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
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
000	
F82*7	Application function option for special motors, SGM7D motor drive

Note: 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.

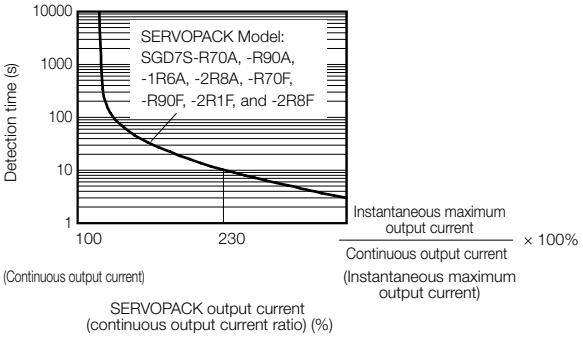
Note: Readily available up to 1.5 kW. Others available on request.

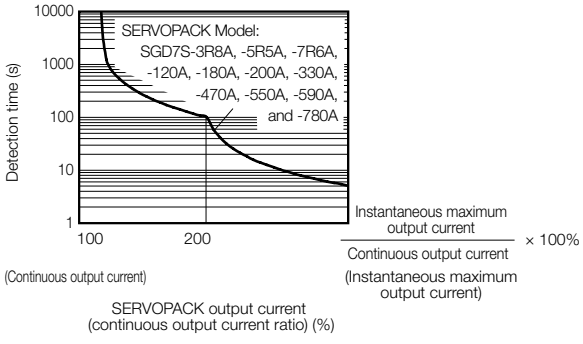
Model SGD7S-			470A	550A	590A	780A
Maximum Applicable Motor Capacity [kW]			6.0	7.5	11	15
Continuous Output Current [A]			46.9	54.7	58.6	78.0
Instantaneous Maximum Output Current [A]			110	130	140	170
Main Circuit	Power Supply		200 VAC to 240 VAC, -15% to +10%, 50 Hz/60 Hz			
	Input Current [A]*1		29	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 USB 2.0 standard (12 Mbps).
Displays/ Indicators			CHARGE indicator and five-digit seven-segment display
Panel Operator			Four push switches
Analog Monitor (CN5)			Number of points: 2 Output voltage range: ±10 VDC (effective linearity range: ±8 V) Resolution: 16 bits Accuracy: ±20 mV (Typ) Maximum output current: ±10 mA Settling time (±1%): 1.2 ms (Typ)
Dynamic Brake (DB)			Activated when a servo alarm or overtravel (OT) occurs, or when the power supply to the main circuit or servo is OFF.
Regenerative Processing			Built-in (An external resistor must be connected to the SGD7S-470A to -780A.) Refer to Built-In Regenerative Resistor.
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:

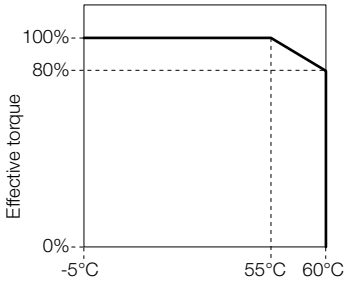
$$\text{Coefficient of speed fluctuation} = \frac{\text{No-load motor speed - Total-load motor speed}}{\text{Rated motor speed}} \times 100\%$$

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

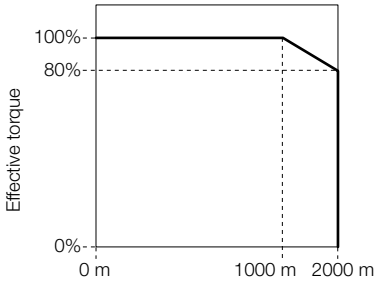
Derating Specifications

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.

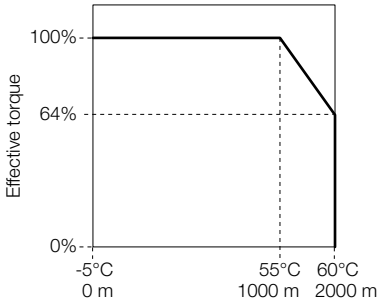
SGD7S-R70A, -R90A, -1R6A, -2R8A, -R70F, -R90F, -2R1F, and -2R8F



Surrounding air temperature

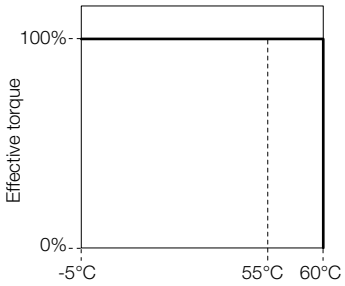


Altitude

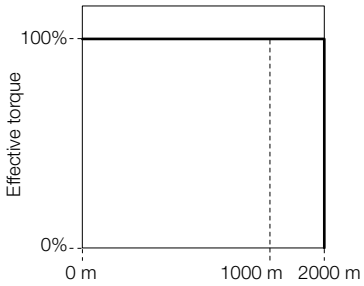


Surrounding air temperature and altitude

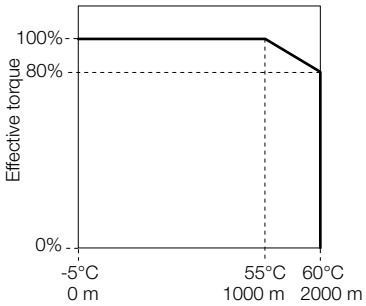
SGD7S-3R8A, -5R5A, -7R6A, -120A, -180A, -200A, -330A, -470A, -550A, -590A, and -780A



Surrounding air temperature



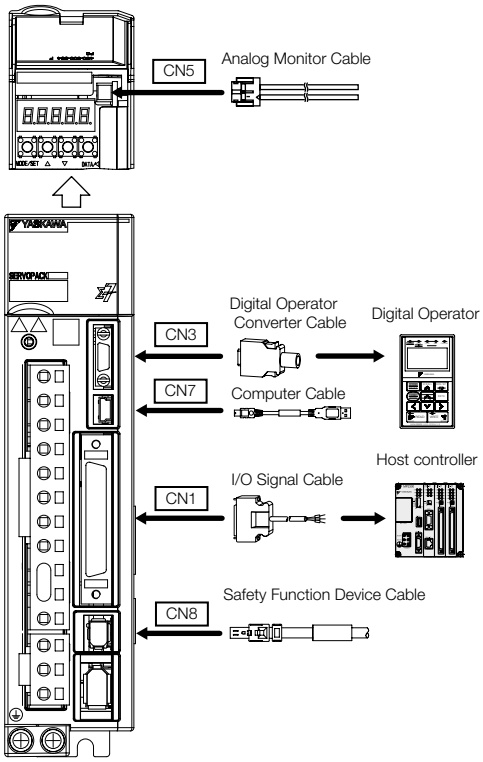
Altitude



Surrounding air temperature and altitude

Selecting Cables SGD7S Analog Voltage/Pulse Train

System Configurations



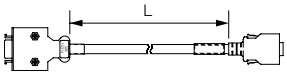
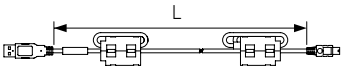
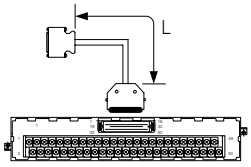
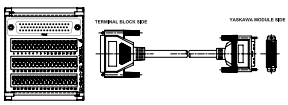
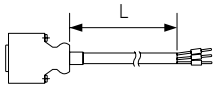
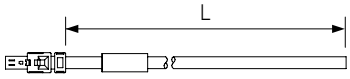
Selection Table

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.

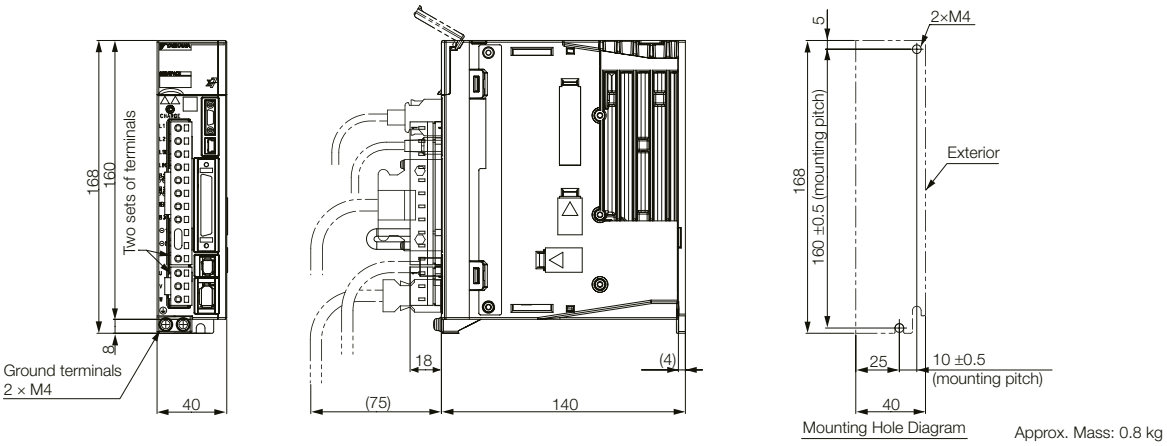
DC Power Supply Wires for Sigma-7S SERVOPACKs

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.

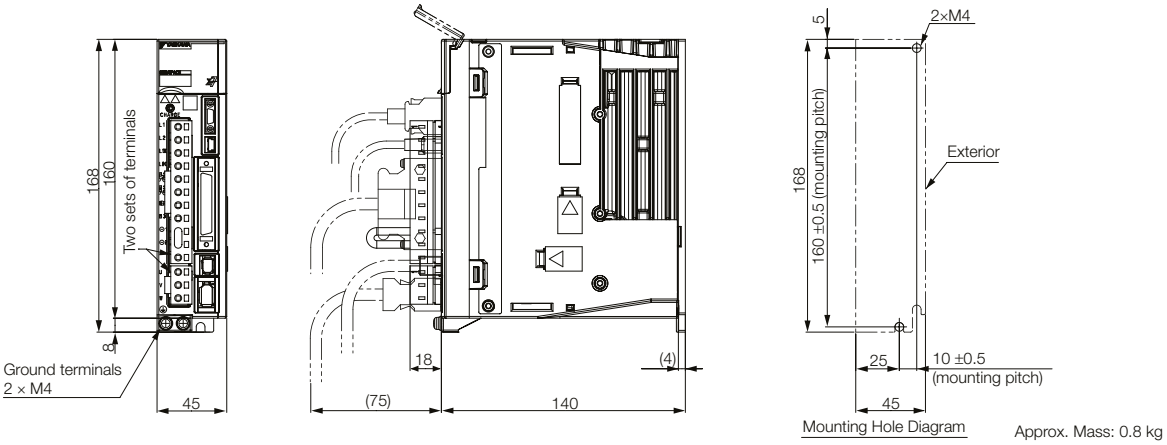
SERVOPACK External Dimensions

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



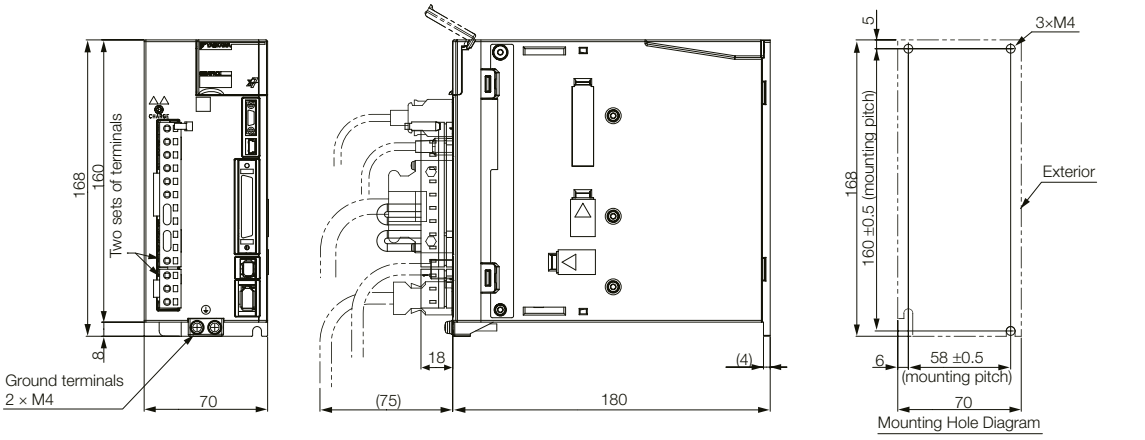
Approx. Mass: 0.8 kg
Unit: mm

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



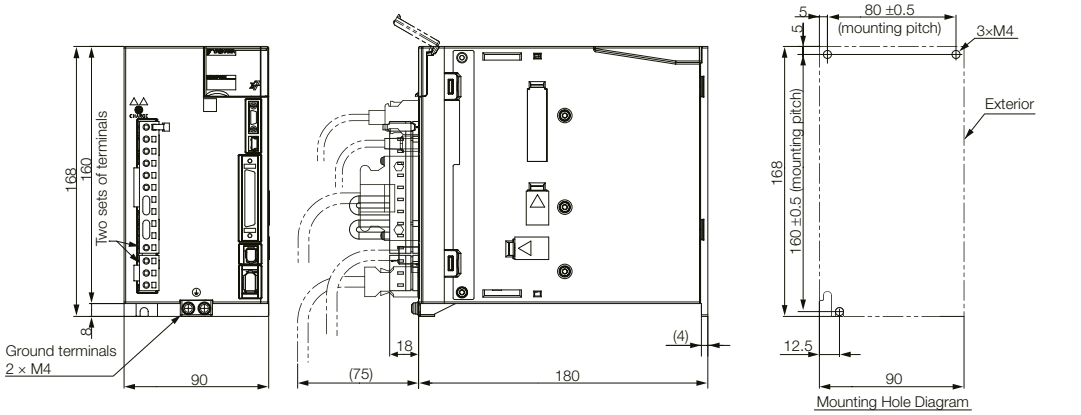
Approx. Mass: 0.8 kg
Unit: mm

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



Approx. Mass: 1.6 kg

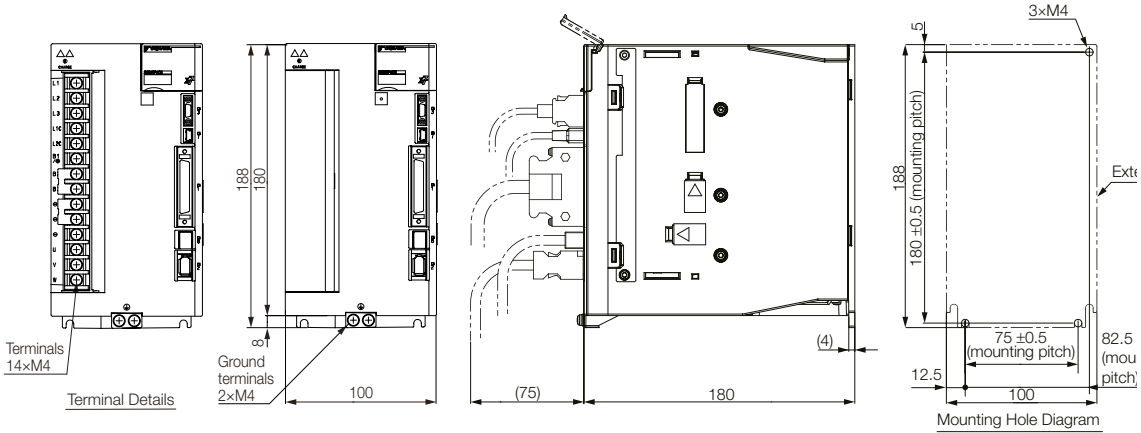
Three-phase & Single-phase, 200 VAC: SGD7S-120A



Approx. Mass: 2.2 kg

Unit: mm

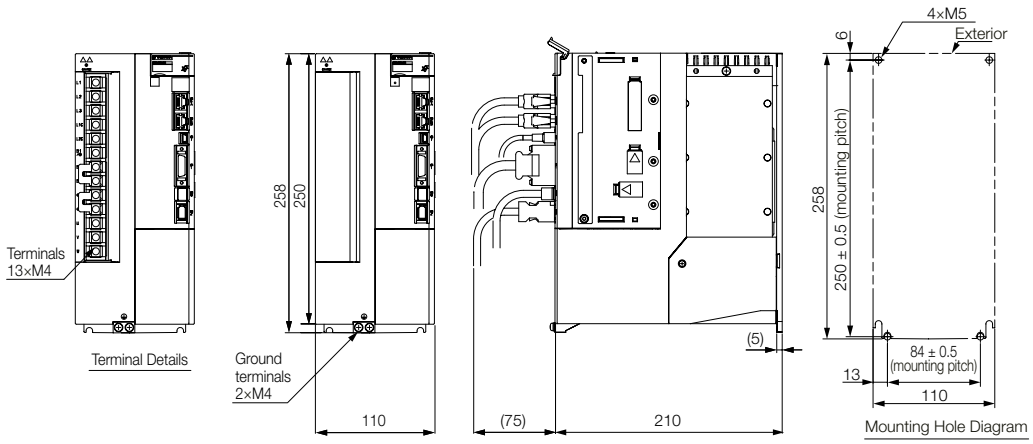
Three-phase, 200 VAC: SGD7S-180A and -200A



Approx. Mass: 2.7

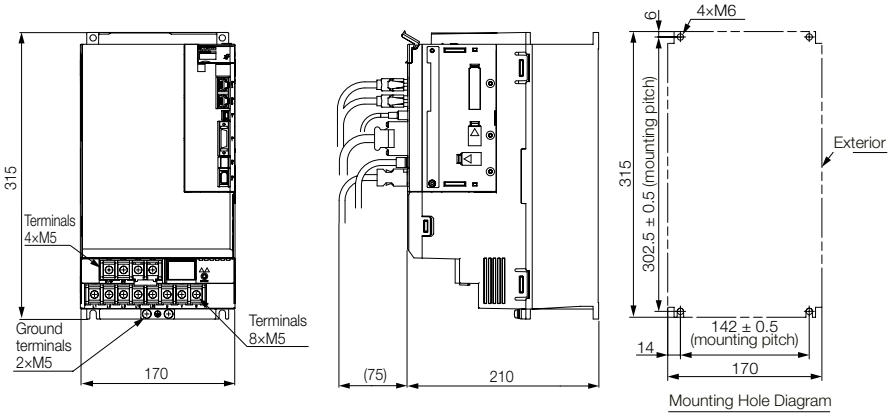
Unit: r

Three-phase, 200 VAC: SGD7S-330A



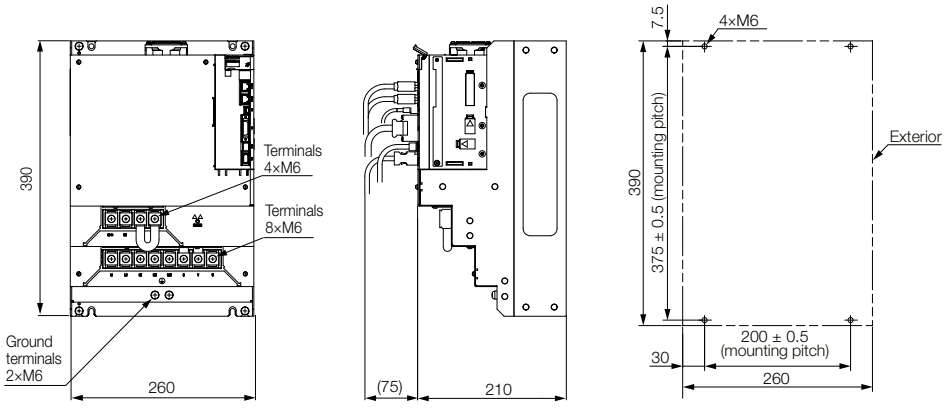
Approx. Mass: 4.4 kg

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
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
000	
F82*7	Application function option for special motors, SGM7D motor drive

Note: 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

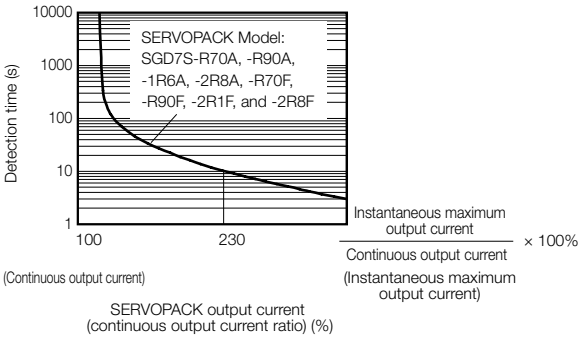
Model SGD7S-			470A	550A	590A	780A
Maximum Applicable Motor Capacity [kW]			6.0	7.5	11	15
Continuous Output Current [A]			46.9	54.7	58.6	78.0
Instantaneous Maximum Output Current [A]			110	130	140	170
Main Circuit	Power Supply		200 VAC to 240 VAC, -15% to +10%, 50 Hz/60 Hz			
	Input Current [A]*1		29	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			

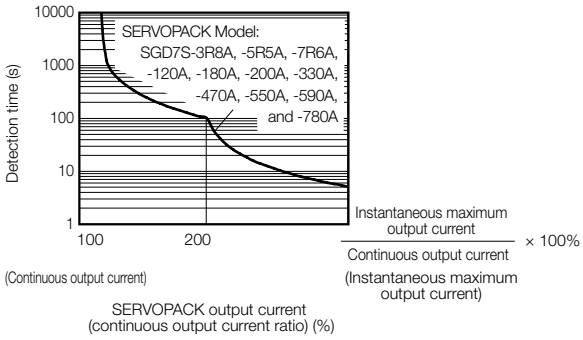
Note: Readily available up to 1.5 kW. Others available on request.

*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:

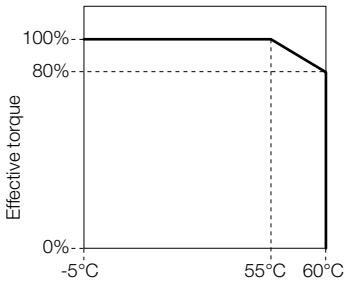
$$\text{Coefficient of speed fluctuation} = \frac{\text{No-load motor speed - Total-load motor speed}}{\text{Rated motor speed}} \times 100\%$$

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

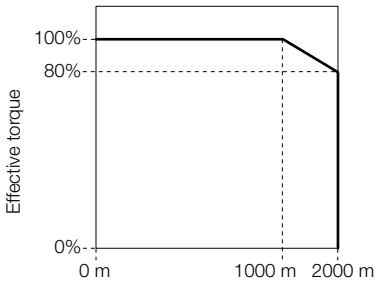
Derating Specifications

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.

