87.5	122	280 0 -0.052	75 +0.019 0	110 0 -0.035	38
80M□A11	191	137.5	172	280 0 -0.052	75 +0.019 0	110 0 -0.035	45
1AM□A11	241	187.5	222	280 0 -0.052	75 +0.019 0	110 0 -0.035	51

• Flange Specification: 3



* The shaded section indicates the rotating parts.

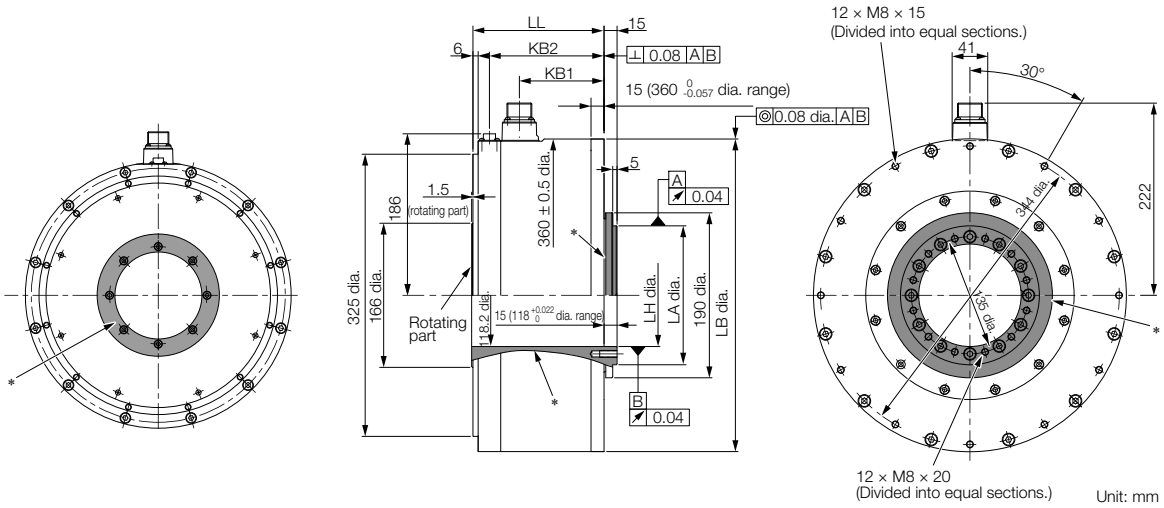
Model SGMCS-	L	LL	KB1	KB2	LB	LH	LA	Approx. Mass [kg]
45M□A31	150	135	102.5	137	248 0 -0.046	75 +0.019 0	110 0 -0.035	38
80M□A31	200	185	152.5	187	248 0 -0.046	75 +0.019 0	110 0 -0.035	45
1AM□A31	250	235	202.5	237	248 0 -0.046	75 +0.019 0	110 0 -0.035	51

Refer to the following section for information on connectors.

☞ *Connector Specifications* (page 77)

◆ SGMCS-□□N

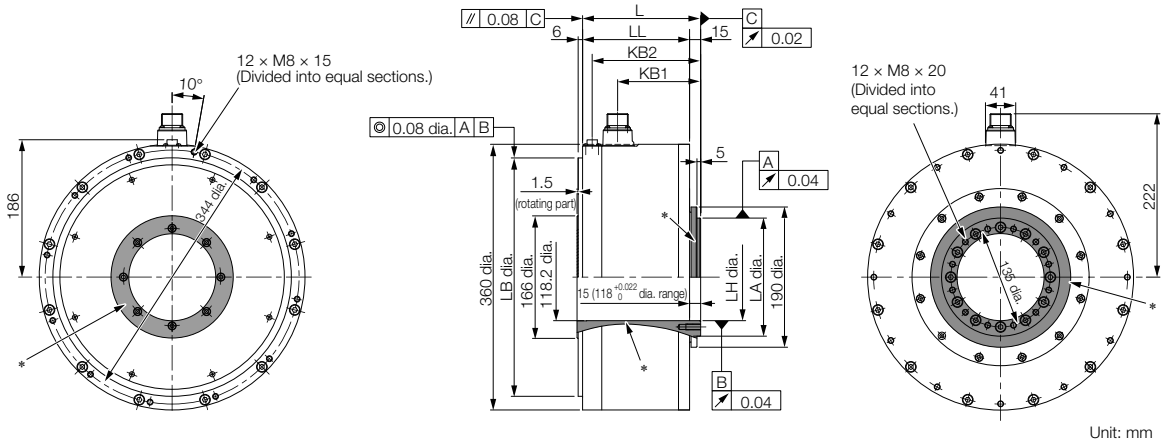
• Flange Specification: 1



* The shaded section indicates the rotating parts.

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

• Flange Specification: 3



* 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

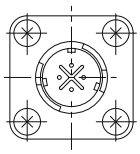
Refer to the following section for information on connectors.

☞ *Connector Specifications* (page 77)

Connector Specifications

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

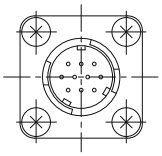
• Servomotor Connector Specifications



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

Mating connector: JN1DS04FK1
(Not provided by Yaskawa.)

• Encoder Connector Specifications

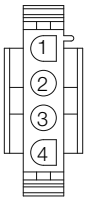


Model: JN1AS10ML1-R
Manufacturer: Japan Aviation Electronics Industry, Ltd.

Mating connector: JN1DS10SL1
(Not provided by Yaskawa.)

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

• Servomotor Connector Specifications

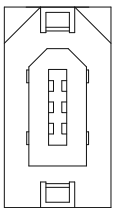


Model
- Plug: 350779-1
- Pins: 350561-3 or 350690-3 (No.1 to 3)
- Ground pin: 350654-1 or 350669-1 (No. 4)

Manufacturer: Tyco Electronics Japan G.K.

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

• Encoder Connector Specifications

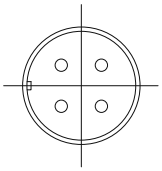


Model: 55102-0600
Manufacturer: Molex Japan Co., Ltd.

Mating connector: 54280-0609

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

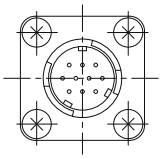
• Servomotor Connector Specifications



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

SGMCV

Model Designations

SGMCV - 04 B E A 1 1

Direct Drive Servomotors: SGMCV

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

1st+2nd digits Rated Output

Code	Specification
04	4 N·m
08	8 N·m
10	10 N·m
14	14 N·m
17	17 N·m
25	25 N·m

4th digit Serial Encoder

Code	Specification
E	22-bit single-turn data
I	22-bit multiturn data

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)

3rd digit Servomotor Outer Diameter

Code	Specification
B	135-mm dia.
C	175-mm dia.

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

Ratings and Specifications

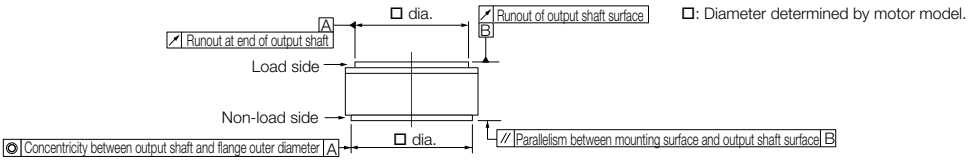
Specifications

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 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	Surrounding Air Temperature		0°C to 40°C (with no freezing)					
	Surrounding Air Humidity		20% to 80% relative humidity (with no condensation)					
	Installation Site		• Must be indoors and free of corrosive and explosive gases. • Must be well-ventilated and free of dust and moisture. • Must facilitate inspection and cleaning. • Must have an altitude of 1,000 m or less. • Must be free of strong magnetic fields.					
	Storage Environment		Store the Servomotor in the following environment if you store it with the power cable disconnected. Storage Temperature: -20°C to 60°C (with no freezing) Storage Humidity: 20% to 80% relative humidity (with no condensation)					
Mechanical Tolerances*3	Runout of Output Shaft Surface	mm	0.02 (0.01 for high machine precision option)					
	Runout at End of Output Shaft	mm	0.04 (0.01 for high machine precision option)					
	Parallelism between Mounting Surface and Output Shaft Surface	mm	0.07					
	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			Refer to the following section. ☞ *Σ-7 Series Combination* (page M-18)					

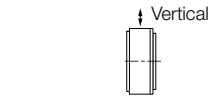
*1. A vibration class of V15 indicates a vibration amplitude of 15 μm maximum on the Servomotor without a load at the rated motor speed.

*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.

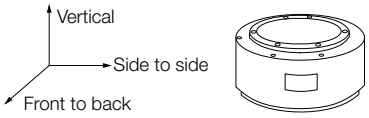


*4. The shock resistance for shock in the vertical direction when the Servomotor is mounted with the shaft in a horizontal position is given in the above table.



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.



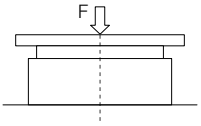
Ratings

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		N·m	4.00	10.0	14.0	8.00	17.0	25.0
Instantaneous Maximum Torque*1		N·m	12.0	30.0	42.0	24.0	51.0	75.0
Stall Torque*1		N·m	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	N·m	45	55	65	92	98	110

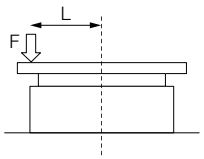
*1. These values are for operation in combination with a SERVOPACK when the temperature of the armature winding is 100°C. The values for other items are at 20°C. These are typical values.

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

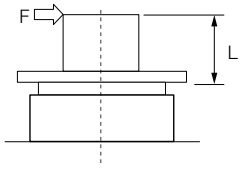
*3. The thrust loads and moment loads that are applied while a Servomotor is operating are roughly classified into the following patterns. Design the machine so that the thrust loads or moment loads will not exceed the values given in the table.



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



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

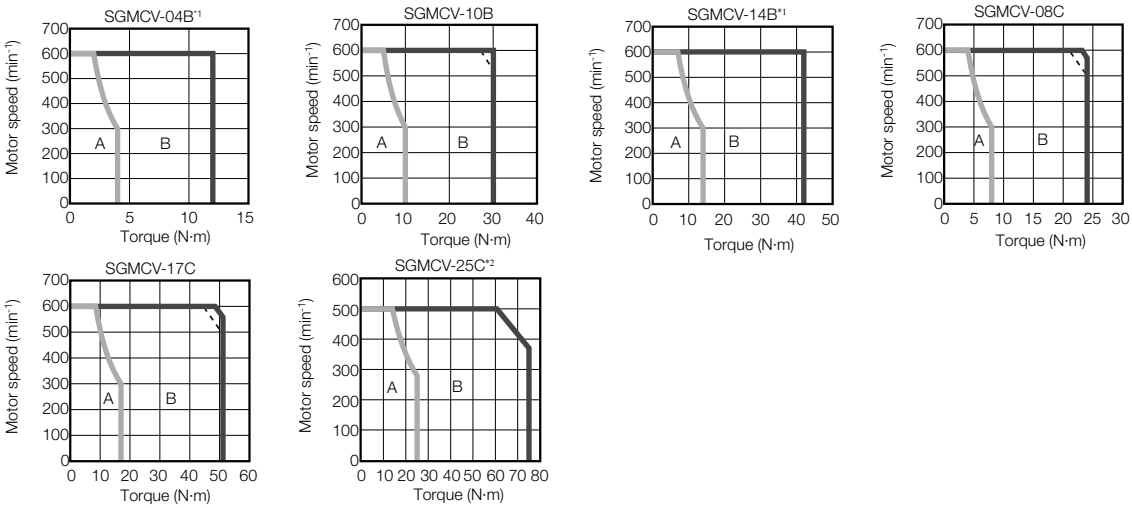


Where F is the external force,
Thrust load = Load mass
Moment load = F × L

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

Torque-Motor Speed Characteristics

A : Continuous duty zone ——— (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.

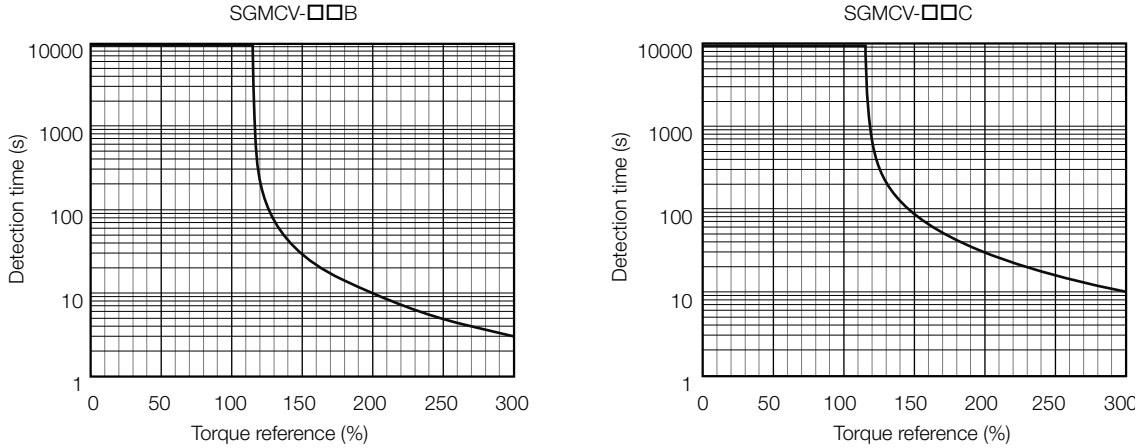
Note: 1. These values are for operation in combination with a SERVOPACK when the temperature of the armature winding is 100°C. These are typical values.

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 as 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.

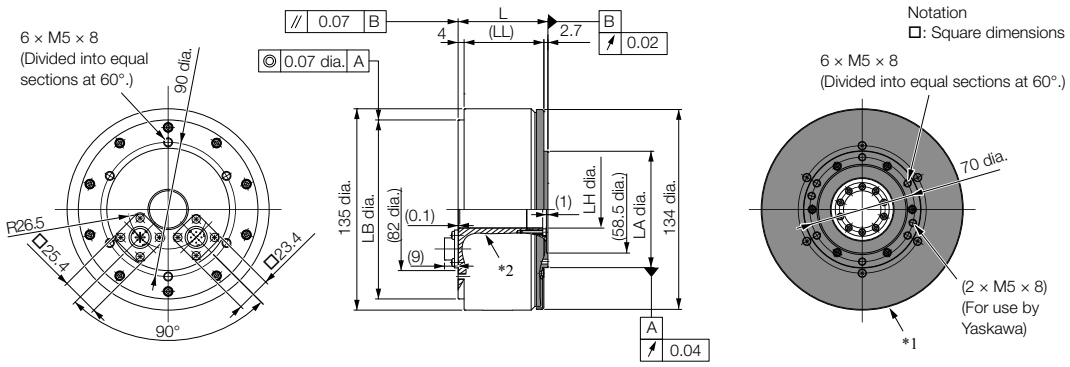


Note: The above overload protection characteristics do not mean that you can perform continuous duty operation with an output of 100% or higher. Use the Servomotor so that the effective torque remains within the continuous duty zone given in *Torque-Motor Speed Characteristics* on page 83.

External Dimensions

◆ SGMCV-□□B

• Flange Specification: 1



Unit: mm

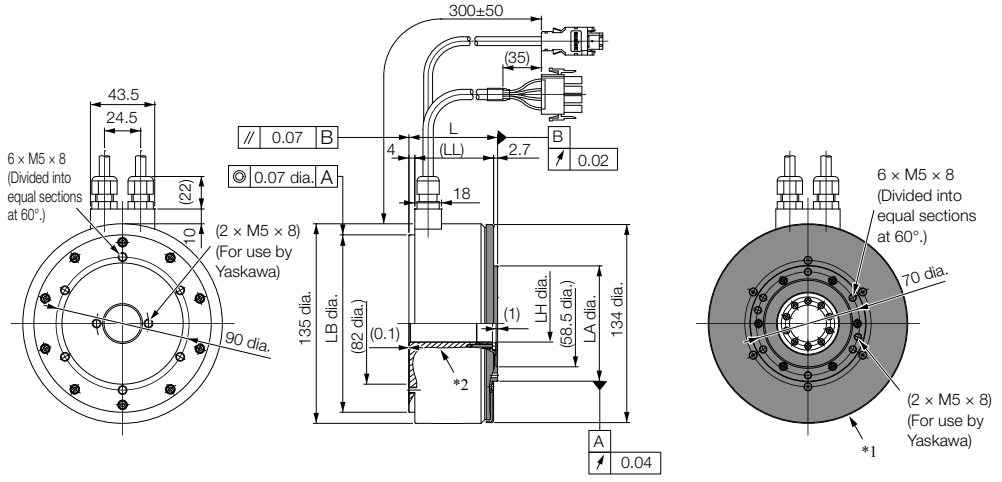
*1. The shaded section indicates the rotating parts.

*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.

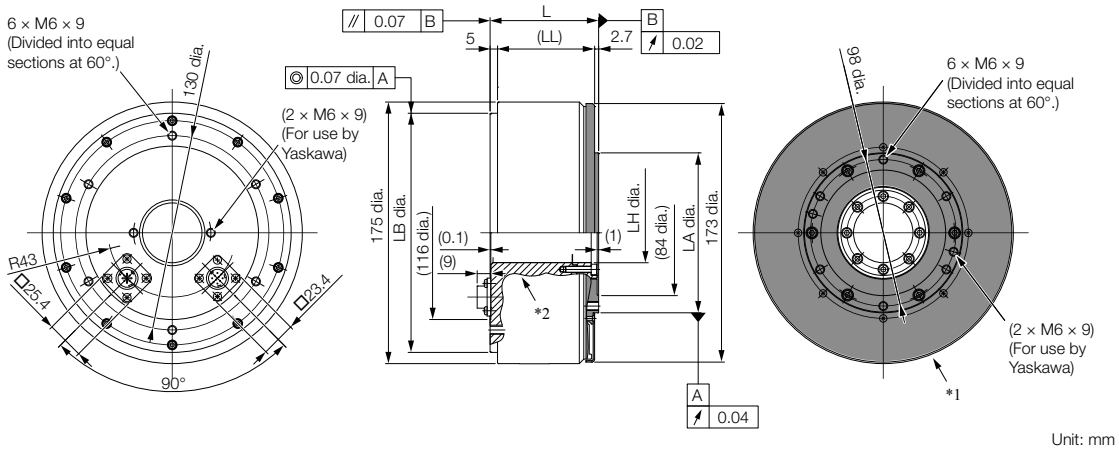
Model SGMCV-	L	(LL)	LB	LH	LA	Approx. Mass [kg]
04B□A41	60	53.3	$120^{\ 0}_{-0.035}$	$25^{+0.3}_{+0.1}$	$78^{\ 0}_{-0.030}$	5.0
10B□A41	85	78.3	$120^{\ 0}_{-0.035}$	$25^{+0.3}_{+0.1}$	$78^{\ 0}_{-0.030}$	6.5
14B□A41	115	108.3	$120^{\ 0}_{-0.035}$	$25^{+0.3}_{+0.1}$	$78^{\ 0}_{-0.030}$	9.0

Refer to the following section for information on connectors.

☞ *Connector Specifications* (page 86)

◆ SGMCV-□□C

• Flange Specification: 1



Unit: mm

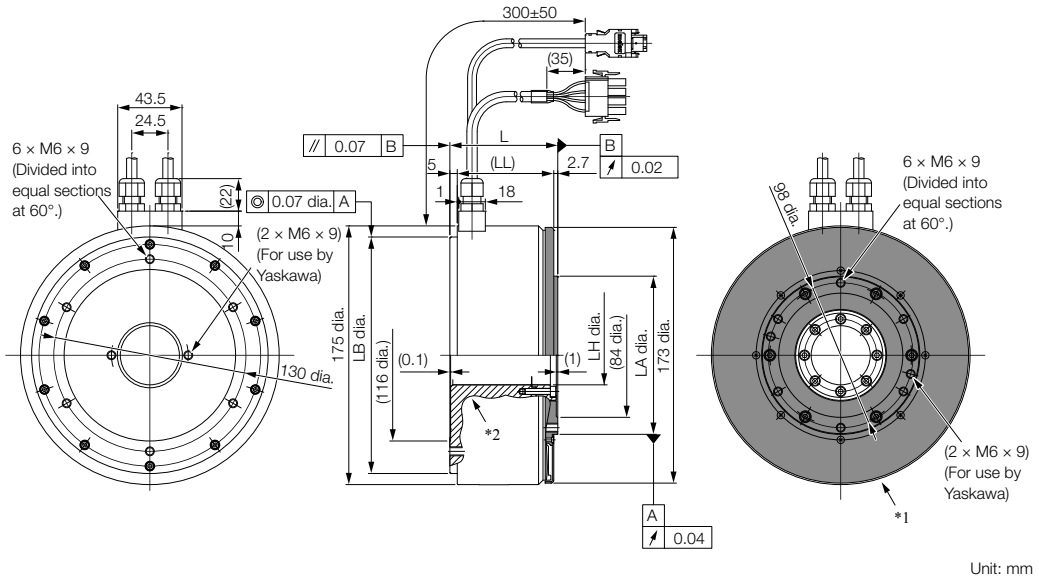
*1. The shaded section indicates the rotating parts.

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

Note: Values in parentheses are reference dimensions.

Model 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



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]
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

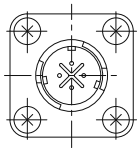
Refer to the following section for information on connectors.

☞ *Connector Specifications* (page 86)

Connector Specifications

◆ Flange Specification 1

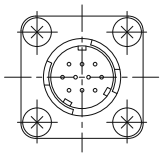
• Servomotor Connector Specifications



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

Mating connector: JN1DS04FK1
(Not provided by Yaskawa.)

• Encoder Connector Specifications

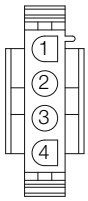


Model: JN1AS10ML1-R
Manufacturer: Japan Aviation Electronics Industry, Ltd.

Mating connector: JN1DS10SL1
(Not provided by Yaskawa.)

◆ Flange Specification 4

• Servomotor Connector Specifications

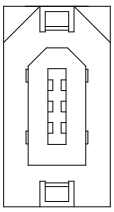


Model
- Plug: 350779-1
- Pins: 350561-3 or 350690-3 (No.1 to 3)
- Ground pin: 350654-1 or 350669-1 (No. 4)

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

Linear Servomotors

SGLG (Coreless Models)

Model Designations

Moving Coil

S G L G W - 30 A 050 C P □

Linear Σ Series Linear Servomotors

1st digit | 2nd digit | 3rd+4th digits | 5th digit | 6th+7th+8th digits | 9th digit | 10th digit | 11th digit

1st digit Servomotor Type

Code	Specification
G	Coreless model

2nd digit Moving Coil/Magnetic Way

Code	Specification
W	Moving Coil

3rd+4th digits 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+7th+8th digits 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	Specification	Applicable Models
None	Connector from Tyco Electronics Japan G.K.	All models
D	Connector from Interconnectron GmbH	SGLGW -30A, -40A, -60A

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

Magnetic Way

S G L G M - 30 108 A □

Linear Σ Series Linear Servomotors

1st digit | 2nd digit | 3rd+4th digits | 5th+6th+7th digits | 8th digit | 9th digit

1st digit Servomotor Type

(Same as for the Moving Coil.)

2nd digit Moving Coil/Magnetic Way

Code	Specification
M	Magnetic Way

3rd+4th digits Magnet Height

(Same as for the Moving Coil.)

5th+6th+7th digits Length of Magnetic Way

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

8th digit Design Revision Order

A, B, C*...

9th digit Options

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

* The SGLGM-40 and SGLGM-60 also have a CT code.
  - C = Without mounting holes on the bottom
  - CT = With mounting holes on the bottom

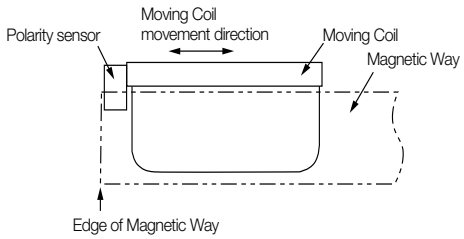
Note: This information is provided to explain model numbers. It is not meant to imply that models are available for all combinations of codes.

Precautions on Moving Coils with Polarity Sensors

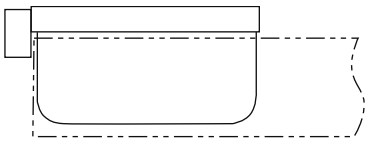
Note

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.

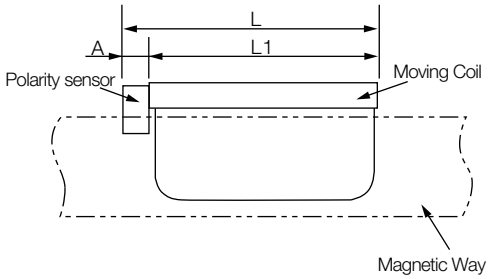
Correct Installation



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 Model SGLGW-		30A		40A			60A			90A		
		050C	080C	140C	253C	365C	140C	253C	365C	200C	370C	535C
Time Rating		Continuous										
Thermal Class		B										
Insulation Resistance		500 VDC, 10 MΩ min.										
Withstand Voltage		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	Surrounding Air Temperature	0°C to 40°C (with no freezing)										
	Surrounding Air Humidity	20% to 80% relative humidity (with no condensation)										
	Installation Site	• Must be indoors and free of corrosive and explosive gases. • Must be well-ventilated and free of dust and moisture. • Must facilitate inspection and cleaning. • Must have an altitude of 1,000 m or less. • Must be free of strong magnetic fields.										
Shock Resistance	Impact Acceleration Rate	196 m/s^2										
	Number of Impacts	2 times										
Vibration Resistance	Vibration Acceleration Rate	49 m/s^2 (the vibration resistance in three directions, vertical, side-to-side, and front-to-back)										

Ratings: With Standard-Force Magnetic Way

Linear Servomotor Moving Coil Model SGLGW-		30A		40A			60A			90A		
		050C	080C	140C	253C	365C	140C	253C	365C	200C	370C	535C
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.

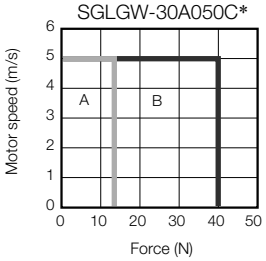
*2. The rated forces are the continuous allowable force values at 40°C with an aluminum heat sink of the dimensions given below.

- 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

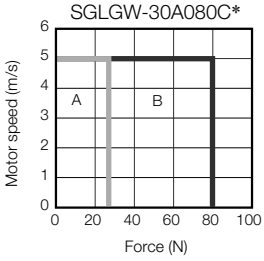
◆ Force-Motor Speed Characteristics

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

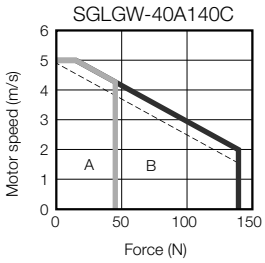
SGLGW-30A050C*



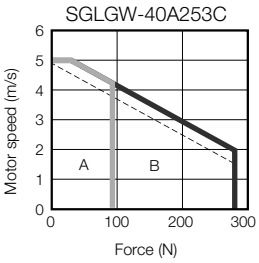
SGLGW-30A080C*



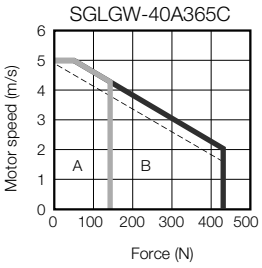
SGLGW-40A140C



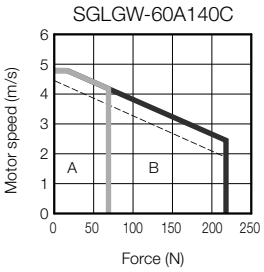
SGLGW-40A253C



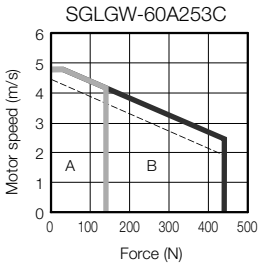
SGLGW-40A365C



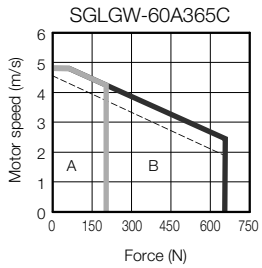
SGLGW-60A140C



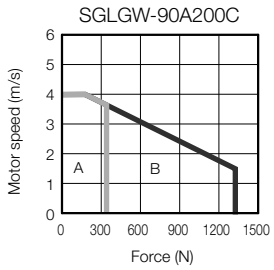
SGLGW-60A253C



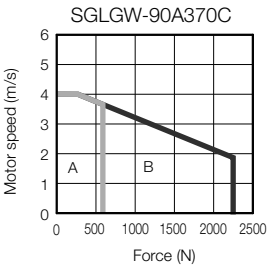
SGLGW-60A365C



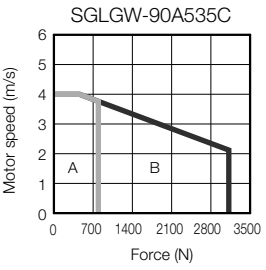
SGLGW-90A200C



SGLGW-90A370C



SGLGW-90A535C



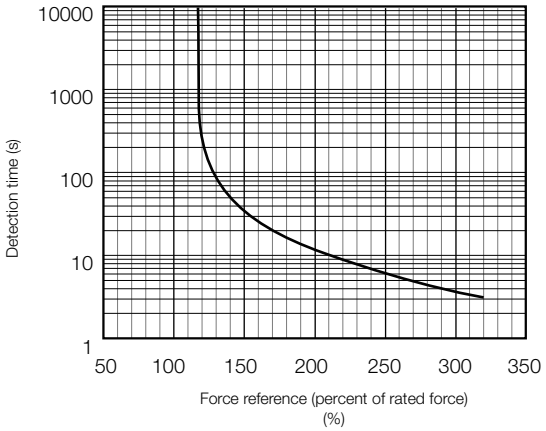
* The characteristics are the same for three-phase 200 V and single-phase 200 V.

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 the length of the Servomotor Main Circuit Cable exceeds 20 m, the intermittent duty zone in the force-motor speed characteristics will become smaller as the voltage drop increases.

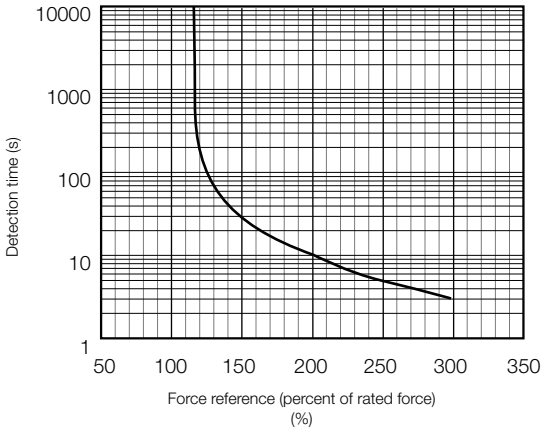
Servomotor Overload Protection Characteristics

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

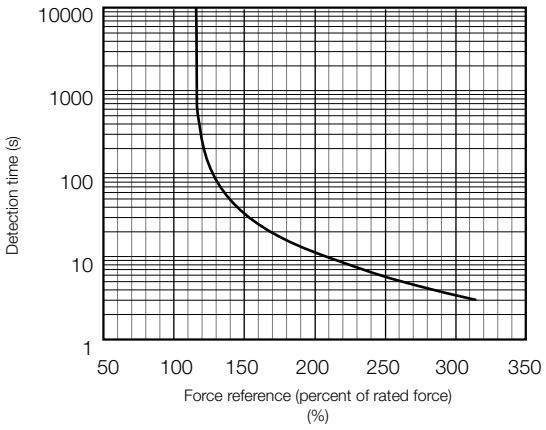
SGLGW-30A



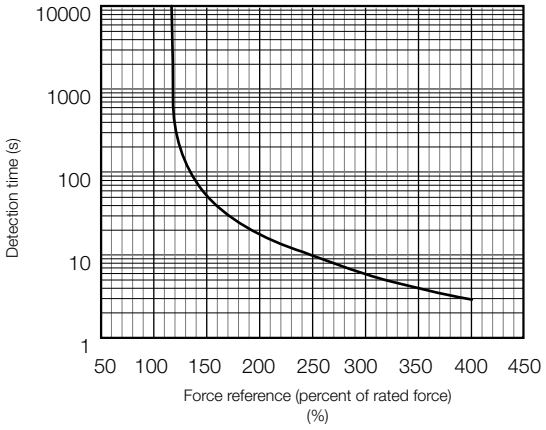
SGLGW-40A



SGLGW-60A



SGLGW-90A



Note: The above overload protection characteristics do not mean that you can perform continuous duty operation with an output of 100% or higher. Use the Servomotor so that the effective force remains within the continuous duty zone given in ◆ *Force-Motor Speed Characteristics* on page 92.

Specifications: With High-Force Magnetic Way

Linear Servomotor Moving Coil Model SGLGW-		40A			60A		
		140C	253C	365C	140C	253C	365C
Time Rating		Continuous					
Thermal Class		B					
Insulation Resistance		500 VDC, 10 MΩ min.					
Withstand Voltage		1,500 VAC for 1 minute					
Excitation		Permanent magnet					
Cooling Method		Self-cooled or air-cooled					
Protective Structure		IP00					
Environmental Conditions	Surrounding Air Temperature	0°C to 40°C (with no freezing)					
	Surrounding Air Humidity	20% to 80% relative humidity (with no condensation)					
	Installation Site	• Must be indoors and free of corrosive and explosive gases. • Must be well-ventilated and free of dust and moisture. • Must facilitate inspection and cleaning. • Must have an altitude of 1,000 m or less. • Must be free of strong magnetic fields.					
Shock Resistance	Impact Acceleration Rate	196 m/s^2					
	Number of Impacts	2 times					
Vibration Resistance	Vibration Acceleration Rate	49 m/s^2 (the vibration resistance in three directions, vertical, side-to-side, and front-to-back)					

Ratings: With High-Force Magnetic Way

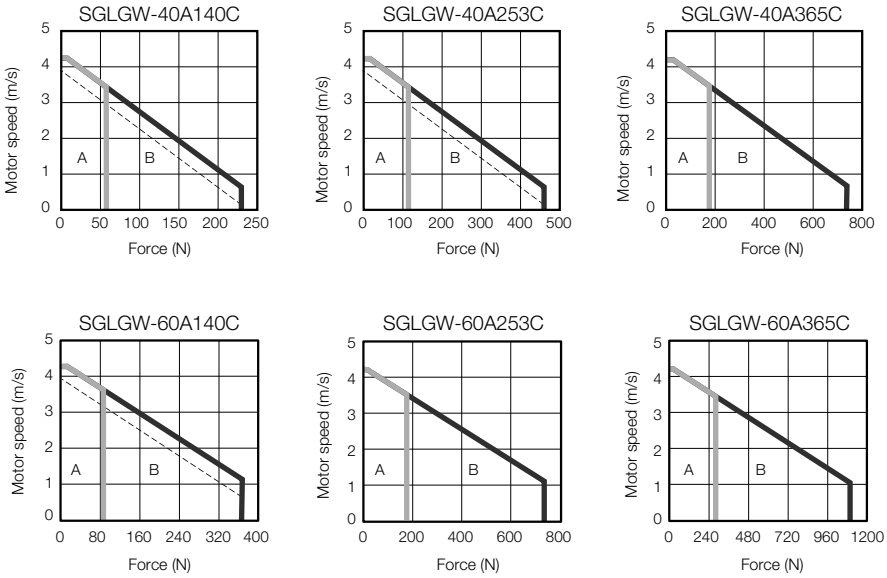
Linear Servomotor Moving Coil Model SGLGW-		40A			60A		
		140C	253C	365C	140C	253C	365C
Rated Motor Speed (Reference Speed during Speed Control)*1	m/s	1.0	1.0	1.0	1.0	1.0	1.0
Maximum Speed*1	m/s	4.2	4.2	4.2	4.2	4.2	4.2
Rated Force*1, *2	N	57	114	171	85	170	255
Maximum Force*1	N	230	460	690	360	720	1080
Rated Current*1	Arms	0.80	1.6	2.4	1.2	2.2	3.3
Maximum Current*1	Arms	3.2	6.5	9.7	5.0	10.0	14.9
Moving Coil Mass	kg	0.34	0.60	0.87	0.42	0.76	1.1
Force Constant	N/Arms	76.0	76.0	76.0	77.4	77.4	77.4
BEMF Constant	Vrms/(m/s)/phase	25.3	25.3	25.3	25.8	25.8	25.8
Motor Constant	$N/\sqrt{W}$	9.62	13.6	16.7	12.9	18.2	22.3
Electrical Time Constant	ms	0.43	0.43	0.43	0.45	0.45	0.45
Mechanical Time Constant	ms	3.7	3.2	3.1	2.5	2.3	2.2
Thermal Resistance (with Heat Sink)	K/W	1.67	0.87	0.58	1.56	0.77	0.51
Thermal Resistance (without Heat Sink)	K/W	3.02	1.80	1.23	2.59	1.48	1.15
Magnetic Attraction	N	0	0	0	0	0	0
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 40°C with an aluminum heat sink of the dimensions given below.
- 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

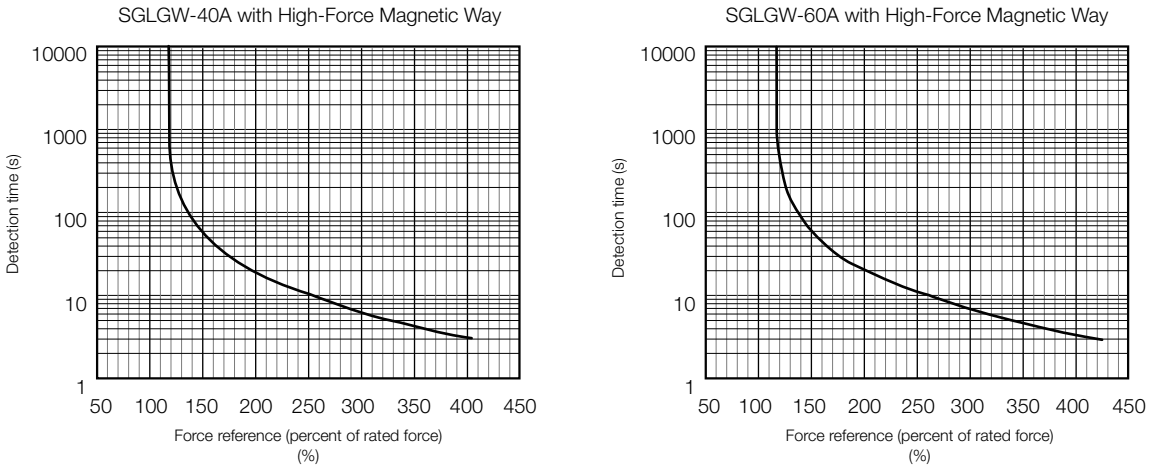
A : Continuous duty zone ———— (solid lines): With three-phase 200-V input
B : Intermittent duty zone - - - - - - - - (dotted lines): With single-phase 200-V input



Note: 1. These values are for operation in combination with a SERVOPACK when the temperature of the armature winding is 100°C. These are typical values.
2. The characteristics in the intermittent duty zone depend on the power supply voltage.
3. If the effective force is within the allowable range for the rated force, the Servomotor can be used within the intermittent duty zone.
4. If the length of the Servomotor Main Circuit Cable exceeds 20 m, the intermittent duty zone in the force-motor speed characteristics will become smaller as 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.

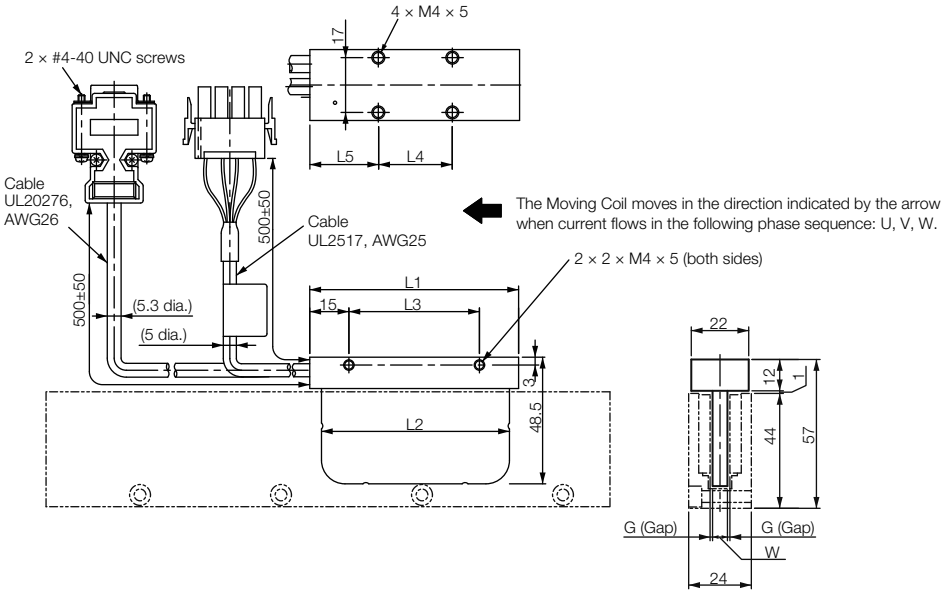


Note: The above overload protection characteristics do not mean that you can perform continuous duty operation with an output of 100% or higher. Use the Servomotor so that the effective force remains within the continuous duty zone given in ◆ *Force-Motor Speed Characteristics* on page 95.

External Dimensions

SGLGW-30

◆ Moving Coils: SGLGW-30A□□□C□



Unit: mm

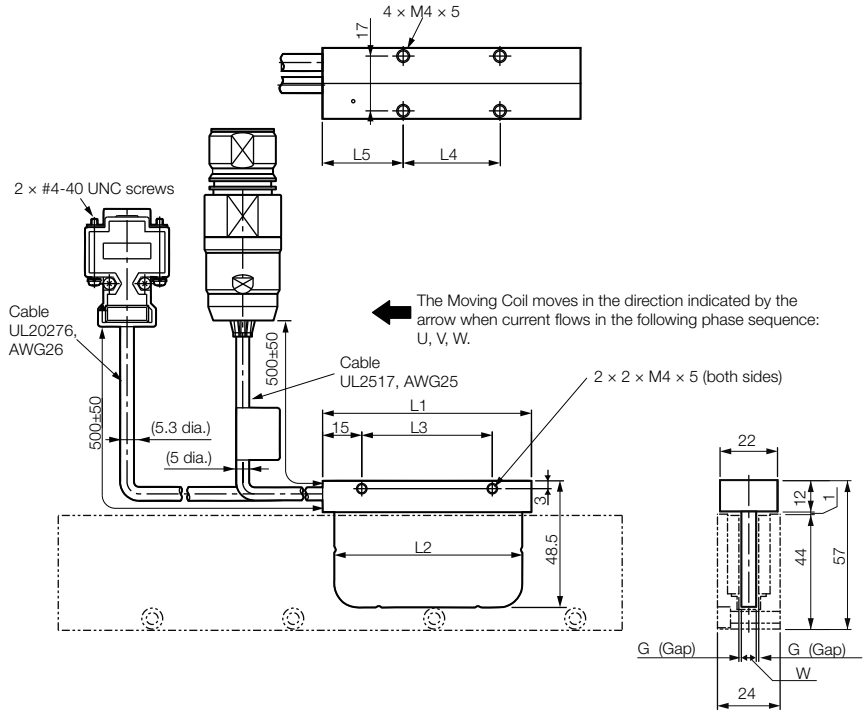
Moving Coil Model SGLGW-	L1	L2	L3	L4	L5	W	G (Gap)	Approx. Mass* [kg]
30A050C□	50	48	30	20	20	5.9	0.85	0.14
30A080C□	80	72	50	30	25	5.7	0.95	0.19

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

Refer to the following section for the connection specifications for the Sensor Cable and Servomotor Main Circuit Cable.

☞ ◆ *SGLGW-30A□□□C□ Moving Coils* (page 109)

◆ Moving Coils: SGLGW-30A□□□C□D



Unit: mm

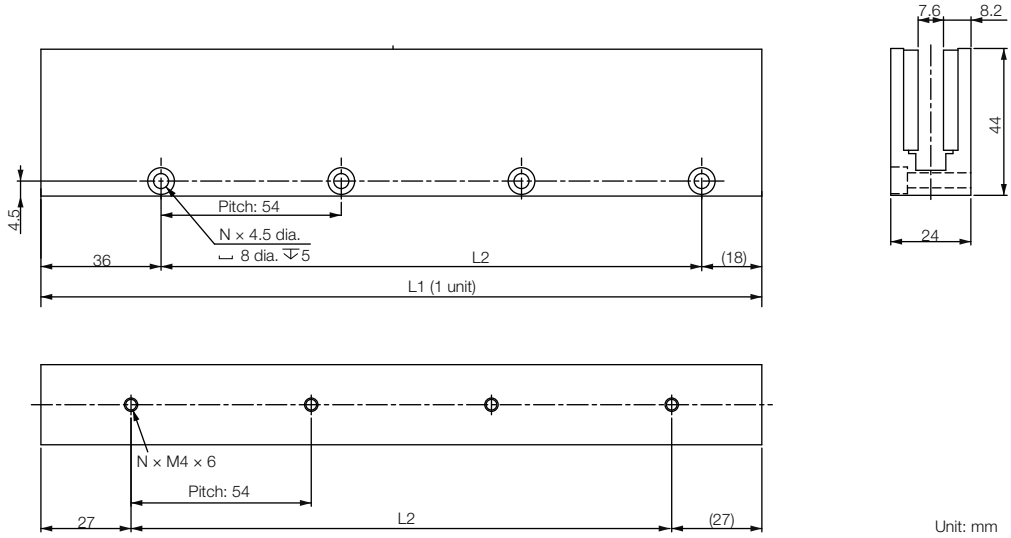
Moving Coil Model SGLGW-	L1	L2	L3	L4	L5	W	G (Gap)	Approx. Mass* [kg]
30A050C□D	50	48	30	20	20	5.9	0.85	0.14
30A080C□D	80	72	50	30	25	5.7	0.95	0.19

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

Refer to the following section for the connection specifications for the Sensor Cable and Servomotor Main Circuit Cable.

☞ ◆ *SGLGW-30A□□□C□D Moving Coils* (page 109)

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

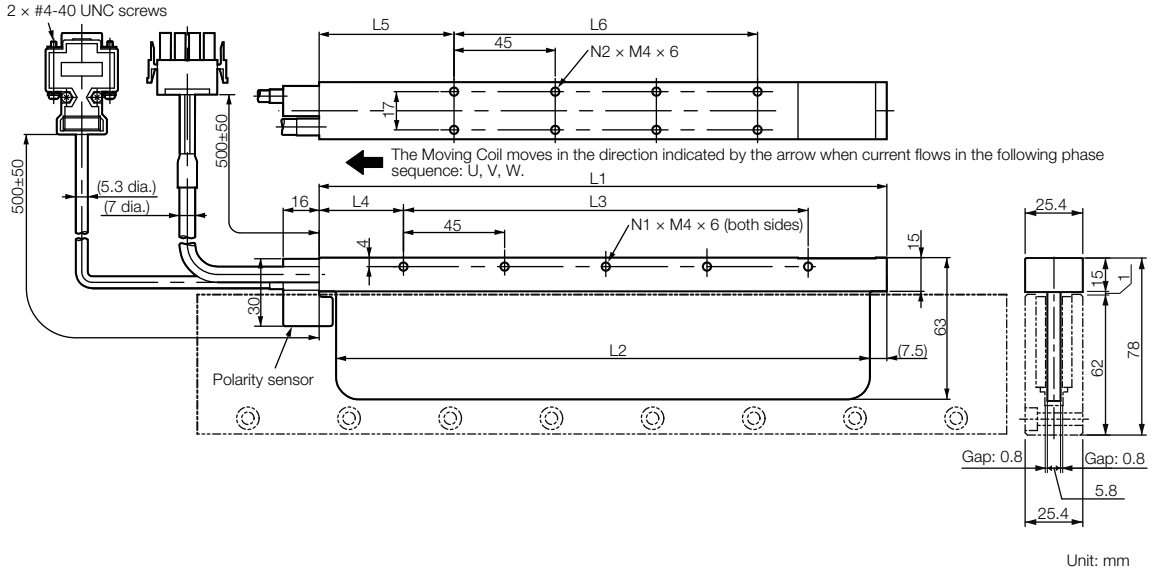


Unit: mm

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

SGLGW-40

◆ Moving Coils: SGLGW-40A□□□C□



Unit: mm

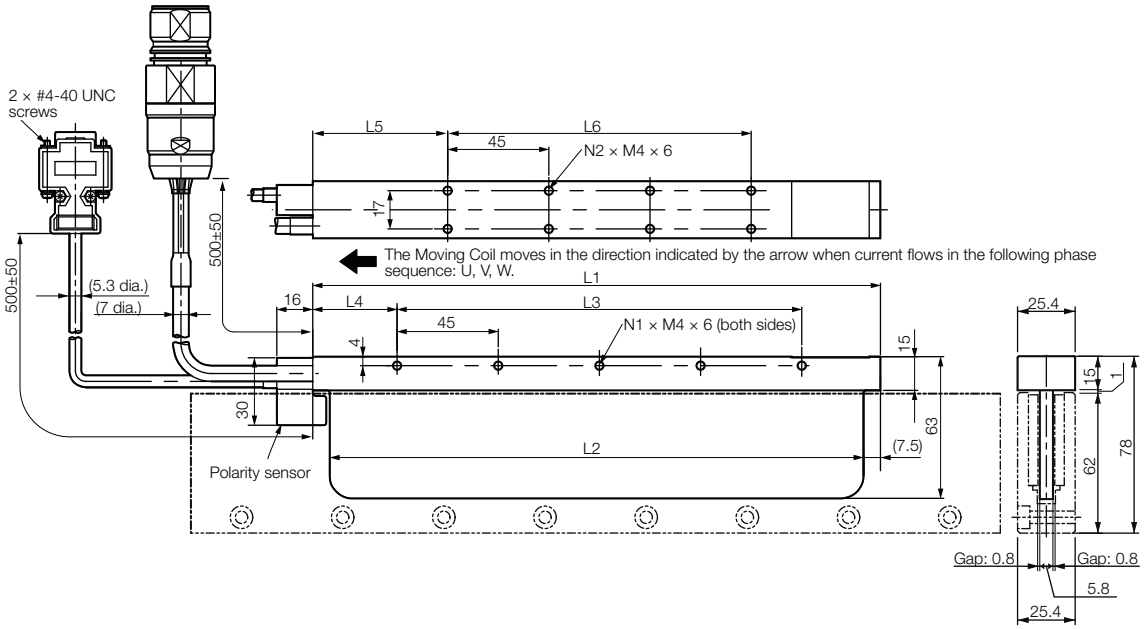
Moving Coil Model SGLGW-	L1	L2	L3	L4	L5	L6	N1	N2	Approx. Mass* [kg]
40A140C□	140	125	90	30	52.5	45	3	4	0.40
40A253C□	252.5	237.5	180	37.5	60	135	5	8	0.66
40A365C□	365	350	315	30	52.5	270	8	14	0.93

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

Refer to the following section for the connection specifications for the Sensor Cable and Servomotor Main Circuit Cable.

☞ ◆ *SGLGW-40A□□□C□ and -60A□□□C□ Moving Coils* (page 110)

◆ Moving Coils: SGLGW-40A□□□C□D



Unit: mm

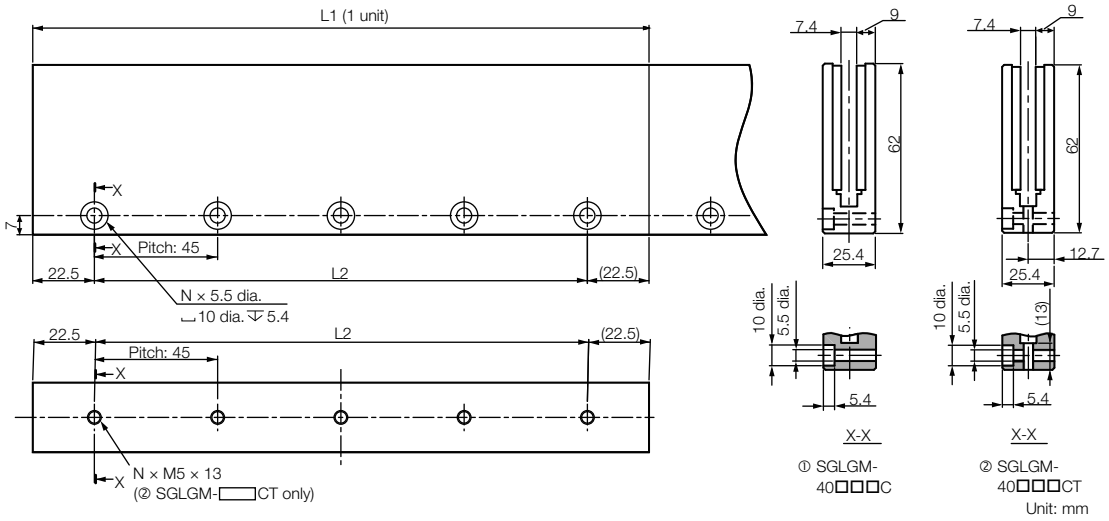
Moving Coil Model SGLGW-	L1	L2	L3	L4	L5	L6	N1	N2	Approx. Mass* [kg]
40A140C□D	140	125	90	30	52.5	45	3	4	0.40
40A253C□D	252.5	237.5	180	37.5	60	135	5	8	0.66
40A365C□D	365	350	315	30	52.5	270	8	14	0.93

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

Refer to the following section for the connection specifications for the Sensor Cable and Servomotor Main Circuit Cable.

