

Sigma-7Siec with integrated iec-Controller

Model Designations

SGD7S - 2R8 A M0 A 000 F50

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

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

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

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

Contents

Rotary Motors

Direct Drive Motors

Linear Motors

SERVOPACKs

Option Modules

Periphery

Appendix

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
Overtoltage 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.

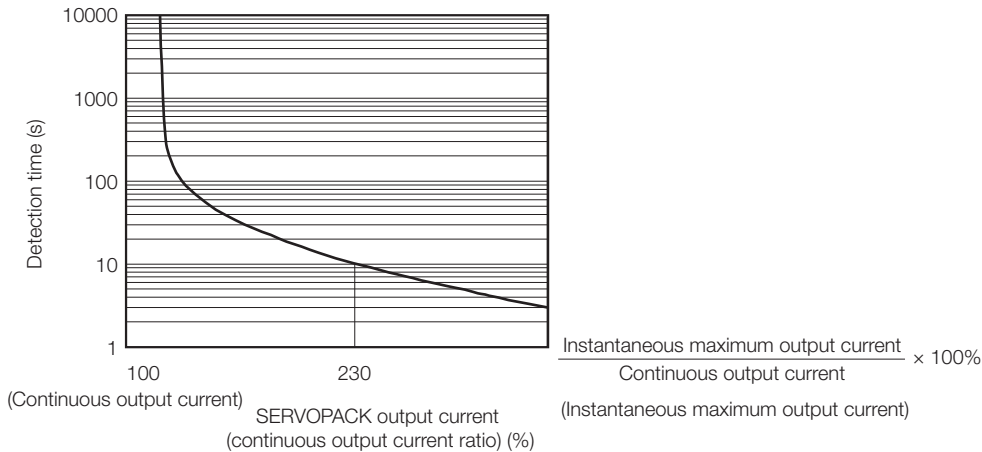
*2. This value is for the optional JUSP-RA04-E Regenerative Resistor Unit.

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

SERVOPACK Overload Protection Characteristics

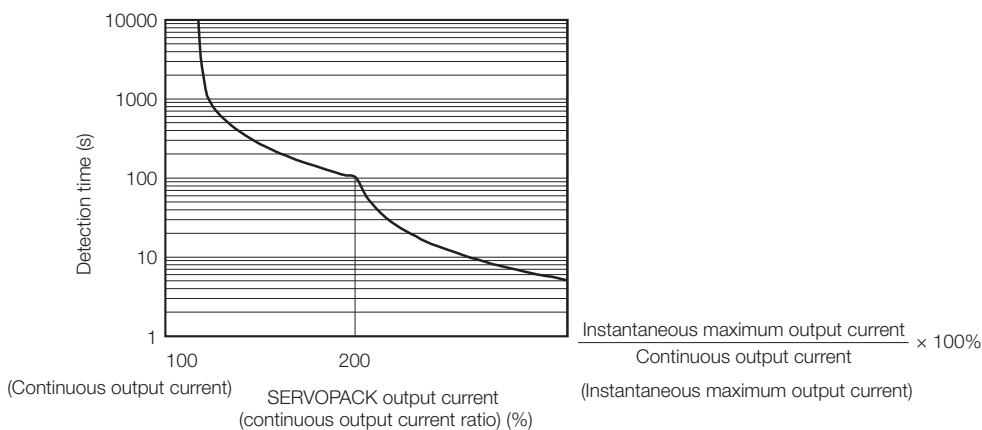
The overload detection level is set for hot start conditions with a SERVOPACK surrounding air temperature of 55°C. An overload alarm (A.710 or A.720) will occur if overload operation that exceeds the overload protection characteristics shown in the following diagram (i.e., operation on the right side 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	<ul style="list-style-type: none"> 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	SERVOPACK 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	<ul style="list-style-type: none"> 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		
Others	With derating, usage is possible between 1,000 m and 2,000 m. 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%)	
	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
		<ul style="list-style-type: none"> 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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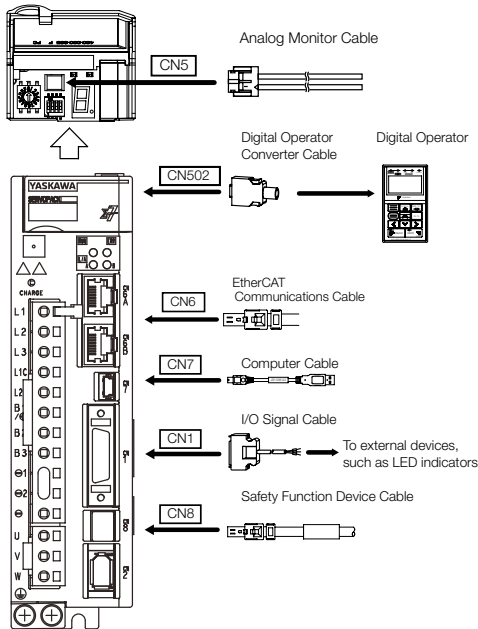
SGD7Siec with integrated iec-Controller

