YASKAWA

Sigma-7 200V

www.yaskawa.eu.com

Quick. Fast. Reliable.

Amplifiers

- Single & three-phase input
- Embedded fieldbus
  - » Pulse train / analog input
  - » MECHATROLINK-II
  - » MECHATROLINK-III
  - » EtherCAT
  - » PROFINET
  - » Command Option Type
- Single & dual axis amplifier
- Dual axis amplifier with built-in controller
- Single axis amplifier with IEC-based built-in controller

Motors

- Rotary, Linear and Direct Drive Motors available
- Very compact design
- Available from 50 W to 15 kW

Contents

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Seven Reasons for Sigma-7

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

1 Comprehensive Motor and Amplifier Power Range

Wide power range

- Very compact motors from 50 W to 15 kW
- Linear motors iron core and ironless with a peak force up to 7,560 N

2 Savings through Performance

Lower production costs

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

No additional cooling necessary

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

Energy savings and higher productivity

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

Higher performance

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

3 Safety Features

Smooth integration of mandatory legal safety standards

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

4 High Efficiency

Very low heat generation

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

5 High Accuracy

Next level 24-bit absolute encoder for maximum accuracy

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

6 Impressive System Performance

Very high precision teamed up with fast, smooth operation

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

7 Outstanding Reliability

Even more reliability for your production

- More than 15 million servo systems in the field
- Improved machine reliability, reduced service and maintenance costs, less downtime

Servomotors

Rotary

SGMMV

- Low inertia, ultra-small capacity
- 10 W - 30 W

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

SGM7D

- Medium capacity, with core
- Rated: 1.3 Nm - 240 Nm
  Peak: 4 Nm - 400 Nm

SGM7E

- Coreless, inner rotor
- Rated: 2 Nm - 35 Nm
  Peak: 6 Nm - 105 Nm

SGM7F

- With core, inner rotor
- Rated: 2 Nm - 200 Nm
  Peak: 6 Nm - 600 Nm

SGMCS

- Small capacity, coreless or Medium capacity, with core
- Rated: 2 Nm - 200 Nm
  Peak: 6 Nm - 600 Nm

SGMCV

- Small capacity, with core
- Rated: 4 Nm - 35 Nm
  Peak: 12 Nm - 105 Nm

Linear

SGLG

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

SGLFW / SGLFW2

- Model with F-type iron core
- Rated: 25 N - 2520 N
  Peak: 86 N - 7560 N

SGLT

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

Note: Readily available up to 1.5 kW. Others available on request.

SERVOPACKs

SGD7S-□□□A00A
Single-axis
Analog Voltage/
Pulse Train Refe-
rence

SGD7S-□□□A10A
Single-axis
MECHATROLINK-II
Communication
Reference

SGD7S-□□□A20A
Single-axis
MECHATROLINK-III
Communication
Reference

SGD7S-□□□A30A
Single-axis
MECHATROLINK-III
Communication
Reference
with RJ45 connector

SGD7S-□□□AA0A
Single-axis
EtherCAT
Communication
Reference

SGD7S-□□□AC0A
Single-axis
PROFINET
Communication
Reference

SGD7S-□□□AE0A
Single-axis
Command Option
Attachable Type

SGD7S-□□□M0A
Single-axis
Sigma-7Siec
(with integrated
iec-Controller)

SGD7W-□□□A20A
Dual-axis
MECHATROLINK-III
Communication
Reference

SGD7C-□□□AMAA□□□
Dual-axis
SERVOPACK
with built-in
controller

Option Modules

SGDV-OF□0□A
Fully-Closed /
Feedback Option
Modules

SGDV-OSA01A
Safety Module

SGDV-OCA03A
INDEXER Module

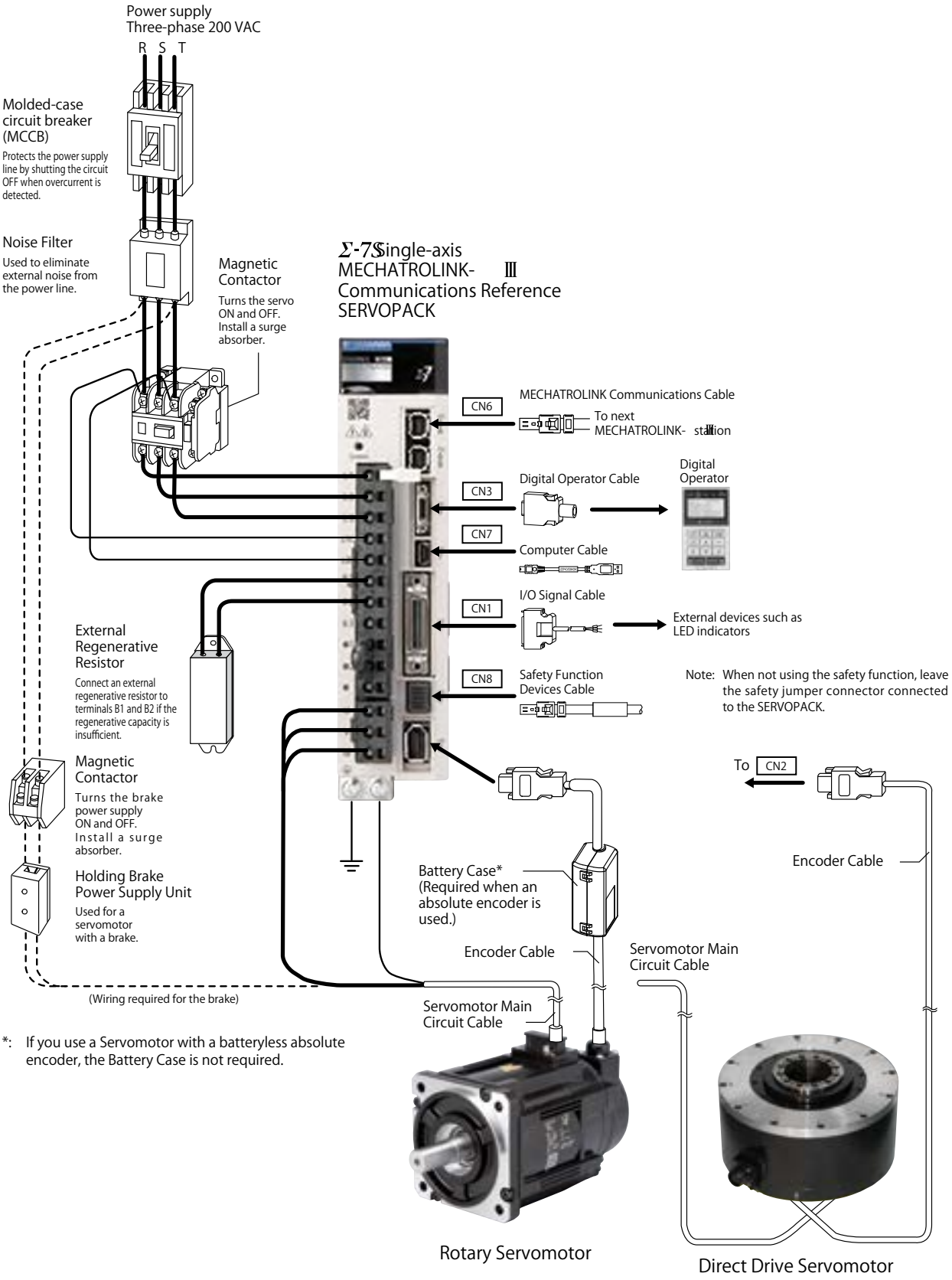
SGDV-OCA0□A
DeviceNet Modules

SGDV-OCC02A
MP2600iec Module

Note: Readily available up to 1.5 kW. Others available on request.

Sigma-7S SERVOPACK and Rotary/Direct Drive Servomotor for MECHATRONLINK-III Communications

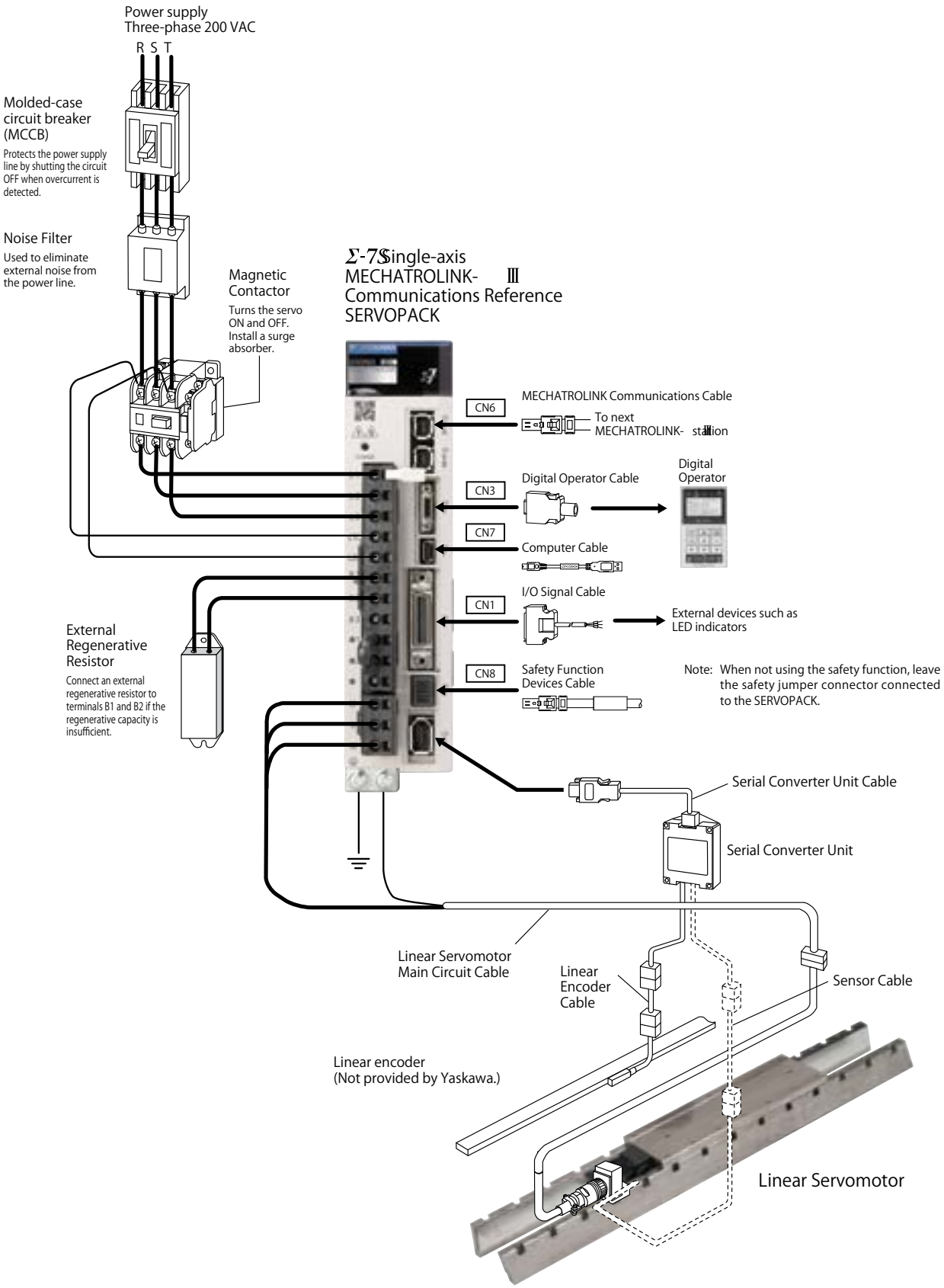
Three-phase 200 VAC



*: If you use a Servomotor with a batteryless absolute encoder, the Battery Case is not required.

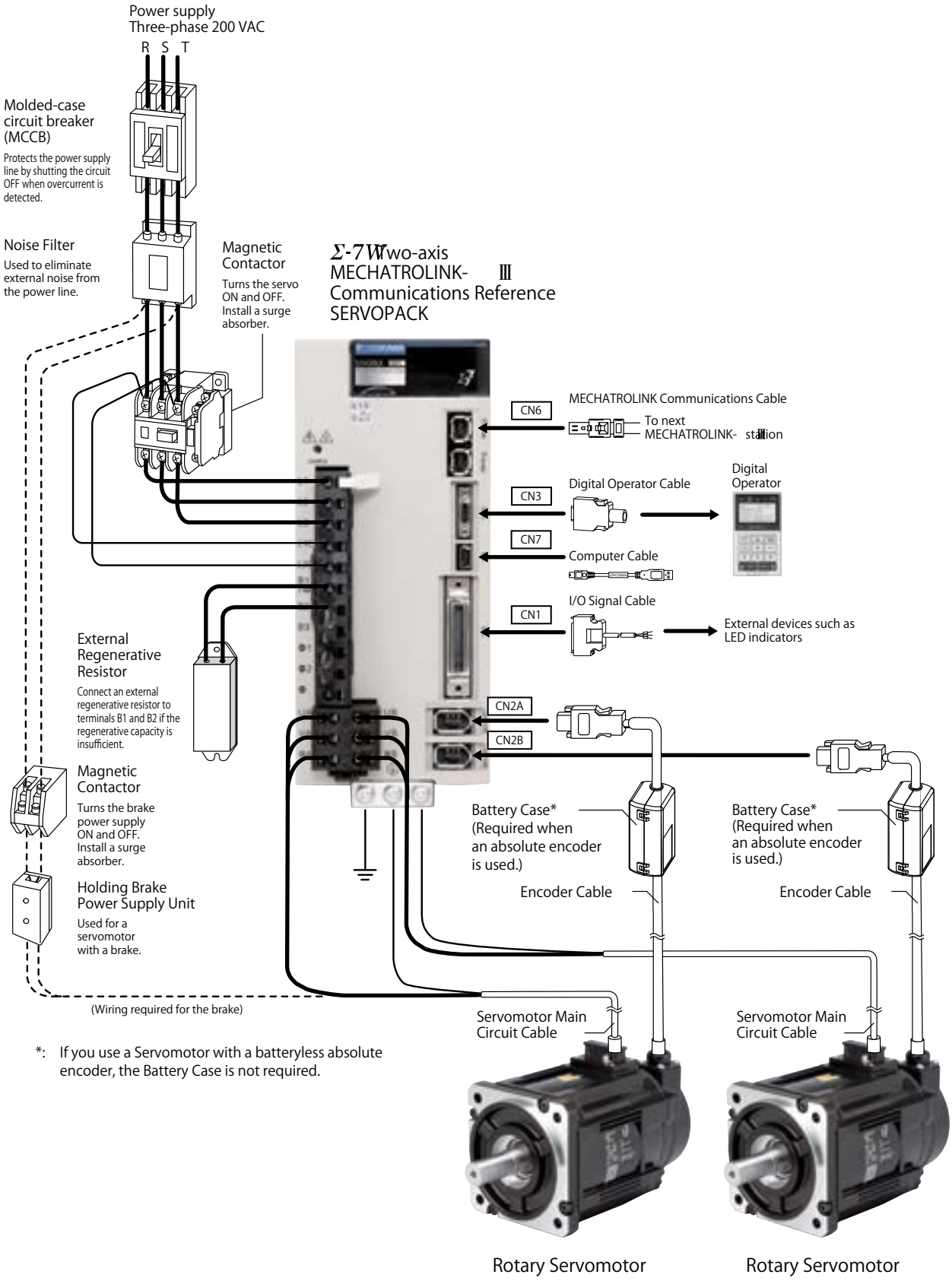
Sigma-7S SERVOPACK and Linear Servomotor for MECHATROLINK-III Communications

Three-phase 200 VAC



Sigma-7W SERVOPACK and Rotary/Direct Drive Servomotor for MECHATRONLINK-III Communications

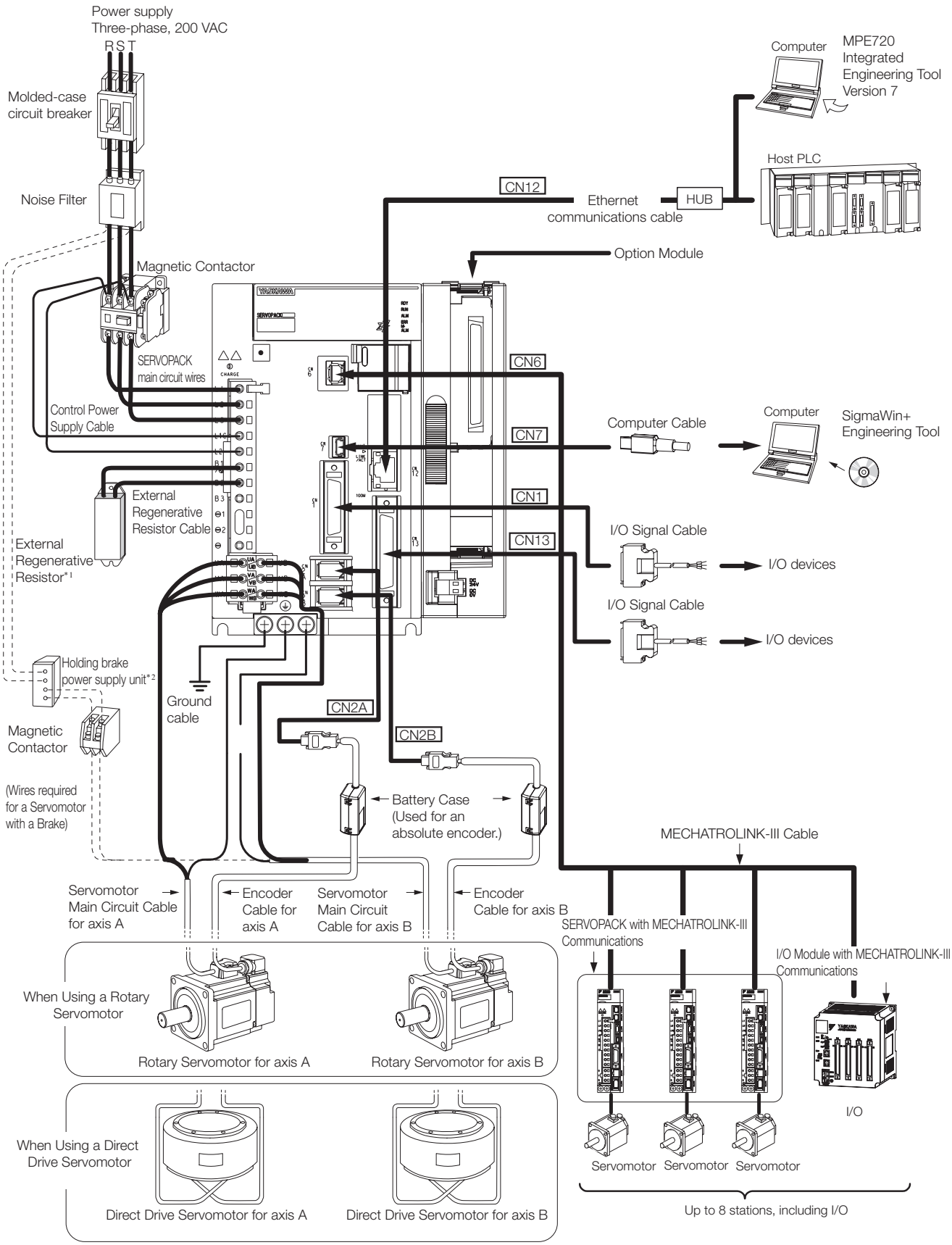
Three-phase 200 VAC



*: If you use a Servomotor with a batteryless absolute encoder, the Battery Case is not required.

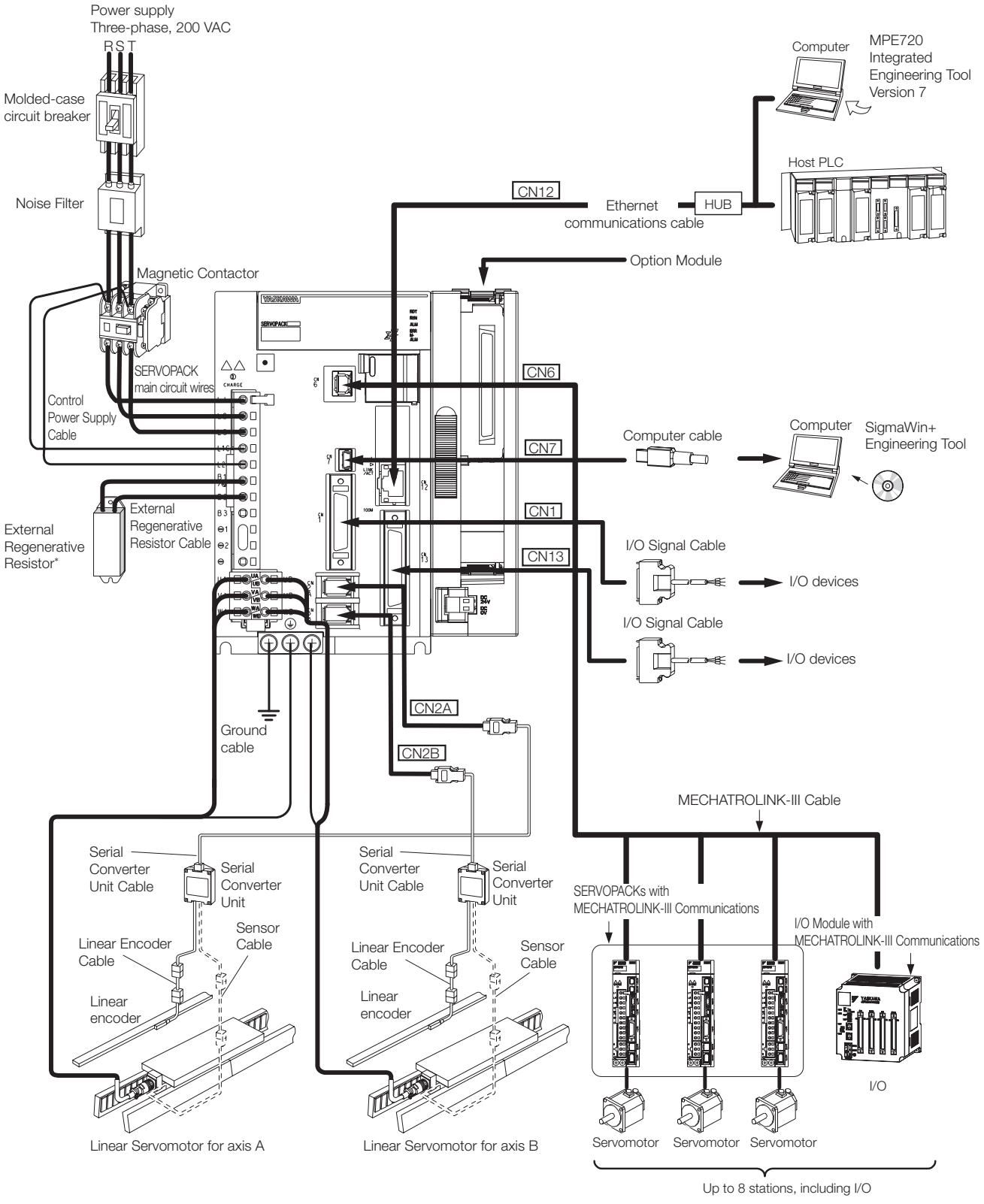
Sigma-7C SERVOPACK with integrated Controller and Rotary/Direct Drive Servomotor

Three-phase 200 VAC



Sigma-7C SERVOPACK with integrated Controller and Linear Servomotor

Three-phase 200 VAC



Combination of Rotary Servomotors and SERVOPACKs

Rotary Servomotor Model		Rated Output [W]	SERVOPACK Model	
			SGD7S-□□□□	SGD7W-□□□□ SGD7C-□□□□

Note: Readily available up to 1.5 kW. Others available on request.

*1. If you use this combination, performance may not be as good, e.g., the control gain may not increase, in comparison with using a Sigma-7 SERVOPACK.
*2. The rated output is 2.4 kW if you combine the SGM7G-30A with the SGD7S-200A.

Combination of Direct Drive Servomotors and SERVOPACKs

Direct Drive Servomotor Model		Rated torque [Nm]	Instantaneous Max. Torque [Nm]	SERVOPACK Model	
				SGD7S-□□□□	SGD7W-□□□□ SGD7C-□□□□
SGM7D (With core, outer rotor)	SGM7D-30F	30	50	120A*1	–
	SGM7D-58F	58	100		
	SGM7D-90F	90	150		
	SGM7D-1AF	110	200		
	SGM7D-01G	1.3	4	2R8A*1, 2R8F*1	
	SGM7D-05G	5	6		
	SGM7D-08G	8	15	120A*1	
	SGM7D-18G	18	30		
	SGM7D-24G	24	45		
	SGM7D-34G	34	60		
	SGM7D-45G	45	75		
	SGM7D-03H	3	4	2R8A*1, 2R8F*1	
	SGM7D-28I	28	50	120A*1	
	SGM7D-70I	70	100		
	SGM7D-1ZI	100	150		
	SGM7D-1CI	130	200		
	SGM7D-2BI	220	300		
	SGM7D-2DI	240	400		
	SGM7D-06J	6	8		
	SGM7D-09J	9	15		
	SGM7D-18J	18	30		
	SGM7D-20J	20	45		
	SGM7D-38J	38	60		
	SGM7D-02K	2.06	5	2R8A*1, 2R8F*1	
	SGM7D-06K	6	10		
	SGM7D-08K	8	15		
	SGM7D-06L	6	10		
	SGM7D-12L	12	20		
	SGM7D-30L	30	40	120A*1	
SGM7E (Coreless, inner rotor)	SGM7E-02B	2	6	2R8A, 2R1F	2R8A
	SGM7E-05B	5	15		
	SGM7E-07B	7	21		
	SGM7E-04C	4	12	2R8A, 2R8F	
	SGM7E-10C	10	30		
	SGM7E-14C	14	42		
	SGM7E-08D	8	24		
	SGM7E-17D	17	51		
	SGM7E-25D	25	75		
	SGM7E-16E	16	48	5R5A	
	SGM7E-35E	35	105		
SGM7F (With core, inner rotor)	SGM7F-02A	2	6	2R8A, 2R1F	2R8A
	SGM7F-05A	5	15		
	SGM7F-07A	7	21	2R8A, 2R8F	
	SGM7F-04B	4	12		
	SGM7F-10B	10	30		
	SGM7F-14B	14	42	5R5A	
	SGM7F-08C	8	24	2R8A, 2R8F	2R8A
	SGM7F-17C	17	51	5R5A	
	SGM7F-25C	25	75	7R6A	
	SGM7F-16D	16	48	5R5A	
	SGM7F-35D	35	105	7R6A*2, 120A	7R6A*2
	SGM7F-45M	45	135	7R6A	
	SGM7F-80M	80	240	120A	–
	SGM7F-1AM	110	330	180A	
	SGM7F-80N	80	240	120A	
	SGM7F-1EN	150	450	200A	
	SGM7F-2ZN	200	600		

Combination of Direct Drive Servomotors and SERVOPACKs

Direct Drive Servomotor Model		Rated torque [Nm]	Instantaneous Max. Torque [Nm]	SERVOPACK Model	
				SGD7S-□□□□	SGD7W-□□□□ SGD7C-□□□□
SGMCV (Small capacity, with core, inner rotor)	SGMCV-04B	4	12	2R8A, 2R8F	2R8A
	SGMCV-10B	10	30		
	SGMCV-14B	14	42	5R5A	
	SGMCV-08C	8	24	2R8A, 2R8F	2R8A
	SGMCV-17C	17	51	5R5A	
	SGMCV-25C	25	75	7R6A	
	SGMCV-16D	16	48	5R5A	
	SGMCV-35D	35	105	7R6A*2, 120A	7R6A*2
SGMCS (Small capacity, coreless, inner rotor)	SGMCS-02B	2	6	2R8A, 2R1F	2R8A
	SGMCS-05B	5	15		
	SGMCS-07B	7	21		
	SGMCS-04C	4	12	2R8A, 2R8F	
	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		
SGMCS (Medium capacity, with core, inner rotor)	SGMCS-45M	45	135	7R6A	
	SGMCS-80M	80	240	120A	–
	SGMCS-1AM	110	330	180A	
	SGMCS-80N	80	240	120A	
	SGMCS-1EN	150	450	200A	
	SGMCS-2ZN	200	600		

*1: An SGM7D Servomotor is used together with an FT-specification SERVOPACK. The following SERVOPACK models can be used.
- SGD7S-□□□□□□A□□□F82□
- SGD7S-□□□□00A□□□F83□
- SGD7S-□□□□20A□□□F84□

*2: Use the derated values given in the table below for the rated output and rated motor speed of this combination.

SERVOPACK Model		SGD7S-□□□□	SGD7W-□□□□ SGD7C-□□□□
Rated Output	[W]	1,000	
Rated Motor Speed	[min^{-1}]	270	

Combination of SERVOPACKs and Option Modules

SERVOPACK Model	Option Module*	
	Safety Module (SGDV-OSA01A)	Feedback Module (SGDV-OF□□A)
Single-axis Analog Voltage/Pulse Train Reference Type (SGD7S-□□□A00A)	✓	✓
Single-axis MECHATROLINK- II Communications Reference Type (SGD7S-□□□A10A)	✓	✓
Single-axis MECHATROLINK- III Communications Reference Type (SGD7S-□□□A20A)	✓	✓
Single-axis MECHATROLINK- III Communications Reference Type (SGD7S-□□□A30A) with RJ45-Connector	✓	✓
Single-axis EtherCAT Communications Reference Type (SGD7S-□□□AA0A)	✓	✓
Single-axis Command Option Attachable Type (SGD7S-□□□AE0A)	✓	✓
Single-axis PROFINET Communications Reference Type (SGD7S-□□□AC0A)	✓	✓
Single-axis Sigma-7 Siec SERVOPACK with built-in Controller IEC 61131 (SGD7S-□□□AM0A000F50)	✓	✓
Dual-axis MECHATROLINK-III Communications Reference Type (SGD7W-□□□A20A)	–	–
Dual-axis SERVOPACK with built-in Controller (SGD7C-□□□AMA□□□)	–	–

SERVOPACK Model	Command Option Type	Model Designation		
Command Option Attachable Type (SGD7S-□□□AE0A)	INDEXER	SGDV-OCA03A	–	✓
	DeviceNet (Driven by control power supply)	SGDV-OCA04A	–	✓
	DeviceNet (Driven by external power supply)	SGDV-OCA05A	–	✓
	1.5 Axis Controller IEC 61131 MP2600iec	VMK-U-MP26A01R001	–	–

*Feedback Module and Safety Module cannot be combined.

✓ : Possible – : Not Possible

Combination of Linear Servomotors and SERVOPACKs

Linear Servomotor Model		Rated force [N]	Peak Force [N]	SERVOPACK Model	
				SGD7S-□□□□	SGD7W-□□□□ SGD7C-□□□□
SGLG (Coreless model, with standard magnetic way)	SGLGW-30A050C	12.5	40	R70A, R70F	1R6A
	SGLGW-30A080C	25	80	R90A, R90F	
	SGLGW-40A140C	47	140		
	SGLGW-40A253C	93	280	1R6A, 2R1F	
	SGLGW-40A365C	140	420	2R8A, 2R8F	2R8A
	SGLGW-60A140C	70	220	1R6A, 2R1F	1R6A
	SGLGW-60A253C	140	440	2R8A, 2R8F	2R8A
	SGLGW-60A365C	210	660	5R5A	
	SGLGW-90A200C	325	1,300	120A	–
	SGLGW-90A370C	550	2,200	180A	
	SGLGW-90A535C	750	3,000	200A	
SGLG (Coreless model, with high-force magnetic way)	SGLGW-40A140C	57	230	1R6A, 2R1F	1R6A
	SGLGW-40A253C	114	460	2R8A, 2R8F	2R8A
	SGLGW-40A365C	171	690	3R8A	5R5A
	SGLGW-60A140C	85	360	1R6A, 2R1F	1R6A
	SGLGW-60A253C	170	720	3R8A	5R5A
	SGLGW-60A365C	255	1,080	7R6A	
SGLFW2 (Model with F-type iron core)	SGLFW2-20A090A	25	86	1R6A, 2R1F	1R6A
	SGLFW2-20A120A	40	125		
	SGLFW2-35A120A	80	220		
	SGLFW2-35A230A	160	440	3R8A	5R5A
	SGLFW2-50A200B	280	600	5R5A	
	SGLFW2-50A380B	560	1,200	120A	–
	SGLFW2-1ZA200B				
	SGLFW2-1ZA380B	1,120	2,400	200A	
	SGLFW2-30A070A	45	135	1R6A, 2R1F	1R6A
	SGLFW2-30A120A	90	270		
	SGLFW2-30A230A	180	540	3R8A	–
		170	500	2R8A, 2R8F	2R8A
	SGLFW2-45A200A	280	840	5R5A	
	SGLFW2-45A380A	560	1,680	180A	–
			1,500	120A	
	SGLFW2-90A200A	560	1,680		
	SGLFW2-90A380A	1,120	3,360	200A	
	SGLFW2-90A560A	1,680	5,040	330A	
	SGLFW2-1DA380A	1,680	5,040	200A	
	SGLFW2-1DA560A	2,520	7,560	330A	
SGLT (Model with T-type iron core)	SGLTW-20A170A	130	380	3R8A	5R5A
	SGLTW-20A320A	250	760	7R6A	
	SGLTW-20A460A	380	1,140	120A	–
	SGLTW-35A170A	220	660	5R5A	
	SGLTW-35A170H	300	600		
	SGLTW-35A320A	440	1,320	120A	–
	SGLTW-35A320H	600	1,200		
	SGLTW-35A460A	670	2,000	180A	
	SGLTW-40A400B	670	2,600		
	SGLTW-40A600B	1,000	4,000	330A	
	SGLTW-50A170H	450	900	5R5A	
	SGLTW-50A320H	900	1,800	120A	–
	SGLTW-80A400B	1,300	5,000	330A	
	SGLTW-80A600B	2,000	7,500	550A	

Recommended Encoders

Incremental Linear Encoders

Output Signal	Manufacturer	Encoder Type	Model			Encoder Pitch [µm]	Resolution [nm]	Maximum Speed*3 [m/s]	Support for Polarity Sensor Input	Application to Linear Motors	Application to Fully-closed Loop Control
			Scale	Sensor Head	Interpolator (Serial Converter Unit)						
1Vp-p Analog Voltage*1	Heidenhain Corporation	Exposed	LIDA48□		(JZDP-H003/-H006)*5	20	78.1	5	✓	✓	✓
					(JZDP-J003/-J006)*5		4.9	2	✓	✓	*9
			LIF48□		(JZDP-H003/-H006)*5	4	15.6	1	✓	✓	✓
					(JZDP-J003/-J006)*5		1.0	0.4	✓	*9	*9
	Renishaw plc*4	Exposed	RGS20	RGH22B	(JZDP-H005/-H008)*5	20	78.1	5	✓	✓	✓
					(JZDP-J005/-J008)*5		4.9	2	✓	✓	*9
Encoder for YASKAWA Serial Interface*2	Magnescale Co., Ltd.	Exposed	SL7□0	PL101-RY*6		800	97.7	5	—	✓	✓
				PL101	MJ620-T13*7				✓	✓	*9
			SQ10	PQ10	MQ10-FLA	400	48.83	3	—	✓	✓
					MQ10-GLA				✓	✓	
		Sealed	SR75-□□□□□LF		—	80	9.8	3.33	—	✓	✓
			SR75-□□□□□MF		—	80	78.1	3.33	—	✓	✓
			SR85-□□□□□LF		—	80	9.8	3.33	—	✓	✓
			SR85-□□□□□MF		—	80	78.1	3.33	—	✓	✓

Absolute Linear Encoders

Output Signal	Manufacturer	Encoder Type	Model			Encoder Pitch [µm]	Resolution [nm]	Maximum Speed*3 [m/s]	Support for Polarity Sensor Input	Application to Linear Motors	Application to Fully-closed Loop Control
			Scale	Sensor Head	Interpolator (Serial Converter Unit)						
Encoder for YASKAWA Serial Interface*2	Magnescale Co., Ltd.	Sealed	SR77-□□□□□LF		—	80	9.8	3.33	—	✓	✓
			SR77-□□□□□MF		—	80	78.1	3.33	—	✓	✓
			SR87-□□□□□LF		—	80	9.8	3.33	—	✓	✓
			SR87-□□□□□MF		—	80	78.1	3.33	—	✓	✓
	Mitutoyo Corporation	Exposed	ST781A		—	256	500	5	—	✓	✓
			ST782A		—	256	500	5	—	✓	✓
			ST783A		—	51.2	100	5	—	✓	✓
			ST784A		—	51.2	100	5	—	✓	✓
			ST788A		—	51.2	100	5	—	✓	✓
			ST789A*10		—	25.6	50	5	—	✓	✓
			ST1381		—	5.12	10	8	—	✓	✓
			ST1382		—	0.512	1	3.6*11	—	✓	✓
	Heidenhain Corporation	Exposed	LIC4100 series		EIB339IY*8	20.48	5	10	—	✓	✓
			LIC2100 series			204.8	50	10	—	✓	✓
						409.6	100	10	—	✓	✓
		Sealed	LC115			40.96	10	3	—	✓	✓
			LC415			40.96	10	3	—	✓	✓
	Renishaw plc	Exposed	EL36Y-□□050F□□□		—	12.8	50	100	—	✓	✓
			EL36Y-□□100F□□□		—	25.6	100	100	—	✓	✓
			EL36Y-□□500F□□□		—	128	500	100	—	✓	✓
			RL36Y-□□050□□□		—	12.8	50	100	—	✓	✓
			RL36Y-□□001□□□		—	0.256	1	3.6	—	✓	✓

* 1. You must also use a YASKAWA Serial Converter Unit. The output signal will be multiplied by 8 bits (256 divisions) or 12 bits (4,096 divisions) in the Serial Converter Unit.
* 2. The multiplier (number of divisions) depends on the Linear Encoder. Also, you must write the motor constant file to the Linear Encoder in advance.
* 3. These are reference values for setting SERVOPACK parameters. Contact the manufacturer for actual linear encoder scale pitches.
* 4. The maximum speeds given in the above table are the maximum applicable speeds of the encoders when combined with a YASKAWA SERVOPACK. The actual speed will be restricted by either the maximum speed of the Linear Servomotor or the maximum speed of the Linear Encoder (given above).
* 5. If you use the origin signals with a Linear Encoder from Renishaw plc, the origin may sometimes be falsely detected. If that occurs, use the BID/DIR signal to output the origin signal only in one direction.
* 6. Use this model number to purchase the Serial Converter Unit.
* 7. Use this model number to purchase the Sensor Head with Interpolator.
* 8. Use this model number to purchase the Interpolator.
* 9. Contact your YASKAWA representative.
*10. Contact Mitutoyo Corporation for details on the Linear Encoders.
*11.The speed is restricted for some SERVOPACKs.
Note: Confirm detailed specifications, such as the tolerances, dimensions, and operating environment, with the manufacturer of the Encoder before you use it.

Absolute Rotary Encoder

Output Signal	Manufacturer	Encoder Type	Model		Relay Device between Fully-Closed Module and Rotary Encoder	Resolution [Bits]	Maximum Speed*1 [min^{-1}]
			Scale	Sensor Head			
Encoder for YASKAWA Serial Interface (∑-LINK)	Magnescale Co., Ltd.	Sealed	RU77-4096ADF*2		–	20	2,000
			RU77-4096AFFT01*2			22	2,000
	Heidenhain Corporation	Exposed	ECA4412*2		EIB3391Y	27	1,600
						28	800
						29	400
		Sealed	RCN2□10*2			26	3,000
			RCN5□10*2			28	800
			RCN8□10*2			29	400
			ROC2310*2			26	3,000
			ROC7310*2			28	800
	Renishaw PLC	Exposed	RA23Y-□□□□□□□□□*2		–	23	14,600
			RA26Y-□□□□□□□□□*2			26	3,250
			RA30Y-□□□□□□□□□*2			30	200

* 1. The maximum speeds given in the above table are the maximum applicable speeds of the encoders when combined with a YASKAWA SERVOPACK. The actual speed will be restricted by either the maximum speed of the Linear Servomotor or the maximum speed of the Linear Encoder (given above).
* 2. This is a single-turn absolute encoder.
Note: Confirm detailed specifications, such as the tolerances, dimensions, and operating environment, with the manufacturer of the Encoder before you use it.

Model Designations

Rotary Servomotors

SGM7J - 01 A 7 A 2 1

Sigma-7 series Servomotors: SGM7J

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

1st + 2nd digit - Rated output

Code	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
6	24-bit batteryless absolute
7	24-bit absolute
F	24-bit incremental

5th digit - Design revision order

Code	Specification
A	Standard model

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

SGM7A - 01 A 7 A 2 1

Sigma-7 series Servomotors: SGM7A

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

1st + 2nd digit - Rated output

Code	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
30	3.0 kW
40	4.0 kW
50	5.0 kW
70	7.0 kW

3rd digit - Power supply voltage

Code	Specification
A	200 VAC

4th digit - Serial encoder

Code	Specification
6	24-bit batteryless absolute
7	24-bit absolute
F	24-bit incremental

5th digit - Design revision order

Code	Specification
A	Standard model

Note: Readily available up to 1.5 kW. Others available on request.

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

SGM7G - 03 A 7 A 2 1

Sigma-7 series Servomotors: SGM7G

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

1st + 2nd digit - Rated output

Code	Specification
03	300 W
05	450 W
09	850 W
13	1.3 kW
20	1.8 kW
30	2.9 kW*
44	4.4 kW
55	5.5 kW
75	7.5 kW
1A	11.0 kW
1E	15.0 kW

3rd digit - Power supply voltage

Code	Specification
A	200 VAC

4th digit - Serial encoder

Code	Specification
6	24-bit batteryless absolute
7	24-bit absolute
F	24-bit incremental

5th digit - Design revision order

Code	Specification
A	Standard model

6th digit - Shaft end

Code	Specification
2	Straight without key
6	Straight shaft 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

Note: Readily available up to 1.5 kW. Others available on request.

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

Model Designations

SGMMV - A1 A 2 A 2 1

Sigma-5 mini series Servomotors: SGMMV

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

1st + 2nd digit - Rated output

Code	Specification
A1	10 W
A2	20 W
A3	30 W

3rd digit - Power supply voltage

Code	Specification
A	200 VAC

4th digit - Serial encoder

Code	Specification
2	17-bit absolute

5th digit - Design revision order

Code	Specification
A	Standard model

6th digit - Shaft end

Code	Specification
2	Straight without key
A	Straight with fl at seats (optional)

7th digit - Options

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

Direct Drive Servomotors

SGM7D - 30 F 7 C 4 1

Direct Drive Servomotors

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

1st + 2nd digit - Rated Output

Code	Specification	Code	Specification
01	1.3 Nm	30	30 Nm
02	2.06 Nm	34	34 Nm
03	3 Nm	38	38 Nm
05	5 Nm	45	45 Nm
06	6 Nm	58	58 Nm
08	8 Nm	70	70 Nm
09	9 Nm	90	90 Nm
12	12 Nm	1Z	100 Nm
18	18 Nm	1A	110 Nm
20	20 Nm	1C	130 Nm
24	24 Nm	2B	220 Nm
28	28 Nm	2D	240 Nm

3rd digit - Servomotor Outer Diameter

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

4th digit - Serial Encoder

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

5th digit - Design Revision Order

Code	Specification
C	

6th digit - Flange

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

7th digit - Options

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

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

SGM7E - 02 B 7 A 1 1

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

1st + 2nd digit - Rated Output

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

3rd digit - Servomotor Outer Diameter

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

4th digit - Serial Encoder

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

5th digit - Design Revision Order

Code	Specification
A	Standard Model

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
4	High machine precision (runout at end of shaft and runout of shaft surface: 0.01 mm)

* Both multiturn absolute encoder and incremental encoder can be used as a single-turn absolute encoder by setting parameters.
Note: 1. Direct Drive Servomotors are not available with holding brakes.
2. This information is provided to explain model numbers. It is not meant to imply that models are available for all combinations of codes.

SGM7F - 02 A 7 A 1 1

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

1st + 2nd digit - Rated Output

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

3rd digit - Servomotor Outer Diameter

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

4th digit - Serial Encoder

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

5th digit - Design Revision Order

Code	Specification
A	Standard Model

6th digit - Flange

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

7th digit - Options

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

* Both multiturn absolute encoder and incremental encoder can be used as a single-turn absolute encoder by setting parameters.
Note: 1. Direct Drive Servomotors are not available with holding brakes.
2. This information is provided to explain model numbers. It is not meant to imply that models are available for all combinations of codes.

Model Designations

SGMCS - 02 B 3 C 1 1 - E

Direct Drive Servomotors — 1st + 2nd | 3rd | 4th | 5th | 6th | 7th | 8th digit

1st + 2nd digit - Rated Output

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

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 single-turn absolute encoder
D	20-bit incremental encoder

5th digit - Design Revision Order

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

6th digit - Flange

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

7th digit - Options

Code	Specification
1	Without options

8th digit

Code	Specification
E	RoHS II Suffix

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

SGMCV - 04 B E A 1 1

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

1st + 2nd digit - Rated Output

Code	Specification
04	4 Nm
08	8 Nm
10	10 Nm
14	14 Nm
17	17 Nm
25	25 Nm
35	35 Nm

3rd digit - Servomotor Outer Diameter

Code	Specification
B	135 mm dia.
C	175 mm dia.
D	230 mm dia.

4th digit - Serial Encoder

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

9th digit - Design Revision Order

Code	Specification
A	Standard Model

6th digit - Flange

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

7th digit - Options

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

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

Linear Servomotors SGLG (Coreless Models)

Moving Coil

SGL G W - 30 A 050 C P □ - E

Sigma-7 Series Linear Servomotors | 1st | 2nd | 3rd + 4th | 5th | 6th - 8th | 9th | 10th | 11th | 12th digit

1st digit - Servomotor Type

Code	Specifications
G	Coreless model

2nd digit - Moving Coil/ Magnetic Way

Code	Specification
W	Moving Coil

3rd + 4th digit - Magnet Height

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

5th digit - Power Supply Voltage

Code	Specification
A	200 VAC

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

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

9th digit - Design Revision Order

Code	Specification
A, B, ...	Revision

10th digit - Sensor Specification and Cooling Method

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

11th digit - Connector for Servomotor Main Circuit Cable

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

12th digit

Code	Specifications
E	RoHS II Suffix

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

Magnetic Way

SGL G M - 30 108 C □ - E

Sigma-7 Series Linear Servomotors | 1st | 2nd | 3rd + 4th | 5th - 7th | 8th | 9th | 10th digit

1st digit - Servomotor Type

Code	Specifications
G	Coreless model

2nd digit - Moving Coil/ Magnetic Way

Code	Specifications
M	Magnetic Way

3rd + 4th digit - Magnet Height

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

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

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

8th digit - Design Revision Order

Code	Specifications
A, B, C*	Revision

9th digit - Options

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

10th digit

Code	Specifications
E	RoHS II Suffix

*: 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 (Models with F-type Iron Cores)

Moving Coil

S	G	L		F	W2	-	30	A	070	A	S	1	E	
Sigma-7 Series Linear Servomotors				1st	2nd		3rd + 4th	5th	6th - 8th	9th	10th	11th	12th	digit

1st digit - Servomotor Type

Code	Specification
F	With F-type iron core

2nd digit - Moving Coil/Magnetic Way

Code	Specification
W2	Moving Coil

3rd + 4th digit - Magnet Height

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

5th digit - Power Supply Voltage

Code	Specification
A	200 VAC

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

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

9th digit - Design Revision Order

Code	Specification
A	Standard Model

10th digit - Sensor Specification

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

11th digit - Options

Code	Cooling Method
1	Self-cooled
L	Water-cooled*

12th digit - Options

Code	Connection
E	Metal round connector (Phoenix)

* Contact your YASKAWA representative for information on water-cooled model.
Note: This information is provided to explain model numbers. It is not meant to imply that models are available for all combinations of codes.

Magnetic Way

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

1st digit - Servomotor Type

Code	Specification
F	With F-type iron core

2nd digit - Moving Coil/Magnetic Way

Code	Specification
M2	Magnetic Way

3rd + 4th digit - Magnet Height

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

5th ... 7th digit - 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

Code	Specification
A	Standard Model

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

SGLFW (Models with F-type Iron Cores)

Moving Coil

S G L F W - 20 A 090 A P □ - E

Sigma-7 Series Linear Servomotors	1st	2nd	3rd + 4th	5th	6th - 8th	9th	10th	11th	12th	digit

1st digit - Specification

Code	Servomotor Type
F	With F-type iron core

2nd digit - Moving Coil/ Magnetic Way

Code	Specification
W	Moving Coil

3rd + 4th digit - Magnet Height

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

5th digit - Voltage

Code	Specification
A	200 VAC

6th - 8th digit - Length of Moving Coil

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

9th digit - Design Revision Order

Code	Specification
A, B, ...	Revision

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

12th digit

Code	Specifications
E	RoHS II Suffix

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 □ - E

Sigma-7 Series Linear Servomotors	1st	2nd	3rd + 4th	5th - 7th	8th	9th	10th	digit

1st digit - Servomotor Type

Code	Specification
F	With F-type iron core

2nd digit - Moving Coil/Magnetic Way

Code	Specification
M	Magnetic Way

3rd + 4th digit - Magnet Height

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

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

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

8th digit - Design Revision Order

Code	Specification
A, B, ...	Revision

9th digit - Options

Code	Specification
None	Without options
C	With magnet cover

10th digit

Code	Specifications
E	RoHS II Suffix

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

SGLT (Models with T-type Iron Cores)

Moving Coil

SGL T W - 20 A 170 A P □ - E

Sigma-7 Series Linear Servomotors | 1st | 2nd | 3rd + 4th | 5th | 6th ... 8th | 9th | 10th | 11th | 12th | digit

1st digit - Servomotor Type

Code	Specification
T	With T-type iron core

2nd digit - Moving Coil/Magnetic Way

Code	Specification
W	Moving Coil

3rd + 4th digit - Magnet Height

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

5th digit - Power Supply Voltage

Code	Specification
A	200 VAC

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

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

9th digit - Design Revision Order

Code	Specification
A, B, ...	Revision
H	High-efficiency model

10th digit - Sensor Specifications and Cooling Method

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

11th digit - Connector for Servomotor Main Circuit Cable

Code	Specification	Applicable Models
None	Connector from Tyco Electronics Japan G.K.	SGLTW-20A□□□□□ -35A□□□□□
	MS connector	SGLTW-40A□□□□B□ -80A□□□□B□
	Loose lead wires with no connector	SGLTW-35A□□□H□ -50A□□□H□

12th digit

Code	Specifications
E	RoHS II Suffix

* Contact your YASKAWA representative for the characteristics, dimensions, and other details on servomotors with these specifications.

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

Magnetic Way

SGL T M - 20 324 A □ - E

Sigma-7 Series Linear Servomotors | 1st | 2nd | 3rd + 4th | 5th ... 7th | 8th | 9th | 10th | digit

1st digit - Servomotor Type

Code	Specification
T	With T-type iron core

2nd digit - Moving Coil/Magnetic Way

Code	Specification
M	Magnetic Way

3rd + 4th digit - Magnet Height

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

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

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

8th digit - Design Revision Order

Code	Specification
A, B, ...	Revision
H	High-efficiency model

9th digit - Options

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

10th digit

Code	Specifications
E	RoHS II Suffix

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

SERVOPACKs

SGD7S - R70 A 00 A 001 F50

Sigma-7 Series Sigma-7S Models	1st ... 3rd	4th	5th + 6th	7th	8th ... 10th	11th ... 13th	digit

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

Code	Specification
Three-phase, 200 V	
R70*1	0.05 kW
R90*1	0.1 kW
1R6*1	0.2 kW
2R8*1	0.4 kW
3R8	0.5 kW
5R5*1	0.75 kW
7R6	1.0 kW
120*2	1.5 kW
180	2.0 kW
200*3	3.0 kW
330	5.0 kW
470	6.0 kW
550	7.5 kW
590	11 kW
780	15 kW

4th digit - Voltage

Code	Specification
A	200 VAC

5th + 6th digit - Interface*4

Code	Specification
00	Analog Voltage/ Pulse train reference
10	MECHATROLINK-II communication reference
20	MECHATROLINK-III communication reference
30	MECHATROLINK-III communication reference with RJ45 connector
A0	EtherCAT communication reference
C0	PROFINET communication reference
E0	Command Option Attachable Type*5
M0	Sigma-7Siec (with integrated iec-Controller)

7th digit - Design Revision Order

Code	Specification
A	Standard Model

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

Code	Specifications	Applicable Models
None	Without Options	All models
000	Without Options only used in combination with FT/EX	All models
001	Rack-mounted	SGD7S-R70A to -330A
	Duct-ventilated	SGD7S-470A to -780A
002	Varnished	All models
008	Single-phase, 200 V power input	SGD7S-120A
020*6	No dynamic brake	SGD7S-R70A to -2R8A
	External dynamic brake resistor	SGD7S-3R8A to -780A
00A	Varnished and single-phase power input	All models

11th ... 13th digit - FT/EX Specifications

Code	Specifications
None	None
F50*8	Application function for integrated MPiec
F82*7	Application function option for special motors, SGM7D motor drive
F83*7	Application function option for special motors, SGM7D motor drive, indexing

Note:

Depending on configuration choices made, the model code might end after the 7th or 10th digit, or involve all 13 digits.

Readily available up to 1.5 kW. Others available on request.
Additional accessories and software for SERVOPACKs is described in the Periphery section.
*1. You can use these models with either a single-phase or three-phase power supply input.
*2. A model with a single-phase, 200-VAC power supply input is available as a hardware option (model. SGD7S-120A□0A008).
*3. The rated output is 2.4 kW if you combine the SGM7G-30A with the SGD7S-200A.
*4. The same SERVOPACKs are used for both Rotary Servomotors and Linear Servomotors.
*5. A command option module must be attached to the Command Option Attachable-type SERVOPACK for use.
*6. Refer to the following manual for details.
Sigma-7-Series AC Servo Drive Sigma-7S/Sigma-7W SERVOPACK with Hardware Option Specifications Dynamic Brake Product Manual (Manual No.: SIEP S800001 73)
*7. Refer to the following manual for details.
Sigma-7-Series AC Servo Drive Σ-7S SERVOPACK with FT/EX Specification for SGM7D Motor Product Manual (Manual No.: SIEP S800001 91)
*8. Applicable for Sigma-7Siec models.

Model Designations

SGD7W - 1R6 A 20 A 700

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

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

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

4th digit - Voltage

Code	Specification
A	200 VAC

5th + 6th digit - Interface*3

Code	Specification
20	MECHATROLINK-III communication Reference

7th digit - Design Revision Order

Code	Specification
A	Standard Model

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

Code	Specification	Applicable Models
None	Without Options	All models
700*4	HWBB Option	All models

Note:
Additional accessories and software for SERVOPACKs is described in the Periphery section.
*1. You can use these models with either a single-phase or three-phase power supply input. For more information, please contact your YASKAWA representative.
*2. If you use the SGD7W-5R5A with a single-phase 200-VAC power supply input, derate the load ratio to 65%. An example is given below.
If the load ratio of the fi rst axis is 90%, use a load ratio of 40% for the second axis so that average load ratio for both axes is 65% ((90% + 40%)/2 = 65%).
*3. The same SERVOPACKs are used for both Rotary Servomotors and Linear Servomotors.
*4. Refer to the following manual for details.
Sigma-7 Series AC Servo Drive Sigma-7W/Sigma-7C SERVOPACK with Hardware Option Specifications HWBB Function Product Manual (Manual No.: SIEP S800001 72)

SGD7C - 1R6 A MA A 700

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

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

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

4th digit - Voltage

Code	Specification
A	200 VAC

5th + 6th digit - Interface*3

Code	Specification
20	MECHATROLINK-III communication Reference
MA	Bus connection with references

7th digit - Design Revision Order

Code	Specification
A	Standard Model

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

Code	Specification	Applicable Models
None	Without Options	All models
700*4	HWBB Option	All models

Note:
Additional accessories and software for SERVOPACKs is described in the Periphery section.
*1. You can use these models with either a single-phase or three-phase power supply input.
*2. If you use the SGD7W-5R5A with a single-phase 200-VAC power supply input, derate the load ratio to 65%. An example is given below.
If the load ratio of the fi rst axis is 90%, use a load ratio of 40% for the second axis so that average load ratio for both axes is 65% ((90% + 40%)/2 = 65%).
*3. The same SERVOPACKs are used for both Rotary Servomotors and Linear Servomotors.
*4. Refer to the following manual for details.
Sigma-7 Series AC Servo Drive Sigma-7W/Sigma-7C SERVOPACK with Hardware Option Specifications HWBB Function Product Manual (Manual No.: SIEP S800001 72)

Related Documents

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

Document Name (Document No.)		Description of Document
MP3300 Documents Machine Controller MP3300 (KAEP C880725 03)	**MP3000 Series Manual**	Describes the functions, specifications, operating methods, maintenance, inspections, and troubleshooting of the MP3000-Series MP3300 Machine Controllers.
	MP3300 Product Manual (SIEP C880725 21)	
	MP3300iec Machine Controller Hardware Manual (YAI-SIA-IEC-7)	
Sigma-7 Series Documents AC Servo Drives Sigma-7 Series	**Sigma-7 Series SERVOPACK Product Manual**	Provide detailed information on selecting Sigma-7 Series SERVOPACKs and information on installing, connecting, setting, performing trial operation for, tuning, and monitoring the Servo Drives.
	Sigma-7S SERVOPACK with MECHATROLINK-III Communications References (SIEP S800001 28)	
	Sigma-7S SERVOPACK with MECHATROLINK-II Communications References (SIEP S800001 27)	
	Sigma-7S SERVOPACK with Analog Voltage/Pulse Train References (SIEP S800001 26)	
	Sigma-7S SERVOPACK Command Option Attachable Type with INDEXER Module (SIEP S800001 64)	
	Sigma-7S SERVOPACK Command Option Attachable Type with DeviceNet Module (SIEP S800001 70)	
	Sigma-7W SERVOPACK with MECHATROLINK-III Communications References (SIEP S800001 29)	
	Sigma-5-Series/ -Series for Large-Capacity Models/ Sigma-7-Series User's Manual Safety Module (SIEP C720829 06)	Provides details information required for the design and maintenance of a Safety Module.
	Sigma-7C SERVOPACK (SIEP S800002 04)	Provides detailed information on selecting Sigma-7-Series Sigma-7C SERVOPACKs; installing, connecting, setting, testing in trial operation, and tuning Servo Drives; writing, monitoring, and maintaining programs; and other information.
	Sigma-7C SERVOPACK Motion Control User's Manual (SIEP S800002 03)	Provides detailed information on the specifications, system configuration, and application methods of the Motion Control Function Modules (SVD, SVC4, and SVR4) for Sigma-7-Series Sigma-7C SERVOPACKS.
	Sigma-7C SERVOPACK Troubleshooting Manual (SIEP S800002 07)	Provides detailed troubleshooting information for Sigma-7-Series Sigma-7C SERVOPACKs.
	Machine Controller MP3000 Series Communications User's Manual (SIEP C880725 12)	Provides detailed information on the specifications, system configuration, and communications connection methods for the Ethernet communications that are used with Sigma-7-Series Sigma-7C SERVOPACKs.
	Sigma-7S / Sigma-7W SERVOPACK with Hardware Option Specifications Dynamic Brake (SIEP S800001 73)	Provides detailed information on Hardware Options for Simga-7-Series SERVOPACKs.
	Sigma-7W / Sigma-7C SERVOPACK with Hardware Option Specifications HWBB Function (SIEP S800001 72)	
	Sigma-7-Series AC Servo Drive Sigma-7S SERVOPACK with Hardware Option Specifications Dynamic Brake (SIEP S800001 91)	Provides detailed information on Options for Sigma-7S SERVOPACK with FT/EX Specification.
	Sigma-7 PROFINET Hardware Manual (SIEP YEUOC7P 01)	Provides detailed information required on Sigma-7 PROFINET SERVOPACKs.
	Sigma-7 Siec Hardware Manual (IG.S7Siec.01)	Provides detailed information required on Sigma-7 Siec SERVOPACKs.
	Sigma-5-Series / Sigma-5-Series for Large-Capacity Models / Sigma-7-Series User's Manual Safety Module (SIEP C720829 06)	Provides detailed information required for the design and maintenance of a Safety Module.

Continued on next page.

Related Documents

Continued on next page.

Document Name (Document No.)		Description of Document
Sigma-7 Series Documents AC Servo Drives Sigma-7 Series	**Sigma-7 Series Servomotor Product Manual**	Provides detailed information on selecting, installing, and connecting the Sigma-7 Series Servomotors.
	Rotary Servomotor Product Manual (SIEP S800001 36)	
	Linear Servomotor Product Manual (SIEP S800001 37)	
	Direct Drive Servomotor Product Manual (SIEP S800001 38)	
	Others	Provides detailed information on the MECHATROLINK-III communications standard servo profi le commands that are used for a Sigma-7 Series Servo System.
	MECHATROLINK-III Communications Standard Servo Profi le Command Manual (SIEP S800001 31)	
	MECHATROLINK-II Communications Command Manual (SIEP S800001 30)	Provides detailed information on the MECHATROLINK-II communications commands that are used for a Sigma-7 Series Servo System.
	Digital Operator Operating Manual (SIEP S800001 33)	Describes the operating procedures for a Digital Operator for a Sigma-7 Series Servo System.
	Engineering Tool SigmaWin+ Operation Manual (SIEP S800001 34)	Provides detailed operating procedures for the SigmaWin+ Engineering Tool for a Sigma-7 Series Servo System.
	Machine Controller MP2000/MP3000 Series Engineering Tool MPE720 Version 7 User's Manual (SIEP C880761 03)	Describes in detail how to operate MPE720 version 7.
	Machine Controller MP3000 Series Ladder Programming Manual (SIEP C880725 13)	Provides detailed information on the ladder programming specifications and instructions for Sigma-7-Series Sigma-7C SERVOPACKs. SERVOPACKs.
	Machine Controller MP3000 Series Motion Prgramming Manual (SIEP C880725 14)	Provides detailed information on the motion programming and sequence programming specifi cations and instructions for Sigma-7-Series Sigma-7C SERVOPACKs.
	Machine Controller MP2600iec Hardware Manual (YEA-SIA-IEC-6)	
	Function Block Manual (HB500 | DM C-LIB_PN | D MC-LIB_Sigma7-PN V1.0 | en)	

FT Specifications

The know-how we have acquired in every market has resulted in the creation of a lineup of SERVOPACKs with FT specifications that have added functions to optimally suit a variety of applications.
Please contact your local YASKAWA representative for further information.

FT Specifications	Applications	Additional Functions	Features	Interface			
				A/P	ML-II	ML-III	EtherCAT
FT19	Tracking	Built-in Less Deviation Control	Little delay in motor operations for position reference as a result of built-in less deviation control. Ideal for applications that require reference tracking performance (high position accuracy) during movement.	✓	–	✓	–
FT21	Machining and Cutting	Feed Shaft Supporting	Improved tracking ability and high-accuracy machining operations with the use of clearance (constant distance) control, predictive control, and quadrant projection compensation functions.	–	–	✓	–
FT40	Press and Injection Molding	Pressure Feedback	Highly accurate pressure control with input of pressure sensor signals directly to the SERVOPACK.	–	–	✓	–
FT41	Press and Injection Molding	Pressure Feedback	Highly accurate pressure control by feeding back the signals of the pressure sensors directly to the SERVOPACK through the MECHATROLINK-I/O system.	–	–	✓	–
FT60	Conveyance	Three-Point Latching	The host controller can detect the orientation of the workpiece or offsets in multiple workpieces based on the information on the three positions input to the SERVOPACK.	–	–	✓	–
FT62	Conveyance and Alignment	Triggers at Pre-set Positions and Rotational Coordinate System	Addition of pass-through signals for designated points to enable coordinated operations with the use of trigger signals. Turntables can be easily controlled with infinite-length coordinates.	–	–	✓	–
FT63	Conveyance	Built-in Semi-Closed/ Fully-Closed Loop Control Online Switching Function	Allows loop control to be switched between semi-closed/fully-closed while online.	✓	–	✓	–
FT70	Gantry	Built-in Optimal Gantry Control	Three built-in functions (Position correction table, Synchronized stopping during alarms, and the Position deviation between axes overflow detection) effective for driving gantries.	–	–	✓	–
FT77	Conveyance	Built-in Torque/Force Assistance	Multiple SERVOPACKs can be used for applications that require more than one axis to easily build a system will increase the torque or force up to five times.	✓	–	✓	–
FT79	Indexing	Built-in INDEXER	Convenient positioning functions (ZONE signal outputs, job speed table, homing, other) added for high-precision and high-speed positioning without a motion controller.	✓	–	–	–
FT81	For Special Motors	Harmonic Drive Systems Actuator	SERVOPACKs with the capability to use Harmonic Drive Systems.	–	✓	✓	✓
FT82	For Special Motors	SGM7D Motor Drive	SERVOPACKs with high torque, high precision, and a user-friendly design for SGM7D motors.	✓	✓	✓	✓
FT83	For Special Motors	SGM7D Motor Drive	SERVOPACKs with built-in INDEXER for SGM7D motors.	✓	–	–	–
FT84	Conveyance and Alignment with SGM7D	Triggers at Pre-set Positions and Rotational Coordinate System	Addition of pass-through signals for designated points to enable coordinated operations with use of trigger signals. Turntables can be easily controlled with infinte-length coordinates.	–	–	✓	–

✓ :Possible – :Not possible

SGMMV

- Low inertia, ultra-small capacity
- 10 W - 30 W

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

Note: Readily available up to 1.5 kW. Others available on request.

Rotary Servomotors

Model Designations

SGMMV - A1 A 2 A 2 1

SGMMV	-	A1	A	2	A	2	1	
Sigma-7 series Servomotors: SGMMV		1st + 2nd	3rd	4th	5th	6th	7th	digit

1st + 2nd digit - Rated output	
Code	**Specification**
A1	10 W
A2	20 W
A3	30 W

3rd digit - Power supply voltage	
Code	**Specification**
A	200 V AC

4th digit - Serial encoder	
Code	**Specification**
2	17-bit absolute

5th digit - Design revision order	
Code	**Specification**
A	Standard model

6th digit - Shaft end	
Code	**Specification**
2	Straight
A	Straight with flat seats

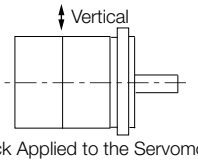
7th digit - Options	
Code	**Specification**
1	Without options
C	With holding brake (24 V DC)

Specifications and Ratings

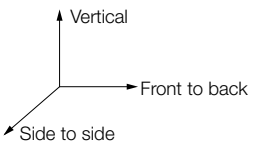
Specifications

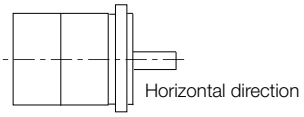
Voltage		200 V		
Model SGMMV-		A1A	A2A	A3A
Time Rating		Continuous		
Thermal Class		B		
Insulation Resistance		500 VDC, 10 MOhm min.		
Withstand Voltage		1,500 VAC for 1 minute		
Excitation		Permanent magnet		
Mounting		Flange-mounted		
Drive Method		Direct drive		
Rotation Direction		Counterclockwise (CCW) for forward reference when viewed from the load side		
Vibration Class *1		V15		
Environmental Conditions	Surrounding Air Temperature	0 °C to 40 °C		
	Surrounding Air Humidity	20% to 80% relative humidity (non-condensing)		
	Installation Site	• Must be indoors and free of corrosive and explosive gases. • Must be well-ventilated and free of dust and moisture. • Must facilitate inspection and cleaning. • Must have an altitude of 1,000 m or less. • Must be free of strong magnetic fields.		
	Storage Environment	Store the Servomotor in the following environment if you store it with the power cable disconnected. • Storage Temperature: -20 °C to 60 °C (with no freezing) • Storage Humidity: 20% to 80% relative humidity (non-condensing)		
Shock Resistance *2	Impact Acceleration Rate at Flange	490 m/s^2		
	Number of Impacts	2 times		
Vibration Resistance *2	Vibration Acceleration Rate at Flange	49 m/s^2		
Applicable SERVOPACKS	SGD7S-	R90A, R90F		1R6A, 2R1F
	SGD7W- SGD7C-	1R6A *3, 2R8A *3		1R6A, 2R8A *3

*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 given values are for when the Servomotor shaft is mounted horizontally and shock or vibration is applied in the directions shown in the following figures. The strength of the vibration that the Servomotor can withstand depends on the application. Always check the vibration acceleration rate that is applied to the Servomotor with the actual equipment.



Shock Applied to the Servomotor





Vibration Applied to the Servomotor

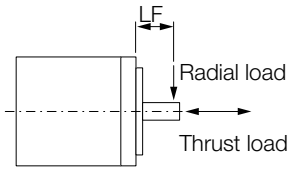
*3 If you use a Servomotor together with a Sigma-7W or Sigma-7C SERVOPACK, the control gain may not increase as much as with a Sigma-7S SERVOPACK and other performances may be lower than those achieved with a Sigma-7S SERVOPACK.

Ratings

Voltage			200 V		
Model SGMMV-			A1A	A2A	A3A
Rated Output *1		W	10	20	30
Rated Torque *1, *2		Nm	0.0318	0.0637	0.0955
Instantaneous Maximum Torque *1		Nm	0.0955	0.191	0.286
Rated Current *1		A	0.70	0.66	0.98
Instantaneous Maximum Current *1		A	2.0	1.9	2.9
Rated Motor Speed *1		min^{-1}	3000		
Maximum Motor Speed *1		min^{-1}	6000		
Torque Constant		Nm/A	0.0516	0.107	0.107
Motor Moment of Inertia		$\times10^{-4}$ kg·m^2	2.72 (4.07)	4.66 (6.02)	6.68 (8.04)
Rated Power Rate *1		kW/s	3.72	8.71	13.7
Rated Angular Acceleration Rate *1		rad/s	117,000	137,000	143,000
Heat Sink Size (Aluminium) *3		mm	150 × 150 × 3		250 × 250 × 6
Protective Structure *4			Totally enclosed, self-cooled, IP55 (except for shaft opening)		
Holding Brake Specifications *5	Rated Voltage	V	24 VDC±10%		
	Capacity	W	2.0	2.6	
	Holding Torque	Nm	0.0318	0.0637	0.0955
	Coil Resistance	Ω (at 20 °C)	320	221.5	
	Rated Current	A (at 20 °C)	0.075	0.108	
	Time Required to Release Brake	ms	40		
	Time Required to Brake	ms	100		
Allowable Load Moment of Inertia (Motor Moment of Inertia Ratio) *6			30 times		
	With External Regenerative Resistor				
Allowable Shaft Load *7	LF	mm	16		
	Allowable Radial Load	N	34	44	
	Allowable Thrust Load	N	14.5		

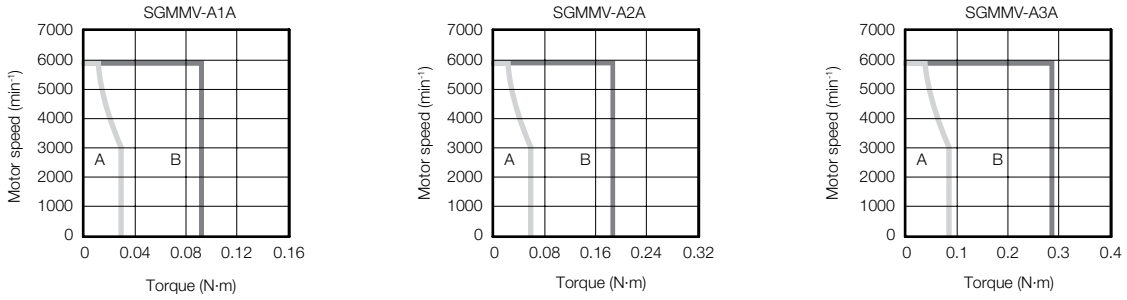
Notes:
The values in parentheses are for Servomotors with Holding Brakes.
*1. These values are for operation in combination with a SERVOPACK when the temperature of the armature winding is 100°C. These are typical values.
*2. The rated torques are the continuous allowable torque values with an aluminum or steel heat sink of the dimensions given in the table.
*3. Refer to the „Servomotor Heat Dissipation Conditions“ section for the relation between the heat sinks and derating rate.
*4. This does not apply to the shaft opening. Protective structure specifications apply only when the special cable is used.
*5. Observe the following precautions if you use a Servomotor with a Holding Brake.
- The holding brake cannot be used to stop the Servomotor.
- The time required to release the brake and the time required to brake depend on which discharge circuit is used. Confirm that the operation delay time is appropriate for the actual equipment.
- The 24-VDC power supply is not provided by YASKAWA.

*6. The motor moment of inertia scaling factor is the value for a standard Servomotor without a Holding Brake.
*7. Design the mechanical system so that the thrust and radial loads applied to the Servomotor shaft end during operation do not exceed the values given in the table.



Torque-motor Speed Characteristics

A : Continuous duty zone
B : Intermittent duty zone*

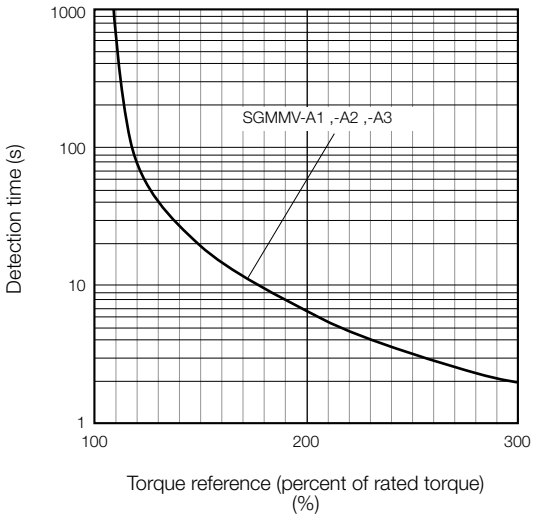


* The characteristics are the same for three-phase 200 V, single-phase 200 V and single-phase 100 V input..

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

Servomotor Overload Protection Characteristics

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



Note:
The above overload 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.

Allowable Load Moment of Inertia

The allowable load moments of inertia (motor moment of inertia ratios) for the Servomotors are given in the Servomotor Ratings section. The values are determined by the regenerative energy processing capacity of the SERVOPACK and are also affected by the drive conditions of the Servomotor. Perform the required steps for each of the following cases. Use the SigmaSize+ AC Servo Drive Capacity Selection Program to check the driving conditions. Contact your YASKAWA representative for information on this program.

Exceeding the allowable Load Moment of Inertia

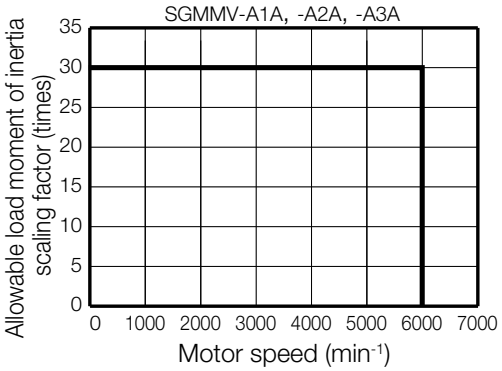
Use one of the following measures to adjust the load moment of inertia to within the allowable value.
- Reduce the torque limit.
- Reduce the deceleration rate.
- Reduce the maximum motor speed.

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

Information
An Overvoltage Alarm (A.400) is likely to occur during deceleration if the load moment of inertia exceeds the allowable load moment of inertia. SERVOPACKs with a built-in regenerative resistor may generate a Regenerative Overload Alarm (A.320). Refer to Built-In Regenerative Resistor section for the regenerative power (W) that can be processed by the SERVOPACKs. Install an External Regenerative Resistor when the built-in regenerative resistor cannot process all of the regenerative power.

SERVOPACKs without built-in Regenerative Resistors

The following graph shows the allowable load moment of inertia scaling factor of the motor speed (reference values for deceleration operation at or above the rated torque). Application is possible without an external regenerative resistor within the allowable value. However, an External Regenerative Resistor is required in the shaded areas of the graphs.



Note: Applicable SERVOPACK models: SGD7S-R90A, -1R6A, -R90F, and -2R1F

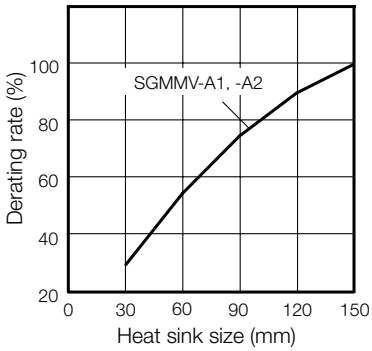
When an external Regenerative Resistor is required

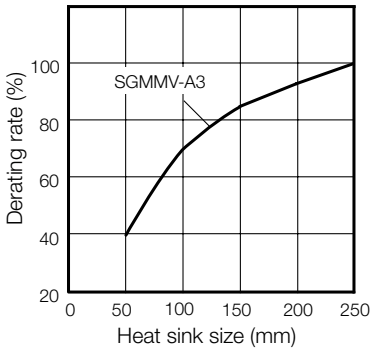
Install the External Regenerative Resistor. Refer to the “External Regenerative Resistors” section for the recommended products.

Derating Rates

Servomotor Heat Dissipation Conditions

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





Important

The actual temperature rise depends on 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.

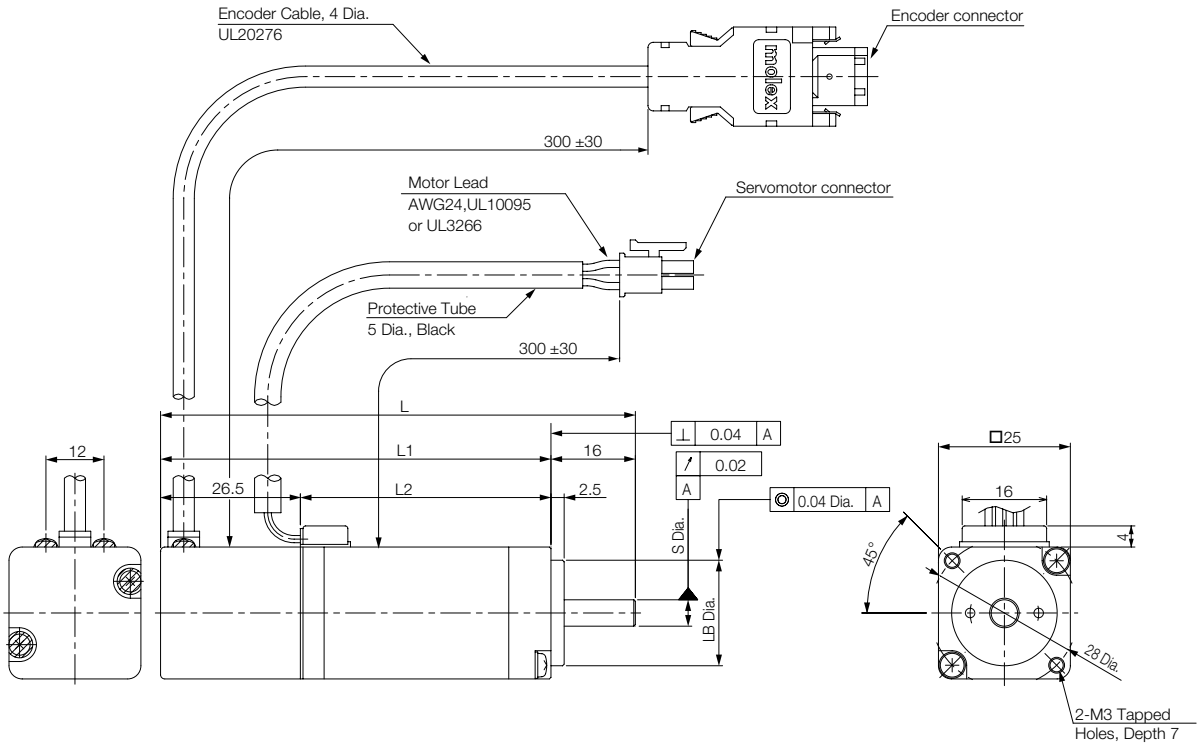
Information
When using Servomotors with derating, change the detection timing of overload warning and overload alarm based on the overload detection level of the motor given in “Servomotor Overload Protection Characteristics”.

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

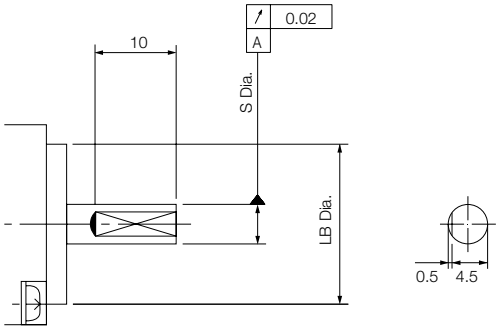
SGMMV-A1, -A2 and -A3



Model SGMMV	L	L1	L2	Flange Dimensions		Approx.
				S	LB	Mass [kg]
A1A2A□1	70	54	27.5	5 $^{0}_{-0.008}$	20 $^{0}_{-0.021}$	0.13
A2A2A□1	80	64	37.5	5 $^{0}_{-0.008}$	20 $^{0}_{-0.021}$	0.17
A3A2A□1	90	74	47.5	5 $^{0}_{-0.008}$	20 $^{0}_{-0.021}$	0.21

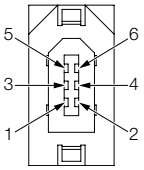
Shaft End Specifications

Straight with Flat Seats



Connector Specifications

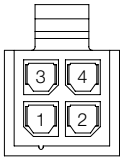
Encoder Connector



1	PG5V	Red
2	PG0V	Black
3*	BAT	Orange
4*	BAT0	Orange/ White
5	PS	Light blue
6	/PS	Light blue/ white
Connector Case	FG (frame ground)	Shield

*) A battery is required only for an absolute encoder.
Model: 55102-0600
Manufacturer: Molex Japan LLC
Mating Connector: 54280-0609

Servomotor Connector

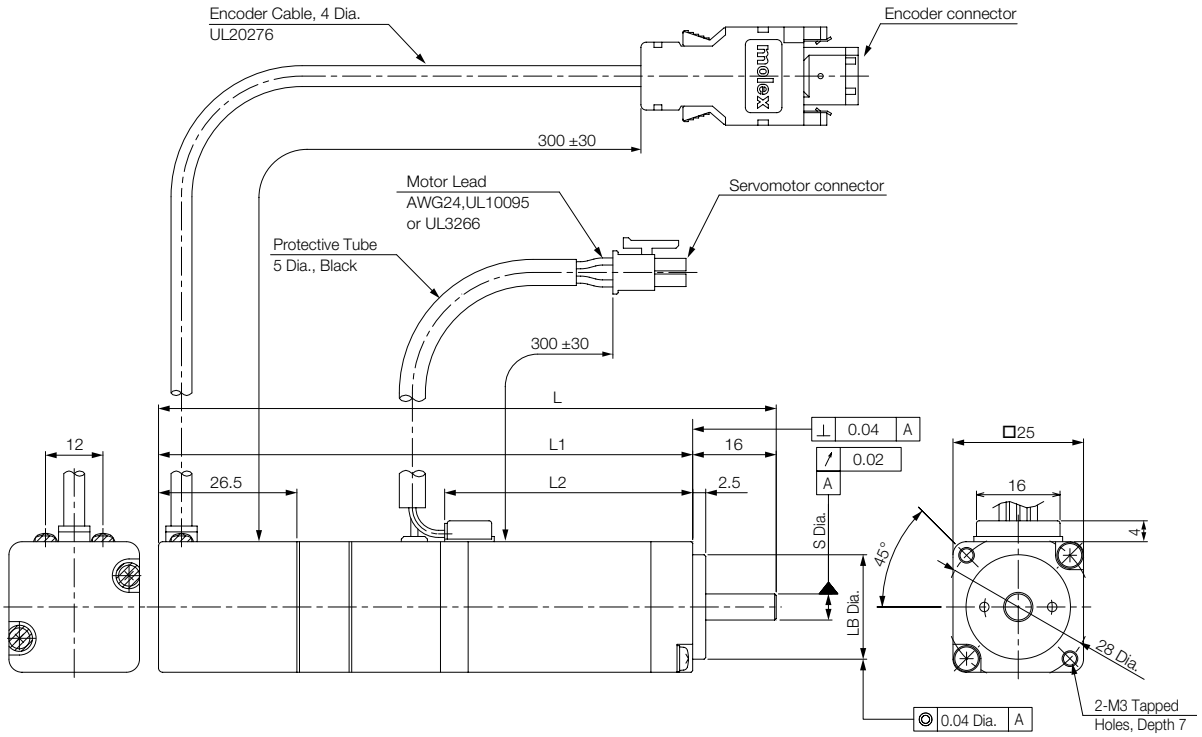


1	Phase U
2	Phase V
3	Phase W
4	FG (frame ground)

Receptacle: 43025-0400
Manufacturer: Molex Japan LLC

Servomotors with Holding Brakes

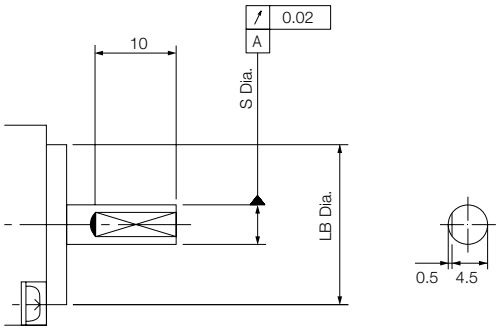
SGMMV-A1, -A2 and -A3



Model SGMMV	L	L1	L2	Flange Dimensions		Approx.
				S	LB	Mass [kg]
A1A2A□C	94.5	78.5	27.5	5 $^{0}_{-0.008}$	20 $^{0}_{-0.021}$	0.215
A2A2A□C	108.5	92.5	37.5	5 $^{0}_{-0.008}$	20 $^{0}_{-0.021}$	0.27
A3A2A□C	118.5	102.5	47.5	5 $^{0}_{-0.008}$	20 $^{0}_{-0.021}$	0.31

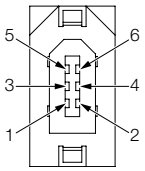
Shaft End Specifications

Straight with Flat Seats



Connector Specifications

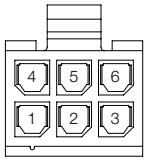
Encoder Connector



1	PG5V	Red
2	PG0V	Black
3*	BAT	Orange
4*	BAT0	Orange/ White
5	PS	Light blue
6	/PS	Light blue/ white
Connector Case	FG (frame ground)	Shield

*) A battery is required only for an absolute encoder.
Model: 55102-0600
Manufacturer: Molex Japan LLC
Mating Connector: 54280-0609

Servomotor Connector



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

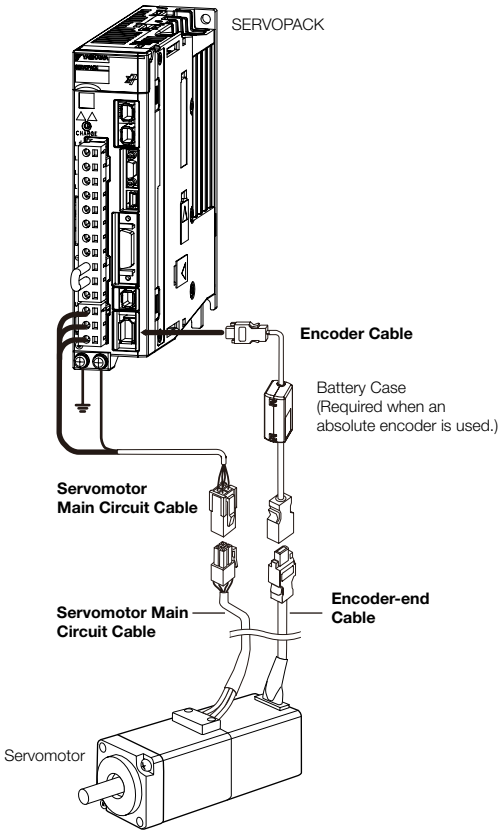
Receptacle: 43025-0600
Manufacturer: Molex Japan LLC

Selecting Cables SGMMV

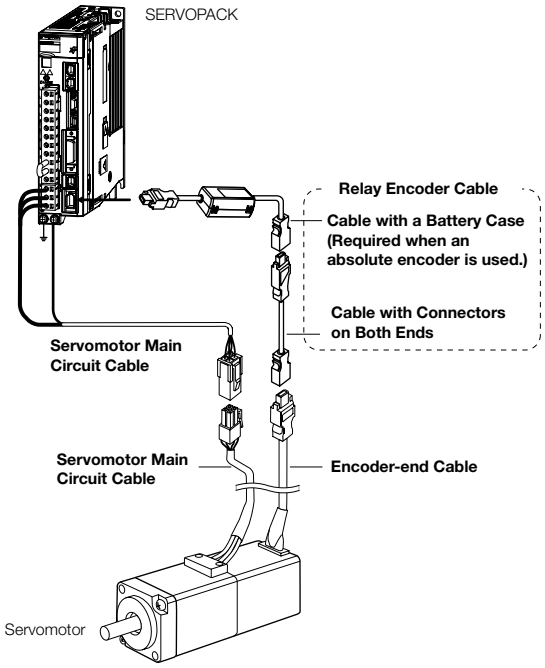
Cable Configurations

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

Encoder Cable of 20 m or less

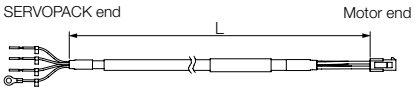
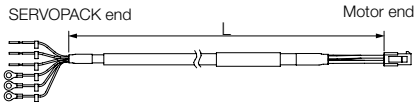


Encoder Cable of 30 m to 50 m (Relay Cable)



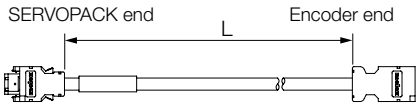
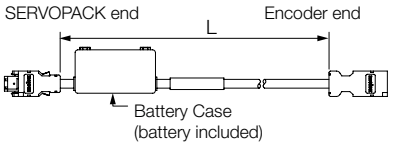
Note:
1. If the Encoder Cable length exceeds 20 m, be sure to use a Relay Encoder Cable.
2. If you use a Servomotor Main Circuit Cable that exceeds 20 m, the intermittent duty zone in the torquemotor speed characteristics will become smaller because the voltage drop increases.
3. Refer to the following manual for the following information.
   - Cable dimensional drawings and cable connection specifications
   - Order numbers and specifications of individual connectors for cables
   - Order numbers and specifications for wiring materials: Sigma-7-Series AC Servo Drive Peripheral Device Selection Manual (Manual No.: SIEP S800001 32)

Servomotor Main Circuit Cables

Description	Length	Order Number		Appearance
		Standard Cable	Flexible Cable*	
For Servomotors without Holding Brakes	3m	JZSP-CF1M00-03-E	JZSP-CF1M20-03-E	
	5m	JZSP-CF1M00-05-E	JZSP-CF1M20-05-E	
	10m	JZSP-CF1M00-10-E	JZSP-CF1M20-10-E	
	15m	JZSP-CF1M00-15-E	JZSP-CF1M20-15-E	
	20m	JZSP-CF1M00-20-E	JZSP-CF1M20-20-E	
	30m	JZSP-CF1M00-30-E	JZSP-CF1M20-30-E	
	40m	JZSP-CF1M00-40-E	JZSP-CF1M20-40-E	
	50m	JZSP-CF1M00-50-E	JZSP-CF1M20-50-E	
For Servomotors with Holding Brakes	3m	JZSP-CF1M03-03-E	JZSP-CF1M23-03-E	
	5m	JZSP-CF1M03-05-E	JZSP-CF1M23-05-E	
	10m	JZSP-CF1M03-10-E	JZSP-CF1M23-10-E	
	15m	JZSP-CF1M03-15-E	JZSP-CF1M23-15-E	
	20m	JZSP-CF1M03-20-E	JZSP-CF1M23-20-E	
	30m	JZSP-CF1M03-30-E	JZSP-CF1M23-30-E	
	40m	JZSP-CF1M03-40-E	JZSP-CF1M23-40-E	
	50m	JZSP-CF1M03-50-E	JZSP-CF1M23-50-E	

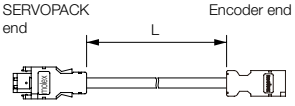
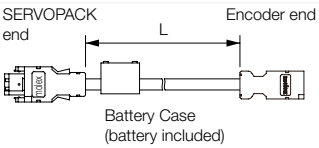
* Use Flexible Cables for moving parts of machines, such as robots. The recommended bending radius (R) is 90 mm or larger.

Encoder Cables of 20 m or less

Description	Length	Order Number		Appearance
		Standard Cable	Flexible Cable*	
Cables with Connectors on Both Ends (for incremental encoder)	3m	JZSP-CMP00-03-E	JZSP-CMP10-03-E	
	5m	JZSP-CMP00-05-E	JZSP-CMP10-05-E	
	10m	JZSP-CMP00-10-E	JZSP-CMP10-10-E	
	15m	JZSP-CMP00-15-E	JZSP-CMP10-15-E	
	20m	JZSP-CMP00-20-E	JZSP-CMP10-20-E	
Cables with Connectors on Both Ends (for absolute encoder: With Battery Case)	3m	JZSP-CSP19-03-E	JZSP-CSP29-03-E	
	5m	JZSP-CSP19-05-E	JZSP-CSP29-05-E	
	10m	JZSP-CSP19-10-E	JZSP-CSP29-10-E	
	15m	JZSP-CSP19-15-E	JZSP-CSP29-15-E	
	20m	JZSP-CSP19-20-E	JZSP-CSP29-20-E	

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

Encoder Extension Cables of 30 m to 50 m

Description	Length	Order Number	Appearance
Cables with Connectors on Both Ends (for incremental or absolute encoder)	30m	JZSP-UCMP00-30-E	
	40m	JZSP-UCMP00-40-E	
	50m	JZSP-UCMP00-50-E	
Cable with a Battery Case (Required when an absolute encoder is used.)*	0.3m	JZSP-CSP12-E	

Note: Encoder Extension cables can only be used together with suitable Encoder Cables.
* This Cable is not required if a battery is connected to the host controller.

Model Designations

SGM7A - 01 A 7 A 2 1

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

1st + 2nd digit - Rated output

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

Note: Readily available up to 1.5 kW. Others available on request.

3rd digit - Power supply voltage

Code	Specification
A	200 VAC

4th digit - Serial encoder

Code	Specification
6	24-bit batteryless absolute
7	24-bit absolute
F	24-bit incremental

5th digit - Design revision order

Code	Specification
A	Standard model

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

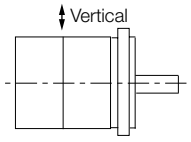
Specifications and Ratings

Specifications

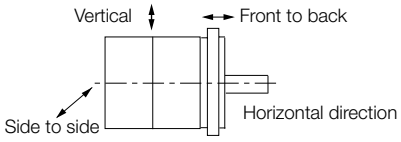
Voltage			200 V									
Model SGM7A-			A5A	01A	C2A, 02A	04A	06A. 08A	10A, 15A	20A	25A, 30A	40A, 50A	70A
Time Rating			Continuous									
Thermal Class			Models A5A to 10A: B; Models 15A to 70A: F									
Insulation Resistance			500 VDC, 10 MOhm min.									
Withstand Voltage			1,500 VAC for 1 minute									
Excitation			Permanent magnet									
Mounting			Flange mounted									
Drive Method			Direct drive									
Rotation Direction			Counterclockwise (CCW) for forward reference when viewed from the load side									
Vibration Class*1			V15									
Environmental Conditions	Surrounding Air Temperature		0 °C to 40 °C (With derating, usage is possible between 40 °C and 60 °C)*3									
	Surrounding Air Humidity		20% to 80% relative humidity (non-condensing)									
	Installation Site		• Must be indoors and free of corrosive and explosive gases. • Must be well-ventilated and free of dust and moisture. • Must facilitate inspection and cleaning. • Must have an altitude of 1,000 m or less. (With derating, usage is possible between 1,000 m and 2,000 m.)*3 • Must be free of strong magnetic fields.									
	Storage Environment		• Store the Servomotor in the following environment if you store it with the power cable disconnected. • Storage Temperature: -20 °C to 60 °C (with no freezing) • Storage Humidity: 20% to 80% relative humidity (non-condensing)									
Shock Resistance*2	Impact Acceleration Rate at Flange		490 m/s^2									
	Number of Impacts		2 times									
Vibration Resistance*2	Vibration Acceleration Rate at Flange		49 m/s^2 (Models 15A to 50A: 24.5 m/s^2 front to back)									14.7 m/s^2
Applicable SERVOPACKS		SGD7S-	R70A, R70F	R90A, R90F	1R6A, 2R1F	2R8A, 2R8F	5R5A	120A	180A	200A	330A	550A
		SGD7W- SGD7C-	1R6A*4	2R8A*4	1R6A, 2R8A*4	2R8A, 5R5A*4, 7R6A*4	5R5A, 7R6A	–				

Note: Readily available up to 1.5 kW. Others available on request.

*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 given values are for when the Servomotor shaft is mounted horizontally and shock or vibration is applied in the directions shown in the following figures. The strength of the vibration that the Servomotor can withstand depends on the application. Always check the vibration acceleration rate that is applied to the Servomotor with the actual equipment.



Shock Applied to the Servomotor



Vibration Applied to the Servomotor

*3 Refer to the Derating Rates section.
*4 If you use a Servomotor together with a Sigma-7W or Sigma-7C SERVOPACK, the control gain may not increase as much as with a Sigma-7S SERVOPACK and other performances may be lower than those achieved with a Sigma-7S SERVOPACK.

Ratings

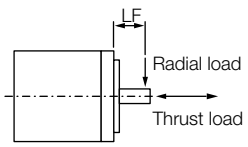
Voltage			200 V							
Model SGM7A-			A5A	01A	C2A	02A	04A	06A	08A	10A
Rated Output *1		W	50	100	150	200	400	600	750	1,000
Rated Torque *1, *2		Nm	0.159	0.318	0.477	0.637	1.27	1.91	2.39	3.18
Instantaneous Maximum Torque *1		Nm	0.557	1.11	1.67	2.23	4.46	6.69	8.36	11.1
Rated Current *1		A	0.57	0.89	1.5	1.5	2.4	4.5	4.4	6.4
Instantaneous Maximum Current *1		A	2.1	3.2	5.6	5.9	9.3	16.9	16.8	23.2
Rated Motor Speed *1		min^{-1}	3000							
Maximum Motor Speed		min^{-1}	6000							
Torque Constant		Nm/A	0.307	0.387	0.335	0.461	0.582	0.461	0.590	0.547
Motor Moment of Inertia		$\times10^{-4}$ 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	73,200 (53,500)	94,300 (76,200)	104,000 (88,600)	45,800 (30,400)	58,700 (44,400)	60,600 (49,600)	30,800 (25,000)	32,700 (27,600)
Derating Rate for Servomotor with Oil Seal		%	80		90		95			
Heat Sink Size (Aluminium)		mm	200 × 200 × 6		250 × 250 × 6			300 × 300 × 12 *7	250 × 250 × 6	300 × 300 × 12
Protective Structure *3			Totally enclosed, self-cooled, IP67							
Holding Brake Specifications *4	Rated Voltage	V	24 VDC±10%							
	Capacity	W		5.5		6			6.5	
	Holding Torque	Nm	0.159	0.318	0.477	0.637	1.27	1.91	2.39	3.18
	Coil Resistance	Ω (at 20 °C)		104.8±10%		96±10%			88.6±10%	
	Rated Current	A (at 20 °C)		0.23		0.25			0.27	
	Time Required to Release Brake	ms			60				80	
	Time Required to Brake	ms	100							
Allowable Load Moment of Inertia (Motor Moment of Inertia Ratio)			40 times			30 times	20 times		20 times	
	With External Regenerative Resistor and Dynamic Brake Resistor								30 times	
Allowable Shaft Load *5	LF	mm	20			25			35	
	Allowable Radial Load	N	78			245			392	
	Allowable Thrust Load	N	54			74			147	

Note: Readily available up to 1.5 kW. Others available on request.

Notes:
*1. These values are for operation in combination with a SERVOPACK when the temperature of the armature winding is 100°C. The values for other items are at 20°C. These are typical values.
*2. The rated torques are the continuous allowable torque values at a surrounding air temperature of 40°C with an aluminum heat sink of the dimensions given in the table.
*3. Refer to the Servomotor Heat Dissipation Conditions section for the relation between the heat sinks and derating rate.
*4. This does not apply to the shaft opening. Protective structure specifications apply only when the special cable is used.
*5. Observe the following precautions if you use a Servomotor with a Holding Brake.
- The holding brake cannot be used to stop the Servomotor.
- The time required to release the brake and the time required to brake depend on which discharge circuit is used. Confirm that the operation delay time is appropriate for the actual equipment.
- The 24-VDC power supply is not provided by YASKAWA.

*6. The motor moment of inertia scaling factor is the value for a standard Servomotor without a Holding Brake.
*7. To externally connect a dynamic brake resistor, select hardware option specification 020 for the SERVOPACK. However, you cannot externally connect a dynamic brake resistor if you use the following SERVOPACKs (maximum applicable motor capacity: 400 W).
- SGD7S-R70□□□A020 to -2R8□□□A020
- SGD7W-1R6A20A020 to -2R8A20A020
- SGD7C-1R6AMAA020 to -2R8AMAA020

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



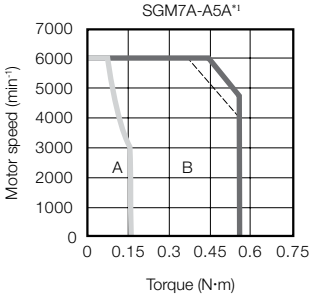
*9. If the heat sink is 250 mm × 250 mm × 6 mm, the rated output is 550 W and the rated torque is 1.75 N·m. Refer to the Servomotor Heat Dissipation Conditions section for details.

Torque-Motor Speed Characteristics

A : Continuous duty zone
B : Intermittent duty zone

——— (solid lines): With three-phase 200-V or single-phase 230-V input
- - - - - - - - (dotted lines): With single-phase 200-V input
— – — (dashed-dotted lines): With single-phase 100-V input

SGM7A-A5A*1



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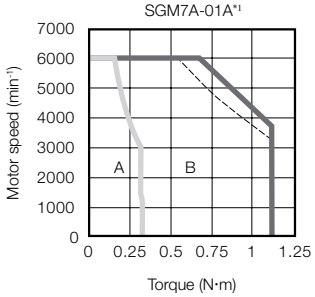
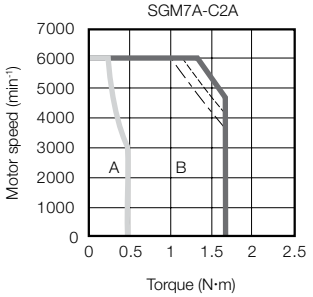
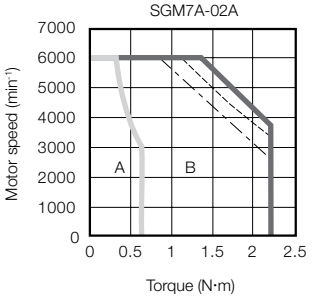


SGM7A-C2A



SGM7A-02A



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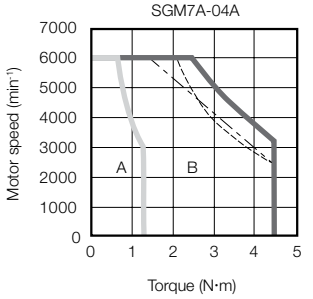

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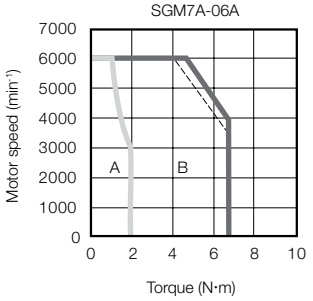

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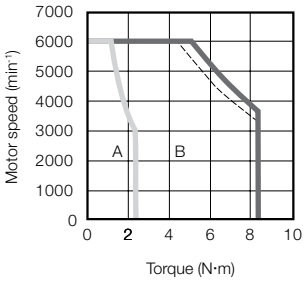
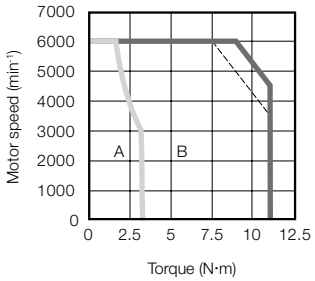


SGM7A-10A*2



* The characteristics are the same for three-phase 200 V and single-phase 200 V.
A single-phase power input can be used in combination with the SGD7S-120A□□A008.

Notes:
1. These values are for operation in combination with a SERVOPACK when the temperature of the armature winding is 100 °C. These are typical values.
2. The characteristics in the intermittent duty zone depend on the power supply voltage.
3. If the effective torque is within the allowable range for the rated torque, the Servomotor can be used within the intermittent duty zone.
4. If you use a Servomotor Motor Power Cable that exceeds 20 m, the intermittent duty zone in the torquemotor speed characteristics will become smaller because the voltage drop increases.

Ratings continued

Model SGM7A-			15A	20A	25A	30A	40A	50A	70A
Rated Output *1		kW	1.5	2.0	2.5	3.0	4.0	5.0	7.0
Rated Torque *1, *2		Nm	4.90	6.36	7.96	9.80	12.6	15.8	22.3
Instantaneous Maximum Torque *1		Nm	14.7	19.1	23.9	29.4	37.8	47.6	54.0
Rated Current *1		A	9.3	12.1	15.6	17.9	25.4	27.6	38.3
Instantaneous Maximum Current *1		A	28	42	51	56	77	84	105
Rated Motor Speed *1		min^{-1}	3,000						
Maximum Motor Speed *1		min^{-1}	6,000*9						
Torque Constant		Nm/A	0.590	0.561	0.538	0.582	0.519	0.604	0.604
Motor Moment of Inertia		$\times10^{-4}$ kg·m^2	2.00	2.47	3.19	7.00	9.60	12.3	12.3
	with holding brake		2.25	2.72	3.44	9.20	11.8	14.5	–
	with batteryless absolute encoder		2.00	2.47	3.19	7.00	9.60	12.3	12.3
Rated Power Rate *1		kW/s	120	164	199	137	165	203	404
	with holding brake		106	148	184	104	134	172	–
Rated Angular Acceleration Rate *1		rad/s^2	24,500	25,700	24,900	14,000	13,100	12,800	18,100
	with holding brake		21,700	23,300	23,100	10,600	10,600	10,800	–
Heat Sink Size*3		mm	300 × 300 × 12			400 × 400 × 20			
Protective Structure*4			Totally enclosed, self-cooled, IP67						Totally enclosed, separately cooled (with fan), IP22
Holding Brake Specifications *5	Rated Voltage	V	24 VDC +10% 0						–
	Capacity	W	12			10			
	Holding Torque	Nm	7.84		10	20			
	Coil Resistance	Ω (at 20 °C)	48			59			
	Rated Current	A (at 20 °C)	0.5			0.41			
	Time Required to Release Brake	ms	170			100			
	Time Required to Brake	ms	80						
Allowable Load Moment of Inertia (Motor Moment of Inertia Ratio)*6			10 times			5 times			
	With External Regenerative Resistor and Dynamic Brake Resistor*7		20 times			15 times			
Allowable Shaft Load *8	LF	mm	45			63			
	Allowable Radial Load	N	686			980	1,176		
	Allowable Thrust Load	N	196			392			

Note: Readily available up to 1.5 kW. Others available on request.

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

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

*3. Refer to the Servomotor Heat Dissipation Conditions section for the relation between the heat sinks and derating rate.

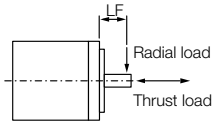
*4. This does not apply to the shaft opening. Protective structure specifications apply only when the special cable is used.

*5. Observe the following precautions if you use a Servomotor with a Holding Brake.
- The holding brake cannot be used to stop the Servomotor.
- The time required to release the brake and the time required to brake depend on which discharge circuit is used. Confirm that the operation delay time is appropriate for the actual equipment.
- The 24-VDC power supply is not provided by YASKAWA.

*6. The motor moment of inertia scaling factor is the value for a standard Servomotor without a Holding Brake.

*7. To externally connect a dynamic brake resistor, select hardware option specification 020 for the SERVOPACK. However, you cannot externally connect a dynamic brake resistor if you use the following SERVOPACKs (maximum applicable motor capacity: 400 W).
- SGD7S-R70□□□A020 to -2R8□□□A020
- SGD7W-1R6A20A020 to -2R8A20A020
- SGD7C-1R6AMAA020 to -2R8AMAA020

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

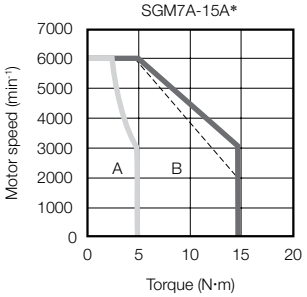


*9. For the SGM7A-25A or SGM7A-50A, the maximum motor speed for the continuous duty zone is 5,000 min^{-1}. Use the Servomotor within the continuous duty zone for the average motor speed and effective torque.

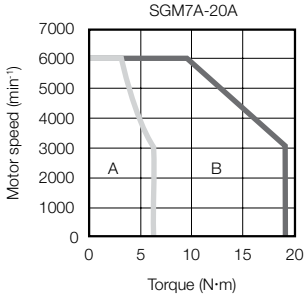
Torque-Motor Speed Characteristics

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

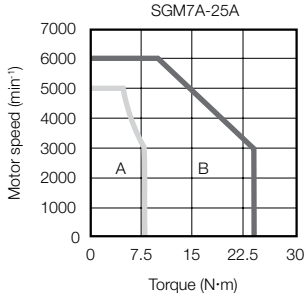
SGM7A-15A*



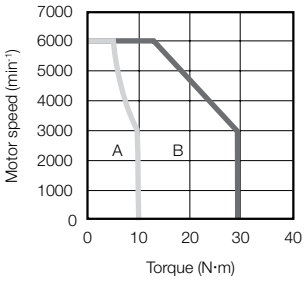
SGM7A-20A



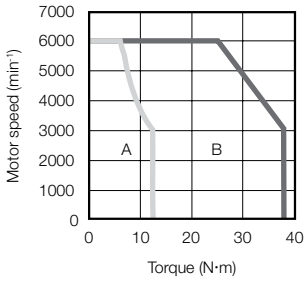
SGM7A-25A



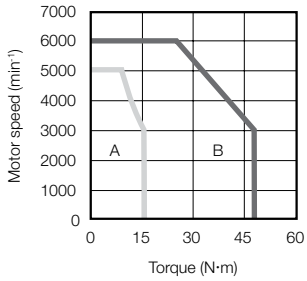
SGM7A-30A



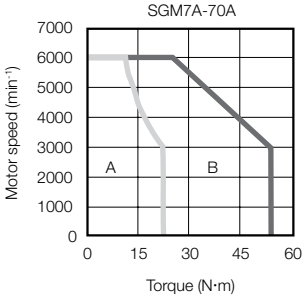
SGM7A-40A



SGM7A-50A



SGM7A-70A



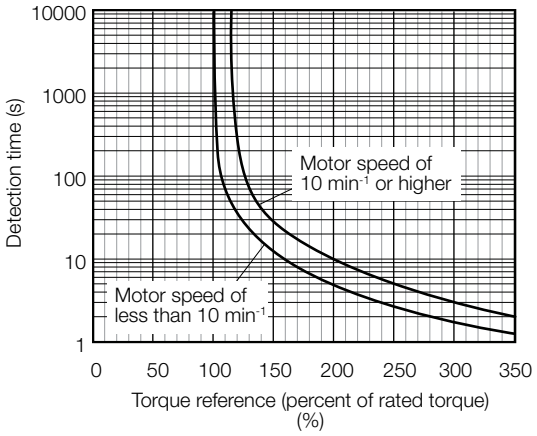
* A single-phase power input can be used in combination with the SGD7S-120A□□A008.

Notes:
1 These values are for operation in combination with a SERVOPACK when the temperature of the armature winding is 20 °C. These are typical values.
2 The characteristics in the intermittent duty zone depend on the power supply voltage.
3 If the effective torque is within the allowable range for the rated torque, the Servomotor can be used within the intermittent duty zone.
4 If you use a Servomotor Motor Power Cable that exceeds 20 m, the intermittent duty zone in the torquemotor speed characteristics will become smaller because the voltage drop increases.

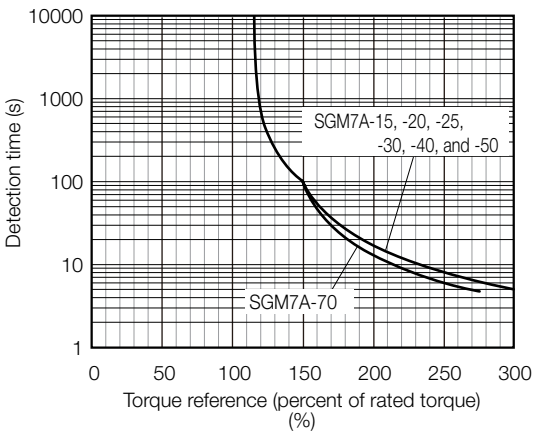
Servomotor Overload Protection Characteristics

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

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



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



Note:

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

Allowable Load Moment of Inertia

The load moment of inertia indicates the inertia of the load. The larger the load moment of inertia, the worse the response. If the moment of inertia is too large, operation will become unstable.
Refer to Servomotor Ratings. This value is provided strictly as a guideline and results depend on Servomotor driving conditions. Use the SigmaJunmaSize+ AC Servo Drive Capacity Selection Program to check the driving conditions. Contact your YASKAWA representative for information on this program.

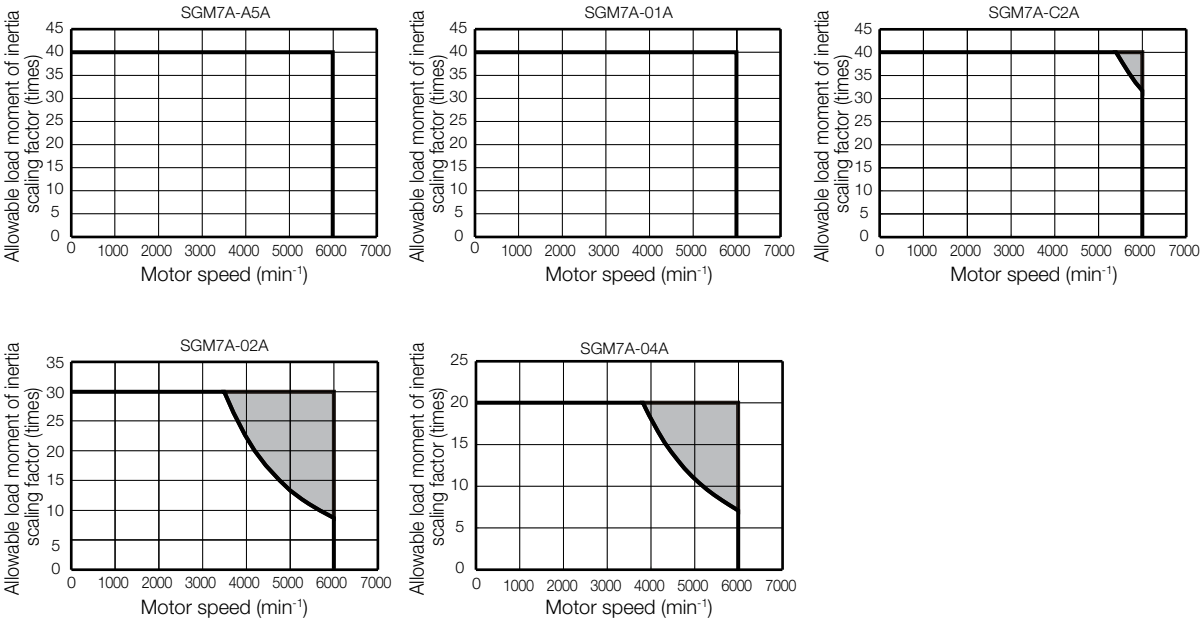
An Overvoltage Alarm (A.400) is likely to occur during deceleration if the load moment of inertia exceeds the allowable load moment of inertia. SERVOPACKs with a built-in regenerative resistor may generate a Regenerative Overload Alarm (A.320). Perform one of the following steps if this occurs.

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

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

SERVOPACKs without built-in Regenative Resistors

The following graph shows the allowable load moment of inertia scaling factor of the motor speed (reference values for deceleration operation at or above the rated torque). Application is possible without an external regenerative resistor within the allowable value. However, an External Regenerative Resistor is required in the shaded areas of the graphs.



Note: Applicable SERVOPACK models: SGD7S-R70A, -R90A, -1R6A, -2R8A, -R70F, -R90F, -2R1F, and -2R8F

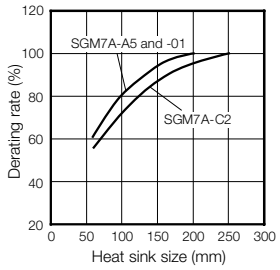
When an External Regenerative Resistor Is Required

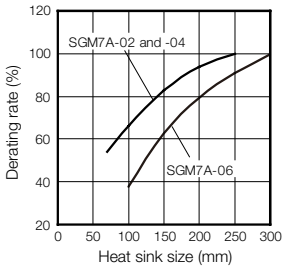
Install the External Regenerative Resistor. Refer to the External Regenerative Resistors section for the recommended products.