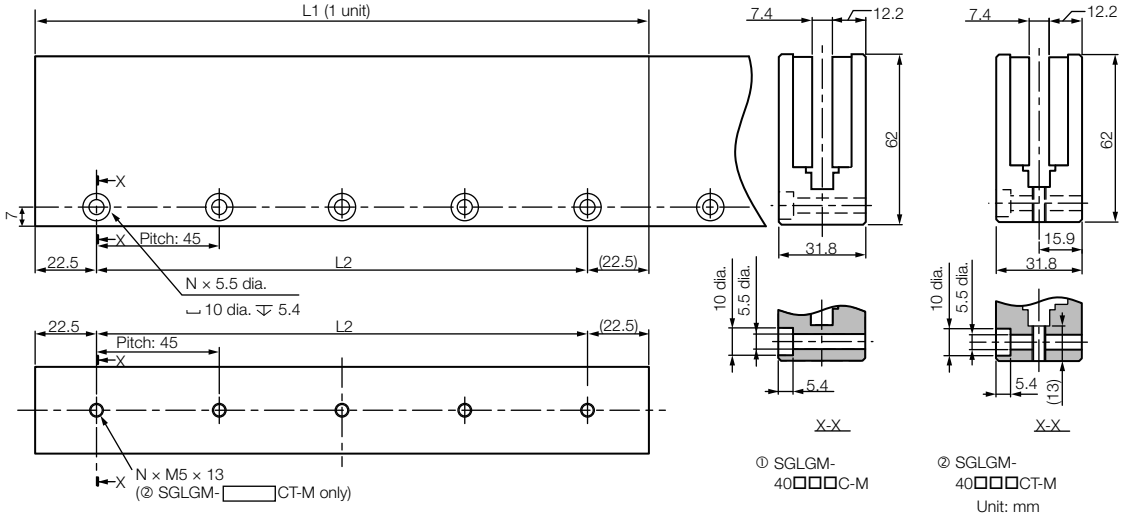
☞ ◆ *SGLGW-40A□□□C□D and -60A□□□C□D Moving Coils* (page 110)

◆ Standard-Force Magnetic Ways:
SGLGM-40□□□C (without Mounting Holes on the Bottom)
SGLGM-40□□□CT (with Mounting Holes on the Bottom)



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

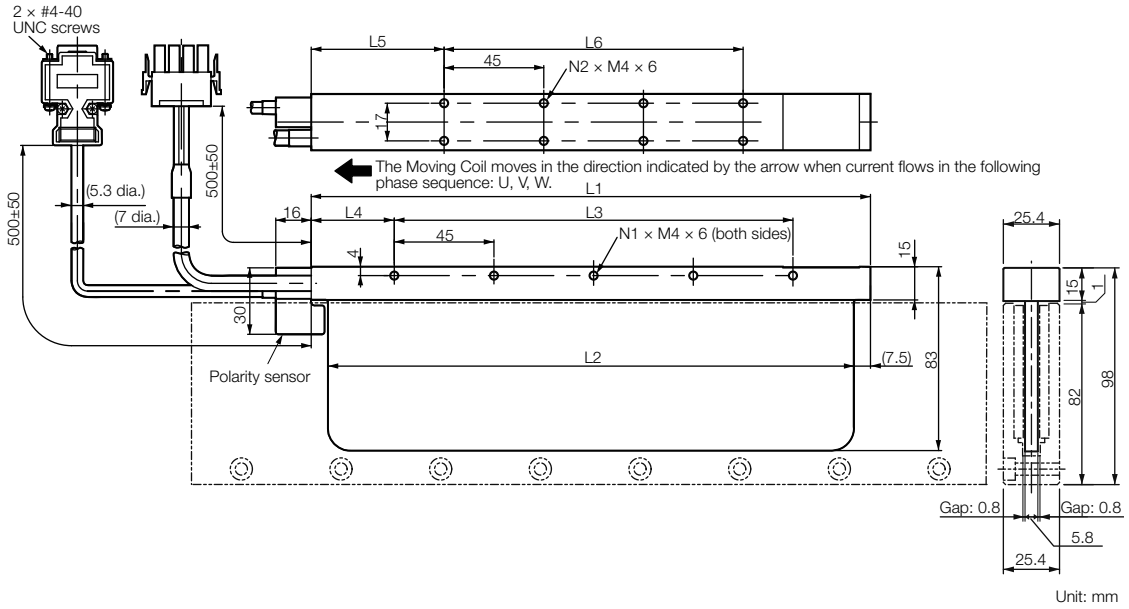
◆ High-Force Magnetic Ways:
SGLGM-40□□□C-M (without Mounting Holes on the Bottom)
SGLGM-40□□□CT-M (with Mounting Holes on the Bottom)



Type	Magnetic Way Model SGLGM-	L1	L2	N	Approx. Mass [kg]
High-Force	40090C-M or 40090CT-M	$90^{-0.1}_{-0.3}$	45	2	1.0
	40225C-M or 40225CT-M	$225^{-0.1}_{-0.3}$	180	5	2.6
	40360C-M or 40360CT-M	$360^{-0.1}_{-0.3}$	315	8	4.1
	40405C-M or 40405CT-M	$405^{-0.1}_{-0.3}$	360	9	4.6
	40450C-M or 40450CT-M	$450^{-0.1}_{-0.3}$	405	10	5.1

SGLGW-60

◆ Moving Coils: SGLGW-60A□□□C□



Unit: mm

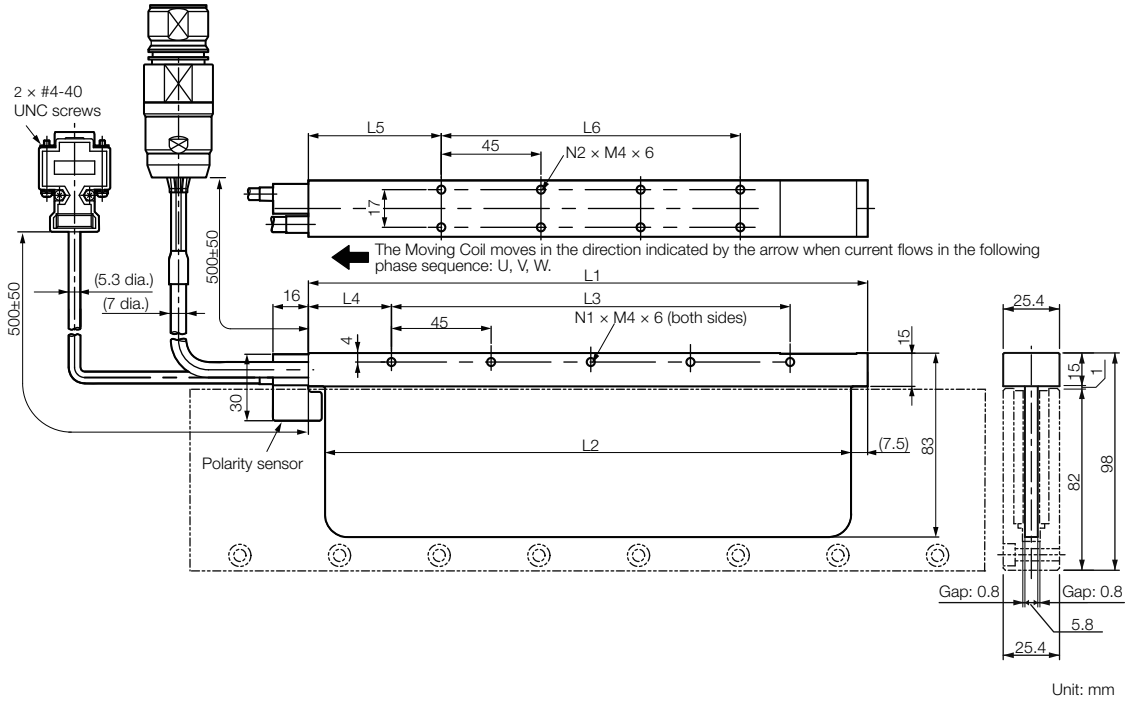
Moving Coil Model SGLGW-	L1	L2	L3	L4	L5	L6	N1	N2	Approx. Mass* [kg]
60A140C□	140	125	90	30	52.5	45	3	4	0.48
60A253C□	252.5	237.5	180	37.5	60	135	5	8	0.82
60A365C□	365	350	315	30	52.5	270	8	14	1.16

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

Refer to the following section for the connection specifications for the Sensor Cable and Servomotor Main Circuit Cable.

☞ ◆ *SGLGW-40A□□□C□ and -60A□□□C□ Moving Coils* (page 110)

◆ Moving Coils: SGLGW-60A□□□C□D



Unit: mm

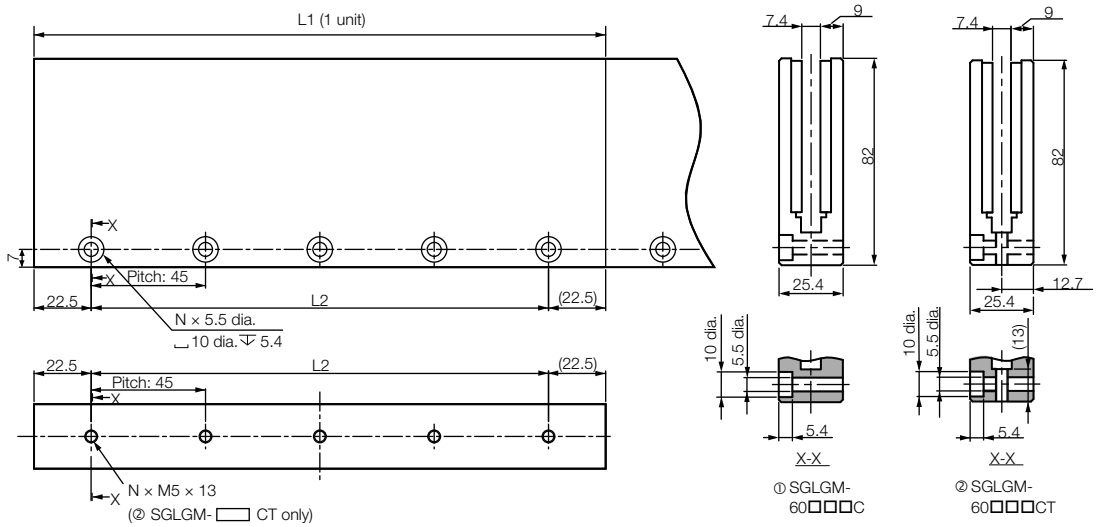
Moving Coil Model SGLGW-	L1	L2	L3	L4	L5	L6	N1	N2	Approx. Mass* [kg]
60A140C□D	140	125	90	30	52.5	45	3	4	0.48
60A253C□D	252.5	237.5	180	37.5	60	135	5	8	0.82
60A365C□D	365	350	315	30	52.5	270	8	14	1.16

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

Refer to the following section for the connection specifications for the Sensor Cable and Servomotor Main Circuit Cable.

☞ ◆ *SGLGW-40A□□□C□D and -60A□□□C□D Moving Coils* (page 110)

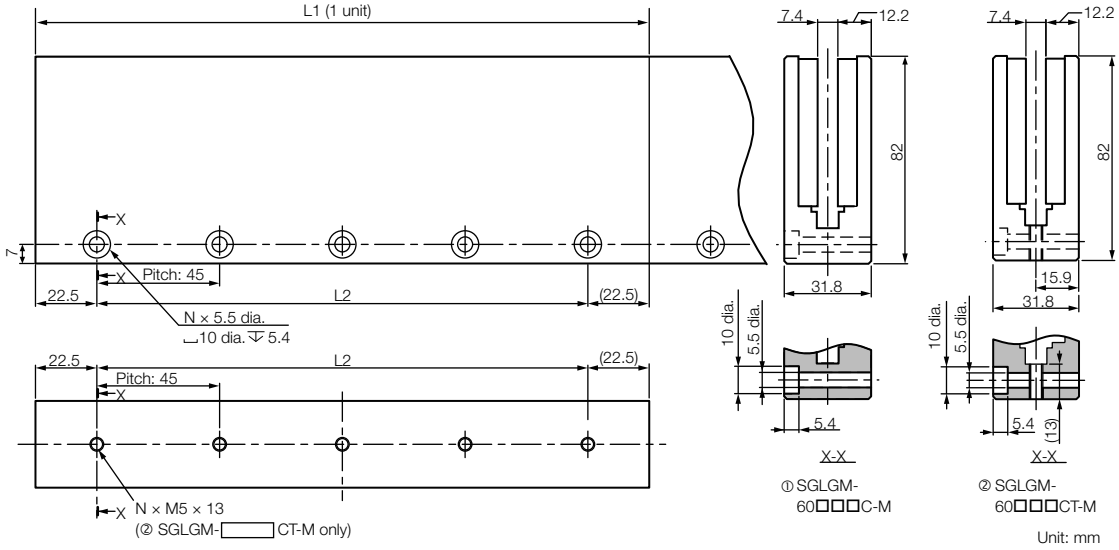
◆ Standard-Force Magnetic Ways:
SGLGM-60□□□C (without Mounting Holes on the Bottom)
SGLGM-60□□□CT (with Mounting Holes on the Bottom)



Unit: mm

Type	Magnetic Way Model SGLGM-	L1	L2	N	Approx. Mass [kg]
Standard-Force	60090C or 60090CT	$90^{-0.1}_{-0.3}$	45	2	1.1
	60225C or 60225CT	$225^{-0.1}_{-0.3}$	180	5	2.6
	60360C or 60360CT	$360^{-0.1}_{-0.3}$	315	8	4.1
	60405C or 60405CT	$405^{-0.1}_{-0.3}$	360	9	4.6
	60450C or 60450CT	$450^{-0.1}_{-0.3}$	405	10	5.1

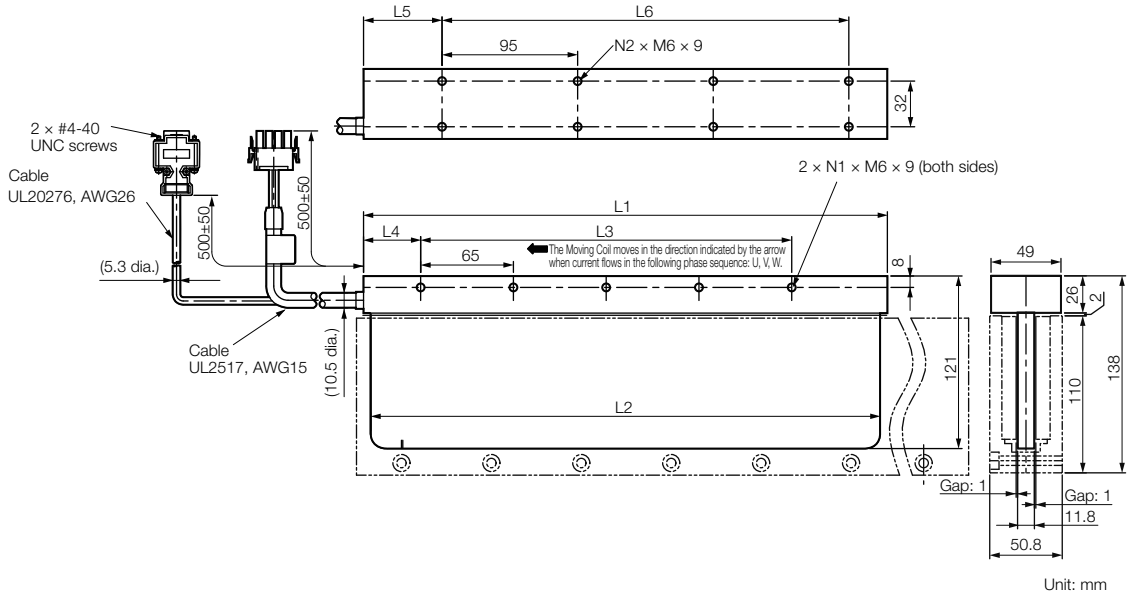
◆ High-Force Magnetic Ways:
SGLGM-60□□□C-M (without Mounting Holes on the Bottom)
SGLGM-60□□□CT-M (with Mounting Holes on the Bottom)



Type	Magnetic Way Model SGLGM-	L1	L2	N	Approx. Mass [kg]
High-Force	60090C-M or 60090CT-M	$90^{-0.1}_{-0.3}$	45	2	1.3
	60225C-M or 60225CT-M	$225^{-0.1}_{-0.3}$	180	5	3.3
	60360C-M or 60360CT-M	$360^{-0.1}_{-0.3}$	315	8	5.2
	60405C-M or 60405CT-M	$405^{-0.1}_{-0.3}$	360	9	5.9
	60450C-M or 60450CT-M	$450^{-0.1}_{-0.3}$	405	10	6.6

SGLGW-90

◆ Moving Coils: SGLGW-90A□□□C□



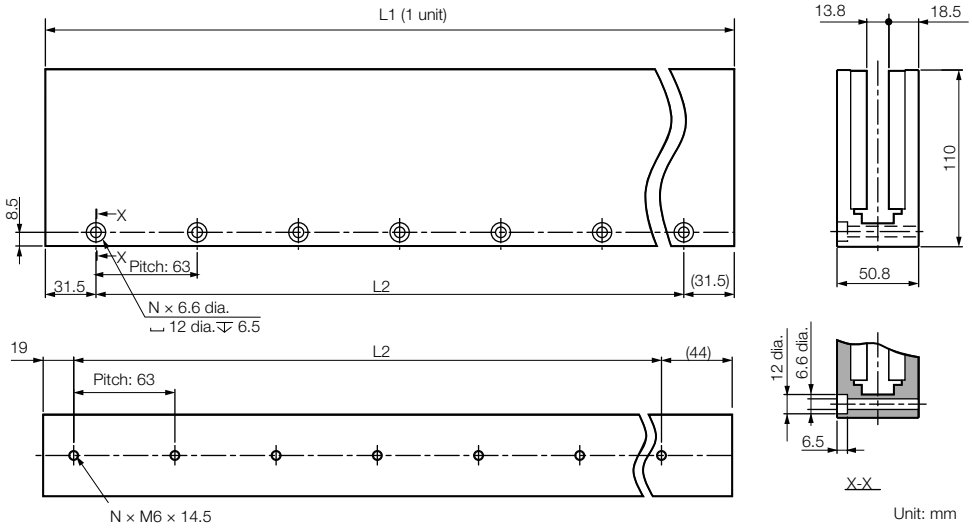
Moving Coil Model SGLGW-	L1	L2	L3	L4	L5	L6	N1	N2	Approx. Mass* [kg]
90A200C□	199	189	130	40	60	95	3	4	2.2
90A370C□	367	357	260	40	55	285	5	8	3.65
90A535C□	535	525	455	40	60	380	8	10	4.95

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

Refer to the following section for the connection specifications for the Sensor Cable and Servomotor Main Circuit Cable.

☞ ◆ *SGLGW-90A□□□C□ Moving Coils* (page 111)

◆ Standard-Force Magnetic Ways: SGLGM-90□□□A

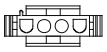


Magnetic Way Model SGLGM-	L1	L2	N	Approx. Mass [kg]
90252A	$252^{-0.1}_{-0.3}$	189	4	7.3
90504A	$504^{-0.1}_{-0.3}$	441	8	14.7

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

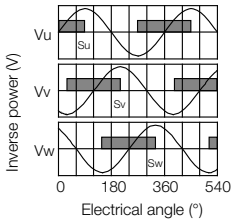
• Polarity Sensor Connector

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

Mating Connector
Socket connector: 17JE-13090-02 (D8C)
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-30A□□□C□D Moving Coils

• Servomotor Connector

Extension: SROC06JMSCN169
Pins: 021.423.1020
From Interconnectron GmbH

Mating Connector
Plug: SPUC06KFSDN236
Socket: 020.030.1020

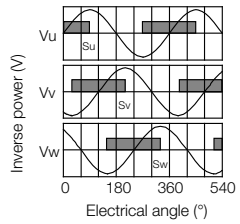
• Polarity Sensor Connector

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

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

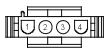
• Polarity Sensor Output Signal

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□ 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

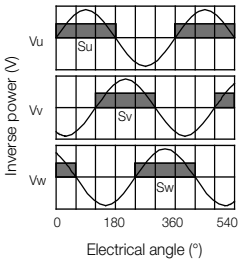
• Polarity Sensor Connector

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

Mating Connector
Socket connector: 17JE-13090-02 (D8C)
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

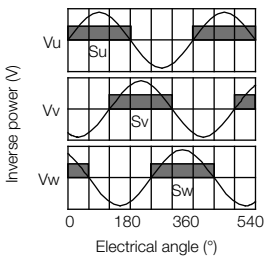
• Polarity Sensor Connector

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

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

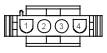
• Polarity Sensor Output Signal

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

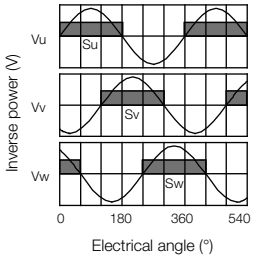
• Polarity Sensor Connector

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

Mating Connector
Socket connector: 17JE-13090-02 (D8C)
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

SGLFW2 Models

◆ Moving Coil

S G L F W 2 - 30 A 070 A T □

Linear Σ Series Linear Servomotors | 1st digit | 2nd digit | 3rd+4th digits | 5th digit | 6th+7th+8th digits | 9th digit | 10th digit | 11th digit

1st digit Servomotor Type

Code	Specification
F	With F-type iron core

2nd digit Moving Coil/Magnetic Way

Code	Specification
W	Moving Coil

3rd+4th digits 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+7th+8th digits Length of Moving Coil

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

9th digit Design Revision Order

A

10th digit Sensor Specification

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

11th digit Cooling Method

Code	Specification
None	Self-cooled
L	Water-cooled*

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

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

◆ Magnetic Way

S G L F M 2 - 30 270 A

Linear Σ Series Linear Servomotors | 1st digit | 2nd digit | 3rd+4th digits | 5th+6th+7th digits | 8th digit

1st digit Servomotor Type

(Same as for the Moving Coil.)

2nd digit Moving Coil/Magnetic Way

Code	Specification
M	Magnetic Way

3rd+4th digits Magnet Height

(Same as for the Moving Coil.)

5th+6th+7th digits Length of Magnetic Way

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

8th digit Design Revision Order

A

SGLFW Models

◆ Moving Coil

S G L F W - 20 A 090 A P □

Linear Σ Series Linear Servomotors

1st digit | 2nd digit | 3rd+4th digits | 5th digit | 6th+7th+8th digits | 9th digit | 10th digit | 11th digit

1st digit Servomotor Type

Code	Specification
F	With F-type iron core

2nd digit Moving Coil/Magnetic Way

Code	Specification
W	Moving Coil

3rd+4th digits 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+7th+8th digits Length of Moving Coil

Code	Specification
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

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

◆ Magnetic Way

S G L F M - 20 324 A □

Linear Σ Series Linear Servomotors

1st digit | 2nd digit | 3rd+4th digits | 5th+6th+7th digits | 8th digit | 9th digit

1st digit Servomotor Type

(Same as for the Moving Coil.)

2nd digit Moving Coil/Magnetic Way

Code	Specification
M	Magnetic Way

3rd+4th digits Magnet Height

(Same as for the Moving Coil.)

5th+6th+7th digits 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 ...

9th digit Options

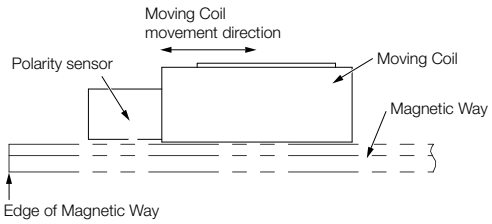
Code	Specification
None	Without options
C	With magnet cover

Precautions on Moving Coils with Polarity Sensors

Note

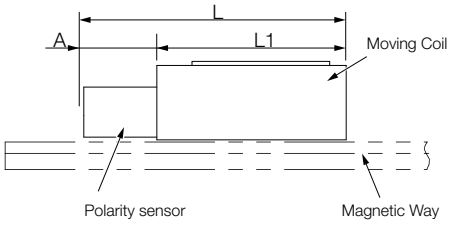
When you use a Moving Coil with a Polarity Sensor, the Magnetic Way must cover the bottom of the polarity sensor. Refer to the example that shows the correct installation.
When determining the length of the Moving Coil's stroke or the length of the Magnetic Way, consider the total length (L) of the Moving 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	99
30A120AS	125		154
30A230AS	230		259
45A200AS	205	34	239
45A380AS	384		418
90A200AS	205	34	239
90A380AS	384		418
1DA380AS	384	34	418

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 Model SGLFW2-		30A			45A		90A		1DA
		070A□	120A□	230A□	200A□	380A□	200A□	380A□	380A□
Time Rating		Continuous							
Thermal Class		B							
Insulation Resistance		500 VDC, 10 MΩ min.							
Withstand Voltage		1,500 VAC for 1 minute							
Excitation		Permanent magnet							
Cooling Method		Self-cooled and water-cooled*							
Protective Structure		IP00							
Environmental Conditions	Surrounding Air Temperature	0°C to 40°C (with no freezing)							
	Surrounding Air Humidity	20% to 80% relative humidity (with no condensation)							
	Installation Site	• Must be indoors and free of corrosive and explosive gases. • Must be well-ventilated and free of dust and moisture. • Must facilitate inspection and cleaning. • Must have an altitude of 1,000 m or less. • Must be free of strong magnetic fields.							
Shock Resistance	Impact Acceleration 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 Model SGLFW2-			30A				45A		
			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	–	–

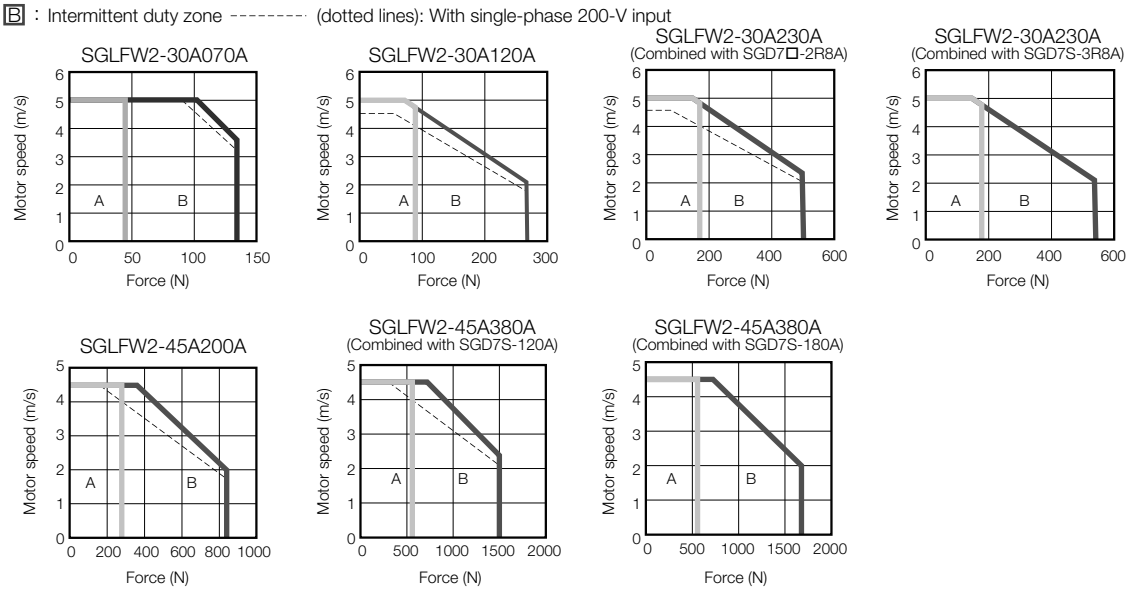
*1. These values are for operation in combination with a SERVOPACK when the temperature of the armature winding is 100°C. The values for other items are at 20°C. These are typical values.

*2. The rated forces are the continuous allowable force values at 40°C with an aluminum heat sink of the dimensions given below.

- 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 200-V input



Note: 1. These values are for operation in combination with a SERVOPACK when the temperature of the armature winding is 100°C. These are typical values.
2. The characteristics in the intermittent duty zone depend on the power supply voltage.
3. If the effective force is within the allowable range for the rated force, the Servomotor can be used within the intermittent duty zone.
4. If the length of the Servomotor Main Circuit Cable exceeds 20 m, the intermittent duty zone in the force-motor speed characteristics will become smaller as the voltage drop increases.

Ratings

Linear Servomotor Moving Coil Model SGLFW2-			90A		1DA
			200A□	380A□	380A□
Rated Motor Speed (Reference Speed during Speed Control)*1		m/s	4.0	4.0	2.0
Maximum Speed*1		m/s	4.0	4.0	2.5
Rated Force*1, *2		N	560	1120	1680
Maximum Force*1		N	1680	3360	5040
Rated Current*1		Arms	7.2	14.4	14.4
Maximum Current*1		Arms	26.9	53.9	53.9
Moving Coil Mass		kg	5.3	10.1	14.6
Force Constant		N/Arms	82.0	82.0	123
BEMF Constant		Vrms/(m/s)/phase	27.3	27.3	41.0
Motor Constant		N/$\sqrt{W}$	58.1	82.2	105
Electrical Time Constant		ms	24	23	25
Mechanical Time Constant		ms	1.6	1.5	1.3
Thermal Resistance (with Heat Sink)		K/W	0.45	0.21	0.18
Thermal Resistance (without Heat Sink)		K/W	1.81	1.03	0.79
Magnetic Attraction		N	4240	8480	12700
Combined Magnetic Way, SGLFM2-			90□□□A		1D□□□A
Combined Serial Converter Unit, JZDP-□□□□-			633	634	649
Applicable SERVOPACKs	SGD7S-		120A	200A	200A
	SGD7W-		–	–	–

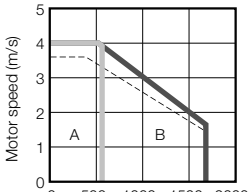
*1. These values are for operation in combination with a SERVOPACK when the temperature of the armature winding is 100°C. The values for other items are at 20°C. These are typical values.

*2. The rated forces are the continuous allowable force values at 40°C with an aluminum heat sink of the dimensions given below.
- 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: SGLFW2-1DA380A

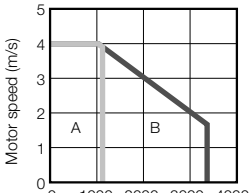
◆ Force-Motor Speed Characteristics

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

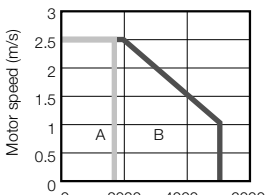
SGLFW2-90A200A



SGLFW2-90A380A



SGLFW2-1DA380A

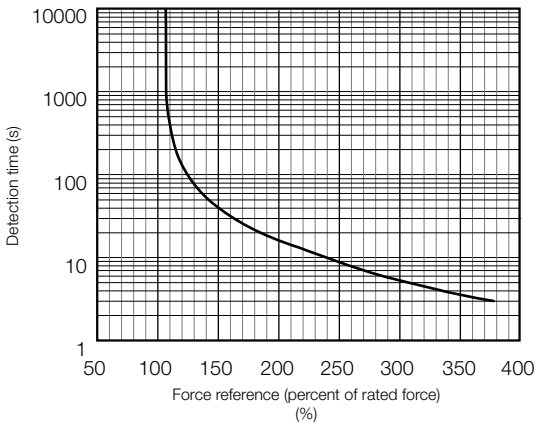


Note: 1. These values are for operation in combination with a SERVOPACK when the temperature of the armature winding is 100°C. These are typical values.
2. The characteristics in the intermittent duty zone depend on the power supply voltage.
3. If the effective force is within the allowable range for the rated force, the Servomotor can be used within the intermittent duty zone.
4. If the length of the Servomotor Main Circuit Cable exceeds 20 m, the intermittent duty zone in the force-motor speed characteristics will become smaller as the voltage drop increases.

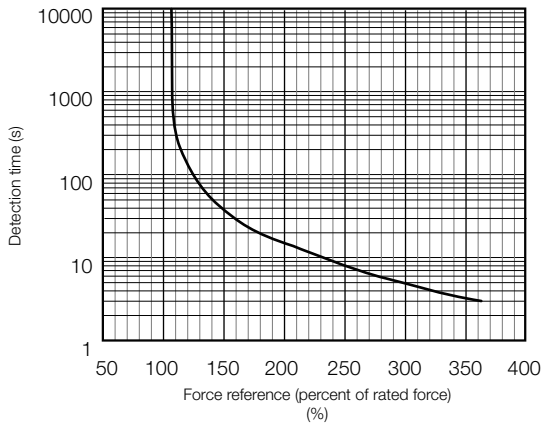
◆ Servomotor Overload Protection Characteristics

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

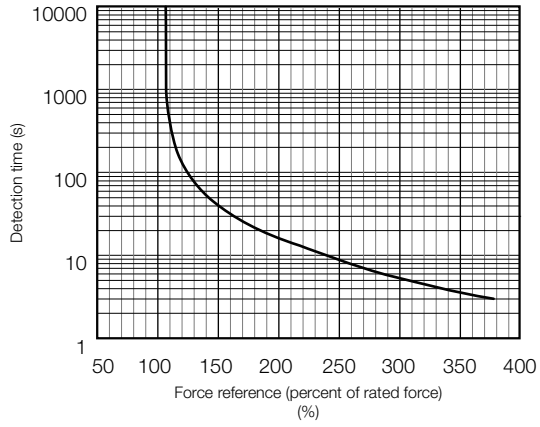
SGLFW2-30A070A



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 117 and on page 119.

Ratings and Specifications: SGLFW Models

Specifications

Linear Servomotor Moving Coil Model SGLFW-		20A		35A		50A		1ZA	
		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	Surrounding Air Temperature	0°C to 40°C (with no freezing)							
	Surrounding Air Humidity	20% to 80% relative humidity (with no condensation)							
	Installation Site	• Must be indoors and free of corrosive and explosive gases. • Must be well-ventilated and free of dust and moisture. • Must facilitate inspection and cleaning. • Must have an altitude of 1,000 m or less. • Must be free of strong magnetic fields.							
Shock Resistance	Impact Acceleration Rate	196 m/s^2							
	Number of Impacts	2 times							
Vibration Resistance	Vibration Acceleration Rate	49 m/s^2 (the vibration resistance in three directions, vertical, side-to-side, and front-to-back)							

Ratings

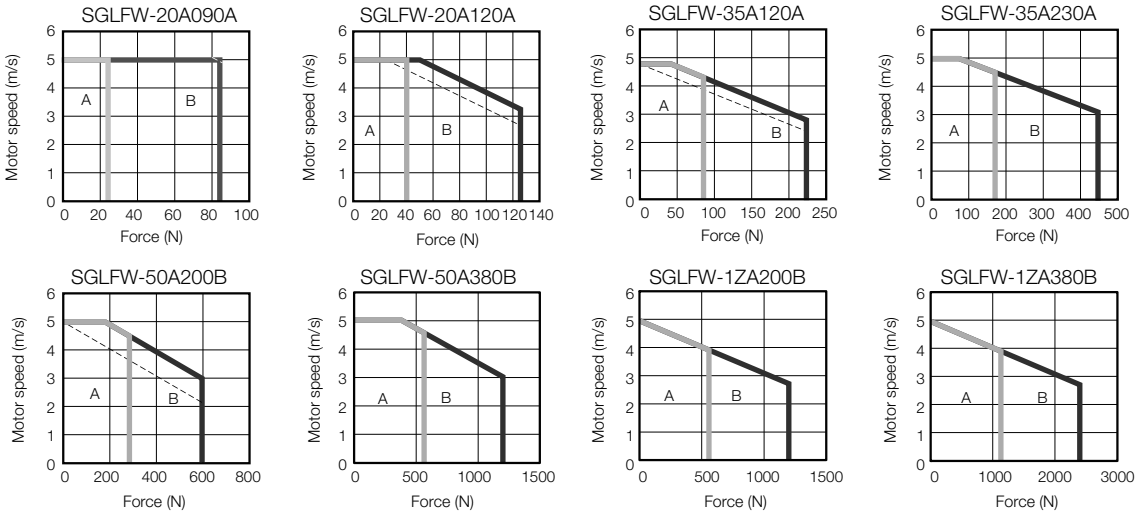
Linear Servomotor Moving Coil Model SGLFW-			20A		35A		50A		1ZA	
			090A	120A	120A	230A	200B	380B	200B	380B
Rated Motor Speed (Reference Speed during Speed Control)*1		m/s	5.0	3.5	2.5	3.0	1.5	1.5	1.5	1.5
Maximum Speed*1		m/s	5.0	5.0	5.0	5.0	5.0	5.0	4.9	4.9
Rated Force*1, *2		N	25	40	80	160	280	560	560	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 40°C with an aluminum heat sink of the dimensions given below.
- 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 200-V input

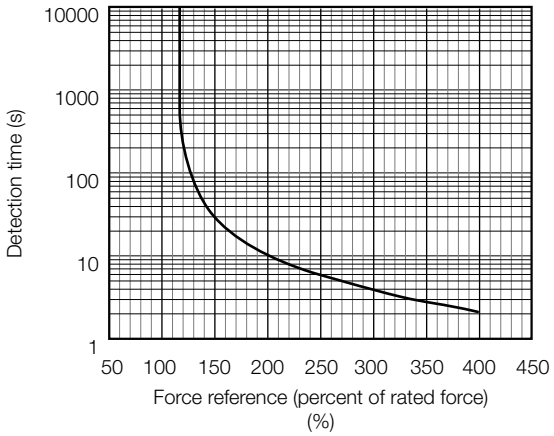


Note: 1. These values are for operation in combination with a SERVOPACK when the temperature of the armature winding is 100°C. These are typical values.
2. The characteristics in the intermittent duty zone depend on the power supply voltage.
3. If the effective force is within the allowable range for the rated force, the Servomotor can be used within the intermittent duty zone.
4. If the length of the Servomotor Main Circuit Cable exceeds 20 m, the intermittent duty zone in the force-motor speed characteristics will become smaller as the voltage drop increases.

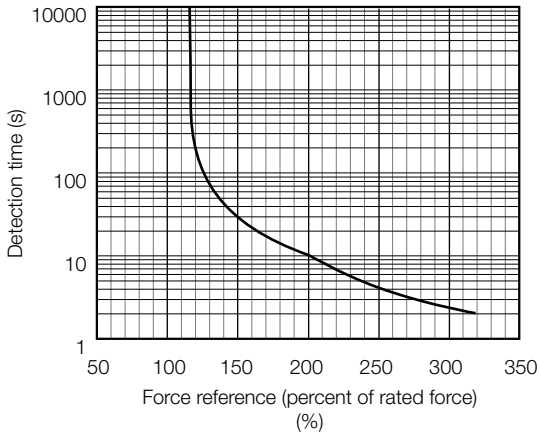
◆ Servomotor Overload Protection Characteristics

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

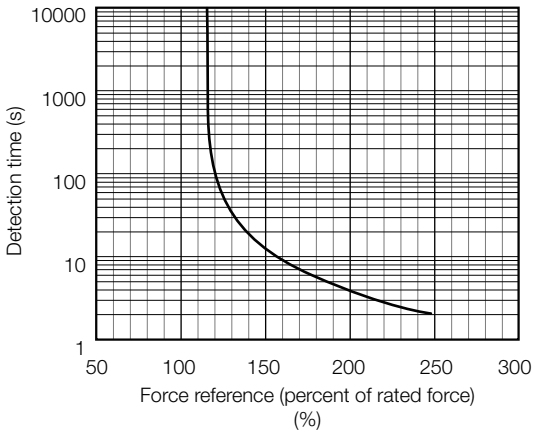
SGLFW-20A



SGLFW-35A



SGLFW-50A and -1ZA

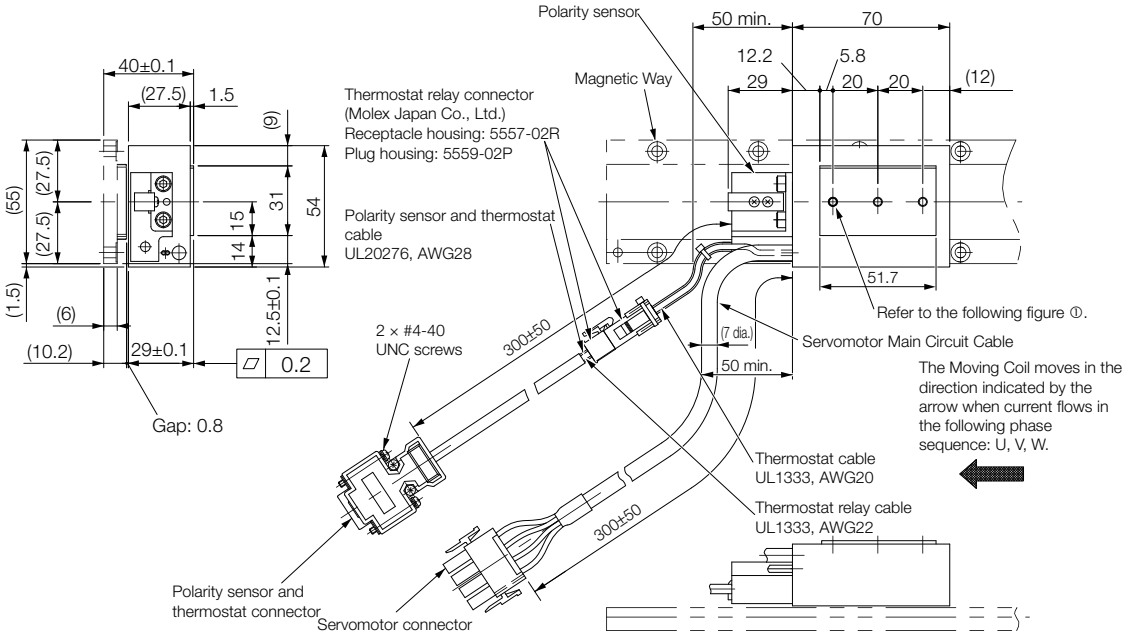


Note: The above overload protection characteristics do not mean that you can perform continuous duty operation with an output of 100% or higher. Use the Servomotor so that the effective force remains within the continuous duty zone given in ◆ *Force-Motor Speed Characteristics* on page 123.

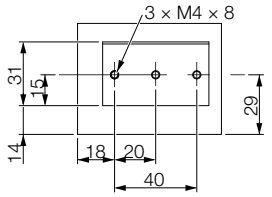
External Dimensions

SGLFW2-30

◆ Moving Coil with Polarity Sensor: SGLFW2-30A070AS



①SGLFW2-30A070AS



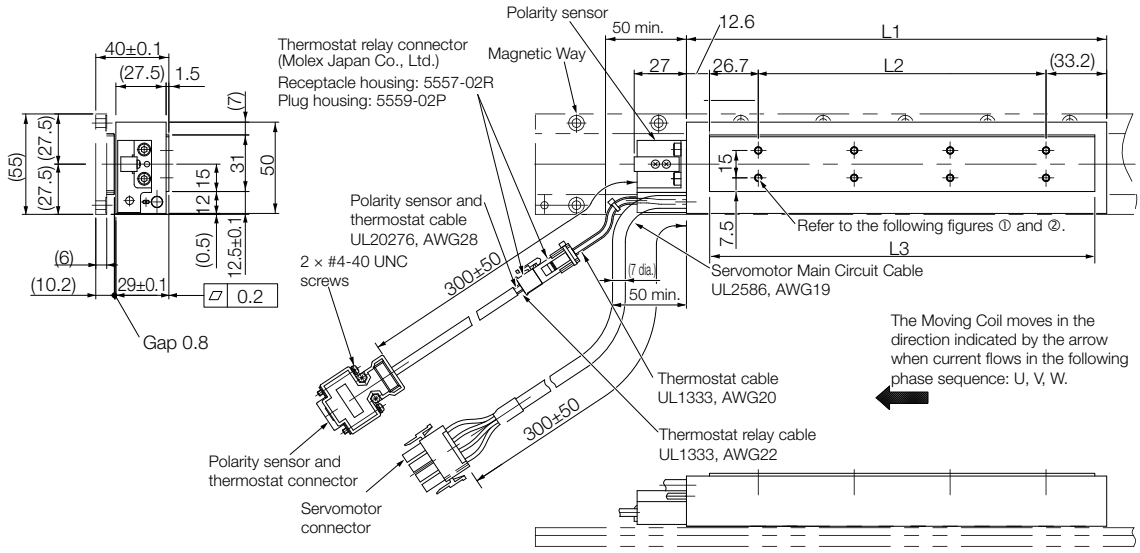
Approx. mass: 0.5 kg

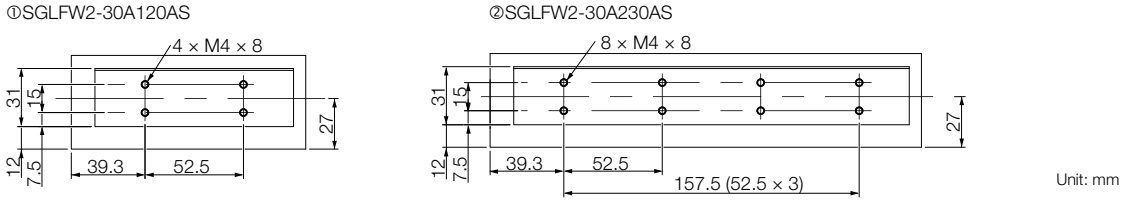
Unit: mm

Refer to the following section for the connection specifications for the Sensor Cable and Servomotor Main Circuit Cable.

☞ ◆ *Moving Coils with Polarity Sensors: SGLFW2-30 and -45* (page 150)

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



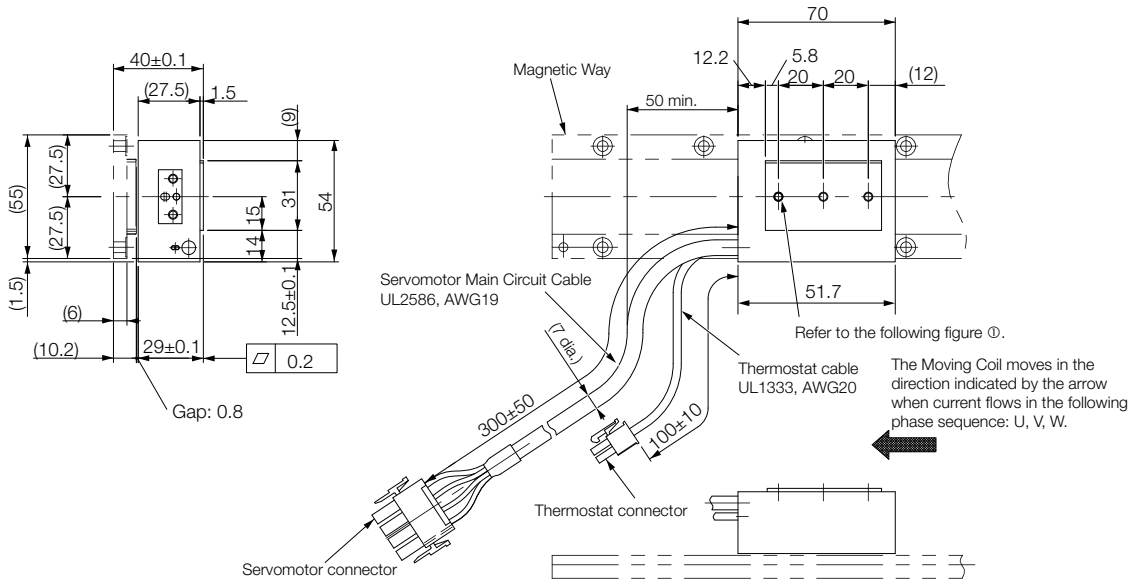


Moving Coil Model SGLFW2-	L1	L2	L3	Approx. Mass [kg]
30A120AS	125	52.5	105.9	0.9
30A230AS	230	157.5	210.9	1.7

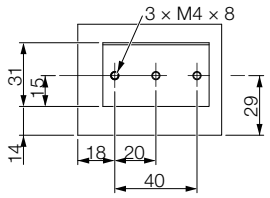
Refer to the following section for the connection specifications for the Sensor Cable and Servomotor Main Circuit Cable.

☞ ◆ *Moving Coils with Polarity Sensors: SGLFW2-30 and -45* (page 150)

◆ Moving Coil without Polarity Sensor: SGLFW2-30A070AT



①SGLFW2-30A070AT



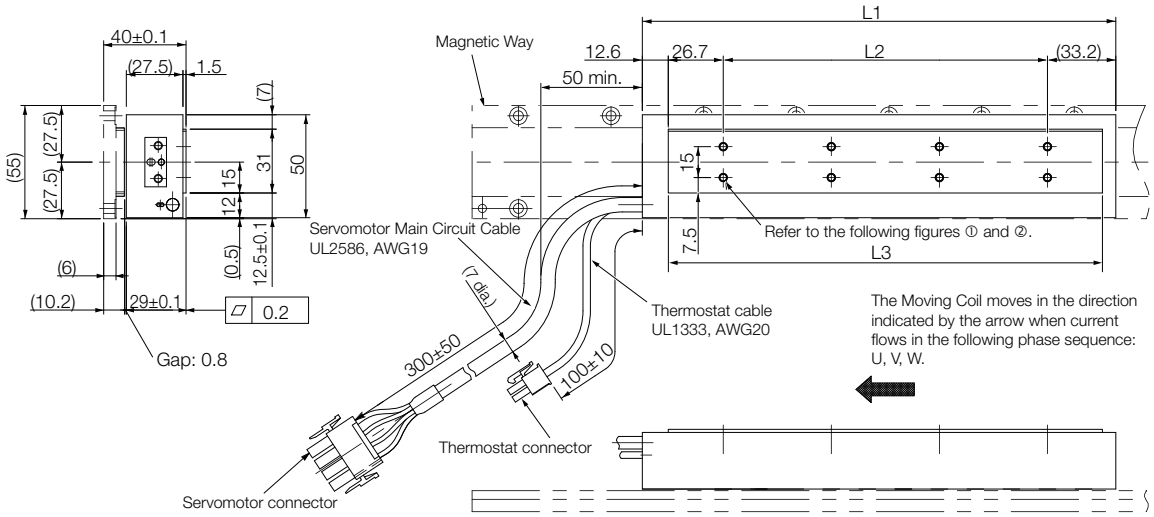
Approx. mass: 0.5 kg

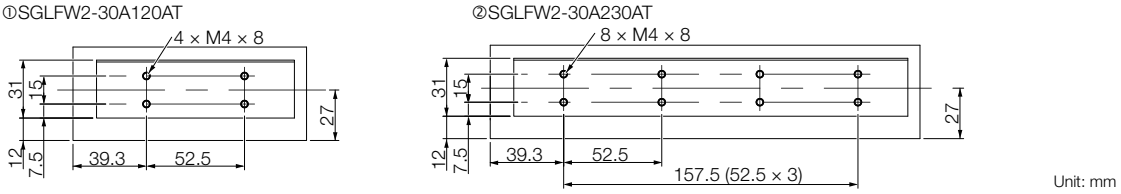
Unit: mm

Refer to the following section for the connection specifications for the Sensor Cable and Servomotor Main Circuit Cable.