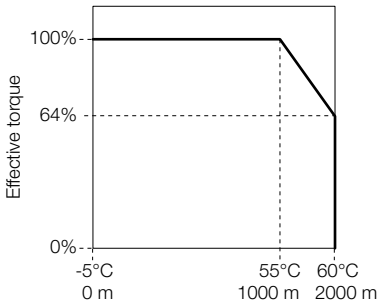
SGD7S-R70A, -R90A, -1R6A, -2R8A, -R70F, -R90F, -2R1F, and -2R8F



Surrounding air temperature

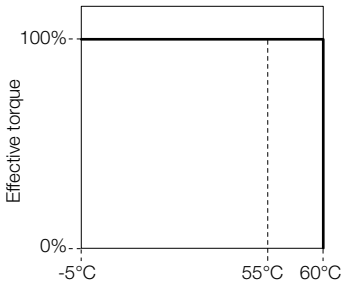


Altitude

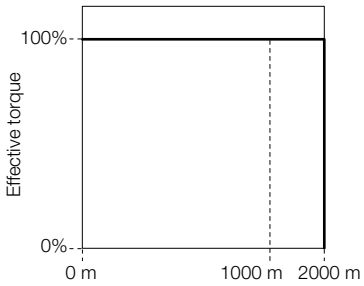


Surrounding air temperature and altitude

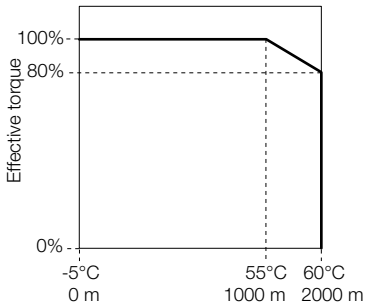
SGD7S-3R8A, -5R5A, -7R6A, -120A, -180A, -200A, -330A, -470A, -550A, -590A, and -780A



Surrounding air temperature



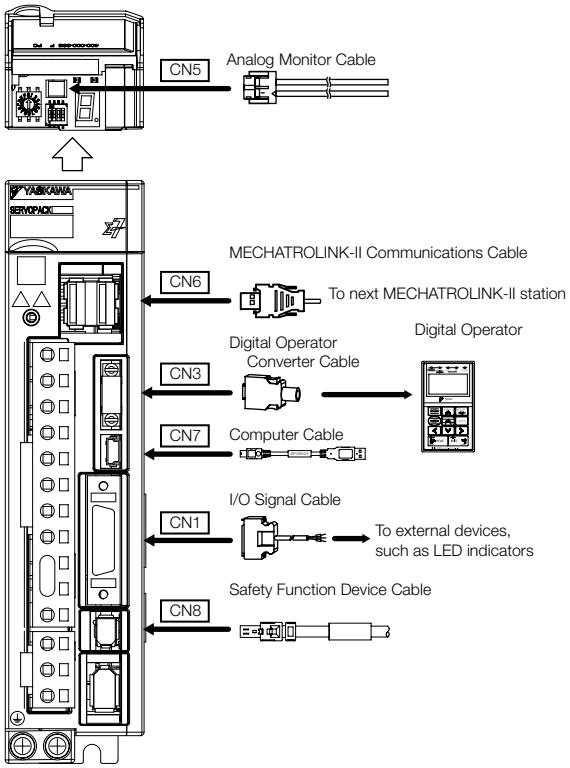
Altitude



Surrounding air temperature and altitude

Selecting Cables SGD7S MECHATROLINK-II

System Configurations



Selection Table

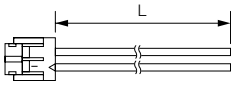
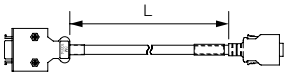
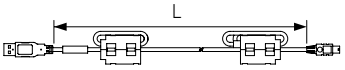
Important

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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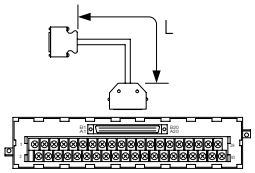
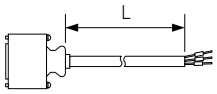
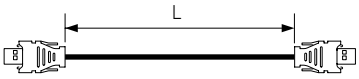
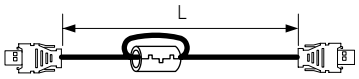
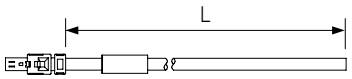
Code	Description		Length	Order Number	Appearance
CN1	I/O Signal Cables	Soldered Connector Kit		JZSP-CSI9-2-E	
		Connector-Terminal Block Converter Unit (with cable)	0.5 m	JUSP-TA26P-E	
			1 m	JUSP-TA26P-1-E	
			2 m	JUSP-TA26P-2-E	
		Cable with Loose Wires at One End (loose wires on peripheral device 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.

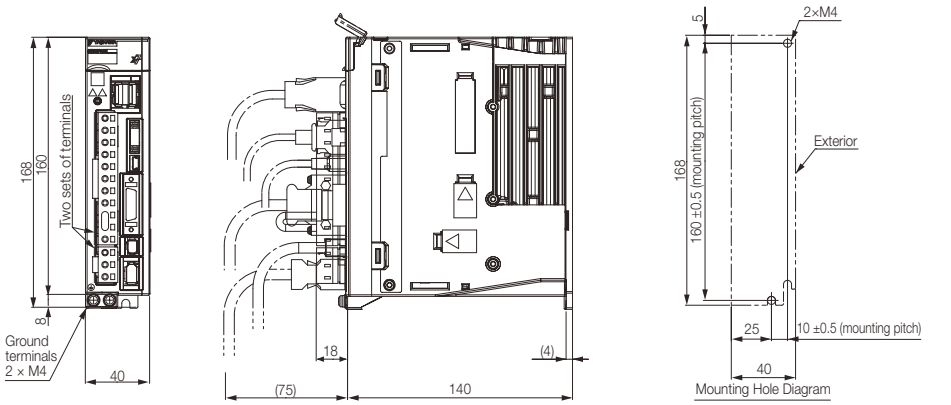
DC Power Supply Wires for Sigma-7S SERVOPACKs

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.

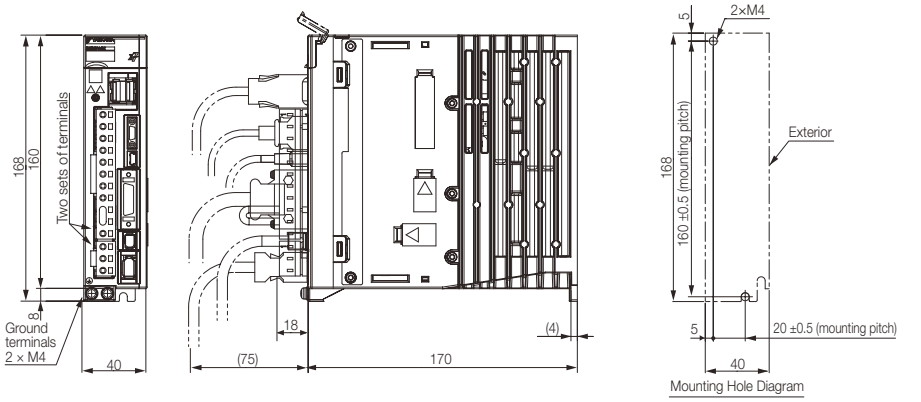
SERVOPACK External Dimensions

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



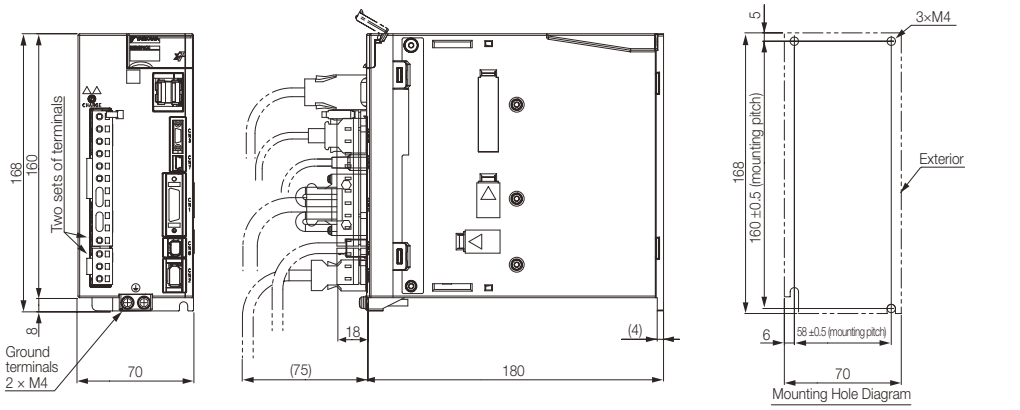
Approx. mass: 0.8 kg
Unit: mm

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



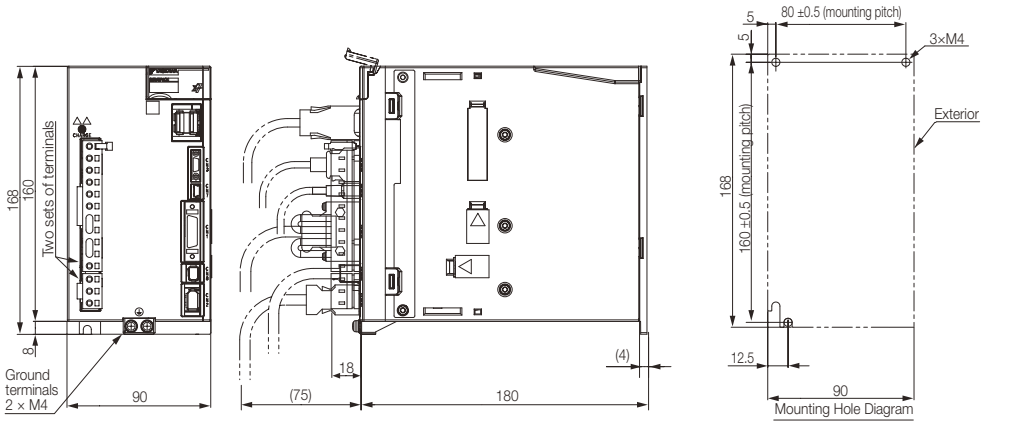
Approx. mass: 1.0 kg
Unit: mm

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



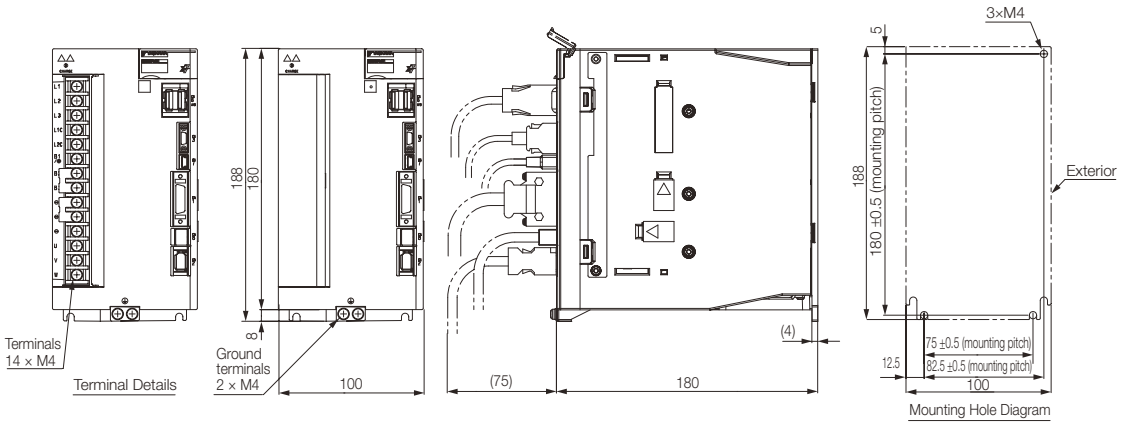
Approx. mass: 1.6 kg
Unit: mm

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



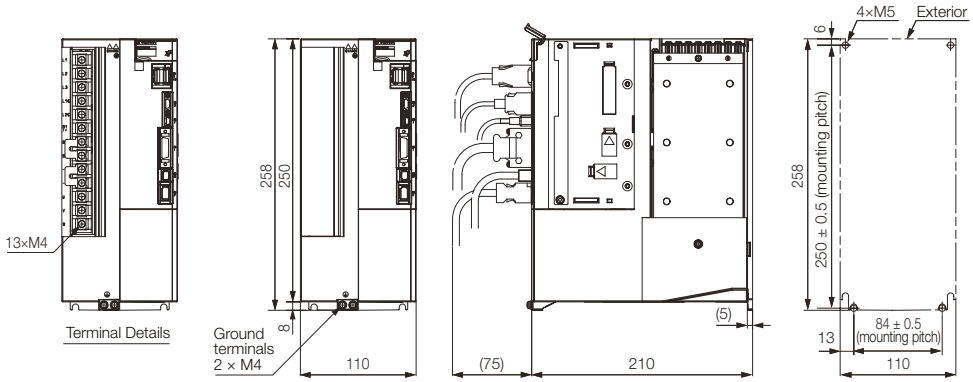
Approx. mass: 2.2 kg
Unit: mm

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



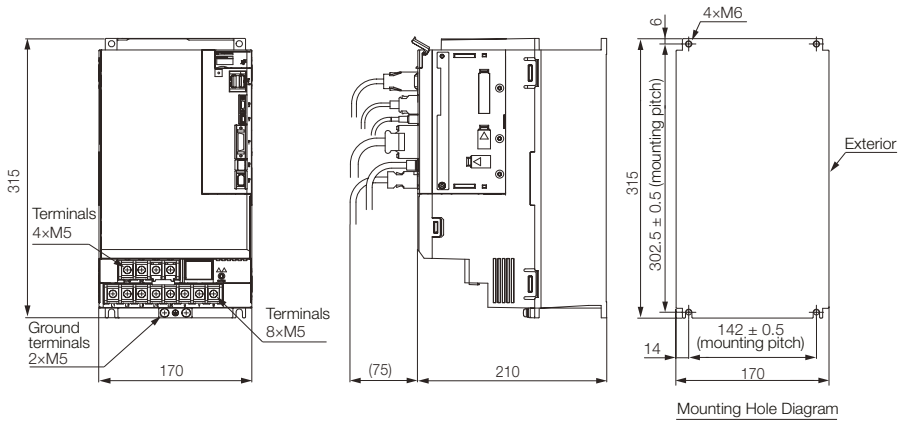
Approx. mass: 2.7 kg
Unit: mm

Three-phase, 200 VAC: SGD7S-330A



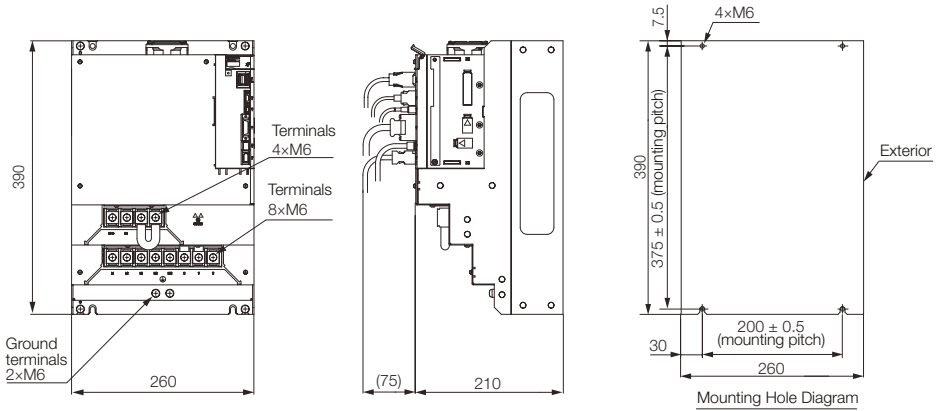
Approx. Mass: 4.4 kg
Unit: mm

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
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
000	
F82*7	Application function option for special motors, SGM7D motor drive

Note: 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

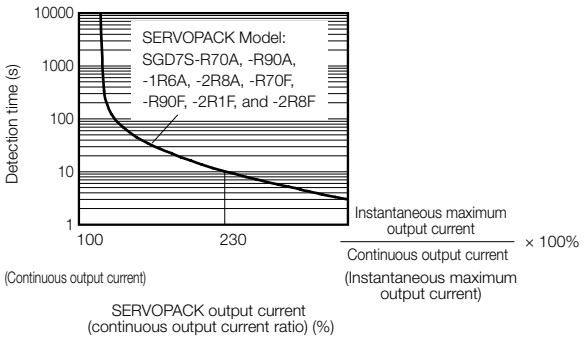
Model SGD7S-			470A	550A	590A	780A
Maximum Applicable Motor Capacity [kW]			6.0	7.5	11	15
Continuous Output Current [A]			46.9	54.7	58.6	78.0
Instantaneous Maximum Output Current [A]			110	130	140	170
Main Circuit	Power Supply		200 VAC to 240 VAC, -15% to +10%, 50 Hz/60 Hz			
	Input Current [A]*1		29	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			

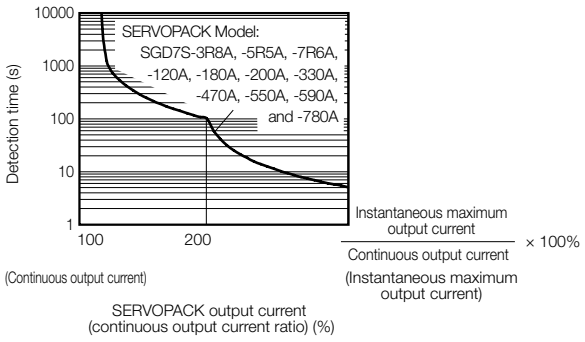
*1. This is the net value at the rated load.
*2. This value is for the optional JUSP-RA04-E Regenerative Resistor Unit.
*3. This value is for the optional JUSP-RA05-E Regenerative Resistor Unit.

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:

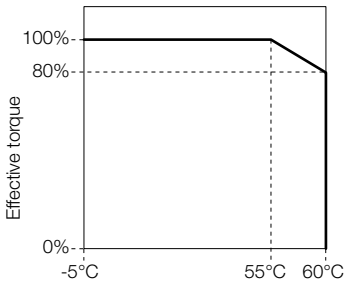
$$\text{Coefficient of speed fluctuation} = \frac{\text{No-load motor speed - Total-load motor speed}}{\text{Rated motor speed}} \times 100\%$$

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

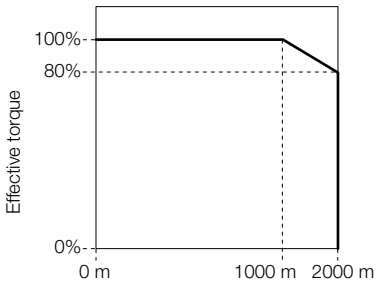
Derating Specifications

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.

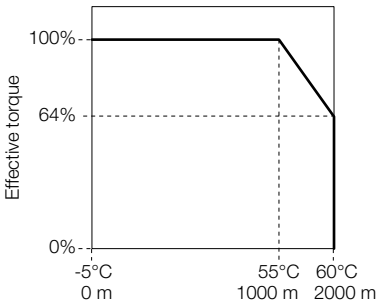
SGD7S-R70A, -R90A, -1R6A, -2R8A, -R70F, -R90F, -2R1F, and -2R8F



Surrounding air temperature

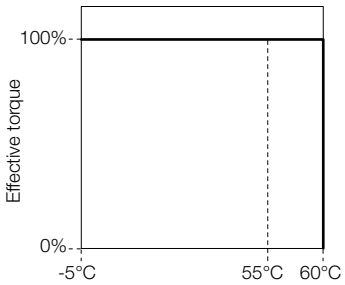


Altitude

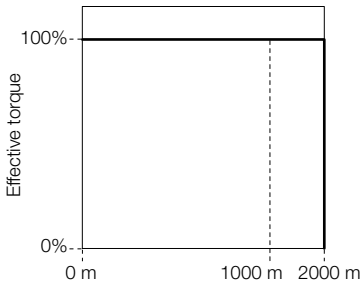


Surrounding air temperature and altitude

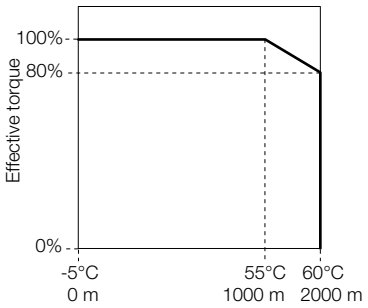
SGD7S-3R8A, -5R5A, -7R6A, -120A, -180A, -200A, -330A, -470A, -550A, -590A, and -780A



Surrounding air temperature



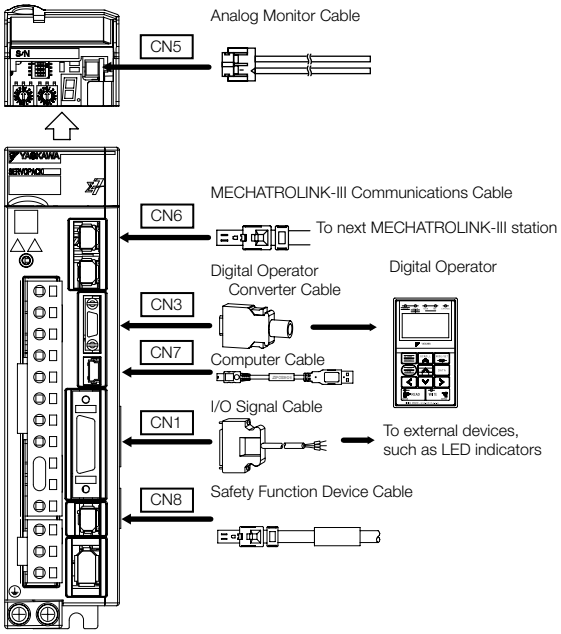
Altitude



Surrounding air temperature and altitude

Selecting Cables SGD7S MECHATROLINK-III

System Configurations



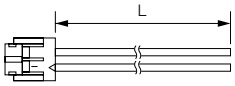
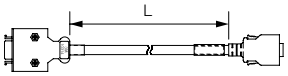
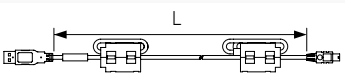
Selection Table

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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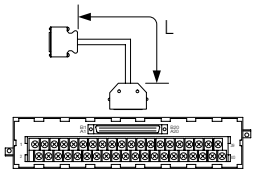
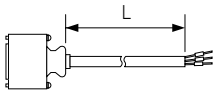
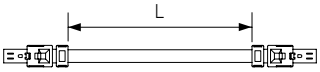
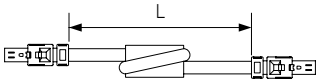
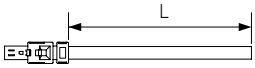
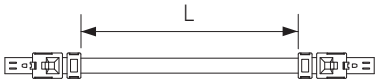
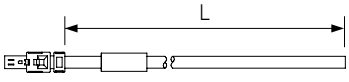
Code	Description		Length	Order Number	Appearance
CN1	I/O Signal Cables	Soldered Connector Kit		JZSP-CSI9-2-E	
		Connector-Terminal Block Converter Unit (with cable)	0.5 m	JUSP-TA26P-E	
			1 m	JUSP-TA26P-1-E	
			2 m	JUSP-TA26P-2-E	
		Cable with Loose Wires at One End (loose wires on peripheral device 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.