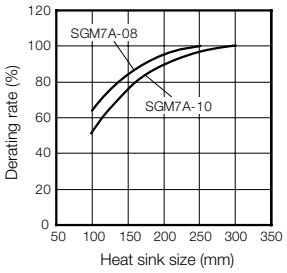
Derating Rates

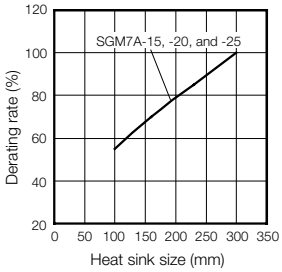
Servomotor Heat Dissipation Conditions

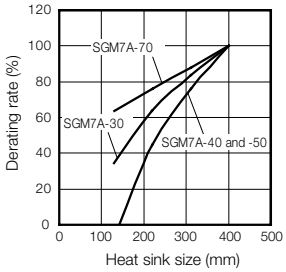
The Servomotor ratings are the continuous allowable values at a surrounding air temperature of 40°C when a heat sink is installed on the Servomotor. If the Servomotor is mounted on a small device component, the Servomotor temperature may rise considerably because the surface for heat dissipation becomes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









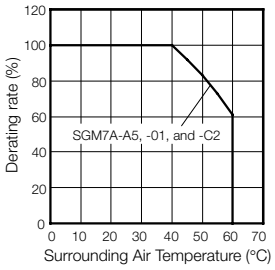


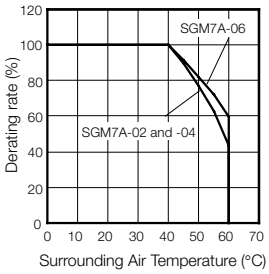
Important

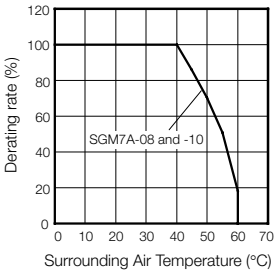
The actual temperature rise depends on how the heat sink (i.e., the Servomotor mounting section) is attached to the installation surface, what material is used for the Servomotor mounting section, and the motor speed. Always check the Servomotor temperature with the actual equipment.

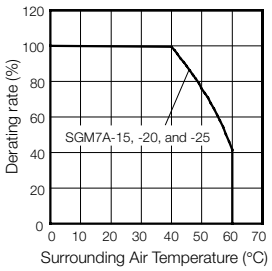
Applications Where the Surrounding Air Temperature Exceeds 40°C

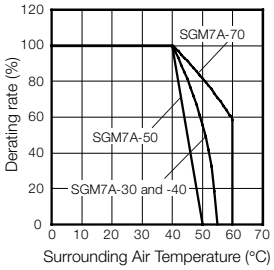
The Servomotor ratings are the continuous allowable values at a surrounding air temperature of 40°C. If you use a Servomotor at a surrounding air temperature that exceeds 40°C (60°C max.), apply a suitable derating rate from the following graphs.





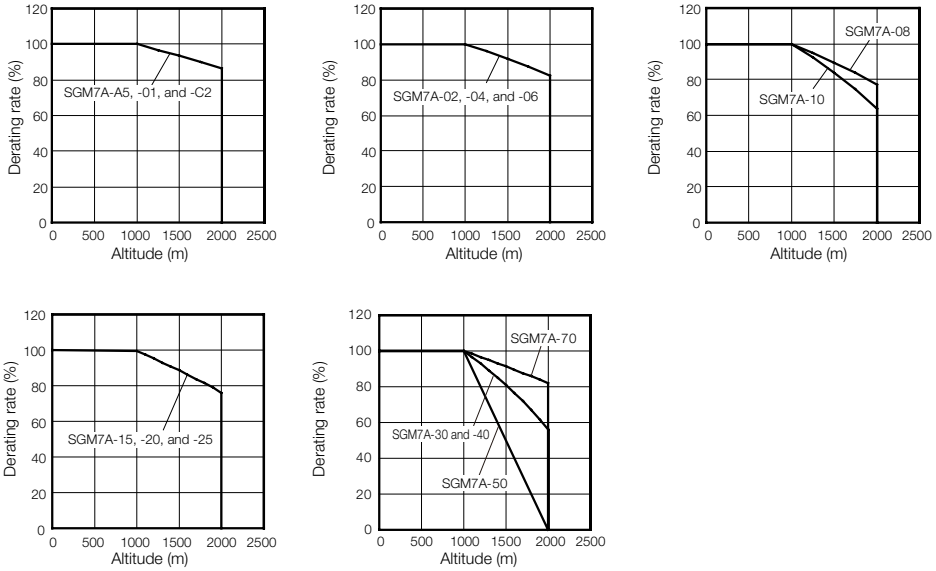






Applications Where the Altitude Exceeds 1,000 m

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.



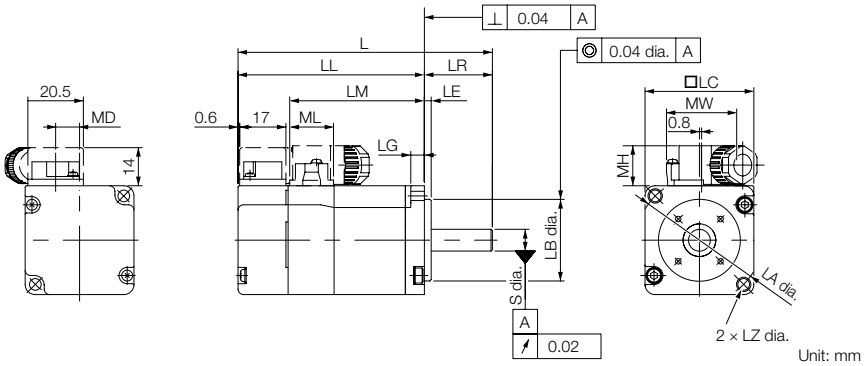
Information
When using Servomotors with derating, change the detection timing of overload warning and overload alarm based on the overload detection level of the motor given in “Servomotor Overload Protection Characteristics”.

Note
1. Use the combination of the SERVOPACK and Servomotor so that the derating conditions are satisfied for both the SERVOPACK and Servomotor.
2. The derating rates are applicable only when the average motor speed is less than or equal to the rated motor speed. If the average motor speed exceeds the rated motor speed, consult with your Yaskawa representative.

External Dimensions

Servomotors

SGM7A-A5, -01, -C2



Unit: mm

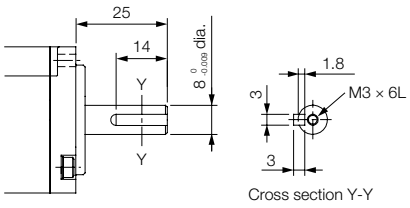
Model SMG7A	L*	LL*	LM	Flange Dimensions							S	MD	MW	MH	ML	Approx. Mass [kg]
				LR	LE	LG	LC	LA	LB	LZ						
A5A□A2□	81.5 (122)	56.5 (97)	37.9	25	2.5	5	40	46	$30^{0}_{-0.021}$	4.3	$8^{0}_{-0.009}$	8.8	25.8	14.7	16.1	0.3 (0.6)
01A□A2□	93.5 (134)	68.5 (109)	49.9	25	2.5	5	40	46	$30^{0}_{-0.021}$	4.3	$8^{0}_{-0.009}$	8.8	25.8	14.7	16.1	0.4 (0.7)
C2A□A2□	105.5 (153.5)	80.5 (128.5)	61.9	25	2.5	5	40	46	$30^{0}_{-0.021}$	4.3	$8^{0}_{-0.009}$	8.8	25.8	14.7	16.1	0.5 (0.8)

* For models that have a batteryless absolute encoder, L and LL are 8 mm greater than the given value. Refer to the Dimensions of Servomotors with Batteryless Absolute Encoders section for the values for individual models.

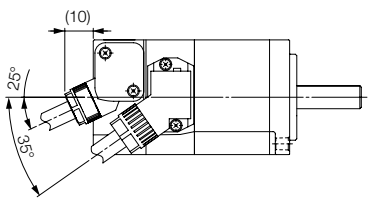
Notes:
1 The values in parentheses are for Servomotors with Holding Brakes.
2The values for a straight, without key specification are given. Refer to the information given below for other shaft end specifications and option specifications.

Shaft End Specifications

Straight with Key and Tap

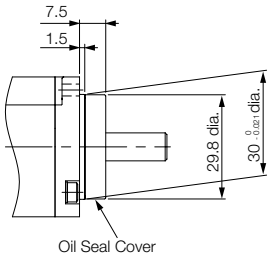


With Two Flat Seats

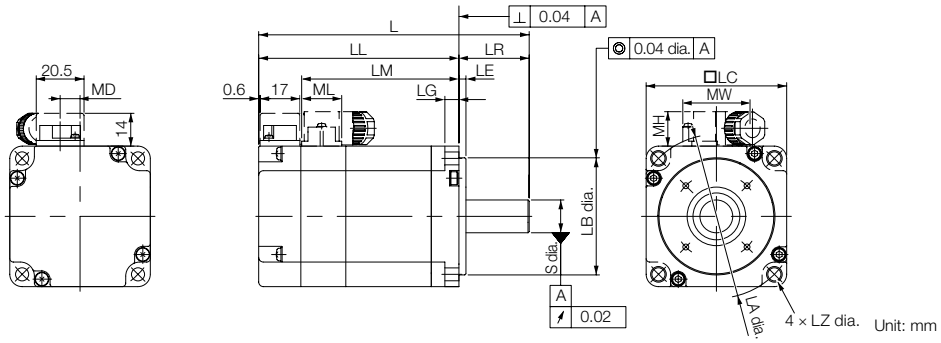


Specification of Options

Oil Seal



SGM7A-02, -04 and -06



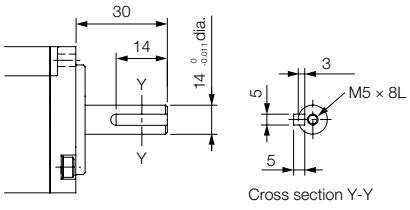
Model SMG7A	L*	LL*	LM	Flange Dimensions							S	MD	MW	MH	ML	Approx. Mass [kg]
				LR	LE	LG	LC	LA	LB	LZ						
02A□A2□	99.5 (140)	69.5 (110)	51.2	30	3	6	60	70	$50^{0}_{-0.025}$	5.5	$14^{0}_{-0.011}$	8.5	28.7	14.7	17.1	0.8 (1.4)
04A□A2□	115.5 (156)	85.5 (126)	67.2	30	3	6	60	70	$50^{0}_{-0.025}$	5.5	$14^{0}_{-0.011}$	8.5	28.7	14.7	17.1	1.2 (1.8)
06A□A2□	137.5 (191.5)	107.5 (161.5)	89.2	30	3	6	60	70	$50^{0}_{-0.025}$	5.5	$14^{0}_{-0.011}$	8.5	28.7	14.7	17.1	1.6 (2.2)

* For models that have a batteryless absolute encoder, L and LL are 8 mm greater than the given value. Refer to the Dimensions of Servomotors with Batteryless Absolute Encoders section for the values for individual models.

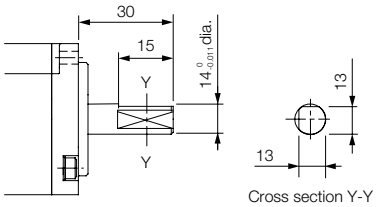
Notes:
1 The values in parentheses are for Servomotors with Holding Brakes.
2 The values for a straight, without key specification are given. Refer to the information given below for other shaft end specifications and option specifications.

Shaft End Specifications

Straight with Key and Tap

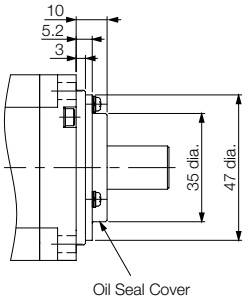


With Two Flat Seats

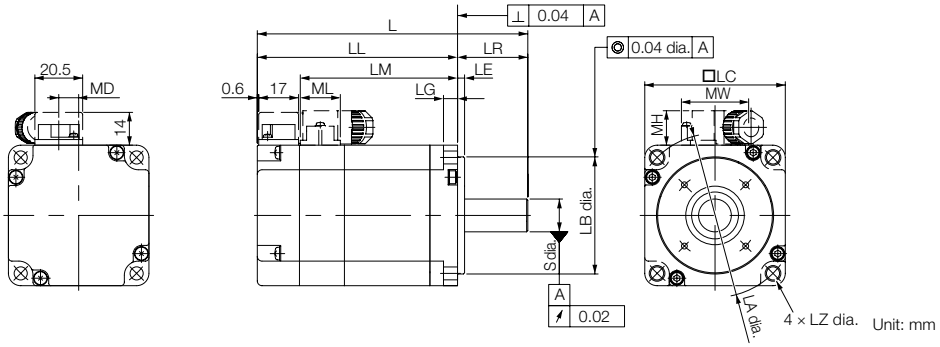


Specification of Options

Oil Seal



SGM7A-08 and -10



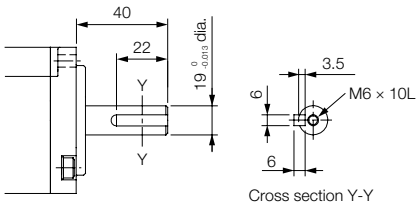
Model SMG7A	L*	LL*	LM	Flange Dimensions							S	MD	MW	MH	ML	Approx. Mass [kg]
				LR	LE	LG	LC	LA	LB	LZ						
08A□A2□	137 (184)	97 (144)	78.5	40	3	8	80	90	$70^{0}_{-0.030}$	7	$19^{0}_{-0.013}$	13.6	38	14.7	19.3	2.3 (2.9)
10A□A2□	162 (209)	122 (169)	103.5	40	3	8	80	90	$70^{0}_{-0.030}$	7	$19^{0}_{-0.013}$	13.6	38	14.7	19.3	3.1 (3.7)

* For models that have a batteryless absolute encoder, L and LL are 8 mm greater and the approximate mass is 0.1 kg greater than the given value. Refer to the Dimensions of Servomotors with Batteryless Absolute Encoders section for the values for individual models.

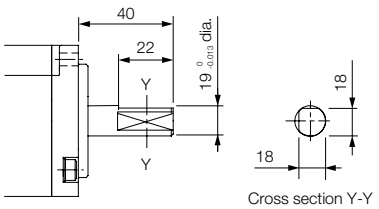
Notes:
1. The values in parentheses are for Servomotors with Holding Brakes.
2. The values for a straight, without key specification are given. Refer to the information given below for other shaft end specifications and option specifications.

Shaft End Specifications

Straight with Key and Tap

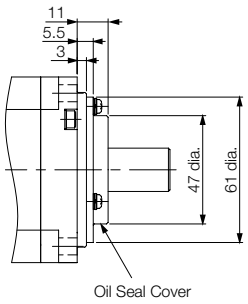


With Two Flat Seats



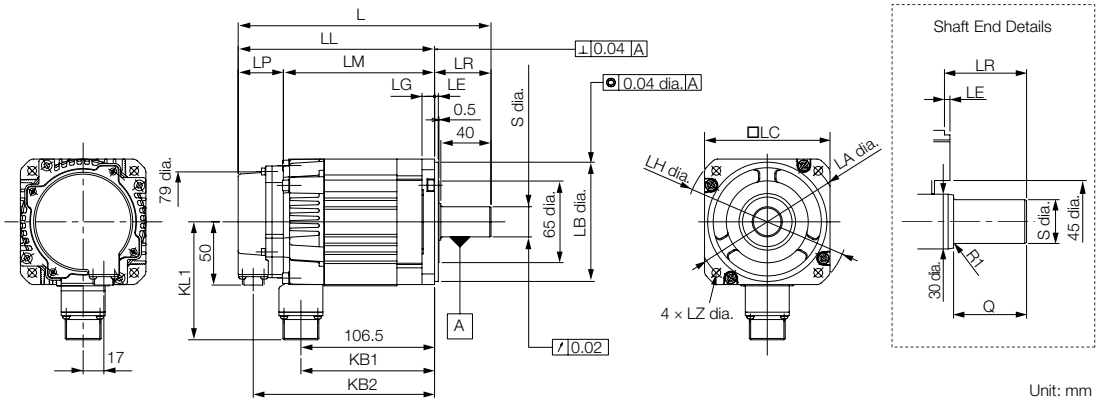
Specification of Options

Oil Seal



Servomotors without Holding Brakes

SGM7A-15, -20, and -25



Unit: mm

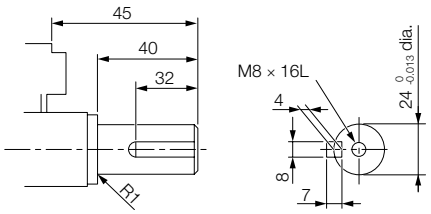
Model SGM7A-	L*	LL*	LM	LP	LR	KB1	KB2*	KL1	Flange Dimensions							Shaft End Dimensions		Approx. Mass[kg]
									LA	LB	LC	LE	LG	LH	LZ	S	Q	
15A□A21	202	157	121	36	45	107	145	94	115	$95^{0}_{-0.035}$	100	3	10	130	7	$24^{0}_{-0.013}$	40	4.6
20A□A21	218	173	137	36	45	123	161	94	115	$95^{0}_{-0.035}$	100	3	10	130	7	$24^{0}_{-0.013}$	40	5.4
25A□A21	241	196	160	36	45	146	184	94	115	$95^{0}_{-0.035}$	100	3	10	130	7	$24^{0}_{-0.013}$	40	6.8

* For models that have a batteryless absolute encoder, L, LL, LP, and KB2 are 8 mm greater than the given value. Refer to the Dimensions of Servomotors with Batteryless Absolute Encoders section for the values for individual models.

Notes:
1 The values in parentheses are for Servomotors with Holding Brakes.
2 The values for a straight, without key specification are given. Refer to the information given below for other shaft end specifications and option specifications.

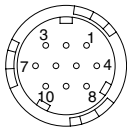
Shaft End Specifications

Straight with Key and Tap



Connector Specifications

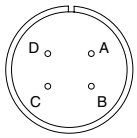
Encoder Connector (24-bit Encoder)



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

* A battery is required only for an absolute 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.

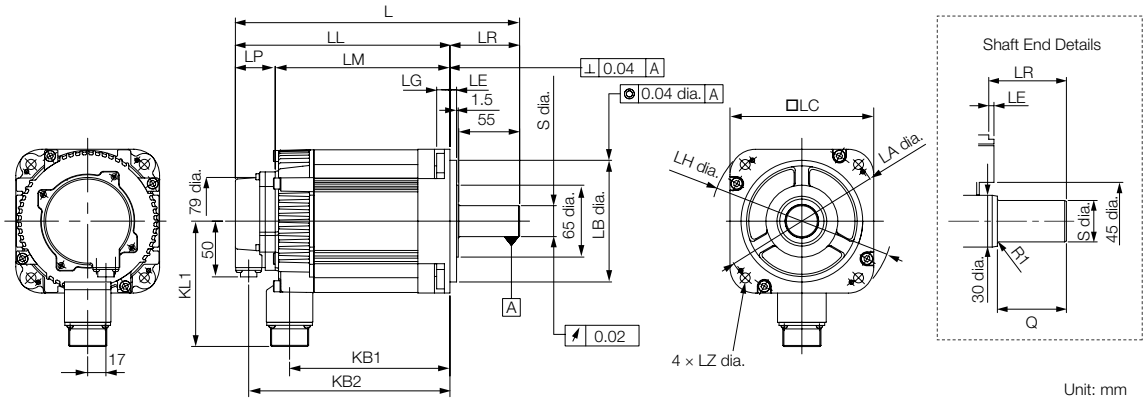
Servomotor Connector



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

Manufacturer: DDK Ltd.

SGM7A-30, -40, and -50



Unit: mm

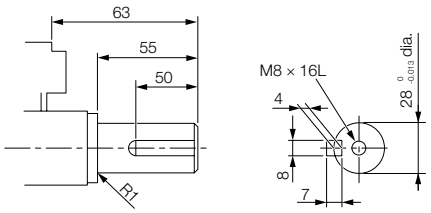
Model SGM7A-	L*	LL*	LM	LP	LR	KB1	KB2*	KL1	Flange Dimensions							Shaft End Dimensions		Approx. Mass[kg]
									LA	LB	LC	LE	LG	LH	LZ	S	Q	
30A□A21	257	194	158	36	63	145	182	114	145	$110^{0}_{-0.035}$	130	6	12	165	9	$28^{0}_{-0.013}$	55	10.5
40A□A21	296	233	197	36	63	184	221	114	145	$110^{0}_{-0.035}$	130	6	12	165	9	$28^{0}_{-0.013}$	55	13.5
50A□A21	336	273	237	36	63	224	261	114	145	$110^{0}_{-0.035}$	130	6	12	165	9	$82^{0}_{-0.013}$	55	16.5

* For models that have a batteryless absolute encoder, L, LL, LP, and KB2 are 8 mm greater than the given value. Refer to the Dimensions of Servomotors with Batteryless Absolute Encoders section for the values for individual models.

Notes:
1 The values in parentheses are for Servomotors with Holding Brakes.
2 The values for a straight, without key specification are given. Refer to the information given below for other shaft end specifications and option specifications.

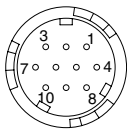
Shaft End Specifications

Straight with Key and Tap



Connector Specifications

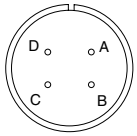
Encoder Connector (24-bit Encoder)



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

* A battery is required only for an absolute 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.

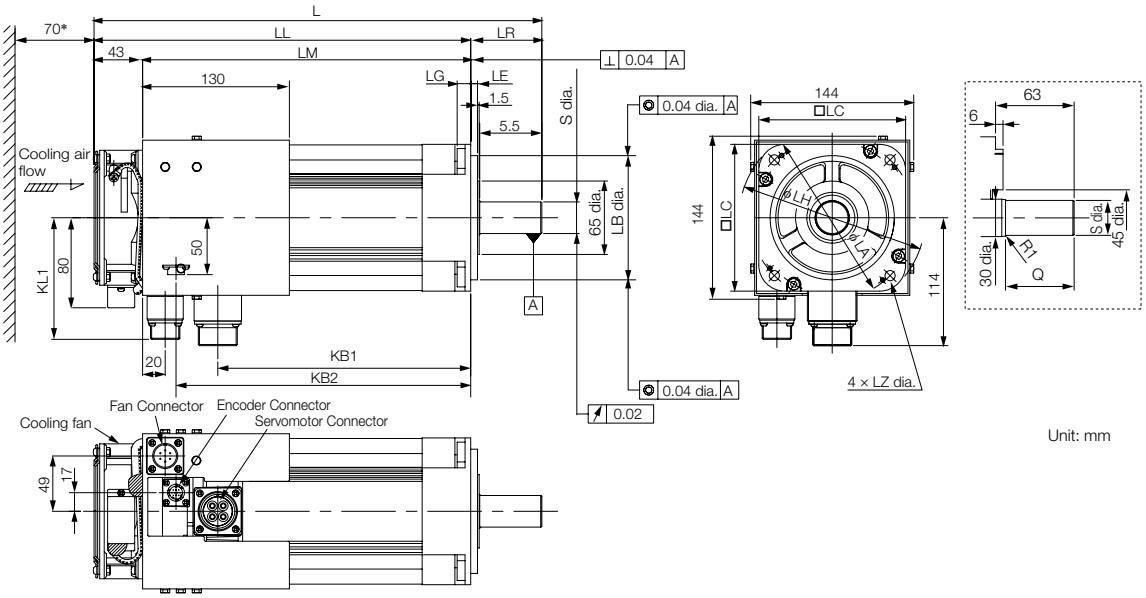
Servomotor Connector



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

Manufacturer: DDK Ltd.

SGM7A-70



* Leave a minimum space of 70 mm around the Servomotor from walls and other equipment to allow for a sufficient amount of cooling air.

Model SGM7A-	L	LL	LM	LR	KB1	KB2*	KL1	Flange Dimensions							Shaft End Dimensions		Approx. Mass[kg]
								LA	LB	LC	LE	LG	LH	LZ	S	Q	
70A□A21	397	334	291	63	224	261	108	145	$110^{0}_{-0.035}$	130	6	12	165	9	$28^{0}_{-0.013}$	55	18.5

* For models that have a batteryless absolute encoder, KB2 are 8 mm greater than the given value. Refer to the Dimensions of Servomotors with Batteryless Absolute Encoders section for the values for individual models.

Notes:
1 The values in parentheses are for Servomotors with Holding Brakes.
2 The values for a straight, without key specification are given. Refer to the information given below for other shaft end specifications and option specifications.

Cooling Fan Specifications

Single-phase, 200 V
50/60 Hz
17/15 W
0.11/0.09 A

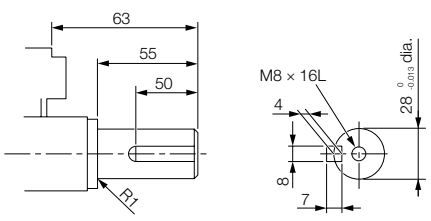
Specifications of Fan Operation Error Detector

Contact Capacity
- Maximum allowable voltage: 350 V (AC/DC)
- Maximum allowable current: 120 mA (AC/ DC)
- Maximum controllable power: 360 mW

Alarm Contacts
- ON for normal fan rotation.
- OFF at 1,680 ± 100 min-1 max.
- OFF for 3 seconds at startup.

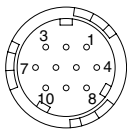
Shaft End Specifications

Straight with Key and Tap



Connector Specifications

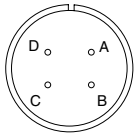
Encoder Connector (24-bit Encoder)



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

* A battery is required only for an absolute 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.

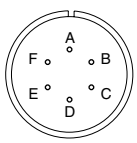
Servomotor Connector



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

Manufacturer: DDK Ltd.

Fan Connector

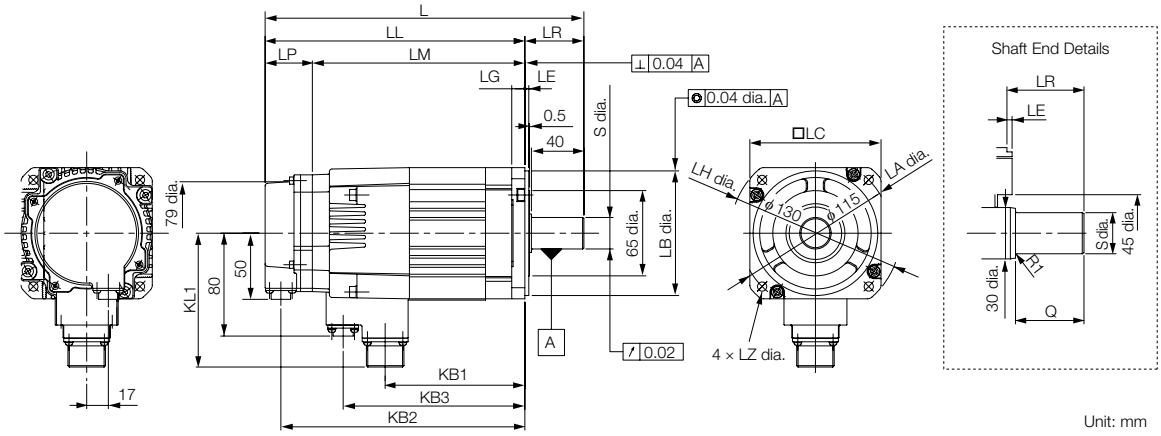


A	Fan motor	D	Alarm pin
B	Fan motor	E	Alarm pin
C	–	F	FG (frame ground)

Receptacle: MS3102A14S-6P
Applicable Plug (Available from Yaskawa Controls Co., Ltd.)
Plug: MS3108B14S-6S
Cable Clamp: MS3057-6A
Note: The Servomotor Connector (receptacle) is RoHS compliant.Contact the connector manufacturer for RoHS-compliant cable-side connectors (not provided by Yaskawa).

Servomotors with Holding Brakes

SGM7A-15, -20, and -25



Unit: mm

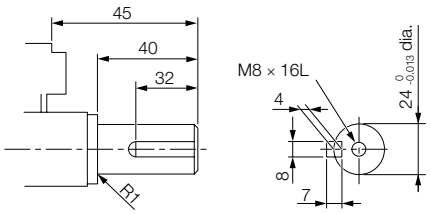
Model SGM7A-	L*	LL*	LM	LP	LR	KB1	KB2*	KB3	KL1	Flange Dimensions							Shaft End Dimensions		Approx. Mass[kg]
										LA	LB	LC	LE	LG	LH	LZ	S	Q	
15A□A2C	243	198	162	36	45	107	186	139	102	115	$95^{0}_{-0.035}$	100	3	10	130	7	$24^{0}_{-0.013}$	40	6.0
20A□A2C	259	214	178	36	45	123	202	155	102	115	$95^{0}_{-0.035}$	100	3	10	130	7	$24^{0}_{-0.013}$	40	6.8
25A□A2C	292	247	211	36	45	156	235	188	102	115	$95^{0}_{-0.035}$	100	3	10	130	7	$24^{0}_{-0.013}$	40	8.7

* For models that have a batteryless absolute encoder, L, LL, LP, and KB2 are 8 mm greater than the given value. Refer to the Dimensions of Servomotors with Batteryless Absolute Encoders section for the values for individual models.

Notes:
1 The values in parentheses are for Servomotors with Holding Brakes.
2 The values for a straight, without key specification are given. Refer to the information given below for other shaft end specifications and option specifications.

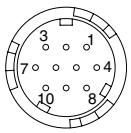
Shaft End Specifications

Straight with Key and Tap



Connector Specifications

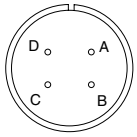
Encoder Connector (24-bit Encoder)



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

* A battery is required only for an absolute 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.

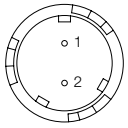
Servomotor Connector



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

Manufacturer: DDK Ltd.

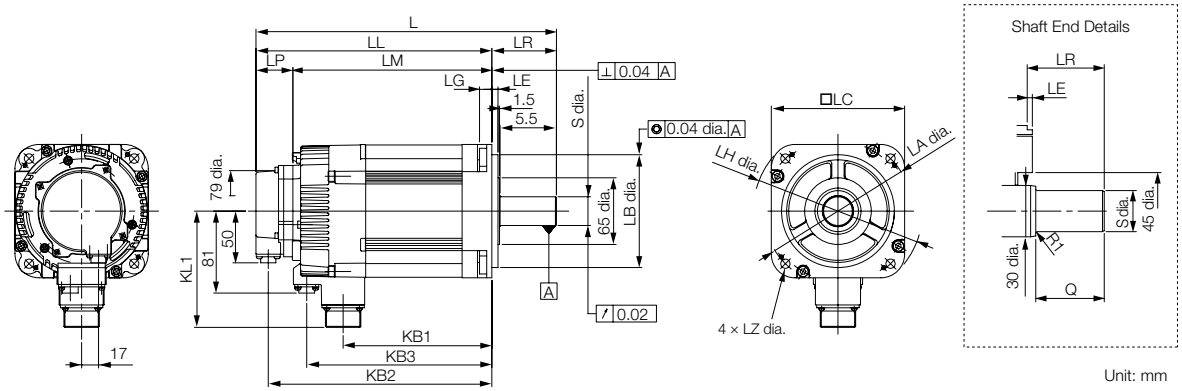
Brake Connector



1	Brake terminal
2	Brake terminal

Note: There is no voltage polarity for the brake terminals.
Receptacle: CM10-R10P-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.

SGM7A-30, -40, and -50



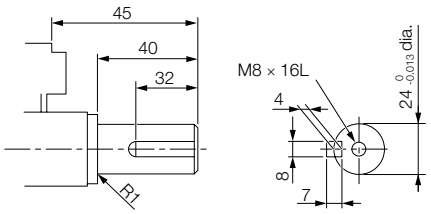
Model SGM7A-	L*	LL*	LM	LP	LR	KB1	KB2*	KB3	KL1	Flange Dimensions							Shaft End Dimensions		Approx. Mass[kg]
										LA	LB	LC	LE	LG	LH	LZ	S	Q	
30A□A2C	293	232	196	36	63	145	220	181	119	145	$110^{0}_{-0.035}$	130	6	12	165	9	$28^{0}_{-0.013}$	55	13
40A□A2C	332	269	233	36	63	184	257	220	119	145	$110^{0}_{-0.035}$	130	6	12	165	9	$28^{0}_{-0.013}$	55	16
50A□A2C	372	309	273	36	63	224	297	260	119	145	$110^{0}_{-0.035}$	130	6	12	165	9	$28^{0}_{-0.013}$	55	19

* For models that have a batteryless absolute encoder, L, LL, LP, and KB2 are 8 mm greater than the given value. Refer to the Dimensions of Servomotors with Batteryless Absolute Encoders section for the values for individual models.

Notes:
1 The values in parentheses are for Servomotors with Holding Brakes.
2 The values for a straight, without key specification are given. Refer to the information given below for other shaft end specifications and option specifications.

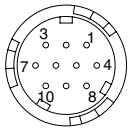
Shaft End Specifications

Straight with Key and Tap



Connector Specifications

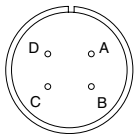
Encoder Connector (24-bit Encoder)



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

* A battery is required only for an absolute 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.

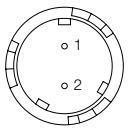
Servomotor Connector



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

Manufacturer: DDK Ltd.

Brake Connector



1	Brake terminal
2	Brake terminal

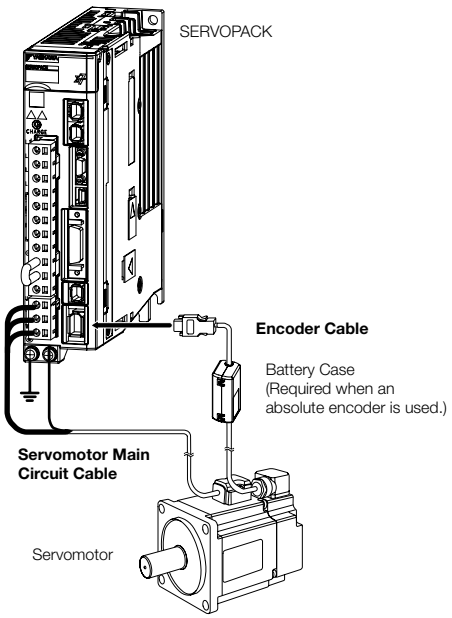
Note: There is no voltage polarity for the brake terminals.
Receptacle: CM10-R10P-D
Applicable plug: Not provided by Yaskawa.
Plug: CM10-AP2S-□-D for Right-angle Plug
CM10-SP2S-□-D for Straight Plug
(□ depends on the applicable cable size.)
Manufacturer: DDK Ltd.

Selecting Cables SGM7A

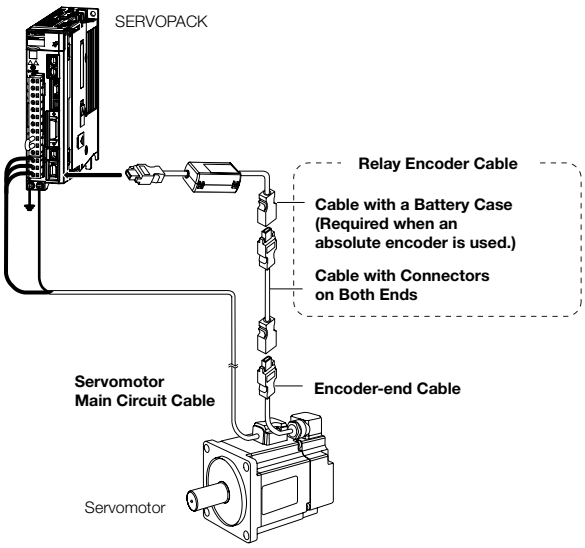
Cable Configurations

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

Encoder Cable of 20 m or less



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



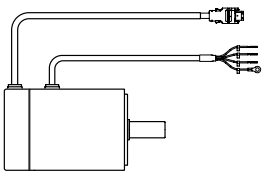
Note:
1. Cables with connectors on both ends that are compliant with an IP67 protective structure and European Safety Standards are not available from YASKAWA for the SGM7A-15A to SGM7A-70A Servomotors. You must make such a cable yourself. Use the Connectors specified by YASKAWA for these Servomotors. (These Connectors are compliant with the standards.) YASKAWA does not specify what wiring materials to use.
2. If the Encoder Cable length exceeds 20 m, be sure to use a Relay Encoder Cable.
3. If you use a Servomotor Motor Power Cable that exceeds 20 m, the intermittent duty zone in the torquemotor speed characteristics will become smaller because the voltage drop increases.
4. Refer to the following manual for the following information.
   - Cable dimensional drawings and cable connection specifications
   - Order numbers and specifications of individual connectors for cables
   - Order numbers and specifications for wiring materials

   Sigma-7-Series AC Servo Drive Peripheral Device Selection Manual (Manual No.: SIEP S800001 32)

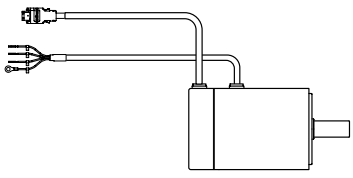
Important

For the SGM7A-A5 to -10, there are different order numbers for the Servomotor Motor Power Cables and Encoder Cables depending on the cable installation direction. Confirm the order numbers before you order.

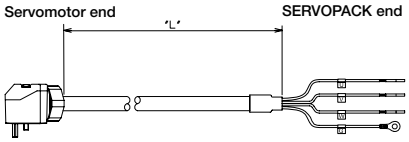
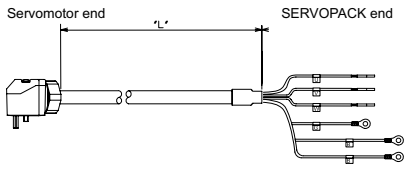
Cable installed towards Load



Cable installed away from Load

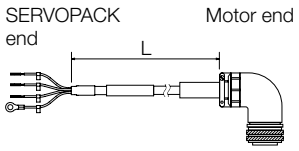
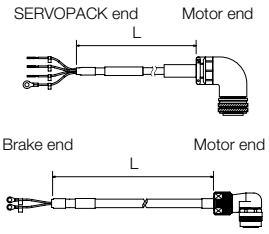
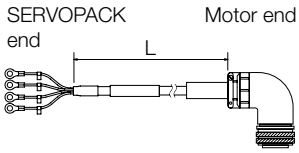
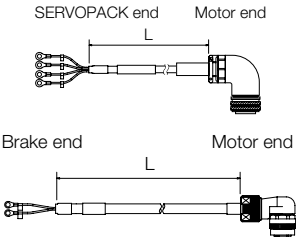


Servomotor Motor Power Cables

Servomotor Model	Description	Length	Order Number Flexible Cable*	Appearance
SGM7A-A5 to -C2 50 W to 150 W	For Servomotors without Holding Brakes Cable installed toward load	3 m	JZSP-CSM21-03-E-G#	
		5 m	JZSP-CSM21-05-E-G#	
		10 m	JZSP-CSM21-10-E-G#	
		15 m	JZSP-CSM21-15-E-G#	
		20 m	JZSP-CSM21-20-E-G#	
SGM7A-02 to -06 200 W to 600 W		3 m	JZSP-CSM22-03-E-G#	
		5 m	JZSP-CSM22-05-E-G#	
		10 m	JZSP-CSM22-10-E-G#	
		15 m	JZSP-CSM22-15-E-G#	
		20 m	JZSP-CSM22-20-E-G#	
SGM7A-08 and -10 750 W, 1.0 kW		3 m	JZSP-CSM23-03-E-G#	
		5 m	JZSP-CSM23-05-E-G#	
		10 m	JZSP-CSM23-10-E-G#	
		15 m	JZSP-CSM23-15-E-G#	
		20 m	JZSP-CSM23-20-E-G#	
		30 m	JZSP-CSM23-30-E-G#	
SGM7A-A5 to -C2 50 W to 150 W	For Servomotors with Holding Brakes Cable installed towards load	3 m	JZSP-CSM31-03-E-G#	
		5 m	JZSP-CSM31-05-E-G#	
		10 m	JZSP-CSM31-10-E-G#	
		15 m	JZSP-CSM31-15-E-G#	
		20 m	JZSP-CSM31-20-E-G#	
SGM7A-02 to -06 200 W to 600 W		3 m	JZSP-CSM32-03-E-G#	
		5 m	JZSP-CSM32-05-E-G#	
		10 m	JZSP-CSM32-10-E-G#	
		15 m	JZSP-CSM32-15-E-G#	
		20 m	JZSP-CSM32-20-E-G#	
SGM7A-08 and -10 750 W, 1.0 kW		3 m	JZSP-CSM33-03-G#	
		5 m	JZSP-CSM33-05-G#	
		10 m	JZSP-CSM33-10-G#	
		15 m	JZSP-CSM33-15-G#	
		20 m	JZSP-CSM33-20-G#	

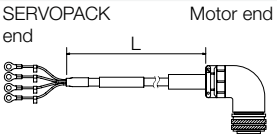
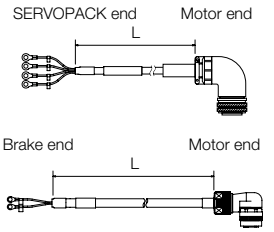
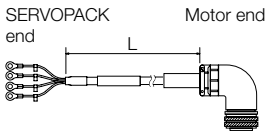
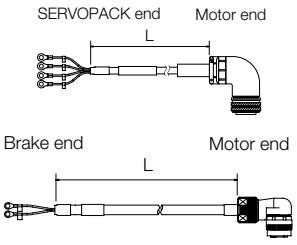
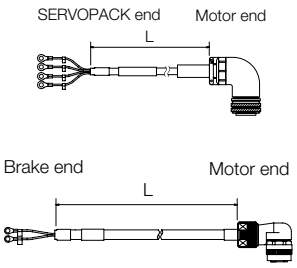
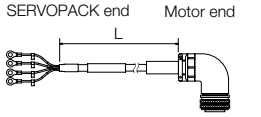
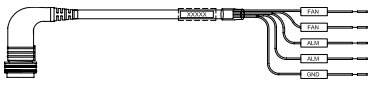
* Use Flexible Cables for moving parts of machines, such as robots. The recommended bending radius (R) is 90 mm or larger.
Note: The digit # of the order number represents the design revision.

Servomotor Motor Power Cables

Servomotor Model	Description	Connector Specifications	Length	Order Number Flexible Cable*1	Appearance
SGM7A-15 1.5 kW	For Servomotors without Holding Brakes	Right-angle	3 m	JZSP-CVMCA12-03-E-G#	
			5 m	JZSP-CVMCA12-05-E-G#	
			10 m	JZSP-CVMCA12-10-E-G#	
			15 m	JZSP-CVMCA12-15-E-G#	
			20 m	JZSP-CVMCA12-20-E-G#	
	For Servomotors with Holding Brakes (Set of Two Cables*2)	Right-angle	3 m	JZSP-CVMCA12-03-E-G#	
				JZSP-CVB12Y-03-E-G#	
			5 m	JZSP-CVMCA12-05-E-G#	
				JZSP-CVB12Y-05-E-G#	
			10 m	JZSP-CVMCA12-10-E-G#	
				JZSP-CVB12Y-10-E-G#	
			15 m	JZSP-CVMCA12-15-E-G#	
				JZSP-CVB12Y-15-E-G#	
			20 m	JZSP-CVMCA12-20-E-G#	
				JZSP-CVB12Y-20-E-G#	
SGM7A-20 2.0 kW	For Servomotors without Holding Brakes	Right-angle	3 m	JZSP-CVMCA12-03-E-G#	
			5 m	JZSP-CVMCA12-05-E-G#	
			10 m	JZSP-CVMCA12-10-E-G#	
			15 m	JZSP-CVMCA12-15-E-G#	
			20 m	JZSP-CVMCA12-20-E-G#	
	For Servomotors with Holding Brakes (Set of Two Cables*2)	Right-angle	3 m	JZSP-CVMCA12-03-E-G#	
				JZSP-CVB12Y-03-E-G#	
			5 m	JZSP-CVMCA12-05-E-G#	
				JZSP-CVB12Y-05-E-G#	
			10 m	JZSP-CVMCA12-10-E-G#	
				JZSP-CVB12Y-10-E-G#	
			15 m	JZSP-CVMCA12-15-E-G#	
				JZSP-CVB12Y-15-E-G#	
			20 m	JZSP-CVMCA12-20-E-G#	
				JZSP-CVB12Y-20-E-G#	

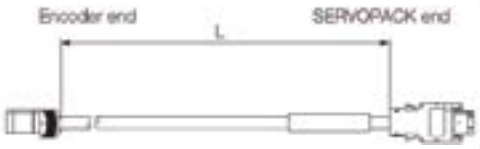
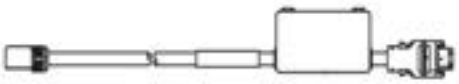
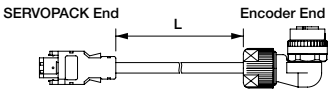
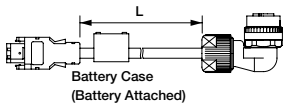
*1. Use Flexible Cables for moving parts of machines, such as robots. The recommended bending radius (R) is 90 mm or larger.
*2. This order number is for a set of two cables (Main Power Supply Cable and Holding Brake Cable). When you purchase them separately, the order numbers for Main Power Supply Cables are the same as for a Servomotor without a Holding Brake.
The following order numbers are for a Holding Brake Cable. These Standard Cables are Flexible Cables.
- Cable with Straight Plug: JZSP-U7B23-□□-E
- Cable with Right-angle Plug: JZSP-U7B24-□□-E

Servomotor Main Circuit Cables

Servomotor Model	Description	Connector Specifications	Length	Order Number Flexible Cable*1	Appearance
SGM7A-25 2.5 kW	For Servomotors without Holding Brakes	Right-angle	3 m	JZSP-CVMCA12-03-E-G#	
			5 m	JZSP-CVMCA12-05-E-G#	
			10 m	JZSP-CVMCA12-10-E-G#	
			15 m	JZSP-CVMCA12-15-E-G#	
			20 m	JZSP-CVMCA12-20-E-G#	
	For Servomotors with Holding Brakes (Set of Two Cables*2)	Right-angle	3 m	JZSP-CVMCA12-03-E-G#	
				JZSP-CVB12Y-03-E-G#	
			5 m	JZSP-CVMCA12-05-E-G#	
				JZSP-CVB12Y-05-E-G#	
			10 m	JZSP-CVMCA12-10-E-G#	
				JZSP-CVB12Y-10-E-G#	
			15 m	JZSP-CVMCA12-15-E-G#	
				JZSP-CVB12Y-15-E-G#	
			20 m	JZSP-CVMCA12-20-E-G#	
				JZSP-CVB12Y-20-E-G#	
SGM7A-30 3.0 kW	For Servomotors without Holding Brakes	Right-angle	3 m	JZSP-CVMCA13-03-E-G#	
			5 m	JZSP-CVMCA13-05-E-G#	
			10 m	JZSP-CVMCA13-10-E-G#	
			15 m	JZSP-CVMCA13-15-E-G#	
			20 m	JZSP-CVMCA13-20-E-G#	
	For Servomotors with Holding Brakes (Set of Two Cables*2)	Right-angle	3 m	JZSP-CVMCA13-03-E-G#	
				JZSP-CVB12Y-03-E-G#	
			5 m	JZSP-CVMCA13-05-E-G#	
				JZSP-CVB12Y-05-E-G#	
			10 m	JZSP-CVMCA13-10-E-G#	
				JZSP-CVB12Y-10-E-G#	
			15 m	JZSP-CVMCA13-15-E-G#	
				JZSP-CVB12Y-15-E-G#	
			20 m	JZSP-CVMCA13-20-E-G#	
				JZSP-CVB12Y-20-E-G#	
SGM7A-40 to -50 4.0 kW & 5.0 kW	For Servomotors with Holding Brakes (Set of Two Cables*2)	Right-angle	3 m	JZSP-CVMCA35-03-E-G#	
				JZSP-CVB12Y-03-E-G#	
			5 m	JZSP-CVMCA35-05-E-G#	
				JZSP-CVB12Y-05-E-G#	
			10 m	JZSP-CVMCA35-10-E-G#	
				JZSP-CVB12Y-10-E-G#	
			15 m	JZSP-CVMCA35-15-E-G#	
				JZSP-CVB12Y-15-E-G#	
			20 m	JZSP-CVMCA35-20-E-G#	
				JZSP-CVB12Y-20-E-G#	
SGM7A-70 7.0 kW	For Servomotors without Holding Brakes	Right-angle	3 m	JZSP-CVMCA35-03-E-G#	
			5 m	JZSP-CVMCA35-05-E-G#	
			10 m	JZSP-CVMCA35-10-E-G#	
			15 m	JZSP-CVMCA35-15-E-G#	
			20 m	JZSP-CVMCA35-20-E-G#	
	Fan Cable	Right-angle	3 m	BFEV-03(A)-E	
			5 m	BFEV-05(A)-E	
			10 m	BFEV-10(A)-E	
			15 m	BFEV-15(A)-E	
			20 m	BFEV-20(A)-E	

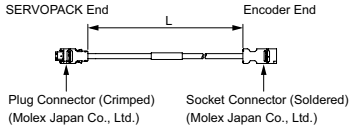
*1. Use Flexible Cables for moving parts of machines, such as robots. The recommended bending radius (R) is 90 mm or larger.
*2. This order number is for a set of two cables (Main Power Supply Cable and Holding Brake Cable). When you purchase them separately, the order numbers for Main Power Supply Cables are the same as for a Servomotor without a Holding Brake.
The following order numbers are for a Holding Brake Cable. These Standard Cables are Flexible Cables.
- Cable with Straight Plug: JZSP-U7B23-□□-E
- Cable with Right-angle Plug: JZSP-U7B24-□□-E

Encoder Cables of 20 m or less

Servomotor Model	Description	Length	Order Number	Appearance
SGM7A-A5 to -10 50 W - 1 kW	Cable direction to load side	3 m	JZSP-C7PI2D-03-E-G#	
		5 m	JZSP-C7PI2D-05-E-G#	
		10 m	JZSP-C7PI2D-10-E-G#	
		15 m	JZSP-C7PI2D-15-E-G#	
		20 m	JZSP-C7PI2D-20-E-G#	
	Cable direction away from load	3 m	JZSP-C7PI2E-03-E-G#	
		5 m	JZSP-C7PI2E-05-E-G#	
		10 m	JZSP-C7PI2E-10-E-G#	
		15 m	JZSP-C7PI2E-15-E-G#	
		20 m	JZSP-C7PI2E-20-E-G#	
	Cable with battery case, direction to load side	3 m	JZSP-C7PA2D-03-E-G#	
		5 m	JZSP-C7PA2D-05-E-G#	
		10 m	JZSP-C7PA2D-10-E-G#	
		15 m	JZSP-C7PA2D-15-E-G#	
		20 m	JZSP-C7PA2D-20-E-G#	
	Cable with battery case, direction away from load side	3 m	JZSP-C7PA2E-03-E-G#	
		5 m	JZSP-C7PA2E-05-E-G#	
		10 m	JZSP-C7PA2E-10-E-G#	
		15 m	JZSP-C7PA2E-15-E-G#	
		20 m	JZSP-C7PA2E-20-E-G#	
SGM7A-15 to -30 1.5 W - 3 kW	For incremental encoder	3 m	JZSP-CVP12-03-E-G#	
		5 m	JZSP-CVP12-05-E-G#	
		10 m	JZSP-CVP12-10-E-G#	
		15 m	JZSP-CVP12-15-E-G#	
		20 m	JZSP-CVP12-20-E-G#	
	For absolute ne-coder with battery case *1	3 m	JZSP-CVP27-03-E-G#	
		5 m	JZSP-CVP27-05-E-G#	
		10 m	JZSP-CVP27-10-E-G#	
		15 m	JZSP-CVP27-15-E-G#	
		20 m	JZSP-CVP27-20-E-G#	

*1. If a battery is connected to the host controller, the Battery Case is not required. If so, use a cable for incremental encoders.

Encoder Extension Cables of 30 m or above

Servomotor Model	Description	Length	Order Number	Appearance
All SGM7A models	Cable with Connectors (For incremental and absolute encoder)	30 m	JZSP-UCMP00-30-E	
		40 m	JZSP-UCMP00-40-E	
		50 m	JZSP-UCMP00-50-E	

Note: Encoder Extension cables can only be used together with suitable Encoder Cables.

Model Designations

SGM7J - 01 A 7 A 2 1

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

1st + 2nd digit - Rated output

Code	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
6	24-bit batteryless absolute
7	24-bit absolute
F	24-bit incremental

5th digit - Design revision order

Code	Specification
A	Standard model

6th digit - Shaft end

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

7th digit - Options

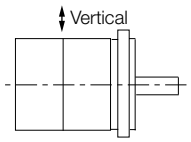
Code	Specification
1	Without options
C	With holding brake (24 VDC)
E	With oil seal and holding brake (24 VDC)
S	With oil seal

Specifications and Ratings

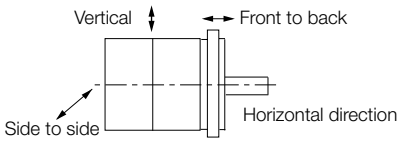
Specifications

Voltage		200 V						
Model SGM7J-		05A	01A	C2A	02A	04A	06A	08A
Time Rating		Continuous						
Thermal Class		B						
Insulation Resistance		500 VDC, 10 MOhm min.						
Withstand Voltage		1,500 VAC for 1 minute						
Excitation		Permanent magnet						
Mounting		Flange-mounted						
Drive Method		Direct drive						
Rotation Direction		Counterclockwise (CCW) for forward reference when viewed from the load side						
Vibration Class*1		V15						
Environmental Conditions	Surrounding Air Temperature	0 °C to 40 °C (With derating, usage is possible between 40 °C and 60 °C)*3						
	Surrounding Air Humidity	20% to 80% relative humidity (with no condensation)						
	Installation Site	• Must be indoors and free of corrosive and explosive gases. • Must be well-ventilated and free of dust and moisture. • Must facilitate inspection and cleaning. • Must have an altitude of 1,000 m or less. (With derating, usage is possible between 1,000 m and 2,000 m.)*3 • Must be free of strong magnetic fields.						
	Storage Environment	Store the Servomotor in the following environment if you store it with the power cable disconnected. Storage Temperature: -20 °C to 60 °C (with no freezing) Storage Humidity: 20% to 80% relative humidity (with no condensation)						
Shock Resistance*2	Impact Acceleration Rate at Flange	490 m/s^2						
	Number of Impacts	2 times						
Vibration Resistance*2	Vibration Acceleration Rate at Flange	49 m/s^2						
Applicable SERVOPACKS	SGD7S-	R70A, R70F	R70A, R90F	1R6A, 2R1F		2R8A, 2R8F	5R5A	
	SGD7W- SGD7C	1R6A*4, 2R8A*4		1R6A*4, 2R8A*4		2R8A, 5R5A*4, 7R6A*4	5R5A, 7R6A	

*1. A vibration class of V15 indicates a vibration amplitude of 15 mm maximum on the Servomotor without a load at the rated motor speed.
*2. The given values are for when the Servomotor shaft is mounted horizontally and shock or vibration is applied in the directions shown in the following figures. The strength of the vibration that the Servomotor can withstand depends on the application. Always check the vibration acceleration rate that is applied to the Servomotor with the actual equipment.



Shock Applied to the Servomotor



Vibration Applied to the Servomotor

*3. Refer to the following section for the derating rates.
*4. If you use a Servomotor together with a S-7W or S-7C SERVOPACK, the control gain may not increase as much as with a S-7S SERVOPACK and other performances may be lower than those achieved with a S-7S SERVOPACK.

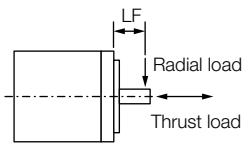
Ratings

Voltage			200 V						
Model SGM7J-			A5A	01A	C2A	02A	04A	06A	08A
Rated Output *1		W	50	100	150	200	400	600	750
Rated Torque *1, *2		Nm	0.159	0.318	0.477	0.637	1.27	1.91	2.39
Instantaneous Maximum Torque *1		Nm	0.557	1.11	1.67	2.23	4.46	6.69	8.36
Rated Current *1		A	0.55	0.85	1.6	1.6	2.5	4.2	4.4
Instantaneous Maximum Current *1		A	2.0	3.1	5.7	5.8	9.3	15.3	16.9
Rated Motor Speed *1		min^{-1}	3,000						
Maximum Motor Speed *1		min^{-1}	6,000						
Torque Constant		Nm/A	0.316	0.413	0.321	0.444	0.544	0.493	0.584
Motor Moment of Inertia		×10^{-4} kg·m^2	0.0395	0.0659	0.0915	0.263	0.486	0.800	1.59
	with holding brake		0.0475	0.0739	0.0995	0.333	0.556	0.870	1.77
	with batteryless absolute encoder		0.0410	0.0674	0.0930	0.264	0.487	0.801	1.59
Rated Power Rate *1		kW/s	6.40	15.3	24.8	15.4	33.1	45.6	35.9
	with holding brake		5.32	13.6	22.8	12.1	29.0	41.9	32.2
Rated Angular Acceleration Rate *1		rad/s	40,200	48,200	52,100	24,200	26,100	23,800	15,000
	with holding brake		33,400	43,000	47,900	19,100	22,800	21,900	13,500
Derating Rate for Servomotor with Oil Seal		%	80		90		95		
Heat Sink Size (Aluminium) *3		mm	200 × 200 × 6		250 × 250 × 6				
Protective Structure *4			Totally enclosed, self-cooled, IP67						
Holding Brake Specifications *5	Rated Voltage	V	24 VDC ±10%						
	Capacity	W	5.5			6		6.5	
	Holding Torque	Nm	0.159	0.318	0.477	0.637	1.27	1.91	2.39
	Coil Resistance	Ω (at 20 °C)	104.8±10%			96±10%		88.6±10%	
	Rated Current	A (at 20 °C)	0.23			0.25		0.27	
	Time Required to Release Brake	ms	60					80	
	Time Required to Brake	ms	100						
Allowable Load Moment of Inertia (Motor Moment of Inertia Ratio) *6			35 times			15 times	10 times	20 times	12 times
	With External Regenerative Resistor and Dynamic Brake Resistor *7		35 times			25 times		20 times	15 times
Allowable Shaft Load *3	LF	mm	20			25			35
	Allowable Radial Load	N	78			245			392
	Allowable Thrust Load	N	54			74			147

*1. These values are for operation in combination with a SERVOPACK when the temperature of the armature winding is 100°C. The values for other items are at 20°C. These are typical values.
*2. The rated torques are the continuous allowable torque values at a surrounding air temperature of 40°C with an aluminum heat sink of the dimensions given in the table.
*3. Refer to the following section for the relation between the heat sinks and derating rate.
*4. This does not apply to the shaft opening. Protective structure specifications apply only when the special cable is used.
*5. Observe the following precautions if you use a Servomotor with a Holding Brake.
- The holding brake cannot be used to stop the Servomotor.
- The time required to release the brake and the time required to brake depend on which discharge circuit is used. Confirm that the operation delay time is appropriate for the actual equipment.
- The 24-VDC power supply is not provided by YASKAWA.

*6. The motor moment of inertia scaling factor is the value for a standard Servomotor without a Holding Brake.
*7. To externally connect a dynamic brake resistor, select hardware option specification 020 for the SERVOPACK. However, you cannot externally connect a dynamic brake resistor if you use the following SERVOPACKs (maximum applicable motor capacity: 400 W).
- SGD7S-R70□□□A020 to -2R8□□□A020
- SGD7W-1R6A20A020 to -2R8A20A020
- SGD7C-1R6AMAA020 to -2R8AMAA020

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

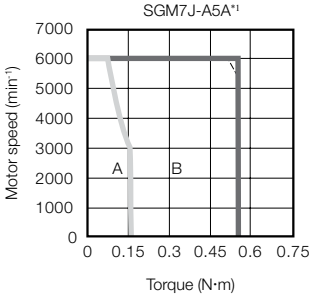


Torque-motor Speed Characteristics

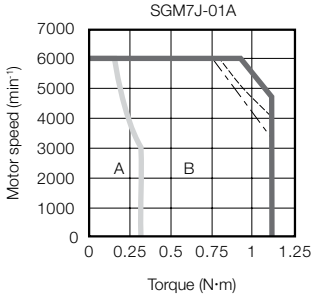
A : Continuous duty zone
B : Intermittent duty zone

——— (solid lines): With three-phase 200-V or single-phase 230-V input
- - - - - - - - (dotted lines): With single-phase 200-V input
— – — (dashed-dotted lines): With single-phase 100-V input

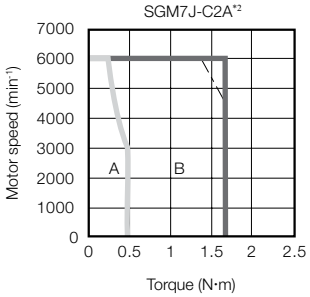
SGM7J-A5A*1



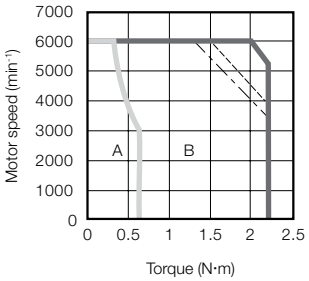
SGM7J-01A



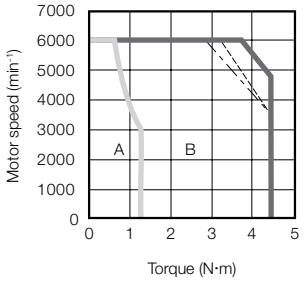
SGM7J-C2A*2



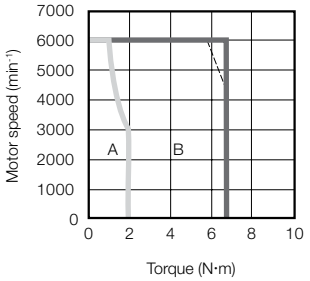
SGM7J-02A



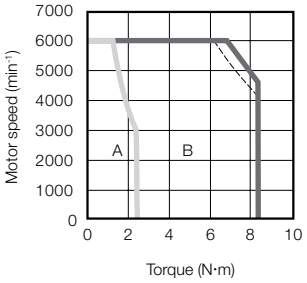
SGM7J-04A



SGM7J-06A



SGM7J-08A

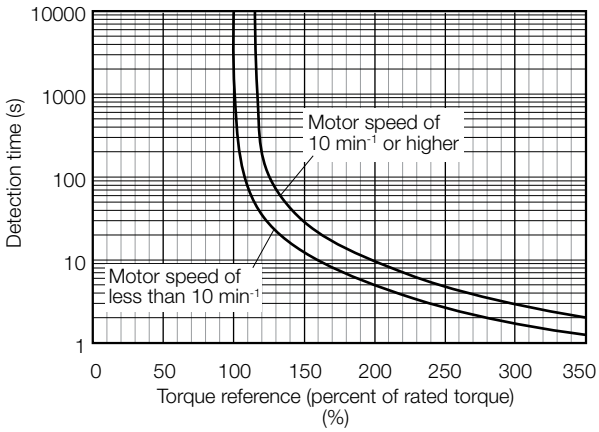


*1. The characteristics are the same for single-phase 200 V and single-phase 100 V input.
*2. The characteristics are the same for three-phase 200 V and single-phase 200 V input.

Notes:
1. These values (typical values) are for operation in combination with a SERVOPACK when the temperature of the armature winding is 100°C.
2. The characteristics in the intermittent duty zone depend on the power supply voltage.
3. If the effective torque is within the allowable range for the rated torque, the Servomotor can be used within the intermittent duty zone.
4. If you use a Servomotor Motor Power Cable that exceeds 20 m, the intermittent duty zone in the torque-motor speed characteristics will become smaller because the voltage drop increases.

Servomotor Overload Protection Characteristics

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



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

Allowable Load Moment of Inertia

The allowable load moments of inertia (motor moment of inertia ratios) for the Servomotors are given in the Ratings of Servomotors. The values are determined by the regenerative energy processing capacity of the SERVOPACK and are also affected by the drive conditions of the Servomotor. Perform the required Steps for each of the following cases.

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

Exceeding the allowable Load Moment of Inertia

Use one of the following measures to adjust the load moment of inertia to within the allowable value.
- Reduce the torque limit.
- Reduce the deceleration rate.
- Reduce the maximum motor speed.

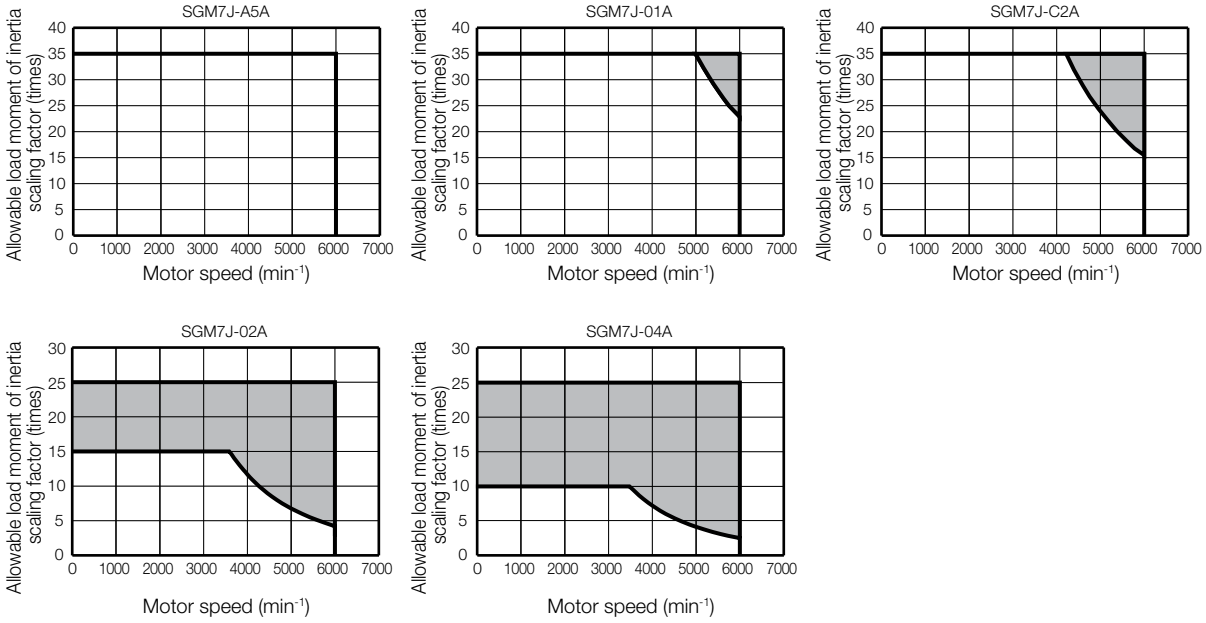
If the above steps is not possible, install an external regenerative resistor.

Information

An Overvoltage Alarm (A.400) is likely to occur during deceleration if the load moment of inertia exceeds the allowable load moment of inertia. SERVOPACKs with a built-in regenerative resistor may generate a Regenerative Overload Alarm (A.320). Refer to Built-In Regenerative Resistor for the regenerative power (W) that can be processed by the SERVOPACKs.
Install an External Regenerative Resistor when the built-in regenerative resistor cannot process all of the regenerative power.

SERVOPACKs without built-in Regenerative Resistors

The following graph shows the allowable load moment of inertia scaling factor of the motor speed (reference values for deceleration operation at or above the rated torque). Application is possible without an external regenerative resistor within the allowable value. However, an External Regenerative Resistor is required in the shaded areas of the graphs.



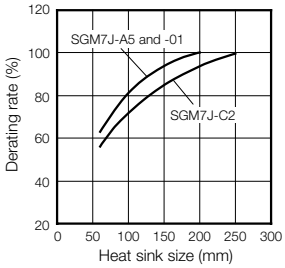
Note: Applicable SERVOPACK models: SGD7S-R70A, -R90A, -1R6A, -2R8A, -R70F, -R90F, -2R1F, and -2R8F

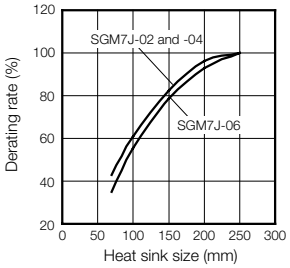
When an External Regenerative Resistor is required

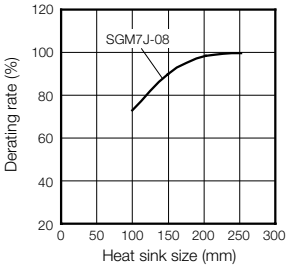
Install the External Regenerative Resistor. Refer to the following section for the recommended products.

Servomotor Heat Dissipation Conditions

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





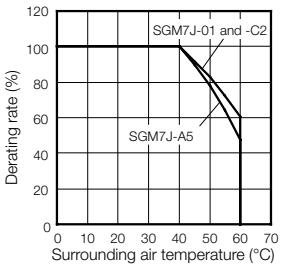


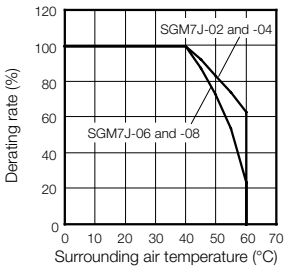
Important

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

Applications where the surrounding Air Temperature of the Servomotor exceeds 40 °C

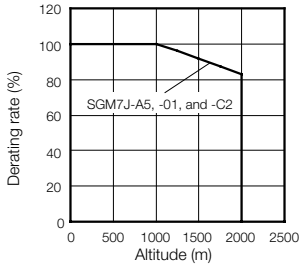
The Servomotor ratings are the continuous allowable values at a surrounding air temperature of 40°C. If you use a Servomotor at a surrounding air temperature that exceeds 40°C (60°C max.), apply a suitable derating rate from the following graphs.

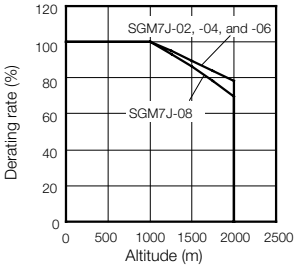




Applications where the Altitude exceeds 1,000 m

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.





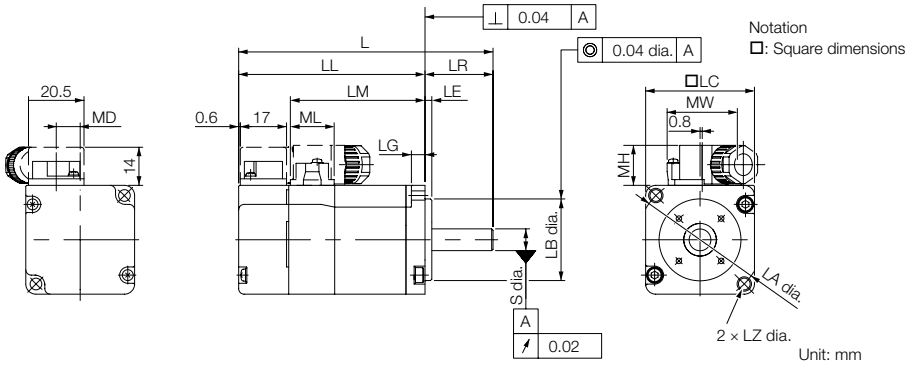
Information

When using Servomotors with derating, change the detection timing of overload warning and overload alarm based on the overload detection level of the motor given in Servomotor Overload Protection Characteristics.

Notes:
1. Use the combination of the SERVOPACK and Servomotor so that the derating conditions are satisfied for both the SERVOPACK and Servomotor.
2. The derating rates are applicable only when the average motor speed is less than or equal to the rated motor speed. If the average motor speed exceeds the rated motor speed, consult with your YASKAWA representative.

Dimensions

SGM7J-A5, -01, and -C2

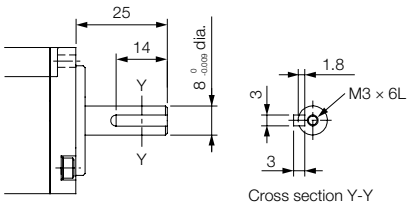


Model SGM7J-	L*	LL*	LM	Flange Dimensions							S	MD	MW	MH	ML	Approx. Mass [kg]
				LR	LE	LG	LC	LA	LB	LZ						
A5A□A2□	81.5 (122)	56.5 (97)	37.9	25	2.5	5	40	46	$30^{0}_{-0.021}$	4.3	$8^{0}_{-0.009}$	8.8	25.8	14.7	16.1	0.3 (0.6)
01A□A2□	93.5 (134)	68.5 (109)	49.9	25	2.5	5	40	46	$30^{0}_{-0.021}$	4.3	$8^{0}_{-0.009}$	8.8	25.8	14.7	16.1	0.4 (0.7)
C2A□A2□	105.5 (153.5)	80.5 (128.5)	61.9	25	2.5	5	40	46	$30^{0}_{-0.021}$	4.3	$8^{0}_{-0.009}$	8.8	25.8	14.7	16.1	0.5 (0.8)

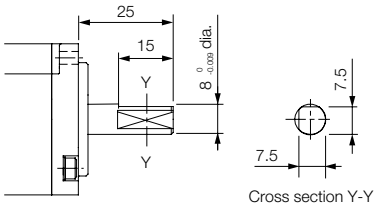
* For models that have a batteryless absolute encoder, L and LL are 8 mm greater than the given value. Refer to the following section for the values for individual models.
Notes:
1. The values in parentheses are for Servomotors with Holding Brakes.
2. The values for a straight, without key specification are given. Refer to the information given below for other shaft end specifications and option specifications.

Shaft End Specifications

Straight with Key and Tap

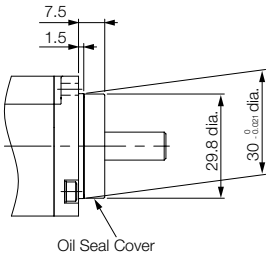


with Two Flat Seats

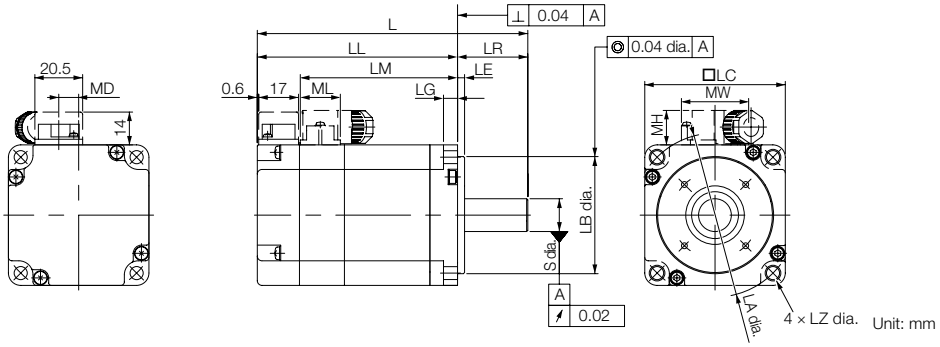


Specifications of Options

Oil Seal



SGM7J-02, -04 and -06

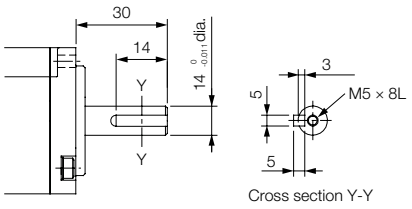


Model SGM7J-	L*	LL*	LM	Flange Dimensions							S	MD	MW	MH	ML	Approx. Mass [kg]
				LR	LE	LG	LC	LA	LB	LZ						
02A□A2□	99.5 (140)	69.5 (110)	51.2	30	3	6	60	70	$50^{0}_{-0.025}$	5.5	$14^{0}_{-0.011}$	8.5	28.7	14.7	17.1	0.8 (1.4)
04A□A2□	115.5 (156)	85.5 (126)	67.2	30	3	6	60	70	$50^{0}_{-0.025}$	5.5	$14^{0}_{-0.011}$	8.5	28.7	14.7	17.1	1.1 (1.7)
06A□A2□	137.5 (191.5)	107.5 (161.5)	89.2	30	3	6	60	70	$50^{0}_{-0.025}$	5.5	$14^{0}_{-0.011}$	8.5	28.7	14.7	17.1	1.6 (2.2)

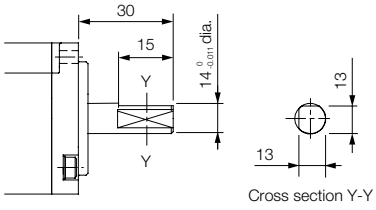
* For models that have a batteryless absolute encoder, L and LL are 8 mm greater than the given value. Refer to the following section for the values for individual models.
Notes:
1. The values in parentheses are for Servomotors with Holding Brakes.
2. The values for a straight, without key specification are given. Refer to the information given below for other shaft end specifications and option specifications.

Shaft End Specifications

Straight with Key and Tap

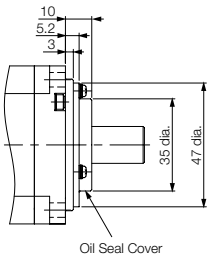


with Two Flat Seats

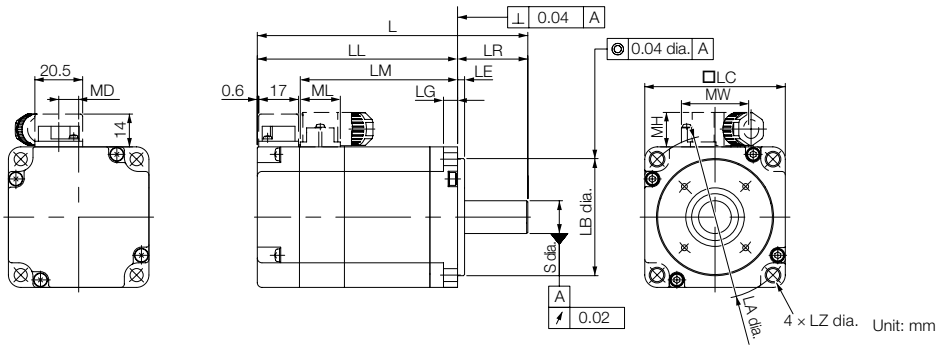


Specifications of Options

Oil Seal



SGM7J-08

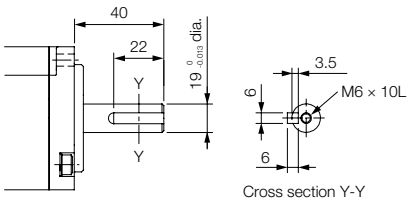


Model SGM7J-	L*	LL*	LM	Flange Dimensions							S	MD	MW	MH	ML	Approx. Mass [kg]
				LR	LE	LG	LC	LA	LB	LZ						
08A□A2□	137 (184)	97 (144)	78.5	40	3	8	80	90	$70^{0}_{-0.030}$	7	$19^{0}_{-0.013}$	13.6	38	14.7	19.3	2.2 (2.8)

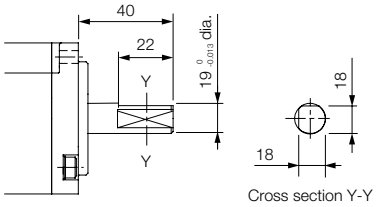
* For models that have a batteryless absolute encoder, L and LL are 8 mm greater and the approximate mass is 0.1 kg greater than the given value. Refer to the following section for the values for individual models.Notes:
1. The values in parentheses are for Servomotors with Holding Brakes.
2. The values for a straight, without key specification are given. Refer to the information given below for other shaft end specifications and option specifications.

Shaft End Specifications

Straight with Key and Tap

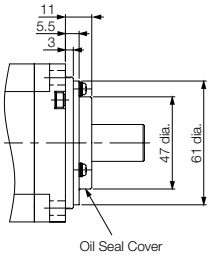


with Two Flat Seats



Specifications of Options

Oil Seal



Dimensions of Servomotors with batteryless Absolute Encoders

Model SGM7J-	L	LL	Approx. Mass [kg]
A5A6A2□	89.5 (130)	64.5 (105)	0.3 (0.6)
01A6A2□	101.5 (142)	76.5 (117)	0.4 (0.7)
C2A6A2□	113.5 (161.5)	88.5 (136.5)	0.5 (0.8)
02A6A2□	107.5 (148)	77.5 (118)	0.8 (1.4)
04A6A2□	123.5 (164)	93.5 (134)	1.1 (1.7)
06A6A2□	145.5 (198.5)	115.5 (169.5)	1.6 (2.2)
08A6A2□	145 (192)	105 (152)	2.3 (2.9)

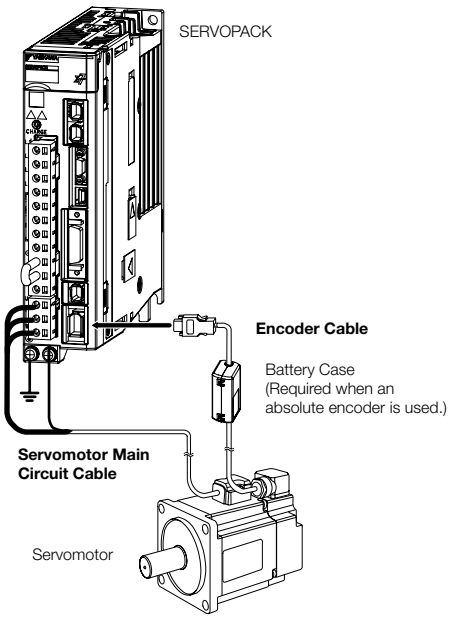
Note: The values in parentheses are for Servomotors with Holding Brakes.

Selecting Cables SGM7J

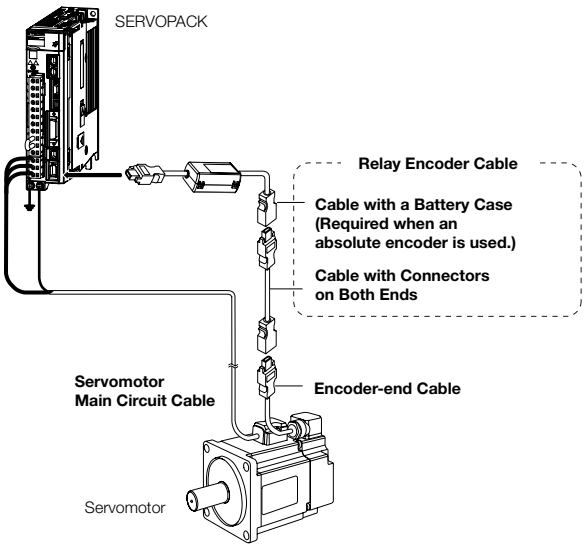
Cable Configurations

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

Encoder Cable of 20 m or less



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

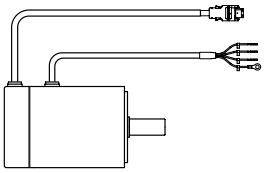


Note:
1. If the Encoder Cable length exceeds 20 m, be sure to use a Relay Encoder Cable.
2. If you use a Servomotor Motor Power Cable that exceeds 20 m, the intermittent duty zone in the torquemotor speed characteristics will become smaller because the voltage drop increases.
3. Refer to the following manual for the following information.
   - Cable dimensional drawings and cable connection specifications
   - Order numbers and specifications of individual connectors for cables
   - Order numbers and specifications for wiring materials: Sigma-7-Series AC Servo Drive Peripheral Device Selection Manual (Manual No.: SIEP S800001 32)

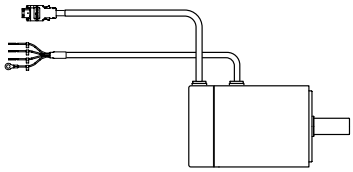
Important

There are different order numbers for the Servomotor Motor Power Cables and Encoder Cables depending on the cable installation direction. Confirm the order numbers before you order.

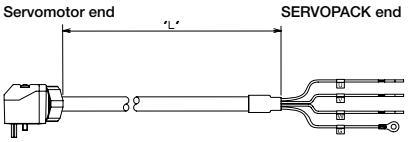
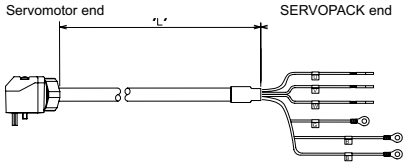
Cable installed towards Load



Cable installed away from Load

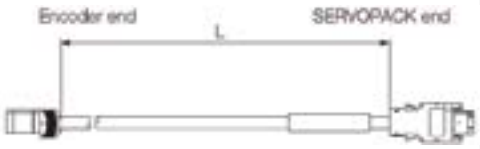


Servomotor Motor Power Cables

Servomotor Model	Description	Length	Order Number Flexible Cable*	Appearance
SGM7J-A5 to -C2 50 W to 150 W	For Servomotors without Holding Brakes Cable installed towards load	3 m	JZSP-CSM21-03-E-G#	
		5 m	JZSP-CSM21-05-E-G#	
		10 m	JZSP-CSM21-10-E-G#	
		15 m	JZSP-CSM21-15-E-G#	
		20 m	JZSP-CSM21-20-E-G#	
SGM7J-02 to -06 200 W to 600 W		3 m	JZSP-CSM22-03-E-G#	
		5 m	JZSP-CSM22-05-E-G#	
		10 m	JZSP-CSM22-10-E-G#	
		15 m	JZSP-CSM22-15-E-G#	
		20 m	JZSP-CSM22-20-E-G#	
		30 m	JZSP-CSM22-30-E-G#	
SGM7J-08 750 W, 1.0 kW		3 m	JZSP-CSM23-03-E-G#	
		5 m	JZSP-CSM23-05-E-G#	
		10 m	JZSP-CSM23-10-E-G#	
		15 m	JZSP-CSM23-15-E-G#	
		20 m	JZSP-CSM23-20-E-G#	
		30 m	JZSP-CSM23-30-E-G#	
SGM7J-A5 to -C2 50 W to 150 W	For Servomotors with Holding Brakes Cable installed towards load	3 m	JZSP-CSM31-03-E-G#	
		5 m	JZSP-CSM31-05-E-G#	
		10 m	JZSP-CSM31-10-E-G#	
		15 m	JZSP-CSM31-15-E-G#	
		20 m	JZSP-CSM31-20-E-G#	
SGM7J-02 to -06 200 W to 600 W		3 m	JZSP-CSM32-03-E-G#	
		5 m	JZSP-CSM32-05-E-G#	
		10 m	JZSP-CSM32-10-E-G#	
		15 m	JZSP-CSM32-15-E-G#	
		20 m	JZSP-CSM32-20-E-G#	
SGM7J-08 750 W, 1.0 kW		3 m	JZSP-CSM33-03-E-G#	
		5 m	JZSP-CSM33-05-E-G#	
		10 m	JZSP-CSM33-10-E-G#	
		15 m	JZSP-CSM33-15-E-G#	
		20 m	JZSP-CSM33-20-E-G#	

* Use Flexible Cables for moving parts of machines, such as robots. The recommended bending radius (R) is 90 mm or larger.
Note: The digit # of the order number represents the design revision number.

Encoder Cables

Servomotor Model	Description	Length	Order Number	Appearance
SGM7J-A5 to 08 50 W - 750 W	Cable direction to load side	3 m	JZSP-C7PI2D-03-E-G#	
		5 m	JZSP-C7PI2D-05-E-G#	
		10 m	JZSP-C7PI2D-10-E-G#	
		15 m	JZSP-C7PI2D-15-E-G#	
		20 m	JZSP-C7PI2D-20-E-G#	
		25 m	JZSP-C7PI2D-25-E-G#	
		30 m	JZSP-C7PI2D-30-E-G#	
		35 m	JZSP-C7PI2D-35-E-G#	
		40 m	JZSP-C7PI2D-40-E-G#	
	Cable direction away from load	3 m	JZSP-C7PI2E-03-E-G#	
		5 m	JZSP-C7PI2E-05-E-G#	
		10 m	JZSP-C7PI2E-10-E-G#	
		15 m	JZSP-C7PI2E-15-E-G#	
		20 m	JZSP-C7PI2E-20-E-G#	
		25 m	JZSP-C7PI2E-25-E-G#	
		30 m	JZSP-C7PI2E-30-E-G#	
		35 m	JZSP-C7PI2E-35-E-G#	
		40 m	JZSP-C7PI2E-40-E-G#	
	Cable with battery case, direction to load side	3 m	JZSP-C7PA2D-03-E-G#	
		5 m	JZSP-C7PA2D-05-E-G#	
		10 m	JZSP-C7PA2D-10-E-G#	
		15 m	JZSP-C7PA2D-15-E-G#	
		20 m	JZSP-C7PA2D-20-E-G#	
		25 m	JZSP-C7PA2D-25-E-G#	
		30 m	JZSP-C7PA2D-30-E-G#	
		35 m	JZSP-C7PA2D-35-E-G#	
		40 m	JZSP-C7PA2D-40-E-G#	
	Cable with battery case, direction away from load side	3 m	JZSP-C7PA2E-03-E-G#	
		5 m	JZSP-C7PA2E-05-E-G#	
		10 m	JZSP-C7PA2E-10-E-G#	
		15 m	JZSP-C7PA2E-15-E-G#	
		20 m	JZSP-C7PA2E-20-E-G#	
		25 m	JZSP-C7PA2E-25-E-G#	
		30 m	JZSP-C7PA2E-30-E-G#	
		35 m	JZSP-C7PA2E-35-E-G#	
		40 m	JZSP-C7PA2E-40-E-G#	

Model Designations

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

1st + 2nd digit - Rated output

Code	Specification
03	300 W
05	450 W
09	850 W
13	1.3 kW
20	1.8 kW
30	2.9 kW*
44	4.4 kW
55	5.5 kW
75	7.5 kW
1A	11.0 kW
1E	15.0 kW

3rd digit - Power supply voltage

Code	Specification
A	200 VAC

4th digit - Serial encoder

Code	Specification
6	24-bit batteryless absolute
7	24-bit absolute
F	24-bit incremental

5th digit - Design revision order

Code	Specification
A	Standard model

6th digit - Shaft end

Code	Specification
2	Straight without key
6	Straight shaft 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

Note: Readily available up to 1.5 kW. Others available on request.

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

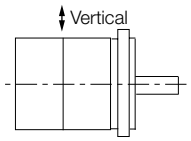
Specifications and Ratings

Specifications

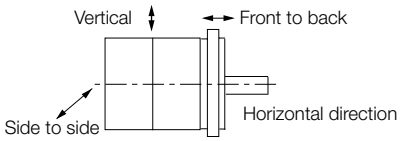
Voltage		200 V									
Model SGM7G-		03A	05A	09A	13A	20A	30A	44A	55A	75A	1AA	1EA
Time Rating		Continuous										
Thermal Class		UL:F, CE:F										
Insulation Resistance		500 VDC, 10 MΩ min.										
Withstand Voltage		1,500 VAC for 1 minute										
Excitation		Permanent magnet										
Mounting		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)*3										
	Surrounding Air Humidity	20% to 80% relative humidity (with no condensation)										
	Installation Site	• Must be indoors and free of corrosive and explosive gases. • Must be well-ventilated and free of dust and moisture. • Must facilitate inspection and cleaning. • Must have an altitude of 1,000 m or less. (With derating, usage is possible between 1,000 m and 2,000 m.)*3 • Must be free of strong magnetic fields.										
	Storage Environment	Store the Servomotor in the following environment if you store it with the power cable disconnected. Storage Temperature: -20 °C to 60 °C (with no freezing) Storage Humidity: 20% to 80% relative humidity (with no condensation)										
Shock Resistance*2	Impact Acceleration Rate at Flange	490 m/s^2										
	Number of Impacts	2 times										
Vibration Resistance*2	Vibration Acceleration Rate at Flange	49 m/s^2 (24.5 m/s^2 front to back)							24.5 m/s^2			
Applicable SERVOPACKs	SGD7S-	3R8A		7R6A	120A	180A	330A		470A	550A	590A	780A
	SGD7W- SGD7C-	5R5A*4, 7R6A*4		7A6A	–							

Note: Readily available up to 1.5 kW. Others available on request.

*1. A vibration class of V15 indicates a vibration amplitude of 15 mm maximum on the Servomotor without a load at the rated motor speed.
*2. The given values are for when the Servomotor shaft is mounted horizontally and shock or vibration is applied in the directions shown in the following figures.
The strength of the vibration that the Servomotor can withstand depends on the application. Always check the vibration acceleration rate that is applied to the Servomotor with the actual equipment.



Shock Applied to the Servomotor



Vibration Applied to the Servomotor

*3. Refer to the following section for the derating rates.
*4. If you use a Servomotor together with a S-7W or S-7C SERVOPACK, the control gain may not increase as much as with a S-7S SERVOPACK and other performances may be lower than those achieved with a S-7S SERVOPACK.

Servomotor Ratings

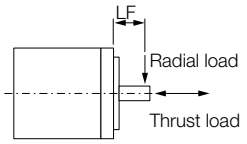
Voltage			200 V				
Model SGM7G-			03A	05A	09A	13A	20A
Rated Output *1		kW	0.3	0.45	0.85	1.3	1.8
Rated Torque *1, *2		Nm	1.96	2.86	5.39	8.34	11.5
Instantaneous Maximum Torque *1		Nm	5.88	8.92	14.2	23.3	28.7
Rated Current *1		A	2.8	3.8	6.9	10.7	16.7
Instantaneous Maximum Current *1		A	8.0	11	17	28	42
Rated Motor Speed *1		min^{-1}	1,500				
Maximum Motor Speed *1		min^{-1}	3,000				
Torque Constant		Nm/A	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	7,900 (7,180)	8,590 (7,990)	3,880 (3,370)	4,190 (3,790)	4,420 (4,090)
Heat Sink Size*3		mm	250 × 250 × 6 (aluminium)			400 × 400 × 20 (steel)	
Protective Structure *4			Totally enclosed, self-cooled, IP67				
Holding Brake Specifications *5	Rated Voltage	V	24 VDC $^{+10\%}_{0}$				
	Capacity	W	10				
	Holding Torque	Nm	4.5		12.7	19.6	
	Coil Resistance	Ω (at 20 °C)	56		59		
	Rated Current	A (at 20 °C)	0.43		0.41		
	Time Required to Release Brake	ms	100				
	Time Required to Brake	ms	80				
Allowable Load Moment of Inertia (Motor Moment of Inertia Ratio)			15 times	15 times	5 times		
	With External Regenerative Resistor and Dynamic Brake Resistor				10 times		
Allowable Shaft Load *7	LF	mm	40		58		
	Allowable Radial Load	N	490			686	980
	Allowable Thrust Load	N	98			343	392

Note: Readily available up to 1.5 kW. Others available on request.

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 with an aluminum or steel heat sink of the dimensions given in the table.
*3. Refer to the following section for the relation between the heat sinks and derating rate.
*4. This does not apply to the shaft opening. Protective structure specifications apply only when the special cable is used.
*5. Observe the following precautions if you use a Servomotor with a Holding Brake.
- The holding brake cannot be used to stop the Servomotor.
- The time required to release the brake and the time required to brake depend on which discharge circuit is used. Confirm that the operation delay time is appropriate for the actual equipment.
- The 24-VDC power supply is not provided by YASKAWA.

*6. The motor moment of inertia scaling factor is the value for a standard Servomotor without a Holding Brake.
*7. Design the mechanical system so that the thrust and radial loads applied to the Servomotor shaft end during operation do not exceed the values given in the table.

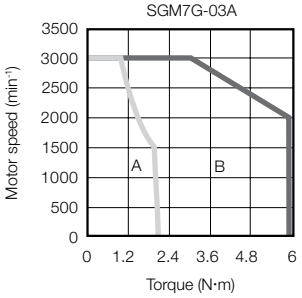


Torque-motor Speed Characteristics

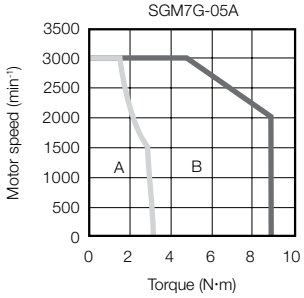
A : Continuous duty zone
B : Intermittent duty zone

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

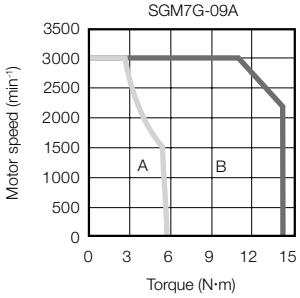
SGM7G-03A



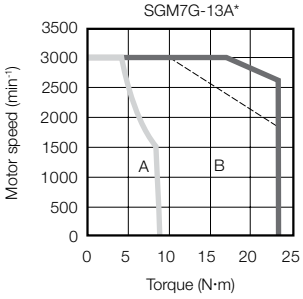
SGM7G-05A



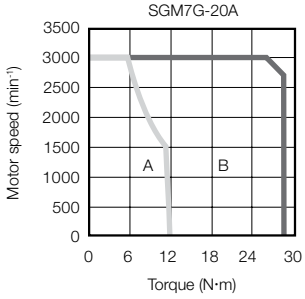
SGM7G-09A



SGM7G-13A*



SGM7G-20A



* A single-phase power input can be used in combination with the SGD7S-120A□□A008.

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

Servomotor Ratings

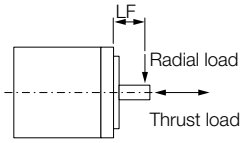
Model SGM7G-			30A	30A*6	44A	55A	75A	1AA	1EA
Rated Output *1		kW	2.9	2.4	4.4	5.5	7.5	11	15
Rated Torque *1, *2		Nm	18.6	15.1	28.4	35.0	48.0	70.0	95.4
Instantaneous Maximum Torque *1		Nm	54.0	45.1	71.6	102	119	175	224
Rated Current *1		A	23.8	19.6	32.8	37.2	54.7	58.6	78.0
Instantaneous Maximum Current *1		A	70	56	84	110	130	140	170
Rated Motor Speed *1		min^{-1}	1,500						
Maximum Motor Speed *1		min^{-1}	3,000					2,000	
Torque Constant		Nm/A	0.848	0.848	0.934	1.00	0.957	1.38	1.44
Motor Moment of Inertia		$\times10^{-4}$ kg·m^2	46.0 (53.9)	46.0 (53.9)	67.5 (75.4)	89.0 (96.9)	125 (133)	242 (261)	303 (341)
Rated Power Rate *1		kW/s	75.2 (64.2)	49.5 (42.2)	119 (107)	138 (126)	184 (173)	202 (188)	300 (267)
Rated Angular Acceleration Rate *1		rad/s^2	4,040 (3,450)	3,280 (2,800)	4,210 (3,370)	3,930 (3,610)	3,840 (3,610)	2,890 (2,680)	3,150 (2,800)
Heat Sink Size*3		mm	500 × 500 × 30 (steel)					650 × 650 × 35 (steel)	
Protective Structure *4			Totally enclosed, self-cooled, IP67						
Holding Brake Specifications *5	Rated Voltage	V	24 VDC +10% 0						
	Capacity	W	18.5			25		32	35
	Holding Torque	Nm	43.1			72.6		84.3	114.6
	Coil Resistance	Ω (at 20 °C)	31			23		18	17
	Rated Current	A (at 20 °C)	0.77			1.05		1.33	1.46
	Time Required to Release Brake	ms	170						250
	Time Required to Brake	ms	100			80			
Allowable Load Moment of Inertia (Motor Moment of Inertia Ratio) *6			5 times	3 times	5 times				
	With External Regenerative Resistor and Dynamic Brake Resistor		10 times	7 times	10 times				
Allowable Shaft Load *7	LF	mm	79			113		116	
	Allowable Radial Load	N	1,470			1,764			4,998
	Allowable Thrust Load	N	490			588			2,156

Note: Readily available up to 1.5 kW. Others available on request.

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

*1. These values are for operation in combination with a SERVOPACK when the temperature of the armature winding is 20°C. These are typical values.
*2. The rated torques are the continuous allowable torque values with an aluminum or steel heat sink of the dimensions given in the table.
*3. Refer to the following section for the relation between the heat sinks and derating rate.
*4. This does not apply to the shaft opening. Protective structure specifications apply only when the special cable is used.
*5. Observe the following precautions if you use a Servomotor with a Holding Brake.
- The holding brake cannot be used to stop the Servomotor.
- The time required to release the brake and the time required to brake depend on which discharge circuit is used. Confirm that the operation delay time is appropriate for the actual equipment.
- The 24-VDC power supply is not provided by YASKAWA.

*6. The motor moment of inertia scaling factor is the value for a standard Servomotor without a Holding Brake.
*7. 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.

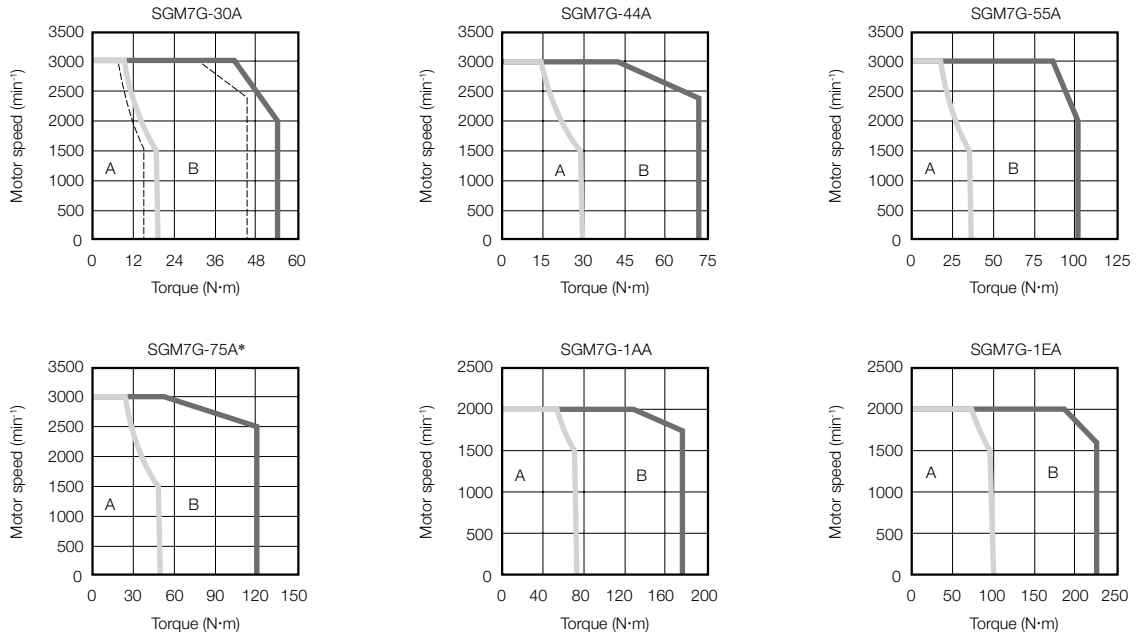


*8. This is the value if you combine the SGM7G-30A with the SGD7S-200A.

Torque-motor Speed Characteristics

A : Continuous duty zone
B : Intermittent duty zone

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



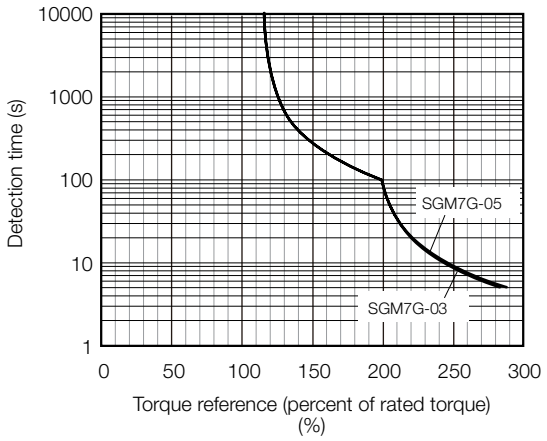
* Use an SGM7G-75A Servomotor with a Holding Brake with an output torque of 14.4 Nm (30% of the rated torque) or lower when using the Servomotor in continuous operation at the maximum motor speed of 3,000 min^{-1}.

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

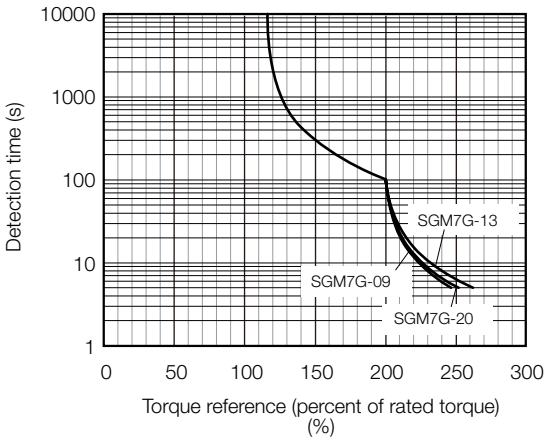
Servomotor Overload Protection Characteristics

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

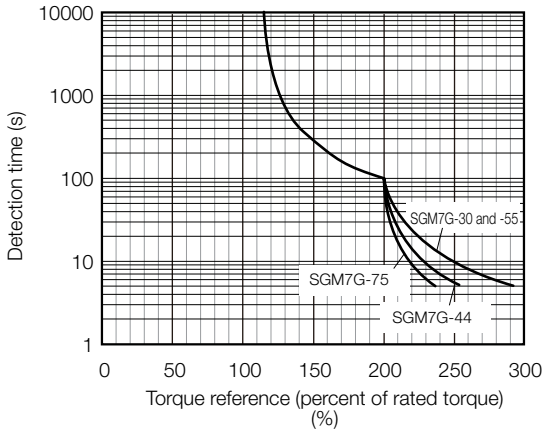
SGM7G-03 and -05



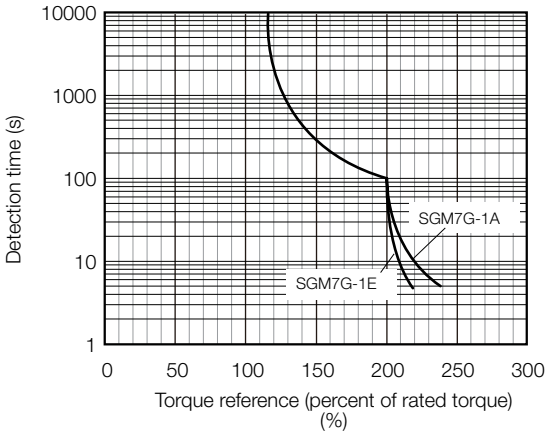
SGM7G-09, -13, and -20



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



SGM7G-1A and -1E



Note:
The above overload 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.

Allowable Load Moment of Inertia

The allowable load moments of inertia (motor moment of inertia ratios) for the Servomotors are given in the Servomotor Ratings. The values are determined by the regenerative energy processing capacity of the SERVOPACK and are also affected by the drive conditions of the Servomotor. Perform the required Steps for each of the following cases.
Use the SigmaSize+ AC Servo Drive Capacity Selection Program to check the driving conditions. Contact your YASKAWA representative for information on this program.

Exceeding the allowable Load Moment of Inertia

Use one of the following measures to adjust the load moment of inertia to within the allowable value.
- Reduce the torque limit.
- Reduce the deceleration rate.
- Reduce the maximum motor speed.

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

Information

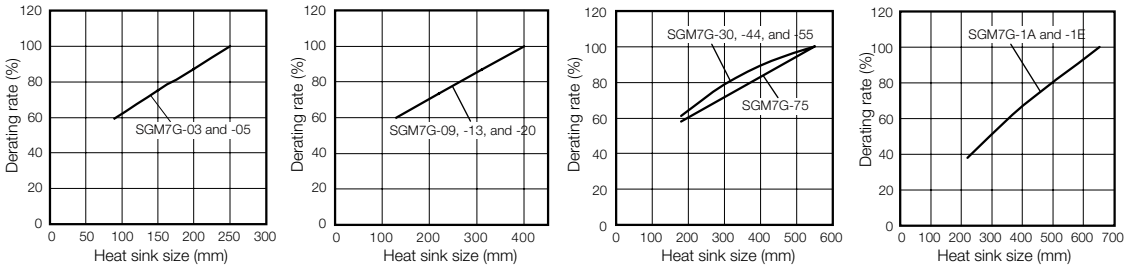
An Overvoltage Alarm (A.400) is likely to occur during deceleration if the load moment of inertia exceeds the allowable load moment of inertia. SERVOPACKs with a built-in regenerative resistor may generate a Regenerative Overload Alarm (A.320). Refer to Built-In Regenerative Resistor for the regenerative power (W) that can be processed by the SERVOPACKs.
Install an External Regenerative Resistor when the built-in regenerative resistor cannot process all of the regenerative power.

When an External Regenerative Resistor is required

Install the External Regenerative Resistor. Refer to the following section for the recommended products.

Servomotor Heat Dissipation Conditions

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

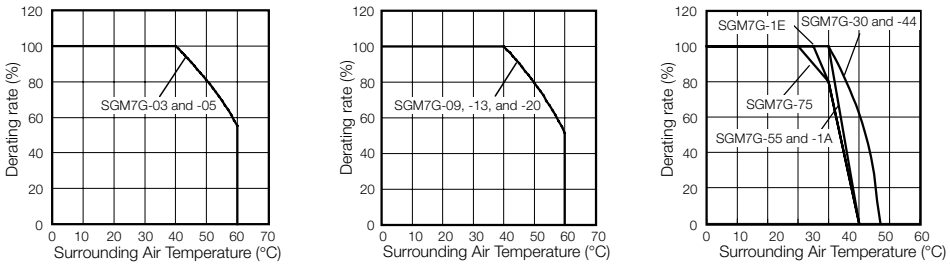


Important

The actual temperature rise depends on 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.

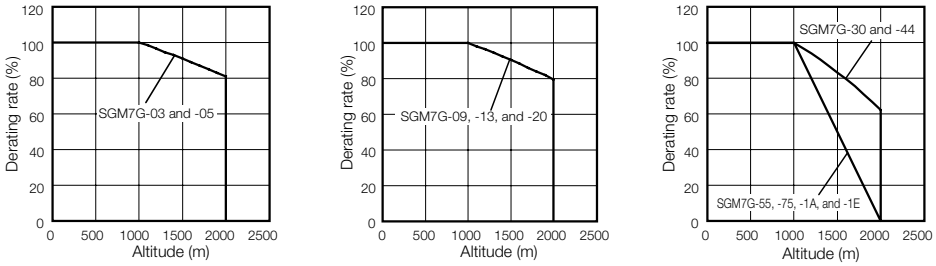
Servomotor Derating Rates for surrounding Air Temperatures

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



Applications where the Altitude exceeds 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.



Information

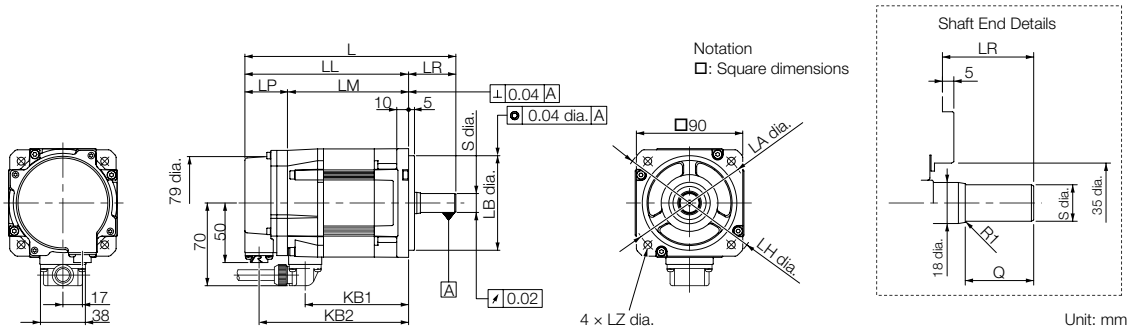
When using Servomotors with derating, change the detection timing of overload warning and overload alarm based on the overload detection level of the motor given in Servomotor Overload Protection Characteristics.

Notes:
1. Use the combination of the SERVOPACK and Servomotor so that the derating conditions are satisfied for both the SERVOPACK and Servomotor.
2. The derating rates are applicable only when the average motor speed is less than or equal to the rated motor speed. If the average motor speed exceeds the rated motor speed, consult with your YASKAWA representative.

External Dimensions

Servomotors without Holding Brakes

SGM7G-03 and -05



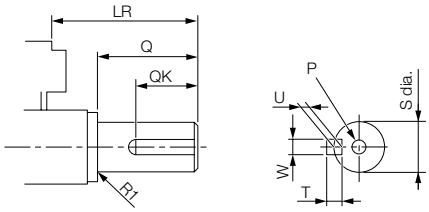
Model SGM7G-	L*1	LL*1	LM	LP*1	LR	KB1	KB2*1	KL1	Flange Dimensions							Shaft End Dimensions		Approx. Mass [kg]
									LA	LB	LC	LE	LG	LH	LZ	S	Q	
03A□A21	166*2	126	90	36	40*2	75	114	70	100	$80^{0}_{-0.030}$	90	5	10	120	6.6	$16^{0}_{-0.011}$ *2	30*2	2.6
05A□A21	179	139	103	36	40	88	127	70	100	$80^{0}_{-0.030}$	90	5	10	120	6.6	$16^{0}_{-0.013}$	30	3.2

*1. For models that have a batteryless absolute encoder, L, LL, LP, and KB2 are 8 mm greater than the given value. Refer to the following section for the values for individual models.
*2. The L, LR, S, and Q dimensions of these Servomotors are different from those of the S-V-series SGMGV Servomotors.
Models that have the same installation dimensions as the SGMGV Servomotors are also available. Contact your YASKAWA representative for details.

Notes:
1. The values in parentheses are for Servomotors with Holding Brakes.
2. The values for a straight, without key specification are given. Refer to the information given below for other shaft end specifications and option specifications.

Shaft End Specifications

Straight with Key and Tap

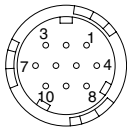


Model SGM7G-	LR	Q	QK	S	W	T	U	P
03A□A61	40*	30*	20*	$16^{0}_{-0.011}$ *	5	5	3	M5 x 2L
05A□A61	40	30	20	$16^{0}_{-0.013}$	5	5	3	

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

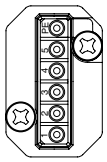
Encoder Connector (24-bit Encoder)



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

* A battery is required only for an absolute 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.

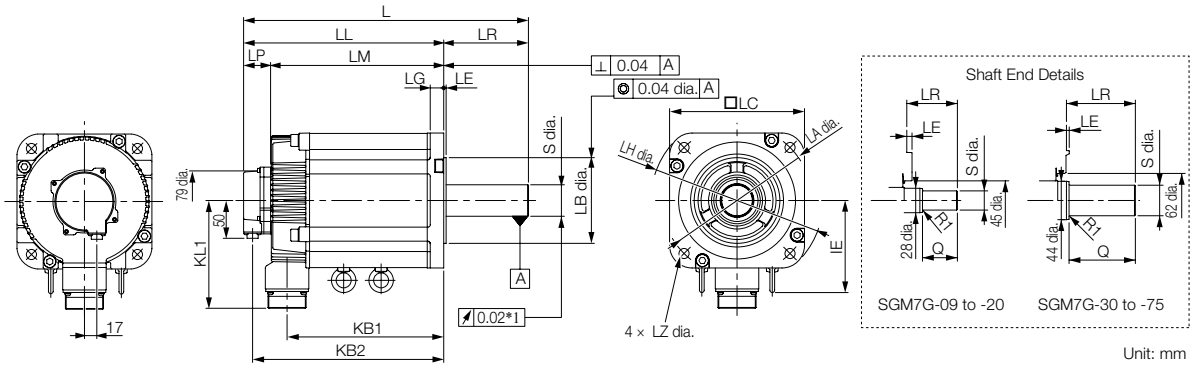
Servomotor Connector



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

Manufacturer: Japan Aviation Electronics Industry, Ltd.

SGM7G-09 to -75



Unit: mm

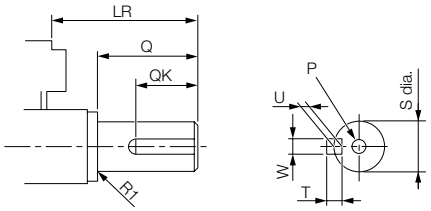
Model SGM7G-	L*2	LL*2	LM	LP*2	LR	KB1	KB2*2	IE	KL1	Flange Dimensions							Shaft End Dimensions		Approx. Mass
										LA	LB	LC	LE	LG	LH	LZ	S	Q	[kg]
09A□A21	195	137	101	36	58	83	125	–	104	145	$110^{0}_{-0.035}$	130	6	12	165	9	$24^{0}_{-0.013}$ *3	40	5.5
13A□A21	211	153	117	36	58	99	141	–	104	145	$110^{0}_{-0.035}$	130	6	12	165	9	$24^{0}_{-0.013}$ *3	40	7.1
20A□A21	229	171	135	36	58	117	159	–	104	145	$110^{0}_{-0.035}$	130	6	12	165	9	$24^{0}_{-0.013}$ *3	40	8.6
30A□A21	239	160	124	36	79	108	148	–	134	200	$114.3^{0}_{-0.025}$	180	3.2	18	230	13.5	$35^{+0.01}_{0}$	76	13.5
44A□A21	263	184	148	36	79	132	172	–	134	200	$114.3^{0}_{-0.025}$	180	3.2	18	230	13.5	$35^{+0.01}_{0}$	76	17.5
55A□A21	334	221	185	36	113	163	209	123	144	200	$114.3^{0}_{-0.025}$	180	3.2	18	230	13.5	$42^{0}_{-0.016}$	110	21.5
75A□A21	380	267	231	36	113	209	255	123	144	200	$114.3^{0}_{-0.025}$	180	3.2	18	230	13.5	$42^{0}_{-0.016}$	110	29.5

*1. This is 0.04 for the SGM7G-55 or SGM7G-75.
*2. For models that have a batteryless absolute encoder, L, LL, LP, and KB2 are 8 mm greater than the given value. Refer to the following section for the values for individual models.
*3. The S dimensions of these Servomotors are different from those of the S-V-series SGMGV Servomotors.
Models that have the same installation dimensions as the SGMGV Servomotors are also available. Contact your YASKAWA representative for details.