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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 <ul style="list-style-type: none"> • /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. A JUSP-JC001 Communications Unit is required to connect to a Digital Operator (JUSP-OP05A-1-E).
Communications	RS-422A Communications (CN502)	Interfaces
		1:N Communications Axis Address Setting
	USB Communications (CN7)	Interface
		Up to N = 15 stations possible for RS-422A port
		Set with parameters.
		Personal computer (with SigmaWin+)
		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.


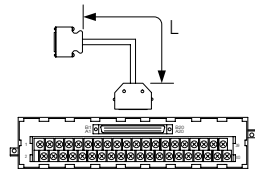
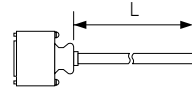
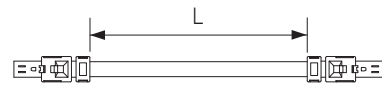

- Cable dimensional drawings and cable connection specifications
- Order numbers and specifications of individual connectors for cables
Sigma-7-Series AC Servo Drive Peripheral Device Selection Manual (Manual No.: SIEP S800001 32)

Code	Description	Length	Order Number	Appearance
CN5	Analog Monitor Cable	1 m	JZSP-CA01-E	
CN502	Digital Operator		JUSP-OP05A-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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SGD7Siec with integrated iec-Controller

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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		
	3 m		JUSP-TA26P-3-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.

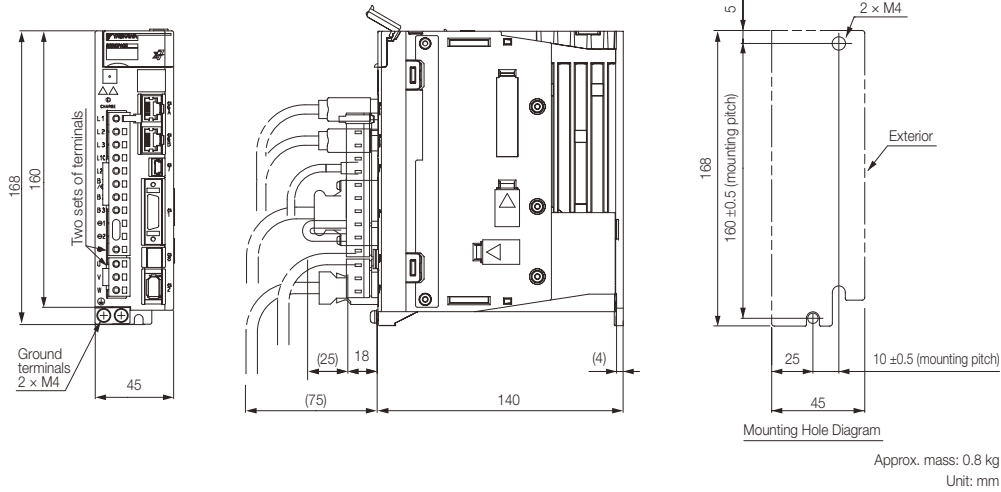
*4. When using safety functions, connect this Cable to the safety function devices.

When not using safety functions, connect the enclosed Safety Jumper Connector (JZSP-CVH05-E) to the SERVOPACK.

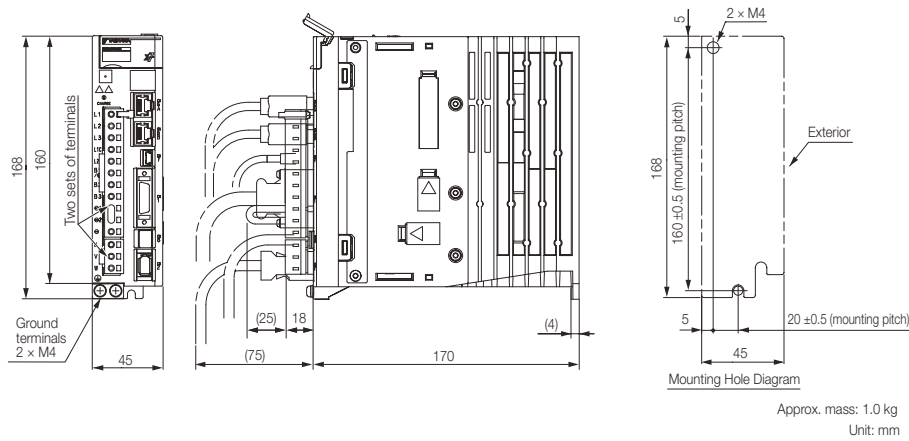
*5. Use the Connector Kit when you make cables yourself.