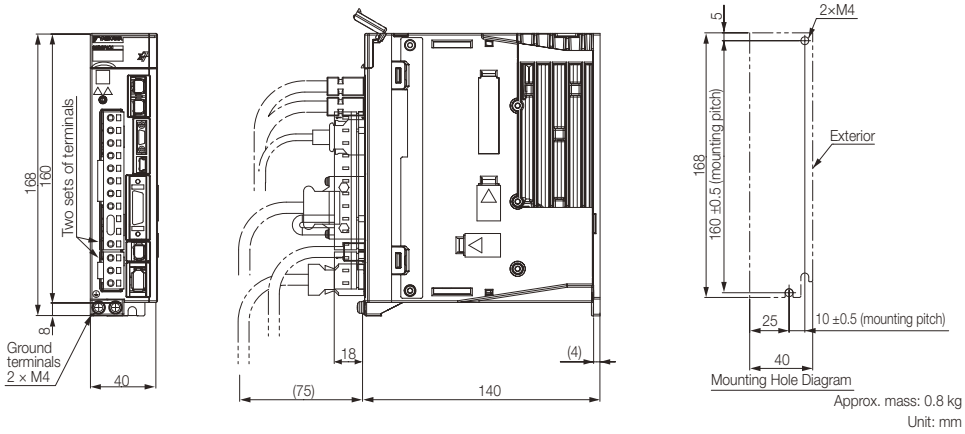
DC Power Supply Wires for Sigma-7S SERVOPACKs

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.

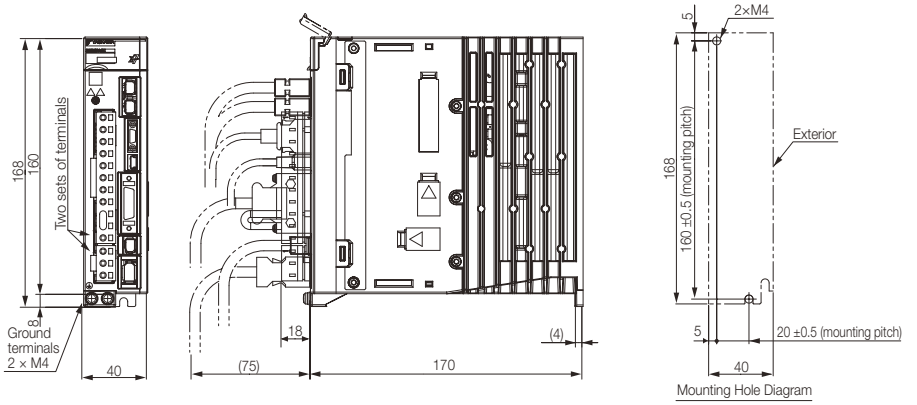
SERVOPACK External Dimensions

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



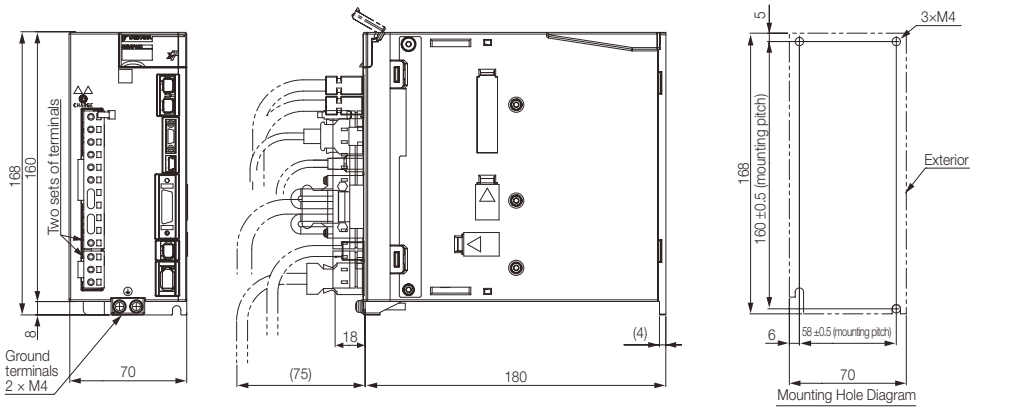
Approx. mass: 0.8 kg
Unit: mm

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



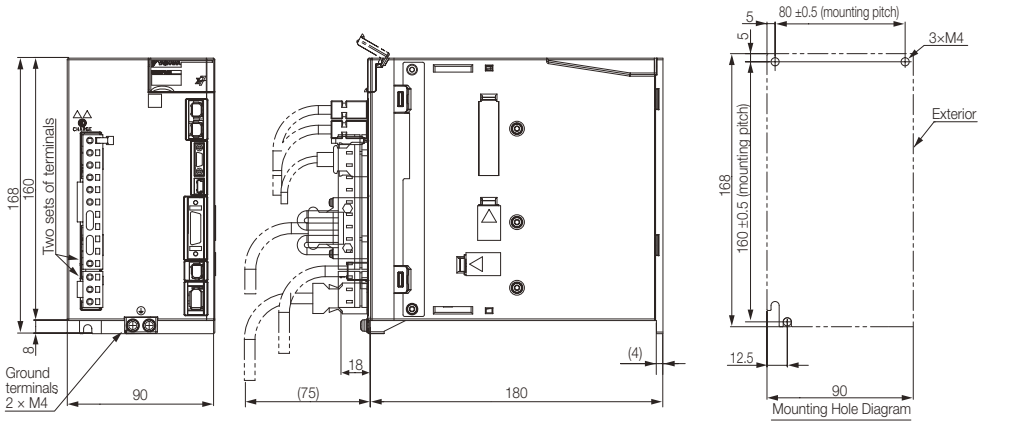
Approx. mass: 1.0 kg
Unit: mm

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



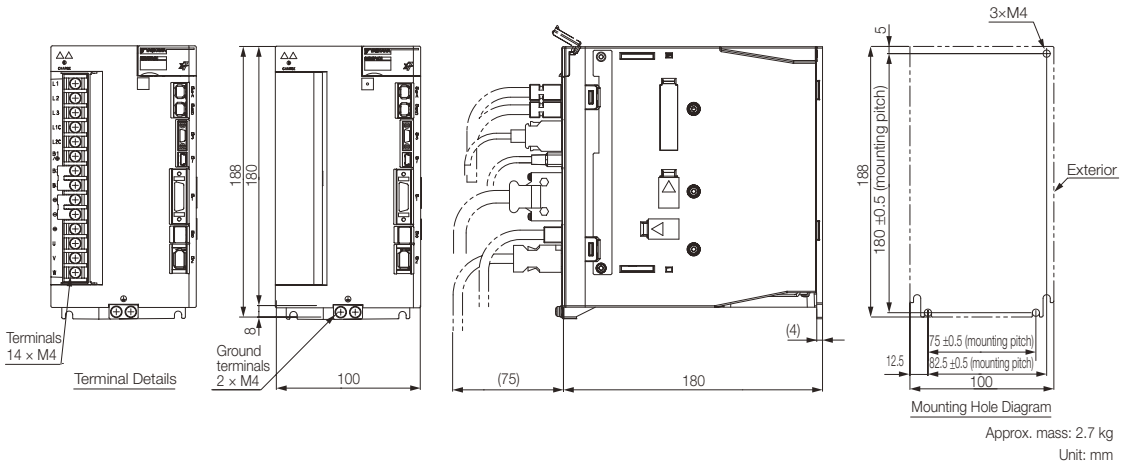
Approx. mass: 1.6 kg
Unit: mm

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



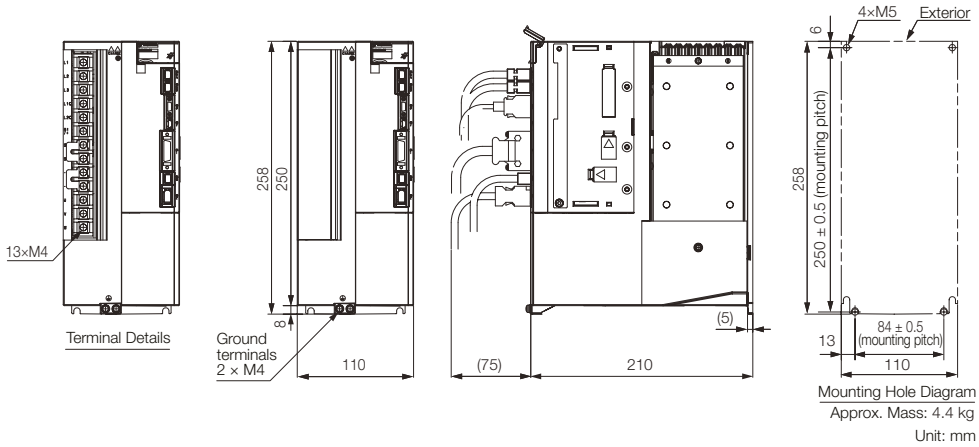
Approx. mass: 2.2 kg
Unit: mm

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



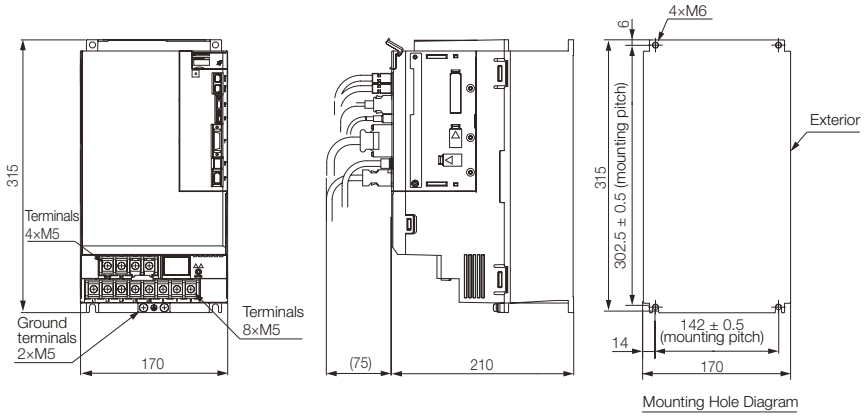
Approx. mass: 2.7 kg
Unit: mm

Three-phase, 200 VAC: SGD7S-330A



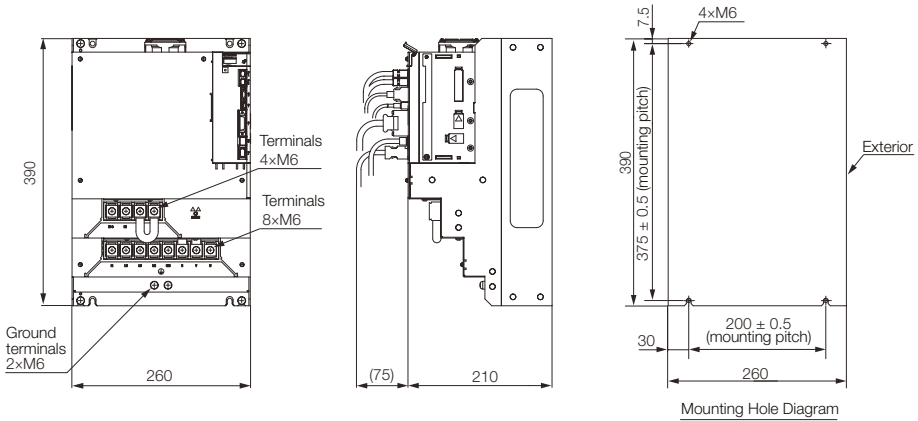
Approx. Mass: 4.4 kg
Unit: mm

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
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
000	
F82*7	Application function option for special motors, SGM7D motor drive

Note: 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

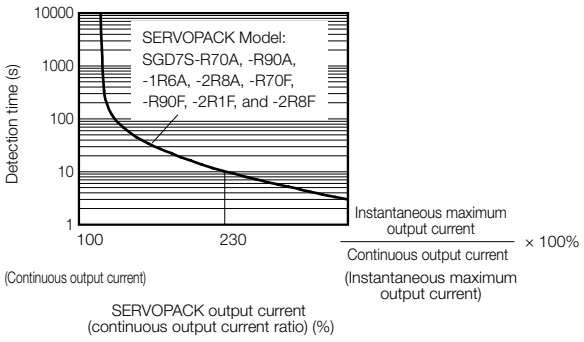
Model SGD7S-			470A	550A	590A	780A
Maximum Applicable Motor Capacity [kW]			6.0	7.5	11	15
Continuous Output Current [A]			46.9	54.7	58.6	78.0
Instantaneous Maximum Output Current [A]			110	130	140	170
Main Circuit	Power Supply		200 VAC to 240 VAC, -15% to +10%, 50 Hz/60 Hz			
	Input Current [A]*1		29	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			

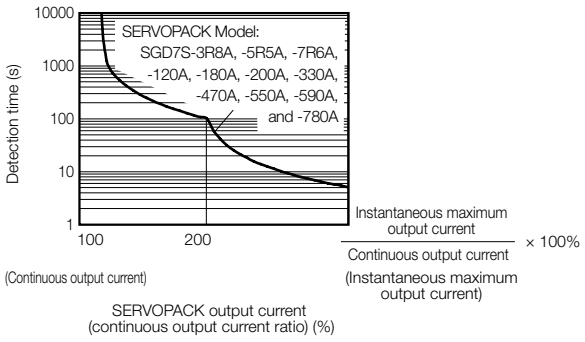
Note: Readily available up to 1.5 kW. Others available on request.

*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	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:

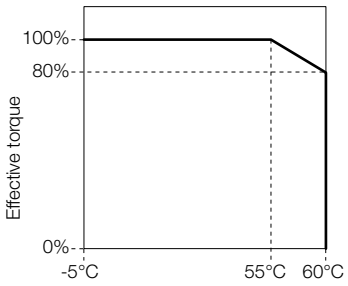
$$\text{Coefficient of speed fluctuation} = \frac{\text{No-load motor speed - Total-load motor speed}}{\text{Rated motor speed}} \times 100\%$$

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

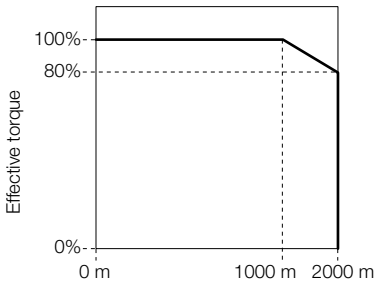
Derating Specifications

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.

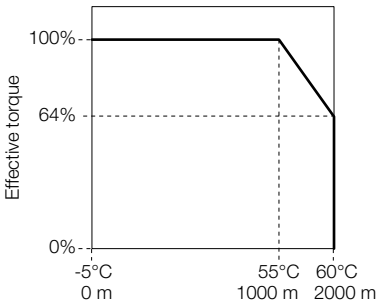
SGD7S-R70A, -R90A, -1R6A, -2R8A, -R70F, -R90F, -2R1F, and -2R8F



Surrounding air temperature

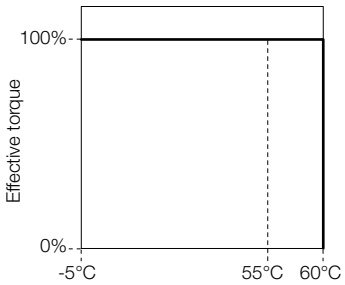


Altitude

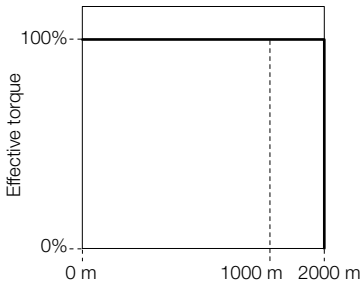


Surrounding air temperature and altitude

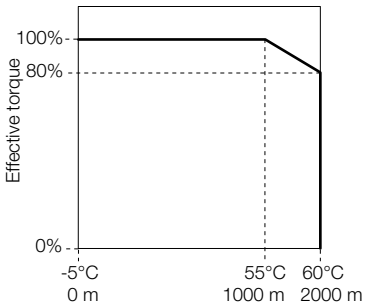
SGD7S-3R8A, -5R5A, -7R6A, -120A, -180A, -200A, -330A, -470A, -550A, -590A, and -780A



Surrounding air temperature



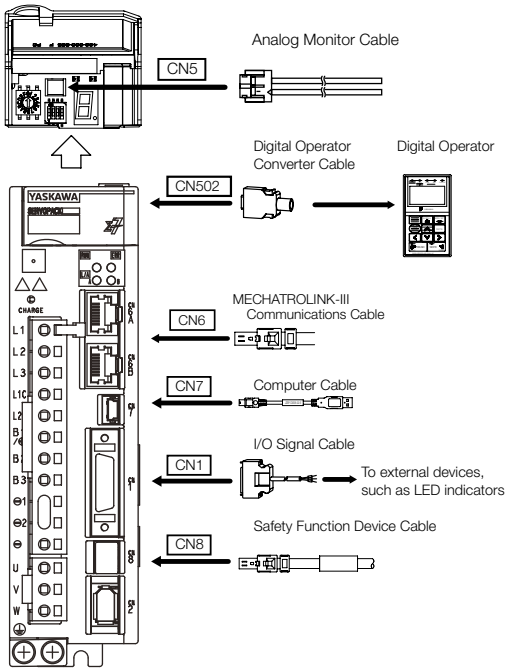
Altitude



Surrounding air temperature and altitude

Selecting Cables SGD7S MECHATROLINK-III with RJ45

System Configurations



Selection Table

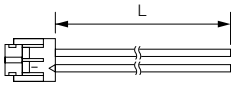
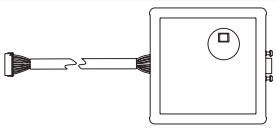
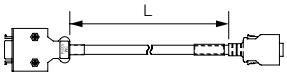
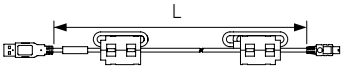
Important

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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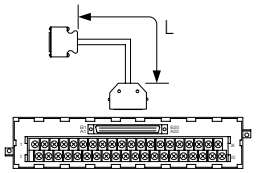
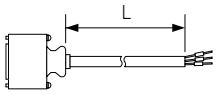
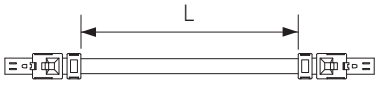
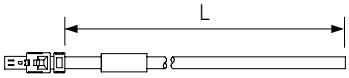
Code	Description		Length	Order Number	Appearance
CN1	I/O Signal Cables	Soldered Connector Kit		JZSP-CSI9-2-E	
		Connector-Terminal Block Converter Unit (with cable)	0.5 m	JUSP-TA26P-E	
			1 m	JUSP-TA26P-1-E	
			2 m	JUSP-TA26P-2-E	
		Cable with Loose Wires at One End (loose wires on peripheral device 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 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.

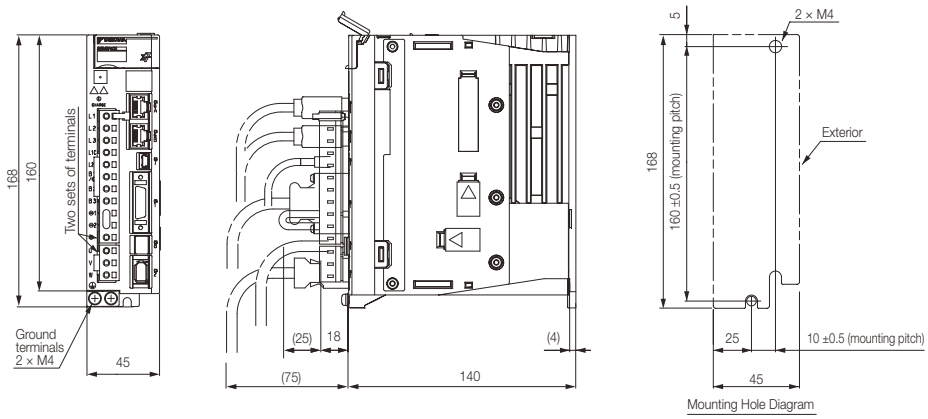
DC Power Supply Wires for Sigma-7S SERVOPACKs

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.