Notes:
1. The values in parentheses are for Servomotors with Holding Brakes.
2. The values for a straight, without key specification are given. Refer to the information given below for other shaft end specifications and option specifications.

Shaft End Specifications

Straight with Key and Tap

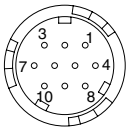


Model SGM7G-	LR	Q	QK	S	W	T	U	P
09A□A61	58	40	25	$24^{0}_{-0.013}$ *	8*	7*	4*	M5x12L
13A□A61	58	40	25	$24^{0}_{-0.013}$ *	8*	7*	4*	
20A□A61	58	40	25	$24^{0}_{-0.013}$ *	8	7	4	
30A□A61	79	76	60	$35^{+0.01}_{0}$	10	8	5	M12×25L
44A□A61	79	76	60	$35^{+0.01}_{0}$	10	8	5	
55A□A61	113	110	90	$42^{0}_{-0.016}$	12	8	5	M16×32L
75A□A61	113	110	90	$42^{0}_{-0.016}$	12	8	5	

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

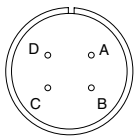
Encoder Connector (24-bit Encoder)



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

* A battery is required only for an absolute 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.

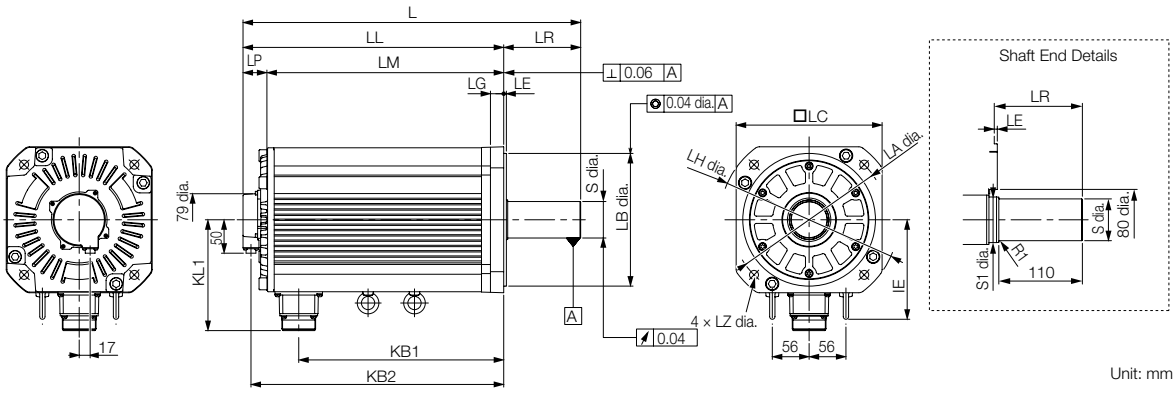
Servomotor Connector



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

Manufacturer: DDK Ltd.

SGM7G-1A and -1E



Unit: mm

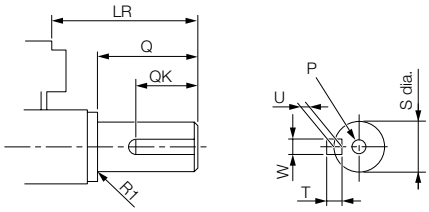
Model SGM7G-	L*	LL*	LM	LP*	LR	KB1	KB2*	KL1	Flange Dimensions							Shaft End Dimensions		Approx. Mass [kg]
									LA	LB	LC	LE	LG	LH	LZ	S	S1	
1AA□A21	447	331	295	36	116	247	319	150	235	$200^{0}_{-0.046}$	220	4	20	270	13.5	$42^{0}_{-0.016}$	50	57
1EA□A21	509	393	357	36	116	309	381	150	235	$200^{0}_{-0.046}$	220	4	20	270	13.5	$55^{+0.030}_{+0.011}$	60	67

* For models that have a batteryless absolute encoder, L, LL, LP, and KB2 are 8 mm greater than the given value. Refer to the following section for the values for individual models.

Notes:
1. The values in parentheses are for Servomotors with Holding Brakes.
2. The values for a straight, without key specification are given. Refer to the information given below for other shaft end specifications and option specifications.

Shaft End Specifications

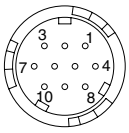
Straight with Key and Tap



Model SGM7G-	LR	Q	QK	S	W	T	U	P
1AA□A61	116	110	90	$42^{0}_{-0.016}$	12	8	5	M16x32L
1EA□A61	116	110	90	$55^{+0.030}_{+0.011}$	16	10	6	M20x40L

Connector Specifications

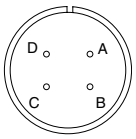
Encoder Connector (24-bit Encoder)



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

* A battery is required only for an absolute 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

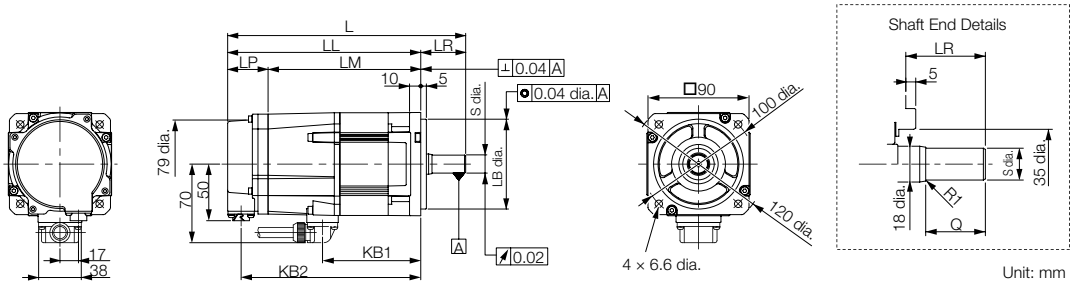


A	Phase U	C	Phase W
B	Phase V	D	FG (frame ground)

Manufacturer: DDK Ltd.

Servomotors with Holding Brakes

SGM7G-03 and -05



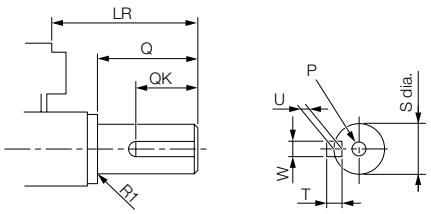
Model SGM7G-	L*1	LL*1	LM	LP*1	LR	KB1	KB2*1	KL1	Flange Dimensions							Shaft End Dimensions		Approx. Mass [kg]
									LA	LB	LC	LE	LG	LH	LZ	S	Q	
03A□A2C	199*2	159	123	36	40*2	75	147	70	100	$80^{0}_{-0.030}$	90	5	10	120	6.6	$16^{0}_{-0.011\ *2}$	30*2	3.6
05A□A2C	212	172	136	36	40	88	160	70	100	$80^{0}_{-0.030}$	90	5	10	120	6.6	$16^{0}_{-0.013}$	30	4.2

*1. For models that have a batteryless absolute encoder, L, LL, LP, and KB2 are 8 mm greater than the given value. Refer to the following section for the values for individual models.
*2. The L, LR, S, and Q dimensions of these Servomotors are different from those of the S-V-series SGMGV Servomotors.
Models that have the same installation dimensions as the SGMGV Servomotors are also available. Contact your YASKAWA representative for details.

Notes:
1. The values in parentheses are for Servomotors with Holding Brakes.
2. The values for a straight, without key specification are given. Refer to the information given below for other shaft end specifications and option specifications.

Shaft End Specifications

Straight with Key and Tap

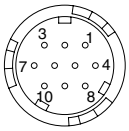


Model SGM7G-	LR	Q	QK	S	W	T	U	P
03A□A6C	40*	30*	20*	$16^{0}_{-0.011\ *}$	5	5	3	M5x12L
05A□A6C	40	30	20	$16^{0}_{-0.013}$	5	5	3	

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

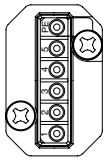
Encoder Connector (24-bit Encoder)



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

* A battery is required only for an absolute 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.

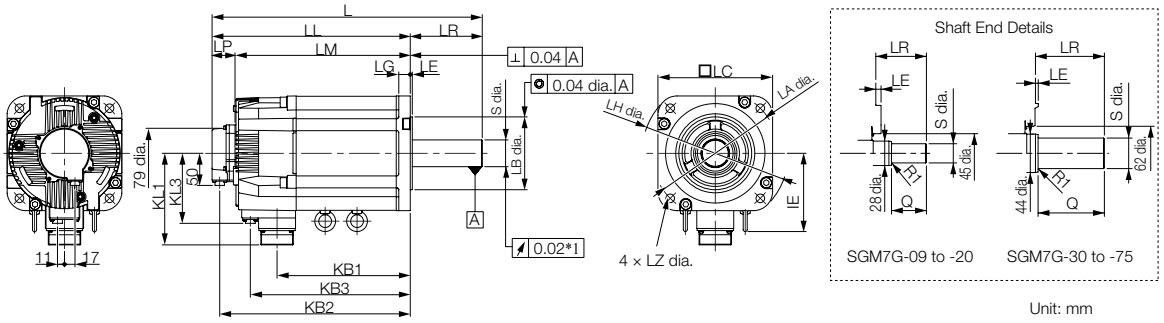
Servomotor Connector



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

Manufacturer: Japan Aviation Electronics Industry, Ltd.

SGM7G-09 to -75



Unit: mm

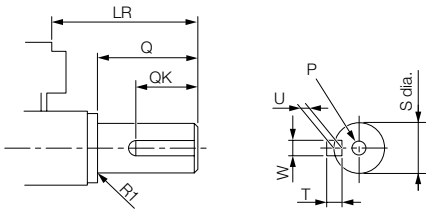
Model SGM7G-	L*2	LL*2	LM	LP*2	LR	KB1	KB2*2	KB3	IE	KL1	KL3	Flange Dimensions							Shaft End Dimensions		Approx. Mass
												LA	LB	LC	LE	LG	LH	LZ	S	Q	[kg]
09A□A2C	231	173	137	36	58	83	161	115	–	104	80	145	$110^{0}_{-0.035}$	130	6	12	165	9	$24^{0}_{-0.013}$ *3	40	7.5
13A□A2C	247	189	153	36	58	99	177	131	–	104	80	145	$110^{0}_{-0.035}$	130	6	12	165	9	$24^{0}_{-0.013}$ *3	40	9.0
20A□A2C	265	207	171	36	58	117	195	149	–	104	80	145	$110^{0}_{-0.035}$	130	6	12	165	9	$24^{0}_{-0.013}$ *3	40	11.0
30A□A2C	287	208	172	36	79	108	196	148	–	134	110	200	$114.3^{0}_{-0.025}$	180	3.2	18	230	13.5	$35^{+0.01}_{0}$	76	19.5
44A□A2C	311	232	196	36	79	132	220	172	–	134	110	200	$114.3^{0}_{-0.025}$	180	3.2	18	230	13.5	$35^{+0.01}_{0}$	76	23.5
55A□A2C	378	265	229	36	113	163	253	205	123	144	110	200	$114.3^{0}_{-0.025}$	180	3.2	18	230	13.5	$42^{0}_{-0.016}$	110	27.5
75A□A2C	424	311	275	36	113	209	299	251	123	144	110	200	$114.3^{0}_{-0.025}$	180	3.2	18	230	13.5	$42^{0}_{-0.016}$	110	35.0

*1. This is 0.04 for the SGM7G-55 or SGM7G-75.
*2. For models that have a batteryless absolute encoder, L, LL, LP, and KB2 are 8 mm greater than the given value. Refer to the following section for the values for individual models.
*3. The S dimensions of these Servomotors are different from those of the S-V-series SGMGV Servomotors.
Models that have the same installation dimensions as the SGMGV Servomotors are also available. Contact your YASKAWA representative for details.

Notes:
1. The values in parentheses are for Servomotors with Holding Brakes.
2. The values for a straight, without key specification are given. Refer to the information given below for other shaft end specifications and option specifications.

Shaft End Specifications

Straight with Key and Tap

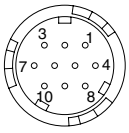


Model SGM7G-	LR	Q	QK	S	W	T	U	P
09A□A6C	58	40	25	$24^{0}_{-0.013}$ *	8*	7*	4*	M5x12L
13A□A6C	58	40	25	$24^{0}_{-0.013}$ *	8*	7*	4*	
20A□A6C	58	40	25	$24^{0}_{-0.013}$ *	8	7	4	
30A□A6C	79	76	60	$35^{+0.01}_{0}$	10	8	5	M12×25L
44A□A6C	79	76	60	$35^{+0.01}_{0}$	10	8	5	
55A□A6C	113	110	90	$42^{0}_{-0.016}$	12	8	5	M16×32L
75A□A6C	113	110	90	$42^{0}_{-0.016}$	12	8	5	

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

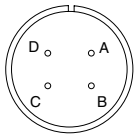
Encoder Connector (24-bit Encoder)



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

* A battery is required only for an absolute 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.

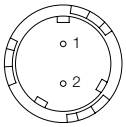
Servomotor Connector



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

Manufacturer: DDK Ltd.

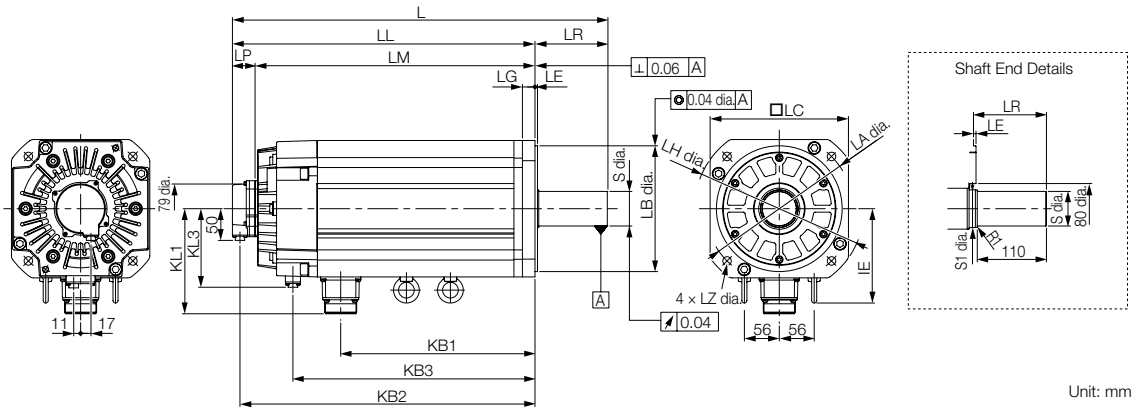
Brake Connector



1	Brake terminal
2	Brake terminal

Note: There is no voltage polarity for the brake terminals.
Receptacle: CM10-R10P-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.

SGM7G-1A and -1E



Unit: mm

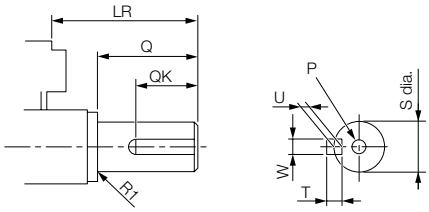
Model SGM7G-	L*	LL*	LM	LP*	LR	KB1	KB2*	KB3	IE	KL1	KL3	Flange Dimensions							Shaft End Dimensions		Approx. Mass
												LA	LB	LC	LE	LG	LH	LZ	S	S1	[kg]
1AA□A2C	498	382	346	36	116	247	370	315	150	168	125	235	$200^{0}_{-0.046}$	220	4	20	270	13.5	$42^{0}_{-0.016}$	50	65
1EA□A2C	598	482	446	36	116	309	470	385	150	168	125	235	$200^{0}_{-0.046}$	220	4	20	270	13.5	$55^{+0.030}_{+0.011}$	60	85

* For models that have a batteryless absolute encoder, L, LL, LP, and KB2 are 8 mm greater than the given value. Refer to the following section for the values for individual models.

Notes:
1. The values in parentheses are for Servomotors with Holding Brakes.
2. The values for a straight, without key specification are given. Refer to the information given below for other shaft end specifications and option specifications.

Shaft End Specifications

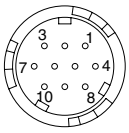
Straight with Key and Tap



Model SGM7G-	LR	Q	QK	S	W	T	U	P
1AA□A6C	116	110	90	$42^{0}_{-0.016}$	12	8	5	M16x32L
1EA□A6C	116	110	90	$55^{+0.030}_{+0.011}$	16	10	6	M20x40L

Connector Specifications

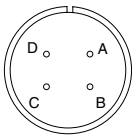
Encoder Connector (24-bit Encoder)



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

* A battery is required only for an absolute 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.

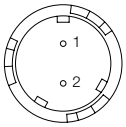
Servomotor Connector



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

Manufacturer: DDK Ltd.

Brake Connector



1	Brake terminal
2	Brake terminal

Note: There is no voltage polarity for the brake terminals.
Receptacle: CM10-R10P-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.

Dimensions of Servomotors with batteryless Absolute Encoders

Servomotors without Holding Brakes

Model SGM7G-	L	LL	LP	KB2	Approx. Mass [kg]
03A6A21	174	134	44	122	2.6
05A6A21	187	147	44	135	3.2
09A6A21	203	145	44	133	5.5
13A6A21	219	161	44	149	7.1
20A6A21	237	179	44	167	8.6
30A6A21	247	168	44	156	13.5
44A6A21	271	192	44	180	17.5
55A6A21	342	229	44	217	21.5
75A6A21	388	275	44	263	29.5
1AA6A21	455	339	44	327	57
1EA6A21	514	401	44	389	67

Servomotors with Holding Brakes

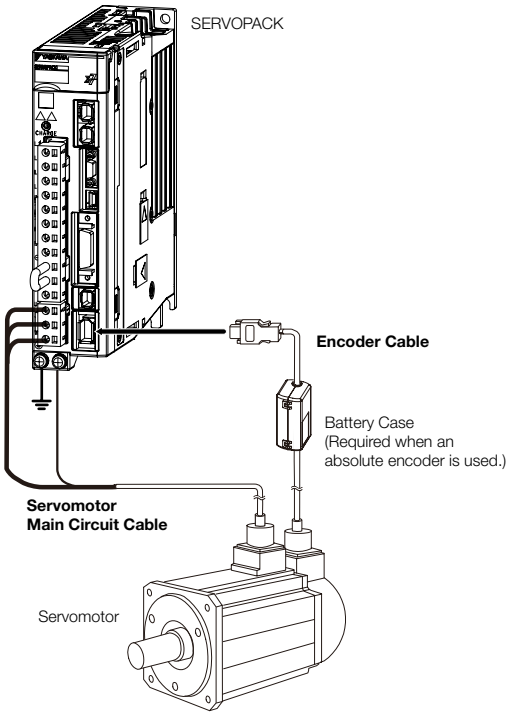
Model SGM7G-	L	LL	LP	KB2	Approx. Mass [kg]
03A6A2C	207	167	44	155	3.6
05A6A2C	220	180	44	168	4.2
09A6A2C	239	181	44	169	7.5
13A6A2C	255	197	44	185	9.0
20A6A2C	273	215	44	203	11
30A6A2C	295	216	44	204	19.5
44A6A2C	319	240	44	228	23.5
55A6A2C	386	273	44	261	27.5
75A6A2C	432	319	44	307	35.0
1AA6A2C	506	390	44	378	65
1EA6A2C	606	490	44	478	85

Selecting Cables SGM7G

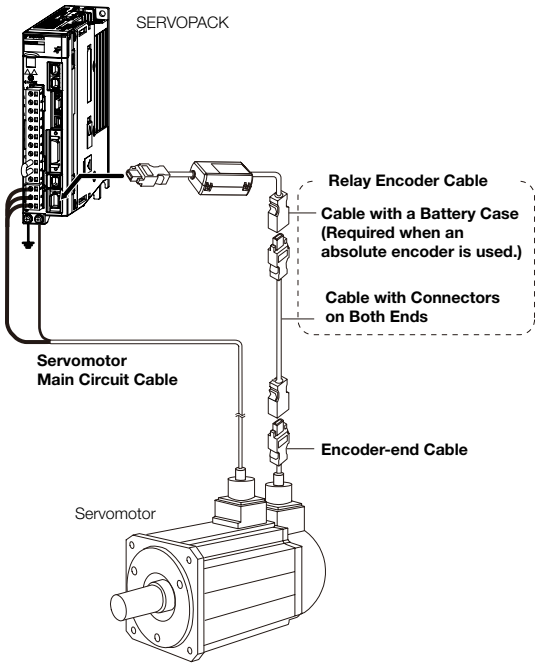
Cable Configurations

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

Encoder Cable of 20 m or less



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

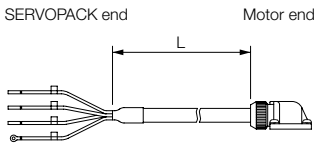
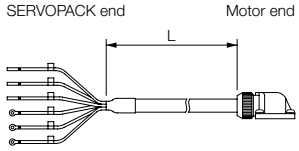


Note:

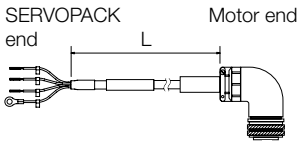
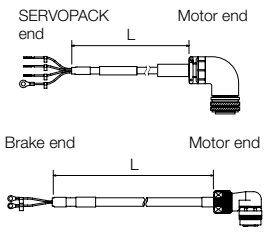
1. Cables with connectors on both ends that are compliant with an IP67 protective structure and European Safety Standards are not available from YASKAWA for the SGM7G Servomotors. You must make such a cable yourself. Use the Connectors specified by YASKAWA for these Servomotors. (These Connectors are compliant with the standards.) YASKAWA does not specify what wiring materials to use.
2. If the Encoder Cable length exceeds 20 m, be sure to use a Relay Encoder Cable.
3. If you use a Servomotor Main Circuit Cable that exceeds 20 m, the intermittent duty zone in the torquemotor speed characteristics will become smaller because the voltage drop increases.
4. Refer to the following manual for the following information.
   - Cable dimensional drawings and cable connection specifications
   - Order numbers and specifications of individual connectors for cables
   - Order numbers and specifications for wiring materials

   Sigma-7-Series AC Servo Drive Peripheral Device Selection Manual (Manual No.: SIEP S800001 32)

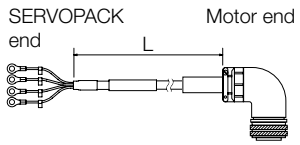
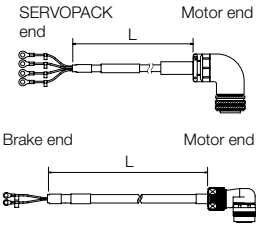
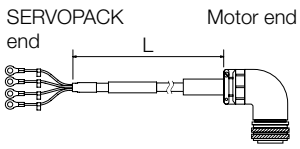
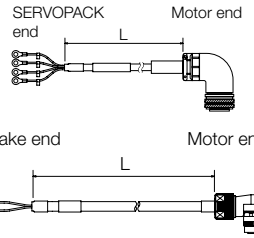
Servomotor Main Circuit Cables

Servomotor Model	Description	Length	Order Number*	Appearance
SGM7G-03 and -05 300 W, 450 W	For Servomotors without Holding Brakes	3m	JZSP-CVM21-03-E-G#	
		5m	JZSP-CVM21-05-E-G#	
		10m	JZSP-CVM21-10-E-G#	
		15m	JZSP-CVM21-15-E-G#	
		20m	JZSP-CVM21-20-E-G#	
		30m	JZSP-CVM21-30-E-G#	
	For Servomotors with Holding Brakes	3m	JZSP-CVM41-03-E-G#	
		5m	JZSP-CVM41-05-E-G#	
		10m	JZSP-CVM41-10-E-G#	
		15m	JZSP-CVM41-15-E-G#	
		20m	JZSP-CVM41-20-E-G#	

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

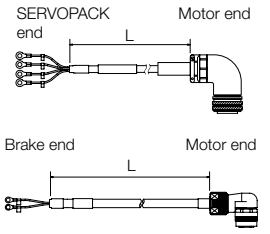
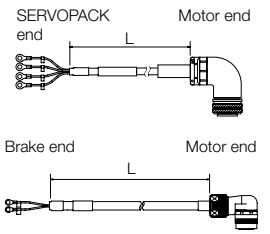
Servomotor Model	Description	Connector Specifications	Length	Order Number Flexible Cable*1	Appearance
SGM7G-09 to -20 850 W, 1.8 kW	For Servomotors without Holding Brakes	Right-angle	3m	JZSP-CVMCA12-03-E-G#	
			5m	JZSP-CVMCA12-05-E-G#	
			10m	JZSP-CVMCA12-10-E-G#	
			15m	JZSP-CVMCA12-15-E-G#	
			20m	JZSP-CVMCA12-20-E-G#	
	For Servomotors with Holding Brakes (Set of Two Cables*2)	Right-angle	3m	JZSP-CVMCA12-03-E-G#	
				JZSP-CVB12Y-03-E-G#	
			5m	JZSP-CVMCA12-05-E-G#	
				JZSP-CVB12Y-05-E-G#	
			10m	JZSP-CVMCA12-10-E-G#	
				JZSP-CVB12Y-10-E-G#	
			15m	JZSP-CVMCA12-15-E-G#	
				JZSP-CVB12Y-15-E-G#	
			20m	JZSP-CVMCA12-20-E-G#	
				JZSP-CVB12Y-20-E-G#	

*1. Use Flexible Cables for moving parts of machines, such as robots. The recommended bending radius (R) is 90 mm or larger.
*2. This order number is for a set of two cables (Main Power Supply Cable and Holding Brake Cable).
When you purchase them separately, the order numbers for Main Power Supply Cables are the same as for a Servomotor without a Holding Brake.
The following order numbers are for a Holding Brake Cable. These Standard Cables are Flexible Cables.
- Cable with Straight Plug: JZSP-U7B23-□□-E
- Cable with Right-angle Plug: JZSP-U7B24-□□-E

Servomotor Model	Description	Connector Specifications	Length	Order Number Flexible Cable*1	Appearance
SGM7G-30 and -44 2.9 kW, 4.4 kW	For Servomotors without Holding Brakes	Right-angle	3 m	JZSP-CVMCA13-03-E-G#	
			5 m	JZSP-CVMCA13-05-E-G#	
			10 m	JZSP-CVMCA13-10-E-G#	
			15 m	JZSP-CVMCA13-15-E-G#	
			20 m	JZSP-CVMCA13-20-E-G#	
	For Servomotors with Holding Brakes (Set of Two Cables*2)	Right-angle	3 m	JZSP-CVMCA13-03-E-G#	
				JZSP-CVB12Y-03-E-G#	
			5 m	JZSP-CVMCA13-05-E-G#	
				JZSP-CVB12Y-05-E-G#	
			10 m	JZSP-CVMCA13-10-E-G#	
				JZSP-CVB12Y-10-E-G#	
			15 m	JZSP-CVMCA13-15-E-G#	
				JZSP-CVB12Y-15-E-G#	
			20 m	JZSP-CVMCA13-20-E-G#	
				JZSP-CVB12Y-20-E-G#	
SGM7G-55 5.5 kW	For Servomotors without Holding Brakes	Right-angle	3 m	JZSP-CVMCA14-03-E-G#	
			5 m	JZSP-CVMCA14-05-E-G#	
			10 m	JZSP-CVMCA14-10-E-G#	
			15 m	JZSP-CVMCA14-15-E-G#	
			20 m	JZSP-CVMCA14-20-E-G#	
	For Servomotors with Holding Brakes (Set of Two Cables*2)	Right-angle	3 m	JZSP-CVMCA14-03-E-G#	
				JZSP-CVB12Y-03-E-G#	
			5 m	JZSP-CVMCA14-05-E-G#	
				JZSP-CVB12Y-05-E-G#	
			10 m	JZSP-CVMCA14-10-E-G#	
				JZSP-CVB12Y-10-E-G#	
			15 m	JZSP-CVMCA14-15-E-G#	
				JZSP-CVB12Y-15-E-G#	
			20 m	JZSP-CVMCA14-20-E-G#	
				JZSP-CVB12Y-20-E-G#	

*1. Use Flexible Cables for moving parts of machines, such as robots. The recommended bending radius (R) is 90 mm or larger.
*2. This order number is for a set of two cables (Main Power Supply Cable and Holding Brake Cable). When you purchase them separately, the order numbers for Main Power Supply Cables are the same as for a Servomotor without a Holding Brake.
The following order numbers are for a Holding Brake Cable. These Standard Cables are Flexible Cables.
- Cable with Straight Plug: JZSP-U7B23-□□-E
- Cable with Right-angle Plug: JZSP-U7B24-□□-E

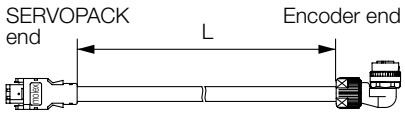
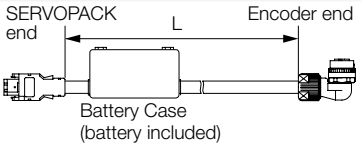
Note: If you need a Cable with a length of 20 m to 50 m, consider the operating conditions and specify a suitable length.

Servomotor Model	Description	Connector Specifications	Length	Flexible Cable*1	Appearance
SGM7G- 75 and -1A 7.5kW, 11kW	For Servo-motors without Holding Brakes	Right-angle	3m	JZSP-CVMCA15-03-E-G#	
			5m	JZSP-CVMCA15-05-E-G#	
			10m	JZSP-CVMCA15-10-E-G#	
			15m	JZSP-CVMCA15-15-E-G#	
			20m	JZSP-CVMCA15-20-E-G#	
	For Servo-motors with Holding Brakes (Set of Two Cables*2)	Right-angle	3m	JZSP-CVMCA15-03-E-G# JZSP-CVB12Y-03-E-G#	
			5m	JZSP-CVMCA15-05-E-G# JZSP-CVB12Y-05-E-G#	
			10m	JZSP-CVMCA15-10-E-G# JZSP-CVB12Y-10-E-G#	
			15m	JZSP-CVMCA15-15-E-G# JZSP-CVB12Y-15-E-G#	
			20m	JZSP-CVMCA15-20-E-G# JZSP-CVB12Y-20-E-G#	
SGM7G- 1E 15kW	For Servo-motors without Holding Brakes	Right-angle	3m	JZSP-CVMCA16-03-E-G#	
			5m	JZSP-CVMCA16-05-E-G#	
			10m	JZSP-CVMCA16-10-E-G#	
			15m	JZSP-CVMCA16-15-E-G#	
			20m	JZSP-CVMCA16-20-E-G#	
	For Servo-motors with Holding Brakes (Set of Two Cables*2)	Right-angle	3m	JZSP-CVMCA16-03-E-G# JZSP-CVB12Y-03-E-G#	
			5m	JZSP-CVMCA16-05-E-G# JZSP-CVB12Y-05-E-G#	
			10m	JZSP-CVMCA16-10-E-G# JZSP-CVB12Y-10-E-G#	
			15m	JZSP-CVMCA16-15-E-G# JZSP-CVB12Y-15-E-G#	
			20m	JZSP-CVMCA16-20-E-G# JZSP-CVB12Y-20-E-G#	

*1. Use Flexible Cables for moving parts of machines, such as robots. The recommended bending radius (R) is 90mm or larger.
*2. This order number is for a set of two cables (Main Power Supply Cable and Holding Brake Cable). When you purchase them separately, the order numbers for Main Power Supply Cables are the same as for a Servomotor without a Holding Brake.
The following order numbers are for a Holding Brake Cable. These Standard Cables are Flexible Cables.
- Cable with Straight Plug: JZSP-U7B23-□□-E
- Cable with Right-angle Plug: JZSP-U7B24-□□-E

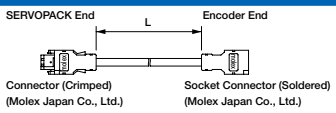
Note: If you need a Cable with a length of 20m to 50m, consider the operating conditions and specify a suitable length.

Encoder Cables of 20 m or less

Servomotor Model	Description	Length	Flexible Cable*1	Appearance
All SGM7G Models	For incremental encoder, or battery-less absolute encoder	3 m	JZSP-CVP12-03-E-G#	
		5 m	JZSP-CVP12-05-E-G#	
		10 m	JZSP-CVP12-10-E-G#	
		15 m	JZSP-CVP12-15-E-G#	
		20 m	JZSP-CVP12-20-E-G#	
	For absolute encoder: With Battery Case*2	3 m	JZSP-CVP27-03-E-G#	
		5 m	JZSP-CVP27-05-E-G#	
		10 m	JZSP-CVP27-10-E-G#	
		15 m	JZSP-CVP27-15-E-G#	
		20 m	JZSP-CVP27-20-E-G#	

*1. Use Flexible Cables for moving parts of machines, such as robots. The recommended bending radius (R) is 90 mm or larger.
*2. If a battery is connected to the host controller, the Battery Case is not required. If so, use a cable for incremental encoders.

Encoder Extension Cables of 30 m or above

Servomotor Model	Description	Length	Order Number	Appearance
All SGM7G models	Cable with Connectors (For incremental and absolute encoder)	30 m	JZSP-UCMP00-30-E	
		40 m	JZSP-UCMP00-40-E	
		50 m	JZSP-UCMP00-50-E	

Note: Encoder Extension cables can only be used together with suitable Encoder Cables.

Direct Drive Servomotors

SERVOPACKs

Sigma-7S Analog Voltage/Pulse Train

Model Designations

SGD7S	-	R70	A	00	A	001	000	
Sigma-7 Series Sigma-7S Models		1st ... 3rd	4th	5th + 6th	7th	8th ... 10th	11th ... 13th	digit

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

Code	Specification
Three-phase, 200 V	
R70*1	0.05 kW
R90*1	0.1 kW
1R6*1	0.2 kW
2R8*1	0.4 kW
3R8	0.5 kW
5R5*1	0.75 kW
7R6	1.0 kW
120*2	1.5 kW
180	2.0 kW
200*3	3.0 kW
330	5.0 kW
470	6.0 kW
550	7.5 kW
590	11 kW
780	15 kW

4th digit - Voltage

Code	Specification
A	200 VAC

5th + 6th digit - Interface*4

Code	Specification
00	Analog Voltage/ Pulse Train Reference

7th digit - Design Revision Order

Code	Specification
A	Standard Model

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

Code	Specifications	Applicable Models
None	Without Options	All models
000	Without Options only used in combination with FT/EX	All models
001	Rack-mounted	SGD7S-R70A to -330A
	Duct-ventilated	SGD7S-470A to -780A
002	Varnished	All models
008	Single-phase, 200 V power input	SGD7S-120A
020*6	No dynamic brake	SGD7S-R70A to -2R8A
	External dynamic brake resistor	SGD7S-3R8A to -780A
00A	Varnished and single-phase power input	All models

11th ... 13th digit - FT/EX Specifications

Code	Specifications
None	None
F50*8	Application function for integrated MPiec
F82*7	Application function option for special motors, SGM7D motor drive
F83*7	Application function option for special motors, SGM7D motor drive, indexing

Note:

Depending on configuration choices made, the model code might end after the 7th or 10th digit, or involve all 13 digits.

Readily available up to 1.5 kW. Others available on request.
Additional accessories and software for SERVOPACKs is described in the Periphery section.

Note:
*1. You can use these models with either a single-phase or three-phase power supply input.
*2. A model with a single-phase, 200-VAC power supply input is available as a hardware option (model. SGD7S-120A□0A008).
*3. The rated output is 2.4 kW if you combine the SGM7G-30A with the SGD7S-200A.
*4. The same SERVOPACKs are used for both Rotary Servomotors and Linear Servomotors.
*5. A command option module must be attached to the Command Option Attachable-type SERVOPACK for use.
*6. Refer to the following manual for details.
Sigma-7-Series AC Servo Drive Sigma-7S/Sigma-7W SERVOPACK with Hardware Option Specifications Dynamic Brake Product Manual (Manual No.: SIEP S800001 73)
*7. Refer to the following manual for details.
Sigma-7-Series AC Servo Drive Σ-7S SERVOPACK with FT/EX Specification for SGM7D Motor Product Manual (Manual No.: SIEP S800001 91)

Ratings and Specifications

Ratings

Single-phase, 200 VAC

Model SGD7S-			R70A	R90A	1R6A	2R8A	5R5A	120A
Maximum Applicable Motor Capacity [kW]			0.05	0.1	0.2	0.4	0.75	1.5
Continuous Output Current [A]			0.66	0.91	1.6	2.8	5.5	11.6
Instantaneous Maximum Output Current [A]			2.1	3.2	5.9	9.3	16.9	28
Main Circuit	Power Supply		200 VAC to 240 VAC, -15% to +10%, 50 Hz/60 Hz					
	Input Current [A]*		0.8	1.6	2.4	5.0	8.7	16
Control	Power Supply		200 VAC to 240 VAC, -15% to +10%, 50 Hz/60 Hz					
	Input Current [A]*		0.2	0.2	0.2	0.2	0.2	0.25
Power Supply Capacity [kVA]*			0.2	0.3	0.6	1.2	1.9	4.0
Power Loss*	Main Circuit Power Loss [W]		5.0	7.1	12.1	23.7	39.2	71.8
	Control Circuit Power Loss [W]		12	12	12	12	14	16
	Built-in Regenerative Resistor Power Loss [W]		–	–	–	–	8	16
	Total Power Loss [W]		17.0	19.1	24.1	35.7	61.2	103.8
Regenerative Resistor	Built-in Regenerative Resistor	Resistance [Ω]	–	–	–	–	40	12
		Capacity [W]	–	–	–	–	40	60
	Minimum Allowable External Resistance [Ω]		40	40	40	40	40	12
Overvoltage Category			III					

* This is the net value at the rated load.

Note: Readily available up to 1.5 kW. Others available on request.

Three-phase, 200 VAC

Model SGD7S-			R70A	R90A	1R6A	2R8A	3R8A	5R5A	7R6A	120A	180A	200A	330A
Maximum Applicable Motor Capacity [kW]			0.05	0.1	0.2	0.4	0.5	0.75	1.0	1.5	2.0	3.0	5.0
Continuous Output Current [A]			0.66	0.91	1.6	2.8	3.8	5.5	7.6	11.6	18.5	19.6	32.9
Instantaneous Maximum Output Current [A]			2.1	3.2	5.9	9.3	11	16.9	17	28	42	56	84.0
Main Circuit	Power Supply		200 VAC to 240 VAC, -15% to +10%, 50 Hz/60 Hz										
	Input Current [A]*		0.4	0.8	1.3	2.5	3.0	4.1	5.7	7.3	10	15	25
Control	Power Supply		200 VAC to 240 VAC, -15% to +10%, 50 Hz/60 Hz										
	Input Current [A]*		0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.25	0.25	0.3
Power Supply Capacity [kVA]*			0.2	0.3	0.5	1.0	1.3	1.6	2.3	3.2	4.0	5.9	7.5
Power Loss*	Main Circuit Power Loss [W]		5.0	7.0	11.9	22.5	28.5	38.9	49.2	72.6	104.2	114.2	226.6
	Control Circuit Power Loss [W]		12	12	12	12	14	14	14	15	16	16	19
	Built-in Regenerative Resistor Power Loss [W]		–	–	–	–	8	8	8	10	16	16	36
	Total Power Loss [W]		17.0	19.0	23.9	34.5	50.5	60.9	71.2	97.6	136.2	146.2	281.6
Regenerative Resistor	Built-In Regenerative Resistor	Resistance [Ω]	–	–	–	–	40	40	40	20	12	12	8
		Capacity [W]	–	–	–	–	40	40	40	60	60	60	180
	Minimum Allowable External Resistance [Ω]		40	40	40	40	40	40	40	20	12	12	8
Overvoltage Category			III										

* This is the net value at the rated load.

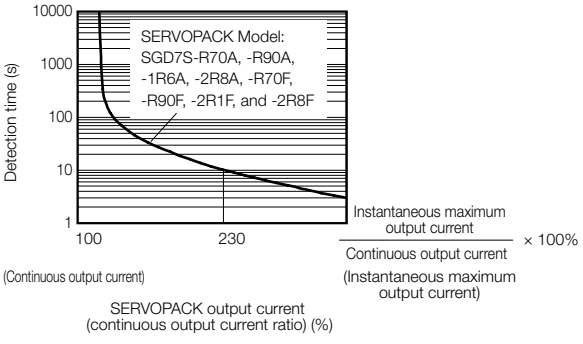
Note: Readily available up to 1.5 kW. Others available on request.

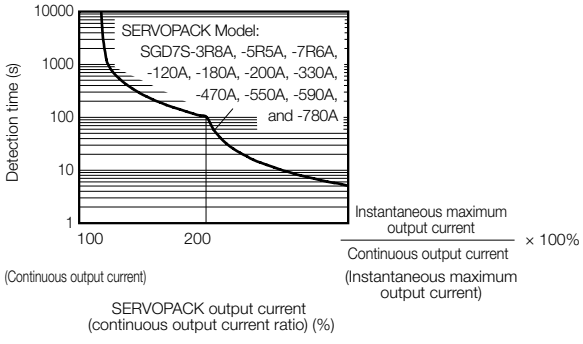
Model SGD7S-			470A	550A	590A	780A
Maximum Applicable Motor Capacity [kW]			6.0	7.5	11	15
Continuous Output Current [A]			46.9	54.7	58.6	78.0
Instantaneous Maximum Output Current [A]			110	130	140	170
Main Circuit	Power Supply		200 VAC to 240 VAC, -15% to +10%, 50 Hz/60 Hz			
	Input Current [A]*1		29	37	54	73
Control	Power Supply		200 VAC to 240 VAC, -15% to +10%, 50 Hz/60 Hz			
	Input Current [A]*1		0.3	0.3	0.4	0.4
Power Supply Capacity [kVA]*1			10.7	14.6	21.7	29.6
Power Loss*1	Main Circuit Power Loss [W]		271.7	326.9	365.3	501.4
	Control Circuit Power Loss [W]		21	21	28	28
	Built-in Regenerative Resistor Power Loss [W]		180*2	180*3	350*3	350*3
	Total Power Loss [W]		292.7	347.9	393.3	529.4
External Regenerative Resistor Unit	External Regenerative Resistor Unit	Resistance [Ω]	6.25*2	3.13*3	3.13*3	3.13*3
		Capacity [W]	880*2	1,760*3	1,760*3	1,760*3
	Minimum Allowable External Resistance [Ω]		5.8	2.9	2.9	2.9
Overvoltage Category			III			

Note: Readily available up to 1.5 kW. Others available on request.

*1. This is the net value at the rated load.
*2. This value is for the optional JUSP-RA04-E Regenerative Resistor Unit.
*3. This value is for the optional JUSP-RA05-E Regenerative Resistor Unit.

SERVOPACK Overload Protection Characteristics





Note:
The above overload protection characteristics do not mean that you can perform continuous duty operation with an output of 100% or higher.
For a YASKAWA-specified combination of SERVOPACK and Servomotor, maintain the effective torque (or effective force) within the continuous duty zone of the torque-motor speed characteristic (or force-motor speed characteristics) of the Servomotor.

Specifications

Item		Specification	
Control Method		IGBT-based PWM control, sine wave current drive	
Feedback	With Rotary Servomotor	Serial encoder: 17 bits (absolute encoder) 20 bits or 24 bits (incremental encoder/absolute encoder) 22 bits (absolute encoder)	
	With Linear Servomotor	• Absolute linear encoder (The signal resolution depends on the absolute linear encoder.) • Incremental linear encoder (The signal resolution depends on the incremental linear encoder or Serial Converter Unit.)	
Environmental Conditions	Ambient Air Temperature*1	-5°C to 55°C With derating, usage is possible between 55°C and 60°C. Refer to the following section for Derating Specifications.	
	Storage Temperature	-20°C to 85°C	
	Ambient Air Humidity	95% relative humidity max. (with no freezing or condensation)	
	Storage Humidity	95% relative humidity max. (with no freezing or condensation)	
	Vibration Resistance	4.9 m/s^2	
	Shock Resistance	19.6 m/s^2	
	Protection Class	Class	SERVOPACK Model: SGD7S-
		IP20	R70A, R90A,1R6A, 2R8A, 3R8A, 5R5A, 7R6A,120A
		IP10	180A, 200A, 330A, 470A, 550A, 590A, 780A
	Pollution Degree	2 • Must be no corrosive or flammable gases. • Must be no exposure to water, oil, or chemicals. • Must be no dust, salts, or iron dust.	
	Altitude*1	1,000 m or less With derating, usage is possible between 1,000 m and 2,000 m. Refer to the following section for Derating specifications.	
	Others	Do not use the SERVOPACK in the following locations: Locations subject to static electricity noise, strong electromagnetic/magnetic fields, or radioactivity	
Applicable Standards		UL 61800-5-1, EN 50178, CSA C22.2 No.14, EN 61800-5-1, EN 55011 group 1 class A, EN 61000-6-2, EN 61000-6-4, EN 61800-3, IEC 61508-1 to 4, IEC 61800-5-2, IEC 62061, ISO 13849-1, and IEC 61326-3-1	
Mounting		Mounting	SERVOPACK Model: SGD7S-
		Base-mounted	All models
		Rack-mounted	R70A, R90A, 1R6A, 2R8A, 3R8A, 5R5A, 7R6A, 120A, 180A, 200A, 330A, R70F, R90F, 2R1F, 2R8F
		Duct-ventilated	470A, 550A, 590A, 780A
Performance	Speed Control Range	1:5000 (At the rated torque, the lower limit of the speed control range must not cause the Servomotor to stop.)	
	Coefficient of Speed Fluctuation*2	±0.01% of rated speed max. (for a load fluctuation of 0% to 100%)	
		0% of rated speed max. (for a voltage fluctuation of ±10%)	
		±0.1% of rated speed max. (for a temperature fluctuation of 25°C ±25°C)	
	Torque Control Precision (Repeatability)	±1%	
	Soft Start Time Setting	0 s to 10 s (Can be set separately for acceleration and deceleration.)	

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Item			Specification
I/O Signals	Encoder Divided Pulse Output		Phase A, phase B, phase C: Line-driver output Number of divided output pulses: Any setting is allowed.
	Linear Servomotor Overheat Protection Signal Input		Number of input points: 1 Input voltage range: 0 V to +5 V
	Sequence Input Signals	Fixed Input	Allowable voltage range: 5 VDC ±5% Number of input points: 1 Absolute Data Request (SEN)
		Input Signals That Can Be Allocated	Allowable voltage range: 24 VDC ±20% Number of input points: 7 Input method: Sink inputs or source inputs Input Signals: ● /S-ON (Servo ON) signal ● /P-CON (Proportional Control) Signal ● P-OT (Forward Drive Prohibit) and N-OT (Reverse Drive Prohibit) signals ● /ALM-RST (Alarm Reset) signal ● /P-CL (Forward External Torque Limit) and /N-CL (Reverse External Torque Limit) signals ● /SPD-D (Motor Direction) signal ● /SPD-A and /SPD-B (Internal Set Speed Selection) signals ● /C-SEL (Control Selection) signal ● /ZCLAMP (Zero Clamping) signal ● /INHIBIT (Reference Pulse Inhibit) signal ● /G-SEL (Gain Selection) signal ● /P-DET (Polarity Detection) signal ● SEN (Absolute Data Request) signal ● /PSEL (Reference Pulse Input Multiplication Switch) Signal ● FSTP (Forced Stop Input) signal A signal can be allocated and the positive and negative logic can be changed.
	Sequence Output Signals	Fixed Output	Allowable voltage range: 5 VDC to 30 VDC Number of output points: 1 Output 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: ● /COIN (Positioning Completion) Signal ● /V-CMP (Speed Coincidence Detection) Signal ● /TGON (Rotation Detection) Signal ● /S-RDY (Servo Ready) signal ● /CLT (Torque Limit Detection) Signal ● /VLT (Speed Limit Detection) Signal ● /BK (Brake) signal ● /WARN (Warning) Signal ● /NEAR (Near) signal ● /PSELA (Reference Pulse Input Multiplication Switching Output) signal ● ALO1, ALO2, and ALO3 (Alarm Code) signals 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 indicator and five-digit seven-segment display
Panel Operator			Four push switches
Analog Monitor (CN5)			Number of points: 2 Output voltage range: ±10 VDC (effective linearity range: ±8 V) Resolution: 16 bits Accuracy: ±20 mV (Typ) Maximum output current: ±10 mA Settling time (±1%): 1.2 ms (Typ)
Dynamic Brake (DB)			Activated when a servo alarm or overtravel (OT) occurs, or when the power supply to the main circuit or servo is OFF.
Regenerative Processing			Built-in (An external resistor must be connected to the SGD7S-470A to -780A.) Refer to Built-In Regenerative Resistor.
Overtravel (OT) Prevention			Stopping with dynamic brake, deceleration to a stop, or coasting to a stop for the P-OT (Forward Drive Prohibit) or N-OT (Reverse Drive Prohibit) signal
Protective Functions			Overcurrent, overvoltage, low voltage, overload, regeneration error, etc.
Utility Functions			Gain adjustment, alarm history, jogging, origin search, etc.
Safety Functions	Inputs		/HWBB1 and /HWBB2: Base block signals for Power Modules
	Output		EDM1: Monitors the status of built-in safety circuit (fixed output).
	Applicable Standards*3		ISO13849-1 PLe (Category 3) and IEC61508 SIL3
Option Module			Fully-Closed Modules and Safety Modules. Note: You cannot use a Fully-Closed Module and a Safety Module together.

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Item					Specification
Controls	Speed Control	Soft Start Time Setting			0 s to 10 s (Can be set separately for acceleration and deceleration.)
		Input Signal	Reference Voltage		• Maximum input voltage: ±12 V (forward motor rotation for positive reference). • 6 VDC at rated speed (default setting). Input gain setting can be changed.
			Input Impedance		Approx. 14 kΩ
			Circuit Time Constant		30 μs
		Internal Set Speed Control	Rotation Direction Selection		With Proportional Control signal
			Speed Selection		With Forward/Reverse External Torque Limit signals (speed 1 to 3 selection). Servomotor stops or another control method is used when both signals are OFF.
	Position Control	Feedforward Compensation			0% to 100%
		Output Signal Positioning Completed Width Setting			0 to 1,073,741,824 reference units
		Input Signals	Reference pulses	Reference Pulse Form	One of the following is selected: Sign + pulse train, CW + CCW pulse trains, and two-phase pulse trains with 90° phase differential
				Input Form	Line driver or open collector
				Maximum Input Frequency	• Line Driver Sign + pulse train or CW + CCW pulse trains: 4 Mpps Two-phase pulse trains with 90° phase differential: 1 Mpps • Open Collector Sign + pulse train or CW + CCW pulse trains: 200 kpps Two-phase pulse trains with 90° phase differential: 200 kpps
				Input Multiplication Switching	1 to 100 times
			Clear Signal		Position deviation clear Line driver or open collector
	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. If you combine a S-7-Series SERVOPACK with a S-V-Series Option Module, the following S-V-Series SERVOPACKs specifications must be used: a surrounding air temperature of 0°C to 55°C and an altitude of 1,000 m max. Also, the applicable range cannot be increased by derating.
2. The coefficient of speed fluctuation for load fluctuation is defined as follows:

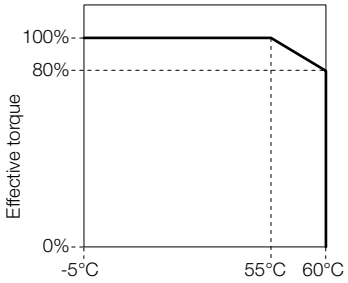
$$\text{Coefficient of speed fluctuation} = \frac{\text{No-load motor speed - Total-load motor speed}}{\text{Rated motor speed}} \times 100\%$$

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

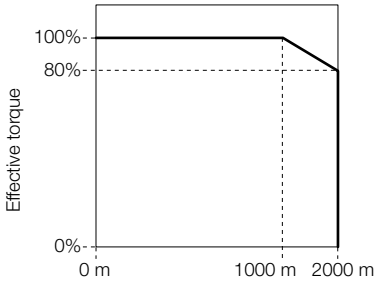
Derating Specifications

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

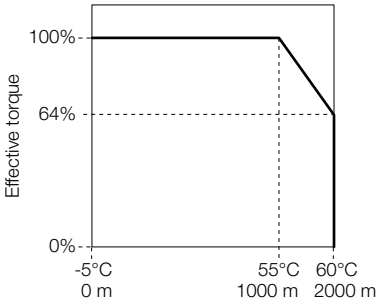
SGD7S-R70A, -R90A, -1R6A, -2R8A, -R70F, -R90F, -2R1F, and -2R8F



Surrounding air temperature

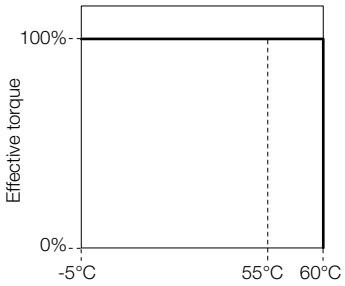


Altitude

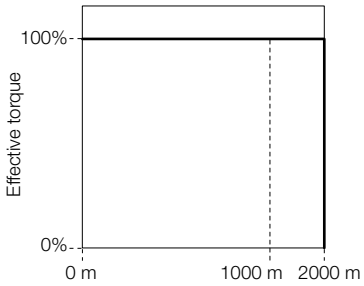


Surrounding air temperature and altitude

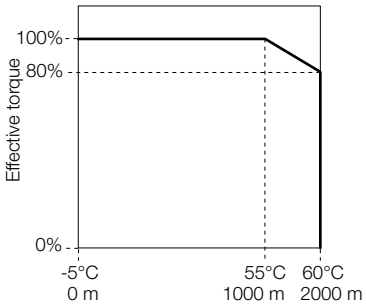
SGD7S-3R8A, -5R5A, -7R6A, -120A, -180A, -200A, -330A, -470A, -550A, -590A, and -780A



Surrounding air temperature



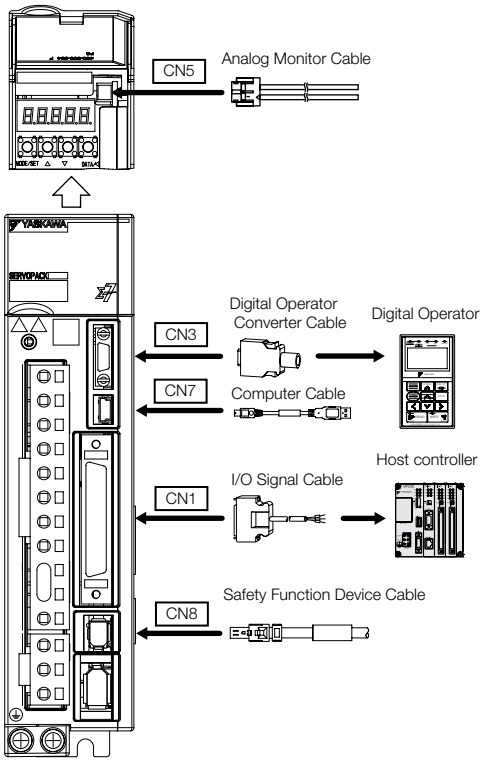
Altitude



Surrounding air temperature and altitude

Selecting Cables SGD7S Analog Voltage/Pulse Train

System Configurations



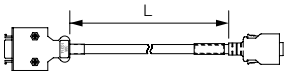
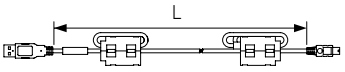
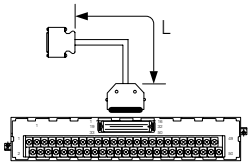
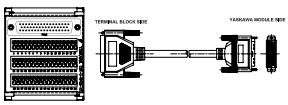
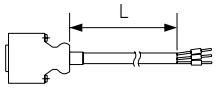
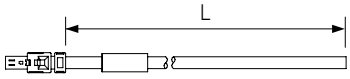
Selection Table

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.

Refer to the following manual for the following information.
- Cable dimensional drawings and cable connection specifications
- Order numbers and specifications of individual connectors for cables

Sigma-7-Series AC Servo Drive Peripheral Device Selection Manual (Manual No.: SIEP S800001 32)

Code	Description		Length	Order Number	Appearance
CN5	Analog Monitor Cable		1 m	JZSP-CA01-E	
CN3	Digital Operator			JUSP-0P05A-1-E	
		Digital Operator Converter Cable	0.3 m	JZSP-CVS05-A3-E*1	
CN7	Computer Cable		2.5 m	JZSP-CVS06-02-E	
CN1	I/O Signal Cables	Soldered Connector Kit		JZSP-CSI9-1-E	
		Connector-Terminal Block Converter Unit (with cable & screw connectors)	0.5 m	JUSP-TA50PG-E	
			1 m	JUSP-TA50PG-1-E	
			2 m	JUSP-TA50PG-2-E	
		Connector-Terminal Block Converter Unit (with cable & screwless clamp connectors)	0.5 m	CBK-U-MP2B-A5	Terminal Block and 0.5 m Connection Cable 
			1 m	CBK-U-MP2B-01	
			3 m	CBK-U-MP2B-03	
		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	
CN8	Safety Function Device Cables	Cables with Connectors*2	1 m	JZSP-CVH03-01-E	
			3 m	JZSP-CVH03-03-E	
		Connector Kit*3		Contact Tyco Electronics Japan G.K. Product name: Industrial Mini I/O D-shape Type 1 Plug Connector Kit Model number: 2013595-1	

*1. This Converter Cable is required to use the Sigma-III-series Digital Operator (JUSP-OP05A) for Sigma-7-series SERVOPACKs.
*2. 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.
*3. Use the Connector Kit when you make cables yourself.

SERVOPACK Main Circuit Wires

Important

These specifications are based on IEC/EN 61800-5-1, UL 61800-5-1, and CSA C22.2 No.274.
1. To comply with UL standards, use UL-compliant wires.
2. Use copper wires with a rated temperature of 75° 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 surrounding air temperature.

Three-phase, 200-VAC Wires for Sigma-7S SERVOPACKs

SGD7S-	Terminals		Wire Size	Screw Size	Tightening Torque [Nm]
R70A, R90A, 1R6A, 2R8A, 3R8A, 5R5A, 7R6A	Main Circuit Power Supply Cable	L1, L2, L3	AWG16 (1.25 mm²)	–	–
	Servomotor Main Circuit Cable*	U, V, W			
	Control Power Supply Cable	L1C, L2C			
	External Regenerative Resistor Cable	B1/⊕, B2			
	Ground cable	⏚	AWG14 (2.0 mm²) min.	M4	1.2 to 1.4
120A	Main Circuit Power Supply Cable	L1, L2, L3	AWG14 (2.0 mm²)	–	–
	Servomotor Main Circuit Cable*	U, V, W			
	Control Power Supply Cable	L1C, L2C	AWG16 (1.25 mm²)		
	External Regenerative Resistor Cable	B1/⊕, B2			
	Ground cable	⏚	AWG14 (2.0 mm²) min.	M4	1.2 to 1.4
180A	Main Circuit Power Supply Cable	L1, L2, L3	AWG14 (2.0 mm²)	M4	1.0 to 1.2
	Servomotor Main Circuit Cable*	U, V, W	AWG10 (5.5 mm²)		
	Control Power Supply Cable	L1C, L2C	AWG16 (1.25 mm²)		
	External Regenerative Resistor Cable	B1/⊕, B2			
	Ground cable	⏚	AWG14 (2.0 mm²) min.	M4	1.2 to 1.4
200A	Main Circuit Power Supply Cable	L1, L2, L3	AWG12 (3.5 mm²)	M4	1.0 to 1.2
	Servomotor Main Circuit Cable*	U, V, W	AWG10 (5.5 mm²)		
	Control Power Supply Cable	L1C, L2C	AWG16 (1.25 mm²)		
	External Regenerative Resistor Cable	B1/⊕, B2			
	Ground cable	⏚	AWG14 (2.0 mm²) min.	M4	1.2 to 1.4
330A	Main Circuit Power Supply Cable	L1, L2, L3	AWG8 (8.0 mm²)	M4	1.0 to 1.2
	Servomotor Main Circuit Cable*	U, V, W			
	Control Power Supply Cable	L1C, L2C	AWG16 (1.25 mm²)		
	External Regenerative Resistor Cable	B1/⊕, B2	AWG14 (2.0 mm²)		
	Ground cable	⏚	AWG14 (2.0 mm²) min.	M4	1.2 to 1.4
470A	Main Circuit Power Supply Cable	L1, L2, L3	AWG8 (8.0 mm²)	M5	2.2 to 2.4
	Servomotor Main Circuit Cable*	U, V, W	AWG6 (14 mm²)		
	Control Power Supply Cable	L1C, L2C	AWG16 (1.25 mm²)		
	External Regenerative Resistor Cable	B1/⊕, B2	AWG14 (2.0 mm²)		
	Ground cable	⏚	AWG14 (2.0 mm²) min.		
550A	Main Circuit Power Supply Cable	L1, L2, L3	AWG8 (8.0 mm²)		
	Servomotor Main Circuit Cable*	U, V, W	AWG4 (22 mm²)		
	Control Power Supply Cable	L1C, L2C	AWG16 (1.25 mm²)		
	External Regenerative Resistor Cable	B1/⊕, B2	AWG10 (5.5 mm²)		
	Ground cable	⏚	AWG14 (2.0 mm²) min.		
590A	Main Circuit Power Supply Cable	L1, L2, L3	AWG4 (22 mm²)	M6	2.7 to 3.0
	Servomotor Main Circuit Cable*	U, V, W			
	Control Power Supply Cable	L1C, L2C	AWG16 (1.25 mm²)		
	External Regenerative Resistor Cable	B1/⊕, B2	AWG10 (5.5 mm²)		
	Ground cable	⏚	AWG14 (2.0 mm²) min.		
780A	Main Circuit Power Supply Cable	L1, L2, L3	AWG3 (30 mm²)		
	Servomotor Main Circuit Cable*	U, V, W			
	Control Power Supply Cable	L1C, L2C	AWG16 (1.25 mm²)		
	External Regenerative Resistor Cable	B1/⊕, B2	AWG8 (8.0 mm²)		
	Ground cable	⏚	AWG14 (2.0 mm²) min.		

* If you do not use the recommended Servomotor Main Circuit Cable, use this table to select wires.

Single-phase, 200-VAC Wires for Sigma-7S SERVOPACKs

SGD7S-	Terminals		Wire Size	Screw Size	Tightening Torque [Nm]
R70A, R90A, 1R6A, 2R8A	Main Circuit Power Supply Cable	L1, L2, L3	AWG16 (1.25 mm²)	–	–
	Servomotor Main Circuit Cable*	U, V, W			
	Control Power Supply Cable	L1C, L2C			
	External Regenerative Resistor Cable	B1/⊕, B2			
	Ground cable	⏚	AWG14 (2.0 mm²) min.	M4	1.2 to 1.4
5R5A	Main Circuit Power Supply Cable	L1, L2, L3	AWG14 (2.0 mm²)	–	–
	Servomotor Main Circuit Cable*	U, V, W	AWG16 (1.25 mm²)		
	Control Power Supply Cable	L1C, L2C			
	External Regenerative Resistor Cable	B1/⊕, B2			
	Ground cable	⏚	AWG14 (2.0 mm²) min.	M4	1.2 to 1.4
120A□□□008	Main Circuit Power Supply Cable	L1, L2, L3	AWG14 (2.0 mm²)	M4	1.0 to 1.2
	Servomotor Main Circuit Cable*	U, V, W			
	Control Power Supply Cable	L1C, L2C	AWG16 (1.25 mm²)		
	External Regenerative Resistor Cable	B1/⊕, B2			
	Ground cable	⏚	AWG14 (2.0 mm²) min.	M4	1.2 to 1.4

* If you do not use the recommended Servomotor Main Circuit Cable, use this table to select wires.

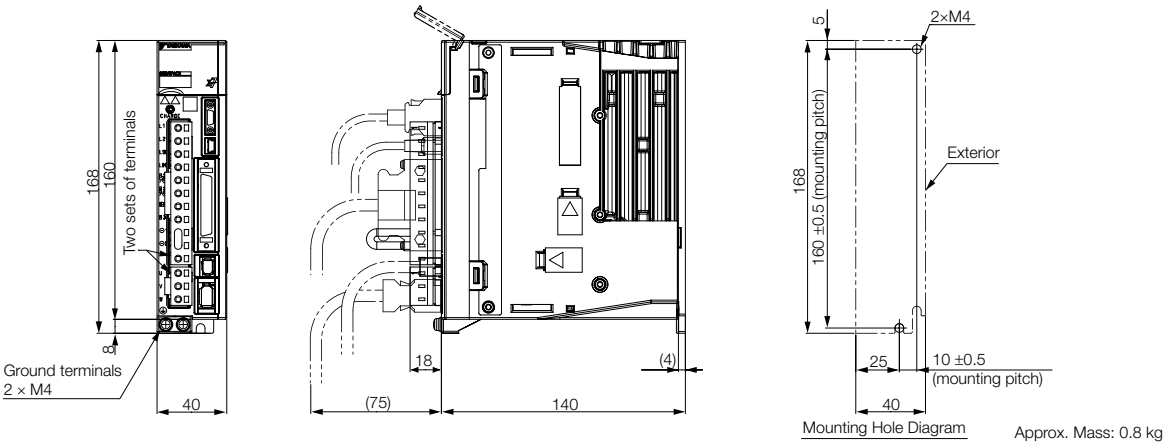
DC Power Supply Wires for Sigma-7S SERVOPACKs

SGD7S-	Terminals*1		Wire Size	Screw Size	Tightening Torque [Nm]
R70A, R90A, 1R6A, 2R8A, 3R8A, 5R5A, 7R6A	Servomotor Main Circuit Cable	U, V, W*2	AWG16 (1.25 mm²)	–	–
	Control Power Supply Cable	L1C, L2C			
	External Regenerative Resistor Cable	B1/⊕, ⊖2			
	Ground cable	⏚	AWG14 (2.0 mm²) min.	M4	1.2 to 1.4
120A (three-phase, 200-VAC input)	Servomotor Main Circuit Cable	U, V, W*2	AWG14 (2.0 mm²)	–	–
	Control Power Supply Cable	L1C, L2C	AWG16 (1.25 mm²)		
	External Regenerative Resistor Cable	B1/⊕, ⊖2	AWG14 (2.0 mm²)		
	Ground cable	⏚	AWG14 (2.0 mm²) min.	M4	1.2 to 1.4
120A□□□008 (single-phase, 200-VAC input)	Servomotor Main Circuit Cable	U, V, W*2	AWG14 (2.0 mm²)	M4	1.0 to 1.2
	Control Power Supply Cable	L1C, L2C	AWG16 (1.25 mm²)		
	External Regenerative Resistor Cable	B1/⊕, ⊖2	AWG14 (2.0 mm²)		
	Ground cable	⏚	AWG14 (2.0 mm²) min.	M4	1.2 to 1.4
180A, 200A	Servomotor Main Circuit Cable	U, V, W*2	AWG10 (5.5 mm²)	M4	1.0 to 1.2
	Control Power Supply Cable	L1C, L2C	AWG16 (1.25 mm²)		
	External Regenerative Resistor Cable	B1/⊕, ⊖2	AWG10 (5.5 mm²)		
	Ground cable	⏚	AWG14 (2.0 mm²) min.	M4	1.2 to 1.4
330A	Servomotor Main Circuit Cable	U, V, W*2	AWG8 (8.0 mm²)	M4	1.0 to 1.2
	Control Power Supply Cable	L1C, L2C	AWG16 (1.25 mm²)		
	External Regenerative Resistor Cable	B1/⊕, ⊖2	AWG8 (8.0 mm²)		
	Ground cable	⏚	AWG14 (2.0 mm²) min.	M4	1.2 to 1.4
470A	Servomotor Main Circuit Cable	U, V, W*2	AWG6 (14 mm²)	M5	2.2 to 2.4
	Control Power Supply Cable	L1C, L2C	AWG16 (1.25 mm²)		
	External Regenerative Resistor Cable	B1/⊕, ⊖2	AWG8 (8.0 mm²)		
	Ground cable	⏚	AWG14 (2.0 mm²) min.		
550A	Servomotor Main Circuit Cable	U, V, W*2	AWG4 (22 mm²)		
	Control Power Supply Cable	L1C, L2C	AWG16 (1.25 mm²)		
	External Regenerative Resistor Cable	B1/⊕, ⊖2	AWG6 (14 mm²)		
	Ground cable	⏚	AWG14 (2.0 mm²) min.		
590A	Servomotor Main Circuit Cable	U, V, W*2	AWG4 (22 mm²)	M6	2.7 to 3.0
	Control Power Supply Cable	L1C, L2C	AWG16 (1.25 mm²)		
	External Regenerative Resistor Cable	B1/⊕, ⊖2	AWG3 (30 mm²)		
	Ground cable	⏚	AWG14 (2.0 mm²) min.		
780A	Servomotor Main Circuit Cable	U, V, W*2	AWG3 (30 mm²)		
	Control Power Supply Cable	L1C, L2C	AWG16 (1.25 mm²)		
	External Regenerative Resistor Cable	B1/⊕, ⊖2	AWG3 (30 mm²)		
	Ground cable	⏚	AWG14 (2.0 mm²) min.		

*1. Do not wire the following terminals: L1, L2, L3, B2, B3, ⊖1, ⊖ and terminals.
*2. If you do not use the recommended Servomotor Main Circuit Cable, use this table to select wires.

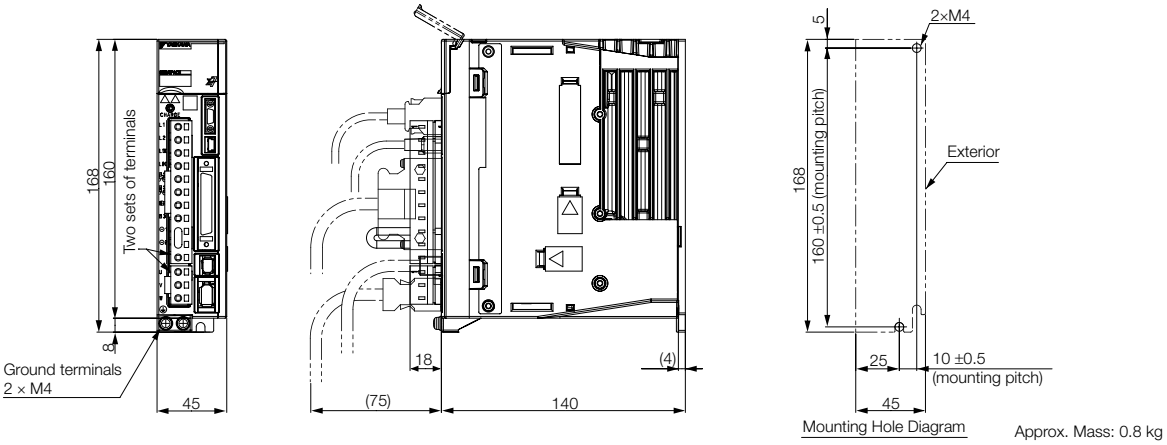
SERVOPACK External Dimensions

Three-phase & Single-phase, 200 VAC: SGD7S-R70A, -R90A, and -1R6A



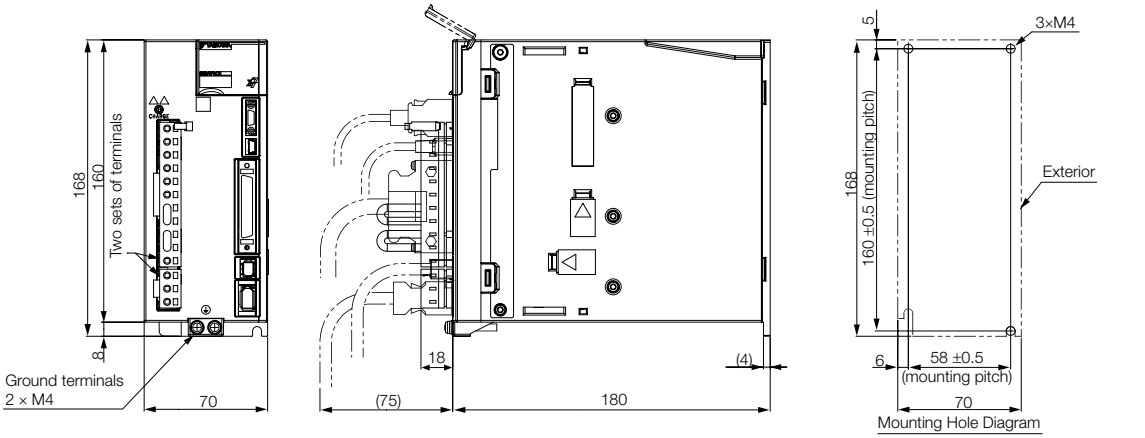
Approx. Mass: 0.8 kg
Unit: mm

Three-phase & Single-phase, 200 VAC: SGD7S-2R8A



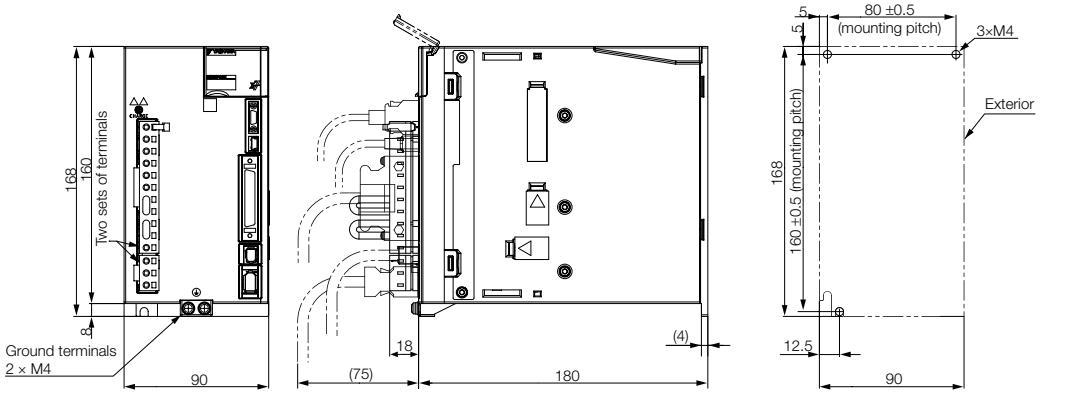
Approx. Mass: 0.8 kg
Unit: mm

Three-phase & Single-phase, 200 VAC: SGD7S-3R8A, -5R5A, Three-phase 200 VAC: -7R6A



Approx. Mass: 1.6 kg

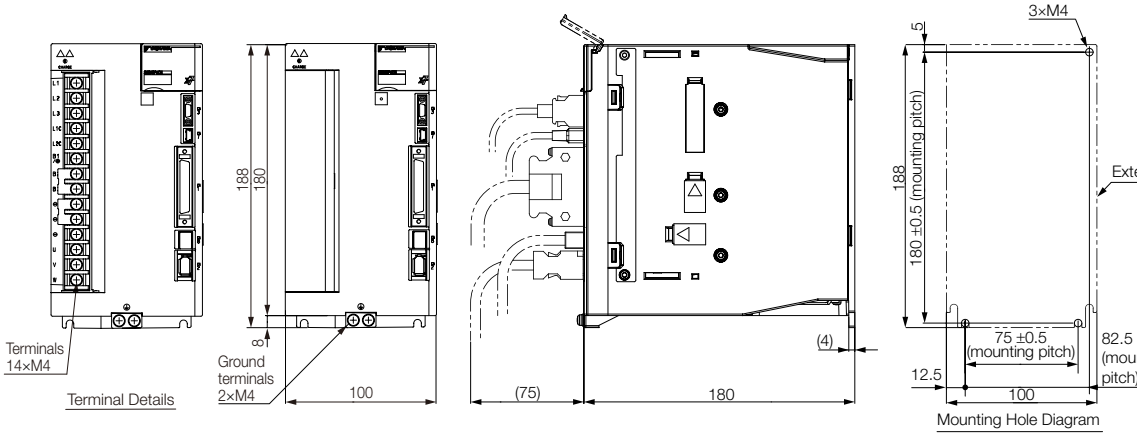
Three-phase & Single-phase, 200 VAC: SGD7S-120A



Approx. Mass: 2.2 kg

Unit: mm

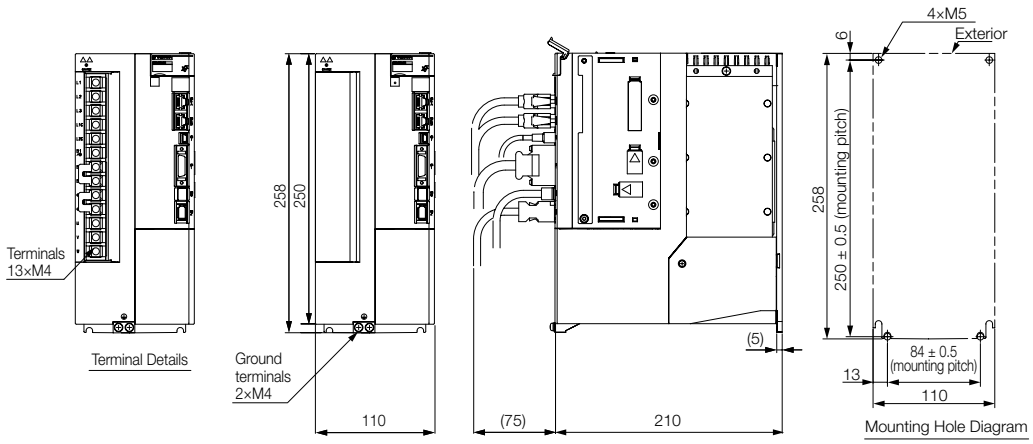
Three-phase, 200 VAC: SGD7S-180A and -200A



Approx. Mass: 2.7

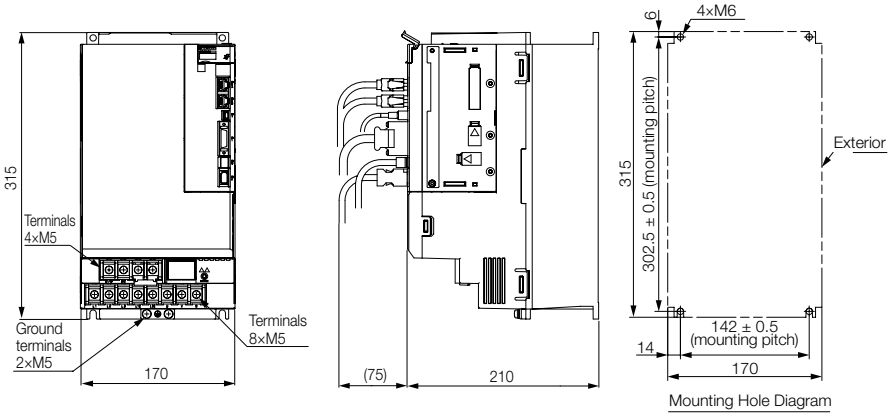
Unit: r

Three-phase, 200 VAC: SGD7S-330A



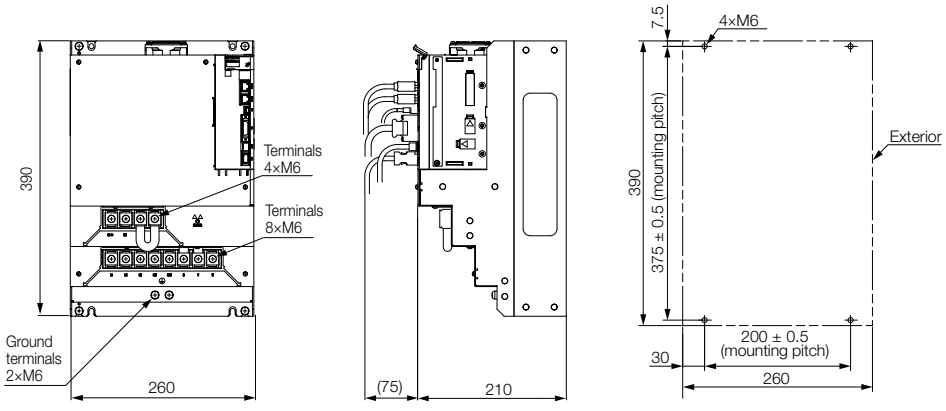
Approx. Mass: 4.4 kg

Three-phase, 200 VAC: SGD7S-470A and -550A



Approx. Mass: 8.2 kg

Three-phase, 200 VAC: SGD7S-590A and -780A



Approx. Mass: 15.5 kg
Unit: mm

Model Designations

SGD7S - R70 A 10 A 001 000

Sigma-7 Series Sigma-7S Models	1st ... 3rd	4th	5th + 6th	7th	8th ... 10th	11th ... 13th	digit

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

Code	Specification
Three-phase, 200 V	
R70*1	0.05 kW
R90*1	0.1 kW
1R6*1	0.2 kW
2R8*1	0.4 kW
3R8	0.5 kW
5R5*1	0.75 kW
7R6	1.0 kW
120*2	1.5 kW
180	2.0 kW
200*3	3.0 kW
330	5.0 kW
470	6.0 kW
550	7.5 kW
590	11 kW
780	15 kW

4th digit - Voltage

Code	Specification
A	200 VAC

5th + 6th digit - Interface*4

Code	Specification
10	MECHATROLINK-II communication Reference

7th digit - Design Revision Order

Code	Specification
A	Standard Model

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

Code	Specifications	Applicable Models
None	Without Options	All models
000	Without Options only used in combination with FT/EX	All models
001	Rack-mounted	SGD7S-R70A to -330A
	Duct-ventilated	SGD7S-470A to -780A
002	Varnished	All models
008	Single-phase, 200 V power input	SGD7S-120A
020*6	No dynamic brake	SGD7S-R70A to -2R8A
	External dynamic brake resistor	SGD7S-3R8A to -780A
00A	Varnished and single-phase power input	All models

11th ... 13th digit - FT/EX Specifications

Code	Specifications
None	None
F82*7	Application function option for special motors, SGM7D motor drive

Note:

Depending on configuration choices made, the model code might end after the 7th or 10th digit, or involve all 13 digits.

Readily available up to 1.5 kW. Others available on request.
Additional accessories and software for SERVOPACKs is described in the Periphery section.

Note:
*1. You can use these models with either a single-phase or three-phase power supply input.
*2. A model with a single-phase, 200-VAC power supply input is available as a hardware option (model. SGD7S-120A□0A008).
*3. The rated output is 2.4 kW if you combine the SGM7G-30A with the SGD7S-200A.
*4. The same SERVOPACKs are used for both Rotary Servomotors and Linear Servomotors.
*5. A command option module must be attached to the Command Option Attachable-type SERVOPACK for use.
*6. Refer to the following manual for details.
Sigma-7-Series AC Servo Drive Sigma-7S/Sigma-7W SERVOPACK with Hardware Option Specifications Dynamic Brake Product Manual (Manual No.: SIEP S800001 73)
*7. Refer to the following manual for details.
Sigma-7-Series AC Servo Drive Σ-7S SERVOPACK with FT/EX Specification for SGM7D Motor Product Manual (Manual No.: SIEP S800001 91)

Ratings and Specifications

Ratings

Single-phase, 200 VAC

Model SGD7S-			R70A	R90A	1R6A	2R8A	5R5A	120A
Maximum Applicable Motor Capacity [kW]			0.05	0.1	0.2	0.4	0.75	1.5
Continuous Output Current [A]			0.66	0.91	1.6	2.8	5.5	11.6
Instantaneous Maximum Output Current [A]			2.1	3.2	5.9	9.3	16.9	28
Main Circuit	Power Supply		200 VAC to 240 VAC, -15% to +10%, 50 Hz/60 Hz					
	Input Current [A]*		0.8	1.6	2.4	5.0	8.7	16
Control	Power Supply		200 VAC to 240 VAC, -15% to +10%, 50 Hz/60 Hz					
	Input Current [A]*		0.2	0.2	0.2	0.2	0.2	0.25
Power Supply Capacity [kVA]*			0.2	0.3	0.6	1.2	1.9	4.0
Power Loss*	Main Circuit Power Loss [W]		5.0	7.1	12.1	23.7	39.2	71.8
	Control Circuit Power Loss [W]		12	12	12	12	14	16
	Built-in Regenerative Resistor Power Loss [W]		-	-	-	-	8	16
	Total Power Loss [W]		17.0	19.1	24.1	35.7	61.2	103.8
Regenerative Resistor	Built-In Regenerative Resistor	Resistance [Ω]	-	-	-	-	40	12
		Capacity [W]	-	-	-	-	40	60
	Minimum Allowable External Resistance [Ω]		40	40	40	40	40	12
Overvoltage Category			III					

* This is the net value at the rated load.
Note: Readily available up to 1.5 kW. Others available on request.

Three-phase, 200 VAC

Model SGD7S-			R70A	R90A	1R6A	2R8A	3R8A	5R5A	7R6A	120A	180A	200A	330A
Maximum Applicable Motor Capacity [kW]			0.05	0.1	0.2	0.4	0.5	0.75	1.0	1.5	2.0	3.0	5.0
Continuous Output Current [A]			0.66	0.91	1.6	2.8	3.8	5.5	7.6	11.6	18.5	19.6	32.9
Instantaneous Maximum Output Current [A]			2.1	3.2	5.9	9.3	11	16.9	17	28	42	56	84
Main Circuit	Power Supply		200 VAC to 240 VAC, -15% to +10%, 50 Hz/60 Hz										
	Input Current [A]*		0.4	0.8	1.3	2.5	3.0	4.1	5.7	7.3	10	15	25
Control	Power Supply		200 VAC to 240 VAC, -15% to +10%, 50 Hz/60 Hz										
	Input Current [A]*		0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.25	0.25	0.3
Power Supply Capacity [kVA]*			0.2	0.3	0.5	1.0	1.3	1.6	2.3	3.2	4.0	5.9	7.5
Power Loss*	Main Circuit Power Loss [W]		5.0	7.0	11.9	22.5	28.5	38.9	49.2	72.6	104.2	114.2	226.6
	Control Circuit Power Loss [W]		12	12	12	12	14	14	14	15	16	16	19
	Built-in Regenerative Resistor Power Loss [W]		–	–	–	–	8	8	8	10	16	16	36
	Total Power Loss [W]												
Regenerative Resistor	Built-In Regenerative Resistor	Resistance [Ω]	–	–	–	–	40	40	40	20	12	12	8
		Capacity [W]	–	–	–	–	40	40	40	60	60	60	180
	Minimum Allowable External Resistance [Ω]		40	40	40	40	40	40	40	20	12	12	8
Overvoltage Category			III										

* This is the net value at the rated load.

Note: Readily available up to 1.5 kW. Others available on request.

Three-phase, 200 VAC continued

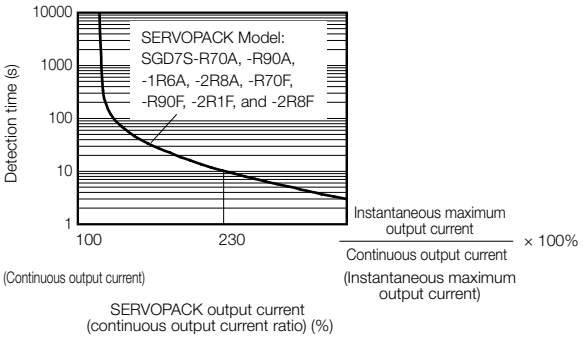
Model SGD7S-			470A	550A	590A	780A
Maximum Applicable Motor Capacity [kW]			6.0	7.5	11	15
Continuous Output Current [A]			46.9	54.7	58.6	78.0
Instantaneous Maximum Output Current [A]			110	130	140	170
Main Circuit	Power Supply		200 VAC to 240 VAC, -15% to +10%, 50 Hz/60 Hz			
	Input Current [A]*1		29	37	54	73
Control	Power Supply		200 VAC to 240 VAC, -15% to +10%, 50 Hz/60 Hz			
	Input Current [A]*1		0.3	0.3	0.4	0.4
Power Supply Capacity [kVA]*1			10.7	14.6	21.7	29.6
Power Loss*1	Main Circuit Power Loss [W]		271.7	326.9	365.3	501.4
	Control Circuit Power Loss [W]		21	21	28	28
	Built-in Regenerative Resistor Power Loss [W]		180*2	180*3	350*3	350*3
	Total Power Loss [W]		292.7	347.9	393.3	529.4
Regenerative Resistor	Built-In Regenerative Resistor	Resistance [Ω]	6.25*2	3.13*3	3.13*3	3.13*3
		Capacity [W]	880*2	1,760*3	1,760*3	1,760*3
	Minimum Allowable External Resistance [Ω]		5.8	2.9	2.9	2.9
Overvoltage Category			III			

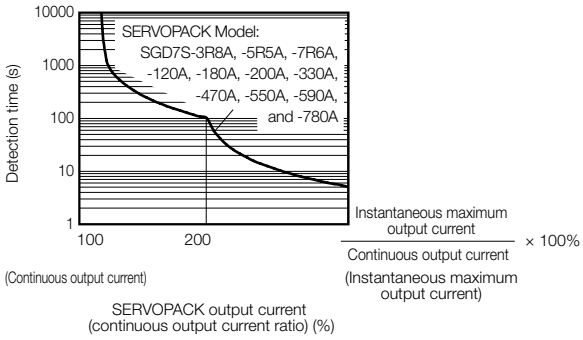
Note: Readily available up to 1.5 kW. Others available on request.

*1. This is the net value at the rated load.
*2. This value is for the optional JUSP-RA04-E Regenerative Resistor Unit.
*3. This value is for the optional JUSP-RA05-E Regenerative Resistor Unit.

SERVOPACK Overload Protection Characteristics

The overload detection level is set for hot start conditions with a SERVOPACK surrounding air temperature of 55°C. An overload alarm (A.710 or A.720) will occur if overload operation that exceeds the overload protection characteristics shown in the following diagram (i.e., operation on the right side of the applicable line) is performed.
The actual overload detection level will be the detection level of the connected SERVOPACK or Servomotor that has the lower overload protection characteristics.
In most cases, that will be the overload protection characteristics of the Servomotor.





Note:
The above overload protection characteristics do not mean that you can perform continuous duty operation with an output of 100% or higher.
For a YASKAWA-specified combination of SERVOPACK and Servomotor, maintain the effective torque within the continuous duty zone of the torque-motor speed characteristic of the Servomotor.

Specifications

Item			Specification
Control Method			IGBT-based PWM control, sine wave current drive
Feedback	With Rotary Servomotor		Serial encoder: 17 bits (absolute encoder) 20 bits or 24 bits (incremental encoder/absolute encoder) 22 bits (absolute encoder)
	With Linear Servomotor		• Absolute linear encoder (The signal resolution depends on the absolute linear encoder.) • Incremental linear encoder (The signal resolution depends on the incremental linear encoder or Serial Converter Unit.)
Environmental Conditions	Ambient Air Temperature*1		-5°C to 55°C With derating, usage is possible between 55°C and 60°C. Refer to the following section for Derating Specifications.
	Storage Temperature		-20°C to 85°C
	Ambient Air Humidity		95% relative humidity max. (with no freezing or condensation)
	Storage Humidity		95% relative humidity max. (with no freezing or condensation)
	Vibration Resistance		4.9 m/s^2
	Shock Resistance		19.6 m/s^2
	Protection Class	Class	SERVOPACK Model: SGD7S-
		IP20	R70A, R90A, 1R6A, 2R8A, 3R8A, 5R5A, 7R6A, 120A, R70F, R90F, 2R1F, 2R8F
		IP10	120A10A008, 180A, 200A, 330A, 470A, 550A, 590A, 780A
	Pollution Degree		2 • Must be no corrosive or flammable gases. • Must be no exposure to water, oil, or chemicals. • Must be no dust, salts, or iron dust.
	Altitude*1		1,000 m or less With derating, usage is possible between 1,000 m and 2,000 m. Refer to the following section for Derating specifications.
	Others		Do not use the SERVOPACK in the following locations: Locations subject to static electricity noise, strong electromagnetic/magnetic fields, or radioactivity
Applicable Standards			UL 61800-5-1, EN 50178, CSA C22.2 No.14, EN 61800-5-1, EN 55011 group 1 class A, EN 61000-6-2, EN 61000-6-4, EN 61800-3, IEC 61508-1 to 4, IEC 61800-5-2, IEC 62061, ISO 13849-1, and IEC 61326-3-1
Mounting		Mounting	SERVOPACK Model: SGD7S-
		Base-mounted	All models
		Rack-mounted	R70A, R90A, 1R6A, 2R8A, 3R8A, 5R5A, 7R6A, 120A, 180A, 200A, 330A, R70F, R90F, 2R1F, 2R8F
		Duct-ventilated	470A, 550A, 590A, 780A
Performance	Speed Control Range		1:5,000 (At the rated torque, the lower limit of the speed control range must not cause the Servomotor to stop.)
	Coefficient of Speed Fluctuation*2		±0.01% of rated speed max. (for a load fluctuation of 0% to 100%)
			0% of rated speed max. (for a voltage fluctuation of ±10%)
			±0.1% of rated speed max. (for a temperature fluctuation of 25°C ±25°C)
	Torque Control Precision (Repeatability)		±1%
	Soft Start Time Setting		0 s to 10 s (Can be set separately for acceleration and deceleration.)

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Item			Specification
I/O Signals	Encoder Divided Pulse Output		Phase A, phase B, phase C: Line-driver output Number of divided output pulses: Any setting is allowed.
	Overheat Protection Input		Number of input points: 1 Input voltage range: 0 V to +5 V
	Sequence Input Signals	Input Signals That Can Be Allocated	Allowable voltage range: 24 VDC ±20% Number of input points: 7 Input method: Sink inputs or source inputs Input Signals: ● P-OT (Forward Drive Prohibit) and N-OT (Reverse Drive Prohibit) signals ● /P-CL (Forward External Torque Limit) and /N-CL (Reverse External Torque Limit) signals ● /DEC (Origin Return Deceleration Switch) signal ● /EXT1 to /EXT3 (External Latch Input 1 to 3) signals ● FSTP (Forced Stop Input) signal A signal can be allocated and the positive and negative logic can be changed.
	Sequence Output Signals	Fixed Output	Allowable voltage range: 5 VDC to 30 VDC Number of output points: 1 Output 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: ● /COIN (Positioning Completion) signal ● /V-CMP (Speed Coincidence Detection) signal ● /TGON (Rotation Detection) signal ● /S-RDY (Servo Ready) signal ● /CLT (Torque Limit Detection) signal ● /VLT (Speed Limit Detection) signal ● /BK (Brake) signal ● /WARN (Warning) signal ● /NEAR (Near) signal 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	41 to 5F hex (maximum number of slaves: 30) Selected with the combination of a rotary switch (S2) and DIP switch (S3).
	USB Communications (CN7)	Interface	Personal Computer (with SigmaWin+)
		Communications Standard	Conforms to USB 2.0 standard (12 Mbps).
Displays/ Indicators			CHARGE, PWR, and COM indicators, and one-digit seven-segment display
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.
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

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Item		Specification
Analog Monitor (CN5)		Number of points: 2 Output voltage range: ±10 VDC (effective linearity range: ±8 V) Resolution: 16 bits Accuracy: ±20 mV (Typ) Maximum output current: ±10 mA Settling time (±1%): 1.2 ms (Typ)
Dynamic Brake (DB)		Activated when a servo alarm or overtravel (OT) occurs, or when the power supply to the main circuit or servo is OFF.
Regenerative Processing		Built-in (An external resistor must be connected to the SGD7S-470A to -780A.) Refer to Built-In Regenerative Resistor.
Overtravel (OT) Prevention		Stopping with dynamic brake, deceleration to a stop, or coasting to a stop for the P-OT (Forward Drive Prohibit) or N-OT (Reverse Drive Prohibit) signal
Protective Functions		Overcurrent, overvoltage, low voltage, overload, regeneration error, etc.
Utility Functions		Gain adjustment, alarm history, jogging, origin search, etc.
Safety Functions	Inputs	/HWBB1 and /HWBB2: Base block signals for Power Modules
	Output	EDM1: Monitors the status of built-in safety circuit (fixed output).
	Applicable Standards*3	ISO13849-1 PLe (Category 3) and IEC61508 SIL3
Option Module		Fully-Closed Module and Safety Module Note: You cannot use a Fully-Closed Module and a Safety Module together.

*1. If you combine a Sigma-7-Series SERVOPACK with a Sigma-V-Series Option Module, the following Sigma-V-Series SERVOPACKs specifications must be used: a surrounding air temperature of 0°C to 55°C and an altitude of 1,000 m max. Also, the applicable range cannot be increased by derating.

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

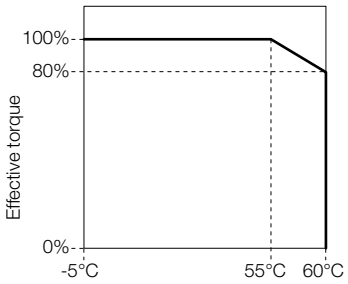
$$\text{Coefficient of speed fluctuation} = \frac{\text{No-load motor speed - Total-load motor speed}}{\text{Rated motor speed}} \times 100\%$$

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

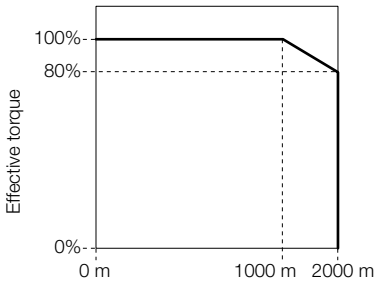
Derating Specifications

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

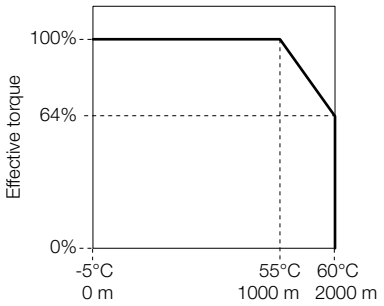
SGD7S-R70A, -R90A, -1R6A, -2R8A, -R70F, -R90F, -2R1F, and -2R8F



Surrounding air temperature

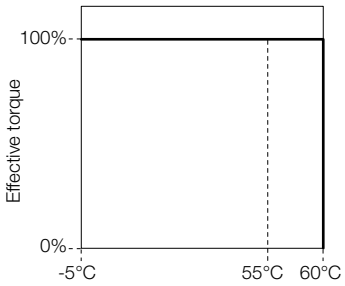


Altitude

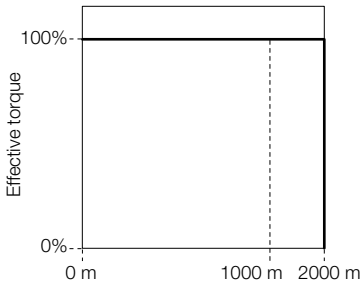


Surrounding air temperature and altitude

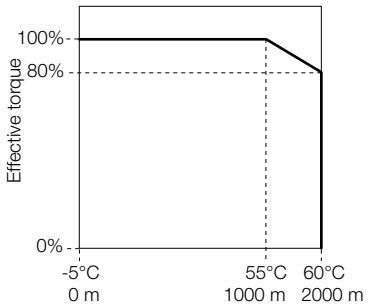
SGD7S-3R8A, -5R5A, -7R6A, -120A, -180A, -200A, -330A, -470A, -550A, -590A, and -780A



Surrounding air temperature



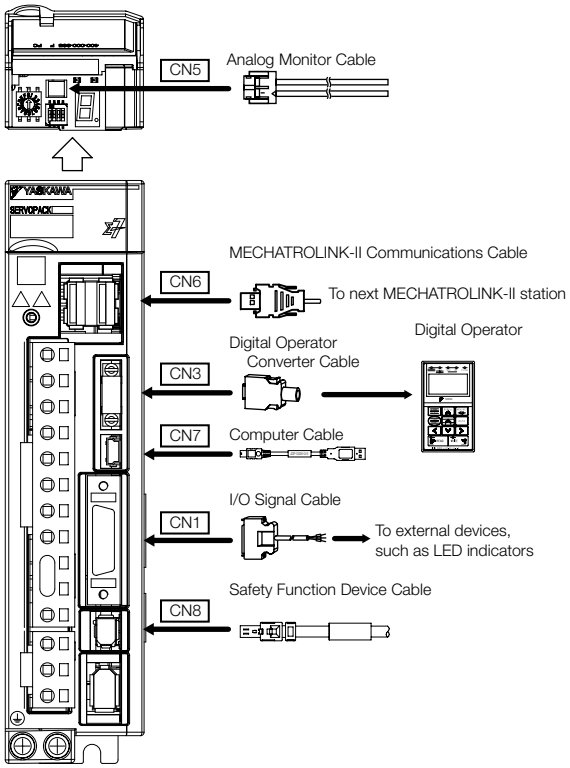
Altitude



Surrounding air temperature and altitude

Selecting Cables SGD7S MECHATROLINK-II

System Configurations



Selection Table

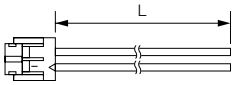
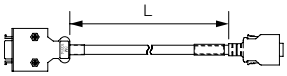
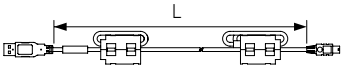
Important

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.

Refer to the following manual for the following information.

- Cable dimensional drawings and cable connection specifications
- Order numbers and specifications of individual connectors for cables

Sigma-7-Series AC Servo Drive Peripheral Device Selection Manual (Manual No.: SIEP S800001 32)

Code	Description		Length	Order Number	Appearance
CN5	Analog Monitor Cable		1 m	JZSP-CA01-E	
CN3	Digital Operator			JUSP-0P05A-1-E	
		Digital Operator Converter Cable	0.3 m	JZSP-CVS05-A3-E*1	
CN7	Computer Cable		2.5 m	JZSP-CVS06-02-E	

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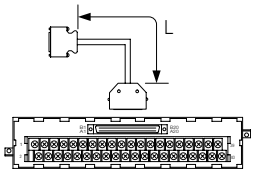
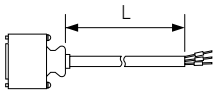
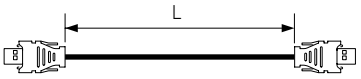
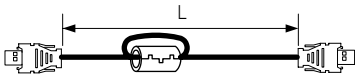
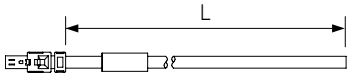
Code	Description		Length	Order Number	Appearance
CN1	I/O Signal Cables	Soldered Connector Kit		JZSP-CSI9-2-E	
		Connector-Terminal Block Converter Unit (with cable)	0.5 m	JUSP-TA26P-E	
			1 m	JUSP-TA26P-1-E	
			2 m	JUSP-TA26P-2-E	
		Cable with Loose Wires at One End (loose wires on peripheral device end)	1 m	JZSP-CSI02-1-E	
			2 m	JZSP-CSI02-2-E	
			3 m	JZSP-CSI02-3-E	
CN6	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	
CN8	Safety Function Device Cables	Cables with Connectors*2	1 m	JZSP-CVH03-01-E	
			3 m	JZSP-CVH03-03-E	
		Connector Kit*3		Contact Tyco Electronics Japan G.K. Product name: Industrial Mini I/O D-shape Type 1 Plug Connector Kit Model number: 2013595-1	

*1. This Converter Cable is required to use the Sigma-III-series Digital Operator (JUSP-OP05A) for Sigma-7-series SERVOPACKs.
*2. 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.
*3. Use the Connector Kit when you make cables yourself.

SERVOPACK Main Circuit Wires


Important

These specifications are based on IEC/EN 61800-5-1, UL 61800-5-1, and CSA C22.2 No.274.
1. To comply with UL standards, use UL-compliant wires.
2. Use copper wires with a rated temperature of 75° 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 surrounding air temperature.

Three-phase, 200-VAC Wires for Sigma-7S SERVOPACKs

SGD7S-	Terminals		Wire Size	Screw Size	Tightening Torque [Nm]
R70A, R90A, 1R6A, 2R8A, 3R8A, 5R5A, 7R6A	Main Circuit Power Supply Cable	L1, L2, L3	AWG16 (1.25 mm²)	–	–
	Servomotor Main Circuit Cable*	U, V, W			
	Control Power Supply Cable	L1C, L2C			
	External Regenerative Resistor Cable	B1/⊕, B2			
	Ground cable	⏚	AWG14 (2.0 mm²) min.	M4	1.2 to 1.4
120A	Main Circuit Power Supply Cable	L1, L2, L3	AWG14 (2.0 mm²)	–	–
	Servomotor Main Circuit Cable*	U, V, W			
	Control Power Supply Cable	L1C, L2C	AWG16 (1.25 mm²)		
	External Regenerative Resistor Cable	B1/⊕, B2			
	Ground cable	⏚	AWG14 (2.0 mm²) min.	M4	1.2 to 1.4
180A	Main Circuit Power Supply Cable	L1, L2, L3	AWG14 (2.0 mm²)	M4	1.0 to 1.2
	Servomotor Main Circuit Cable*	U, V, W	AWG10 (5.5 mm²)		
	Control Power Supply Cable	L1C, L2C	AWG16 (1.25 mm²)		
	External Regenerative Resistor Cable	B1/⊕, B2			
	Ground cable	⏚	AWG14 (2.0 mm²) min.	M4	1.2 to 1.4
200A	Main Circuit Power Supply Cable	L1, L2, L3	AWG12 (3.5 mm²)	M4	1.0 to 1.2
	Servomotor Main Circuit Cable*	U, V, W	AWG10 (5.5 mm²)		
	Control Power Supply Cable	L1C, L2C	AWG16 (1.25 mm²)		
	External Regenerative Resistor Cable	B1/⊕, B2			
	Ground cable	⏚	AWG14 (2.0 mm²) min.	M4	1.2 to 1.4
330A	Main Circuit Power Supply Cable	L1, L2, L3	AWG8 (8.0 mm²)	M4	1.0 to 1.2
	Servomotor Main Circuit Cable*	U, V, W			
	Control Power Supply Cable	L1C, L2C	AWG16 (1.25 mm²)		
	External Regenerative Resistor Cable	B1/⊕, B2	AWG14 (2.0 mm²)		
	Ground cable	⏚	AWG14 (2.0 mm²) min.	M4	1.2 to 1.4
470A	Main Circuit Power Supply Cable	L1, L2, L3	AWG8 (8.0 mm²)	M5	2.2 to 2.4
	Servomotor Main Circuit Cable*	U, V, W	AWG6 (14 mm²)		
	Control Power Supply Cable	L1C, L2C	AWG16 (1.25 mm²)		
	External Regenerative Resistor Cable	B1/⊕, B2	AWG14 (2.0 mm²)		
	Ground cable	⏚	AWG14 (2.0 mm²) min.		
550A	Main Circuit Power Supply Cable	L1, L2, L3	AWG8 (8.0 mm²)		
	Servomotor Main Circuit Cable*	U, V, W	AWG4 (22 mm²)		
	Control Power Supply Cable	L1C, L2C	AWG16 (1.25 mm²)		
	External Regenerative Resistor Cable	B1/⊕, B2	AWG10 (5.5 mm²)		
	Ground cable	⏚	AWG14 (2.0 mm²) min.		
590A	Main Circuit Power Supply Cable	L1, L2, L3	AWG4 (22 mm²)	M6	2.7 to 3.0
	Servomotor Main Circuit Cable*	U, V, W			
	Control Power Supply Cable	L1C, L2C	AWG16 (1.25 mm²)		
	External Regenerative Resistor Cable	B1/⊕, B2	AWG10 (5.5 mm²)		
	Ground cable	⏚	AWG14 (2.0 mm²) min.		
780A	Main Circuit Power Supply Cable	L1, L2, L3	AWG3 (30 mm²)		
	Servomotor Main Circuit Cable*	U, V, W			
	Control Power Supply Cable	L1C, L2C	AWG16 (1.25 mm²)		
	External Regenerative Resistor Cable	B1/⊕, B2	AWG8 (8.0 mm²)		
	Ground cable	⏚	AWG14 (2.0 mm²) min.		

* If you do not use the recommended Servomotor Main Circuit Cable, use this table to select wires.

Single-phase, 200-VAC Wires for Sigma-7S SERVOPACKs

SGD7S-	Terminals		Wire Size	Screw Size	Tightening Torque [Nm]
R70A, R90A, 1R6A, 2R8A	Main Circuit Power Supply Cable	L1, L2, L3	AWG16 (1.25 mm²)	–	–
	Servomotor Main Circuit Cable*	U, V, W			
	Control Power Supply Cable	L1C, L2C			
	External Regenerative Resistor Cable	B1/⊕, B2			
	Ground cable	⏚	AWG14 (2.0 mm²) min.	M4	1.2 to 1.4
5R5A	Main Circuit Power Supply Cable	L1, L2, L3	AWG14 (2.0 mm²)	–	–
	Servomotor Main Circuit Cable*	U, V, W	AWG16 (1.25 mm²)		
	Control Power Supply Cable	L1C, L2C			
	External Regenerative Resistor Cable	B1/⊕, B2			
	Ground cable	⏚	AWG14 (2.0 mm²) min.	M4	1.2 to 1.4
120A□□□008	Main Circuit Power Supply Cable	L1, L2, L3	AWG14 (2.0 mm²)	M4	1.0 to 1.2
	Servomotor Main Circuit Cable*	U, V, W			
	Control Power Supply Cable	L1C, L2C	AWG16 (1.25 mm²)		
	External Regenerative Resistor Cable	B1/⊕, B2			
	Ground cable	⏚	AWG14 (2.0 mm²) min.	M4	1.2 to 1.4

* If you do not use the recommended Servomotor Main Circuit Cable, use this table to select wires.

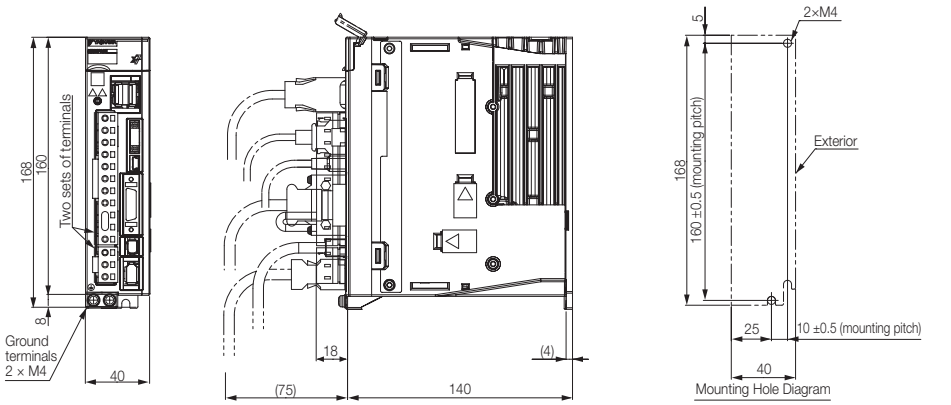
DC Power Supply Wires for Sigma-7S SERVOPACKs

SGD7S-	Terminals*1		Wire Size	Screw Size	Tightening Torque [Nm]
R70A, R90A, 1R6A, 2R8A, 3R8A, 5R5A, 7R6A	Servomotor Main Circuit Cable	U, V, W*2	AWG16 (1.25 mm²)	–	–
	Control Power Supply Cable	L1C, L2C			
	External Regenerative Resistor Cable	B1/⊕, ⊖2			
	Ground cable	⏚	AWG14 (2.0 mm²) min.	M4	1.2 to 1.4
120A (three-phase, 200-VAC input)	Servomotor Main Circuit Cable	U, V, W*2	AWG14 (2.0 mm²)	–	–
	Control Power Supply Cable	L1C, L2C	AWG16 (1.25 mm²)		
	External Regenerative Resistor Cable	B1/⊕, ⊖2	AWG14 (2.0 mm²)		
	Ground cable	⏚	AWG14 (2.0 mm²) min.	M4	1.2 to 1.4
120A□□□008 (single-phase, 200-VAC input)	Servomotor Main Circuit Cable	U, V, W*2	AWG14 (2.0 mm²)	M4	1.0 to 1.2
	Control Power Supply Cable	L1C, L2C	AWG16 (1.25 mm²)		
	External Regenerative Resistor Cable	B1/⊕, ⊖2	AWG14 (2.0 mm²)		
	Ground cable	⏚	AWG14 (2.0 mm²) min.	M4	1.2 to 1.4
180A, 200A	Servomotor Main Circuit Cable	U, V, W*2	AWG10 (5.5 mm²)	M4	1.0 to 1.2
	Control Power Supply Cable	L1C, L2C	AWG16 (1.25 mm²)		
	External Regenerative Resistor Cable	B1/⊕, ⊖2	AWG10 (5.5 mm²)		
	Ground cable	⏚	AWG14 (2.0 mm²) min.	M4	1.2 to 1.4
330A	Servomotor Main Circuit Cable	U, V, W*2	AWG8 (8.0 mm²)	M4	1.0 to 1.2
	Control Power Supply Cable	L1C, L2C	AWG16 (1.25 mm²)		
	External Regenerative Resistor Cable	B1/⊕, ⊖2	AWG8 (8.0 mm²)		
	Ground cable	⏚	AWG14 (2.0 mm²) min.	M4	1.2 to 1.4
470A	Servomotor Main Circuit Cable	U, V, W*2	AWG6 (14 mm²)	M5	2.2 to 2.4
	Control Power Supply Cable	L1C, L2C	AWG16 (1.25 mm²)		
	External Regenerative Resistor Cable	B1/⊕, ⊖2	AWG8 (8.0 mm²)		
	Ground cable	⏚	AWG14 (2.0 mm²) min.		
550A	Servomotor Main Circuit Cable	U, V, W*2	AWG4 (22 mm²)		
	Control Power Supply Cable	L1C, L2C	AWG16 (1.25 mm²)		
	External Regenerative Resistor Cable	B1/⊕, ⊖2	AWG6 (14 mm²)		
	Ground cable	⏚	AWG14 (2.0 mm²) min.		
590A	Servomotor Main Circuit Cable	U, V, W*2	AWG4 (22 mm²)	M6	2.7 to 3.0
	Control Power Supply Cable	L1C, L2C	AWG16 (1.25 mm²)		
	External Regenerative Resistor Cable	B1/⊕, ⊖2	AWG3 (30 mm²)		
	Ground cable	⏚	AWG14 (2.0 mm²) min.		
780A	Servomotor Main Circuit Cable	U, V, W*2	AWG3 (30 mm²)		
	Control Power Supply Cable	L1C, L2C	AWG16 (1.25 mm²)		
	External Regenerative Resistor Cable	B1/⊕, ⊖2	AWG3 (30 mm²)		
	Ground cable	⏚	AWG14 (2.0 mm²) min.		

*1. Do not wire the following terminals: L1, L2, L3, B2, B3, ⊖1, ⊖ and terminals.
*2. If you do not use the recommended Servomotor Main Circuit Cable, use this table to select wires.

