YASKAWA

AC SERVO DRIVES
Σ-7 SERIES

Servopacks

Certified for ISO9001 and ISO14001

JQA-0422 JQA-EM0202

MECHATROLINK

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SERVOPACKs

Features

Σ-7S SERVOPACKs (Single-axis)

Analog Voltage/Pulse Train Reference Type 326
- 3.1 kHz response frequency and improved vibration suppression

MECHATROLINK-II Communications Reference Type..... 336
- High-precision motion control.
- 3.1 kHz response frequency and improved vibration suppression

MECHATROLINK-III Communications Reference Type..... 346
- Real-time communication (communication speed: 100 Mbps).
- High-precision motion control.
- 3.1 kHz response frequency and improved vibration suppression

INDEXER Module-Mounted Type 356
- Simple connection to the host controller with the I/O module.
- Reliable high-speed, high-precision positioning.
- Motion control without use of motion controllers.

DeviceNet Module-Mounted Type 370
- Compliant with the communication specifications of the DeviceNet open field network.
- Monitor information from servo drive with the host controller.
- Full range of positioning functions featured.

FT82/FT83 Specification (SGM7D Motor Drive Type)..... 382
- High torque, high precision, and a user-friendly design.
- FT83 SERVOPACKs with built-in INDEXER.

Σ-7W SERVOPACKs (Two-axis)

MECHATROLINK-III Communications Reference Type..... 412
- Two axes can be controlled with a SERVOPACK.
- The regenerative energy of multiple axes can be used as the drive energy.

Σ-7C SERVOPACKs (Two-axis, with built-in Controllers)

Bus Connection Reference Type 420
- Build small-scale equipment system without PLC using one SERVOPACK.
- Expand functionality by mounting an option unit.
- Reduce burden of designing software when part of the equipment changes.

Common

SERVOPACK External Dimensions 436
Peripheral Devices 448

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

Model Designations

SGD7S - R70 A 00 A 001 000 B

Σ-7 Series
Σ-7S SERVOPACKs

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

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

Voltage	Code	Specification
Three-phase, 200 VAC	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
Single-phase, 100 VAC	R70	0.05 kW
	R90	0.1 kW
	2R1	0.2 kW
	2R8	0.4 kW

4th digit Voltage

Code	Specification
A	200 VAC
F	100 VAC

5th+6th digits Interface*4

Code	Specification
00	Analog voltage/pulse train reference

7th digit Design Revision Order

A

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

Code	Specification	Applicable Models
None	Without options	All models
000		
001	Rack-mounted	SGD7S-R70A to -330A
		SGD7S-R70F to -2R8F
	Duct-ventilated	SGD7S-470A to -780A
002	Varnished	All models
008	Single-phase, 200-VAC power supply input	SGD7S-120A
020*5	No dynamic brake	SGD7S-R70A to -2R8A
		SGD7S-R70F to -2R8F
	External dynamic brake resistor	SGD7S-3R8A to -780A

11th+12th+13th digits FT/EX Specification

Code	Specification
None	None
000	

14th digit BTO Specification*6 (Available in Japan only)

Code	Specification
None	None
B	BTO Specification

*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-120A00A008).

*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. Refer to the following manual for details.
📖 *Σ-7-Series AC Servo Drive Σ-7S/Σ-7W SERVOPACK with Hardware Option Specifications Dynamic Brake Product Manual* (Manual No.: SIEP S800001 73)

*6. The BTO specification indicates if the SERVOPACK is customized by using the MechatroCloud BTO service. You need a BTO number to order SERVOPACKs with customized specifications.
Refer to page M-15 for the details on the BTO service.

Ratings and Specifications

Ratings

◆ Three-phase, 200 VAC

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

* This is the net value at the rated load.

Model SGD7S-			470A	550A	590A	780A
Maximum Applicable Motor Capacity [kW]			6.0	7.5	11	15
Continuous Output Current [Arms]			46.9	54.7	58.6	78.0
Instantaneous Maximum Output Current [Arms]			110	130	140	170
Main Circuit	Power Supply		200 VAC to 240 VAC, -15% to +10%, 50 Hz/60 Hz			
	Input Current [Arms]*1		29	37	54	73
Control	Power Supply		200 VAC to 240 VAC, -15% to +10%, 50 Hz/60 Hz			
	Input Current [Arms]*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	1760*3	1760*3	1760*3
	Minimum Allowable External Resistance [Ω]		5.8	2.9	2.9	2.9
Overvoltage Category			III			

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

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

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

◆ Single-phase, 200 VAC

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

* This is the net value at the rated load.

◆ 270 VDC

Model SGD7S-		R70A	R90A	1R6A	2R8A	3R8A	5R5A	7R6A	120A
Maximum Applicable Motor Capacity [kW]		0.05	0.1	0.2	0.4	0.5	0.75	1.0	1.5
Continuous Output Current [Arms]		0.66	0.91	1.6	2.8	3.8	5.5	7.6	11.6
Instantaneous Maximum Output Current [Arms]		2.1	3.2	5.9	9.3	11.0	16.9	17.0	28.0
Main Circuit	Power Supply	270 VDC to 324 VDC, -15% to +10%							
	Input Current [Arms]*1	0.5	1.0	1.5	3.0	3.8	4.9	6.9	11
Control	Power Supply	270 VDC to 324 VDC, -15% to +10%							
	Input Current [Arms]*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 Arms 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 [Arms]		18.5	19.6	32.9	46.9	54.7	58.6	78.0
Instantaneous Maximum Output Current [Arms]		42.0	56.0	84.0	110	130	140	170
Main Circuit	Power Supply	270 VDC to 324 VDC, -15% to +10%						
	Input Current [Arms]*	14	20	34	36	48	68	92
Control	Power Supply	270 VDC to 324 VDC, -15% to +10%						
	Input Current [Arms]*	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.

◆ Single-phase, 100 VAC

Model SGD7S-		R70F	R90F	2R1F	2R8F
Maximum Applicable Motor Capacity [kW]		0.05	0.1	0.2	0.4
Continuous Output Current [Arms]		0.66	0.91	2.1	2.8
Instantaneous Maximum Output Current [Arms]		2.1	3.2	6.5	9.3
Main Circuit	Power Supply	100 VAC to 120 VAC, -15% to +10%, 50 Hz/60 Hz			
	Input Current [Arms]*	1.5	2.5	5	10
Control	Power Supply	100 VAC to 120 VAC, -15% to +10%, 50 Hz/60 Hz			
	Input Current [Arms]*	0.38	0.38	0.38	0.38
Power Supply Capacity [kVA]*		0.2	0.3	0.6	1.4
Power Loss*	Main Circuit Power Loss [W]	5.3	7.8	14.2	26.2
	Control Circuit Power Loss [W]	12	12	12	12
	Total Power Loss [W]	17.3	19.8	26.2	38.2
Regenerative Resistor	Minimum Allowable External Resistance [Ω]	40	40	40	40
Overvoltage Category		III			

* This is the net value at the rated load.

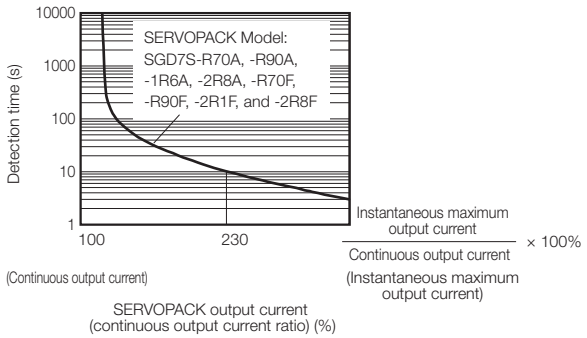
SERVOPACK Overload Protection Characteristics

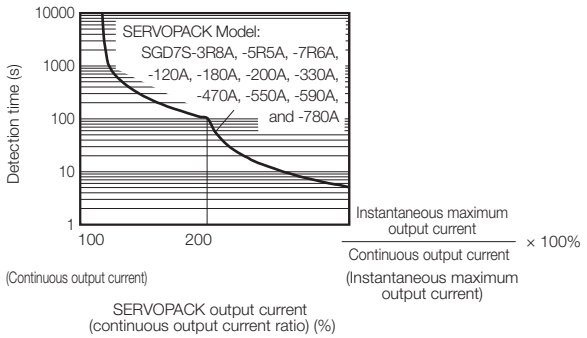
The overload detection level is set for hot start conditions with a SERVOPACK surrounding air temperature of 55°C.

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.

Specifications

<table>
<tr><th colspan="2">Item</th><th>Specification</th></tr>
<tr><td colspan="2">Control Method</td><td>IGBT-based PWM control, sine wave current drive</td></tr>
<tr><td rowspan="2">Feedback</td><td>With Rotary Servomotor</td><td>Serial encoder: 17 bits (absolute encoder)
20 bits or 24 bits (incremental encoder/absolute encoder)
22 bits (absolute encoder)</td></tr>
<tr><td>With Linear Servomotor</td><td>• Absolute linear encoder (The signal resolution depends on the absolute linear encoder.)
• Incremental linear encoder (The signal resolution depends on the incremental linear encoder or Serial Converter Unit.)</td></tr>
<tr><td rowspan="8">Environmental Conditions</td><td>Surrounding Air Temperature*1</td><td>-5°C to 55°C
With derating, usage is possible between 55°C and 60°C.
Refer to the following section for derating specifications.
☞ Derating Specifications (page 333)</td></tr>
<tr><td>Storage Temperature</td><td>-20°C to 85°C</td></tr>
<tr><td>Surrounding Air Humidity</td><td>95% relative humidity max. (with no freezing or condensation)</td></tr>
<tr><td>Storage Humidity</td><td>95% relative humidity max. (with no freezing or condensation)</td></tr>
<tr><td>Vibration Resistance</td><td>4.9 m/s^2</td></tr>
<tr><td>Shock Resistance</td><td>19.6 m/s^2</td></tr>
<tr><td>Degree of Protection</td><td><table><tr><th>Class</th><th>SERVOPACK Model: SGD7S-</th></tr><tr><td>IP20</td><td>R70A, R90A, 1R6A, 2R8A, 3R8A, 5R5A, 7R6A, 120A, R70F, R90F, 2R1F, 2R8F</td></tr><tr><td>IP10</td><td>120A00A008, 180A, 200A, 330A, 470A, 550A, 590A, 780A</td></tr></table></td></tr>
<tr><td>Pollution Degree</td><td>2
• Must be no corrosive or flammable gases.
• Must be no exposure to water, oil, or chemicals.
• Must be no dust, salts, or iron dust.</td></tr>
<tr><td>Altitude*1</td><td>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.
☞ Derating Specifications (page 333)</td></tr>
<tr><td>Others</td><td>Do not use the SERVOPACK in the following locations: Locations subject to static electricity noise, strong electromagnetic/magnetic fields, or radioactivity</td></tr>
<tr><td colspan="2">Applicable Standards</td><td>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</td></tr>
<tr><td colspan="2">Mounting</td><td><table><tr><th>Mounting</th><th>SERVOPACK Model: SGD7S-</th></tr><tr><td>Base-mounted</td><td>All Models</td></tr><tr><td>Rack-mounted</td><td>R70A, R90A, 1R6A, 2R8A, 3R8A, 5R5A, 7R6A, 120A, 180A, 200A, 330A, R70F, R90F, 2R1F, 2R8F</td></tr><tr><td>Duct-ventilated</td><td>470A, 550A, 590A, 780A</td></tr></table></td></tr>
<tr><td rowspan="4">Performance</td><td>Speed Control Range</td><td>1:5000 (At the rated torque, the lower limit of the speed control range must not cause the Servomotor to stop.)</td></tr>
<tr><td rowspan="3">Coefficient of Speed Fluctuation*2</td><td>±0.01% of rated speed max. (for a load fluctuation of 0% to 100%)</td></tr>
<tr><td>0% of rated speed max. (for a voltage fluctuation of ±10%)</td></tr>
<tr><td>±0.1% of rated speed max. (for a temperature fluctuation of 25°C ±25°C)</td></tr>
<tr><td>Torque Control Precision (Repeatability)</td><td>±1%</td></tr>
<tr><td>Soft Start Time Setting</td><td>0 s to 10 s (Can be set separately for acceleration and deceleration.)</td></tr>
</table>

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Item			Specification
I/O Signals	Encoder Divided Pulse Output		Phase A, phase B, phase C: Line-driver output Number of divided output pulses: Any setting is allowed.
	Overheat Protection Input		Number of input points: 1 Input voltage range: 0 V to +5 V
	Sequence Input Signals	Fixed Input	Allowable voltage range: 5 VDC ±5% Number of input points: 1 Absolute Data Request (SEN)
		Input Signals That Can Be Allocated	Allowable voltage range: 24 VDC ±20% Number of input points: 7
			Input method: Sink inputs or source inputs Input Signals • /S-ON (Servo ON) signal • /P-CON (Proportional Control) Signal • P-OT (Forward Drive Prohibit) and N-OT (Reverse Drive Prohibit) signals • /ALM-RST (Alarm Reset) signal • /P-CL (Forward External Torque Limit) and /N-CL (Reverse External Torque Limit) signals • /SPD-D (Motor Direction) signal • /SPD-A and /SPD-B (Internal Set Speed Selection) signals • /C-SEL (Control Selection) signal • /ZCLAMP (Zero Clamping) signal • /INHIBIT (Reference Pulse Inhibit) signal • /G-SEL (Gain Selection) signal • /P-DET (Polarity Detection) signal • SEN (Absolute Data Request) signal • /PSEL (Reference Pulse Input Multiplication Switch) Signal • FSTP (Forced Stop Input) signal A signal can be allocated and the positive and negative logic can be changed.
	Sequence Output Signals	Fixed Output	Allowable voltage range: 5 VDC to 30 VDC Number of output points: 1 Output signal: Servo Alarm (ALM)
		Output Signals That Can Be Allocated	Allowable voltage range: 5 VDC to 30 VDC Number of output points: 6 (A photocoupler output (isolated) is used for three of the outputs.) (An open-collector output (non-isolated) is used for the other three outputs.)
			Output Signals • /COIN (Positioning Completion) Signal • /V-CMP (Speed Coincidence Detection) Signal • /TGON (Rotation Detection) Signal • /S-RDY (Servo Ready) signal • /CLT (Torque Limit Detection) Signal • /VLT (Speed Limit Detection) Signal • /BK (Brake) signal • /WARN (Warning) Signal • /NEAR (Near) signal • /PSELA (Reference Pulse Input Multiplication Switching Output) signal • ALO1, ALO2, and ALO3 (Alarm Code) signals A signal can be allocated and the positive and negative logic can be changed.
Communications	RS-422A Communications (CN3)	Interfaces	Digital Operator (JUSP-OP05A-1-E) and personal computer (with SigmaWin+)
		1:N Communications	Up to N = 15 stations possible for RS-422A port
		Axis Address Setting	Set with parameters.
	USB Communications (CN7)	Interface	Personal computer (with SigmaWin+)
		Communications Standard	Conforms to USB2.0 standard (12 Mbps).
Displays/Indicators			CHARGE indicator and five-digit seven-segment display

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Item					Specification
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.) ☞ *Built-In Regenerative Resistor* (page 472)
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.
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 Σ-7-Series SERVOPACK with a Σ-V-Series Option Module, the following Σ-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:

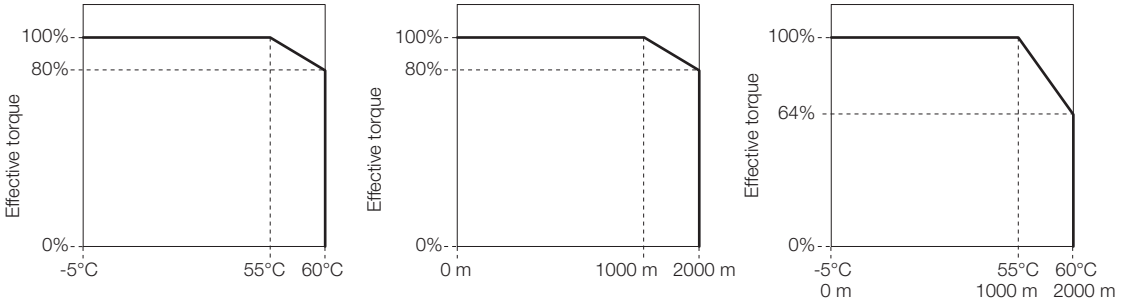
$$\text{Coefficient of speed fluctuation} = \frac{\text{No-load motor speed - Total-load motor speed}}{\text{Rated motor speed}} \times 100\%$$