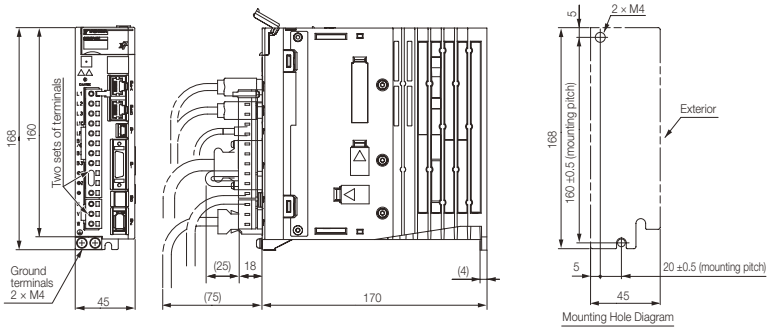
SERVOPACK External Dimensions

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



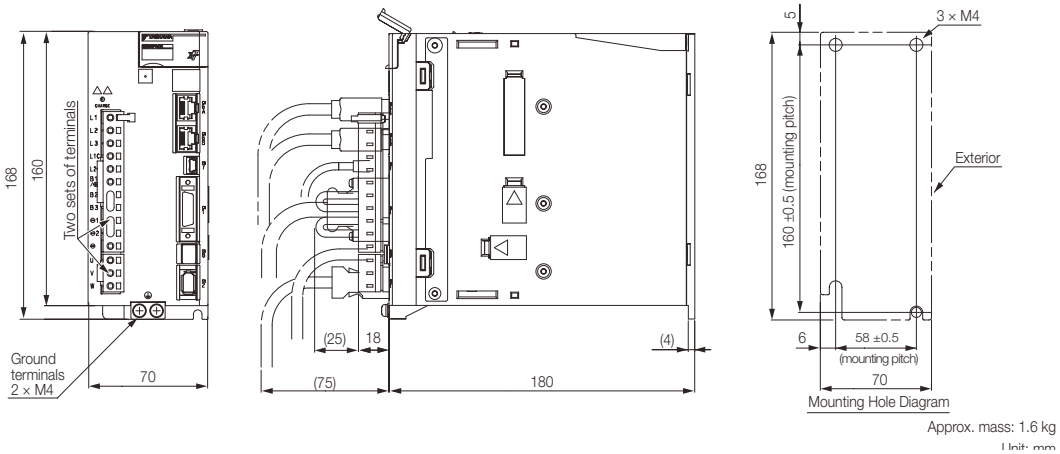
Approx. mass: 0.8 kg
Unit: mm

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



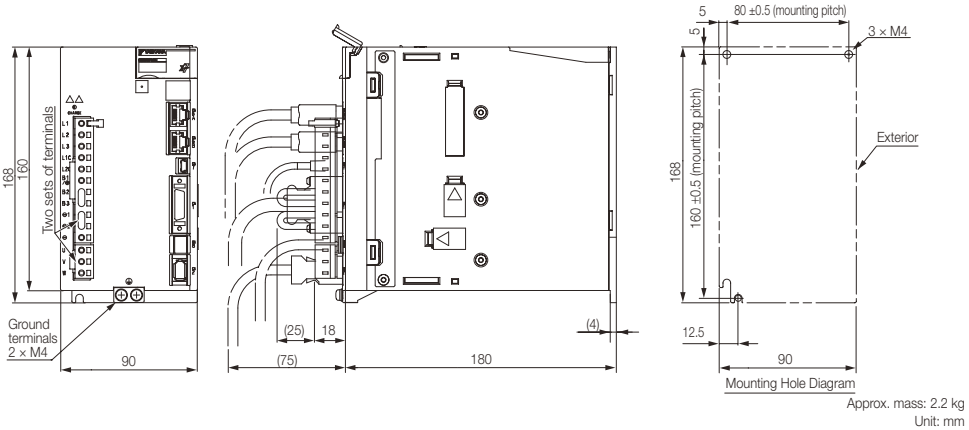
Approx. mass: 1.0 kg
Unit: mm

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



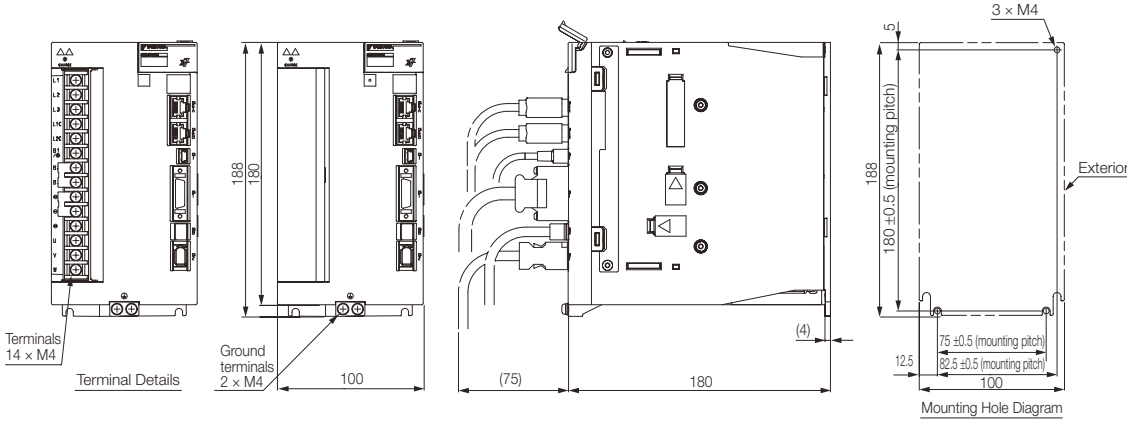
Approx. mass: 1.6 kg
Unit: mm

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



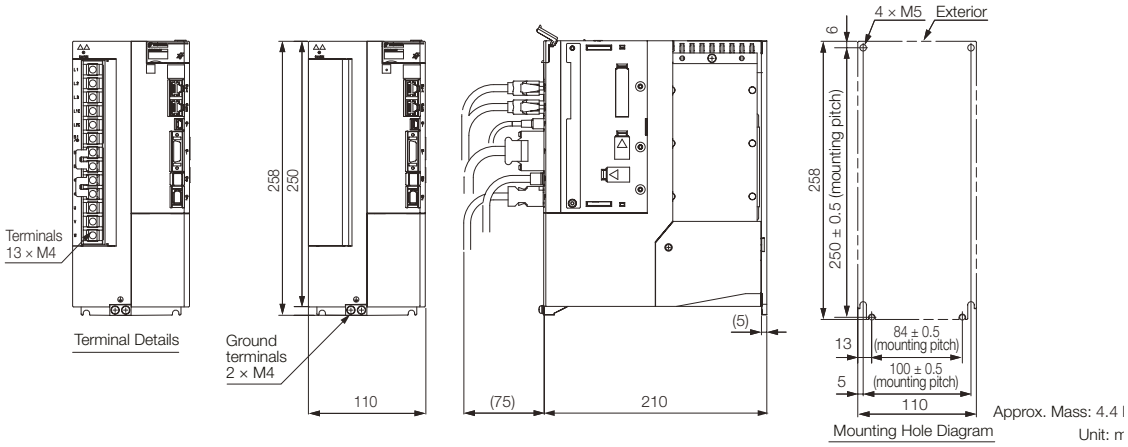
Approx. mass: 2.2 kg
Unit: mm

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

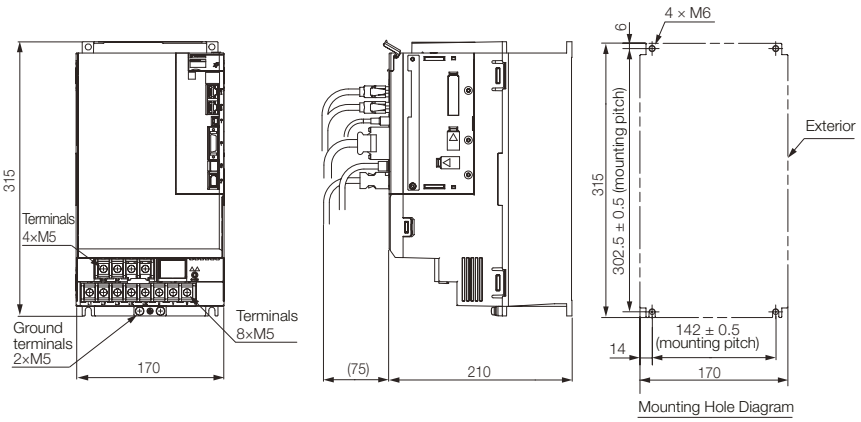


Approx. mass: 2.7 kg
Unit: mm

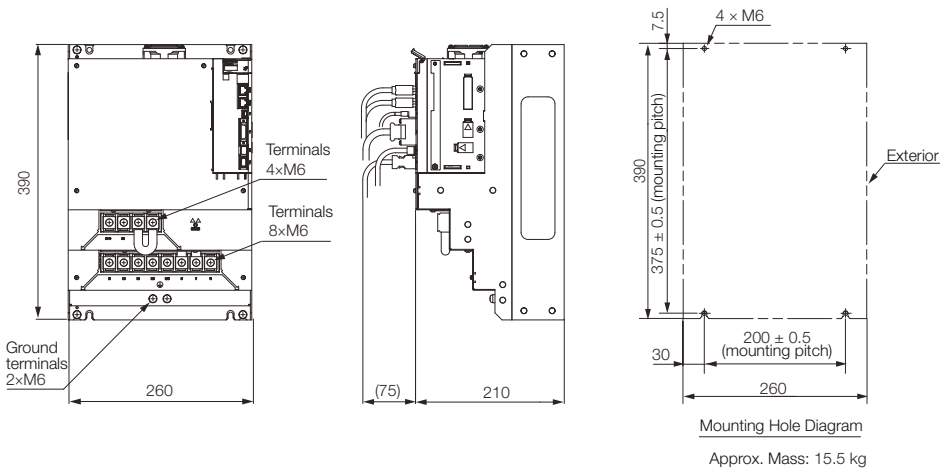
Three-phase, 200 VAC: SGD7S-330A



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



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



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
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
000	
F82	Application Function Option for special motors, SGM7D motor

Note: 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			

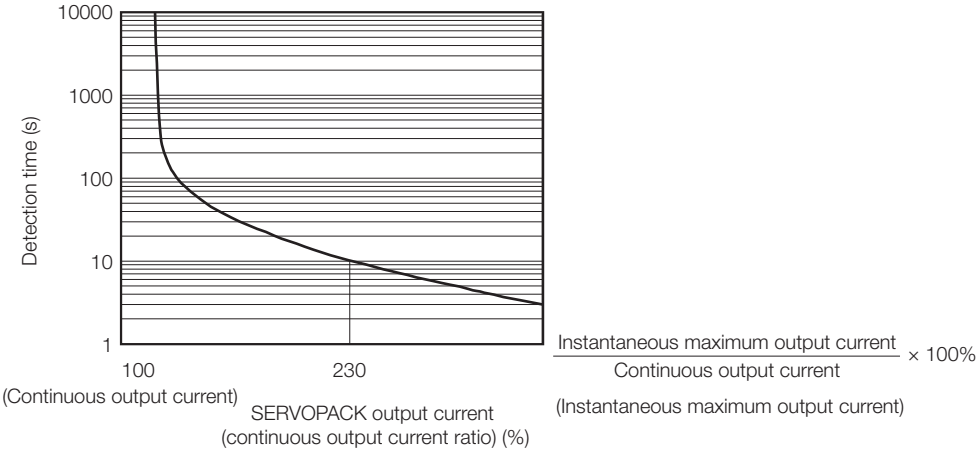
Note: Readily available up to 1.5 kW. Others available on request.

*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

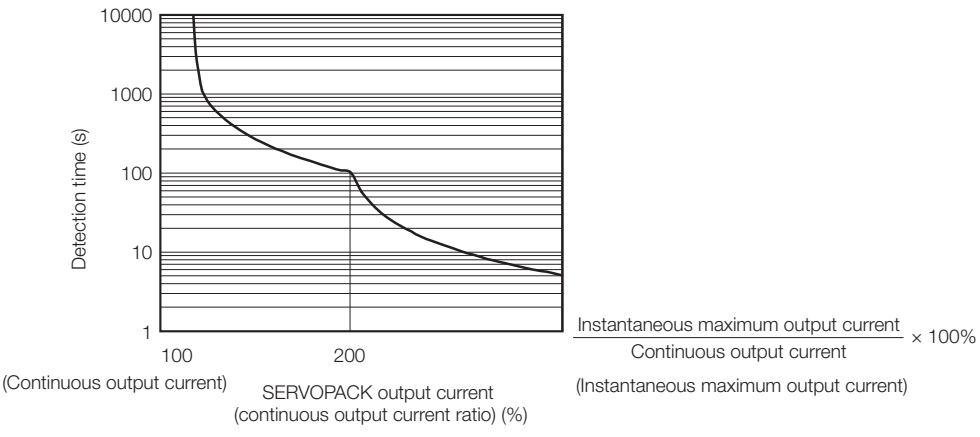
The overload detection level is set for hot start conditions with a SERVOPACK surrounding air temperature of 55°C.
An overload alarm (A.710 or A.720) will occur if overload operation that exceeds the overload protection characteristics shown in the following diagram (i.e., operation on the right side 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:

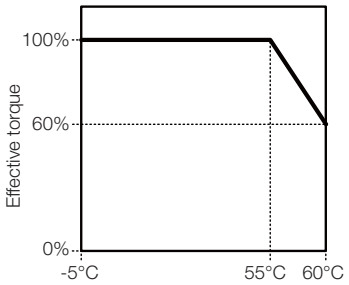
$$\text{Coefficient of speed fluctuation} = \frac{\text{No-load motor speed - Total-load motor speed}}{\text{Rated motor speed}} \times 100\%$$

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

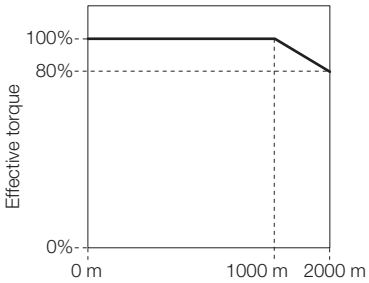
Derating Specifications

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.

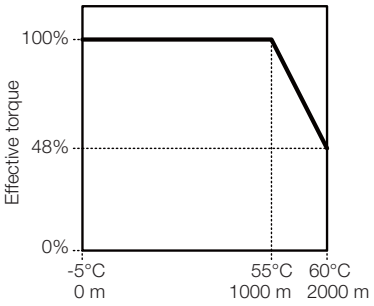
SGD7S-R70A, -R90A, -1R6A, -2R8A, -R70F, -R90F, -2R1F, and -2R8F



Surrounding air temperature

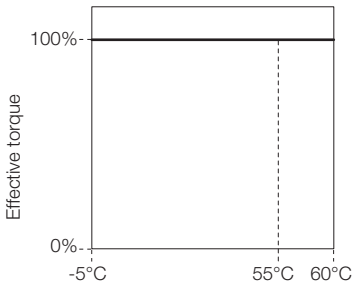


Altitude

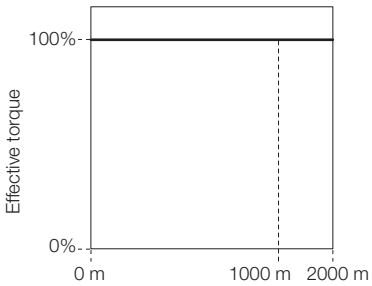


Surrounding air temperature and altitude

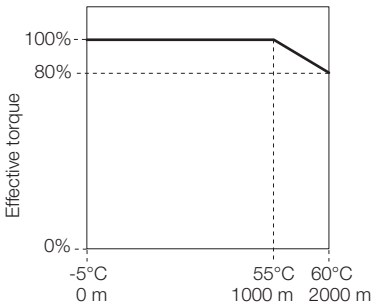
SGD7S-3R8A, -5R5A, -7R6A, -120A, -180A, -200A, -330A, -470A, -550A, -590A, and -780A



Surrounding air temperature



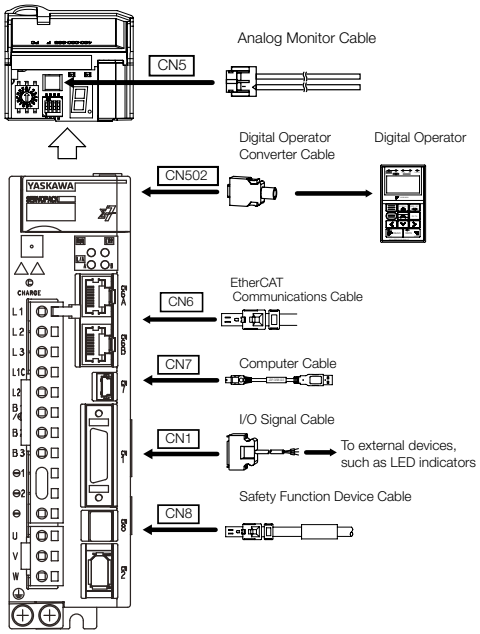
Altitude



Surrounding air temperature and altitude

Selecting Cables SGD7S EtherCAT

System Configurations



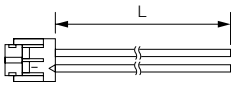
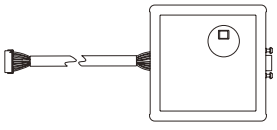
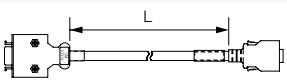
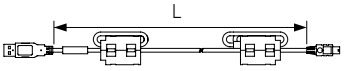
Selection Table

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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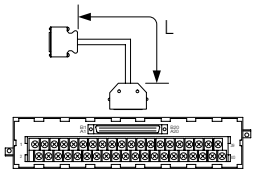
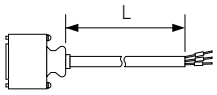
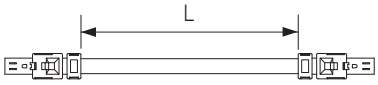
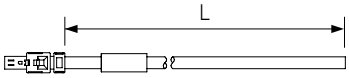
Code	Description		Length	Order Number	Appearance
CN1	I/O Signal Cables	Soldered Connector Kit		JZSP-CSI9-2-E	
		Connector-Terminal Block Converter Unit (with cable)	0.5 m	JUSP-TA26P-E	
			1 m	JUSP-TA26P-1-E	
			2 m	JUSP-TA26P-2-E	
		Cable with Loose Wires at One End (loose wires on peripheral device 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.

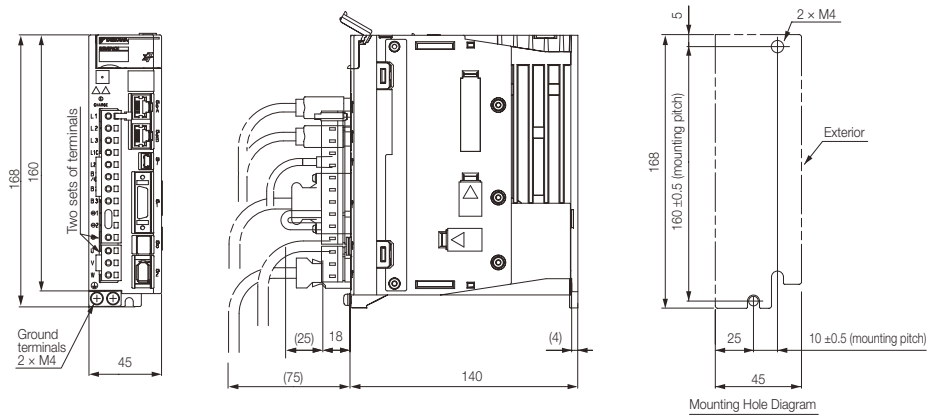
DC Power Supply Wires for Sigma-7S SERVOPACKs

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.

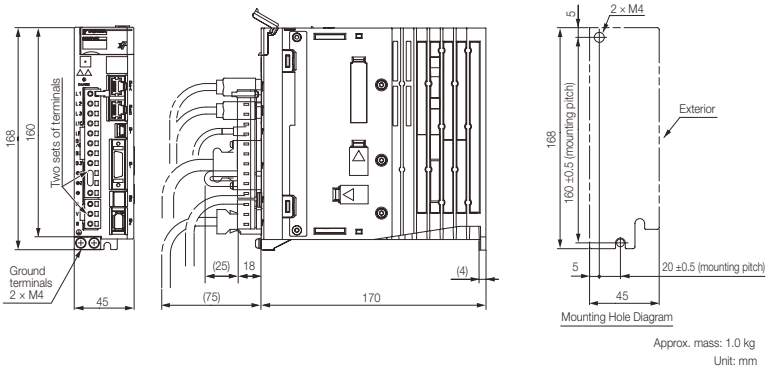
SERVOPACK External Dimensions

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



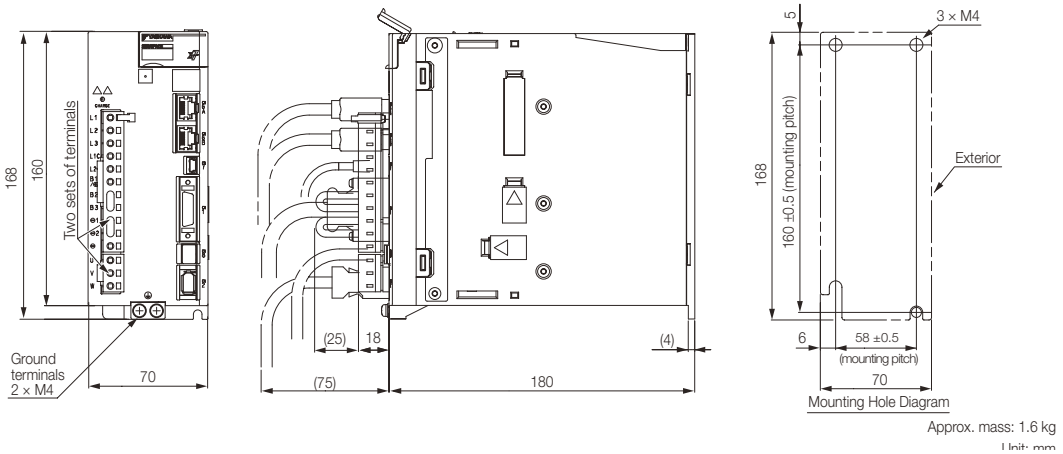
Approx. mass: 0.8 kg
Unit: mm

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



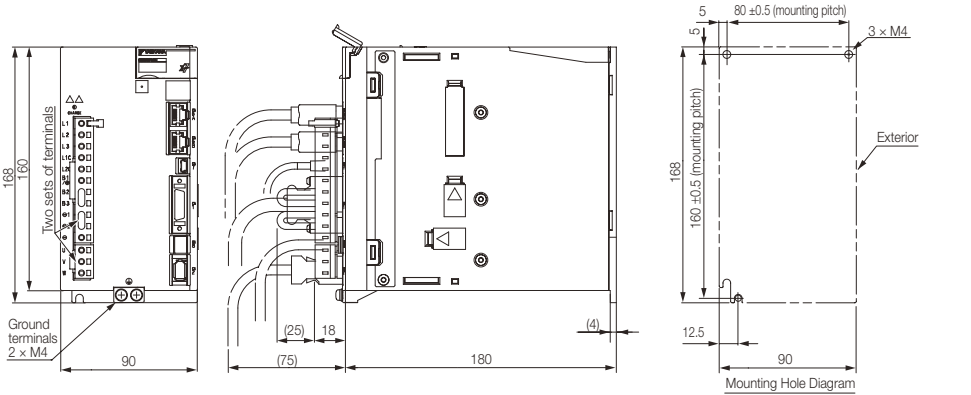
Approx. mass: 1.0 kg
Unit: mm

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



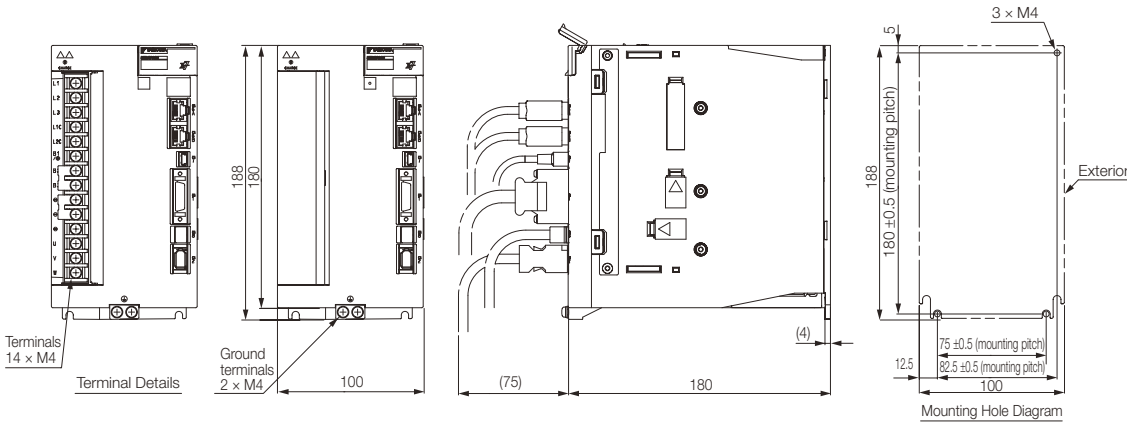
Approx. mass: 1.6 kg
Unit: mm

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



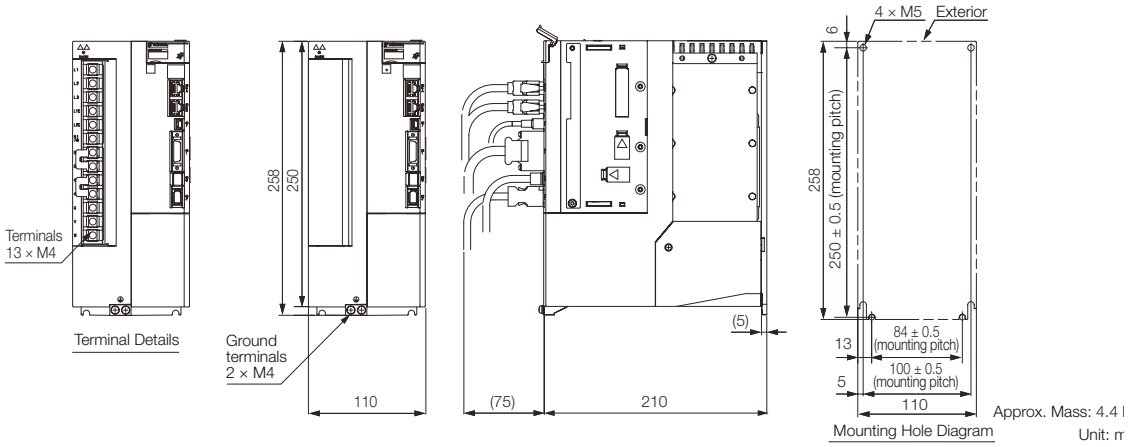
Approx. mass: 2.2 kg
Unit: mm

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

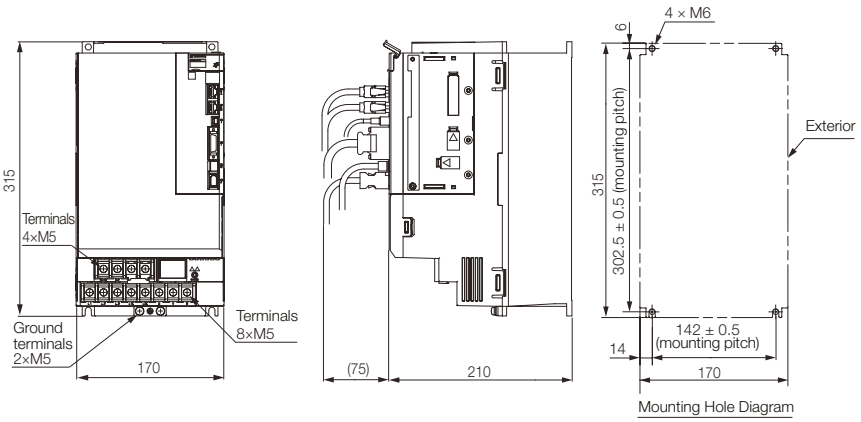


Approx. mass: 2.7 kg
Unit: mm

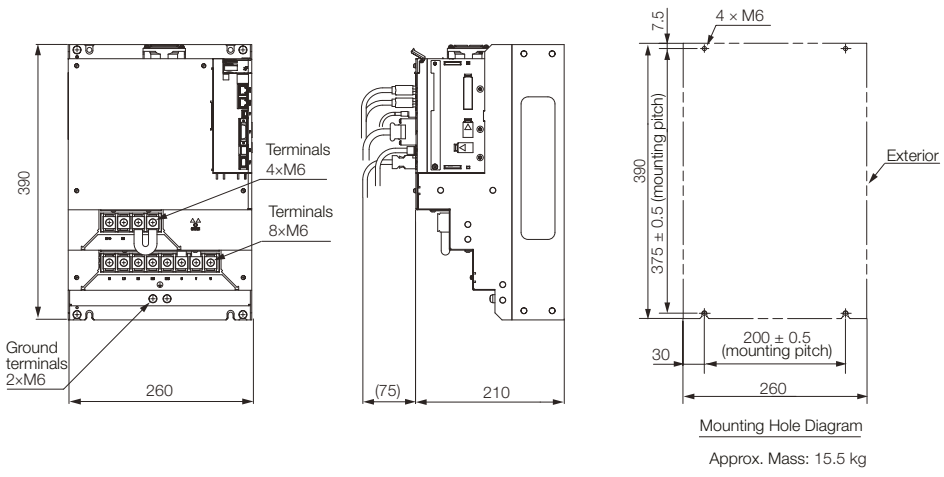
Three-phase, 200 VAC: SGD7S-330A



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



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



Model Designations

SGD7S - R70 A C0 A 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
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