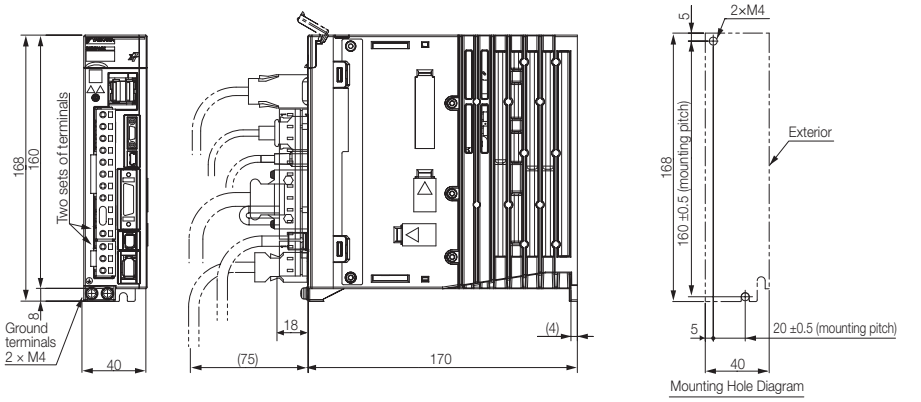
SERVOPACK External Dimensions

Three-phase & Single-phase, 200 VAC: SGD7S-R70A, -R90A, and -1R6A



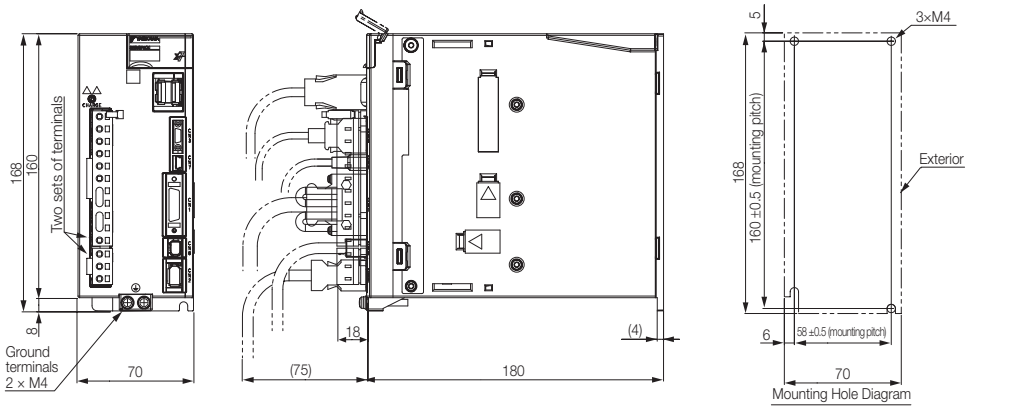
Approx. mass: 0.8 kg
Unit: mm

Three-phase & Single-phase, 200 VAC: SGD7S-2R8A



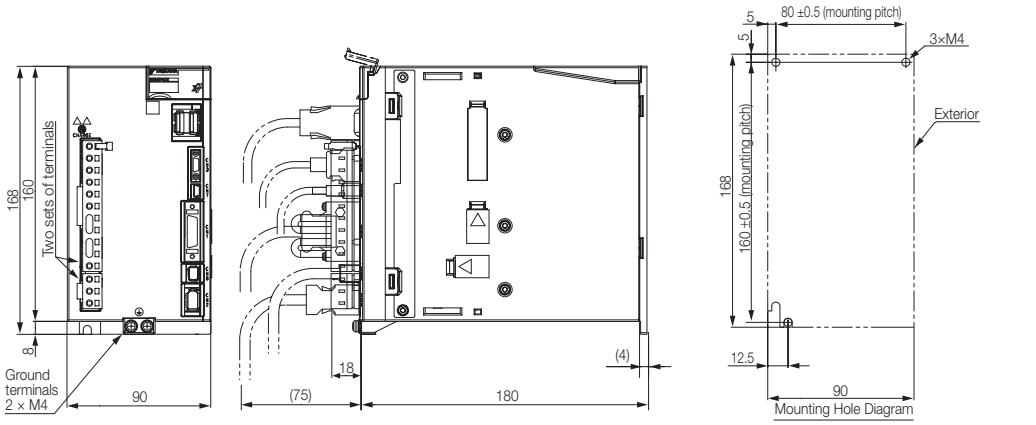
Approx. mass: 1.0 kg
Unit: mm

Three-phase & Single-phase, 200 VAC: SGD7S-3R8A, -5R5A
Three-phase, 200 VAC: -7R6A



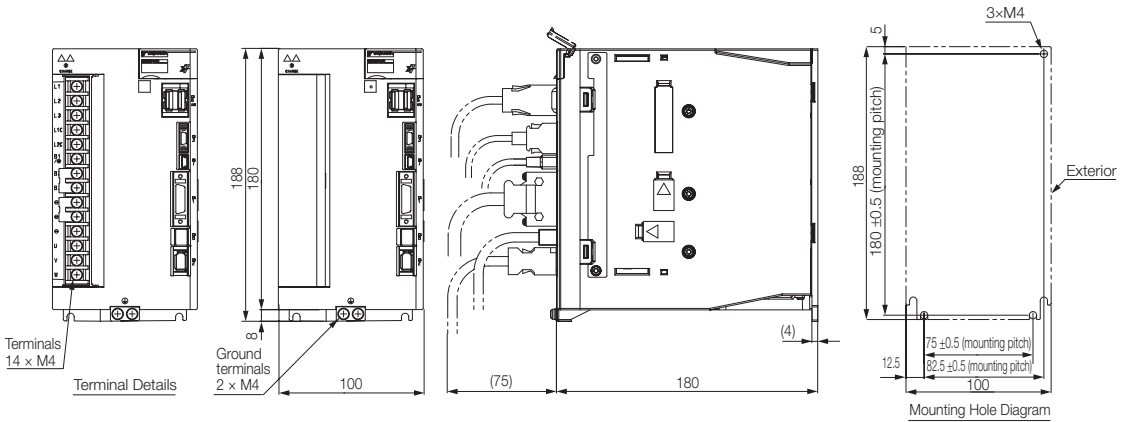
Approx. mass: 1.6 kg
Unit: mm

Three-phase & Single-phase, 200 VAC: SGD7S-120A



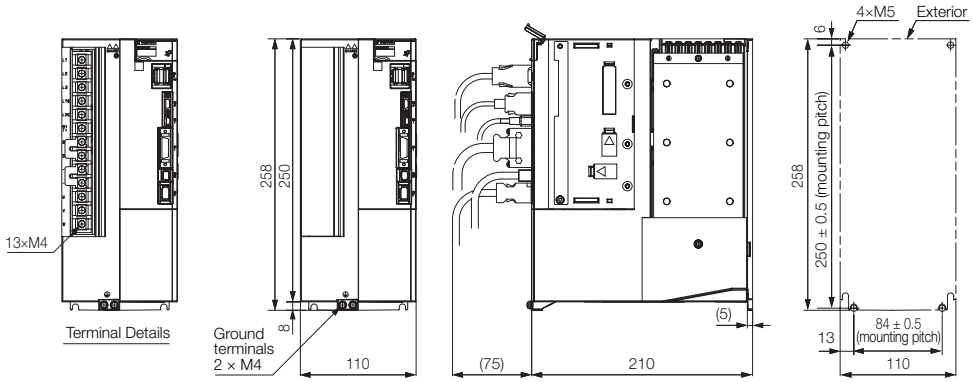
Approx. mass: 2.2 kg
Unit: mm

Three-phase, 200 VAC: SGD7S-180A and -200A



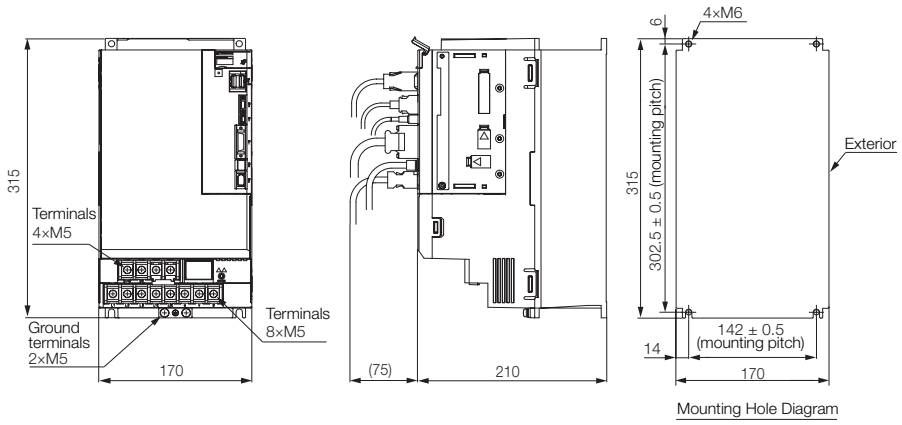
Approx. mass: 2.7 kg
Unit: mm

Three-phase, 200 VAC: SGD7S-330A



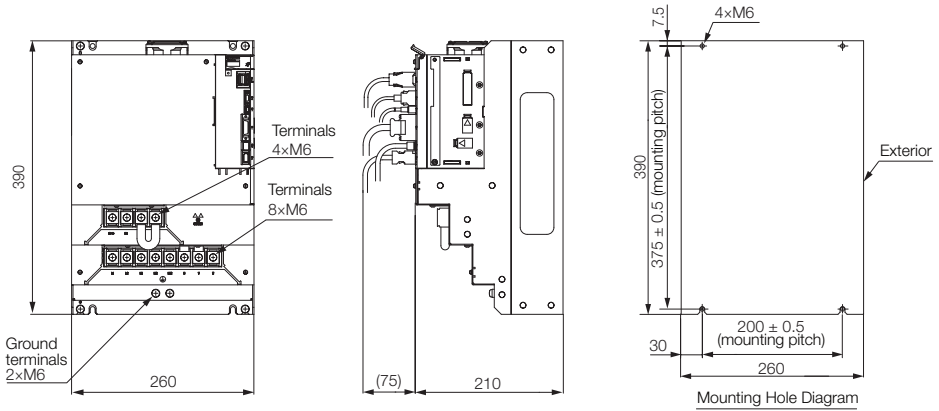
Approx. Mass: 4.4 kg
Unit: mm

Three-phase, 200 VAC: SGD7S-470A and -550A



Approx. Mass: 8.2 kg
Unit: mm

Three-phase, 200 VAC: SGD7S-590A and -780A



Approx. Mass: 15.5 kg
Unit: mm

Model Designations

SGD7S - R70 A 20 A 001 000

Sigma-7 Series Sigma-7S Models	1st ... 3rd	4th	5th + 6th	7th	8th ... 10th	11th ... 13th	digit

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

Code	Specification
Three-phase, 200 V	
R70*1	0.05 kW
R90*1	0.1 kW
1R6*1	0.2 kW
2R8*1	0.4 kW
3R8	0.5 kW
5R5*1	0.75 kW
7R6	1.0 kW
120*2	1.5 kW
180	2.0 kW
200*3	3.0 kW
330	5.0 kW
470	6.0 kW
550	7.5 kW
590	11 kW
780	15 kW

4th digit - Voltage

Code	Specification
A	200 VAC

5th + 6th digit - Interface*4

Code	Specification
20	MECHATROLINK-III communication Reference

7th digit - Design Revision Order

Code	Specification
A	Standard Model

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

Code	Specifications	Applicable Models
None	Without Options	All models
000	Without Options only used in combination with FT/EX	All models
001	Rack-mounted	SGD7S-R70A to -330A
	Duct-ventilated	SGD7S-470A to -780A
002	Varnished	All models
008	Single-phase, 200 V power input	SGD7S-120A
020*6	No dynamic brake	SGD7S-R70A to -2R8A
	External dynamic brake resistor	SGD7S-3R8A to -780A
00A	Varnished and single-phase power input	All models

11th ... 13th digit - FT/EX Specifications

Code	Specifications
None	None
F82*7	Application function option for special motors, SGM7D motor drive

Note:

Depending on configuration choices made, the model code might end after the 7th or 10th digit, or involve all 13 digits.

Readily available up to 1.5 kW. Others available on request.
Additional accessories and software for SERVOPACKs is described in the Periphery section.

Note:
*1. You can use these models with either a single-phase or three-phase power supply input.
*2. A model with a single-phase, 200-VAC power supply input is available as a hardware option (model. SGD7S-120A□0A008).
*3. The rated output is 2.4 kW if you combine the SGM7G-30A with the SGD7S-200A.
*4. The same SERVOPACKs are used for both Rotary Servomotors and Linear Servomotors.
*5. A command option module must be attached to the Command Option Attachable-type SERVOPACK for use.
*6. Refer to the following manual for details.
Sigma-7-Series AC Servo Drive Sigma-7S/Sigma-7W SERVOPACK with Hardware Option Specifications Dynamic Brake Product Manual (Manual No.: SIEP S800001 73)
*7. Refer to the following manual for details.
Sigma-7-Series AC Servo Drive Σ-7S SERVOPACK with FT/EX Specification for SGM7D Motor Product Manual (Manual No.: SIEP S800001 91)

Ratings and Specifications

Ratings

Single-phase, 200 VAC

Model SGD7S-			R70A	R90A	1R6A	2R8A	5R5A	120A
Maximum Applicable Motor Capacity [kW]			0.05	0.1	0.2	0.4	0.75	1.5
Continuous Output Current [A]			0.66	0.91	1.6	2.8	5.5	11.6
Instantaneous Maximum Output Current [A]			2.1	3.2	5.9	9.3	16.9	28
Main Circuit	Power Supply		200 VAC to 240 VAC, -15% to +10%, 50 Hz/60 Hz					
	Input Current [A]*		0.8	1.6	2.4	5.0	8.7	16
Control	Power Supply		200 VAC to 240 VAC, -15% to +10%, 50 Hz/60 Hz					
	Input Current [A]*		0.2	0.2	0.2	0.2	0.2	0.25
Power Supply Capacity [kVA]*			0.2	0.3	0.6	1.2	1.9	4.0
Power Loss*	Main Circuit Power Loss [W]		5.0	7.1	12.1	23.7	39.2	71.8
	Control Circuit Power Loss [W]		12	12	12	12	14	16
	Built-in Regenerative Resistor Power Loss [W]		–	–	–	–	8	16
	Total Power Loss [W]		17.0	19.1	24.1	35.7	61.2	103.8
Regenerative Resistor	Built-In Regenerative Resistor	Resistance [Ω]	–	–	–	–	40	12
		Capacity [W]	–	–	–	–	40	60
	Minimum Allowable External Resistance [Ω]		40	40	40	40	40	12
Overvoltage Category			III					

* This is the net value at the rated load.

Three-phase, 200 VAC

Model SGD7S-			R70A	R90A	1R6A	2R8A	3R8A	5R5A	7R6A	120A	180A	200A	330A
Maximum Applicable Motor Capacity [kW]			0.05	0.1	0.2	0.4	0.5	0.75	1.0	1.5	2.0	3.0	5.0
Continuous Output Current [A]			0.66	0.91	1.6	2.8	3.8	5.5	7.6	11.6	18.5	19.6	32.9
Instantaneous Maximum Output Current [A]			2.1	3.2	5.9	9.3	11	16.9	17	28	42	56	84.0
Main Circuit	Power Supply		200 VAC to 240 VAC, -15% to +10%, 50 Hz/60 Hz										
	Input Current [A]*		0.4	0.8	1.3	2.5	3.0	4.1	5.7	7.3	10	15	25
Control	Power Supply		200 VAC to 240 VAC, -15% to +10%, 50 Hz/60 Hz										
	Input Current [A]*		0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.25	0.25	0.3
Power Supply Capacity [kVA]*			0.2	0.3	0.5	1.0	1.3	1.6	2.3	3.2	4.0	5.9	7.5
Power Loss*	Main Circuit Power Loss [W]		5.0	7.0	11.9	22.5	28.5	38.9	49.2	72.6	104.2	114.2	226.6
	Control Circuit Power Loss [W]		12	12	12	12	14	14	14	15	16	16	19
	Built-in Regenerative Resistor Power Loss [W]		–	–	–	–	8	8	8	10	16	16	36
	Total Power Loss [W]		17.0	19.0	23.9	34.5	50.5	60.9	71.2	97.6	136.2	146.2	281.6
Regenerative Resistor	Built-In Regenerative Resistor	Resistance [Ω]	–	–	–	–	40	40	40	20	12	12	8
		Capacity [W]	–	–	–	–	40	40	40	60	60	60	180
	Minimum Allowable External Resistance [Ω]		40	40	40	40	40	40	40	20	12	12	8
Overvoltage Category			III										

* This is the net value at the rated load.

Note: Readily available up to 1.5 kW. Others available on request.

Three-phase, 200 VAC continued

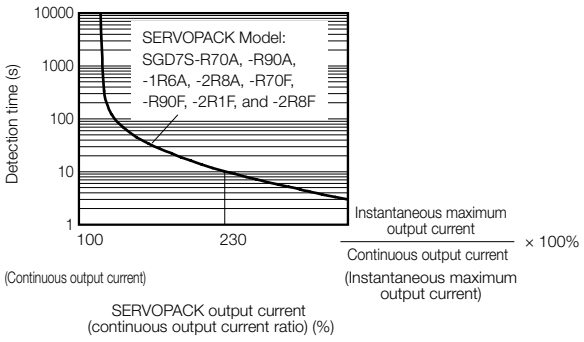
Model SGD7S-			470A	550A	590A	780A
Maximum Applicable Motor Capacity [kW]			6.0	7.5	11	15
Continuous Output Current [A]			46.9	54.7	58.6	78.0
Instantaneous Maximum Output Current [A]			110	130	140	170
Main Circuit	Power Supply		200 VAC to 240 VAC, -15% to +10%, 50 Hz/60 Hz			
	Input Current [A]*1		29	37	54	73
Control	Power Supply		200 VAC to 240 VAC, -15% to +10%, 50 Hz/60 Hz			
	Input Current [A]*1		0.3	0.3	0.4	0.4
Power Supply Capacity [kVA]* 1			10.7	14.6	21.7	29.6
Power Loss*1	Main Circuit Power Loss [W]		271.7	326.9	365.3	501.4
	Control Circuit Power Loss [W]		21	21	28	28
	External Regenerative Resistor Unit Power Loss [W]		180*2	180*3	350*3	350*3
	Total Power Loss [W]		292.7	347.9	393.3	529.4
External Regenerative Resistor Unit	External Regenerative Resistor Unit	Resistance [Ω]	6.25*2	3.13*3	3.13*3	3.13*3
		Capacity [W]	880*2	1,760*3	1,760*3	1,760*3
	Minimum Allowable External Resistance [Ω]		5.8	2.9	2.9	2.9
Overvoltage Category			III			

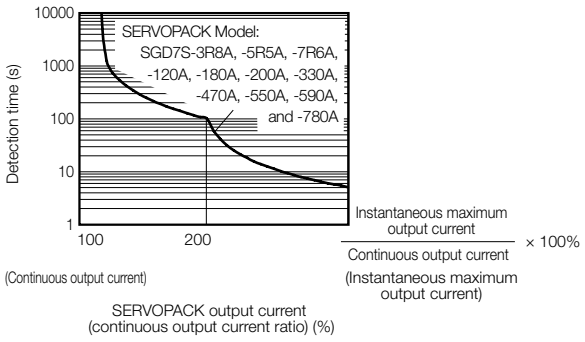
*1. This is the net value at the rated load.
*2. This value is for the optional JUSP-RA04-E Regenerative Resistor Unit.
*3. This value is for the optional JUSP-RA05-E Regenerative Resistor Unit.

Note: Readily available up to 1.5 kW. Others available on request.

SERVOPACK Overload Protection Characteristics

The overload detection level is set for hot start conditions with a SERVOPACK surrounding air temperature of 55°C.
An overload alarm (A.710 or A.720) will occur if overload operation that exceeds the overload protection characteristics shown in the following diagram (i.e., operation on the right side of the applicable line) is performed.
The actual overload detection level will be the detection level of the connected SERVOPACK or Servomotor that has the lower overload protection characteristics.
In most cases, that will be the overload protection characteristics of the Servomotor.





Note:
The above overload protection characteristics do not mean that you can perform continuous duty operation with an output of 100% or higher.
For a YASKAWA-specified combination of SERVOPACK and Servomotor, maintain the effective torque within the continuous duty zone of the torque-motor speed characteristic of the Servomotor.

Specifications

Item		Specification	
Drive Method		IGBT-based PWM control, sine wave current drive	
Feedback	With Rotary Servomotor	Serial encoder: 17 bits (absolute encoder) 20 bits or 24 bits (incremental encoder/absolute encoder) 22 bits (absolute encoder)	
	With Linear Servomotor	• Absolute linear encoder (The signal resolution depends on the absolute linear encoder.) • Incremental linear encoder (The signal resolution depends on the incremental linear encoder or Serial Converter Unit.)	
Environmental Conditions	Ambient Air Temperature*1	-5°C to 55°C With derating, usage is possible between 55°C and 60°C. Refer to the following section for Derating Specifications.	
	Storage Temperature	-20°C to 85°C	
	Ambient Air Humidity	95% relative humidity max. (with no freezing or condensation)	
	Storage Humidity	95% relative humidity max. (with no freezing or condensation)	
	Vibration Resistance	4.9 m/s^2	
	Shock Resistance	19.6 m/s^2	
	Protection Class	Class	SERVOPACK Model: SGD7S-
		IP20	R70A, R90A, 1R6A, 2R8A, 3R8A, 5R5A, 7R6A, 120A, R70F, R90F, 2R1F, 2R8F
		IP10	120A20A008, 180A, 200A, 330A, 470A, 550A, 590A, 780A
	Pollution Degree	2 • Must be no corrosive or flammable gases. • Must be no exposure to water, oil, or chemicals. • Must be no dust, salts, or iron dust.	
	Altitude*1	1,000 m or less With derating, usage is possible between 1,000 m and 2,000 m. Refer to the following section for Derating specifications.	
	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 (E147823), CSA C22.2 No.274, EN ISO13849-1: 2015, EN 55011 group 1 class A, EN 61000-6-2, EN 61000-6-4, EN 61800-3 (Category C2, Second environment), EN 50178, EN 61800-5-1, IEC 60204-1, IEC 61508 series, IEC 62061, IEC 61800-5-2, and IEC 61326-3-1	
Mounting		Mounting	SERVOPACK Model: SGD7S-
		Base-mounted	All models
		Rack-mounted	R70A, R90A, 1R6A, 2R8A, 3R8A, 5R5A, 7R6A, 120A, 180A, 200A, 330A, R70F, R90F, 2R1F, 2R8F
		Duct-ventilated	470A, 550A, 590A, 780A
Performance	Speed Control Range	1:5,000 (At the rated torque, the lower limit of the speed control range must not cause the Servomotor to stop.)	
	Coefficient of Speed Fluctuation*2	±0.01% of rated speed max. (for a load fluctuation of 0% to 100%)	
		0% of rated speed max. (for a voltage fluctuation of ±10%)	
		±0.1% of rated speed max. (for a temperature fluctuation of 25°C ±25°C)	
	Torque Control Precision (Repeatability)	±1%	
	Soft Start Time Setting	0 s to 10 s (Can be set separately for acceleration and deceleration.)	

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Item			Specification
I/O Signals	Encoder Divided Pulse Output		Phase A, phase B, phase C: Line-driver output Number of divided output pulses: Any setting is allowed.
	Overheat Protection Input		Number of input points: 1 Input voltage range: 0 V to +5 V
	Sequence Input Signals	Input Signals That Can Be Allocated	Allowable voltage range: 24 VDC ±20% Number of input points: 7 Input method: Sink inputs or source inputs Input Signals: ● P-OT (Forward Drive Prohibit) and N-OT (Reverse Drive Prohibit) signals ● /P-CL (Forward External Torque Limit) and /N-CL (Reverse External Torque Limit) signals ● /DEC (Origin Return Deceleration Switch) signal ● /EXT1 to /EXT3 (External Latch Input 1 to 3) signals ● FSTP (Forced Stop Input) signal A signal can be allocated and the positive and negative logic can be changed.
	Sequence Output Signals	Fixed Output	Allowable voltage range: 5 VDC to 30 VDC Number of output points: 1 Output 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: ● /COIN (Positioning Completion) signal ● /V-CMP (Speed Coincidence Detection) signal ● /TGON (Rotation Detection) signal ● /S-RDY (Servo Ready) signal ● /CLT (Torque Limit Detection) signal ● /VLT (Speed Limit Detection) signal ● /BK (Brake) signal ● /WARN (Warning) signal ● /NEAR (Near) signal 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	03 to EF hex (maximum number of slaves: 62) The rotary switches (S1 and S2) are used to set the station address.
	USB Communications (CN7)	Interface	Personal Computer (with SigmaWin+)
		Communications Standard	Conforms to USB 2.0 standard (12 Mbps).
Displays/ Indicators			CHARGE, PWR, COM, L1, and L2 indicators, and one-digit seven-segment display
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		32 or 48 bytes/station A DIP switch (S3) is used to select the number of transmission bytes.
Reference Method	Performance		Position, speed, or torque control with MECHATROLINK-III communications
	Reference Input		MECHATROLINK-III commands (sequence, motion, data setting, data access, monitoring, adjustment, etc.)
	Profile		MECHATROLINK-III standard servo profile

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Item		Specification
MECHATROLINK-III Communications Setting Switches		Rotary switch (S1 and S2) positions: 16 Number of DIP switch (S3) pins: 4
Analog Monitor (CN5)		Number of points: 2 Output voltage range: ±10 VDC (effective linearity range: ±8 V) Resolution: 16 bits Accuracy: ±20 mV (Typ) Maximum output current: ±10 mA Settling time (±1%): 1.2 ms (Typ)
Dynamic Brake (DB)		Activated when a servo alarm or overtravel (OT) occurs, or when the power supply to the main circuit or servo is OFF.
Regenerative Processing		Built-in (An external resistor must be connected to the SGD7S-470A to -780A.) Refer to Built-In Regenerative Resistor.
Overtravel (OT) Prevention		Stopping with dynamic brake, deceleration to a stop, or coasting to a stop for the P-OT (Forward Drive Prohibit) or N-OT (Reverse Drive Prohibit) signal
Protective Functions		Overcurrent, overvoltage, low voltage, overload, regeneration error, etc.
Utility Functions		Gain adjustment, alarm history, jogging, origin search, etc.
Safety Functions	Inputs	/HWBB1 and /HWBB2: Base block signals for Power Modules
	Output	EDM1: Monitors the status of built-in safety circuit (fixed output).
	Applicable Standards*3	ISO13849-1 PLe (Category 3), IEC61508 SIL3
Option Module		Fully-Closed Module and Safety Module Note: You cannot use a Fully-Closed Module and a Safety Module together.

*1. If you combine a S-7-Series SERVOPACK with a S-V-Series Option Module, the following S-V-Series SERVOPACKs specifications must be used: a surrounding air temperature of 0°C to 55°C and an altitude of 1,000 m max. Also, the applicable range cannot be increased by derating.
*2. The coefficient of speed fluctuation for load fluctuation is defined as follows:

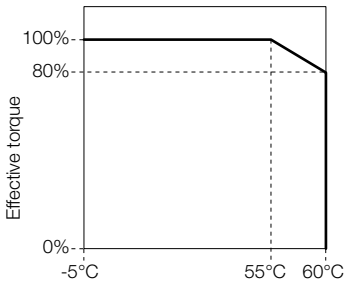
$$\text{Coefficient of speed fluctuation} = \frac{\text{No-load motor speed - Total-load motor speed}}{\text{Rated motor speed}} \times 100\%$$

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

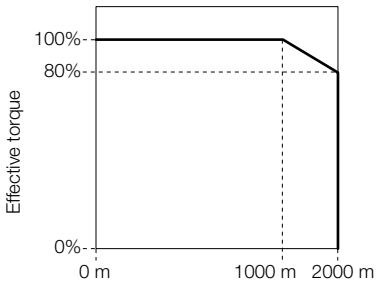
Derating Specifications

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

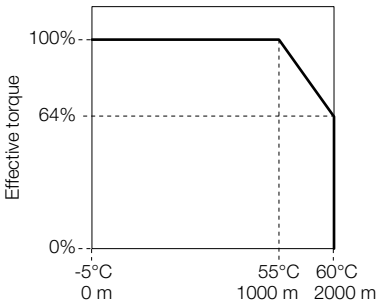
SGD7S-R70A, -R90A, -1R6A, -2R8A, -R70F, -R90F, -2R1F, and -2R8F



Surrounding air temperature

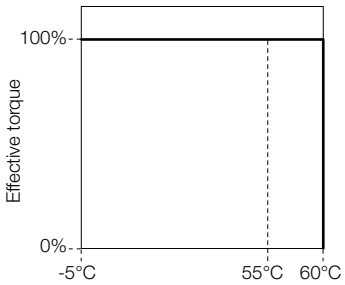


Altitude

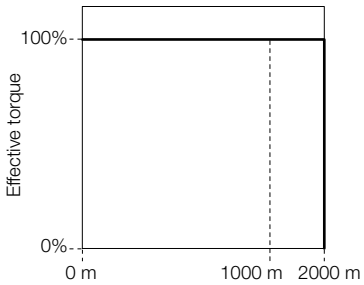


Surrounding air temperature and altitude

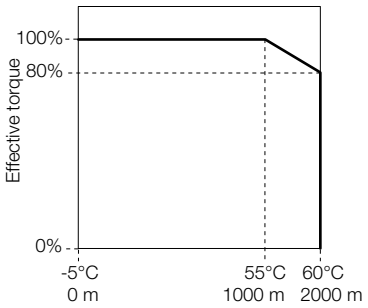
SGD7S-3R8A, -5R5A, -7R6A, -120A, -180A, -200A, -330A, -470A, -550A, -590A, and -780A



Surrounding air temperature



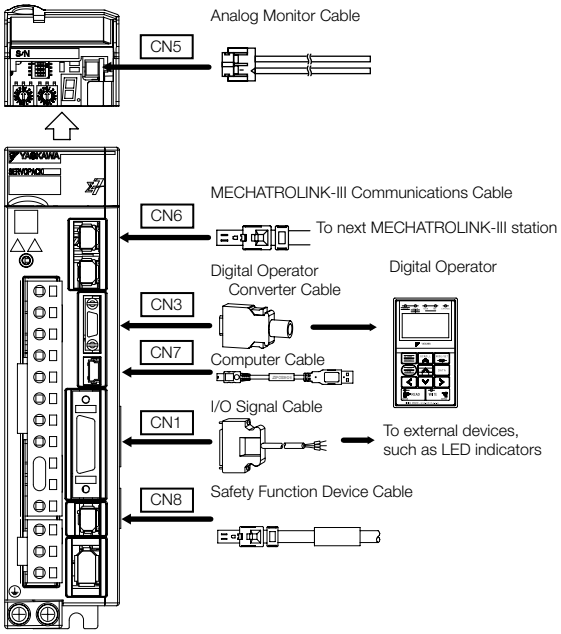
Altitude



Surrounding air temperature and altitude

Selecting Cables SGD7S MECHATROLINK-III

System Configurations



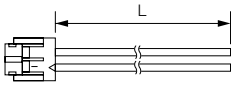
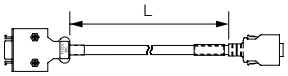
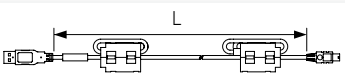
Selection Table

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.

Refer to the following manual for the following information.
- Cable dimensional drawings and cable connection specifications
- Order numbers and specifications of individual connectors for cables

Sigma-7-Series AC Servo Drive Peripheral Device Selection Manual (Manual No.: SIEP S800001 32)

Code	Description		Length	Order Number	Appearance
CN5	Analog Monitor Cable		1 m	JZSP-CA01-E	
CN3	Digital Operator			JUSP-0P05A-1-E	
		Digital Operator Converter Cable	0.3 m	JZSP-CVS05-A3-E*1	
				JZSP-CVS07-A3-E*2	
CN7	Computer Cable		2.5 m	JZSP-CVS06-02-E	

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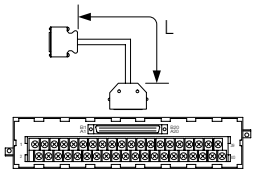
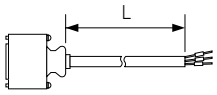
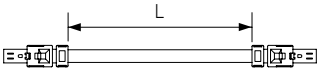
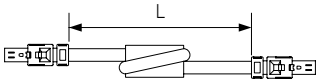
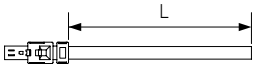
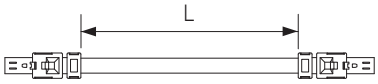
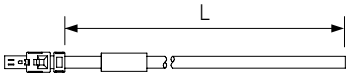
Code	Description		Length	Order Number	Appearance
CN1	I/O Signal Cables	Soldered Connector Kit		JZSP-CSI9-2-E	
		Connector-Terminal Block Converter Unit (with cable)	0.5 m	JUSP-TA26P-E	
			1 m	JUSP-TA26P-1-E	
			2 m	JUSP-TA26P-2-E	
		Cable with Loose Wires at One End (loose wires on peripheral device end)	1 m	JZSP-CSI02-1-E	
			2 m	JZSP-CSI02-2-E	
			3 m	JZSP-CSI02-3-E	
CN6	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	
	MECHATROLINK-III / EtherCAT / PROFINET Communications Cables (RJ45)*3		0.2 m	CM3R☐M0-00P2-E	
			0.5 m	CM3R☐M0-00P5-E	
			1 m	JZSP-CM3R☐M0-01-E	
			3 m	JZSP-CM3R☐M0-03-E	
			5 m	JZSP-CM3R☐M0-05-E	
			10 m	JZSP-CM3R☐M0-10-E	
			20 m	JZSP-CM3R☐M0-20-E	
			30 m	JZSP-CM3R☐M0-30-E	
			40 m	JZSP-CM3R☐M0-40-E	
			50 m	JZSP-CM3R☐M0-50-E	
CN8	Safety Function Device Cables	Cables with Connectors*4	1 m	JZSP-CVH03-01-E-Gx	
			3 m	JZSP-CVH03-03-E-Gx	
		Connector Kit*5		Contact Tyco Electronics Japan G.K. Product name: Industrial Mini I/O D-shape Type 1 Plug Connector Kit Model number: 2013595-1	

*1. This Converter Cable is required to use the Sigma-III-series Digital Operator (JUSP-OP05A) for S-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. This cable is available in two variants. The order number for these cables differs at the marked ☐, an „R" at this place is used for Cables with RJ45 Connectors on both ends, while an „M" is used for Cables with RJ45 Connector on One End and IMI Connector on the other End.
*4. 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.
*5. Use the Connector Kit when you make cables yourself.

SERVOPACK Main Circuit Wires


Important

These specifications are based on IEC/EN 61800-5-1, UL 61800-5-1, and CSA C22.2 No.274.
1. To comply with UL standards, use UL-compliant wires.
2. Use copper wires with a rated temperature of 75° 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 surrounding air temperature.

Three-phase, 200-VAC Wires for Sigma-7S SERVOPACKs

SGD7S-	Terminals		Wire Size	Screw Size	Tightening Torque [Nm]
R70A, R90A, 1R6A, 2R8A, 3R8A, 5R5A, 7R6A	Main Circuit Power Supply Cable	L1, L2, L3	AWG16 (1.25 mm²)	–	–
	Servomotor Main Circuit Cable*	U, V, W			
	Control Power Supply Cable	L1C, L2C			
	External Regenerative Resistor Cable	B1/⊕, B2			
	Ground cable	⏚	AWG14 (2.0 mm²) min.	M4	1.2 to 1.4
120A	Main Circuit Power Supply Cable	L1, L2, L3	AWG14 (2.0 mm²)	–	–
	Servomotor Main Circuit Cable*	U, V, W			
	Control Power Supply Cable	L1C, L2C	AWG16 (1.25 mm²)		
	External Regenerative Resistor Cable	B1/⊕, B2			
	Ground cable	⏚	AWG14 (2.0 mm²) min.	M4	1.2 to 1.4
180A	Main Circuit Power Supply Cable	L1, L2, L3	AWG14 (2.0 mm²)	M4	1.0 to 1.2
	Servomotor Main Circuit Cable*	U, V, W	AWG10 (5.5 mm²)		
	Control Power Supply Cable	L1C, L2C	AWG16 (1.25 mm²)		
	External Regenerative Resistor Cable	B1/⊕, B2			
	Ground cable	⏚	AWG14 (2.0 mm²) min.	M4	1.2 to 1.4
200A	Main Circuit Power Supply Cable	L1, L2, L3	AWG12 (3.5 mm²)	M4	1.0 to 1.2
	Servomotor Main Circuit Cable*	U, V, W	AWG10 (5.5 mm²)		
	Control Power Supply Cable	L1C, L2C	AWG16 (1.25 mm²)		
	External Regenerative Resistor Cable	B1/⊕, B2			
	Ground cable	⏚	AWG14 (2.0 mm²) min.	M4	1.2 to 1.4
330A	Main Circuit Power Supply Cable	L1, L2, L3	AWG8 (8.0 mm²)	M4	1.0 to 1.2
	Servomotor Main Circuit Cable*	U, V, W			
	Control Power Supply Cable	L1C, L2C	AWG16 (1.25 mm²)		
	External Regenerative Resistor Cable	B1/⊕, B2	AWG14 (2.0 mm²)		
	Ground cable	⏚	AWG14 (2.0 mm²) min.	M4	1.2 to 1.4
470A	Main Circuit Power Supply Cable	L1, L2, L3	AWG8 (8.0 mm²)	M5	2.2 to 2.4
	Servomotor Main Circuit Cable*	U, V, W	AWG6 (14 mm²)		
	Control Power Supply Cable	L1C, L2C	AWG16 (1.25 mm²)		
	External Regenerative Resistor Cable	B1/⊕, B2	AWG14 (2.0 mm²)		
	Ground cable	⏚	AWG14 (2.0 mm²) min.		
550A	Main Circuit Power Supply Cable	L1, L2, L3	AWG8 (8.0 mm²)		
	Servomotor Main Circuit Cable*	U, V, W	AWG4 (22 mm²)		
	Control Power Supply Cable	L1C, L2C	AWG16 (1.25 mm²)		
	External Regenerative Resistor Cable	B1/⊕, B2	AWG10 (5.5 mm²)		
	Ground cable	⏚	AWG14 (2.0 mm²) min.		
590A	Main Circuit Power Supply Cable	L1, L2, L3	AWG4 (22 mm²)	M6	2.7 to 3.0
	Servomotor Main Circuit Cable*	U, V, W			
	Control Power Supply Cable	L1C, L2C	AWG16 (1.25 mm²)		
	External Regenerative Resistor Cable	B1/⊕, B2	AWG10 (5.5 mm²)		
	Ground cable	⏚	AWG14 (2.0 mm²) min.		
780A	Main Circuit Power Supply Cable	L1, L2, L3	AWG3 (30 mm²)		
	Servomotor Main Circuit Cable*	U, V, W			
	Control Power Supply Cable	L1C, L2C	AWG16 (1.25 mm²)		
	External Regenerative Resistor Cable	B1/⊕, B2	AWG8 (8.0 mm²)		
	Ground cable	⏚	AWG14 (2.0 mm²) min.		

* If you do not use the recommended Servomotor Main Circuit Cable, use this table to select wires.

Single-phase, 200-VAC Wires for Sigma-7S SERVOPACKs

SGD7S-	Terminals		Wire Size	Screw Size	Tightening Torque [Nm]
R70A, R90A, 1R6A, 2R8A	Main Circuit Power Supply Cable	L1, L2, L3	AWG16 (1.25 mm²)	–	–
	Servomotor Main Circuit Cable*	U, V, W			
	Control Power Supply Cable	L1C, L2C			
	External Regenerative Resistor Cable	B1/⊕, B2			
	Ground cable	⏚	AWG14 (2.0 mm²) min.	M4	1.2 to 1.4
5R5A	Main Circuit Power Supply Cable	L1, L2, L3	AWG14 (2.0 mm²)	–	–
	Servomotor Main Circuit Cable*	U, V, W	AWG16 (1.25 mm²)		
	Control Power Supply Cable	L1C, L2C			
	External Regenerative Resistor Cable	B1/⊕, B2			
	Ground cable	⏚	AWG14 (2.0 mm²) min.	M4	1.2 to 1.4
120A□□□008	Main Circuit Power Supply Cable	L1, L2, L3	AWG14 (2.0 mm²)	M4	1.0 to 1.2
	Servomotor Main Circuit Cable*	U, V, W			
	Control Power Supply Cable	L1C, L2C	AWG16 (1.25 mm²)		
	External Regenerative Resistor Cable	B1/⊕, B2			
	Ground cable	⏚	AWG14 (2.0 mm²) min.	M4	1.2 to 1.4

* If you do not use the recommended Servomotor Main Circuit Cable, use this table to select wires.

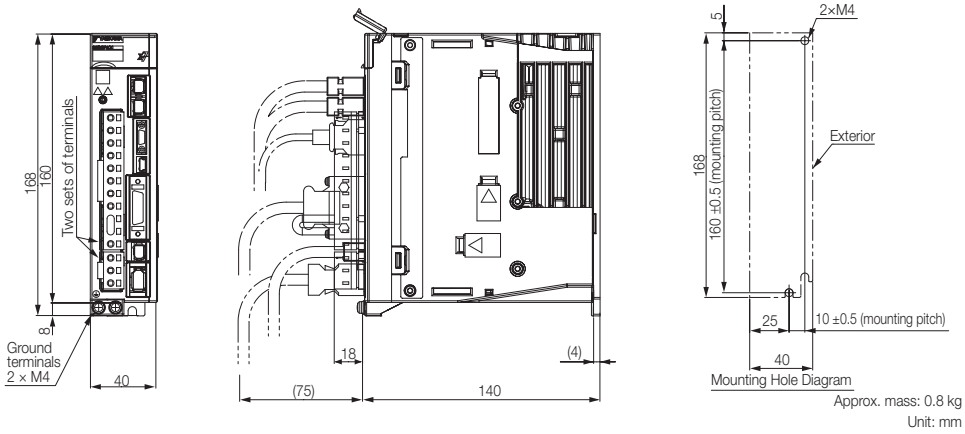
DC Power Supply Wires for Sigma-7S SERVOPACKs

SGD7S-	Terminals*1		Wire Size	Screw Size	Tightening Torque [Nm]
R70A, R90A, 1R6A, 2R8A, 3R8A, 5R5A, 7R6A	Servomotor Main Circuit Cable	U, V, W*2	AWG16 (1.25 mm²)	–	–
	Control Power Supply Cable	L1C, L2C			
	External Regenerative Resistor Cable	B1/⊕, ⊖2			
	Ground cable	⏚	AWG14 (2.0 mm²) min.	M4	1.2 to 1.4
120A (three-phase, 200-VAC input)	Servomotor Main Circuit Cable	U, V, W*2	AWG14 (2.0 mm²)	–	–
	Control Power Supply Cable	L1C, L2C	AWG16 (1.25 mm²)		
	External Regenerative Resistor Cable	B1/⊕, ⊖2	AWG14 (2.0 mm²)		
	Ground cable	⏚	AWG14 (2.0 mm²) min.	M4	1.2 to 1.4
120A□□□008 (single-phase, 200-VAC input)	Servomotor Main Circuit Cable	U, V, W*2	AWG14 (2.0 mm²)	M4	1.0 to 1.2
	Control Power Supply Cable	L1C, L2C	AWG16 (1.25 mm²)		
	External Regenerative Resistor Cable	B1/⊕, ⊖2	AWG14 (2.0 mm²)		
	Ground cable	⏚	AWG14 (2.0 mm²) min.	M4	1.2 to 1.4
180A, 200A	Servomotor Main Circuit Cable	U, V, W*2	AWG10 (5.5 mm²)	M4	1.0 to 1.2
	Control Power Supply Cable	L1C, L2C	AWG16 (1.25 mm²)		
	External Regenerative Resistor Cable	B1/⊕, ⊖2	AWG10 (5.5 mm²)		
	Ground cable	⏚	AWG14 (2.0 mm²) min.	M4	1.2 to 1.4
330A	Servomotor Main Circuit Cable	U, V, W*2	AWG8 (8.0 mm²)	M4	1.0 to 1.2
	Control Power Supply Cable	L1C, L2C	AWG16 (1.25 mm²)		
	External Regenerative Resistor Cable	B1/⊕, ⊖2	AWG8 (8.0 mm²)		
	Ground cable	⏚	AWG14 (2.0 mm²) min.	M4	1.2 to 1.4
470A	Servomotor Main Circuit Cable	U, V, W*2	AWG6 (14 mm²)	M5	2.2 to 2.4
	Control Power Supply Cable	L1C, L2C	AWG16 (1.25 mm²)		
	External Regenerative Resistor Cable	B1/⊕, ⊖2	AWG8 (8.0 mm²)		
	Ground cable	⏚	AWG14 (2.0 mm²) min.		
550A	Servomotor Main Circuit Cable	U, V, W*2	AWG4 (22 mm²)		
	Control Power Supply Cable	L1C, L2C	AWG16 (1.25 mm²)		
	External Regenerative Resistor Cable	B1/⊕, ⊖2	AWG6 (14 mm²)		
	Ground cable	⏚	AWG14 (2.0 mm²) min.		
590A	Servomotor Main Circuit Cable	U, V, W*2	AWG4 (22 mm²)	M6	2.7 to 3.0
	Control Power Supply Cable	L1C, L2C	AWG16 (1.25 mm²)		
	External Regenerative Resistor Cable	B1/⊕, ⊖2	AWG3 (30 mm²)		
	Ground cable	⏚	AWG14 (2.0 mm²) min.		
780A	Servomotor Main Circuit Cable	U, V, W*2	AWG3 (30 mm²)		
	Control Power Supply Cable	L1C, L2C	AWG16 (1.25 mm²)		
	External Regenerative Resistor Cable	B1/⊕, ⊖2	AWG3 (30 mm²)		
	Ground cable	⏚	AWG14 (2.0 mm²) min.		

*1. Do not wire the following terminals: L1, L2, L3, B2, B3, ⊖1, ⊖ and terminals.
*2. If you do not use the recommended Servomotor Main Circuit Cable, use this table to select wires.

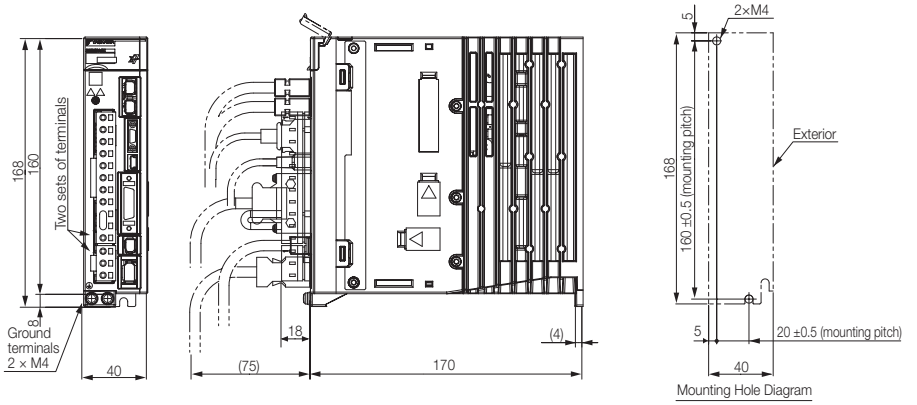
SERVOPACK External Dimensions

Three-phase & Single-phase, 200 VAC: SGD7S-R70A, -R90A, and -1R6A



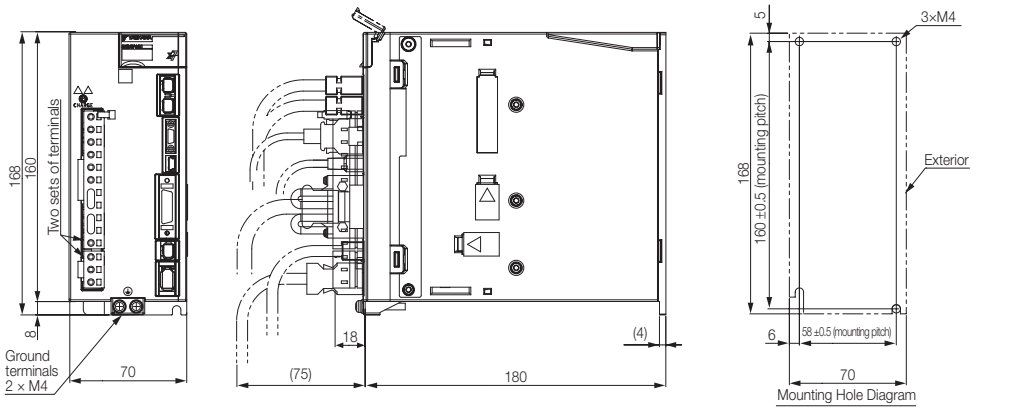
Approx. mass: 0.8 kg
Unit: mm

Three-phase & Single-phase, 200 VAC: SGD7S-2R8A



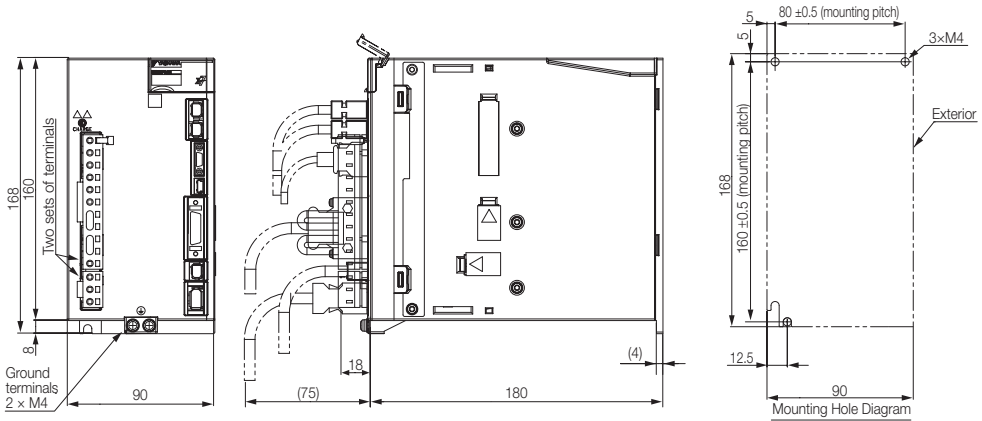
Approx. mass: 1.0 kg
Unit: mm

Three-phase & Single-phase, 200 VAC: SGD7S-3R8A, -5R5A
Three-phase, 200 VAC: -7R6A



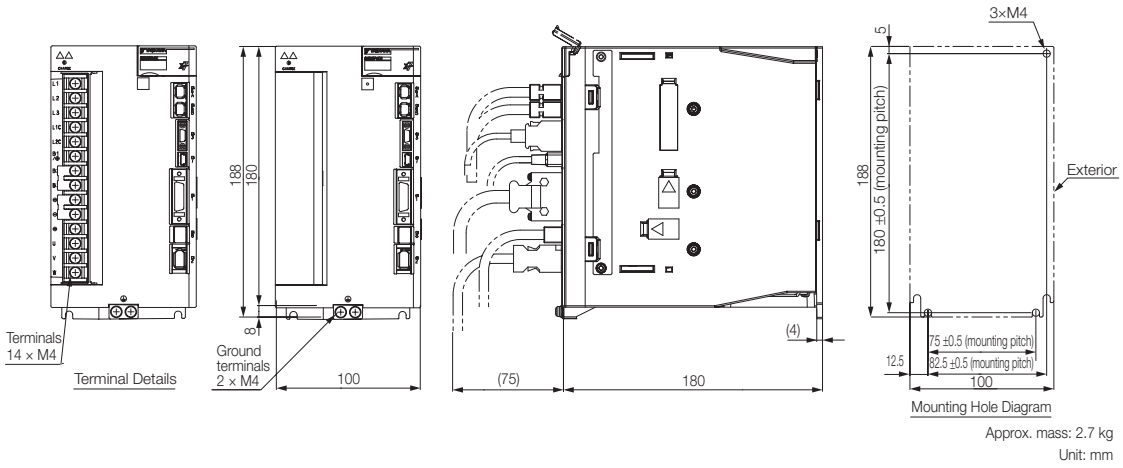
Approx. mass: 1.6 kg
Unit: mm

Three-phase & Single-phase, 200 VAC: SGD7S-120A



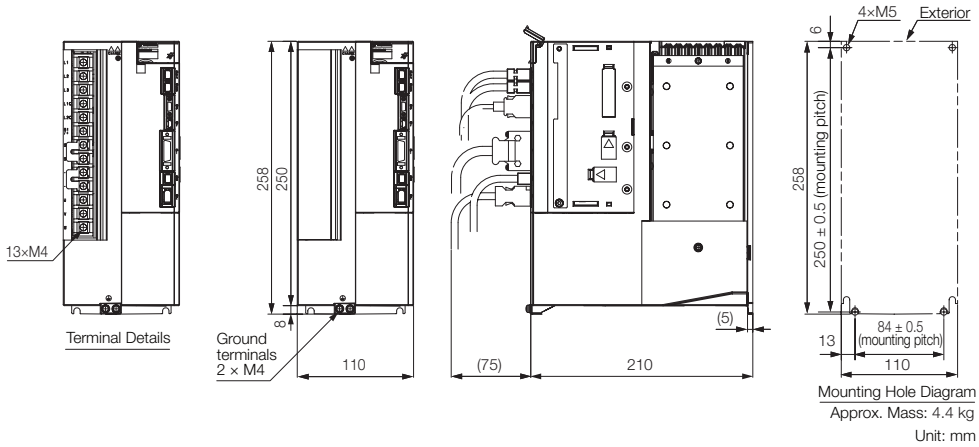
Approx. mass: 2.2 kg
Unit: mm

Three-phase, 200 VAC: SGD7S-180A and -200A



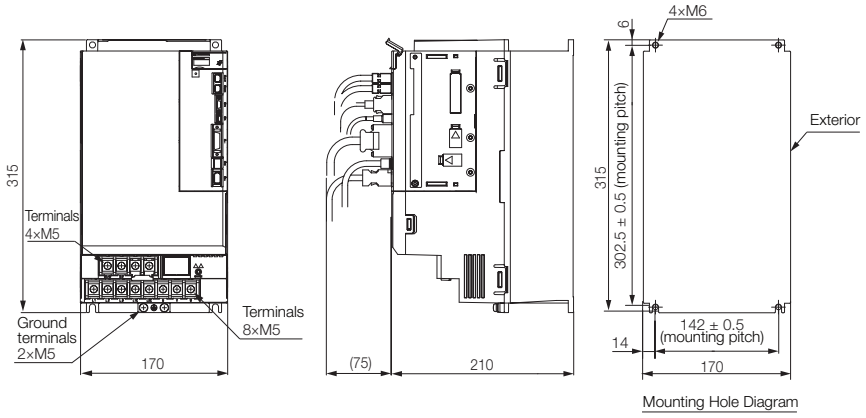
Approx. mass: 2.7 kg
Unit: mm

Three-phase, 200 VAC: SGD7S-330A



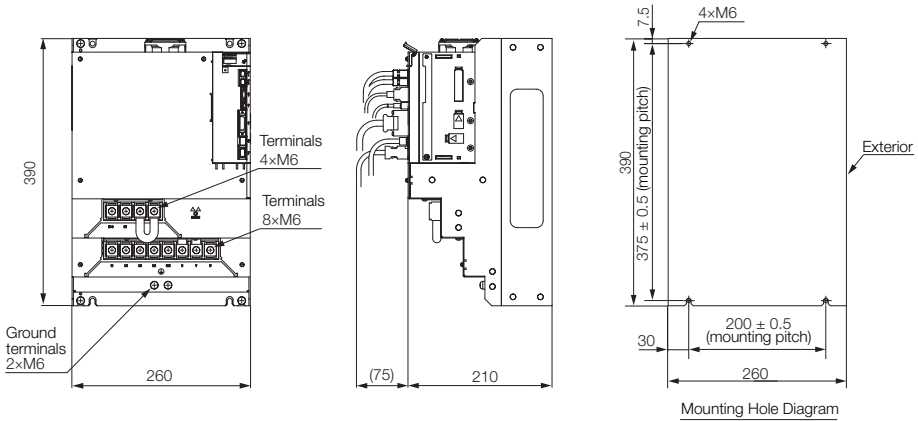
Approx. Mass: 4.4 kg
Unit: mm

Three-phase, 200 VAC: SGD7S-470A and -550A



Approx. Mass: 8.2 kg
Unit: mm

Three-phase, 200 VAC: SGD7S-590A and -780A



Approx. Mass: 15.5 kg
Unit: mm

Sigma-7S MECHATROLINK-III with RJ45

Model Designations

SGD7S - R70 A 30 A 001 000

Sigma-7 Series Sigma-7S Models	1st ... 3rd	4th	5th + 6th	7th	8th ... 10th	11th ... 13th	digit

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

Code	Specification
Three-phase, 200 V	
R70*1	0.05 kW
R90*1	0.1 kW
1R6*1	0.2 kW
2R8*1	0.4 kW
3R8	0.5 kW
5R5*1	0.75 kW
7R6	1.0 kW
120*2	1.5 kW
180	2.0 kW
200*3	3.0 kW
330	5.0 kW
470	6.0 kW
550	7.5 kW
590	11 kW
780	15 kW

4th digit - Voltage

Code	Specification
A	200 VAC

5th + 6th digit - Interface*4

Code	Specification
30	MECHATROLINK-III communication Reference with RJ45 connector

7th digit - Design Revision Order

Code	Specification
A	Standard Model

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

Code	Specifications	Applicable Models
None	Without Options	All models
000	Without Options only used in combination with FT/EX	All models
001	Rack-mounted	SGD7S-R70A to -330A
	Duct-ventilated	SGD7S-470A to -780A
002	Varnished	All models
008	Single-phase, 200 V power input	SGD7S-120A
020*6	No dynamic brake	SGD7S-R70A to -2R8A
	External dynamic brake resistor	SGD7S-3R8A to -780A
00A	Varnished and single-phase power input	All models

11th ... 13th digit - FT/EX Specifications

Code	Specifications
None	None
F82*7	Application function option for special motors, SGM7D motor drive

Note:

Depending on configuration choices made, the model code might end after the 7th or 10th digit, or involve all 13 digits.

Readily available up to 1.5 kW. Others available on request.
Additional accessories and software for SERVOPACKs is described in the Periphery section.

Note:
*1. You can use these models with either a single-phase or three-phase power supply input.
*2. A model with a single-phase, 200-VAC power supply input is available as a hardware option (model. SGD7S-120A□0A008).
*3. The rated output is 2.4 kW if you combine the SGM7G-30A with the SGD7S-200A.
*4. The same SERVOPACKs are used for both Rotary Servomotors and Linear Servomotors.
*5. A command option module must be attached to the Command Option Attachable-type SERVOPACK for use.
*6. Refer to the following manual for details.
Sigma-7-Series AC Servo Drive Sigma-7S/Sigma-7W SERVOPACK with Hardware Option Specifications Dynamic Brake Product Manual (Manual No.: SIEP S800001 73)
*7. Refer to the following manual for details.
Sigma-7-Series AC Servo Drive Σ-7S SERVOPACK with FT/EX Specification for SGM7D Motor Product Manual (Manual No.: SIEP S800001 91)

Ratings and Specifications

Ratings

Single-phase, 200 VAC

Model SGD7S-			R70A	R90A	1R6A	2R8A	5R5A	120A
Maximum Applicable Motor Capacity [kW]			0.05	0.1	0.2	0.4	0.75	1.5
Continuous Output Current [A]			0.66	0.91	1.6	2.8	5.5	11.6
Instantaneous Maximum Output Current [A]			2.1	3.2	5.9	9.3	16.9	28
Main Circuit	Power Supply		200 VAC to 240 VAC, -15% to +10%, 50 Hz/60 Hz					
	Input Current [A]*		0.8	1.6	2.4	5.0	8.7	16
Control	Power Supply		200 VAC to 240 VAC, -15% to +10%, 50 Hz/60 Hz					
	Input Current [A]*		0.2	0.2	0.2	0.2	0.2	0.25
Power Supply Capacity [kVA]*			0.2	0.3	0.6	1.2	1.9	4.0
Power Loss*	Main Circuit Power Loss [W]		5.0	7.1	12.1	23.7	39.2	71.8
	Control Circuit Power Loss [W]		12	12	12	12	14	16
	Built-in Regenerative Resistor Power Loss [W]		–	–	–	–	8	16
	Total Power Loss [W]		17.0	19.1	24.1	35.7	61.2	103.8
Regenerative Resistor	Built-In Regenerative Resistor	Resistance [Ω]	–	–	–	–	40	12
		Capacity [W]	–	–	–	–	40	60
	Minimum Allowable External Resistance [Ω]		40	40	40	40	40	12
Overvoltage Category			III					

* This is the net value at the rated load.

Three-phase, 200 VAC

Model SGD7S-			R70A	R90A	1R6A	2R8A	3R8A	5R5A	7R6A	120A	180A	200A	330A
Maximum Applicable Motor Capacity [kW]			0.05	0.1	0.2	0.4	0.5	0.75	1.0	1.5	2.0	3.0	5.0
Continuous Output Current [A]			0.66	0.91	1.6	2.8	3.8	5.5	7.6	11.6	18.5	19.6	32.9
Instantaneous Maximum Output Current [A]			2.1	3.2	5.9	9.3	11	16.9	17	28	42	56	84.0
Main Circuit	Power Supply		200 VAC to 240 VAC, -15% to +10%, 50 Hz/60 Hz										
	Input Current [A]*		0.4	0.8	1.3	2.5	3.0	4.1	5.7	7.3	10	15	25
Control	Power Supply		200 VAC to 240 VAC, -15% to +10%, 50 Hz/60 Hz										
	Input Current [A]*		0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.25	0.25	0.3
Power Supply Capacity [kVA]*			0.2	0.3	0.5	1.0	1.3	1.6	2.3	3.2	4.0	5.9	7.5
Power Loss*	Main Circuit Power Loss [W]		5.0	7.0	11.9	22.5	28.5	38.9	49.2	72.6	104.2	114.2	226.6
	Control Circuit Power Loss [W]		12	12	12	12	14	14	14	15	16	16	19
	Built-in Regenerative Resistor Power Loss [W]		–	–	–	–	8	8	8	10	16	16	36
	Total Power Loss [W]		17.0	19.0	23.9	34.5	50.5	60.9	71.2	97.6	136.2	146.2	281.6
Regenerative Resistor	Built-In Regenerative Resistor	Resistance [Ω]	–	–	–	–	40	40	40	20	12	12	8
		Capacity [W]	–	–	–	–	40	40	40	60	60	60	180
	Minimum Allowable External Resistance [Ω]		40	40	40	40	40	40	40	20	12	12	8
Overvoltage Category			III										

* This is the net value at the rated load.

Note: Readily available up to 1.5 kW. Others available on request.

Three-phase, 200 VAC continued

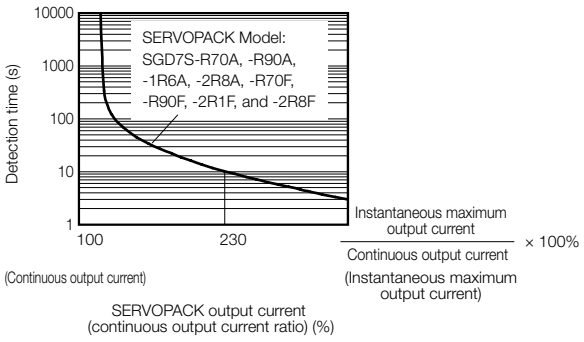
Model SGD7S-			470A	550A	590A	780A
Maximum Applicable Motor Capacity [kW]			6.0	7.5	11	15
Continuous Output Current [A]			46.9	54.7	58.6	78.0
Instantaneous Maximum Output Current [A]			110	130	140	170
Main Circuit	Power Supply		200 VAC to 240 VAC, -15% to +10%, 50 Hz/60 Hz			
	Input Current [A]*1		29	37	54	73
Control	Power Supply		200 VAC to 240 VAC, -15% to +10%, 50 Hz/60 Hz			
	Input Current [A]*1		0.3	0.3	0.4	0.4
Power Supply Capacity [kVA]* 1			10.7	14.6	21.7	29.6
Power Loss*1	Main Circuit Power Loss [W]		271.7	326.9	365.3	501.4
	Control Circuit Power Loss [W]		21	21	28	28
	External Regenerative Resistor Unit Power Loss [W]		180*2	180*3	350*3	350*3
	Total Power Loss [W]		292.7	347.9	393.3	529.4
External Regenerative Resistor Unit	External Regenerative Resistor Unit	Resistance [Ω]	6.25*2	3.13*3	3.13*3	3.13*3
		Capacity [W]	880*2	1,760*3	1,760*3	1,760*3
	Minimum Allowable External Resistance [Ω]		5.8	2.9	2.9	2.9
Overvoltage Category			III			

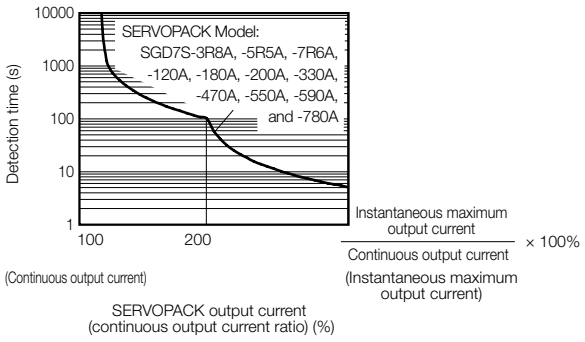
Note: Readily available up to 1.5 kW. Others available on request.

*1. This is the net value at the rated load.
*2. This value is for the optional JUSP-RA04-E Regenerative Resistor Unit.
*3. This value is for the optional JUSP-RA05-E Regenerative Resistor Unit.

SERVOPACK Overload Protection Characteristics

The overload detection level is set for hot start conditions with a SERVOPACK surrounding air temperature of 55°C.
An overload alarm (A.710 or A.720) will occur if overload operation that exceeds the overload protection characteristics shown in the following diagram (i.e., operation on the right side of the applicable line) is performed.
The actual overload detection level will be the detection level of the connected SERVOPACK or Servomotor that has the lower overload protection characteristics.
In most cases, that will be the overload protection characteristics of the Servomotor.





Note:
The above overload protection characteristics do not mean that you can perform continuous duty operation with an output of 100% or higher.
For a YASKAWA-specified combination of SERVOPACK and Servomotor, maintain the effective torque within the continuous duty zone of the torque-motor speed characteristic of the Servomotor.

Specifications

Item		Specification	
Drive Method		IGBT-based PWM control, sine wave current drive	
Feedback	With Rotary Servomotor	Serial encoder: 17 bits (absolute encoder) 20 bits or 24 bits (incremental encoder/absolute encoder) 22 bits (absolute encoder)	
	With Linear Servomotor	• Absolute linear encoder (The signal resolution depends on the absolute linear encoder.) • Incremental linear encoder (The signal resolution depends on the incremental linear encoder or Serial Converter Unit.)	
Environmental Conditions	Ambient Air Temperature*1	-5°C to 55°C With derating, usage is possible between 55°C and 60°C. Refer to the following section for Derating Specifications.	
	Storage Temperature	-20°C to 85°C	
	Ambient Air Humidity	95% relative humidity max. (with no freezing or condensation)	
	Storage Humidity	95% relative humidity max. (with no freezing or condensation)	
	Vibration Resistance	4.9 m/s^2	
	Shock Resistance	19.6 m/s^2	
	Protection Class	Class	SERVOPACK Model: SGD7S-
		IP20	R70A, R90A, 1R6A, 2R8A, 3R8A, 5R5A, 7R6A, 120A, R70F, R90F, 2R1F, 2R8F
		IP10	120A20A008, 180A, 200A, 330A, 470A, 550A, 590A, 780A
	Pollution Degree	2 • Must be no corrosive or flammable gases. • Must be no exposure to water, oil, or chemicals. • Must be no dust, salts, or iron dust.	
	Altitude*1	1,000 m or less With derating, usage is possible between 1,000 m and 2,000 m. Refer to the following section for Derating specifications.	
	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 (E147823), CSA C22.2 No.274, EN ISO13849-1: 2015, EN 55011 group 1 class A, EN 61000-6-2, EN 61000-6-4, EN 61800-3 (Category C2, Second environment), EN 50178, EN 61800-5-1, IEC 60204-1, IEC 61508 series, IEC 62061, IEC 61800-5-2, and IEC 61326-3-1	
Mounting		Mounting	SERVOPACK Model: SGD7S-
		Base-mounted	All models
		Rack-mounted	R70A, R90A, 1R6A, 2R8A, 3R8A, 5R5A, 7R6A, 120A, 180A, 200A, 330A, R70F, R90F, 2R1F, 2R8F
		Duct-ventilated	470A, 550A, 590A, 780A
Performance	Speed Control Range	1:5,000 (At the rated torque, the lower limit of the speed control range must not cause the Servomotor to stop.)	
	Coefficient of Speed Fluctuation*2	±0.01% of rated speed max. (for a load fluctuation of 0% to 100%)	
		0% of rated speed max. (for a voltage fluctuation of ±10%)	
		±0.1% of rated speed max. (for a temperature fluctuation of 25°C ±25°C)	
	Torque Control Precision (Repeatability)	±1%	
	Soft Start Time Setting	0 s to 10 s (Can be set separately for acceleration and deceleration.)	

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Item			Specification
I/O Signals	Encoder Divided Pulse Output		Phase A, phase B, phase C: Line-driver output Number of divided output pulses: Any setting is allowed.
	Overheat Protection Input		Number of input points: 1 Input voltage range: 0 V to +5 V
	Sequence Input Signals		Allowable voltage range: 24 VDC ±20% Number of input points: 7
		Input Signals That Can Be Allocated	Input method: Sink inputs or source inputs Input Signals: ● P-OT (Forward Drive Prohibit) and N-OT (Reverse Drive Prohibit) signals ● /P-CL (Forward External Torque Limit) and /N-CL (Reverse External Torque Limit) signals ● /DEC (Origin Return Deceleration Switch) signal ● /EXT1 to /EXT3 (External Latch Input 1 to 3) signals ● FSTP (Forced Stop Input) signal A signal can be allocated and the positive and negative logic can be changed.
	Sequence Output Signals	Fixed Output	Allowable voltage range: 5 VDC to 30 VDC Number of output points: 1 Output 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: ● /COIN (Positioning Completion) signal ● /V-CMP (Speed Coincidence Detection) signal ● /TGON (Rotation Detection) signal ● /S-RDY (Servo Ready) signal ● /CLT (Torque Limit Detection) signal ● /VLT (Speed Limit Detection) signal ● /BK (Brake) signal ● /WARN (Warning) signal ● /NEAR (Near) signal 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	03 to EF hex (maximum number of slaves: 62) The rotary switches (S1 and S2) are used to set the station address.
	USB Communications (CN7)	Interface	Personal Computer (with SigmaWin+)
		Communications Standard	Conforms to USB 2.0 standard (12 Mbps).
Displays/ Indicators			CHARGE, PWR, COM, L1, and L2 indicators, and one-digit seven-segment display
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		32 or 48 bytes/station A DIP switch (S3) is used to select the number of transmission bytes.
Reference Method	Performance		Position, speed, or torque control with MECHATROLINK-III communications
	Reference Input		MECHATROLINK-III commands (sequence, motion, data setting, data access, monitoring, adjustment, etc.)
	Profile		MECHATROLINK-III standard servo profile

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Item		Specification
MECHATROLINK-III Communications Setting Switches		Rotary switch (S1 and S2) positions: 16 Number of DIP switch (S3) pins: 4
Analog Monitor (CN5)		Number of points: 2 Output voltage range: ±10 VDC (effective linearity range: ±8 V) Resolution: 16 bits Accuracy: ±20 mV (Typ) Maximum output current: ±10 mA Settling time (±1%): 1.2 ms (Typ)
Dynamic Brake (DB)		Activated when a servo alarm or overtravel (OT) occurs, or when the power supply to the main circuit or servo is OFF.
Regenerative Processing		Built-in (An external resistor must be connected to the SGD7S-470A to -780A.) Refer to Built-In Regenerative Resistor.
Overtravel (OT) Prevention		Stopping with dynamic brake, deceleration to a stop, or coasting to a stop for the P-OT (Forward Drive Prohibit) or N-OT (Reverse Drive Prohibit) signal
Protective Functions		Overcurrent, overvoltage, low voltage, overload, regeneration error, etc.
Utility Functions		Gain adjustment, alarm history, jogging, origin search, etc.
Safety Functions	Inputs	/HWBB1 and /HWBB2: Base block signals for Power Modules
	Output	EDM1: Monitors the status of built-in safety circuit (fixed output).
	Applicable Standards*3	ISO13849-1 PLe (Category 3), IEC61508 SIL3
Option Module		Fully-Closed Module and Safety Module Note: You cannot use a Fully-Closed Module and a Safety Module together.

*1. If you combine a S-7-Series SERVOPACK with a S-V-Series Option Module, the following S-V-Series SERVOPACKs specifications must be used: a surrounding air temperature of 0°C to 55°C and an altitude of 1,000 m max. Also, the applicable range cannot be increased by derating.
*2. The coefficient of speed fluctuation for load fluctuation is defined as follows:

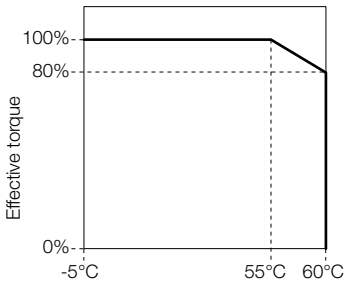
$$\text{Coefficient of speed fluctuation} = \frac{\text{No-load motor speed - Total-load motor speed}}{\text{Rated motor speed}} \times 100\%$$

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

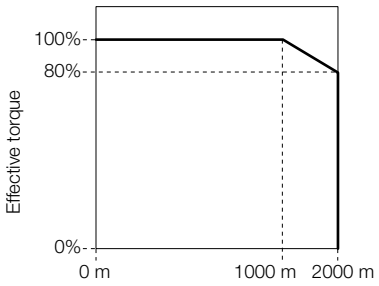
Derating Specifications

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

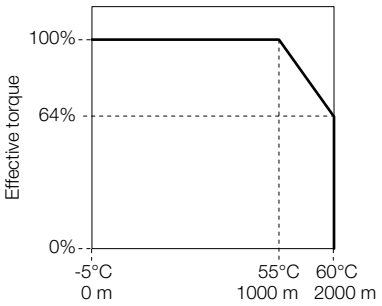
SGD7S-R70A, -R90A, -1R6A, -2R8A, -R70F, -R90F, -2R1F, and -2R8F



Surrounding air temperature

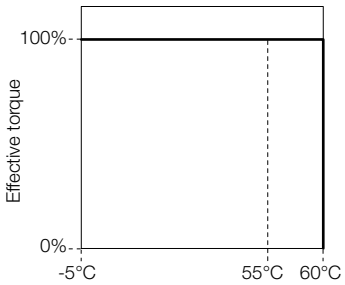


Altitude

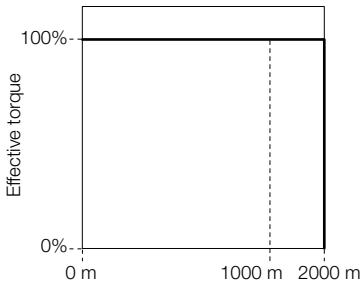


Surrounding air temperature and altitude

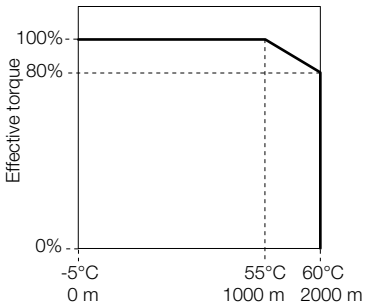
SGD7S-3R8A, -5R5A, -7R6A, -120A, -180A, -200A, -330A, -470A, -550A, -590A, and -780A



Surrounding air temperature



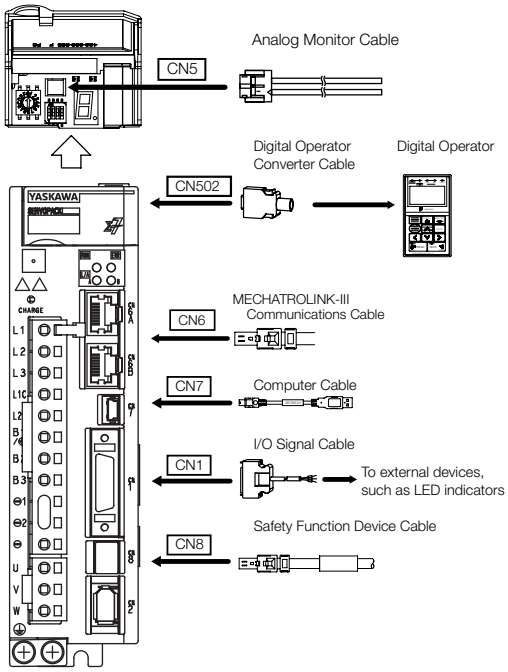
Altitude



Surrounding air temperature and altitude

Selecting Cables SGD7S MECHATROLINK-III with RJ45

System Configurations



Selection Table

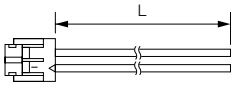
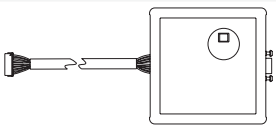
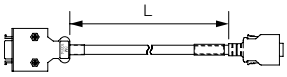
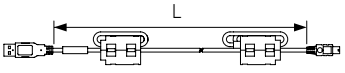
Important

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.

Refer to the following manual for the following information.

- Cable dimensional drawings and cable connection specifications
- Order numbers and specifications of individual connectors for cables

Sigma-7-Series AC Servo Drive Peripheral Device Selection Manual (Manual No.: SIEP S800001 32)

Code	Description		Length	Order Number	Appearance
CN5	Analog Monitor Cable		1 m	JZSP-CA01-E	
CN502	Digital Operator			JUSP-0P05A-1-E	
		Serial Communications Connector	0.3 m	JUSP-JC001-1	
		Digital Operator Converter Cable	0.3 m	JZSP-CVS05-A3-E*1	
				JZSP-CVS07-A3-E*2	
CN7	Computer Cable		2.5 m	JZSP-CVS06-02-E	

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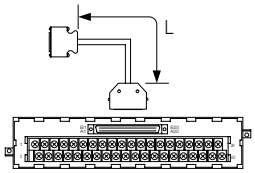
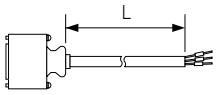
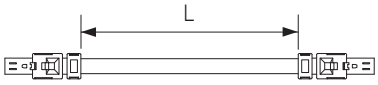
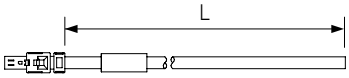
Code	Description		Length	Order Number	Appearance
CN1	I/O Signal Cables	Soldered Connector Kit		JZSP-CSI9-2-E	
		Connector-Terminal Block Converter Unit (with cable)	0.5 m	JUSP-TA26P-E	
			1 m	JUSP-TA26P-1-E	
			2 m	JUSP-TA26P-2-E	
		Cable with Loose Wires at One End (loose wires on peripheral device end)	1 m	JZSP-CSI02-1-E	
			2 m	JZSP-CSI02-2-E	
			3 m	JZSP-CSI02-3-E	
CN6	MECHATROLINK-III / EtherCAT / PROFINET Communications Cables (RJ45)*3		0.2 m	CM3R□M0-00P2-E	
			0.5 m	CM3R□M0-00P5-E	
			1 m	JZSP-CM3R□M0-01-E	
			3 m	JZSP-CM3R□M0-03-E	
			5 m	JZSP-CM3R□M0-05-E	
			10 m	JZSP-CM3R□M0-10-E	
			20 m	JZSP-CM3R□M0-20-E	
			30 m	JZSP-CM3R□M0-30-E	
			40 m	JZSP-CM3R□M0-40-E	
			50 m	JZSP-CM3R□M0-50-E	
CN8	Safety Function Device Cables	Cables with Connectors*4	1 m	JZSP-CVH03-01-E-Gx	
			3 m	JZSP-CVH03-03-E-Gx	
		Connector Kit*5		Contact Tyco Electronics Japan G.K. Product name: Industrial Mini I/O D-shape Type 1 Plug Connector Kit Model number: 2013595-1	

*1. This Converter Cable is required to use the Sigma-III-series Digital Operator (JUSP-OP05A) for S-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. This cable is available in two variants. The order number for these cables differs at the marked □, an „R“ at this place is used for Cables with RJ45 Connectors on both ends, while an „M“ is used for Cables with RJ45 Connector on One End and IMI Connector on the other End.
*4. 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.
*5. Use the Connector Kit when you make cables yourself.

SERVOPACK Main Circuit Wires

Important

These specifications are based on IEC/EN 61800-5-1, UL 61800-5-1, and CSA C22.2 No.274.
1. To comply with UL standards, use UL-compliant wires.
2. Use copper wires with a rated temperature of 75° 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 surrounding air temperature.

Three-phase, 200-VAC Wires for Sigma-7S SERVOPACKs

SGD7S-	Terminals		Wire Size	Screw Size	Tightening Torque [Nm]
R70A, R90A, 1R6A, 2R8A, 3R8A, 5R5A, 7R6A	Main Circuit Power Supply Cable	L1, L2, L3	AWG16 (1.25 mm²)	–	–
	Servomotor Main Circuit Cable*	U, V, W			
	Control Power Supply Cable	L1C, L2C			
	External Regenerative Resistor Cable	B1/⊕, B2			
	Ground cable	⏚	AWG14 (2.0 mm²) min.	M4	1.2 to 1.4
120A	Main Circuit Power Supply Cable	L1, L2, L3	AWG14 (2.0 mm²)	–	–
	Servomotor Main Circuit Cable*	U, V, W			
	Control Power Supply Cable	L1C, L2C	AWG16 (1.25 mm²)		
	External Regenerative Resistor Cable	B1/⊕, B2			
	Ground cable	⏚	AWG14 (2.0 mm²) min.	M4	1.2 to 1.4
180A	Main Circuit Power Supply Cable	L1, L2, L3	AWG14 (2.0 mm²)	M4	1.0 to 1.2
	Servomotor Main Circuit Cable*	U, V, W	AWG10 (5.5 mm²)		
	Control Power Supply Cable	L1C, L2C	AWG16 (1.25 mm²)		
	External Regenerative Resistor Cable	B1/⊕, B2			
	Ground cable	⏚	AWG14 (2.0 mm²) min.	M4	1.2 to 1.4
200A	Main Circuit Power Supply Cable	L1, L2, L3	AWG12 (3.5 mm²)	M4	1.0 to 1.2
	Servomotor Main Circuit Cable*	U, V, W	AWG10 (5.5 mm²)		
	Control Power Supply Cable	L1C, L2C	AWG16 (1.25 mm²)		
	External Regenerative Resistor Cable	B1/⊕, B2			
	Ground cable	⏚	AWG14 (2.0 mm²) min.	M4	1.2 to 1.4
330A	Main Circuit Power Supply Cable	L1, L2, L3	AWG8 (8.0 mm²)	M4	1.0 to 1.2
	Servomotor Main Circuit Cable*	U, V, W			
	Control Power Supply Cable	L1C, L2C	AWG16 (1.25 mm²)		
	External Regenerative Resistor Cable	B1/⊕, B2	AWG14 (2.0 mm²)		
	Ground cable	⏚	AWG14 (2.0 mm²) min.	M4	1.2 to 1.4
470A	Main Circuit Power Supply Cable	L1, L2, L3	AWG8 (8.0 mm²)	M5	2.2 to 2.4
	Servomotor Main Circuit Cable*	U, V, W	AWG6 (14 mm²)		
	Control Power Supply Cable	L1C, L2C	AWG16 (1.25 mm²)		
	External Regenerative Resistor Cable	B1/⊕, B2	AWG14 (2.0 mm²)		
	Ground cable	⏚	AWG14 (2.0 mm²) min.		
550A	Main Circuit Power Supply Cable	L1, L2, L3	AWG8 (8.0 mm²)		
	Servomotor Main Circuit Cable*	U, V, W	AWG4 (22 mm²)		
	Control Power Supply Cable	L1C, L2C	AWG16 (1.25 mm²)		
	External Regenerative Resistor Cable	B1/⊕, B2	AWG10 (5.5 mm²)		
	Ground cable	⏚	AWG14 (2.0 mm²) min.		
590A	Main Circuit Power Supply Cable	L1, L2, L3	AWG4 (22 mm²)	M6	2.7 to 3.0
	Servomotor Main Circuit Cable*	U, V, W			
	Control Power Supply Cable	L1C, L2C	AWG16 (1.25 mm²)		
	External Regenerative Resistor Cable	B1/⊕, B2	AWG10 (5.5 mm²)		
	Ground cable	⏚	AWG14 (2.0 mm²) min.		
780A	Main Circuit Power Supply Cable	L1, L2, L3	AWG3 (30 mm²)		
	Servomotor Main Circuit Cable*	U, V, W			
	Control Power Supply Cable	L1C, L2C	AWG16 (1.25 mm²)		
	External Regenerative Resistor Cable	B1/⊕, B2	AWG8 (8.0 mm²)		
	Ground cable	⏚	AWG14 (2.0 mm²) min.		

* If you do not use the recommended Servomotor Main Circuit Cable, use this table to select wires.

Single-phase, 200-VAC Wires for Sigma-7S SERVOPACKs

SGD7S-	Terminals		Wire Size	Screw Size	Tightening Torque [Nm]
R70A, R90A, 1R6A, 2R8A	Main Circuit Power Supply Cable	L1, L2, L3	AWG16 (1.25 mm^2)	–	–
	Servomotor Main Circuit Cable*	U, V, W			
	Control Power Supply Cable	L1C, L2C			
	External Regenerative Resistor Cable	B1/⊕, B2			
	Ground cable	⏚	AWG14 (2.0 mm^2) min.	M4	1.2 to 1.4
5R5A	Main Circuit Power Supply Cable	L1, L2, L3	AWG14 (2.0 mm^2)	–	–
	Servomotor Main Circuit Cable*	U, V, W	AWG16 (1.25 mm^2)		
	Control Power Supply Cable	L1C, L2C			
	External Regenerative Resistor Cable	B1/⊕, B2			
	Ground cable	⏚	AWG14 (2.0 mm^2) min.	M4	1.2 to 1.4
120A□□□008	Main Circuit Power Supply Cable	L1, L2, L3	AWG14 (2.0 mm^2)	M4	1.0 to 1.2
	Servomotor Main Circuit Cable*	U, V, W			
	Control Power Supply Cable	L1C, L2C	AWG16 (1.25 mm^2)		
	External Regenerative Resistor Cable	B1/⊕, B2			
	Ground cable	⏚	AWG14 (2.0 mm^2) min.	M4	1.2 to 1.4

* If you do not use the recommended Servomotor Main Circuit Cable, use this table to select wires.

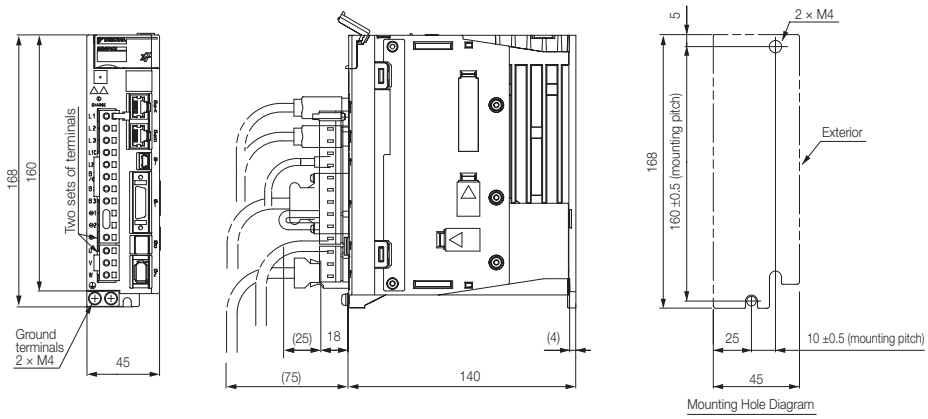
DC Power Supply Wires for Sigma-7S SERVOPACKs

SGD7S-	Terminals*1		Wire Size	Screw Size	Tightening Torque [Nm]
R70A, R90A, 1R6A, 2R8A, 3R8A, 5R5A, 7R6A	Servomotor Main Circuit Cable	U, V, W*2	AWG16 (1.25 mm^2)	–	–
	Control Power Supply Cable	L1C, L2C			
	External Regenerative Resistor Cable	B1/⊕, ⊖2			
	Ground cable	⏚	AWG14 (2.0 mm^2) min.	M4	1.2 to 1.4
120A (three-phase, 200-VAC input)	Servomotor Main Circuit Cable	U, V, W*2	AWG14 (2.0 mm^2)	–	–
	Control Power Supply Cable	L1C, L2C	AWG16 (1.25 mm^2)		
	External Regenerative Resistor Cable	B1/⊕, ⊖2	AWG14 (2.0 mm^2)		
	Ground cable	⏚	AWG14 (2.0 mm^2) min.	M4	1.2 to 1.4
120A□□□008 (single-phase, 200-VAC input)	Servomotor Main Circuit Cable	U, V, W*2	AWG14 (2.0 mm^2)	M4	1.0 to 1.2
	Control Power Supply Cable	L1C, L2C	AWG16 (1.25 mm^2)		
	External Regenerative Resistor Cable	B1/⊕, ⊖2	AWG14 (2.0 mm^2)		
	Ground cable	⏚	AWG14 (2.0 mm^2) min.	M4	1.2 to 1.4
180A, 200A	Servomotor Main Circuit Cable	U, V, W*2	AWG10 (5.5 mm^2)	M4	1.0 to 1.2
	Control Power Supply Cable	L1C, L2C	AWG16 (1.25 mm^2)		
	External Regenerative Resistor Cable	B1/⊕, ⊖2	AWG10 (5.5 mm^2)		
	Ground cable	⏚	AWG14 (2.0 mm^2) min.	M4	1.2 to 1.4
330A	Servomotor Main Circuit Cable	U, V, W*2	AWG8 (8.0 mm^2)	M4	1.0 to 1.2
	Control Power Supply Cable	L1C, L2C	AWG16 (1.25 mm^2)		
	External Regenerative Resistor Cable	B1/⊕, ⊖2	AWG8 (8.0 mm^2)		
	Ground cable	⏚	AWG14 (2.0 mm^2) min.	M4	1.2 to 1.4
470A	Servomotor Main Circuit Cable	U, V, W*2	AWG6 (14 mm^2)	M5	2.2 to 2.4
	Control Power Supply Cable	L1C, L2C	AWG16 (1.25 mm^2)		
	External Regenerative Resistor Cable	B1/⊕, ⊖2	AWG8 (8.0 mm^2)		
	Ground cable	⏚	AWG14 (2.0 mm^2) min.		
550A	Servomotor Main Circuit Cable	U, V, W*2	AWG4 (22 mm^2)		
	Control Power Supply Cable	L1C, L2C	AWG16 (1.25 mm^2)		
	External Regenerative Resistor Cable	B1/⊕, ⊖2	AWG6 (14 mm^2)		
	Ground cable	⏚	AWG14 (2.0 mm^2) min.		
590A	Servomotor Main Circuit Cable	U, V, W*2	AWG4 (22 mm^2)	M6	2.7 to 3.0
	Control Power Supply Cable	L1C, L2C	AWG16 (1.25 mm^2)		
	External Regenerative Resistor Cable	B1/⊕, ⊖2	AWG3 (30 mm^2)		
	Ground cable	⏚	AWG14 (2.0 mm^2) min.		
780A	Servomotor Main Circuit Cable	U, V, W*2	AWG3 (30 mm^2)		
	Control Power Supply Cable	L1C, L2C	AWG16 (1.25 mm^2)		
	External Regenerative Resistor Cable	B1/⊕, ⊖2	AWG3 (30 mm^2)		
	Ground cable	⏚	AWG14 (2.0 mm^2) min.		

*1. Do not wire the following terminals: L1, L2, L3, B2, B3, ⊖1, ⊖ and terminals.
*2. If you do not use the recommended Servomotor Main Circuit Cable, use this table to select wires.

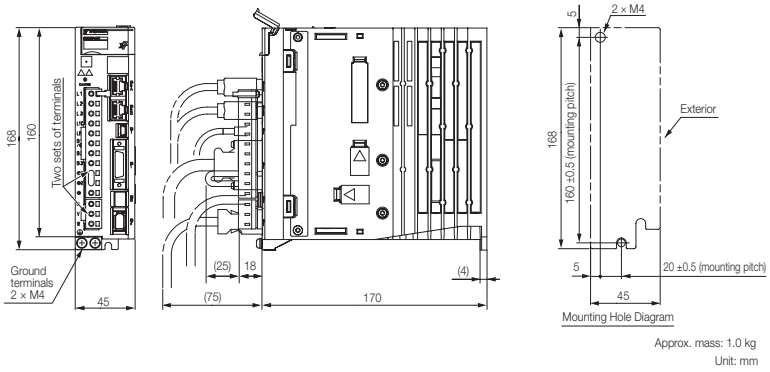
SERVOPACK External Dimensions

Three-phase & Single-phase, 200 VAC: SGD7S-R70A, -R90A, and -1R6A



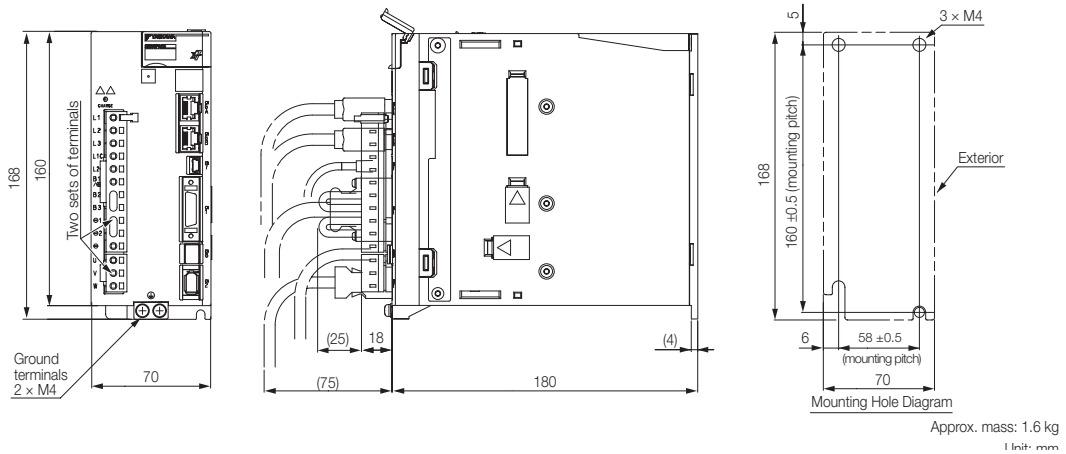
Approx. mass: 0.8 kg
Unit: mm

Three-phase & Single-phase, 200 VAC: SGD7S-2R8A



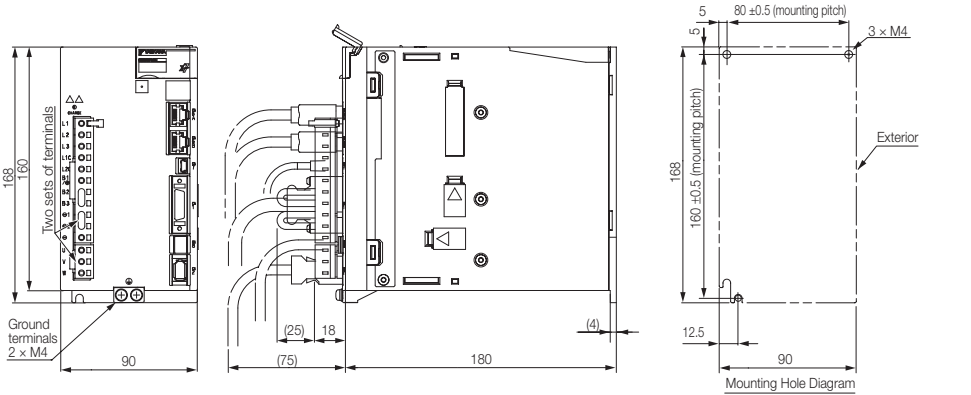
Approx. mass: 1.0 kg
Unit: mm

Three-phase & Single-phase, 200 VAC: SGD7S-3R8A, -5R5A
Three-phase, 200 VAC: -7R6A



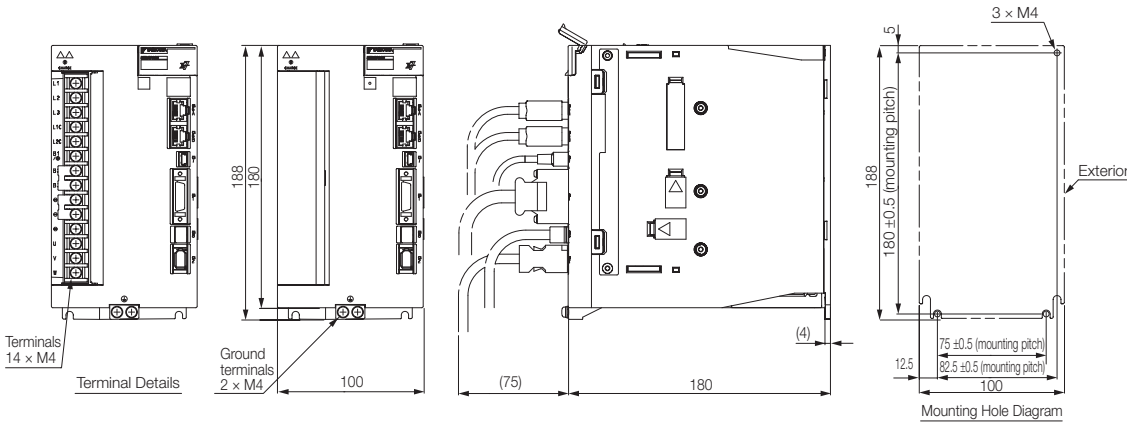
Approx. mass: 1.6 kg
Unit: mm

Three-phase & Single-phase, 200 VAC: SGD7S-120A



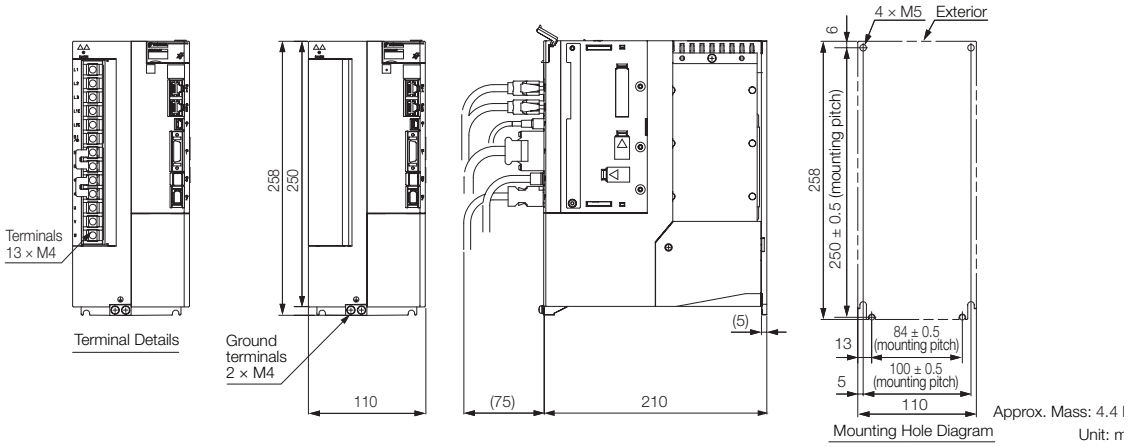
Approx. mass: 2.2 kg
Unit: mm

Three-phase, 200 VAC: SGD7S-180A and -200A

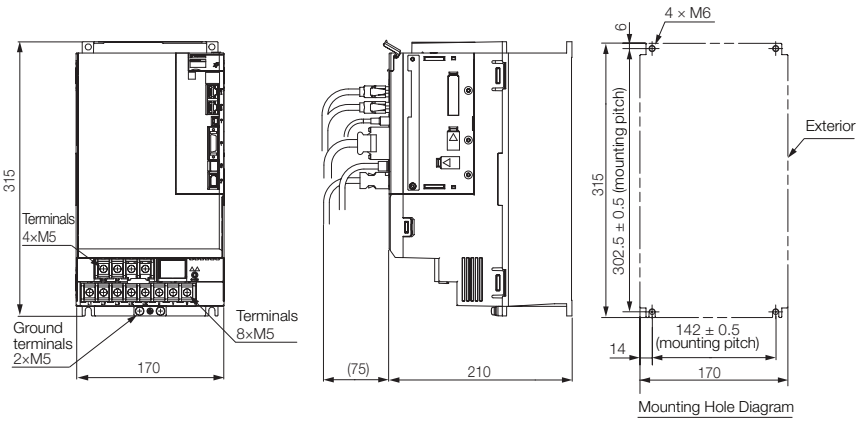


Approx. mass: 2.7 kg
Unit: mm

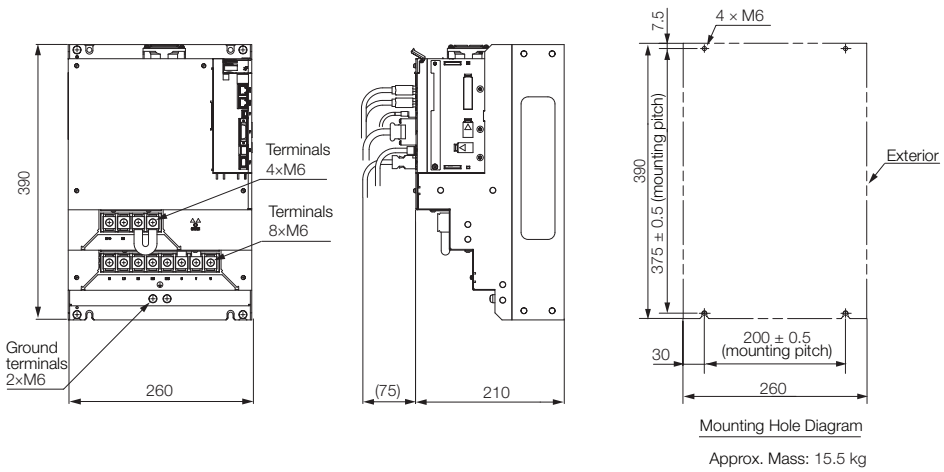
Three-phase, 200 VAC: SGD7S-330A



Three-phase, 200 VAC: SGD7S-470A and -550A



Three-phase, 200 VAC: SGD7S-590A and -780A



Model Designations

SGD7S	-	R70	A	A0	A	001	000	
Sigma-7 Series Sigma-7S Models		1st ... 3rd	4th	5th + 6th	7th	8th ... 10th	11th ... 13th	digit

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

Code	Specification
Three-phase, 200 V	
R70*1	0.05 kW
R90*1	0.1 kW
1R6*1	0.2 kW
2R8*1	0.4 kW
3R8	0.5 kW
5R5*1	0.75 kW
7R6	1.0 kW
120*2	1.5 kW
180	2.0 kW
200*3	3.0 kW
330	5.0 kW
470	6.0 kW
550	7.5 kW
590	11 kW
780	15 kW

4th digit - Voltage

Code	Specification
A	200 VAC

5th + 6th digit - Interface*4

Code	Specification
A0	EtherCAT communication Reference

7th digit - Design Revision Order

Code	Specification
A	Standard Model

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

Code	Specifications	Applicable Models
None	Without Options	All models
000	Without Options only used in combination with FT/EX	All models
001	Rack-mounted	SGD7S-R70A to -330A
	Duct-ventilated	SGD7S-470A to -780A
002	Varnished	All models
008	Single-phase, 200 V power input	SGD7S-120A
020*6	No dynamic brake	SGD7S-R70A to -2R8A
	External dynamic brake resistor	SGD7S-3R8A to -780A
00A	Varnished and single-phase power input	All models

11th ... 13th digit - FT/EX Specifications

Code	Specifications
None	None
F82	Application Function Option for special motors, SGM7D motor

Note:

Depending on configuration choices made, the model code might end after the 7th or 10th digit, or involve all 13 digits.

Readily available up to 1.5 kW. Others available on request.
Additional accessories and software for SERVOPACKs is described in the Periphery section.

Note:
*1. You can use these models with either a single-phase or three-phase power supply input.
*2. A model with a single-phase, 200-VAC power supply input is available as a hardware option (model. SGD7S-120A□0A008).
*3. The rated output is 2.4 kW if you combine the SGM7G-30A with the SGD7S-200A.
*4. The same SERVOPACKs are used for both Rotary Servomotors and Linear Servomotors.
*5. A command option module must be attached to the Command Option Attachable-type SERVOPACK for use.
*6. Refer to the following manual for details.
Sigma-7-Series AC Servo Drive Sigma-7S/Sigma-7W SERVOPACK with Hardware Option Specifications Dynamic Brake Product Manual (Manual No.: SIEP S800001 73)
*7. Refer to the following manual for details.
Sigma-7-Series AC Servo Drive Σ-7S SERVOPACK with FT/EX Specification for SGM7D Motor Product Manual (Manual No.: SIEP S800001 91)

Ratings and Specifications

Ratings

Single-phase, 200 VAC

Model SGD7S-			R70A	R90A	1R6A	2R8A	5R5A	120A
Maximum Applicable Motor Capacity [kW]			0.05	0.1	0.2	0.4	0.75	2
Continuous Output Current [A]			0.66	0.91	1.6	2.8	5.5	18.5
Instantaneous Maximum Output Current [A]			2.1	3.2	5.9	9.3	16.9	42
Main Circuit	Power Supply		200 VAC to 240 VAC, -15% to +10%, 50 Hz/60 Hz					
	Input Current [A]*		0.8	1.6	2.4	5.0	8.7	10
Control	Power Supply		200 VAC to 240 VAC, -15% to +10%, 50 Hz/60 Hz					
	Input Current [A]*		0.2	0.2	0.2	0.2	0.2	0.25
Power Supply Capacity [kVA]*			0.2	0.3	0.6	1.2	1.9	4
Power Loss*	Main Circuit Power Loss [W]		5	7.1	12.1	23.7	39.2	104.2
	Control Circuit Power Loss [W]		12	12	12	12	14	16
	Built-in Regenerative Resistor Power Loss [W]		–	–	–	–	8	16
	Total Power Loss [W]		17	19.1	24.1	35.7	61.2	136.2
Regenerative Resistor	Built-In Regenerative Resistor	Resistance [Ω]	–	–	–	–	40	12
		Capacity [W]	–	–	–	–	40	60
	Minimum Allowable External Resistance [Ω]		40	40	40	40	40	12
Overvoltage Category			III					

* This is the net value at the rated load.

Three-phase, 200 VAC

Model SGD7S-			R70A	R90A	1R6A	2R8A	3R8A	5R5A	7R6A	120A	180A	200A	330A
Maximum Applicable Motor Capacity [kW]			0.05	0.1	0.2	0.4	0.5	0.75	1	1.5	2	3	5
Continuous Output Current [A]			0.66	0.91	1.6	2.8	3.8	5.5	7.6	11.6	18.5	19.6	32.9
Instantaneous Maximum Output Current [A]			2.1	3.2	5.9	9.3	11	16.9	17	28	42	56	84
Main Circuit	Power Supply		200 VAC to 240 VAC, -15% to +10%, 50 Hz/60 Hz										
	Input Current [A]*		0.4	0.8	1.3	2.5	3	4.1	5.7	7.3	10	15	25
Control	Power Supply		200 VAC to 240 VAC, -15% to +10%, 50 Hz/60 Hz										
	Input Current [A]*		0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.25	0.25	0.3
Power Supply Capacity [kVA]*			0.2	0.3	0.5	1	1.3	1.6	2.3	3.2	4	5.9	7.5
Power Loss*	Main Circuit Power Loss [W]		5	7	11.9	22.5	28.5	38.9	49.2	72.6	104.2	114.2	226.6
	Control Circuit Power Loss [W]		12	12	12	12	14	14	14	15	16	16	19
	Built-in Regenerative Resistor Power Loss [W]		–	–	–	–	8	8	8	10	16	16	36
	Total Power Loss [W]		17	19	23.9	34.5	50.5	60.9	71.2	97.6	136.2	146.2	281.6
Regenerative Resistor	Built-In Regenerative Resistor	Resistance [Ω]	–	–	–	–	40	40	40	20	12	12	8
		Capacity [W]	–	–	–	–	40	40	40	60	60	60	180
	Minimum Allowable External Resistance [Ω]		40	40	40	40	40	40	40	20	12	12	8
Overvoltage Category			III										

* This is the net value at the rated load.

Note: Readily available up to 1.5 kW. Others available on request.

Model SGD7S-			470A	550A	590A	780A
Maximum Applicable Motor Capacity [kW]			6	7.5	11	15
Continuous Output Current [A]			46.9	54.7	58.6	78
Instantaneous Maximum Output Current [A]			110	130	140	170
Main Circuit	Power Supply		200 VAC to 240 VAC, -15% to +10%, 50 Hz/60 Hz			
	Input Current [A]*1		29	37	54	73
Control	Power Supply		200 VAC to 240 VAC, -15% to +10%, 50 Hz/60 Hz			
	Input Current [A]*1		0.3	0.3	0.4	0.4
Power Supply Capacity [kVA]*1			10.7	14.6	21.7	29.6
Power Loss*1	Main Circuit Power Loss [W]		271.7	326.9	365.3	501.4
	Control Circuit Power Loss [W]		21	21	28	28
	Built-in Regenerative Resistor Power Loss [W]		180*2	350*3	350*3	350*3
	Total Power Loss [W]		292.7	347.9	393.3	529.4
Regenerative Resistor	External Regenerative Resistor	Resistance [Ω]	6.25*2	3.13*3	3.13*3	3.13*3
		Capacity [W]	880*2	1,760*3	1,760*3	1,760*3
	Minimum Allowable External Resistance [Ω]		5.8	2.9	2.9	2.9
Overvoltage Category			III			

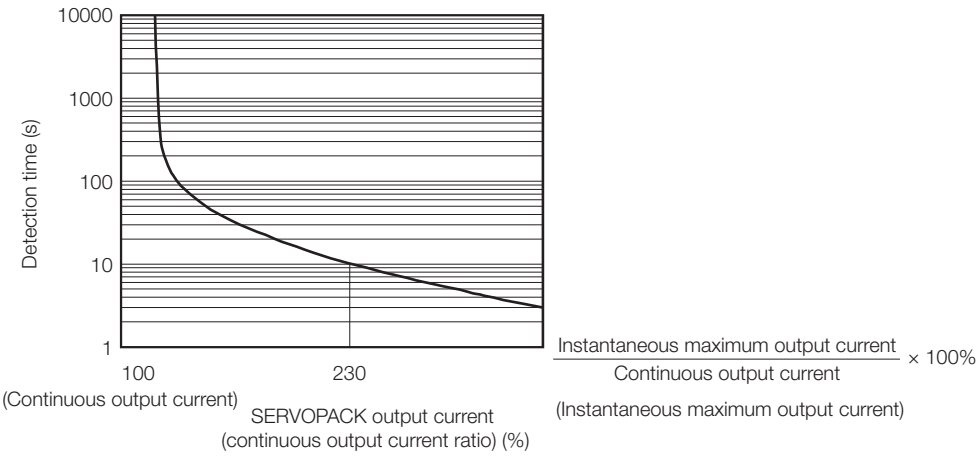
Note: Readily available up to 1.5 kW. Others available on request.

*1. This is the net value at the rated load.
*2. This value is for the optional JUSP-RA04-E Regenerative Resistor Unit.
*3. This value is for the optional JUSP-RA05-E Regenerative Resistor Unit.

SERVOPACK Overload Protection Characteristics

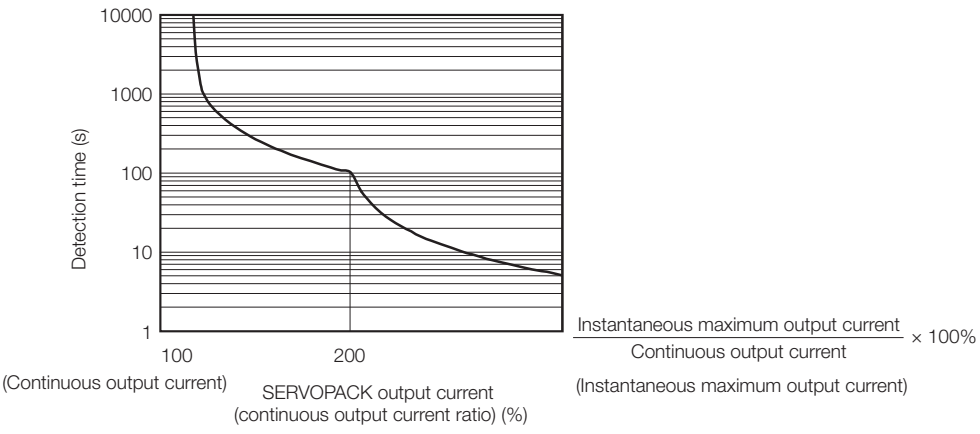
The overload detection level is set for hot start conditions with a SERVOPACK surrounding air temperature of 55°C.
An overload alarm (A.710 or A.720) will occur if overload operation that exceeds the overload protection characteristics shown in the following diagram (i.e., operation on the right side of the applicable line) is performed.
The actual overload detection level will be the detection level of the connected SERVOPACK or Servomotor that has the lower overload protection characteristics.
In most cases, that will be the overload protection characteristics of the Servomotor.

SGD7S-R70A, -R90A, -1R6A, -2R8A, -R70F, -R90F, -2R1F, and -2R8F



Note:
The above overload protection characteristics do not mean that you can perform continuous duty operation with an output of 100% or higher.
For a YASKAWA-specified combination of SERVOPACK and Servomotor, maintain the effective torque within the continuous duty zone of the torque-motor speed characteristic of the Servomotor.

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



Note:
The above overload protection characteristics do not mean that you can perform continuous duty operation with an output of 100% or higher.
For a YASKAWA-specified combination of SERVOPACK and Servomotor, maintain the effective torque within the continuous duty zone of the torque-motor speed characteristic of the Servomotor.

Specifications

Item		Specification	
Control Method		IGBT-based PWM control, sine wave current drive	
Feedback	With Rotary Servomotor	Serial encoder: 20 bits or 24 bits (incremental encoder/absolute encoder) 22 bits (absolute encoder)	
	With Linear Servomotor	• Absolute linear encoder (The signal resolution depends on the absolute linear encoder.) • Incremental linear encoder (The signal resolution depends on the incremental linear encoder or Serial Converter Unit.)	
Environmental Conditions	Ambient Air Temperature*1	-5°C to 55°C With derating, usage is possible between 55°C and 60°C. Refer to the following section for Derating Specifications.	
	Storage Temperature	-20°C to 85°C	
	Ambient Air Humidity	95% relative humidity max. (with no freezing or condensation)	
	Storage Humidity	95% relative humidity max. (with no freezing or condensation)	
	Vibration Resistance	4.9 m/s^2	
	Shock Resistance	19.6 m/s^2	
	Degree of Protection	Degree	SERVPOACK Model: SGD7S-
		IP 20	R70A, R90A, 1R6A, 2R8A, 3R8A, 5R5A, 7R6A, 120A
		IP 10	180A, 200A, 330A, 470A, 550A, 590A, 780A
	Pollution Degree	2 • Must be no corrosive or flammable gases. • Must be no exposure to water, oil, or chemicals. • Must be no dust, salts, or iron dust.	
	Altitude*1	1,000 m or less With derating, usage is possible between 1,000 m and 2,000 m. Refer to the following section for Derating specifications.	
	Others	Do not use the SERVOPACK in the following locations: Locations subject to static electricity noise, strong electromagnetic/magnetic fields, or radioactivity	
Applicable Standards		UL 61800-5-1, EN50178, CSA C22.2 No.14, EN 61800-5-1, EN 55011 group 1 class A, EN 61000-6-2, EN 61000-6-4, and EN 61800-3	
Mounting		Mounting	SERVOPACK Model: SGD7S
		Base-mounted	All Models
		Rack-mounted	R70A, R90A, 1R6A, 2R8A, 3R8A, 5R5A, 7R6A, 120A, 180A, 200A, 330A
		Duct-ventilated	470A, 550A, 590A, 780A
Performance	Speed Control Range	1:5,000 (At the rated torque, the lower limit of the speed control range must not cause the Servomotor to stop.)	
	Coefficient of Speed Fluctuation*2	±0.01% of rated speed max. (for a load fluctuation of 0% to 100%)	
		0% of rated speed max. (for a voltage fluctuation of ±10%)	
		±0.1% of rated speed max. (for a temperature fluctuation of 25°C ± 25°C)	
	Torque Control Precision (Repeatability)	±1%	
	Soft Start Time Setting	0 s to 10 s (Can be set separately for acceleration and deceleration.)	

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Item			Specification
I/O Signals	Encoder Divided Pulse Output		Phase A, phase B, phase C: Line-driver output Number of divided output pulses: Any setting is allowed.
	Linear Servomotor Overheat Protection Signal Input		Number of input points: 1 Input voltage range: 0 V to +5 V
	Sequence Input Signals	Input Signals that can be allocated	Allowable voltage range: 24 VDC ±20% Number of input points: 7 Input method: Sink inputs or source inputs Input Signals ● P-OT (Forward Drive Prohibit) and N-OT (Reverse Drive Prohibit) signals ● /Probe1 (Probe 1 Latch Input) signal ● /Probe2 (Probe 2 Latch Input) signal ● /Home (Home Switch Input) signal ● /P-CL (Forward External Torque Limit) and /N-CL (Reverse External Torque Limit) signals ● FSTP (Forced Stop Input) signal A signal can be allocated and the positive and negative logic can be changed.
	Sequence Output Signals	Fixed Output	Allowable voltage range: 5 VDC to 30 VDC Number of output points: 1 Output signal: ALM (Servo Alarm) signal
		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 ● /COIN (Positioning Completion) signal ● /V-CMP (Speed Coincidence Detection) signal ● /TGON (Rotation Detection) signal ● /S-RDY (Servo Ready) signal ● /CLT (Torque Limit Detection) signal ● /VLT (Speed Limit Detection) signal ● /BK (Brake) signal ● /WARN (Warning) signal ● /NEAR (Near) signal A signal can be allocated and the positive and negative logic can be changed.
Communications	RS-422A Communications (CN502)	Interfaces	A JUSP-JC001 Communications Unit is required to connect to a Digital Operator (JUSP-OP05A-1-E).
		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, PWR, CN, RUN, ERR, and L/A (A and B) indicators, and onedigit seven-segment display
EtherCAT Communications Setting Switches			EtherCAT secondary address (S1 and S2), 16 positions

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Item		Specification
EtherCAT Communications	Applicable Communications Standards	IEC 61158 Type 12, IEC 61800-7 CiA402 Drive Profile
	Physical Layer	100BASE-TX (IEEE 802.3)
	Communications Connectors	CN6A (RJ45): EtherCAT signal input connector CN6B (RJ45): EtherCAT signal output connector
	Cable	Category 5, 4 shielded twisted pairs * The cable is automatically detected with AUTO MDIX.
	Sync Manager	SM0: Mailbox output, SM1: Mailbox input, SM2: Process data output, and SM3: Process data input
	FMMU	FMMU 0: Mapped in process data output (RxPDO) area. FMMU 1: Mapped in process data input (TxPDO) area. FMMU 2: Mapped to mailbox status.
	EtherCAT Commands (Data Link Layer)	APRD, FPRD, BRD, LRD, APWR, FPWR, BWR, LWR, ARMW, and FRMW (APRW, FPRW, BRW, and LRW commands are not supported.)
	Process Data	Assignments can be changed with PDO mapping.
	Mailbox (CoE)	Emergency messages, SDO requests, SDO responses, and SDO information (TxPDO/RxPDO and remote TxPDO/RxPDO are not supported.)
	Distributed Clocks	Free-Run Mode and DC Mode (Can be switched.) Applicable DC cycles: 125 µs to 4 ms in 125-µs increments
	Slave Information Interface	256 bytes (read-only)
	Indicators	EtherCAT communications in progress: Link/Activity x 2 EtherCAT communications status: RUN x 1 EtherCAT error status: ERR x 1
CiA402 Drive Profile		• Homing Mode • Profile Position Mode • Interpolated Position Mode • Profile Velocity Mode • Profile Torque Mode • Cyclic Synchronous Position Mode • Cyclic Synchronous Velocity Mode • Cyclic Synchronous Torque Mode • Touch Probe Function • Torque Limit Function
Analog Monitor (CN5)		Number of points: 2 Output voltage range: ±10 VDC (effective linearity range: ±8 V) Resolution: 16 bits Accuracy: ±20 mV (Typ) Maximum output current: ±10 mA Settling time (±1%): 1.2 ms (Typ)
Dynamic Brake (DB)		Activated when a servo alarm or overtravel (OT) occurs, or when the power supply to the main circuit or servo is OFF.
Regenerative Processing		Built-in (An external resistor must be connected to the SGD7S-470A to -780A.) Refer to the following manual for details. Sigma-7-Series AC Servo Drive Peripheral Device Selection Manual (Manual No.: SIEP S800001 32)
Overtravel (OT) Prevention		Stopping with dynamic brake, deceleration to a stop, or coasting to a stop for the P-OT (Forward Drive Prohibit) or N-OT (Reverse Drive Prohibit) signal
Protective Functions		Overcurrent, overvoltage, low voltage, overload, regeneration error, etc.
Utility Functions		Gain adjustment, alarm history, jogging, origin search, etc.
Safety Functions	Inputs	/HWBB1 and /HWBB2: Base block signals for Power Modules
	Output	EDM1: Monitors the status of built-in safety circuit (fixed output).
	Applicable Standards*3	ISO13849-1 PLe (Category 3), IEC61508 SIL3
Applicable Option Modules		Fully-closed Modules and Safety Modules Note: You cannot use a Fully-closed Module and a Safety Module together.