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

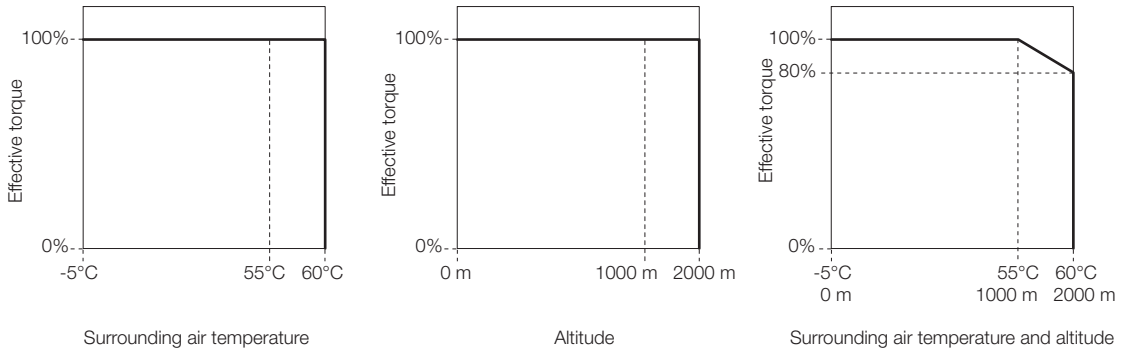
Derating Specifications

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

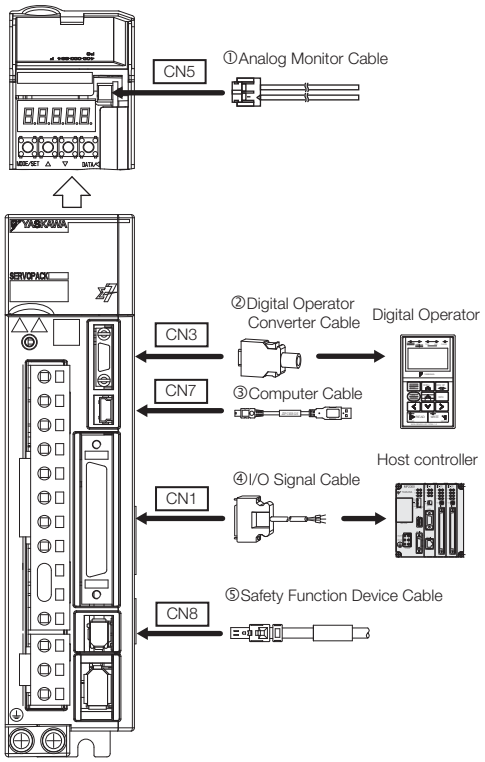


◆ SGD7S-3R8A, -5R5A, -7R6A, -120A, -180A, -200A, -330A, -470A, -550A, -590A, and -780A



Selecting Cables

◆ System Configurations



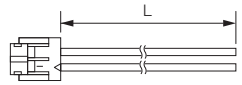
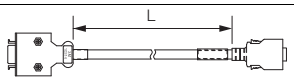
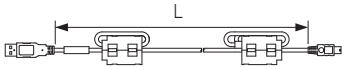
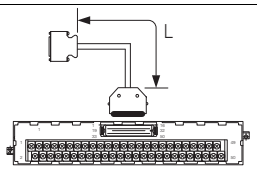
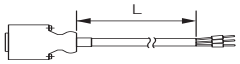
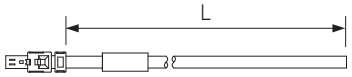
◆ Selection Table

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.

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

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

Code	Name		Length (L)	Order Number	Appearance
①	Analog Monitor Cable		1 m	JZSP-CA01-E	
②	Digital Operator Converter Cable		0.3 m	JZSP-CVS05-A3-E*1	
③	Computer Cable		2.5 m	JZSP-CVS06-02-E	
④	I/O Signal Cables	Soldered Connector Kit		JZSP-CSI9-1-E	
		Connector-Terminal Block Converter Unit (with cable)	0.5 m	JUSP-TA50PG-E	
			1 m	JUSP-TA50PG-1-E	
			2 m	JUSP-TA50PG-2-E	
		Cable with Loose Wires at One End (loose wires on peripheral device end)	1 m	JZSP-CSI01-1-E	
			2 m	JZSP-CSI01-2-E	
			3 m	JZSP-CSI01-3-E	
⑤	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 Σ-III-series Digital Operator (JUSP-OP05A) for Σ-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.

Model Designations

SGD7S - R70 A 10 A 001 000 B

Σ-7 Series
Σ-7S SERVOPACKs

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

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

Voltage	Code	Specification
Three-phase, 200 VAC	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
Single-phase, 100 VAC	R70	0.05 kW
	R90	0.1 kW
	2R1	0.2 kW
	2R8	0.4 kW

4th digit Voltage

Code	Specification
A	200 VAC
F	100 VAC

5th+6th digits Interface*4

Code	Specification
10	MECHATROLINK-II communications reference

7th digit Design Revision Order

A

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

Code	Specification	Applicable Models
None	Without options	All models
000		
001	Rack-mounted	SGD7S-R70A to -330A
		SGD7S-R70F to -2R8F
	Duct-ventilated	SGD7S-470A to -780A
002	Varnished	All models
008	Single-phase, 200-VAC power supply input	SGD7S-120A
020*5	No dynamic brake	SGD7S-R70A to -2R8A
		SGD7S-R70F to -2R8F
	External dynamic brake resistor	SGD7S-3R8A to -780A

11th+12th+13th digits FT/EX Specification

Code	Specification
None	None
000	

14th digit BTO Specification*6 (Available in Japan only)

Code	Specification
None	None
B	BTO Specification

*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-120A10A008).

*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. Refer to the following manual for details.
📖 *Σ-7-Series AC Servo Drive Σ-7S/Σ-7W SERVOPACK with Hardware Option Specifications Dynamic Brake Product Manual* (Manual No.: SIEP S800001 73)

*6. The BTO specification indicates if the SERVOPACK is customized by using the MechatroCloud BTO service.
You need a BTO number to order SERVOPACKs with customized specifications.
Refer to page M-15 for the details on the BTO service.

Ratings and Specifications

Ratings

◆ Three-phase, 200 VAC

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

* This is the net value at the rated load.

Model SGD7S-			470A	550A	590A	780A
Maximum Applicable Motor Capacity [kW]			6.0	7.5	11	15
Continuous Output Current [Arms]			46.9	54.7	58.6	78.0
Instantaneous Maximum Output Current [Arms]			110	130	140	170
Main Circuit	Power Supply		200 VAC to 240 VAC, -15% to +10%, 50 Hz/60 Hz			
	Input Current [Arms]*1		29	37	54	73
Control	Power Supply		200 VAC to 240 VAC, -15% to +10%, 50 Hz/60 Hz			
	Input Current [Arms]*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	1760*3	1760*3	1760*3
	Minimum Allowable External Resistance [Ω]		5.8	2.9	2.9	2.9
Overvoltage Category			III			

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

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

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

◆ Single-phase, 200 VAC

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

* This is the net value at the rated load.

◆ 270 VDC

Model SGD7S-		R70A	R90A	1R6A	2R8A	3R8A	5R5A	7R6A	120A
Maximum Applicable Motor Capacity [kW]		0.05	0.1	0.2	0.4	0.5	0.75	1.0	1.5
Continuous Output Current [Arms]		0.66	0.91	1.6	2.8	3.8	5.5	7.6	11.6
Instantaneous Maximum Output Current [Arms]		2.1	3.2	5.9	9.3	11.0	16.9	17.0	28.0
Main Circuit	Power Supply	270 VDC to 324 VDC, -15% to +10%							
	Input Current [Arms]*1	0.5	1.0	1.5	3.0	3.8	4.9	6.9	11
Control	Power Supply	270 VDC to 324 VDC, -15% to +10%							
	Input Current [Arms]*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 Arms 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 [Arms]		18.5	19.6	32.9	46.9	54.7	58.6	78.0
Instantaneous Maximum Output Current [Arms]		42.0	56.0	84.0	110	130	140	170
Main Circuit	Power Supply	270 VDC to 324 VDC, -15% to +10%						
	Input Current [Arms]*	14	20	34	36	48	68	92
Control	Power Supply	270 VDC to 324 VDC, -15% to +10%						
	Input Current [Arms]*	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.

◆ Single-phase, 100 VAC

Model SGD7S-		R70F	R90F	2R1F	2R8F
Maximum Applicable Motor Capacity [kW]		0.05	0.1	0.2	0.4
Continuous Output Current [Arms]		0.66	0.91	2.1	2.8
Instantaneous Maximum Output Current [Arms]		2.1	3.2	6.5	9.3
Main Circuit	Power Supply	100 VAC to 120 VAC, -15% to +10%, 50 Hz/60 Hz			
	Input Current [Arms]*	1.5	2.5	5	10
Control	Power Supply	100 VAC to 120 VAC, -15% to +10%, 50 Hz/60 Hz			
	Input Current [Arms]*	0.38	0.38	0.38	0.38
Power Supply Capacity [kVA]*		0.2	0.3	0.6	1.4
Power Loss*	Main Circuit Power Loss [W]	5.3	7.8	14.2	26.2
	Control Circuit Power Loss [W]	12	12	12	12
	Total Power Loss [W]	17.3	19.8	26.2	38.2
Regenerative Resistor	Minimum Allowable External Resistance [Ω]	40	40	40	40
Overvoltage Category		III			

* This is the net value at the rated load.

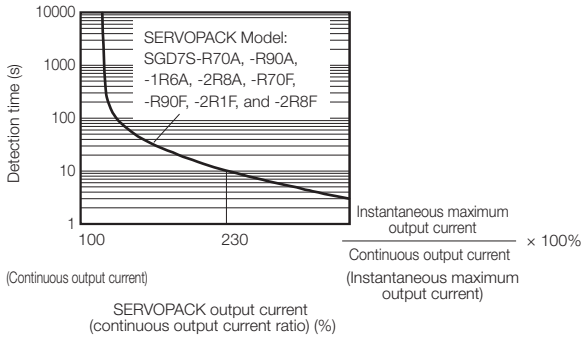
SERVOPACK Overload Protection Characteristics

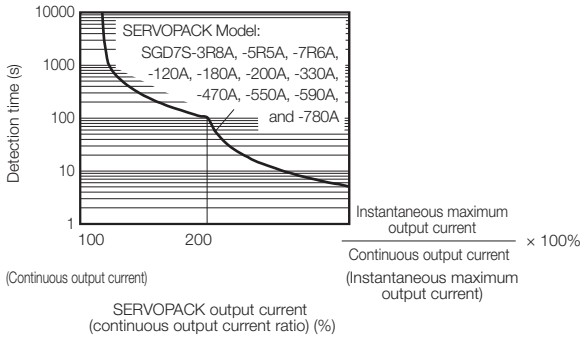
The overload detection level is set for hot start conditions with a SERVOPACK surrounding air temperature of 55°C.

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.

Specifications

<table>
<tr><th colspan="2">Item</th><th>Specification</th></tr>
<tr><td colspan="2">Control Method</td><td>IGBT-based PWM control, sine wave current drive</td></tr>
<tr><td rowspan="2">Feedback</td><td>With Rotary Servomotor</td><td>Serial encoder: 17 bits (absolute encoder)
20 bits or 24 bits (incremental encoder/absolute encoder)
22 bits (absolute encoder)</td></tr>
<tr><td>With Linear Servomotor</td><td>• Absolute linear encoder (The signal resolution depends on the absolute linear encoder.)
• Incremental linear encoder (The signal resolution depends on the incremental linear encoder or Serial Converter Unit.)</td></tr>
<tr><td rowspan="8">Environmental Conditions</td><td>Surrounding Air Temperature*1</td><td>-5°C to 55°C
With derating, usage is possible between 55°C and 60°C.
Refer to the following section for derating specifications.
☞ Derating Specifications (page 343)</td></tr>
<tr><td>Storage Temperature</td><td>-20°C to 85°C</td></tr>
<tr><td>Surrounding Air Humidity</td><td>95% relative humidity max. (with no freezing or condensation)</td></tr>
<tr><td>Storage Humidity</td><td>95% relative humidity max. (with no freezing or condensation)</td></tr>
<tr><td>Vibration Resistance</td><td>4.9 m/s^2</td></tr>
<tr><td>Shock Resistance</td><td>19.6 m/s^2</td></tr>
<tr><td>Degree of Protection</td><td><table><tr><th>Class</th><th>SERVOPACK Model: SGD7S-</th></tr><tr><td>IP20</td><td>R70A, R90A, 1R6A, 2R8A, 3R8A, 5R5A, 7R6A, 120A, R70F, R90F, 2R1F, 2R8F</td></tr><tr><td>IP10</td><td>120A10A008, 180A, 200A, 330A, 470A, 550A, 590A, 780A</td></tr></table></td></tr>
<tr><td>Pollution Degree</td><td>2
• Must be no corrosive or flammable gases.
• Must be no exposure to water, oil, or chemicals.
• Must be no dust, salts, or iron dust.</td></tr>
<tr><td>Altitude*1</td><td>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.
☞ Derating Specifications (page 343)</td></tr>
<tr><td>Others</td><td>Do not use the SERVOPACK in the following locations: Locations subject to static electricity noise, strong electromagnetic/magnetic fields, or radioactivity</td></tr>
<tr><td colspan="2">Applicable Standards</td><td>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</td></tr>
<tr><td colspan="2">Mounting</td><td><table><tr><th>Mounting</th><th>SERVOPACK Model: SGD7S-</th></tr><tr><td>Base-mounted</td><td>All Models</td></tr><tr><td>Rack-mounted</td><td>R70A, R90A, 1R6A, 2R8A, 3R8A, 5R5A, 7R6A, 120A, 180A, 200A, 330A, R70F, R90F, 2R1F, 2R8F</td></tr><tr><td>Duct-ventilated</td><td>470A, 550A, 590A, 780A</td></tr></table></td></tr>
<tr><td rowspan="4">Performance</td><td>Speed Control Range</td><td>1:5000 (At the rated torque, the lower limit of the speed control range must not cause the Servomotor to stop.)</td></tr>
<tr><td rowspan="3">Coefficient of Speed Fluctuation*2</td><td>±0.01% of rated speed max. (for a load fluctuation of 0% to 100%)</td></tr>
<tr><td>0% of rated speed max. (for a voltage fluctuation of ±10%)</td></tr>
<tr><td>±0.1% of rated speed max. (for a temperature fluctuation of 25°C ±25°C)</td></tr>
<tr><td>Torque Control Precision (Repeatability)</td><td>±1%</td></tr>
<tr><td>Soft Start Time Setting</td><td>0 s to 10 s (Can be set separately for acceleration and deceleration.)</td></tr>
</table>

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Item				Specification
I/O Signals	Encoder Divided Pulse Output			Phase A, phase B, phase C: Line-driver output Number of divided output pulses: Any setting is allowed.
	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 USB2.0 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.) ☞ *Built-In Regenerative Resistor* (page 472)
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 Modules and Safety Modules Note: You cannot use a Fully-Closed Module and a Safety Module together.