☞ ◆ *Moving Coils without Polarity Sensors: SGLFW2-30 and -45* (page 151)

◆ Moving Coils without Polarity Sensors: SGLFW2-30A□□□AT





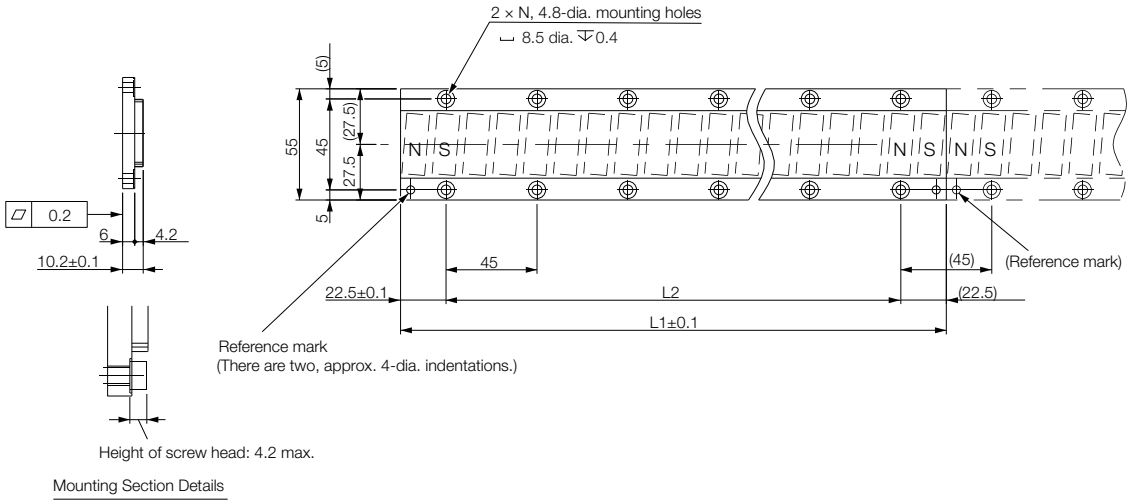
Unit: mm

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 connection specifications for the Sensor Cable and Servomotor Main Circuit Cable.

☞ ◆ *Moving Coils without Polarity Sensors: SGLFW2-30 and -45* (page 151)

◆ Magnetic Ways: SGLFM2-30□□□A



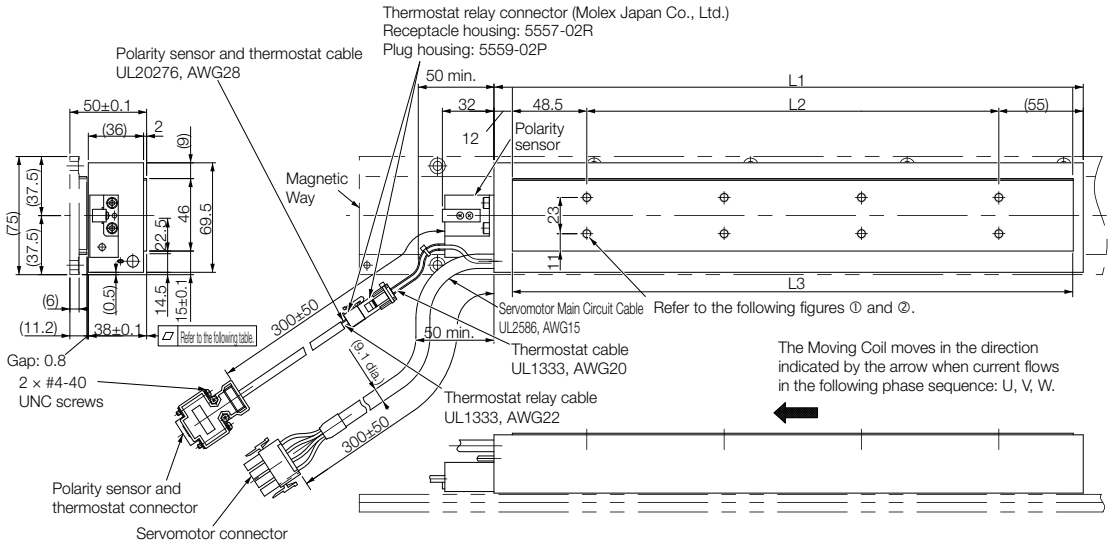
Unit: mm

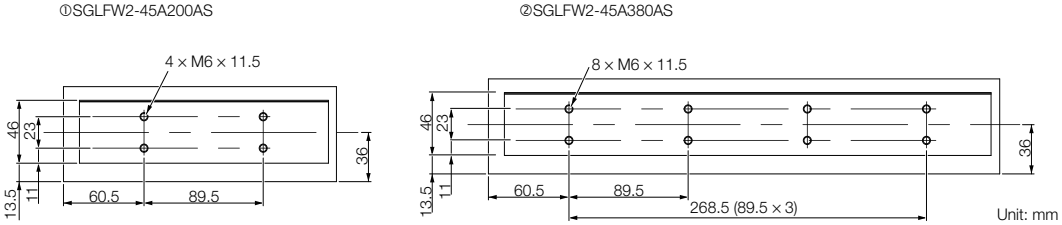
Note: More than one Magnetic Way can be connected. Connect the Magnetic Ways so that the reference marks on them are aligned in the same direction as shown in the figure.

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

SGLFW2-45

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



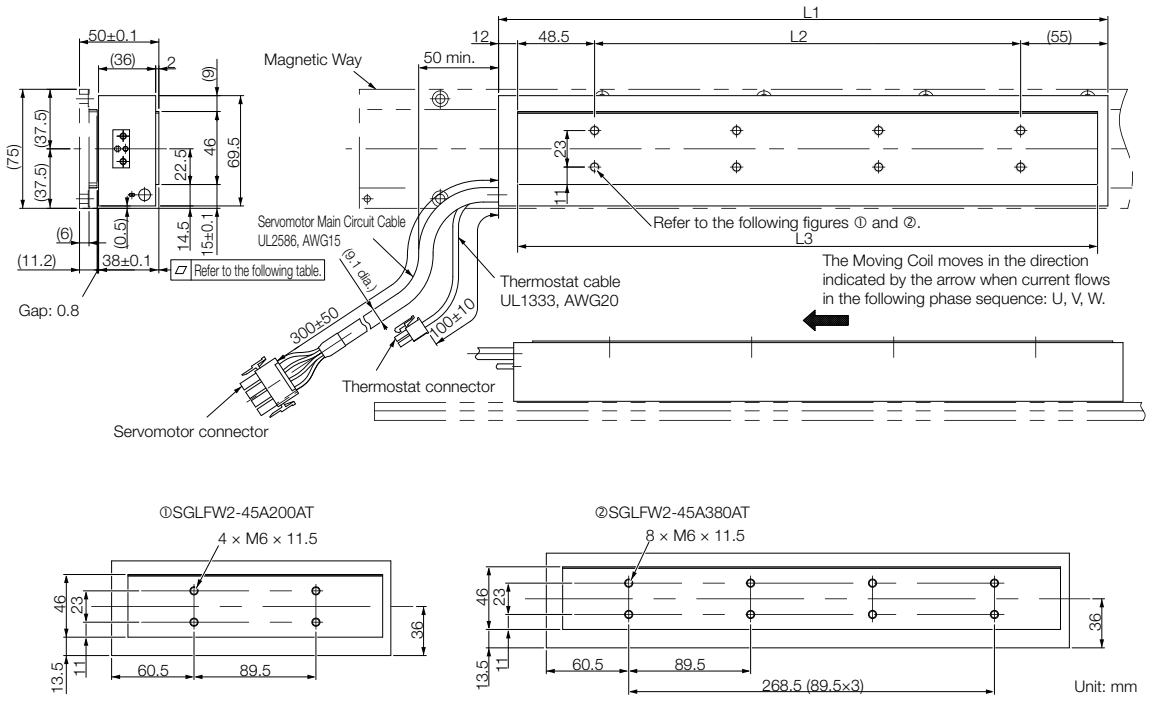


Moving Coil Model SGLFW2-	L1	L2	L3	Flatness	Approx. Mass [kg]
45A200AS	205	89.5	187	0.2	2.9
45A380AS	384	268.5	365.5	0.3	5.5

Refer to the following section for the connection specifications for the Sensor Cable and Servomotor Main Circuit Cable.

☞ ◆ *Moving Coils with Polarity Sensors: SGLFW2-30 and -45* (page 150)

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

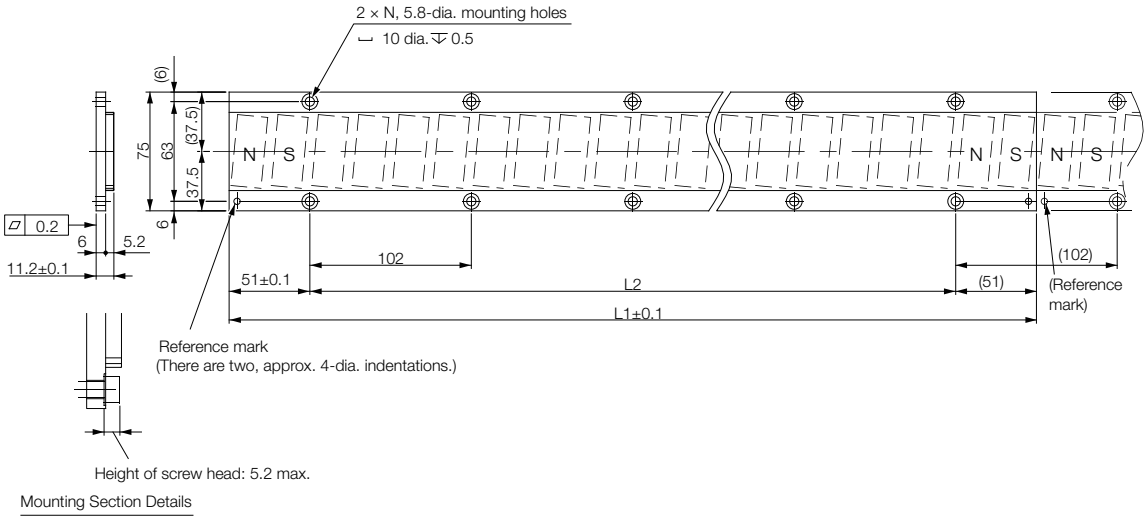


Moving Coil Model SGLFW2-	L1	L2	L3	Flatness	Approx. Mass [kg]
45A200AT	205	89.5	187	0.2	2.9
45A380AT	384	268.5	365.5	0.3	5.5

Refer to the following section for the connection specifications for the Sensor Cable and Servomotor Main Circuit Cable.

☞ ◆ *Moving Coils without Polarity Sensors: SGLFW2-30 and -45* (page 151)

◆ Magnetic Ways: SGLFM2-45□□□A



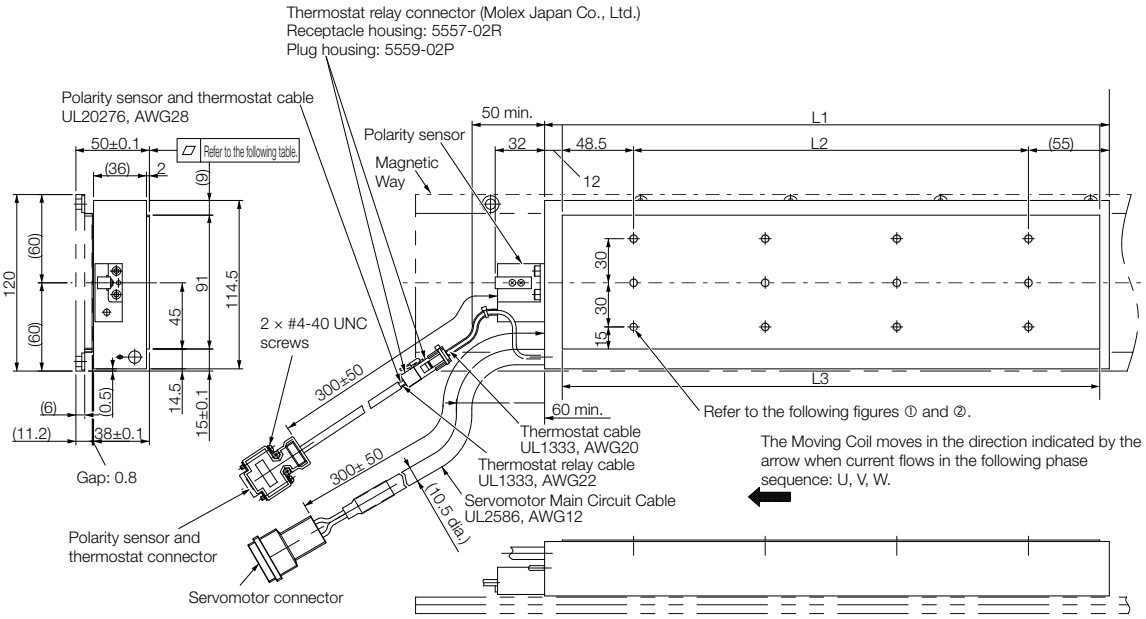
Unit: mm

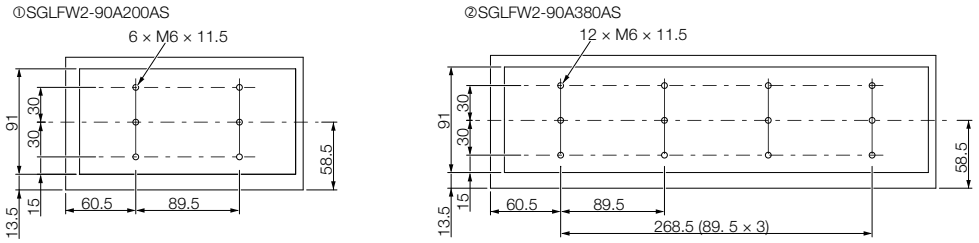
Note: More than one Magnetic Way can be connected. Connect the Magnetic Ways so that the reference marks on them are aligned in the same direction as shown in the figure.

Magnetic Way Model SGLFM2-	L1 ± 0.1	L2	N	Approx. Mass [kg]
45306A	306	204 (102 × 2)	3	1.5
45510A	510	408 (102 × 4)	5	2.5
45714A	714	612 (102 × 6)	7	3.4

SGLFW2-90

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





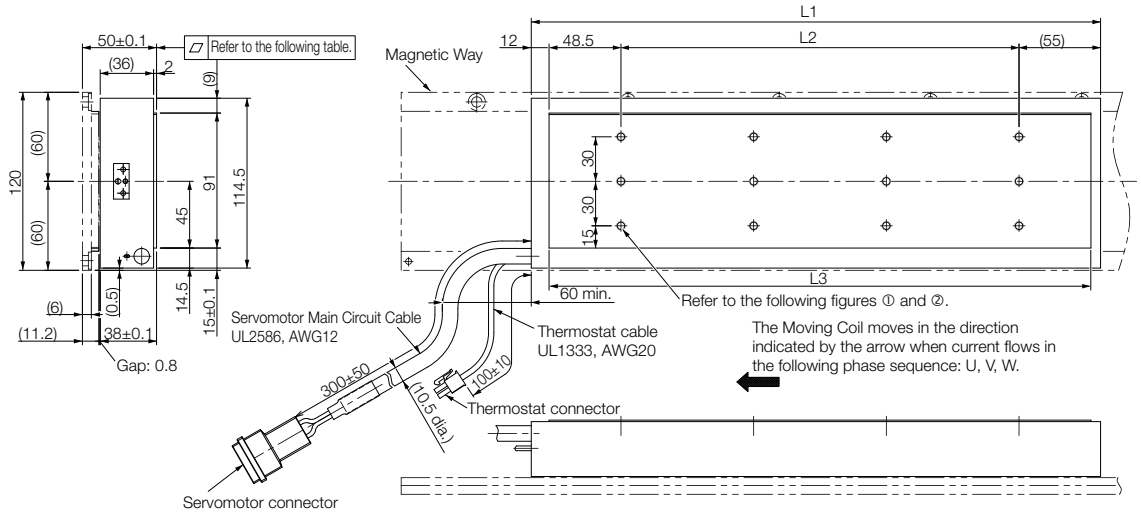
Unit: mm

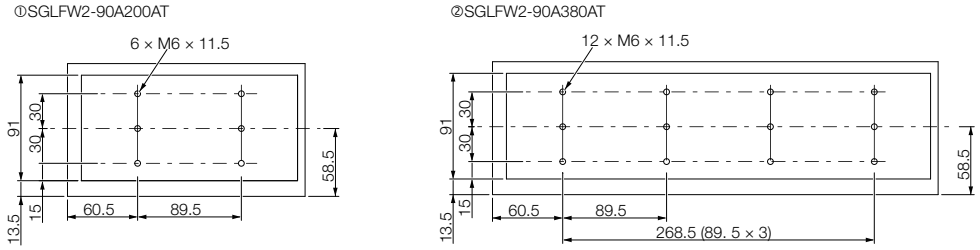
Moving Coil Model SGLFW2-	L1	L2	L3	Flatness	Approx. Mass [kg]
90A200AS	205	89.5	187	0.2	5.3
90A380AS	384	268.5	365.5	0.3	10.1

Refer to the following section for the connection specifications for the Sensor Cable and Servomotor Main Circuit Cable.

☞ ◆ *Moving Coils with Polarity Sensors: SGLFW2-90 and -1D* (page 151)

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





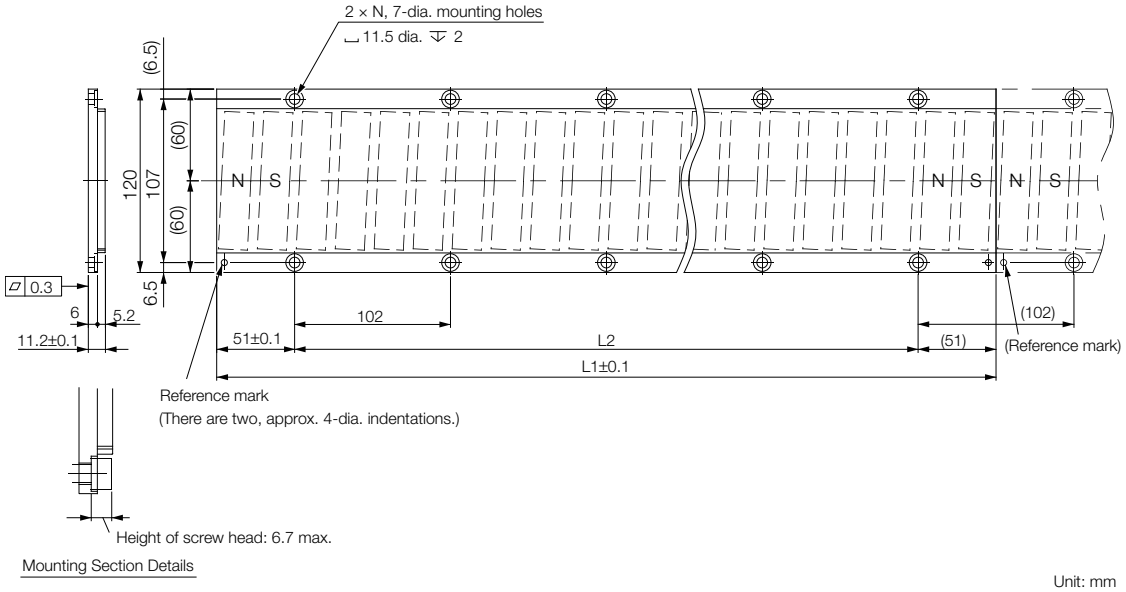
Unit: mm

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

Refer to the following section for the connection specifications for the Sensor Cable and Servomotor Main Circuit Cable.

☞ ◆ *Moving Coils without Polarity Sensors: SGLFW2-90 and -1D* (page 152)

◆ Magnetic Ways: SGLFM2-90□□□A



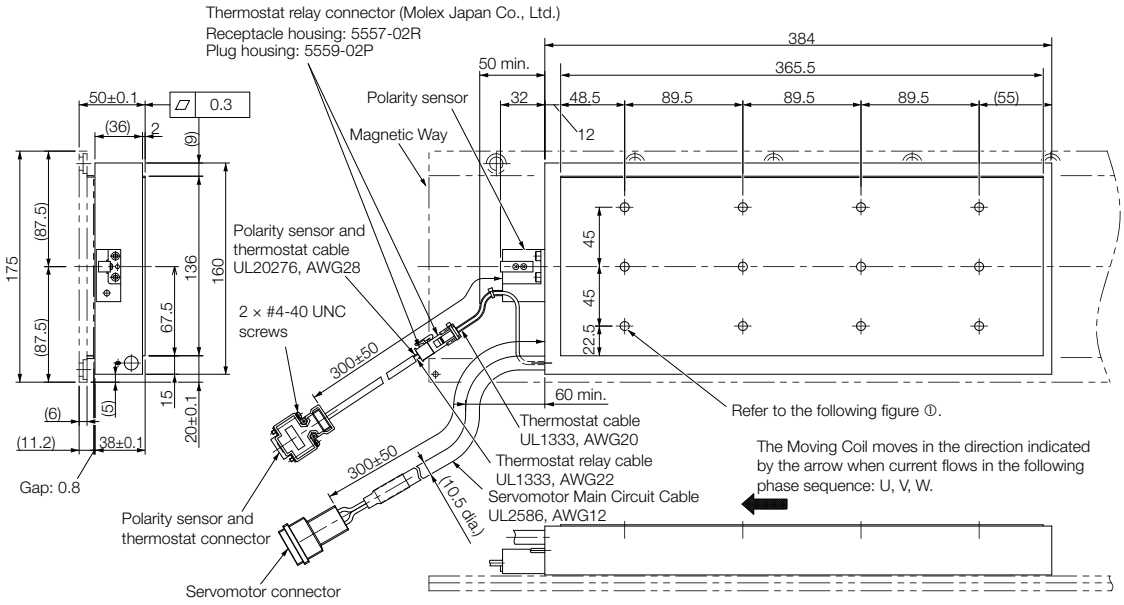
Unit: mm

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

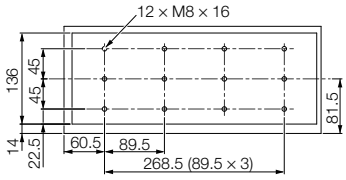
Magnetic Way Model SGLFM2-	L1±0.1	L2	N	Approx. Mass [kg]
90306A	306	204 (102 × 2)	3	2.6
90510A	510	408 (102 × 4)	5	4.2
90714A	714	612 (102 × 6)	7	5.9

SGLFW2-1D

◆ Moving Coil with Polarity Sensor: SGLFW2-1DA380AS



①SGLFW2-1DA380AS



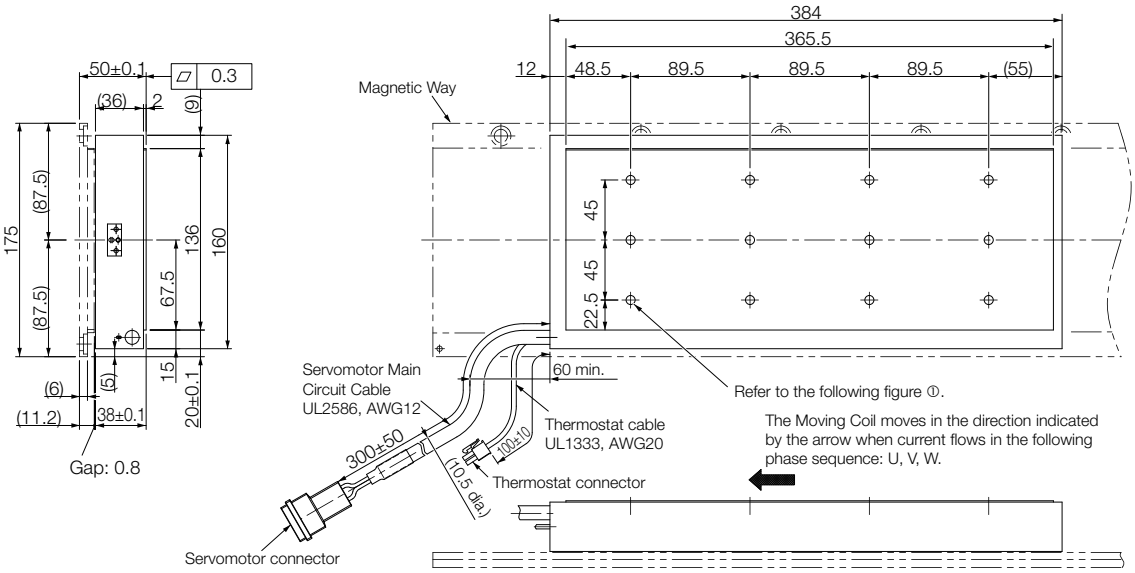
Approx. mass: 14.6 kg

Unit: mm

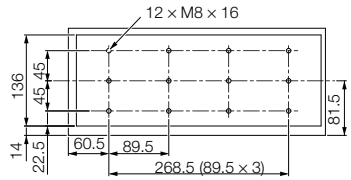
Refer to the following section for the connection specifications for the Sensor Cable and Servomotor Main Circuit Cable.

☞ ◆ *Moving Coils with Polarity Sensors: SGLFW2-90 and -1D* (page 151)

◆ Moving Coil without Polarity Sensor: SGLFW2-1DA380AT



①SGLFW2-1DA380AT



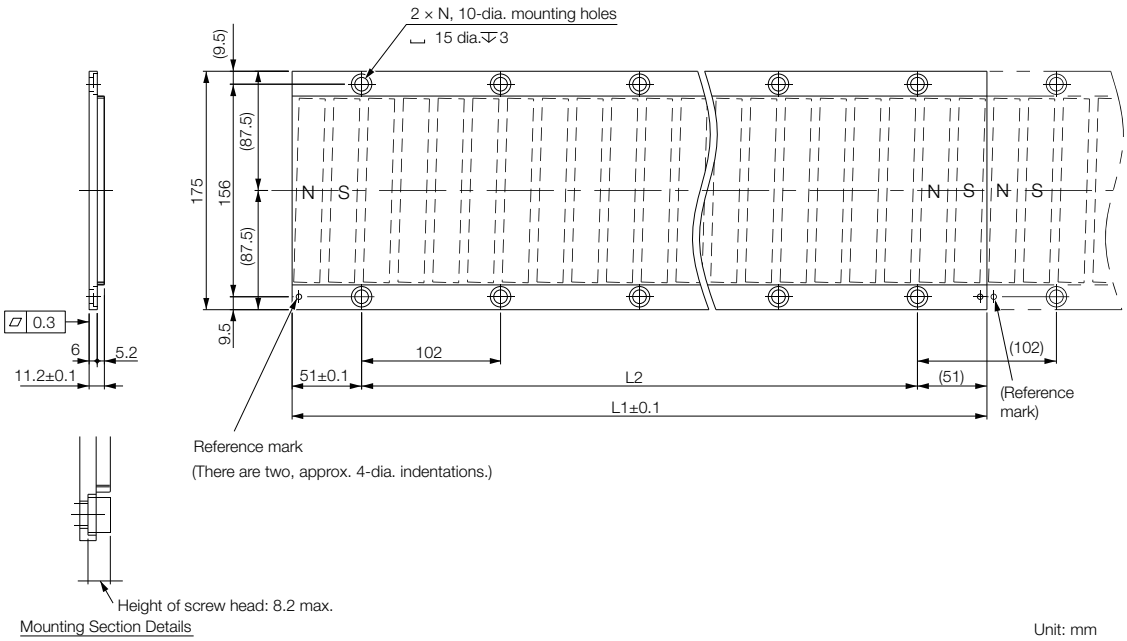
Approx. mass: 14.6 kg

Unit: mm

Refer to the following section for the connection specifications for the Sensor Cable and Servomotor Main Circuit Cable.

☞ ◆ *Moving Coils without Polarity Sensors: SGLFW2-90 and -1D* (page 152)

◆ Magnetic Ways: SGLFM2-1D□□□A

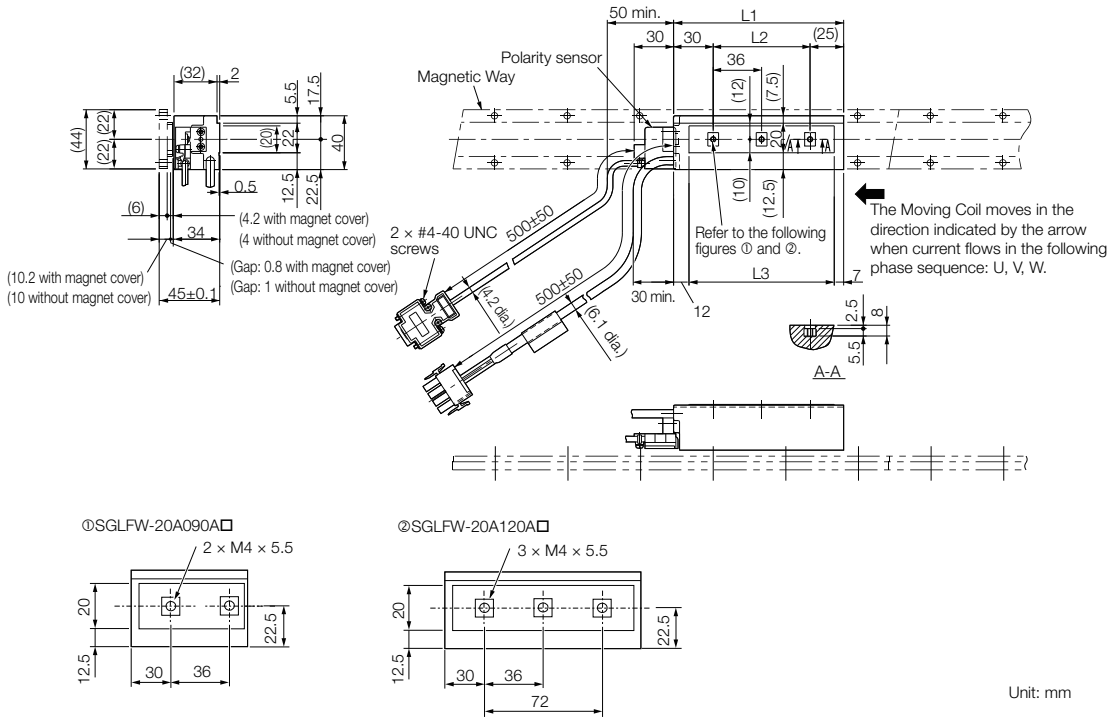


Note: More than one Magnetic Way can be connected. Connect the Magnetic Ways so that the reference marks on them are aligned in the same direction as shown in the figure.

Magnetic Way Model SGLFM2-	L1±0.1	L2	N	Approx. Mass [kg]
1D306A	306	204 (102 × 2)	3	3.7
1D510A	510	408 (102 × 4)	5	6.2
1D714A	714	612 (102 × 6)	7	8.6

SGLFW-20

◆ Moving Coils: SGLFW-20A□□□A□



Unit: mm

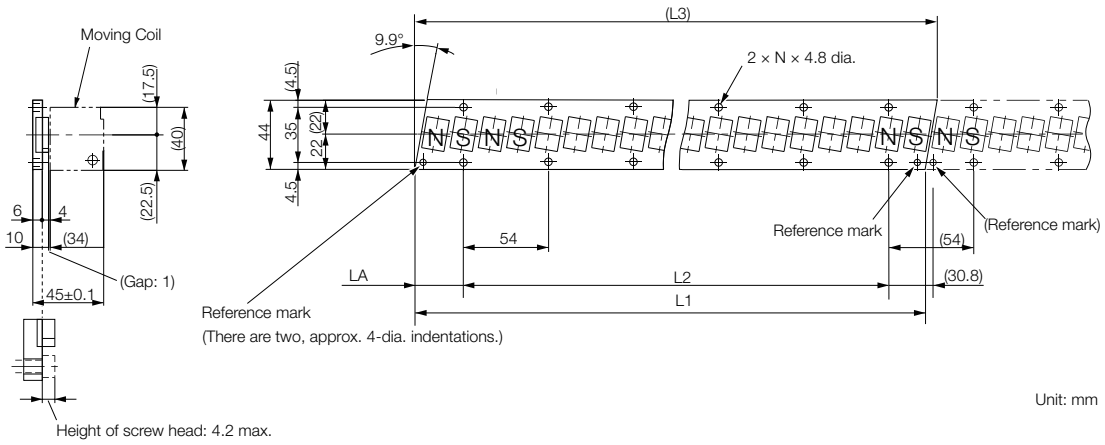
Moving Coil Model SGLFW-	L1	L2	L3	Approx. Mass [kg]
20A090A□	91	36	72	0.7
20A120A□	127	72	108	0.9

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 connection specifications for the Sensor Cable and Servomotor Main Circuit Cable.

☞ ◆ *SGLFW-20A□□□A□ and -35A□□□A□ Moving Coils* (page 152)

◆ Magnetic Ways: SGLFM-20□□□A

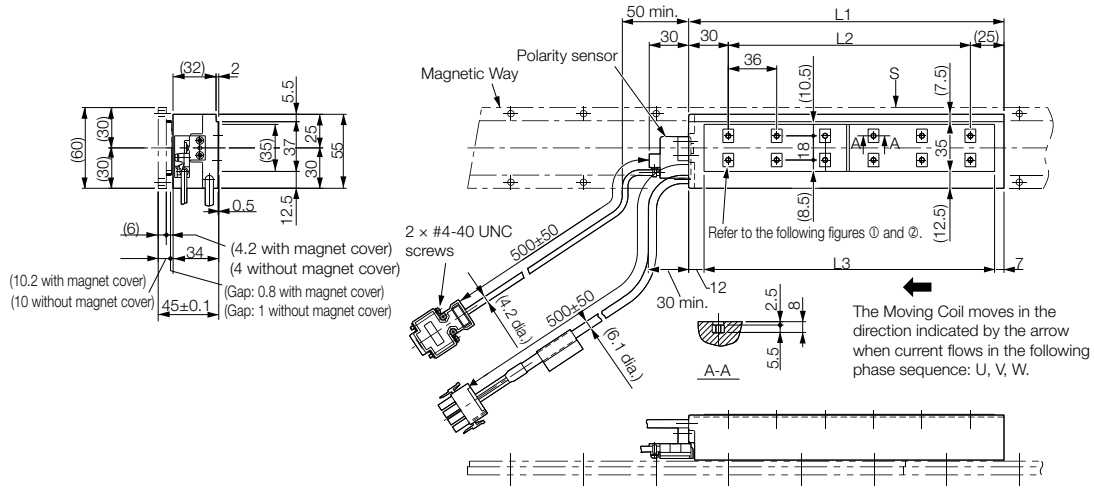


Note: More than one Magnetic Way can be connected. Connect the Magnetic Ways so that the reference marks on them are aligned in the same direction as shown in the figure.

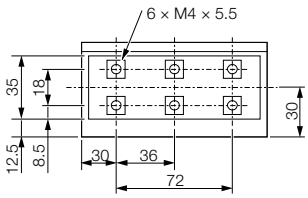
Magnetic Way Model SGLFM-	L1	L2	(L3)	LA	N	Approx. Mass [kg]
20324A	$324^{-0.1}_{-0.3}$	270 (54 × 5)	(331.6)	$30.8^{0}_{-0.2}$	6	0.9
20540A	$540^{-0.1}_{-0.3}$	486 (54 × 9)	(547.6)	$30.8^{0}_{-0.2}$	10	1.4
20756A	$756^{-0.1}_{-0.3}$	702 (54 × 13)	(763.6)	$30.8^{0}_{-0.2}$	14	2

SGLFW-35

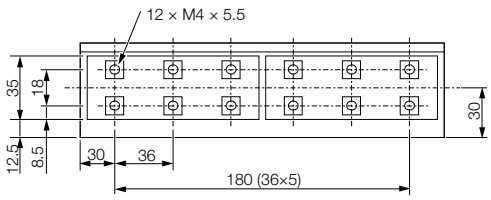
◆ Moving Coils: SGLFW-35A□□□A□



①SGLFW-35A120A□



②SGLFW-35A230A□



Unit: mm

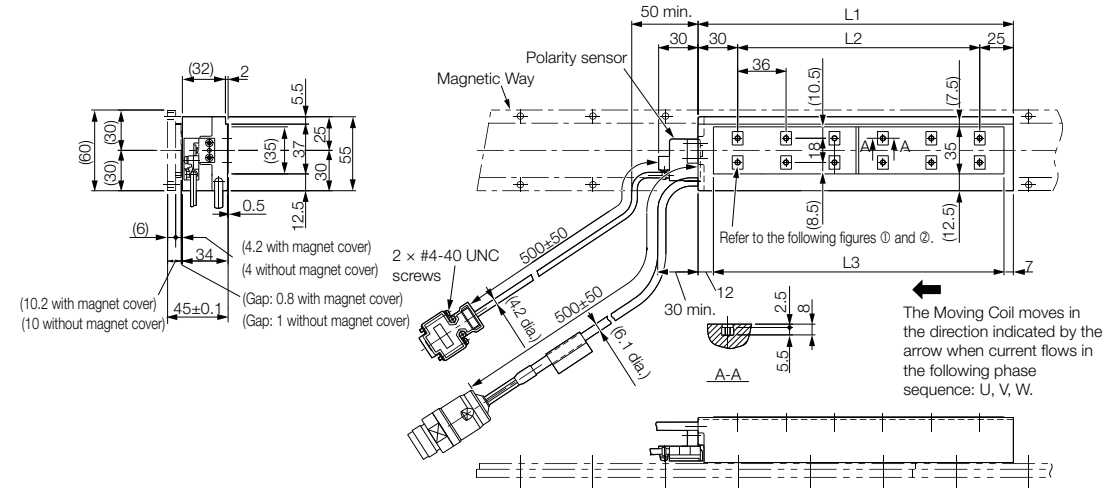
Moving Coil Model SGLFW-	L1	L2	L3	Approx. Mass [kg]
35A120A□	127	72	108	1.3
35A230A□	235	180	216	2.3

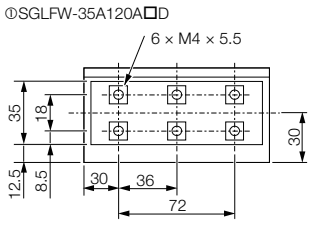
Note: The above dimensional drawing gives the dimensions for both models with polarity sensors and models without polarity sensors.

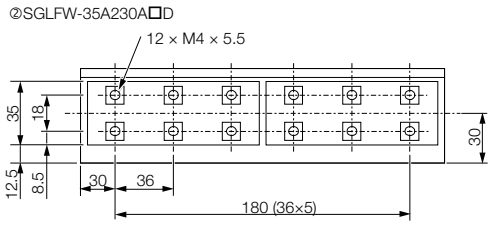
Refer to the following section for the connection specifications for the Sensor Cable and Servomotor Main Circuit Cable.

☞ ◆ *SGLFW-20A□□□A□ and -35A□□□A□ Moving Coils* (page 152)

◆ Moving Coils: SGLFW-35A□□□A□D







Unit: mm

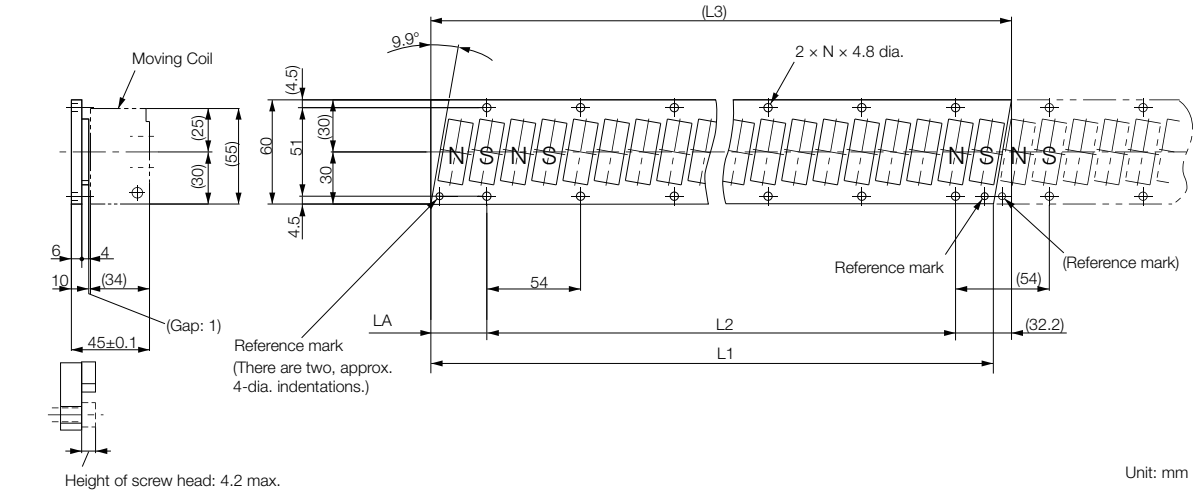
Moving Coil Model SGLFW-	L1	L2	L3	Approx. Mass [kg]
35A120A□D	127	72	108	1.3
35A230A□D	235	180	216	2.3

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 connection specifications for the Sensor Cable and Servomotor Main Circuit Cable.

☞ ◆ *SGLFW-35A□□□A□D and -50A□□□B□D Moving Coils* (page 153)

◆ Magnetic Ways: SGLFM-35□□□A

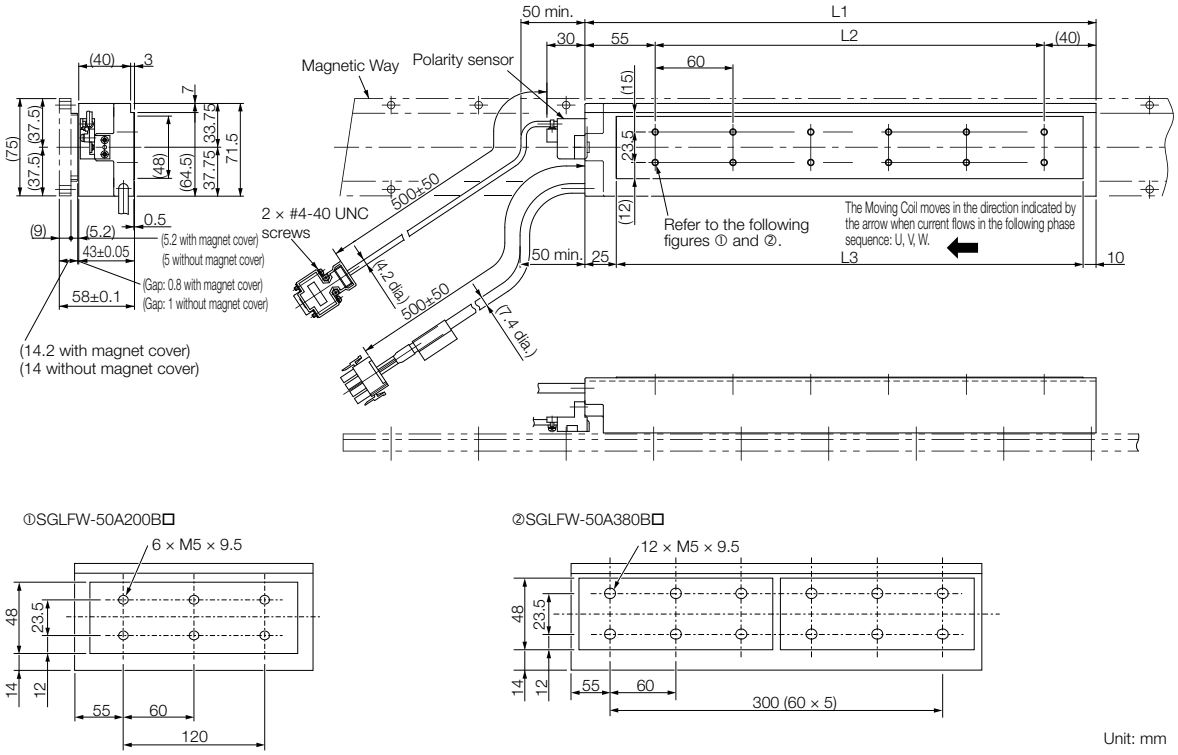


Note: More than one Magnetic Way can be connected. Connect the Magnetic Ways so that the reference marks on them are aligned in the same direction as shown in the figure.

Magnetic Way Model 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)	(766.4)	32.2 $^{0}_{-0.2}$	14	2.9

SGLFW-50

◆ Moving Coils: SGLFW-50A□□□B□



Unit: mm

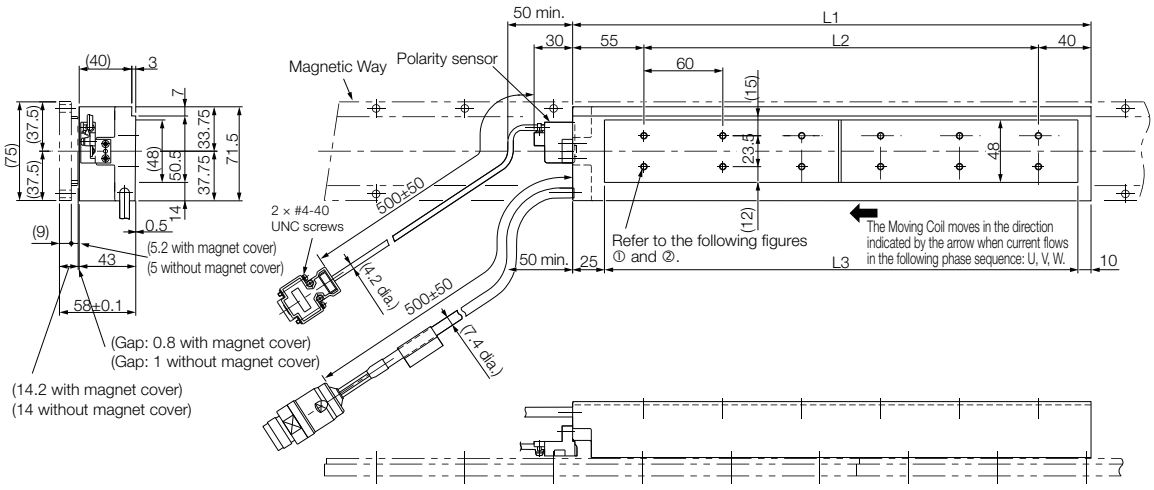
Moving Coil Model SGLFW-	L1	L2	L3	Approx. Mass [kg]
50A200B□	215	120	180	3.5
50A380B□	395	300	360	6.9

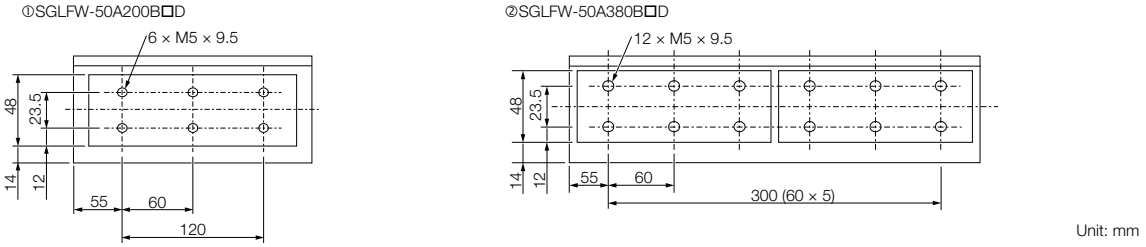
Note: The above dimensional drawing gives the dimensions for both models with polarity sensors and models without polarity sensors.

Refer to the following section for the connection specifications for the Sensor Cable and Servomotor Main Circuit Cable.

☞ ◆ *SGLFW-50A□□□B□ Moving Coils* (page 153)

◆ Moving Coils: SGLFW-50A□□□B□D





Unit: mm

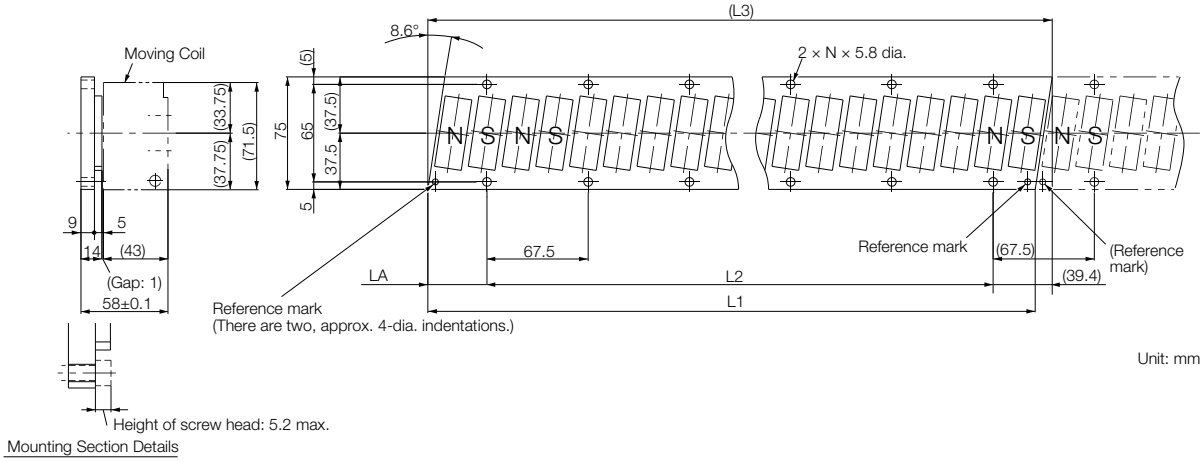
Moving Coil Model SGLFW-	L1	L2	L3	Approx. Mass [kg]
50A200B□D	215	120	180	3.5
50A380B□D	395	300	360	6.9

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 connection specifications for the Sensor Cable and Servomotor Main Circuit Cable.

☞ ◆ *SGLFW-35A□□□A□D and -50A□□□B□D Moving Coils* (page 153)

◆ Magnetic Ways: SGLFM-50□□□A

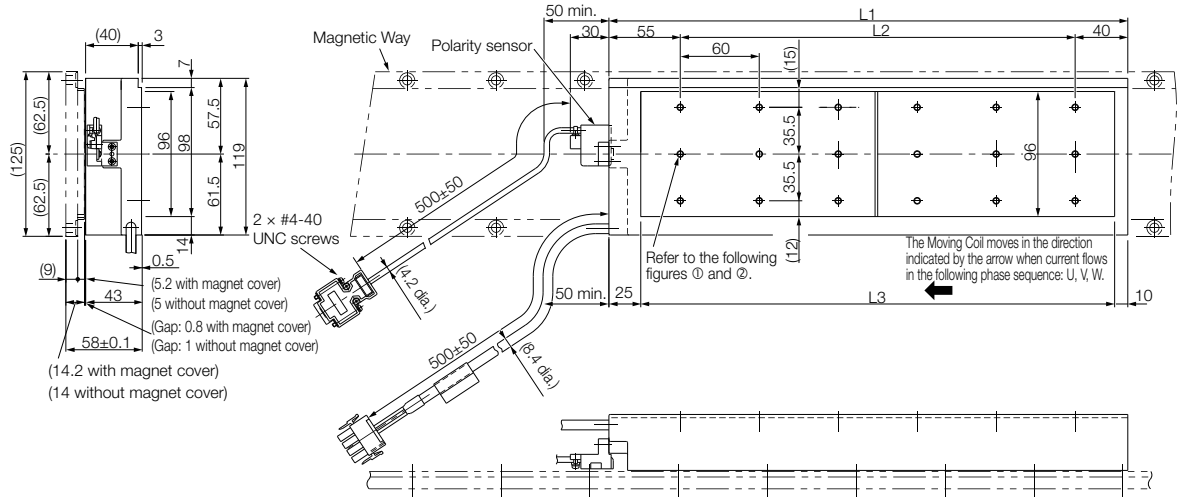


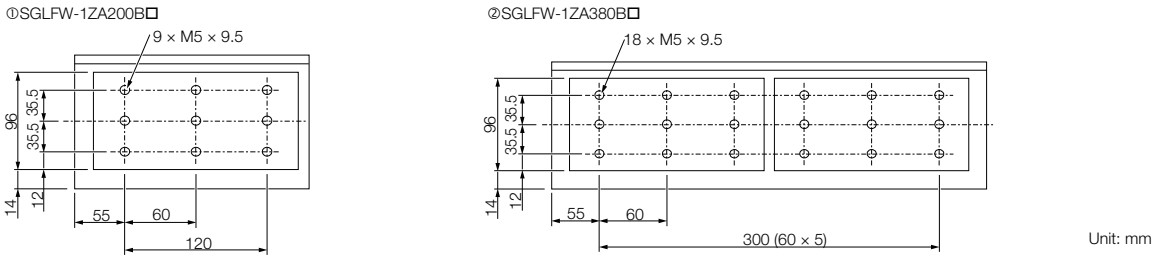
Note: More than one Magnetic Way can be connected. Connect the Magnetic Ways so that the reference marks on them are aligned in the same direction as shown in the figure.