Note:
*1. If you combine a Sigma-7-Series SERVOPACK with a Sigma-V-Series Option Module, the following Sigma-V-Series SERVOPACKs specifications must be used: a surrounding air temperature of 0°C to 55°C and an altitude of 1,000 m max. Also, the applicable surrounding range cannot be increased by derating.
*2. The coefficient of speed fluctuation for load fluctuation is defined as follows:

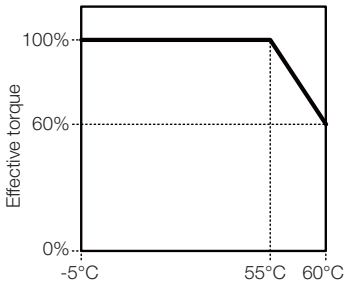
$$\text{Coefficient of speed fluctuation} = \frac{\text{No-load motor speed - Total-load motor speed}}{\text{Rated motor speed}} \times 100\%$$

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

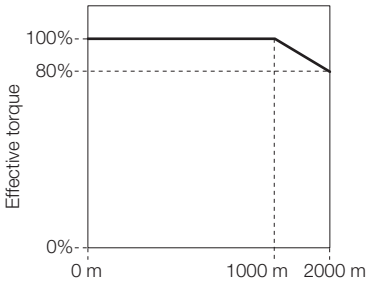
Derating Specifications

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

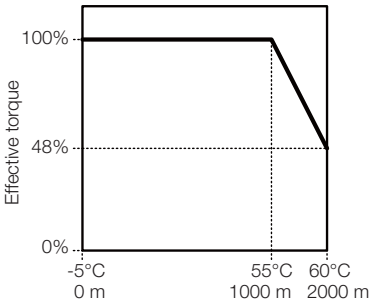
SGD7S-R70A, -R90A, -1R6A, -2R8A, -R70F, -R90F, -2R1F, and -2R8F



Surrounding air temperature

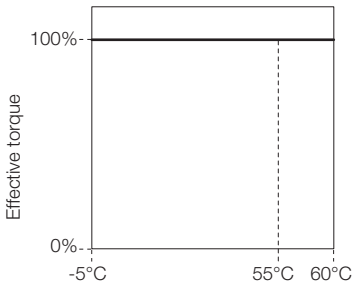


Altitude

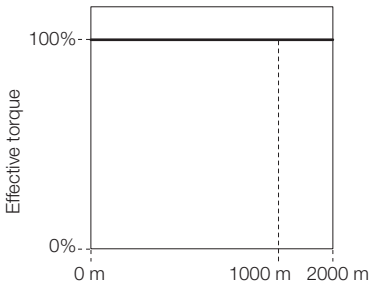


Surrounding air temperature and altitude

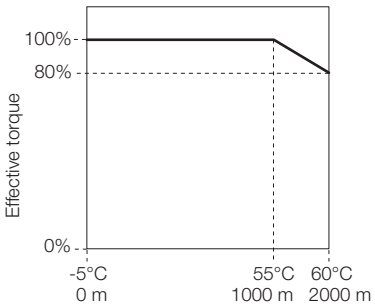
SGD7S-3R8A, -5R5A, -7R6A, -120A, -180A, -200A, -330A, -470A, -550A, -590A, and -780A



Surrounding air temperature



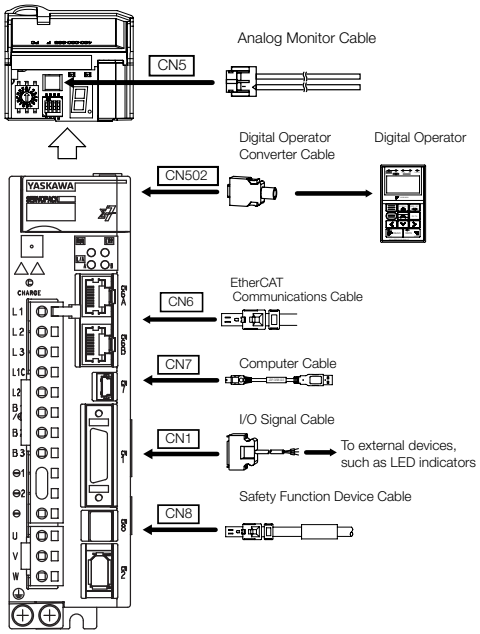
Altitude



Surrounding air temperature and altitude

Selecting Cables SGD7S EtherCAT

System Configurations



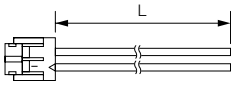
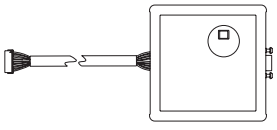
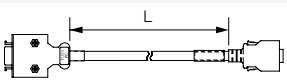
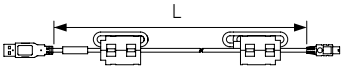
Selection Table

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.

Refer to the following manual for the following information.
- Cable dimensional drawings and cable connection specifications
- Order numbers and specifications of individual connectors for cables

Sigma-7-Series AC Servo Drive Peripheral Device Selection Manual (Manual No.: SIEP S800001 32)

Code	Description		Length	Order Number	Appearance
CN5	Analog Monitor Cable		1 m	JZSP-CA01-E	
CN502	Digital Operator			JUSP-0P05A-1-E	
		Serial Communications Connector	0.3 m	JUSP-JC001-1	
		Digital Operator Converter Cable	0.3 m	JZSP-CVS05-A3-E*1	
				JZSP-CVS07-A3-E*2	
CN7	Computer Cable		2.5 m	JZSP-CVS06-02-E	

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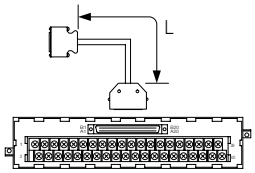
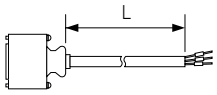
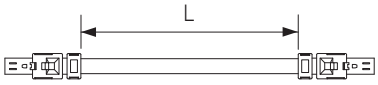
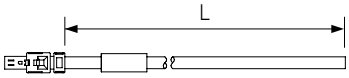
Code	Description		Length	Order Number	Appearance
CN1	I/O Signal Cables	Soldered Connector Kit		JZSP-CSI9-2-E	
		Connector-Terminal Block Converter Unit (with cable)	0.5 m	JUSP-TA26P-E	
			1 m	JUSP-TA26P-1-E	
			2 m	JUSP-TA26P-2-E	
		Cable with Loose Wires at One End (loose wires on peripheral device end)	1 m	JZSP-CSI02-1-E	
			2 m	JZSP-CSI02-2-E	
			3 m	JZSP-CSI02-3-E	
CN6	MECHATROLINK-III / EtherCAT / PROFINET Communications Cables (RJ45)*3		0.2 m	CM3R□M0-00P2-E	
			0.5 m	CM3R□M0-00P5-E	
			1 m	JZSP-CM3R□M0-01-E	
			3 m	JZSP-CM3R□M0-03-E	
			5 m	JZSP-CM3R□M0-05-E	
			10 m	JZSP-CM3R□M0-10-E	
			20 m	JZSP-CM3R□M0-20-E	
			30 m	JZSP-CM3R□M0-30-E	
			40 m	JZSP-CM3R□M0-40-E	
			50 m	JZSP-CM3R□M0-50-E	
CN8	Safety Function Device Cables	Cables with Connectors*4	1 m	JZSP-CVH03-01-E-Gx	
			3 m	JZSP-CVH03-03-E-Gx	
		Connector Kit*5		Contact Tyco Electronics Japan G.K. Product name: Industrial Mini I/O D-shape Type 1 Plug Connector Kit Model number: 2013595-1	

*1. This Converter Cable is required to use the Sigma-III-series Digital Operator (JUSP-OP05A) for S-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. This cable is available in two variants. The order number for these cables differs at the marked □, an „R“ at this place is used for Cables with RJ45 Connectors on both ends, while an „M“ is used for Cables with RJ45 Connector on One End and IMI Connector on the other End.
*4. 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.
*5. Use the Connector Kit when you make cables yourself.

SERVOPACK Main Circuit Wires

Important

These specifications are based on IEC/EN 61800-5-1, UL 61800-5-1, and CSA C22.2 No.274.
1. To comply with UL standards, use UL-compliant wires.
2. Use copper wires with a rated temperature of 75° 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 surrounding air temperature.

Three-phase, 200-VAC Wires for Sigma-7S SERVOPACKs

SGD7S-	Terminals		Wire Size	Screw Size	Tightening Torque [Nm]
R70A, R90A, 1R6A, 2R8A, 3R8A, 5R5A, 7R6A	Main Circuit Power Supply Cable	L1, L2, L3	AWG16 (1.25 mm²)	–	–
	Servomotor Main Circuit Cable*	U, V, W			
	Control Power Supply Cable	L1C, L2C			
	External Regenerative Resistor Cable	B1/⊕, B2			
	Ground cable	⏚	AWG14 (2.0 mm²) min.	M4	1.2 to 1.4
120A	Main Circuit Power Supply Cable	L1, L2, L3	AWG14 (2.0 mm²)	–	–
	Servomotor Main Circuit Cable*	U, V, W			
	Control Power Supply Cable	L1C, L2C	AWG16 (1.25 mm²)		
	External Regenerative Resistor Cable	B1/⊕, B2			
	Ground cable	⏚	AWG14 (2.0 mm²) min.	M4	1.2 to 1.4
180A	Main Circuit Power Supply Cable	L1, L2, L3	AWG14 (2.0 mm²)	M4	1.0 to 1.2
	Servomotor Main Circuit Cable*	U, V, W	AWG10 (5.5 mm²)		
	Control Power Supply Cable	L1C, L2C	AWG16 (1.25 mm²)		
	External Regenerative Resistor Cable	B1/⊕, B2			
	Ground cable	⏚	AWG14 (2.0 mm²) min.	M4	1.2 to 1.4
200A	Main Circuit Power Supply Cable	L1, L2, L3	AWG12 (3.5 mm²)	M4	1.0 to 1.2
	Servomotor Main Circuit Cable*	U, V, W	AWG10 (5.5 mm²)		
	Control Power Supply Cable	L1C, L2C	AWG16 (1.25 mm²)		
	External Regenerative Resistor Cable	B1/⊕, B2			
	Ground cable	⏚	AWG14 (2.0 mm²) min.	M4	1.2 to 1.4
330A	Main Circuit Power Supply Cable	L1, L2, L3	AWG8 (8.0 mm²)	M4	1.0 to 1.2
	Servomotor Main Circuit Cable*	U, V, W			
	Control Power Supply Cable	L1C, L2C	AWG16 (1.25 mm²)		
	External Regenerative Resistor Cable	B1/⊕, B2	AWG14 (2.0 mm²)		
	Ground cable	⏚	AWG14 (2.0 mm²) min.	M4	1.2 to 1.4
470A	Main Circuit Power Supply Cable	L1, L2, L3	AWG8 (8.0 mm²)	M5	2.2 to 2.4
	Servomotor Main Circuit Cable*	U, V, W	AWG6 (14 mm²)		
	Control Power Supply Cable	L1C, L2C	AWG16 (1.25 mm²)		
	External Regenerative Resistor Cable	B1/⊕, B2	AWG14 (2.0 mm²)		
	Ground cable	⏚	AWG14 (2.0 mm²) min.		
550A	Main Circuit Power Supply Cable	L1, L2, L3	AWG8 (8.0 mm²)		
	Servomotor Main Circuit Cable*	U, V, W	AWG4 (22 mm²)		
	Control Power Supply Cable	L1C, L2C	AWG16 (1.25 mm²)		
	External Regenerative Resistor Cable	B1/⊕, B2	AWG10 (5.5 mm²)		
	Ground cable	⏚	AWG14 (2.0 mm²) min.		
590A	Main Circuit Power Supply Cable	L1, L2, L3	AWG4 (22 mm²)	M6	2.7 to 3.0
	Servomotor Main Circuit Cable*	U, V, W			
	Control Power Supply Cable	L1C, L2C	AWG16 (1.25 mm²)		
	External Regenerative Resistor Cable	B1/⊕, B2	AWG10 (5.5 mm²)		
	Ground cable	⏚	AWG14 (2.0 mm²) min.		
780A	Main Circuit Power Supply Cable	L1, L2, L3	AWG3 (30 mm²)		
	Servomotor Main Circuit Cable*	U, V, W			
	Control Power Supply Cable	L1C, L2C	AWG16 (1.25 mm²)		
	External Regenerative Resistor Cable	B1/⊕, B2	AWG8 (8.0 mm²)		
	Ground cable	⏚	AWG14 (2.0 mm²) min.		

* If you do not use the recommended Servomotor Main Circuit Cable, use this table to select wires.

Single-phase, 200-VAC Wires for Sigma-7S SERVOPACKs

SGD7S-	Terminals		Wire Size	Screw Size	Tightening Torque [Nm]
R70A, R90A, 1R6A, 2R8A	Main Circuit Power Supply Cable	L1, L2, L3	AWG16 (1.25 mm^2)	–	–
	Servomotor Main Circuit Cable*	U, V, W			
	Control Power Supply Cable	L1C, L2C			
	External Regenerative Resistor Cable	B1/⊕, B2			
	Ground cable	⏚	AWG14 (2.0 mm^2) min.	M4	1.2 to 1.4
5R5A	Main Circuit Power Supply Cable	L1, L2, L3	AWG14 (2.0 mm^2)	–	–
	Servomotor Main Circuit Cable*	U, V, W	AWG16 (1.25 mm^2)		
	Control Power Supply Cable	L1C, L2C			
	External Regenerative Resistor Cable	B1/⊕, B2			
	Ground cable	⏚	AWG14 (2.0 mm^2) min.	M4	1.2 to 1.4
120A□□□008	Main Circuit Power Supply Cable	L1, L2, L3	AWG14 (2.0 mm^2)	M4	1.0 to 1.2
	Servomotor Main Circuit Cable*	U, V, W			
	Control Power Supply Cable	L1C, L2C	AWG16 (1.25 mm^2)		
	External Regenerative Resistor Cable	B1/⊕, B2			
	Ground cable	⏚	AWG14 (2.0 mm^2) min.	M4	1.2 to 1.4

* If you do not use the recommended Servomotor Main Circuit Cable, use this table to select wires.

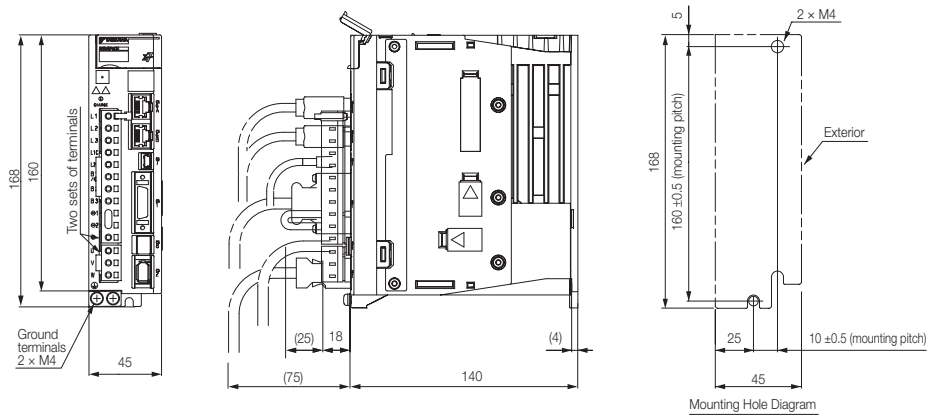
DC Power Supply Wires for Sigma-7S SERVOPACKs

SGD7S-	Terminals*1		Wire Size	Screw Size	Tightening Torque [Nm]
R70A, R90A, 1R6A, 2R8A, 3R8A, 5R5A, 7R6A	Servomotor Main Circuit Cable	U, V, W*2	AWG16 (1.25 mm^2)	–	–
	Control Power Supply Cable	L1C, L2C			
	External Regenerative Resistor Cable	B1/⊕, ⊖2			
	Ground cable	⏚	AWG14 (2.0 mm^2) min.	M4	1.2 to 1.4
120A (three-phase, 200-VAC input)	Servomotor Main Circuit Cable	U, V, W*2	AWG14 (2.0 mm^2)	–	–
	Control Power Supply Cable	L1C, L2C	AWG16 (1.25 mm^2)		
	External Regenerative Resistor Cable	B1/⊕, ⊖2	AWG14 (2.0 mm^2)		
	Ground cable	⏚	AWG14 (2.0 mm^2) min.	M4	1.2 to 1.4
120A□□□008 (single-phase, 200-VAC input)	Servomotor Main Circuit Cable	U, V, W*2	AWG14 (2.0 mm^2)	M4	1.0 to 1.2
	Control Power Supply Cable	L1C, L2C	AWG16 (1.25 mm^2)		
	External Regenerative Resistor Cable	B1/⊕, ⊖2	AWG14 (2.0 mm^2)		
	Ground cable	⏚	AWG14 (2.0 mm^2) min.	M4	1.2 to 1.4
180A, 200A	Servomotor Main Circuit Cable	U, V, W*2	AWG10 (5.5 mm^2)	M4	1.0 to 1.2
	Control Power Supply Cable	L1C, L2C	AWG16 (1.25 mm^2)		
	External Regenerative Resistor Cable	B1/⊕, ⊖2	AWG10 (5.5 mm^2)		
	Ground cable	⏚	AWG14 (2.0 mm^2) min.	M4	1.2 to 1.4
330A	Servomotor Main Circuit Cable	U, V, W*2	AWG8 (8.0 mm^2)	M4	1.0 to 1.2
	Control Power Supply Cable	L1C, L2C	AWG16 (1.25 mm^2)		
	External Regenerative Resistor Cable	B1/⊕, ⊖2	AWG8 (8.0 mm^2)		
	Ground cable	⏚	AWG14 (2.0 mm^2) min.	M4	1.2 to 1.4
470A	Servomotor Main Circuit Cable	U, V, W*2	AWG6 (14 mm^2)	M5	2.2 to 2.4
	Control Power Supply Cable	L1C, L2C	AWG16 (1.25 mm^2)		
	External Regenerative Resistor Cable	B1/⊕, ⊖2	AWG8 (8.0 mm^2)		
	Ground cable	⏚	AWG14 (2.0 mm^2) min.		
550A	Servomotor Main Circuit Cable	U, V, W*2	AWG4 (22 mm^2)		
	Control Power Supply Cable	L1C, L2C	AWG16 (1.25 mm^2)		
	External Regenerative Resistor Cable	B1/⊕, ⊖2	AWG6 (14 mm^2)		
	Ground cable	⏚	AWG14 (2.0 mm^2) min.		
590A	Servomotor Main Circuit Cable	U, V, W*2	AWG4 (22 mm^2)	M6	2.7 to 3.0
	Control Power Supply Cable	L1C, L2C	AWG16 (1.25 mm^2)		
	External Regenerative Resistor Cable	B1/⊕, ⊖2	AWG3 (30 mm^2)		
	Ground cable	⏚	AWG14 (2.0 mm^2) min.		
780A	Servomotor Main Circuit Cable	U, V, W*2	AWG3 (30 mm^2)		
	Control Power Supply Cable	L1C, L2C	AWG16 (1.25 mm^2)		
	External Regenerative Resistor Cable	B1/⊕, ⊖2	AWG3 (30 mm^2)		
	Ground cable	⏚	AWG14 (2.0 mm^2) min.		

*1. Do not wire the following terminals: L1, L2, L3, B2, B3, ⊖1, ⊖ and terminals.
*2. If you do not use the recommended Servomotor Main Circuit Cable, use this table to select wires.

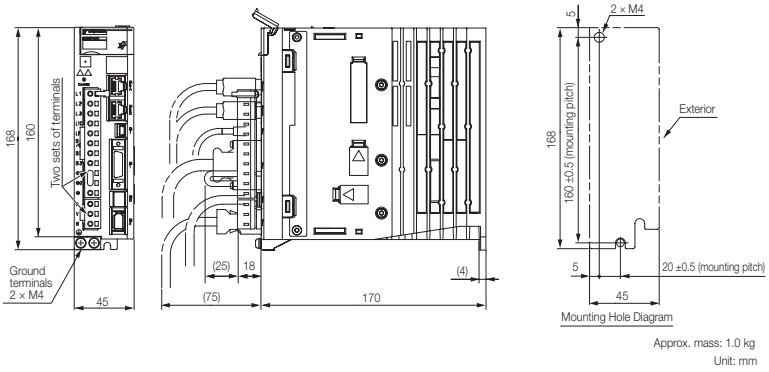
SERVOPACK External Dimensions

Three-phase & Single-phase, 200 VAC: SGD7S-R70A, -R90A, and -1R6A



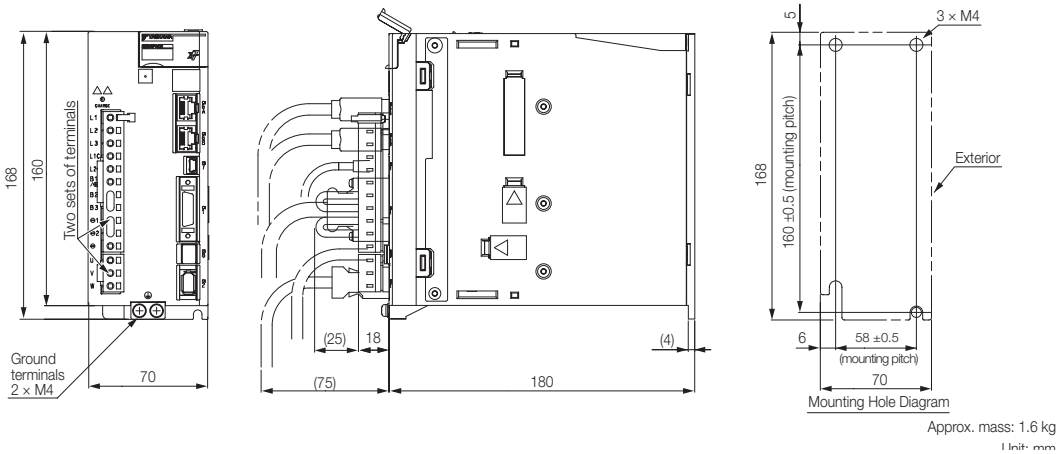
Approx. mass: 0.8 kg
Unit: mm

Three-phase & Single-phase, 200 VAC: SGD7S-2R8A



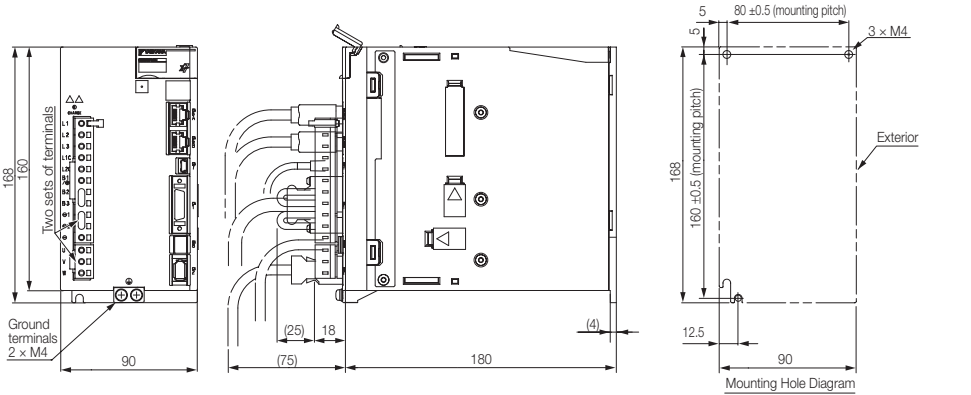
Approx. mass: 1.0 kg
Unit: mm

Three-phase & Single-phase, 200 VAC: SGD7S-3R8A, -5R5A
Three-phase. 200 VAC: -7R6A



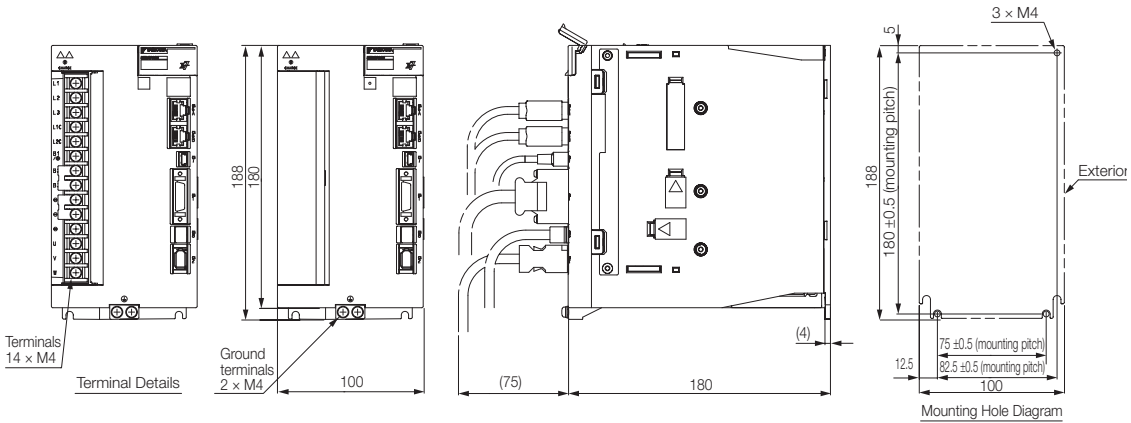
Approx. mass: 1.6 kg
Unit: mm

Three-phase & Single-phase, 200 VAC: SGD7S-120A



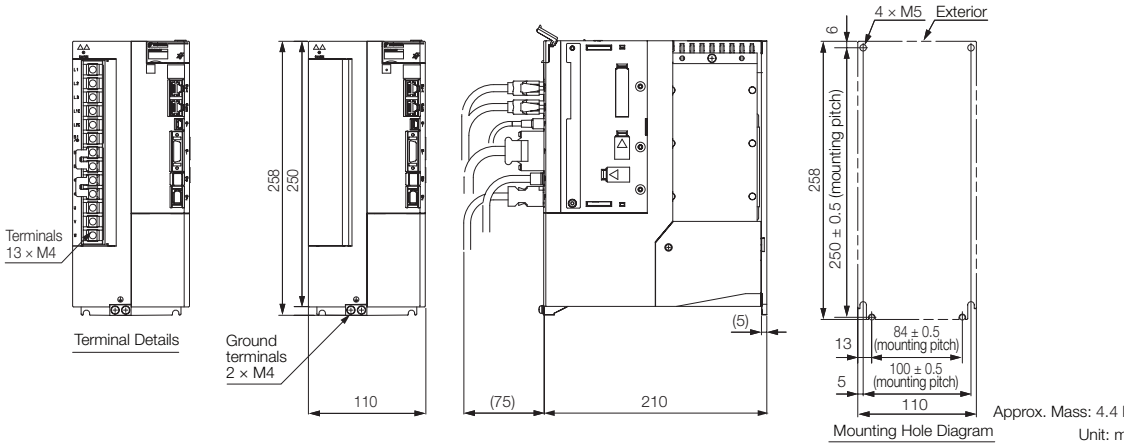
Approx. mass: 2.2 kg
Unit: mm

Three-phase, 200 VAC: SGD7S-180A and -200A

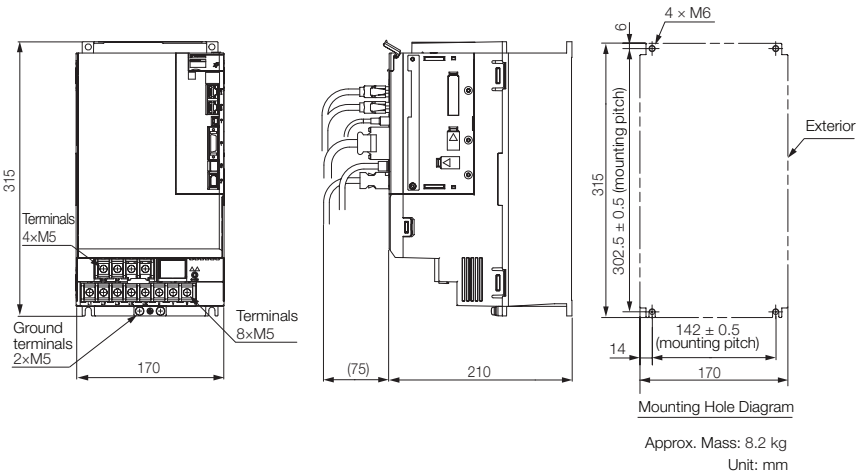


Approx. mass: 2.7 kg
Unit: mm

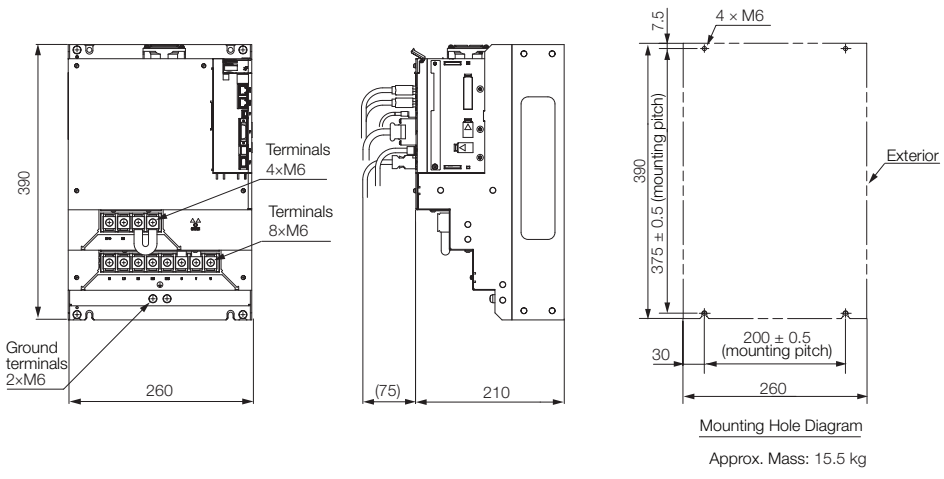
Three-phase, 200 VAC: SGD7S-330A



Three-phase, 200 VAC: SGD7S-470A and -550A



Three-phase, 200 VAC: SGD7S-590A and -780A



Model Designations

SGD7S - R70 A C0 A 008

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

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

Code	Specification
Three-phase, 200 V	
R70*1	0.05 kW
R90*1	0.1 kW
1R6*1	0.2 kW
2R8*1	0.4 kW
5R5*1	0.75 kW
120*2	1.5 kW

4th digit - Voltage

Code	Specification
A	200 VAC

5th + 6th digit - Interface*4

Code	Specification
C0	PROFINET communication Reference

7th digit - Design Revision Order

Code	Specification
A	Standard Model

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

Code	Specifications	Applicable Models
008	Single-phase, 200 V power input	SGD7S-120A

Note:

Depending on configuration choices made, the model code might end after the 7th or 10th digit, or involve all 13 digits.

Readily available up to 1.5 kW. Others available on request.
Additional accessories and software for SERVOPACKs is described in the Periphery section.

Note:
*1. You can use these models with either a single-phase or three-phase power supply input.
*2. A model with a single-phase, 200-VAC power supply input is available as a hardware option (model. SGD7S-120A□0A008).
*3. The rated output is 2.4 kW if you combine the SGM7G-30A with the SGD7S-200A.
*4. The same SERVOPACKs are used for both Rotary Servomotors and Linear Servomotors.
*5. A command option module must be attached to the Command Option Attachable-type SERVOPACK for use.
*6. Refer to the following manual for details.
Sigma-7-Series AC Servo Drive Sigma-7S/Sigma-7W SERVOPACK with Hardware Option Specifications Dynamic Brake Product Manual (Manual No.: SIEP S800001 73)
*7. Refer to the following manual for details.
Sigma-7-Series AC Servo Drive Σ-7S SERVOPACK with FT/EX Specification for SGM7D Motor Product Manual (Manual No.: SIEP S800001 91)

Ratings and Specifications

Ratings

Single-phase, 200 VAC

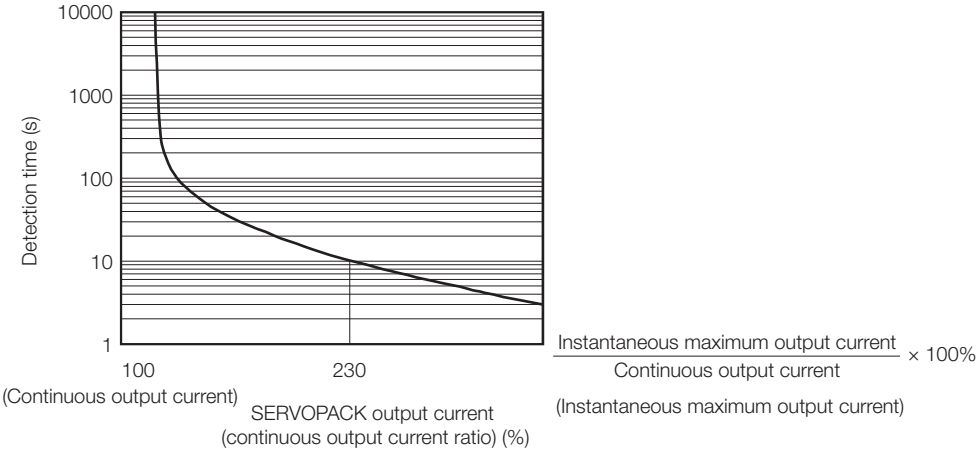
Model SGD7S-			R70A	R90A	1R6A	2R8A	5R5A	120A
Maximum Applicable Motor Capacity [kW]			0.05	0.1	0.2	0.4	0.75	2
Continuous Output Current [A]			0.66	0.91	1.6	2.8	5.5	18.5
Instantaneous Maximum Output Current [A]			2.1	3.2	5.9	9.3	16.9	42
Main Circuit	Power Supply		200 VAC to 240 VAC, -15% to +10%, 50 Hz/60 Hz					
	Input Current [A]*		0.8	1.6	2.4	5.0	8.7	10
Control	Power Supply		200 VAC to 240 VAC, -15% to +10%, 50 Hz/60 Hz					
	Input Current [A]*		0.2	0.2	0.2	0.2	0.2	0.25
Power Supply Capacity [kVA]*			0.2	0.3	0.6	1.2	1.9	4
Power Loss*	Main Circuit Power Loss [W]		5	7.1	12.1	23.7	39.2	104.2
	Control Circuit Power Loss [W]		12	12	12	12	14	16
	Built-in Regenerative Resistor Power Loss [W]		–	–	–	–	8	16
	Total Power Loss [W]		17	19.1	24.1	35.7	61.2	136.2
Regenerative Resistor	Built-In Regenerative Resistor	Resistance [Ω]	–	–	–	–	40	12
		Capacity [W]	–	–	–	–	40	60
	Minimum Allowable External Resistance [Ω]		40	40	40	40	40	12
Overvoltage Category			III					

* This is the net value at the rated load.

SERVOPACK Overload Protection Characteristics

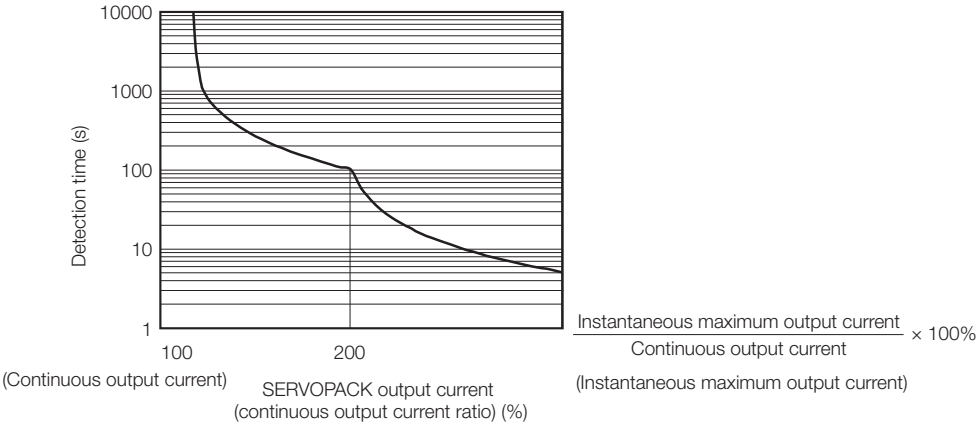
The overload detection level is set for hot start conditions with a SERVOPACK surrounding air temperature of 55°C.
An overload alarm (A.710 or A.720) will occur if overload operation that exceeds the overload protection characteristics shown in the following diagram (i.e., operation on the right side of the applicable line) is performed.
The actual overload detection level will be the detection level of the connected SERVOPACK or Servomotor that has the lower overload protection characteristics.
In most cases, that will be the overload protection characteristics of the Servomotor.

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



Note:
The above overload protection characteristics do not mean that you can perform continuous duty operation with an output of 100% or higher.
For a YASKAWA-specified combination of SERVOPACK and Servomotor, maintain the effective torque within the continuous duty zone of the torque-motor speed characteristic of the Servomotor.

SGD7S-5R5A, -120A



Note:
The above overload protection characteristics do not mean that you can perform continuous duty operation with an output of 100% or higher.
For a YASKAWA-specified combination of SERVOPACK and Servomotor, maintain the effective torque within the continuous duty zone of the torque-motor speed characteristic of the Servomotor.

Specifications using PROFINET Communication Reference

Item			Specification
Control Method			IGBT-based PWM control, sine wave current drive
Feedback	With Rotary Servomotor		Serial 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*1		-5°C to 55°C (60°C with derating) However, the range for the SGD7S-370D is -5°C to 40°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
	Degree of Protection		IP10
	Pollution Degree		2 • Must be no corrosive or flammable gases. • Must be no exposure to water, oil, or chemicals. • Must be no dust, salts, or iron dust.
	Altitude		1,000 m or less (above 1,000 m with derating)
	Others		Do not use the SERVOPACK in the following locations: Locations subject to static electricity noise, strong electromagnetic/magnetic fields, or radioactivity
Applicable Standards			Refer to the section Compliance with UL Standards, EU Directives, and Other Safety Standards (in Combination with SERVOPACK).
Mounting			Base-mounted
Performance	Speed Control Range		1:5,000 (At the rated torque, the lower limit of the speed control range must not cause the Servomotor to stop.)
	Coefficient of Speed Fluctuation*2		±0.01 % of rated speed max. (for a load fluctuation of 0 % to 100 %)
			0% of rated speed max. (for a voltage fluctuation of ±10 %)
			±0.1 % of rated speed max. (for a temperature fluctuation of 25 °C ±25 °C)
	Torque Control Precision (Repeatability)		±1 %
	Soft Start Time Setting		0 s to 10 s (Can be set separately for acceleration and deceleration.)
I/O Signals	Encoder Divided Pulse Output		Phase A, phase B, phase C: Line-driver output Number of divided output pulses: Any setting is allowed
	Linear Servomotor Overheat Protection Signal Input		Number of input points: 1 Input voltage range: 0 V to +5 V
	Sequence Input Signals	Input Signals that can be allocated	Allowable voltage range: 24 VDC ±20 % Number of input points: 7 Input method: Sink inputs or source inputs Input Signals • P-OT (Forward Drive Prohibit) and N-OT (Reverse Drive Prohibit) signals • /EXT1 (Probe 1 Latch Input) signal • /EXT2 (Probe 2 Latch Input) signal • /DEC (Home Switch Input) signal • /P-CL (Forward External Torque Limit) and /N-CL (Reverse External Torque Limit) signals • /SI0 and /SI6 (General-Purpose Input) signals 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: ALM (Servo Alarm) signal
		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 • /COIN (Positioning Completion) signal • /V-CMP (Speed Coincidence Detection) signal • /TGON (Rotation Detection) signal • /S-RDY (Servo Ready) signal • /CLT (Torque Limit Detection) signal • /VLT (Speed Limit Detection) signal • /BK (Brake) signal • /WARN (Warning) signal • /NEAR (Near) signal A signal can be allocated and the positive and negative logic can be changed.
Communications	RS-422A Communications (CN502)	Interfaces	Digital Operator (JUSP-OP05A-1-E)
		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+) The software version of the SigmaWin+ must be version 7.28 or higher.
		Communications Standard	Conforms to USB 2.0 standard (12 Mbps).

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Item		Specification
Displays/Indicators		CHARGE, PWR, RUN, ERR, and L/A (A and B) indicators, and one-digit seven-segment display
PROFINET Communications	Applicable Communications Standards	IEC 61158 Type 12, IEC 61800-7 PROFIdrive Profile, Ethernet PROFINET IO RT
	Physical Layer	100BASE-TX (IEEE 802.3)
	Communications Connectors	CN6A (RJ45): PROFINET signal input connector CN6B (RJ45): PROFINET signal output connector Full-duplex, Auto-negotiation, Auto-crossover
	Cable	Category 5, 4 shielded twisted pairs * The cable is automatically detected with AUTO MDIX.
	Baud Rate Setting	100 MBit/s
	Supported Protocols	• RTC - Real time cyclic protocol - RT class 1 (unsynchronized) • RTA - Real time acyclic protocol • DCP - Discovery and configuration protocol • CL-RPC - Connectionless remote procedure call • LLDP - Link layer discovery protocol • SNMP - Simple network management protocol
	Node Address Setting	DCP
	Indentification & Maintenance Functions	I&MO-3
	Topology Recognition	LLDP, SNMP V1, MIB2
	Power Supply	5 V ± 5 %, 500 mA (max.) supplied internal from drive CN10
	LED Indicator	Red (ERR), Green (RUN), PROFINET communicating (L/A) × 2
	Node Type	Axis Drive Unit
	Acyclic Parameter Access	Read/Write Record
	Cyclic Messaging	Set of pre-defined standard telegram: ST1, ST2, ST7, ST8, ST9 Set of pre-defined manufacture telegram: Telegram number 100 Telegram mapping: Dynamic with max. 16 signal entries of free telegram number 999
	Alarm Notification PDU	Optional
PROFIdrive Profile	Standard	IEC 61800-7-1/2/3
	Motor Type / Axis Type	Servo / Rotary, Linear
	Profile Services	Cycle messaging, Acyclic parameter access mechanism, Identification & maintenance functions (I&M03), PROFIdrive parameters, Diagnostic and alarm mechanism, Fault buffer mechanism
	Application Classes	1, 3
	PROFIdrive Position and Velocity Modes	Motion profile type: Linear
	CIA402 Homing Modes	CIA402 Supported methods: 1-6, 17-22, 35, 33, 34 Motion profile type: Linear Homing persistent in absolute motor encoder
	CIA402 Torque Mode	Torque Profile Type: Linear
Drive Profile		• Homing Mode • PROFIdrive Position Mode • PROFIdrive Velocity Mode • Profile Torque Mode • Touch Probe Function • Torque Limit Function
Analog Monitor (CN5)		Number of points: 2 Output voltage range: ±10 VDC (effective linearity range: ±8 V) Resolution: 16 bits Accuracy: ±20 mV (Typ) Maximum output current: ±10 mA Settling time (±1 %): 1.2 ms (Typ)
Dynamic Brake (DB)		Activated when a servo alarm or overtravel (OT) occurs, or when the power supply to the main circuit or servo is OFF.
Regenerative Processing		Built-in. Refer to the catalog for details.
Overtravel (OT) Prevention		Stopping with dynamic brake, deceleration to a stop, or coasting to a stop for the P-OT (Forward Drive Prohibit) or N-OT (Reverse Drive Prohibit) signal
Protective Functions		Overcurrent, overvoltage, low voltage, overload, regeneration error, etc.
Utility Functions		Gain adjustment, alarm history, jogging, origin search, etc.
Safety Functions	Inputs	/HWBB1 and /HWBB2: Base block signals for Power Modules
	Output	EDM1: Monitors the status of built-in safety circuit (fixed output).
	Applicable Standards*3	ISO13849-1 PLe (Category 3), IEC61508 SIL3
Applicable Option Modules		Fully-closed Modules, Option Module Safety

*1. If you combine a Sigma-7 SERVOPACK with a Sigma-V Option Module, the surrounding air temperature specification of the Sigma-V SERVOPACKs must be used, i.e., 0 °C to 55 °C. Also, the applicable surrounding range cannot be increased by derating.

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

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

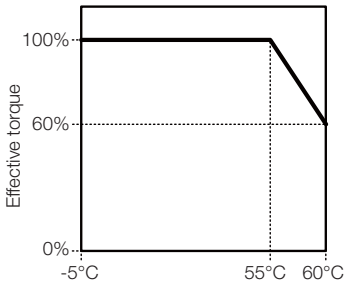
*3. The SGD7S-210D, -260D, -280D, and -370D do not have a dynamic brake (DB). If a dynamic brake is necessary, create an external dynamic brake circuit.

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

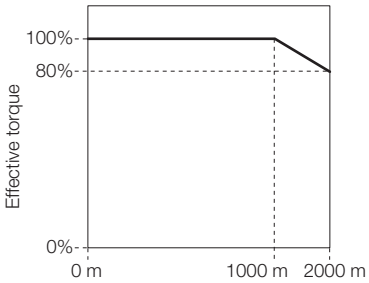
Derating Specifications

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

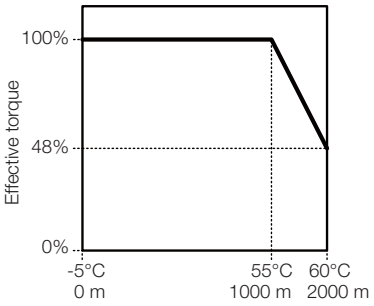
SGD7S-R70A, -R90A, -1R6A, -2R8A



Surrounding air temperature

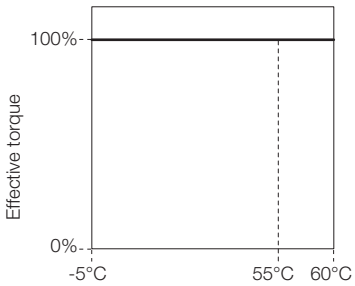


Altitude

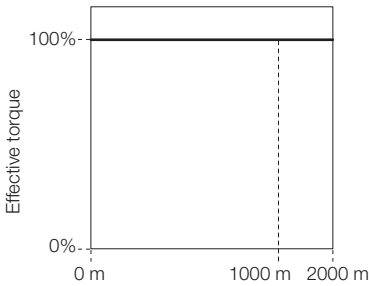


Surrounding air temperature and altitude

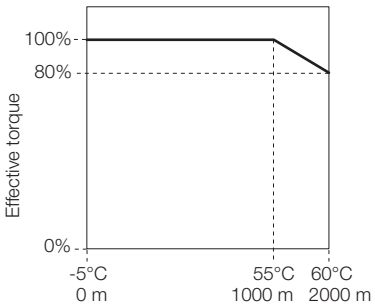
SGD7S-5R5A, -120A



Surrounding air temperature



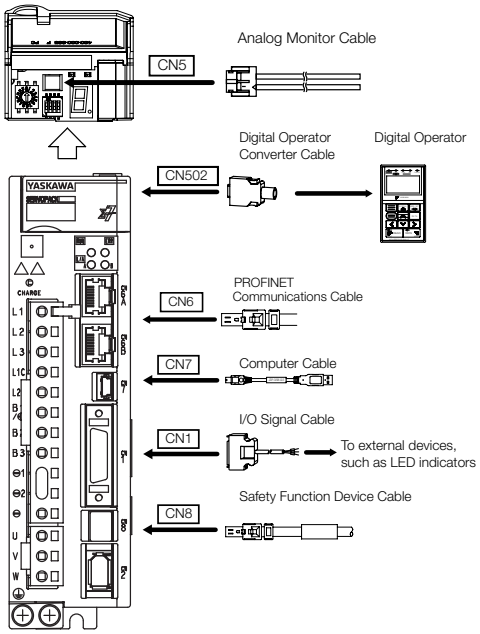
Altitude



Surrounding air temperature and altitude

Selecting Cables SGD7S PROFINET

System Configurations



Selection Table

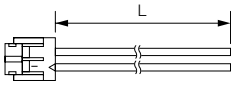
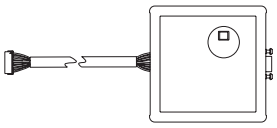
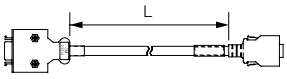
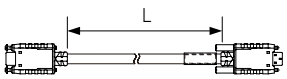
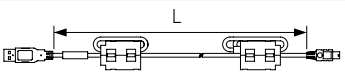
Important

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.

Refer to the following manual for the following information.

- Cable dimensional drawings and cable connection specifications
- Order numbers and specifications of individual connectors for cables

Sigma-7-Series AC Servo Drive Peripheral Device Selection Manual (Manual No.: SIEP S800001 32)

Code	Description		Length	Order Number	Appearance
CN5	Analog Monitor Cable		1 m	JZSP-CA01-E	
CN502	Digital Operator			JUSP-0P05A-1-E	
		Serial Communications Connector	0.3 m	JUSP-JC001-1	
		Digital Operator Converter Cable	0.3 m	JZSP-CVS05-A3-E*1	
				JZSP-CVS07-A3-E*2	
CN7	Computer Cable		2.5 m	JZSP-CVS06-02-E	

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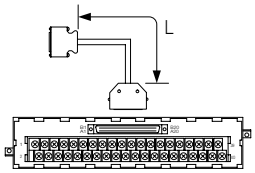
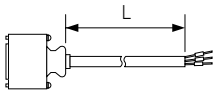
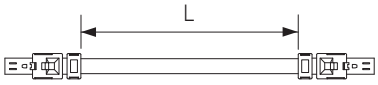
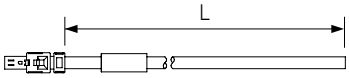
Code	Description		Length	Order Number	Appearance
CN1	I/O Signal Cables	Soldered Connector Kit		JZSP-CSI9-2-E	
		Connector-Terminal Block Converter Unit (with cable)	0.5 m	JUSP-TA26P-E	
			1 m	JUSP-TA26P-1-E	
			2 m	JUSP-TA26P-2-E	
		Cable with Loose Wires at One End (loose wires on peripheral device end)	1 m	JZSP-CSI02-1-E	
			2 m	JZSP-CSI02-2-E	
			3 m	JZSP-CSI02-3-E	
CN6	MECHATROLINK-III / EtherCAT / PROFINET Communications Cables (RJ45)*3		0.2 m	CM3R□M0-00P2-E	
			0.5 m	CM3R□M0-00P5-E	
			1 m	JZSP-CM3R□M0-01-E	
			3 m	JZSP-CM3R□M0-03-E	
			5 m	JZSP-CM3R□M0-05-E	
			10 m	JZSP-CM3R□M0-10-E	
			20 m	JZSP-CM3R□M0-20-E	
			30 m	JZSP-CM3R□M0-30-E	
			40 m	JZSP-CM3R□M0-40-E	
			50 m	JZSP-CM3R□M0-50-E	
CN8	Safety Function Device Cables	Cables with Connectors*4	1 m	JZSP-CVH03-01-E-Gx	
			3 m	JZSP-CVH03-03-E-Gx	
		Connector Kit*5		Contact Tyco Electronics Japan G.K. Product name: Industrial Mini I/O D-shape Type 1 Plug Connector Kit Model number: 2013595-1	

*1. This Converter Cable is required to use the Sigma-III-series Digital Operator (JUSP-OP05A) for S-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. This cable is available in two variants. The order number for these cables differs at the marked □, an „R“ at this place is used for Cables with RJ45 Connectors on both ends, while an „M“ is used for Cables with RJ45 Connector on One End and IMI Connector on the other End.
*4. 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.
*5. Use the Connector Kit when you make cables yourself.

SERVOPACK Main Circuit Wires

Important

These specifications are based on IEC/EN 61800-5-1, UL 61800-5-1, and CSA C22.2 No.274.
1. To comply with UL standards, use UL-compliant wires.
2. Use copper wires with a rated temperature of 75° 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 surrounding air temperature.

Three-phase, 200-VAC Wires for Sigma-7S SERVOPACKs

SGD7S-	Terminals		Wire Size	Screw Size	Tightening Torque [Nm]
R70A, R90A, 1R6A, 2R8A, 3R8A, 5R5A, 7R6A	Main Circuit Power Supply Cable	L1, L2, L3	AWG16 (1.25 mm²)	–	–
	Servomotor Main Circuit Cable*	U, V, W			
	Control Power Supply Cable	L1C, L2C			
	External Regenerative Resistor Cable	B1/⊕, B2			
	Ground cable	⏚	AWG14 (2.0 mm²) min.	M4	1.2 to 1.4
120A	Main Circuit Power Supply Cable	L1, L2, L3	AWG14 (2.0 mm²)	–	–
	Servomotor Main Circuit Cable*	U, V, W			
	Control Power Supply Cable	L1C, L2C	AWG16 (1.25 mm²)		
	External Regenerative Resistor Cable	B1/⊕, B2			
	Ground cable	⏚	AWG14 (2.0 mm²) min.	M4	1.2 to 1.4
180A	Main Circuit Power Supply Cable	L1, L2, L3	AWG14 (2.0 mm²)	M4	1.0 to 1.2
	Servomotor Main Circuit Cable*	U, V, W	AWG10 (5.5 mm²)		
	Control Power Supply Cable	L1C, L2C	AWG16 (1.25 mm²)		
	External Regenerative Resistor Cable	B1/⊕, B2			
	Ground cable	⏚	AWG14 (2.0 mm²) min.	M4	1.2 to 1.4
200A	Main Circuit Power Supply Cable	L1, L2, L3	AWG12 (3.5 mm²)	M4	1.0 to 1.2
	Servomotor Main Circuit Cable*	U, V, W	AWG10 (5.5 mm²)		
	Control Power Supply Cable	L1C, L2C	AWG16 (1.25 mm²)		
	External Regenerative Resistor Cable	B1/⊕, B2			
	Ground cable	⏚	AWG14 (2.0 mm²) min.	M4	1.2 to 1.4
330A	Main Circuit Power Supply Cable	L1, L2, L3	AWG8 (8.0 mm²)	M4	1.0 to 1.2
	Servomotor Main Circuit Cable*	U, V, W			
	Control Power Supply Cable	L1C, L2C	AWG16 (1.25 mm²)		
	External Regenerative Resistor Cable	B1/⊕, B2	AWG14 (2.0 mm²)		
	Ground cable	⏚	AWG14 (2.0 mm²) min.	M4	1.2 to 1.4
470A	Main Circuit Power Supply Cable	L1, L2, L3	AWG8 (8.0 mm²)	M5	2.2 to 2.4
	Servomotor Main Circuit Cable*	U, V, W	AWG6 (14 mm²)		
	Control Power Supply Cable	L1C, L2C	AWG16 (1.25 mm²)		
	External Regenerative Resistor Cable	B1/⊕, B2	AWG14 (2.0 mm²)		
	Ground cable	⏚	AWG14 (2.0 mm²) min.		
550A	Main Circuit Power Supply Cable	L1, L2, L3	AWG8 (8.0 mm²)		
	Servomotor Main Circuit Cable*	U, V, W	AWG4 (22 mm²)		
	Control Power Supply Cable	L1C, L2C	AWG16 (1.25 mm²)		
	External Regenerative Resistor Cable	B1/⊕, B2	AWG10 (5.5 mm²)		
	Ground cable	⏚	AWG14 (2.0 mm²) min.		
590A	Main Circuit Power Supply Cable	L1, L2, L3	AWG4 (22 mm²)	M6	2.7 to 3.0
	Servomotor Main Circuit Cable*	U, V, W			
	Control Power Supply Cable	L1C, L2C	AWG16 (1.25 mm²)		
	External Regenerative Resistor Cable	B1/⊕, B2	AWG10 (5.5 mm²)		
	Ground cable	⏚	AWG14 (2.0 mm²) min.		
780A	Main Circuit Power Supply Cable	L1, L2, L3	AWG3 (30 mm²)		
	Servomotor Main Circuit Cable*	U, V, W			
	Control Power Supply Cable	L1C, L2C	AWG16 (1.25 mm²)		
	External Regenerative Resistor Cable	B1/⊕, B2	AWG8 (8.0 mm²)		
	Ground cable	⏚	AWG14 (2.0 mm²) min.		

* If you do not use the recommended Servomotor Main Circuit Cable, use this table to select wires.

Single-phase, 200-VAC Wires for Sigma-7S SERVOPACKs

SGD7S-	Terminals		Wire Size	Screw Size	Tightening Torque [Nm]
R70A, R90A, 1R6A, 2R8A	Main Circuit Power Supply Cable	L1, L2, L3	AWG16 (1.25 mm²)	–	–
	Servomotor Main Circuit Cable*	U, V, W			
	Control Power Supply Cable	L1C, L2C			
	External Regenerative Resistor Cable	B1/⊕, B2			
	Ground cable	⏚	AWG14 (2.0 mm²) min.	M4	1.2 to 1.4
5R5A	Main Circuit Power Supply Cable	L1, L2, L3	AWG14 (2.0 mm²)	–	–
	Servomotor Main Circuit Cable*	U, V, W	AWG16 (1.25 mm²)		
	Control Power Supply Cable	L1C, L2C			
	External Regenerative Resistor Cable	B1/⊕, B2			
	Ground cable	⏚	AWG14 (2.0 mm²) min.	M4	1.2 to 1.4
120A□□□008	Main Circuit Power Supply Cable	L1, L2, L3	AWG14 (2.0 mm²)	M4	1.0 to 1.2
	Servomotor Main Circuit Cable*	U, V, W			
	Control Power Supply Cable	L1C, L2C	AWG16 (1.25 mm²)		
	External Regenerative Resistor Cable	B1/⊕, B2			
	Ground cable	⏚	AWG14 (2.0 mm²) min.	M4	1.2 to 1.4

* If you do not use the recommended Servomotor Main Circuit Cable, use this table to select wires.

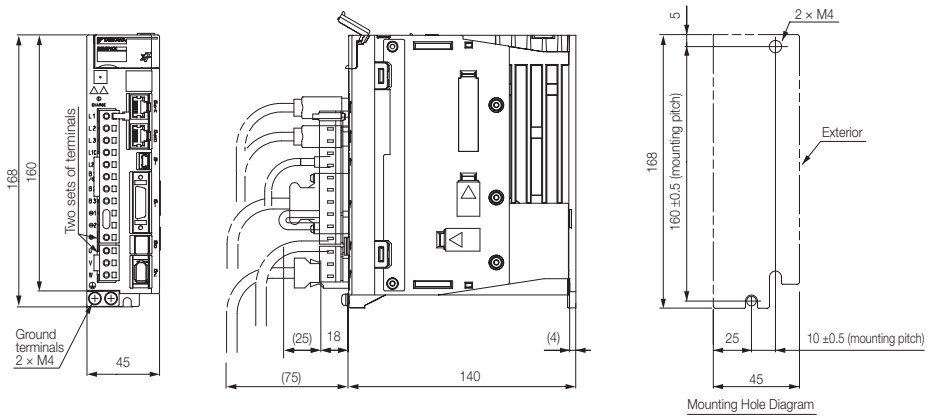
DC Power Supply Wires for Sigma-7S SERVOPACKs

SGD7S-	Terminals*1		Wire Size	Screw Size	Tightening Torque [Nm]
R70A, R90A, 1R6A, 2R8A, 3R8A, 5R5A, 7R6A	Servomotor Main Circuit Cable	U, V, W*2	AWG16 (1.25 mm²)	–	–
	Control Power Supply Cable	L1C, L2C			
	External Regenerative Resistor Cable	B1/⊕, ⊖2			
	Ground cable	⏚	AWG14 (2.0 mm²) min.	M4	1.2 to 1.4
120A (three-phase, 200-VAC input)	Servomotor Main Circuit Cable	U, V, W*2	AWG14 (2.0 mm²)	–	–
	Control Power Supply Cable	L1C, L2C	AWG16 (1.25 mm²)		
	External Regenerative Resistor Cable	B1/⊕, ⊖2	AWG14 (2.0 mm²)		
	Ground cable	⏚	AWG14 (2.0 mm²) min.	M4	1.2 to 1.4
120A□□□008 (single-phase, 200-VAC input)	Servomotor Main Circuit Cable	U, V, W*2	AWG14 (2.0 mm²)	M4	1.0 to 1.2
	Control Power Supply Cable	L1C, L2C	AWG16 (1.25 mm²)		
	External Regenerative Resistor Cable	B1/⊕, ⊖2	AWG14 (2.0 mm²)		
	Ground cable	⏚	AWG14 (2.0 mm²) min.	M4	1.2 to 1.4
180A, 200A	Servomotor Main Circuit Cable	U, V, W*2	AWG10 (5.5 mm²)	M4	1.0 to 1.2
	Control Power Supply Cable	L1C, L2C	AWG16 (1.25 mm²)		
	External Regenerative Resistor Cable	B1/⊕, ⊖2	AWG10 (5.5 mm²)		
	Ground cable	⏚	AWG14 (2.0 mm²) min.	M4	1.2 to 1.4
330A	Servomotor Main Circuit Cable	U, V, W*2	AWG8 (8.0 mm²)	M4	1.0 to 1.2
	Control Power Supply Cable	L1C, L2C	AWG16 (1.25 mm²)		
	External Regenerative Resistor Cable	B1/⊕, ⊖2	AWG8 (8.0 mm²)		
	Ground cable	⏚	AWG14 (2.0 mm²) min.	M4	1.2 to 1.4
470A	Servomotor Main Circuit Cable	U, V, W*2	AWG6 (14 mm²)	M5	2.2 to 2.4
	Control Power Supply Cable	L1C, L2C	AWG16 (1.25 mm²)		
	External Regenerative Resistor Cable	B1/⊕, ⊖2	AWG8 (8.0 mm²)		
	Ground cable	⏚	AWG14 (2.0 mm²) min.		
550A	Servomotor Main Circuit Cable	U, V, W*2	AWG4 (22 mm²)		
	Control Power Supply Cable	L1C, L2C	AWG16 (1.25 mm²)		
	External Regenerative Resistor Cable	B1/⊕, ⊖2	AWG6 (14 mm²)		
	Ground cable	⏚	AWG14 (2.0 mm²) min.		
590A	Servomotor Main Circuit Cable	U, V, W*2	AWG4 (22 mm²)	M6	2.7 to 3.0
	Control Power Supply Cable	L1C, L2C	AWG16 (1.25 mm²)		
	External Regenerative Resistor Cable	B1/⊕, ⊖2	AWG3 (30 mm²)		
	Ground cable	⏚	AWG14 (2.0 mm²) min.		
780A	Servomotor Main Circuit Cable	U, V, W*2	AWG3 (30 mm²)		
	Control Power Supply Cable	L1C, L2C	AWG16 (1.25 mm²)		
	External Regenerative Resistor Cable	B1/⊕, ⊖2	AWG3 (30 mm²)		
	Ground cable	⏚	AWG14 (2.0 mm²) min.		

*1. Do not wire the following terminals: L1, L2, L3, B2, B3, ⊖1, ⊖ and terminals.
*2. If you do not use the recommended Servomotor Main Circuit Cable, use this table to select wires.

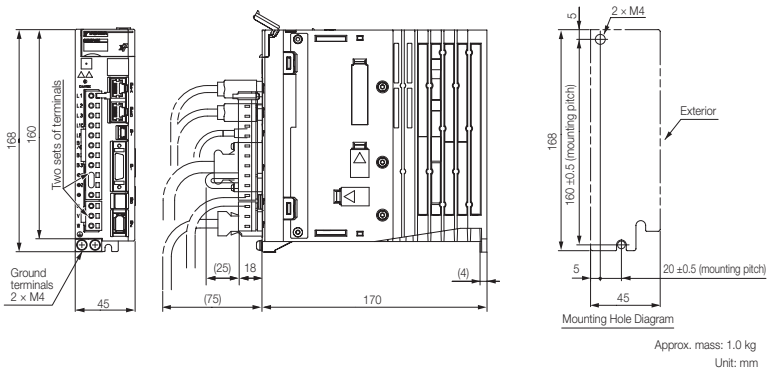
SERVOPACK External Dimensions

Three-phase & Single-phase, 200 VAC: SGD7S-R70A, -R90A, and -1R6A



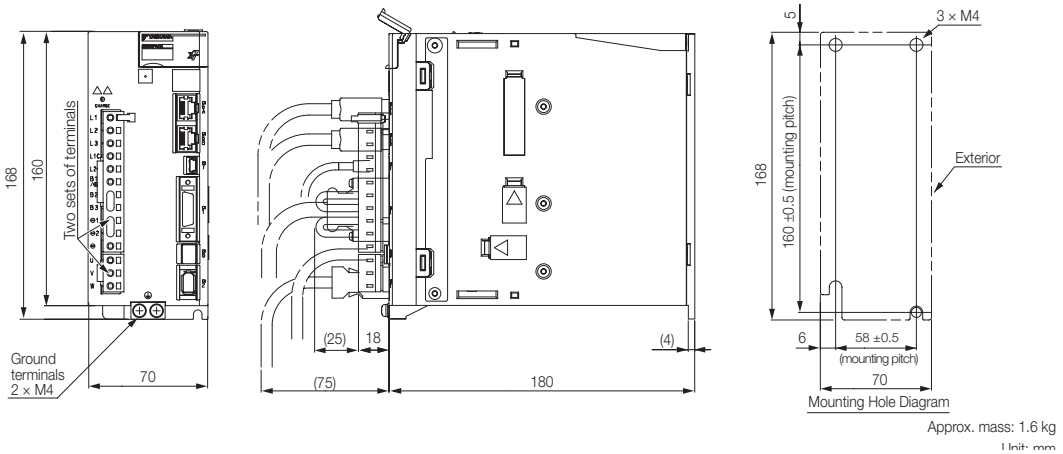
Approx. mass: 0.8 kg
Unit: mm

Three-phase & Single-phase, 200 VAC: SGD7S-2R8A



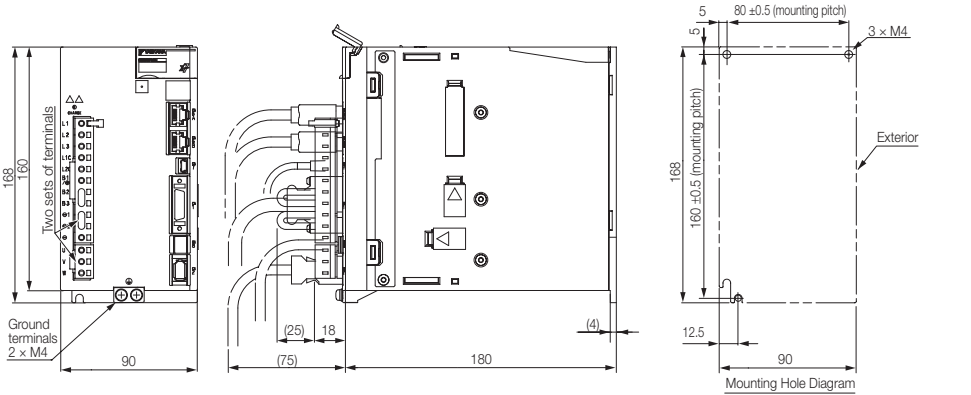
Approx. mass: 1.0 kg
Unit: mm

Three-phase & Single-phase, 200 VAC: SGD7S-3R8A, -5R5A
Three-phase. 200 VAC: -7R6A



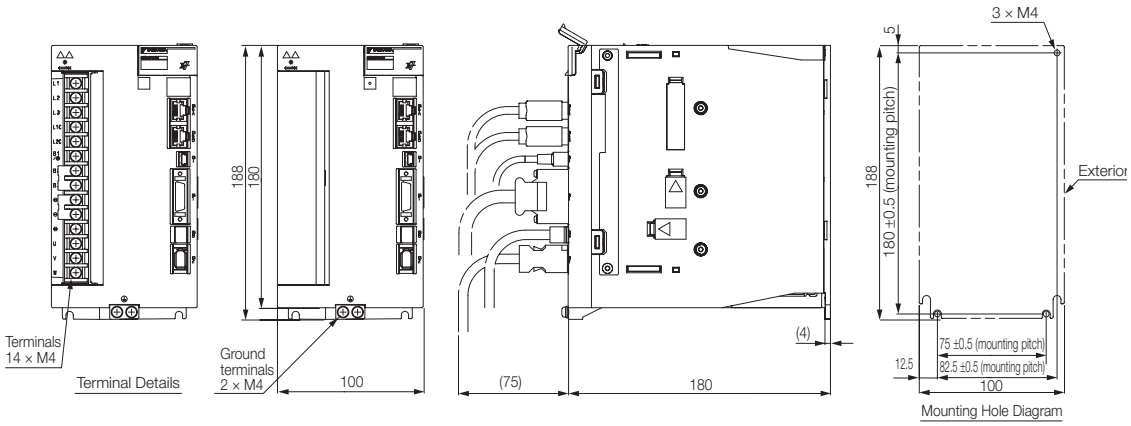
Approx. mass: 1.6 kg
Unit: mm

Three-phase & Single-phase, 200 VAC: SGD7S-120A



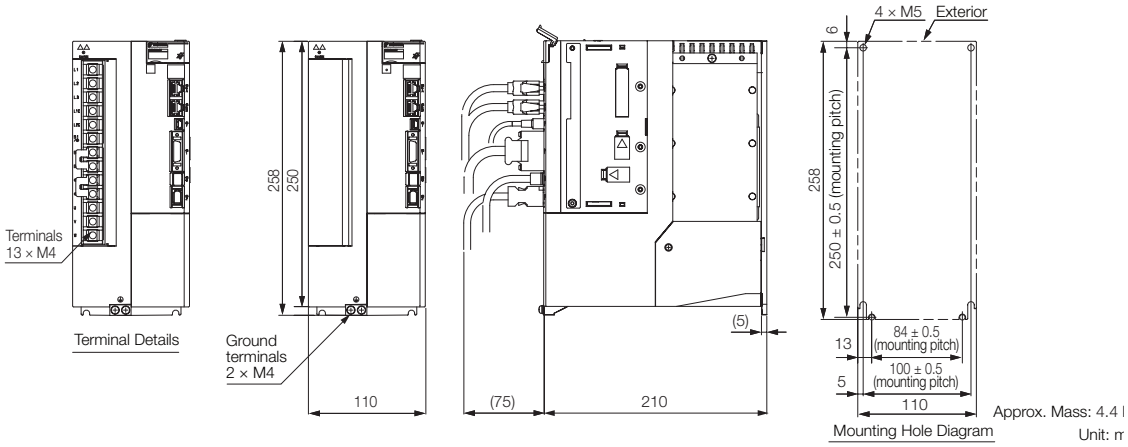
Approx. mass: 2.2 kg
Unit: mm

Three-phase, 200 VAC: SGD7S-180A and -200A

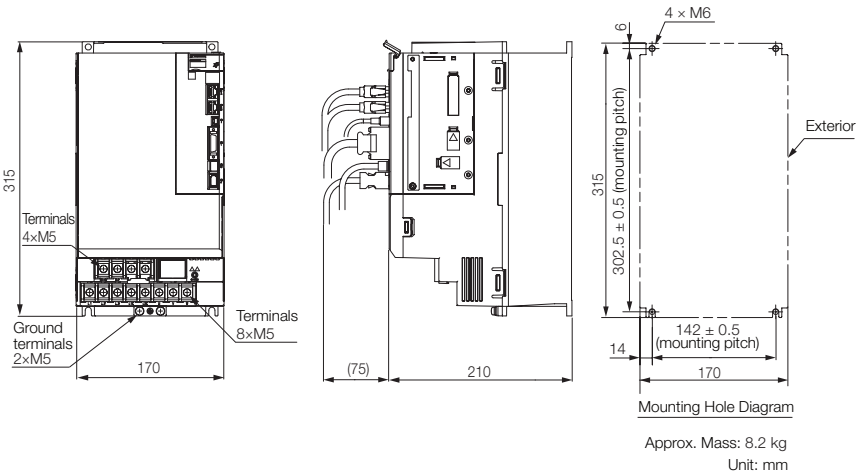


Approx. mass: 2.7 kg
Unit: mm

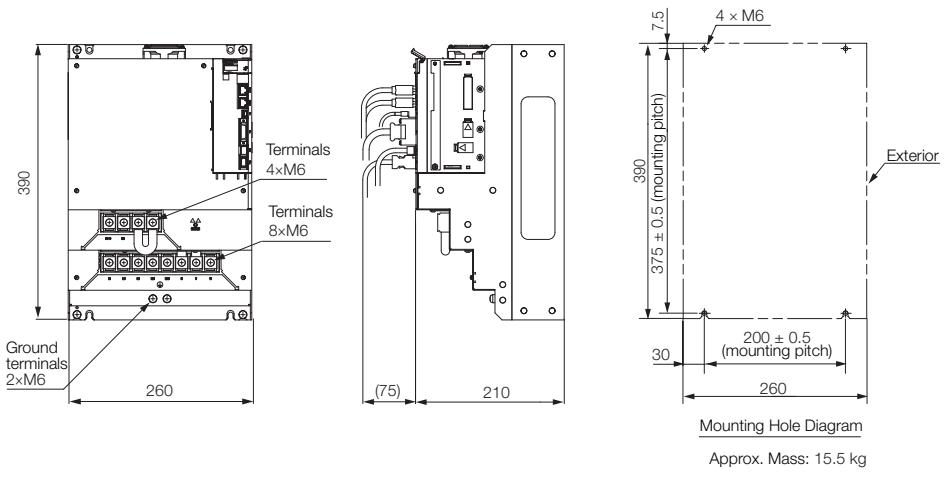
Three-phase, 200 VAC: SGD7S-330A



Three-phase, 200 VAC: SGD7S-470A and -550A



Three-phase, 200 VAC: SGD7S-590A and -780A



Sigma-7W MECHATROLINK-III

Model Designations

SGD7W	-	1R6	A	20	A	700	000	
Sigma-7 Series Sigma-7W Models		1st ... 3rd	4th	5th + 6th	7th	8th ... 10th	11th ... 13th	digit

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

Code	Specification
1R6*1	0.2 kW
2R8*1	0.4 kW
5R5*1*2	0.75 kW
7R6	1.0 kW

4th digit - Voltage

Code	Specification
A	200 VAC, Three-phase

5th + 6th digit - Interface*3

Code	Specification
20	MECHATROLINK-III communication reference

7th digit - Design Revision Order

A

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

Code	Specifications	Applicable Models
None	Without Options	All models
700*4	HWBB option	All models

Note:
Additional accessories and software for SERVOPACKs is described in the Periphery section.

*1. You can use these models with either a single-phase or three-phase power supply input. For more information, please contact your YASKAWA representative.
*2. If you use the Servomotor with a single-phase 200-VAC power supply input, derate the load ratio to 65%.
An example is given below. If the load ratio of the first axis is 90%, use a load ratio of 40% for the second axis so that average load ratio for both axes is 65%.
((90% + 40%)/2 = 65%)
*3. The same SERVOPACKs are used for both Rotary Servomotors and Linear Servomotors.
*4. Refer to the following manual for details.
Sigma-7-Series AC Servo Drive Sigma-7W/Sigma-7C SERVOPACK with Hardware Option Specifications HWBB Function Product Manual (Manual No.: SIEP S800001 72)

Ratings and Specifications

Ratings

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 [A]			1.6	2.8	5.5
Instantaneous Maximum Output Current per Axis [A]			5.9	9.3	16.9
Main Circuit	Power Supply		200 VAC to 240 VAC, -15% to +10%, 50 Hz/60 Hz		
	Input Current [A]*2		5.5	11	12
Control	Power Supply		200 VAC to 240 VAC, -15% to +10%, 50 Hz/60 Hz		
	Input Current [A]*2		0.25	0.25	0.25
Power Supply Capacity [kVA]* 2			1.3	2.4	2.7
Power Loss*2	Main Circuit Power Loss [W]		24.1	43.6	54.1
	Control Circuit Power Loss [W]		17	17	17
	Built-in Regenerative Resistor Power Loss [W]		8	8	16
	Total Power Loss [W]		49	69	87
Regenerative Resistor	Built-In Regenerative Resistor	Resistance [Ω]	40	40	12
		Capacity [W]	40	40	60
	Minimum Allowable External Resistance [Ω]		40	40	12
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%. An example is given below.
If the load ratio of the first axis is 90%, use a load ratio of 40% for the second axis so that average load ratio for both axes is 65%
((90% + 40%)/2 = 65%).
*2. This is the net value at the rated load. However, a load ratio of 65% was used for the SGD7W-5R5A.

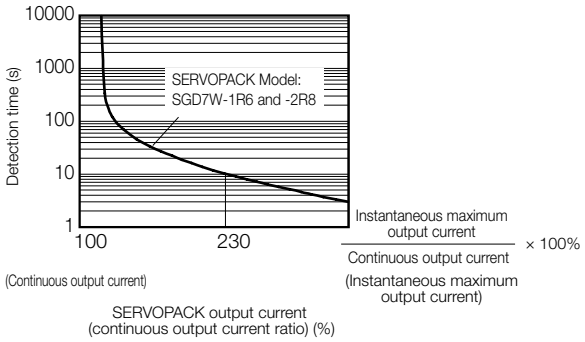
Three-phase, 200 VAC

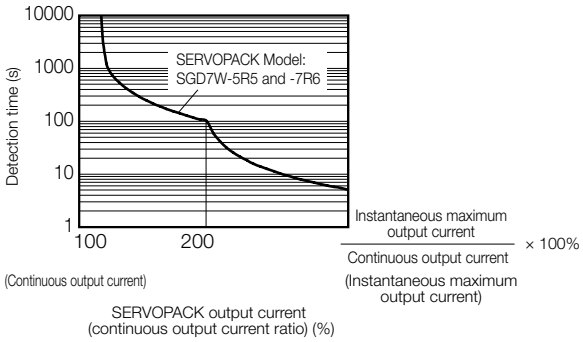
Model SGD7W-			1R6A	2R8A	5R5A	7R6A
Maximum Applicable Motor Capacity per Axis [kW]			0.2	0.4	0.75	1.0
Continuous Output Current per Axis [A]			1.6	2.8	5.5	7.6
Instantaneous Maximum Output Current per Axis [A]			5.9	9.3	16.9	17.0
Main Circuit	Power Supply		200 VAC to 240 VAC, -15% to +10%, 50 Hz/60 Hz			
	Input Current [A]*		2.5	4.7	7.8	11
Control	Power Supply		200 VAC to 240 VAC, -15% to +10%, 50 Hz/60 Hz			
	Input Current [A]*		0.25	0.25	0.25	0.25
Power Supply Capacity [kVA]*			1.0	1.9	3.2	4.5
Power Loss*	Main Circuit Power Loss [W]		24.0	43.3	78.9	94.2
	Control Circuit Power Loss [W]		17	17	17	17
	Built-in Regenerative Resistor Power Loss [W]		8	8	16	16
	Total Power Loss [W]		49	68	112	127
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	12	12
Overvoltage Category			III			

* This is the net value at the rated load.
Note: For more information on Three-phase models, please contact your YASKAWA representative.

SERVOPACK Overload Protection Characteristics

The overload detection level is set for hot start conditions with a SERVOPACK surrounding air temperature of 55°C.
An overload alarm (A.710 or A.720) will occur if overload operation that exceeds the overload protection characteristics shown in the following diagram (i.e., operation on the right side of the applicable line) is performed.
The actual overload detection level will be the detection level of the connected SERVOPACK or Servomotor that has the lower overload protection characteristics.
In most cases, that will be the overload protection characteristics of the Servomotor.





Note:
The above overload protection characteristics do not mean that you can perform continuous duty operation with an output of 100% or higher.
For a YASKAWA-specified combination of SERVOPACK and Servomotor, maintain the effective torque (or effective force) within the continuous duty zone of the torque-motor speed characteristic (or force-motor speed characteristics) of the Servomotor.

Specifications

Item		Specification
Control Method		IGBT-based PWM control, sine wave current drive
Feedback	With Rotary Servomotor	Serial encoder: 17 bits (absolute encoder) 20 bits or 24 bits (incremental encoder/absolute encoder) 22 bits (absolute encoder)
	With Linear Servomotor	• Absolute linear encoder (The signal resolution depends on the absolute linear encoder.) • Incremental linear encoder (The signal resolution depends on the incremental linear encoder or Serial Converter Unit.)
Environmental Conditions	Ambient Air Temperature	-5°C to 55°C With derating, usage is possible between 55°C and 60°C. Refer to the following section for Derating Specifications.
	Storage Temperature	-20°C to 85°C
	Ambient Air Humidity	95% relative humidity max. (with no freezing or condensation)
	Storage Humidity	95% relative humidity max. (with no freezing or condensation)
	Vibration Resistance	4.9 m/s^2
	Shock Resistance	19.6 m/s^2
	Protection Class	IP 20
	Pollution Degree	2 • Must be no corrosive or flammable gases. • Must be no exposure to water, oil, or chemicals. • Must be no dust, salts, or iron dust.
	Altitude	1,000 m or less With derating, usage is possible between 1,000 m and 2,000 m. Refer to the following section for Derating specifications.
	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 (E147823), CSA C22.2 No.274, EN 55011 group 1 class A, EN 61000-6-2, EN 61000-6-4, EN 61800-3 (Category C2, Second environment), EN 50178, and EN 61800-5-1
Mounting		Base-mounted or rack-mounted
Performance	Speed Control Range	1:5,000 (At the rated torque, the lower limit of the speed control range must not cause the Servomotor to stop.)
	Coefficient of Speed Fluctuation*	±0.01% of rated speed max. (for a load fluctuation of 0% to 100%)
		0% of rated speed max. (for a voltage fluctuation of ±10%)
		±0.1% of rated speed max. (for a temperature fluctuation of 25°C ± 25°C)
	Torque Control Precision (Repeatability)	±1%
	Soft Start Time Setting	0 s to 10 s (Can be set separately for acceleration and deceleration.)

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Item			Specification
I/O Signals	Overheat Protection Input		Number of input points: 2 Input voltage range: 0 V to +5 V
	Sequence Input Signals		Allowable voltage range: 24 VDC ±20% Number of input points: 12
		Input Signals That Can Be Allocated	Input method: Sink inputs or source inputs Input Signals ● P-OT (Forward Drive Prohibit) and N-OT (Reverse Drive Prohibit) signals ● /P-CL (Forward External Torque Limit) and /N-CL (Reverse External Torque Limit) signals ● /DEC (Origin Return Deceleration Switch) signal ● /EXT1 to /EXT3 (External Latch Input 1 to 3) signals ● FSTP (Forced Stop Input) signal A signal can be allocated and the positive and negative logic can be changed.
	Sequence Output Signals	Fixed Output	Allowable voltage range: 5 VDC to 30 VDC Number of output points: 2 Output 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: ● /COIN (Positioning Completion) signal ● /V-CMP (Speed Coincidence Detection) signal ● /TGON (Rotation Detection) signal ● /S-RDY (Servo Ready) signal ● /CLT (Torque Limit Detection) signal ● /VLT (Speed Limit Detection) signal ● /BK (Brake) signal ● /WARN (Warning) signal ● /NEAR (Near) signal 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	03 to EF hex (maximum number of slaves: 62) The rotary switches (S1 and S2) are used to set the station address.
	USB Communications (CN7)	Interface	Personal Computer (with SigmaWin+)
		Communications Standard	Conforms to USB2.0 standard (12 Mbps).
Displays/ Indicators			CHARGE, PWR, COM, L1, and L2 indicators, and 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		32 or 48 bytes/station A DIP switch (S3) is used to select the baud rate.
Reference Method	Performance		Position, speed, or torque control with MECHATROLINK-III communications
	Reference Input		MECHATROLINK-III commands (sequence, motion, data setting, data access, monitoring, adjustment, etc.)
	Profile		MECHATROLINK-III standard servo profile
MECHATROLINK-III Communications Setting Switches			Rotary switch (S1 and S2) positions: 16
			Number of DIP switch (S3) pins: 4

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Item	Specification
Analog Monitor (CN5)	Number of points: 2 Output voltage range: ±10 VDC (effective linearity range: ±8 V) Resolution: 16 bits Accuracy: ±20 mV (Typ) Maximum output current: ±10 mA Settling time (±1%): 1.2 ms (Typ)
Dynamic Brake (DB)	Activated when a servo alarm or overtravel (OT) occurs, or when the power supply to the main circuit or servo is OFF.
Regenerative Processing	Built-in
Overtravel (OT) Prevention	Stopping with dynamic brake, deceleration to a stop, or coasting to a stop for the P-OT (Forward Drive Prohibit) or N-OT (Reverse Drive Prohibit) signal
Protective Functions	Overcurrent, overvoltage, low voltage, overload, regeneration error, etc.
Utility Functions	Gain adjustment, alarm history, jogging, origin search, etc.
Option Modules	Option Modules canot be attached.

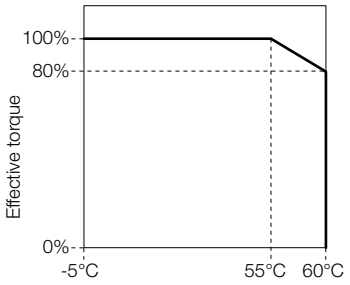
* The coefficient of speed fluctuation for load fluctuation is defined as follows:

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

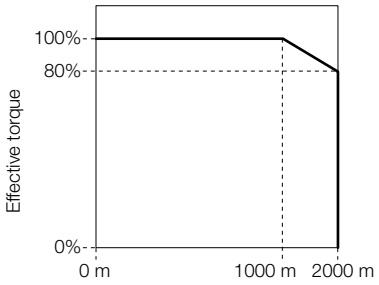
Derating Specifications

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

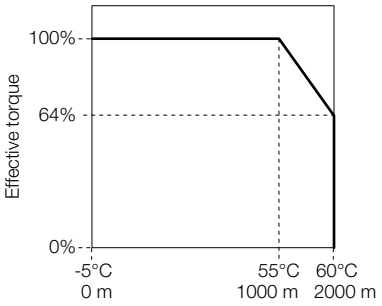
SGD7W-1R6A, -2R8A, -5R5A, and -7R6A



Surrounding air temperature



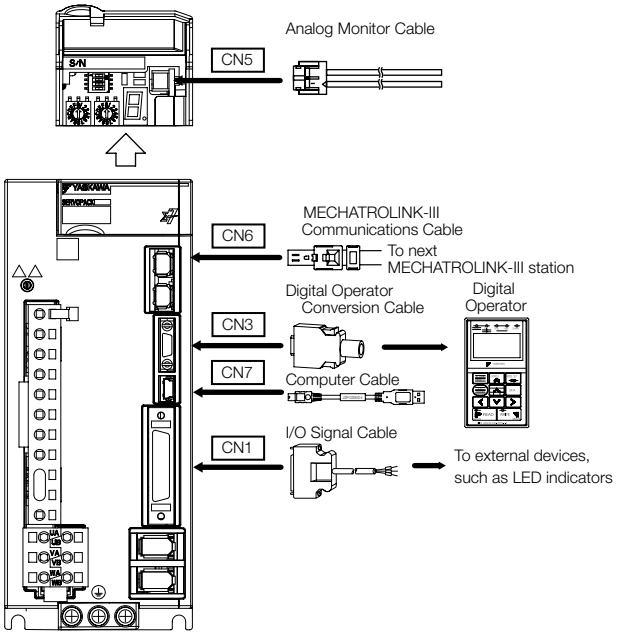
Altitude



Surrounding air temperature and altitude

Selecting Cables SGD7W MECHATROLINK-III

System Configurations

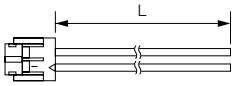
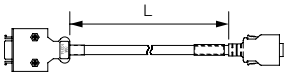
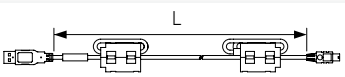


Selection Table

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.

Refer to the following manual for the following information.
- Cable dimensional drawings and cable connection specifications
- Order numbers and specifications of individual connectors for cables
  Sigma-7-Series AC Servo Drive Peripheral Device Selection Manual (Manual No.: SIEP S800001 32)

Code	Description		Length	Order Number	Appearance
CN5	Analog Monitor Cable		1 m	JZSP-CA01-E	
CN3	Digital Operator			JUSP-0P05A-1-E	
		Digital Operator Converter Cable	0.3 m	JZSP-CVS05-A3-E*1	
				JZSP-CVS07-A3-E*2	
CN7	Computer Cable		2.5 m	JZSP-CVS06-02-E	

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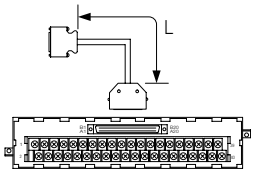
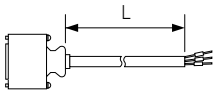
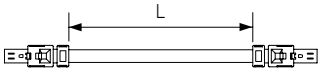
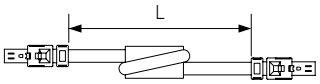
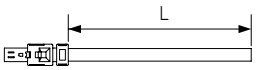
Code	Description		Length	Order Number	Appearance
CN1	I/O Signal Cables	Soldered Connector Kit		DP9420007-E	
		Connector-Terminal Block Converter Unit (with cable)	0.5 m	JUSP-TA36P-E	
			1 m	JUSP-TA36P-1-E	
			2 m	JUSP-TA36P-2-E	
		Cable with Loose Wires at One End (loose wires on peripheral device end)	1 m	JZSP-CSI03-1-E	
			2 m	JZSP-CSI03-2-E	
			3 m	JZSP-CSI03-3-E	
CN6	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 S-III-series Digital Operator (JUSP-OP05A) for S-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.

SERVOPACK Main Circuit Wires

Important

These specifications are based on IEC/EN 61800-5-1, UL 61800-5-1, and CSA C22.2 No.274.
1. To comply with UL standards, use UL-compliant wires.
2. Use copper wires with a rated temperature of 75° 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 surrounding air temperature.

Three-phase, 200-VAC Wires for Sigma-7S SERVOPACKs

SGD7S-	Terminals		Wire Size	Screw Size	Tightening Torque [Nm]
R70A, R90A, 1R6A, 2R8A, 3R8A, 5R5A, 7R6A	Main Circuit Power Supply Cable	L1, L2, L3	AWG16 (1.25 mm²)	–	–
	Servomotor Main Circuit Cable*	U, V, W			
	Control Power Supply Cable	L1C, L2C			
	External Regenerative Resistor Cable	B1/⊕, B2			
	Ground cable	⏚	AWG14 (2.0 mm²) min.	M4	1.2 to 1.4
120A	Main Circuit Power Supply Cable	L1, L2, L3	AWG14 (2.0 mm²)	–	–
	Servomotor Main Circuit Cable*	U, V, W			
	Control Power Supply Cable	L1C, L2C	AWG16 (1.25 mm²)		
	External Regenerative Resistor Cable	B1/⊕, B2			
	Ground cable	⏚	AWG14 (2.0 mm²) min.	M4	1.2 to 1.4
180A	Main Circuit Power Supply Cable	L1, L2, L3	AWG14 (2.0 mm²)	M4	1.0 to 1.2
	Servomotor Main Circuit Cable*	U, V, W	AWG10 (5.5 mm²)		
	Control Power Supply Cable	L1C, L2C	AWG16 (1.25 mm²)		
	External Regenerative Resistor Cable	B1/⊕, B2			
	Ground cable	⏚	AWG14 (2.0 mm²) min.	M4	1.2 to 1.4
200A	Main Circuit Power Supply Cable	L1, L2, L3	AWG12 (3.5 mm²)	M4	1.0 to 1.2
	Servomotor Main Circuit Cable*	U, V, W	AWG10 (5.5 mm²)		
	Control Power Supply Cable	L1C, L2C	AWG16 (1.25 mm²)		
	External Regenerative Resistor Cable	B1/⊕, B2			
	Ground cable	⏚	AWG14 (2.0 mm²) min.	M4	1.2 to 1.4
330A	Main Circuit Power Supply Cable	L1, L2, L3	AWG8 (8.0 mm²)	M4	1.0 to 1.2
	Servomotor Main Circuit Cable*	U, V, W			
	Control Power Supply Cable	L1C, L2C	AWG16 (1.25 mm²)		
	External Regenerative Resistor Cable	B1/⊕, B2	AWG14 (2.0 mm²)		
	Ground cable	⏚	AWG14 (2.0 mm²) min.	M4	1.2 to 1.4
470A	Main Circuit Power Supply Cable	L1, L2, L3	AWG8 (8.0 mm²)	M5	2.2 to 2.4
	Servomotor Main Circuit Cable*	U, V, W	AWG6 (14 mm²)		
	Control Power Supply Cable	L1C, L2C	AWG16 (1.25 mm²)		
	External Regenerative Resistor Cable	B1/⊕, B2	AWG14 (2.0 mm²)		
	Ground cable	⏚	AWG14 (2.0 mm²) min.		
550A	Main Circuit Power Supply Cable	L1, L2, L3	AWG8 (8.0 mm²)		
	Servomotor Main Circuit Cable*	U, V, W	AWG4 (22 mm²)		
	Control Power Supply Cable	L1C, L2C	AWG16 (1.25 mm²)		
	External Regenerative Resistor Cable	B1/⊕, B2	AWG10 (5.5 mm²)		
	Ground cable	⏚	AWG14 (2.0 mm²) min.		
590A	Main Circuit Power Supply Cable	L1, L2, L3	AWG4 (22 mm²)	M6	2.7 to 3.0
	Servomotor Main Circuit Cable*	U, V, W			
	Control Power Supply Cable	L1C, L2C	AWG16 (1.25 mm²)		
	External Regenerative Resistor Cable	B1/⊕, B2	AWG10 (5.5 mm²)		
	Ground cable	⏚	AWG14 (2.0 mm²) min.		
780A	Main Circuit Power Supply Cable	L1, L2, L3	AWG3 (30 mm²)		
	Servomotor Main Circuit Cable*	U, V, W			
	Control Power Supply Cable	L1C, L2C	AWG16 (1.25 mm²)		
	External Regenerative Resistor Cable	B1/⊕, B2	AWG8 (8.0 mm²)		
	Ground cable	⏚	AWG14 (2.0 mm²) min.		

* If you do not use the recommended Servomotor Main Circuit Cable, use this table to select wires.

Single-phase, 200-VAC Wires for Sigma-7S SERVOPACKs

SGD7S-	Terminals		Wire Size	Screw Size	Tightening Torque [Nm]
R70A, R90A, 1R6A, 2R8A	Main Circuit Power Supply Cable	L1, L2, L3	AWG16 (1.25 mm²)	–	–
	Servomotor Main Circuit Cable*	U, V, W			
	Control Power Supply Cable	L1C, L2C			
	External Regenerative Resistor Cable	B1/⊕, B2			
	Ground cable	⏚	AWG14 (2.0 mm²) min.	M4	1.2 to 1.4
5R5A	Main Circuit Power Supply Cable	L1, L2, L3	AWG14 (2.0 mm²)	–	–
	Servomotor Main Circuit Cable*	U, V, W	AWG16 (1.25 mm²)		
	Control Power Supply Cable	L1C, L2C			
	External Regenerative Resistor Cable	B1/⊕, B2			
	Ground cable	⏚	AWG14 (2.0 mm²) min.	M4	1.2 to 1.4
120A□□□008	Main Circuit Power Supply Cable	L1, L2, L3	AWG14 (2.0 mm²)	M4	1.0 to 1.2
	Servomotor Main Circuit Cable*	U, V, W			
	Control Power Supply Cable	L1C, L2C	AWG16 (1.25 mm²)		
	External Regenerative Resistor Cable	B1/⊕, B2			
	Ground cable	⏚	AWG14 (2.0 mm²) min.	M4	1.2 to 1.4

* If you do not use the recommended Servomotor Main Circuit Cable, use this table to select wires.

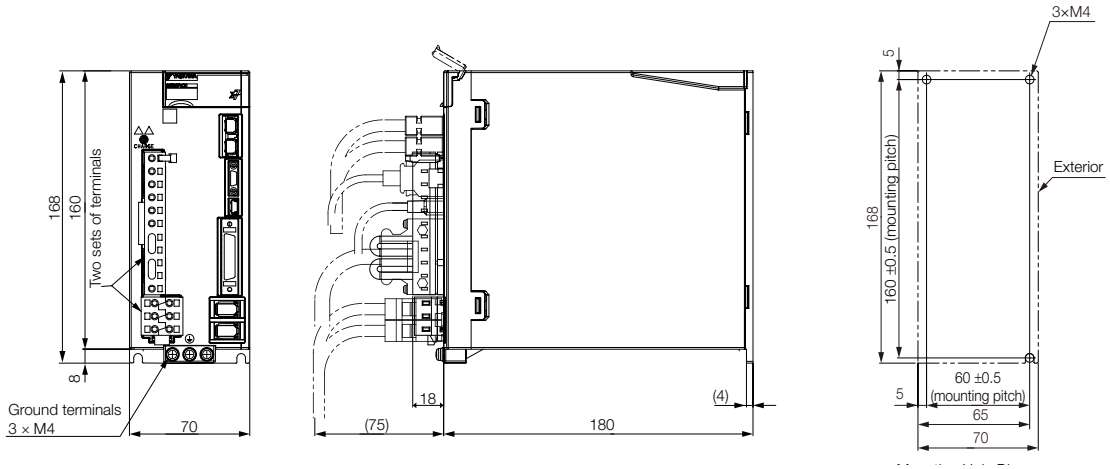
DC Power Supply Wires for Sigma-7S SERVOPACKs

SGD7S-	Terminals*1		Wire Size	Screw Size	Tightening Torque [Nm]
R70A, R90A, 1R6A, 2R8A, 3R8A, 5R5A, 7R6A	Servomotor Main Circuit Cable	U, V, W*2	AWG16 (1.25 mm²)	–	–
	Control Power Supply Cable	L1C, L2C			
	External Regenerative Resistor Cable	B1/⊕, ⊖2			
	Ground cable	⏚	AWG14 (2.0 mm²) min.	M4	1.2 to 1.4
120A (three-phase, 200-VAC input)	Servomotor Main Circuit Cable	U, V, W*2	AWG14 (2.0 mm²)	–	–
	Control Power Supply Cable	L1C, L2C	AWG16 (1.25 mm²)		
	External Regenerative Resistor Cable	B1/⊕, ⊖2	AWG14 (2.0 mm²)		
	Ground cable	⏚	AWG14 (2.0 mm²) min.	M4	1.2 to 1.4
120A□□□008 (single-phase, 200-VAC input)	Servomotor Main Circuit Cable	U, V, W*2	AWG14 (2.0 mm²)	M4	1.0 to 1.2
	Control Power Supply Cable	L1C, L2C	AWG16 (1.25 mm²)		
	External Regenerative Resistor Cable	B1/⊕, ⊖2	AWG14 (2.0 mm²)		
	Ground cable	⏚	AWG14 (2.0 mm²) min.	M4	1.2 to 1.4
180A, 200A	Servomotor Main Circuit Cable	U, V, W*2	AWG10 (5.5 mm²)	M4	1.0 to 1.2
	Control Power Supply Cable	L1C, L2C	AWG16 (1.25 mm²)		
	External Regenerative Resistor Cable	B1/⊕, ⊖2	AWG10 (5.5 mm²)		
	Ground cable	⏚	AWG14 (2.0 mm²) min.	M4	1.2 to 1.4
330A	Servomotor Main Circuit Cable	U, V, W*2	AWG8 (8.0 mm²)	M4	1.0 to 1.2
	Control Power Supply Cable	L1C, L2C	AWG16 (1.25 mm²)		
	External Regenerative Resistor Cable	B1/⊕, ⊖2	AWG8 (8.0 mm²)		
	Ground cable	⏚	AWG14 (2.0 mm²) min.	M4	1.2 to 1.4
470A	Servomotor Main Circuit Cable	U, V, W*2	AWG6 (14 mm²)	M5	2.2 to 2.4
	Control Power Supply Cable	L1C, L2C	AWG16 (1.25 mm²)		
	External Regenerative Resistor Cable	B1/⊕, ⊖2	AWG8 (8.0 mm²)		
	Ground cable	⏚	AWG14 (2.0 mm²) min.		
550A	Servomotor Main Circuit Cable	U, V, W*2	AWG4 (22 mm²)		
	Control Power Supply Cable	L1C, L2C	AWG16 (1.25 mm²)		
	External Regenerative Resistor Cable	B1/⊕, ⊖2	AWG6 (14 mm²)		
	Ground cable	⏚	AWG14 (2.0 mm²) min.		
590A	Servomotor Main Circuit Cable	U, V, W*2	AWG4 (22 mm²)	M6	2.7 to 3.0
	Control Power Supply Cable	L1C, L2C	AWG16 (1.25 mm²)		
	External Regenerative Resistor Cable	B1/⊕, ⊖2	AWG3 (30 mm²)		
	Ground cable	⏚	AWG14 (2.0 mm²) min.		
780A	Servomotor Main Circuit Cable	U, V, W*2	AWG3 (30 mm²)		
	Control Power Supply Cable	L1C, L2C	AWG16 (1.25 mm²)		
	External Regenerative Resistor Cable	B1/⊕, ⊖2	AWG3 (30 mm²)		
	Ground cable	⏚	AWG14 (2.0 mm²) min.		

*1. Do not wire the following terminals: L1, L2, L3, B2, B3, ⊖1, ⊖ and terminals.
*2. If you do not use the recommended Servomotor Main Circuit Cable, use this table to select wires.

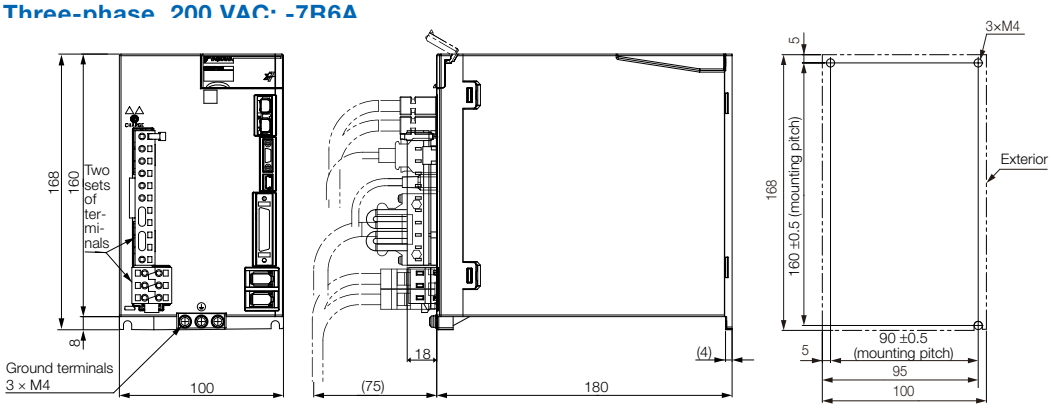
SERVOPACK External Dimensions SGD7W

Three-phase & Single-phase, 200 VAC: SGD7W-1R6A and -2R8A



Three-phase & Single-phase, 200 VAC: SGD7W-5R5A

Three-phase, 200 VAC: -7R6A



Mounting Hole Diagram

Approx. Mass: 2.3 kg

Unit: mm

Model Designations

SGD7C	-	1R6	A	MA	A	700	
Sigma-7 Series SERVOPACKs		1st ... 3rd	4th	5th + 6th	7th	8th ... 10th	digit

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

Code	Specifications
1R6[*1]	0.2 kW
2R8[*1]	0.4 kW
5R5[*1 *2]	0.75 kW
7R6	1.0 kW

4th digit - Voltage

Code	Specifications
A	200 VAC single/three-phase[*1]

5th + 6th digit - Interface

Code	Specifications
MA	Bus connection reference

7th digit - Design Revision Order

Code	Specifications
A	Standard Model

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

Code	Specifications	Applicable Models
None	Without Options	All models
700[*4]	HWBB option	All models

Note:
Additional accessories and software for SERVOPACKs is described in the Periphery section.

*1. You can use these models with either a single-phase or three-phase power supply input.
*2. If you use the Servomotor with a single-phase 200-VAC power supply input, derate the load ratio to 65%. An example is given below.
If the load ratio of the first axis is 90%, use a load ratio of 40% for the second axis so that average load ratio for both axes is 65%. ((90% + 40%)/2 = 65%)
*3. The same SERVOPACKs are used for both Rotary Servomotors and Linear Servomotors.
*4. Refer to the following manual for details.
Sigma-7-Series AC Servo Drive Sigma-7W/Sigma-7C SERVOPACK with Hardware Option Specifications HWBB Function Product Manual (Manual No.: SIEP S800001 72)

Ratings and Specifications

Ratings

Single-phase, 200 VAC

Model SGD7C-			1R6A	2R8A	5R5A*1
Maximum Applicable Motor Capacity per Axis [kW]			0.2	0.4	0.75
Continuous Output Current per Axis [A]			1.6	2.8	5.5
Instantaneous Maximum Output Current per Axis [A]			5.9	9.3	16.9
Main Circuit	Power Supply		200 VAC to 240 VAC, -15% to +10%, 50 Hz/60 Hz		
	Input Current [A]*2		5.5	11	12
Control	Power Supply		200 VAC to 240 VAC, -15% to +10%, 50 Hz/60 Hz		
	Input Current [A]*2		0.25		
Power Supply Capacity [kVA]*2			1.3	2.4	2.7
Power Loss*2	Main Circuit Power Loss [W]		24.1	43.6	54.1
	Control Circuit Power Loss [W]		17		
	Built-in Regenerative Resistor Power Loss [W]		8		16
	Total Power Loss [W]		49	69	87
Regenerative Resistor	Built-In Regenerative Resistor	Resistance [Ω]	40		12
		Capacity [W]	40		60
	Minimum Allowable External Resistance [Ω]		40		12
Overvoltage Category			III		

*1. If you use the SGD7C-5R5A with a single-phase 200-VAC power supply input, derate the load ratio to 65%. An example is given below. If the load ratio of the first axis is 90%, use a load ratio of 40% for the second axis so that average load ratio for both axes is 65% ((90% + 40%)/2 = 65%).
*2. This is the net value at the rated load. However, a load ratio of 65% was used for the SGD7W-5R5A.

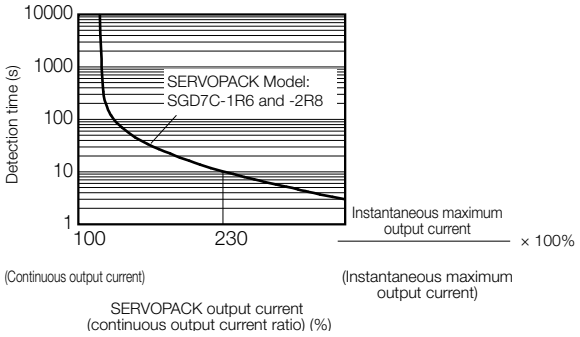
Three-phase, 200 VAC

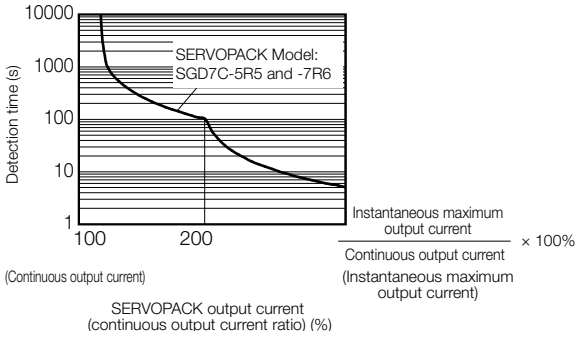
Model SGD7C-			1R6A	2R8A	5R5A	7R6A
Maximum Applicable Motor Capacity per Axis [kW]			0.2	0.4	0.75	1.0
Continuous Output Current per Axis [A]			1.6	2.8	5.5	7.6
Instantaneous Maximum Output Current per Axis [A]			5.9	9.3	16.9	17.0
Main Circuit	Power Supply		200 VAC to 240 VAC, -15% to +10%, 50 Hz/60 Hz			
	Input Current [A]*		2.5	4.7	7.8	11
Control	Power Supply		200 VAC to 240 VAC, -15% to +10%, 50 Hz/60 Hz			
	Input Current [A]*		0.25			
Power Supply Capacity [kVA]*			1.0	1.9	3.2	4.5
Power Loss*	Main Circuit Power Loss [W]		24.0	43.3	78.9	94.2
	Control Circuit Power Loss [W]		17			
	Built-in Regenerative Resistor Power Loss [W]		8		16	
	Total Power Loss [W]		49	68	112	127
Regenerative Resistor	Built-In Regenerative Resistor	Resistance [Ω]	40		12	
		Capacity [W]	40		60	
	Minimum Allowable External Resistance [Ω]		40		12	
Overvoltage Category			III			

*This is the net value at the rated load.

SERVOPACK Overload Protection Characteristics

The overload detection level is set for hot start conditions with a SERVOPACK surrounding air temperature of 55°C.
An overload alarm (A.710 or A.720) will occur if overload operation that exceeds the overload protection characteristics shown in the following diagram (i.e., operation on the right side of the applicable line) is performed.
The actual overload detection level will be the detection level of the connected SERVOPACK or Servomotor that has the lower overload protection characteristics.
In most cases, that will be the overload protection characteristics of the Servomotor.





Note:
The above overload protection characteristics do not mean that you can perform continuous duty operation with an output of 100% or higher.
For a YASKAWA-specified combination of SERVOPACK and Servomotor, maintain the effective torque (or effective force) within the continuous duty zone of the torque-motor speed characteristic (or force-motor speed characteristics) of the Servomotor.

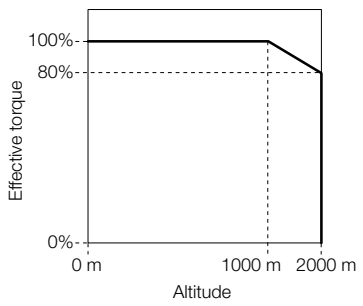
General Specifications

Item		Specification
Control Method		IGBT-based PWM control, sine wave current drive
Feedback	With Rotary Servomotor	Serial encoder: 17 bits (absolute encoder) 20 bits or 24 bits (incremental encoder/absolute encoder) 22 bits (absolute encoder)
	With Linear Servomotor	• Absolute linear encoder (The signal resolution depends on the absolute linear encoder.) • Incremental linear encoder (The signal resolution depends on the incremental linear encoder or Serial Converter Unit.)
Environmental Conditions	Ambient Air Temperature	0°C to 55°C
	Storage Temperature	-20°C to 85°C
	Ambient Air Humidity	10 % to 95% relative humidity max. (with no freezing or condensation)
	Storage Humidity	10 % to 95% relative humidity max. (with no freezing or condensation)
	Vibration Resistance	4.9 m/s^2
	Shock Resistance	19.6 m/s^2
	Degree of Protection	IP 20
	Pollution Degree	2 • Must be no corrosive or flammable gases. • Must be no exposure to water, oil, or chemicals. • Must be no dust, salts, or iron dust.
	Altitude	1,000 m or less With derating, usage is possible between 1,000 m and 2,000 m. Refer to the Derating Specifications section.
	Power Frequency Magnetic Field	30 A/m (50 Hz/60 Hz), IEC 61000-4-8, Level 4
	Others	Must be no exposure to electrostatic noise or radiation.
Applicable Standards		UL 61800-5-1 (E147823), CSA C22.2 No.274, EN 55011 group 1 class A, EN 61000-6-2, EN 61000-6-4, EN 61800-3 (Category C2, Second environment), EN 50178, and EN 61800-5-1
Mounting		Base-mounted or rack-mounted

Derating Specifications

If you use the SERVOPACK at an altitude of 1,000 m to 2,000 m, you must apply the derating rates given in the following graph.

SGD7C-1R6A, -2R8A, -5R5A, and -7R6A



Servo Section Specifications

Item			Specification
Performance	Speed Control Range		1:5,000 (At the rated torque, the lower limit of the speed control range must not cause the Servomotor to stop.)
	Coefficient of Speed Fluctuation*		±0.01% of rated speed max. (for a load fluctuation of 0% to 100%)
			0% of rated speed max. (for a load fluctuation of ±10%)
			±0.1% of rated speed max. (for a temperature fluctuation of 25°C ±25°C)
	Torque Control Precision (Repeatability)		±1%
	Soft Start Time Setting		0 s to 10 s (Can be set separately for acceleration and deceleration.)
I/O Signals	Overheat Protection Input		Number of input points: 2 Input voltage range (0 V to 5 V)
	Sequence Input Signals	Input Signals that can be allocated	Allowable voltage range: 24 VDC ±20% Number of input points: 12 Input method: Sink inputs or source inputs Input Signals: • P-OT (Forward Drive Prohibit Input) and N-OT (Reverse Drive Prohibit Input) signals • /P-CL (Forward External Torque Limit) and /N-CL (Reverse External Torque Limit) signals • /DEC (Origin Return Deceleration Switch) signal • /EXT1 to /EXT3 (External Latch Input 1 to 3) signals • FSTP (Forced Stop Input) signal A signal can be allocated and the positive and negative logic can be changed.
	Sequence Output Signals	Fixed Outputs	Allowable voltage range: 5 VDC to 30 VDC Number of output points: 2 Output signal: ALM (Servo Alarm Output) signal
		Output Signals that can be allocated	Allowable voltage range: 5 VDC to 30 VDC Number of outputs points: 5 (Photocoupler outputs (isolated) are used.) Output Signals: • /COIN (Positioning Completion) signal • /V-CMP (Speed Coincidence Detection) signal • /TGON (Rotation Detection) signal • /S-RDY (Servo Ready) signal • /CLT (Torque Limit Detection) signal • /VLT (Speed Limit Detection) signal • /BK (Brake) signal • /WARN (Warning) signal • /NEAR (Near) signal A signal can be allocated and the positive and negative logic can be changed.
Communications	USB Communications (CN7)	Interface	Personal computer (with SigmaWin+)
		Communications Standard	Conforms to USB 2.0 standard (12 Mbps)
Displays/Indicators			CHARGE and PWR indicators, and two, one-digit seven-segment displays
Reference Method			Reference with built-in controller
Dynamic Brake (DB)			Activated when a servo alarm or overtravel (OT) occurs, or when the power supply to the main circuit or servo is OFF
Regenerative Processing			Built-in
Overtravel (OT) Prevention			Stopping with dynamic brake, deceleration to a stop, or coasting to a stop for the P-OT (Forward Drive Prohibit Input) or N-OT (Reverse Drive Prohibit Input) signal
Protective Functions			Overcurrent, overvoltage, undervoltage, overload, regeneration error, etc.
Utility Functions			Gain adjustment, alarm history, jogging, origin search, etc.
Applicable Option Modules			None

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

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

Controller Section Specifications

Hardware Specifications

Item	Specification
Flash Memory	Capacity: 24 MB (15 MB of user memory)
SDRAM	Capacity: 256 MB
MRAM	Capacity: 4 MB
Calendar	Seconds, minutes, hour, day, week, month, year, day of week, and timing
Ethernet	One port, 10Base-T or 100Base-TX
MECHATROLINK	• MECHATROLINK-III, 1 circuit with 1 port • Master
USB	• USB 2.0, Type A host, 1 port • Compatible devices: USB storage
Indicators and Displays	• Seven-segment display • Status indicators • USB Status Indicator • Ethernet status indicators
Switches	• DIP switches: Mode switches • STOP/SAVE switch
Connectors	• MECHATROLINK-III connector (CN6) • USB connector (CN10) • Ethernet connector (CN12) • Controller Section I/O connector (CN13)

Performance Specifications

Item		Specification	Remarks
Number of controlled Axes	SVC4	4 axes 1 circuit	Circuit number selected from 1 to 16.
	SVD	2 axes	Circuit number selected from 1 to 16.
	SVR4	4 axes 1 circuit	Circuit number selected from 1 to 16.
	Maximum Number of controlled Axes	6 axes	–
Scan Time Settings	H Scan	0.5 ms to 32.0 ms (in 0.25-ms increments)	Refer to the following manual for details. Sigma-7-Series Sigma-7C SERVOPACK Product Manual (Manual No.: SIEP S800002 04)
	L Scan	2.0 ms to 300 ms (in 0.5-ms increments)	–
	H Scan Default	4 ms	–
	L Scan Default	200 ms	–
Peripheral Devices	Calendar	Supported	–
	Communications Interface	Ethernet	–
	USB	Supported	–
Memory Capacity	DRAM	256 MB with ECC	–
	MRAM	4 MB	Up to 1 MB can be used to back up table data.
	Program Capacity	15 MB	Total capacity including definition data, ladder programs, table data, etc.
Ladder Programs	Number of Startup Drawings (DWG.A)	64	Number of steps per drawing: 4,000
	Number of Interrupt Drawings (DWG.I)	64	
	Number of High-Speed Scan Drawings (DWG.H)	1,000	
	Number of Low-Speed Scan Drawings (DWG.L)	2,000	
	Number of User Function Drawings	2,000	

Continued on next page.