*1. If you combine a Σ-7-Series SERVOPACK with a Σ-V-Series Option Module, the following Σ-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:

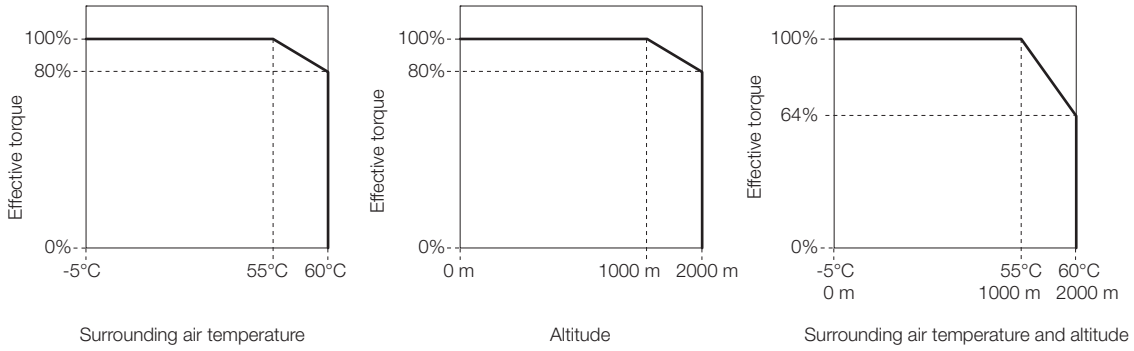
$$\text{Coefficient of speed fluctuation} = \frac{\text{No-load motor speed - Total-load motor speed}}{\text{Rated motor speed}} \times 100\%$$

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

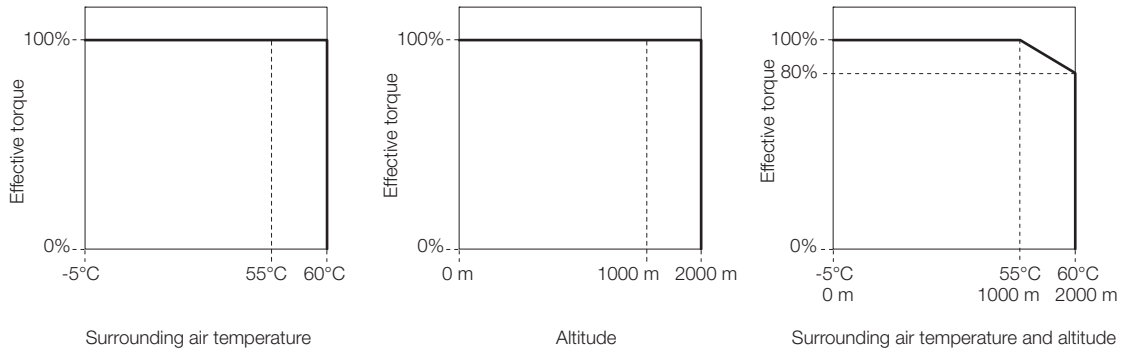
Derating Specifications

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

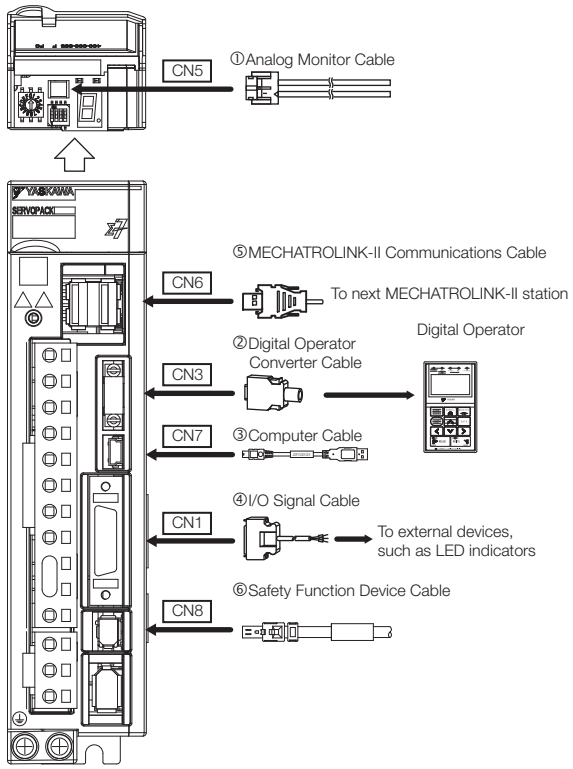


◆ SGD7S-3R8A, -5R5A, -7R6A, -120A, -180A, -200A, -330A, -470A, -550A, -590A, and -780A



Selecting Cables

◆ System Configurations



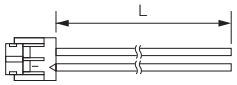
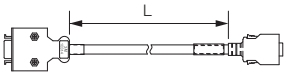
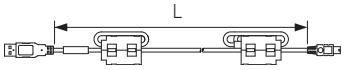
◆ Selection Table

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.

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

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

Code	Name	Length (L)	Order Number	Appearance
①	Analog Monitor Cable	1 m	JZSP-CA01-E	
②	Digital Operator Converter Cable	0.3 m	JZSP-CVS05-A3-E*1	
③	Computer Cable	2.5 m	JZSP-CVS06-02-E	

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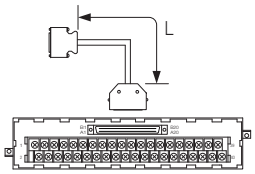
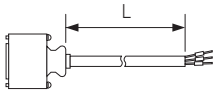
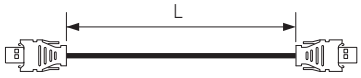
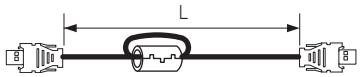
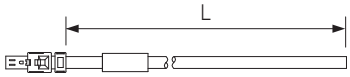
Code	Name		Length (L)	Order Number	Appearance
④	I/O Signal Cables	Soldered Connector Kit		JZSP-CSI9-2-E	
		Connector-Terminal Block Converter Unit (with cable)	0.5 m	JUSP-TA26P-E	
			1 m	JUSP-TA26P-1-E	
			2 m	JUSP-TA26P-2-E	
		Cable with Loose Wires at One End (loose wires on peripheral device end)	1 m	JZSP-CSI02-1-E	
			2 m	JZSP-CSI02-2-E	
			3 m	JZSP-CSI02-3-E	
⑤	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	
⑥	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 Σ-III-series Digital Operator (JUSP-OP05A) for Σ-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.

Model Designations

SGD7S - R70 A 20 A 001 000 B

- SGD7S: Σ-7 Series Σ-7S SERVOPACKs
- R70: 1st+2nd+3rd digits
- A: 4th digit
- 20: 5th+6th digits
- A: 7th digit
- 001: 8th+9th+10th digits
- 000: 11th+12th+13th digits
- B: 14th digit

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

Voltage	Code	Specification
Three-phase, 200 VAC	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
Single-phase, 100 VAC	R70	0.05 kW
	R90	0.1 kW
	2R1	0.2 kW
	2R8	0.4 kW

4th digit Voltage

Code	Specification
A	200 VAC
F	100 VAC

5th+6th digits Interface*4

Code	Specification
20	MECHATROLINK-III communications reference

7th digit Design Revision Order

A

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

Code	Specification	Applicable Models
None	Without options	All models
000		
001	Rack-mounted	SGD7S-R70A to -330A
		SGD7S-R70F to -2R8F
	Duct-ventilated	SGD7S-470A to -780A
002	Varnished	All models
008	Single-phase, 200-VAC power supply input	SGD7S-120A
020*5	No dynamic brake	SGD7S-R70A to -2R8A
		SGD7S-R70F to -2R8F
	External dynamic brake resistor	SGD7S-3R8A to -780A

11th+12th+13th digits FT/EX Specification

Code	Specification
None	None
000	

14th digit BTO Specification*6 (Available in Japan only)

Code	Specification
None	None
B	BTO Specification

*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-120A20A008).

*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. Refer to the following manual for details.
📖 *Σ-7-Series AC Servo Drive Σ-7S/Σ-7W SERVOPACK with Hardware Option Specifications Dynamic Brake Product Manual* (Manual No.: SIEP S800001 73)

*6. The BTO specification indicates if the SERVOPACK is customized by using the MechatroCloud BTO service. You need a BTO number to order SERVOPACKs with customized specifications.
Refer to page M-15 for the details on the BTO service.

Ratings and Specifications

Ratings

◆ Three-phase, 200 VAC

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

* This is the net value at the rated load.

Model SGD7S-			470A	550A	590A	780A
Maximum Applicable Motor Capacity [kW]			6.0	7.5	11	15
Continuous Output Current [Arms]			46.9	54.7	58.6	78.0
Instantaneous Maximum Output Current [Arms]			110	130	140	170
Main Circuit	Power Supply		200 VAC to 240 VAC, -15% to +10%, 50 Hz/60 Hz			
	Input Current [Arms]*1		29	37	54	73
Control	Power Supply		200 VAC to 240 VAC, -15% to +10%, 50 Hz/60 Hz			
	Input Current [Arms]*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	1760*3	1760*3	1760*3
	Minimum Allowable External Resistance [Ω]		5.8	2.9	2.9	2.9
Overvoltage Category			III			

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

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

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

◆ Single-phase, 200 VAC

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

* This is the net value at the rated load.

◆ 270 VDC

Model SGD7S-		R70A	R90A	1R6A	2R8A	3R8A	5R5A	7R6A	120A
Maximum Applicable Motor Capacity [kW]		0.05	0.1	0.2	0.4	0.5	0.75	1.0	1.5
Continuous Output Current [Arms]		0.66	0.91	1.6	2.8	3.8	5.5	7.6	11.6
Instantaneous Maximum Output Current [Arms]		2.1	3.2	5.9	9.3	11.0	16.9	17.0	28.0
Main Circuit	Power Supply	270 VDC to 324 VDC, -15% to +10%							
	Input Current [Arms]*1	0.5	1.0	1.5	3.0	3.8	4.9	6.9	11
Control	Power Supply	270 VDC to 324 VDC, -15% to +10%							
	Input Current [Arms]*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 Arms 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 [Arms]		18.5	19.6	32.9	46.9	54.7	58.6	78.0
Instantaneous Maximum Output Current [Arms]		42.0	56.0	84.0	110	130	140	170
Main Circuit	Power Supply	270 VDC to 324 VDC, -15% to +10%						
	Input Current [Arms]*	14	20	34	36	48	68	92
Control	Power Supply	270 VDC to 324 VDC, -15% to +10%						
	Input Current [Arms]*	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.

◆ Single-phase, 100 VAC

Model SGD7S-		R70F	R90F	2R1F	2R8F
Maximum Applicable Motor Capacity [kW]		0.05	0.1	0.2	0.4
Continuous Output Current [Arms]		0.66	0.91	2.1	2.8
Instantaneous Maximum Output Current [Arms]		2.1	3.2	6.5	9.3
Main Circuit	Power Supply	100 VAC to 120 VAC, -15% to +10%, 50 Hz/60 Hz			
	Input Current [Arms]*	1.5	2.5	5	10
Control	Power Supply	100 VAC to 120 VAC, -15% to +10%, 50 Hz/60 Hz			
	Input Current [Arms]*	0.38	0.38	0.38	0.38
Power Supply Capacity [kVA]*		0.2	0.3	0.6	1.4
Power Loss*	Main Circuit Power Loss [W]	5.3	7.8	14.2	26.2
	Control Circuit Power Loss [W]	12	12	12	12
	Total Power Loss [W]	17.3	19.8	26.2	38.2
Regenerative Resistor	Minimum Allowable External Resistance [Ω]	40	40	40	40
Overvoltage Category		III			

* This is the net value at the rated load.

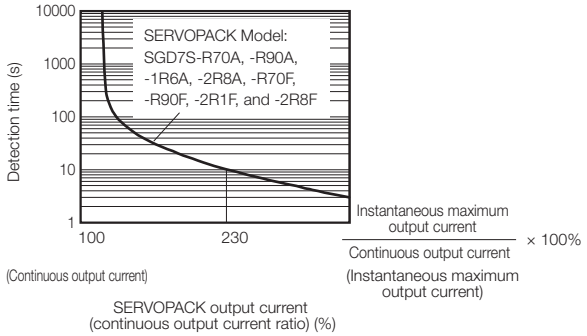
SERVOPACK Overload Protection Characteristics

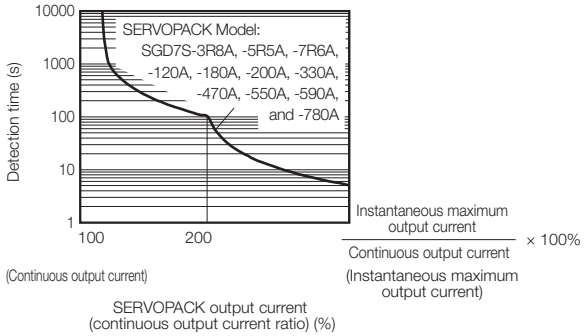
The overload detection level is set for hot start conditions with a SERVOPACK surrounding air temperature of 55°C.

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.

Specifications

<table>
<tr><th colspan="2">Item</th><th>Specification</th></tr>
<tr><td colspan="2">Drive Method</td><td>IGBT-based PWM control, sine wave current drive</td></tr>
<tr><td rowspan="2">Feedback</td><td>With Rotary Servomotor</td><td>Serial encoder: 17 bits (absolute encoder)
20 bits or 24 bits (incremental encoder/absolute encoder)
22 bits (absolute encoder)</td></tr>
<tr><td>With Linear Servomotor</td><td>• Absolute linear encoder (The signal resolution depends on the absolute linear encoder.)
• Incremental linear encoder (The signal resolution depends on the incremental linear encoder or Serial Converter Unit.)</td></tr>
<tr><td rowspan="8">Environmental Conditions</td><td>Surrounding Air Temperature*1</td><td>-5°C to 55°C
With derating, usage is possible between 55°C and 60°C.
Refer to the following section for derating specifications.
☞ Derating Specifications (page 353)</td></tr>
<tr><td>Storage Temperature</td><td>-20°C to 85°C</td></tr>
<tr><td>Surrounding Air Humidity</td><td>95% relative humidity max. (with no freezing or condensation)</td></tr>
<tr><td>Storage Humidity</td><td>95% relative humidity max. (with no freezing or condensation)</td></tr>
<tr><td>Vibration Resistance</td><td>4.9 m/s^2</td></tr>
<tr><td>Shock Resistance</td><td>19.6 m/s^2</td></tr>
<tr><td>Degree of Protection</td><td><table><tr><th>Class</th><th>SERVOPACK Model: SGD7S-</th></tr><tr><td>IP20</td><td>R70A, R90A, 1R6A, 2R8A, 3R8A, 5R5A, 7R6A, 120A, R70F, R90F, 2R1F, 2R8F</td></tr><tr><td>IP10</td><td>120A20A008, 180A, 200A, 330A, 470A, 550A, 590A, 780A</td></tr></table></td></tr>
<tr><td>Pollution Degree</td><td>2
• Must be no corrosive or flammable gases.
• Must be no exposure to water, oil, or chemicals.
• Must be no dust, salts, or iron dust.</td></tr>
<tr><td>Altitude*1</td><td>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.
☞ Derating Specifications (page 353)</td></tr>
<tr><td>Others</td><td>Do not use the SERVOPACK in the following locations: Locations subject to static electricity noise, strong electromagnetic/magnetic fields, or radioactivity</td></tr>
<tr><td colspan="2">Applicable Standards</td><td>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</td></tr>
<tr><td colspan="2">Mounting</td><td><table><tr><th>Mounting</th><th>SERVOPACK Model: SGD7S-</th></tr><tr><td>Base-mounted</td><td>All Models</td></tr><tr><td>Rack-mounted</td><td>R70A, R90A, 1R6A, 2R8A, 3R8A, 5R5A, 7R6A, 120A, 180A, 200A, 330A, R70F, R90F, 2R1F, 2R8F</td></tr><tr><td>Duct-ventilated</td><td>470A, 550A, 590A, 780A</td></tr></table></td></tr>
<tr><td rowspan="5">Performance</td><td>Speed Control Range</td><td>1:5000 (At the rated torque, the lower limit of the speed control range must not cause the Servomotor to stop.)</td></tr>
<tr><td rowspan="3">Coefficient of Speed Fluctuation*2</td><td>±0.01% of rated speed max. (for a load fluctuation of 0% to 100%)</td></tr>
<tr><td>0% of rated speed max. (for a voltage fluctuation of ±10%)</td></tr>
<tr><td>±0.1% of rated speed max. (for a temperature fluctuation of 25°C ±25°C)</td></tr>
<tr><td>Torque Control Precision (Repeatability)</td><td>±1%</td></tr>
<tr><td>Soft Start Time Setting</td><td>0 s to 10 s (Can be set separately for acceleration and deceleration.)</td></tr>
</table>

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Item				Specification
I/O Signals	Encoder Divided Pulse Output			Phase A, phase B, phase C: Line-driver output Number of divided output pulses: Any setting is allowed.
	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 USB2.0 standard (12 Mbps).
Displays/Indicators				CHARGE, PWR, CN, 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.) ☞ *Built-In Regenerative Resistor* (page 472)
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 Modules and Safety Modules Note: You cannot use a Fully-Closed Module and a Safety Module together.