Magnetic Way Model 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

SGLFW-1Z

◆ Moving Coils: SGLFW-1ZA□□□B□





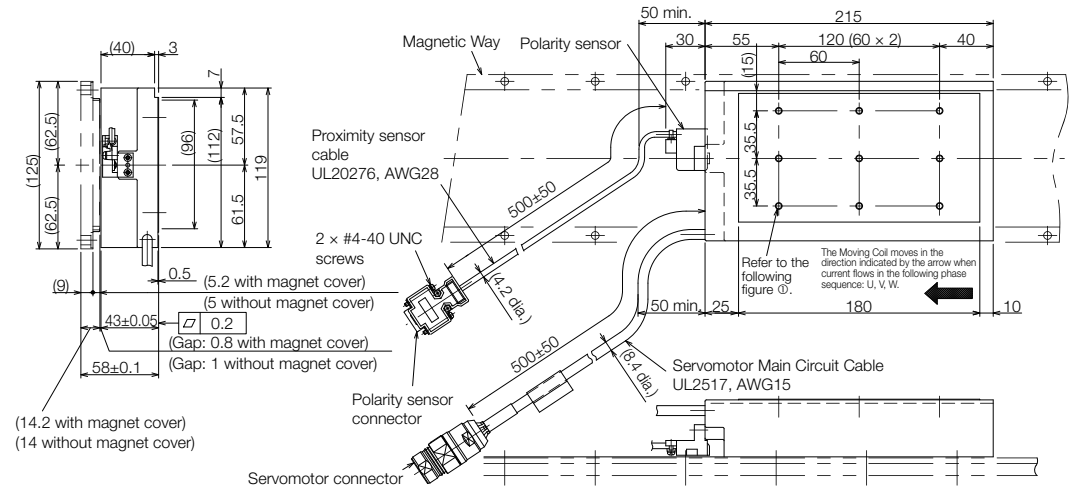
Moving Coil Model SGLFW-	L1	L2	L3	Approx. Mass [kg]
1ZA200B□	215	120	180	6.4
1ZA380B□	395	300	360	11.5

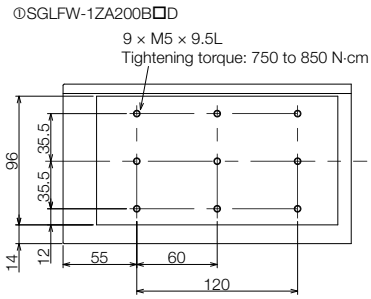
Note: The above dimensional drawing gives the dimensions for both models with polarity sensors and models without polarity sensors.

Refer to the following section for the connection specifications for the Sensor Cable and Servomotor Main Circuit Cable.

☞ ◆ *SGLFW-1ZA□□□B□ Moving Coils* (page 154)

◆ Moving Coils: SGLFW-1ZA200B□D





Approx. mass: 6.4 kg

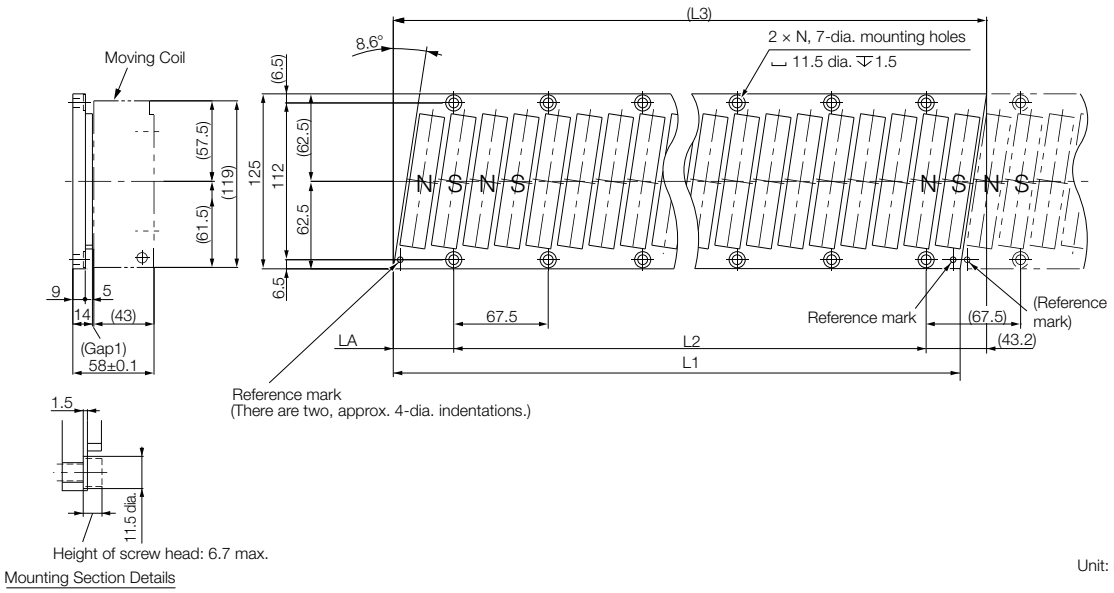
Unit: mm

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 connection specifications for the Sensor Cable and Servomotor Main Circuit Cable.

☞ ◆ *SGLFW-1ZA200B□D Moving Coils* (page 154)

◆ Magnetic Ways: SGLFM-1Z□□□A



Unit: mm

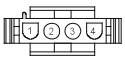
Note: More than one Magnetic Way can be connected. Connect the Magnetic Ways so that the reference marks on them are aligned in the same direction as shown in the figure.

Magnetic Way Model 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)
From Tyco Electronics Japan G.K.

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

- Polarity Sensor and Thermostat Connector

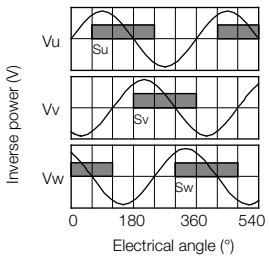
Pin connector: 17JE-23090-02 (D8C) -CG
From DDK Ltd.

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

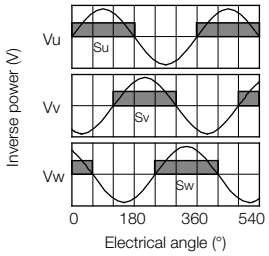
- Polarity Sensor Output Signal

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.

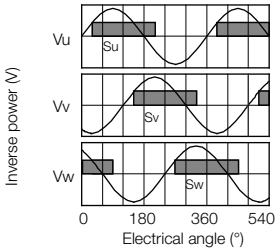
SGLFW2-30A070AS



SGLFW2-30A120AS
SGLFW2-30A230AS

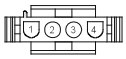


SGLFW2-45A200AS
SGLFW2-45A380AS



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

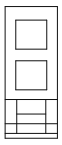
• Servomotor Connector



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

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

• Thermostat Connector

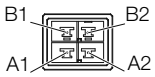


Receptacle housing: 5557-02R
Terminals: 5556T or 5556TL
From Molex Japan Co., Ltd.

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

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

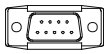
• Servomotor Connector



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

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

• Polarity Sensor and Thermostat Connector

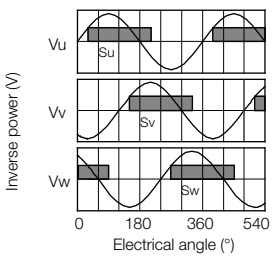


Pin connector: 17JE-23090-02 (D8C) -CG
From DDK Ltd.

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

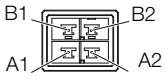
• Polarity Sensor Output Signal

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

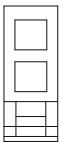
• Servomotor Connector



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

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

• Thermostat Connector

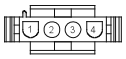


Receptacle housing: 5557-02R
Terminals: 5556T or 5556TL
From Molex Japan Co., Ltd.

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

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

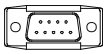
• Servomotor Connector



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

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

• Polarity Sensor Connector

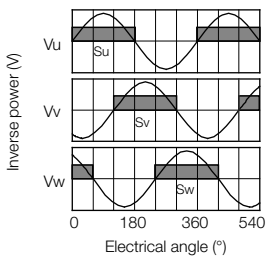


Pin connector: 17JE-23090-02 (D8C)
From DDK Ltd.

Mating Connector
Socket connector: 17JE-13090-02 (D8C)
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.



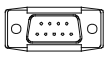
◆ SGLFW-35A□□□A□D and -50A□□□B□D Moving Coils

• Servomotor Connector

Extension: ARRA06AMRPN182
Pins: 021.279.1020
From Interconnectron GmbH

Mating Connector
Plug: APRA06BFRDN170
Socket: 020.105.1020

• Polarity Sensor Connector

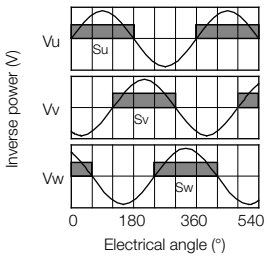


Pin connector: 17JE-23090-02 (D8C)
From DDK Ltd.

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

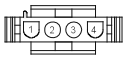
• Polarity Sensor Output Signal

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

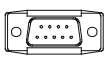
• Servomotor Connector



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

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

• Polarity Sensor Connector

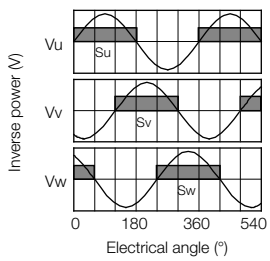


Pin connector: 17JE-23090-02 (D8C)
From DDK Ltd.

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

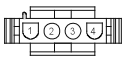
• Polarity Sensor Output Signal

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)
From Tyco Electronics Japan G.K.

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

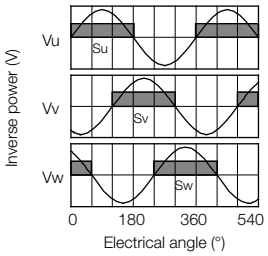
• Polarity Sensor Connector

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

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

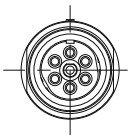
• Polarity Sensor Output Signal

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

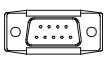
• Servomotor Connector



Extension: SROC06JMSCN169
Pins: 021.423.1020
From Interconnectron GmbH

Mating Connector
Plug: SPUC06KFSDN236
Socket: 020.030.1020

• Polarity Sensor Connector

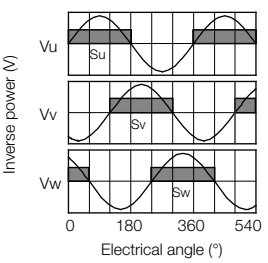


Pin connector: 17JE-23090-02 (D8C)
From DDK Ltd.

Mating Connector
Socket connector: 17JE-13090-02 (D8C)
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

Moving Coil

S G L T W - 20 A 170 A P □

Linear Σ Series Linear Servomotors	1st digit	2nd digit	3rd+4th digits	5th digit	6th+7th+8th digits	9th digit	10th digit	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 digits Magnet Height

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

5th digit Power Supply Voltage

Code	Specification
A	200 VAC

6th+7th+8th digits 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 Specification and Cooling Method

Code	Specifications		Applicable Models
	Polarity Sensor	Cooling Method	
None	None	Self-cooled	All models
C*	None	Water-cooled	SGLTW-40
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□□□□□ -50A□□□□□
	MS connector	SGLTW-40□□□□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 combinations of codes.

Magnetic Way

S G L T M - 20 324 A □

Linear Σ Series Linear Servomotors	1st digit	2nd digit	3rd+4th digits	5th+6th+7th digits	8th digit	9th digit

1st digit Servomotor Type

(Same as for the Moving Coil.)

2nd digit Moving Coil/Magnetic Way

Code	Specification
M	Magnetic Way

3rd+4th digits Magnet Height

(Same as for the Moving Coil.)

5th+6th+7th digits 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

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

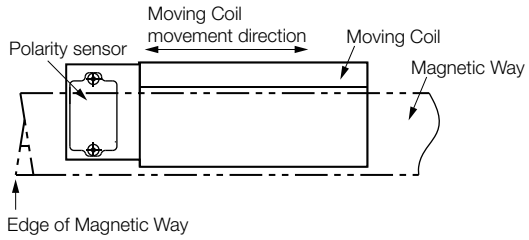
Note: This information is provided to explain model numbers. It is not meant to imply that models are available for all combinations of codes.

Precautions on Moving Coils with Polarity Sensors

Note

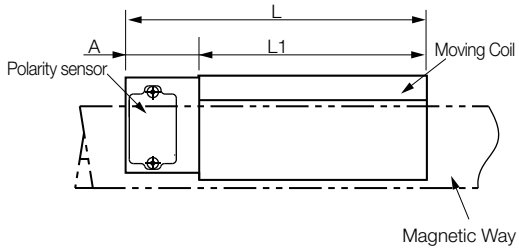
When you use a Moving Coil with a Polarity Sensor, the Magnetic Way must cover the bottom of the polarity sensor. Refer to the example that shows the correct installation.
When determining the length of the Moving Coil's stroke or the length of the Magnetic Way, consider the total length of the Moving 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

Ratings and Specifications

Specifications

Linear Servomotor Moving Coil Model SGLTW-		Standard Models							High-efficiency Models			
		20A			35A			40A	35A		50A	
		170A	320A	460A	170A	320A	460A	400B	170H	320H	170H	320H
Time Rating		Continuous										
Thermal Class		B										
Insulation Resistance		500 VDC, 10 MΩ min.										
Withstand Voltage		1,500 VAC for 1 minute										
Excitation		Permanent magnet										
Cooling Method		Self-cooled										
Protective Structure		IP00										
Environmental Conditions	Surrounding Air Temperature	0°C to 40°C (with no freezing)										
	Surrounding Air Humidity	20% to 80% relative humidity (with no condensation)										
	Installation Site	• Must be indoors and free of corrosive and explosive gases. • Must be well-ventilated and free of dust and moisture. • Must facilitate inspection and cleaning. • Must have an altitude of 1,000 m or less. • Must be free of strong magnetic fields.										
Shock Resistance	Impact Acceleration 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 Model SGLTW-		Standard Models							High-efficiency Models			
		20A			35A			40A	35A		50A	
		170A	320A	460A	170A	320A	460A	400B	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	2.5	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	4.8	4.8	3.2	3.1
Rated Force*1, *2	N	130	250	380	220	440	670	670	300	600	450	900
Maximum Force*1	N	380	760	1140	660	1320	2000	2600	600	1200	900	1800
Rated Current*1	Arms	2.3	4.4	6.7	3.5	7.0	10.7	7.3	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	11.9	23.9	11.8	23.6
Moving Coil Mass	kg	2.5	4.6	6.7	3.7	6.8	10	15	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	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	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	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	16	16	17
Mechanical Time Constant	ms	7.1	6.6	6.4	5.2	4.8	4.6	4.0	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	0.76	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	1.26	0.83	0.97	0.80
Magnetic Attraction*3	N	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	1400	2780	2000	3980
Combined Magnetic Way, SGLTM-		20□□□A□			35□□□A□			40□□□A□	35□□□H□		50□□□H□	
Combined Serial Converter Unit, JZDP-□□□□-		011	012	013	014	015	016	185	105	106	108	109
Applicable SERVOPACKs	SGD7S-	3R8A	7R6A	120A	5R5A	120A	180A	180A	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 40°C with an aluminum heat sink of the dimensions given below.
- 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 and -50A320H

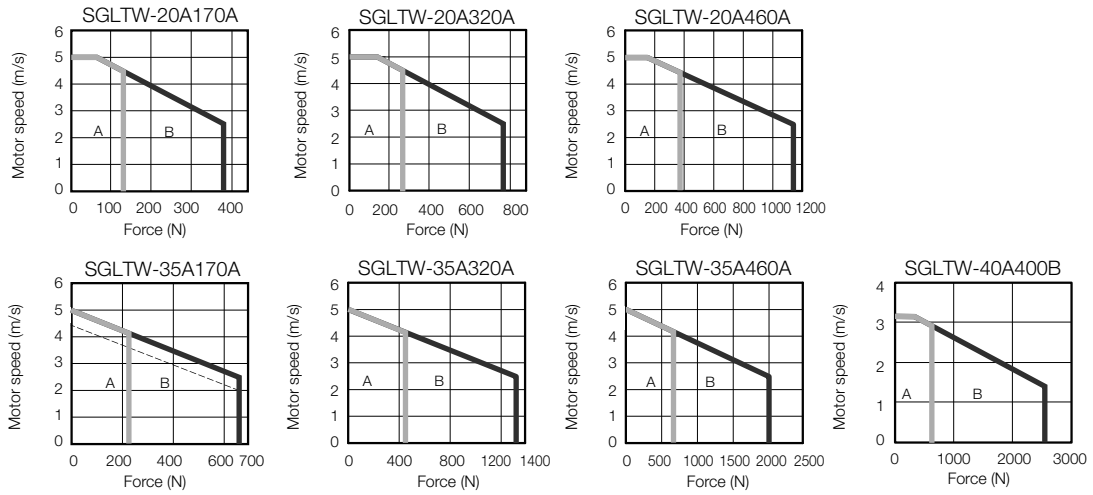
*3. The unbalanced magnetic gap that results from the Moving Coil installation condition causes a magnetic attraction on the Moving Coil.

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

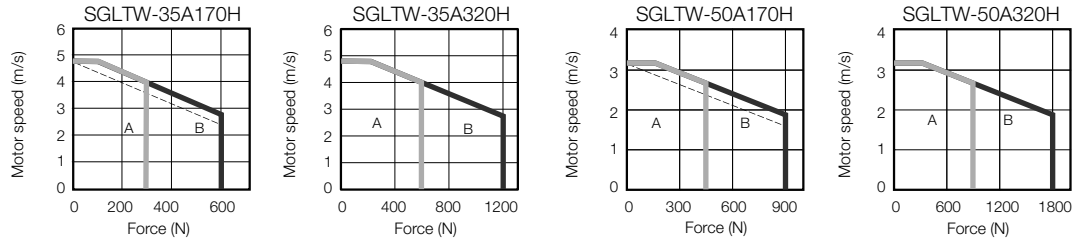
Force-Motor Speed Characteristics

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

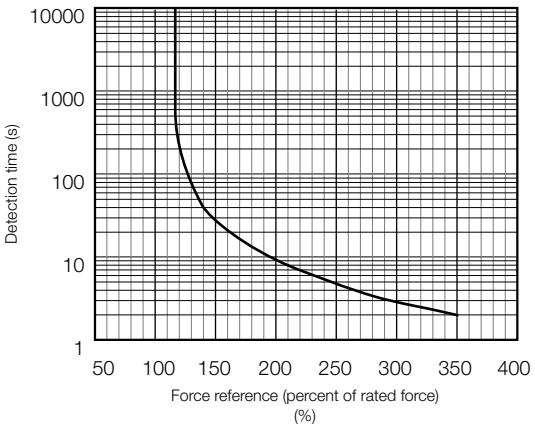


Note: 1. These values are for operation in combination with a SERVOPACK when the temperature of the armature winding is 100°C. These are typical values.
2. The characteristics in the intermittent duty zone depend on the power supply voltage.
3. If the effective force is within the allowable range for the rated force, the Servomotor can be used within the intermittent duty zone.
4. If the length of the Servomotor Main Circuit Cable exceeds 20 m, the intermittent duty zone in the force-motor speed characteristics will become smaller as the voltage drop increases.

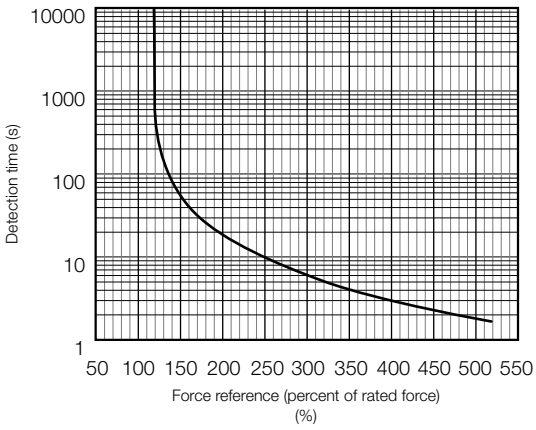
Servomotor Overload Protection Characteristics

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

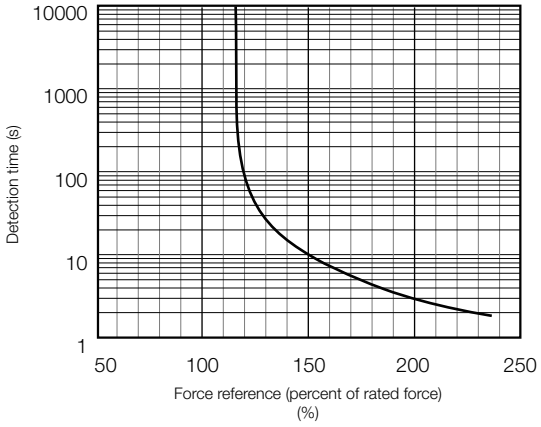
SGLTW-20A□□□A and -35A□□□A



SGLTW-40A



SGLTW-35A□□□H and -50A□□□H

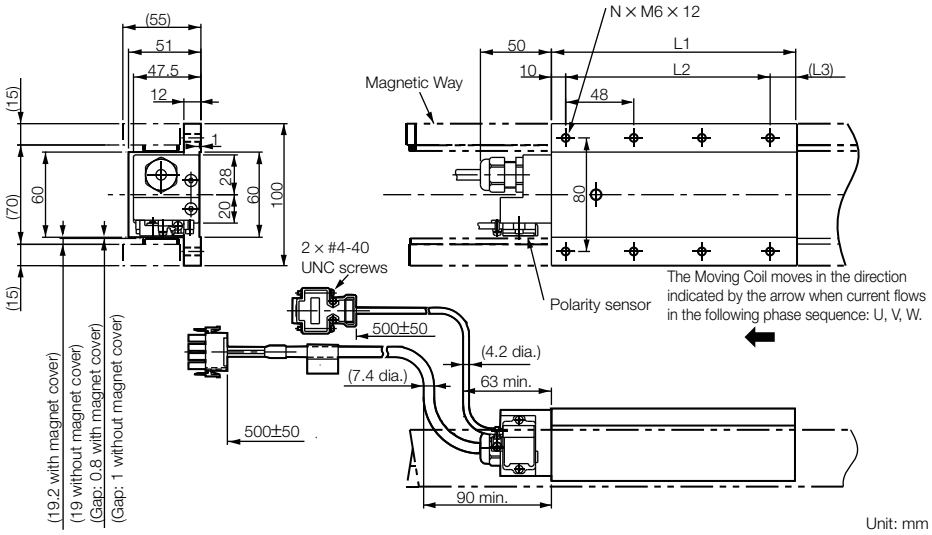


Note: The above overload protection characteristics do mean that you can perform continuous duty operation with an output of 100% or higher. Use the Servomotor so that the effective force remains within the continuous duty zone given in *Force-Motor Speed Characteristics* on page 159.

External Dimensions

SGLTW-20: Standard Models

◆ Moving Coils: SGLTW-20A□□□A□



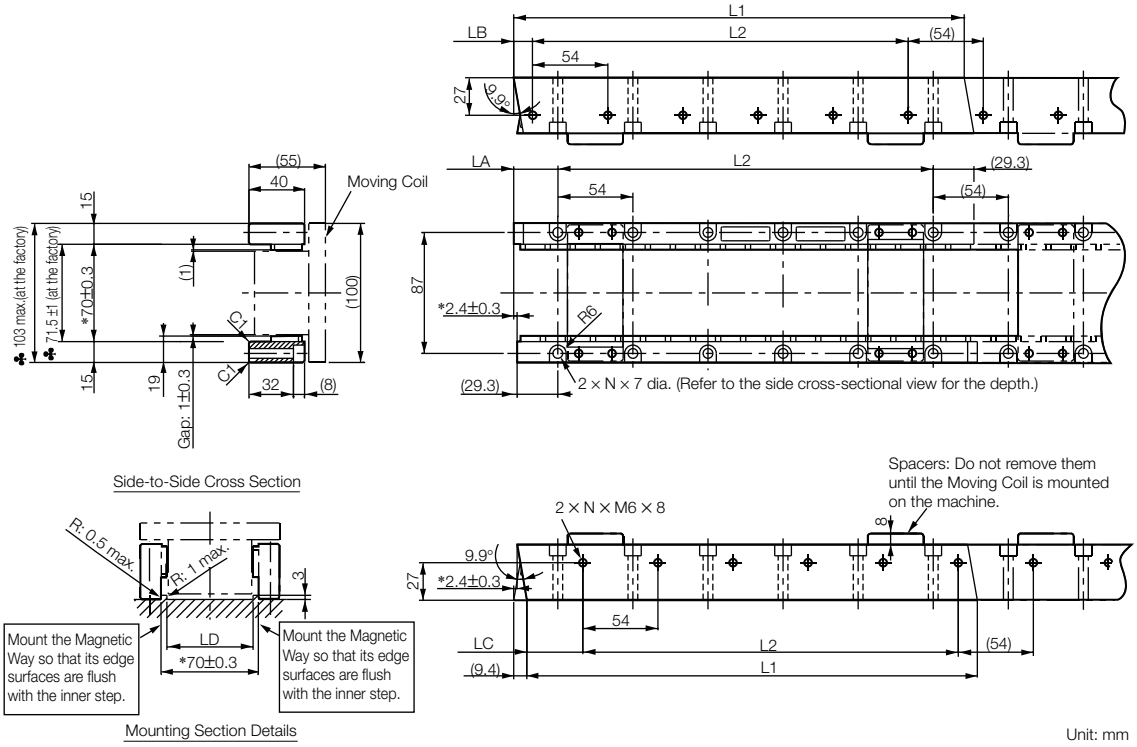
Unit: mm

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 connection specifications for the Sensor Cable and Servomotor Main Circuit Cable.

☞ ◆ *SGLTW-20A□□□A□ and -35A□□□A□ Moving Coils* (page 174)

◆ Magnetic Ways: SGLTM-20□□□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.

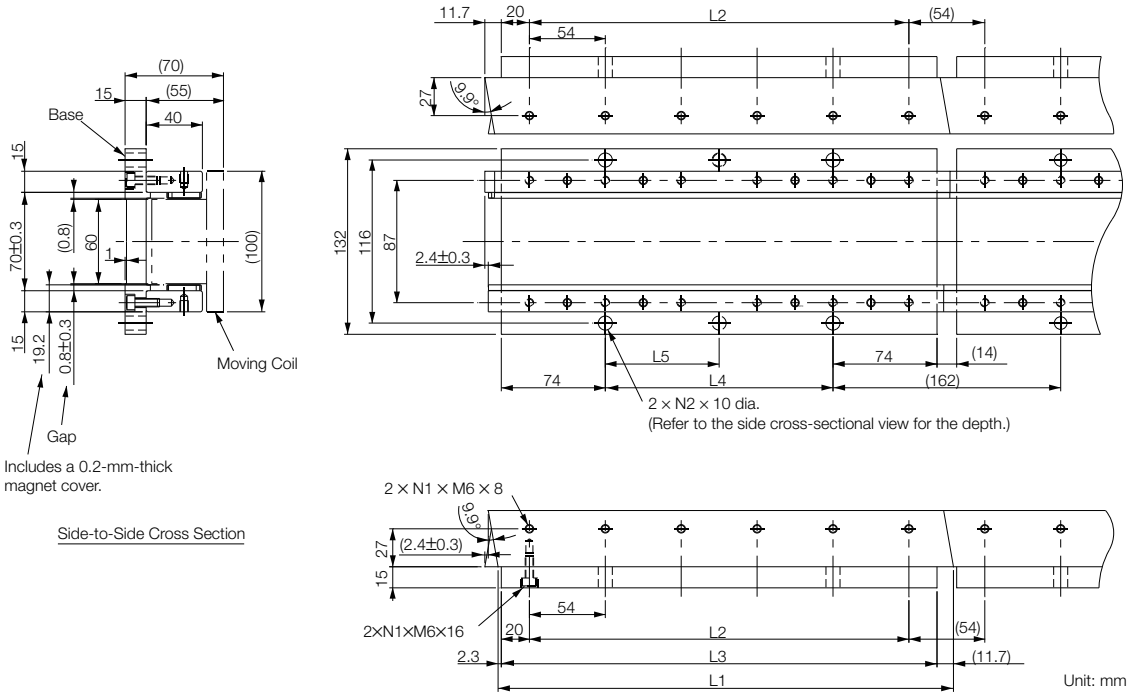
2. More than one Magnetic Way can be connected.

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	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

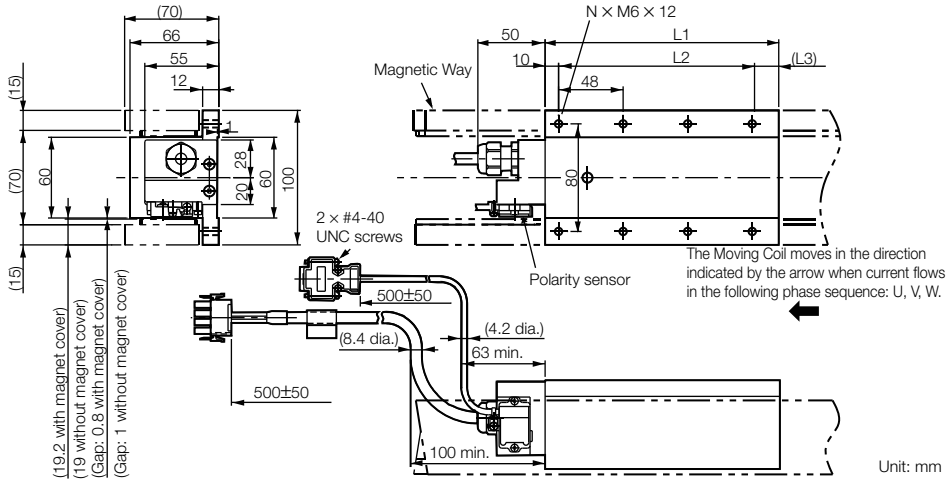


Note: More than one Magnetic Way can be connected.

Magnetic Way Model SGLTM-	L1	L2	L3	L4	L5	N1	N2	Approx. Mass [kg]
20324AY	$324^{-0.1}_{-0.3}$	270	310	162	162	6	2	5.1
20540AY	$540^{-0.1}_{-0.3}$	486	526	378	189	10	3	8.5
20756AY	$756^{-0.1}_{-0.3}$	702	742	594	198	14	4	12

SGLTW-35: Standard Models

◆ Moving Coils: SGLTW-35A□□□A□

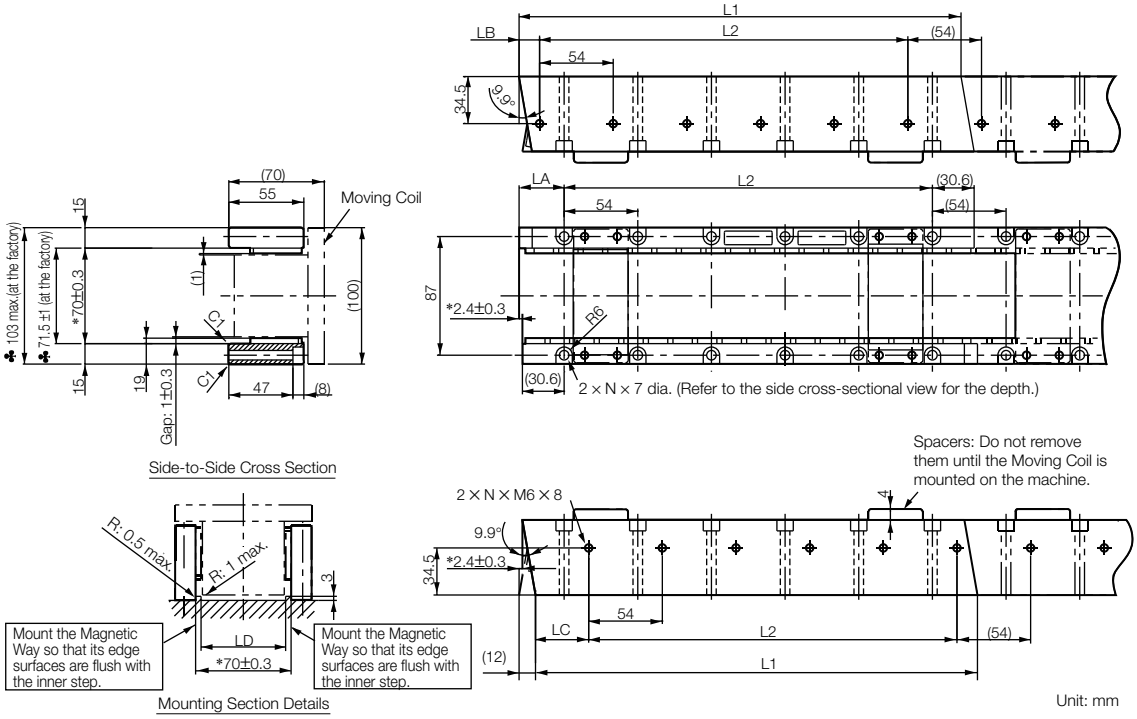


Moving Coil Model SGLTW-	L1	L2	(L3)	N	Approx. Mass [kg]
35A170A□	170	144 (48 × 3)	(16)	8	3.7
35A320A□	315	288 (48 × 6)	(17)	14	6.8
35A460A□	460	432 (48 × 9)	(18)	20	10

Refer to the following section for the connection specifications for the Sensor Cable and Servomotor Main Circuit Cable.

☞ ◆ *SGLTW-20A□□□A□ and -35A□□□A□ Moving Coils* (page 174)

◆ 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.

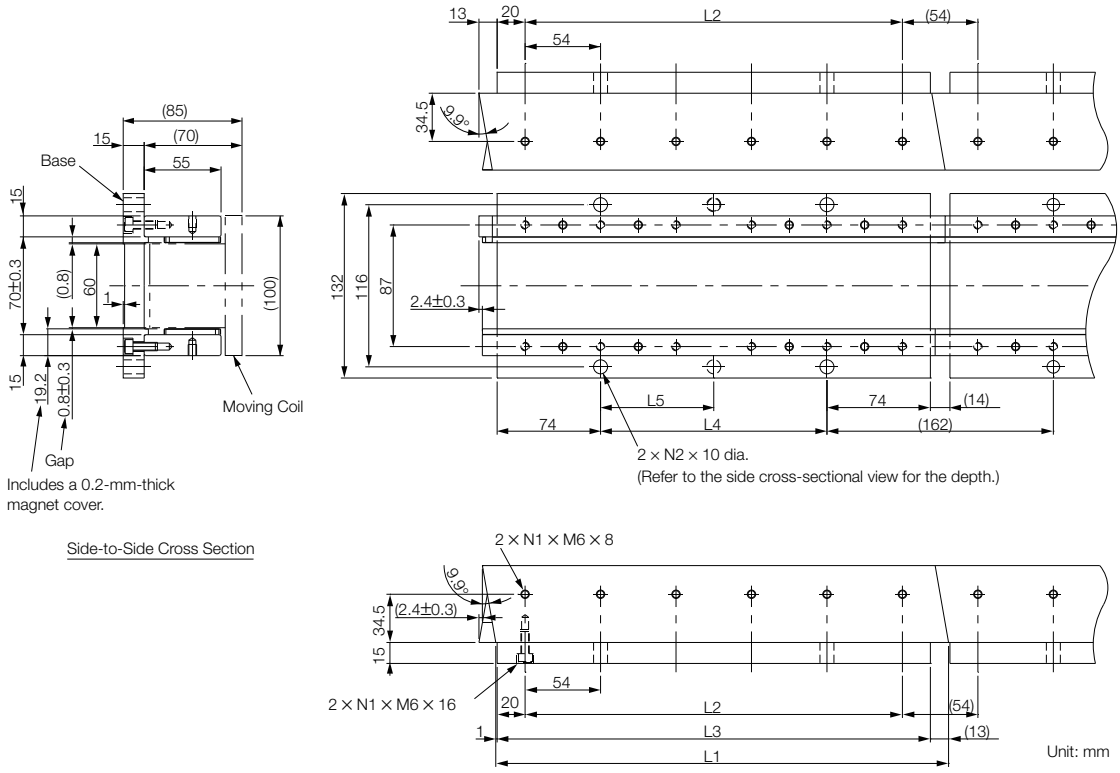
2. More than one Magnetic Way can be connected.

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

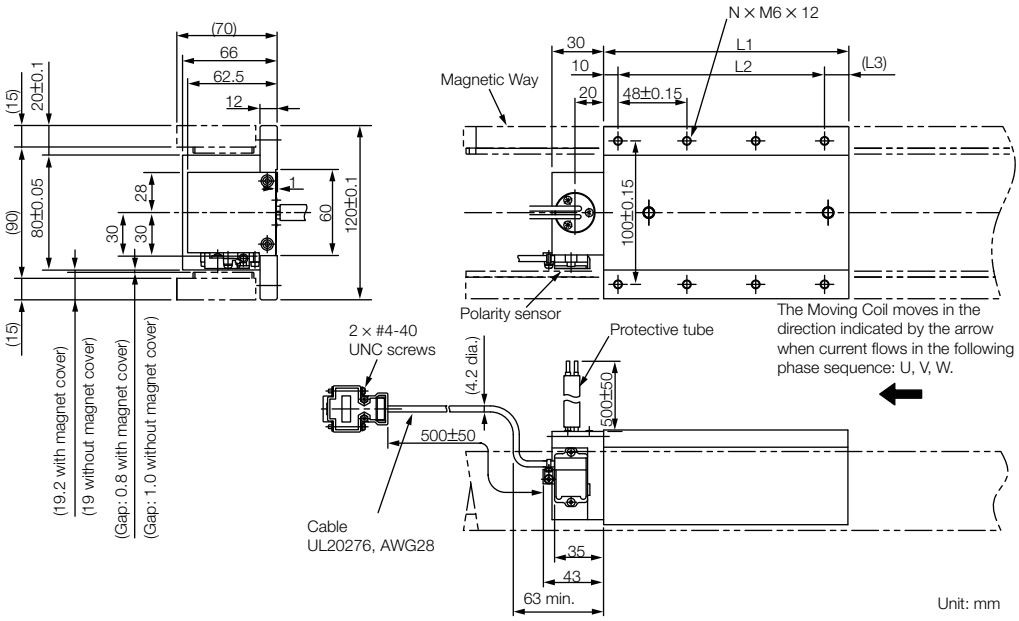


Note: More than one Magnetic Way can be connected.

Magnetic Way Model SGLTM-	L1	L2	L3	L4	L5	N1	N2	Approx. Mass [kg]
35324AY	$324^{-0.1}_{-0.3}$	270	310	162	162	6	2	6.4
35540AY	$540^{-0.1}_{-0.3}$	486	526	378	189	10	3	11
35756AY	$756^{-0.1}_{-0.3}$	702	742	594	198	14	4	15

SGLTW-35□□□□H□: High-efficiency Models

◆ Moving Coils: SGLTW-35A□□□H□

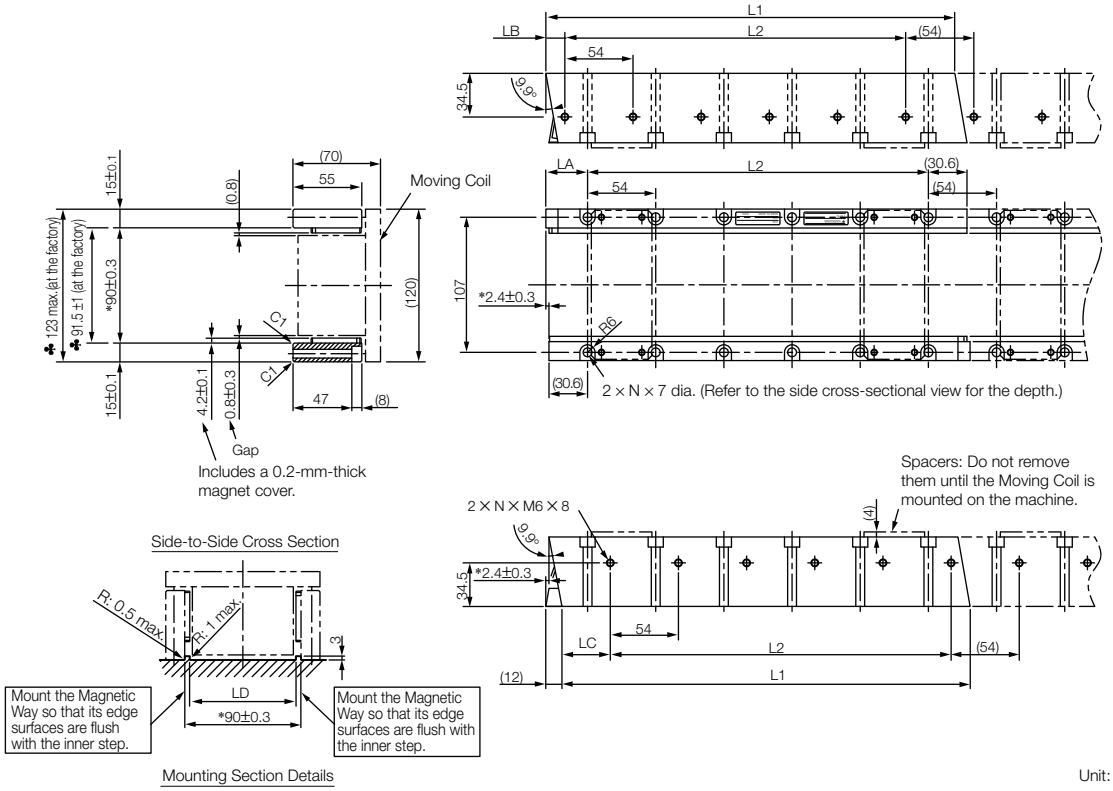


Moving Coil Model SGLTW-	L1	L2	L3	N	Approx. Mass [kg]
35A170H□	170	144 (48 × 3)	(16)	8	4.7
35A320H□	315	288 (48 × 6)	(17)	14	8.8

Refer to the following section for the connection specifications for the Sensor Cable and Servomotor Main Circuit Cable.

☞ ◆ *SGLTW-35A□□□H□ and -50A□□□H□ Moving Coils* (page 175)

◆ Magnetic Ways: SGLTM-35□□□H□



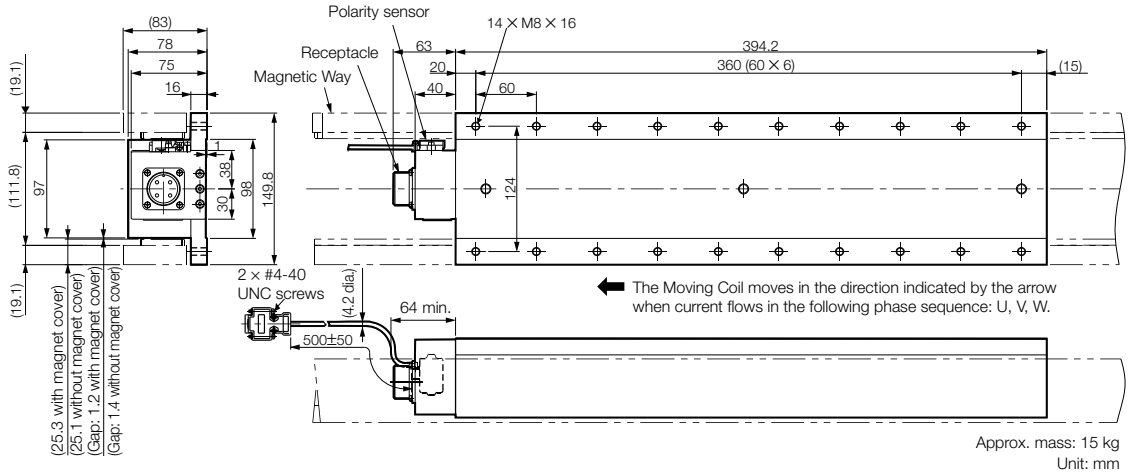
Unit: mm

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	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

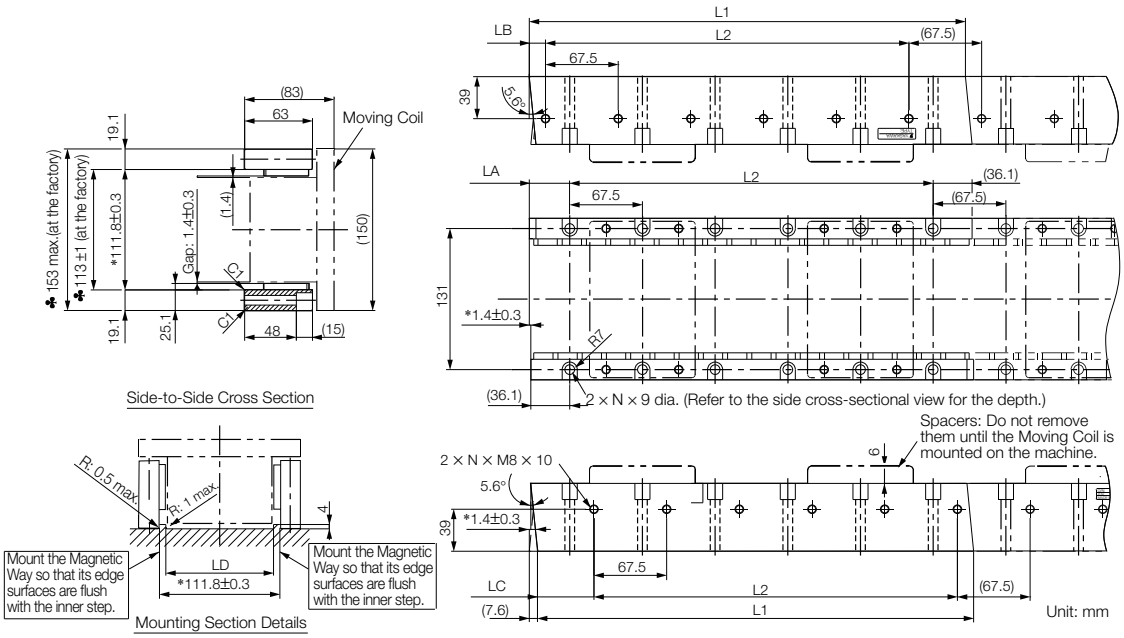
◆ Moving Coils: SGLTW-40A400B□



Refer to the following section for the connection specifications for the Sensor Cable and Servomotor Main Circuit Cable.

☞ ◆ *SGLTW-40A400B□ Moving Coils* (page 174)

◆ Magnetic Ways: SGLTM-40□□□A□



Note: 1. Two Magnetic Way tracks are used together as a set. For safety, when they are shipped, the two tracks are secured to a mounting spacer made from aluminum.

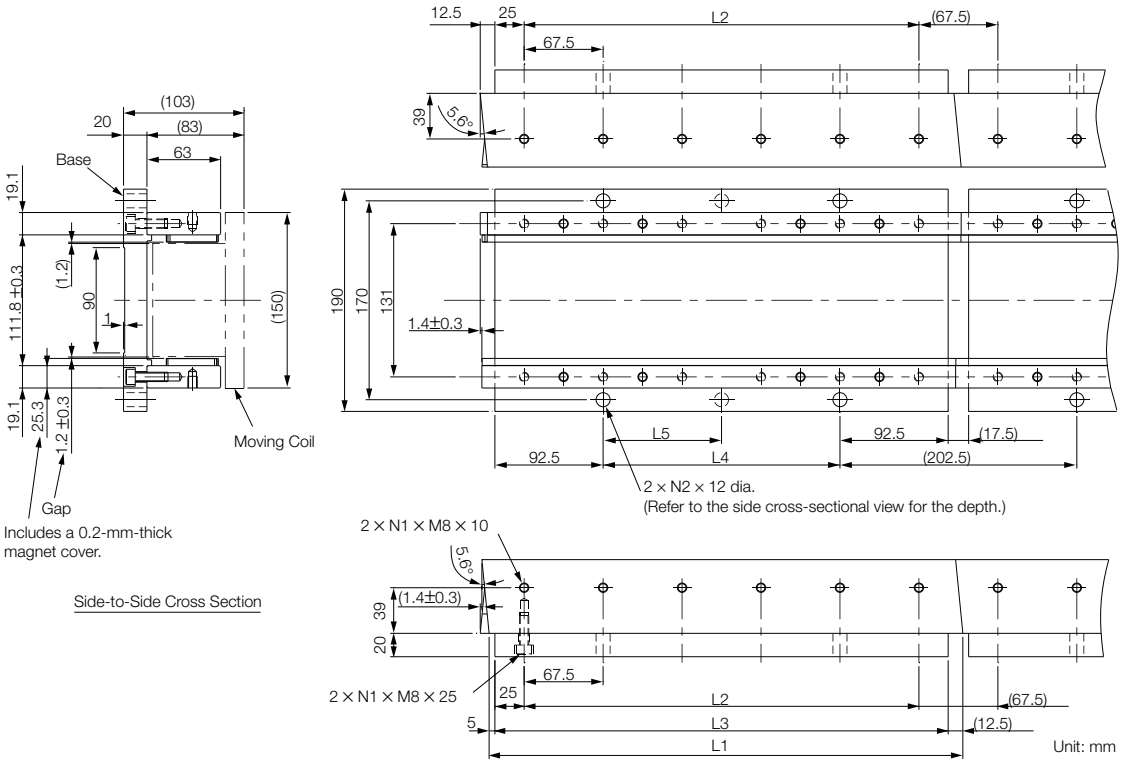
2. More than one Magnetic Way can be connected.

3. Dimensions with asterisks are the distances between the Magnetic Way tracks. Install the tracks according to the specified dimensions. Observe the dimensions given in *Mounting Section Details* after installation.
Dimensions when the Magnetic Way is shipped from the factory are indicated by ♣.

4. Use socket head screws of strength class 10.9 or higher for the Magnetic Way mounting screws. (Do not use stainless steel screws.)

Magnetic Way Model SGLTM-	L1	L2	LA	LB	LC	LD	N	Approx. Mass [kg]
40405A□	$405^{-0.1}_{-0.3}$	337.5 (67.5 × 5)	$37.5^{0}_{-0.2}$	$15^{0}_{-0.2}$	$52.5^{0}_{-0.2}$	$100^{+0.6}_{0}$	6	9
40675A□	$675^{-0.1}_{-0.3}$	607.5 (67.5 × 9)	$37.5^{0}_{-0.2}$	$15^{0}_{-0.2}$	$52.5^{0}_{-0.2}$	$100^{+0.6}_{0}$	10	15
40945A□	$945^{-0.1}_{-0.3}$	877.5 (67.5 × 13)	$37.5^{0}_{-0.2}$	$15^{0}_{-0.2}$	$52.5^{0}_{-0.2}$	$100^{+0.6}_{0}$	14	21

◆ Magnetic Ways with Bases: SGLTM-40□□□AY

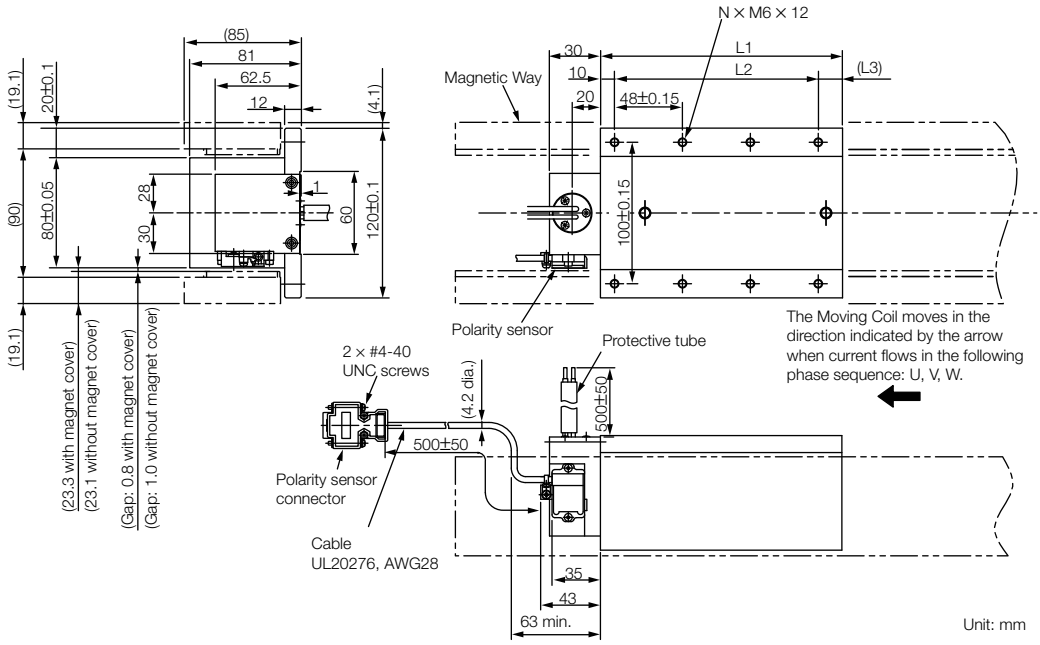


Note: More than one Magnetic Way can be connected.