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

Code	Specifications
None	None
000	

Note: 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

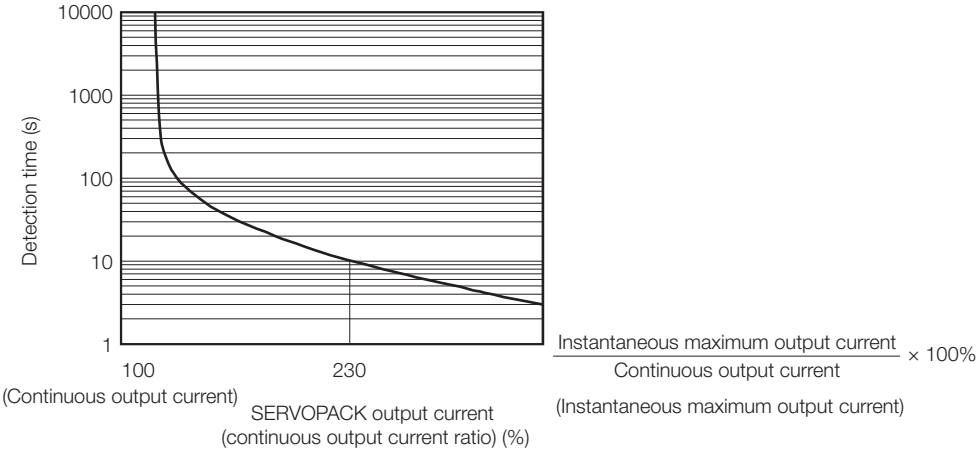
Model SGD7S-			R70A	R90A	1R6A	2R8A	5R5A	120A
Maximum Applicable Motor Capacity [kW]			0.05	0.1	0.2	0.4	0.75	2
Continuous Output Current [A]			0.66	0.91	1.6	2.8	5.5	18.5
Instantaneous Maximum Output Current [A]			2.1	3.2	5.9	9.3	16.9	42
Main Circuit	Power Supply		200 VAC to 240 VAC, -15% to +10%, 50 Hz/60 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

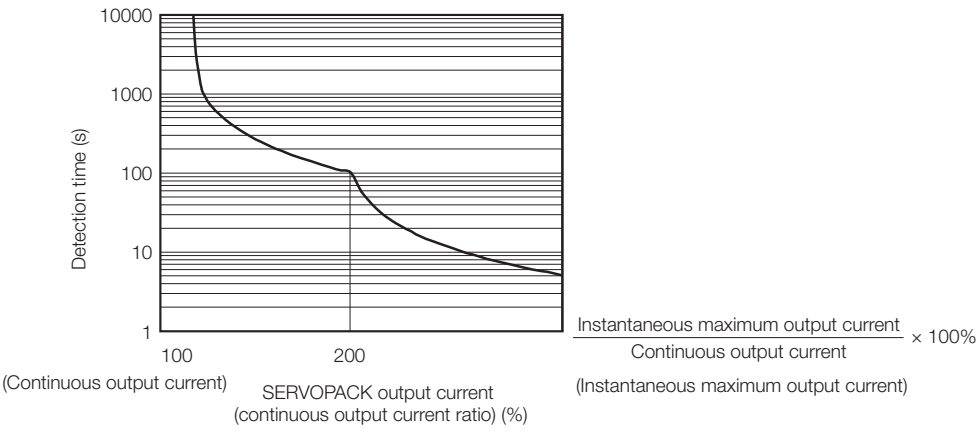
The overload detection level is set for hot start conditions with a SERVOPACK surrounding air temperature of 55°C.
An overload alarm (A.710 or A.720) will occur if overload operation that exceeds the overload protection characteristics shown in the following diagram (i.e., operation on the right side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

Continued on next page.

Continued from previous page.

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:

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

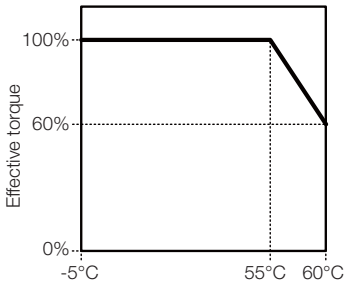
*3. The SGD7S-210D, -260D, -280D, and -370D do not have a dynamic brake (DB). If a dynamic brake is necessary, create an external dynamic brake circuit.

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

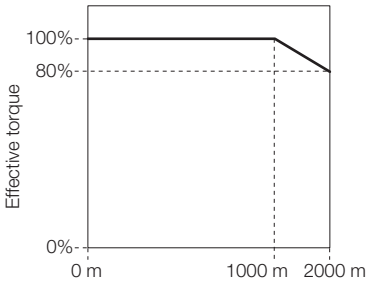
Derating Specifications

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.

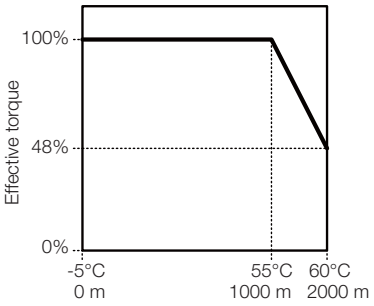
SGD7S-R70A, -R90A, -1R6A, -2R8A



Surrounding air temperature

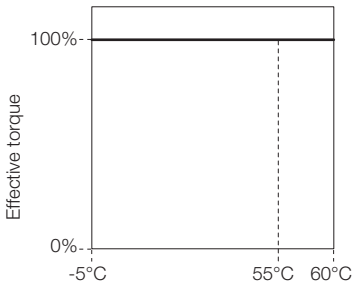


Altitude

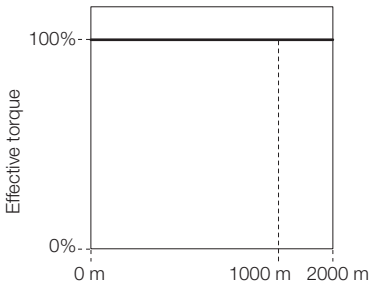


Surrounding air temperature and altitude

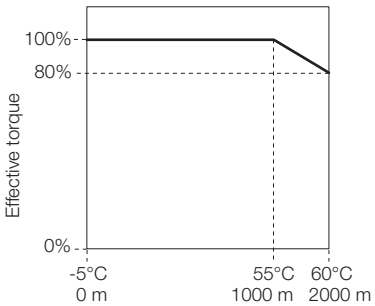
SGD7S-5R5A, -120A



Surrounding air temperature



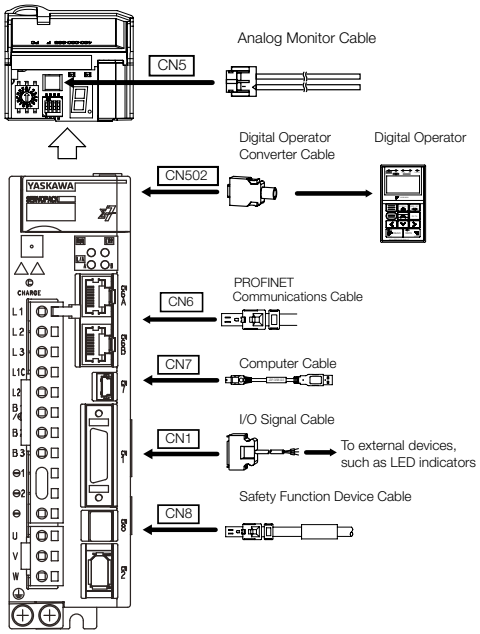
Altitude



Surrounding air temperature and altitude

Selecting Cables SGD7S PROFINET

System Configurations



Selection Table

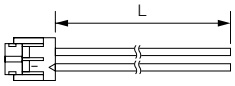
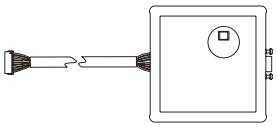
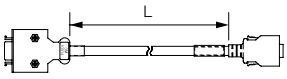
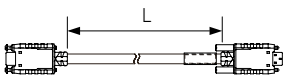
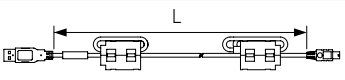
Important

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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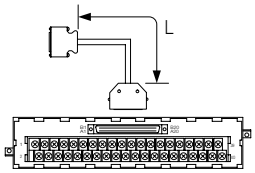
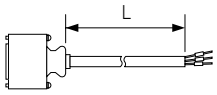
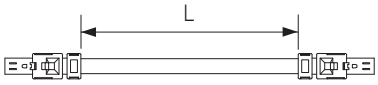
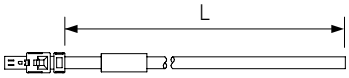
Code	Description		Length	Order Number	Appearance
CN1	I/O Signal Cables	Soldered Connector Kit		JZSP-CSI9-2-E	
		Connector-Terminal Block Converter Unit (with cable)	0.5 m	JUSP-TA26P-E	
			1 m	JUSP-TA26P-1-E	
			2 m	JUSP-TA26P-2-E	
		Cable with Loose Wires at One End (loose wires on peripheral device 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.

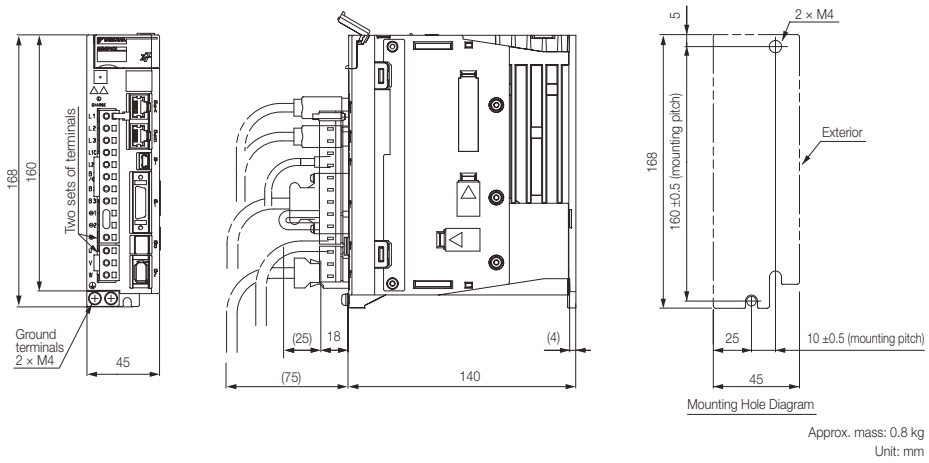
DC Power Supply Wires for Sigma-7S SERVOPACKs

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.

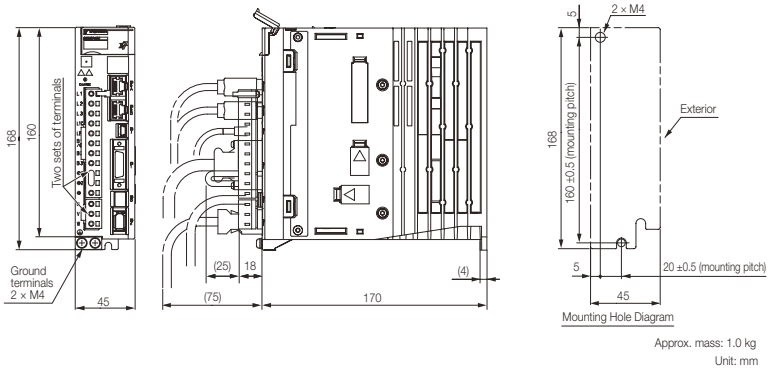
SERVOPACK External Dimensions

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



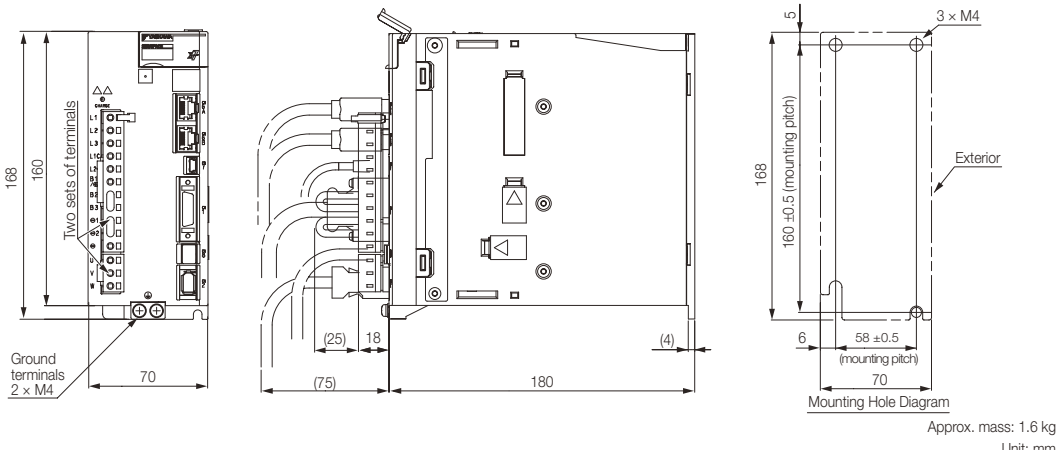
Approx. mass: 0.8 kg
Unit: mm

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



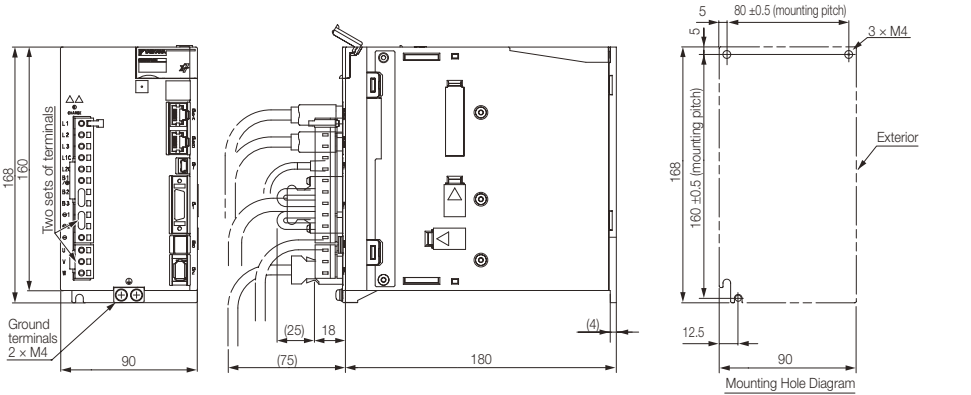
Approx. mass: 1.0 kg
Unit: mm

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



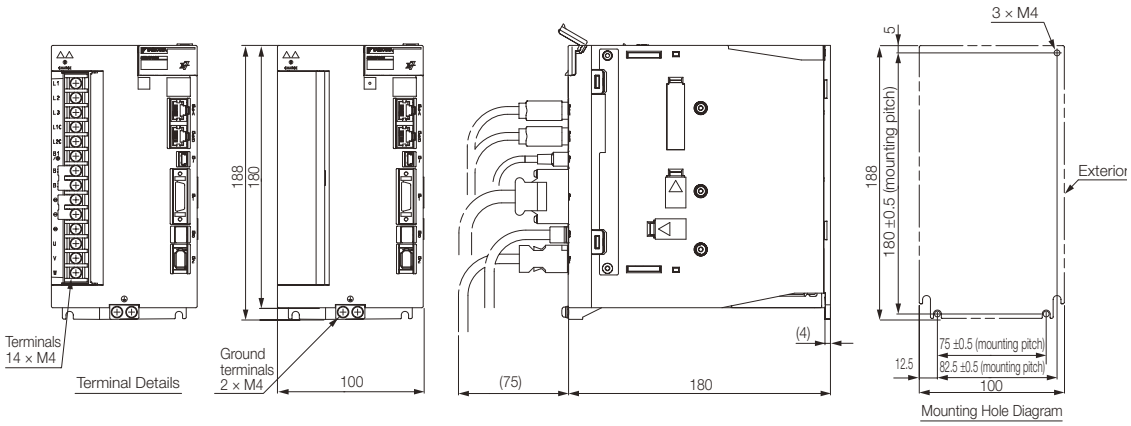
Approx. mass: 1.6 kg
Unit: mm

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



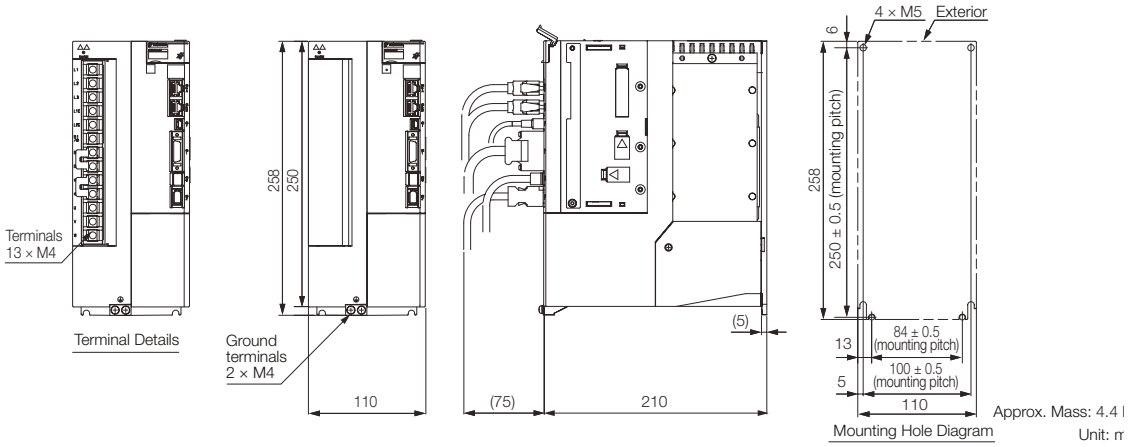
Approx. mass: 2.2 kg
Unit: mm

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

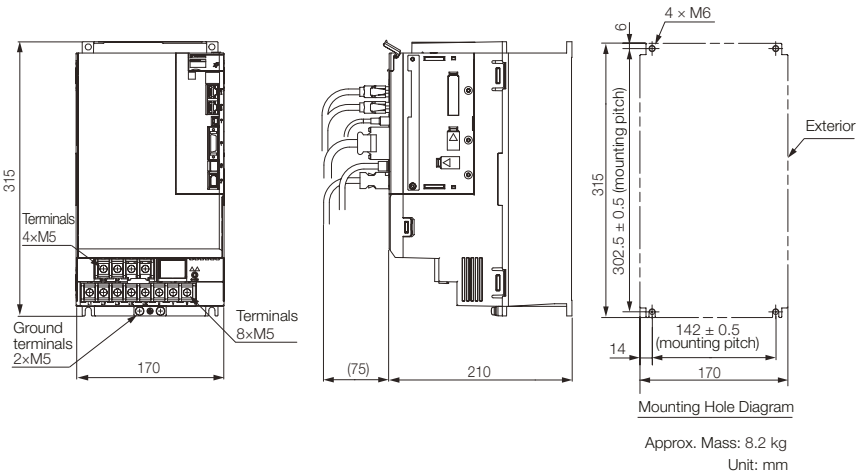


Approx. mass: 2.7 kg
Unit: mm

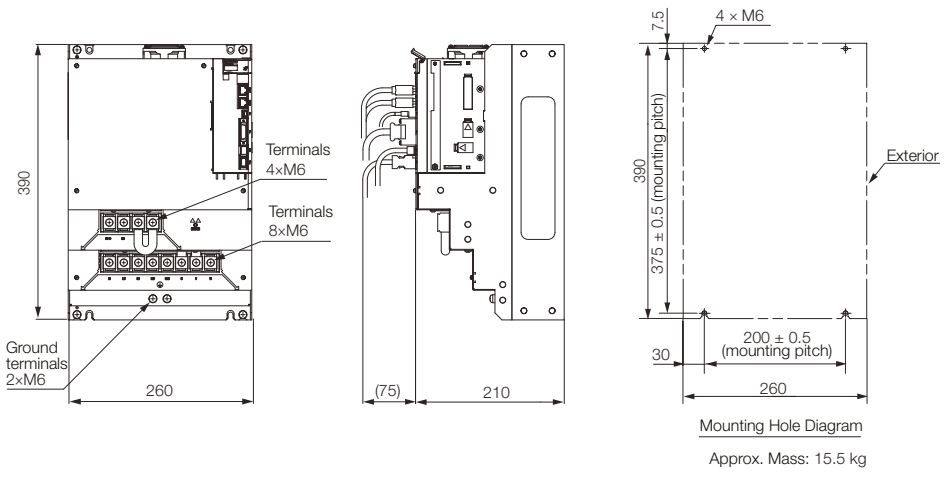
Three-phase, 200 VAC: SGD7S-330A



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



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



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 000	Without Options	All models
700*4	HWBB option	All models

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

Code	Specifications
None 000	None

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.