*1. If you combine a Σ-7-Series SERVOPACK with a Σ-V-Series Option Module, the following Σ-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:

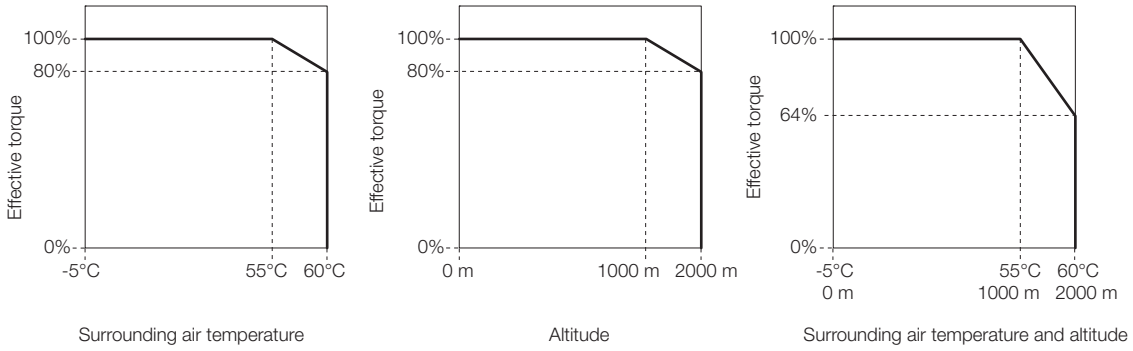
$$\text{Coefficient of speed fluctuation} = \frac{\text{No-load motor speed - Total-load motor speed}}{\text{Rated motor speed}} \times 100\%$$

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

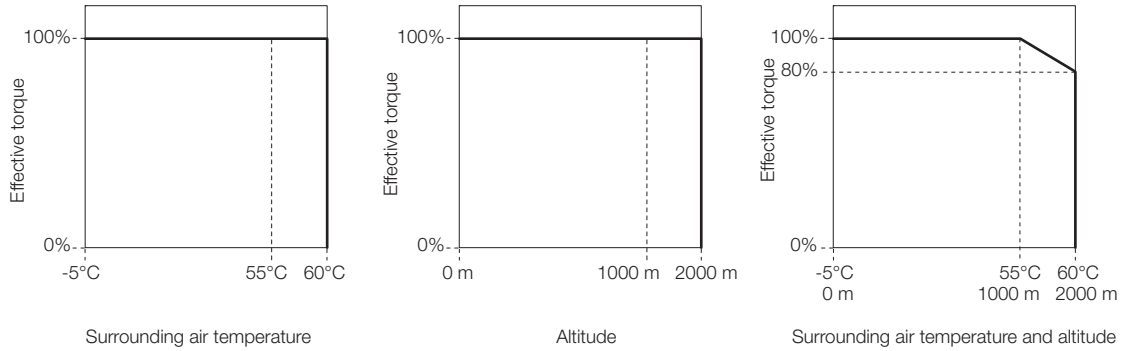
Derating Specifications

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

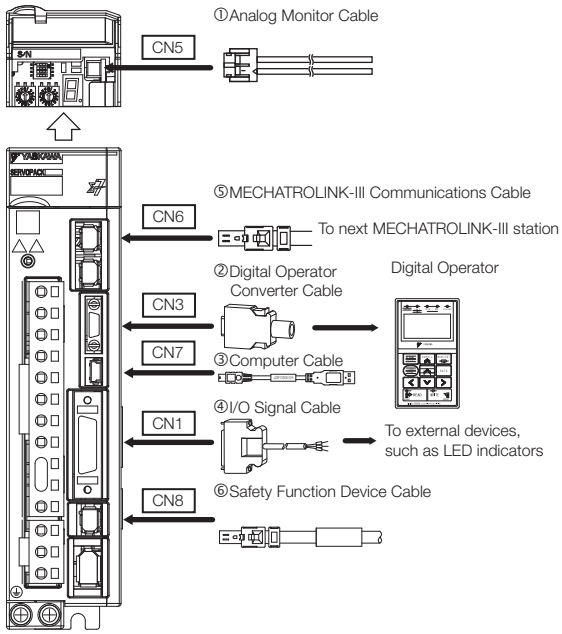


◆ SGD7S-3R8A, -5R5A, -7R6A, -120A, -180A, -200A, -330A, -470A, -550A, -590A, and -780A



Selecting Cables

◆ System Configurations



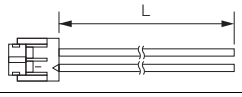
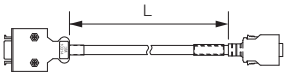
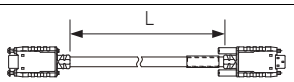
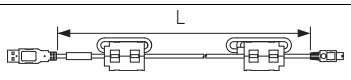
◆ Selection Table

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.

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

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

Code	Name	Length (L)	Order Number	Appearance
①	Analog Monitor Cable	1 m	JZSP-CA01-E	
②	Digital Operator Converter Cable	0.3 m	JZSP-CVS05-A3-E*1	
			JZSP-CVS07-A3-E*2	
③	Computer Cable	2.5 m	JZSP-CVS06-02-E	

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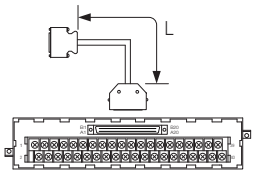
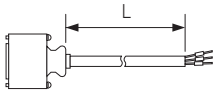
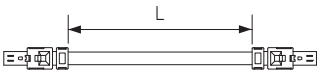
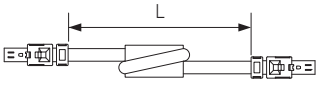
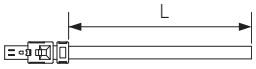
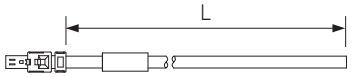
Code	Name		Length (L)	Order Number	Appearance
④	I/O Signal Cables	Soldered Connector Kit		JZSP-CSI9-2-E	
		Connector-Terminal Block Converter Unit (with cable)	0.5 m	JUSP-TA26P-E	
			1 m	JUSP-TA26P-1-E	
			2 m	JUSP-TA26P-2-E	
		Cable with Loose Wires at One End (loose wires on peripheral device end)	1 m	JZSP-CSI02-1-E	
			2 m	JZSP-CSI02-2-E	
			3 m	JZSP-CSI02-3-E	
⑤	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	
⑥	Safety Function Device Cables	Cables with Connectors*3	1 m	JZSP-CVH03-01-E	
			3 m	JZSP-CVH03-03-E	
		Connector Kit*4		Contact Tyco Electronics Japan G.K. Product name: Industrial Mini I/O D-shape Type 1 Plug Connector Kit Model number: 2013595-1	

*1. This Converter Cable is required to use the Σ-III-series Digital Operator (JUSP-OP05A) for Σ-7-series SERVOPACKs.

*2. If you use a MECHATROLINK-III Communications Reference SERVOPACK, this Converter Cable is required to prevent the cable from disconnecting from the Digital Operator.

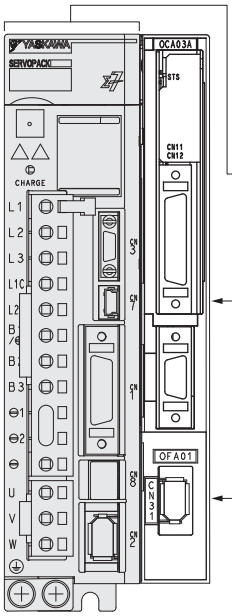
*3. When using safety functions, connect this Cable to the safety function devices.
When not using safety functions, connect the enclosed Safety Jumper Connector (JZSP-CVH05-E) to the SERVOPACK.

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

Σ-7S Single-axis INDEXER Module-Mounted SERVOPACKs

Configuration

A Σ-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.



Model Numbers of Sets
SGD7S□□□□E0A□□□10□

Command Option Attachable-Type SERVOPACKs
SGD7S-□□□□E0A□□□

INDEXER Module
SGDV-OCA03A

Note: Firmware version 6 or later is required.

Fully-Closed Module*
SGDV-OFA01A

* Attach a Fully-Closed Module if fully-closed loop control is required.

Purchase Order Number

Purchasing a Module in a Set with the SERVOPACK

To order SERVOPACKs with a INDEXER Module attached, use the following model numbers.

SGD7S *1 | R70 | A | E0 | A | 000 | 100

- SGD7S: Σ-7 Series Σ-7S SERVOPACKs
- R70: 1st+2nd+3rd digits
- A: 4th digit
- E0: 5th+6th digits
- A: 7th digit
- 000: 8th+9th+10th digits
- 100: 11th+12th+13th digits

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

Voltage	Code	Specification
Three-phase, 200 VAC	R70*2	0.05 kW
	R90*2	0.1 kW
	1R6*2	0.2 kW
	2R8*2	0.4 kW
	3R8	0.5 kW
	5R5*2	0.75 kW
	7R6	1.0 kW
	120*3	1.5 kW
	180	2.0 kW
	200*4	3.0 kW
	330	5.0 kW
	470	6.0 kW
	550	7.5 kW
	590	11 kW
	780	15 kW
Single-phase, 100 VAC	R70	0.05 kW
	R90	0.1 kW
	2R1	0.2 kW
	2R8	0.4 kW

4th digit: Voltage

Code	Specification
A	200 VAC
F	100 VAC

5th+6th digits: Interface

Code	Specification
E0	Command Option Attachable Type

7th digit: Design Revision Order

A

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

Code	Specification	Applicable Models
None	Without options	All models
001	Rack-mounted	SGD7S-R70A to -330A
		SGD7S-R70F to -2R8F
	Duct-ventilated	SGD7S-470A to -780A
002	Varnished	All models
008	Single-phase, 200-VAC power supply input	SGD7S-120A
020*5	No dynamic brake	SGD7S-R70A to -2R8A
		SGD7S-R70F to -2R8F
	External dynamic brake resistor	SGD7S-3R8A to -780A

11th+12th+13th digits: Option Module

Code	Specification
100	INDEXER Module
101	INDEXER Module + Fully-Closed Module

*1. The model number of a SERVOPACK with an Option Module is not hyphenated after SGD7S.

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

*3. A model with a single-phase, 200-VAC power supply input is available as a hardware option (model: SGD7S-120AE0A008).

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

*5. Refer to the following manual for details.

📖 *Σ-7-Series AC Servo Drive Σ-7S/Σ-7W SERVOPACK with Hardware Option Specifications Dynamic Brake Product Manual* (Manual No.: SIEP S800001 73)

Note: Contact your Yaskawa representative for information on combining options.

Purchasing a Module Separately

When ordering SERVOPACKs and Option Modules separately, use the following model numbers.

◆ SERVOPACK

SGD7S - R70 A E0 A 001 000 B

Σ-7 Series Σ-7S SERVOPACKs	1st+2nd+3rd digits	4th digit	5th+6th digits	7th digit	8th+9th+10th digits	11th+12th+13th digits	14th digit

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

Voltage	Code	Specification
Three-phase, 200 VAC	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
Single-phase, 100 VAC	R70	0.05 kW
	R90	0.1 kW
	2R1	0.2 kW
	2R8	0.4 kW

4th digit Voltage

Code	Specification
A	200 VAC
F	100 VAC

5th+6th digits Interface*4

Code	Specification
E0	Command Option Attachable Type

7th digit Design Revision Order

A

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

Code	Specification	Applicable Models
None	Without options	All models
000		
001	Rack-mounted	SGD7S-R70A to -330A
		SGD7S-R70F to -2R8F
	Duct-ventilated	SGD7S-470A to -780A
002	Varnished	All models
008	Single-phase, 200-VAC power supply input	SGD7S-120A
020*5	No dynamic brake	SGD7S-R70A to -2R8A
		SGD7S-R70F to -2R8F
	External dynamic brake resistor	SGD7S-3R8A to -780A

11th+12th+13th digits FT/EX Specification

Code	Specification
None	None
000	

14th digit BTO Specification*6

Code	Specification
None	None
B	BTO Specification

*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-120AE0A008).

*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. Refer to the following manual for details.
📖 *Σ-7-Series AC Servo Drive S-7S/S-7W SERVOPACK with Hardware Option Specifications Dynamic Brake Product Manual* (Manual No.: SIEP S800001 73)

*6. The BTO specification indicates if the SERVOPACK is customized by using the MechatroCloud BTO service. You need a BTO number to order SERVOPACKs with customized specifications.
Refer to page M-15 for the details on the BTO service.

Important

One Option Case Kit is required for each SERVOPACK.
Option Case Kit model: SGDV-OZA01A

◆ INDEXER Module

SGDV-OCA03A

◆ Fully-Closed Module

SGDV-OFA01A

Ratings and Specifications

SERVOPACK Ratings

◆ Three-Phase, 200 VAC

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

* This is the net value at the rated load.

Model SGD7S-			470A	550A	590A	780A
Maximum Applicable Motor Capacity [kW]			6.0	7.5	11	15
Continuous Output Current [Arms]			46.9	54.7	58.6	78.0
Instantaneous Maximum Output Current [Arms]			110	130	140	170
Main Circuit	Power Supply		200 VAC to 240 VAC, -15% to +10%, 50 Hz/60 Hz			
	Input Current [Arms]*1		29	37	54	73
Control	Power Supply		200 VAC to 240 VAC, -15% to +10%, 50 Hz/60 Hz			
	Input Current [Arms]*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 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	1760*3	1760*3	1760*3
	Minimum Allowable External Resistance [Ω]		5.8	2.9	2.9	2.9
Overvoltage Category			III			

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

◆ Single-phase, 200 VAC

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

* This is the net value at the rated load.

◆ 270 VDC

Model SGD7S-		R70A	R90A	1R6A	2R8A	3R8A	5R5A	7R6A	120A
Maximum Applicable Motor Capacity [kW]		0.05	0.1	0.2	0.4	0.5	0.75	1.0	1.5
Continuous Output Current [Arms]		0.66	0.91	1.6	2.8	3.8	5.5	7.6	11.6
Instantaneous Maximum Output Current [Arms]		2.1	3.2	5.9	9.3	11.0	16.9	17.0	28.0
Main Circuit	Power Supply	270 VDC to 324 VDC, -15% to +10%							
	Input Current [Arms]*1	0.5	1.0	1.5	3.0	3.8	4.9	6.9	11
Control	Power Supply	270 VDC to 324 VDC, -15% to +10%							
	Input Current [Arms]*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 Arms 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 [Arms]		18.5	19.6	32.9	46.9	54.7	58.6	78.0
Instantaneous Maximum Output Current [Arms]		42.0	56.0	84.0	110	130	140	170
Main Circuit	Power Supply	270 VDC to 324 VDC, -15% to +10%						
	Input Current [Arms]*	14	20	34	36	48	68	92
Control	Power Supply	270 VDC to 324 VDC, -15% to +10%						
	Input Current [Arms]*	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.

◆ Single-phase, 100 VAC

Model SGD7S-		R70F	R90F	2R1F	2R8F
Maximum Applicable Motor Capacity [kW]		0.05	0.1	0.2	0.4
Continuous Output Current [Arms]		0.66	0.91	2.1	2.8
Instantaneous Maximum Output Current [Arms]		2.1	3.2	6.5	9.3
Main Circuit	Power Supply	100 VAC to 120 VAC, -15% to +10%, 50 Hz/60 Hz			
	Input Current [Arms]*	1.5	2.5	5	10
Control	Power Supply	100 VAC to 120 VAC, -15% to +10%, 50 Hz/60 Hz			
	Input Current [Arms]*	0.38	0.38	0.38	0.38
Power Supply Capacity [kVA]*		0.2	0.3	0.6	1.4
Power Loss*	Main Circuit Power Loss [W]	5.3	7.8	14.2	26.2
	Control Circuit Power Loss [W]	12	12	12	12
	Total Power Loss [W]	17.3	19.8	26.2	38.2
Regenerative Resistor	Minimum Allowable External Resistance [Ω]	40	40	40	40
Overvoltage Category		III			

* This is the net value at the rated load.

INDEXER Module Power Loss

The power supply for an INDEXER Module is supplied from the control power supply of the SERVOPACK. The power loss is given in the following table.

Item	Specification
Power Supply Method	5.05 VDC
Maximum Operating Voltage	5.25 VDC
Maximum Operating Current	500 mA
Maximum Power Loss	2.6 W

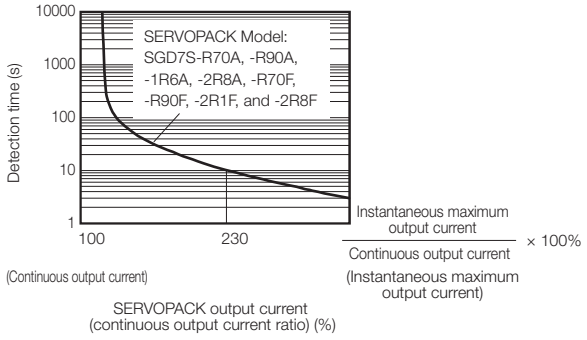
SERVOPACK Overload Protection Characteristics

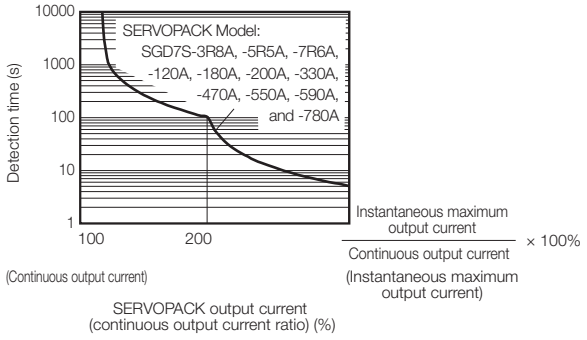
The overload detection level is set for hot start conditions with a SERVOPACK surrounding air temperature of 55°C.