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□

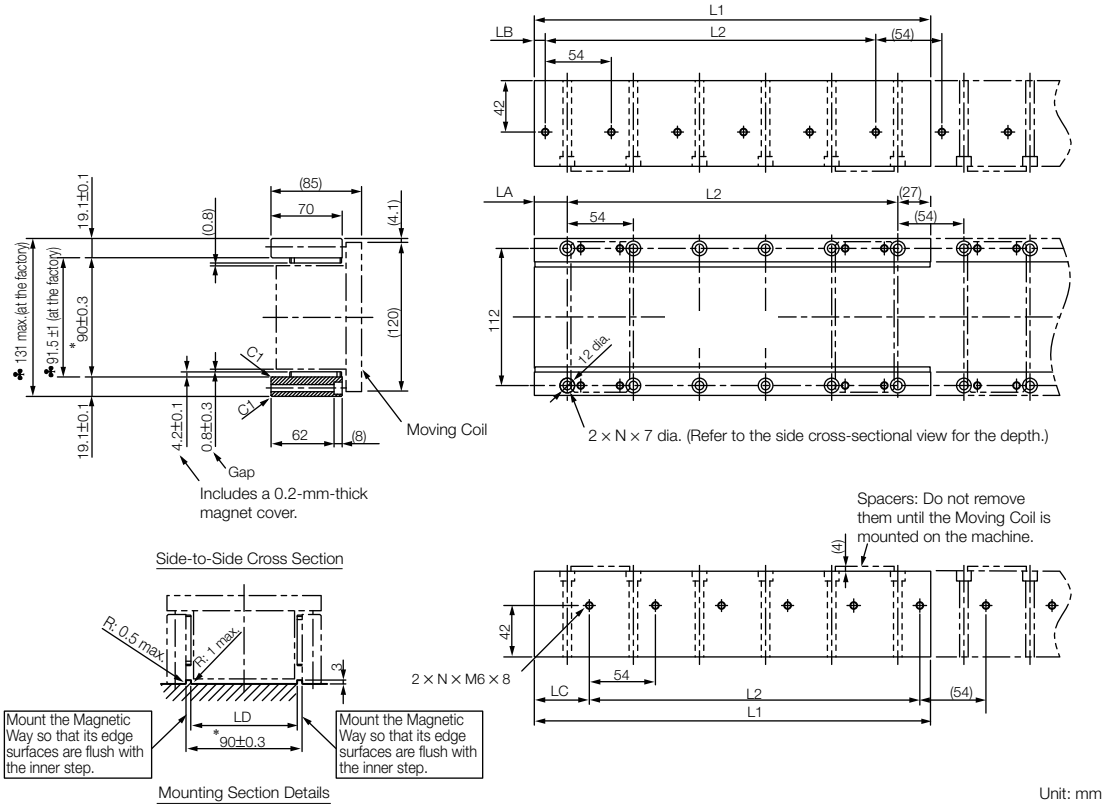


Moving Coil Model SGLTW-	L1	L2	(L3)	N	Approx. Mass [kg]
50A170H□	170	144 (48 × 3)	(16)	8	6
50A320H□	315	288 (48 × 6)	(17)	14	11

Refer to the following section for the connection specifications for the Sensor Cable and Servomotor Main Circuit Cable.

☞ ◆ *SGLTW-35A□□□H□ and -50A□□□H□ Moving Coils* (page 175)

◆ Magnetic Ways: SGLTM-50□□□H□



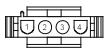
Note: 1. Two Magnetic Way tracks are used together as a set. For safety, when they are shipped, the two tracks are secured to a mounting spacer made from aluminum.
2. More than one Magnetic Way can be connected.
3. Dimensions with asterisks are the distances between the Magnetic Way tracks. Install the 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

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)
From Tyco Electronics Japan G.K.

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

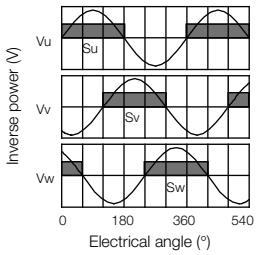
• Polarity Sensor Connector

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

Mating Connector
Socket connector: 17JE-13090-02 (D8C)
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-40A400B□ 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

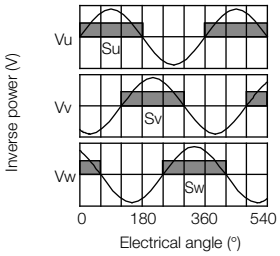
• Polarity Sensor Connector

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

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

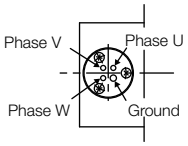
• Polarity Sensor Output Signal

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.)

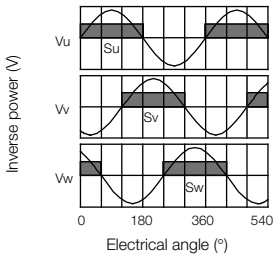
• Polarity Sensor Connector

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

Mating Connector
Socket connector: 17JE-13090-02 (D8C)
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.



SGLC (Cylinder Models)

Model Designations

Combination of Moving Coil and Magnetic Way

S G L C - D16 A 085 A P - 750 A

Linear Σ Series Linear Servomotors

1st digit | 2nd+3rd+4th digits | 5th digit | 6th+7th+8th digits | 9th digit | 10th digit | 11th+12th+13th digits | 14th digit

Note: This code contains four digits if the length of the Magnetic Way is 1,000 or longer.

1st digit Servomotor Type

Code	Specification
C	Cylinder model

2nd+3rd+4th digits

Outer Diameter of Magnetic Way*1

Code	Specification
D16	16 mm
D20	20 mm
D25	25 mm
D32	32 mm

5th digit Power Supply Voltage

Code	Specification
A	200 VAC

6th+7th+8th digits Length of Moving Coil*1

Code	Specification	Outer Diameter Code of Magnetic Way
085	85 mm	D16
100	100 mm	D20
115	115 mm	D16
125	125 mm	D25
135	135 mm	D20
145	145 mm	D16
165	165 mm	D32
170	170 mm	D20, D25
215	215 mm	D25
225	225 mm	D32
285	285 mm	D32

9th digit Design Revision Order of Moving Coil

A, B…

10th digit Sensor Specification

Code	Specification
P	With polarity sensor

11th+12th+13th digits Length of Magnetic Way*1

Code	Specification	Special Orders*2
300	300 mm	240 mm to 420 mm (in 30-mm increments)
350	350 mm	280 mm to 490 mm (in 35-mm increments)
450	450 mm	360 mm to 630 mm (in 45-mm increments)
510	510 mm	480 mm to 750 mm (in 30-mm increments)
590	590 mm	555 mm to 870 mm (in 35-mm increments)
600	600 mm	480 mm to 840 mm (in 60-mm increments)
750	750 mm	For Magnetic Way with outer diameter of 16 mm: 480 mm to 750 mm (in 30-mm increments)
		For Magnetic Way with outer diameter of 25 mm: 705 mm to 1,110 mm (in 45-mm increments)
870	870 mm	555 mm to 870 mm (in 35-mm increments)
1020	1020 mm	960 mm to 1,500 mm (in 60-mm increments)
1110	1110 mm	705 mm to 1,110 mm (in 45-mm increments)
1500	1500 mm	960 mm to 1,500 mm (in 60-mm increments)

14th digit Design Revision Order of Magnetic Way

A, B…

*1. There are restrictions in the allowable combinations. Refer to the following section for details.

☞ *List of Models* (page 178)

*2. Contact your Yaskawa representative when you make a special order.

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

S G L C W - D16 A 085 A P

Linear Σ Series Linear Servomotors

1st digit | 2nd digit | 3rd+4th+5th digits | 6th digit | 7th+8th+9th digits | 10th digit | 11th digit

1st digit Servomotor Type

(Same as above combinations.)

2nd digit Moving Coil/Magnetic Way

Code	Specification
W	Moving Coil

3th+4th+5th digits Outer Diameter of Magnetic Way

(Same as above combinations.)

6th digit Power Supply Voltage

(Same as above combinations.)

7th+8th+9th digits Length of Moving Coil

(Same as above combinations.)

10th digit Design Revision Order

A, B …

11th digit Sensor Specification

(Same as above combinations.)

Note: 1. Order the Moving Coil and Magnetic Way as a set. Contact your Yaskawa representative before purchasing a Moving Coil and Magnetic Way separately.

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

Magnetic Way

S G L C M - D16 750 A

Linear Σ Series Linear Servomotors | 1st digit | 2nd digit | 3rd+4th+5th digits | 6th+7th+8th digits | 9th digit

1st digit Servomotor Type

(Same as above combinations.)

2nd digit Moving Coil/Magnetic Way

Code	Specification
M	Magnetic Way

3th+4th+5th digits Outer Diameter of Magnetic Way

(Same as above combinations.)

6th+7th+8th digits Length of Magnetic Way

(Same as above combinations.)

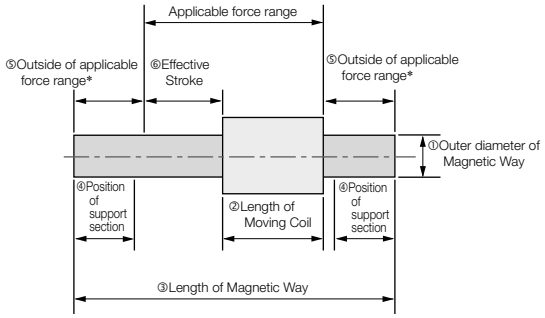
9th digit Design Revision Order

A, B …

Note: 1. Order the Moving Coil and Magnetic Way as a set. Contact your Yaskawa representative before purchasing a Moving Coil and Magnetic Way separately.

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

List of Models



Model SGLC-	① Outer diameter of Magnetic Way [mm]	② Length of Moving Coil [mm]	③ Length of Magnetic Way [mm]	④ Position of Support Section [mm]	⑤ Outside of Applicable Force Range* [mm]	⑥ Effective Stroke [mm]
D16A085AP-300A	16	85	300	30	37.5	140
D16A085AP-510A			510	45	52.5	320
D16A085AP-750A			750	45	52.5	560
D16A115AP-300A	16	115	300	30	37.5	110
D16A115AP-510A			510	45	52.5	290
D16A115AP-750A			750	45	52.5	530
D16A145AP-300A	16	145	300	30	37.5	80
D16A145AP-510A			510	45	52.5	260
D16A145AP-750A			750	45	52.5	500
D20A100AP-350A	20	100	350	35	45	160
D20A100AP-590A			590	50	60	370
D20A100AP-870A			870	50	60	650
D20A135AP-350A	20	135	350	35	45	125
D20A135AP-590A			590	50	60	335
D20A135AP-870A			870	50	60	615
D20A170AP-350A	20	170	350	35	45	90
D20A170AP-590A			590	50	60	300
D20A170AP-870A			870	50	60	580
D25A125AP-450A	25	125	450	45	57.5	210
D25A125AP-750A			750	60	72.5	480
D25A125AP-1110A			1110	60	72.5	840
D25A170AP-450A	25	170	450	45	57.5	165
D25A170AP-750A			750	60	72.5	435
D25A170AP-1110A			1110	60	72.5	795
D25A215AP-450A	25	215	450	45	57.5	120
D25A215AP-750A			750	60	72.5	390
D25A215AP-1110A			1110	60	72.5	750
D32A165AP-600A	32	165	600	60	75	285
D32A165AP-1020A			1020	90	105	645
D32A165AP-1500A			1500	90	105	1125
D32A225AP-600A	32	225	600	60	75	225
D32A225AP-1020A			1020	90	105	585
D32A225AP-1500A			1500	90	105	1065
D32A285AP-600A	32	285	600	60	75	165
D32A285AP-1020A			1020	90	105	525
D32A285AP-1500A			1500	90	105	1005

* The characteristics given in *Force-Motor Speed Characteristics* on page 181 will not be met when the Moving Coil is outside of applicable force range.

Ratings and Specifications

Specifications

Linear Servomotor Model SGLC-		D16A			D20A			D25A			D32A		
		085A	115A	145A	100A	135A	170A	125A	170A	215A	165A	225A	285A
Time Rating		Continuous											
Thermal Class		B											
Insulation Resistance		500 VDC, 10 MΩ min.											
Withstand Voltage		1,500 VAC for 1 minute											
Excitation		Permanent magnet											
Cooling Method		Self-cooled											
Protective Structure		IP00											
Environmental Conditions	Surrounding Air Temperature	0°C to 40°C (with no freezing)											
	Surrounding Air Humidity	20% to 80% relative humidity (with no condensation)											
	Installation Site	• Must be indoors and free of corrosive and explosive gases. • Must be well-ventilated and free of dust and moisture. • Must facilitate inspection and cleaning. • Must have an altitude of 1,000 m or less. • Must be free of strong magnetic fields.											
Shock Resistance	Impact Acceleration Rate	98 m/s^2											
	Number of Impacts	2 times											
Vibration Resistance	Vibration Acceleration Rate	Moving Coil: 24.5 m/s^2 (the vibration resistance in three directions, vertical, side-to-side, and front-to-back) Magnetic Way: 24.5 m/s^2 (the vibration resistance in the direction of the shaft) 4.9 m/s^2 (the vertical and horizontal vibration resistance)											
Combined Magnetic Way, SGLCM-		D16□□□A			D20□□□A			D25□□□A			D32□□□A		
Combined Serial Converter Unit, JZDP-□□□□-		354	373	356	357	358	359	360	374	362	363	364	365
Applicable SERVOPACKs	SGD7S-	R70A	R70A	R90A	1R6A	1R6A	2R8A	1R6A	2R8A	5R5A	2R8A	5R5A	5R5A
	SGD7W-	1R6A	1R6A	1R6A	1R6A	1R6A	2R8A	1R6A	2R8A	5R5A	2R8A	5R5A	5R5A

Ratings

Linear Servomotor Model SGLC-		D16A			D20A			D25A			D32A		
		085A	115A	145A	100A	135A	170A	125A	170A	215A	165A	225A	285A
Rated Motor Speed (Reference Speed during Speed Control)*1	m/s	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5
Maximum Speed*1, *3	m/s	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Rated Force*1, *2	N	17	25	34	30	45	60	70	105	140	90	135	180
Maximum Force*1	N	60	90	120	150	225	300	280	420	560	420	630	840
Rated Current*1	Arms	0.59	0.53	0.66	0.98	0.98	1.2	1.4	1.8	3.5	1.6	2.8	2.8
Maximum Current*1	Arms	2.1	2.1	2.5	4.9	4.9	6.0	5.7	7.0	13.0	7.3	13.0	13.0
Moving Coil Mass	kg	0.30	0.40	0.50	0.60	0.80	1.0	1.0	1.4	1.8	1.8	2.5	3.2
Force Constant	N/Arms	31.2	46.8	51.3	33.0	49.5	54.3	53.1	64.8	43.2	61.8	52.2	69.6
BEMF Constant	Vrms/(m/s)/phase	10.4	15.6	17.1	11.0	16.5	18.1	17.7	21.6	14.4	20.6	17.4	23.2
Motor Constant	$N/\sqrt{W}$	4.78	5.85	6.67	7.47	9.18	10.4	10.0	12.4	15.4	16.2	20.0	23.0
Electrical Time Constant	ms	0.18	0.18	0.17	0.38	0.32	0.41	0.18	0.59	0.65	0.98	1.0	1.1
Mechanical Time Constant	ms	13	12	11	11	9.5	9.2	10	9.1	7.6	6.9	6.3	6.0
Thermal Resistance (with Heat Sink)	K/W	3.35	2.90	1.64	1.66	1.45	1.29	1.00	0.68	0.61	0.77	0.53	0.49
Thermal Resistance (without Heat Sink)	K/W	6.79	5.24	4.26	4.35	3.38	2.76	2.99	2.29	1.81	1.87	1.43	1.16
Magnetic Attraction*4	N	0	0	0	0	0	0	0	0	0	0	0	0

*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 40°C with an aluminum heat sink of the dimensions given below.
- Heat Sink Dimensions
  - 100 mm × 200 mm × 12 mm: SGLC-D16A085A and -D16A115A
  - 200 mm × 300 mm × 12 mm: SGLC-D16A145A, -D20A100A, -D20A135A, and -D20A170A
  - 300 mm × 400 mm × 12 mm: SGLC-D25A125A and -D32A165A
  - 400 mm × 500 mm × 12 mm: SGLC-D25A170A, -D25A215A, -D32A225A, and -D32A285A

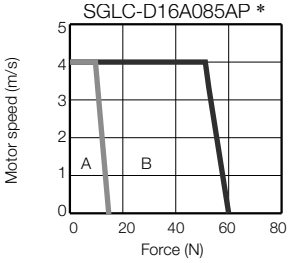
*3. For speed control operation with an analog voltage reference, set 1.5 m/s as the rated motor speed.

*4. This is the theoretical magnetic attraction between the Moving Coil and Magnetic Way. The unbalanced magnetic gap after installation causes a magnetic attraction.

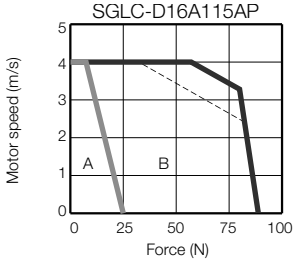
Force-Motor Speed Characteristics

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

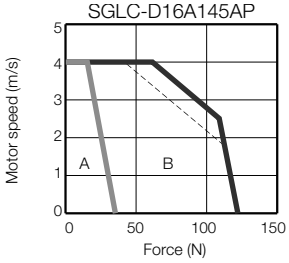
SGLC-D16A085AP *



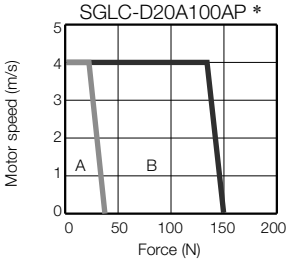
SGLC-D16A115AP



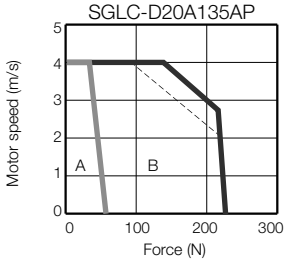
SGLC-D16A145AP



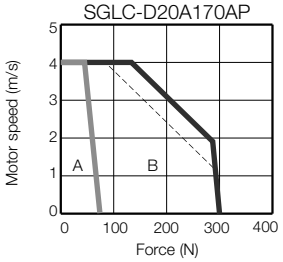
SGLC-D20A100AP *



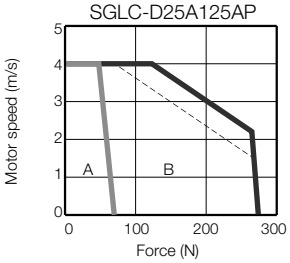
SGLC-D20A135AP



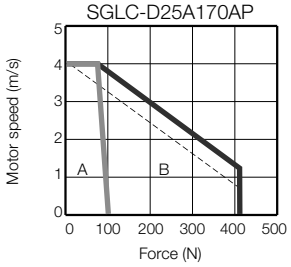
SGLC-D20A170AP



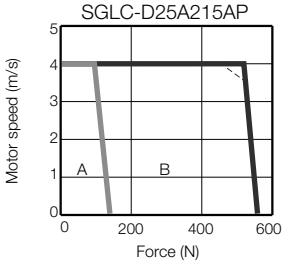
SGLC-D25A125AP



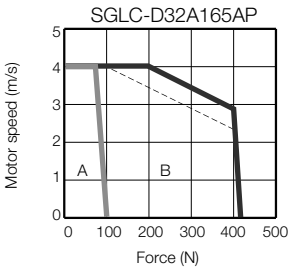
SGLC-D25A170AP



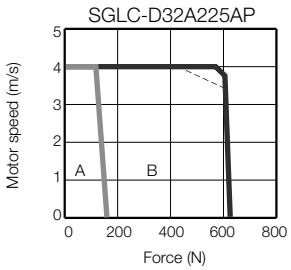
SGLC-D25A215AP



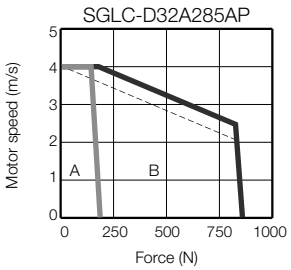
SGLC-D32A165AP



SGLC-D32A225AP



SGLC-D32A285AP



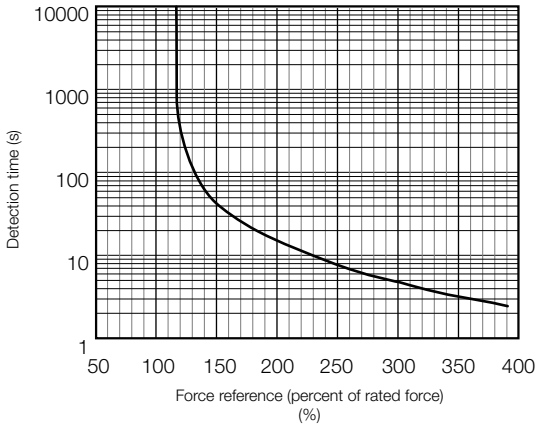
* The characteristics are the same for three-phase 200 V and single-phase 200 V.

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 the length of the Servomotor Main Circuit Cable exceeds 20 m, the intermittent duty zone in the force-motor speed characteristics will become smaller as the voltage drop increases.

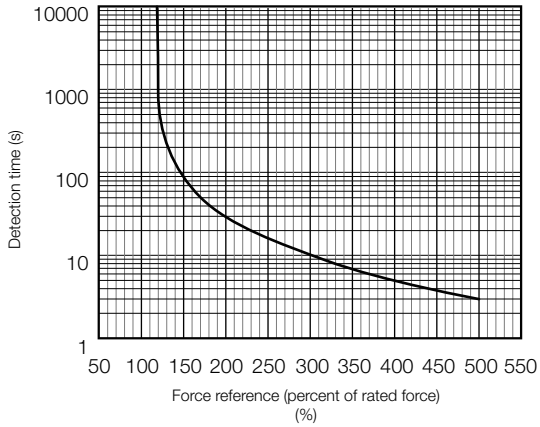
Servomotor Overload Protection Characteristics

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

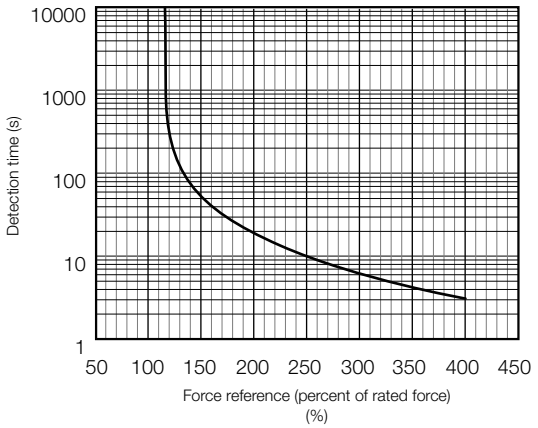
SGLCW-D16A



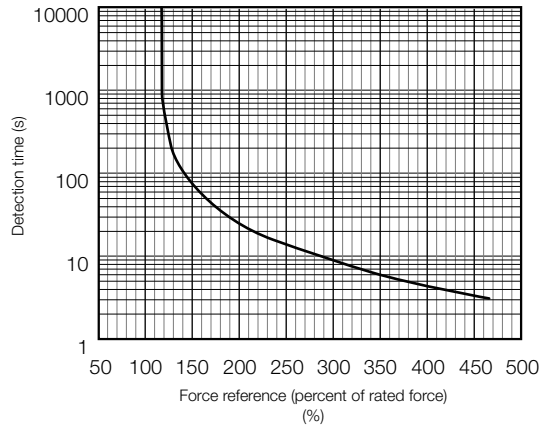
SGLCW-D20A



SGLCW-D25A



SGLCW-D32A

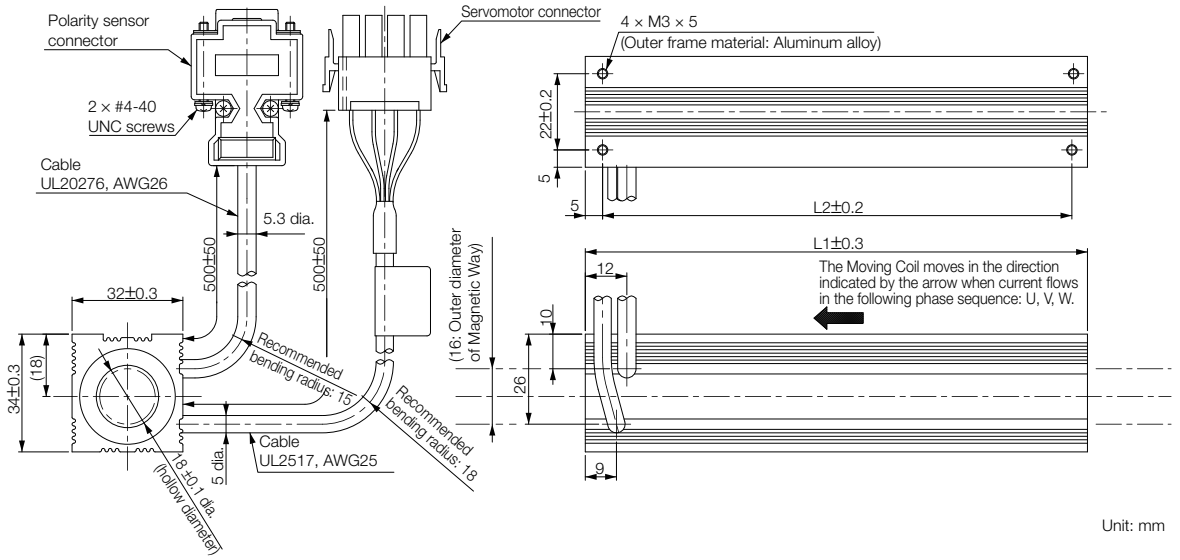


Note: The above overload protection characteristics do not mean that you can perform continuous duty operation with an output of 100% or higher.
Use the Servomotor so that the effective force remains within the continuous duty zone given in *Force-Motor Speed Characteristics* on page 181.

External Dimensions

SGLC-D16

◆ Moving Coils: SGLCW-D16A□□□AP



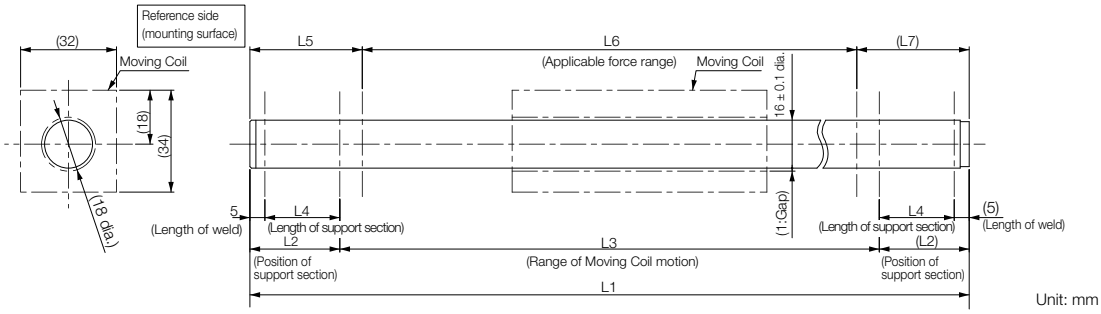
Moving Coil Model SGLCW-	L1	L2	Approx. Mass* [kg]
D16A085AP	85	75	0.3
D16A115AP	115	105	0.4
D16A145AP	145	135	0.5

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

Refer to the following section for the connection specifications for the Sensor Cable and Servomotor Main Circuit Cable.

☞ ◆ *SGLC-D16 and -D20 Moving Coils* (page 191)

◆ Magnetic Ways: SGLCM-D16□□□A



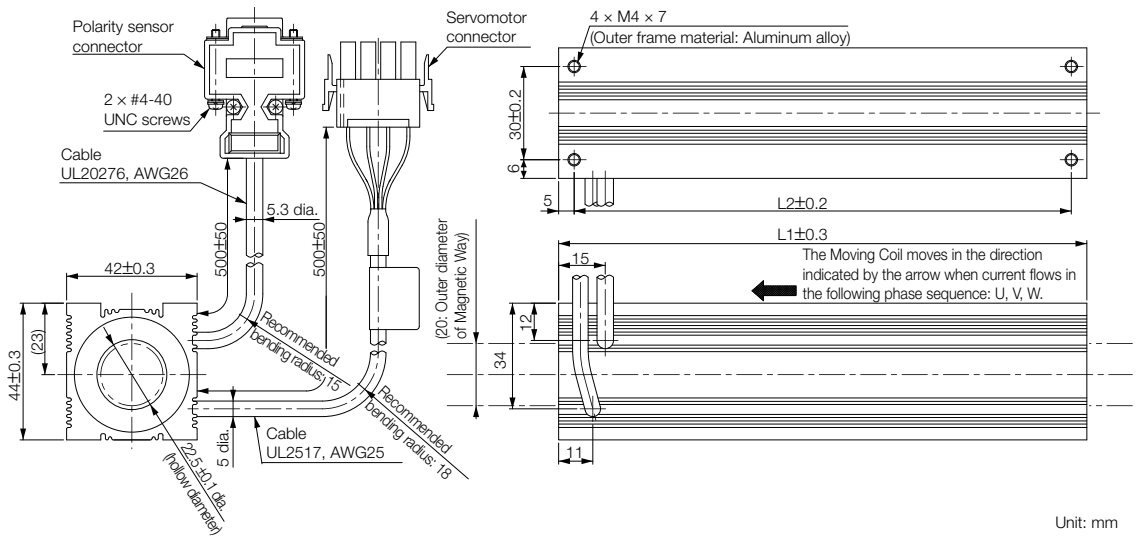
Unit: mm

Note: The Magnetic Way will become deformed if a magnetic attraction with the Moving Coil is generated. After installation, take measures over the entire range of motion to prevent any contact between the Magnetic Way and the Moving Coil.

Magnetic Way Model SGLCM-	L1	L2	L3	L4	L5	L6	L7	Approx. Mass [kg]
D16240A	240 ± 1.6	30	180	25	37.5 ± 0.3	165 ± 1.2	37.5	0.38
D16270A	270 ± 1.6	30	210	25	37.5 ± 0.3	195 ± 1.2	37.5	0.43
D16300A	300 ± 1.6	30	240	25	37.5 ± 0.3	225 ± 1.2	37.5	0.48
D16330A	330 ± 1.6	30	270	25	37.5 ± 0.3	255 ± 1.2	37.5	0.53
D16360A	360 ± 1.6	30	300	25	37.5 ± 0.3	285 ± 1.2	37.5	0.58
D16390A	390 ± 1.6	30	330	25	37.5 ± 0.3	315 ± 1.2	37.5	0.63
D16420A	420 ± 1.6	30	360	25	37.5 ± 0.3	345 ± 1.2	37.5	0.68
D16480A	480 ± 2.5	45	390	40	52.5 ± 0.3	375 ± 2.1	52.5	0.75
D16510A	510 ± 2.5	45	420	40	52.5 ± 0.3	405 ± 2.1	52.5	0.80
D16540A	540 ± 2.5	45	450	40	52.5 ± 0.3	435 ± 2.1	52.5	0.85
D16570A	570 ± 2.5	45	480	40	52.5 ± 0.3	465 ± 2.1	52.5	0.90
D16600A	600 ± 2.5	45	510	40	52.5 ± 0.3	495 ± 2.1	52.5	0.95
D16630A	630 ± 2.5	45	540	40	52.5 ± 0.3	525 ± 2.1	52.5	1.00
D16660A	660 ± 2.5	45	570	40	52.5 ± 0.3	555 ± 2.1	52.5	1.05
D16690A	690 ± 2.5	45	600	40	52.5 ± 0.3	585 ± 2.1	52.5	1.10
D16720A	720 ± 2.5	45	630	40	52.5 ± 0.3	615 ± 2.1	52.5	1.15
D16750A	750 ± 3.0	45	660	40	52.5 ± 0.3	645 ± 2.5	52.5	1.20

SGLC-D20

◆ Moving Coils: SGLCW-D20A□□□AP



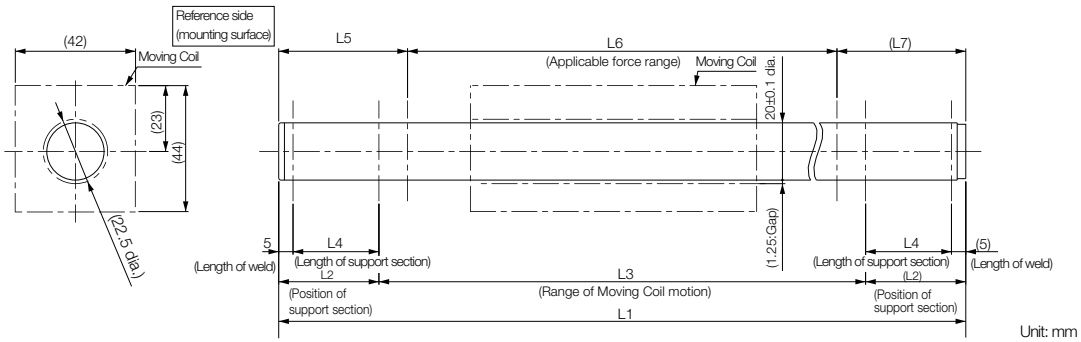
Moving Coil Model SGLCW-	L1	L2	Approx. Mass* [kg]
D20A100AP	100	90	0.6
D20A135AP	135	125	0.8
D20A170AP	170	160	1.0

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

Refer to the following section for the connection specifications for the Sensor Cable and Servomotor Main Circuit Cable.

☞ ◆ *SGLC-D16 and -D20 Moving Coils* (page 191)

◆ Magnetic Ways: SGLCM-D20□□□A

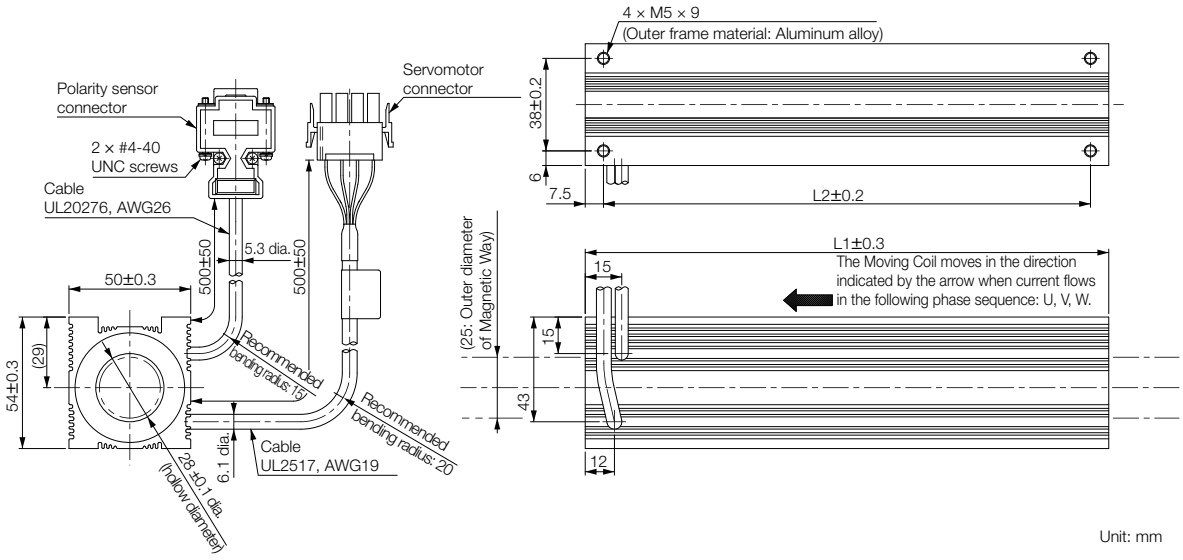


Note: The Magnetic Way will become deformed if a magnetic attraction with the Moving Coil is generated. After installation, take measures over the entire range of motion to prevent any contact between the Magnetic Way and the Moving Coil.

Magnetic Way Model SGLCM-	L1	L2	L3	L4	L5	L6	L7	Approx. Mass [kg]
D20280A	280 ± 1.6	35	210	30	45 ± 0.3	190 ± 1.2	45	0.68
D20315A	315 ± 1.6	35	245	30	45 ± 0.3	225 ± 1.2	45	0.77
D20350A	350 ± 1.6	35	280	30	45 ± 0.3	260 ± 1.2	45	0.86
D20385A	385 ± 1.6	35	315	30	45 ± 0.3	295 ± 1.2	45	0.95
D20420A	420 ± 1.6	35	350	30	45 ± 0.3	330 ± 1.2	45	1.00
D20455A	455 ± 1.6	35	385	30	45 ± 0.3	365 ± 1.2	45	1.10
D20490A	490 ± 1.6	35	420	30	45 ± 0.3	400 ± 1.2	45	1.20
D20555A	555 ± 2.5	50	455	45	60 ± 0.3	435 ± 2.1	60	1.35
D20590A	590 ± 2.5	50	490	45	60 ± 0.3	470 ± 2.1	60	1.45
D20625A	625 ± 2.5	50	525	45	60 ± 0.3	505 ± 2.1	60	1.55
D20660A	660 ± 2.5	50	560	45	60 ± 0.3	540 ± 2.1	60	1.60
D20695A	695 ± 2.5	50	595	45	60 ± 0.3	575 ± 2.1	60	1.70
D20730A	730 ± 2.5	50	630	45	60 ± 0.3	610 ± 2.1	60	1.80
D20765A	765 ± 2.5	50	665	45	60 ± 0.3	645 ± 2.1	60	1.90
D20800A	800 ± 2.5	50	700	45	60 ± 0.3	680 ± 2.1	60	2.00
D20835A	835 ± 2.5	50	735	45	60 ± 0.3	715 ± 2.1	60	2.10
D20870A	870 ± 3.0	50	770	45	60 ± 0.3	750 ± 2.5	60	2.20

SGLC-D25

◆ Moving Coils: SGLCW-D25A□□□AP



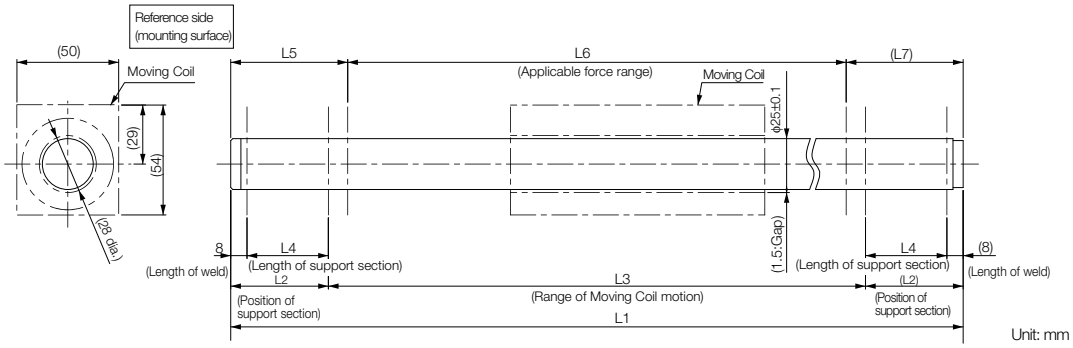
Moving Coil Model SGLCW-	L1	L2	Approx. Mass* [kg]
D25A125AP	125	110	1.0
D25A170AP	170	153	1.4
D25A215AP	215	200	1.8

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

Refer to the following section for the connection specifications for the Sensor Cable and Servomotor Main Circuit Cable.

☞ ◆ *SGLC-D25 and -D32 Moving Coils* (page 191)

◆ Magnetic Ways: SGLCM-D25□□□A

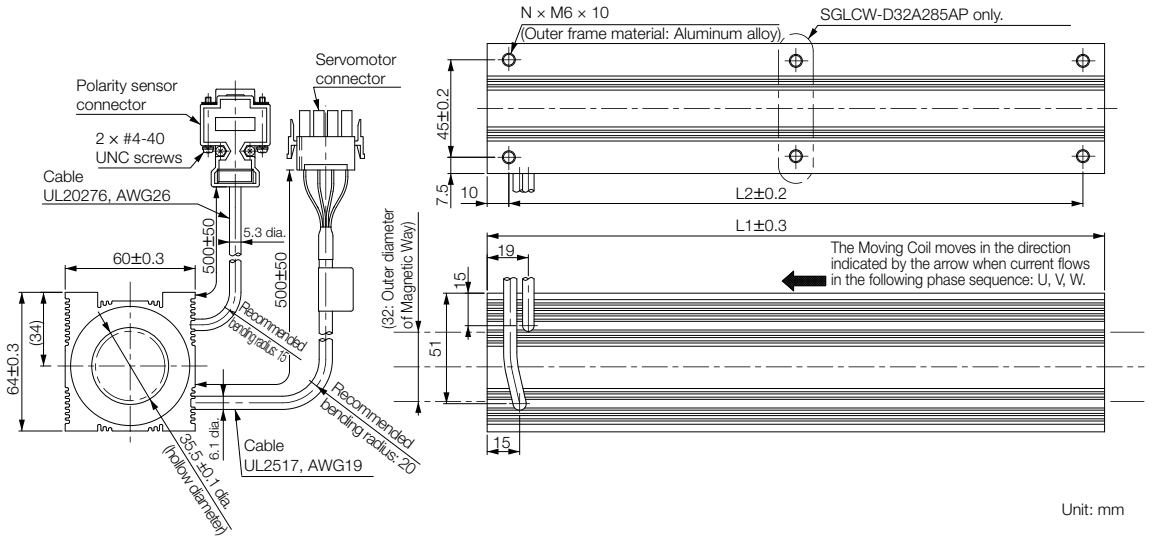


Note: The Magnetic Way will become deformed if a magnetic attraction with the Moving Coil is generated. After installation, take measures over the entire range of motion to prevent any contact between the Magnetic Way and the Moving Coil.

Magnetic Way Model SGLCM-	L1	L2	L3	L4	L5	L6	L7	Approx. Mass [kg]
D25360A	360 ± 1.6	45	270	37	57.5 ± 0.3	245 ± 1.2	57.5	1.50
D25405A	405 ± 1.6	45	315	37	57.5 ± 0.3	290 ± 1.2	57.5	1.65
D25450A	450 ± 1.6	45	360	37	57.5 ± 0.3	335 ± 1.2	57.5	1.80
D25495A	495 ± 1.6	45	405	37	57.5 ± 0.3	380 ± 1.2	57.5	1.95
D25540A	540 ± 1.6	45	450	37	57.5 ± 0.3	425 ± 1.2	57.5	2.10
D25585A	585 ± 1.6	45	495	37	57.5 ± 0.3	470 ± 1.2	57.5	2.25
D25630A	630 ± 1.6	45	540	37	57.5 ± 0.3	515 ± 1.2	57.5	2.40
D25705A	705 ± 2.5	60	585	52	72.5 ± 0.3	560 ± 2.1	72.5	2.85
D25750A	750 ± 2.5	60	630	52	72.5 ± 0.3	605 ± 2.1	72.5	3.00
D25795A	795 ± 2.5	60	675	52	72.5 ± 0.3	650 ± 2.1	72.5	3.15
D25840A	840 ± 2.5	60	720	52	72.5 ± 0.3	695 ± 2.1	72.5	3.30
D25885A	885 ± 2.5	60	765	52	72.5 ± 0.3	740 ± 2.1	72.5	3.45
D25930A	930 ± 2.5	60	810	52	72.5 ± 0.3	785 ± 2.1	72.5	3.60
D25975A	975 ± 2.5	60	855	52	72.5 ± 0.3	830 ± 2.1	72.5	3.75
D251020A	1020 ± 2.5	60	900	52	72.5 ± 0.3	875 ± 2.1	72.5	3.90
D251065A	1065 ± 2.5	60	945	52	72.5 ± 0.3	920 ± 2.1	72.5	4.05
D251110A	1110 ± 3.0	60	990	52	72.5 ± 0.3	965 ± 2.5	72.5	4.20

SGLC-D32

◆ Moving Coils: SGLCW-D32A□□□AP



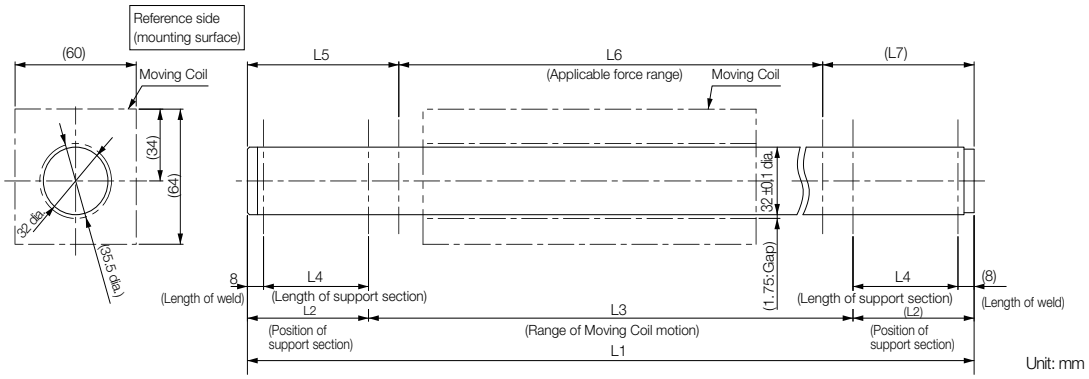
Moving Coil Model SGLCW-	L1	L2	N	Approx. Mass* [kg]
D32A165AP	165	145	4	1.8
D32A225AP	225	205	4	2.5
D32A285AP	285	265	6	3.2

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

Refer to the following section for the connection specifications for the Sensor Cable and Servomotor Main Circuit Cable.

☞ ◆ *SGLC-D25 and -D32 Moving Coils* (page 191)

◆ Magnetic Ways: SGLCM-D32□□□A



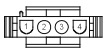
Note: The Magnetic Way will become deformed if a magnetic attraction with the Moving Coil is generated. After installation, take measures over the entire range of motion to prevent any contact between the Magnetic Way and the Moving Coil.

Magnetic Way Model SGLCM-	L1	L2	L3	L4	L5	L6	L7	Approx. Mass [kg]
D32480A	480 ± 1.6	60	360	52	75 ± 0.3	330 ± 1.2	75	3.0
D32540A	540 ± 1.6	60	420	52	75 ± 0.3	390 ± 1.2	75	3.4
D32600A	600 ± 1.6	60	480	52	75 ± 0.3	450 ± 1.2	75	3.8
D32660A	660 ± 1.6	60	540	52	75 ± 0.3	510 ± 1.2	75	4.2
D32720A	720 ± 1.6	60	600	52	75 ± 0.3	570 ± 1.2	75	4.6
D32780A	780 ± 1.6	60	660	52	75 ± 0.3	630 ± 1.2	75	5.0
D32840A	840 ± 1.6	60	720	52	75 ± 0.3	690 ± 1.2	75	5.4
D32960A	960 ± 2.5	90	780	82	105 ± 0.3	750 ± 2.1	105	5.9
D321020A	1020 ± 2.5	90	840	82	105 ± 0.3	810 ± 2.1	105	6.3
D321080A	1080 ± 2.5	90	900	82	105 ± 0.3	870 ± 2.1	105	6.7
D321140A	1140 ± 2.5	90	960	82	105 ± 0.3	930 ± 2.1	105	7.1
D321200A	1200 ± 2.5	90	1020	82	105 ± 0.3	990 ± 2.1	105	7.5
D321260A	1260 ± 2.5	90	1080	82	105 ± 0.3	1050 ± 2.1	105	7.9
D321320A	1320 ± 2.5	90	1140	82	105 ± 0.3	1110 ± 2.1	105	8.3
D321380A	1380 ± 2.5	90	1200	82	105 ± 0.3	1170 ± 2.1	105	8.7
D321440A	1440 ± 2.5	90	1260	82	105 ± 0.3	1230 ± 2.1	105	9.1
D321500A	1500 ± 3.0	90	1320	82	105 ± 0.3	1290 ± 2.5	105	9.5

Connector Specifications

◆ SGLC-D16 and -D20 Moving Coils

• Servomotor Connector



Plug: 350779-1
Pins: 350561-3 or 350690-3 (No.1 to 3)
770210-1 (No. 4)
From Tyco Electronics Japan G.K.

Mating Connector
Cap: 350780-1
Socket: 350925-1 or 770673-1

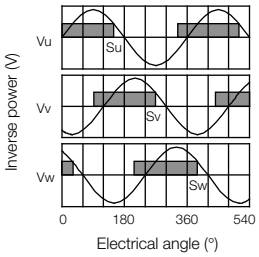
• Polarity Sensor Connector

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

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

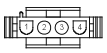
• Polarity Sensor Output Signal

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.



◆ SGLC-D25 and -D32 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: 350925-1 or 770673-1

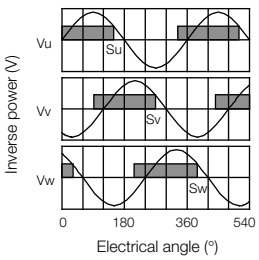
• Polarity Sensor Connector

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

Mating Connector
Socket connector: 17JE-13090-02 (D8C)
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.



MEMO

SERVOPACKs

Σ-7S Single-axis Analog Voltage/Pulse Train Reference SERVOPACKs

Model Designations

SGD7S - R70 A 00 A 001

- SGD7S: Σ-7 Series SERVOPACKs: Σ-7S Models
- R70: 1st+2nd+3rd digits
- A: 4th digit
- 00: 5th+6th digits
- A: 7th digit
- 001: 8th+9th+10th digits

1st+2nd+3rd digits: Maximum Applicable Motor Capacity

Voltage	Code	Specification
Three-phase, 200 V	R70	0.05 kW
	R90	0.1 kW
	1R6	0.2 kW
	2R8	0.4 kW
	3R8	0.5 kW
	5R5	0.75 kW
	7R6	1.0 kW
	120	1.5 kW
	180	2.0 kW
	200	3.0 kW

4th digit: Voltage

Code	Specification
A	200 VAC

5th+6th digits: Interface*

Code	Specification
00	Analog voltage/pulse train reference

7th digit: Design Revision Order

A

8th+9th+10th digits: Hardware Options Specification

Code	Specification	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.

Ratings and Specifications

Ratings

◆ Three-phase, 200 VAC

Model SGD7S-			R70A	R90A	1R6A	2R8A	3R8A	5R5A	7R6A	120A	180A	200A
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
Continuous Output Current [Arms]			0.66	0.91	1.6	2.8	3.8	5.5	7.6	11.6	18.5	19.6
Instantaneous Maximum Output Current [Arms]			2.1	3.2	5.9	9.3	11	16.9	17	28	42	56
Main Circuit	Power Supply		200 VAC to 240 VAC, +10% to -15%, 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
Control Power Supply			200 VAC to 240 VAC, +10% to -15%, 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
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
	Control Circuit Power Loss [W]		17	17	17	17	17	17	17	22	22	22
	Built-in Regenerative Resistor Power Loss [W]		–	–	–	–	8	8	8	10	16	16
	Total Power Loss [W]		22.1	24.3	30.5	41.0	45.1	68.8	78.6	97.8	149.9	151.8
Regenerative Resistor	Built-In Regenerative Resistor	Resistance [Ω]	–	–	–	–	40	40	40	20	12	12
		Capacity [W]	–	–	–	–	40	40	40	60	60	60
	Minimum Allowable External Resistance [Ω]		40	40	40	40	40	40	40	20	12	12
Overvoltage Category			III									

* This is the net value at the rated load.