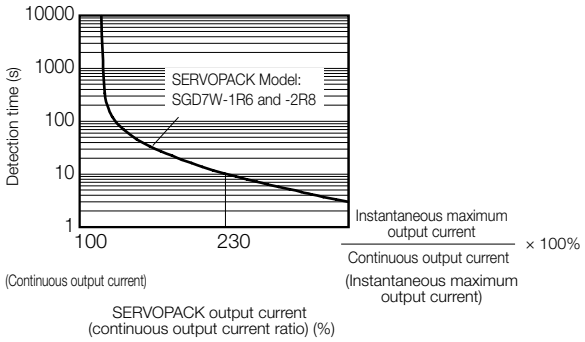
Three-phase, 200 VAC

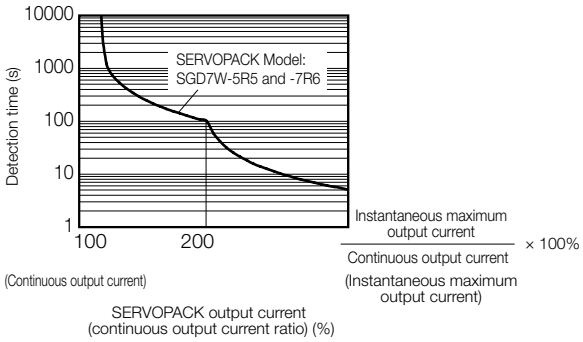
Model SGD7W-			1R6A	2R8A	5R5A	7R6A
Maximum Applicable Motor Capacity per Axis [kW]			0.2	0.4	0.75	1.0
Continuous Output Current per Axis [A]			1.6	2.8	5.5	7.6
Instantaneous Maximum Output Current per Axis [A]			5.9	9.3	16.9	17.0
Main Circuit	Power Supply		200 VAC to 240 VAC, -15% to +10%, 50 Hz/60 Hz			
	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	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) 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.

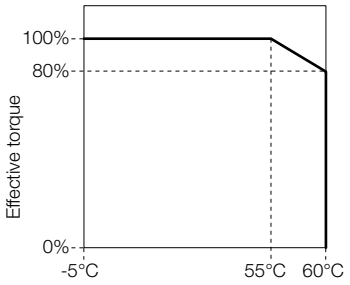
* The coefficient of speed fluctuation for load fluctuation is defined as follows:

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

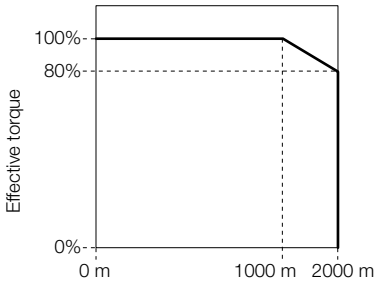
Derating Specifications

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.

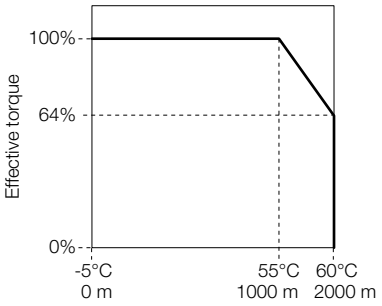
SGD7W-1R6A, -2R8A, -5R5A, and -7R6A



Surrounding air temperature



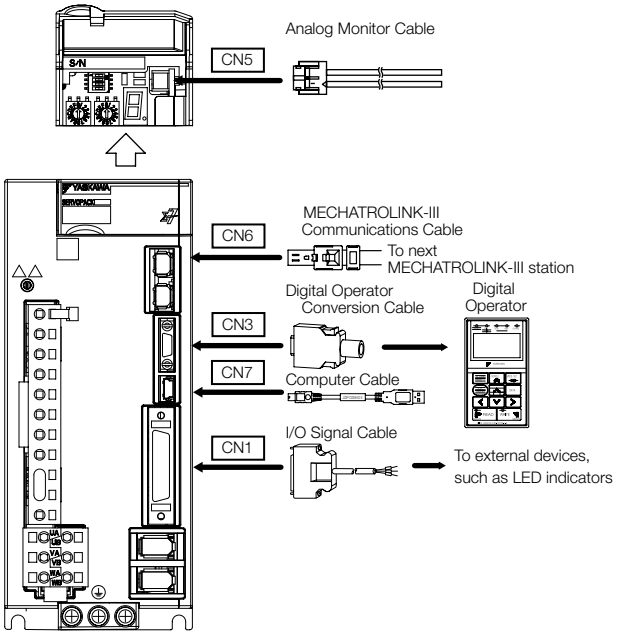
Altitude



Surrounding air temperature and altitude

Selecting Cables SGD7W MECHATROLINK-III

System Configurations

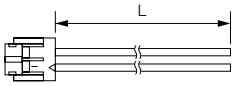
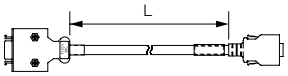
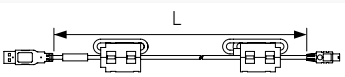


Selection Table

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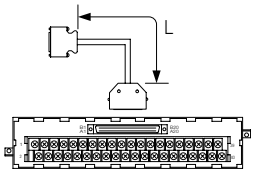
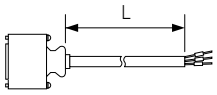
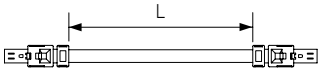
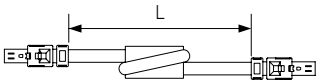
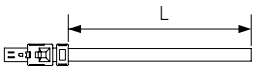
Code	Description		Length	Order Number	Appearance
CN1	I/O Signal Cables	Soldered Connector Kit		DP9420007-E	
		Connector-Terminal Block Converter Unit (with cable)	0.5 m	JUSP-TA36P-E	
			1 m	JUSP-TA36P-1-E	
			2 m	JUSP-TA36P-2-E	
		Cable with Loose Wires at One End (loose wires on peripheral device end)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

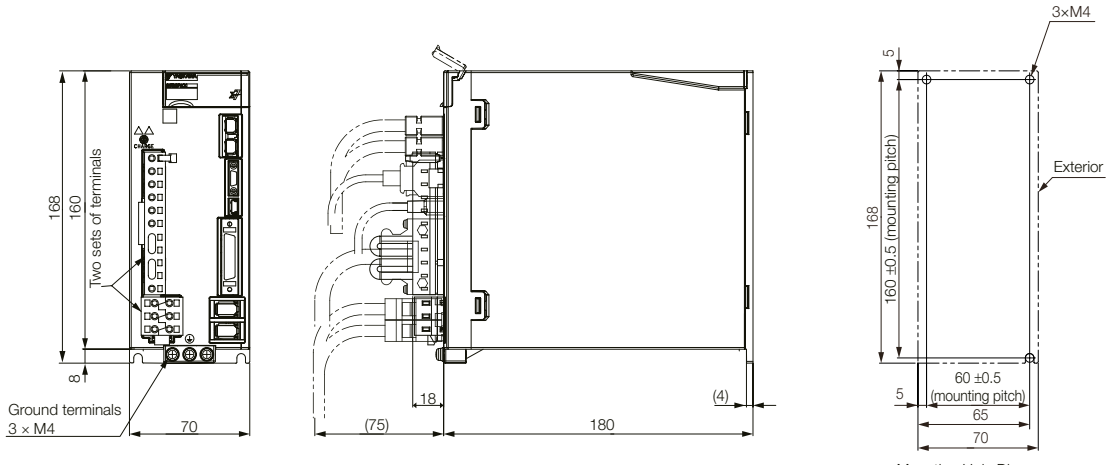
DC Power Supply Wires for Sigma-7S SERVOPACKs

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.

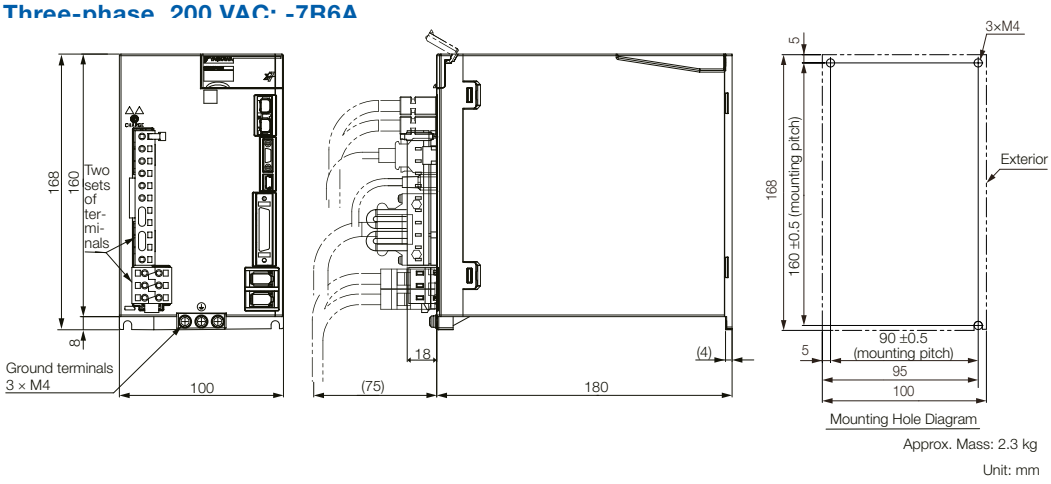
SERVOPACK External Dimensions SGD7W

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



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

Three-phase, 200 VAC: -7R6A



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 000	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.

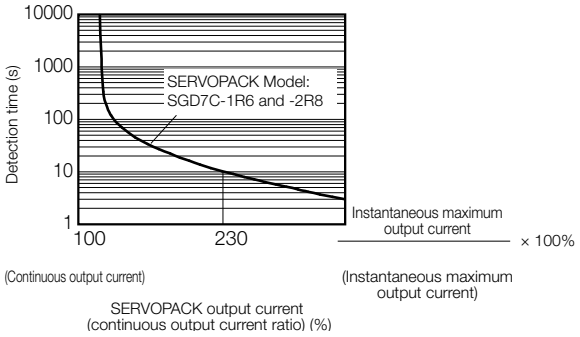
Three-phase, 200 VAC

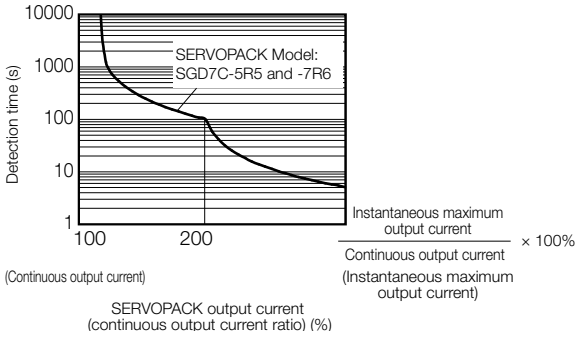
Model SGD7C-			1R6A	2R8A	5R5A	7R6A
Maximum Applicable Motor Capacity per Axis [kW]			0.2	0.4	0.75	1.0
Continuous Output Current per Axis [A]			1.6	2.8	5.5	7.6
Instantaneous Maximum Output Current per Axis [A]			5.9	9.3	16.9	17.0
Main Circuit	Power Supply		200 VAC to 240 VAC, -15% to +10%, 50 Hz/60 Hz			
	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.

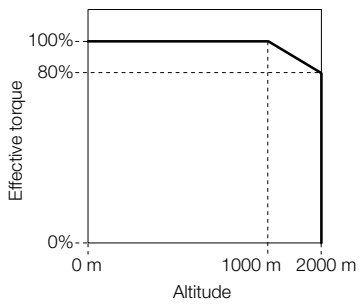
General Specifications

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	

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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

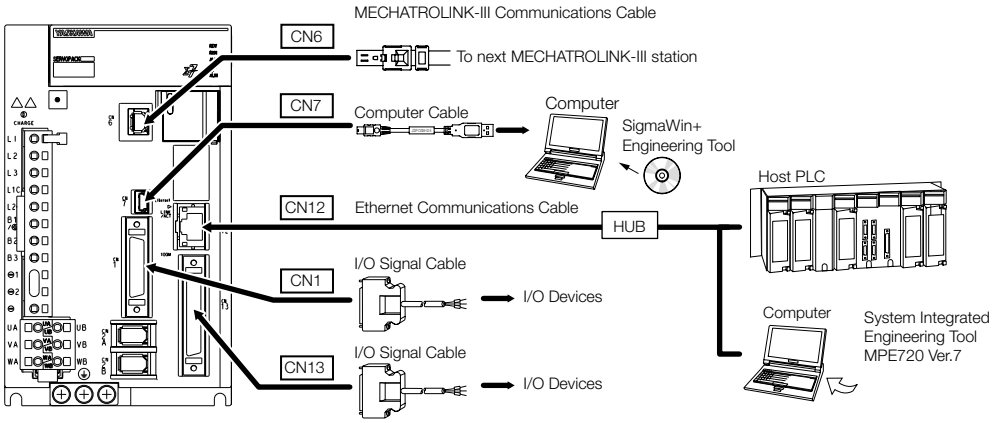
System Register Specifications

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

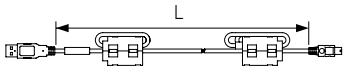
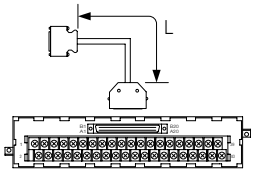
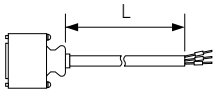
Important

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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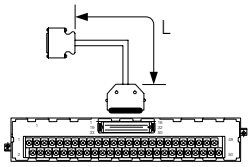
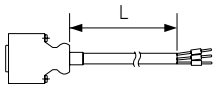
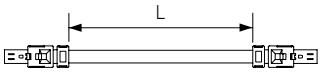
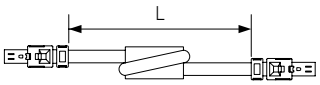
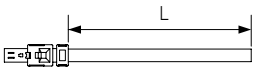
Code	Description		Length	Order Number	Appearance
CN1	I/O Signal Cables	Soldered Connector Kit		JZSP-CSI9-1-E	
		Connector-Terminal Block Converter Unit (with cable)	0.5 m	JUSP-TA50PG-E	
			1 m	JUSP-TA50PG-1-E	
			2 m	JUSP-TA50PG-2-E	
		Cable with Loose Wires at One End (loose wires on peripheral device 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.

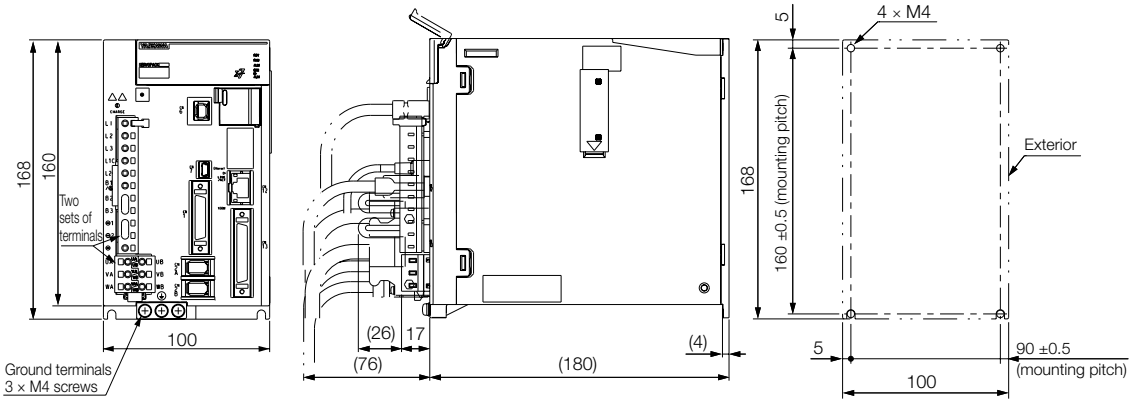
Single-phase / Three-phase, 200-VAC Wires for Sigma-7C SERVOPACKs

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.

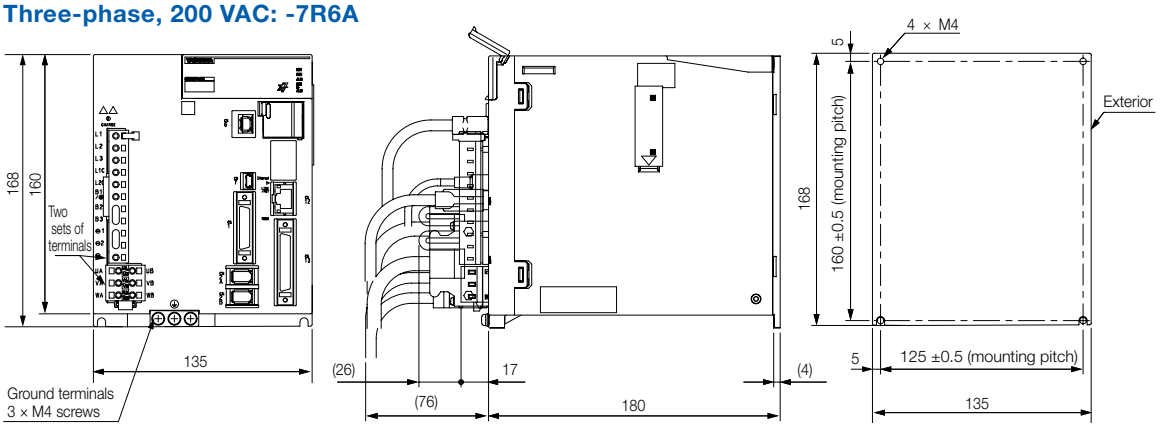
Sigma-7C SERVOPACK External Dimensions

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

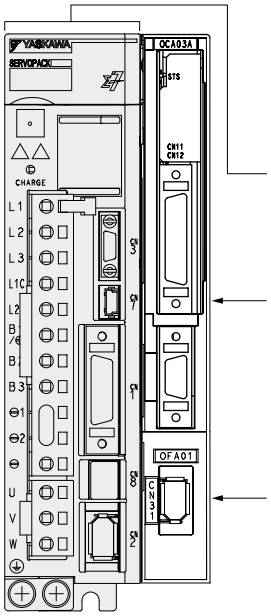


Approx. mass: 2.8 kg
Unit: mm

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
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
000	

Note: 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.

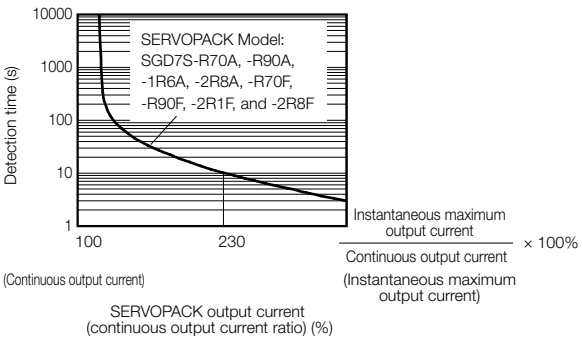
Model SGD7S-		180A	200A	330A	470A	550A	590A	780A
Maximum Applicable Motor Capacity [kW]		2.0	3.0	5.0	6.0	7.5	11.0	15.0
Continuous Output Current [A]		18.5	19.6	32.9	46.9	54.7	58.6	78.0
Instantaneous Maximum Output Current [A]		42.0	56.0	84.0	110	130	140	170
Main Circuit	Power Supply	270 VDC to 324 VDC, -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						

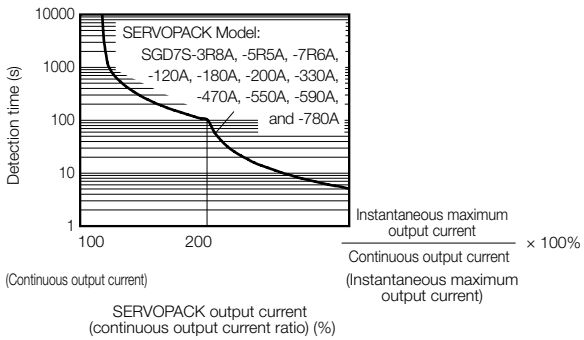
* This is the net value at the rated load.

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.