An overload alarm (A.710 or A.720) will occur if overload operation that exceeds the overload protection characteristics shown in the following diagram (i.e., operation on the right side of the applicable line) is performed.

The actual overload detection level will be the detection level of the connected SERVOPACK or Servomotor that has the lower overload protection characteristics.

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





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

Specifications

The specifications when the INDEXER Module is combined with a Command Option Attachable-Type SERVOPACK are given in the following table.

<table>
<tr><th colspan="2">Item</th><th>Specification</th></tr>
<tr><td colspan="2">Control Method</td><td>IGBT-based PWM control, sine wave current drive</td></tr>
<tr><td rowspan="2">Feedback</td><td>With Rotary Servomotor</td><td>Serial encoder: 17 bits (absolute encoder)
20 bits or 24 bits (incremental encoder/absolute encoder)
22 bits (absolute encoder)</td></tr>
<tr><td>With Linear Servomotor</td><td>• Absolute linear encoder (The signal resolution depends on the absolute linear encoder.)
• Incremental linear encoder (The signal resolution depends on the incremental linear encoder or Serial Converter Unit.)</td></tr>
<tr><td rowspan="8">Environmental Conditions</td><td>Surrounding Air Temperature</td><td>0°C to 55°C</td></tr>
<tr><td>Storage Temperature</td><td>-20°C to 85°C</td></tr>
<tr><td>Surrounding Air Humidity</td><td>90% relative humidity max. (with no freezing or condensation)</td></tr>
<tr><td>Storage Humidity</td><td>90% relative humidity max. (with no freezing or condensation)</td></tr>
<tr><td>Vibration Resistance</td><td>4.9 m/s^2</td></tr>
<tr><td>Shock Resistance</td><td>19.6 m/s^2</td></tr>
<tr><td>Degree of Protection</td><td><table><tr><th>Class</th><th>SERVOPACK Model: SGD7S-</th></tr><tr><td>IP20</td><td>R70A, R90A, 1R6A, 2R8A, 3R8A, 5R5A, 7R6A, 120A, R70F, R90F, 2R1F, 2R8F</td></tr><tr><td>IP10</td><td>120AE0A008, 180A, 200A, 330A, 470A, 550A, 590A, 780A</td></tr></table></td></tr>
<tr><td>Pollution Degree</td><td>2
• Must be no corrosive or flammable gases.
• Must be no exposure to water, oil, or chemicals.
• Must be no dust, salts, or iron dust.</td></tr>
<tr><td>Altitude</td><td>1,000 m max.</td></tr>
<tr><td>Others</td><td>Do not use the SERVOPACK in the following locations: Locations subject to static electricity noise, strong electromagnetic/magnetic fields, or radioactivity</td></tr>
<tr><td colspan="2">Applicable Standards</td><td>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</td></tr>
<tr><td colspan="2">Mounting</td><td><table><tr><th>Mounting</th><th>SERVOPACK Model: SGD7S-</th></tr><tr><td>Base-mounted</td><td>All Models</td></tr><tr><td>Rack-mounted</td><td>R70A, R90A, 1R6A, 2R8A, 3R8A, 5R5A, 7R6A, 120A, 180A, 200A, 330A, R70F, R90F, 2R1F, 2R8F</td></tr><tr><td>Duct-ventilated</td><td>470A, 550A, 590A, 780A</td></tr></table></td></tr>
<tr><td rowspan="4">Performance</td><td>Speed Control Range</td><td>1:5000 (At the rated torque, the lower limit of the speed control range must not cause the Servomotor to stop.)</td></tr>
<tr><td rowspan="3">Coefficient of Speed Fluctuation[*1]</td><td>±0.01% of rated speed max. (for a load fluctuation of 0% to 100%)</td></tr>
<tr><td>0% of rated speed max. (for a voltage fluctuation of ±10%)</td></tr>
<tr><td>±0.1% of rated speed max. (for a temperature fluctuation of 25°C ±25°C)</td></tr>
<tr><td>Torque Control Precision (Repeatability)</td><td>±1%</td></tr>
<tr><td>Soft Start Time Setting</td><td>0 s to 10 s (Can be set separately for acceleration and deceleration.)</td></tr>
<tr><td rowspan="2">I/O Signals</td><td>Encoder Divided Pulse Output</td><td>Phase A, phase B, phase C: Line-driver output Number of divided output pulses: Any setting is allowed.</td></tr>
<tr><td>Overheat Protection Input</td><td>Number of input points: 1
Input voltage range: 0 V to +5 V</td></tr>
</table>

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<table>
<tr><th colspan="4">Item</th><th colspan="2">Specification</th></tr>
<tr><td rowspan="6">I/O Signals</td><td rowspan="4">Sequence Input Signals</td><td>SERVOPACK</td><td rowspan="4">Fixed Input</td><td colspan="2">Allowable voltage range: 24 VDC ±20%
Number of input points: 6</td></tr>
<tr><td rowspan="3">INDEXER Module</td><td colspan="2">Input method: Sink inputs or source inputs
Input Signals:
• Alarm Reset (/ALM-RST)
• Forward Drive Prohibited (P-OT)
• Reverse Drive Prohibited (N-OT)
• Origin Return Deceleration Switch (/DEC)
• Registration (/RGRT)
• Servo ON (/S-ON)
A signal can be allocated and the positive and negative logic can be changed.</td></tr>
<tr><td colspan="2">Allowable voltage range: 24 VDC ±20%
Number of input points: 11</td></tr>
<tr><td colspan="2">/MODE 0/1 (Mode Switch Input) signal
<table><tr><th>Mode 0</th><th>Mode 1</th></tr><tr><td>• /START-STOP (Program Table Operation Start-Stop Input) signal
• /PGMRES (Program Table Operation Reset Input) signal
• /SEL0 (Program Step Selection Input 0) signal
• /SEL1 (Program Step Selection Input 1) signal
• /SEL2 (Program Step Selection Input 2) signal
• /SEL3 (Program Step Selection Input 3) signal
• /SEL4 (Program Step Selection Input 4) signal
• /SEL5 (Program Step Selection Input 5) signal
• /SEL6 (Program Step Selection Input 6) signal
• /SEL7 (Program Step Selection Input 7) signal</td><td>• /HOME (Origin Return Input) signal
• /JOGP (Forward Jog Input) signal
• /JOGN (Reverse Jog Input) signal
• /JOG0 (Jog Speed Table Selection Input 0) signal
• /JOG1 (Jog Speed Table Selection Input 1) signal
• /JOG2 (Jog Speed Table Selection Input 2) signal
• /JOG3 (Jog Speed Table Selection Input 3) signal</td></tr></table></td></tr>
<tr><td rowspan="3">Sequence Output Signals</td><td rowspan="2">SERVOPACK</td><td>Fixed Output</td><td colspan="2">Allowable voltage range: 5 VDC to 30 VDC
Number of output points: 1
Output signal: Servo Alarm (/ALM)</td></tr>
<tr><td>Output Signals for Which Allocations Can Be Changed</td><td colspan="2">Allowable voltage range: 5 VDC to 30 VDC
Number of output points: 3
(A photocoupler output (isolated) is used.)
Output Signals:
• Warning Output (/WARN)
• Brake Output (/BK)
• Servo Ready Output (/S-RDY)
• Alarm Code Output (/ALO1, /ALO2, and /ALO3)
A signal can be allocated and the positive and negative logic can be changed.</td></tr>
<tr><td>INDEXER Module</td><td>Fixed Output</td><td colspan="2">Allowable voltage range: 5 VDC to 30 VDC
Number of output points: 9
Output Signals:
• Positioning Completion Output (/INPOSITION)
• Programmable Output 0 (/POUT0)
• Programmable Output 1 (/POUT1)
• Programmable Output 2 (/POUT2)
• Programmable Output 3 (/POUT3)
• Programmable Output 4 (/POUT4)
• Programmable Output 5 (/POUT5)
• Programmable Output 6 (/POUT6)
• Programmable Output 7 (/POUT7)</td></tr>
</table>

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Item			Specification
Communications	RS-422A Communications (CN3)	Interfaces	Digital Operator (JUSP-OP05A-1-E) and personal computer (with SigmaWin+)
		1:N Communications	Up to N = 15 stations possible for RS-422A port
		Axis Address Setting	Set with parameters.
	USB Communications (CN7)	Interfaces	Interface Personal computer (with SigmaWin+)
		Communications Standard	Conforms to USB2.0 standard (12 Mbps).
Displays/ Indicators	SERVOPACK		CHARGE and PWR indicators, and one-digit seven-segment display
	INDEXER Module		Refer to the following manual for details. 📖 *Σ-7-Series AC Servo Drive Σ-7S SERVOPACK Command Option Attachable Type with INDEXER Module Product Manual* (Manual No.: SIEP S800001 64)
Operating Methods	Program Table Method		• Program table positioning in which steps are executed sequentially by commands given through contact input or serial communications • Positioning in which station numbers are specified by commands given through contact input or serial communications
		Max. Number of Steps	256
		Max. Number of Tables	256
		Max. Number of Stations	256
	Serial Communications Method		Serial command by 1-channel ASCII code Communications specifications: RS-422/485 (50 m max.) Connection topology: Multi-drop connection (16 axes max.) Baud rate: 9600, 19200, 38400 bps
	Other Functions		Registration (positioning by external signals), origin return
Analog Monitor (CN5)			Number of points: 2 Output voltage range: ±10 VDC (effective linearity range: ±8 V) Resolution: 16 bits Accuracy: ±20 mV (Typ) Maximum output current: ±10 mA Settling time (±1%): 1.2 ms (Typ)
Dynamic Brake (DB)			Activated when a servo alarm or overtravel (OT) occurs, or when the power supply to the main circuit or servo is OFF.
Regenerative Processing			Built-in (An external resistor must be connected to the SGD7S-470A to -780A.) Refer to the following section for details. ☞ *Built-In Regenerative Resistor* (page 472)
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	Inputs		/HWBB1 and /HWBB2: Base block signals for Power Modules
	Output		EDM1: Monitors the status of built-in safety circuit (fixed output).
	Applicable Standards*2		ISO13849-1 PLe (Category 3), IEC61508 SIL3
Applicable Option Modules			Fully-Closed Module Note: You cannot use a Safety Module if you are using an INDEXER Module.

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

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

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

Reference Methods

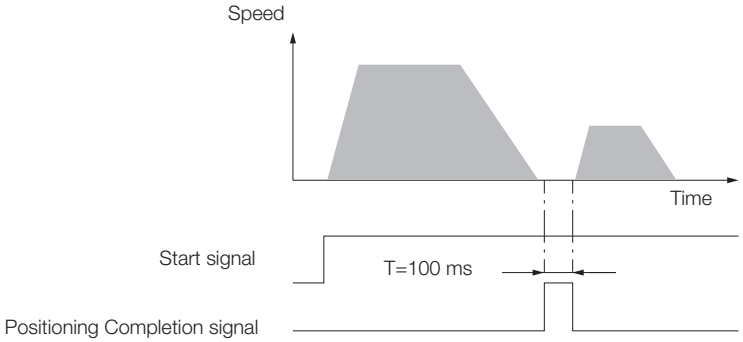
The INDEXER Module has two reference methods: digital I/O and serial commands. These command methods are described in the following sections.

Digital I/O is used with a program table (mode 0) or a jog speed table (mode 1). You can use a program table (mode 0) to execute the program steps that you select with I/O signal patterns (binary format). If the jog speed table (mode 1) is being used, the jog speed selected with the input signal pattern (binary format) can be executed.

- Program Table

256 steps

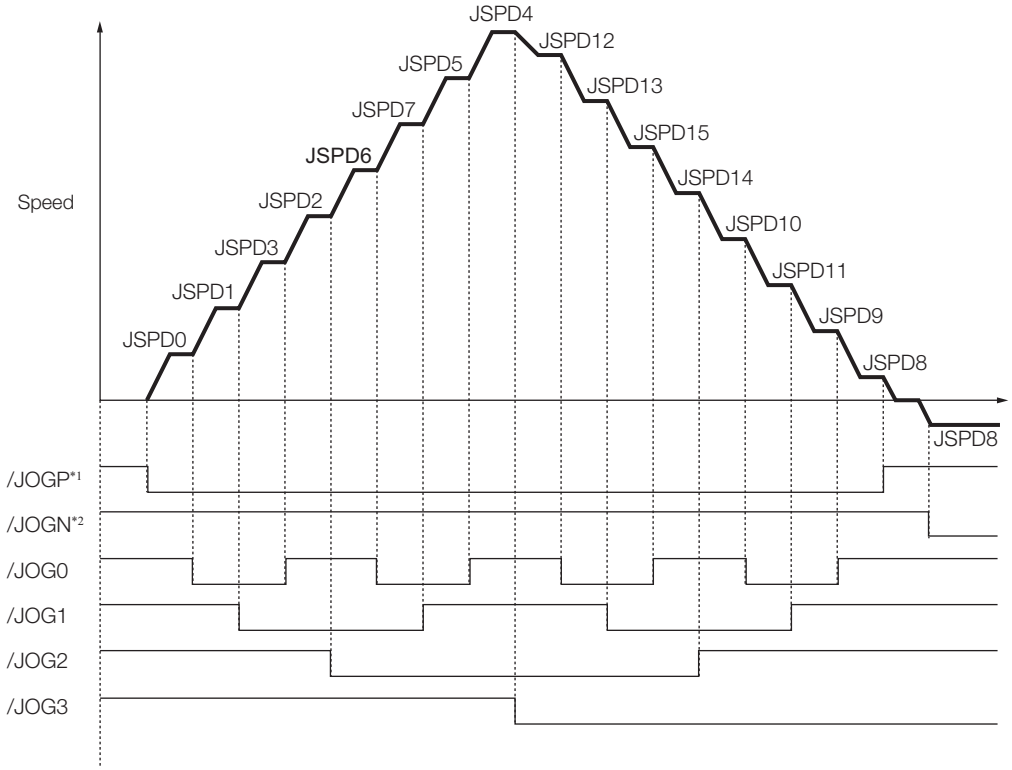
PGMSTEP	POS	SPD	RDST	RSPD	ACC*	DEC*	EVENT	LOOP	NEXT
0	I+400000	2000	500000	1000	200	100	T5000	1	1
1	I+100000	1000	200000	2000	100	50	IT0	1	END
⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮
n	I+400000	2000	500000	1000	100	50	IT100	1	n+1
n+1	I+100000	1000	200000	2000	⋮	⋮	NT0	1	END
⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮
254	I+400000	2000	500000	1000	100	50	SEL3T200	1	127
255	I+100000	1000	200000	2000	100	50	DT0	1	END



• Jog Speed Table

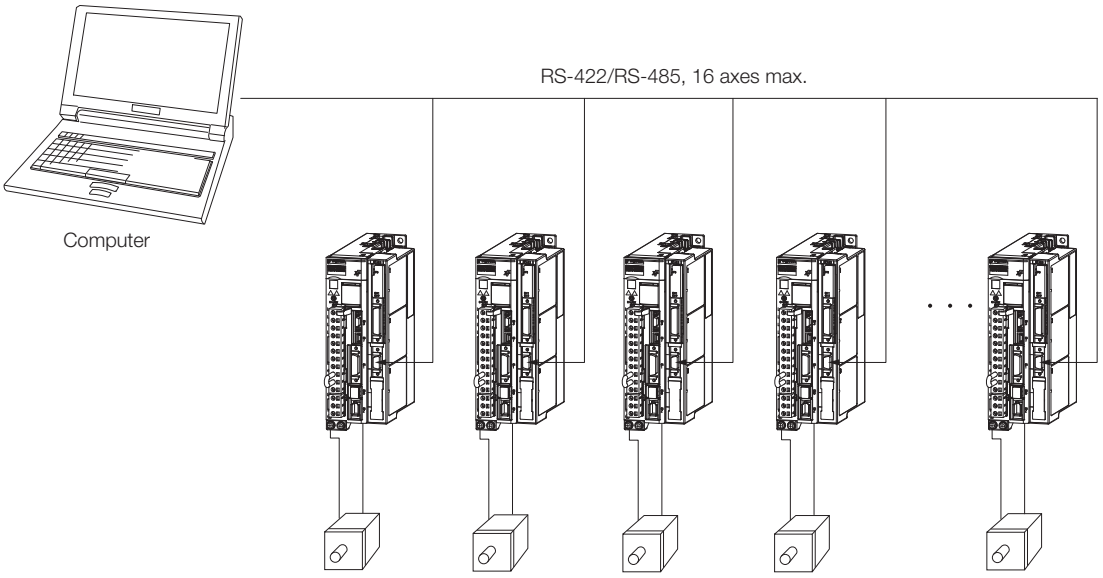
	JSPD	JOG3	JOG2	JOG1	JOG0	Jog Speed
16 combinations	0	0	0	0	0	1000
	1	0	0	0	1	2000
	2	0	0	1	0	4000
	⋮	⋮	⋮	⋮	⋮	⋮
	⋮	⋮	⋮	⋮	⋮	⋮
	⋮	⋮	⋮	⋮	⋮	⋮
	15	1	1	1	1	5500

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

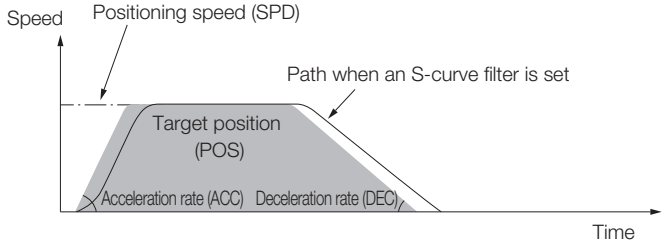


*1. Forward operation at the jog speed is performed while the /JOGP signal is ON.
*2. Reverse operation at the jog speed is performed while the /JOGN signal is ON.