◆ 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, +10% to -15%, 50 Hz/60 Hz					*2
	Input Current [Arms]*3		0.8	1.6	2.4	5.0	8.7	16
Control Power Supply			200 VAC to 240 VAC, +10% to -15%, 50 Hz/60 Hz					
Power Supply Capacity [kVA]*3			0.2	0.3	0.6	1.2	1.9	4.0
Power Loss*3	Main Circuit Power Loss [W]		5.1	7.3	13.5	24.0	43.8	65.8
	Control Circuit Power Loss [W]		17	17	17	17	17	22
	Built-in Regenerative Resistor Power Loss [W]		–	–	–	–	8	10
	Total Power Loss [W]		22.1	24.3	30.5	41.0	68.8	97.8
Regenerative Resistor	Built-In Regenerative Resistor	Resistance [Ω]	–	–	–	–	40	20
		Capacity [W]	–	–	–	–	40	60
	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, +10% to -15%, 50 Hz/60 Hz

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

Specifications

<table>
<tr><th colspan="3">Item</th><th>Specification</th></tr>
<tr><td colspan="2">Control Method</td><td></td><td>IGBT-based PWM control, sine wave current drive</td></tr>
<tr><td rowspan="2">Feedback</td><td>With Rotary Servomotor</td><td></td><td>Serial encoder: 22 bits (absolute encoder)
24 bits (incremental encoder/absolute encoder)</td></tr>
<tr><td>With Linear Servomotor</td><td></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></td><td>-5°C to 55°C
(With derating, usage is possible between 55°C and 60°C.)</td></tr>
<tr><td>Storage Temperature</td><td></td><td>-20°C to 85°C</td></tr>
<tr><td>Surrounding Air Humidity</td><td></td><td>95% relative humidity max. (with no freezing or condensation)</td></tr>
<tr><td>Storage Humidity</td><td></td><td>95% relative humidity max. (with no freezing or condensation)</td></tr>
<tr><td>Vibration Resistance</td><td></td><td>4.9 m/s^2</td></tr>
<tr><td>Shock Resistance</td><td></td><td>19.6 m/s^2</td></tr>
<tr><td>Protection Class</td><td></td><td><table><tr><th>Class</th><th>SERVOPACK Model: SGD7S-</th></tr><tr><td>IP20</td><td>R70A, R90A, 1R6A, 2R8A, 3R8A, 5R5A, 7R6A, 120A</td></tr><tr><td>IP10</td><td>180A, 200A</td></tr></table></td></tr>
<tr><td>Pollution Degree</td><td></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></td><td>1,000 m or less. (With derating, usage is possible between 1,000 m and 2,000 m.)</td></tr>
<tr><td>Others</td><td></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></td><td>UL 61800-5-1, 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</td></tr>
<tr><td colspan="2">Mounting</td><td></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</td></tr></table></td></tr>
<tr><td rowspan="5">Performance</td><td colspan="2">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>Load Fluctuation</td><td>±0.01% max. (at rated motor speed and 0% to 100% load)</td></tr>
<tr><td>Voltage Fluctuation</td><td>0% (at rated motor speed and rated voltage ±10%)</td></tr>
<tr><td>Temperature Fluctuation</td><td>±0.1% max. (at rated motor speed and 25°C ±25°C)</td></tr>
<tr><td colspan="2">Torque Control Precision (Repeatability)</td><td>±1%</td></tr>
<tr><td colspan="2">Soft Start Time Setting</td><td>0 s to 10 s (Can be set separately for acceleration and deceleration.)</td></tr>
</table>

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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	Fixed Input	SEN signal
		Input Signals That Can Be Allocated	Allowable voltage range: 24 VDC ±20% Number of input points: 7
			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) • Internal Set Speed Selection (/SPD-D, /SPD-A, and /SPD-B) • Control Selection (/C-SEL) • Zero Clamping (/ZCLAMP) • Reference Pulse Inhibit (/INHIBIT) • Gain Selection (/G-SEL) • Reference Pulse Input Multiplication Switch (/PSEL) • The SEN input (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 (/S-RDY) • Torque Limit Detection (/CLT) • Speed Limit Detection (/VLT) • Brake (/BK) • Warning (/WARN) • Near (/NEAR) • Reference Pulse Input Multiplication Switching Output (/PSELA) • The 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 USB2.0 standard (12 Mbps).

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Item					Specification
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
Overtravel (OT) Prevention					Stopping with dynamic brake, deceleration to a stop, or coast to a stop at P-OT or N-OT input.
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
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

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Item				Specification
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:

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

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

Σ-7S Single-axis MECHATROLINK-II Communications Reference SERVOPACKs

Model Designations

SGD7S - R70 A 10 A 001

- SGD7S: Σ-7 Series SERVOPACKs: Σ-7S Models
- R70: 1st+2nd+3rd digits
- A: 4th digit
- 10: 5th+6th digits
- A: 7th digit
- 001: 8th+9th+10th digits

1st+2nd+3rd digits Maximum Applicable Motor Capacity

Voltage	Code	Specification
Three-phase, 200 V	R70	0.05 kW
	R90	0.1 kW
	1R6	0.2 kW
	2R8	0.4 kW
	3R8	0.5 kW
	5R5	0.75 kW
	7R6	1.0 kW
	120	1.5 kW
	180	2.0 kW
	200	3.0 kW

4th digit Voltage

Code	Specification
A	200 VAC

5th+6th digits Interface*

Code	Specification
10	MECHATROLINK-II communications reference

7th digit Design Revision Order

A

8th+9th+10th digits Hardware Options Specification

Code	Specification	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.

Ratings and Specifications

Ratings

◆ Three-phase, 200 VAC

Model SGD7S-			R70A	R90A	1R6A	2R8A	3R8A	5R5A	7R6A	120A	180A	200A
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
Continuous Output Current [Arms]			0.66	0.91	1.6	2.8	3.8	5.5	7.6	11.6	18.5	19.6
Instantaneous Maximum Output Current [Arms]			2.1	3.2	5.9	9.3	11	16.9	17	28	42	56
Main Circuit	Power Supply		200 VAC to 240 VAC, +10% to -15%, 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
Control Power Supply			200 VAC to 240 VAC, +10% to -15%, 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
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
	Control Circuit Power Loss [W]		17	17	17	17	17	17	17	22	22	22
	Built-in Regenerative Resistor Power Loss [W]		–	–	–	–	8	8	8	10	16	16
	Total Power Loss [W]		22.1	24.3	30.5	41.0	45.1	68.8	78.6	97.8	149.9	151.8
Regenerative Resistor	Built-In Regenerative Resistor	Resistance [Ω]	–	–	–	–	40	40	40	20	12	12
		Capacity [W]	–	–	–	–	40	40	40	60	60	60
	Minimum Allowable External Resistance [Ω]		40	40	40	40	40	40	40	20	12	12
Overvoltage Category			III									

* This is the net value at the rated load.

◆ 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, +10% to -15%, 50 Hz/60 Hz					*2
	Input Current [Arms]*3		0.8	1.6	2.4	5.0	8.7	16
Control Power Supply			200 VAC to 240 VAC, +10% to -15%, 50 Hz/60 Hz					
Power Supply Capacity [kVA]*3			0.2	0.3	0.6	1.2	1.9	4.0
Power Loss*3	Main Circuit Power Loss [W]		5.1	7.3	13.5	24.0	43.8	65.8
	Control Circuit Power Loss [W]		17	17	17	17	17	22
	Built-in Regenerative Resistor Power Loss [W]		–	–	–	–	8	10
	Total Power Loss [W]		22.1	24.3	30.5	41.0	68.8	97.8
Regenerative Resistor	Built-In Regenerative Resistor	Resistance [Ω]	–	–	–	–	40	20
		Capacity [W]	–	–	–	–	40	60
	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, +10% to -15%, 50 Hz/60 Hz

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

Specifications

<table>
<tr><th colspan="3">Item</th><th>Specification</th></tr>
<tr><td colspan="2">Control Method</td><td></td><td>IGBT-based PWM control, sine wave current drive</td></tr>
<tr><td rowspan="2">Feedback</td><td colspan="2">With Rotary Servomotor</td><td>Serial encoder: 22 bits (absolute encoder)
24 bits (incremental encoder/absolute encoder)</td></tr>
<tr><td colspan="2">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 colspan="2">Surrounding Air Temperature</td><td>-5°C to 55°C
(With derating, usage is possible between 55°C and 60°C.)</td></tr>
<tr><td colspan="2">Storage Temperature</td><td>-20°C to 85°C</td></tr>
<tr><td colspan="2">Surrounding Air Humidity</td><td>95% relative humidity max. (with no freezing or condensation)</td></tr>
<tr><td colspan="2">Storage Humidity</td><td>95% relative humidity max. (with no freezing or condensation)</td></tr>
<tr><td colspan="2">Vibration Resistance</td><td>4.9 m/s^2</td></tr>
<tr><td colspan="2">Shock Resistance</td><td>19.6 m/s^2</td></tr>
<tr><td colspan="2">Protection Class</td><td><table><tr><th>Class</th><th>SERVOPACK Model: SGD7S-</th></tr><tr><td>IP20</td><td>R70A, R90A, 1R6A, 2R8A, 3R8A, 5R5A, 7R6A, 120A</td></tr><tr><td>IP10</td><td>180A, 200A</td></tr></table></td></tr>
<tr><td colspan="2">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 colspan="2">Altitude</td><td>1,000 m or less. (With derating, usage is possible between 1,000 m and 2,000 m.)</td></tr>
<tr><td colspan="2">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="3">Applicable Standards</td><td>UL 61800-5-1, 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</td></tr>
<tr><td colspan="3">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</td></tr></table></td></tr>
<tr><td rowspan="5">Performance</td><td colspan="2">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>Load Fluctuation</td><td>±0.01% max. (at rated motor speed and 0% to 100% load)</td></tr>
<tr><td>Voltage Fluctuation</td><td>0% (at rated motor speed and rated voltage ±10%)</td></tr>
<tr><td>Temperature Fluctuation</td><td>±0.1% max. (at rated motor speed and 25°C ±25°C)</td></tr>
<tr><td colspan="2">Torque Control Precision (Repeatability)</td><td>±1%</td></tr>
<tr><td colspan="2">Soft Start Time Setting</td><td>0 s to 10 s (Can be set separately for acceleration and deceleration.)</td></tr>
</table>

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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 Signals • Origin Return Deceleration Switch (/DEC) • External Latch (/EXT 1 to 3) • Forward Drive Prohibit (P-OT) and Reverse Drive Prohibit (N-OT) • The Forward External Torque Limit (/P-CL) and Reverse External Torque Limit (/N-CL) 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 (/S-RDY) • Torque Limit Detection (/CLT) • Speed Limit Detection (/VLT) • Brake (/BK) • Warning (/WARN) • Near (/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 USB2.0 standard (12 Mbps).
Displays/Indicators			CHARGE, POWER, and COM indicators, and one-digit seven-segment display
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 A DIP switch (S3) is used to select the baud rate.
	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.

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Item		Specification
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
Overtravel (OT) Prevention		Stopping with dynamic brake, deceleration to a stop, or coast to a stop at P-OT or N-OT input.
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

*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.

Σ-7S Single-axis MECHATROLINK-III Communications Reference SERVOPACKs

Model Designations

SGD7S - R70 A 20 A 001

- Σ-7 Series SERVOPACKs: Σ-7S Models
- 1st+2nd+3rd digits
- 4th digit
- 5th+6th digits
- 7th digit
- 8th+9th+10th digits

1st+2nd+3rd digits Maximum Applicable Motor Capacity

Voltage	Code	Specification
Three-phase, 200 V	R70	0.05 kW
	R90	0.1 kW
	1R6	0.2 kW
	2R8	0.4 kW
	3R8	0.5 kW
	5R5	0.75 kW
	7R6	1.0 kW
	120	1.5 kW
	180	2.0 kW
	200	3.0 kW

4th digit Voltage

Code	Specification
A	200 VAC

5th+6th digits Interface*

Code	Specification
20	MECHATROLINK-III communications reference

7th digit Design Revision Order

A

8th+9th+10th digits Hardware Options Specification

Code	Specification	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.

Ratings and Specifications

Ratings

◆ Three-phase, 200 VAC

Model SGD7S-			R70A	R90A	1R6A	2R8A	3R8A	5R5A	7R6A	120A	180A	200A
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
Continuous Output Current [Arms]			0.66	0.91	1.6	2.8	3.8	5.5	7.6	11.6	18.5	19.6
Instantaneous Maximum Output Current [Arms]			2.1	3.2	5.9	9.3	11	16.9	17	28	42	56
Main Circuit	Power Supply		200 VAC to 240 VAC, +10% to -15%, 50 Hz/60 Hz									
	Input Current [Arms]*		0.4	0.8	1.3	2.5	3.0	4.1	5.7	7.3	1.0	15
Control Power Supply			200 VAC to 240 VAC, +10% to -15%, 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
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
	Control Circuit Power Loss [W]		17	17	17	17	17	17	17	22	22	22
	Built-in Regenerative Resistor Power Loss [W]		–	–	–	–	8	8	8	10	16	16
	Total Power Loss [W]		22.1	24.3	30.5	41.0	45.1	68.8	78.6	97.8	149.9	151.8
Regenerative Resistor	Built-In Regenerative Resistor	Resistance [Ω]	–	–	–	–	40	40	40	20	12	12
		Capacity [W]	–	–	–	–	40	40	40	60	60	60
	Minimum Allowable External Resistance [Ω]		40	40	40	40	40	40	40	20	12	12
Overvoltage Category			III									

* This is the net value at the rated load.

◆ 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, +10% to -15%, 50 Hz/60 Hz					*2
	Input Current [Arms]*3		0.8	1.6	2.4	5.0	8.7	16
Control Power Supply			200 VAC to 240 VAC, +10% to -15%, 50 Hz/60 Hz					
Power Supply Capacity [kVA]*3			0.2	0.3	0.6	1.2	1.9	4.0
Power Loss*3	Main Circuit Power Loss [W]		5.1	7.3	13.5	24.0	43.8	65.8
	Control Circuit Power Loss [W]		17	17	17	17	17	22
	Built-in Regenerative Resistor Power Loss [W]		–	–	–	–	8	10
	Total Power Loss [W]		22.1	24.3	30.5	41.0	68.8	97.8
Regenerative Resistor	Built-In Regenerative Resistor	Resistance [Ω]	–	–	–	–	40	20
		Capacity [W]	–	–	–	–	40	60
	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, +10% to -15%, 50 Hz/60 Hz

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

Specifications

<table>
<tr><th colspan="3">Item</th><th>Specification</th></tr>
<tr><td colspan="2">Drive Method</td><td></td><td>IGBT-based PWM control, sine wave current drive</td></tr>
<tr><td rowspan="2">Feedback</td><td colspan="2">With Rotary Servomotor</td><td>Serial encoder: 22 bits (absolute encoder)
24 bits (incremental encoder/absolute encoder)</td></tr>
<tr><td colspan="2">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 colspan="2">Surrounding Air Temperature</td><td>-5°C to 55°C
(With derating, usage is possible between 55°C and 60°C.)</td></tr>
<tr><td colspan="2">Storage Temperature</td><td>-20°C to 85°C</td></tr>
<tr><td colspan="2">Surrounding Air Humidity</td><td>95% relative humidity max. (with no freezing or condensation)</td></tr>
<tr><td colspan="2">Storage Humidity</td><td>95% relative humidity max. (with no freezing or condensation)</td></tr>
<tr><td colspan="2">Vibration Resistance</td><td>4.9 m/s^2</td></tr>
<tr><td colspan="2">Shock Resistance</td><td>19.6 m/s^2</td></tr>
<tr><td colspan="2">Protection Class</td><td><table><tr><th>Class</th><th>SERVOPACK Model: SGD7S-</th></tr><tr><td>IP20</td><td>R70A, R90A, 1R6A, 2R8A, 3R8A, 5R5A, 7R6A, 120A</td></tr><tr><td>IP10</td><td>180A, 200A</td></tr></table></td></tr>
<tr><td colspan="2">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 colspan="2">Altitude</td><td>1,000 m or less. (With derating, usage is possible between 1,000 m and 2,000 m.)</td></tr>
<tr><td colspan="2">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="3">Applicable Standards</td><td>UL 61800-5-1, 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</td></tr>
<tr><td colspan="3">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</td></tr></table></td></tr>
<tr><td rowspan="5">Performance</td><td colspan="2">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>Load Fluctuation</td><td>±0.01% max. (at rated motor speed and 0% to 100% load)</td></tr>
<tr><td>Voltage Fluctuation</td><td>0% (at rated motor speed and rated voltage ±10%)</td></tr>
<tr><td>Temperature Fluctuation</td><td>±0.1% max. (at rated motor speed and 25°C ±25°C)</td></tr>
<tr><td colspan="2">Torque Control Precision (Repeatability)</td><td>±1%</td></tr>
<tr><td colspan="2">Soft Start Time Setting</td><td>0 s to 10 s (Can be set separately for acceleration and deceleration.)</td></tr>
</table>

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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 Signals • Origin Return Deceleration Switch (/DEC) • External Latch (/EXT 1 to 3) • Forward Drive Prohibit (P-OT) and Reverse Drive Prohibit (N-OT) • The Forward External Torque Limit (/P-CL) and Reverse External Torque Limit (/N-CL) 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 (/S-RDY) • Torque Limit Detection (/CLT) • Speed Limit Detection (/VLT) • Brake (/BK) • Warning (/WARN) • Near (/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 USB2.0 standard (12 Mbps).
Displays/Indicators			CHARGE, POWER, COM, L1, and L2 indicators, and one-digit seven-segment display
MECHATROLINK-III 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.
	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.

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Item		Specification
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-II-compatible 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 coast to a stop at P-OT or N-OT input.
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

*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.

Σ-7W Two-axis MECHATROLINK-III Communications Reference SERVOPACKs

Model Designations

SGD7W - 1R6 A 20 A 001

Σ-7 Series SERVOPACKs: Σ-7W Models

1st+2nd+3rd digits

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

4th digit

Code	Specification
A	200 VAC

5th+6th digits

Code	Specification
20	MECHATROLINK-III communications reference

7th digit

A

8th+9th+10th digits

Code	Specification	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 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, +10% to -15%, 50 Hz/60 Hz			
	Input Current [Arms]*		2.5	4.7	7.8	11
Control Power Supply			200 VAC to 240 VAC, +10% to -15%, 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, +10% to -15%, 50 Hz/60 Hz		
	Input Current [Arms]*2		5.5	11	12
Control Power Supply			200 VAC to 240 VAC, +10% to -15%, 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, derate the load ratio to 65%.

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

Specifications

Item			Specification
Control Method			IGBT-based PWM control, sine wave current drive
Feedback	With Rotary Servomotor		Serial encoder: 22 bits (absolute encoder) 24 bits (incremental encoder/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		-5°C to 55°C (With derating, usage is possible between 55°C and 60°C.)
	Storage Temperature		-20°C to 85°C
	Surrounding Air Humidity		95% relative humidity max. (with no freezing or condensation)
	Storage Humidity		95% relative humidity max. (with no freezing or condensation)
	Vibration Resistance		4.9 m/s^2
	Shock Resistance		19.6 m/s^2
	Protection Class		IP20
	Pollution Degree		2 • Must be no corrosive or flammable gases. • Must be no exposure to water, oil, or chemicals. • Must be no dust, salts, or iron dust.
	Altitude		1,000 m or less. (With derating, usage is possible between 1,000 m and 2,000 m.)
	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, 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*	Load Fluctuation	±0.01% max. (at rated motor speed and 0% to 100% load)
		Voltage Fluctuation	0% (at rated motor speed and rated voltage ±10%)
		Temperature Fluctuation	±0.1% max. (at rated motor speed and 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	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 Signals • Origin Return Deceleration Switch (/DEC) • External Latch (/EXT 1 to 3) • Forward Drive Prohibit (P-OT) and Reverse Drive Prohibit (N-OT) 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: 5 (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 (/WARN) • Near (/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 Settings	Set with parameters.
	USB Communications (CN7)	Interface	Personal computer (with SigmaWin+)
		Communications Standard	Conforms to USB2.0 standard (12 Mbps).
Displays/Indicators			CHARGE, POWER, COM, L1, and L2 indicators, and two, one-digit seven-segment displays
MECHATROLINK-III 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 baud rate.

Continued on next page.

Continued from previous page.

Item		Specification
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-II-compatible 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 coast to a stop at P-OT or N-OT input.
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:

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

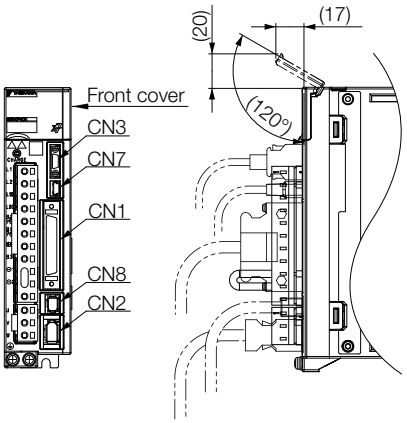
SERVOPACK External Dimensions

Interpreting the Dimensional Drawings

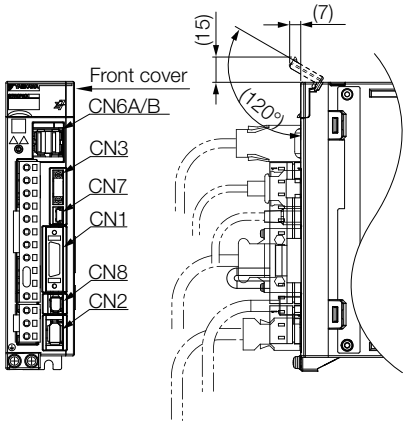
The front cover dimensions and panel connectors depend on the SERVOPACK interface. Refer to the following figures.

Front Cover Dimensions

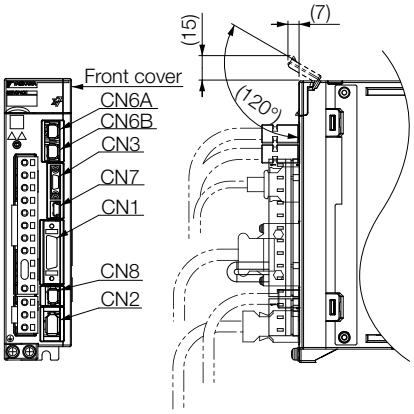
- Σ-7S Analog Voltage/Pulse Train Reference SERVOPACKs



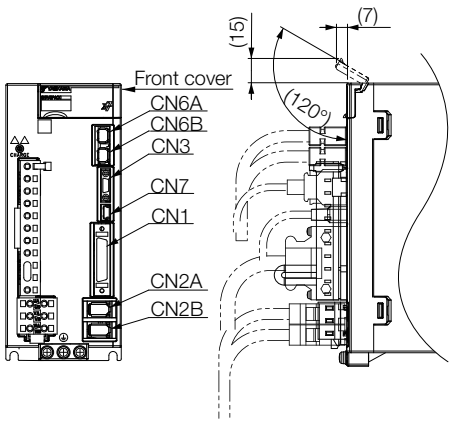
- Σ-7S MECHATROLINK-II Communications Reference SERVOPACKs



- Σ-7S MECHATROLINK-III Communications Reference SERVOPACKs



- Σ-7W MECHATROLINK-III Communications Reference SERVOPACKs



Connectors

SERVOPACK	Connector No.	Model	Number of Pins	Manufacturer
Σ-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.
Σ-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.
Σ-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.
Σ-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.

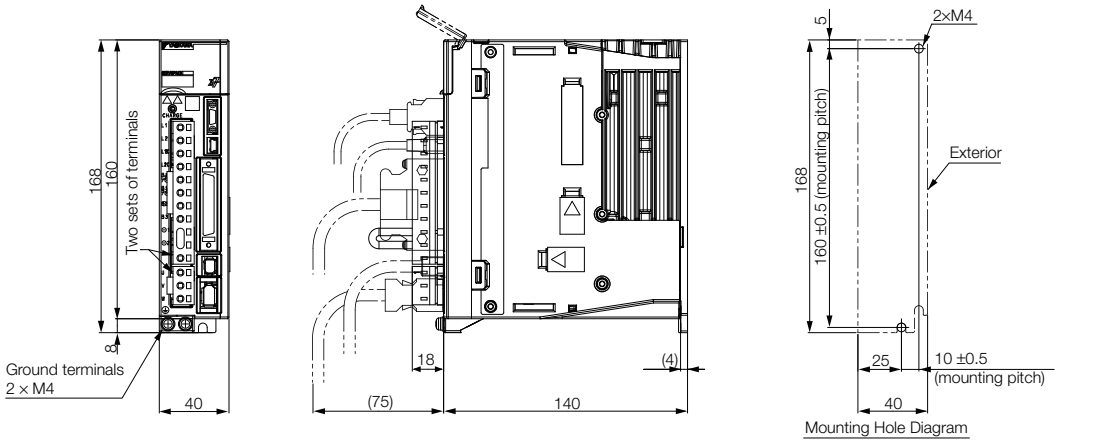
Note: The above connectors or their equivalents are used for the SERVOPACKs.

External Dimensions

All of the dimensional drawings show Analog Voltage/Pulse Train Reference SERVOPACKs as typical examples.

Σ-7S SERVOPACKs: Base-mounted

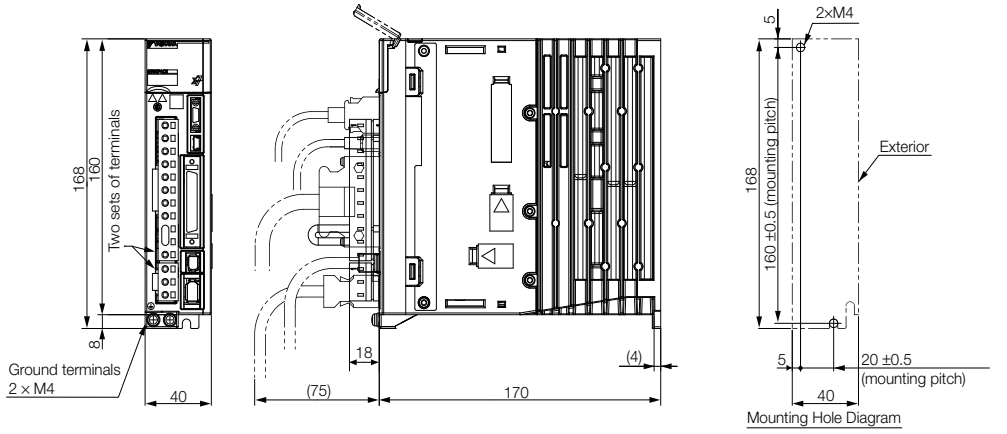
◆ Three-phase, 200 VAC: SGD7S-R70A, -R90A, and -1R6A



Approx. Mass: 0.8 kg

Unit: mm

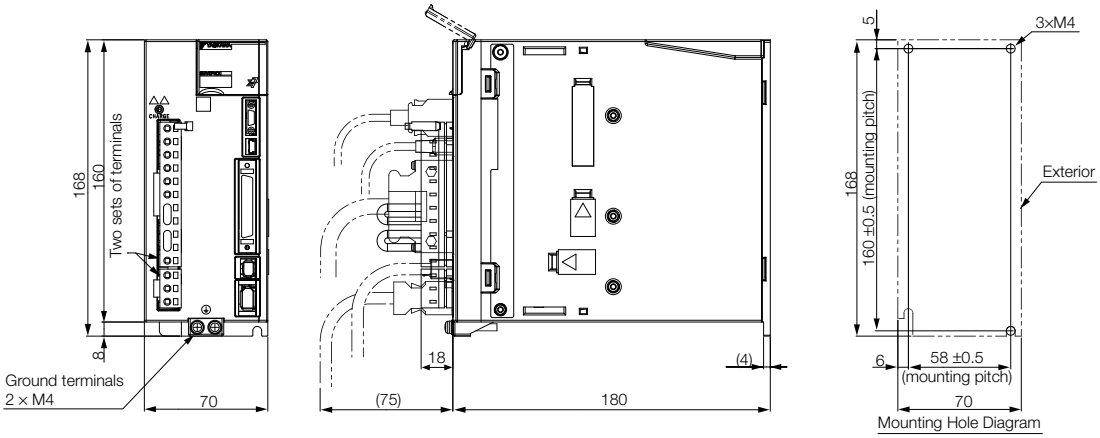
◆ Three-phase, 200 VAC: SGD7S-2R8A



Approx. Mass: 1.0 kg

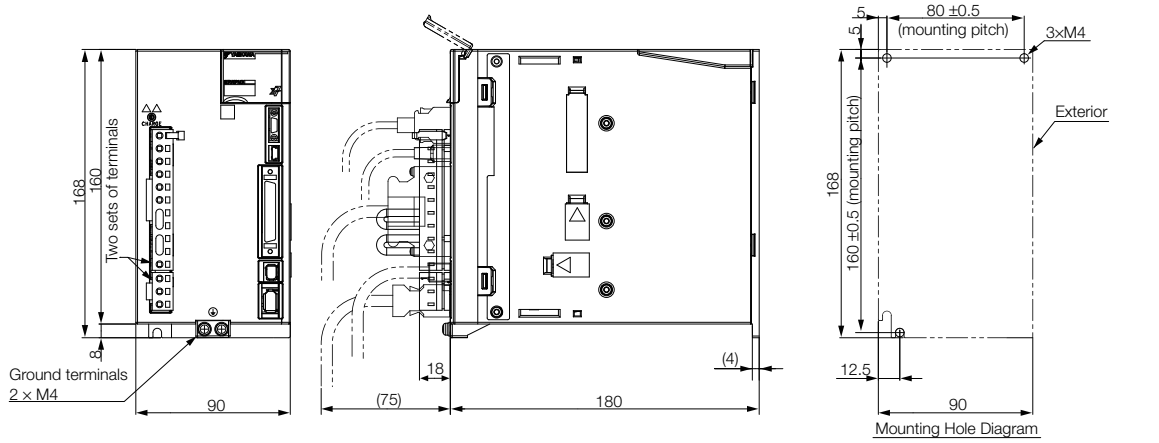
Unit: mm

◆ Three-phase, 200 VAC: SGD7S-3R8A, -5R5A, and -7R6A



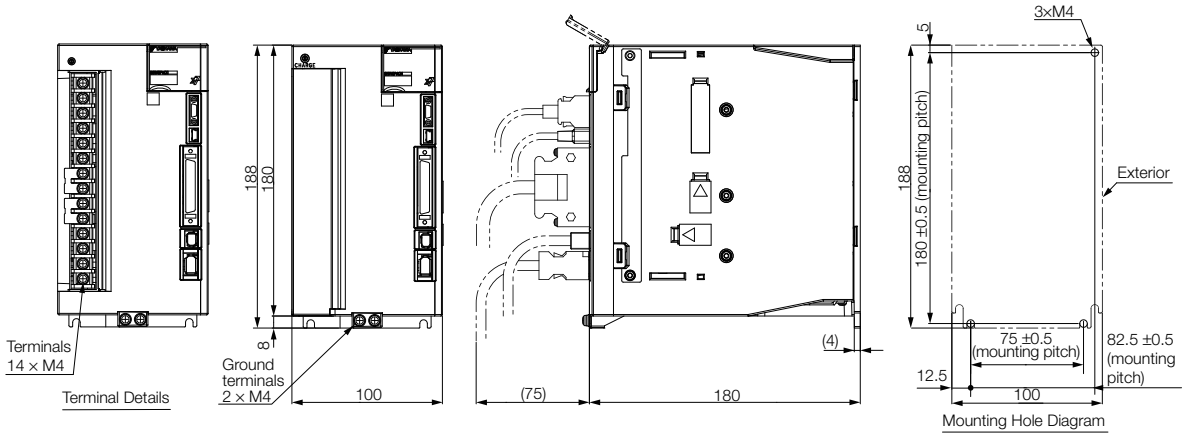
Approx. Mass: 1.6 kg
Unit: mm

◆ Three-phase, 200 VAC: SGD7S-120A



Approx. Mass: 2.2 kg
Unit: mm

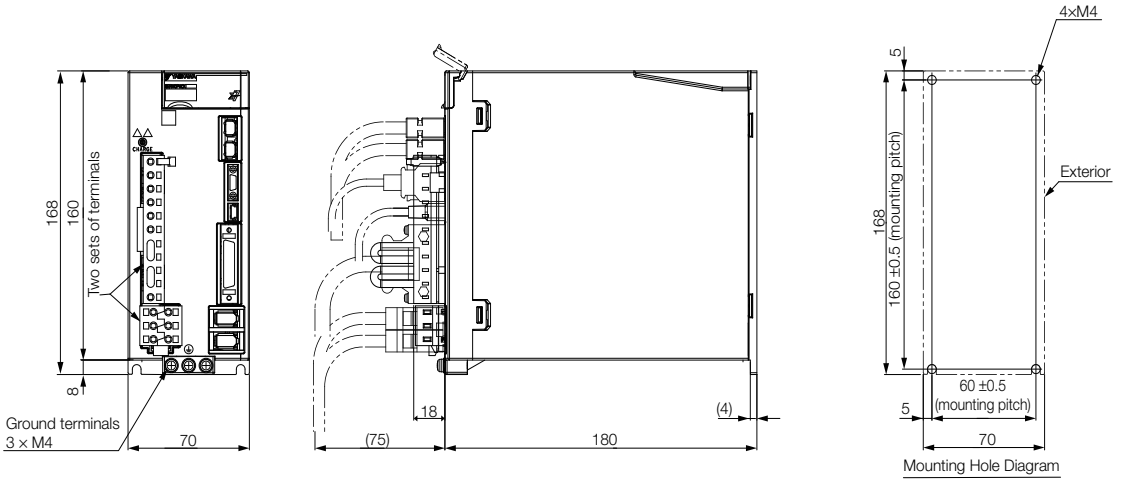
◆ Three-phase, 200 VAC: SGD7S-180A and -200A



Approx. Mass: 2.7 kg
Unit: mm

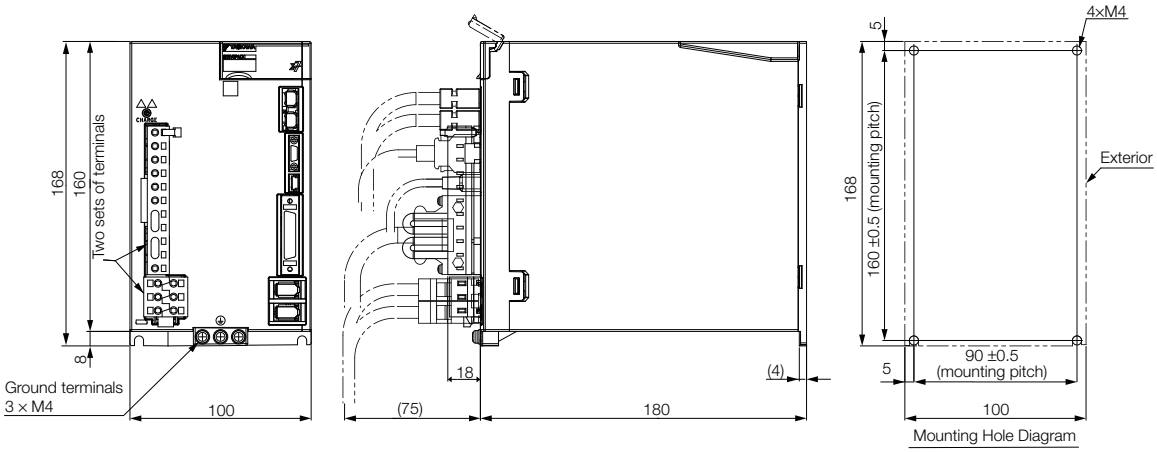
Σ-7W SERVOPACKs: Base-mounted

◆ 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

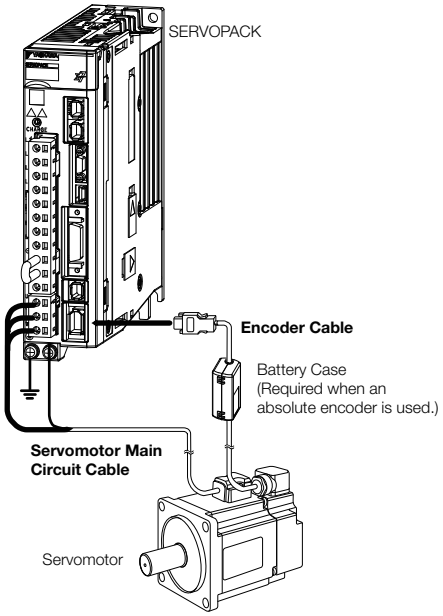
MEMO

Cables and Peripheral Devices

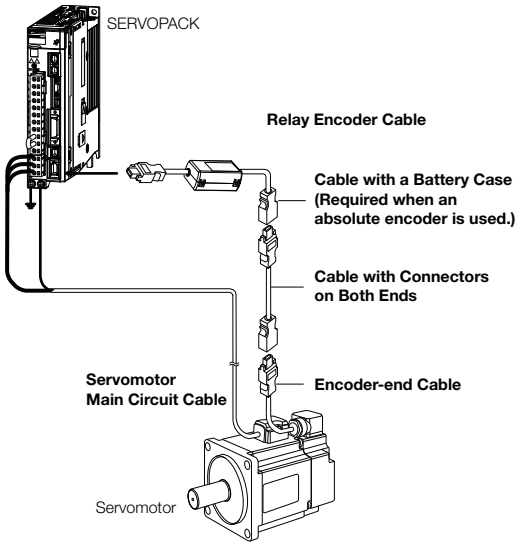
Cables for SGM7A and SGM7J Rotary Servomotors

System Configurations

Encoder Cable of 20 m or Less



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



Note: 1. Cables with connectors on both ends that are compliant with an IP67 protective structure and European Safety Standards are not available from Yaskawa for the SGM7A-15A to SGM7A-30A Servomotors. You must make such a cable yourself. Use the Connectors specified by Yaskawa for these Servomotors. (These Connectors are compliant with the standards.) Yaskawa does not specify what wiring materials to use.

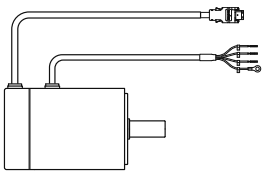
2. If the cable length exceeds 20 m, be sure to use a Relay Encoder Cable.
3. If the length of the Servomotor Main Circuit Cable exceeds 20 m, the intermittent duty zone in the torque-motor speed characteristics will become smaller because the voltage drop increases.
4. Refer to the *Σ-7 Series AC Servo Drive Peripheral Device Selection Manual* (Manual No. SIEP S800001 32) 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

Important

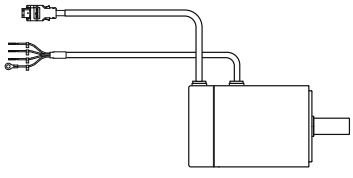
For the following Servomotor models, there are different order numbers for the Servomotor Main Circuit Cables and Encoder Cables depending on the cable installation direction. Confirm the order numbers before you order.

- All SGM7J models
- SGM7A models SGM7A-A5 to SGM7A-10

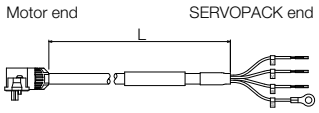
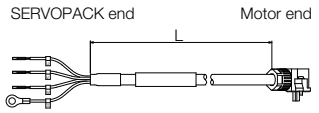
Cable Installed toward Load



Cable Installed away from Load

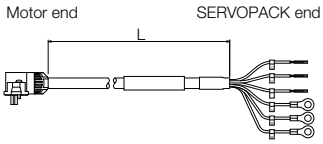
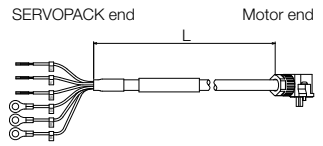


Servomotor Main Circuit Cables

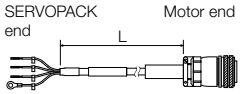
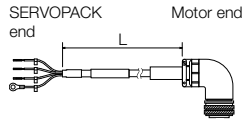
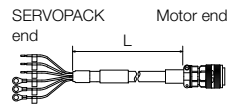
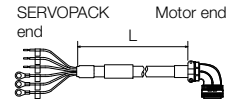
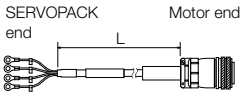
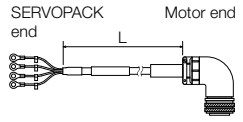
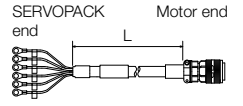
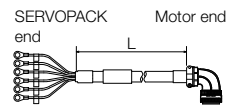
Servomotor Model	Name	Length	Order Number		Appearance
			Standard Cable	Flexible Cable*	
SGM7J-A5 to -C2 SGM7A-A5 to -C2 50 W to 150 W	For Servomotors without Holding Brakes Cable installed toward load	3 m	JZSP-C7M10F-03-E	JZSP-C7M12F-03-E	
		5 m	JZSP-C7M10F-05-E	JZSP-C7M12F-05-E	
		10 m	JZSP-C7M10F-10-E	JZSP-C7M12F-10-E	
		15 m	JZSP-C7M10F-15-E	JZSP-C7M12F-15-E	
		20 m	JZSP-C7M10F-20-E	JZSP-C7M12F-20-E	
		30 m	JZSP-C7M10F-30-E	JZSP-C7M12F-30-E	
		40 m	JZSP-C7M10F-40-E	JZSP-C7M12F-40-E	
		50 m	JZSP-C7M10F-50-E	JZSP-C7M12F-50-E	
SGM7J-02 to -06 SGM7A-02 to -06 200 W to 600 W		3 m	JZSP-C7M20F-03-E	JZSP-C7M22F-03-E	
		5 m	JZSP-C7M20F-05-E	JZSP-C7M22F-05-E	
		10 m	JZSP-C7M20F-10-E	JZSP-C7M22F-10-E	
		15 m	JZSP-C7M20F-15-E	JZSP-C7M22F-15-E	
		20 m	JZSP-C7M20F-20-E	JZSP-C7M22F-20-E	
		30 m	JZSP-C7M20F-30-E	JZSP-C7M22F-30-E	
		40 m	JZSP-C7M20F-40-E	JZSP-C7M22F-40-E	
		50 m	JZSP-C7M20F-50-E	JZSP-C7M22F-50-E	
SGM7J-08 SGM7A-08 and -10 750 W, 1.0 kW		3 m	JZSP-C7M30F-03-E	JZSP-C7M32F-03-E	
		5 m	JZSP-C7M30F-05-E	JZSP-C7M32F-05-E	
		10 m	JZSP-C7M30F-10-E	JZSP-C7M32F-10-E	
		15 m	JZSP-C7M30F-15-E	JZSP-C7M32F-15-E	
		20 m	JZSP-C7M30F-20-E	JZSP-C7M32F-20-E	
		30 m	JZSP-C7M30F-30-E	JZSP-C7M32F-30-E	
		40 m	JZSP-C7M30F-40-E	JZSP-C7M32F-40-E	
		50 m	JZSP-C7M30F-50-E	JZSP-C7M32F-50-E	
SGM7J-A5 to -C2 SGM7A-A5 to -C2 50 W to 150 W	For Servomotors without Holding Brakes Cable installed away from load	3 m	JZSP-C7M10G-03-E	JZSP-C7M12G-03-E	
		5 m	JZSP-C7M10G-05-E	JZSP-C7M12G-05-E	
		10 m	JZSP-C7M10G-10-E	JZSP-C7M12G-10-E	
		15 m	JZSP-C7M10G-15-E	JZSP-C7M12G-15-E	
		20 m	JZSP-C7M10G-20-E	JZSP-C7M12G-20-E	
		30 m	JZSP-C7M10G-30-E	JZSP-C7M12G-30-E	
		40 m	JZSP-C7M10G-40-E	JZSP-C7M12G-40-E	
		50 m	JZSP-C7M10G-50-E	JZSP-C7M12G-50-E	
SGM7J-02 to -06 SGM7A-02 to -06 200 W to 600 W		3 m	JZSP-C7M20G-03-E	JZSP-C7M22G-03-E	
		5 m	JZSP-C7M20G-05-E	JZSP-C7M22G-05-E	
		10 m	JZSP-C7M20G-10-E	JZSP-C7M22G-10-E	
		15 m	JZSP-C7M20G-15-E	JZSP-C7M22G-15-E	
		20 m	JZSP-C7M20G-20-E	JZSP-C7M22G-20-E	
		30 m	JZSP-C7M20G-30-E	JZSP-C7M22G-30-E	
		40 m	JZSP-C7M20G-40-E	JZSP-C7M22G-40-E	
		50 m	JZSP-C7M20G-50-E	JZSP-C7M22G-50-E	
SGM7J-08 SGM7A-08 and -10 750 W, 1.0 kW		3 m	JZSP-C7M30G-03-E	JZSP-C7M32G-03-E	
		5 m	JZSP-C7M30G-05-E	JZSP-C7M32G-05-E	
		10 m	JZSP-C7M30G-10-E	JZSP-C7M32G-10-E	
		15 m	JZSP-C7M30G-15-E	JZSP-C7M32G-15-E	
		20 m	JZSP-C7M30G-20-E	JZSP-C7M32G-20-E	
		30 m	JZSP-C7M30G-30-E	JZSP-C7M32G-30-E	
		40 m	JZSP-C7M30G-40-E	JZSP-C7M32G-40-E	
		50 m	JZSP-C7M30G-50-E	JZSP-C7M32G-50-E	

* Use Flexible Cables for moving parts of machines, such as robots.

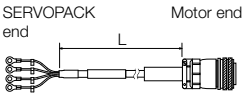
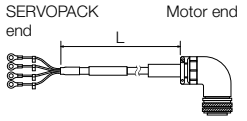
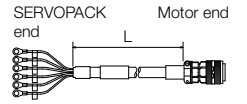
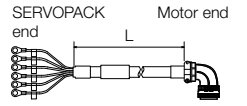
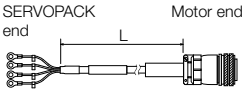
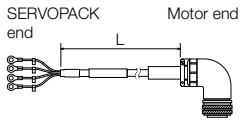
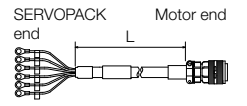
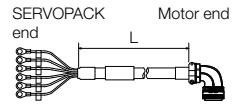
Cables for SGM7A and SGM7J Rotary Servomotors

Servomotor Model	Name	Length	Order Number		Appearance
			Standard Cable	Flexible Cable*	
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-C7M13F-03-E	JZSP-C7M14F-03-E	
		5 m	JZSP-C7M13F-05-E	JZSP-C7M14F-05-E	
		10 m	JZSP-C7M13F-10-E	JZSP-C7M14F-10-E	
		15 m	JZSP-C7M13F-15-E	JZSP-C7M14F-15-E	
		20 m	JZSP-C7M13F-20-E	JZSP-C7M14F-20-E	
		30 m	JZSP-C7M13F-30-E	JZSP-C7M14F-30-E	
		40 m	JZSP-C7M13F-40-E	JZSP-C7M14F-40-E	
		50 m	JZSP-C7M13F-50-E	JZSP-C7M14F-50-E	
SGM7J-02 to -06 SGM7A-02 to -06 200 W to 600 W		3 m	JZSP-C7M23F-03-E	JZSP-C7M24F-03-E	
		5 m	JZSP-C7M23F-05-E	JZSP-C7M24F-05-E	
		10 m	JZSP-C7M23F-10-E	JZSP-C7M24F-10-E	
		15 m	JZSP-C7M23F-15-E	JZSP-C7M24F-15-E	
		20 m	JZSP-C7M23F-20-E	JZSP-C7M24F-20-E	
		30 m	JZSP-C7M23F-30-E	JZSP-C7M24F-30-E	
		40 m	JZSP-C7M23F-40-E	JZSP-C7M24F-40-E	
		50 m	JZSP-C7M23F-50-E	JZSP-C7M24F-50-E	
SGM7J-08 SGM7A-08 and -10 750 W, 1.0 kW		3 m	JZSP-C7M33F-03-E	JZSP-C7M34F-03-E	
		5 m	JZSP-C7M33F-05-E	JZSP-C7M34F-05-E	
		10 m	JZSP-C7M33F-10-E	JZSP-C7M34F-10-E	
		15 m	JZSP-C7M33F-15-E	JZSP-C7M34F-15-E	
		20 m	JZSP-C7M33F-20-E	JZSP-C7M34F-20-E	
		30 m	JZSP-C7M33F-30-E	JZSP-C7M34F-30-E	
		40 m	JZSP-C7M33F-40-E	JZSP-C7M34F-40-E	
		50 m	JZSP-C7M33F-50-E	JZSP-C7M34F-50-E	
SGM7J-A5 to -C2 SGM7A-A5 to -C2 50 W to 150 W	For Servomotors with Holding Brakes Cable installed away from load	3 m	JZSP-C7M13G-03-E	JZSP-C7M14G-03-E	
		5 m	JZSP-C7M13G-05-E	JZSP-C7M14G-05-E	
		10 m	JZSP-C7M13G-10-E	JZSP-C7M14G-10-E	
		15 m	JZSP-C7M13G-15-E	JZSP-C7M14G-15-E	
		20 m	JZSP-C7M13G-20-E	JZSP-C7M14G-20-E	
		30 m	JZSP-C7M13G-30-E	JZSP-C7M14G-30-E	
		40 m	JZSP-C7M13G-40-E	JZSP-C7M14G-40-E	
		50 m	JZSP-C7M13G-50-E	JZSP-C7M14G-50-E	
SGM7J-02 to -06 SGM7A-02 to -06 200 W to 600 W		3 m	JZSP-C7M23G-03-E	JZSP-C7M24G-03-E	
		5 m	JZSP-C7M23G-05-E	JZSP-C7M24G-05-E	
		10 m	JZSP-C7M23G-10-E	JZSP-C7M24G-10-E	
		15 m	JZSP-C7M23G-15-E	JZSP-C7M24G-15-E	
		20 m	JZSP-C7M23G-20-E	JZSP-C7M24G-20-E	
		30 m	JZSP-C7M23G-30-E	JZSP-C7M24G-30-E	
		40 m	JZSP-C7M23G-40-E	JZSP-C7M24G-40-E	
		50 m	JZSP-C7M23G-50-E	JZSP-C7M24G-50-E	
SGM7J-08 SGM7A-08 and -10 750 W, 1.0 kW		3 m	JZSP-C7M33G-03-E	JZSP-C7M34G-03-E	
		5 m	JZSP-C7M33G-05-E	JZSP-C7M34G-05-E	
		10 m	JZSP-C7M33G-10-E	JZSP-C7M34G-10-E	
		15 m	JZSP-C7M33G-15-E	JZSP-C7M34G-15-E	
		20 m	JZSP-C7M33G-20-E	JZSP-C7M34G-20-E	
		30 m	JZSP-C7M33G-30-E	JZSP-C7M34G-30-E	
		40 m	JZSP-C7M33G-40-E	JZSP-C7M34G-40-E	
		50 m	JZSP-C7M33G-50-E	JZSP-C7M34G-50-E	

* Use Flexible Cables for moving parts of machines, such as robots.

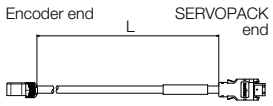
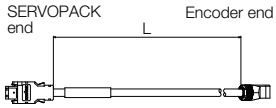
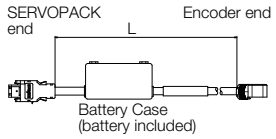
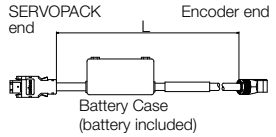
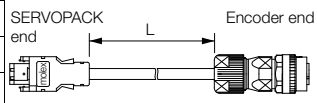
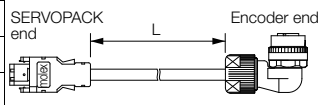
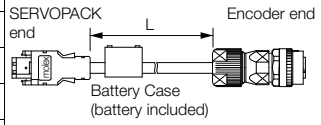
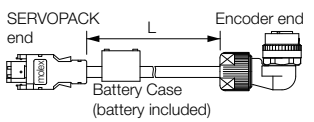
Servomotor Model	Name	Connector Specifications	Length	Order Number		Appearance
				Standard Cable	Flexible Cable*	
SGM7A-15A 1.5 kW	For Servomotors without Holding Brakes	Straight	3 m	JZSP-UVA101-03-E	JZSP-UVA121-03-E	
			5 m	JZSP-UVA101-05-E	JZSP-UVA121-05-E	
			10 m	JZSP-UVA101-10-E	JZSP-UVA121-10-E	
			15 m	JZSP-UVA101-15-E	JZSP-UVA121-15-E	
			20 m	JZSP-UVA101-20-E	JZSP-UVA121-20-E	
		Right-angle	3 m	JZSP-UVA102-03-E	JZSP-UVA122-03-E	
			5 m	JZSP-UVA102-05-E	JZSP-UVA122-05-E	
			10 m	JZSP-UVA102-10-E	JZSP-UVA122-10-E	
			15 m	JZSP-UVA102-15-E	JZSP-UVA122-15-E	
			20 m	JZSP-UVA102-20-E	JZSP-UVA122-20-E	
	For Servomotors with Holding Brakes	Straight	3 m	JZSP-UVA151-03-E	JZSP-UVA161-03-E	
			5 m	JZSP-UVA151-05-E	JZSP-UVA161-05-E	
			10 m	JZSP-UVA151-10-E	JZSP-UVA161-10-E	
			15 m	JZSP-UVA151-15-E	JZSP-UVA161-15-E	
			20 m	JZSP-UVA151-20-E	JZSP-UVA161-20-E	
		Right-angle	3 m	JZSP-UVA152-03-E	JZSP-UVA162-03-E	
			5 m	JZSP-UVA152-05-E	JZSP-UVA162-05-E	
			10 m	JZSP-UVA152-10-E	JZSP-UVA162-10-E	
			15 m	JZSP-UVA152-15-E	JZSP-UVA162-15-E	
			20 m	JZSP-UVA152-20-E	JZSP-UVA162-20-E	
SGM7A-20A 2.0 kW	For Servomotors without Holding Brakes	Straight	3 m	JZSP-UVA301-03-E	JZSP-UVA321-03-E	
			5 m	JZSP-UVA301-05-E	JZSP-UVA321-05-E	
			10 m	JZSP-UVA301-10-E	JZSP-UVA321-10-E	
			15 m	JZSP-UVA301-15-E	JZSP-UVA321-15-E	
			20 m	JZSP-UVA301-20-E	JZSP-UVA321-20-E	
		Right-angle	3 m	JZSP-UVA302-03-E	JZSP-UVA322-03-E	
			5 m	JZSP-UVA302-05-E	JZSP-UVA322-05-E	
			10 m	JZSP-UVA302-10-E	JZSP-UVA322-10-E	
			15 m	JZSP-UVA302-15-E	JZSP-UVA322-15-E	
			20 m	JZSP-UVA302-20-E	JZSP-UVA322-20-E	
	For Servomotors with Holding Brakes	Straight	3 m	JZSP-UVA351-03-E	JZSP-UVA361-03-E	
			5 m	JZSP-UVA351-05-E	JZSP-UVA361-05-E	
			10 m	JZSP-UVA351-10-E	JZSP-UVA361-10-E	
			15 m	JZSP-UVA351-15-E	JZSP-UVA361-15-E	
			20 m	JZSP-UVA351-20-E	JZSP-UVA361-20-E	
		Right-angle	3 m	JZSP-UVA352-03-E	JZSP-UVA362-03-E	
			5 m	JZSP-UVA352-05-E	JZSP-UVA362-05-E	
			10 m	JZSP-UVA352-10-E	JZSP-UVA362-10-E	
			15 m	JZSP-UVA352-15-E	JZSP-UVA362-15-E	
			20 m	JZSP-UVA352-20-E	JZSP-UVA362-20-E	

* Use Flexible Cables for moving parts of machines, such as robots.