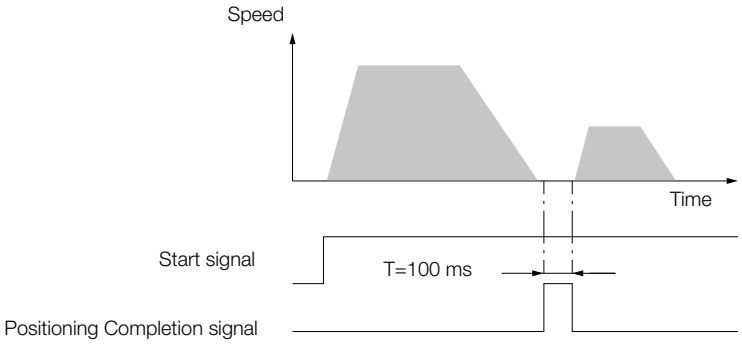
*1. The coefficient of speed fluctuation for load fluctuation is defined as follows:

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

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

Reference Methods

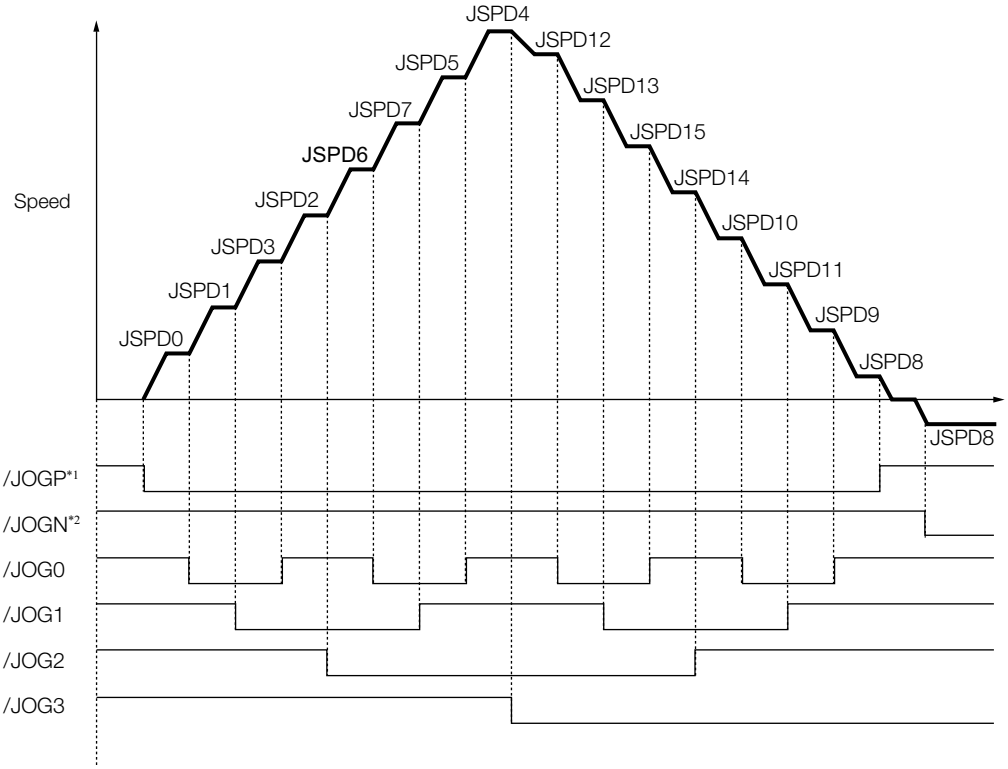
	PGMSTEP	POS	SPD	RDST	RSPD	ACC*	DEC*	EVENT	LOOP	NEXT
256 steps	0	I+400000	2000	500000	1000	200	100	T5000	1	1
	1	I+100000	1000	200000	2000	100	50	ITO	1	END
	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮
	n	I+400000	2000	500000	1000	100	50	IT100	1	n+1
	n+1	I+100000	1000	200000	2000	⋮	⋮	NT0	1	END
	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮
	254	I+400000	2000	500000	1000	100	50	SEL3T200	1	127
	255	I+100000	1000	200000	2000	100	50	DT0	1	END



Jog Speed Table

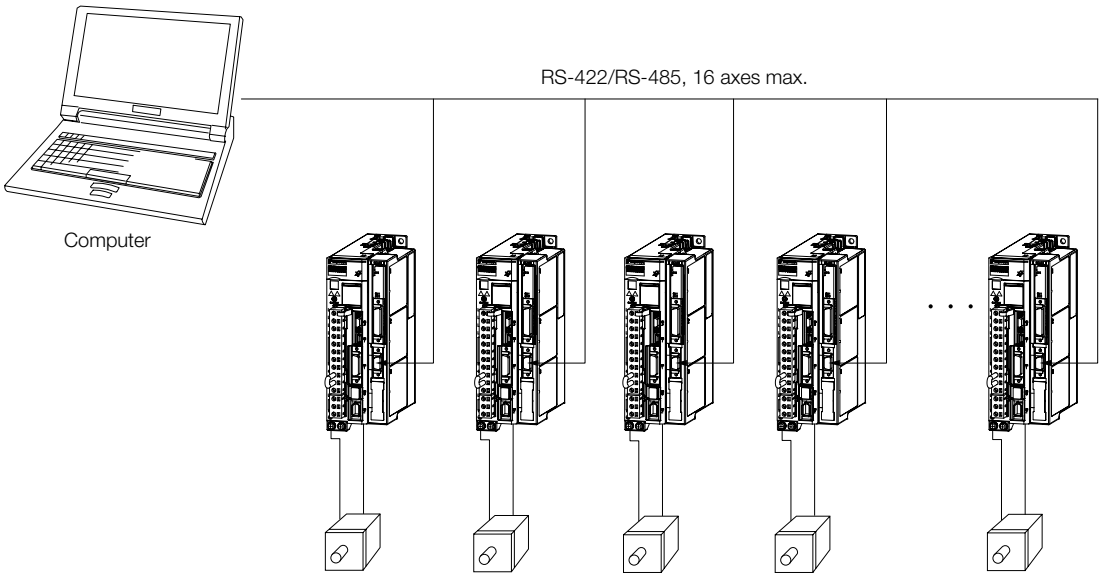
	JSPD	JOG3	JOG2	JOG1	JOG0	Jog Speed
16 combinations	0	0	0	0	0	1000
	1	0	0	0	1	2000
	2	0	0	1	0	4000
	⋮	⋮	⋮	⋮	⋮	⋮
	⋮	⋮	⋮	⋮	⋮	⋮
	⋮	⋮	⋮	⋮	⋮	⋮
	15	1	1	1	1	5500

Note: 1: Signal is ON (active), 0: Signal is OFF (inactive).

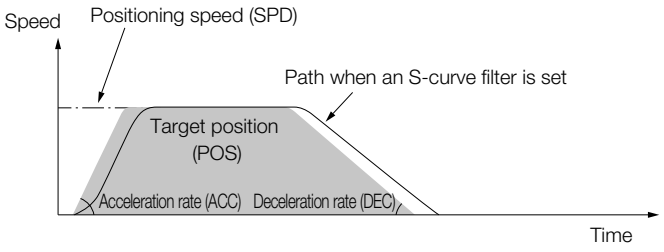


*1. Forward operation at the jog speed is performed while the /JOGP signal is ON.
*2. Reverse operation at the jog speed is performed while the /JOGN signal is ON.

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).



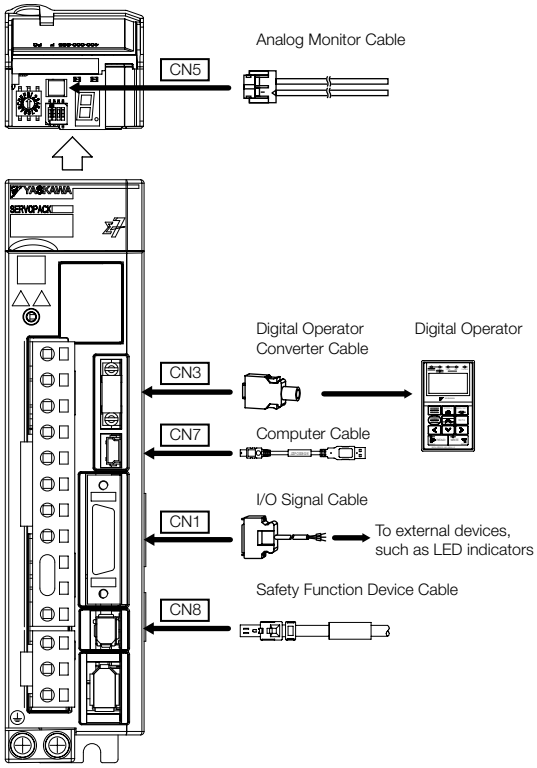

```
1SVON           # Servo turned ON.
1POSI=400000    # Set relative position to 400,000.
1SPD=2000       # Set speed to 2,000.
1ACC=200        # Set acceleration rate to 200.
1DEC=100        # Set deceleration rate to 100.
1ST             # Start operation.
 :
```



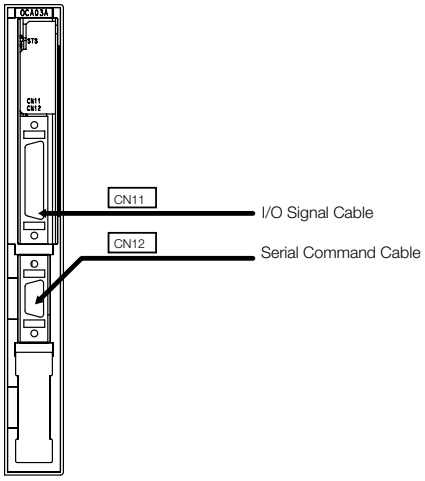
Selecting Cables SGD7S Command Option Attachable Type with INDEXER Module

System Configurations

SGD7S Single Axis Command Option Attachable Type SERVOPACK



INDEXER Module



Selection Table

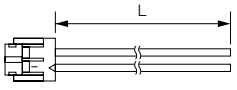
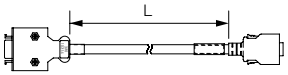
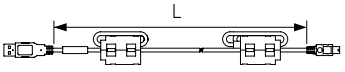
Important

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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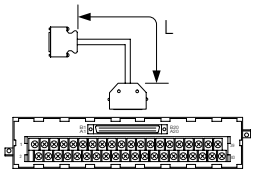
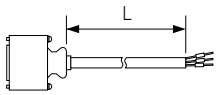
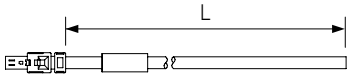
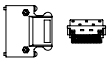
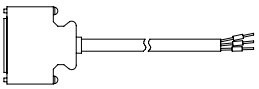
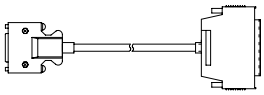
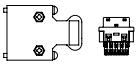
Code	Description		Length	Order Number	Appearance
CN1	I/O Signal Cables	Soldered Connector Kit		JZSP-CSI9-1-E	
		Connector-Terminal Block Converter Unit (with cable)	0.5 m	JUSP-TA26P-E	
			1 m	JUSP-TA26P-1-E	
			2 m	JUSP-TA26P-2-E	
		Cable with Loose Wires at One End (loose wires on peripheral device 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.		

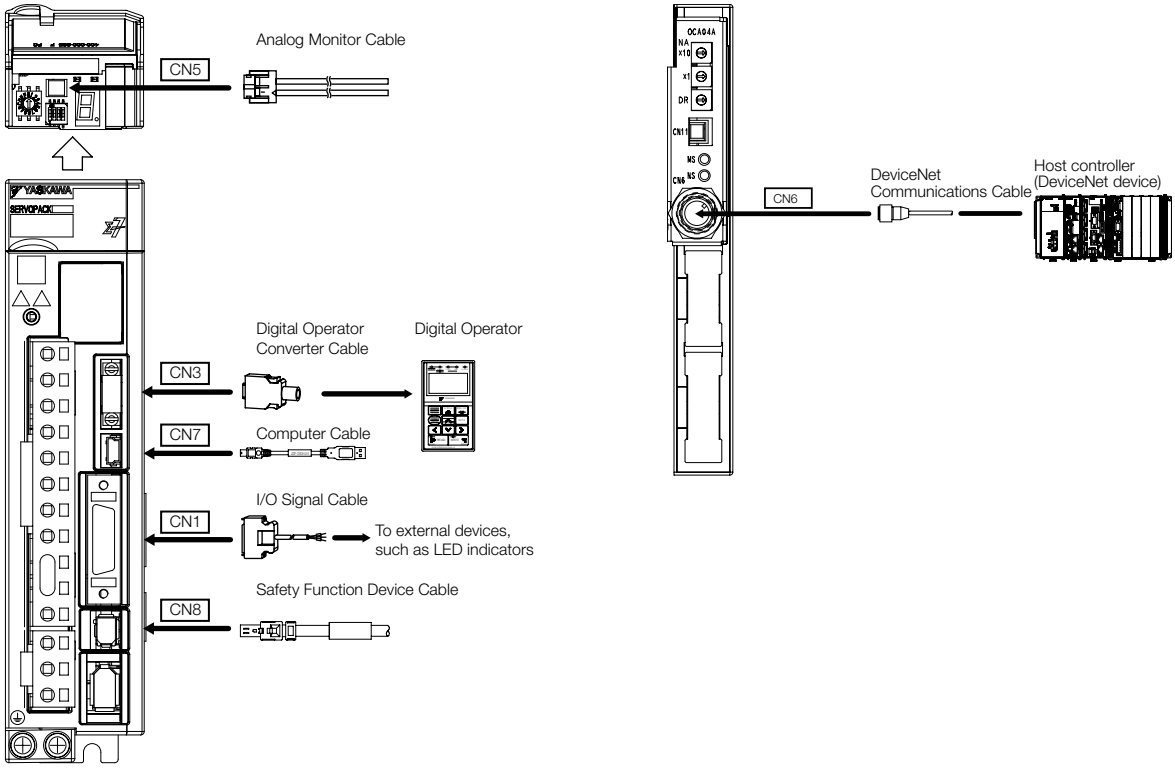
*1. Do not wire the following terminals: L1, L2, L3, B2, B3, ⊖1, ⊖ and terminals.
*2. If you do not use the recommended Servomotor Main Circuit Cable, use this table to select wires.

Selecting Cables SGD7S Command Option Attachable Type with DeviceNet Module

System Configurations

SGD7S Single Axis Command Option Attachable Type SERVOPACK

DeviceNet Module



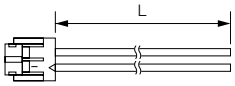
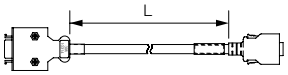
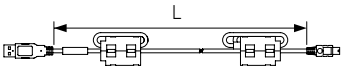
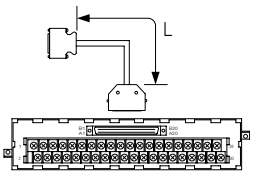
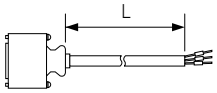
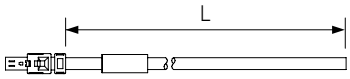
Selection Table

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.

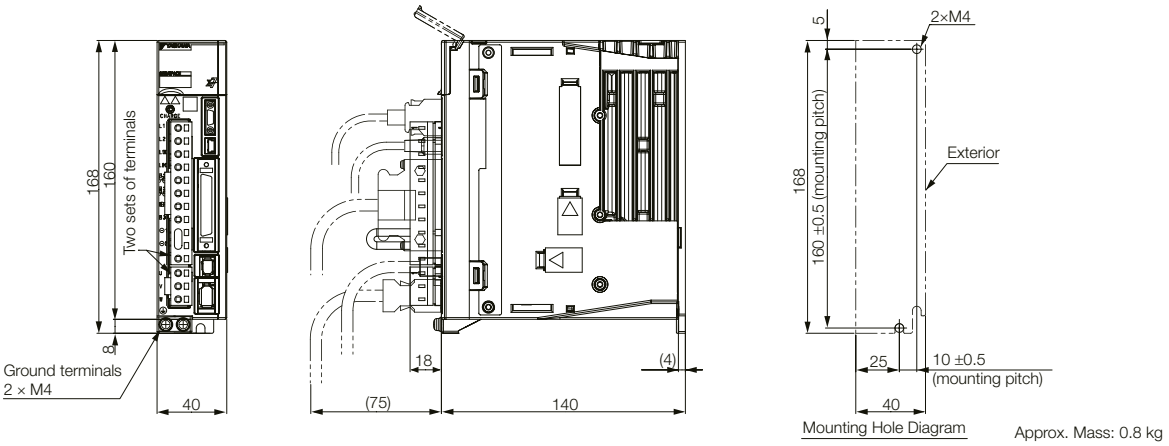
DC Power Supply Wires for Sigma-7S SERVOPACKs

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

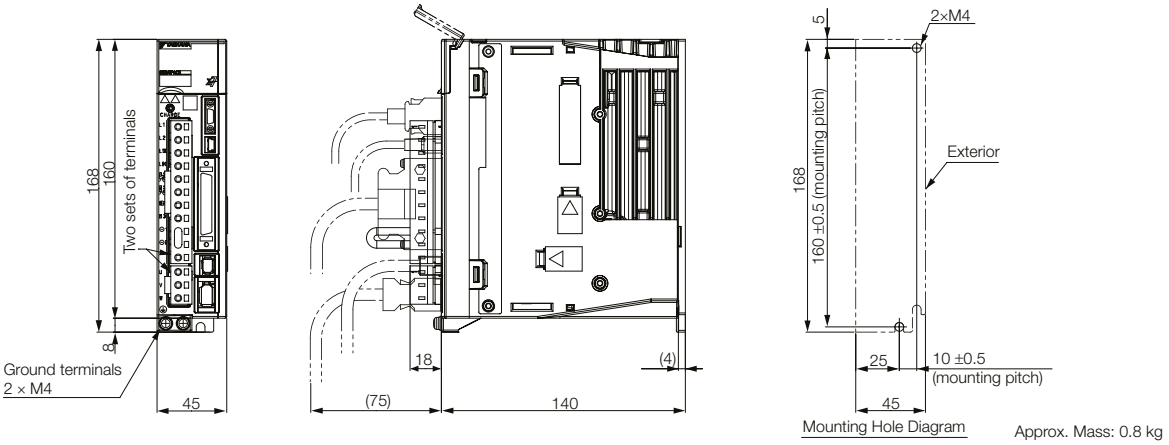
Three-phase & Single-phase, 200 VAC: SGD7S-R70A, -R90A, and -1R6A



Approx. Mass: 0.8 kg

Unit: mm

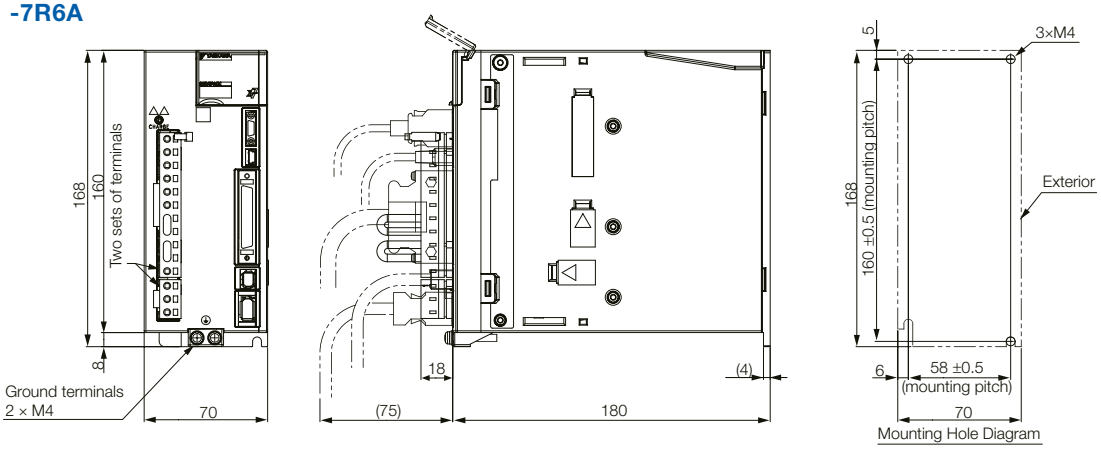
Three-phase & Single-phase, 200 VAC: SGD7S-2R8A



Approx. Mass: 0.8 kg

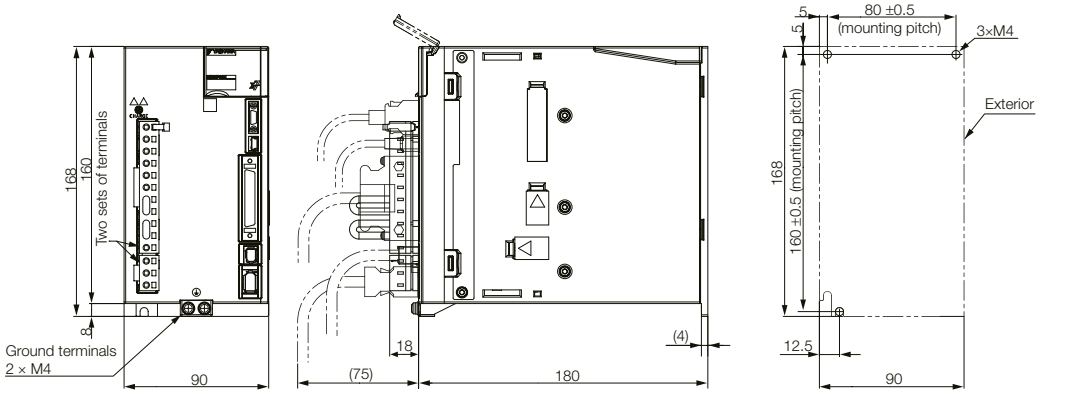
Unit: mm

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



Approx. Mass: 1.6 kg

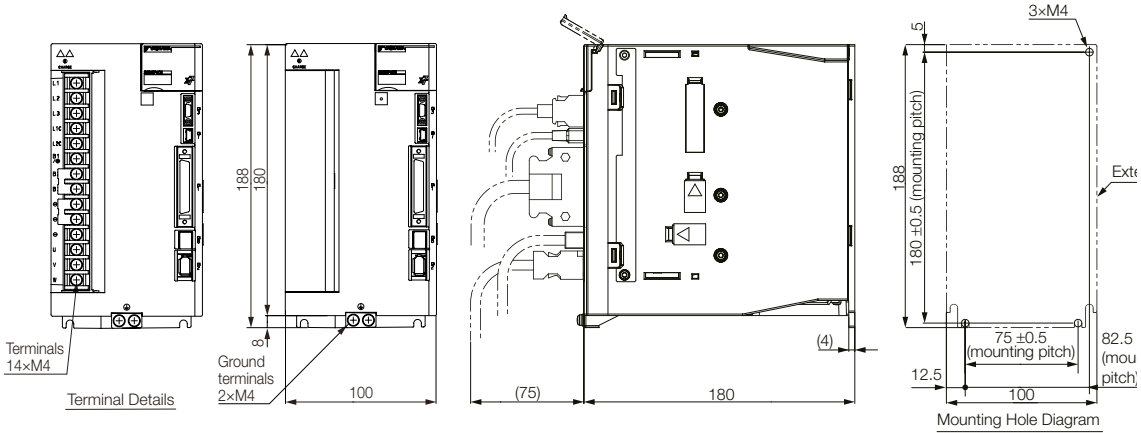
Three-phase & Single-phase, 200 VAC: SGD7S-120A



Approx. Mass: 2.2 kg

Unit: mm

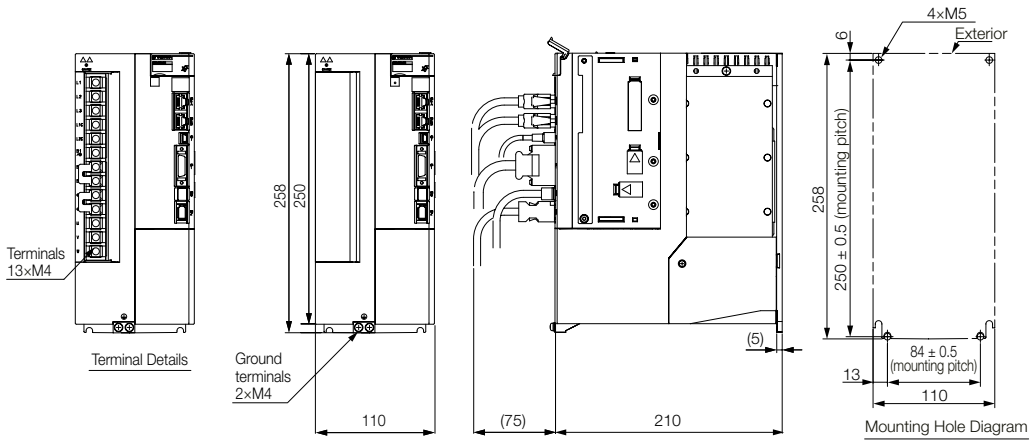
Three-phase, 200 VAC: SGD7S-180A and -200A



Approx. Mass: 2.7

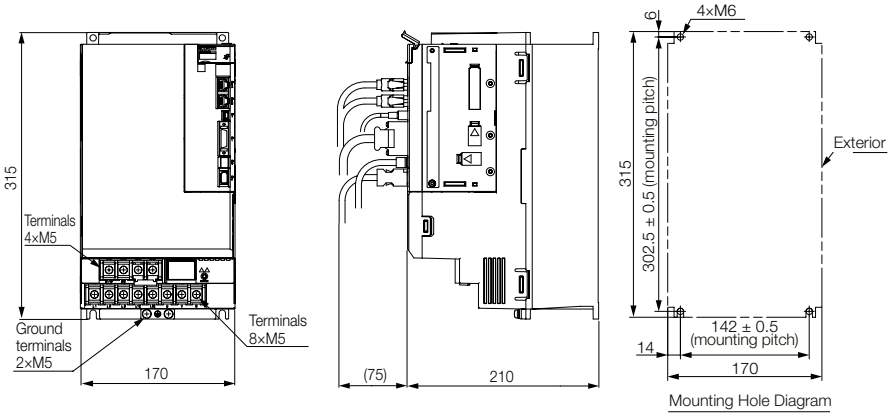
Unit: r

Three-phase, 200 VAC: SGD7S-330A



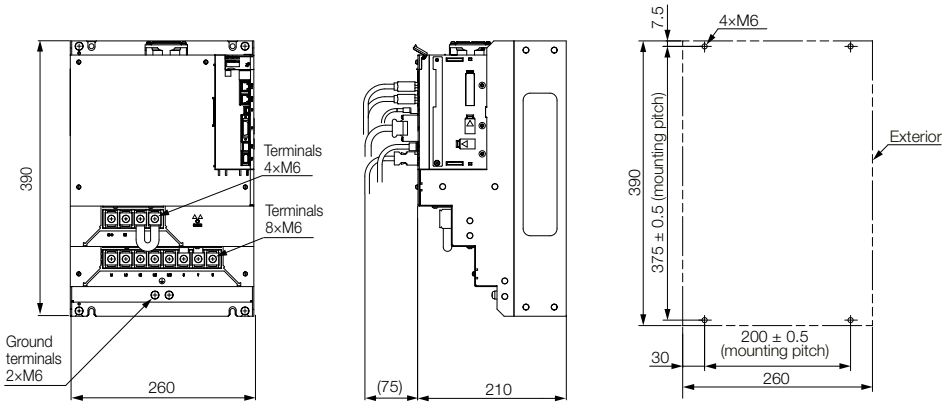
Approx. Mass: 4.4 kg

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			

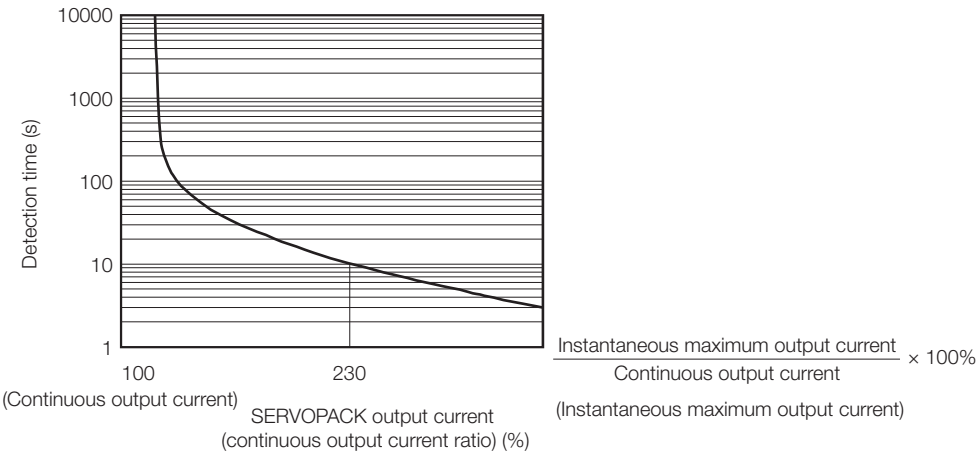
Note: Readily available up to 1.5 kW. Others available on request.