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.
 :
```

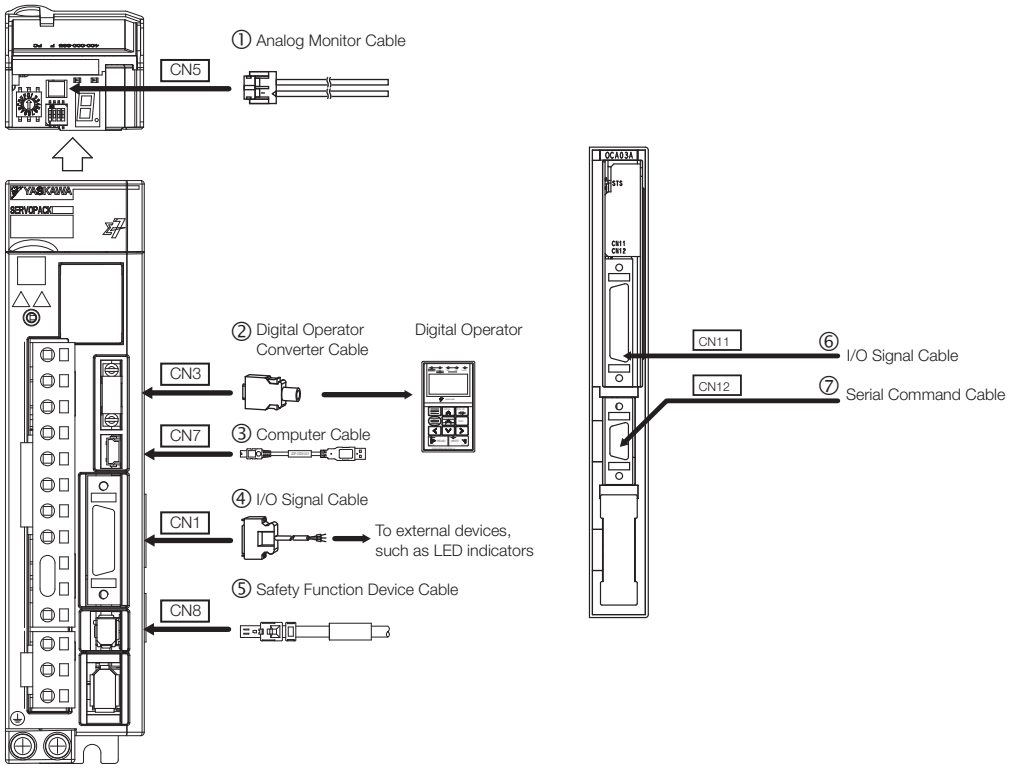


Selecting Cables

◆ System Configurations

■ Σ-7S Single-axis Command Option Attachable-Type SERVOPACKs

■ Command Option Module: INDEXER Module



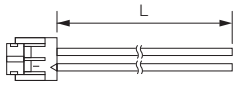
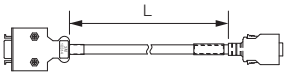
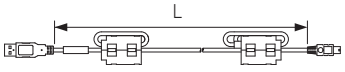
◆ Selection Table

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.

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

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

Code	Name	Length (L)	Order Number	Appearance
①	Analog Monitor Cable	1 m	JZSP-CA01-E	
②	Digital Operator Converter Cable	0.3 m	JZSP-CVS05-A3-E*1	
③	Computer Cable	2.5 m	JZSP-CVS06-02-E	

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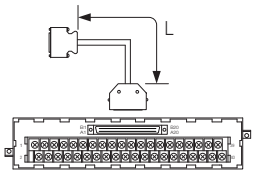
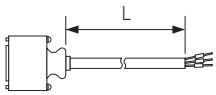
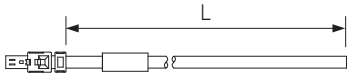
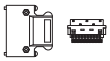
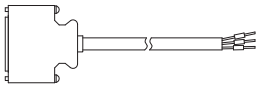
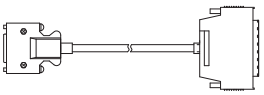
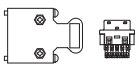
Continued from previous page.

Code	Name		Length (L)	Order Number	Appearance
④	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	
⑤	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	
⑥	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	
⑦	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 Σ-III-series Digital Operator (JUSP-OP05A) for Σ-7-series SERVOPACKs.

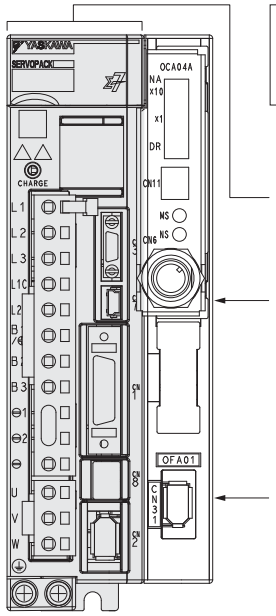
*2. When using safety functions, connect this Cable to the safety function devices.
When not using safety functions, connect the enclosed Safety Jumper Connector (JZSP-CVH05-E) to the SERVOPACK.

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

Σ-7S Single-axis DeviceNet Module-Mounted SERVOPACKs

Configuration

A Σ-7S Single-axis DeviceNet Module-Mounted SERVOPACK is a Command Option Attachable-Type SERVOPACK with a DeviceNet Module mounted on the side of the SERVOPACK. Positioning and origin returns can be performed by sending commands from the host controller (DeviceNet master).



Model Numbers of Sets
SGD7S□□□□E0A□□□5□□ (driven by control power supply)
SGD7S□□□□E0A□□□6□□ (driven by external power supply)

Command Option Attachable-Type SERVOPACKs
SGD7S-□□□□E0A□□□

DeviceNet Modules with Option Case Kit
SGDV-OCA04A (driven by control power supply)
SGDV-OCA05A (driven by external power supply)

Fully-Closed Module*
SGDV-OFA01A

* Attach a Fully-Closed Module if fully-closed loop control is required.

Purchase Order Number

Purchasing a Module in a Set with the SERVOPACK

To order SERVOPACKs with a DeviceNet Module attached, use the following model numbers.

SGD7S *1 | R70 | A | E0 | A | 000 | 500

- SGD7S: Σ-7 Series Σ-7S SERVOPACKs
- R70: 1st+2nd+3rd digits
- A: 4th digit
- E0: 5th+6th digits
- A: 7th digit
- 000: 8th+9th+10th digits
- 500: 11th+12th+13th digits

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

Voltage	Code	Specification
Three-phase, 200 VAC	R70*2	0.05 kW
	R90*2	0.1 kW
	1R6*2	0.2 kW
	2R8*2	0.4 kW
	3R8	0.5 kW
	5R5*2	0.75 kW
	7R6	1.0 kW
	120*3	1.5 kW
	180	2.0 kW
	200*4	3.0 kW
	330	5.0 kW
	470	6.0 kW
	550	7.5 kW
	590	11 kW
	780	15 kW
Single-phase, 100 VAC	R70	0.05 kW
	R90	0.1 kW
	2R1	0.2 kW
	2R8	0.4 kW

4th digit: Voltage

Code	Specification
A	200 VAC
F	100 VAC

5th+6th digits: Interface

Code	Specification
E0	Command Option Attachable Type

7th digit: Design Revision Order

A

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

Code	Specification	Applicable Models
None	Without options	All models
001	Rack-mounted	SGD7S-R70A to -330A
		SGD7S-R70F to -2R8F
	Duct-ventilated	SGD7S-470A to -780A
002	Varnished	All models
008	Single-phase, 200-VAC power supply input	SGD7S-120A
020*5	No dynamic brake	SGD7S-R70A to -2R8A
		SGD7S-R70F to -2R8F
	External dynamic brake resistor	SGD7S-3R8A to -780A

11th+12th+13th digits: Option Module

Code	Specification
500	DeviceNet Module driven by control power supply
501	DeviceNet Module driven by control power supply +Fully-Closed Module
600	DeviceNet Module driven by external power supply
601	DeviceNet Module driven by external power supply +Fully-Closed Module

*1. The model number of a SERVOPACK with an Option Module is not hyphenated after SGD7S.

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

*3. A model with a single-phase, 200-VAC power supply input is available as a hardware option (model: SGD7S-120AE0A008).

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

*5. Refer to the following manual for details.

📖 *Σ-7-Series AC Servo Drive Σ-7S/Σ-7W SERVOPACK with Hardware Option Specifications Dynamic Brake Product Manual* (Manual No.: SIEP S800001 73)

Note: Contact your Yaskawa representative for information on combining options.
The DeviceNet Module is equipped with an Option Case Kit. (Option Case Kits do not need to be ordered separately.)

Purchasing a Module Separately

When ordering SERVOPACKs and Option Modules separately, use the following model numbers.

◆ SERVOPACK

SGD7S - R70 A E0 A 001 000 B

- SGD7S: Σ-7 Series Σ-7S SERVOPACKs
- R70: 1st+2nd+3rd digits
- A: 4th digit
- E0: 5th+6th digits
- A: 7th digit
- 001: 8th+9th+10th digits
- 000: 11th+12th+13th digits
- B: 14th digit

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

Voltage	Code	Specification
Three-phase, 200 VAC	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
Single-phase, 100 VAC	R70	0.05 kW
	R90	0.1 kW
	2R1	0.2 kW
	2R8	0.4 kW

4th digit Voltage

Code	Specification
A	200 VAC
F	100 VAC

5th+6th digits Interface*4

Code	Specification
E0	Command Option Attachable Type

7th digit Design Revision Order

A

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

Code	Specification	Applicable Models
None	Without options	All models
000		
001	Rack-mounted	SGD7S-R70A to -330A
		SGD7S-R70F to -2R8F
	Duct-ventilated	SGD7S-470A to -780A
002	Varnished	All models
008	Single-phase, 200-VAC power supply input	SGD7S-120A
020*5	No dynamic brake	SGD7S-R70A to -2R8A
		SGD7S-R70F to -2R8F
	External dynamic brake resistor	SGD7S-3R8A to -780A

11th+12th+13th digits FT/EX Specification

Code	Specification
None	None
000	

14th digit BTO Specification*6

Code	Specification
None	None
B	BTO Specification

*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-120AE0A008).

*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. Refer to the following manual for details.
📖 *Σ-7-Series AC Servo Drive Σ-7S/Σ-7W SERVOPACK with Hardware Option Specifications Dynamic Brake Product Manual* (Manual No.: SIEP S800001 73)

*6. The BTO specification indicates if the SERVOPACK is customized by using the MechatroCloud BTO service. You need a BTO number to order SERVOPACKs with customized specifications. Refer to page M-15 for the details on the BTO service.

◆ DeviceNet Modules

SGDV-OCA04A (driven by control power supply)

SGDV-OCA05A (driven by external power supply)

Important

The DeviceNet Module is equipped with an Option Case Kit. (Option Case Kits do not need to be ordered separately.)

◆ Fully-Closed Module

SGDV-OFA01A

Ratings and Specifications

SERVOPACK Ratings

◆ Three-Phase, 200 VAC

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

* This is the net value at the rated load.

Model SGD7S-			470A	550A	590A	780A
Maximum Applicable Motor Capacity [kW]			6.0	7.5	11	15
Continuous Output Current [Arms]			46.9	54.7	58.6	78.0
Instantaneous Maximum Output Current [Arms]			110	130	140	170
Main Circuit	Power Supply		200 VAC to 240 VAC, -15% to +10%, 50 Hz/60 Hz			
	Input Current [Arms]*1		29	37	54	73
Control	Power Supply		200 VAC to 240 VAC, -15% to +10%, 50 Hz/60 Hz			
	Input Current [Arms]*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 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	1760*3	1760*3	1760*3
	Minimum Allowable External Resistance [Ω]		5.8	2.9	2.9	2.9
Overvoltage Category			III			

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

◆ Single-phase, 200 VAC

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

* This is the net value at the rated load.

◆ 270 VDC

Model SGD7S-		R70A	R90A	1R6A	2R8A	3R8A	5R5A	7R6A	120A
Maximum Applicable Motor Capacity [kW]		0.05	0.1	0.2	0.4	0.5	0.75	1.0	1.5
Continuous Output Current [Arms]		0.66	0.91	1.6	2.8	3.8	5.5	7.6	11.6
Instantaneous Maximum Output Current [Arms]		2.1	3.2	5.9	9.3	11.0	16.9	17.0	28.0
Main Circuit	Power Supply	270 VDC to 324 VDC, -15% to +10%							
	Input Current [Arms]*1	0.5	1.0	1.5	3.0	3.8	4.9	6.9	11
Control	Power Supply	270 VDC to 324 VDC, -15% to +10%							
	Input Current [Arms]*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 Arms 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 [Arms]		18.5	19.6	32.9	46.9	54.7	58.6	78.0
Instantaneous Maximum Output Current [Arms]		42.0	56.0	84.0	110	130	140	170
Main Circuit	Power Supply	270 VDC to 324 VDC, -15% to +10%						
	Input Current [Arms]*	14	20	34	36	48	68	92
Control	Power Supply	270 VDC to 324 VDC, -15% to +10%						
	Input Current [Arms]*	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.

◆ Single-phase, 100 VAC

Model SGD7S-		R70F	R90F	2R1F	2R8F
Maximum Applicable Motor Capacity [kW]		0.05	0.1	0.2	0.4
Continuous Output Current [Arms]		0.66	0.91	2.1	2.8
Instantaneous Maximum Output Current [Arms]		2.1	3.2	6.5	9.3
Main Circuit	Power Supply	100 VAC to 120 VAC, -15% to +10%, 50 Hz/60 Hz			
	Input Current [Arms]*	1.5	2.5	5	10
Control	Power Supply	100 VAC to 120 VAC, -15% to +10%, 50 Hz/60 Hz			
	Input Current [Arms]*	0.38	0.38	0.38	0.38
Power Supply Capacity [kVA]*		0.2	0.3	0.6	1.4
Power Loss*	Main Circuit Power Loss [W]	5.3	7.8	14.2	26.2
	Control Circuit Power Loss [W]	12	12	12	12
	Total Power Loss [W]	17.3	19.8	26.2	38.2
Regenerative Resistor	Minimum Allowable External Resistance [Ω]	40	40	40	40
Overvoltage Category		III			

* This is the net value at the rated load.

DeviceNet Module Ratings

The power supply method and power loss of a DeviceNet Module depend on the model of the DeviceNet Module.

◆ SGDV-OCA04A (Interface: Driven by Control Power Supply)

The specifications of the SGDV-OCA04A DeviceNet Module are given in the following table.

Item	Specification	
	DeviceNet Communications Section	Control Section
Power Supply Method	Supplied from the DeviceNet communications cable.	Supplied from the control power supply of a Command Option Attachable-Type SERVOPACK.
Minimum Operating Voltage	11 VDC	Included in the current consumption of the Command Option Attachable-Type SERVOPACK.
Maximum Operating Voltage	25 VDC	
Maximum Operating Current	25 mA	
Maximum Power Loss	625 mW	

◆ SGDV-OCA05A (Interface: Driven by External Power Supply)

The specifications of the SGDV-OCA05A DeviceNet Module are given in the following table.

Item	Specification	
	DeviceNet Communications Section	Control Section
Power Supply Method	Supplied from the DeviceNet communications cable.	
Minimum Operating Voltage	11 VDC	
Maximum Operating Voltage	25 VDC	
Maximum Operating Current	100 mA for 24-VDC power supply 200 mA for 11-VDC power supply	
Maximum Power Loss	2.4 W	

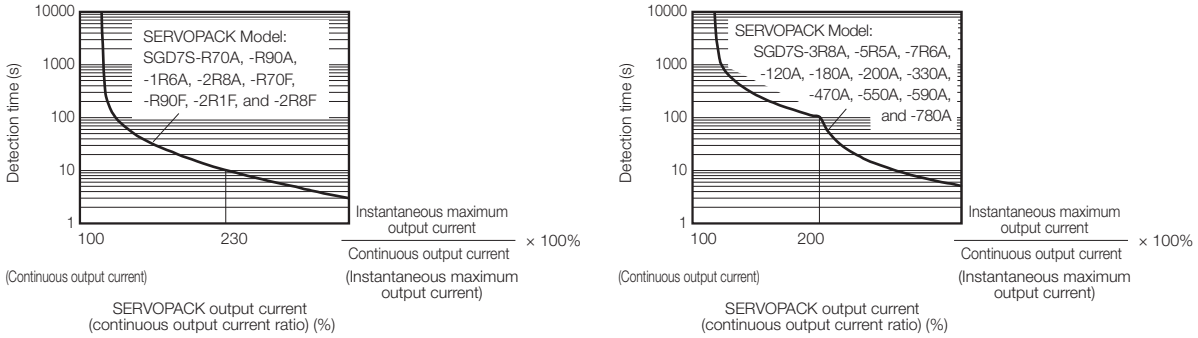
SERVOPACK Overload Protection Characteristics

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

An overload alarm (A.710 or A.720) will occur if overload operation that exceeds the overload protection characteristics shown in the following diagram (i.e., operation on the right side of the 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

The specifications when the DeviceNet Module is combined with a Command Option Attachable-Type SERVOPACK are given in the following table.

<table>
<tr><th colspan="2">Item</th><th>Specification</th></tr>
<tr><td colspan="2">Control Method</td><td>IGBT-based PWM control, sine wave current drive</td></tr>
<tr><td rowspan="2">Feedback</td><td>With Rotary Servomotor</td><td>Serial encoder: 17 bits (absolute encoder)
20 bits or 24 bits (incremental encoder/absolute encoder)
22 bits (absolute encoder)</td></tr>
<tr><td>With Linear Servomotor</td><td>• Absolute linear encoder (The signal resolution depends on the absolute linear encoder.)
• Incremental linear encoder (The signal resolution depends on the incremental linear encoder or Serial Converter Unit.)</td></tr>
<tr><td rowspan="8">Environmental Conditions</td><td>Surrounding Air Temperature</td><td>0°C to 55°C</td></tr>
<tr><td>Storage Temperature</td><td>-20°C to 85°C</td></tr>
<tr><td>Surrounding Air Humidity</td><td>90% relative humidity max. (with no freezing or condensation)</td></tr>
<tr><td>Storage Humidity</td><td>90% relative humidity max. (with no freezing or condensation)</td></tr>
<tr><td>Vibration Resistance</td><td>4.9 m/s^2</td></tr>
<tr><td>Shock Resistance</td><td>19.6 m/s^2</td></tr>