SERVOPACK External Dimensions

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

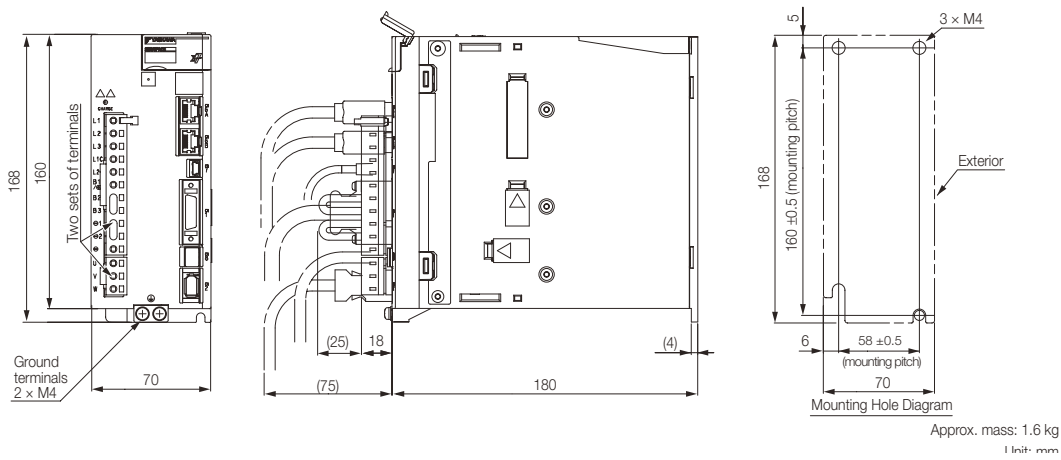


Three-phase, 200 VAC: SGD7S-2R8A

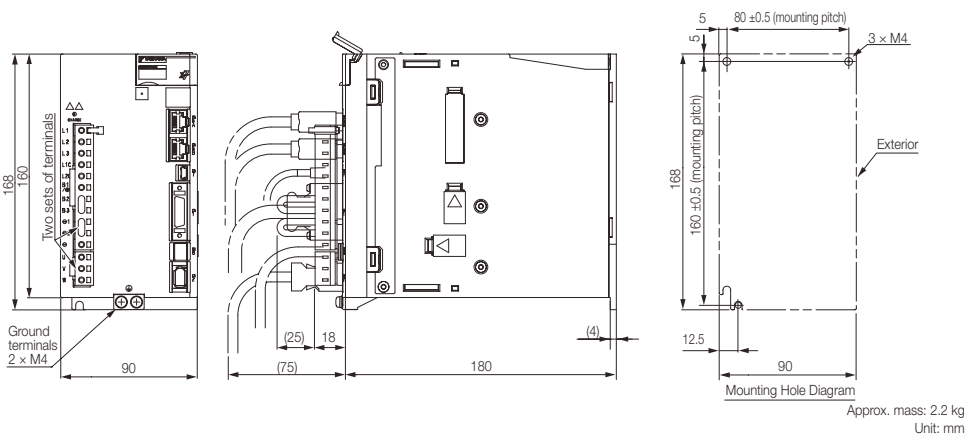


SGD7Siec with integrated iec-Controller

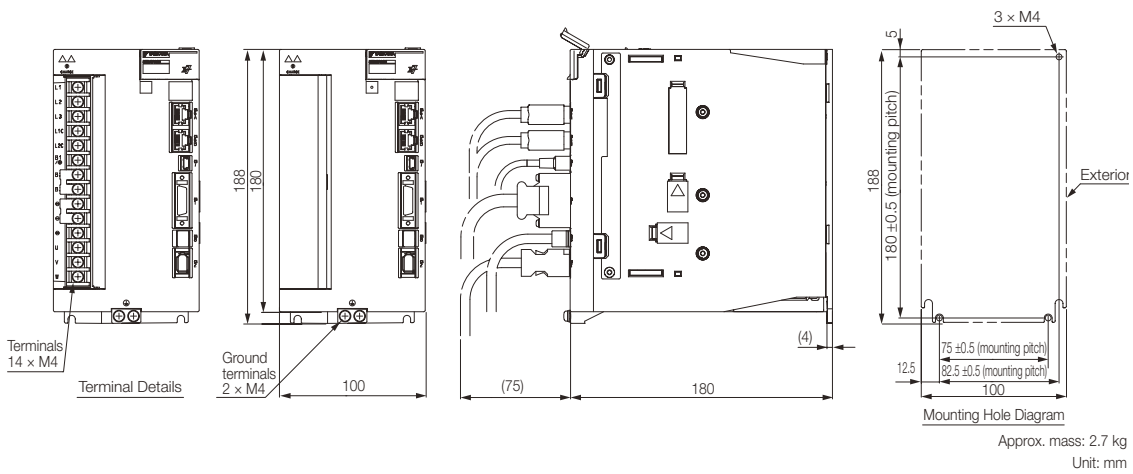
Three-phase, 200 VAC: SGD7S-3R8A, -5R5A, and -7R6A