*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

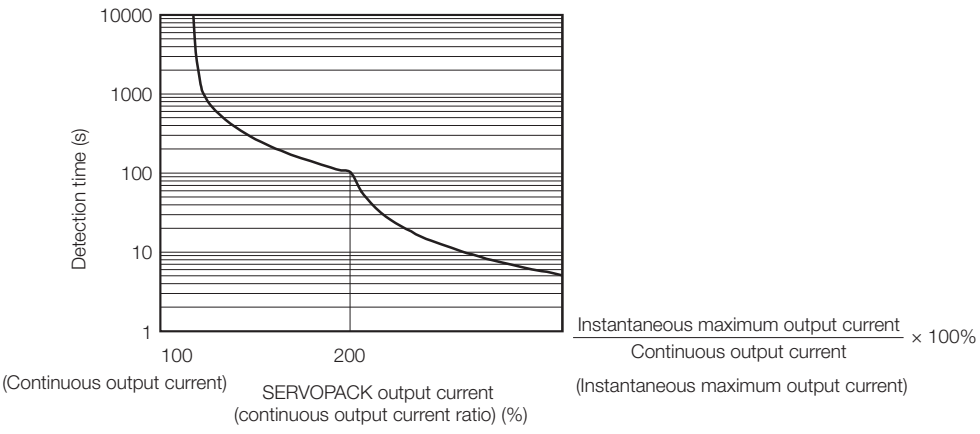
The overload detection level is set for hot start conditions with a SERVOPACK surrounding air temperature of 55°C.
An overload alarm (A.710 or A.720) will occur if overload operation that exceeds the overload protection characteristics shown in the following diagram (i.e., operation on the right side 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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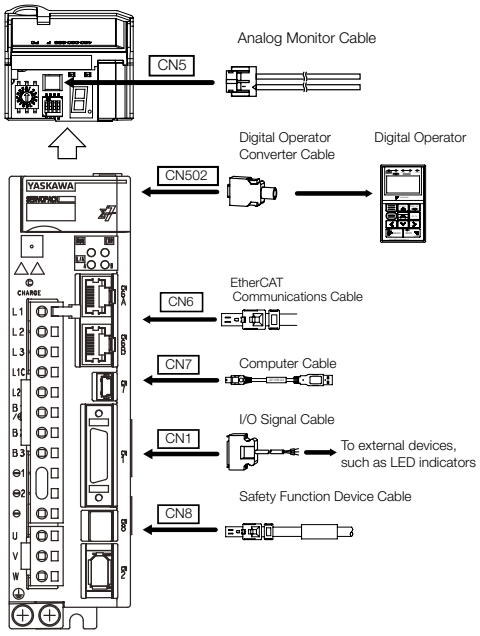
Item			Specification
I/O Signals	Digital Output Signals	Fixed Output	Allowable voltage range: 5 VDC to 30 VDC Number of output points: 1 Output signal: ALM (Servo Alarm) signal
		Output Signals that can be allocated	Allowable voltage range: 5 VDC to 30 VDC Number of output points: 3 (A photocoupler output (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

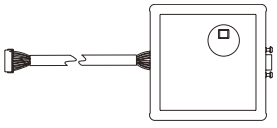
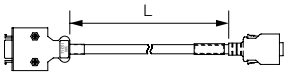
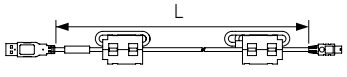
Important

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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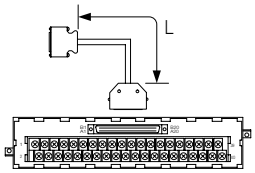
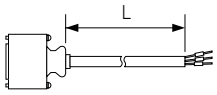
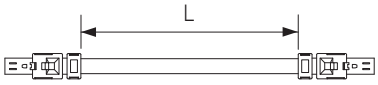
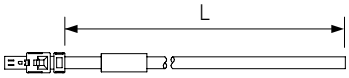
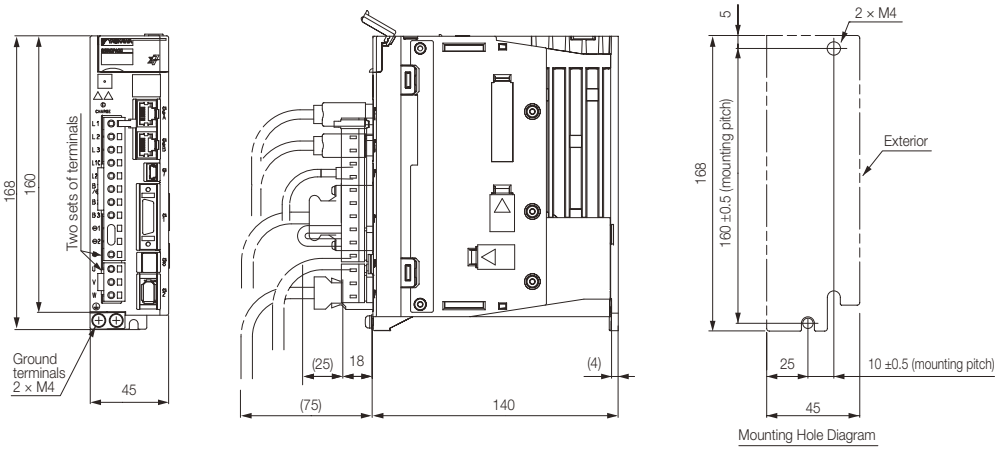
Code	Description		Length	Order Number	Appearance
CN1	I/O Signal Cables	Soldered Connector Kit		JZSP-CSI9-2-E	
		Connector-Terminal Block Converter Unit (with cable)	0.5 m	JUSP-TA26P-E	
			1 m	JUSP-TA26P-1-E	
			2 m	JUSP-TA26P-2-E	
		Cable with Loose Wires at One End (loose wires on peripheral device 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.

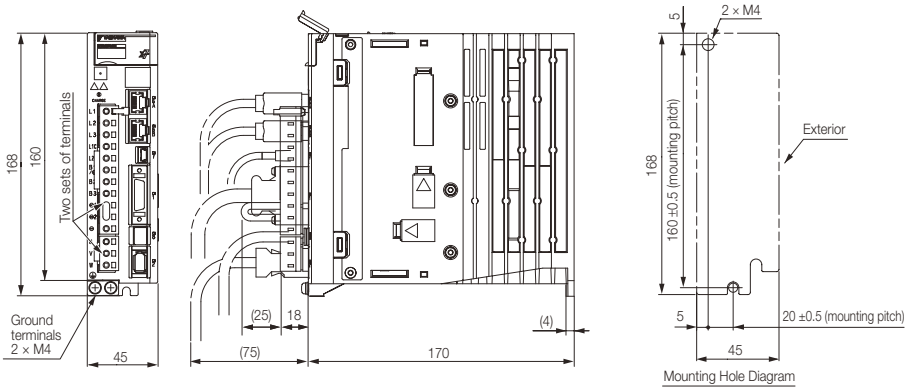
SERVOPACK External Dimensions

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



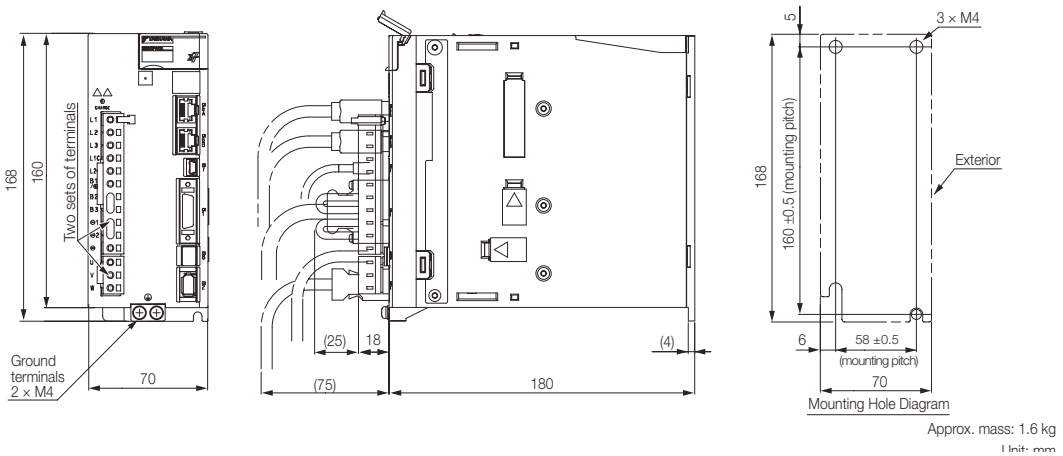
Approx. mass: 0.8 kg
Unit: mm

Three-phase, 200 VAC: SGD7S-2R8A



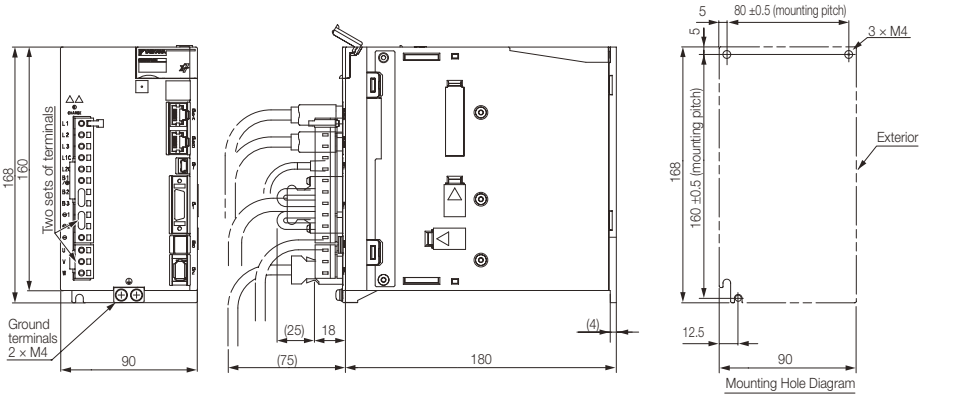
Approx. mass: 1.0 kg
Unit: mm

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



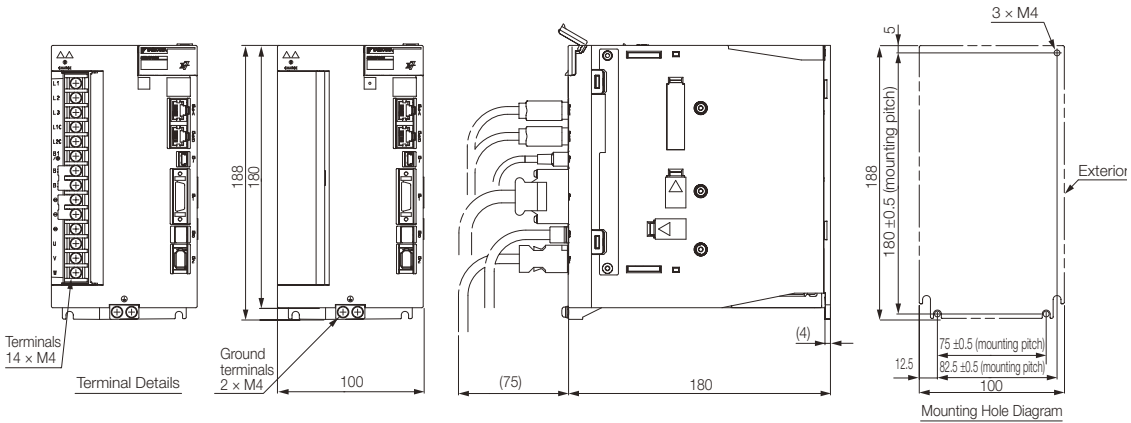
Approx. mass: 1.6 kg
Unit: mm

Three-phase, 200 VAC: SGD7S-120A



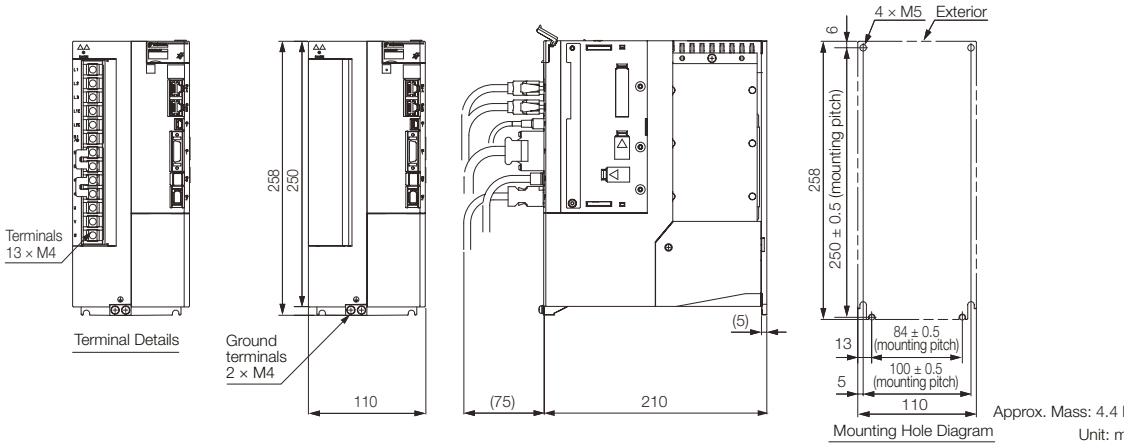
Approx. mass: 2.2 kg
Unit: mm

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

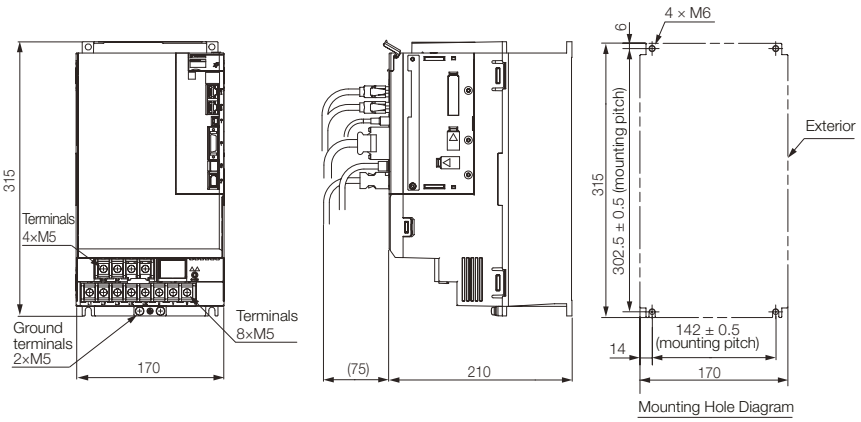


Approx. mass: 2.7 kg
Unit: mm

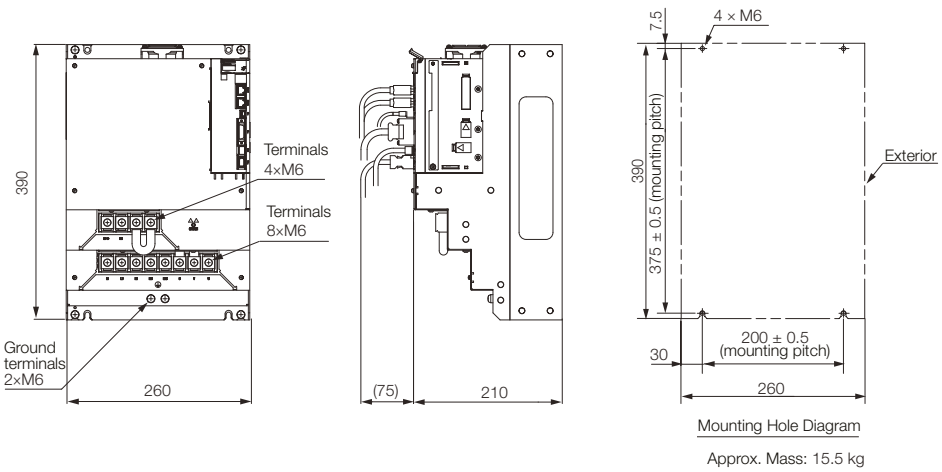
Three-phase, 200 VAC: SGD7S-330A



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



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



Connector Specifications

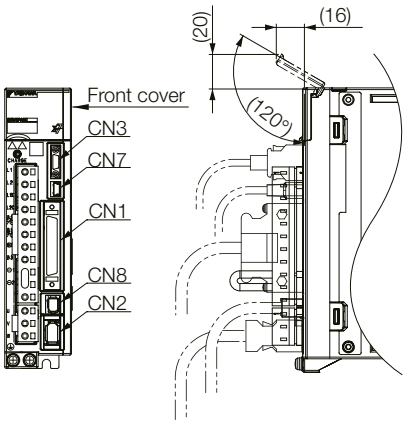
SERVOPACK	Connector No.	Model	Number of Pins	Manufacturer
Sigma-7S Analog Voltage/Pulse Train Reference SERVOPACK	CN1	10150-3000PE	50	Sumitomo 3M Ltd.
	CN2	3E106-0220KV	6	Sumitomo 3M Ltd.
	CN3	HDR-EC14LFDTN- SLD-PLUS	14	Honda Tsushin Kogyo Co., Ltd.
	CN7	2172034-1	5	Tyco Electronics Japan G.K.
	CN8	1981080-1	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



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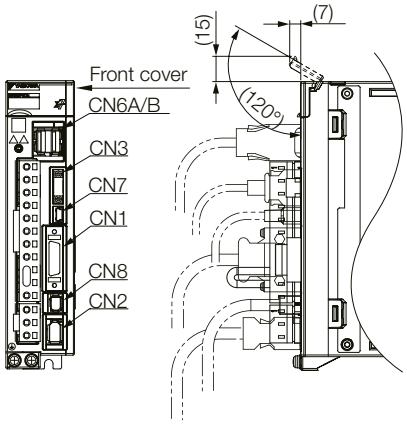
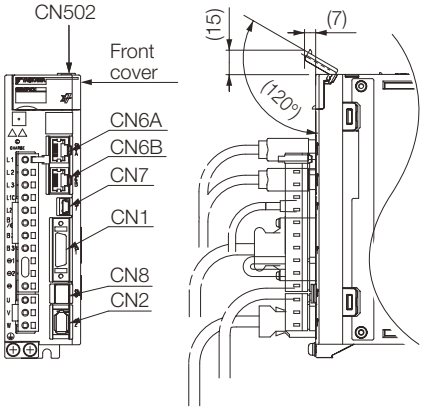
MECHATROLINK-II Communications Reference SERVOPACKs



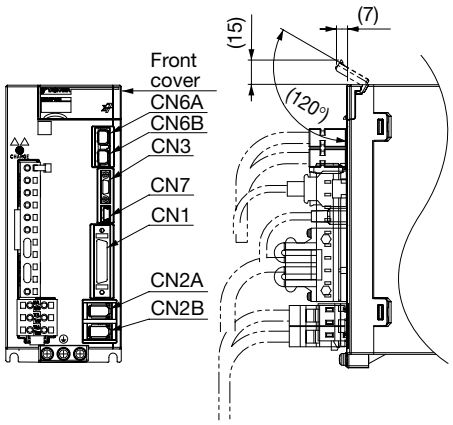
Sigma-7S

MECHATROLINK-III Communications Reference SERVOPACKs



Sigma-7W

MECHATROLINK-III Communications Reference SERVOPACKs



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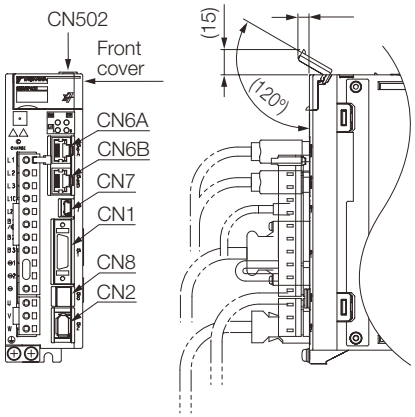
EtherCAT Communication Reference SERVOPACKs



Sigma-7C

Bus Connection Reference SERVOPACKs