Servomotor Model	Name	Connector Specifications	Length	Order Number		Appearance
				Standard Cable	Flexible Cable*	
SGM7A-25A 2.5 kW	For Servomotors without Holding Brakes	Straight	3 m	JZSP-UVA501-03-E	JZSP-UVA521-03-E	
			5 m	JZSP-UVA501-05-E	JZSP-UVA521-05-E	
			10 m	JZSP-UVA501-10-E	JZSP-UVA521-10-E	
			15 m	JZSP-UVA501-15-E	JZSP-UVA521-15-E	
			20 m	JZSP-UVA501-20-E	JZSP-UVA521-20-E	
		Right-angle	3 m	JZSP-UVA502-03-E	JZSP-UVA522-03-E	
			5 m	JZSP-UVA502-05-E	JZSP-UVA522-05-E	
			10 m	JZSP-UVA502-10-E	JZSP-UVA522-10-E	
			15 m	JZSP-UVA502-15-E	JZSP-UVA522-15-E	
			20 m	JZSP-UVA502-20-E	JZSP-UVA522-20-E	
	For Servomotors with Holding Brakes	Straight	3 m	JZSP-UVA551-03-E	JZSP-UVA561-03-E	
			5 m	JZSP-UVA551-05-E	JZSP-UVA561-05-E	
			10 m	JZSP-UVA551-10-E	JZSP-UVA561-10-E	
			15 m	JZSP-UVA551-15-E	JZSP-UVA561-15-E	
			20 m	JZSP-UVA551-20-E	JZSP-UVA561-20-E	
		Right-angle	3 m	JZSP-UVA552-03-E	JZSP-UVA562-03-E	
			5 m	JZSP-UVA552-05-E	JZSP-UVA562-05-E	
			10 m	JZSP-UVA552-10-E	JZSP-UVA562-10-E	
			15 m	JZSP-UVA552-15-E	JZSP-UVA562-15-E	
			20 m	JZSP-UVA552-20-E	JZSP-UVA562-20-E	
SGM7A-30A 3.0 kW	For Servomotors without Holding Brakes	Straight	3 m	JZSP-UVA601-03-E	JZSP-UVA621-03-E	
			5 m	JZSP-UVA601-05-E	JZSP-UVA621-05-E	
			10 m	JZSP-UVA601-10-E	JZSP-UVA621-10-E	
			15 m	JZSP-UVA601-15-E	JZSP-UVA621-15-E	
			20 m	JZSP-UVA601-20-E	JZSP-UVA621-20-E	
		Right-angle	3 m	JZSP-UVA602-03-E	JZSP-UVA622-03-E	
			5 m	JZSP-UVA602-05-E	JZSP-UVA622-05-E	
			10 m	JZSP-UVA602-10-E	JZSP-UVA622-10-E	
			15 m	JZSP-UVA602-15-E	JZSP-UVA622-15-E	
			20 m	JZSP-UVA602-20-E	JZSP-UVA622-20-E	
	For Servomotors with Holding Brakes	Straight	3 m	JZSP-UVA651-03-E	JZSP-UVA661-03-E	
			5 m	JZSP-UVA651-05-E	JZSP-UVA661-05-E	
			10 m	JZSP-UVA651-10-E	JZSP-UVA661-10-E	
			15 m	JZSP-UVA651-15-E	JZSP-UVA661-15-E	
			20 m	JZSP-UVA651-20-E	JZSP-UVA661-20-E	
		Right-angle	3 m	JZSP-UVA652-03-E	JZSP-UVA662-03-E	
			5 m	JZSP-UVA652-05-E	JZSP-UVA662-05-E	
			10 m	JZSP-UVA652-10-E	JZSP-UVA662-10-E	
			15 m	JZSP-UVA652-15-E	JZSP-UVA662-15-E	
			20 m	JZSP-UVA652-20-E	JZSP-UVA662-20-E	

* Use Flexible Cables for moving parts of machines, such as robots.

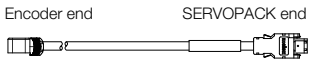
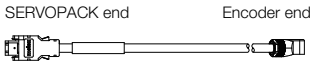
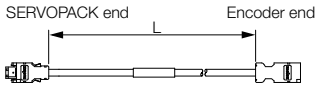
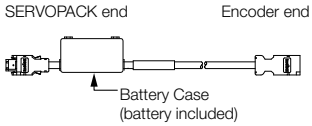
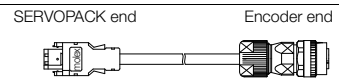
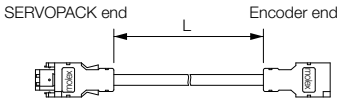
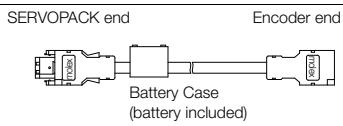
Encoder Cables of 20 m or Less

Servomotor Model	Name	Length	Order Number		Appearance
			Standard Cable	Flexible Cable*1	
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-C7PI0D-03-E	JZSP-C7PI2D-03-E	
		5 m	JZSP-C7PI0D-05-E	JZSP-C7PI2D-05-E	
		10 m	JZSP-C7PI0D-10-E	JZSP-C7PI2D-10-E	
		15 m	JZSP-C7PI0D-15-E	JZSP-C7PI2D-15-E	
		20 m	JZSP-C7PI0D-20-E	JZSP-C7PI2D-20-E	
	For incremental encoder Cable installed away from load	3 m	JZSP-C7PI0E-03-E	JZSP-C7PI2E-03-E	
		5 m	JZSP-C7PI0E-05-E	JZSP-C7PI2E-05-E	
		10 m	JZSP-C7PI0E-10-E	JZSP-C7PI2E-10-E	
		15 m	JZSP-C7PI0E-15-E	JZSP-C7PI2E-15-E	
		20 m	JZSP-C7PI0E-20-E	JZSP-C7PI2E-20-E	
	For absolute encoder: With Battery Case*2 Cable installed toward load	3 m	JZSP-C7PA0D-03-E	JZSP-C7PA2D-03-E	
		5 m	JZSP-C7PA0D-05-E	JZSP-C7PA2D-05-E	
		10 m	JZSP-C7PA0D-10-E	JZSP-C7PA2D-10-E	
		15 m	JZSP-C7PA0D-15-E	JZSP-C7PA2D-15-E	
		20 m	JZSP-C7PA0D-20-E	JZSP-C7PA2D-20-E	
	For absolute encoder: With Battery Case*2 Cable installed away from load	3 m	JZSP-C7PA0E-03-E	JZSP-C7PA2E-03-E	
		5 m	JZSP-C7PA0E-05-E	JZSP-C7PA2E-05-E	
		10 m	JZSP-C7PA0E-10-E	JZSP-C7PA2E-10-E	
		15 m	JZSP-C7PA0E-15-E	JZSP-C7PA2E-15-E	
		20 m	JZSP-C7PA0E-20-E	JZSP-C7PA2E-20-E	
SGM7A-15 to -30 1.5 kW to 3.0 kW	For incremental encoder	3 m	JZSP-CVP01-03-E	JZSP-CVP11-03-E	
		5 m	JZSP-CVP01-05-E	JZSP-CVP11-05-E	
		10 m	JZSP-CVP01-10-E	JZSP-CVP11-10-E	
		15 m	JZSP-CVP01-15-E	JZSP-CVP11-15-E	
		20 m	JZSP-CVP01-20-E	JZSP-CVP11-20-E	
		3 m	JZSP-CVP02-03-E	JZSP-CVP12-03-E	
		5 m	JZSP-CVP02-05-E	JZSP-CVP12-05-E	
		10 m	JZSP-CVP02-10-E	JZSP-CVP12-10-E	
		15 m	JZSP-CVP02-15-E	JZSP-CVP12-15-E	
		20 m	JZSP-CVP02-20-E	JZSP-CVP12-20-E	
	For absolute encoder: With Battery Case*2	3 m	JZSP-CVP06-03-E	JZSP-CVP26-03-E	
		5 m	JZSP-CVP06-05-E	JZSP-CVP26-05-E	
		10 m	JZSP-CVP06-10-E	JZSP-CVP26-10-E	
		15 m	JZSP-CVP06-15-E	JZSP-CVP26-15-E	
		20 m	JZSP-CVP06-20-E	JZSP-CVP26-20-E	
		3 m	JZSP-CVP07-03-E	JZSP-CVP27-03-E	
		5 m	JZSP-CVP07-05-E	JZSP-CVP27-05-E	
		10 m	JZSP-CVP07-10-E	JZSP-CVP27-10-E	
		15 m	JZSP-CVP07-15-E	JZSP-CVP27-15-E	
		20 m	JZSP-CVP07-20-E	JZSP-CVP27-20-E	

*1. Use Flexible Cables for moving parts of machines, such as robots.

*2. If a battery is connected to the host controller, the Battery Case is not required. If so, use a cable for incremental encoders.

Relay Encoder Cable of 30 m to 50 m

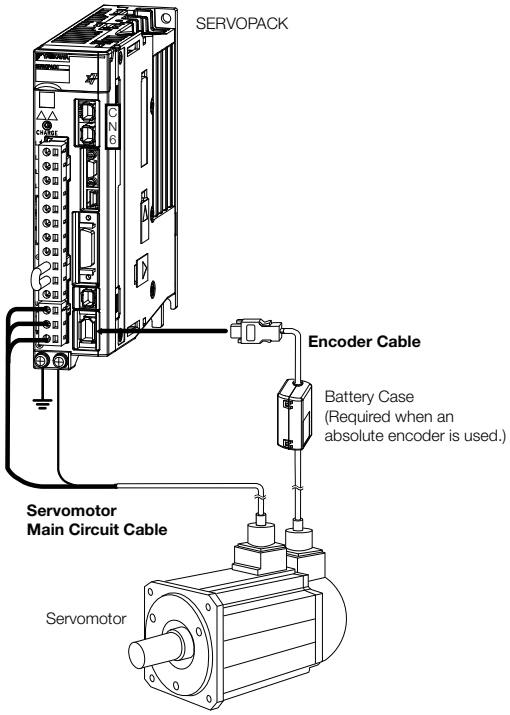
Servomotor Model	Name	Length	Order Number	Appearance
SGM7J-A5 to -08 50 W to 750 W SGM7A-A5 to -10 50 W to 1.0 kW	Encoder-end Cable (for incremental or absolute encoder) Cable installed toward load	0.3 m	JZSP-C7PRCD-E	
	Encoder-end Cable (for incremental or absolute encoder) Cable installed away from load	0.3 m	JZSP-C7PRCE-E	
	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	
	Cable with a Battery Case (Required when an absolute encoder is used.*)	0.3 m	JZSP-CSP12-E	
SGM7A-15 to -30 1.5 kW to 3.0 kW	Encoder-end Cable (for incremental or absolute encoder)	0.3 m	JZSP-CVP01-E	
			JZSP-CVP02-E	
	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	
	Cable with a Battery Case (Required when an absolute encoder is used.*)	0.3 m	JZSP-CSP12-E	

* This Cable is not required if a battery is connected to the host controller.

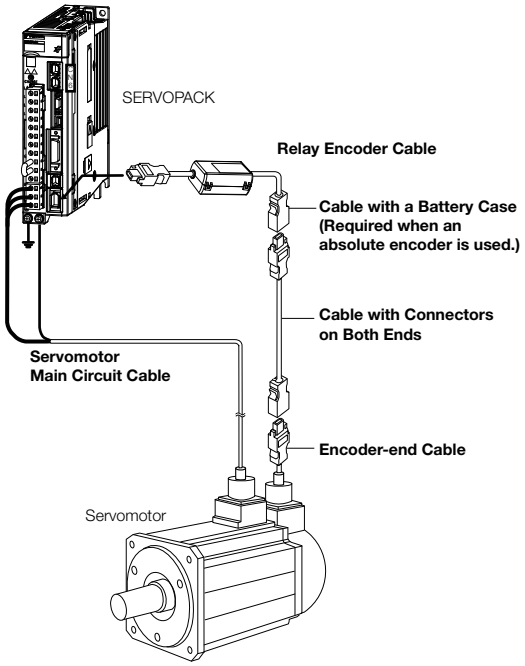
Cables for SGM7G Rotary Servomotors

System Configurations

Encoder Cable of 20 m or Less



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



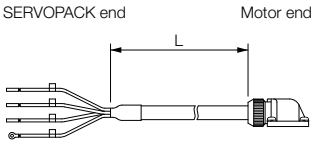
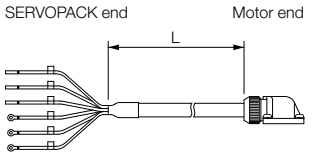
Note: 1. Cables with connectors on both ends that are compliant with an IP67 protective structure and European Safety Standards are not available from Yaskawa for the SGM7G Servomotors. You must make such a cable yourself. Use the Connectors specified by Yaskawa for these Servomotors. (These Connectors are compliant with the standards.) Yaskawa does not specify what wiring materials to use.

2. If the cable length exceeds 20 m, be sure to use a Relay Encoder Cable.

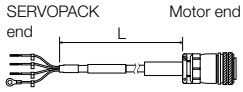
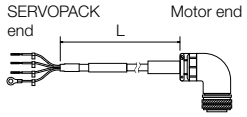
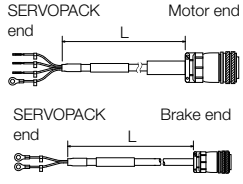
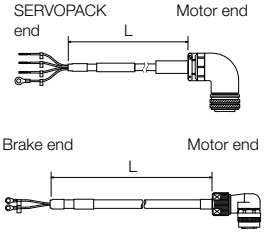
3. If the length of the Servomotor Main Circuit Cable exceeds 20 m, the intermittent duty zone in the torque-motor speed characteristics will become smaller because the voltage drop increases.

4. Refer to the *Σ-7 Series AC Servo Drive Peripheral Device Selection Manual* (Manual No. SIEP S800001 32) 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

Servomotor Main Circuit Cables

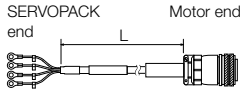
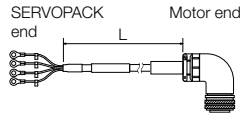
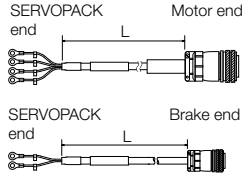
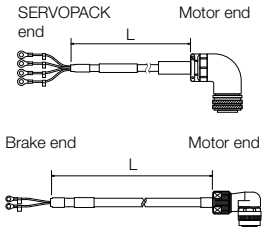
Servomotor Model	Name	Length	Order Number*	Appearance
SGM7G-03 to -05 0.3 kW 0.45 kW	For Servomotors without Holding Brakes	3 m	JZSP-CVM21-03-E	
		5 m	JZSP-CVM21-05-E	
		10 m	JZSP-CVM21-10-E	
		15 m	JZSP-CVM21-15-E	
		20 m	JZSP-CVM21-20-E	
		30 m	JZSP-CVM21-30-E	
		40 m	JZSP-CVM21-40-E	
		50 m	JZSP-CVM21-50-E	
	For Servomotors with Holding Brakes	3 m	JZSP-CVM41-03-E	
		5 m	JZSP-CVM41-05-E	
		10 m	JZSP-CVM41-10-E	
		15 m	JZSP-CVM41-15-E	
		20 m	JZSP-CVM41-20-E	
		30 m	JZSP-CVM41-30-E	
		40 m	JZSP-CVM41-40-E	
		50 m	JZSP-CVM41-50-E	

* Flexible cables are provided as a standard feature.

Servo-motor Model	Name	Connec-tor Spec-ifications	Length	Order Number		Appearance
				Standard Cable	Flexible Cable	
SGM7G-09, -13 850 W, 1.3 kW	For Servomotors without Holding Brakes	Straight	3 m	JZSP-UVA101-03-E	JZSP-UVA121-03-E	
			5 m	JZSP-UVA101-05-E	JZSP-UVA121-05-E	
			10 m	JZSP-UVA101-10-E	JZSP-UVA121-10-E	
			15 m	JZSP-UVA101-15-E	JZSP-UVA121-15-E	
			20 m	JZSP-UVA101-20-E	JZSP-UVA121-20-E	
		Right-angle	3 m	JZSP-UVA102-03-E	JZSP-UVA122-03-E	
			5 m	JZSP-UVA102-05-E	JZSP-UVA122-05-E	
			10 m	JZSP-UVA102-10-E	JZSP-UVA122-10-E	
			15 m	JZSP-UVA102-15-E	JZSP-UVA122-15-E	
			20 m	JZSP-UVA102-20-E	JZSP-UVA122-20-E	
	For Servomotors with Holding Brakes Note: Set of two cables (Main Power Supply Cable and Holding Brake Cable)	Straight*1	3 m	JZSP-UVA131-03-E	JZSP-UVA141-03-E	
			5 m	JZSP-UVA131-05-E	JZSP-UVA141-05-E	
			10 m	JZSP-UVA131-10-E	JZSP-UVA141-10-E	
			15 m	JZSP-UVA131-15-E	JZSP-UVA141-15-E	
			20 m	JZSP-UVA131-20-E	JZSP-UVA141-20-E	
		Right-angle *2	3 m	JZSP-UVA132-03-E	JZSP-UVA142-03-E	
			5 m	JZSP-UVA132-05-E	JZSP-UVA142-05-E	
			10 m	JZSP-UVA132-10-E	JZSP-UVA142-10-E	
			15 m	JZSP-UVA132-15-E	JZSP-UVA142-15-E	
			20 m	JZSP-UVA132-20-E	JZSP-UVA142-20-E	

*1. The order number for the Main Power Supply Cable is JZSP-UVA101-□□-E (standard cable) or JZSP-UVA121-□□-E (flexible cable). The order number for the Holding Brake Cable is JZSP-CVB9-SMC3-E.

*2. The order number for the Main Power Supply Cable is JZSP-UVA102-□□-E (standard cable) or JZSP-UVA122-□□-E (flexible cable). The order number for the Holding Brake Cable is JZSP-CVB9-AMC3-E.

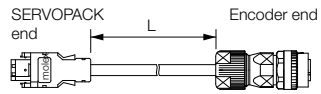
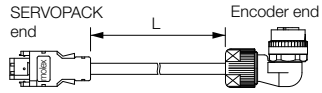
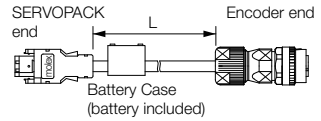
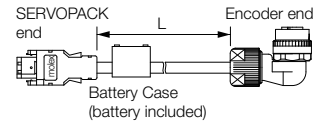
Servomotor Model	Name	Connector Specifications	Length	Order Number		Appearance
				Standard Cable	Flexible Cable	
SGM7G-20 1.8 kW	For Servomotors without Holding Brakes	Straight	3 m	JZSP-UVA301-03-E	JZSP-UVA321-03-E	
			5 m	JZSP-UVA301-05-E	JZSP-UVA321-05-E	
			10 m	JZSP-UVA301-10-E	JZSP-UVA321-10-E	
			15 m	JZSP-UVA301-15-E	JZSP-UVA321-15-E	
			20 m	JZSP-UVA301-20-E	JZSP-UVA321-20-E	
		Right-angle	3 m	JZSP-UVA302-03-E	JZSP-UVA322-03-E	
			5 m	JZSP-UVA302-05-E	JZSP-UVA322-05-E	
			10 m	JZSP-UVA302-10-E	JZSP-UVA322-10-E	
			15 m	JZSP-UVA302-15-E	JZSP-UVA322-15-E	
			20 m	JZSP-UVA302-20-E	JZSP-UVA322-20-E	
	For Servomotors with Holding Brakes Note: Set of two cables (Main Power Supply Cable and Holding Brake Cable)	Straight*1	3 m	JZSP-UVA331-03-E	JZSP-UVA341-03-E	
			5 m	JZSP-UVA331-05-E	JZSP-UVA341-05-E	
			10 m	JZSP-UVA331-10-E	JZSP-UVA341-10-E	
			15 m	JZSP-UVA331-15-E	JZSP-UVA341-15-E	
			20 m	JZSP-UVA331-20-E	JZSP-UVA341-20-E	
		Right-angle *2	3 m	JZSP-UVA332-03-E	JZSP-UVA342-03-E	
			5 m	JZSP-UVA332-05-E	JZSP-UVA342-05-E	
			10 m	JZSP-UVA332-10-E	JZSP-UVA342-10-E	
			15 m	JZSP-UVA332-15-E	JZSP-UVA342-15-E	
			20 m	JZSP-UVA332-20-E	JZSP-UVA342-20-E	

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

*1. The order number for the Main Power Supply Cable is JZSP-UVA301-□□-E (standard cable) or JZSP-UVA321-□□-E (flexible cable). The order number for the Holding Brake Cable is JZSP-CVB9-SMC3-E.

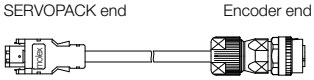
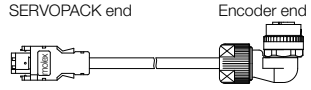
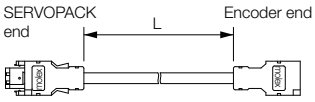
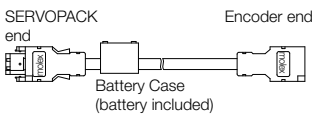
*2. The order number for the Main Power Supply Cable is JZSP-UVA302-□□-E (standard cable) or JZSP-UVA322-□□-E (flexible cable). The order number for the Holding Brake Cable is JZSP-CVB9-AMC3-E.

Encoder Cables of 20 m or Less

Servomotor Model	Name	Length	Order Number		Appearance
			Standard Cable	Flexible Cable*	
SGM7G-03 to -20 300 W to 1.8 kW	Cables with Connectors on Both Ends (for incremental encoder)	3 m	JZSP-CVP01-03-E	JZSP-CVP11-03-E	
		5 m	JZSP-CVP01-05-E	JZSP-CVP11-05-E	
		10 m	JZSP-CVP01-10-E	JZSP-CVP11-10-E	
		15 m	JZSP-CVP01-15-E	JZSP-CVP11-15-E	
		20 m	JZSP-CVP01-20-E	JZSP-CVP11-20-E	
		3 m	JZSP-CVP02-03-E	JZSP-CVP12-03-E	
		5 m	JZSP-CVP02-05-E	JZSP-CVP12-05-E	
		10 m	JZSP-CVP02-10-E	JZSP-CVP12-10-E	
		15 m	JZSP-CVP02-15-E	JZSP-CVP12-15-E	
		20 m	JZSP-CVP02-20-E	JZSP-CVP12-20-E	
	Cables with Connectors on Both Ends (for absolute encoder: With Battery Case)	3 m	JZSP-CVP06-03-E	JZSP-CVP26-03-E	
		5 m	JZSP-CVP06-05-E	JZSP-CVP26-05-E	
		10 m	JZSP-CVP06-10-E	JZSP-CVP26-10-E	
		15 m	JZSP-CVP06-15-E	JZSP-CVP26-15-E	
		20 m	JZSP-CVP06-20-E	JZSP-CVP26-20-E	
		3 m	JZSP-CVP07-03-E	JZSP-CVP27-03-E	
		5 m	JZSP-CVP07-05-E	JZSP-CVP27-05-E	
		10 m	JZSP-CVP07-10-E	JZSP-CVP27-10-E	
		15 m	JZSP-CVP07-15-E	JZSP-CVP27-15-E	
		20 m	JZSP-CVP07-20-E	JZSP-CVP27-20-E	

* Use Flexible Cables for moving parts of machines, such as robots.

Relay Encoder Cables of 30 m to 50 m

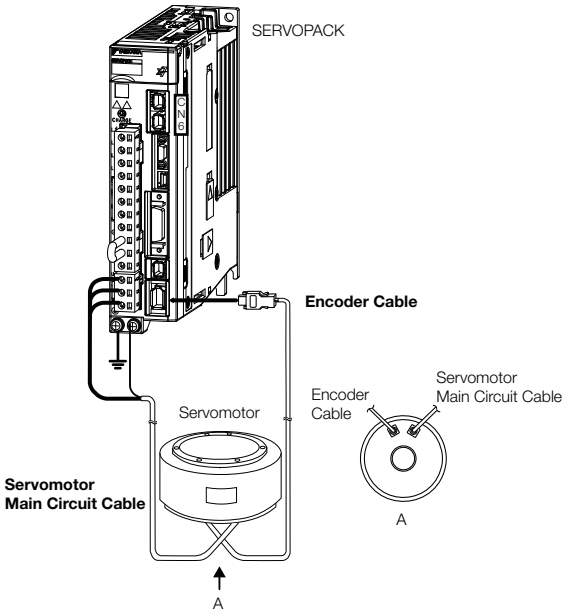
Servomotor Model	Name	Length	Order Number for Standard Cable	Appearance
SGM7G-03 to -20 300 W to 1.8 kW	Encoder-end Cable (for incremental or absolute encoder)	0.3 m	JZSP-CVP01-E	
			JZSP-CVP02-E	
	Cables with Connectors on Both Ends (for incremental or absolute encoder)	30 m	JZSP-UCMP00-30-E	
		40 m	JZSP-UCMP00-40-E	
		50 m	JZSP-UCMP00-50-E	
	Cable with a Battery Case (Required only if an absolute encoder is used.)*	0.3 m	JZSP-CSP12-E	

* This Cable is not required if a battery is connected to the host controller.

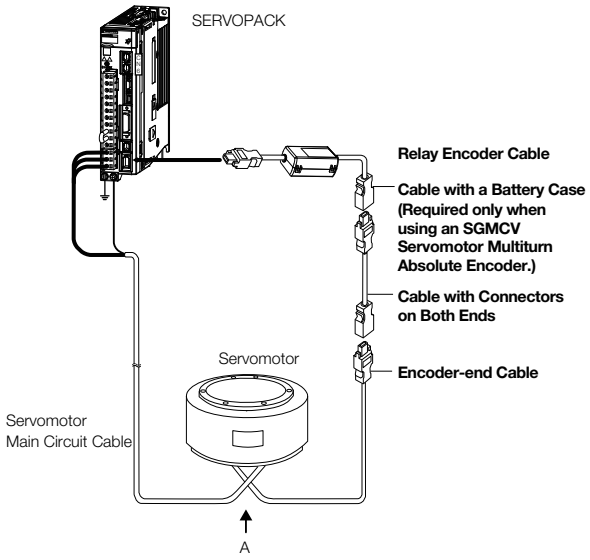
Cables for Direct Drive Servomotors

System Configurations

Encoder Cable of 20 m or Less



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



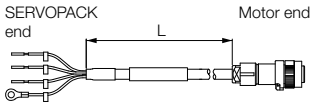
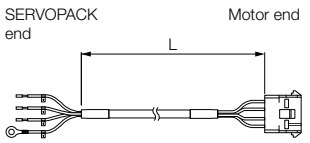
Note: 1. If the cable length exceeds 20 m, be sure to use a Relay Encoder Cable.

2. If 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.

3. Refer to the *Σ-7 Series AC Servo Drive Peripheral Device Selection Manual* (Manual No. SIEP S800001 32) 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

Servomotor Main Circuit Cables

◆ SGMCV-□□

Servomotor Model	Length	Order Number		Appearance
		Standard Cable	Flexible Cable*1	
SGMCV-□□B□□1 SGMCV-□□C□□1 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□□4 SGMCV-□□C□□4 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	

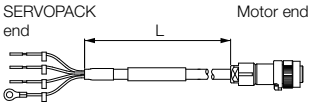
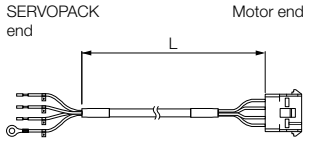
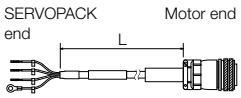
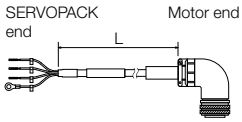
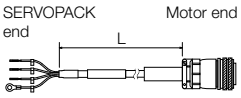
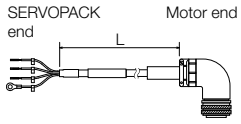
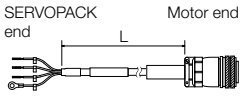
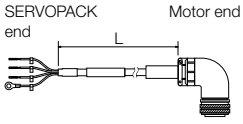
*1. Use Flexible Cables for moving parts of machines, such as robots.

*2. Refer to the following section for the flange specifications.

☞ *Flange Specifications* (page 236)

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

◆ SGMCS-□□

Servomotor Model	Length	Order Number		Appearance
		Standard Cable	Flexible Cable*1	
SGMCS-□□B□□1 SGMCS-□□C□□1 SGMCS-□□D□□1 SGMCS-□□E□□1 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□□4 SGMCS-□□C□□4 SGMCS-□□D□□4 SGMCS-□□E□□4 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	JZSP-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	

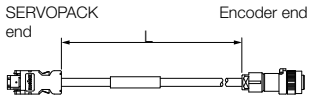
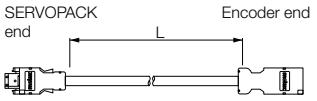
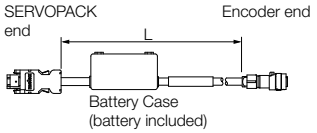
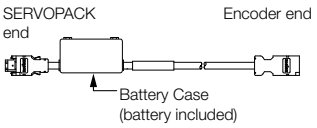
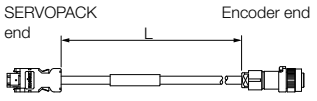
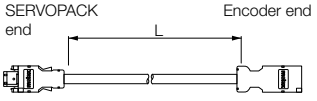
*1. Use Flexible Cables for moving parts of machines, such as robots.

*2. Refer to the following section for the flange specifications.

☞ *Flange Specifications* (page 236)

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

Encoder Cables of 20 m or Less

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-□□ 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	

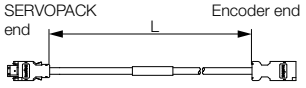
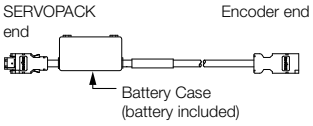
*1. Use Flexible Cables for moving parts of machines, such as robots.

*2. Refer to the following section for the flange specifications.

☞ *Flange Specifications* (page 236)

Relay Encoder Cables of 30 m to 50 m

◆ SGMCV-□□

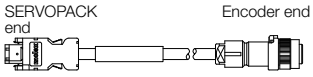
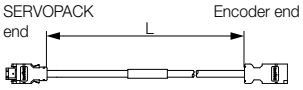
Servomotor Model	Name	Length	Order Number*1	Appearance
SGMCV-□□BE SGMCV-□□BI SGMCV-□□CE SGMCV-□□CI Flange specification*2: 1	Encoder-end Cable (for single-turn/multiturn absolute encoder)	0.3 m	JZSP-C7PRC0-E	
SGMCV-□□BE SGMCV-□□BI SGMCV-□□CE SGMCV-□□CI Flange specification*2: 1 or 4	Cables with Connectors 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.

☞ *Flange Specifications* (page 236)

◆ 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* (page 236)

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)	○	○

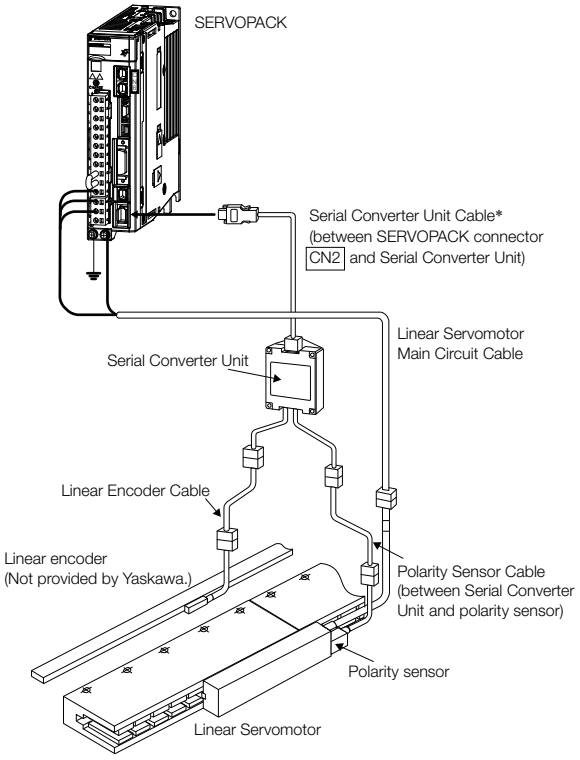
◆ SGMCS-□□

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)	○	○	○	○	–	–

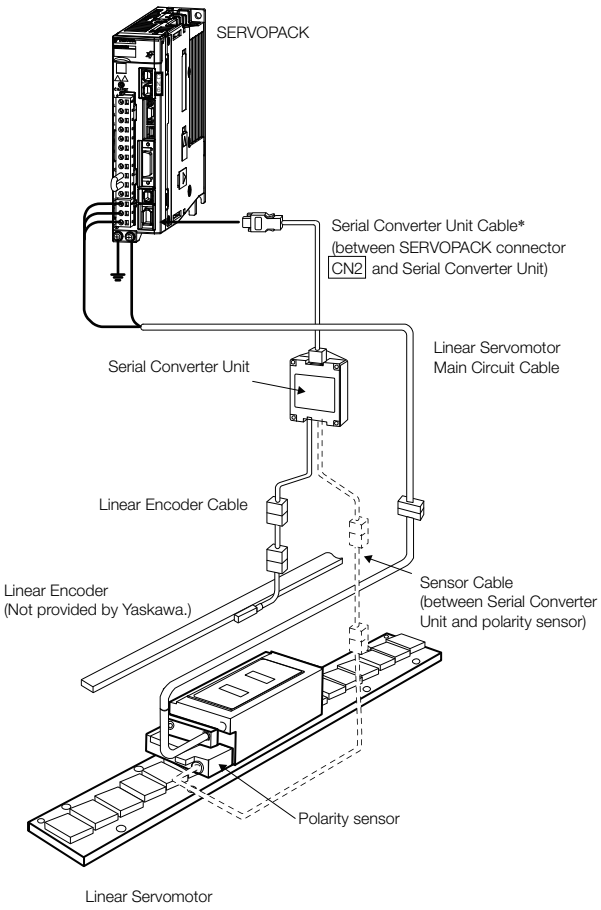
Cables for Linear Servomotors

System Configurations

Example: SGLG Coreless Servomotors



Example: SGLFW2 Servomotors with F-type Iron Cores (with Thermal Protectors)

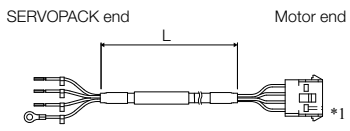


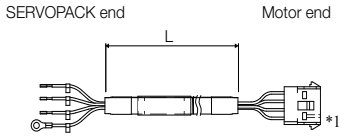
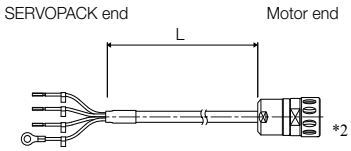
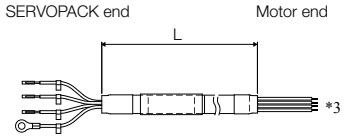
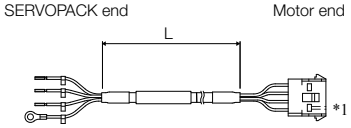
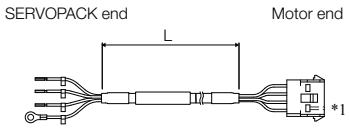
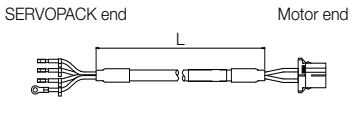
* You can connect directly to an absolute linear encoder.

Note: 1. The above system configurations are for SGLG Coreless Servomotors or SGLFW2 Servomotors with F-type Iron Cores (with thermal protectors). Refer to the manual for the Linear Servomotor for configurations with other models.

2. Refer to the *Σ-7 Series AC Servo Drive Peripheral Device Selection Manual* (Manual No. SIEP S800001 32) 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

Servomotor Main Circuit Cables

Servomotor Model	Length	Order Number	Appearance
SGLGW-30A, -40A, -60A SGLFW-20A, -35A All SGLC models	1 m	JZSP-CLN11-01-E	
	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□ SGLFW2-30A070A□L SGLFW2-30A120A□ SGLFW2-30A120A□L SGLFW2-30A230A□ SGLFW2-30A230A□L	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□ SGLFW2-45A200A□L SGLFW2-45A380A□ SGLFW2-45A380A□L	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	

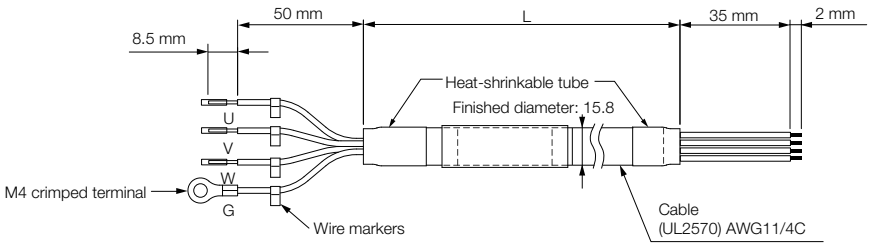
Note: Estimates are available for models other than those listed above (SGLFW2-90A□□□A□L and SGLFW2-1D□□□A□L).

*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

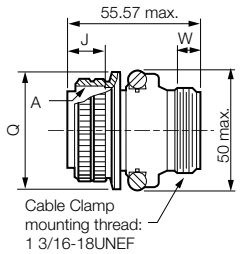
Signal	Pin
Phase U	A
Phase V	B
Phase W	C
FG	D

◆ 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

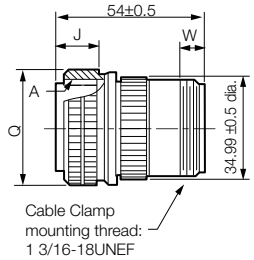
Unit: mm



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

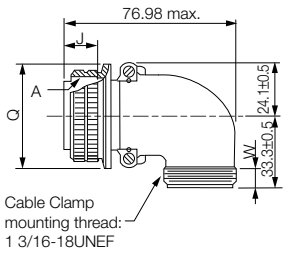
Unit: mm



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

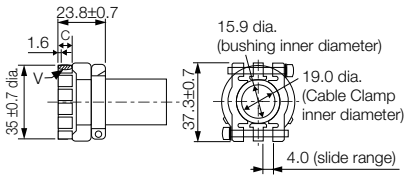
Unit: mm



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

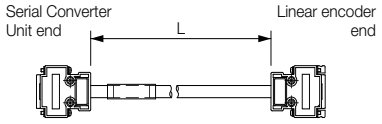
◆ Dimensional Drawings: MS3057-12A Cable Clamp with Rubber Bushing

Unit: mm



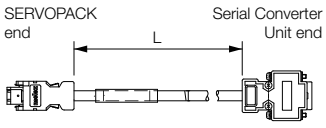
Applicable Connector Shell Size	Effective Thread Length C	Mounting Thread V	Attached Bushing
20.22	10.3	1 3/16-18UNEF	AN3420-12

Linear Encoder Cables

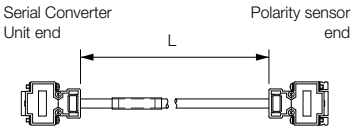
Name	Servomotor Model	Length*	Order Number	Appearance
For linear encoder from Renishaw PLC	All Models	1 m	JZSP-CLL00-01-E	
		3 m	JZSP-CLL00-03-E	
		5 m	JZSP-CLL00-05-E	
		10 m	JZSP-CLL00-10-E	
		15 m	JZSP-CLL00-15-E	
For linear encoder from Heidenhain Corporation		1 m	JZSP-CLL30-01-E	
		3 m	JZSP-CLL30-03-E	
		5 m	JZSP-CLL30-05-E	
		10 m	JZSP-CLL30-10-E	
		15 m	JZSP-CLL30-15-E	

* When using a JZDP-G00□-□□□-E Serial Converter Unit, do not exceed a cable length of 3 m.

Serial Converter Unit Cables

Servomotor Model	Length	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

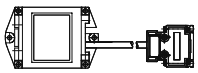
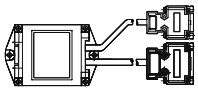
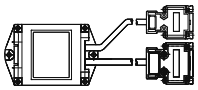
Servomotor Model	Length	Order Number	Appearance
SGLGW-□□A SGLFW-□□A SGLTW-□□A SGLCW-□□A	1 m	JZSP-CLL10-01-E	
	3 m	JZSP-CLL10-03-E	
	5 m	JZSP-CLL10-05-E	
	10 m	JZSP-CLL10-10-E	
	15 m	JZSP-CLL10-15-E	
SGLFW2-□□A□□□AS□*	1 m	JZSP-CL2L100-01-E	
	3 m	JZSP-CL2L100-03-E	
	5 m	JZSP-CL2L100-05-E	
	10 m	JZSP-CL2L100-10-E	
	15 m	JZSP-CL2L100-15-E	

* Contact your Yaskawa representative for information on Sensor Cables for an SGLFW2-□□A□□□AT□ (without polarity sensor).

Serial Converter Units

Selection Table (Model Designations)

JZDP - □00□ - □□□

Serial Converter Unit Model				
Code	Appearance	Applicable Linear Encoder	Polarity Sensor	Temperature Sensor
H003 J003		From Heidenhain Corp.	None	None
H005 J005		From Renishaw PLC	None	None
H006 J006		From Heidenhain Corp.	Yes	Yes
H008 J008		From Renishaw PLC	Yes	Yes

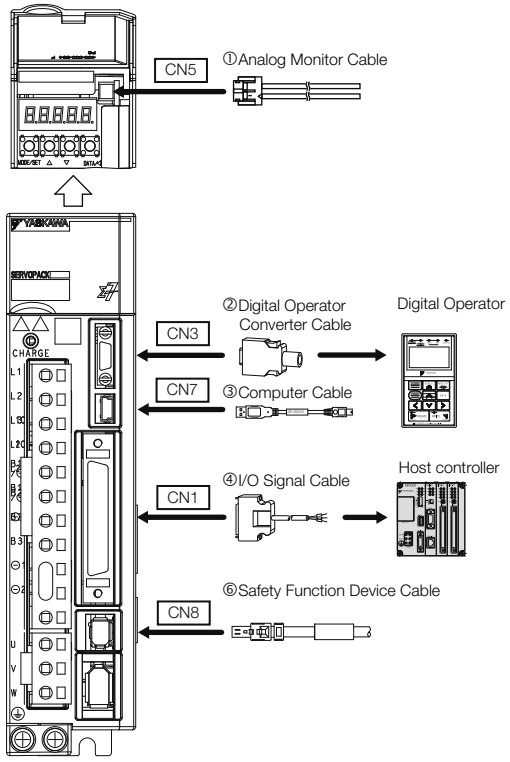
Applicable Linear Servomotor					
Servomotor Model		Code	Servomotor Model		Code
SGLGW - (coreless models) For Standard-force Magnetic Way	30A050C	250	SGLTW- (models with T-type iron cores)	20A170A	011
	30A080C	251		20A320A	012
	40A140C	252		20A460A	013
	40A253C	253		35A170A	014
	40A365C	254		35A320A	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 models) For High-force Magnetic Way	40A140C	255		40A600B	186
	40A253C	256		80A400B	187
	40A365C	257		80A600B	188
	60A140C	261	SGLC- (cylinder models)	D16A085AP	354
	60A253C	262		D16A115AP	373
	60A365C	263		D16A145AP	356
SGLFW- (models with F-type iron cores)	20A090A	017		D20A100AP	357
	20A120A	018		D20A135AP	358
	35A120A	019		D20A170AP	359
	35A230A	020		D25A125AP	360
	50A200B	181		D25A170AP	374
	50A380B	182		D25A215AP	362
	1ZA200B	183		D32A165AP	363
	1ZA380B	184		D32A225AP	364
SGLFW2- (models with F-type iron cores)	30A070A	628		D32A285AP	365
	30A120A	629			
	30A230A	630			
	45A200A	631			
	45A380A	632			
	90A200A	633			
	90A380A	634			
	1DA380A	649			

Note: Refer to the *Σ-7 Series AC Servo Drive Peripheral Device Selection Manual* (Manual No. SIEP S800001 32) for details on the Serial Converter Units.

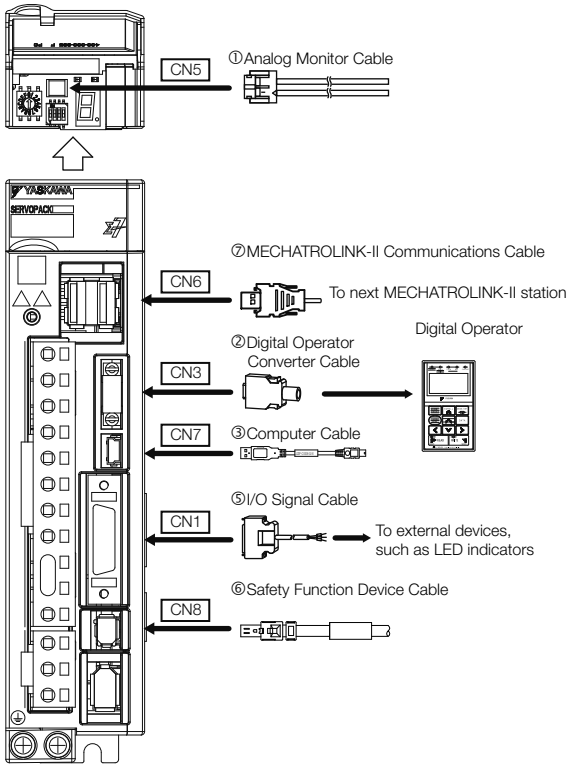
Cables for SERVOPACKs

System Configurations

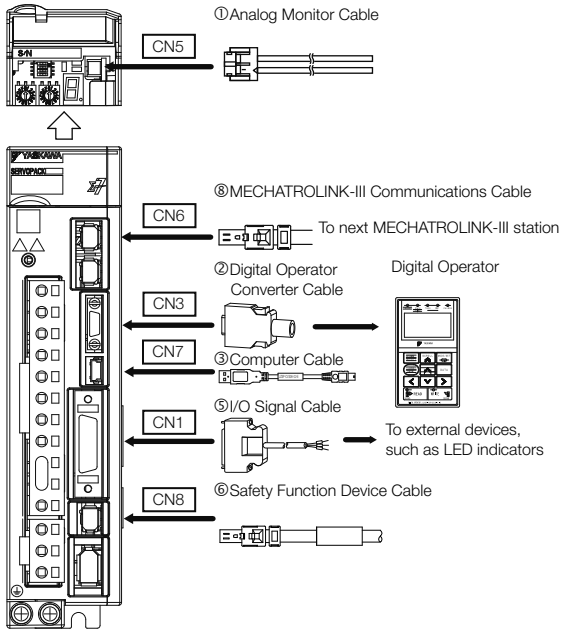
■ Σ-7S Single-axis Analog Voltage/Pulse Train Reference SERVOPACKs



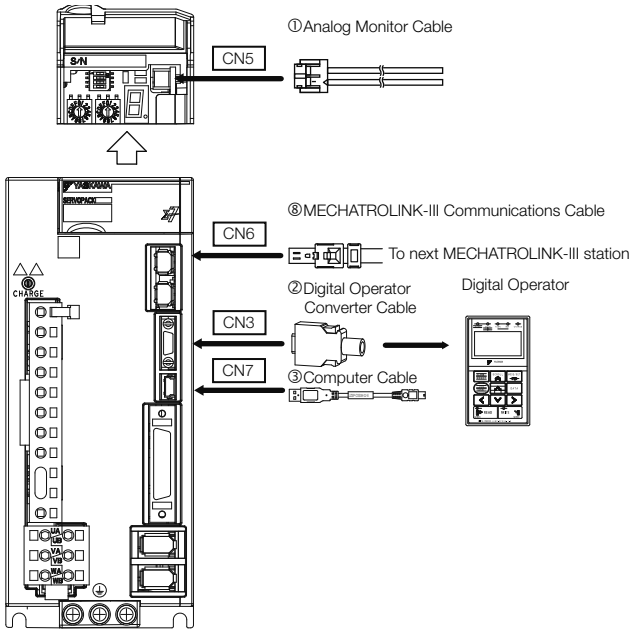
■ Σ-7S Single-axis MECHATROLINK-II Communications Reference SERVOPACKs



■ Σ-7S Single-axis MECHATROLINK-III Communications Reference SERVOPACKs



■ Σ-7W Two-axis MECHATROLINK-III Communications Reference SERVOPACKs

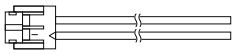
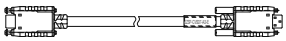
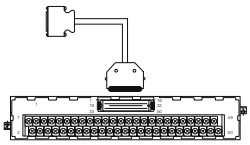
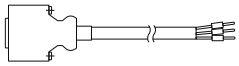
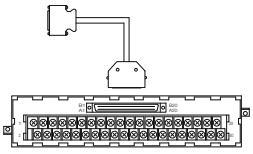
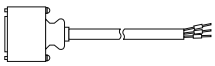


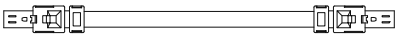
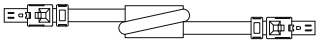
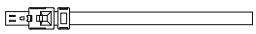
Selection Table

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. Operation may not be dependable due to low noise resistance with any other cable.