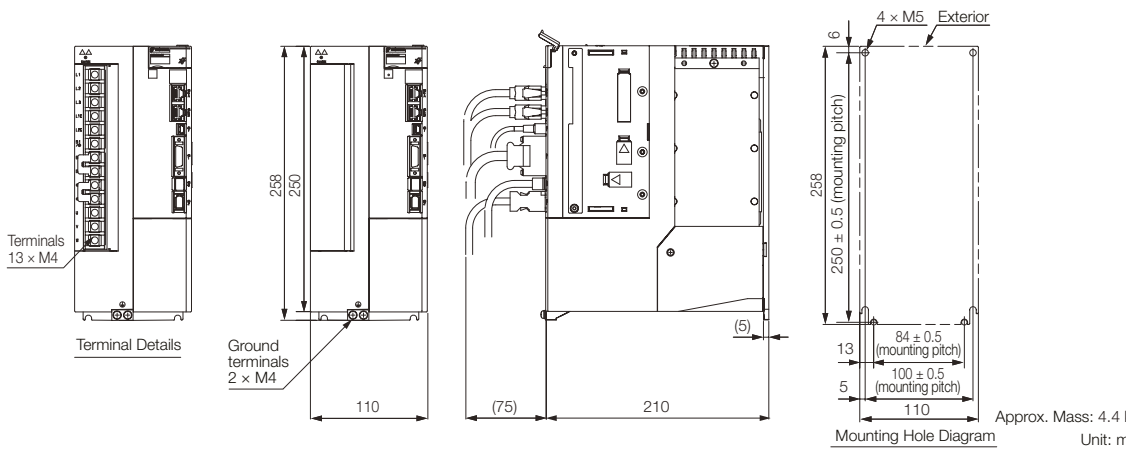
Three-phase, 200 VAC: SGD7S-120A



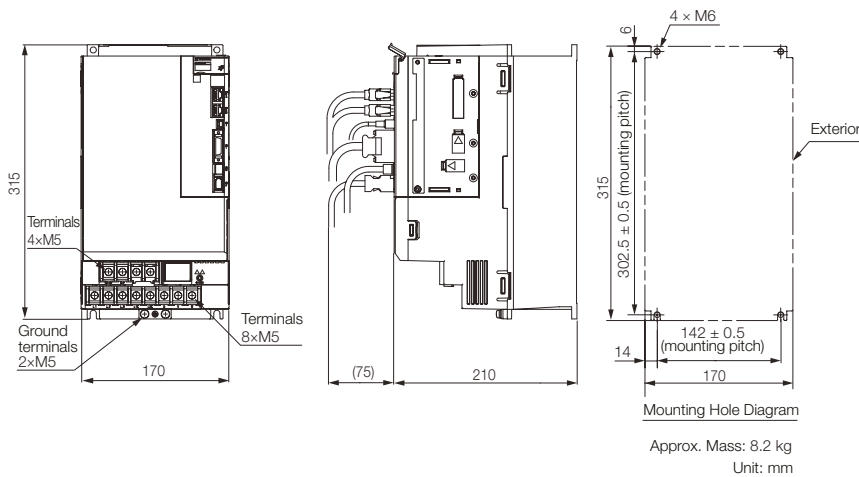
Three-phase, 200 VAC: SGD7S-180A and -200A



Three-phase, 200 VAC: SGD7S-330A



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



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