Continued from previous page.

Item			Specification	Remarks
Motion Programs	Number of Programs		512	Total of all programs listed below: • Motion main programs • Motion subprograms • Sequence main programs • Sequence subprograms
	Number of Groups		16	–
	Number of Tasks		32	–
	Number of Nesting Levels for IF Instructions		8	–
	Number of Nesting Levels for MSEE Instructions		8	–
	Number of Parallel Forks per Task		8	Select from the following four options: • Main: 4 forks, Sub: 2 forks • Main: 8 forks • Main: 2 forks, Sub: 4 forks • Sub: 8 forks
	Number of Simultaneously Controlled Axes per Task		10 axes	–
Registers	S Registers		64 Kwords	–
	M Registers		1 Mword	–
	G Registers		2 Mwords	–
	I/O Registers		64 Kwords	–
	Motion Registers		32 Kwords	–
	C Registers		16 Kwords	–
	# Registers		16 Kwords	–
	D Registers		16 Kwords	–
Data Types	Bit (B)		Supported	0 or 1
	Integer (W)		Supported	-32,768 to 32,767
	Double-Length Integer (L)		Supported	-2,147,483,648 to 2,147,483,647
	Quadruple-Length Integer (Q)		Supported	-9,223,372,036,854,775,808 to 9,223,372,036,854,775,807
	Single-Precision Real Number (F)		Supported	± (1.175E-38 to 3.402E+38) or 0
	Double-Precision Real Number (D)		Supported	±(2.225E-308 to 1.798E+308) or 0
	Addresses (A)		Supported	0 to 16,777,214
Index Registers	Subscript i		Supported	Special registers for offsetting addresses. Subscripts i and j function identically.
	Subscript j		Supported	
	Array Registers		Supported	Used to handle registers as arrays.
Data Tracing	Number of Groups		4	–
	Trace Memory		256 Kwords total in 4 groups	–
	Traceable Data Points		16 points per group	–
	Trigger Types		>, <, =, <>, >=, <= and differential detection of the above conditions	–
Data Logging	Number of Groups		4	–
	Log Storage Location		Built-in RAM disk or USB memory device	–
	Log File Formats		CSV file format or binary file format	–
	Data Logging Points		64 points per group	–
	Number of Log Files	Built-in RAM Disk	1 to 4,000	–
		USB Memory	1 to 32,767 or unlimited	The ultimate upper limit is 10,000 files even if unlimited is selected.
	Trigger Types		>, <, =, <>, >=, <=	–

Communications Function Module Specifications

Item			Specification	Remarks
Abbreviation			218IFD	
Commission Items	Transmission Interface		10Base-T/100Base-TX	–
	Number of Communications Ports (Connectors)		1	–
	Transmission Protocols		TCP/UDP/IP/ARP/ICMP/IGMP	–
Ethernet Communications	Maximum Number of Communications Connections		20 + 2 (I/O message communications)	–
	Maximum Number of Communications Channels		10 + 2 (I/O message communications)	–
	Automatic Reception		Supported	Not supported for no-protocol communications.
	Maximum Number of Automatic Reception Connections		10	–
	Automatic Reception Status Monitor		Supported	–
	Maximum Size of Message Communications	MEMOBUS	Write: 100 words Read: 125 words	–
		Extended MEMOBUS	Write: 2,043 words Read: 2,044 words	–
		MELSEC (A-Compatible 1E)	Write: 256 words Read: 256 words	–
		MELSEC (QnA-Compatible 3E)	Write: 960 words Read: 960 words	–
		MODBUS/TCP	Write: 100 words Read: 125 words	–
		OMRON	Write: 996 words Read: 999 words	–
		TOYOPUC	Write: 1,022 words	–
		No-protocol	Write: 2,046 words	–
	Maximum Size of I/O Message Communications	MEMOBUS	Write: 100 words Read: 125 words	–
		Extended MEMOBUS	Write: 1,024 words Read: 1,024 words	–
		MELSEC (A-Compatible 1E)	Write: 256 words Read: 256 words	–
		MELSEC (QnA-Compatible 3E)	Write: 256 words Read: 256 words	–
		MODBUS/TCP	Write: 100 words Read: 125 words	–
		OMRON	Write: 996 words Read: 999 words	–
		Execution Conditions	You can select controls (start/stop) from a ladder program	–
		Execution Status Monitor	Supported	–
	MotomanSync-MP		Supported	–
	FTP Server		Supported	–
	FTP Client		Supported	–
	Receive Buffer Mode Selection for Noprotocol Communications		Supported	–
	Engineering Tools	Communications Platform	Ethernet	–
		Controller Searches	Supported	–
		Supported Engineering Tools	MPE720 Ver.7 and SigmaWin+ Ver.7	–

Motion Control Function Module Specifications

Module	Item		Specification
SVD	Number of Controlled Axes*1		2
	Reference Update Cycle (High-Speed Scan Cycle Performed by the CPU)		500 µs to 32.0 ms
	Register Ranges		Registers for two axes are assigned from the registers for each circuit. Refer to the following manual for details. Sigma-7-Series Sigma-7C SERVOPACK Motion Control User's Manual (Manual No.: SIEP S800002 03)
SVC4	Number of Controlled Axes*1		4
	Reference Update Cycle (High-Speed Scan Cycle Performed by the CPU)		500 µs to 32.0 ms
	Register Ranges		Registers for four axes are assigned from the registers for each circuit. Refer to the following manuals for details. Sigma-7-Series Sigma-7C SERVOPACK Motion Control User's Manual (Manual No.: SIEP S800002 03)
	MECHATROLINK-III communications	Communications Interface	Master
		Communications Cycle (Reference Update Cycle)	500 µs to 32.0 ms
		Transmission Cycle*2	125 µs, 250 µs, 500 µs, or 1 ms
		Communications Cable	MECHATROLINK-III Communications Cable
		Maximum Number of Connectable Stations	8
		Topology	Cascade connections, star connections, or mixed star-cascade connections
		Terminating Resistance	Not required
		Connectable Slave Devices	SERVOPACKs, Stepping Motor Drivers, Inverters, I/O Modules, and Machine Controllers that support MECHATROLINK-III communications
		Supported Profiles	MECHATROLINK-III Servo Standard, MECHATROLINK-III I/O Standard, MECHATROLINK-III Inverter Standard, and MECHATROLINK-III Stepping Motor Standard
SVR4	Number of Controlled Axes*1		4
	Reference Update Cycle (High-Speed Scan Cycle Performed by the CPU)		500 µs to 32.0 ms
	Register Ranges		Registers for four axes are assigned from the registers for each circuit. Refer to the following manuals for details. Sigma-7-Series Sigma-7C SERVOPACK Motion Control User's Manual (Manual No.: SIEP S800002 03)

*1. A maximum of six axes can be controlled with the Motion Control Function Module in a Sigma-7C SERVOPACK.
Do not control more than a total of six axes with one Motion Control Function Module.
*2. The transmission cycle is the cycle in which the SVC4 and the slave devices perform communications on the MECHATROLINIK-III transmission path.

M-EXECUTOR Specifications

Registerable Programs

Program Type		Number of Registered Programs
Motion Programs		32*
Sequence Programs	Startup	1
	Interrupt	Not possible
	H scan	32*
	L scan	32*

* The combined total of motion programs and sequence programs must not exceed 32.

Program Control Methods

You can use the following control methods for the programs that are registered in the M-EXECUTOR:

Item	Motion Programs	Sequence Programs
Execution Method	Sequential execution	Startup: Event execution H scan: Scan execution L scan: Scan execution
System Work	The same number is used for the definition number and system work number. Definition Number: System Work Number No.1: 1 No.2: 2 ...: ... No.32: 32	
Program Designation Method	Direct designation or indirect designation	Direct designation
Program Execution Method	Register the program in the definitions and start execution by turning ON the start signal.	Execution is started when the program is registered in the definitions.
Interpolation Override Setting	Supported	Not supported
I/O Link Definitions	Supported	Not supported
Motion Program Status reporting in S Registers	Supported	
Number of Parallel Forks	Up to 8 Main: 4 forks, Sub: 2 forks Main: 8 forks Main: 2 forks, Sub:4 forks Sub: 8 forks	No forks
Error Diagram Execution when an Operation Error occurs	Supported	

USB Memory Specifications

Item	Specification	Remarks
Supported Media	USB memory device	Refer to the „Recommended USB Memory Device“ section for details.
Applicable FAT	FAT16/32	–
Maximum Number of Nested Directories	10	–
File Information	Last update timestamp supported	Uses the calendar in the Controller Section. Refer to the following manual for details. Sigma-7-Series Sigma-7C SERVOPACK Product Manual (Manual No.: SIEP S800002 04)
Maximum Length for File Name and Directory Names	256 characters	–
Current Directory Function	16	–
Maximum Number of Simultaneously Open Files	16	–
Formatting	Not supported	Use a formatted USB memory device.

Recommended USB Memory Device

The following USB memory device is recommended. It can be purchased from YASKAWA.

Model	Specification	Manufacturer
SFU24096D1BP1TO-C-QT-111-CAP	4-GB USB memory	Swissbit Japan Inc.

IO16 Function Module Specifications

The following table gives the specifications of the IO16 Function Module. There are 16 digital inputs and 16 digital outputs in the IO16 Function Module.

Item	Specification	
Digital Inputs	Number of Inputs	16
	Input Method	Sink/source
	Isolation Method	Photocouplers
	Input Voltage	24 VDC ±20%
	Input Current	5 mA (typical)
	ON Voltage/Current	15 V min./2 mA min.
	OFF Voltage/Current	5 V max./1 mA max.
	ON/OFF Time	0.01 ms + Digital filter setting
	Digital Filter Setting	0 to 65,535 µs
	Number of Commons	2 (8 points per common)
	Others	DI_00 is also used for interrupt signals DI_01 is also used as the pulse latch input
Digital Outputs	Number of Outputs	16
	Output Method	Transistor open-collector sink outputs
	Isolation Method	Photocouplers
	Output Voltage	24 VDC (20 V to 30 V)
	Output Current	50 mA max.
	Leakage Current When OFF	0.1 mA max.
	ON/OFF Time	0.01 µs (for output current of 85 mA)
	Number of Commons	2 (8 points per common)
	Output Protection	Thermistor (automatic recovery after blow out)
	Others	DO_00 is also used as the Match Output

Counter Specifications

The following table gives the specifications of counter. The counter uses a pulse input on one channel.

Item	Specification	
Pulse Input	Number of Inputs	1 (phase A, B, or Z input)
	Input Circuits	Phases A and B: 5-V differential input, not isolated, maximum frequency: 4 MHz Phase Z: 5-V, 12-V, or 24-V photocoupler input, maximum frequency: 500 kHz
	Input Modes	Phases A and B, sign, and incrementing/decrementing
	Latch Input	Pulses are latched for phase Z or DI_01. Response Times for Phase-Z Input ON: 1 µs max. OFF: 1 µs max. Response Times for DI_01 Input ON: 60 µs max. OFF: 0.5 ms max.
	Other Functions	Match detection, counter preset and clear, electronic gear conversion, phase-C (phase-Z), and digital filter

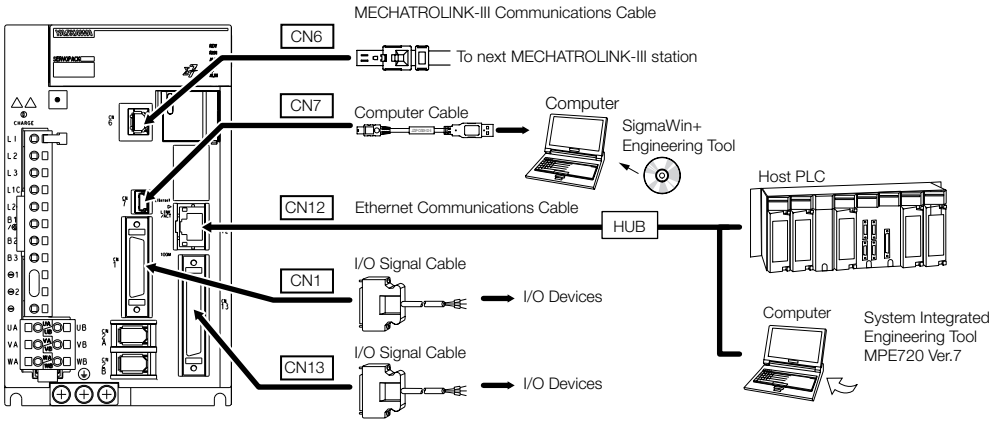
System Register Specifications

This section shows the overall structure of the system registers. Refer to the following manuals for details.
Sigma-7-Series Sigma-7C SERVOPACK Product Manual (Manual No.: SIEP S800002 04)
Sigma-7-Series Sigma-7C SERVOPACK Troubleshooting Manual (Manual No.: SIEP S800002 07)

Register Addresses	Contents
SW00000 to SW00029	System Service Registers
SW00030 to SW00049	System Status
SW00050 to SW00079	System Error Status
SW00050 to SW00079	User Operation Error Status
SW00090 to SW00103	System Service Execution Status
SW00104 to SW00109	Reserved
SW00110 to SW00189	Detailed User Operation Error Status
SW00190 to SW00199	Reserved
SW00200 to SW00503	Security Status
SW00504 and SW00505	Reserved
SW00506 and SW00507	Security Status
SW00508 to SW00649	Reserved
SW00650 to SW00667	USB-Related System Status
SW00668 to SW00693	Reserved
SW00694 to SW00697	Message Relaying Status
SW00698 to SW00789	Interrupt Status
SW00790 to SW00799	Reserved
SW00800 to SW01095	Module Information
SW01096 to SW02687	Reserved
SW02688 to SW03199	PROFINET Controller (266IF-01) IOPS Status
SW03200 to SW05119	Motion Program Information
SW05120 to SW05247	Used by the system (system memory read)
SW05248 to SW08191	Reserved
SW08192 to SW09215	Expansion Motion Program Information
SW09216 to SW09559	Reserved
SW09560 to SW10627	Expansion System I/O Error Status
SW10628 to SW13699	Reserved
SW13700 to SW14259	Expanded Unit and Module Information
SW14260 to SW15997	Reserved
SW15998 to SW16011	Expansion System Service Execution Status
SW16012 to SW16199	Reserved
SW16200 to SW17999	Alarm History Information
SW18000 to SW19999	Reserved
SW20000 to SW22063	Product Information
SW22064 to SW23999	Reserved
SW24000 to SW24321	Data Logging Execution Status
SW24322 to SW24999	Reserved
SW24400 to SW24719	FTP Client Status and Controls
SW25000 to SW25671	Automatic Reception Status for Ethernet Communications
SW25672 to SW27599	Reserved
SW27600 to SW29775	Maintenance Monitor
SW29776 to SW65534	Reserved

Selecting Cables SGD7C with built-in Controller

System Configurations



Selection Table

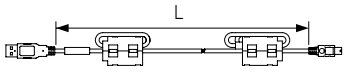
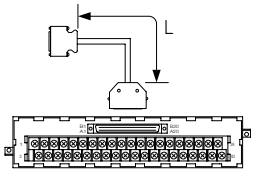
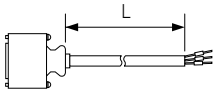
Important

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.

Refer to the following manual for the following information.

- Cable dimensional drawings and cable connection specifications
- Order numbers and specifications of individual connectors for cables

Sigma-7-Series AC Servo Drive Peripheral Device Selection Manual (Manual No.: SIEP S800001 32)

Code	Description		Length	Order Number	Appearance
CN7	Computer Cable		2.5 m	JZSP-CVS06-02-E	
CN13	I/O Signal Cables	Soldered Connector Kit		DP9420007-E	
		Connector-Terminal Block Converter Unit (with cable)	0.5 m	JUSP-TA36P-E	
			1 m	JUSP-TA36P-1-E	
			2 m	JUSP-TA36P-2-E	
		Cable with Loose Wires at One End (loose wires on peripheral device end)	1 m	JZSP-CSI03-1-E	
			2 m	JZSP-CSI03-2-E	
			3 m	JZSP-CSI03-3-E	

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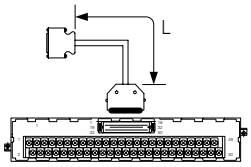
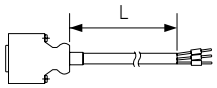
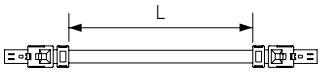
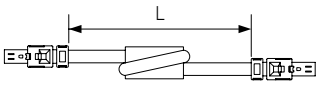
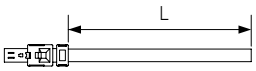
Code	Description		Length	Order Number	Appearance
CN1	I/O Signal Cables	Soldered Connector Kit		JZSP-CSI9-1-E	
		Connector-Terminal Block Converter Unit (with cable)	0.5 m	JUSP-TA50PG-E	
			1 m	JUSP-TA50PG-1-E	
			2 m	JUSP-TA50PG-2-E	
		Cable with Loose Wires at One End (loose wires on peripheral device end)	1 m	JZSP-CSI01-1-E	
			2 m	JZSP-CSI01-2-E	
			3 m	JZSP-CSI01-3-E	
CN6	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	
CN12	Ethernet communications cables			Use a commercially available cable that meets the following conditions: Ethernet specification: 100Base-TX Category 5 or higher Twisted-pair cable with RJ-45 connectors	

SERVOPACK Main Circuit Wires

Important

These specifications are based on IEC/EN 61800-5-1, UL 61800-5-1, and CSA C22.2 No.274.
1. To comply with UL standards, use UL-compliant wires.
2. Use copper wires with a rated temperature of 75° 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 surrounding air temperature.

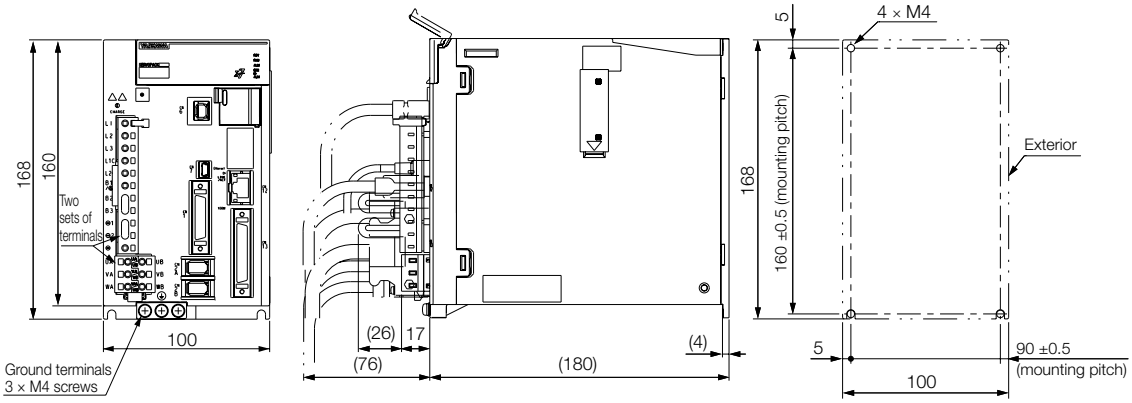
Single-phase / Three-phase, 200-VAC Wires for Sigma-7C SERVOPACKs

SGD7C-	Terminals		Wire Size	Screw Size	Tightening Torque [Nm]
1R6A*2	Main Circuit Power Supply Cable	L1, L2, L3	AWG16 (1.25 mm^2)	–	–
	Servomotor Main Circuit Cable*1	UA, VA, WA, UB, VB, WB			
	Control Power Supply Cable	L1C, L2C			
	External Regenerative Resistor Cable	B1/⊕, B2			
	Ground cable	⏚	AWG14 (2.0 mm^2) min.	M4	1.2 to 1.4
2R8A*2	Main Circuit Power Supply Cable	L1, L2, L3	AWG14 (2.0 mm^2)	–	–
	Servomotor Main Circuit Cable*1	UA, VA, WA, UB, VB, WB	AWG16 (1.25 mm^2)		
	Control Power Supply Cable	L1C, L2C			
	External Regenerative Resistor Cable	B1/⊕, B2			
	Ground cable	⏚	AWG14 (2.0 mm^2) min.	M4	1.2 to 1.4
5R5A*2, 7R6A	Main Circuit Power Supply Cable	L1, L2, L3	AWG14 (2.0 mm^2)	–	–
	Servomotor Main Circuit Cable*1	UA, VA, WA, UB, VB, WB	AWG16 (1.25 mm^2)		
	Control Power Supply Cable	L1C, L2C			
	External Regenerative Resistor Cable	B1/⊕, B2	AWG14 (2.0 mm^2)		
	Ground cable	⏚	AWG14 (2.0 mm^2) min.	M4	1.2 to 1.4

*1 If you do not use the recommended Servomotor Main Circuit Cable, use this table to select wires.
*2 You can use these models with either a single-phase or three-phase power supply input.

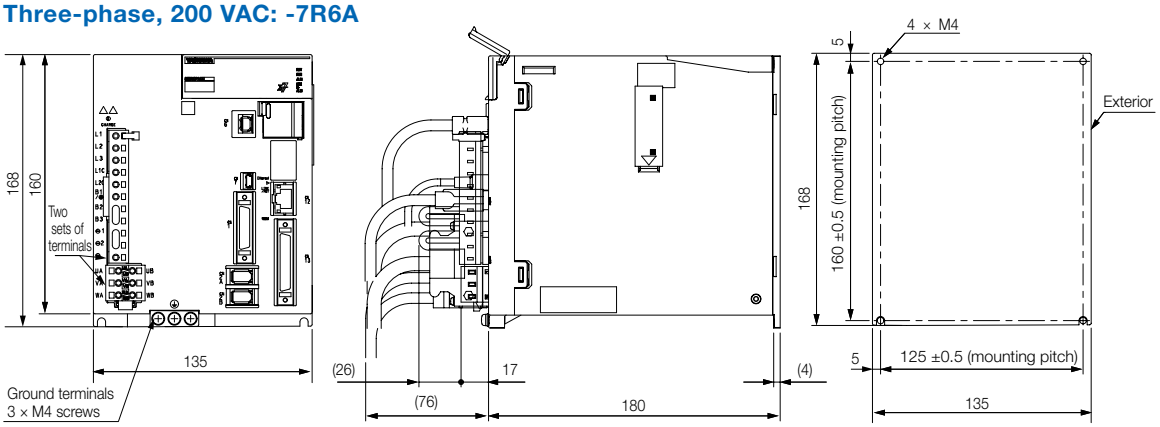
Sigma-7C SERVOPACK External Dimensions

Three-phase & Single-phase, 200 VAC: SGD7C-1R6A and -2R8A



Approx. mass: 2.0 kg
Unit: mm

Three-phase & Single-phase, 200 VAC: SGD7C-5R5A
Three-phase, 200 VAC: -7R6A

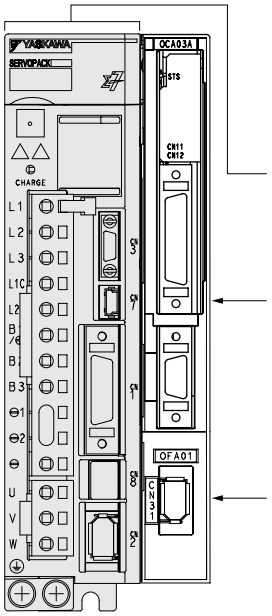


Approx. mass: 2.8 kg
Unit: mm

Sigma-7S Command Option Attachable Type

Configuration

A Sigma-7S Single-axis INDEXER Module-Mounted SERVOPACK is a Command Option Attachable-Type SERVOPACK with an INDEXER Module mounted on the side of the SERVOPACK. Positioning with single-axis control can be performed by using program table operation and other functions.



Command Option Attachable-Type SERVOPACKs
SGD7S-□□□□E0A

Option Module INDEXER
SGDV-OCA03A

Note: Firmware version 6 or later is required.

Fully-Closed Module*
SGDV-OFA01A

* Attach a Fully-Closed Module if fully-closed loop control is required.

Model Designations

SGD7S - R70 A E0 A 001 000

Sigma-7 Series Sigma-7S Models	1st ... 3rd	4th	5th + 6th	7th	8th ... 10th	11th ... 13th	digit

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

Code	Specification
Three-phase, 200 V	
R70*1	0.05 kW
R90*1	0.1 kW
1R6*1	0.2 kW
2R8*1	0.4 kW
3R8	0.5 kW
5R5*1	0.75 kW
7R6	1.0 kW
120*2	1.5 kW
180	2.0 kW
200*3	3.0 kW
330	5.0 kW
470	6.0 kW
550	7.5 kW
590	11 kW
780	15 kW

4th digit - Voltage

Code	Specification
A	200 VAC

5th + 6th digit - Interface*4

Code	Specification
E0	Command Option Attachable Type*5

7th digit - Design Revision Order

Code	Specification
A	Standard Model

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

Code	Specifications	Applicable Models
None	Without Options	All models
000	Without Options only used in combination with FT/EX	All models
001	Rack-mounted	SGD7S-R70A to -330A
	Duct-ventilated	SGD7S-470A to -780A
002	Varnished	All models
008	Single-phase, 200 V power input	SGD7S-120A
020*6	No dynamic brake	SGD7S-R70A to -2R8A
	External dynamic brake resistor	SGD7S-3R8A to -780A
00A	Varnished and single-phase power input	All models

Note:
Depending on configuration choices made, the model code might end after the 7th or 10th digit, or involve all 13 digits.
Readily available up to 1.5 kW. Others available on request.
Additional accessories and software for SERVOPACKs is described in the Periphery section.

Note:
*1. You can use these models with either a single-phase or three-phase power supply input.
*2. A model with a single-phase, 200-VAC power supply input is available as a hardware option (model. SGD7S-120A□0A008).
*3. The rated output is 2.4 kW if you combine the SGM7G-30A with the SGD7S-200A.
*4. The same SERVOPACKs are used for both Rotary Servomotors and Linear Servomotors.
*5. A command option module must be attached to the Command Option Attachable-type SERVOPACK for use.
*6. Refer to the following manual for details.
Sigma-7-Series AC Servo Drive Sigma-7S/Sigma-7W SERVOPACK with Hardware Option Specifications Dynamic Brake Product Manual (Manual No.: SIEP S800001 73)
*7. Refer to the following manual for details.
Sigma-7-Series AC Servo Drive Σ-7S SERVOPACK with FT/EX Specification for SGM7D Motor Product Manual (Manual No.: SIEP S800001 91)

Sigma-7S Single-axis INDEXER Module

Ratings

Single-phase, 200 VAC

Model SGD7S-			R70A	R90A	1R6A	2R8A	5R5A	120A
Maximum Applicable Motor Capacity [kW]			0.05	0.1	0.2	0.4	0.75	1.5
Continuous Output Current [A]			0.66	0.91	1.6	2.8	5.5	11.6
Instantaneous Maximum Output Current [A]			2.1	3.2	5.9	9.3	16.9	28
Main Circuit	Power Supply		200 VAC to 240 VAC, -15% to +10%, 50 Hz/60 Hz					
	Input Current [A]*		0.8	1.6	2.4	5.0	8.7	16
Control	Power Supply		200 VAC to 240 VAC, -15% to +10%, 50 Hz/60 Hz					
	Input Current [A]*		0.2	0.2	0.2	0.2	0.2	0.25
Power Supply Capacity [kVA]*			0.2	0.3	0.6	1.2	1.9	4.0
Power Loss*	Main Circuit Power Loss [W]		5.0	7.1	12.1	23.7	39.2	71.8
	Control Circuit Power Loss [W]		12	12	12	12	14	16
	Built-in Regenerative Resistor Power Loss [W]		–	–	–	–	8	16
	Total Power Loss [W]		17.0	19.1	24.1	35.7	61.2	103.8
Regenerative Resistor	Built-In Regenerative Resistor	Resistance [Ω]	–	–	–	–	40	12
		Capacity [W]	–	–	–	–	40	60
	Minimum Allowable External Resistance [Ω]		40	40	40	40	40	12
Overvoltage Category			III					

* This is the net value at the rated load.

Three-Phase, 200 VAC

Model SGD7S-			R70A	R90A	1R6A	2R8A	3R8A	5R5A	7R6A	120A	180A	200A	330A
Maximum Applicable Motor Capacity [kW]			0.05	0.1	0.2	0.4	0.5	0.75	1.0	1.5	2.0	3.0	5.0
Continuous Output Current [A]			0.66	0.91	1.6	2.8	3.8	5.5	7.6	11.6	18.5	19.6	32.9
Instantaneous Maximum Output Current [A]			2.1	3.2	5.9	9.3	11	16.9	17	28	42	56	84
Main Circuit	Power Supply		200 VAC to 240 VAC, -15% to +10%, 50 Hz/60 Hz										
	Input Current [A]*		0.4	0.8	1.3	2.5	3.0	4.1	5.7	7.3	10	15	25
Control	Power Supply		200 VAC to 240 VAC, -15% to +10%, 50 Hz/60 Hz										
	Input Current [A]*		0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.25	0.25	0.3
Power Supply Capacity [kVA]*			0.2	0.3	0.5	1.0	1.3	1.6	2.3	3.2	4.0	5.9	7.5
Power Loss*	Main Circuit Power Loss [W]		5.0	7.0	11.9	22.5	28.5	38.9	49.2	72.6	104.2	114.2	226.6
	Control Circuit Power Loss [W]		12	12	12	12	14	14	14	15	16	16	19
	Built-in Regenerative Resistor Power Loss [W]		–	–	–	–	8	8	8	10	16	16	36
	Total Power Loss [W]		17.0	19.0	23.9	34.5	50.5	60.9	71.2	97.6	136.2	146.2	281.6
Regenerative Resistor	Built-In Regenerative Resistor	Resistance [Ω]	–	–	–	–	40	40	40	20	12	12	8
		Capacity [W]	–	–	–	–	40	40	40	60	60	60	180
	Minimum Allowable External Resistance [Ω]		40	40	40	40	40	40	40	20	12	12	8
Overvoltage Category			III										

* This is the net value at the rated load.

Note: Readily available up to 1.5 kW. Others available on request.

Model SGD7S-			470A	550A	590A	780A
Maximum Applicable Motor Capacity [kW]			6.0	7.5	11	15
Continuous Output Current [A]			46.9	54.7	58.6	78
Instantaneous Maximum Output Current [A]			110	130	140	170
Main Circuit	Power Supply		200 VAC to 240 VAC, -15% to +10%, 50 Hz/60 Hz			
	Input Current [A]*1		29	37	54	73
Control	Power Supply		200 VAC to 240 VAC, -15% to +10%, 50 Hz/60 Hz			
	Input Current [A]*1		0.3	0.3	0.4	0.4
Power Supply Capacity [kVA]* 1			10.7	14.6	21.7	29.6
Power Loss*1	Main Circuit Power Loss [W]		271.7	326.9	365.3	501.4
	Control Circuit Power Loss [W]		21	21	28	28
	External Regenerative Resistor Unit Power Loss [W]		180*2	180*3	350*3	350*3
	Total Power Loss [W]		292.7	347.9	393.3	529.4
External Regenerative Resistor Unit	External Regenerative Resistor Unit	Resistance [Ω]	6.25*2	3.13*3	3.13*3	3.13*3
		Capacity [W]	880*2	1,760*3	1,760*3	1,760*3
	Minimum Allowable External Resistance [Ω]		5.8	2.9	2.9	2.9
Overvoltage Category			III			

Note: Readily available up to 1.5 kW. Others available on request.

*1. This is the net value at the rated load.
*2. This value is for the optional JUSP-RA04-E Regenerative Resistor Unit.
*3. This value is for the optional JUSP-RA05-E Regenerative Resistor Unit.

270 VDC

Model SGD7S-		R70A	R90A	1R6A	2R8A	3R8A	5R5A	7R6A	120A
Maximum Applicable Motor Capacity [kW]		0.05	0.1	0.2	0.4	0.5	0.75	1	1.5
Continuous Output Current [A]		0.66	0.91	1.6	2.8	3.8	5.5	7.6	11.6
Instantaneous Maximum Output Current [A]		2.1	3.2	5.9	9.3	11	16.9	17	28
Main Circuit	Power Supply	270 VDC to 324 VDC, -15% to +10%							
	Input Current [A]*1	0.5	1	1.5	3	3.8	4.9	6.9	11
Control	Power Supply	270 VDC to 324 VDC, -15% to +10%							
	Input Current [A]*1	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2*2
Power Supply Capacity [kVA]*1		0.2	0.3	0.6	1	1.4	1.6	2.3	3.2
Power Loss*1	Main Circuit Power Loss [W]	4.4	5.9	9.8	17.5	23.0	30.7	38.7	55.8
	Control Circuit Power Loss [W]	12	12	12	12	14	14	14	15
	Total Power Loss [W]	16.4	17.9	21.8	29.5	37.0	44.7	52.7	70.8
Overvoltage Category		III							

*1 This is the net value at the rated load.
*2 The value is 0.25 A for the SGD7S-120A00A008.

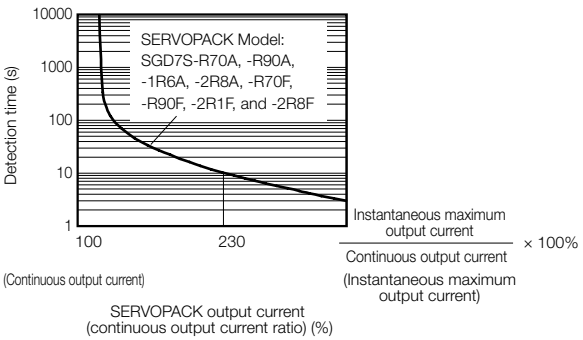
Model SGD7S-		180A	200A	330A	470A	550A	590A	780A
Maximum Applicable Motor Capacity [kW]		2.0	3.0	5.0	6.0	7.5	11.0	15.0
Continuous Output Current [A]		18.5	19.6	32.9	46.9	54.7	58.6	78.0
Instantaneous Maximum Output Current [A]		42.0	56.0	84.0	110	130	140	170
Main Circuit	Power Supply	270 VDC to 324 VDC, -15% to + 10%						
	Input Current [A]*	14	20	34	36	48	68	92
Control	Power Supply	270 VDC to 324 VDC, -15% to + 10%						
	Input Current [A]*	0.25	0.25	0.3	0.3	0.3	0.4	0.4
Power Supply Capacity [kVA]*		4.0	5.9	7.5	10.7	14.6	21.7	29.6
Power Loss*	Main Circuit Power Loss [W]	82.7	83.5	146.2	211.6	255.3	243.6	343.4
	Control Circuit Power Loss [W]	16	16	19	21	21	28	28
	Total Power Loss [W]	98.7	99.5	165.2	232.6	276.3	271.6	371.4
Overvoltage Category		III						

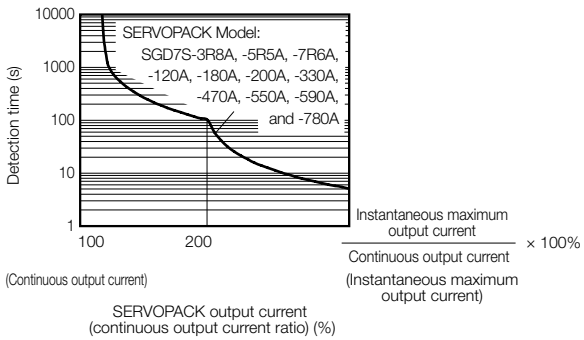
* This is the net value at the rated load.

Note: Readily available up to 1.5 kW. Others available on request.

SERVOPACK Overload Protection Characteristics

The overload detection level is set for hot start conditions with a SERVOPACK surrounding air temperature of 55°C.
An overload alarm (A.710 or A.720) will occur if overload operation that exceeds the overload protection characteristics shown in the following diagram (i.e., operation on the right side of the applicable line) is performed.
The actual overload detection level will be the detection level of the connected SERVOPACK or Servomotor that has the lower overload protection characteristics.
In most cases, that will be the overload protection characteristics of the Servomotor.





Note:
The above overload protection characteristics do not mean that you can perform continuous duty operation with an output of 100% or higher.
For a YASKAWA-specified combination of SERVOPACK and Servomotor, maintain the effective torque within the continuous duty zone of the torque-motor speed characteristic (or force-motor speed characteristics) of the Servomotor.

Specifications

The specification when the INDEXER Module is combined with a Command Option Attachable-Type SERVOPACK are given in the following table.

Item		Specification	
Control Method		IGBT-based PWM control, sine wave current drive	
Feedback	With Rotary Servomotor	Serial encoder: 17 bits (absolute encoder) 20 bits or 24 bits (incremental encoder/absolute encoder) 22 bits (absolute encoder)	
	With Linear Servomotor	• Absolute linear encoder (The signal resolution depends on the absolute linear encoder.) • Incremental linear encoder (The signal resolution depends on the incremental linear encoder or Serial Converter Unit.)	
Environmental Conditions	Surrounding Air Temperature	0°C to 55°C	
	Storage Temperature	-20°C to 85°C	
	Surrounding Air Humidity	90% relative humidity max. (with no freezing or condensation)	
	Storage Humidity	90% relative humidity max. (with no freezing or condensation)	
	Vibration Resistance	4.9 m/s^2	
	Shock Resistance	19.6 m/s^2	
	Degree of Protection	Class	SERVOPACK Model: SGD7S-
		IP10	R70A, R90A, 1R6A, 2R8A, 3R8A, 5R5A, 7R6A, 120A
		IP20	120AE0A008, 180A, 200A, 330A, 470A, 550A, 590A, 780A
	Pollution Degree	2 • Must be no corrosive or flammable gases. • Must be no exposure to water, oil, or chemicals. • Must be no dust, salts, or iron dust.	
	Altitude	1,000 m max.	
	Others	Do not use the SERVOPACK in the following locations: Locations subject to static electricity noise, strong electromagnetic/magnetic fields, or radioactivity	
Applicable Standards		UL 61800-5-1 (E147823), CSA C22.2 No.274, EN ISO13849-1: 2015, EN 55011 group 1 class A, EN 61000-6-2, EN 61000-6-4, EN 61800-3 (Category C2, Second environment), EN 50178, EN 61800-5-1, IEC 60204-1, IEC 61508 series, IEC 62061, IEC 61800-5-2, and IEC 61326-3-1	
Mounting		Mounting	SERVOPACK Model: SGD7S-
		Base-mounted	All Models
		Rack-mounted	R70A, R90A, 1R6A, 2R8A, 3R8A, 5R5A, 7R6A, 120A, 180A, 200A, 330A
		Duct-ventilated	470A, 550A, 590A, 780A
Performance	Speed Control Range	1:5,000 (At the rated torque, the lower limit of the speed control range must not cause the Servomotor to stop.)	
	Coefficient of Speed Fluctuation*1	±0.01% of rated speed max. (for a load fluctuation of 0% to 100%)	
		0% of rated speed max. (for a voltage fluctuation of ±10%)	
		±0.1% of rated speed max. (for a temperature fluctuation of 25°C ±25°C)	
	Torque Control Precision (Repeatability)	±1%	
	Soft Start Time Setting	0 s to 10 s (Can be set separately for acceleration and deceleration.)	
I/O Signals	Encoder Divided Pulse Putput	Phase A, phase B, phase C: Line-driver output Number of divided output pulses: Any setting is allowed	
	Overheat Protection Input	Number of input points: 1 Input voltage range: 0 V to ±5 V	

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Item				Specification	
I/O Signals	Sequence Input Signals	SERVOPACK	Fixed Input	Allowable voltage range: 24 VDC ±20% Number of input points: 6 Input method: Sink inputs or source inputs Input Signals: • Alarm Reset (/ALM-RST) • Forward Drive Prohibited (P-OT) • Reverse Drive Prohibited (N-OT) • Origin Return Deceleration Switch (/DEC) • Registration (/RGRT) • Servo ON (/S-ON) A signal can be allocated and the positive and negative logic can be changed.	
		INDEXER Module	Fixed Input	Allowable voltage range: 24 VDC ±20% Number of input points: 11	
				/MODE 0/1 (Mode Switch Input) signal	
				Mode 0	Mode 1
				• /START-STOP (Program Table Operation Start-Stop Input) signal • /PGMRES (Program Table Operation Reset Input) signal • /SEL0 (Program Step Selection Input 0) signal • /SEL1 (Program Step Selection Input 1) signal • /SEL2 (Program Step Selection Input 2) signal • /SEL3 (Program Step Selection Input 3) signal • /SEL4 (Program Step Selection Input 4) signal • /SEL5 (Program Step Selection Input 5) signal • /SEL6 (Program Step Selection Input 6) signal • /SEL7 (Program Step Selection Input 7) signal	• /HOME (Origin Return Input) signal • /JOGP (Forward Jog Input) signal • /JOGN (Reverse Jog Input) signal • /JOG0 (Jog Speed Table Selection Input 0) signal • /JOG1 (Jog Speed Table Selection Input 1) signal • /JOG2 (Jog Speed Table Selection Input 2) signal • /JOG3 (Jog Speed Table Selection Input 3) signal
	Sequence Output Signals	SERVOPACK	Fixed Input	Allowable voltage range: 5 VDC to 30 VDC Number of output points: 1 Output signal: Servo Alarm (ALM)	
			Output Signals for Which Allocations Can Be Changed	Allowable voltage range: 5 VDC to 30 VDC Number of output points: 3 (A photocoupler output (isolated) is used.) Output Signals: • Warning Output (/WARN) • Brake Output (/BK) • Servo Ready Output (/S-RDY) • Alarm Code Output (/ALO1, /ALO2, and /ALO3) A signal can be allocated and the positive and negative logic can be changed.	
		INDEXER Module	Fixed Input	Allowable voltage range: 5 VDC to 30 VDC Number of output points: 9 Output Signals: • Positioning Completion Output (/INPOSITION) • Programmable Output 0 (/POUT0) • Programmable Output 1 (/POUT1) • Programmable Output 2 (/POUT2) • Programmable Output 3 (/POUT3) • Programmable Output 4 (/POUT4) • Programmable Output 5 (/POUT5) • Programmable Output 6 (/POUT6) • Programmable Output 7 (/POUT7)	

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Item			Specification
Communications	RS-422A Communications (CN3)	Interfaces	Digital Operator (JUSP-OP05A-1-E) and personal computer (with SigmaWin+)
		1:N Communications	Up to N = 15 stations possible for RS-422A port
		Axis Address Setting	Set with parameters.
	USB Communications (CN7)	Interfaces	Interface Personal computer (with SigmaWin+)
		Communications Standard	Conforms to USB2.0 standard (12 Mbps).
Displays/ Indicators	SERVOPACK		CHARGE and PWR indicators, and one-digit seven-segment display
	INDEXER Module		Refer to the following manual for details. Sigma-7-Series AC Servo Drive Sigma-7S SERVOPACK Command Option Attachable Type with INDEXER Module Product Manual (Manual No.: SIEP S800001 64)
Operating Methods	Program Table Method		• Program table positioning in which steps are executed sequentially by commands given through contact input or serial communications • Positioning in which station numbers are specified by commands given through contact input or serial communications
		Max. Number of Steps	256
		Max. Number of Tables	256
		Max. Number of Stations	256
	Serial Communications Method		Serial command by 1-channel ASCII code Communications specifications: RS-422/485 (50 m max.) Connection topology: Multi-drop connection (16 axes max.) Baud rate: 9,600, 19,200, 38,400 bps
	Other Functions		Registration (positioning by external signals), origin return
Analog Monitor (CN5)			Number of points: 2 Output voltage range: ±10 VDC (effective linearity range: ±8 V) Resolution: 16 bits Accuracy: ±20 mV (Typ) Maximum output current: ±10 mA Settling time (±1%): 1.2 ms (Typ)
Dynamic Brake (DB)			Activated when a servo alarm or overtravel (OT) occurs, or when the power supply to the main circuit or servo is OFF.
Regenerative Processing			Built-in (An external resistor must be connected to the SGD7S-470A to -780A.) Refer to the following section for details or Built-In Regenerative Resistor.
Overtravel (OT) Prevention			Stopping with a dynamic brake (DB), coasting to a stop, performing a hard stop, or performing a smooth stop (decelerating to a stop) for a CCW-OT (CCW Drive Prohibit Input) signal or CW-OT (CW Drive Prohibit Input) signal.
Protective Functions			Overcurrent, overvoltage, low voltage, overload, regeneration error, etc.
Utility Functions			Gain adjustment, alarm history, jogging, origin search, etc.
Safety Functions	Input		/HWBB1 and /HWBB2: Base block signals for Power Modules
	Output		EDM1: Monitors the status of built-in safety circuit (fixed output).
	Applicable Standards*2		ISO13849-1 PLe (Category 3), IEC61508 SIL3
Applicable Option Modules			Fully-Closed Module You cannot use a Safety Module if you are using an INDEXER Module.

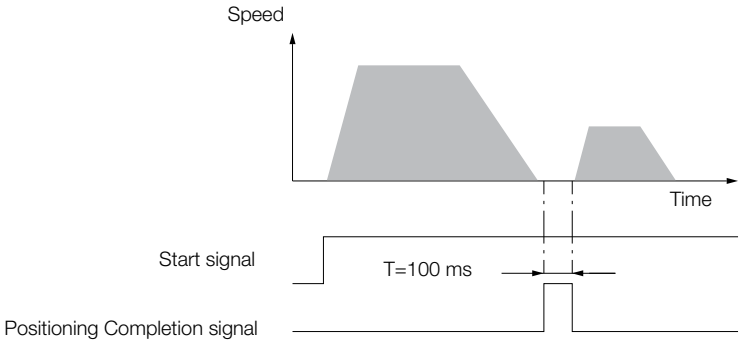
*1. The coefficient of speed fluctuation for load fluctuation is defined as follows:

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

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

Reference Methods

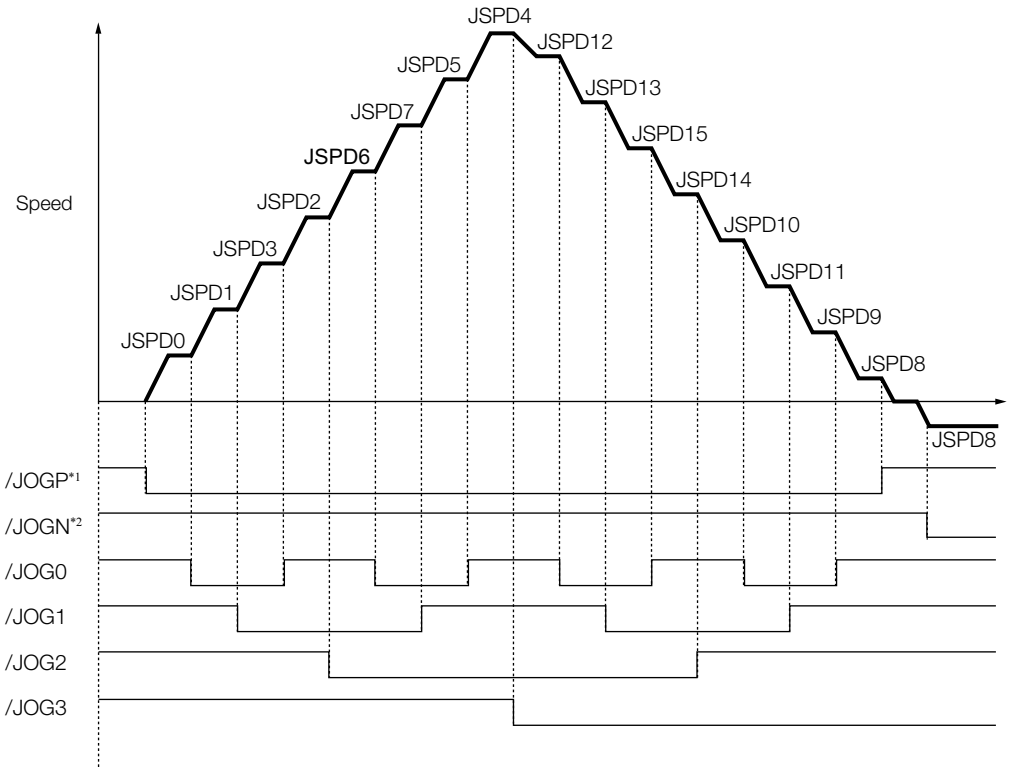
	PGMSTEP	POS	SPD	RDST	RSPD	ACC*	DEC*	EVENT	LOOP	NEXT
256 steps	0	I+400000	2000	500000	1000	200	100	T5000	1	1
	1	I+100000	1000	200000	2000	100	50	ITO	1	END
	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮
	n	I+400000	2000	500000	1000	100	50	IT100	1	n+1
	n+1	I+100000	1000	200000	2000	⋮	⋮	NT0	1	END
	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮
	254	I+400000	2000	500000	1000	100	50	SEL3T200	1	127
	255	I+100000	1000	200000	2000	100	50	DT0	1	END



Jog Speed Table

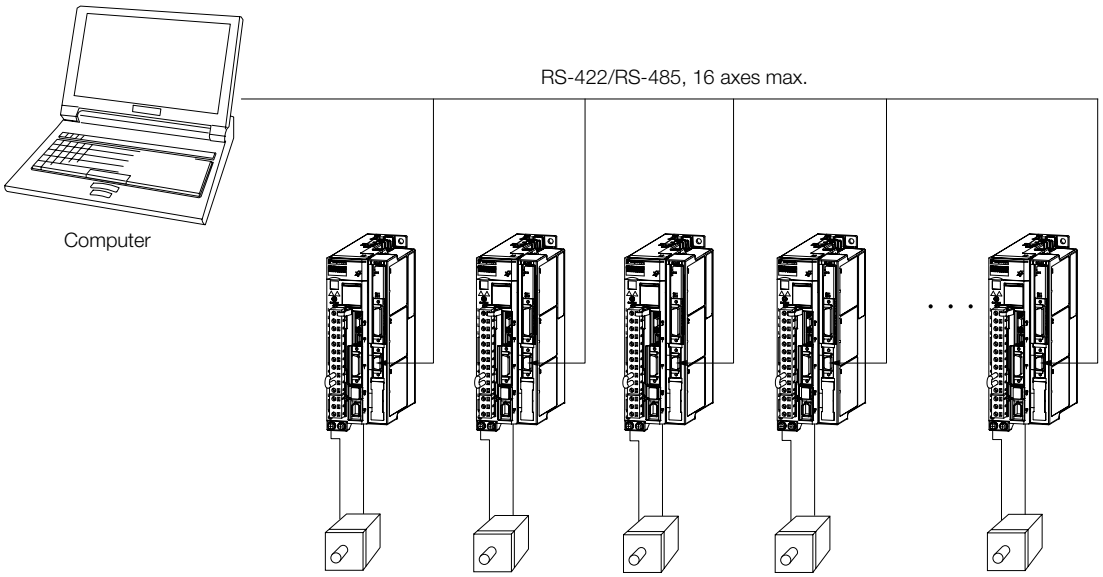
	JSPD	JOG3	JOG2	JOG1	JOG0	Jog Speed
16 combinations	0	0	0	0	0	1000
	1	0	0	0	1	2000
	2	0	0	1	0	4000
	⋮	⋮	⋮	⋮	⋮	⋮
	⋮	⋮	⋮	⋮	⋮	⋮
	⋮	⋮	⋮	⋮	⋮	⋮
	15	1	1	1	1	5500

Note: 1: Signal is ON (active), 0: Signal is OFF (inactive).

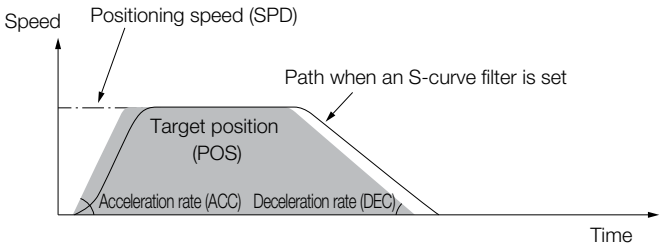


*1. Forward operation at the jog speed is performed while the /JOGP signal is ON.
*2. Reverse operation at the jog speed is performed while the /JOGN signal is ON.

With serial commands, ASCII command strings are sent to the INDEXER Module through RS-422 or RS-485 communications and these commands are interpreted and executed immediately. You can use general-purpose serial communications (RS422/RS485) to perform independent control of up to 16 axes from one host controller (e.g., PC or HMI).



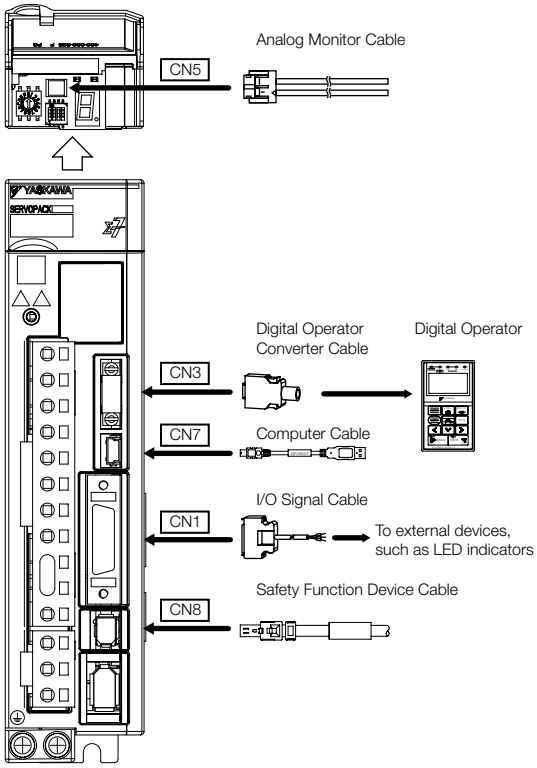

```
1SVON              # Servo turned ON.
1POSI=400000       # Set relative position to 400,000.
1SPD=2000          # Set speed to 2,000.
1ACC=200           # Set acceleration rate to 200.
1DEC=100           # Set deceleration rate to 100.
1ST                # Start operation.
 :
```



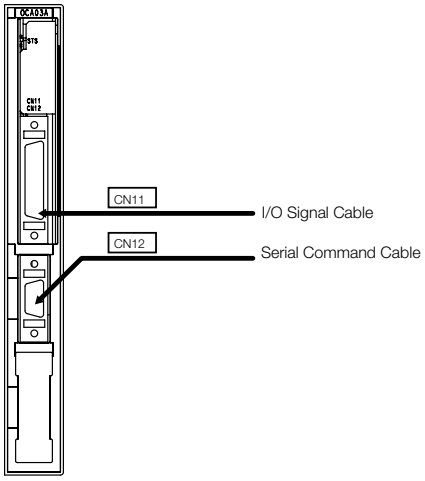
Selecting Cables SGD7S Command Option Attachable Type with INDEXER Module

System Configurations

SGD7S Single Axis Command Option Attachable Type SERVOPACK



INDEXER Module



Selection Table

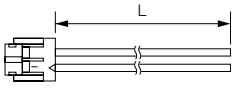
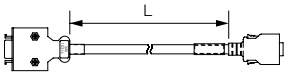
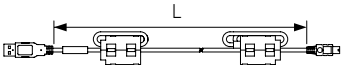
Important

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.

Refer to the following manual for the following information.

- Cable dimensional drawings and cable connection specifications
- Order numbers and specifications of individual connectors for cables

Sigma-7-Series AC Servo Drive Peripheral Device Selection Manual (Manual No.: SIEP S800001 32)

Code	Description		Length	Order Number	Appearance
CN5	Analog Monitor Cable		1 m	JZSP-CA01-E	
CN3	Digital Operator			JUSP-0P05A-1-E	
		Digital Operator Converter Cable	0.3 m	JZSP-CVS05-A3-E*1	
CN7	Computer Cable		2.5 m	JZSP-CVS06-02-E	

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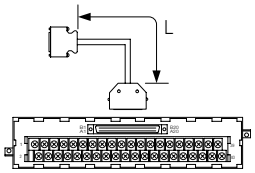
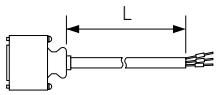
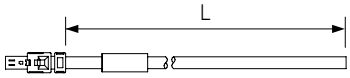
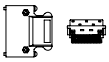
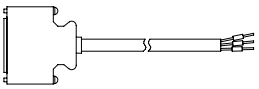
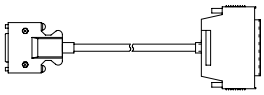
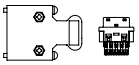
Code	Description		Length	Order Number	Appearance
CN1	I/O Signal Cables	Soldered Connector Kit		JZSP-CSI9-1-E	
		Connector-Terminal Block Converter Unit (with cable)	0.5 m	JUSP-TA26P-E	
			1 m	JUSP-TA26P-1-E	
			2 m	JUSP-TA26P-2-E	
		Cable with Loose Wires at One End (loose wires on peripheral device end)	1 m	JZSP-CSI02-1-E	
			2 m	JZSP-CSI02-2-E	
			3 m	JZSP-CSI02-3-E	
CN8	Safety Function Device Cables	Cables with Connectors*2	1 m	JZSP-CVH03-01-E	
			3 m	JZSP-CVH03-03-E	
		Connector Kit*3		Contact Tyco Electronics Japan G.K. Product name: Industrial Mini I/O D-shape Type 1 Plug Connector Kit Model number: 2013595-1	
CN11	I/O Signal Cables	Connector Kit		DP9420007-E	
		Cables with Loose Wires at One End	1 m	JZSP-CVI01-1-E	
			2 m	JZSP-CVI01-2-E	
			3 m	JZSP-CVI01-3-E	
		Cables with Terminal Block on One End	0.5 m	JUSP-TA36V-E	
			1 m	JUSP-TA36V-1-E	
			2 m	JUSP-TA36V-2-E	
CN12	Serial Command Cable	Connector Kit*3		JZSP-CHI9-1	 Contact YASKAWA Controls Co., Ltd. for the cable.

*1. This Converter Cable is required to use the Sigma-III-series Digital Operator (JUSP-OP05A) for Sigma-7-series SERVOPACKs.
*2. 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.
*3. Use the Connector Kit when you make cables yourself.

SERVOPACK Main Circuit Wires

Important

These specifications are based on IEC/EN 61800-5-1, UL 61800-5-1, and CSA C22.2 No.274.
1. To comply with UL standards, use UL-compliant wires.
2. Use copper wires with a rated temperature of 75° 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 surrounding air temperature.

Three-phase, 200-VAC Wires for Sigma-7S SERVOPACKs

SGD7S-	Terminals		Wire Size	Screw Size	Tightening Torque [Nm]
R70A, R90A, 1R6A, 2R8A, 3R8A, 5R5A, 7R6A	Main Circuit Power Supply Cable	L1, L2, L3	AWG16 (1.25 mm²)	–	–
	Servomotor Main Circuit Cable*	U, V, W			
	Control Power Supply Cable	L1C, L2C			
	External Regenerative Resistor Cable	B1/⊕, B2			
	Ground cable	⏚	AWG14 (2.0 mm²) min.	M4	1.2 to 1.4
120A	Main Circuit Power Supply Cable	L1, L2, L3	AWG14 (2.0 mm²)	–	–
	Servomotor Main Circuit Cable*	U, V, W			
	Control Power Supply Cable	L1C, L2C	AWG16 (1.25 mm²)		
	External Regenerative Resistor Cable	B1/⊕, B2			
	Ground cable	⏚	AWG14 (2.0 mm²) min.	M4	1.2 to 1.4
180A	Main Circuit Power Supply Cable	L1, L2, L3	AWG14 (2.0 mm²)	M4	1.0 to 1.2
	Servomotor Main Circuit Cable*	U, V, W	AWG10 (5.5 mm²)		
	Control Power Supply Cable	L1C, L2C	AWG16 (1.25 mm²)		
	External Regenerative Resistor Cable	B1/⊕, B2			
	Ground cable	⏚	AWG14 (2.0 mm²) min.	M4	1.2 to 1.4
200A	Main Circuit Power Supply Cable	L1, L2, L3	AWG12 (3.5 mm²)	M4	1.0 to 1.2
	Servomotor Main Circuit Cable*	U, V, W	AWG10 (5.5 mm²)		
	Control Power Supply Cable	L1C, L2C	AWG16 (1.25 mm²)		
	External Regenerative Resistor Cable	B1/⊕, B2			
	Ground cable	⏚	AWG14 (2.0 mm²) min.	M4	1.2 to 1.4
330A	Main Circuit Power Supply Cable	L1, L2, L3	AWG8 (8.0 mm²)	M4	1.0 to 1.2
	Servomotor Main Circuit Cable*	U, V, W			
	Control Power Supply Cable	L1C, L2C	AWG16 (1.25 mm²)		
	External Regenerative Resistor Cable	B1/⊕, B2	AWG14 (2.0 mm²)		
	Ground cable	⏚	AWG14 (2.0 mm²) min.	M4	1.2 to 1.4
470A	Main Circuit Power Supply Cable	L1, L2, L3	AWG8 (8.0 mm²)	M5	2.2 to 2.4
	Servomotor Main Circuit Cable*	U, V, W	AWG6 (14 mm²)		
	Control Power Supply Cable	L1C, L2C	AWG16 (1.25 mm²)		
	External Regenerative Resistor Cable	B1/⊕, B2	AWG14 (2.0 mm²)		
	Ground cable	⏚	AWG14 (2.0 mm²) min.		
550A	Main Circuit Power Supply Cable	L1, L2, L3	AWG8 (8.0 mm²)		
	Servomotor Main Circuit Cable*	U, V, W	AWG4 (22 mm²)		
	Control Power Supply Cable	L1C, L2C	AWG16 (1.25 mm²)		
	External Regenerative Resistor Cable	B1/⊕, B2	AWG10 (5.5 mm²)		
	Ground cable	⏚	AWG14 (2.0 mm²) min.		
590A	Main Circuit Power Supply Cable	L1, L2, L3	AWG4 (22 mm²)	M6	2.7 to 3.0
	Servomotor Main Circuit Cable*	U, V, W			
	Control Power Supply Cable	L1C, L2C	AWG16 (1.25 mm²)		
	External Regenerative Resistor Cable	B1/⊕, B2	AWG10 (5.5 mm²)		
	Ground cable	⏚	AWG14 (2.0 mm²) min.		
780A	Main Circuit Power Supply Cable	L1, L2, L3	AWG3 (30 mm²)		
	Servomotor Main Circuit Cable*	U, V, W			
	Control Power Supply Cable	L1C, L2C	AWG16 (1.25 mm²)		
	External Regenerative Resistor Cable	B1/⊕, B2	AWG8 (8.0 mm²)		
	Ground cable	⏚	AWG14 (2.0 mm²) min.		

* If you do not use the recommended Servomotor Main Circuit Cable, use this table to select wires.

Single-phase, 200-VAC Wires for Sigma-7S SERVOPACKs

SGD7S-	Terminals		Wire Size	Screw Size	Tightening Torque [Nm]
R70A, R90A, 1R6A, 2R8A	Main Circuit Power Supply Cable	L1, L2, L3	AWG16 (1.25 mm²)	–	–
	Servomotor Main Circuit Cable*	U, V, W			
	Control Power Supply Cable	L1C, L2C			
	External Regenerative Resistor Cable	B1/⊕, B2			
	Ground cable	⏚	AWG14 (2.0 mm²) min.	M4	1.2 to 1.4
5R5A	Main Circuit Power Supply Cable	L1, L2, L3	AWG14 (2.0 mm²)	–	–
	Servomotor Main Circuit Cable*	U, V, W	AWG16 (1.25 mm²)		
	Control Power Supply Cable	L1C, L2C			
	External Regenerative Resistor Cable	B1/⊕, B2			
	Ground cable	⏚	AWG14 (2.0 mm²) min.	M4	1.2 to 1.4
120A□□□008	Main Circuit Power Supply Cable	L1, L2, L3	AWG14 (2.0 mm²)	M4	1.0 to 1.2
	Servomotor Main Circuit Cable*	U, V, W			
	Control Power Supply Cable	L1C, L2C	AWG16 (1.25 mm²)		
	External Regenerative Resistor Cable	B1/⊕, B2			
	Ground cable	⏚	AWG14 (2.0 mm²) min.	M4	1.2 to 1.4

* If you do not use the recommended Servomotor Main Circuit Cable, use this table to select wires.

DC Power Supply Wires for Sigma-7S SERVOPACKs

SGD7S-	Terminals*1		Wire Size	Screw Size	Tightening Torque [Nm]
R70A, R90A, 1R6A, 2R8A, 3R8A, 5R5A, 7R6A	Servomotor Main Circuit Cable	U, V, W*2	AWG16 (1.25 mm²)	–	–
	Control Power Supply Cable	L1C, L2C			
	External Regenerative Resistor Cable	B1/⊕, ⊖2			
	Ground cable	⏚	AWG14 (2.0 mm²) min.	M4	1.2 to 1.4
120A (three-phase, 200-VAC input)	Servomotor Main Circuit Cable	U, V, W*2	AWG14 (2.0 mm²)	–	–
	Control Power Supply Cable	L1C, L2C	AWG16 (1.25 mm²)		
	External Regenerative Resistor Cable	B1/⊕, ⊖2	AWG14 (2.0 mm²)		
	Ground cable	⏚	AWG14 (2.0 mm²) min.	M4	1.2 to 1.4
120A□□□008 (single-phase, 200-VAC input)	Servomotor Main Circuit Cable	U, V, W*2	AWG14 (2.0 mm²)	M4	1.0 to 1.2
	Control Power Supply Cable	L1C, L2C	AWG16 (1.25 mm²)		
	External Regenerative Resistor Cable	B1/⊕, ⊖2	AWG14 (2.0 mm²)		
	Ground cable	⏚	AWG14 (2.0 mm²) min.	M4	1.2 to 1.4
180A, 200A	Servomotor Main Circuit Cable	U, V, W*2	AWG10 (5.5 mm²)	M4	1.0 to 1.2
	Control Power Supply Cable	L1C, L2C	AWG16 (1.25 mm²)		
	External Regenerative Resistor Cable	B1/⊕, ⊖2	AWG10 (5.5 mm²)		
	Ground cable	⏚	AWG14 (2.0 mm²) min.	M4	1.2 to 1.4
330A	Servomotor Main Circuit Cable	U, V, W*2	AWG8 (8.0 mm²)	M4	1.0 to 1.2
	Control Power Supply Cable	L1C, L2C	AWG16 (1.25 mm²)		
	External Regenerative Resistor Cable	B1/⊕, ⊖2	AWG8 (8.0 mm²)		
	Ground cable	⏚	AWG14 (2.0 mm²) min.	M4	1.2 to 1.4
470A	Servomotor Main Circuit Cable	U, V, W*2	AWG6 (14 mm²)	M5	2.2 to 2.4
	Control Power Supply Cable	L1C, L2C	AWG16 (1.25 mm²)		
	External Regenerative Resistor Cable	B1/⊕, ⊖2	AWG8 (8.0 mm²)		
	Ground cable	⏚	AWG14 (2.0 mm²) min.		
550A	Servomotor Main Circuit Cable	U, V, W*2	AWG4 (22 mm²)		
	Control Power Supply Cable	L1C, L2C	AWG16 (1.25 mm²)		
	External Regenerative Resistor Cable	B1/⊕, ⊖2	AWG6 (14 mm²)		
	Ground cable	⏚	AWG14 (2.0 mm²) min.		
590A	Servomotor Main Circuit Cable	U, V, W*2	AWG4 (22 mm²)	M6	2.7 to 3.0
	Control Power Supply Cable	L1C, L2C	AWG16 (1.25 mm²)		
	External Regenerative Resistor Cable	B1/⊕, ⊖2	AWG3 (30 mm²)		
	Ground cable	⏚	AWG14 (2.0 mm²) min.		
780A	Servomotor Main Circuit Cable	U, V, W*2	AWG3 (30 mm²)		
	Control Power Supply Cable	L1C, L2C	AWG16 (1.25 mm²)		
	External Regenerative Resistor Cable	B1/⊕, ⊖2	AWG3 (30 mm²)		
	Ground cable	⏚	AWG14 (2.0 mm²) min.		

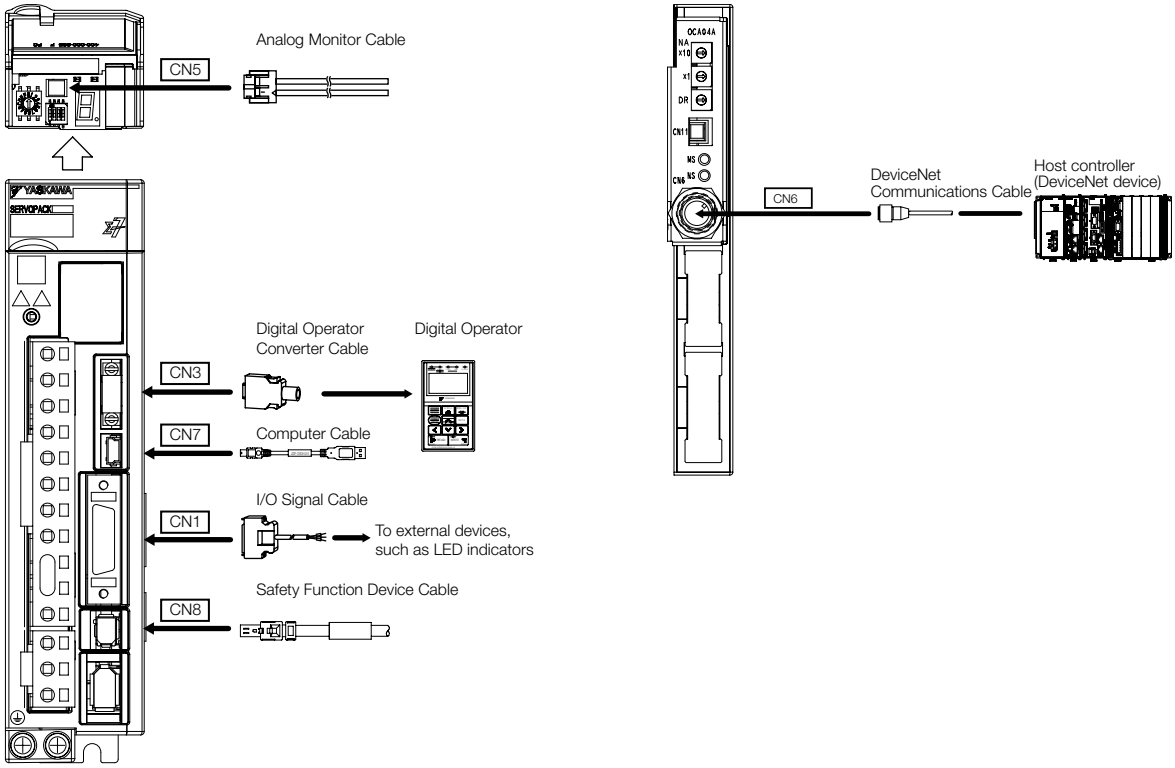
*1. Do not wire the following terminals: L1, L2, L3, B2, B3, ⊖1, ⊖ and terminals.
*2. If you do not use the recommended Servomotor Main Circuit Cable, use this table to select wires.

Selecting Cables SGD7S Command Option Attachable Type with DeviceNet Module

System Configurations

SGD7S Single Axis Command Option Attachable Type SERVOPACK

DeviceNet Module



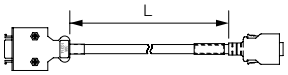
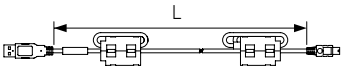
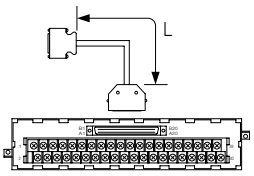
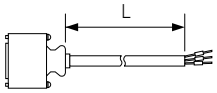
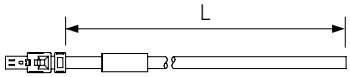
Selection Table

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.

Refer to the following manual for the following information.
- Cable dimensional drawings and cable connection specifications
- Order numbers and specifications of individual connectors for cables

Sigma-7-Series AC Servo Drive Peripheral Device Selection Manual (Manual No.: SIEP S800001 32)

Code	Description		Length	Order Number	Appearance
CN5	Analog Monitor Cable		1 m	JZSP-CA01-E	
CN3	Digital Operator			JUSP-0P05A-1-E	
		Digital Operator Converter Cable	0.3 m	JZSP-CVS05-A3-E*1	
CN7	Computer Cable		2.5 m	JZSP-CVS06-02-E	
CN1	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	
CN8	Safety Function Device Cables	Cables with Connectors*2	1 m	JZSP-CVH03-01-E	
			3 m	JZSP-CVH03-03-E	
		Connector Kit*3		Contact Tyco Electronics Japan G.K. Product name: Industrial Mini I/O D-shape Type 1 Plug Connector Kit Model number: 2013595-1	
CN6	DeviceNet Communications Cable			The communications cable must be an ODVA-Compliant DeviceNet communications cable. We recommend the following Cable. OMRON DCA1-5CN02F1 Cable with Connectors or the equivalent.	

*1. This Converter Cable is required to use the Sigma-III-series Digital Operator (JUSP-OP05A) for Sigma-7-series SERVOPACKs.
*2. 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.
*3. Use the Connector Kit when you make cables yourself.

SERVOPACK Main Circuit Wires

Important

These specifications are based on IEC/EN 61800-5-1, UL 61800-5-1, and CSA C22.2 No.274.
1. To comply with UL standards, use UL-compliant wires.
2. Use copper wires with a rated temperature of 75° 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 surrounding air temperature.

Three-phase, 200-VAC Wires for Sigma-7S SERVOPACKs

SGD7S-	Terminals		Wire Size	Screw Size	Tightening Torque [Nm]
R70A, R90A, 1R6A, 2R8A, 3R8A, 5R5A, 7R6A	Main Circuit Power Supply Cable	L1, L2, L3	AWG16 (1.25 mm²)	–	–
	Servomotor Main Circuit Cable*	U, V, W			
	Control Power Supply Cable	L1C, L2C			
	External Regenerative Resistor Cable	B1/⊕, B2			
	Ground cable	⏚	AWG14 (2.0 mm²) min.	M4	1.2 to 1.4
120A	Main Circuit Power Supply Cable	L1, L2, L3	AWG14 (2.0 mm²)	–	–
	Servomotor Main Circuit Cable*	U, V, W			
	Control Power Supply Cable	L1C, L2C	AWG16 (1.25 mm²)		
	External Regenerative Resistor Cable	B1/⊕, B2			
	Ground cable	⏚	AWG14 (2.0 mm²) min.	M4	1.2 to 1.4
180A	Main Circuit Power Supply Cable	L1, L2, L3	AWG14 (2.0 mm²)	M4	1.0 to 1.2
	Servomotor Main Circuit Cable*	U, V, W	AWG10 (5.5 mm²)		
	Control Power Supply Cable	L1C, L2C	AWG16 (1.25 mm²)		
	External Regenerative Resistor Cable	B1/⊕, B2			
	Ground cable	⏚	AWG14 (2.0 mm²) min.	M4	1.2 to 1.4
200A	Main Circuit Power Supply Cable	L1, L2, L3	AWG12 (3.5 mm²)	M4	1.0 to 1.2
	Servomotor Main Circuit Cable*	U, V, W	AWG10 (5.5 mm²)		
	Control Power Supply Cable	L1C, L2C	AWG16 (1.25 mm²)		
	External Regenerative Resistor Cable	B1/⊕, B2			
	Ground cable	⏚	AWG14 (2.0 mm²) min.	M4	1.2 to 1.4
330A	Main Circuit Power Supply Cable	L1, L2, L3	AWG8 (8.0 mm²)	M4	1.0 to 1.2
	Servomotor Main Circuit Cable*	U, V, W			
	Control Power Supply Cable	L1C, L2C	AWG16 (1.25 mm²)		
	External Regenerative Resistor Cable	B1/⊕, B2	AWG14 (2.0 mm²)		
	Ground cable	⏚	AWG14 (2.0 mm²) min.	M4	1.2 to 1.4
470A	Main Circuit Power Supply Cable	L1, L2, L3	AWG8 (8.0 mm²)	M5	2.2 to 2.4
	Servomotor Main Circuit Cable*	U, V, W	AWG6 (14 mm²)		
	Control Power Supply Cable	L1C, L2C	AWG16 (1.25 mm²)		
	External Regenerative Resistor Cable	B1/⊕, B2	AWG14 (2.0 mm²)		
	Ground cable	⏚	AWG14 (2.0 mm²) min.		
550A	Main Circuit Power Supply Cable	L1, L2, L3	AWG8 (8.0 mm²)		
	Servomotor Main Circuit Cable*	U, V, W	AWG4 (22 mm²)		
	Control Power Supply Cable	L1C, L2C	AWG16 (1.25 mm²)		
	External Regenerative Resistor Cable	B1/⊕, B2	AWG10 (5.5 mm²)		
	Ground cable	⏚	AWG14 (2.0 mm²) min.		
590A	Main Circuit Power Supply Cable	L1, L2, L3	AWG4 (22 mm²)	M6	2.7 to 3.0
	Servomotor Main Circuit Cable*	U, V, W			
	Control Power Supply Cable	L1C, L2C	AWG16 (1.25 mm²)		
	External Regenerative Resistor Cable	B1/⊕, B2	AWG10 (5.5 mm²)		
	Ground cable	⏚	AWG14 (2.0 mm²) min.		
780A	Main Circuit Power Supply Cable	L1, L2, L3	AWG3 (30 mm²)		
	Servomotor Main Circuit Cable*	U, V, W			
	Control Power Supply Cable	L1C, L2C	AWG16 (1.25 mm²)		
	External Regenerative Resistor Cable	B1/⊕, B2	AWG8 (8.0 mm²)		
	Ground cable	⏚	AWG14 (2.0 mm²) min.		

* If you do not use the recommended Servomotor Main Circuit Cable, use this table to select wires.

Single-phase, 200-VAC Wires for Sigma-7S SERVOPACKs

SGD7S-	Terminals		Wire Size	Screw Size	Tightening Torque [Nm]
R70A, R90A, 1R6A, 2R8A	Main Circuit Power Supply Cable	L1, L2, L3	AWG16 (1.25 mm²)	–	–
	Servomotor Main Circuit Cable*	U, V, W			
	Control Power Supply Cable	L1C, L2C			
	External Regenerative Resistor Cable	B1/⊕, B2			
	Ground cable	⏚	AWG14 (2.0 mm²) min.	M4	1.2 to 1.4
5R5A	Main Circuit Power Supply Cable	L1, L2, L3	AWG14 (2.0 mm²)	–	–
	Servomotor Main Circuit Cable*	U, V, W	AWG16 (1.25 mm²)		
	Control Power Supply Cable	L1C, L2C			
	External Regenerative Resistor Cable	B1/⊕, B2			
	Ground cable	⏚	AWG14 (2.0 mm²) min.	M4	1.2 to 1.4
120A□□□008	Main Circuit Power Supply Cable	L1, L2, L3	AWG14 (2.0 mm²)	M4	1.0 to 1.2
	Servomotor Main Circuit Cable*	U, V, W			
	Control Power Supply Cable	L1C, L2C	AWG16 (1.25 mm²)		
	External Regenerative Resistor Cable	B1/⊕, B2			
	Ground cable	⏚	AWG14 (2.0 mm²) min.	M4	1.2 to 1.4

* If you do not use the recommended Servomotor Main Circuit Cable, use this table to select wires.

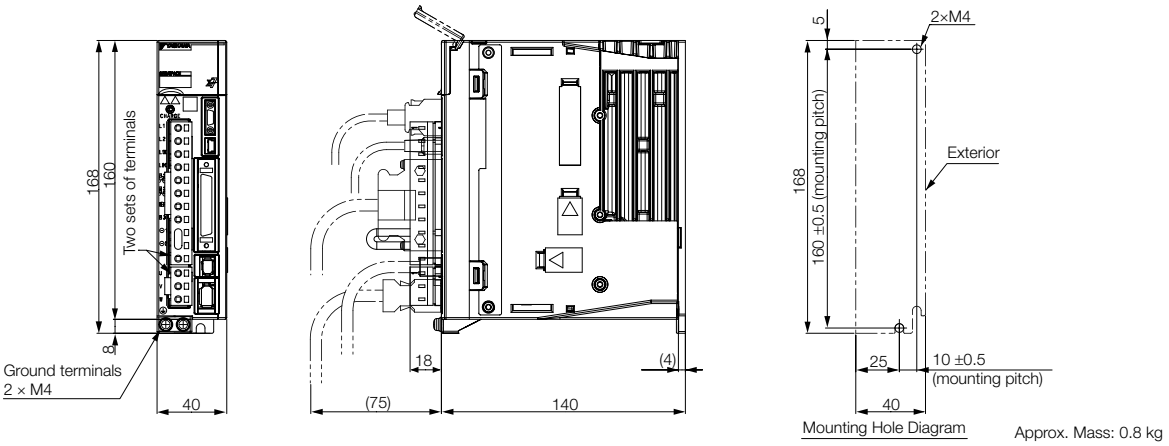
DC Power Supply Wires for Sigma-7S SERVOPACKs

SGD7S-	Terminals*1		Wire Size	Screw Size	Tightening Torque [Nm]
R70A, R90A, 1R6A, 2R8A, 3R8A, 5R5A, 7R6A	Servomotor Main Circuit Cable	U, V, W*2	AWG16 (1.25 mm²)	–	–
	Control Power Supply Cable	L1C, L2C			
	External Regenerative Resistor Cable	B1/⊕, ⊖2			
	Ground cable	⏚	AWG14 (2.0 mm²) min.	M4	1.2 to 1.4
120A (three-phase, 200-VAC input)	Servomotor Main Circuit Cable	U, V, W*2	AWG14 (2.0 mm²)	–	–
	Control Power Supply Cable	L1C, L2C	AWG16 (1.25 mm²)		
	External Regenerative Resistor Cable	B1/⊕, ⊖2	AWG14 (2.0 mm²)		
	Ground cable	⏚	AWG14 (2.0 mm²) min.	M4	1.2 to 1.4
120A□□□008 (single-phase, 200-VAC input)	Servomotor Main Circuit Cable	U, V, W*2	AWG14 (2.0 mm²)	M4	1.0 to 1.2
	Control Power Supply Cable	L1C, L2C	AWG16 (1.25 mm²)		
	External Regenerative Resistor Cable	B1/⊕, ⊖2	AWG14 (2.0 mm²)		
	Ground cable	⏚	AWG14 (2.0 mm²) min.	M4	1.2 to 1.4
180A, 200A	Servomotor Main Circuit Cable	U, V, W*2	AWG10 (5.5 mm²)	M4	1.0 to 1.2
	Control Power Supply Cable	L1C, L2C	AWG16 (1.25 mm²)		
	External Regenerative Resistor Cable	B1/⊕, ⊖2	AWG10 (5.5 mm²)		
	Ground cable	⏚	AWG14 (2.0 mm²) min.	M4	1.2 to 1.4
330A	Servomotor Main Circuit Cable	U, V, W*2	AWG8 (8.0 mm²)	M4	1.0 to 1.2
	Control Power Supply Cable	L1C, L2C	AWG16 (1.25 mm²)		
	External Regenerative Resistor Cable	B1/⊕, ⊖2	AWG8 (8.0 mm²)		
	Ground cable	⏚	AWG14 (2.0 mm²) min.	M4	1.2 to 1.4
470A	Servomotor Main Circuit Cable	U, V, W*2	AWG6 (14 mm²)	M5	2.2 to 2.4
	Control Power Supply Cable	L1C, L2C	AWG16 (1.25 mm²)		
	External Regenerative Resistor Cable	B1/⊕, ⊖2	AWG8 (8.0 mm²)		
	Ground cable	⏚	AWG14 (2.0 mm²) min.		
550A	Servomotor Main Circuit Cable	U, V, W*2	AWG4 (22 mm²)		
	Control Power Supply Cable	L1C, L2C	AWG16 (1.25 mm²)		
	External Regenerative Resistor Cable	B1/⊕, ⊖2	AWG6 (14 mm²)		
	Ground cable	⏚	AWG14 (2.0 mm²) min.		
590A	Servomotor Main Circuit Cable	U, V, W*2	AWG4 (22 mm²)	M6	2.7 to 3.0
	Control Power Supply Cable	L1C, L2C	AWG16 (1.25 mm²)		
	External Regenerative Resistor Cable	B1/⊕, ⊖2	AWG3 (30 mm²)		
	Ground cable	⏚	AWG14 (2.0 mm²) min.		
780A	Servomotor Main Circuit Cable	U, V, W*2	AWG3 (30 mm²)		
	Control Power Supply Cable	L1C, L2C	AWG16 (1.25 mm²)		
	External Regenerative Resistor Cable	B1/⊕, ⊖2	AWG3 (30 mm²)		
	Ground cable	⏚	AWG14 (2.0 mm²) min.		

*1. Do not wire the following terminals: L1, L2, L3, B2, B3, ⊖1, ⊖ and terminals.
*2. If you do not use the recommended Servomotor Main Circuit Cable, use this table to select wires.

SERVOPACK External Dimensions

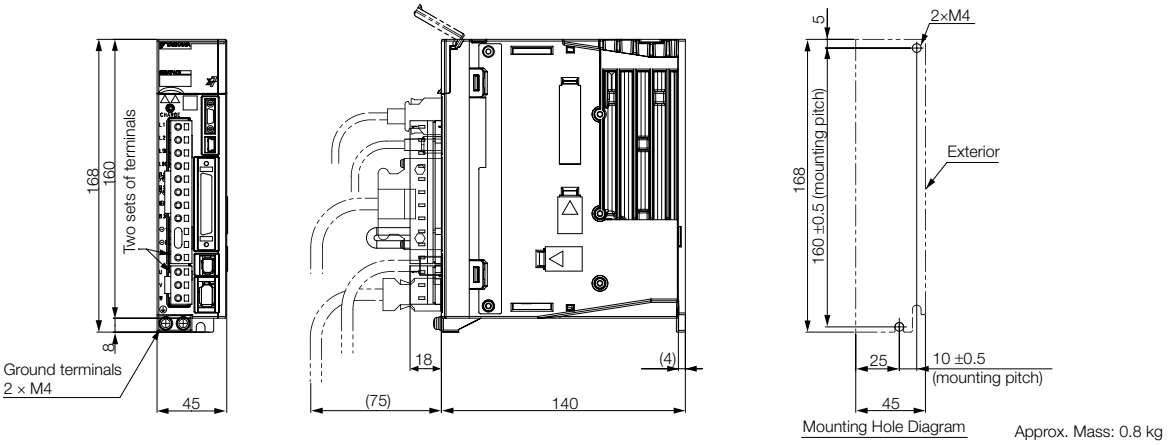
Three-phase & Single-phase, 200 VAC: SGD7S-R70A, -R90A, and -1R6A



Approx. Mass: 0.8 kg

Unit: mm

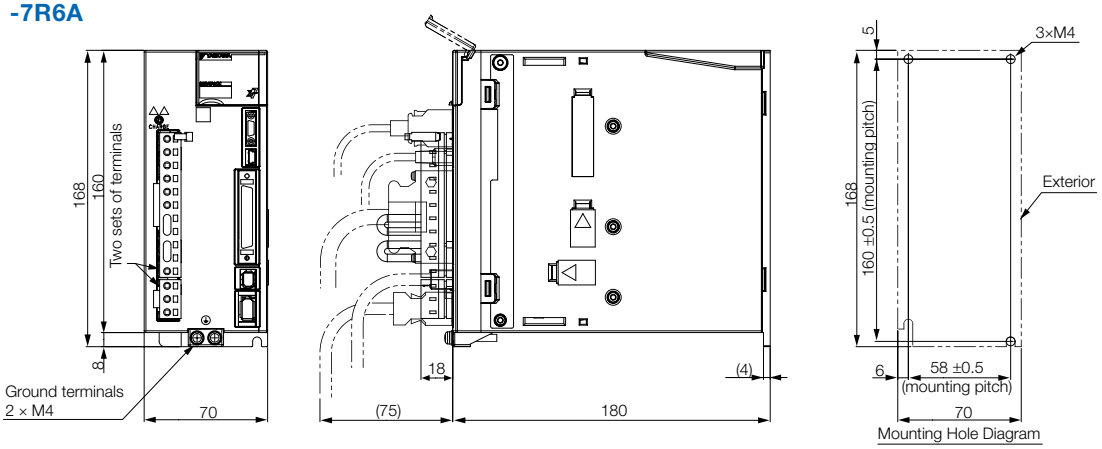
Three-phase & Single-phase, 200 VAC: SGD7S-2R8A



Approx. Mass: 0.8 kg

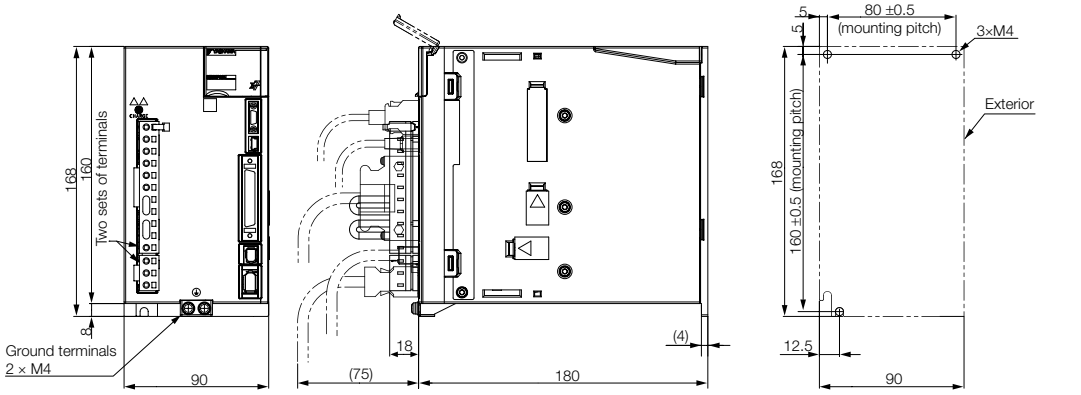
Unit: mm

Three-phase & Single-phase, 200 VAC: SGD7S-3R8A, -5R5A -7R6A



Approx. Mass: 1.6 kg

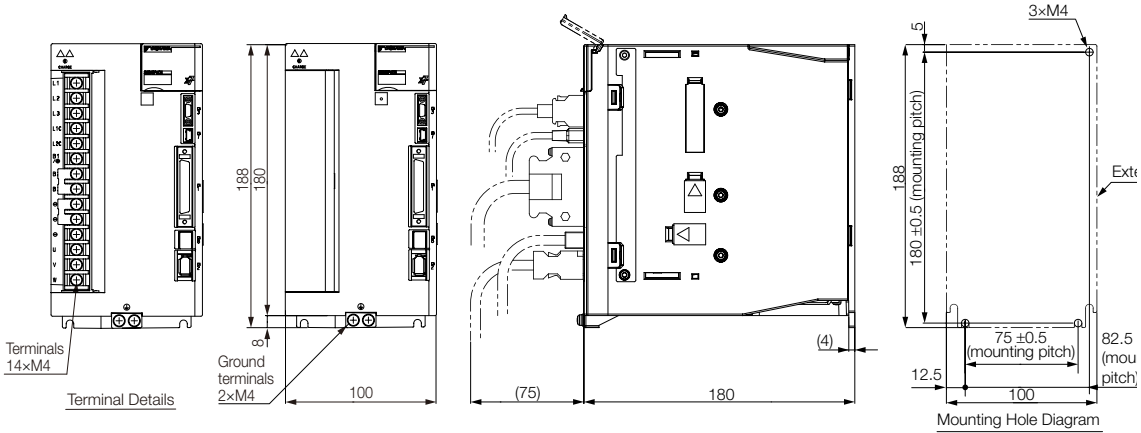
Three-phase & Single-phase, 200 VAC: SGD7S-120A



Approx. Mass: 2.2 kg

Unit: mm

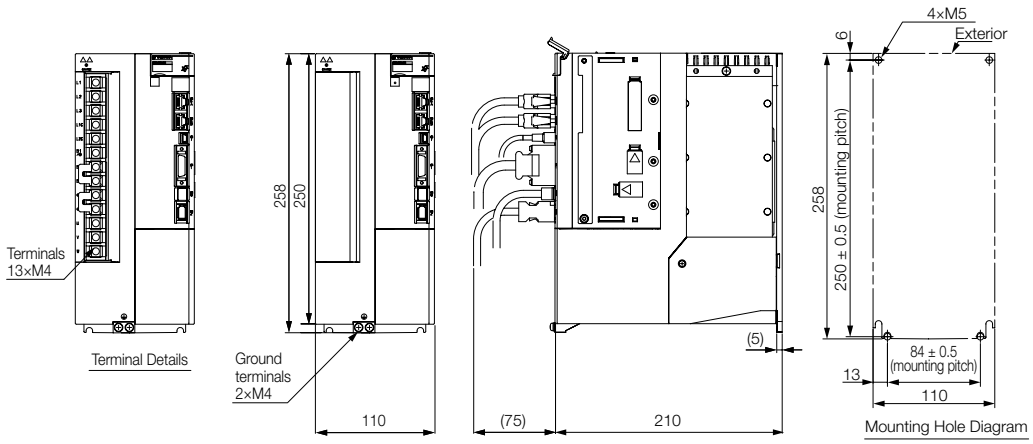
Three-phase, 200 VAC: SGD7S-180A and -200A



Approx. Mass: 2.7

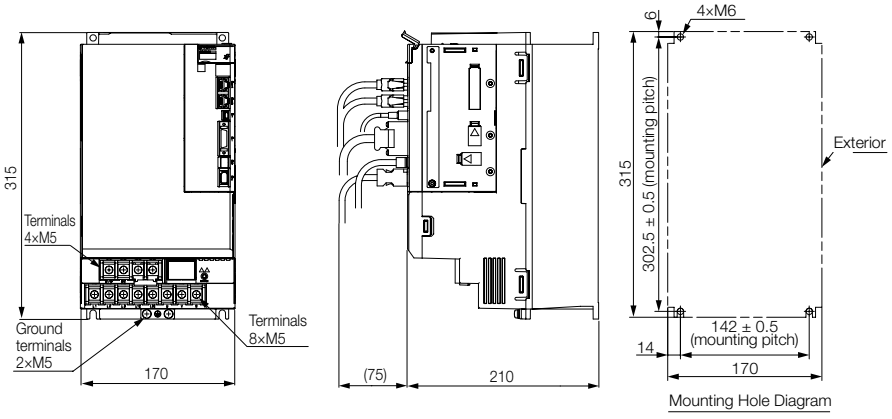
Unit: r

Three-phase, 200 VAC: SGD7S-330A



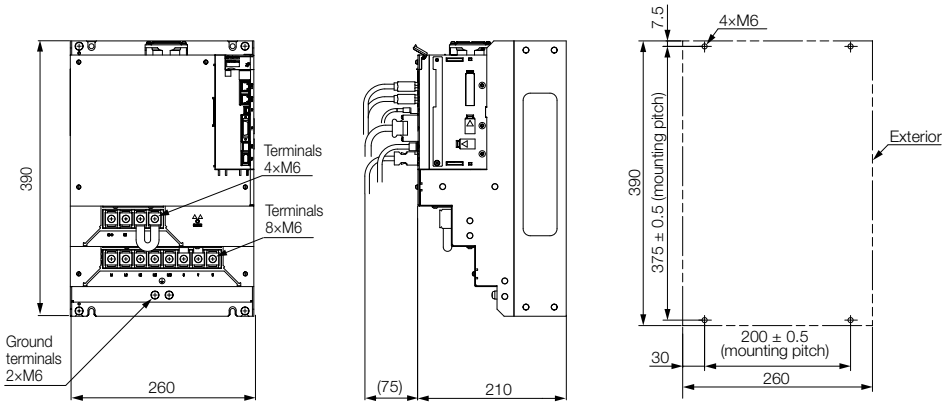
Approx. Mass: 4.4 kg

Three-phase, 200 VAC: SGD7S-470A and -550A



Approx. Mass: 8.2 kg

Three-phase, 200 VAC: SGD7S-590A and -780A



Approx. Mass: 15.5 kg
Unit: mm

Sigma-7Siec with integrated iec-Controller

Model Designations

SGD7S	-	2R8	A	M0	A	000	F50	
Sigma-7 Series SERVOPACKs		1st ... 3rd	4th	5th + 6th	7th	8th ... 10th	11th ... 13th	digit

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

Code	Specifications
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
330	5.0 kW
470	6.0 kW
550	7.5 kW
590	11 kW
780	15 kW

4th digit - Voltage

Code	Specifications
A	200 VAC, Three-phase

5th + 6th digit - Interface

Code	Specifications
M0	Sigma-7Siec (with integrated iec-Controller)

7th digit - Design Revision Order

Code	Specifications
A	

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

Code	Specifications	Applicable Models
000	Without Options	All models

11th ... 13th digit - FT/EX Specifications

Code	Specifications
F50	Application function for integrated MPiec

Note: Readily available up to 1.5 kW. Others available on request.
Additional accessories and software for SERVOPACKs is described in the Periphery section.

Ratings and Specifications

Ratings

Single-phase, 200 VAC

Model SGD7S-			R70A	R90A	1R6A	2R8A	5R5A	120A
Maximum Applicable Motor Capacity [kW]			0.05	0.1	0.2	0.4	0.75	2
Continuous Output Current [A]			0.66	0.91	1.6	2.8	5.5	18.5
Instantaneous Maximum Output Current [A]			2.1	3.2	5.9	9.3	16.9	42
Main Circuit	Power Supply		200 VAC to 240 VAC, -15% to +10%, 50 Hz/60 Hz					
	Input Current [A]*		0.8	1.6	2.4	5.0	8.7	10
Control	Power Supply		200 VAC to 240 VAC, -15% to +10%, 50 Hz/60 Hz					
	Input Current [A]*		0.2	0.2	0.2	0.2	0.2	0.25
Power Supply Capacity [kVA]*			0.2	0.3	0.6	1.2	1.9	4
Power Loss*	Main Circuit Power Loss [W]		5	7.1	12.1	23.7	39.2	104.2
	Control Circuit Power Loss [W]		12	12	12	12	14	16
	Built-in Regenerative Resistor Power Loss [W]		–	–	–	–	8	16
	Total Power Loss [W]		17	19.1	24.1	35.7	61.2	136.2
Regenerative Resistor	Built-In Regenerative Resistor	Resistance [Ω]	–	–	–	–	40	12
		Capacity [W]	–	–	–	–	40	60
	Minimum Allowable External Resistance [Ω]		40	40	40	40	40	12
Overvoltage Category			III					

* This is the net value at the rated load.

Three-phase, 200 VAC

Model SGD7S-			R70A	R90A	1R6A	2R8A	3R8A	5R5A	7R6A	120A	180A	200A	330A
Maximum Applicable Motor Capacity [kW]			0.05	0.1	0.2	0.4	0.5	0.75	1	1.5	2	3	5
Continuous Output Current [A]			0.66	0.91	1.6	2.8	3.8	5.5	7.6	11.6	18.5	19.6	32.9
Instantaneous Maximum Output Current [A]			2.1	3.2	5.9	9.3	11	16.9	17	28	42	56	84
Main Circuit	Power Supply		200 VAC to 240 VAC, -15% to +10%, 50 Hz/60 Hz										
	Input Current [A]*		0.4	0.8	1.3	2.5	3	4.1	5.7	7.3	10	15	25
Control	Power Supply		200 VAC to 240 VAC, -15% to +10%, 50 Hz/60 Hz										
	Input Current [A]*		0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.25	0.25	0.3
Power Supply Capacity [kVA]*			0.2	0.3	0.5	1	1.3	1.6	2.3	3.2	4	5.9	7.5
Power Loss*	Main Circuit Power Loss [W]		5	7	11.9	22.5	28.5	38.9	49.2	72.6	104.2	114.2	226.6
	Control Circuit Power Loss [W]		12	12	12	12	14	14	14	15	16	16	19
	Built-in Regenerative Resistor Power Loss [W]		–	–	–	–	8	8	8	10	16	16	36
	Total Power Loss [W]		17	19	23.9	34.5	50.5	60.9	71.2	97.6	136.2	146.2	281.6
Regenerative Resistor	Built-In Regenerative Resistor	Resistance [Ω]	–	–	–	–	40	40	40	20	12	12	8
		Capacity [W]	–	–	–	–	40	40	40	60	60	60	180
	Minimum Allowable External Resistance [Ω]		40	40	40	40	40	40	40	20	12	12	8
Overvoltage Category			III										

* This is the net value at the rated load.

Note: Readily available up to 1.5 kW. Others available on request.

Model SGD7S-			470A	550A	590A	780A
Maximum Applicable Motor Capacity [kW]			6	7.5	11	15
Continuous Output Current [A]			46.9	54.7	58.6	78
Instantaneous Maximum Output Current [A]			110	130	140	170
Main Circuit	Power Supply		200 VAC to 240 VAC, -15% to +10%, 50 Hz/60 Hz			
	Input Current [A]*1		29	37	54	73
Control	Power Supply		200 VAC to 240 VAC, -15% to +10%, 50 Hz/60 Hz			
	Input Current [A]*1		0.3	0.3	0.4	0.4
Power Supply Capacity [kVA]*1			10.7	14.6	21.7	29.6
Power Loss*1	Main Circuit Power Loss [W]		271.7	326.9	365.3	501.4
	Control Circuit Power Loss [W]		21	21	28	28
	Built-in Regenerative Resistor Power Loss [W]		180*2	350*3	350*3	350*3
	Total Power Loss [W]		292.7	347.9	393.3	529.4
Regenerative Resistor	External Regenerative Resistor	Resistance [Ω]	6.25*2	3.13*3	3.13*3	3.13*3
		Capacity [W]	880*2	1,760*3	1,760*3	1,760*3
	Minimum Allowable External Resistance [Ω]		5.8	2.9	2.9	2.9
Overvoltage Category			III			

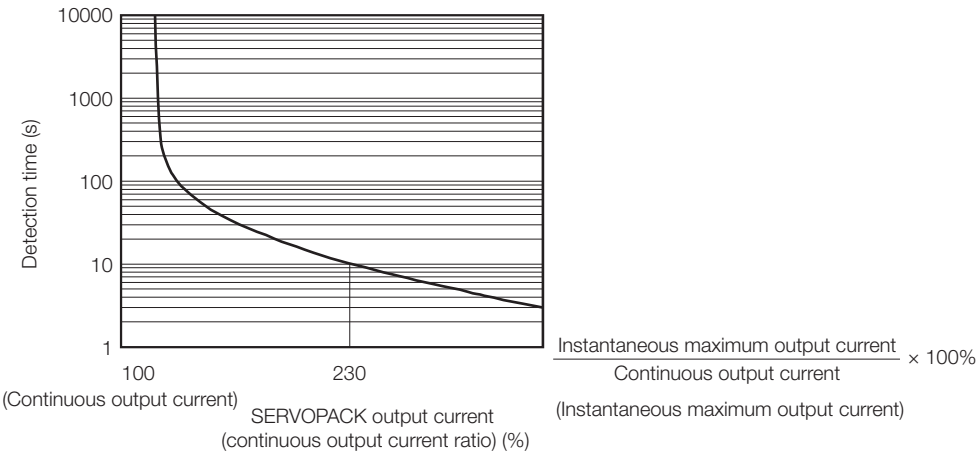
Note: Readily available up to 1.5 kW. Others available on request.

*1. This is the net value at the rated load.
*2. This value is for the optional JUSP-RA04-E Regenerative Resistor Unit.
*3. This value is for the optional JUSP-RA05-E Regenerative Resistor Unit.

SERVOPACK Overload Protection Characteristics

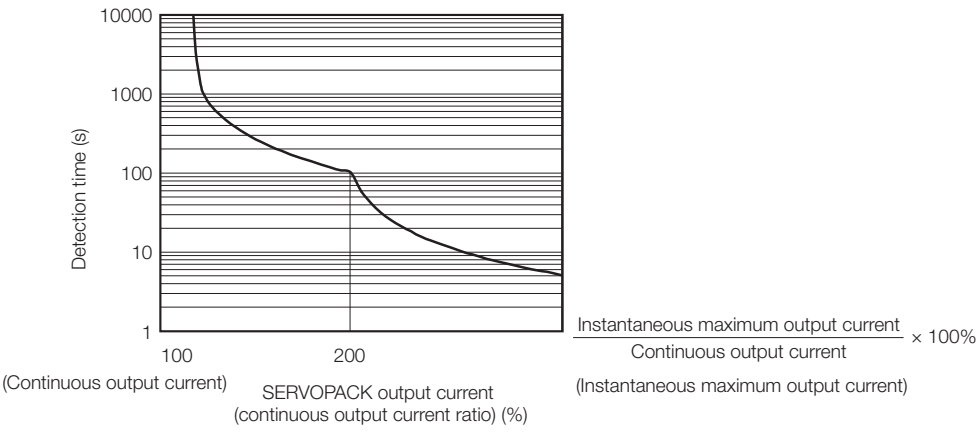
The overload detection level is set for hot start conditions with a SERVOPACK surrounding air temperature of 55°C.
An overload alarm (A.710 or A.720) will occur if overload operation that exceeds the overload protection characteristics shown in the following diagram (i.e., operation on the right side of the applicable line) is performed.
The actual overload detection level will be the detection level of the connected SERVOPACK or Servomotor that has the lower overload protection characteristics.
In most cases, that will be the overload protection characteristics of the Servomotor.

SGD7S-R70A, -R90A, -1R6A, -2R8A, -R70F, -R90F, -2R1F, and -2R8F



Note:
The above overload protection characteristics do not mean that you can perform continuous duty operation with an output of 100% or higher.
For a YASKAWA-specified combination of SERVOPACK and Servomotor, maintain the effective torque within the continuous duty zone of the torque-motor speed characteristic of the Servomotor.

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



Note:
The above overload protection characteristics do not mean that you can perform continuous duty operation with an output of 100% or higher.
For a YASKAWA-specified combination of SERVOPACK and Servomotor, maintain the effective torque within the continuous duty zone of the torque-motor speed characteristic of the Servomotor.

Specifications

Item			Specification	
Control Method			IGBT-based PWM control, sine wave current drive	
Feedback	With Rotary Servomotor		Serial encoder: 20 bits or 24 bits (incremental encoder/absolute encoder) 22 bits (absolute encoder)	
	With Linear Servomotor		• Absolute linear encoder (The signal resolution depends on the absolute linear encoder.) • Incremental linear encoder (The signal resolution depends on the incremental linear encoder or Serial Converter Unit.)	
Environmental Conditions	Ambient Air Temperature		-5°C to 55°C With derating, usage is possible between 55°C and 60°C.	
	Storage Temperature		-20°C to 85°C	
	Ambient Air Humidity		95% relative humidity max. (with no freezing or condensation)	
	Storage Humidity		95% relative humidity max. (with no freezing or condensation)	
	Vibration Resistance		4.9 m/s^2	
	Shock Resistance		19.6 m/s^2	
	Degree of Protection		Degree	SERVPOACK Model: SGD7S-
			IP 20	R70A, R90A, 1R6A, 2R8A, 3R8A, 5R5A, 7R6A, 120A, R70F, R90F, 2R1F, 2R8F
			IP 10	180A, 200A, 330A, 470A, 550A, 590A, 780A
	Pollution Degree		• 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			Compliance with UL Standards, EU Directives and Other Safety Standards	
Mounting			Mounting	SERVOPACK Model: SGD7S
			Base-mounted	All Models
			Rack-mounted	R70A, R90A, 1R6A, 2R8A, 3R8A, 5R5A, 7R6A, 120A, 180A, 200A, 330A, R70F, R90F, 2R1F, 2R8F
			Duct-ventilated	470A, 550A, 590A, 780A
Performance	Speed Control Range		1:5000 (At the rated torque, the lower limit of the speed control range must not cause the Servomotor to stop.)	
	Coefficient of Speed Fluctuation		±0.01% of rated speed max. (for a load fluctuation of 0% to 100%)	
			0% of rated speed max. (for a voltage fluctuation of ±10%)	
			±0.1% of rated speed max. (for a temperature fluctuation of 25°C ± 25°C)	
	Torque Control Precision (Repeatability)		±1%	
	Soft Start Time Setting		0 s to 10 s (Can be set separately for acceleration and deceleration.)	
I/O Signals	Encoder Divided Pulse Output		Phase A, phase B, phase C: Line-driver output Number of divided output pulses: Any setting is allowed.	
	Linear Servomotor Overheat Protection Signal Input		Number of input points: 1 Input voltage range: 0 V to +5 V	
	Digital Input Signals	Input Signals that can be allocated	Allowable voltage range: 24 VDC ±20% Number of input points: 7 Input method: Sink inputs or source inputs Input Signals • P-OT (Forward Drive Prohibit) and N-OT (Reverse Drive Prohibit) signals • /EXT1 External latch signal input (General purpose input) • /EXT2 External latch signal input (General purpose input) • /EXT3 External latch signal input (General purpose input) • /P-CL (Forward External Torque Limit) and /N-CL (Reverse External Torque Limit) signals • FSTP (Forced Stop Input) signal A signal can be allocated and the positive and negative logic can be changed.	

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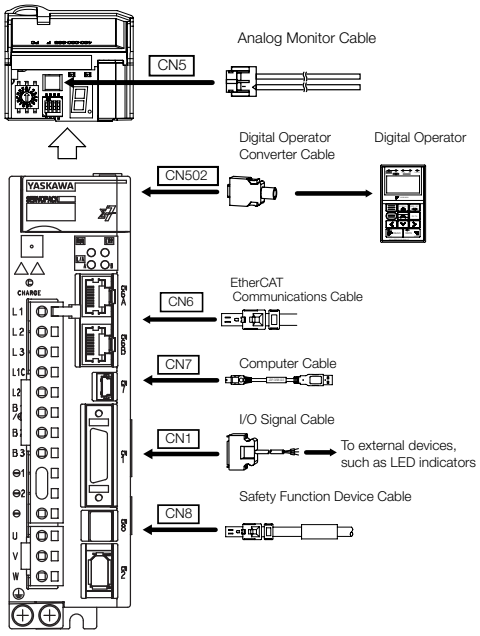
Item			Specification
I/O Signals	Digital Output Signals	Fixed Output	Allowable voltage range: 5 VDC to 30 VDC Number of output points: 1 Output signal: ALM (Servo Alarm) signal
		Output Signals that can be allocated	Allowable voltage range: 5 VDC to 30 VDC Number of output points: 3 (A photocoupler output (isolated) is used.)
			Output Signals • /COIN (Positioning Completion) signal • /V-CMP (Speed Coincidence Detection) signal • /TGON (Rotation Detection) signal • /S-RDY (Servo Ready) signal • /CLT (Torque Limit Detection) signal • /VLT (Speed Limit Detection) signal • /BK (Brake) signal • /WARN (Warning) signal • /NEAR (Near) signal A signal can be allocated and the positive and negative logic can be changed.
Communications	RS-422A Communications (CN502)	Interfaces	A JUSP-JC001 Communications Unit is required to connect to a Digital Operator (JUSP-OP05A-1-E).
		1:N Communications	Up to N = 15 stations possible for RS-422A port
		Axis Addres s Setting	Set with parameters.
	USB Communications (CN7)	Interface	Personal computer (with SigmaWin+)
		Communications Standard	Conforms to USB2.0 standard (12 Mbps).
Displays/Indicators			CHARGE, PWR, CN, RUN, ERR, and L/A (A and B) indicators, and one-digit seven-segment display
Analog Monitor (CN5)			Number of points: 2 Output voltage range: ±10 VDC (effective linearity range: ±8 V) Resolution: 16 bits Accuracy: ±20 mV (Typ) Maximum output current: ±10 mA Settling time (±1%): 1.2 ms (Typ)
Dynamic Brake (DB)			Activated when a servo alarm or overtravel (OT) occurs, or when the power supply to the main circuit or servo is OFF.
Regenerative Processing			Built-in (An external resistor must be connected to the SGD7S-470A to -780A.) Refer to the following manual for details. S-7-Series AC Servo Drive Peripheral Device Selection Manual (Manual No.: SIEP S800001 32)
Overtravel (OT) Prevention			Stopping with dynamic brake, deceleration to a stop, or coasting to a stop for the P-OT (Forward Drive Prohibit) or N-OT (Reverse Drive Prohibit) signal
Protective Functions			Overcurrent, overvoltage, low voltage, overload, regeneration error , etc.
Utility Functions			Gain adjustment, alarm history, jogging, origin search, etc.
Safety Functions	Inputs		/HWBB1 and /HWBB2: Base block signals for Power Modules
	Output		EDM1: Monitors the status of built-in safety circuit (fixed output).
	Applicable Standards		ISO13849-1 PLe (Category 3), IEC61508 SIL3
Applicable Option Modules			Fully-closed Modules and Safety Modules Note: You cannot use a Fully-closed Module and a Safety Module together.

Selecting Cables SGD7Siec with integrated iec-Controller

System Configurations



Selection Table

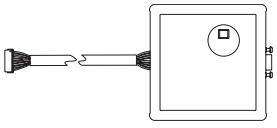
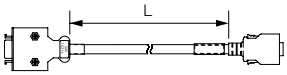
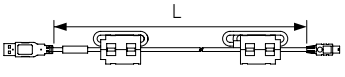
Important

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.

Refer to the following manual for the following information.

- Cable dimensional drawings and cable connection specifications
- Order numbers and specifications of individual connectors for cables

Sigma-7-Series AC Servo Drive Peripheral Device Selection Manual (Manual No.: SIEP S800001 32)

Code	Description		Length	Order Number	Appearance
CN5	Analog Monitor Cable		1 m	JZSP-CA01-E	
CN502	Digital Operator			JUSP-0P05A-1-E	
		Serial Communications Connector	0.3 m	JUSP-JC001-1	
		Digital Operator Converter Cable	0.3 m	JZSP-CVS05-A3-E*1	
				JZSP-CVS07-A3-E*2	
CN7	Computer Cable		2.5 m	JZSP-CVS06-02-E	

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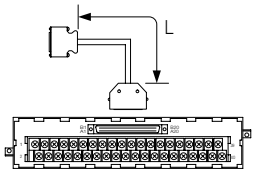
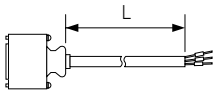
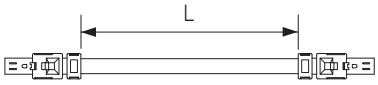
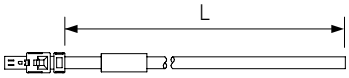
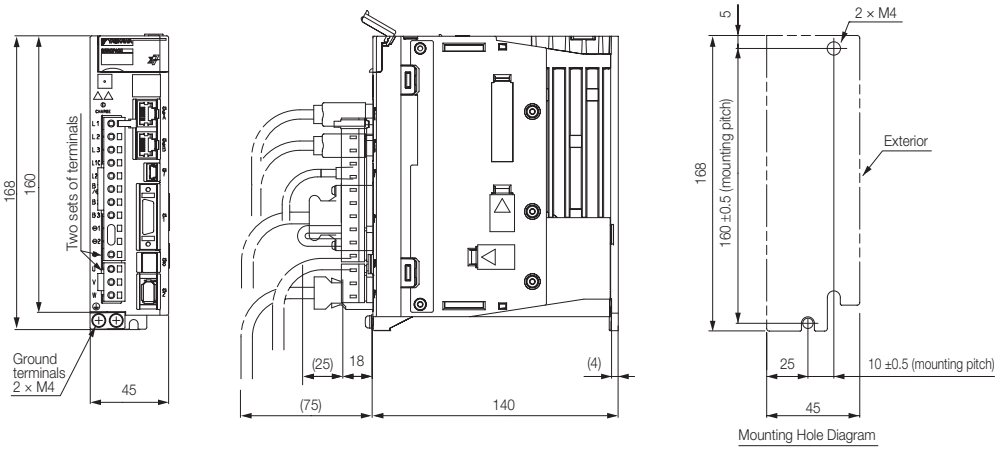
Code	Description		Length	Order Number	Appearance
CN1	I/O Signal Cables	Soldered Connector Kit		JZSP-CSI9-2-E	
		Connector-Terminal Block Converter Unit (with cable)	0.5 m	JUSP-TA26P-E	
			1 m	JUSP-TA26P-1-E	
			2 m	JUSP-TA26P-2-E	
		Cable with Loose Wires at One End (loose wires on peripheral device end)	1 m	JZSP-CSI02-1-E	
			2 m	JZSP-CSI02-2-E	
			3 m	JZSP-CSI02-3-E	
CN6	MECHATROLINK-III / EtherCAT / PROFINET Communications Cables (RJ45)*3		0.2 m	CM3R□M0-00P2-E	
			0.5 m	CM3R□M0-00P5-E	
			1 m	JZSP-CM3R□M0-01-E	
			3 m	JZSP-CM3R□M0-03-E	
			5 m	JZSP-CM3R□M0-05-E	
			10 m	JZSP-CM3R□M0-10-E	
			20 m	JZSP-CM3R□M0-20-E	
			30 m	JZSP-CM3R□M0-30-E	
			40 m	JZSP-CM3R□M0-40-E	
			50 m	JZSP-CM3R□M0-50-E	
CN8	Safety Function Device Cables	Cables with Connectors*4	1 m	JZSP-CVH03-01-E-Gx	
			3 m	JZSP-CVH03-03-E-Gx	
		Connector Kit*5		Contact Tyco Electronics Japan G.K. Product name: Industrial Mini I/O D-shape Type 1 Plug Connector Kit Model number: 2013595-1	

*1. This Converter Cable is required to use the Sigma-III-series Digital Operator (JUSP-OP05A) for S-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. This cable is available in two variants. The order number for these cables differs at the marked □, an „R“ at this place is used for Cables with RJ45 Connectors on both ends, while an „M“ is used for Cables with RJ45 Connector on One End and IMI Connector on the other End.
*4. 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.
*5. Use the Connector Kit when you make cables yourself.