<tr><td>Degree of Protection</td><td><table><tr><th>Class</th><th>SERVOPACK Model: SGD7S-</th></tr><tr><td>IP20</td><td>R70A, R90A, 1R6A, 2R8A, 3R8A, 5R5A, 7R6A, 120A, R70F, R90F, 2R1F, 2R8F</td></tr><tr><td>IP10</td><td>120AE0A008, 180A, 200A, 330A, 470A, 550A, 590A, 780A</td></tr></table></td></tr>
<tr><td>Pollution Degree</td><td>2
• Must be no corrosive or flammable gases.
• Must be no exposure to water, oil, or chemicals.
• Must be no dust, salts, or iron dust.</td></tr>
<tr><td>Altitude</td><td>1,000 m max.</td></tr>
<tr><td>Others</td><td>Do not use the SERVOPACK in the following locations: Locations subject to static electricity noise, strong electromagnetic/magnetic fields, or radioactivity</td></tr>
<tr><td colspan="2">Applicable Standards</td><td>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</td></tr>
<tr><td colspan="2">Mounting</td><td><table><tr><th>Mounting</th><th>SERVOPACK Model: SGD7S-</th></tr><tr><td>Base-mounted</td><td>All Models</td></tr><tr><td>Rack-mounted</td><td>R70A, R90A, 1R6A, 2R8A, 3R8A, 5R5A, 7R6A, 120A, 180A, 200A, 330A, R70F, R90F, 2R1F, 2R8F</td></tr><tr><td>Duct-ventilated</td><td>470A, 550A, 590A, 780A</td></tr></table></td></tr>
<tr><td rowspan="4">Performance</td><td>Speed Control Range</td><td>1:5000 (At the rated torque, the lower limit of the speed control range must not cause the Servomotor to stop.)</td></tr>
<tr><td rowspan="3">Coefficient of Speed Fluctuation*1</td><td>±0.01% of rated speed max. (for a load fluctuation of 0% to 100%)</td></tr>
<tr><td>0% of rated speed max. (for a voltage fluctuation of ±10%)</td></tr>
<tr><td>±0.1% of rated speed max. (for a temperature fluctuation of 25°C ±25°C)</td></tr>
<tr><td>Torque Control Precision (Repeatability)</td><td>±1%</td></tr>
<tr><td rowspan="2">I/O Signals</td><td>Soft Start Time Setting</td><td>0 s to 10 s (Can be set separately for acceleration and deceleration.)</td></tr>
<tr><td>Encoder Divided Pulse Output</td><td>Phase A, phase B, phase C: Line-driver output
Number of divided output pulses: Any setting is allowed.</td></tr>
<tr><td></td><td>Overheat Protection Input</td><td>Number of input points: 1
Input voltage range: 0 V to +5 V</td></tr>
</table>

Continued on next page.

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Item			Specification
I/O Signals	Sequence Input Signals	Fixed Input	Allowable voltage range: 24 VDC ±20% Number of input points: 4
			Input method: Sink inputs or source inputs Input Signals • CCW-OT (CCW Drive Prohibit Input) signal • CW-OT (CW Drive Prohibit Input) signal • /HOME (Origin Signal Input) signal • EXSTOP (External Stop Input) Signal Positive or negative logic can be changed in the parameters.
	Sequence Output Signals	Fixed Output	Allowable voltage range: 5 VDC to 30 VDC Number of output points: 4
			Output Signals • ALM (Servo Alarm Output) signal • /WARN (Warning Signal Output) signal • /BK (Brake) signal • /S-RDY (Servo Ready Output) signal
Communications	Digital Operator Communications (CN3)	Interfaces	Digital Operator (JUSP-OP05A-1-E)
	USB Communications (CN7)	Interface	Personal computer (with SigmaWin+)
		Communications Standard	Conforms to USB2.0 standard (12 Mbps).
Displays/ Indicators	SERVOPACK		CHARGE and PWR indicators, and one-digit seven-segment display
	DeviceNet Module		Refer to the following manual for details. 📖 *Σ-7-Series AC Servo Drive Σ-7S SERVOPACK Command Option Attachable Type with DeviceNet Module Product Manual* (Manual No.: SIEP S800001 70)
Operating Methods	Reference Method	Operation Specifications	Positioning via DeviceNet communications.
		Reference Inputs	DeviceNet communications Commands: Movement references (positioning or speed) and origin returns
	Position Control Functions	Acceleration/Deceleration Methods	Linear, asymmetrical, exponential, and S-curve acceleration/deceleration
		Operating Methods	Simple positioning, origin returns, continuous operation, and switching to positioning
		Fully-Closed Loop Control	Supported.
	Built-in Functions	Position Data Latching	Position data can be latched on phase C, the origin signal, or an external signal.
	DeviceNet Communications	Communications Methods	DeviceNet I/O communications and explicit messages
		Topology	Multidrop or T-branching[*2]
		Baud Rate	125 kbps, 250 kbps, or 500 kbps (Set on rotary switch (DR).)
		Cables	Special cables (OMRON DCA1-5CN02F1 Cable with Connectors or the equivalent.)
		Maximum Number of Nodes	64 nodes (including the master, Maximum number of slaves: 63)
		Node Address Setting	0 to 63 (Set on NA x10 and x1 rotary switches.)
Analog Monitor (CN5)			Number of points: 2 Output voltage range: ±10 VDC (effective linearity range: ±8 V) Resolution: 16 bits Accuracy: ±20 mV (Typ) Maximum output current: ±10 mA Settling time (±1%): 1.2 ms (Typ)
Dynamic Brake (DB)			Activated when a servo alarm or overtravel (OT) occurs, or when the power supply to the main circuit or servo is OFF.
Regenerative Processing			Built-in (An external resistor must be connected to the SGD7S-470A to -780A.) Refer to the following section for details. ☞ *Built-In Regenerative Resistor* (page 472)

Continued on next page.

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Item		Specification
Overtravel (OT) Prevention		Stopping with a dynamic brake (DB), coasting to a stop, performing a hard stop, or smooth stop (decelerating to a stop) for a CCW-OT (CCW Drive Prohibit Input) signal or CW-OT (CW Drive Prohibit Input) signal.
Protective Functions		Overcurrent, overvoltage, low voltage, overload, regeneration error, etc.
Utility Functions		Gain adjustment, alarm history, jogging, origin search, etc.
Safety Functions	Inputs	/HWBB1 and /HWBB2: Base block signals for Power Modules
	Output	EDM1: Monitors the status of built-in safety circuit (fixed output).
	Applicable Standards*3	ISO13849-1 PLe (Category 3), IEC61508 SIL3
Applicable Option Modules		Fully-Closed Module Note: You cannot use a Safety Module if you are using a DeviceNet Module.

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

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

*2. Externally connected terminating resistance is required.
*3. Always perform risk assessment for the system and confirm that the safety requirements are met.

The following table gives the specifications of the DeviceNet Module.

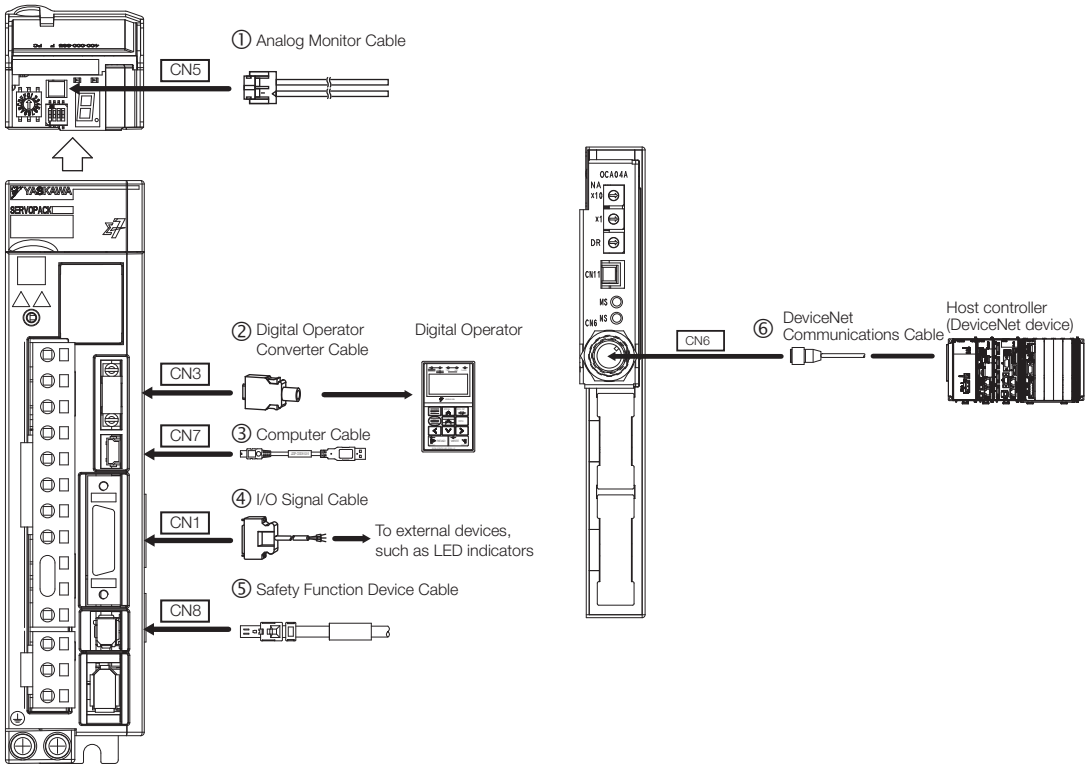
Item		Specification	
		SGDV-OCA04A	SGDV-OCA05A
Mounting Location		Mounted to the side of a Command Option Attachable-Type SERVOPACK.	
Power Supply Method	Control Section	Supplied from the control power supply of a Command Option Attachable-Type SERVOPACK.	Supplied from the DeviceNet communications cable.
	DeviceNet Communications Section	Supplied from the DeviceNet communications cable.	
Current Consumption	Control Section	Included in the current consumption of the Command Option Attachable-Type SERVOPACK.	For 24-VDC power supply: 100 mA max., for 11-VDC power supply: 200 mA max.
	DeviceNet Communications Section	25 mA max.	

Selecting Cables

◆ System Configurations

■ Σ-7S Single-axis Command Option Attachable-Type SERVOPACKs

■ Command Option Module: DeviceNet Module



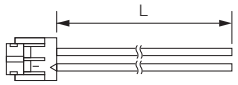
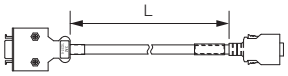
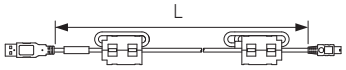
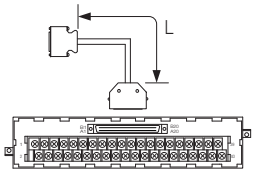
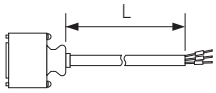
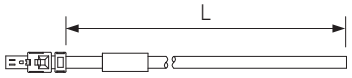
◆ Selection Table

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.

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

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

Code	Name		Length (L)	Order Number	Appearance
①	Analog Monitor Cable		1 m	JZSP-CA01-E	
②	Digital Operator Converter Cable		0.3 m	JZSP-CVS05-A3-E*1	
③	Computer Cable		2.5 m	JZSP-CVS06-02-E	
④	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	
⑤	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	
⑥	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 Σ-III-series Digital Operator (JUSP-OP05A) for Σ-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.

Σ-7S Single-axis FT82 SERVOPACKs SGM7D Motor Drive

Model Designations

SGD7S - 2R8 A 00 A 001 F82 B

- SGD7S: Σ-7 Series, Σ-7S SERVOPACKs
- 2R8: 1st+2nd+3rd digits
- A: 4th digit
- 00: 5th+6th digits
- A: 7th digit
- 001: 8th+9th+10th digits
- F82: 11th+12th+13th digits
- B: 14th digit

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

Voltage	Code	Specification
Three-phase, 200 VAC	2R8*1	0.4 kW
	120*2	1.5 kW
Single-phase, 100 VAC	2R8	0.4 kW

4th digit Voltage

Code	Specification
A	200 VAC
F	100 VAC

5th+6th digits Interface

Code	Specification
00	Analog voltage/pulse train reference
10	MECHATROLINK-II communications reference
20	MECHATROLINK-III communications reference
E0	Command Option Attachable Type*3

7th digit Design Revision Order

A

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

Code	Specification	Applicable Models
None	Without options	All models
000		
001	Rack-mounted	All models
002	Varnished	All models
008	Single-phase, 200-VAC power supply input	SGD7S-120A
020*4	No dynamic brake	SGD7S-2R8A
		SGD7S-2R8F
	External dynamic brake resistor	SGD7S-120A

11th+12th+13th digits FT/EX Specification

Code	Specification
F82*5	Application function option for special motors, SGM7D motor drive

14th digit BTO Specification*6 (Available in Japan only)

Code	Specification
None	None
B	BTO Specification

*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. This interface is supported only by an INDEXER Module (model: SGDV-OCA03A).

*4. Refer to the following manual for details.
📖 *Σ-7-Series AC Servo Drive Σ-7S/Σ-7W SERVOPACK with Hardware Option Specifications Dynamic Brake Product Manual* (Manual No.: SIEP S800001 73)

*5. Refer to the following manual for details.
📖 *Σ-7-Series AC Servo Drive Σ-7S SERVOPACK with FT/EX Specification for SGM7D Motor Product Manual* (Manual No.: SIEP S800001 91)

*6. The BTO specification indicates if the SERVOPACK is customized by using the MechatroCloud BTO service. You need a BTO number to order SERVOPACKs with customized specifications.
Refer to page M-15 for the details on the BTO service.

Ratings and Specifications

Ratings

◆ Three-Phase, 200 VAC

Model SGD7S-			2R8A	120A
Maximum Applicable Motor Capacity [kW]			0.4	1.5
Continuous Output Current [Arms]			2.8	11.6
Instantaneous Maximum Output Current [Arms]			9.3	28
Main Circuit	Power Supply		200 VAC to 240 VAC, -15% to +10%, 50 Hz/60 Hz	
	Input Current [Arms]*		2.5	7.3
Control	Power Supply		200 VAC to 240 VAC, -15% to +10%, 50 Hz/60 Hz	
	Input Current [Arms]*		0.2	0.2
Power Supply Capacity [kVA]*			1.0	3.2
Power Loss*	Main Circuit Power Loss [W]		22.5	72.6
	Control Circuit Power Loss [W]		12	15
	Built-in Regenerative Resistor Power Loss [W]		–	10
	Total Power Loss [W]		34.5	97.6
Regenerative Resistor	Built-In Regenerative Resistor	Resistance [Ω]	–	20
		Capacity [W]	–	60
	Minimum Allowable External Resistance [Ω]		40	20
Overvoltage Category			III	

* This is the net value at the rated load.

◆ Single-Phase, 200 VAC

Model SGD7S-			2R8A	120A
Maximum Applicable Motor Capacity [kW]			0.4	1.5
Continuous Output Current [Arms]			2.8	11.6
Instantaneous Maximum Output Current [Arms]			9.3	28
Main Circuit	Power Supply		200 VAC to 240 VAC, -15% to +10%, 50 Hz/60 Hz	
	Input Current [Arms]*		5.0	16
Control	Power Supply		200 VAC to 240 VAC, -15% to +10%, 50 Hz/60 Hz	
	Input Current [Arms]*		0.2	0.25
Power Supply Capacity [kVA]*			1.2	4.0
Power Loss*	Main Circuit Power Loss [W]		23.7	71.8
	Control Circuit Power Loss [W]		12	16
	Built-in Regenerative Resistor Power Loss [W]		–	16
	Total Power Loss [W]		35.7	103.8
Regenerative Resistor	Built-In Regenerative Resistor	Resistance [Ω]	–	12
		Capacity [W]	–	60
	Minimum Allowable External Resistance [Ω]		40	12
Overvoltage Category			III	

* This is the net value at the rated load.

◆ Single-phase, 100 VAC

Model SGD7S-		2R8F
Maximum Applicable Motor Capacity [kW]		0.4
Continuous Output Current [Arms]		2.8
Instantaneous Maximum Output Current [Arms]		9.3
Main Circuit	Power Supply	100 VAC to 120 VAC, -15% to +10%, 50 Hz/60 Hz
	Input Current [Arms]*	10
Control	Power Supply	100 VAC to 120 VAC, -15% to +10%, 50 Hz/60 Hz
	Input Current [Arms]*	0.38
Power Supply Capacity [kVA]*		1.4
Power Loss*	Main Circuit Power Loss [W]	26.2
	Control Circuit Power Loss [W]	12
	Total Power Loss [W]	38.2
Regenerative Resistor	Minimum Allowable External Resistance [Ω]	40
Overvoltage Category		III

* This is the net value at the rated load.

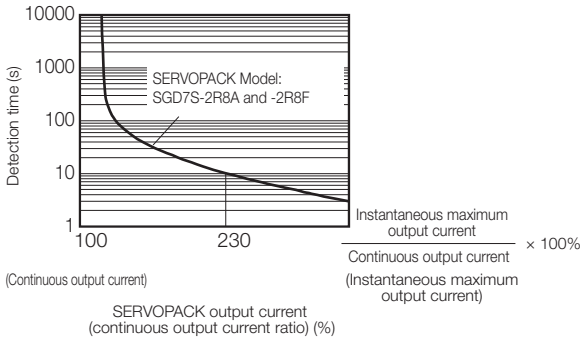
SERVOPACK Overload Protection Characteristics

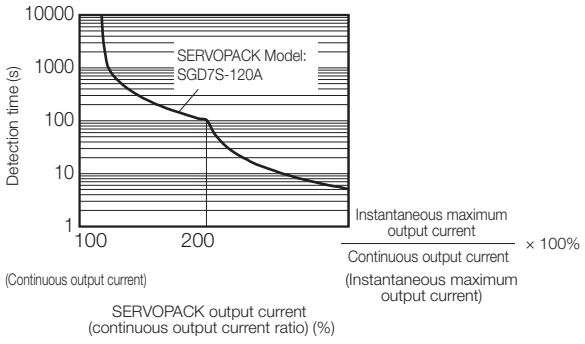
The overload detection level is set for hot start conditions with a SERVOPACK surrounding air temperature of 55°C.