Note: Refer to the *Σ-7 Series AC Servo Drive Peripheral Device Selection Manual* (Manual No. SIEP S800001 32) for the following information.
- Cable dimensional drawings and cable connection specifications
- Order numbers and specifications of individual connectors for cables

Code	Name		Length	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	I/O Signal Cables	Soldered Connector Kit		JZSP-CSI9-1-E	
		Connector-Terminal Block Converter Unit (with cable)	0.5 m	JUSP-TA50PG-E	
			1 m	JUSP-TA50PG-1-E	
			2 m	JUSP-TA50PG-2-E	
		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	I/O Signal Cables	Soldered Connector Kit		JZSP-CSI9-2-E	
		Connector-Terminal Block Converter Unit (with cable)	0.5 m	JUSP-TA26P-E	
			1 m	JUSP-TA26P-1-E	
			2 m	JUSP-TA26P-2-E	
		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	
⑥	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	

Code	Name		Length	Order Number	Appearance
⑦	MECHATROLINK-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	
⑧	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	

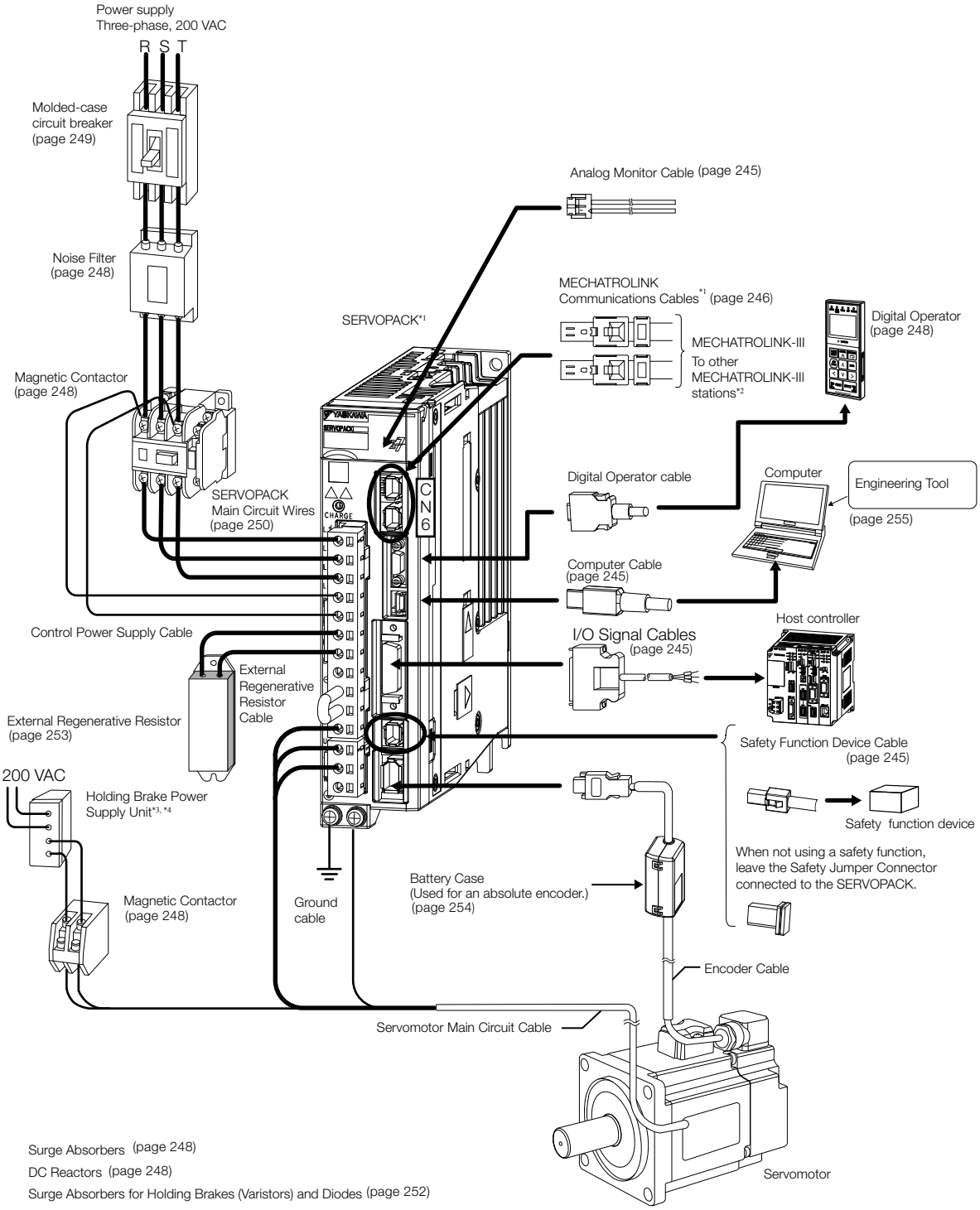
*1. This Converter Cable is required to use the Σ-III-series Digital Operator (JUSP-OP05A) for Σ-7-series SERVOPACKs.

*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 (JZSP-CVH05-E) 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.

Peripheral Device Selection Table

Main Circuit Power Supply	SERVOPACK			Noise Filter*1, *2	DC Reactor*2	Magnetic Contactor	Surge Absorber	Digital Operator
	Maximum Applicable Motor Capacity [kW]	Model SGD7S-	Model SGD7W-					
Three-phase, 200 V	0.05	R70A	–	HF3010C-SZC	X5061	SC-03	LT-C32G801WS	JUSP-OP05A-1-E
	0.1	R90A	–					
	0.2	1R6A	–					
	0.4	2R8A	1R6A					
	0.5	3R8A	–					
	0.75	5R5A	2R8A	HF3020C-SZC		SC-4-1		
	1.0	7R6A	–					
	1.5	120A	5R5A	HF3020C-UQC	X5060			
	2.0	180A	7R6A			SC-5-1		
	3.0	200A	–		X5059			
Single-phase, 200 V	0.05	R70A	–	HF2010A-UPF	X5071	SC-03	LT-C12G801WS	
	0.1	R90A	–					
	0.2	1R6A	–		X5070			
	0.4	2R8A	1R6A		X5069			
	0.75	5R5A	2R8A	HF2020A-UPF	X5079	SC-4-1		
	1.5	120A	5R5A	HF2030A-UPF	X5078	SC-5-1		

Device	Enquires
Noise Filters	Yaskawa Controls Co., Ltd.
Surge Absorbers	
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.
☞ *Selection Table* (page 245)

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.

RH120 (Model) 10Ω (Resistance) J (Resistance Tolerance)

Code	Specification
K	±10%
J	±5%
H	±3%

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.

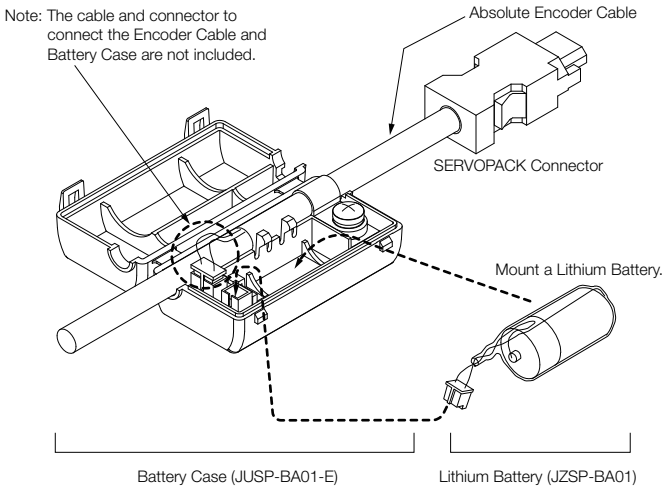
You can also retain the absolute position data by supplying power from a battery on the host controller.

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.

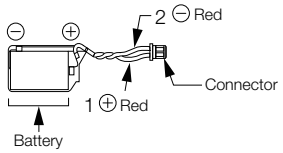
Important

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

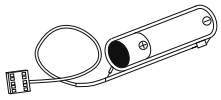
Obtain a Lithium Battery (JZSP-BA01) and mount it in the Battery Case.



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.

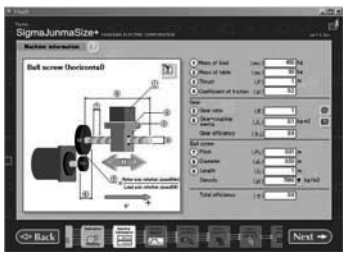
◆ Features

- 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.

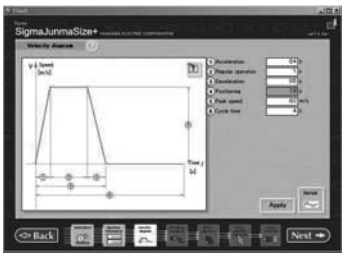
■ Examples of the Servo Selection Interface

Mechanism Selection View

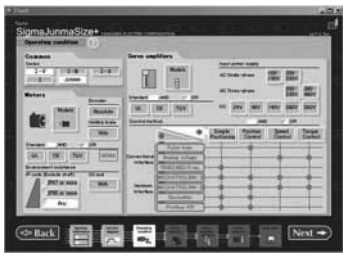
Machine Specification Entry View



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.

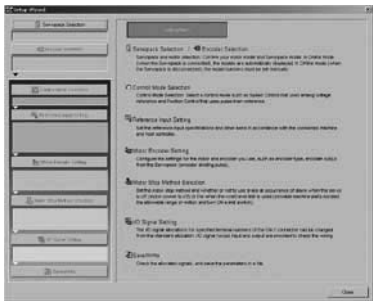
SigmaWin +: AC Servo Drive Engineering Tool

The SigmaWin+ Engineering Tool is used to set up and optimally tune Yaskawa Σ-series Servo Drives.

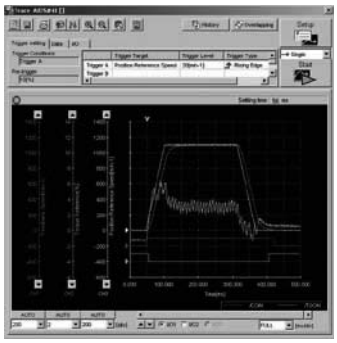
◆ Features

- 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.

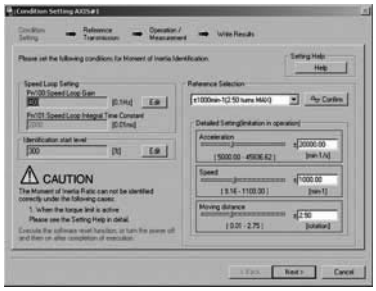
Setting Parameters with a Wizard



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)

Appendices

Capacity Selection for Servomotors

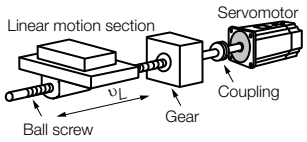
Selecting the Servomotor Capacity

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

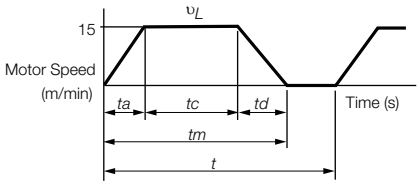
1. Mechanical Specifications



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:

$$T_P = \frac{2\pi n_M (J_M + J_L)}{60ta} + T_L = \frac{2\pi \times 3{,}000 \times (0.263 + 2.29) \times 10^{-4}}{60 \times 0.1} + 0.43$$

$\approx$ 1.23 (N·m) < Maximum instantaneous torque...Satisfactory

- Verification of required deceleration torque:

$$T_S = \frac{2\pi n_M (J_M + J_L)}{60td} - T_L = \frac{2\pi \times 3{,}000 \times (0.263 + 2.29) \times 10^{-4}}{60 \times 0.1} - 0.43$$

$\approx$ 0.37 (N·m) < Maximum instantaneous torque...Satisfactory

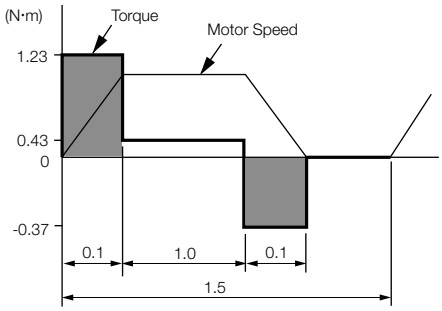
- Verification of effective torque value:

$$Trms = \sqrt{\frac{T_P^2 \cdot ta + T_L^2 \cdot tc + Ts^2 \cdot td}{t}} = \sqrt{\frac{(1.23)^2 \times 0.1 + (0.43)^2 \times 1.0 + (0.37)^2 \times 0.1}{1.5}}$$

≈ 0.483 (N·m) < Rated torque...Satisfactory

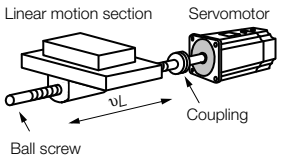
10. Result

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

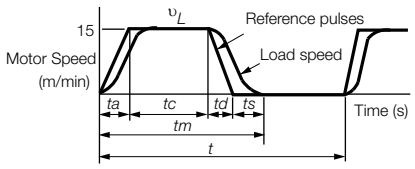
1. Mechanical Specifications



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 (N·m) < Maximum instantaneous torque...Satisfactory

- Verification of required deceleration torque:

$$T_S = \frac{2\pi n_M (J_M + J_L)}{60td} - T_L = \frac{2\pi \times 3{,}000 \times (0.0659 + 1.25) \times 10^{-4}}{60 \times 0.1} - 0.139$$

$\approx$ 0.274 (N·m) < Maximum instantaneous torque...Satisfactory

- Verification of effective torque value:

$$Trms = \sqrt{\frac{T_P{}^2 \cdot ta + T_L{}^2 \cdot tc + Ts^2 \cdot td}{t}} = \sqrt{\frac{(0.552)^2 \times 0.1 + (0.139)^2 \times 0.9 + (0.274)^2 \times 0.1}{1.5}}$$

$\approx$ 0.192 (N·m) < 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: Δ^{ℓ} = 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

$$vs = \frac{1{,}000\upsilon L}{60 \times \Delta_{\ell}} = \frac{1{,}000 \times 15}{60 \times 0.01} = 25{,}000 \text{ (pps)}$$

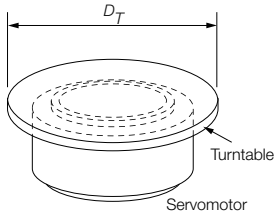
Confirm that the maximum input pulse frequency* is greater than the reference pulse frequency.

*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



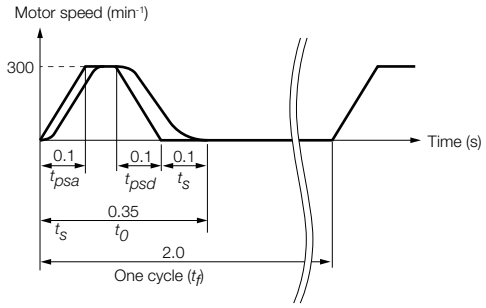
Item	Code	Value
Turntable Mass	w	12 kg
Turntable Diameter	D_T	300 mm
Rotational Angle per Cycle	θ	270 deg
Positioning Time	t_0	0.35 s

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:

$$T_{Ma} = \frac{(J_L + J_M) \times N_O}{9.55 \times t_{psa}} = \frac{(0.135 + 0.00785) \times 300}{9.55 \times 0.1}$$

≈ 44.9 (N·m) < Maximum instantaneous torque...Satisfactory

- Verification of required deceleration torque:

$$T_{Md} = -\frac{(J_L + J_M) \times N_O}{9.55 \times t_{psd}} = -\frac{(0.135 + 0.00785) \times 300}{9.55 \times 0.1}$$

≈ -44.9 (N·m) < Maximum instantaneous torque...Satisfactory

- Verification of effective torque value:

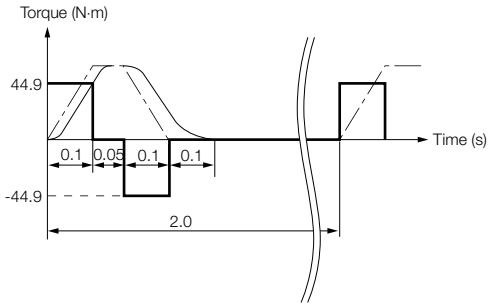
$$Trms = \sqrt{\frac{T_{Ma}^2 \times t_{psa} + T_L^2 \times t_c + T_{Md}^2 \times t_{psd}}{tf}} = \sqrt{\frac{44.9^2 \times 0.1 + 0^2 \times 0.05 + (-44.9)^2 \times 0.1}{2}}$$

≈ 14.2 (N·m) < Rated torque...Satisfactory

t_c =Time of constant motor speed = $t_0 - t_s - t_{psa} - t_{psd}$

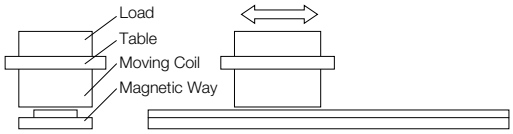
8. Result

It has been verified that the provisionally selected Servomotor is applicable.
The torque diagram is shown below.



Servomotor Capacity Selection Example for Linear Servomotors

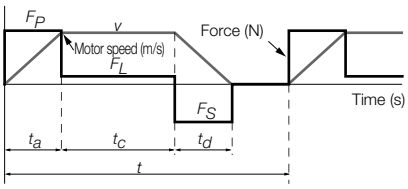
1. Mechanical Specifications



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

  $F_L = \mu \{9.8 \times (m_W + m_T + m_M) + F_{att}\} = 0.2 \{9.8 \times (1 + 2 + 0.82) + 0\} = 7.5$ (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.)

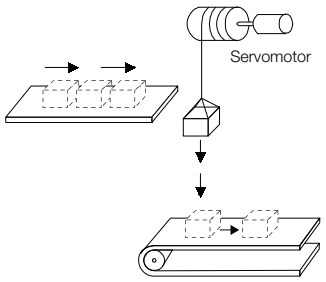
The Servomotor is driven in a regeneration state in the following circumstances:

- 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).

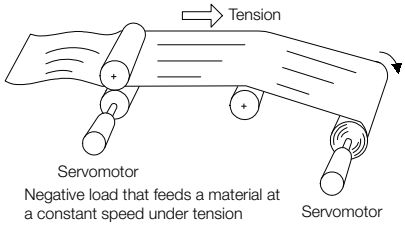
Important

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



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+.

☞ *Simple Calculation* (page 267)

☞ *Calculating the Regenerative Energy* (page 269)

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.

Applicable SERVOPACK		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)

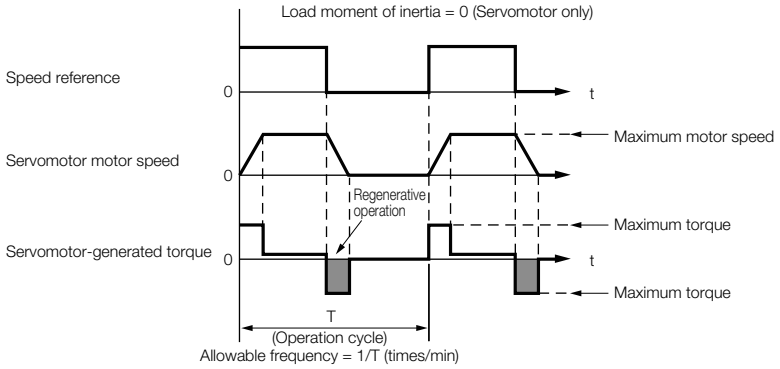
- $J = J_M + J_L$
- J_M: Servomotor moment of inertia (kg·m^2)
- J_L: Load moment of inertia at motor shaft (kg·m^2)
- n_M: Servomotor operating motor speed (min^{-1})

◆ 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.

Servomotor Model		Allowable Frequencies in Regenerative Operation (Rotations/Min)	
		SERVOPACK Model: SGD7S	SERVOPACK Model: SGD7W (Simultaneous Operation of Two Axes)
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	–

Servomotor Model		Allowable Frequencies in Regenerative Operation (Rotations/Min)	
		SERVOPACK Model: SGD7S	SERVOPACK Model: SGD7W (Simultaneous Operation of Two Axes)
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

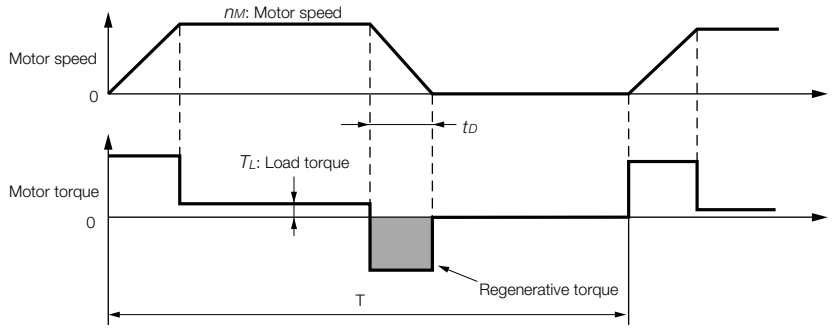
Use the following equation to calculate the allowable frequency for regenerative operation.

$$\text{Allowable frequency} \frac{\text{Allowable frequency for regenerative operation for Servomotor without load}}{(1+n)} \times \left(\frac{\text{Maximum motor speed}}{\text{Operating motor speed}}\right)^2 \text{(time/min)}$$

- $n = J_L/J_M$
- 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.

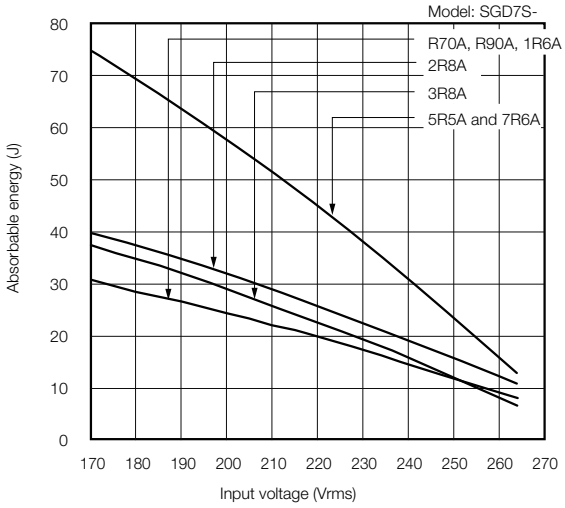
Code	Description
E_S to E_K	Energy in joules (J)
W_K	Required regenerative resistor capacity (W)
J	$= J_M + J_L$ ($kg \cdot m^2$)
n_M	Servomotor motor speed (min^{-1})

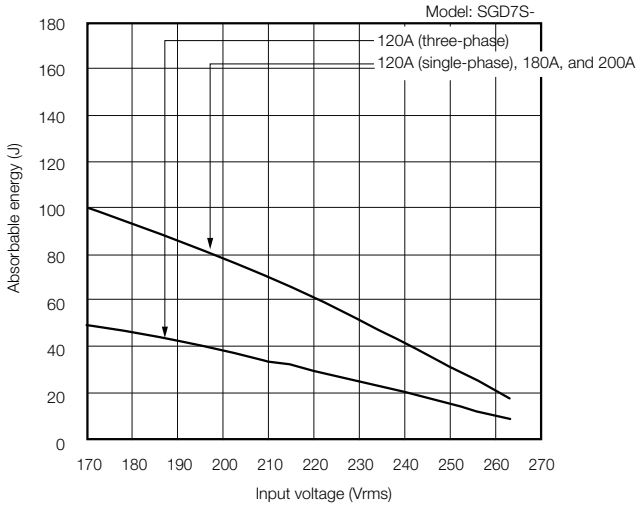
Code	Description
T_L	Load torque (N·m)
t_D	Deceleration stopping time (s)
T	Servomotor repeat operation cycle (s)

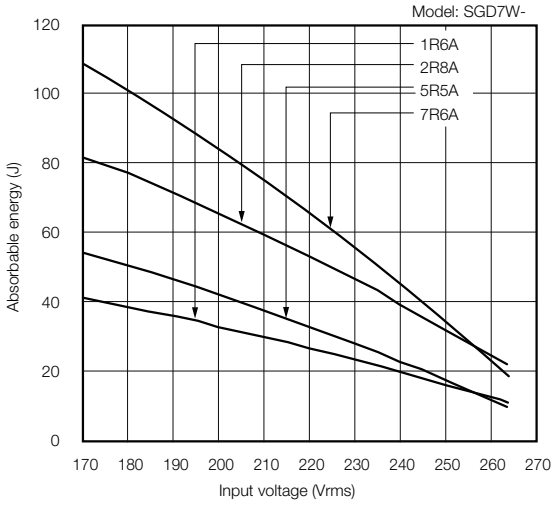
If the value of W_K does not exceed the capacity of the built-in regenerative resistor of the SERVOPACK, an External Regenerative Resistor is not required. For details on the built-in regenerative resisters, refer to the SERVOPACK specifications. If the value of W_K exceeds the capacity of the built-in 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.



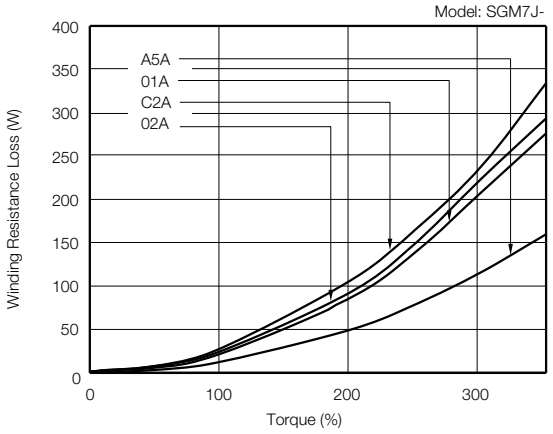


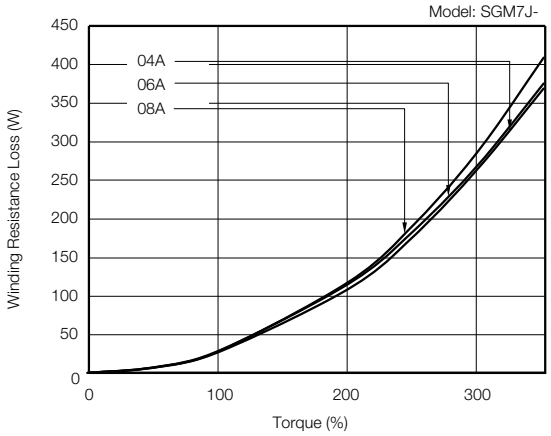


◆ Servomotor Winding Resistance Loss

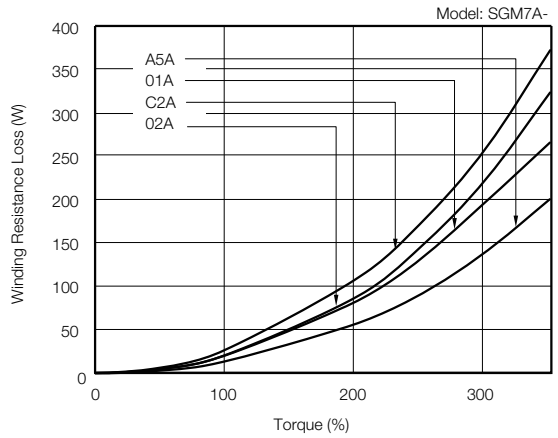
The following figures show the relationship for each Servomotor between the Servomotor's generated torque and the winding resistance loss.

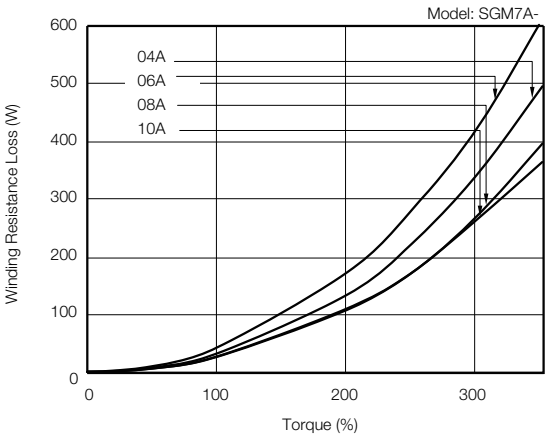
■ SGM7J Rotary Servomotors

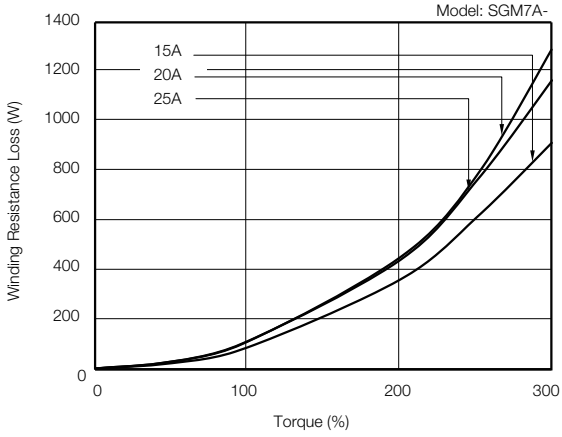


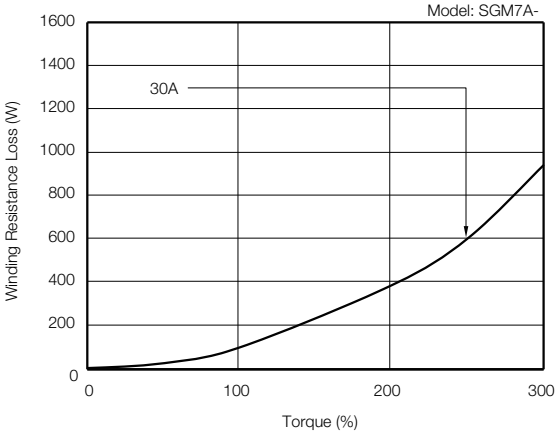


■ SGM7A Rotary Servomotors

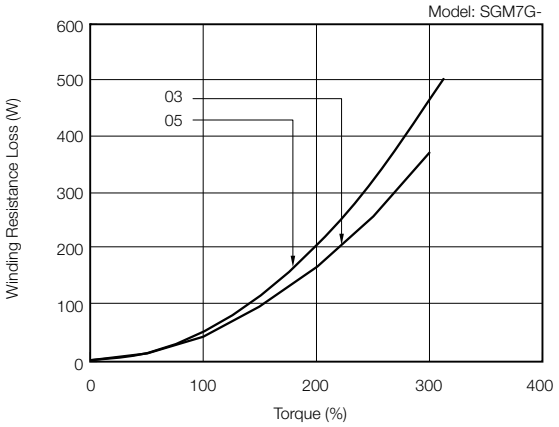


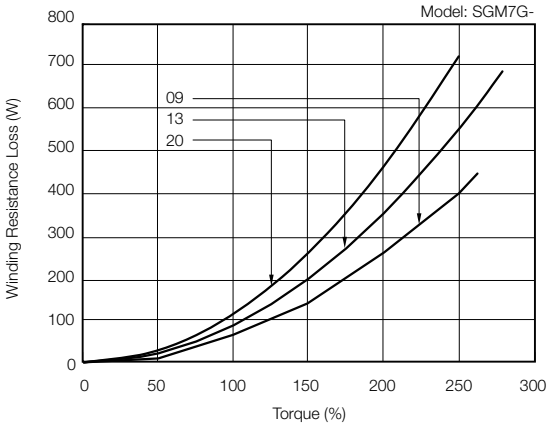




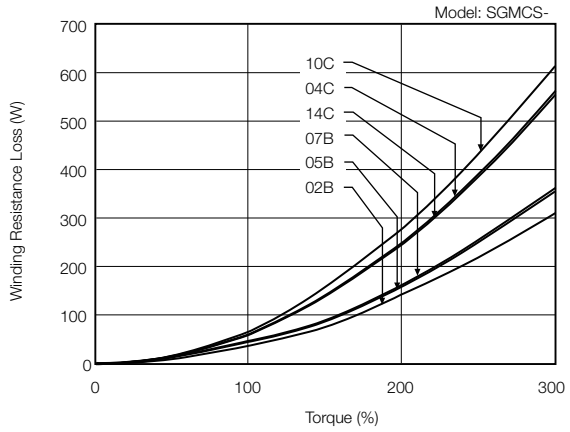


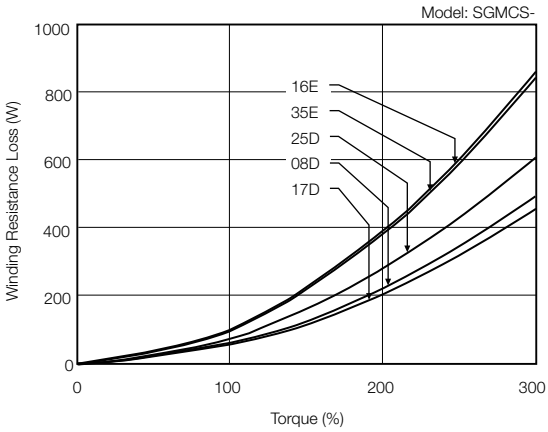
■ SGM7G Rotary Servomotors

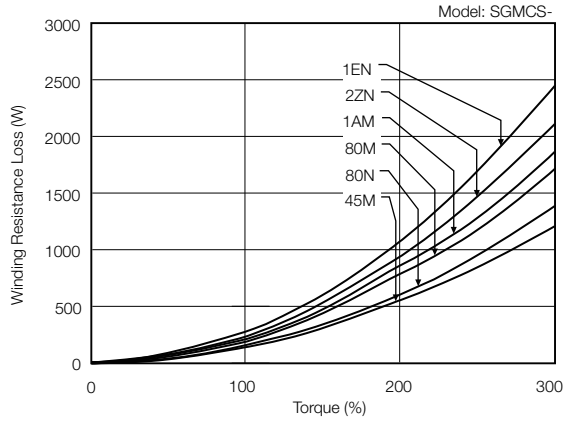




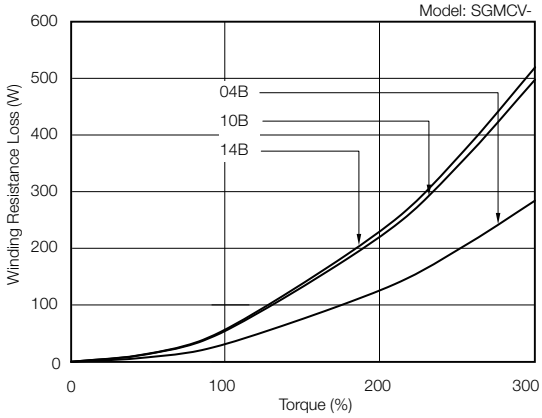
■ SGMCS Direct Drive Servomotors

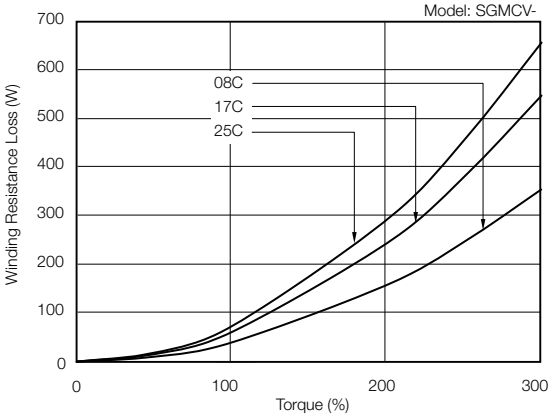




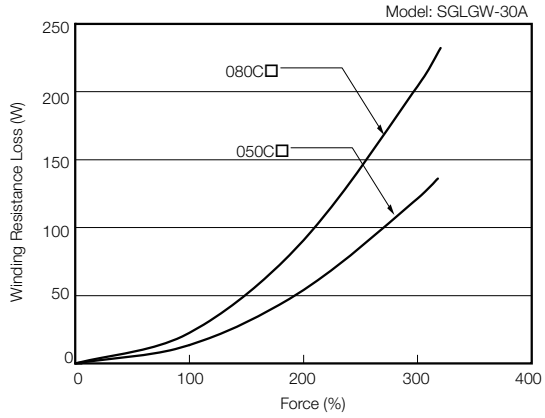


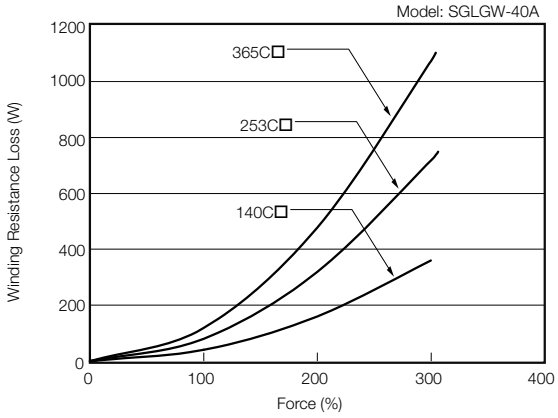
■ SGMCV Direct Drive Servomotors

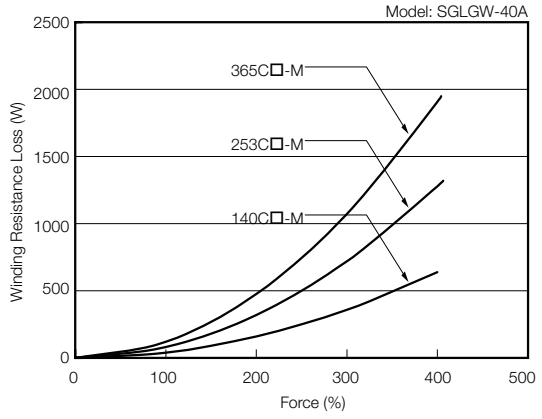


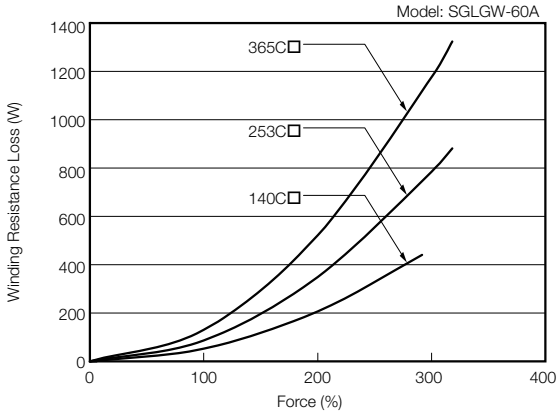


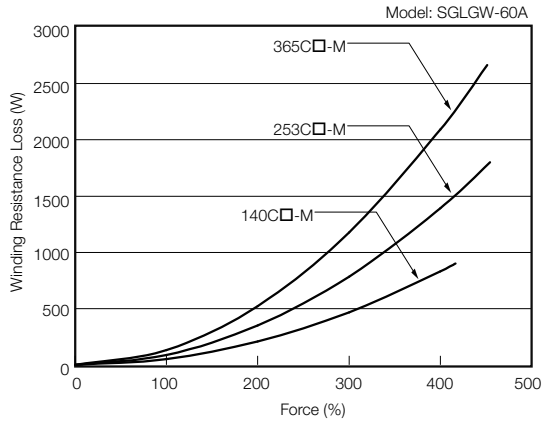
■ SGLGW Linear Servomotors

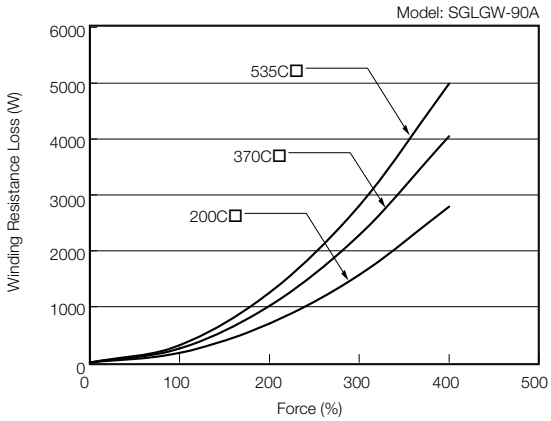




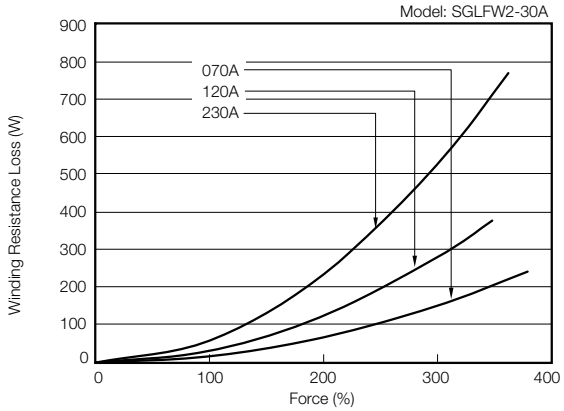


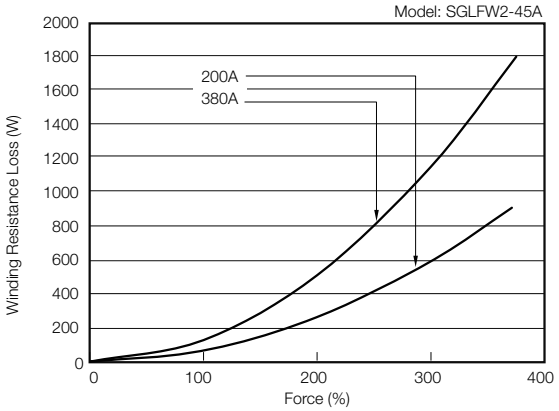


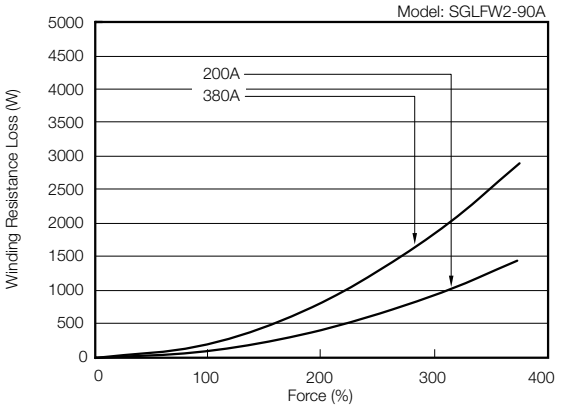


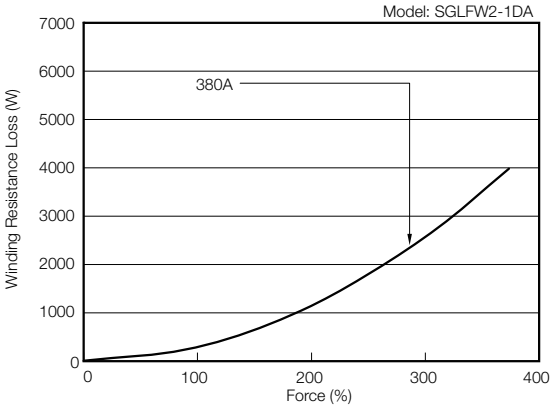


■ SGLFW2 Linear Servomotors

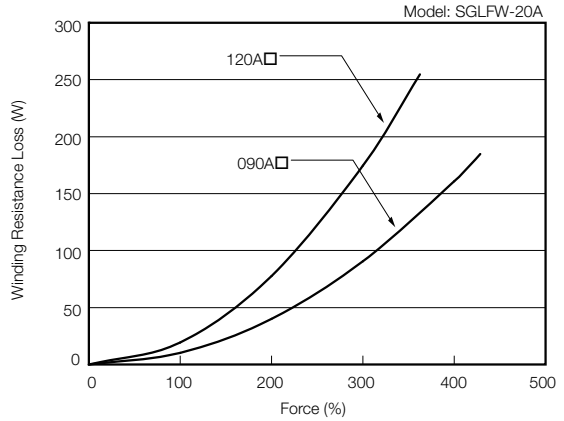


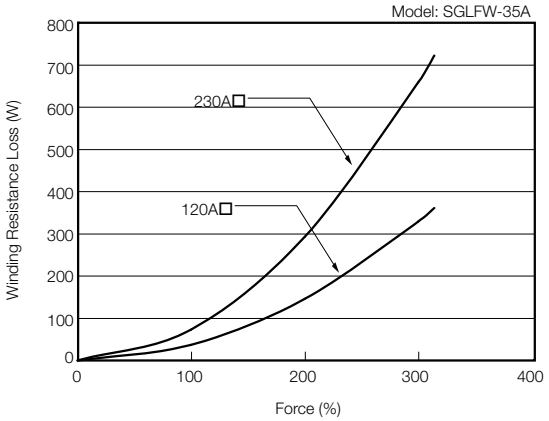


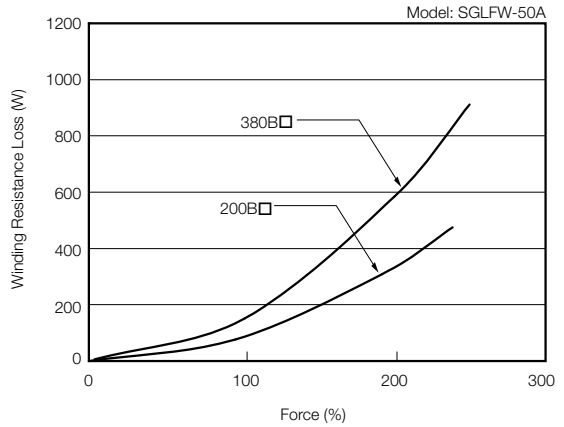


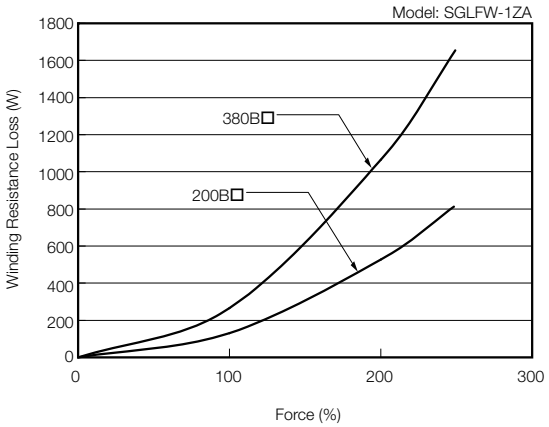


■ SGLFW Linear Servomotors

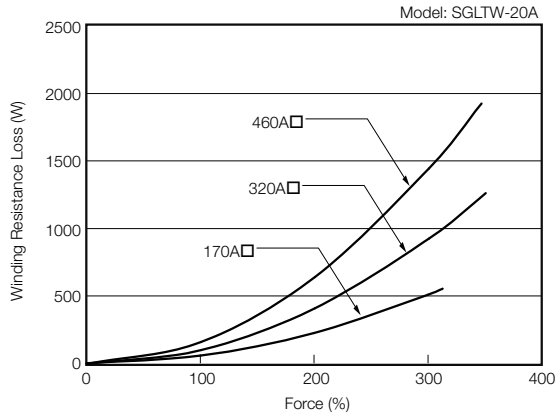


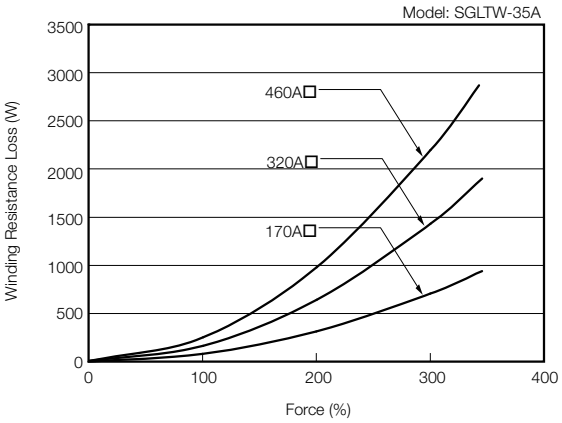


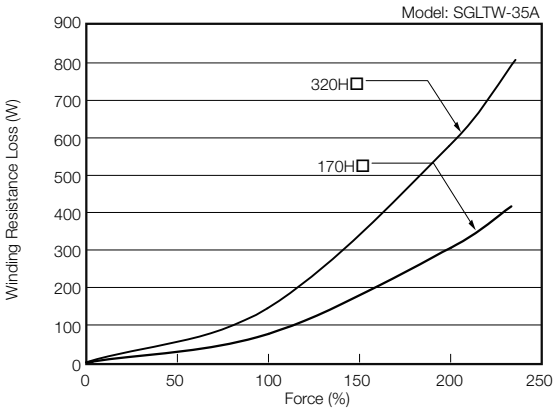


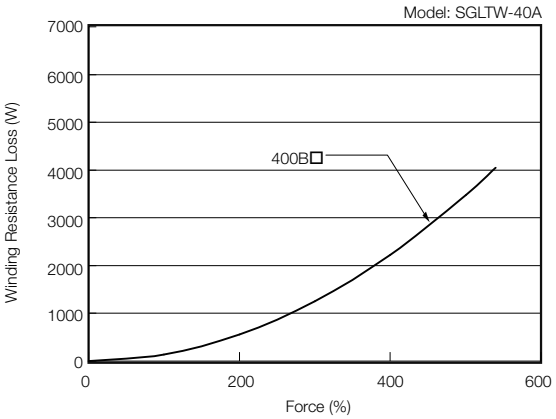


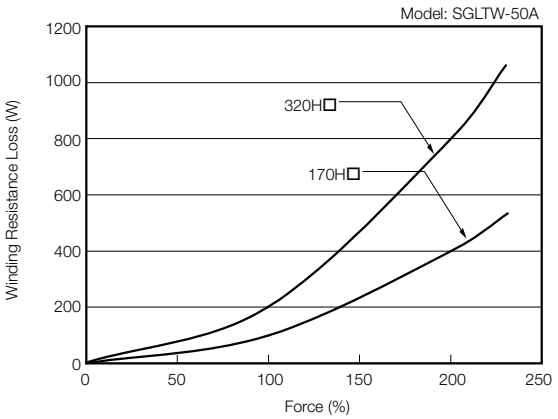
■ SGLTW Linear Servomotors



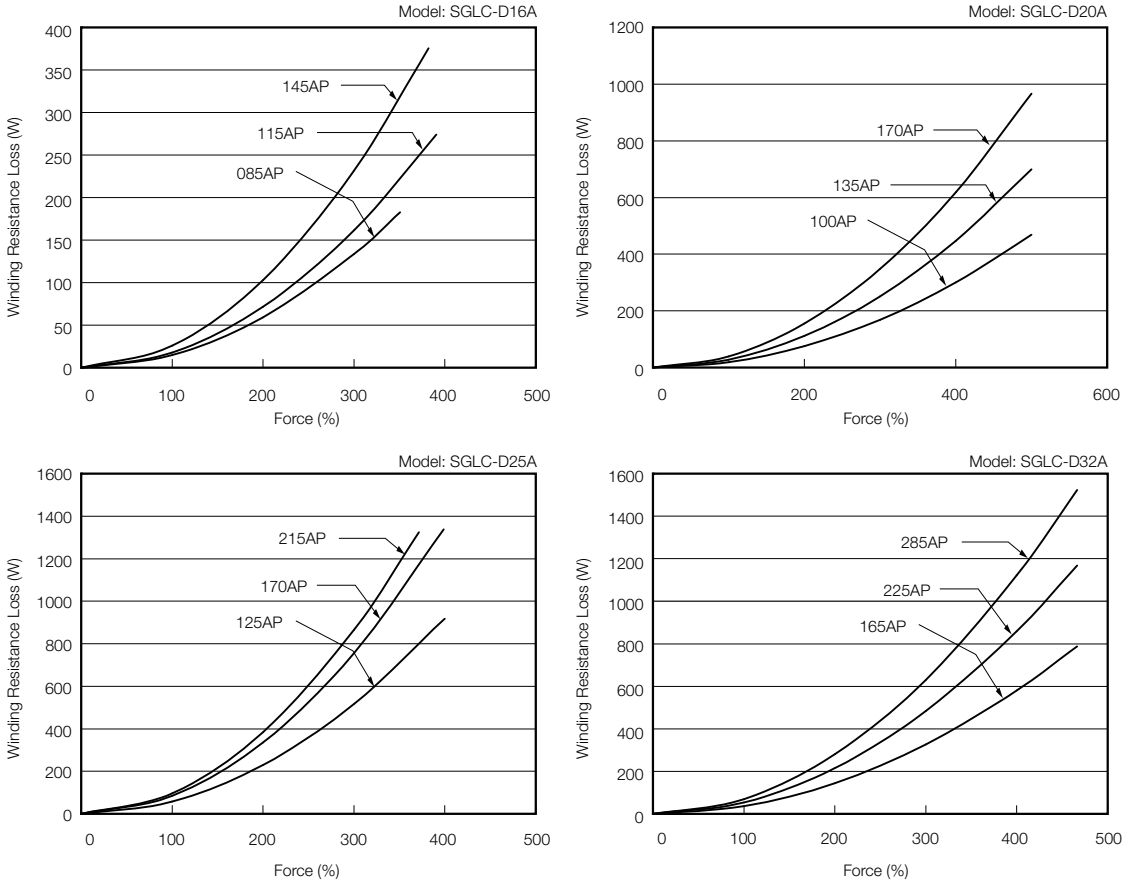








■ SGLC Linear Servomotors



International Standards

● : Certified, – : Not Certified

Product	Model	UL/CSA Standards	CE Marking	KC Mark	RoHS Directive
SERVOPACKs	SGD7S	Scheduled for 2014	Scheduled for 2014	Scheduled for 2014	●
	SGD7W	Scheduled for 2014	Scheduled for 2014	Scheduled for 2014	●

Product	Model	UL/CSA Standards	CE Marking	RoHS Directive
Rotary Servomotors	SGM7J	Scheduled for 2014	Scheduled for 2014	●
	SGM7G	Scheduled for 2014	Scheduled for 2014	●
	SGM7A	Scheduled for 2014	Scheduled for 2014	●
Direct Drive Servomotors	SGMCS	–	*2	●*1
	SGMCV	Scheduled for 2014	Scheduled for 2014	●
Linear Servomotors	SGLGW (SGLGM) *3	–	*4	●
	SGLFW (SGLFM)*3	–	*4	●
	SGLFW2 (SGLFM2)*3	Scheduled for 2015	Scheduled for 2015	●
	SGLTW (SGLTM)*3	–	*4	●
	SGLC	–	*4	●

*1. Estimates are provided for RoHS-compliant products. The model numbers have an "-E" suffix.

*2. 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.

*3. The model numbers of the Magnetic Ways of Linear Servomotors are given in parentheses.

*4. 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.

MEMO

Σ-7 SERIES

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LITERATURE NO. KAEP S800001 23A

Published in Japan February 2014 14-2
13-6-9