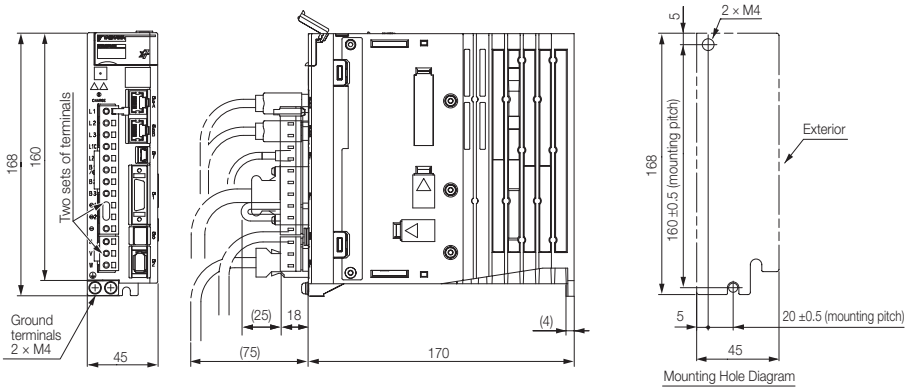
SERVOPACK External Dimensions

Three-phase, 200 VAC: SGD7S-R70A, -R90A, and -1R6A



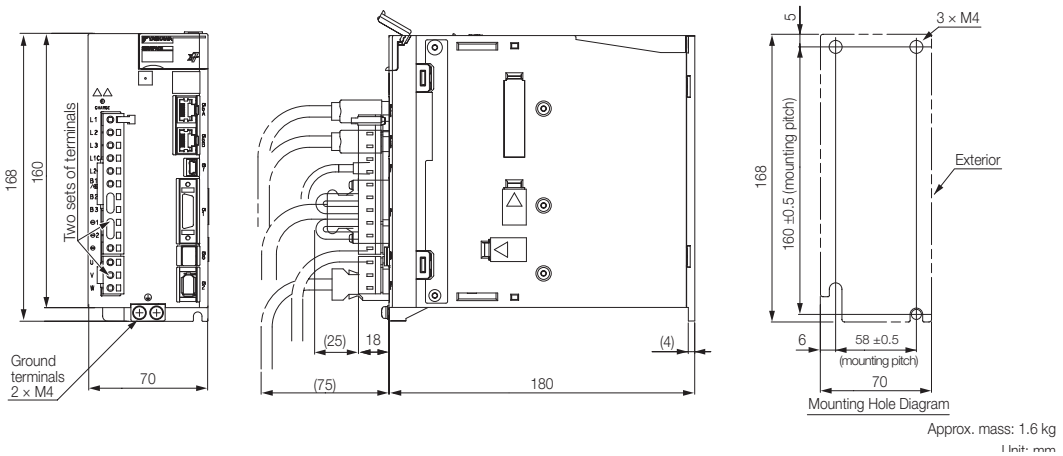
Approx. mass: 0.8 kg
Unit: mm

Three-phase, 200 VAC: SGD7S-2R8A



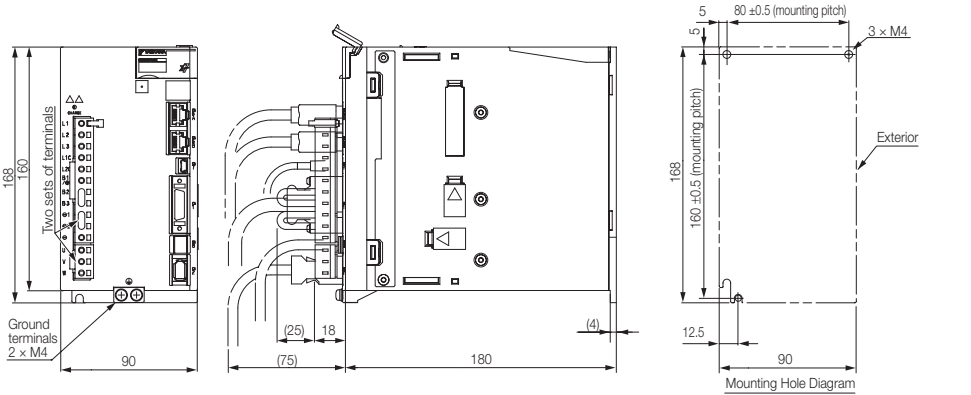
Approx. mass: 1.0 kg
Unit: mm

Three-phase, 200 VAC: SGD7S-3R8A, -5R5A, and -7R6A



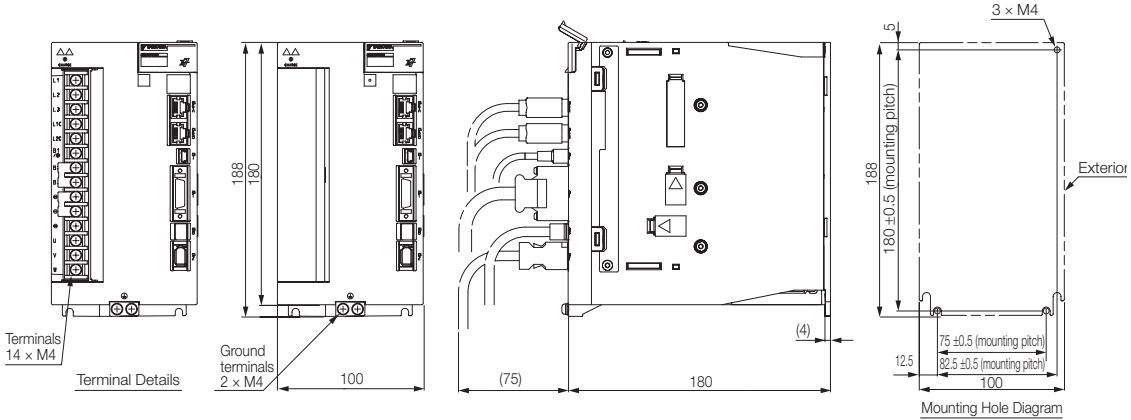
Approx. mass: 1.6 kg
Unit: mm

Three-phase, 200 VAC: SGD7S-120A



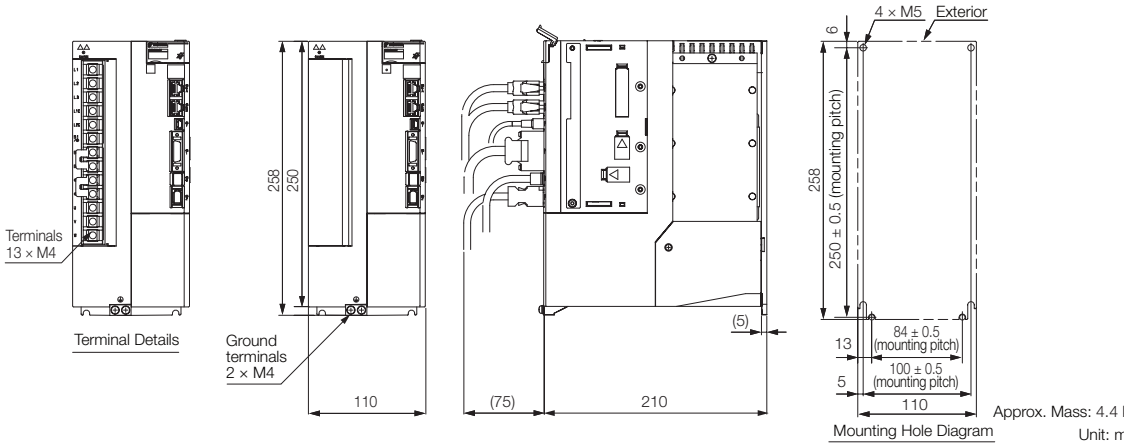
Approx. mass: 2.2 kg
Unit: mm

Three-phase, 200 VAC: SGD7S-180A and -200A

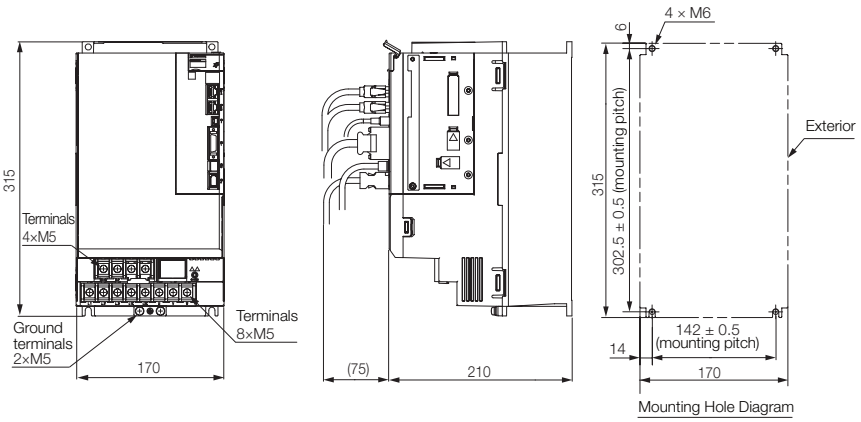


Approx. mass: 2.7 kg
Unit: mm

Three-phase, 200 VAC: SGD7S-330A

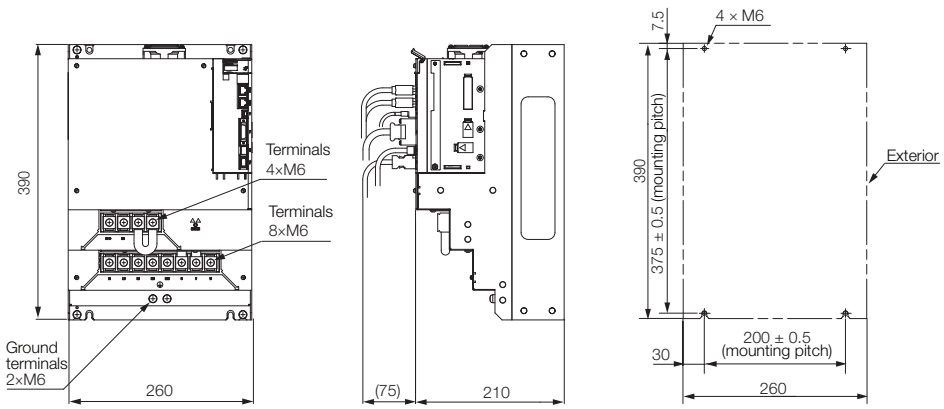


Three-phase, 200 VAC: SGD7S-470A and -550A



Approx. Mass: 8.2 kg
Unit: mm

Three-phase, 200 VAC: SGD7S-590A and -780A



Approx. Mass: 15.5 kg

Connector Specifications and Front Cover Dimensions

Connector Specifications

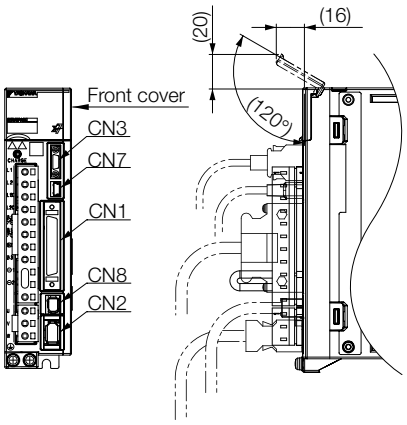
SERVOPACK	Connector No.	Model	Number of Pins	Manufacturer
Sigma-7S Analog Voltage/Pulse Train Reference SERVOPACK	CN1	10150-3000PE	50	Sumitomo 3M Ltd.
	CN2	3E106-0220KV	6	Sumitomo 3M Ltd.
	CN3	HDR-EC14LFDTN- SLD-PLUS	14	Honda Tsushin Kogyo Co., Ltd.
	CN7	2172034-1	5	Tyco Electronics Japan G.K.
	CN8	1981080-1	8	Tyco Electronics Japan G.K.
Sigma-7S MECHATROLINK-II Communications Reference SERVOPACK	CN1	10226-59A3MB	26	Sumitomo 3M Ltd.
	CN2	3E106-0220KV	6	Sumitomo 3M Ltd.
	CN3	HDR-EC14LFDTN- SLD-PLUS	14	Honda Tsushin Kogyo Co., Ltd.
	CN6A, CN6B	1903815-1	8	Tyco Electronics Japan G.K.
	CN7	2172034-1	5	Tyco Electronics Japan G.K.
	CN8	1981080-1	8	Tyco Electronics Japan G.K.
Sigma-7S MECHATROLINK-III Communications Reference SERVOPACK	CN1	10226-59A3MB	26	Sumitomo 3M Ltd.
	CN2	3E106-0220KV	6	Sumitomo 3M Ltd.
	CN3	HDR-EC14LFDTN- SLD-PLUS	14	Honda Tsushin Kogyo Co., Ltd.
	CN502	S8B-ZR-SM4A-TF (LF)(SN)	8	J.S.T. Mfg. Co., Ltd.
	CN6A, CN6B	1-1734579-4	8	Tyco Electronics Japan G.K.
	CN7	2172034-1	5	Tyco Electronics Japan G.K.
	CN8	1981080-1	8	Tyco Electronics Japan G.K.
Sigma-7S MECHATROLINK-III with RJ45 Communications Reference SERVOPACK	CN1	10236-59A3MB	36	3M Japan Ltd.
	CN3	HDR-EC14LFDTN- SLD-PLUS	14	Honda Tsushin Kogyo Co., Ltd.
	CN6A, CN6B	1-1734579-4	8	Tyco Electronics Japan G.K.
	CN7	2172034-1	5	Tyco Electronics Japan G.K.
	CN8	1981080-1	8	Tyco Electronics Japan G.K.
Sigma-7W MECHATROLINK-III Communications Reference SERVOPACK	CN1	10236-59A3MB	36	Sumitomo 3M Ltd.
	CN2A, CN2B	3E106-2230KV	6	Sumitomo 3M Ltd.
	CN3	HDR-EC14LFDTN- SLD-PLUS	14	Honda Tsushin Kogyo Co., Ltd.
	CN6A, CN6B	1-1734579-4	8	Tyco Electronics Japan G.K.
	CN7	2172034-1	5	Tyco Electronics Japan G.K.
	CN8	1981080-1	8	Tyco Electronics Japan G.K.
Sigma-7S EtherCAT Communications Reference SERVOPACK	CN1	10226-59A3MB	29	Sumitomo 3M Ltd.
	CN2	3E106-0220KV	6	Sumitomo 3M Ltd.
	CN502	S8B-ZR-SM4A-TF (LF)(SN)	8	J.S.T. Mfg. Co., Ltd.
	CN6A, CN6B	1-1734579-4	8	Tyco Electronics Japan G.K.
	CN7	2172034-1	5	Tyco Electronics Japan G.K.
	CN8	1981080-1	8	Tyco Electronics Japan G.K.
Sigma-7S PROFINET Communications Reference SERVOPACK	CN1	10226-59A3MB	29	Sumitomo 3M Ltd.
	CN2	3E106-0220KV	6	Sumitomo 3M Ltd.
	CN502	S8B-ZR-SM4A-TF (LF)(SN)	8	J.S.T. Mfg. Co., Ltd.
	CN6A, CN6B	1-1734579-4	8	Tyco Electronics Japan G.K.
	CN7	2172034-1	5	Tyco Electronics Japan G.K.
	CN8	1981080-1	8	Tyco Electronics Japan G.K.
Sigma-7C Bus Connection Reference SERVOPACK	CN1	10236-59A3MB	36	3M Japan Ltd.
	CN2A, CN2B	3E106-2230KV	6	3M Japan Ltd.
	CN6	1981386-1	8	Tyco Electronics Japan G.K.
	CN7	2172034-1	5	Tyco Electronics Japan G.K.
	CN12	26-51024KB13-1	8	UDE Corp.
	CN13	10250-52A3PL	50	3M Japan Ltd.
Sigma-7Siec SERVOPACK	CN1	10236-59A3MB	36	3M Japan Ltd.
	CN3	HDR-EC14LFDTN- SLD-PLUS	14	Honda Tsushin Kogyo Co., Ltd.
	CN6A, CN6B	1-1734579-4	8	Tyco Electronics Japan G.K.
	CN7	2172034-1	5	Tyco Electronics Japan G.K.
	CN8	1981080-1	8	Tyco Electronics Japan G.K.

Note: The above connectors or their equivalents are used for the SERVOPACKs.

Front Cover Dimensions

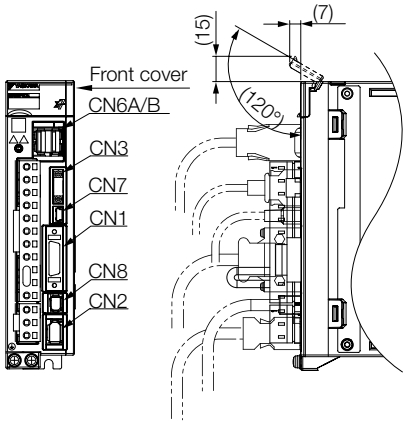
Sigma-7S

Analog Voltage/Pulse Train Reference SERVOPACKs



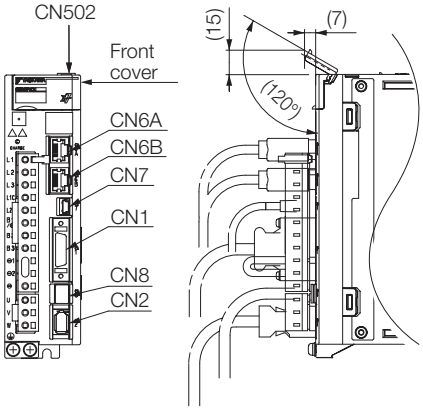
Sigma-7S

MECHATROLINK-II Communications Reference SERVOPACKs



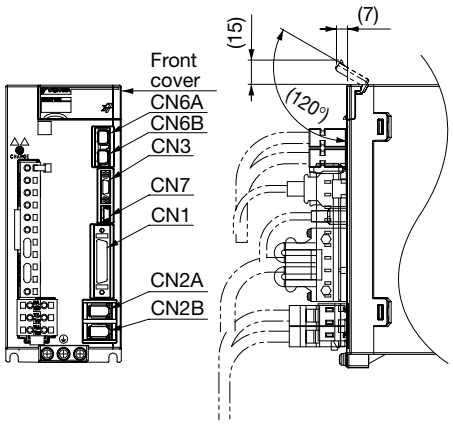
Sigma-7S

MECHATROLINK-III Communications Reference SERVOPACKs



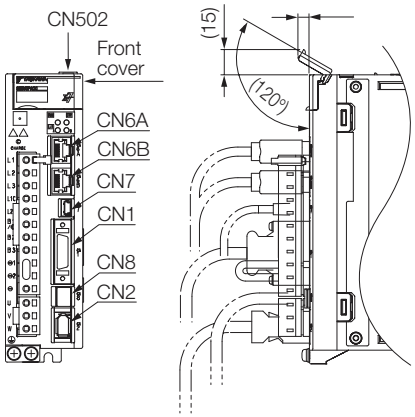
Sigma-7W

MECHATROLINK-III Communications Reference SERVOPACKs



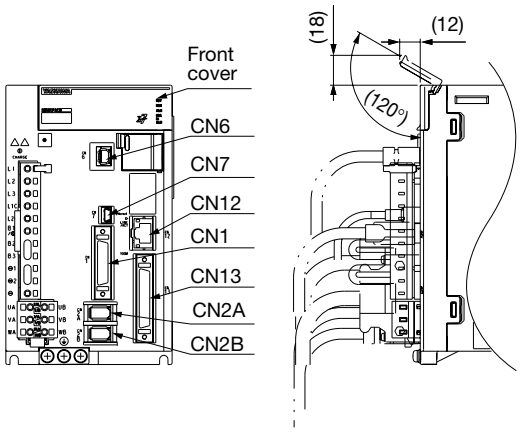
Sigma-7S

EtherCAT Communication Reference SERVOPACKs



Sigma-7C

Bus Connection Reference SERVOPACKs



Option Modules

Feedback Option Modules

Fully-Closed Module

With fully-closed control, an externally installed encoder is used to detect the position of the controlled machine and the machine's position information is fed back to the SERVOPACK. High-precision positioning is possible because the actual machine position is fed back directly. To perform fully-closed loop control, a Fully-Closed Module and SERVOPACK are required.

Model Designations

When ordering a SERVOPACK and a Safety Module separately, use the following Safety Module model number.

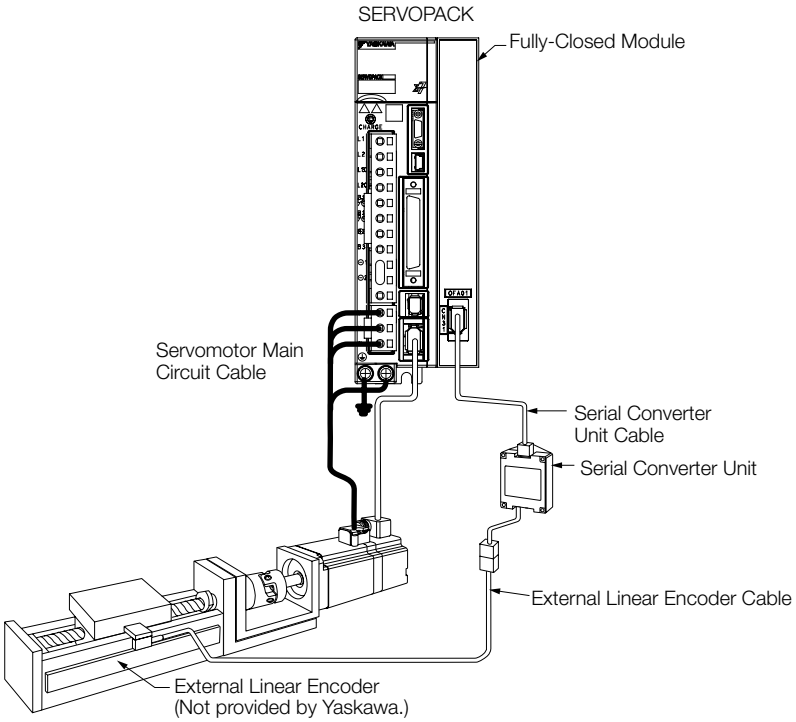
SGDV	-	OF	A01	A
Option Module Safety		1st & 2nd	3rd ... 5th	6th digit

1st & 2nd digit - Module Type	
Code	Module
OF	Option Module Feedback

3rd ... 5th digit - Interface Specifications	
Code	Interface
A01	for YASKAWA Serial Protocol
B01	Serial and Sin/Cos Encoders
B03	Pulse A quad B Encoders
B04	Resolver

6th digit - Design Revision Order	
Code	Specification
A	Initial Design

System Configuration Example



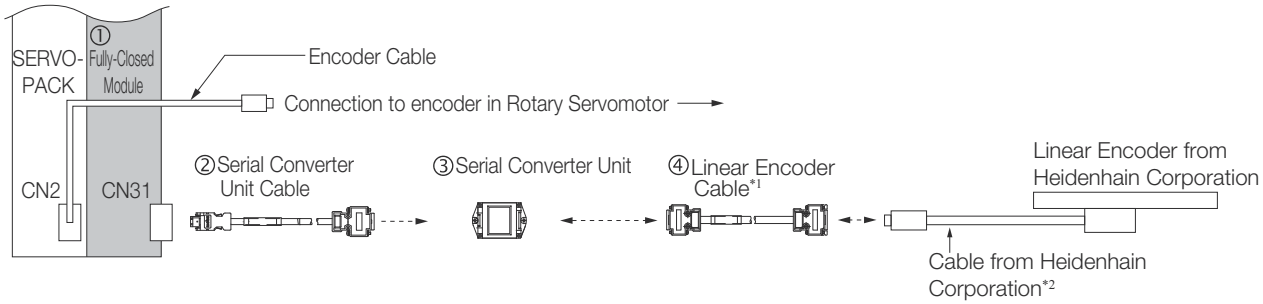
* The connected devices and cables depend on the type of external Linear Encoder that is used.

Note:
Refer to the following section for the information on peripheral devices or chapter Peripheral Devices.

Connections to Linear Encoder from Heidenhain Corporation

Connections for a 1 Vp-p Analog Voltage Output Signal

You must make the connections through a YASKAWA Serial Converter Unit. The output signal will be multiplied by 8 bits (256 divisions) in the Serial Converter Unit.



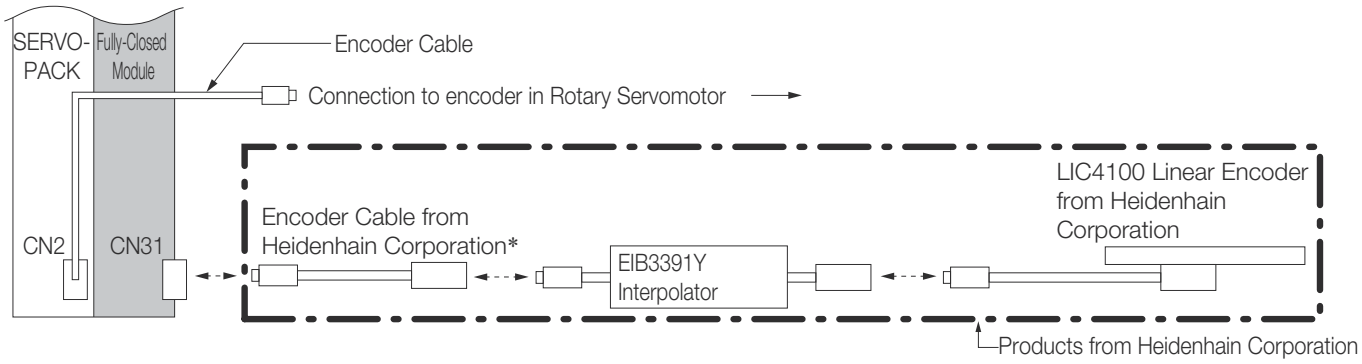
*1. When using a JZDP-J00□-□□□Serial Converter Unit, do not use a YASKAWA Linear Encoder Cable that is longer than 3 m.
*2. Contact Heidenhain Corporation for details on cables (analog 1 Vp-p output, D-sub 15-pin, male) from Heidenhain Corporation.

No.	Item	Model
①	Fully-Closed Module (Purchased alone)	Fully-Closed Module*1 SGDV-OFA01A
②	Serial Converter Unit Cable	JZSP-CLP70-□□*3-E
③	Serial Converter Unit*2	JZDP-H003-000
④	Linear Encoder Cable	JZSP-CLL30-□□*3-E

*1 When ordering a SERVOPACK and a Fully-Closed Module separately, use this Fully-Closed Module model number. Please use the YASKAWA mounting rail JZSP-P7R2-8-E in combination with a Fully-Closed Module.
*2 Contact your YASKAWA representative for specific information.
*3 The boxes (□□) in the model number are reolaced with cable length when ordering. (1m = 01, 3m = 03, 5m = 05, 10m = 10, 15m = 15)

Connections when using a YASKAWA Serial Interface for the Output Signals

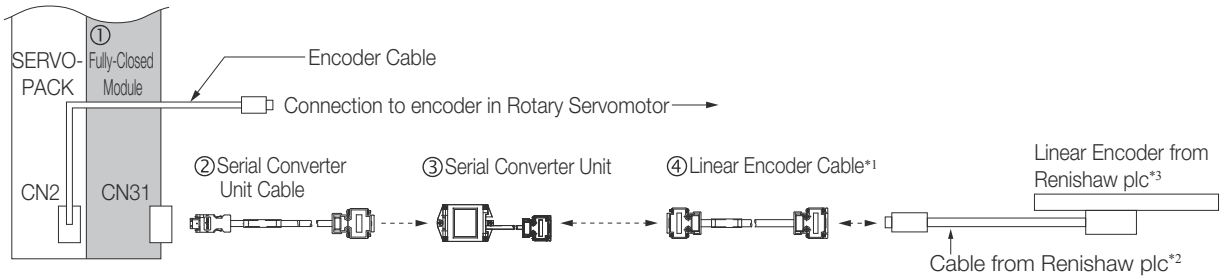
LIC4100 Linear Encoder with EIB3391Y Interpolator



* Use an Encoder Cable from Heidenhain Corporation. Contact Heidenhain Corporation for detailed Encoder Cable specifications.

Connections to Linear Encoder from Renishaw Plc

Connections for a 1 Vp-p Analog Voltage Output Signal



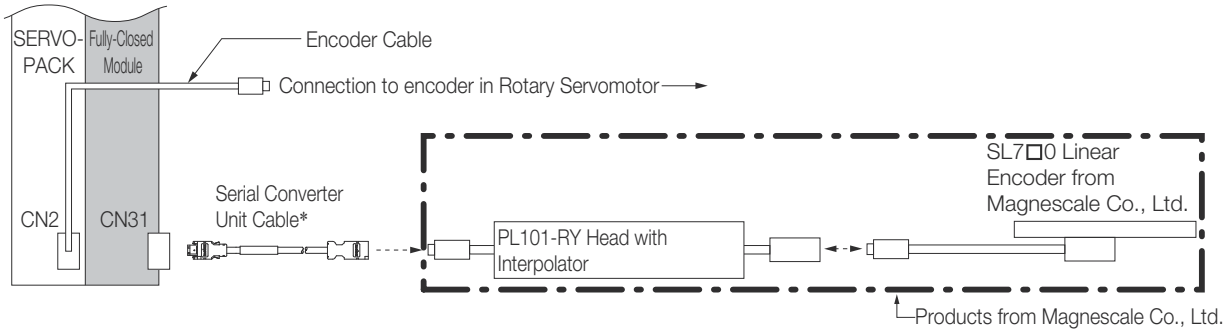
*1 When using a JZDP-J00□-□□□Serial Converter Unit, do not use a YASKAWA Linear Encoder Cable that is longer than 3 m.
*2 Contact Renishaw plc for details on cables (analog 1 Vp-p output, D-sub 15-pin, male) from Renishaw plc.
*3 If you use the origin signals with a Linear Encoder from Renishaw plc, the origin may sometimes be falsely detected. If that occurs, use the BID/DIR signal to output the origin signal only in one direction.

No.	Item	Model
①	Fully-Closed Module (Purchased alone)	Fully-Closed Module*1 SGDV-OFA01A
②	Serial Converter Unit Cable	JZSP-CLP70-□□*3-E
③	Serial Converter Unit*2	JZDP-H005-000
④	Linear Encoder Cable	JZSP-CLL00-□□*3-E

*1 When ordering a SERVOPACK and a Fully-Closed Module separately, use this Fully-Closed Module model number. Please use the YASKAWA mounting rail JZSP-P7R2-8-E in combination with a Fully-Closed Module.
*2 Contact your YASKAWA representative for specific information.
*3 The boxes (□□) in the model number are reolaced with cable length when ordering. (1m = 01, 3m = 03, 5m = 05, 10m = 10, 15m = 15)

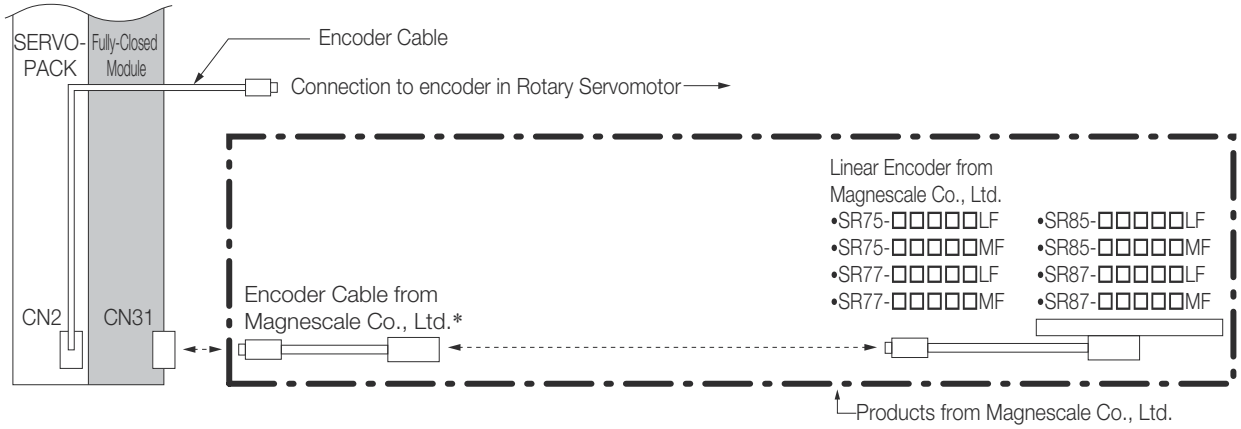
Connections to Linear Encoder from Magnescale Co., Ltd.

SL7□0 Linear Encoder and PL101-RY Sensor Head with Interpolator



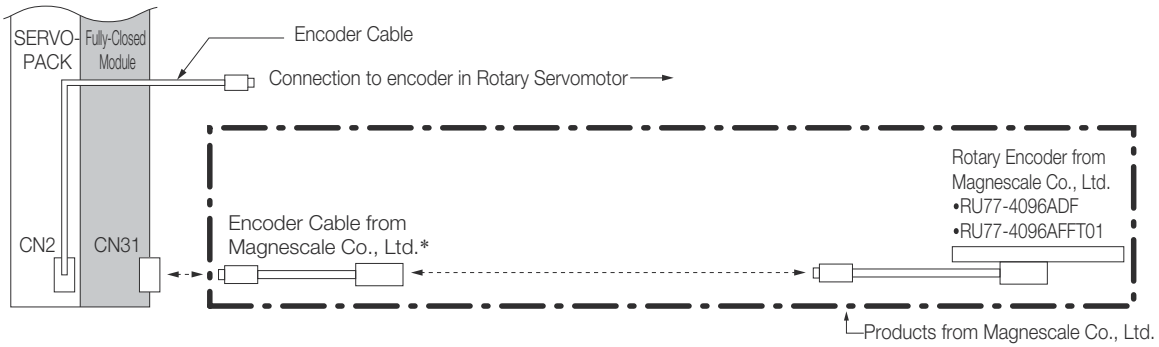
* Refer to the following section for information on cables to connect Fully-Closed Modules and Linear Encoders or chapter Serial Converter Unit Cables.

SR-75, SR-77, SR-85, and SR-87 Linear Encoders



* To connect the SERVOPACK and Linear Encoder, use a CH33-xx□□G Cable from Magnescale Co., Ltd. (This Cable has connectors designed for use with YASKAWA products).

RU77-4096ADF/RU77-4096AFFT01 Absolute Rotary Encoders

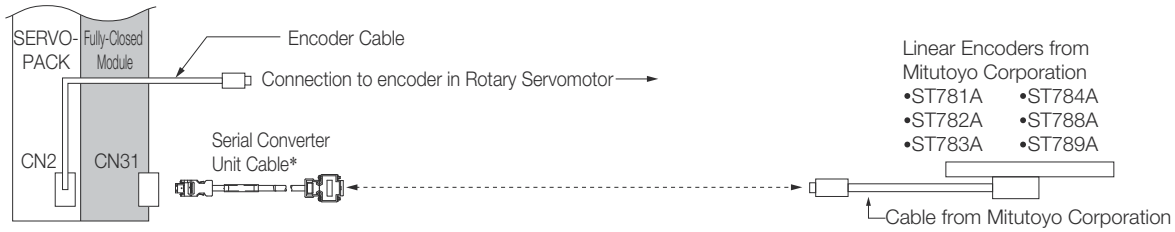


*To connect the SERVOPACK and Rotary Encoder, use a CE28-Series Extension Cable for RU77 from Magnescale Co., Ltd.

Note: The RU77 is a single-turn absolute rotary encoder.

Connections to Linear Encoders from Mitutoyo Corporation

ST78□A Linear Encoders



* Refer to the following section for information on cables to connect Fully-Closed Modules and Linear Encoders or chapter Serial Converter Unit Cables.

Connectors

Device Label	Model	YASKAWA Order No.	Number of Pins	Manufacturer
CN31	3E106-0220KV	JZSP-CMP9-1-E-G#	6	3M Japan Ltd.

Note: The above connecor or their equivalent are used for the Fully-Closed Module.

Standard Specifications

Encoder Type		Specifications	
EnDat 2.2	Encoder Supply	Output voltage	Typ. 5 V
	Serial Interface (Synchronous)	Signal transfer	RS485
		Max. Baud rate	16 MHz
EnDat 2.1	Encoder Supply	Output voltage	Typ. 5 V
	Serial Interface (Synchronous)	Signal transfer	RS485
		Max. Baud rate	2 MHz
	Sine-Cosine input	Signal transfer	Differential signals, symmetric
		Differential voltage	0.5 to 1.25 Vss
		Terminating resistor	124 Ohm
		Signal frequency	250 kHz
		Resolution	13-bits (8192)
Hiperface	Encoder Supply	Output voltage	7 to 12 V
	Serial Interface (Asynchronous)	Signal transfer	RS485
		Max. Baud rate	38.4 MHz
	Sine-Cosine input	Signal transfer	Differential signals, symmetric
		Differential voltage	0.5 to 1.25 Vss
		Terminating resistor	124 Ohm
		Signal frequency	250 kHz
		Resolution	13-bits (8192)
Sine-Cosine Encoder	Encoder Supply	Output voltage	Typ. 5 V
	Sine-Cosine input	Signal transfer	Differential signals, symmetric
		Differential voltage	0.5 to 1.25 Vss
		Terminating resistor	124 Ohm
		Signal frequency	250 kHz
		Resolution	13-bits (8192)
	Reference input	Signal transfer	Differential signals, symmetric
		Differential voltage	0.2 V or more
		Terminating resistor	124 Ohm

Option Module Feedback Set-up for Fully-closepd Loop Control

The encoder parameters must be written into the module via the SERVOPACK using the SigmaWin+ engineering tool. Ask YASKAWA for preparation encoder parameter file for fully-closed loop.

Procedure to download the encoder parameter via SigmaWin+ Version 7.2x via Sigma-7 200 V to Option Module Feedback.

1. Install a motor, encoder and SERVOPACK.
2. In SigmaWin+ select “Parameters > Parameter edit”. Set parameter Pn002.3 = 1 or 3.
3. Start “Setup > Motor parameter scale write” in SigmaWin+.
4. Write configuration file to option module feedback.

Note: Refer to SigmaWin+ Operation manual for information on how to write parameters using SigmaWin+.

General Specification SGDV-OFB01A

Item		Specification
Applicable SERVOPACK		All Sigma-7 Series SERVOPACKs
Applicable SERVOPACK Firmware Version		Version 0023 or later
Placement		Attached to the SERVOPACK
Power Specification	Power Supply Method	Supplied from the control power supply of the SERVOPACK.
Operating Conditions	Surrounding Air / Storage Temperature	0°C to +55 °C / -20 °C to +85 °C
	Ambient / Storage Humidity	90% RH or less (with no condensation)
	Vibration / Shock Resistance	4.9 m/s^2 / 19.8 m/s^2
	Protection Class / Pollution Degree	Protection class: IP10, Pollution degree: 2 An environment that satisfies the following conditions. • Free of corrosive or explosive gases • Free of exposure to water, oil or chemicals • Free of dust, salts or iron dust
	Altitude	1,000 m or less
	Others	Free of static electricity, strong electromagnetic fields, magnetic fields or exposure to radioactivity
Supported motors		Permanent magnet, Synchronous AC rotary or linear motor
Max. output frequency range		Must be lower than 500 [rev/sec]. Note: UL application: 400 [rev/sec] (200 V), 300 [rev/sec] (400 V). If UL is needed, the combination should be applied to UL on customer side.
Supported scales for motor driving usage		EnDat2.1, EnDat2.2, HIPERFACE, Sin/Cos
Supported scales for fully-closed usage		EnDat2.1, EnDat2.2, HIPERFACE, Sin/Cos
Motor pole information for motor driving	Without hall sensor signals	Sigma-5 detecting function is available. In case of EnDat2.1, EnDat2.2 and HIPERFACE, the function should be carried out once (after that, recognized data will be used). In other cases, the function should be carried out each boot-up.
	With hall sensor signals	The data is used (any functions needed for the information).
Unsupported devices		Advanced option module safety: SGDV-OSA01A Fully-closed option module: SGDV-OFA01A

General Specification SGDV-OFB03A

Item		Specification
Applicable SERVOPACK		All Sigma-7 Series SERVOPACKs
Applicable SERVOPACK Firmware Version		Version 0023 or later
Placement		Attached to the SERVOPACK
Power Specification	Power Supply Method	Supplied from the control power supply of the SERVOPACK.
Operating Conditions	Surrounding Air / Storage Temperature	0°C to +55 °C / -20 °C to +85 °C
	Ambient / Storage Humidity	90% RH or less (with no condensation)
	Vibration / Shock Resistance	4.9 m/s^2 / 19.8 m/s^2
	Protection Class / Pollution Degree	Protection class: IP10, Pollution degree: 2 An environment that satisfies the following conditions. • Free of corrosive or explosive gases • Free of exposure to water, oil or chemicals • Free of dust, salts or iron dust
	Altitude	1,000 m or less
	Others	Free of static electricity, strong electromagnetic fields, magnetic fields or exposure to radioactivity
Supported motors		Permanent magnet, Synchronous AC rotary or linear motor
Max. output frequency range		Must be lower than 500 [rev/sec]. Note: UL application: 400 [rev/sec] (200 V), 300 [rev/sec] (400 V). If UL is needed, the combination should be applied to UL on customer side.
Supported scales for motor driving usage		A quad B
Supported scales for fully-closed usage		A quad B
Motor pole information for motor driving	Without hall sensor signals	Sigma-5 detecting function is available. In other cases, the function should be carried out each boot-up.
	With hall sensor signals	The data is used (any functions needed for the information).
Unsupported devices		Advanced option module safety: SGDV-OSA01A Fully-closed option module: SGDV-OFA01A

General Specification SGDV-OFB04A

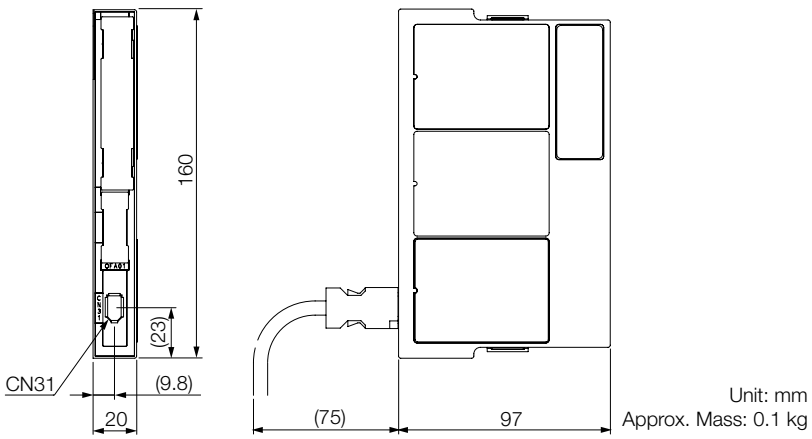
Item		Specification
Applicable SERVOPACK		All Sigma-7 Series SERVOPACKS
Applicable SERVOPACK Firmware Version		Version 0023 or later
Placement		Attached to the SERVOPACK
Power Specification	Power Supply Method	Supplied from the control power supply of the SERVOPACK.
Operating Conditions	Surrounding Air / Storage Temperature	0°C to +55 °C / -20 °C to +85 °C
	Ambient / Storage Humidity	90% RH or less (with no condensation)
	Vibration / Shock Resistance	4.9 m/s^2 / 19.8 m/s^2
	Protection Class / Pollution Degree	Protection class: IP10, Pollution degree: 2 An environment that satisfies the following conditions. • Free of corrosive or explosive gases • Free of exposure to water, oil or chemicals • Free of dust, salts or iron dust
	Altitude	1,000 m or less
	Others	Free of static electricity, strong electromagnetic fields, magnetic fields or exposure to radioactivity
Supported motors		Permanent magnet, Synchronous AC rotary or linear motor
Max. output frequency range		Must be lower than 240 [rev/sec]. Note: UL application: 400 [rev/sec] (200 V), 300 [rev/sec] (400 V). If UL is needed, the combination should be applied to UL on customer side.
Motor pole information for motor driving	Incremental usage	Sigma-5 detecting function is available. The function should be carried out at each boot-up.
	Absolute usage	The data is used (any functions needed for the information). The pole detection function should be carried out only once after the card or the motor has been replaced.
Unsupported devices		Advanced option module safety: SGDV-OSA01A Fully-closed option module: SGDV-OFA01A

Connectors

Device Label	Function	Model	YASKAWA Order Code	Number of Pins	Manufacturer
CN31	Connector Kit for CN1	Case: 10326-52A0-008 Connector: 10126-3000PE	JZSP-CSI9-2-E	26	3M Japan Ltd.

Note: The above connecor or their equivalent are used for the Fully-Closed Module SGDV-0FB0□A.

External Dimensions



Unit: mm
Approx. Mass: 0.1 kg

Connectors

Device Label	Model	Number of Pins	Manufacturer
CN31	3E106-0220KV	6	3M Japan Ltd.

Encoder Signal Functions (CN31)

Pin	Signal	Function
1	PG5 V	Encoder power supply +5 V
2	PG0 V	Encoder power supply 0 V
3	–	–
4	–	–
5	PS	Serial data (+)
6	/PS	Serial data (-)
Shell	Shield	–

Safety Option Module

Safety Module

This Safety Module implements safety functions that conform to EN ISO 13849-1 (the harmonized EU Machinery Directive) and are specified in the individual IEC 61800-5-2 standard. You can combine it with an SGD7S SERVOPACK to design optimum safety in a machine system according to industry needs.

Model Designations

When ordering a SERVOPACK and a Safety Module separately, use the following Safety Module model number.

SGDV	-	OS	A01	A	
Option Module Safety		1st & 2nd	3rd ... 5th	6th	digit

1st & 2nd digit - Module Type	
Code	Module
OS	Option Module Safety

3rd ... 5th digit - Interface Specifications	
Code	Interface
A01	Safety Module

6th digit - Design Revision Order	
Code	Specification
A	Initial Design

Applicable Standards and Functions

Compliance with Safety Standards

Safety Standards	Applicable Standards	Products	
		SERVOPACK	SERVOPACK + Safety Module
Safety of Machinery	EN ISO13849-1: 2015 IEC 60204-1	√	√
Functional Safety	IEC 61508 Series IEC 62061 IEC 61800-5-2	√	√
EMC	IEC 61326-3-1	√	√

Support for Functions defined in IEC61800-5-2

Safety functions are implemented by using the hard wire base block (HWBB) in the SERVOPACK.

Safety Function	Description	Applicable Products	
		SERVOPACK	SERVOPACK + Safety Module
Safe BaseBlock Function (SBB function)	This safety function is equivalent to an STO function. (It shuts OFF the power supply from the SERVOPACK to the motor.)	√	√
Safe BaseBlock with Delay Function (SBB-D function)	This safety function is equivalent to an SS1 function. (It monitors the deceleration operation of the motor for the specified time and then shuts OFF the power supply from the SERVOPACK to the motor.)	—	√
Safe Position Monitor with Delay Function (SPM-D function)	This safety function is equivalent to an SS2 function. (It monitors the deceleration operation of the motor for the specified time and then monitors the position after the motor stops.)	—	√
Safely Limit Speed with Delay Function (SLS-D function)	This safety function is equivalent to an SLS function. (It monitors the deceleration operation of the motor for the specified time and then monitors the speed of the motor to confirm that it remains in the allowable range.)	—	√

Specifications and Ratings

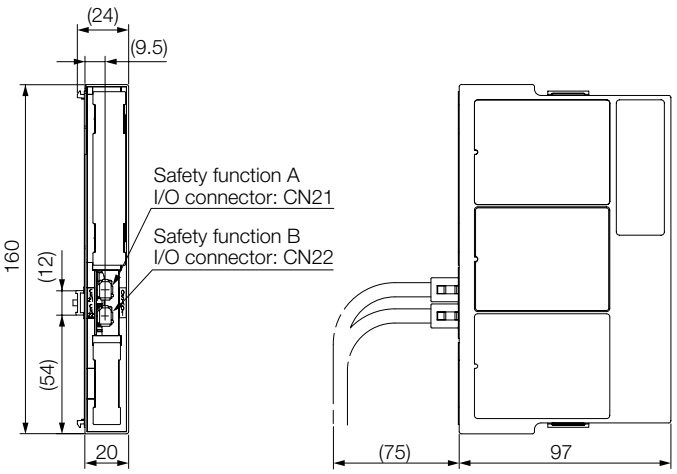
Basic Specifications

Item		Specification	

Compliance with UL Standards, EU Directives, and other Safety Standards (in Combination with SERVOPACK)

Item		Specification	
North American Safety Standards		UL61800-5-1 CSA C22.2 No.274	
European Directives	Machinery Directive (2006/42/EC)	EN ISO 13849-1: 2015	
	EMC Directive (2004/108/EC)	EN 55011/A2 group 1, class A EN 61000-6-2 EN 61000-6-4 EN 61800-3 (Category C2, Second Environment)	
	Low Voltage Directive (2006/95/EC)	EN 50178 EN 61800-5-1	
	RoHS Directive (2011/65/EU)	EN 50581	
Safety Standards	Safety of Machinery	EN ISO 13849-1 IEC 60204-1	
	Functional Safety	IEC 61508 Series IEC 62061 IEC 61800-5-2	
	EMC Directive	IEC 61326-3-1	
Safety Function		IEC 61800-5-2	IEC 60204-1
		Safe Torque Off (STO)	Stop Category 0
		Safe Stop 1 (SS1)	Stop Category 1
		Safe Stop 2 (SS2)	Stop Category 2
		Safely Limited Speed (SLS)	
	Number of Blocks	2	
	Safety Function A	Input signals: 2 channels (redundant signals), output signals: 1 channel	
	Safety Function B	Input signals: 2 channels (redundant signals), output signals: 1 channel	
Safe Performance			
	Safety Integrity Level	SIL2, SILCL2	
	Probability of Dangerous Failure per Hour	PFH = 8.0 × 10^{-8} [1/h] (SBB) PFH = 3.4 × 10^{-8} [1/h] (SBB-D, SPM-D, SLS-D)	
	Category	Cat2	
	Performance Level	PLd (Category 2)	
	Mean Time to Dangerous Failure of Each Channel	MTTFd: High	
	Average Diagnostic Coverage	DCave: Medium	
	Proof Test Interval	10 years	

External Dimensions



Unit: mm
Approx. Mass: 0.1 kg

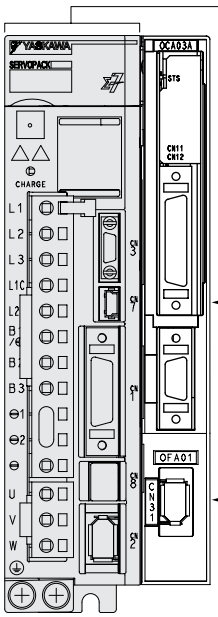
Device Label	Model	Number of Pins	Manufacturer
CN21	1981080-1	8	Tyco Electronics Japan G.K.
CN22	1981080-1	8	Tyco Electronics Japan G.K.

Note:
1. The above connectors or their equivalents are used for SERVOPACKs.
2. Refer to the user's manual of the Safety Module for installation standards.

INDEXER Module

Configuration

A Sigma-7S Single-axis INDEXER Module-Mounted SERVOPACK is a Command Option Attachable-Type SERVOPACK with an INDEXER Module mounted on the side of the SERVOPACK. Positioning with single-axis control can be performed by using program table operation and other functions.



Command Option Attachable-Type SERVOPACKs
SGD7S-□□□□E0A

Option Module INDEXER
SGDV-OCA03A

Note: Firmware version 6 or later is required.

Fully-Closed Module*
SGDV-OFA01A

* Attach a Fully-Closed Module if fully-closed loop control is required.

Model Designation

One Option Case Kit is required for each SERVOPACK.

Option Case Kit model
SGDV-OZA01A

INDEXER Module
SGDV-OCA03A

Fully-Closed Module
SGDV-OFA01A

Sigma-7S Single-Axis INDEXER Module

Ratings

Three-Phase, 200 VAC

Model SGD7S-			R70A	R90A	1R6A	2R8A	3R8A	5R5A	7R6A	120A	180A	200A	330A
Maximum Applicable Motor Capacity [kW]			0.05	0.1	0.2	0.4	0.5	0.75	1.0	1.5	2.0	3.0	5.0
Continuous Output Current [A]			0.66	0.91	1.6	2.8	3.8	5.5	7.6	11.6	18.5	19.6	32.9
Instantaneous Maximum Output Current [A]			2.1	3.2	5.9	9.3	11	16.9	17	28	42	56	84
Main Circuit	Power Supply		200 VAC to 240 VAC, -15% to +10%, 50 Hz/60 Hz										
	Input Current [A]*		0.4	0.8	1.3	2.5	3.0	4.1	5.7	7.3	10	15	25
Control	Power Supply		200 VAC to 240 VAC, -15% to +10%, 50 Hz/60 Hz										
	Input Current [A]*		0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.25	0.25	0.3
Power Supply Capacity [kVA]*			0.2	0.3	0.5	1.0	1.3	1.6	2.3	3.2	4.0	5.9	7.5
Power Loss*	Main Circuit Power Loss [W]		5.0	7.0	11.9	22.5	28.5	38.9	49.2	72.6	104.2	114.2	226.6
	Control Circuit Power Loss [W]		12	12	12	12	14	14	14	15	16	16	19
	Built-in Regenerative Resistor Power Loss [W]		–	–	–	–	8	8	8	10	16	16	36
	Total Power Loss [W]		17.0	19.0	23.9	34.5	50.5	60.9	71.2	97.6	136.2	146.2	281.6
Regenerative Resistor	Built-In Regenerative Resistor	Resistance [Ω]	–	–	–	–	40	40	40	20	12	12	8
		Capacity [W]	–	–	–	–	40	40	40	60	60	60	180
	Minimum Allowable External Resistance [Ω]		40	40	40	40	40	40	40	20	12	12	8
Overvoltage Category			III										

* This is the net value at the rated load.

Model SGD7S-			470A	550A	590A	780A
Maximum Applicable Motor Capacity [kW]			6.0	7.5	11	15
Continuous Output Current [A]			46.9	54.7	58.6	78
Instantaneous Maximum Output Current [A]			110	130	140	170
Main Circuit	Power Supply		200 VAC to 240 VAC, -15% to +10%, 50 Hz/60 Hz			
	Input Current [A]*1		29	37	54	73
Control	Power Supply		200 VAC to 240 VAC, -15% to +10%, 50 Hz/60 Hz			
	Input Current [A]*1		0.3	0.3	0.4	0.4
Power Supply Capacity [kVA]* 1			10.7	14.6	21.7	29.6
Power Loss*1	Main Circuit Power Loss [W]		271.7	326.9	365.3	501.4
	Control Circuit Power Loss [W]		21	21	28	28
	External Regenerative Resistor Unit Power Loss [W]		180*2	180*3	350*3	350*3
	Total Power Loss [W]		292.7	347.9	393.3	529.4
External Regenerative Resistor Unit	External Regenerative Resistor Unit	Resistance [Ω]	6.25*2	3.13*3	3.13*3	3.13*3
		Capacity [W]	880*2	1,760*3	1,760*3	1,760*3
	Minimum Allowable External Resistance [Ω]		5.8	2.9	2.9	2.9
Overvoltage Category			III			

*1. This is the net value at the rated load.
*2. This value is for the optional JUSP-RA04-E Regenerative Resistor Unit.
*3. This value is for the optional JUSP-RA05-E Regenerative Resistor Unit.

Single-phase, 200 VAC

Model SGD7S-			R70A	R90A	1R6A	2R8A	5R5A	120A
Maximum Applicable Motor Capacity [kW]			0.05	0.1	0.2	0.4	0.75	1.5
Continuous Output Current [A]			0.66	0.91	1.6	2.8	5.5	11.6
Instantaneous Maximum Output Current [A]			2.1	3.2	5.9	9.3	16.9	28
Main Circuit	Power Supply		200 VAC to 240 VAC, -15% to +10%, 50 Hz/60 Hz					
	Input Current [A]*		0.8	1.6	2.4	5.0	8.7	16
Control	Power Supply		200 VAC to 240 VAC, -15% to +10%, 50 Hz/60 Hz					
	Input Current [A]*		0.2	0.2	0.2	0.2	0.2	0.25
Power Supply Capacity [kVA]*			0.2	0.3	0.6	1.2	1.9	4.0
Power Loss*	Main Circuit Power Loss [W]		5.0	7.1	12.1	23.7	39.2	71.8
	Control Circuit Power Loss [W]		12	12	12	12	14	16
	Built-in Regenerative Resistor Power Loss [W]		–	–	–	–	8	16
	Total Power Loss [W]		17.0	19.1	24.1	35.7	61.2	103.8
Regenerative Resistor	Built-In Regenerative Resistor	Resistance [Ω]	–	–	–	–	40	12
		Capacity [W]	–	–	–	–	40	60
	Minimum Allowable External Resistance [Ω]		40	40	40	40	40	12
Overvoltage Category			III					

* This is the net value at the rated load.

270 VDC

Model SGD7S-		R70A	R90A	1R6A	2R8A	3R8A	5R5A	7R6A	120A
Maximum Applicable Motor Capacity [kW]		0.05	0.1	0.2	0.4	0.5	0.75	1	1.5
Continuous Output Current [A]		0.66	0.91	1.6	2.8	3.8	5.5	7.6	11.6
Instantaneous Maximum Output Current [A]		2.1	3.2	5.9	9.3	11	16.9	17	28
Main Circuit	Power Supply	270 VDC to 324 VDC, -15% to +10%							
	Input Current [A]*1	0.5	1	1.5	3	3.8	4.9	6.9	11
Control	Power Supply	270 VDC to 324 VDC, -15% to +10%							
	Input Current [A]*1	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2*2
Power Supply Capacity [kVA]*1		0.2	0.3	0.6	1	1.4	1.6	2.3	3.2
Power Loss*1	Main Circuit Power Loss [W]	4.4	5.9	9.8	17.5	23.0	30.7	38.7	55.8
	Control Circuit Power Loss [W]	12	12	12	12	14	14	14	15
	Total Power Loss [W]	16.4	17.9	21.8	29.5	37.0	44.7	52.7	70.8
Overvoltage Category		III							

*1 This is the net value at the rated load.
*2 The value is0.25 A for the SGD7S-120A00A008.

Model SGD7S-		180A	200A	330A	470A	550A	590A	780A
Maximum Applicable Motor Capacity [kW]		2.0	3.0	5.0	6.0	7.5	11.0	15.0
Continuous Output Current [A]		18.5	19.6	32.9	46.9	54.7	58.6	78.0
Instantaneous Maximum Output Current [A]		42.0	56.0	84.0	110	130	140	170
Main Circuit	Power Supply	270 VDC to 324 VDC, -15% to + 10%						
	Input Current [A]*	14	20	34	36	48	68	92
Control	Power Supply	270 VDC to 324 VDC, -15% to + 10%						
	Input Current [A]*	0.25	0.25	0.3	0.3	0.3	0.4	0.4
Power Supply Capacity [kVA]*		4.0	5.9	7.5	10.7	14.6	21.7	29.6
Power Loss*	Main Circuit Power Loss [W]	82.7	83.5	146.2	211.6	255.3	243.6	343.4
	Control Circuit Power Loss [W]	16	16	19	21	21	28	28
	Total Power Loss [W]	98.7	99.5	165.2	232.6	276.3	271.6	371.4
Overvoltage Category		III						

* This is the net value at the rated load.

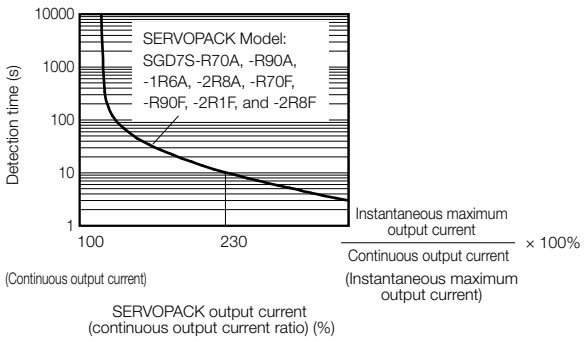
INDEXER Module Power Loss

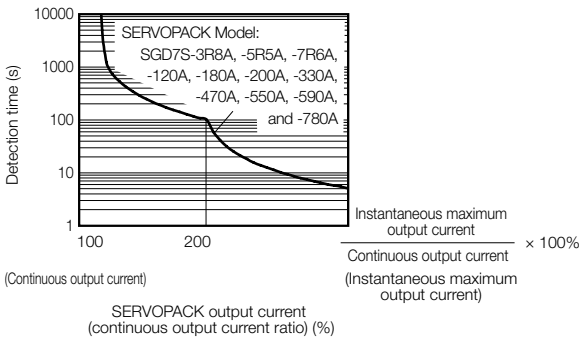
The power supply for an INDEXER Module is supplied from the control power supply of the SERVOPACK. The power loss is given in the following table.

Item	Specification
Power Supply Method	5.05 VDC
Maximum Operating Voltage	5.25 VDC
Maximum Operating Current	500 mA
Maximum Power Loss	2.6 W

SERVOPACK Overload Protection Characteristics

The overload detection level is set for hot start conditions with a SERVOPACK surrounding air temperature of 55°C. An overload alarm (A.710 or A.720) will occur if overload operation that exceeds the overload protection characteristics shown in the following diagram (i.e., operation on the right side of the applicable line) is performed.
The actual overload detection level will be the detection level of the connected SERVOPACK or Servomotor that has the lower overload protection characteristics.
In most cases, that will be the overload protection characteristics of the Servomotor.





Note:
The above overload protection characteristics do not mean that you can perform continuous duty operation with an output of 100% or higher.
For a YASKAWA-specified combination of SERVOPACK and Servomotor, maintain the effective torque within the continuous duty zone of the torque-motor speed characteristic (or force-motor speed characteristics) of the Servomotor.

Specifications

The specification when the INDEXER Module is combined with a Command Option Attachable-Type SERVOPACK are given in the following table.

Item		Specification	
Control Method		IGBT-based PWM control, sine wave current drive	
Feedback	With Rotary Servomotor	Serial encoder: 17 bits (absolute encoder) 20 bits or 24 bits (incremental encoder/absolute encoder) 22 bits (absolute encoder)	
	With Linear Servomotor	• Absolute linear encoder (The signal resolution depends on the absolute linear encoder.) • Incremental linear encoder (The signal resolution depends on the incremental linear encoder or Serial Converter Unit.)	
Environmental Conditions	Surrounding Air Temperature	0°C to 55°C	
	Storage Temperature	-20°C to 85°C	
	Surrounding Air Humidity	90% relative humidity max. (with no freezing or condensation)	
	Storage Humidity	90% relative humidity max. (with no freezing or condensation)	
	Vibration Resistance	4.9 m/s^2	
	Shock Resistance	19.6 m/s^2	
	Degree of Protection	Class	SERVOPACK Model: SGD7S-
		IP10	R70A, R90A, 1R6A, 2R8A, 3R8A, 5R5A, 7R6A, 120A
		IP20	120AE0A008, 180A, 200A, 330A, 470A, 550A, 590A, 780A
	Pollution Degree	2 • Must be no corrosive or flammable gases. • Must be no exposure to water, oil, or chemicals. • Must be no dust, salts, or iron dust.	
	Altitude	1,000 m max.	
	Others	Do not use the SERVOPACK in the following locations: Locations subject to static electricity noise, strong electromagnetic/magnetic fields, or radioactivity	
Applicable Standards		UL 61800-5-1 (E147823), CSA C22.2 No.274, EN ISO13849-1: 2015, EN 55011 group 1 class A, EN 61000-6-2, EN 61000-6-4, EN 61800-3 (Category C2, Second environment), EN 50178, EN 61800-5-1, IEC 60204-1, IEC 61508 series, IEC 62061, IEC 61800-5-2, and IEC 61326-3-1	
Mounting		Mounting	SERVOPACK Model: SGD7S-
		Base-mounted	All Models
		Rack-mounted	R70A, R90A, 1R6A, 2R8A, 3R8A, 5R5A, 7R6A, 120A, 180A, 200A, 330A
		Duct-ventilated	470A, 550A, 590A, 780A
Performance	Speed Control Range	1:5,000 (At the rated torque, the lower limit of the speed control range must not cause the Servomotor to stop.)	
	Coefficient of Speed Fluctuation*1	±0.01% of rated speed max. (for a load fluctuation of 0% to 100%)	
		0% of rated speed max. (for a voltage fluctuation of ±10%)	
		±0.1% of rated speed max. (for a temperature fluctuation of 25°C ±25°C)	
	Torque Control Precision (Repeatability)	±1%	
	Soft Start Time Setting	0 s to 10 s (Can be set separately for acceleration and deceleration.)	
I/O Signals	Encoder Divided Pulse Putput	Phase A, phase B, phase C: Line-driver output Number of divided output pulses: Any setting is allowed	
	Overheat Protection Input	Number of input points: 1 Input voltage range: 0 V to ±5 V	

Continued on next page.

Continued from previous page.

<table>
<tr><th colspan="4">Item</th><th>Specification</th></tr>
<tr><td rowspan="11">I/O Signals</td><td rowspan="3">Sequence Input Signals</td><td>SERVOPACK</td><td>Fixed Input</td><td>Allowable voltage range: 24 VDC ±20%
Number of input points: 6
Input method: Sink inputs or source inputs Input Signals:
• Alarm Reset (/ALM-RST)
• Forward Drive Prohibited (P-OT)
• Reverse Drive Prohibited (N-OT)
• Origin Return Deceleration Switch (/DEC)
• Registration (/RGRT)
• Servo ON (/S-ON)
A signal can be allocated and the positive and negative logic can be changed.</td></tr>
<tr><td rowspan="2">INDEXER Module</td><td rowspan="2">Fixed Input</td><td>Allowable voltage range: 24 VDC ±20%
Number of input points: 11
/MODE 0/1 (Mode Switch Input) signal
Mode 0: • /START-STOP (Program Table Operation Start-Stop Input) signal • /PGMRES (Program Table Operation Reset Input) signal • /SEL0 (Program Step Selection Input 0) signal • /SEL1 (Program Step Selection Input 1) signal • /SEL2 (Program Step Selection Input 2) signal • /SEL3 (Program Step Selection Input 3) signal • /SEL4 (Program Step Selection Input 4) signal • /SEL5 (Program Step Selection Input 5) signal • /SEL6 (Program Step Selection Input 6) signal • /SEL7 (Program Step Selection Input 7) signal
Mode 1: • /HOME (Origin Return Input) signal • /JOGP (Forward Jog Input) signal • /JOGN (Reverse Jog Input) signal • /JOG0 (Jog Speed Table Selection Input 0) signal • /JOG1 (Jog Speed Table Selection Input 1) signal • /JOG2 (Jog Speed Table Selection Input 2) signal • /JOG3 (Jog Speed Table Selection Input 3) signal</td></tr>
<tr><td rowspan="7">Sequence Output Signals</td><td rowspan="2">SERVOPACK</td><td>Fixed Input</td><td>Allowable voltage range: 5 VDC to 30 VDC
Number of output points: 1
Output signal: Servo Alarm (ALM)</td></tr>
<tr><td>Output Signals for Which Allocations Can Be Changed</td><td>Allowable voltage range: 5 VDC to 30 VDC
Number of output points: 3
(A photocoupler output (isolated) is used.)
Output Signals:
• Warning Output (/WARN)
• Brake Output (/BK)
• Servo Ready Output (/S-RDY)
• Alarm Code Output (/ALO1, /ALO2, and /ALO3)
A signal can be allocated and the positive and negative logic can be changed.</td></tr>
<tr><td>INDEXER Module</td><td>Fixed Input</td><td>Allowable voltage range: 5 VDC to 30 VDC
Number of output points: 9
Output Signals:
• Positioning Completion Output (/INPOSITION)
• Programmable Output 0 (/POUT0)
• Programmable Output 1 (/POUT1)
• Programmable Output 2 (/POUT2)
• Programmable Output 3 (/POUT3)
• Programmable Output 4 (/POUT4)
• Programmable Output 5 (/POUT5)
• Programmable Output 6 (/POUT6)
• Programmable Output 7 (/POUT7)</td></tr>
</table>

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Item			Specification
Communications	RS-422A Communications (CN3)	Interfaces	Digital Operator (JUSP-OP05A-1-E) and personal computer (with SigmaWin+)
		1:N Communications	Up to N = 15 stations possible for RS-422A port
		Axis Address Setting	Set with parameters.
	USB Communications (CN7)	Interfaces	Interface Personal computer (with SigmaWin+)
		Communications Standard	Conforms to USB2.0 standard (12 Mbps).
Displays/ Indicators	SERVOPACK		CHARGE and PWR indicators, and one-digit seven-segment display
	INDEXER Module		Refer to the following manual for details. Sigma-7-Series AC Servo Drive Sigma-7S SERVOPACK Command Option Attachable Type with INDEXER Module Product Manual (Manual No.: SIEP S800001 64)
Operating Methods	Program Table Method		• Program table positioning in which steps are executed sequentially by commands given through contact input or serial communications • Positioning in which station numbers are specified by commands given through contact input or serial communications
		Max. Number of Steps	256
		Max. Number of Tables	256
		Max. Number of Stations	256
	Serial Communications Method		Serial command by 1-channel ASCII code Communications specifications: RS-422/485 (50 m max.) Connection topology: Multi-drop connection (16 axes max.) Baud rate: 9,600, 19,200, 38,400 bps
	Other Functions		Registration (positioning by external signals), origin return
Analog Monitor (CN5)			Number of points: 2 Output voltage range: ±10 VDC (effective linearity range: ±8 V) Resolution: 16 bits Accuracy: ±20 mV (Typ) Maximum output current: ±10 mA Settling time (±1%): 1.2 ms (Typ)
Dynamic Brake (DB)			Activated when a servo alarm or overtravel (OT) occurs, or when the power supply to the main circuit or servo is OFF.
Regenerative Processing			Built-in (An external resistor must be connected to the SGD7S-470A to -780A.) Refer to the following section for details or Built-In Regenerative Resistor.
Overtravel (OT) Prevention			Stopping with a dynamic brake (DB), coasting to a stop, performing a hard stop, or performing a smooth stop (decelerating to a stop) for a CCW-OT (CCW Drive Prohibit Input) signal or CW-OT (CW Drive Prohibit Input) signal.
Protective Functions			Overcurrent, overvoltage, low voltage, overload, regeneration error, etc.
Utility Functions			Gain adjustment, alarm history, jogging, origin search, etc.
Safety Functions	Input		/HWBB1 and /HWBB2: Base block signals for Power Modules
	Output		EDM1: Monitors the status of built-in safety circuit (fixed output).
	Applicable Standards*2		ISO13849-1 PLe (Category 3), IEC61508 SIL3
Applicable Option Modules			Fully-Closed Module You cannot use a Safety Module if you are using an INDEXER Module.

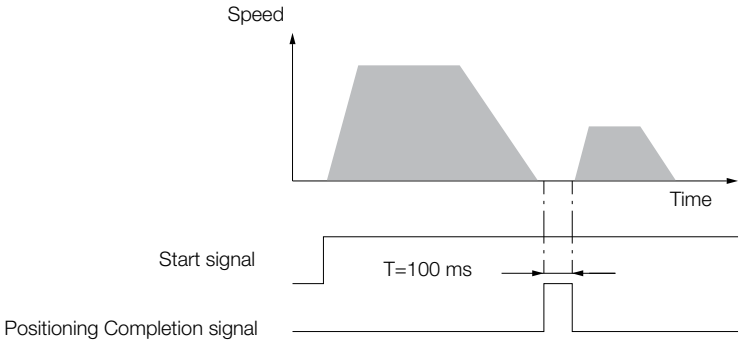
*1. The coefficient of speed fluctuation for load fluctuation is defined as follows:

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

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

Reference Methods

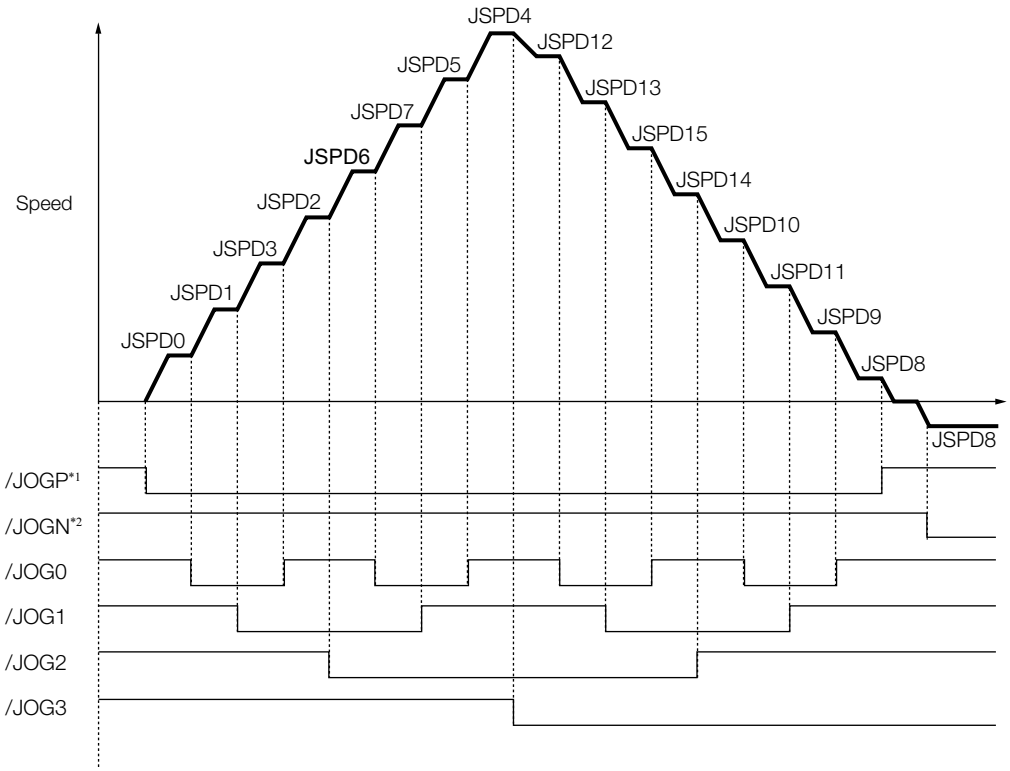
	PGMSTEP	POS	SPD	RDST	RSPD	ACC*	DEC*	EVENT	LOOP	NEXT
256 steps	0	I+400000	2000	500000	1000	200	100	T5000	1	1
	1	I+100000	1000	200000	2000	100	50	ITO	1	END
	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮
	n	I+400000	2000	500000	1000	100	50	IT100	1	n+1
	n+1	I+100000	1000	200000	2000	⋮	⋮	NT0	1	END
	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮
	254	I+400000	2000	500000	1000	100	50	SEL3T200	1	127
	255	I+100000	1000	200000	2000	100	50	DT0	1	END



Jog Speed Table

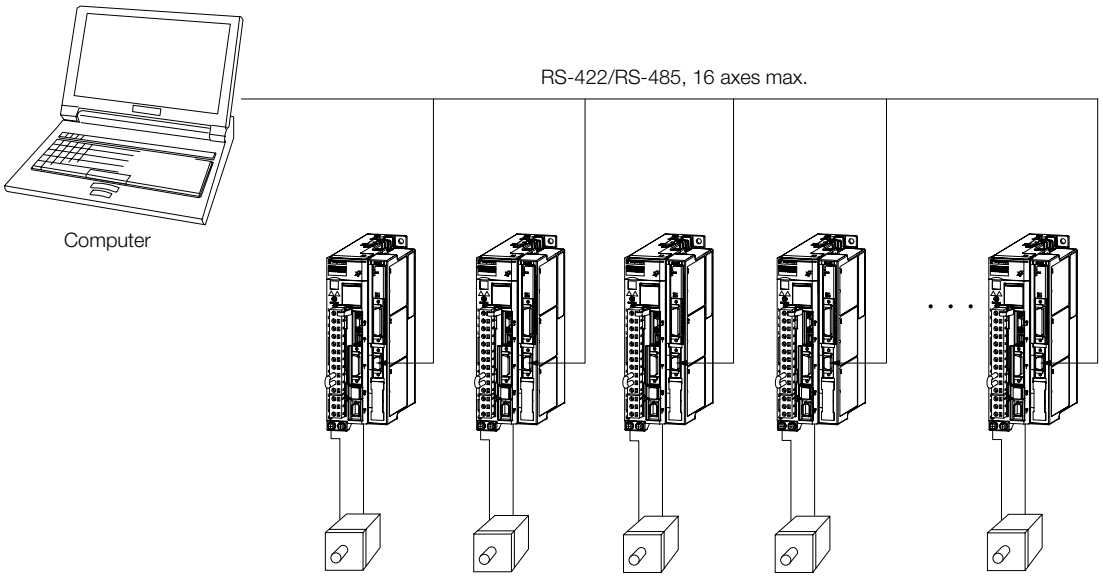
	JSPD	JOG3	JOG2	JOG1	JOG0	Jog Speed
16 combinations	0	0	0	0	0	1000
	1	0	0	0	1	2000
	2	0	0	1	0	4000
	⋮	⋮	⋮	⋮	⋮	⋮
	⋮	⋮	⋮	⋮	⋮	⋮
	⋮	⋮	⋮	⋮	⋮	⋮
	15	1	1	1	1	5500

Note: 1: Signal is ON (active), 0: Signal is OFF (inactive).

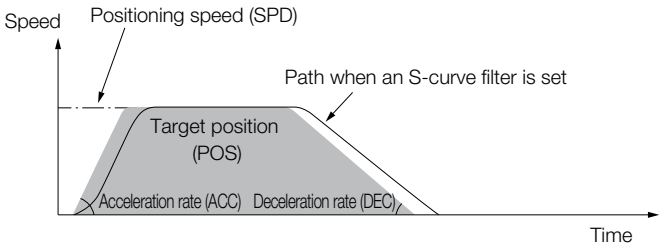


*1. Forward operation at the jog speed is performed while the /JOGP signal is ON.
*2. Reverse operation at the jog speed is performed while the /JOGN signal is ON.

With serial commands, ASCII command strings are sent to the INDEXER Module through RS-422 or RS-485 communications and these commands are interpreted and executed immediately. You can use general-purpose serial communications (RS422/RS485) to perform independent control of up to 16 axes from one host controller (e.g., PC or HMI).



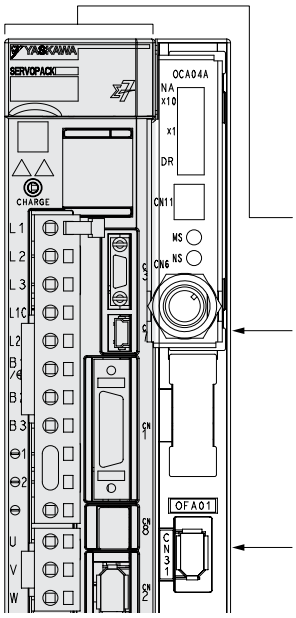

```
1SVON              # Servo turned ON.
1POSI=400000       # Set relative position to 400,000.
1SPD=2000          # Set speed to 2,000.
1ACC=200           # Set acceleration rate to 200.
1DEC=100           # Set deceleration rate to 100.
1ST                # Start operation.
 :
```



DeviceNet Modules

Configuration

A Sigma-7S Single-axis DeviceNet Module-Mounted SERVOPACK is a Command Option Attachable-Type SERVOPACK with a DeviceNet Module mounted on the side of the SERVOPACK. Positioning and origin returns can be performed by sending commands from the host controller (DeviceNet master).



Command Option Attachable-Type SERVOPACKs
SGD7S-□□□□E0A□□□

Option Module DeviceNet
SGDV-OCA04A (driven by control power supply)
SGDV-OCA05A (driven by external power supply)

Fully-Closed Module*
SGDV-OFA01A

Purchasing a Module separately

One Option Case Kit is required for each SERVOPACK.

Option Case Kit model
SGDV-OZA01A

DeviceNet Modules
SGDV-OCA04A (driven by control power supply)
SGDV-OCA05A (driven by external power supply)

Fully-Closed Module
SGDV-OFA01A

Sigma-7S Single-Axis DeviceNet Module

Ratings

Three-Phase, 200 VAC

Model SGD7S-			R70A	R90A	1R6A	2R8A	3R8A	5R5A	7R6A	120A	180A	200A	330A
Maximum Applicable Motor Capacity [kW]			0.05	0.1	0.2	0.4	0.5	0.75	1	1.5	2	3	5
Continuous Output Current [A]			0.66	0.91	1.6	2.8	3.8	5.5	7.6	11.6	18.5	19.6	32.9
Instantaneous Maximum Output Current [A]			2.1	3.2	5.9	9.3	11	16.9	17	28	42	56	84
Main Circuit	Power Supply		200 VAC to 240 VAC, -15% to +10%, 50 Hz/60 Hz										
	Input Current [A]*		0.4	0.8	1.3	2.5	3.0	4.1	5.7	7.3	10	15	25
Control	Power Supply		200 VAC to 240 VAC, -15% to +10%, 50 Hz/60 Hz										
	Input Current [A]*		0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.25	0.25	0.3
Power Supply Capacity [kVA]*			0.2	0.3	0.5	1	1.3	1.6	2.3	3.2	4	5.9	7.5
Power Loss*	Main Circuit Power Loss [W]		5	7	11.9	22.5	28.5	38.9	49.2	72.6	104.2	114.2	226.6
	Control Circuit Power Loss [W]		12	12	12	12	14	14	14	15	16	16	19
	Built-in Regenerative Resistor Power Loss [W]		–	–	–	–	8	8	8	10	16	16	36
	Total Power Loss [W]		17	19	23.9	34.5	50.5	60.9	71.2	97.6	136.2	146.2	281.6
Regenerative Resistor	Built-In Regenerative Resistor	Resistance [Ω]	–	–	–	–	40	40	40	20	12	12	8
		Capacity [W]	–	–	–	–	40	40	40	60	60	60	180
	Minimum Allowable External Resistance [Ω]		40	40	40	40	40	40	40	20	12	12	8
Overvoltage Category			III										

* This is the net value at the rated load.

Model SGD7S-			470A	550A	590A	780A
Maximum Applicable Motor Capacity [kW]			6	7.5	11	15
Continuous Output Current [A]			46.9	54.7	58.6	78
Instantaneous Maximum Output Current [A]			110	130	140	170
Main Circuit	Power Supply		200 VAC to 240 VAC, -15% to +10%, 50 Hz/60 Hz			
	Input Current [A]*1		29	37	54	73
Control	Power Supply		200 VAC to 240 VAC, -15% to +10%, 50 Hz/60 Hz			
	Input Current [A]*1		0.3	0.3	0.4	0.4
Power Supply Capacity [kVA]* 1			10.7	14.6	21.7	29.6
Power Loss*1	Main Circuit Power Loss [W]		271.7	326.9	365.3	501.4
	Control Circuit Power Loss [W]		21	21	28	28
	External Regenerative Resistor Unit Power Loss [W]		180*2	350*3	350*3	350*3
	Total Power Loss [W]		292.7	347.9	393.3	529.4
External Regenerative Resistor Unit	External Regenerative Resistor Unit	Resistance [Ω]	6.25*2	3.13*3	3.13*3	3.13*3
		Capacity [W]	880*2	1,760*3	1,760*3	1,760*3
	Minimum Allowable External Resistance [Ω]		5.8	2.9	2.9	2.9
Overvoltage Category			III			

*1. This is the net value at the rated load.
*2. This value is for the optional JUSP-RA04-E Regenerative Resistor Unit.
*3. This value is for the optional JUSP-RA05-E Regenerative Resistor Unit.

Single-phase, 200 VAC

Model SGD7S-			R70A	R90A	1R6A	2R8A	5R5A	120A
Maximum Applicable Motor Capacity [kW]			0.05	0.1	0.2	0.4	0.75	1.5
Continuous Output Current [A]			0.66	0.91	1.6	2.8	5.5	11.6
Instantaneous Maximum Output Current [A]			2.1	3.2	5.9	9.3	16.9	28
Main Circuit	Power Supply		200 VAC to 240 VAC, -15% to +10%, 50 Hz/60 Hz					
	Input Current [A]*		0.8	1.6	2.4	5.0	8.7	16
Control	Power Supply		200 VAC to 240 VAC, -15% to +10%, 50 Hz/60 Hz					
	Input Current [A]*		0.2	0.2	0.2	0.2	0.2	0.25
Power Supply Capacity [kVA]*			0.2	0.3	0.6	1.2	1.9	4
Power Loss*	Main Circuit Power Loss [W]		5.0	7.1	12.1	23.7	39.2	71.8
	Control Circuit Power Loss [W]		12	12	12	12	14	16
	Built-in Regenerative Resistor Power Loss [W]		–	–	–	–	8	16
	Total Power Loss [W]		17.0	19.1	24.1	35.7	61.2	103.8
Regenerative Resistor	Built-In Regenerative Resistor	Resistance [Ω]	–	–	–	–	40	12
		Capacity [W]	–	–	–	–	40	60
	Minimum Allowable External Resistance [Ω]		40	40	40	40	40	12
Overvoltage Category			III					

* This is the net value at the rated load.

270 VDC

Model SGD7S-		R70A	R90A	1R6A	2R8A	3R8A	5R5A	7R6A	120A
Maximum Applicable Motor Capacity [kW]		0.05	0.1	0.2	0.4	0.5	0.75	1	1.5
Continuous Output Current [A]		0.66	0.91	1.6	2.8	3.8	5.5	7.6	11.6
Instantaneous Maximum Output Current [A]		2.1	3.2	5.9	9.3	11	16.9	17	28
Main Circuit	Power Supply	270 VDC to 324 VDC, -15% to +10%							
	Input Current [A]*1	0.5	1	1.5	3	3.8	4.9	6.9	11
Control Power Supply	Power Supply	270 VDC to 324 VDC, -15% to +10%							
	Input Current [A]*1	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2*2
Power Supply Capacity [kVA]*1		0.2	0.3	0.6	1	1.4	1.6	2.3	3.2
Power Loss*1	Main Circuit Power Loss [W]	4.4	5.9	9.8	17.5	23	30.7	38.7	55.8
	Control Circuit Power Loss [W]	12	12	12	12	14	14	14	15
	Total Power Loss [W]	16.4	17.9	21.8	29.5	37.0	44.7	52.7	70.8
Overvoltage Category		III							

*1. This is the net value at the rated load.
*2. The value is 0.25 A for the SGD7S-120A00A008.

Model SGD7S-		180A	200A	330A	470A	550A	590A	780A

* This is the net value at the rated load.

DeviceNet Module Ratings

The power supply method and power loss of a DeviceNet Module depend on the model of the DeviceNet Module.

SGDV-OCA04A (Interface: Driven by Control Power Supply)

The specifications of the SGDV-OCA04A DeviceNet Module are given in the following table.

Item	Specification	
	DeviceNet Communications Section	Control Section
Power Supply Method	Supplied from the DeviceNet communications cable.	Supplied from the control power supply of a Command Option Attachable-Type SERVOPACK.
Minimum Operating Voltage	11 VDC	Included in the current consumption of the Command Option Attachable-Type SERVOPACK.
Maximum Operating Voltage	25 VDC	
Maximum Operating Current	25 mA	
Maximum Power Loss	625 mW	

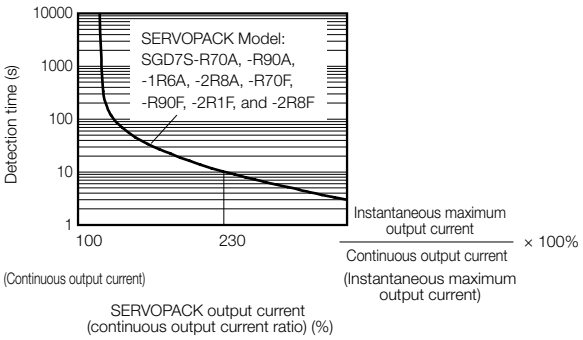
SGDV-OCA05A (Interface: Driven by External Power Supply)

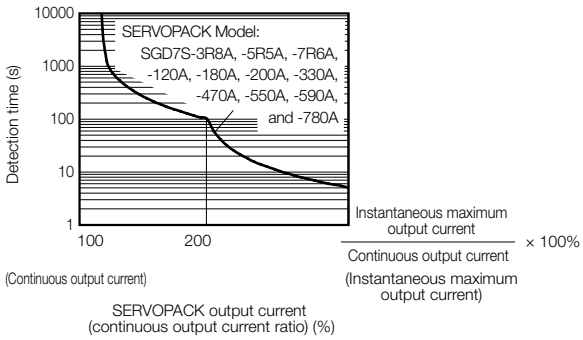
The specifications of the SGDV-OCA05A DeviceNet Module are given in the following table.

Item	Specification	
	DeviceNet Communications Section	Control Section
Power Supply Method	Supplied from the DeviceNet communications cable.	
Minimum Operating Voltage	11 VDC	
Maximum Operating Voltage	25 VDC	
Maximum Operating Current	100 mA for 24-VDC power supply 200 mA for 11-VDC power supply	
Maximum Power Loss	2.4 W	

SERVOPACK Overload Protection Characteristics

The overload detection level is set for hot start conditions with a SERVOPACK surrounding air temperature of 55°C. An overload alarm (A.710 or A.720) will occur if overload operation that exceeds the overload protection characteristics shown in the following diagram (i.e., operation on the right side of the appli- cable line) is performed. The actual overload detection level will be the detection level of the connected SERVOPACK or Servomotor that has the lower overload protection characteristics.
In most cases, that will be the overload protection characteristics of the Servomotor.





Note:
The above overload protection characteristics do not mean that you can perform continuous duty operation with an output of 100% or higher.
For a YASKAWA-specified combination of SERVOPACK and Servomotor, maintain the effective torque (or effective force) within the continuous duty zone of the torque-motor speed characteristic (or force-motor speed characteristics) of the Servomotor.

Specifications

The specification when the INDEXER Module is combined with a Command Option Attachable-Type SERVOPACK are given in the following table.

Item			Specification	
Control Method			IGBT-based PWM control, sine wave current drive	
Feedback	With Rotary Servomotor		Serial encoder: 17 bits (absolute encoder) 20 bits or 24 bits (incremental encoder/absolute encoder) 22 bits (absolute encoder)	
	With Linear Servomotor		• Absolute linear encoder (The signal resolution depends on the absolute linear encoder.) • Incremental linear encoder (The signal resolution depends on the incremental linear encoder or Serial Converter Unit.)	
Environmental Conditions	Surrounding Air Temperature		0°C to 55°C	
	Storage Temperature		-20°C to 85°C	
	Surrounding Air Humidity		90% relative humidity max. (with no freezing or condensation)	
	Storage Humidity		90% relative humidity max. (with no freezing or condensation)	
	Vibration Resistance		4.9 m/s^2	
	Shock Resistance		19.6 m/s^2	
	Degree of Protection		Class	SERVOPACK Model: SGD7S-
			IP20	R70A, R90A, 1R6A, 2R8A, 3R8A, 5R5A, 7R6A, 120A
			IP10	120AE0A008, 180A, 200A, 330A, 470A, 550A, 590A, 780A
	Pollution Degree		2 • Must be no corrosive or flammable gases. • Must be no exposure to water, oil, or chemicals. • Must be no dust, salts, or iron dust.	
	Altitude		1,000 m max.	
	Others		Do not use the SERVOPACK in the following locations: Locations subject to static electricity noise, strong electromagnetic/magnetic fields, or radioactivity	
Applicable Standards			UL 61800-5-1 (E147823), CSA C22.2 No.274, EN ISO13849-1: 2015, EN 55011 group 1 class A, EN 61000-6-2, EN 61000-6-4, EN 61800-3 (Category C2, Second environment), EN 50178, EN 61800-5-1, IEC 60204-1, IEC 61508 series, IEC 62061, IEC 61800-5-2, and IEC 61326-3-1	
Mounting			Mounting	SERVOPACK Model: SGD7S-
			Base-mounted	All Models
			Rack-mounted	R70A, R90A, 1R6A, 2R8A, 3R8A, 5R5A, 7R6A, 120A, 180A, 200A, 330A
			Duct-ventilated	470A, 550A, 590A, 780A
Performance	Speed Control Range		1:5,000 (At the rated torque, the lower limit of the speed control range must not cause the Servomotor to stop.)	
	Coefficient of Speed Fluctuation*1		±0.01% of rated speed max. (for a load fluctuation of 0% to 100%)	
			0% of rated speed max. (for a voltage fluctuation of ±10%)	
			±0.1% of rated speed max. (for a temperature fluctuation of 25°C ±25°C)	
	Torque Control Precision (Repeatability)		±1%	
	Soft Start Time Setting		0 s to 10 s (Can be set separately for acceleration and deceleration.)	
I/O Signals	Encoder Divided Pulse Output		Phase A, phase B, phase C: Line-driver output Number of divided output pulses: Any setting is allowed.	
	Linear Servomotor Overheat Protection Signal Input		Number of input points: 1 Input voltage range: 0 V to ±5 V	
	Sequence Input Signals	Fixed Input	Allowable voltage range: 24 VDC ±20% Number of input points: 4 Input method: Sink inputs or source inputs Input Signals • CCW-OT (CCW Drive Prohibit Input) signal • CW-OT (CW Drive Prohibit Input) signal • /HOME (Origin Signal Input) signal • EXSTOP (External Stop Input) Signal Positive or negative logic can be changed in the parameters.	
	Sequence Output Signals	Fixed Output	Allowable voltage range: 5 VDC to 30 VDC Number of output points: 4 Output Signals • ALM (Servo Alarm Output) signal • /WARN (Warning Signal Output) signal • /BK (Brake) signal • /S-RDY (Servo Ready Output) signal	
Communications	RS-422A Communications (CN3)	Interface	Digital Operator (JUSP-OP05A-1-E)	
	USB Communications (CN7)	Interface	Conforms to USB2.0 standard (12 Mbps)	
		Communications Standard		
Displays / Indicators	SERVOPACK		CHARGE and PWR indicators, and one-digit seven-segment display	
	DeviceNet Module		Refer to the following manual for details. Sigma-7-Series AC Servo Drive Sigma-7S SERVOPACK Command Option Attachable Type with DeviceNet Module Product Manual (Manual No.: SIEP S800001 70)	

Continued on next page.

Item			Specification
Operating Methods	Reference Method	Operation Specifications	Positioning via DeviceNet communications
		Reference Inputs	DeviceNet communications Commands: Movement references (positioning or speed) and origin returns
	Position Control Functions	Acceleration/ Deceleration Methods	Linear, asymmetrical, exponential, and S-curve acceleration/deceleration
		Operating Methods	Simple positioning, origin returns, continuous operation, and switching to positioning
		Fully-Closed Loop Control	Supported.
	Built-in Functions	Position Data Latching	Position data can be latched on phase C, the origin signal, of an external signal.
	DeviceNet Communications	Communications Methods	DeviceNet I/O communications and explicit messages
		Topology	Multidrop or T-branching*2
		Baud Rate	125 kbps, 250 kbps, or 500 kbps (Set on rotary switch (DR).)
		Cables	Special cables (OMRON DCA1-5CN02F1 Cable with Connectors or the equivalent.)
		Maximum Number of Nodes	64 nodes (including the master, Maximum number of slaves: 63)
		Node Address Setting	0 to 63 (Set on NA ×10 and ×1 rotary switches.)
Analog Monitor (CN5)			Number of points: 2 Output voltage range: ±10 VDC (effective linearity range: ±8 V) Resolution: 16 bits Accuracy: ±20 mV (Typ) Maximum output current: ±10 mA Settling time (±1%): 1.2 ms (Typ)
Dynamic Brake (DB)			Activated when a servo alarm or overtravel (OT) occurs, or when the power supply to the main circuit or servo is OFF.
Regenerative Processing			Built-in (An external resistor must be connected to the SGD7S-470A to -780A.) Refer to the following section for details or Built-In Regenerative Resistor.
Overtravel (OT) Prevention			Stopping with a dynamic brake (DB), coasting to a stop, performing a hard stop, or performing a smooth stop (decelerating to a stop) for a CCW-OT (CCW Drive Prohibit Input) signal or CW-OT (CW Drive Prohibit Input) signal.
Protective Functions			Overcurrent, overvoltage, low voltage, overload, regeneration error, etc.
Utility Functions			Gain adjustment, alarm history, jogging, origin search, etc.
Safety Functions	Input		/HWBB1 and /HWBB2: Base block signals for Power Modules
	Output		EDM1: Monitors the status of built-in safety circuit (fixed output)
	Applicable Standrads *3		ISO13849-1 PLe (Category 3), IEC61508 SIL3
Applicable Option Modules			Fully-Closed Module Note: You cannot use a Safety Module if you are using a DeviceNet Module.

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

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

*2. Externally connected terminating resistance is required.
*3. Always perform risk assessment for the system and confirm that the safety requirements are met.

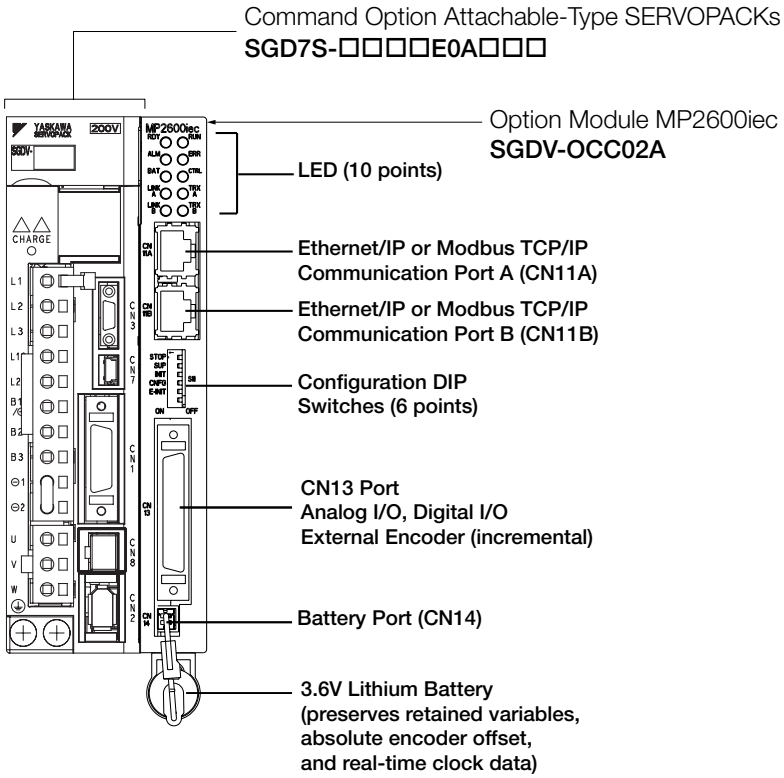
The following table gives the specifications of the DeviceNet Module.

Item		Specification	
		SGDV-OCA04A	SGDV-OCA05A
Mounting Location		Mounted to the side of a Command Option Attachable-Type SERVOPACK.	
Power Supply Method	Control Section	Supplied from the control power supply of a Command Option Attachable-Type SERVOPACK.	Supplied from the DeviceNet communications cable.
	DeviceNet Communications Section	Supplied from the DeviceNet communications cable.	
Current Consumption	Control Section	Included in the current consumption of the Command Option Attachable-Type SERVOPACK.	For 24-VDC power supply: 100 mA max., For 11-VDC power supply: 200 mA max.
	DeviceNet Communications Section	25 mA max.	

MP2600iec Single Axis Machine Controller Option

Configuration

The MP2600iec 1.5 Axis Motion Controller Option for the Sigma-5 amplifier provides a compact, all-in-one, servo/controller package with the following features:



Purchasing a Module separately

Ordering a SERVOPACK and a MP2600iec Single Axis Machine Controller Option Module separately.
Please use the following model number.

VMK-U-MP26A01R001

This kit includes the option module (SGDV-OCC02A), mounting kit (SGDV-OZC01A), battery holder and battery.

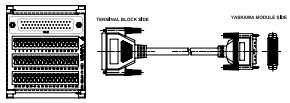
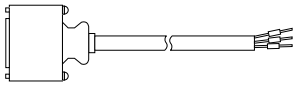
Specifications

Items				Specifications
Environmental Conditions		Ambient Operating Temperature		0 to 55°C
		Ambient Storage Temperature		-20°C to +85°C
		Ambient Operating Humidity		90% RH or less (with no condensation)
		Ambient Storage Humidity		90% RH or less (with no condensation)
		Protection Class / Pollution Degree		Protection class: IP10, Pollution degree: 2 An environment that satisfies the following conditions: • Free of corrosive or explosive gases • Free of exposure to water, oil or chemicals • Free of dust, salts or iron dust
		Operating Altitude		1,000 m above sea level or lower
Mechanical Operating Conditions		Vibration Resistance		4.9 m/s^2
		Shock Resistance		19.6 m/s^2
		Others		Free of static electricity, strong electromagnetic fields, magnetic fields or exposure to radioactivity
CPU				200 MHz, 32 bit, ARM 9
Memory		SDRAM		32 MB
		SRAM		512 kB with battery backup
		Flash		4 MB flash. Code and parameter storage
Operator interface		LED		10 LEDs (red and green - operating mode, communication and error status
		User Configuration		6x DIP switch (operating mode and communication configuration
User I/O	Controller Side (CN13)	Network		2x 100baseTX Ethernet
		Digital input		8 programmable inputs
		Digital output		8 programmable outputs
		Analog input		1 ch., +/- 10V, 16 bit
		Analog output		1 ch., +/- 10V, 16 bit
		Pulse Counter		RS-422-compatible pulse counter input (quadrature, pulse and direction, and up/down counter modes) with 5, 12, and 24 V position latch inputs
	Servo Side (CN1)	Sequence Input	Allocated	Number of Inputs: 7 (1 registration input latches external encoder in 5 µs)
				Functions: The signal allocation and positive/negative logic can be modified. Forward run prohibited (P-OT), reverse run prohibited (N-OT), forward torque limit (/P-CL), reverse torque limit (/N-CL), general-purpose input signal (/SI0 to /SI6)
		Sequence Input	Fixed	Servo Alarm (ALM)
			Allocated	Number of Outputs: 3
				Functions: The signal allocation and positive/negative logic can be modified. Positioning completion (/COIN), speed coincidence detection(/V-CMP), servomotor rotation detection (/TGON), servo ready (/S-RDY), torque limit detection (/CLT), speed limit detection (VLT), brake (/BK), warning (/WARN), near (/NEAR)
Network capability				OPC (Client and Server required)
				Ethernet/IP
				Modbus/TCP
Programming standards				IEC61131/PLCopen
Diagnostic and configuration interface				Web interface
Motion control performance				1 controlled axis and one external encoder input plus virtual axis
Servo-Side Safety Functions		Input		/HWBB1, /HWBB2: Baseblock signal for power module
		Output		EDM1: Status monitor (fixed output) of built-in safety circuit

* Allocated I/O can also be used as programmable I/O.

Selecting Cables

Cable Selection

Description		Length	Order No.	Appearance	Details
CN13 Cables for I/O Signals	Connector Kit		JZSP-CSI9-1-E	Soldered 	(1)
	Connector Terminal Converter Unit	0.5 m	CBK-U-MP2B-A5	Terminal Block and 0.5 m Connection Cable 	(2)
		1 m	CBK-U-MP2B-01		
		3 m	CBK-U-MP2B-03		
	Flying Lead Cable	0.5 m	CFC-U-MP2B-A5		(3)
		1 m	CFC-U-MP2B-01		
		3 m	CFC-U-MP2B-03		
CN11A CN11B Ethernet/EtherCAT/PROFINET Cables for Industrial Use			Category: CAT5e Shield specifications: S/UTP or S/STP Cable length: 50 m maximum		

(1) Connector Kit for CN13

Use the following connector and cable to assemble the cable. The CN13 connector kit includes one case and one connector.

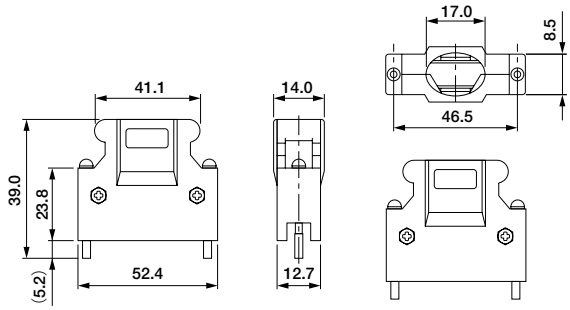
Connector Kit Model	Case		Connector	
	Model	Qty	Model	Qty
JZSP-CSI9-1-E	10350-52Z0-008*	1 set	10150-3000PE* (Soldered)	1

* : Manufactured by Sumitomo 3M Ltd.

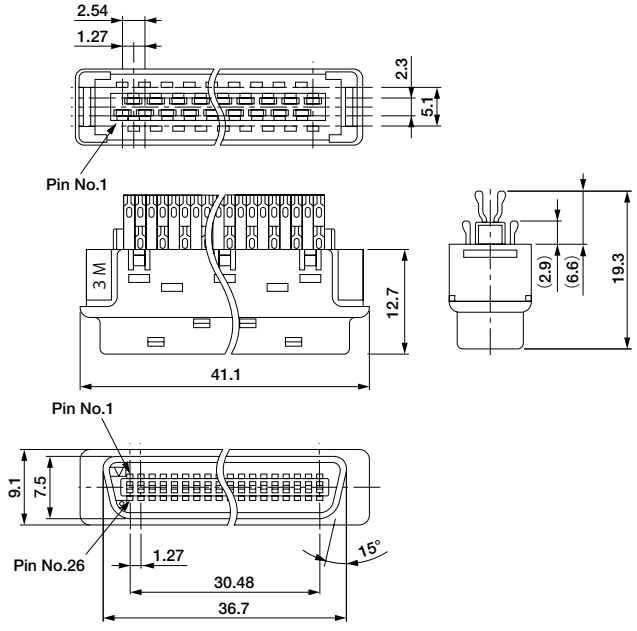
Cable Size

Item	Specifications
Cable	Use twisted-pair or twisted-pair shielded wire.
Applicable Wires	AWG 24, 26, 28, 30
Cable Finished Diameter	16 dia. max.

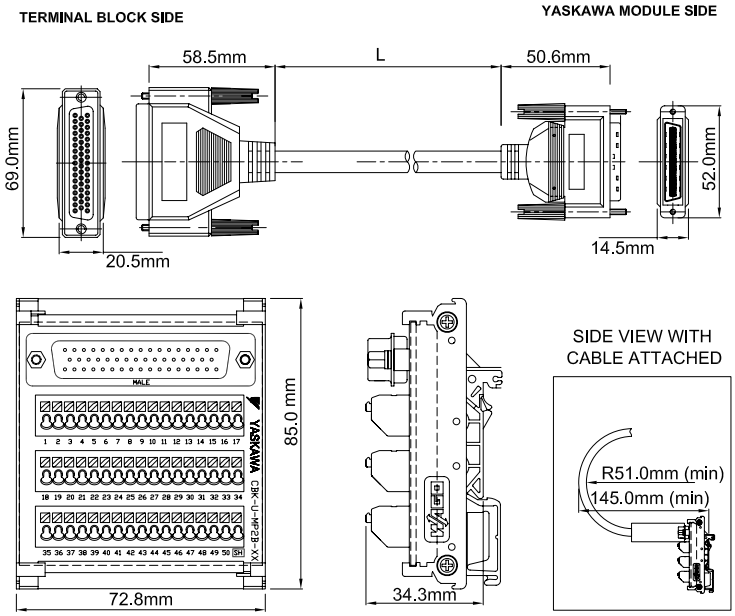
Dimensional Drawings of Case



Dimensional Drawings of Connector



(2) Connector Terminal Converter Unit for CN13



ITEM#	L = LENGTH (mm)
CBK-U-MP2B-A5	500 +/- 38.1
CBK-U-MP2B-01	1000 +/- 38.1
CBK-U-MP2B-03	3000 +/- 38.1

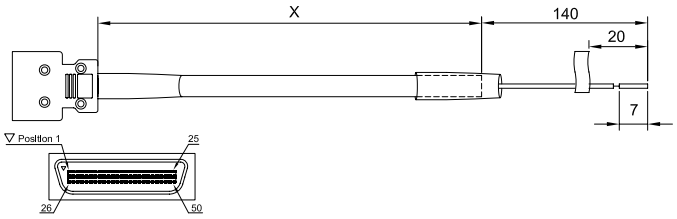
CABLE SPECIFICATION (mm)	
OUTER DIAMETER	8.5 +/- 0.1mm
BENDING RADIUS	6 x O.D. MINIMUM 15 x O.D. FOR LONG TERM RELIABILITY

CBK-U-MP2B-XX Function Chart for MP2600iec

Pin No.	Signal Name	I/O	Function
1	AO	O	Analog output
2	AI	I	Analog input
3	-	-	-
4	PA+	I	Phase A pulse (+)
5	PA-	I	Phase A pulse (-)
6	GND	P	Encoder input ground
7	BAT+	P	Controller SRAM Battery (+)
8	-	-	-
9	PILC5V	I	Phase-C latch pulse (-) for 5VDC input
10	PILC24V	I	Phase-C latch pulse (-) for 24VDC input
11	DO_00-	O	Digital output 0 (-)
12	DO_02-	O	Digital output 2 (-)
13	DICOM	I	Digital input common
14	DI_00	I	Digital input 0
15	DI_02	I	Digital input 2
16	DI_04	I	Digital input 4
17	DI_06	I	Digital input 6
18	DO_04-	O	Digital output 4 (-)
19	DO_06-	O	Digital output 6 (-)
20	-	-	-
21	DO_00+	O	Digital output 0 (+)
22	DO_02+	O	Digital output 2 (+)
23	DO_04+	O	Digital output 4 (+)
24	DO_06+	O	Digital output 6 (+)
25	-	-	-
26	AO_GND	O	Analog output ground
27	AI_GND	I	Analog input ground
28	-	-	-
29	PB+	I	Phase B pulse (+)
30	PB-	I	Phase B pulse (-)
31	GND	P	Encoder input ground
32	BAT-	P	Controller SRAM Battery (-)
33	-	-	-
34	PILC12V	I	Phase-C latch pulse (-) for 12VDC input
35	PIL	I	Phase-C latch pulse (+)
36	DO_01-	O	Digital output 1 (-)
37	DO_03-	O	Digital output 3 (-)
38	DICOM	I	Digital input common
39	DI_01	I	Digital input 1 - shared with pulse latch input
40	DI_03	I	Digital input 3
41	DI_05	I	Digital input 5
42	DI_07	I	Digital input 7
43	DO_05-	O	Digital output 5 (-)
44	DO_07-	O	Digital output 7 (-)
45	-	-	-
46	DO_01+	O	Digital output 1 (+)
47	DO_03+	O	Digital output 3 (+)
48	DO_05+	O	Digital output 5 (+)
49	DO_07+	O	Digital output 7 (+) - shared w/ position agreement COIN signal
50	-	-	-

I = Input, O = Output, P = Power

(3) Flying Lead Cable for CN13



ITEM NUMBER	X = LENGTH (mm)
CFC-U-MP2B-A5	500
CFC-U-MP2B-01	1000
CFC-U-MP2B-03	3000

CABLE SPECIFICATION (mm)	
OUTER DIAMETER	8.1
BENDING RADIUS	12 O.D.

CFC-U-MP2B-XX Function Chart for MP2600iec

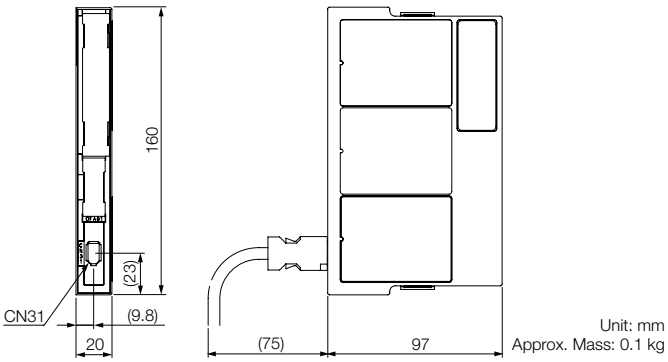
Pin No.	Color (Solid/Band)	Signal Name		Function
1	BLK/RED	AO	O	Analog output
2	BLK/WHT	AI	I	Analog input
3	RED/GRN	-	-	-
4	BLK/BLU	PA+	I	Phase A pulse (+)
5	BLU/BLK	PA-	I	Phase A pulse (-)
6	RED/BLU	GND	P	Encoder input ground
7	RED/WHT	BAT+	P	Controller SRAM Battery (+)
8	BLK/GRN	-	-	-
9	BLK/YEL	PILC5V	I	Phase-C latch pulse (-) for 5VDC input
10	BLK/ORG	PILC24V	I	Phase-C latch pulse (-) for 24VDC input
11	RED/YEL	DO_00-	O	Digital output 0 (-)
12	RED/BRN	DO_02-	O	Digital output 2 (-)
13	RED/ORG	DICOM	I	Digital input common
14	GRN/WHT	DI_00	I	Digital input 0
15	GRN/BLU	DI_02	I	Digital input 2
16	GRN/YEL	DI_04	I	Digital input 4
17	GRN/BRN	DI_06	I	Digital input 6
18	GRN/ORG	DO_04-	O	Digital output 4 (-)
19	WHT/BLU	DO_06-	O	Digital output 6 (-)
20	WHT/YEL	-	-	-
21	YEL/RED	DO_00+	O	Digital output 0 (+)
22	BRN/RED	DO_02+	O	Digital output 2 (+)
23	ORG/GRN	DO_04+	O	Digital output 4 (+)
24	BLU/WHT	DO_06+	O	Digital output 6 (+)
25	WHT/BRN	-	-	-
26	RED/BLK	AO_GND	O	Analog output ground
27	WHT/BLK	AI_GND	I	Analog input ground
28	GRN/RED	-	-	-
29	BLK/BRN	PB+	I	Phase B pulse (+)
30	BRN/BLK	PB-	I	Phase B pulse (-)
31	BLU/RED	GND	P	Encoder input ground
32	WHT/RED	BAT-	P	Controller SRAM Battery (-)
33	GRN/BLK	-	-	-
34	ORG/BLK	PILC12V	I	Phase-C latch pulse (-) for 12VDC input
35	YEL/BLK	PIL	I	Phase-C latch pulse (+)
36	WHT/ORG	DO_01-	O	Digital output 1 (-)
37	BLU/YEL	DO_03-	O	Digital output 3 (-)
38	ORG/RED	DICOM	I	Digital input common
39	WHT/GRN	DI_01	I	Digital input 1 - shared with pulse latch input
40	BLU/GRN	DI_03	I	Digital input 3
41	YEL/GRN	DI_05	I	Digital input 5
42	BRN/GRN	DI_07	I	Digital input 7
43	BLU/BRN	DO_05-	O	Digital output 5 (-)
44	BLU/ORG	DO_07-	O	Digital output 7 (-)
45	YEL/WHT	-	-	-
46	ORG/WHT	DO_01+	O	Digital output 1 (+)
47	YEL/BLU	DO_03+	O	Digital output 3 (+)
48	BRN/BLU	DO_05+	O	Digital output 5 (+)
49	ORG/BLU	DO_07+	O	Digital output 7 (+) - shared w/ position agreement COIN signal
50	BRN/WHT	-	-	-

I = Input, O = Output, P = Power

Dimensions

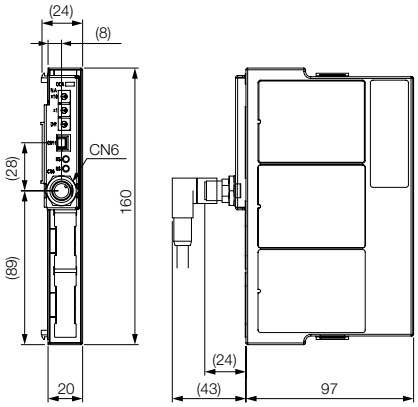
Option Modules External Dimensions

Feedback Option Module



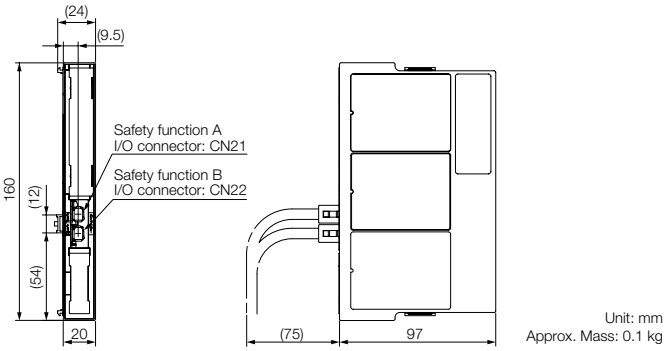
Unit: mm
Approx. Mass: 0.1 kg

DeviceNet Module



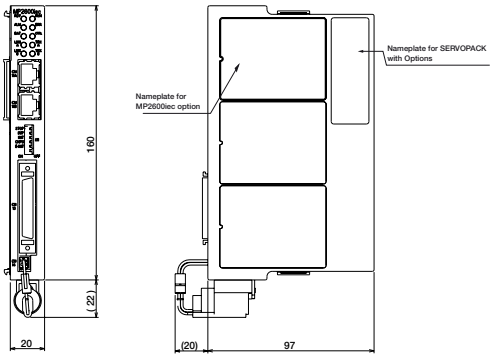
Approx. Mass: 0.3 kg
Unit: mm

Safety Module



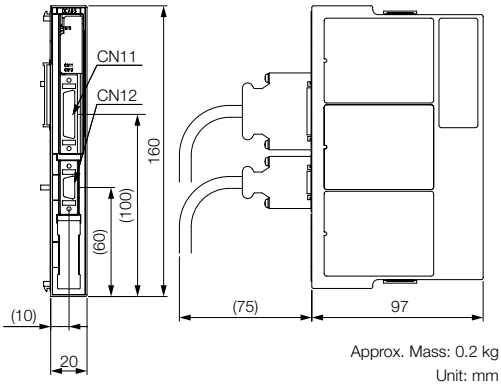
Unit: mm
Approx. Mass: 0.1 kg

MP2600iec Single Axis Machine Controller Option



Dimensions in mm.

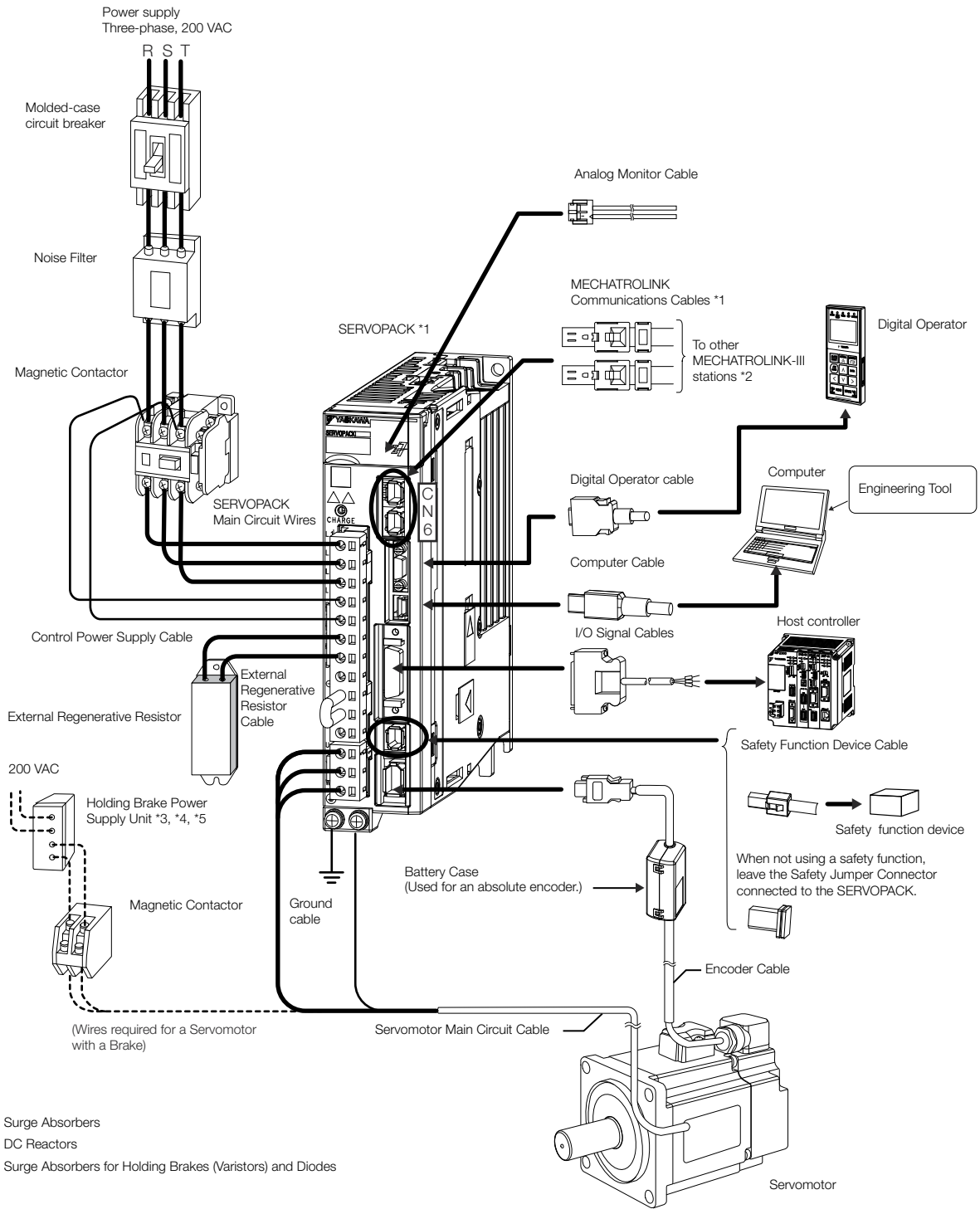
INDEXER Module



Approx. Mass: 0.2 kg
Unit: mm

Periphery

Periphery



*1. The peripheral devices are described using a MECHATROLINK-III Communications Reference SERVOPACK as an example. The shapes of the connectors may be different for other interfaces.

*2. The connected devices depend on the interface.
For MECHATROLINK-II communications references: Other MECHATROLINK-II stations
For analog voltage/pulse train references: There is no CN6 connector.

*3. A Holding Brake Power Supply Unit is required to use a Servomotor with a Holding Brake. Holding Brake Power Supply Units for 24 VDC are not provided by YASKAWA. Obtain these from other manufacturers.
Never connect Holding Brake Power Supply Units with different output voltages to a SERVOPACK. Overcurrent may result in burning in the brake.

*4. If you use a Servomotor with a Holding Brake, select a brake relay according to the power supply voltage and current of the brake. YASKAWA does not recommend any particular brake relays. Select an appropriate brake relay using the selection method of the brake relay manufacturer.

*5. The power supply for the holding brake is not provided by YASKAWA. Select a power supply based on the holding brake specifications. If you use a 24-V brake, install a separate power supply for the 24-VDC power supply from other power supplies, such as the one for the I/O signals of the CN1 connector. If the power supply is shared, the I/O signals may malfunction.

Peripheral Device Selection Table

Peripheral Device Selection Table - SGD7S

Main Circuit Power Supply	Max. Appl. Motor Capacity [kW]	SGD7S-	Noise Filter*1	DC Reactor*2	Magnetic Contactor	Surge Absorber	Digital Operator
Three-phase, 200 VAC	0.05	R70A	HF3010C-SZC	X5061	SC-03	LTC32G801WS	JUSP-OP05A-1-E
	0.1	R90A					
	0.2	1R6A					
	0.4	2R8A					
	0.5	3R8A					
	0.75	5R5A	HF3020C-SZC		SC-4-1		
	1.0	7R6A					
	1.5	120A		X5060			
	2.0	180A			SC-5-1		
	3.0	200A	HF3030C-SZC	X5059			
	5.0	330A	HF3050C-SZC -47EDD	X5068	SC-N1		
	6.0	470A		X008025			
	7.5	550A	HF3060C-SZC	X008026	SC-N2		
	11	590A	HF3100C-SZC	X008027	SC-N2S		
	15	780A		X008028	SC-N3		
Single-phase, 200 VAC	0.05	R70A	FESS-B005A	X5071	SC-03	LTC12G801WS	
	0.1	R90A					
	0.2	1R6A		X5070			
	0.4	2R8A		X5069			
	0.75	5R5A	FESS-B009A	X5079	SC-4-1		
	1.5	120A□ □□008	FESS-B016A	X5078	SC-5-1		

Device	Enquires
FESS Noise Filters	EPA GmbH
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. For Digital Operator Converter cables, refer to the selection table for each type of SERVOPACK.
3. Refer to the following manual for the following information.
   • Dimensional drawings, ratings, and specifications of peripheral devices
   Sigma-7-Series AC Servo Drive Peripheral Device Selection Manual (Manual No.: SIEP S800001 32)

Peripheral Device Selection Table - SGD7W

Main Circuit Power Supply	Max. Appl. Motor Capacity [kW]	SGD7W-	Noise Filter*1	DC Reactor*2	Magnetic Contactor	Surge Absorber	Digital Operator
Three-phase, 200 VAC	0.2	1R6A	HF3010C-SZC	X5061	SC-03	LTC32G801WS	JUSP-OP05A-1-E
	0.4	2R8A	HF3020C-SZC		SC-4-1		
	0.75	5R5A		X5060			
	1.0	7R6A			SC-5-1		
Single-phase, 200 VAC	0.2	1R6A	FESW-B005A	X5069	SC-03	LTC12G801WS	
	0.4	2R8A	FESW-B011A	X5079	SC-4-1		
	0.75	5R5A	FESW-B012A	X5078	SC-5-1		

Device	Enquires
FESW Noise Filters	EPA GmbH
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. For Digital Operator Converter cables, refer to the selection table for each type of SERVOPACK.
3. Refer to the following manual for the following information.
   • Dimensional drawings, ratings, and specifications of peripheral devices
   Sigma-7-Series AC Servo Drive Peripheral Device Selection Manual (Manual No.: SIEP S800001 32)

Peripheral Device Selection Table - SGD7C

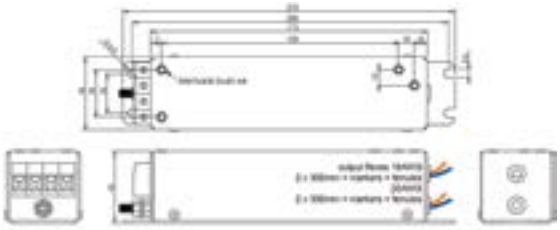
Main Circuit Power Supply	Max. Appl. Motor Capacity [kW]	SGD7C-	Noise Filter*1	DC Reactor*2	Magnetic Contactor	Surge Absorber
Three-phase, 200 VAC	0.2	1R6A	HF3010C-SZC	X5061	SC-03	LTC32G801WS
	0.4	2R8A	HF3020C-SZC		SC-4-1	
	0.75	5R5A		X5060		
	1.0	7R6A			SC-5-1	
Single-phase, 200 VAC	0.2	1R6A	FESW-B012A	X5069	SC-03	LTC12G801WS
	0.4	2R8A		X5079	SC-4-1	
	0.75	5R5A	HF2020A-UPF-2BB	X5078	SC-5-1	

Device	Enquires
FESW Noise Filters	EPA GmbH
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. For Digital Operator Converter cables, refer to the selection table for each type of SERVOPACK.
3. Refer to the following manual for the following information.
   • Dimensional drawings, ratings, and specifications of peripheral devices
   Sigma-7-Series AC Servo Drive Peripheral Device Selection Manual (Manual No.: SIEP S800001 32)

Dimensions of Noise Filters

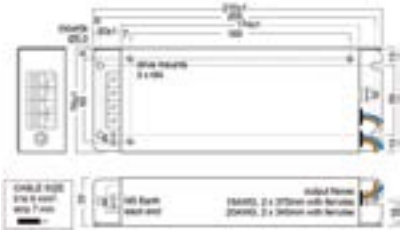
FESS-B005A



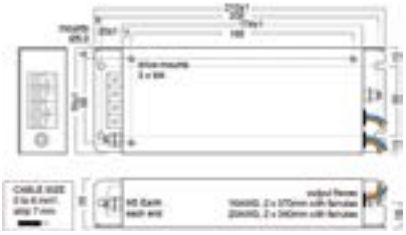
FESS-B009A

FESS-B016A

FESW-B005A



FESW-B011A



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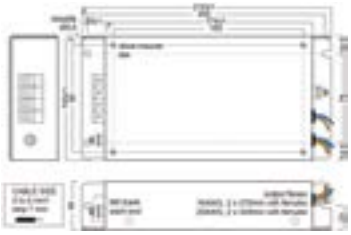
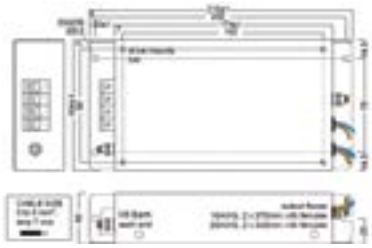
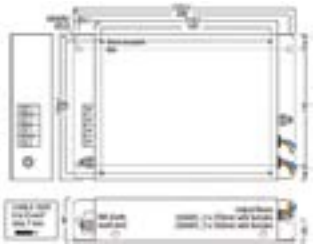


FESC-B011A



FESC-B012A



Noise Filter	Leakage Current	Ambient Temperature	Measurements (L x W x H)	Weight
FESS-B005A	2.9 mA (0.37mA control)	55 °C	210 x 46 x 45 mm	0.4 kg
FESS-B009A	2.9 mA (0.37mA control)	55 °C	210 x 76 x 30 mm	0.5 kg
FESS-B016A	2.9 mA (0.37mA control)	55 °C	230 x 104 x 40 mm	1.0 kg
FESW-B005A	2.9 mA (0.37mA control)	55 °C	210 x 76 x 35 mm	0.6 kg
FESW-B011A	2.9 mA (0.37mA control)	55 °C	210 x 76 x 35 mm	0.6 kg
FESW-B012A	2.9 mA (0.37mA control)	55 °C	210 x 104 x 40 mm	1 kg
FESC-B011A	2.9 mA (0.37mA control)	55 °C	210 x 104 x 40 mm	1 kg
FESC-B012A	2.9 mA (0.37mA control)	55 °C	210 x 139 x 40 mm	1 kg

Molded-case Circuit Breakers and Fuses

Using an AC Power Supply

Use a molded-case circuit breaker and fuse to protect the power supply line. They protect the power line by shutting OFF the circuit when overcurrent is detected. Select these devices based on the information in the following tables.

Note:
The following tables also 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.

SGD7S SERVOPACKs

Main Circuit Power Supply	Max. Appl. Motor Capacity [kW]	SGD7S-	Power Supply Capacity per SERVOPACK [kVA]*	Current Capacity		Inrush Current		Rated Voltage	
				Main Circuit [A]*	Control Power Supply [A]	Main Circuit [A0-p]	Control Power Supply [A0-p]	Fuse [V]	MCCB [V]
Three-phase, 200 VAC	0.05	R70A	0.2	0.4	0.2	34	34	250	240
	0.1	R90A	0.3	0.8					
	0.2	1R6A	0.5	1.3					
	0.4	2R8A	1.0	2.5					
	0.5	3R8A	1.3	3.0					
	0.75	5R5A	1.6	4.1					
	1.0	7R6A	2.3	5.7					
	1.5	120A	3.2	7.3					
	2.0	180A	4.0	10	0.25				
	3.0	200A	5.9	15					
	5.0	330A	7.5	25	0.3	68			
	6.0	470A	10.7	29					
	7.5	550A	14.6	37					
	11	590A	21.7	54	0.4	114			
	15	780A	29.6	73					
Single-phase, 200 VAC	0.05	R70A	0.2	0.8	0.2	34			
	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					
	1.5	120A□ □□008	4.0	16	0.25				

* This is the net value at the rated load.

SGD7W SERVOPACKs

Main Circuit Power Supply	Max. Appl. Motor Capacity [kW]	SGD7W-	Power Supply Capacity per SERVOPACK [kVA]*1	Current Capacity		Inrush Current		Rated Voltage	
				Main Circuit [A]*1	Control Power Supply [A]	Main Circuit [A0-p]	Control Power Supply [A0-p]	Fuse [V]	MCCB [V]
Three-phase, 200 VAC	0.2	1R6A	1.0	2.5	0.25	34	34	250	240
	0.4	2R8A	1.9	4.7					
	0.75	5R5A	3.2	7.8					
	1.0	7R6A	4.5	11					
Single-phase, 200 VAC	0.2	1R6A	1.3	5.5					
	0.4	2R8A	2.4	11					
	0.75	5R5A*2	2.7	12					

*1. This is the net value at the rated load.
*2. If you use the SGD7W-5R5A with a single-phase 200-VAC power supply input, derate the load ratio to 65%. Anexample is given below.
If the load ratio of the first axis is 90%, use a load ratio of 40% for the second axis so that average load ratio for both axes is 65% ((90% + 40%)/2 = 65%).

SGD7C SERVOPACKs

Main Circuit Power Supply	Max. Appl. Motor Capacity [kW]	SGD7C-	Power Supply Capacity per SERVOPACK [kVA]*1	Current Capacity		Inrush Current		Rated Voltage	
				Main Circuit [A]*1	Control Power Supply [A]	Main Circuit [A0-p]	Control Power Supply [A0-p]	Fuse [V]	MCCB [V]
Three-phase, 200 VAC	0.2	1R6A	1.0	2.5	0.25	34	34	250	240
	0.4	2R8A	1.9	4.7					
	0.75	5R5A	3.2	7.8					
	1.0	7R6A	4.5	11					
Single-phase, 200 VAC	0.2	1R6A	1.3	5.5					
	0.4	2R8A	2.4	11					
	0.75	5R5A*2	2.7	12					

*1. This is the net value at the rated load.
*2. If you use the SGD7W-5R5A with a single-phase 200-VAC power supply input, derate the load ratio to 65%. Anexample is given below.
If the load ratio of the first axis is 90%, use a load ratio of 40% for the second axis so that average load ratio for both axes is 65% ((90% + 40%)/2 = 65%).

Using a DC Power Supply

This section gives the power supply specifications for using a DC power supply input. Use the Fuses given in the following tables to protect the power supply line and SERVOPACK. They protect the power line by shutting OFF the circuit when overcurrent is detected.

Note: The following tables provide the net values of the current capacity and inrush current.

SGD7S SERVOPACKs

Main Circuit Power Supply	SGD7S-	Power Supply Capacity per SERVOPACK [kVA]*	Current Capacity		Inrush Current		External Fuse		
			Main Circuit [A]*1	Control Power Supply [A]	Main Circuit [A0-p]	Control Power Supply [A0-p]	Order Number*2	Current Rating [A]	Voltage Rating [Vdc]
270 VDC	R70A	0.2	0.5	0.2	34	34	3,5URGJ17/16UL	16	400
	R90A	0.3	1.0						
	1R6A	0.5	1.5						
	2R8A	1.0	3.0				3,5URGJ17/20UL	20	
	3R8A	1.3	3.8				3,5URGJ17/40UL	40	
	5R5A	1.6	4.9						
	7R6A	2.3	6.9						
	120A	3.2	11						
	120A□□□008			0.25			3,5URGJ17/63UL	63	
	180A	4.0	14						
	200A	5.9	20						
	330A	7.5	34	0.3	68*3 (5Ω external)		3,5URGJ17/100UL	100	
	470A	10.7	36				3,5URGJ23/160UL	160	
	550A	14.6	48						
	590A	21.7	68	0.4	114*3 (3Ω external)		3,5URGJ23/200UL	200	
	780A	29.6	92						

*1. This is the net value at the rated load.
*2. These Fuses are manufactured by MERSEN Japan.
*3. If you use a DC power supply input with any of the following SERVOPACKs, externally connect an inrush current limiting circuit and use the power ON and OFF sequences recommended by YASKAWA: SGD7S-330A, -470A, -550A, -590A, or -780A.
There is a risk of equipment damage. For information on the power ON and OFF sequences, refer to the product manual for the type of references used by your SERVOPACK.

SGD7W SERVOPACKs

Main Circuit Power Supply	SGD7S-	Power Supply Capacity per SERVOPACK [kVA]*	Current Capacity		Inrush Current		External Fuse		
			Main Circuit [A]*1	Control Power Supply [A]	Main Circuit [A0-p]	Control Power Supply [A0-p]	Order Number*2	Current Rating [A]	Voltage Rating [Vdc]
270 VDC	1R6A	1.0	3.0	0.25	34	34	3,5URGJ17/40UL	40	400
	2R8A	1.9	5.8						
	5R5A	3.2	9.7				3,5URGJ17/63UL	63	
	7R6A	4.5	14						

*1. This is the net value at the rated load.
*2. These Fuses are manufactured by MERSEN Japan.

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 builtin regenerative resistor in the SERVOPACK cannot consume all of the regenerative power. Use YASKAWA SigmaSize+, 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 the Pn600 (Regenerative Resistor Capacity) or Pn603 (Regenerative Resistance) parameters.

Selection Table

SERVOPACK Model			Built-In Regenerative Resistor	External Regenerative Resistor	Contents
SGD7S-	SGD7W-	SGD7C-			
R70A, R90A, 1R6A, 2R8A, R70F, R90F, 2R1F, 2R8F	–	–	–	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.*1
3R8A, 5R5A, 7R6A, 120A, 180A, 200A, 330A	1R6A, 2R8A, 5R5A, 7R6A	1R6A, R8A, 5R5A, 7R6A	Standard feature*2	Basically not required	A built-in regenerative resistor is provided as a standard feature. Install an external regenerative resistor when the built-in regenerative resistor cannot process all the regenerative power.*1
470A, 550A, 590A, 780A	–	–	–	Required*3	A built-in regenerative resistor is not provided. An External Regenerative Resistor is required. If the External Regenerative Resistor is not connected to the SERVOPACK, a Regeneration Alarm (A.300) will occur.

*1. Use YASKAWA SigmaSize+, an AC Servo drive capacity selection program, to select an external regenerative resistor.
*2. Refer to the Built-In Regenerative Resistor section for the specifications of built-in regenerative resistors.
*3. Regenerative Resistor Units are available. Refer to that section for details.

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-	SGD7C-	Resistance [Ω]	Capacity [W]		
R70A, R90A, 1R6A, 2R8A, R70F, R90F, 2R1F, 2R8F	–	–	–	–	–	40
3R8A, 5R5A, 7R6A	1R6A, 2R8A	1R6A, 2R8A	40	40	8	40
120A	–	–	20	60	10	20
120A□□□008, 180A, 200A	5R5A, 7R6A	5R5A, 7R6A	12	60	16	12
330A	–	–	8	180	36	8
470A	–	–	(6.25)*1	(880)*1	(180)*1	5.8
550A, 590A, 780A	–	–	(3.13)*2	(1,760)*2	(350)*2	2.9

*1. Values in parentheses are for the optional JUSP-RA04-E Regenerative Resistor Unit.
*2. Values in parentheses are for the optional JUSP-RA05-E Regenerative Resistor Unit.

External Regenerative Resistors

Model	Specification	Mass	Wire Size	Manufacturer	Inquiries
RH120	70 W, 1 Ω to 100 Ω	282 g	AWG16 (1.25 mm^2)	Iwaki Musen Kenkyusho Co., Ltd.	YASKAWA Controls Co., Ltd.
RH150	90 W, 1 Ω to 100 Ω	412 g			
RH220	120 W, 1 Ω to 100 Ω	500 g			
RH220B	120 W, 1 Ω to 100 Ω	495 g	AWG14 (2.0 mm^2)		
RH300C	200 W, 1 Ω to 10 kΩ	850 g			
RH450	150 W, 1 Ω to 100 Ω	880 g			
RH450FY	150 W, 2 Ω to 100 Ω	1.3 kg			
RH500	300 W, 2 Ω to 50 Ω	1.4 kg			

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 Thermal Protector.

RH120 (Model) 10Ω (Resistance) J

Resistance Tolerance	
Code	Specification
K	±10%
J	±5%
H*	±3%

* There is no RH450FY model that has a resistance tolerance of H (±3%).

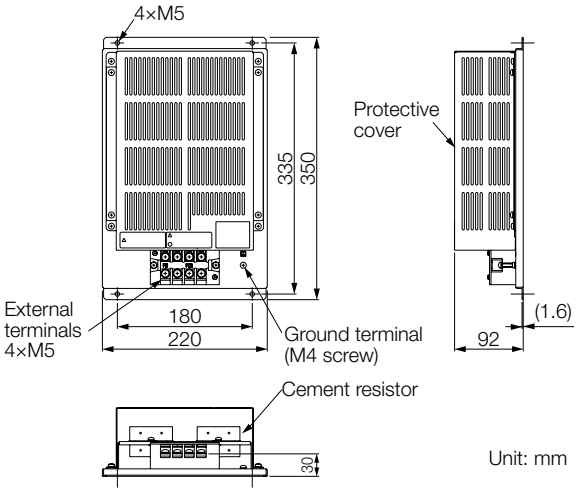
Regenerative Resistor Units

SERVOPACK Model SGD7S-	Regenerative Resistor Unit Model	Specifications	Allowable Power Loss
470A	JUSP-RA04-E	6.25 Ω, 880 W	180 W
550A, 590A or 780A	JUSP-RA05-E	3.13 Ω, 1,760 W	350 W

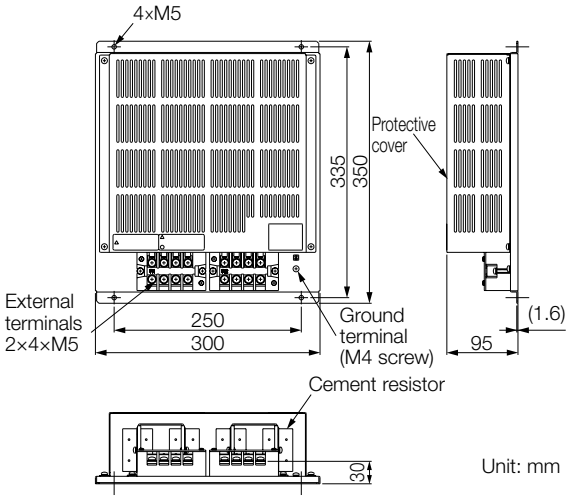
Note: If you use only the above Regenerative Resistor Units, you do not need to change the setting of the Pn600 (Regenerative Resistor Capacity) or Pn603 (Regenerative Resistance) parameters.

External Dimensions

JUSP-RA04-E



JUSP-RA05-E



Batteries for Servomotors 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.

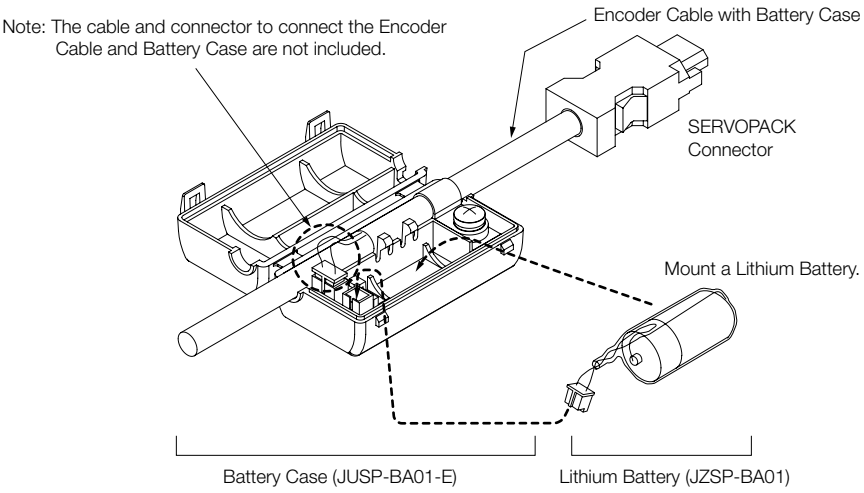
Note: A Battery Case is not required if you use a Servomotor with a Batteryless Absolute Encoder and connect a battery to the host controller.

Using Encoder Cables with Battery Cases

A Battery Case is attached to an Encoder Cable with a Battery Case. To replace the battery, obtain a Lithium Battery (JZSP-BA01) and mount it in the Battery Case.

Important

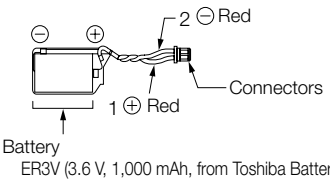
1. You cannot attach the Battery Case to an Incremental Encoder Cable.
2. Install the Battery Case where the surrounding air temperature is between -5°C and 60°C.



Selection Table

Description	Order Number	Contents
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 is mounted into the Battery Case.

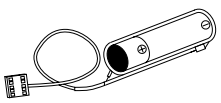
Lithium Battery Dimensional Drawing



ER3V (3.6 V, 1,000 mAh, from Toshiba Battery Co., Ltd.)

When Installing a Battery on the Host Controller

Use a battery that meets the specifications of the host controller.
Use the recommended Battery given in the following table or the equivalent.



Inrush Current Suppression Devices

Inrush current suppression devices prevent equipment from being damaged by inrush current. They are used only when using a SERVOPACK of 5 kW or higher (SGD7S-330A, -470A, -550A, -590A, or -780A) with a DC power supply input.

Selection Tables

External Inrush Current Suppression Resistors

Main Circuit Power Supply	SERVOPACK Model: SGD7S-	External Inrush Current Suppression Resistor			Manufacturer	Inquiries
		Order Number	Resistance [Ω]	Rated Power [W]		
270 VDC	330A	RH120-5ΩJ	5	70	Iwaki Musen Kenkyusho Co., Ltd.	YASKAWA Controls Co., Ltd.
	470A					
	550A					
	590A	RH120-3ΩJ	3			
	780A					

Inrush Current Suppression Resistor Short Relays

Main Circuit Power Supply	SERVOPACK Model: SGD7S-	Main Circuit DC Current [A]	Contact Specification	Recommended Inrush Current Suppression Resistor Short Relay			Manufacturer
				Model	Voltage Rating [Vdc]	Current Rating [A]	
270 VDC	330A	34	NO	G9EA-1-B	400	60	OMRON Corporation
	470A	36					
	550A	48		G9EA-1-B-CA		100	
	590A	68		G9EA-1-B-CA*1 G9EC-1-B*2		200	
	780A	92					

*1. Connect two Relays in parallel. Also, maintain the same resistance between the DC power supply and SERVOPACK for the wiring for each Relay.
*2. This Relay is applicable only when the temperature of the Relay installation environment is 50°C or less.

Motor Power Cable Shielding Clamp

Contact your YASKAWA representative for more information.

SERVOPACK Model	Order No.	
SGD7S 200V 1.5 kW 1ph SGD7W 200V-5R5A	KLBUE_4-13.5_SC	
SGD7S 200V up to 750W SGD7W 200W-1R6A to 2R8A	KLBUE_4-13.5_SET	

SERVOPACK Connector Kit

Contact your YASKAWA representative for more information.

SERVOPACK Model	Order No.	
SGD7S- R70A□□□ to -2R8A□□□	EUOP-M92019	
SGD7S-5R5A□□□	EUOP-M92020	
SGD7W- 1R6A□□□ to -7R6A□□□	EUOP-M92021	

Software

SigmaSize+: AC Servo Capacity Selection Program

You can use the SigmaSize+ to select Servomotors and SERVOPACKs. There are two versions of the software: A cloud version* and a stand-alone version. The software supports all standard servo products sold by YASKAWA.

* SigmaSize+ is available in Japan only. Contact your YASKAWA representative for information on this program.

Features

- Provides a vast amount of new product information.
- Lets you select servo products with a wizard.
- You can access and reuse previously entered data.

Examples of the Servo Selection Interface

Mechanism Selection View

Machine Specification Entry View

Speed Diagram Entry View

Operating Conditions Selection View

Servomotor Selection View

SERVOPACK Selection View

System Requirements

Item	System Requirement
Browser	Internet Explorer version 10 or later
OS	Windows Vista 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.

* 64-bit OS is applicable only for the stand-alone version.

SigmaWin+: AC Servo Drive Engineering Tool

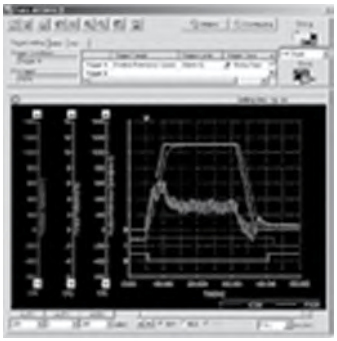
The SigmaWin+ Engineering Tool is used to set up and optimally tune YASKAWA Sigma-series Servo Drives.

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.

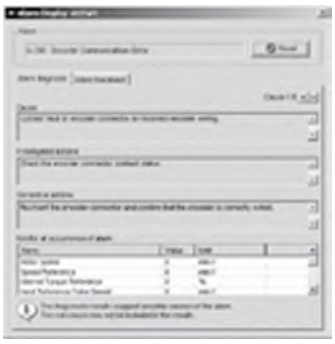
Setting Parameters with a Wizard

Displaying SERVOPACK Data on a Computer just like you would on an Oscilloscope



Estimating Moments of Inertia and Measuring Vibration Frequencies

Displaying Alarms and Alarm Diagnostics



System Requirements

Item	System Requirement	
	Ver.5	Ver.7
Supported Languages	English and Japanese	Japanese, English, and Chinese (simplified)
OS	Windows XP, Windows Vista, or Windows 7 (32-bit or 64-bit edition)	Windows 10, Windows 8, Windows 8.1, or Windows 7 (32-bit or 64-bit edition)
Software Environment	–	.NET Framework 4.5, .NET Framework 4.6
CPU	Pentium 200 MHz min.	1 GHz min. (recommended)
Memory	64 MB min. (96 MB or greater recommended)	1 GB min. (recommended)
Available Hard Disk Space	For Standard Setup: 350 MB min. (400 MB or greater recommended for installation)	500 MB min.
Browser used to display Help	–	Internet Explorer 9 or higher

MPE720 System Integrated Engineering Tool

MPE720 Ver.7 is a system integrated Engineering Tool that provides the complete development functionality to set up, adjust, program, maintain, and inspect not only Controller programs but also all of the devices necessary to design machine installations, including Servo Drives, AC Drives, and Distributed I/O Devices.
It is installed in a PC and operated on a PC interface through a connection between the PC and Machine Controller.

Features

Complete Adjustment and Maintenance of Equipment Drive Devices

MPE720 Ver.7 connected to the Sigma-7C or MP series machine controllers can be used to set up, adjust, and maintain Servo Drives, AC Drives, and I/O Devices connected to a network. There is no need to change connections, which increases efficiency.

Greater Efficiency with the Best Programming Method

Ladder Programming

- The new user interface lets just about anyone easily use the MPE720.
- An improved EXPRESSION instruction simplifies programming calculation in ladder diagrams.
- Support is provided for all types of control, including position, speed, torque, and phase-control.

Motion Programming

- Positioning and interpolation can be programmed with one instruction.
- Programs can be very easily edited using expressions in a text format.
- New variable programming can provide PC-like programming.

System Requirements

Item	Specification
CPU	1 GHz or more recommended (manufactured by Intel or other companies)
Memory Capacity	1 GB or more recommended*
Available Hard Disk Space	700 MB or more (includes standard workspace memory after installation of MPE720)
Display Resolution	1280 × 800 pixels or more recommended
CD Drive	1 (only for installation)
Communication Ports	RS-232C, Ethernet, MP2100 bus, and USB
OS	Windows 10, Windows 8, Windows 8.1, or Windows 7 (32-bit or 64-bit)
.NET Environment	.NET Framework 4.5
Supported Languages	English and Japanese

* Expand memory if other application programs are run simultaneously with MPE720 on the same computer.
Performance may be slow due to the use of memory by multiple application programs that are run simultaneously.

Appendix

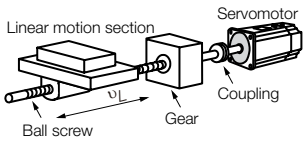
Selecting the Servomotor Capacity

Use YASKAWA SigmaSize+, an AC servo drive capacity selection program, to select the Servomotor capacity. With the SigmaSize+, you can find the optimum Servomotor capacity by simply selecting and entering information according to instructions from a wizard.

Refer to the following selection examples to select Servomotor capacities with manual calculations rather than with the above software.

Capacity Selection Example for a Rotary Servomotor: For Speed Control

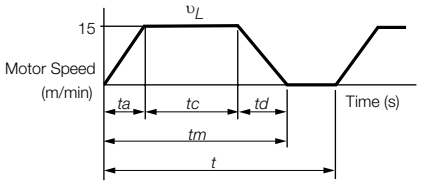
1. Mechanical Specifications



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 x 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 operations/min
Feeding Distance	ℓ	0.275 m
Feeding Time	tm	1.2 s max.
Friction Coefficient	μ	0.2
Mechanical Efficiency	η	0.9 (90%)

2. Operation Pattern



$$t = \frac{60}{n} = \frac{60}{40} = 1.5 \text{ (s)}$$

If ta = td,

$$ta = tm - \frac{60\,\ell}{v_L} = 1.2 - \frac{60 \times 0.275}{15} = 1.2 - 1.1 = 0.1 \text{ (s)}$$

$$tc = 1.2 - 0.1 \times 2 = 1.0 \text{ (s)}$$

3. Motor Speed

- Load shaft speed $n_L = \frac{v_L}{P_B} = \frac{15}{0.01} = 1{,}500 \text{ (min}^{-1}\text{)}$
- Motor shaft speed $n_M = n_L \cdot R = 1{,}500 \times 2 = 3{,}000 \text{ (min}^{-1}\text{)}$

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 JG = 0.40 $\times 10^{-4}$ kg·m^2
- Load moment of inertia at motor shaft

  $J_L = J_{L1} + J_B + J_G = (1.58 + 0.31 + 0.40) \times 10^{-4} = 2.29 \times 10^{-4}$ 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

- TL ≤ Motor rated torque
- $\frac{(Po + Pa)}{2}$ < Provisionally selected Servomotor rated output < $(Po + Pa)$
- n_M ≤ Rated motor speed
- J_L ≤ 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 (Nm)
Instantaneous Maximum Torque	2.23 (Nm)
Motor Moment of Inertia	0.263 x $\times 10^{-4}$ kg·m^2
Allowable Load Moment of Inertia	0.263 x 10^{-4} x 15 = 3.94 $\times 10^{-4}$ kg·m^2

9. Verification of the Provisionally Selected Servomotor

- Verification of required acceleration torque:

$$T_P = \frac{2\pi n_M (J_M + J_L)}{60ta} + T_L = \frac{2\pi \times 3{,}000 \times (0.263 + 2.29) \times 10^{-4}}{60 \times 0.1} + 0.43$$

≈ 1.23 (N·m) < Maximum instantaneous torque...Satisfactory

- Verification of required deceleration torque:

$$T_S = \frac{2\pi n_M (J_M + J_L)}{60td} - T_L = \frac{2\pi \times 3{,}000 \times (0.263 + 2.29) \times 10^{-4}}{60 \times 0.1} - 0.43$$

≈ 0.37 (N·m) < Maximum instantaneous torque...Satisfactory

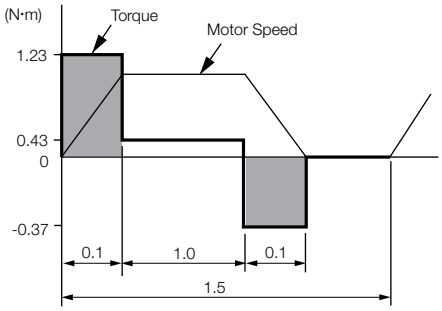
- Verification of effective torque value:

$$Trms = \sqrt{\frac{T_P^2 \cdot ta + T_L^2 \cdot tc + Ts^2 \cdot td}{t}} = \sqrt{\frac{(1.23)^2 \times 0.1 + (0.43)^2 \times 1.0 + (0.37)^2 \times 0.1}{1.5}}$$

≈ 0.483 (N·m) < Rated torque...Satisfactory

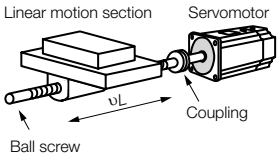
10. Result

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

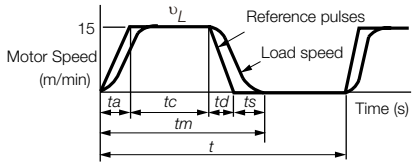
1. Mechanical Specifications



Item	Code	Value
Load Speed	υ_L	15 m/min
Linear Motion Section Mass	m	80 kg
Ball Screw Length	ℓ_B	0.8 m
Ball Screw Diameter	d_B	0.016 m
Ball Screw Lead	P_B	0.005 m
Ball Screw Material Density	ρ	7.87 x 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 rotations/min
Feeding Distance	ℓ	0.25 m
Feeding Time	tm	1.2 s max.
Electrical Stopping Precision	δ	±0.01 mm
Friction Coefficient	μ	0.2
Mechanical Efficiency	η	0.9 (90%)

2. Speed Diagram



$$t = \frac{60}{n} = \frac{60}{40} = 1.5 \text{ (s)}$$

If ta = td and ts = 0.1 (s),

$$ta = tm - ts - \frac{60\,\ell}{\upsilon_L} = 1.2 - 0.1 - \frac{60 \times 0.25}{15} = 0.1 \text{ (s)}$$

$$tc = 1.2 - 0.1 - 0.1 \times 2 = 0.9 \text{ (s)}$$

3. Motor Speed

- Load shaft speed $n_L = \frac{v_L}{P_B} = \frac{15}{0.005} = 3{,}000\ (\text{min}^{-1})$
- Motor shaft speed Direct coupling gear ratio 1/R = 1/1
  $n_M = n_L \cdot R = 3{,}000 \times 1 = 3{,}000\ (\text{min}^{-1})$

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
  $J_L = J_{L1} + J_B + J_G = (1.58 + 0.31 + 0.40) \times 10^{-4} = 2.29 \times 10^{-4}\ \text{kg·m}^2$

6. Load Moving Power

$$P_O = \frac{2\pi n_M \cdot T_L}{60} = \frac{2\pi \times 3{,}000 \times 0.139}{60} = 43.7\ (\text{W})$$

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

- TL ≤ Motor rated torque
- $\frac{(Po + Pa)}{2}$ < Provisionally selected Servomotor rated output < $(Po + Pa)$
- n_M ≤ Rated motor speed
- J_L ≤ 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 (Nm)
Instantaneous Maximum Torque	1.11 (Nm)
Motor Moment of Inertia	0.0659 $\times 10^{-4}$ kg·m^2
Allowable Load Moment of Inertia	0.0659 x 10^{-4} x 35 = 2.31 $\times 10^{-4}$ kg·m^2
Encoder Resolution	16,777,216 pulses/rev [24 bits]

9. Verification of the Provisionally Selected Servomotor

- Verification of required acceleration torque:

$$T_P = \frac{2\pi n_M (J_M + J_L)}{60ta} + T_L = \frac{2\pi \times 3{,}000 \times (0.0659 + 1.25) \times 10^{-4}}{60 \times 0.1} + 0.139$$

$$\approx 0.552 \text{ (N·m)} < \text{Maximum instantaneous torque...Satisfactory}$$

- Verification of required deceleration torque:

$$T_S = \frac{2\pi n_M (J_M + J_L)}{60td} - T_L = \frac{2\pi \times 3{,}000 \times (0.0659 + 1.25) \times 10^{-4}}{60 \times 0.1} - 0.139$$

$$\approx 0.274 \text{ (N·m)} < \text{Maximum instantaneous torque...Satisfactory}$$

- Verification of effective torque value:

$$Trms = \sqrt{\frac{T_P^2 \cdot ta + T_L^2 \cdot tc + Ts^2 \cdot td}{t}} = \sqrt{\frac{(0.552)^2 \times 0.1 + (0.139)^2 \times 0.9 + (0.274)^2 \times 0.1}{1.5}}$$

$$\approx 0.192 \text{ (N·m)} < \text{Rated torque...Satisfactory}$$

It has been verified that the provisionally selected Servomotor is applicable in terms of capacity. Position control is considered next.

10. Positioning Resolution

The electrical stopping precision δ is ±0.01 mm, so the positioning resolution $\Delta\ell$ is 0.01 mm. The ball screw lead P_B is 0.005 m, so the number of pulses per motor rotation is calculated with the following formula.

$$\text{The number of pulses per revolution (pulses)} = \frac{P_B}{\Delta\ell} = \frac{5 \text{ mm/rev}}{0.01 \text{ mm}} = 500 \text{ (pulses/rev)} < \text{Encoder resolution [16777216 (pulses/rev)]}$$

The number of pulses per motor rotation is less than the encoder resolution (pulses/rev), so the provisionally selected Servomotor can be used.

11. Reference Pulse Frequency

The load speed υL is 15 m/min, or 1,000 × 15/60 mm/s and the positioning resolution (travel distance per pulse) is 0.01 mm/pulse, so the reference pulse frequency is calculated with the following formula.

$$vs = \frac{1{,}000\upsilon L}{60 \times \Delta\ell} = \frac{1{,}000 \times 15}{60 \times 0.01} = 25{,}000 \text{ (pps)}$$

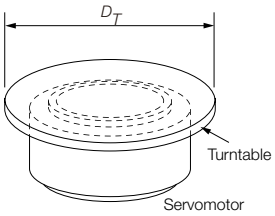
The reference pulse frequency is less than the maximum input pulse frequency,* so the provisionally selected Servomotor can be used.

* 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



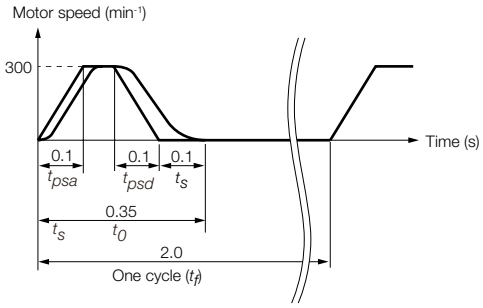
Item	Code	Value
Turntable Mass	W	12 kg
Turntable Diameter	D_T	300 mm
Rotational Angle per Cycle	θ	270 deg
Positioning Time	t_0	0.35 s

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 Nm
Settling Time	t_s	0.1 s

2. Motor Speed of Direct Drive Servomotor

$$N_O = \frac{\theta}{360} \times \frac{60}{(t_0 - t_p - t_s)} = \frac{270}{360} \times \frac{60}{(0.35 - 0.1 - 0.1)} = 300\ (\text{min}^{-1})$$

3. Operation Pattern



4. Load Moment of Inertia

$$J_L = \frac{1}{8} \times D_T^2 \times W = \frac{1}{8} \times (300 \times 10^{-3})^2 \times 12 = 0.135\ (\text{kg·m}^2)$$

5. Load Acceleration/Deceleration Torque

$$T_a = J_L \times 2\pi \times \frac{N_O/60}{t_p} = 0.135 \times 2\pi \times \frac{300/60}{0.1} = 42.4\ (\text{N·m})$$

6. Provisional Selection of Direct Drive Servomotor

① Selection Conditions

- Load acceleration/deceleration torque < Instantaneous maximum torque of Direct Drive Servomotor
- Load moment of inertia < Allowable load moment of inertia ratio (J_R) x 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 (Nm)
Instantaneous Maximum Torque	51 (Nm)
Moment of Inertia (J_M)	0.00785 (kgm^2)
Allowable Load Moment of Inertia Ratio (J_R)	25

7. Verification of the Provisionally Selected Servomotor

- Verification of required acceleration torque:

$$T_{Ma} = \frac{(J_L + J_M) \times N_O}{9.55 \times t_{psa}} = \frac{(0.135 + 0.00785) \times 300}{9.55 \times 0.1}$$

$\approx$ 44.9 (N·m) < Maximum instantaneous torque...Satisfactory

- Verification of required deceleration torque:

$$T_{Md} = -\frac{(J_L + J_M) \times N_O}{9.55 \times t_{psd}} = -\frac{(0.135 + 0.00785) \times 300}{9.55 \times 0.1}$$

$\approx$ -44.9 (N·m) < Maximum instantaneous torque...Satisfactory

- Verification of effective torque value:

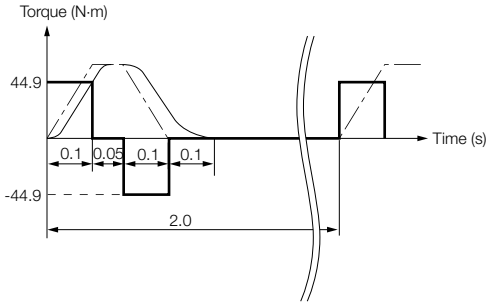
$$Trms = \sqrt{\frac{T_{Ma}^2 \times t_{psa} + T_L^2 \times t_c + T_{Md}^2 \times t_{psd}}{tf}} = \sqrt{\frac{44.9^2 \times 0.1 + 0^2 \times 0.05 + (-44.9)^2 \times 0.1}{2}}$$

$\approx$ 14.2 (N·m) < Rated torque...Satisfactory

t_c =Time of constant motor speed = $t_0 - t_s - t_{psa} - t_{psd}$

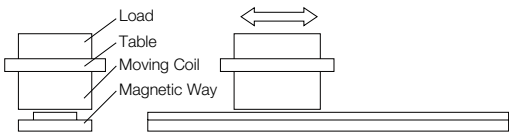
8. Result

It has been verified that the provisionally selected Servomotor is applicable.
The torque diagram is shown below.



Capacity Selection Example for Linear Servomotors

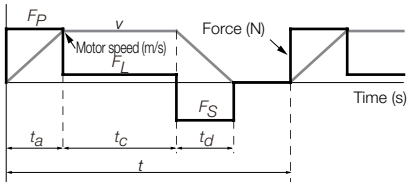
1. Mechanical Specifications



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 x 0.9
- $F_s \leq$ Maximum force x 0.9
- $F_{rms} \leq$ Rated force x 0.9

The following Servomotor Moving Coil and Magnetic Way meet the selection conditions.

- SGLGW-60A253CP-E Linear Servomotor Moving Coil
- SGLGM-60□□□C-E Linear Servomotor Magnetic Way

② Specifications of the Provisionally Selected Servomotor

Item	Value
Maximum Force	440 (N)
Rated Force	140 (N)
Moving Coil Mass (m_M)	0.82 (kg)
Servomotor Magnetic Attraction (F_{att})	0 (N)

6. Verification of the Provisionally Selected Servomotor

- Steady-State Force

  $F_L = \mu \{9.8 \times (m_W + m_T + m_M) + F_{att}\} = 0.2 \{9.8 \times (1 + 2 + 0.82) + 0\} = 7.5$ (N)

- Verification of Acceleration Force

$$F_P = (m_W + m_T + m_M) \times \frac{v}{t_a} + F_L = (1 + 2 + 0.82) \times \frac{2}{0.02} + 7.5$$

$= 389.5$ (N) ≤ Maximum force × 0.9 (= 396 N)… Satisfactory

- Verification of Deceleration Force

$$F_S = (m_W + m_T + m_M) \times \frac{v}{t_a} - F_L = (1 + 2 + 0.82) \times \frac{2}{0.02} - 7.5$$

$= 374.5$ (N) ≤ Maximum force × 0.9 (= 396 N)… Satisfactory

- Verification of Effective Force

$$F_{rms} = \sqrt{\frac{F_P^2 \cdot t_a + F_L^2 \cdot t_c + F_S^2 \cdot t_d}{t}} = \sqrt{\frac{389.5^2 \times 0.02 + 7.5^2 \times 0.36 + 374.5^2 \times 0.02}{0.5}}$$

$= 108.3$ (N) ≤ Rated force × 0.9 (= 132.3 N)… Satisfactory

7. Result

It has been verified that the provisionally selected Servomotor is applicable.

Capacity Selection for Regenerative Resistors

If the regenerative power exceeds the amount that can be absorbed by charging the smoothing capacitor, a regenerative resistor is used.

Regenerative Power and Regenerative Resistance

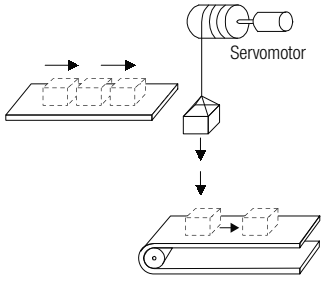
The rotational energy of a driven machine such as a Servomotor that is returned to the SERVOPACK is called regenerative power. The regenerative power is absorbed by charging a smoothing capacitor. When the regenerative power exceeds the capacity of the capacitor, it is consumed by a regenerative resistor. (This is called resistance regeneration.) The Servomotor is driven in a regeneration state in the following circumstances:

- While decelerating to a stop during acceleration/deceleration operation
- While performing continuous downward operation on a vertical axis
- During continuous operation in which the Servomotor is rotated by the load (i.e., a negative load)

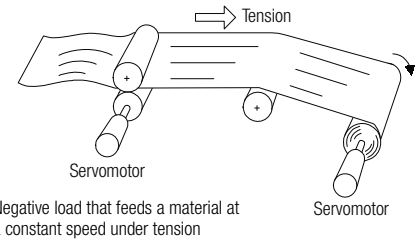
Important

You cannot use the resistance regeneration provided by the SERVOPACK for continuous regeneration. For continuous operation with a negative load, you must design a system that also includes a Power Regenerative Converter or Power Regenerative Unit (for example, YASKAWA model D1000 or R1000). If regenerative power is not appropriately processed, the regenerative energy from the load will exceed the allowable range and damage the SERVOPACK.
Examples of negative loads are shown below.

• Motor Drive to Lower Objects without a Counterweight



• Motor Drive for Feeding



Negative load that feeds a material at a constant speed under tension

Types of Regenerative Resistors

The following regenerative resistors can be used.

- Built-in regenerative resistor: A regenerative resistor that is built into the SERVOPACK. Not all SERVOPACKs have built-in regenerative resistors.
- External Regenerative Resistor: A regenerative resistor that is connected externally to a SERVOPACK. These resistors are used when the smoothing capacitor and built-in regenerative resistor in the SERVOPACK cannot consume all of the regenerative power.

SERVOPACK Model		Built-in Regenerative Resistor	External Regenerative Resistor
SGD7S-	R70A, R90A, 1R6A, 2R8A, R70F, R90F, 2R1F, 2R8F	None	Basically not required
	3R8A, 5R5A, 7R6A, 120A, 180A, 200A, 330A	Standard feature *1	Basically not required
	470A, 550A, 590A, 780A	None	Required *2
SGD7W-	1R6A, 2R8A, 5R5A, 7R6A	Standard feature *1	Basically not required
SGD7C-	1R6A, 2R8A, 5R5A, 7R6A	Standard feature *1	Basically not required

*1. Refer to the "Built-In Regenerative Resistor" section for the specifications of the regenerative resistors built into SERVOPACKs.
*2. An optional external Regenerative Resistor Unit is required.

Selecting External Regenerative Resistor

Use YASKAWA 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+.

- Refer to chapter “Simple Calculation”.
- Refer to chapter “Calculating the Regenerative Energy”.

Simple Calculation

When driving a Servomotor with a horizontal shaft, check if an External Regenerative Resistor is required using the following calculation method.
Note: If you use the SGD7S-470A, -550A, -590A, or -780A, always connect an External Regenerative Resistor.

SERVOPACKs without Built-in Regenerative Resistors:

SGD7S-R70A, -R90A, -1R6A, -2R8A, -R70F, -R90F, -2R1F, and -2R8F

The total amount of energy that can be charged in the capacitors is given in the following table. If the rotational energy (ES) of the Servomotor and load exceeds the value in the following table, 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	

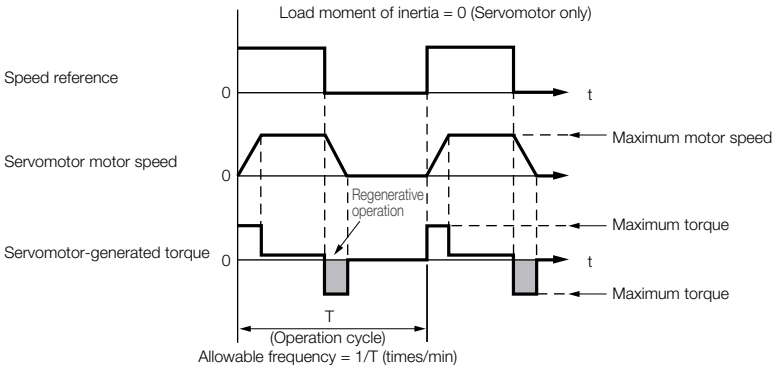
Calculate the rotational energy (E_S) of the servo system with the following equation:

$E_S = J \times (n_M)^2/182$ (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})

SERVOPACKs with Built-in Regenerative Resistors:
SGD7S-3R8A, -5R5A, -7R6A, -120A, -180A, -200A, and -330A
SGD7W-1R6A, -2R8A, -5R5A, and -7R6A
SGD7C-1R6A, -2R8A, -5R5A, and -7R6A

Use the following equation to calculate the allowable frequency for regenerative operation. The following operating conditions were used: Operation cycle from a speed of 0 to the maximum motor speed to 0 (min^{-1}) with acceleration and deceleration operation. If the frequency of the operation cycle (1/T) is lower than the allowable frequency in the calculation results, an External Regenerative Resistor is not necessary. Finally, do the calculation with the actual operating speed and load moment of inertia to determine if an External Regenerative Resistor is required.



Operating Conditions for Calculating the Allowable Regenerative Frequency

$$\text{Allowable frequency} \frac{\text{Allowable frequency for regenerative operation for Servomotor without load*}}{(1+n)} \times \left(\frac{\text{Maximum motor speed}}{\text{Operating motor speed}}\right)^2 \text{(time/min)}$$

- $n = J_L/J_M$
- J_M: Servomotor moment of inertia ($kg \times m^2$)
- J_L: Load moment of inertia at motor shaft ($kg \times m^2$)

* Assign the related value given in the table in Allowable Frequency for Regenerative Operation for Servomotor without Load

Allowable Frequency for Regenerative Operation for Servomotors without Load

- Rotary Servomotors

Servomotor Model		Allowable Frequencies in Regenerative Operation (Operations/Min)	
		SERVOPACK Model: SGD7S	SERVOPACK Model: SGD7W and SGD7C (Simultaneous Operation of Two Axes)
SGMMV-	A1A	-	-
	A2A	-	-
	A3A	-	-
SGM7J-	A5A	-	300
	01A	-	180
	C2A	-	130
	02A	-	46
	04A	-	25
	06A	30	30
	08A	15	15
SGM7A-	A5A	-	560
	01A	-	360
	C2A	-	260
	02A	-	87
	04A	-	56
	06A	77	77
	08A	31	31
	10A	31	-
	15A	15	-
	20A	19	-
	25A	15	-
	30A	6.9	-
	40A	11	-
	50A	8.8	-
	70A	86	-

Servomotor Model		Allowable Frequencies in Regenerative Operation (Operations/Min)	
		SERVOPACK Model: SGD7S	SERVOPACK Model: SGD7W and SGD7C (Simultaneous Operation of Two Axes)
SGM7P-	01A	-	200
	C2A	-	46
	04A	-	29
	08A	11	11
SGM7G-	15A	7.5	-
	03A	39	39
	05A	29	29
	09A	6.9	6.9
	13A	6.1	-
	20A	7.4	-
	30A	9.5	-
	44A	6.4	-
	55A	24	-
	75A	34	-
	1AA	39	-
	1EA	31	-

Allowable Frequency for Regenerative Operation for Servomotors without Load

- Direct Drive Servomotors

Servomotor Model		Allowable Frequencies in Regenerative Operation (Operations/Min)	
		SERVOPACK Model: SGD7S	SERVOPACK Model: SGD7W and SGD7C (Simultaneous Operation of Two Axes)
SGM7D-	01G	-	-
	1AF	120	-
	1CI	74	-
	1ZI	91	-
	02K	–	-
	03H	–	-
	05G	–	-
	06J	350	-
	06L	–	-
	06K	–	-
	08G	430	-
	08K	–	-
	09J	250	-
	12L	–	-
	18G	350	-
	18J	210	-
	20J	200	-
	24G	270	-
	28I	52	-
	2BI	89	-
	2DI	110	-
	30F	210	-
	30L	63	-
	38J	150	-
	34G	220	-
	45G	190	-
	58F	170	-
	70I	100	-
	90F	140	-
SGM7E-	02B	–	62
	05B	–	34
	07B	–	22
	04C	–	22
	08D	–	6.1
	10C	–	19
	14C	–	22
	17D	–	7
	25D	–	9.3
	16E	3.7	3.7
	35E	9.7	9.7

Servomotor Model		Allowable Frequencies in Regenerative Operation (Operations/Min)	
		SERVOPACK Model: SGD7S	SERVOPACK Model: SGD7W and SGD7C (Simultaneous Operation of Two Axes)
SGM7F-	02A	-	150
	05A	-	83
	07A	-	62
	04B	-	75
	08C	-	21
	10B	-	48
	14B	65	65
	16D	13	13
	17C	30	30
	25C	31	31
	35D	19	19
	45M	25	25
	80M	19	-
	1AM	8.9	-
	80N	22	-
	1EN	11	-
	2ZN	9.1	-
SGMCV-	04B	-	75
	08C	-	21
	10B	-	48
	14B	65	65
	16D	13	13
	17C	30	30
	25C	31	31
	35D	19	19
SGMCS-	02B	-	62
	05B	-	34
	07B	-	22
	04C	-	22
	08D	-	6.1
	10C	-	19
	14C	-	22
	17D	-	7
	25D	-	9.3
	16E	3.7	3.7
	35E	9.7	9.7
	45M	25	25
	80M	19	-
	80N	8.9	-
	1AM	22	-
	1EN	11	-
	2ZN	9.1	-

Allowable Frequency for Regenerative Operation for Servomotors without Load

- Linear Servomotors

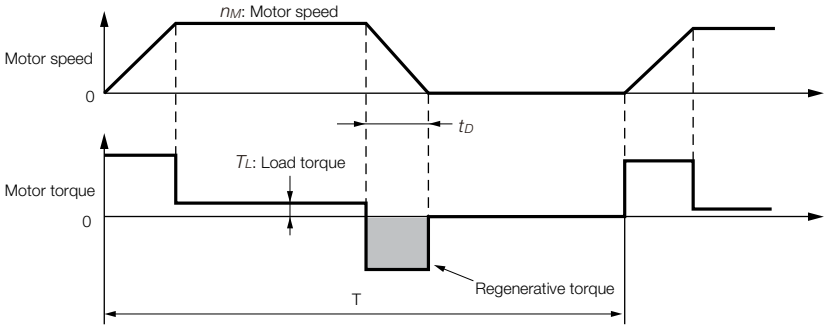
Servomotor Model		Allowable Frequencies in Regenerative Operation (Operations/Min)	
		SERVOPACK Model: SGD7S	SERVOPACK Model: SGD7W and SGD7C (Simultaneous Operation of Two Axes)
SGLGW- Using a Standard-Force Magnetic Way	30A050C	-	190
	30A080C	-	120
	40A140C	-	56
	40A253C	-	32
	40A365C	-	22
	60A140C	-	49
	60A253C	-	27
	60A365C	37	37
	90A200C	34	-
	90A370C	33	-
	90A535C	24	-
SGLGW- Using a High-Force Magnetic Way	40A140C	-	80
	40A253C	-	45
	40A365C	62	62
	60A140C	-	64
	60A253C	71	71
	60A365C	49	49
SGLFW-	20A090A	-	27
	20A120A	-	21
	35A120A	-	14
	35A230A	16	16
	50A200B	10	10
	50A380B	6.9	-
	1ZA200B	7.8	-
	1ZA380B	6.6	-

Servomotor Model		Allowable Frequencies in Regenerative Operation (Operations/Min)	
		SERVOPACK Model: SGD7S	SERVOPACK Model: SGD7W and SGD7C (Simultaneous Operation of Two Axes)
SGLFW2-	30A070A	-	38
	30A120A	-	21
	30A230A	22	11
	45A200A	16	16
	45A380A	10*1	-
		17*2	-
	90A200A	14	-
	90A380A	11	-
	90A560A	18	-
	1DA380A	21	-
	1DA560A	32	-
SGLTW-	20A170A	15	15
	20A320A	8.3	8.3
	20A460A	7.1	-
	35A170A	10	10
	35A170H	8.5	8.5
	35A320A	7	-
	35A320H	5.9	-
	35A460A	7.6	-
	40A400B	13	-
	40A600B	19	-
	50A170H	15	15
	50A320H	11	-
	80A400B	28	-
	80A600B	180	-

*1. This value is in combination with the SGD7S-120A.
*2. This value is in combination with the SGD7S-180A.

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) x t_D
4	Calculate the energy that can be absorbed by the SERVOPACK.	E_C	Calculate from the graphs in u SERVOPACK-absorbable Energy
5	Calculate the energy consumed by the regenerative resistor.	E_K	$E_K = E_S - (E_L + E_M + E_C)$
6	Calculate the required regenerative resistor capacity (W).	W_K	$W_K = E_K/(0.2 \times T)$

*1. The 0.2 in the equation for calculating WK 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	$= J_M + J_L$ (kgm^2)
n_M	Servomotor motor speed (min^{-1})

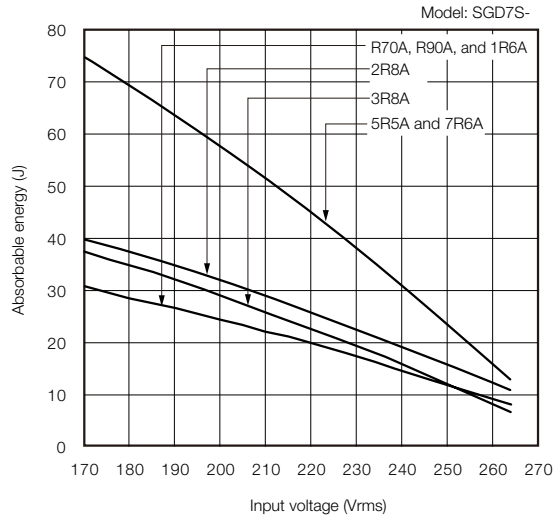
Code	Description
T_L	Load torque (Nm)
t_D	Deceleration stopping time (s)
T	Servomotor repeat operation cycle (s)

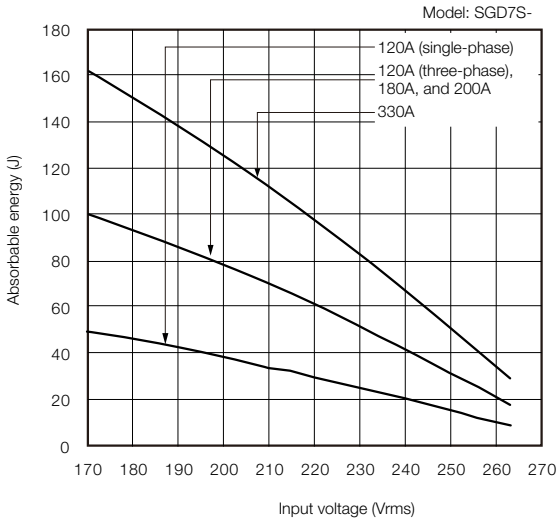
If the value of W_K does not exceed the capacity of the built-in regenerative resistor of the SERVOPACK, an External Regenerative Resistor is not required. If the value of W_K exceeds the capacity of the built-in regenerative resistor, install an External Regenerative Resistor with a capacity equal to the value for W calculated above.

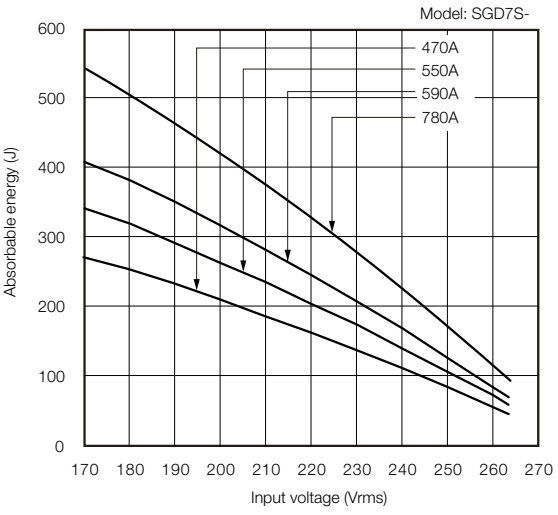
SERVOPACK-absorbable Energy

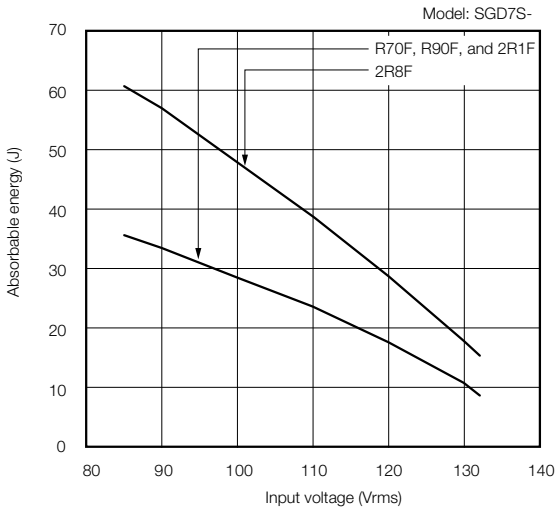
The following figures show the relationship between the SERVOPACK's input power supply voltage and its absorbable energy.

Sigma-7S SERVOPACKs

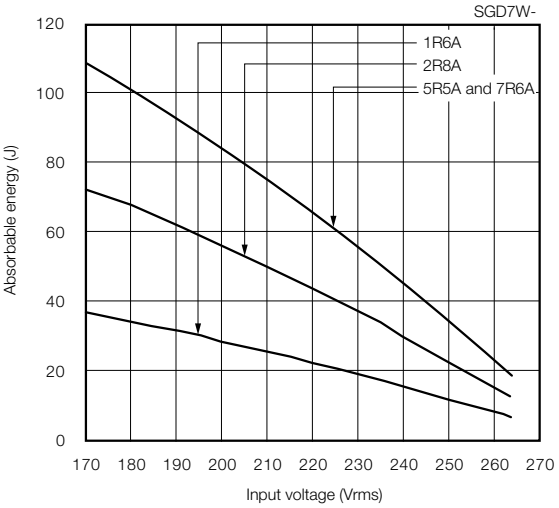




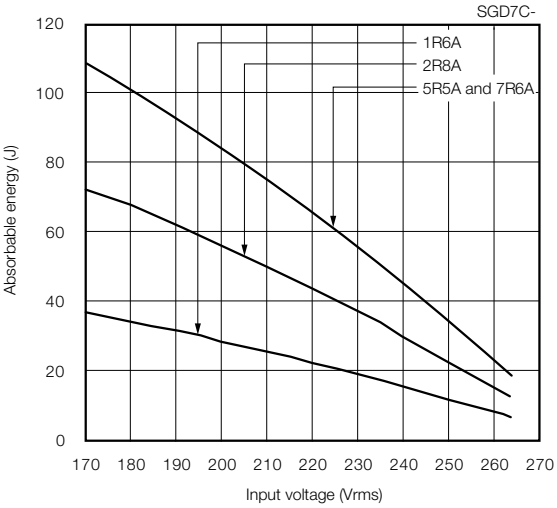




Sigma-7W SERVOPACKs



Sigma-7C SERVOPACKs



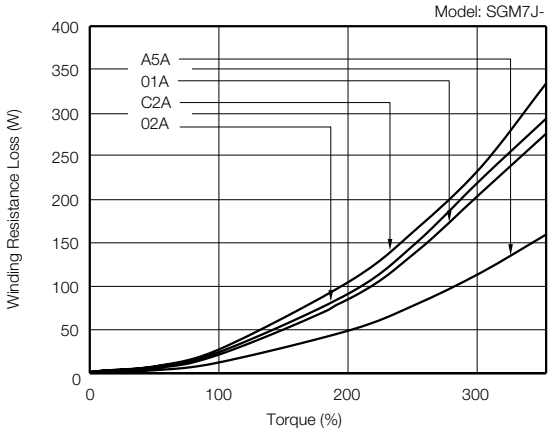
Servomotor Winding Resistance Loss

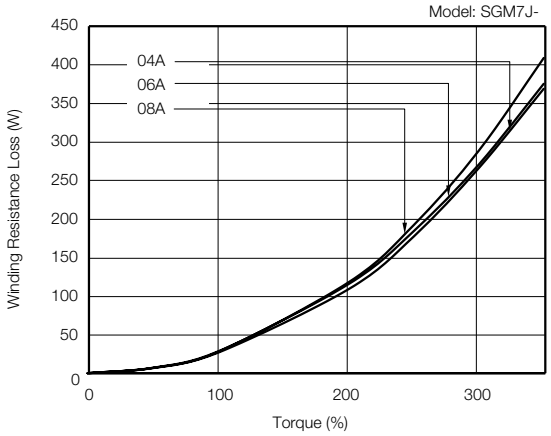
The following figures show the relationship for each Servomotor between the Servomotor's generated torque and the winding resistance loss.

SGMMV Rotary Servomotors

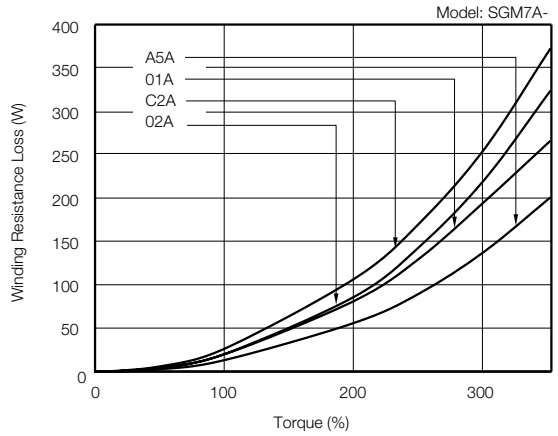
Contact your YASKAWA representative for information on the SGMMV Rotary Servomotors.

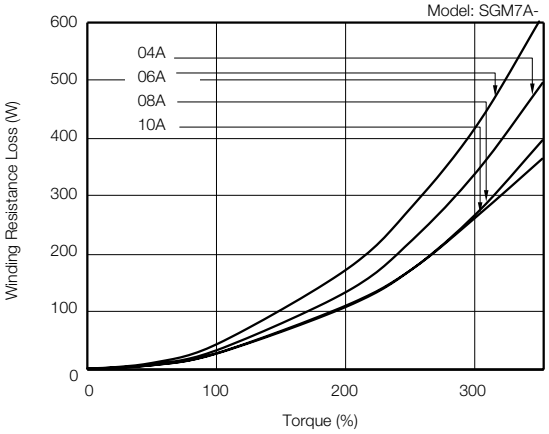
SGM7J Rotary Servomotors

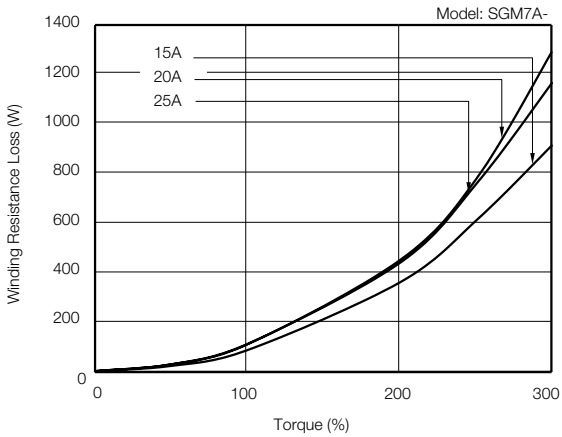


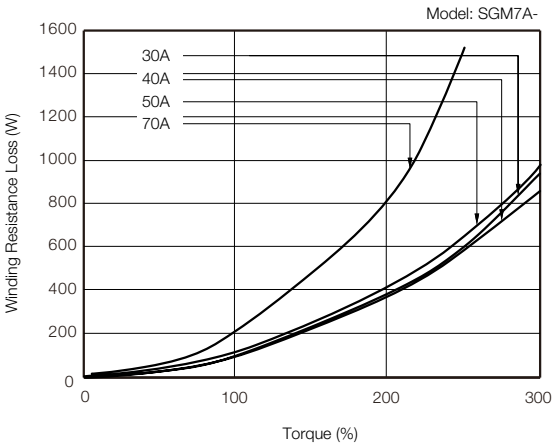


SGM7A Rotary Servomotors

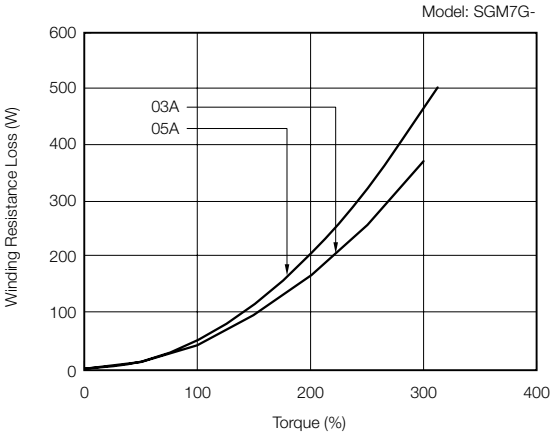


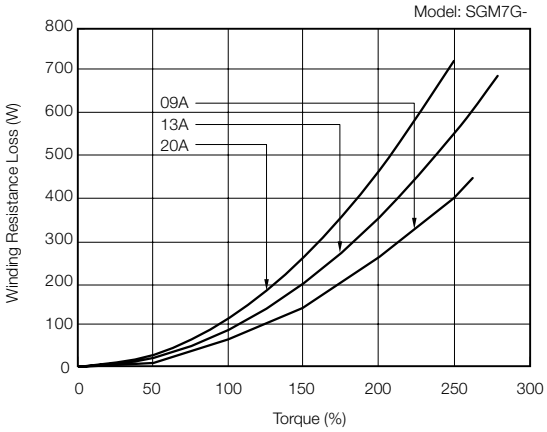


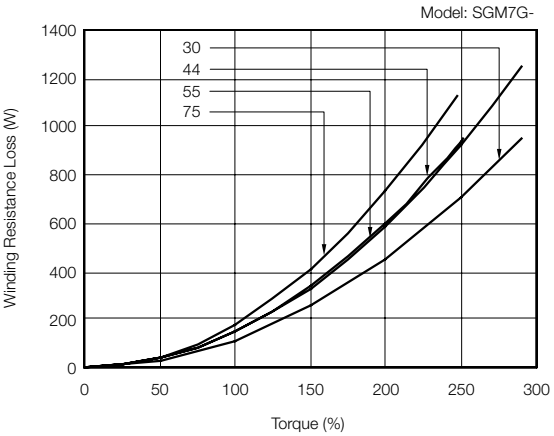


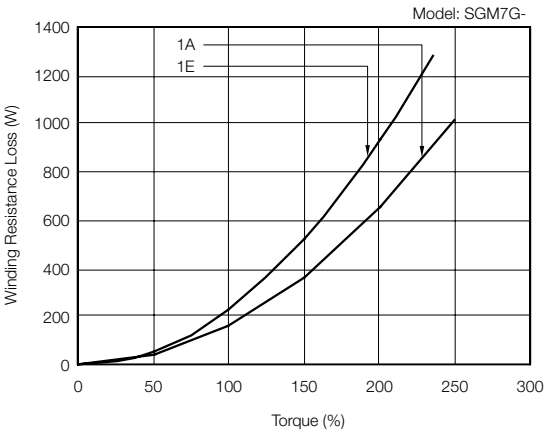


SGM7G Rotary Servomotors

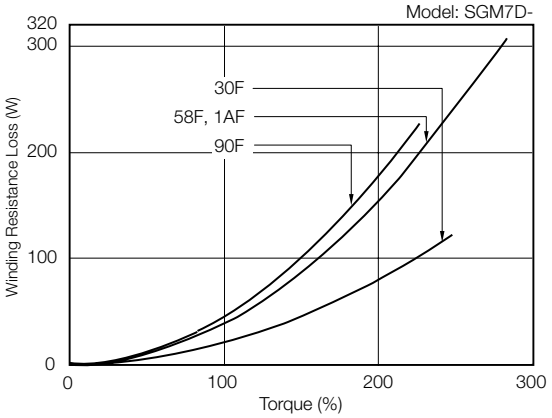


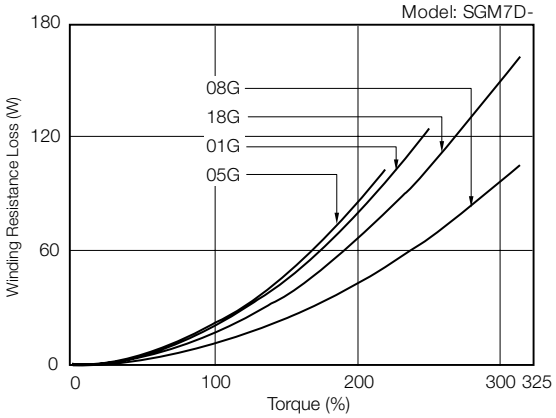


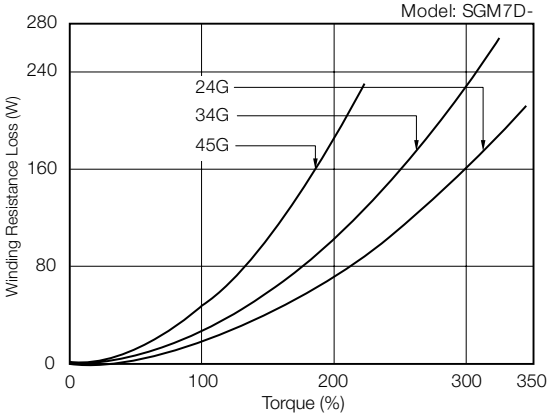


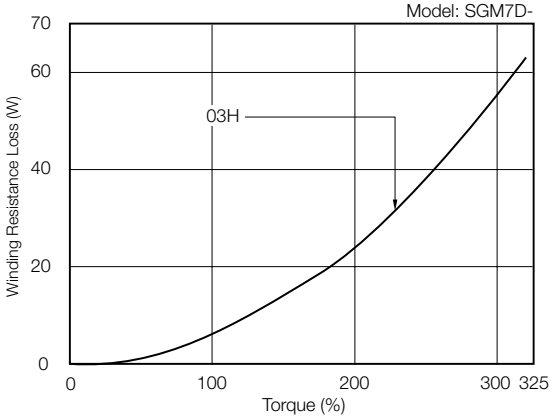


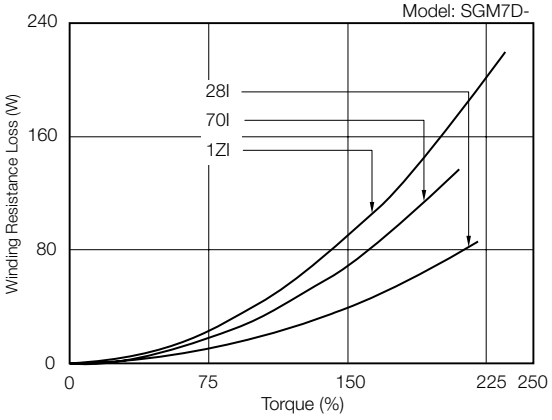
SGM7D Direct Drive Servomotors

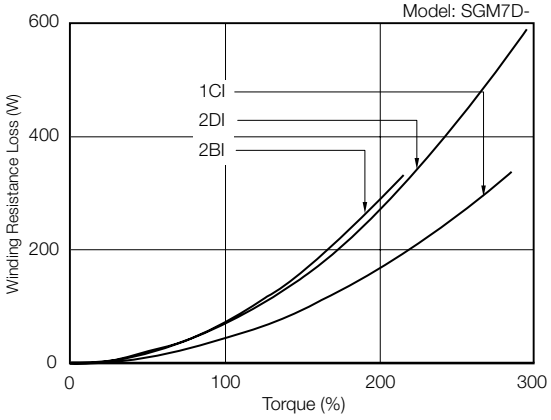


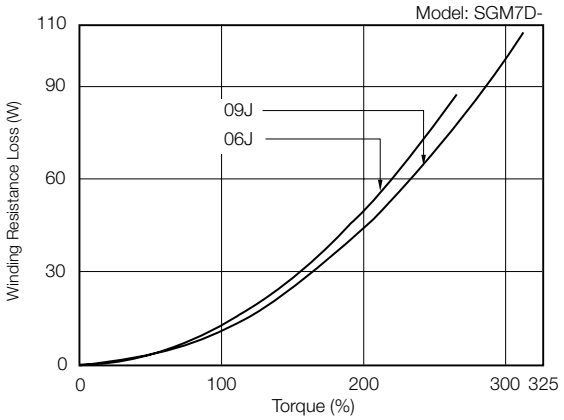


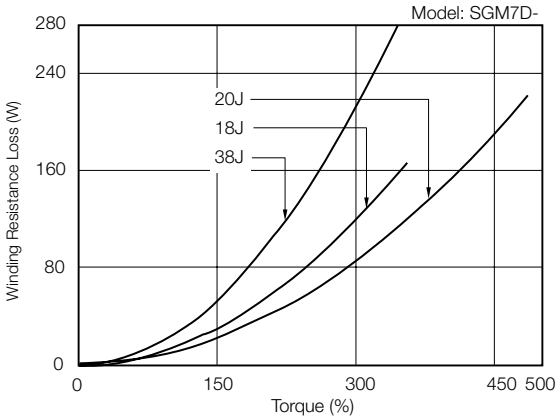


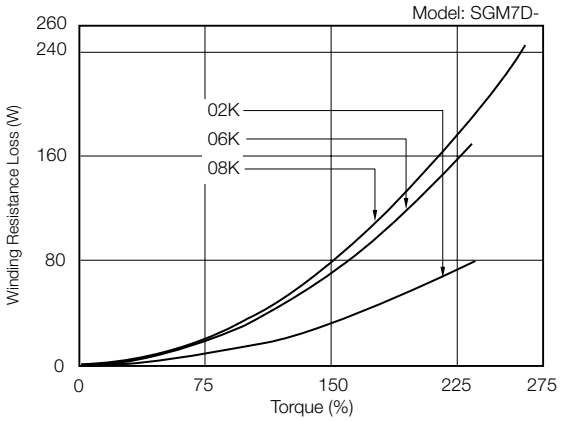


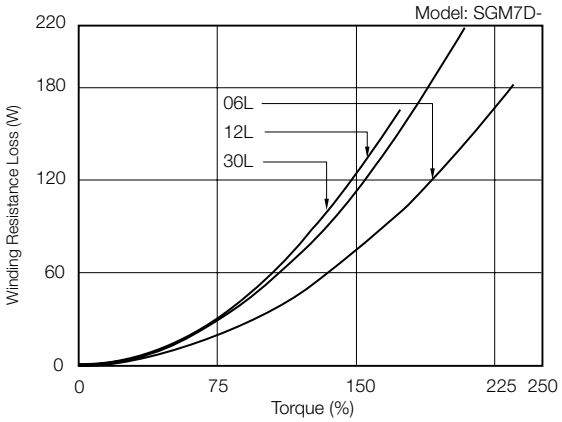




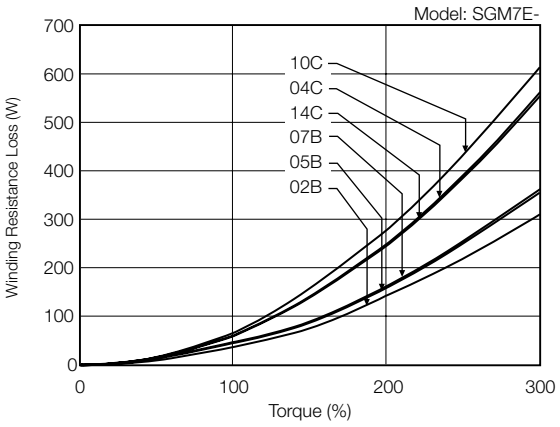

Model: SGM7D-
Winding Resistance Loss (W)
110
90
60
30
0
09J
06J
0
100
200
300 325
Torque (%)

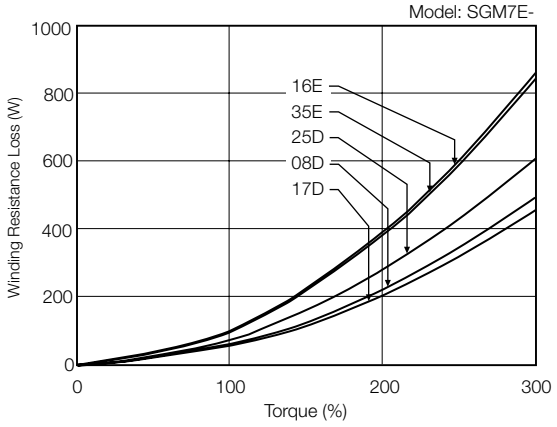

Model: SGM7D-
Winding Resistance Loss (W)
280
240
160
80
0
20J
18J
38J
0
150
300
450 500
Torque (%)


Model: SGM7D-
Winding Resistance Loss (W)
260
240
160
80
0
02K
06K
08K
0
75
150
225
275
Torque (%)

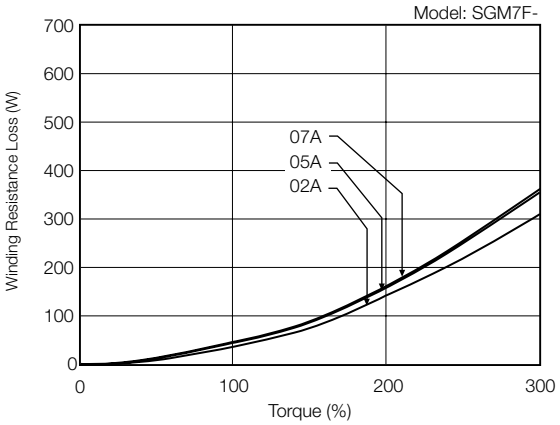

Model: SGM7D-
Winding Resistance Loss (W)
220
180
120
60
0
06L
12L
30L
0
75
150
225 250
Torque (%)

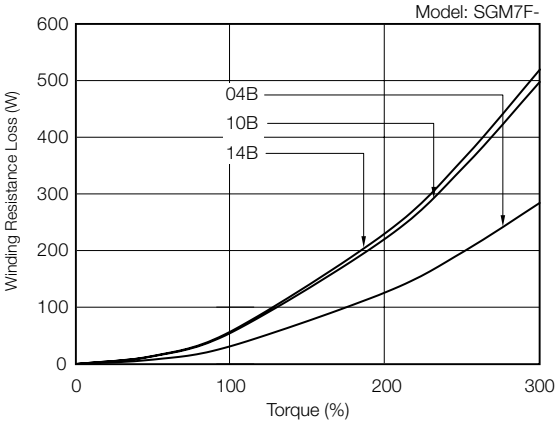
SGM7E Direct Drive Servomotors

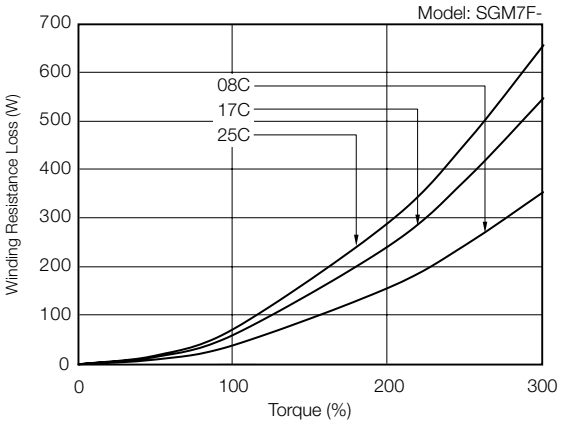


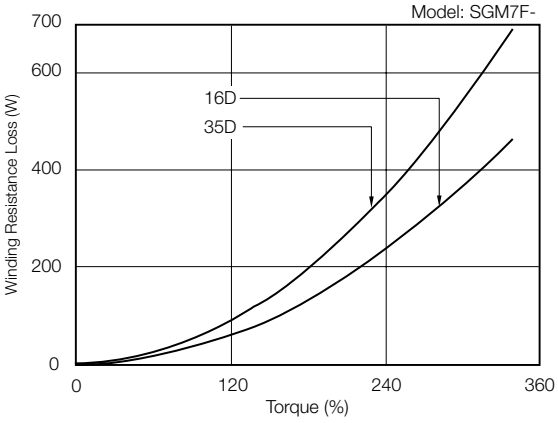


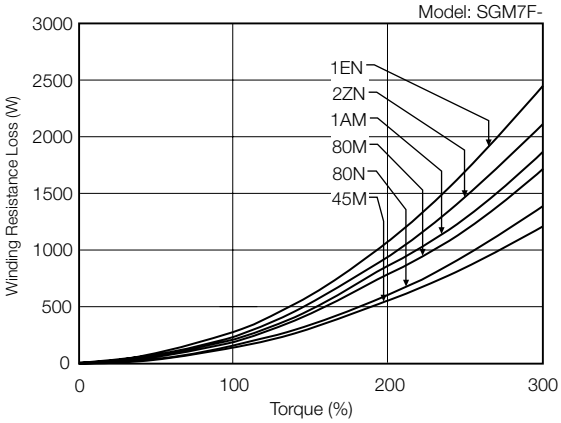
SGM7F Direct Drive Servomotors



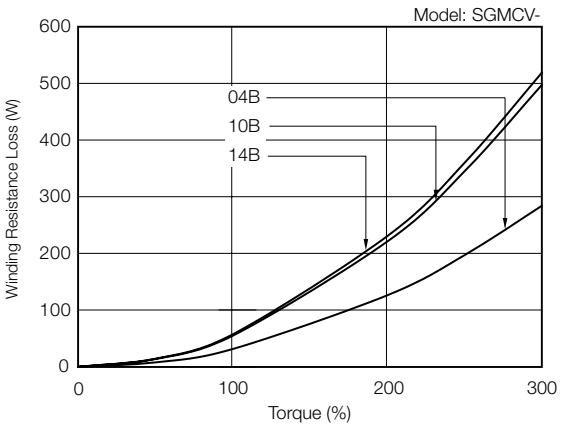


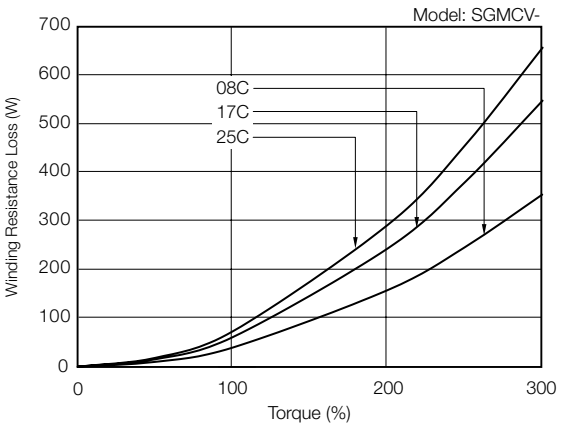


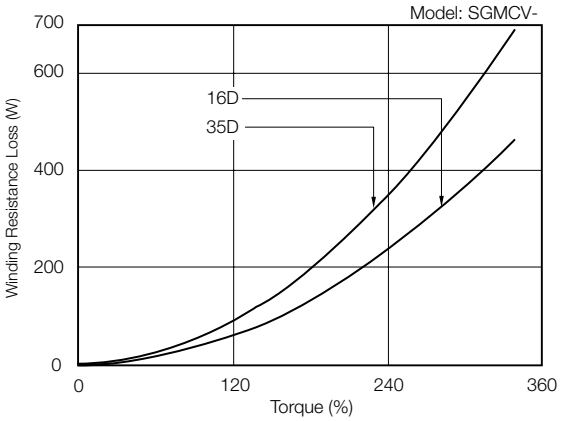




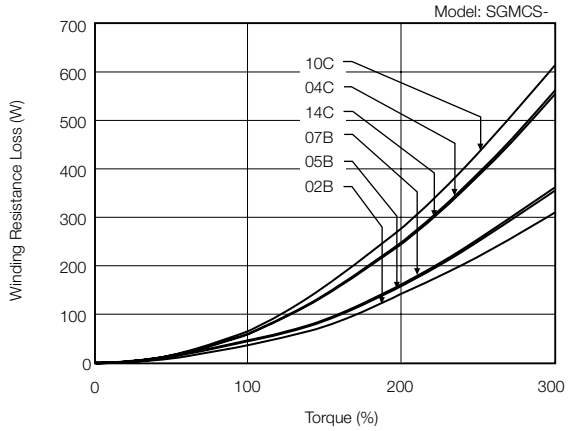
SGMCV Direct Drive Servomotors

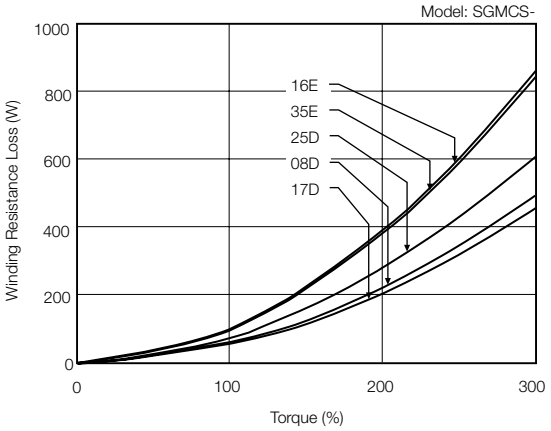


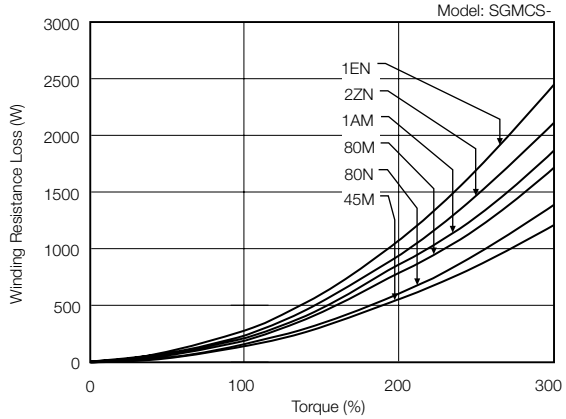




SGMCS Direct Drive Servomotors

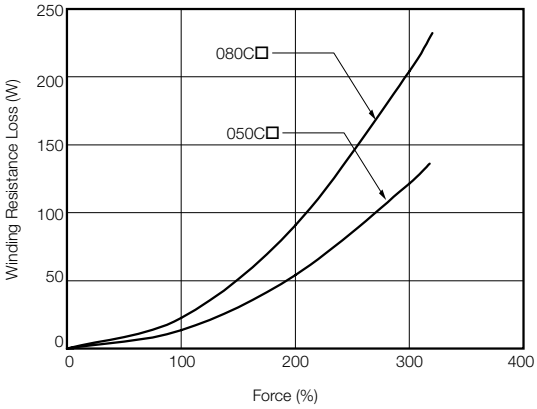




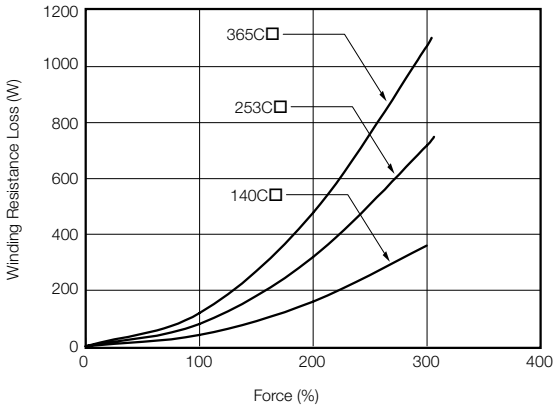


SGLGW Linear Servomotors

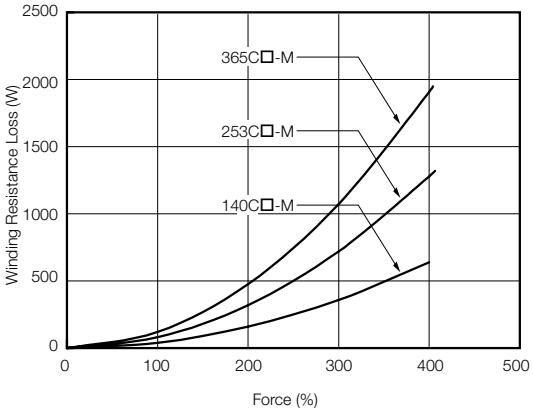
Model: SGLGW-30A



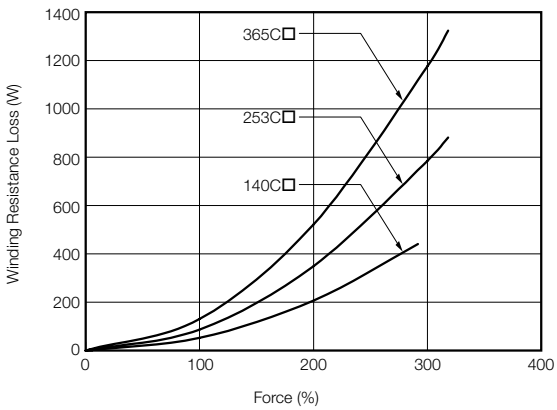
Model: SGLGW-40A



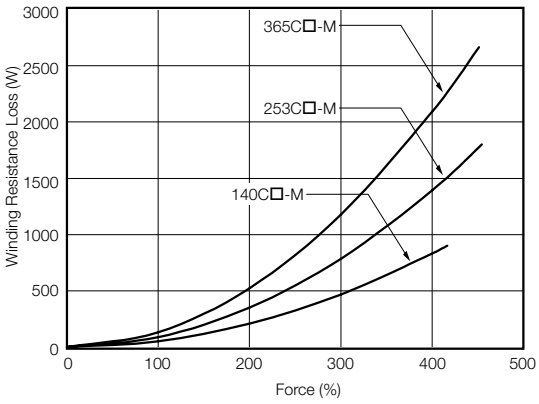
Model: SGLGW-40A



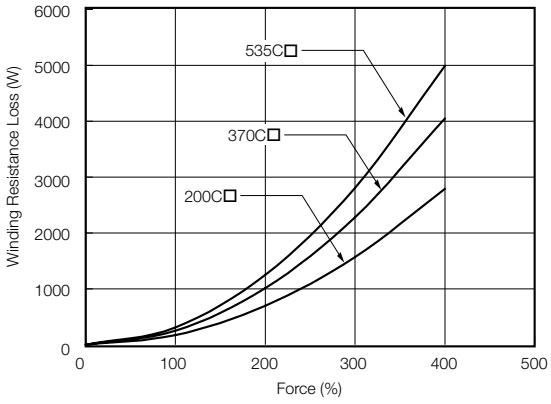
Model: SGLGW-60A



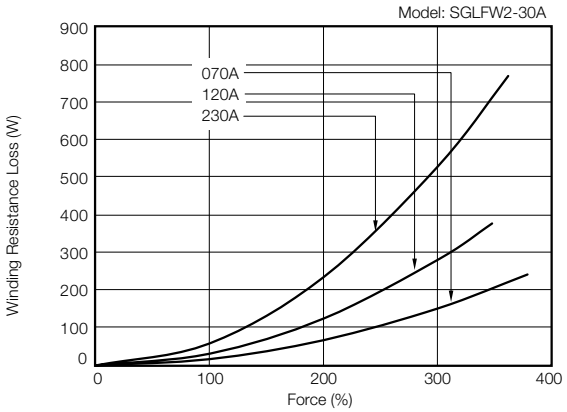
Model: SGLGW-60A

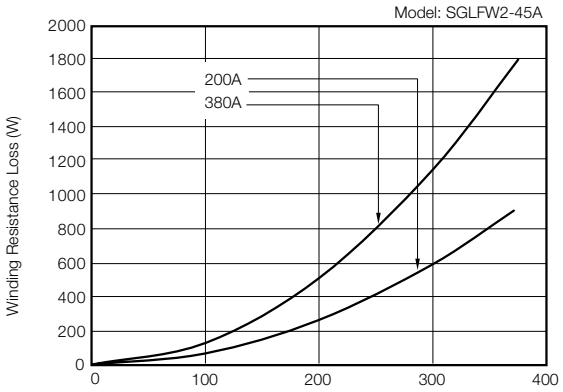


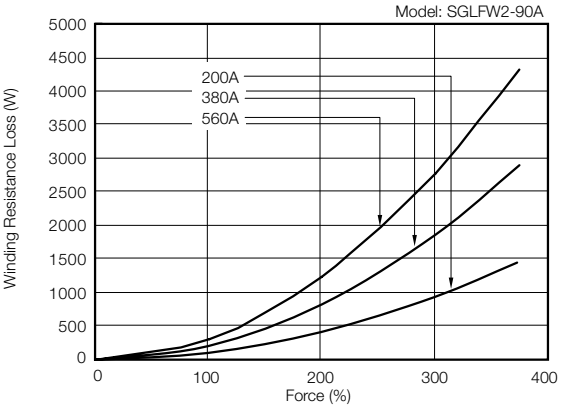
Model: SGLGW-90A

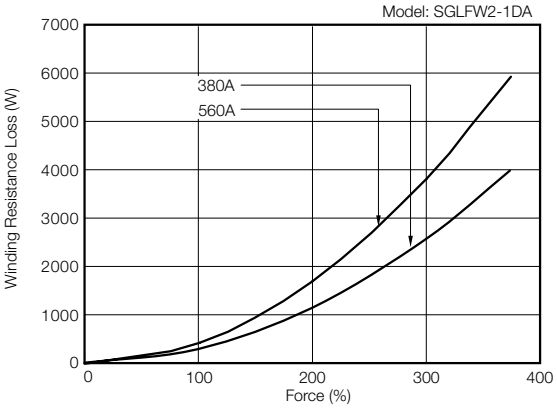


SGLFW2 Linear Servomotors

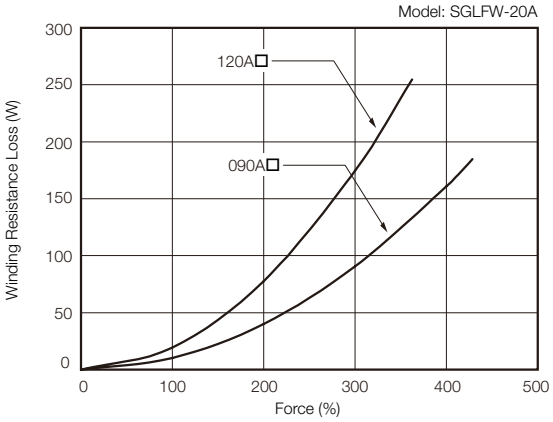


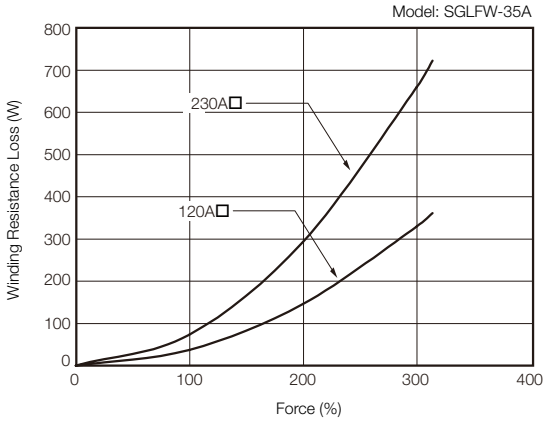


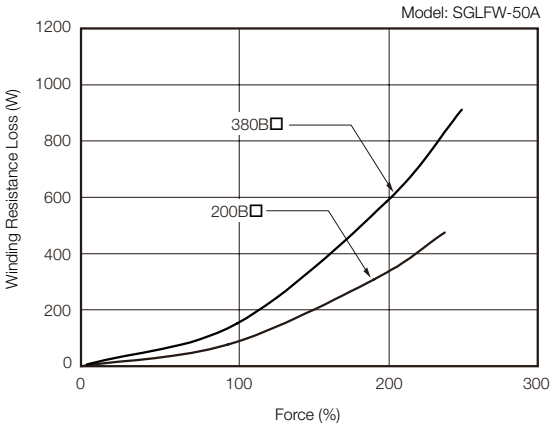


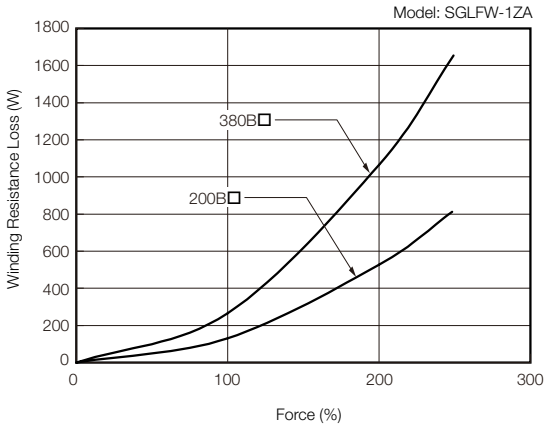


SGLFW Linear Servomotors



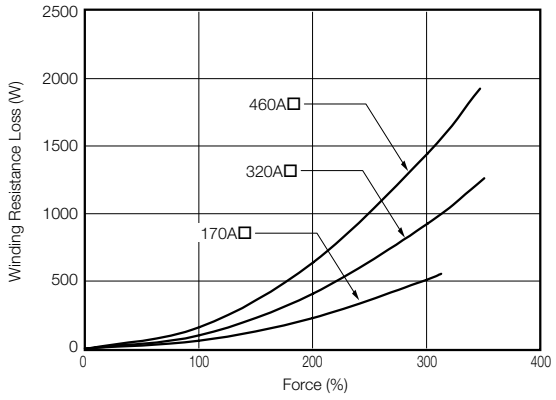




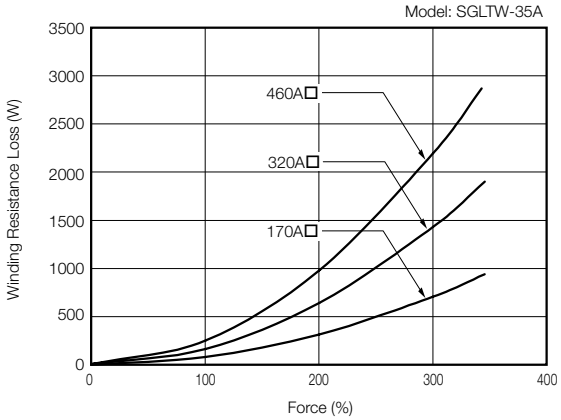


SGLTW Linear Servomotors

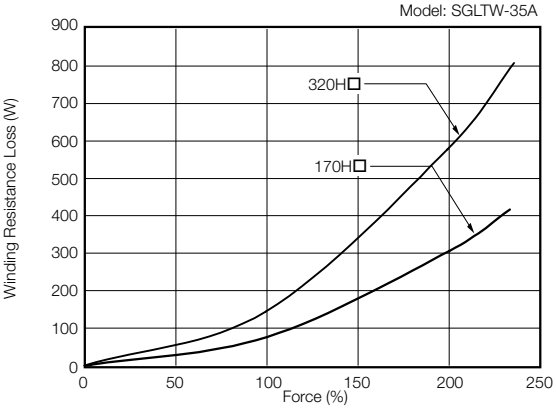
Model: SGLTW-20A



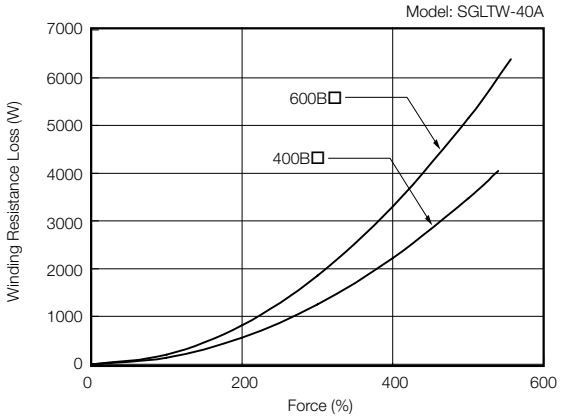
Model: SGLTW-35A



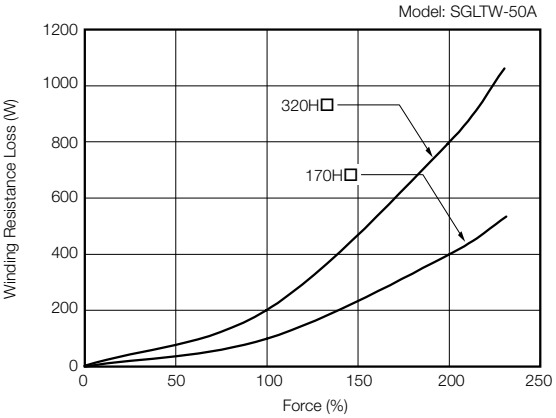
Model: SGLTW-35A



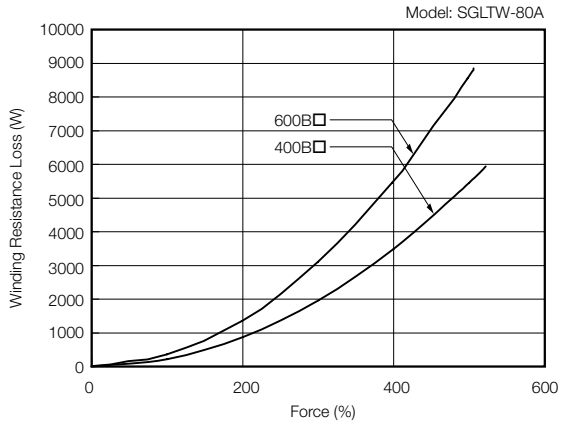
Model: SGLTW-40A



Model: SGLTW-50A



Model: SGLTW-80A



International Standards

√ : Certified – : Not Certified

Product		Model	UL/CSA Standards	CE Marking	KC Mark	RoHS Directive
SERVOPACKs		SGD7S	√	√	√	√
		SGD7W	√	√	√	√
		SGD7C	√	√	√	√
Communications Options	INDEXER Module	SGDV- OCA03A*	√	√	√	√
	DeviceNet Module	SGDV-OCA04A*, -OCA05A*	√	√	√	√
Feedback Option	Fully-Closed Module	SGDV-OFA01A*	√	√	√	√
Safety Option	Safety Module	SGDV-OSA01A*	√	√	√	√

* Use this model number to purchase the Option Module separately.

√ : Certified – : Not Certified

Product	Model	UL/CSA Standards	CE Marking	RoHS Directive
Rotary Servomotors	SGMMV	√	√	√
	SGM7J	√	√	√
	SGM7A	√	√	√
	SGM7P	√	√	√
	SGM7G	√	√	√
Direct Drive Servomotors	SGM7D	–	√	√
	SGM7E	√	√	√
	SGM7F	√*6	√	√
	SGMCV	√	√	√
	SGMCS	√*5	√*2	√*1
Linear Servomotors	SGLGW (SGLGM) *3	√	√*1	√*1
	SGLFW2 (SGLFM2) *3	√	√	√
	SGLFW (SGLFM) *3	√	√*1	√*1
	SGLTW (SGLTM) *3	√	√*1	√*1

*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.
*5. UL Marking certification has been received for all SGMCS models with the exception of SGMCS-□□M and SGMCS-□□N.
*6. UL Marking certification has been received for all SGM7F models with the exception of SGM7F-□□M and SGM7F-□□N.

Details of Warranty

Warranty Period

The warranty period for a product that was purchased (hereinafter called the “delivered product”) is one year from the time of delivery to the location specified by the customer or 18 months from the time of shipment from the YASKAWA factory, whichever is sooner.

Warranty Scope

YASKAWA shall replace or repair a defective product free of charge if a defect attributable to Yaskawa occurs during the above warranty period.
This warranty does not cover defects caused by the delivered product reaching the end of its service life and replacement of parts that require replacement or that have a limited service life.
This warranty does not cover failures that result from any of the following causes.

- Improper handling, abuse, or use in unsuitable conditions or in environments not described in product catalogs or manuals, or in any separately agreed-upon specifications
- Causes not attributable to the delivered product itself
- Modifications or repairs not performed by YASKAWA
- Use of the delivered product in a manner in which it was not originally intended
- Causes that were not foreseeable with the scientific and technological understanding at the time of shipment from YASKAWA
- Events for which YASKAWA is not responsible, such as natural or human-made disasters

Limitations of Liability

- YASKAWA shall in no event be responsible for any damage or loss of opportunity to the customer that arises due to failure of the delivered product.
- YASKAWA shall not be responsible for any programs (including parameter settings) or the results of program execution of the programs provided by the user or by a third party for use with programmable Yaskawa products.
- The information described in product catalogs or manuals is provided for the purpose of the customer purchasing the appropriate product for the intended application. The use thereof does not guarantee that there are no infringements of intellectual property rights or other proprietary rights of Yaskawa or third parties, nor does it construe a license.
- YASKAWA shall not be responsible for any damage arising from infringements of intellectual property rights or other proprietary rights of third parties as a result of using the information described in catalogs or manuals.

Suitability for Use

- It is the customer’s responsibility to confirm conformity with any standards, codes, or regulations that apply if the YASKAWA product is used in combination with any other products.
- The customer must confirm that the YASKAWA product is suitable for the systems, machines, and equipment used by the customer.
- Consult with YASKAWA to determine whether use in the following applications is acceptable. If use in the application is acceptable, use the product with extra allowance in ratings and specifications, and provide safety measures to minimize hazards in the event of failure.
- Outdoor use, use involving potential chemical contamination or electrical interference, or use in conditions or environments not described in product catalogs or manuals
- Nuclear energy control systems, combustion systems, railroad systems, aviation systems, vehicle systems, medical equipment, amusement machines, and installations subject to separate industry or government regulations
- Systems, machines, and equipment that may present a risk to life or property
- Systems that require a high degree of reliability, such as systems that supply gas, water, or electricity, or systems that operate continuously 24 hours a day
- Other systems that require a similar high degree of safety

- Never use the product for an application involving serious risk to life or property without first ensuring that the system is designed to secure the required level of safety with risk warnings and redundancy, and that the YASKAWA product is properly rated and installed.
- The circuit examples and other application examples described in product catalogs and manuals are for reference. Check the functionality and safety of the actual devices and equipment to be used before using the product.
- Read and understand all use prohibitions and precautions, and operate the YASKAWA product correctly to prevent accidental harm to third parties.

Specifications Change

The names, specifications, appearance, and accessories of products in product catalogs and manuals may be changed at any time based on improvements and other reasons. The next editions of the revised catalogs or manuals will be published with updated code numbers. Consult with your YASKAWA representative to confirm the actual specifications before purchasing a product.

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04/2024

YEU_MuC_Sigma7_200V_Cat_EN_v5

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