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.

Specifications

◆ FT82 SERVOPACKs with Analog Voltage/Pulse Train References

Item		Specification
Control Method		IGBT-based PWM control, sine wave current drive
Feedback		Serial encoder: 24 bits (incremental encoder/absolute encoder)
Environmental Conditions	Surrounding 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. ☞ *Derating Specifications* (page 397)
	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	Degree: IP20 — SERVOPACK Models: SGD7S-2R8A, -120A (three-phase, 200-VAC input), and -2R8F Degree: IP10 — SERVOPACK Models: SGD7S-120A00A008 (single-phase, 200-VAC input)
	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. ☞ *Derating Specifications* (page 397)
	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		Base-mounted or rack-mounted
Performance	Speed Control Range	1:5000 (At the rated torque, the lower limit of the speed control range must not cause the Servomotor to stop.)
	Coefficient of Speed Fluctuation*2	±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.)

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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.
	Sequence Input Signals	Fixed Input		Allowable voltage range: 5 VDC ±5% Number of input points: 1 SEN (Absolute Data Request) signal
		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 • /P-DET (Polarity Detection) signal • /G-SEL (Gain Selection) signal • /PSEL (Reference Pulse Input Multiplication Switch) Signal • SEN (Absolute Data Request) 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: 6 (A photocoupler output (isolated) is used for three of the outputs.) (An open-collector output (non-isolated) is used for the other three outputs.)
				Output Signals • /COIN (Positioning Completion) Signal • /V-CMP (Speed Coincidence Detection) Signal • /TGON (Rotation Detection) Signal • /S-RDY (Servo Ready) signal • /CLT (Torque Limit Detection) Signal • /VLT (Speed Limit Detection) Signal • /BK (Brake) signal • /WARN (Warning) Signal • /NEAR (Near) signal • /PSELA (Reference Pulse Input Multiplication Switching Output) signal • ALO1, ALO2, and ALO3 (Alarm Code) signals A signal can be allocated and the positive and negative logic can be changed.
Communications	RS-422A Communications (CN3)	Interfaces		Digital Operator (JUSP-OP05A-1-E) and personal computer (with SigmaWin+)
		1:N Communications		Up to N = 15 stations possible for RS-422A port
		Axis Address Setting		Set with parameters.
	USB Communications (CN7)	Interface		Personal computer (with SigmaWin+)
		Communications Standard		Conforms to USB2.0 standard (12 Mbps).
Displays/Indicators				CHARGE indicator and five-digit seven-segment display
Panel Operator				Four push switches

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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 ☞ *Built-In Regenerative Resistor* (page 472)
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
Applicable Option Modules					Fully-closed Modules and Safety Modules Note: You cannot use a Fully-closed Module and a Safety Module together.
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 Σ-7-Series SERVOPACK with a Σ-V-Series Option Module, the following Σ-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.

◆ FT82 SERVOPACK with MECHATROLINK-II Communications References

Item		Specification
Control Method		IGBT-based PWM control, sine wave current drive
Feedback		Serial encoder: 24 bits (incremental encoder/absolute encoder)
Environmental Conditions	Surrounding 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. ☞ *Derating Specifications* (page 397)
	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	Degree: IP20 — SERVOPACK Models: SGD7S-2R8A, -120A (three-phase, 200-VAC input), and -2R8F Degree: IP10 — SERVOPACK Models: SGD7S-120A10A008 (single-phase, 200-VAC input)
	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. ☞ *Derating Specifications* (page 397)
	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		Base-mounted or rack-mounted
Performance	Speed Control Range	1:5000 (At the rated torque, the lower limit of the speed control range must not cause the Servomotor to stop.)
	Coefficient of Speed Fluctuation*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.
	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 • /DEC (Origin Return Deceleration Switch) signal • /EXT1 to /EXT3 (External Latch Input 1 to 3) 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 • /P-DET (Polarity Detection) 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 (CN3)		Interfaces	Digital Operator (JUSP-OP05A-1-E) and personal computer (with SigmaWin+)
			1:N Communications	Up to N = 15 stations possible for RS-422A port
			Axis Address Setting	Set with parameters.
	USB Communications (CN7)		Interface	Personal computer (with SigmaWin+)
			Communications Standard	Conforms to USB2.0 standard (12 Mbps).
Displays/Indicators				CHARGE, 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 ☞ *Built-In Regenerative Resistor* (page 472)
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.

*1. If you combine a Σ-7-Series SERVOPACK with a Σ-V-Series Option Module, the following Σ-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.

◆ FT82 SERVOPACK with MECHATROLINK-III Communications References

Item		Specification
Drive Method		IGBT-based PWM control, sine wave current drive
Feedback		Serial encoder: 24 bits (incremental encoder/absolute encoder)
Environmental Conditions	Surrounding 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. ☞ *Derating Specifications* (page 397)
	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	Degree: IP20 — SERVOPACK Models: SGD7S-2R8A, -120A (three-phase, 200-VAC input), and -2R8F Degree: IP10 — SERVOPACK Models: SGD7S-120A20A008 (single-phase, 200-VAC input)
	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. ☞ *Derating Specifications* (page 397)
	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		Base-mounted or rack-mounted
Performance	Speed Control Range	1:5000 (At the rated torque, the lower limit of the speed control range must not cause the Servomotor to stop.)
	Coefficient of Speed Fluctuation*2	±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.)

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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.
	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 • /DEC (Origin Return Deceleration Switch) signal • /EXT1 to /EXT3 (External Latch Input 1 to 3) 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 • /P-DET (Polarity Detection) 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 (CN3)		Interfaces	Digital Operator (JUSP-OP05A-1-E) and personal computer (with SigmaWin+)
			1:N Communications	Up to N = 15 stations possible for RS-422A port
			Axis Address Setting	Set with parameters.
	USB Communications (CN7)		Interface	Personal computer (with SigmaWin+)
			Communications Standard	Conforms to USB2.0 standard (12 Mbps).
Displays/Indicators				CHARGE, PWR, CN, 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
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 ☞ *Built-In Regenerative Resistor* (page 472)
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.

*1. If you combine a Σ-7-Series SERVOPACK with a Σ-V-Series Option Module, the following Σ-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.

◆ Command Option Attachable-type FT82 SERVOPACKs with INDEXER Modules

The specifications when the INDEXER Module is combined with a Command Option Attachable-type SERVOPACK are given in the following table.

Item		Specification
Control Method		IGBT-based PWM control, sine wave current drive
Feedback		Serial encoder: 24 bits (incremental encoder/absolute encoder)
Environmental Conditions	Surrounding Air Temperature	0°C to 55°C
	Storage Temperature	-20°C to 85°C
	Surrounding Air Humidity	90% relative humidity max. (with no freezing or condensation)
	Storage Humidity	90% relative humidity max. (with no freezing or condensation)
	Vibration Resistance	4.9 m/s^2
	Shock Resistance	19.6 m/s^2
	Degree of Protection	IP10
	Pollution Degree	2 • Must be no corrosive or flammable gases. • Must be no exposure to water, oil, or chemicals. • Must be no dust, salts, or iron dust.
	Altitude	1,000 m or less.
	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		Base-mounted or rack-mounted
Performance	Speed Control Range	1:5000 (At the rated torque, the lower limit of the speed control range must not cause the Servomotor to stop.)
	Coefficient of Speed Fluctuation*1	±0.01% of rated speed max. (for a load fluctuation of 0% to 100%)
		0% of rated speed max. (for a voltage fluctuation of ±10%)
		±0.1% of rated speed max. (for a temperature fluctuation of 25°C ±25°C)
	Torque Control Precision (Repeatability)	±1%
	Soft Start Time Setting	0 s to 10 s (Can be set separately for acceleration and deceleration.)
I/O Signals	Encoder Divided Pulse Output	Phase A, phase B, phase C: Line-driver output Number of divided output pulses: Any setting is allowed.

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Item				Specification	
I/O Signals	Sequence Input Signals	SERVOPACK	Fixed Inputs	Allowable voltage range: 24 VDC ±20% Number of input points: 6	
				Input method: Sink inputs or source inputs Input signals: • /ALM-RST (Alarm Reset) signal • P-OT (Forward Drive Prohibit) signal • N-OT (Reverse Drive Prohibit) signal • /DEC (Origin Return Deceleration) switch • /RGRT (Registration Input) signal • /S-ON (Servo ON) signal Positive or negative logic can be changed in the parameters.	
		INDEXER Module		Allowable voltage range: 24 VDC ±10% 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 Outputs	Allowable voltage range: 5 VDC to 30 VDC Number of output points: 1 Output signal: ALM (Servo Alarm Output) signal	
			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: • /WARN (Warning Output) signal • /BK (Brake Output) signal • /S-RDY (Servo Ready Output) signal • /ALO1, /ALO2, and /ALO3 (Alarm Code Output) signals Signal allocations and positive or negative logic can be changed in the parameters.	
		INDEXER Module	Fixed Outputs	Allowable voltage range: 5 VDC to 30 VDC Number of output points: 9 Output signals: • /INPOSITION (Positioning Completion Output) signal • /POUT0 (Programmable Output 0) signal • /POUT1 (Programmable Output 1) signal • /POUT2 (Programmable Output 2) signal • /POUT3 (Programmable Output 3) signal • /POUT4 (Programmable Output 4) signal • /POUT5 (Programmable Output 5) signal • /POUT6 (Programmable Output 6) signal • /POUT7 (Programmable Output 7) signal	

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Item			Specification
Communications	RS-422A Communications (CN3)	Interfaces	Digital Operator (JUSP-OP05A-1-E), Personal computer (with SigmaWin+)
		1:N Communications	Up to N = 15 stations possible for RS-422A port
		Axis Address Setting	Set with parameters.
	USB Communications (CN7)	Interface	Personal computer (with SigmaWin+)
		Communications Standard	Conforms to USB2.0 standard (12 Mbps).
Displays/ Indicators	SERVOPACK		CHARGE and PWR indicators, and one-digit seven-segment display
	INDEXER Module		Refer to the following manual for details. 📖 *Σ-7-Series Σ-7S Command Option Attachable-type SERVOPACK with INDEXER Module Product Manual* (Manual No.: SIEP S800001 64)
Operating Methods	Program Table Method		• Program table positioning in which steps are executed sequentially by commands given through contact input or serial communications • Positioning in which station numbers are specified by commands given through contact input or serial communications
		Max. Number of Steps	256
		Max. Number of Tables	256
		Max. Number of Stations	256
	Serial Communications Method		Serial command by 1-channel ASCII code Communications specifications:RS-422/485 (50 m max.) Connection topology:Multi-drop connection (16 axes max.) Baud rate:9600, 19200, 38400 bps
	Other Functions		Registration (positioning by external signals), origin return
Analog Monitor (CN5)			Number of points: 2 Output voltage range: ±10 VDC (effective linearity range: ±8 V) Resolution: 16 bits Accuracy: ±20 mV (Typ) Maximum output current: ±10 mA Settling time (±1%): 1.2 ms (Typ)
Dynamic Brake (DB)			Activated when a servo alarm or overtravel (OT) occurs, or when the power supply to the main circuit or servo is OFF.
Regenerative Processing			Built-in ☞ *Built-In Regenerative Resistor* (page 472)
Overtravel (OT) Prevention			Stopping with dynamic brake, deceleration to a stop, or coasting to a stop for the P-OT (Forward Drive Prohibit) or N-OT (Reverse Drive Prohibit) signal
Protective Functions			Overcurrent, overvoltage, low voltage, overload, regeneration error, etc.
Utility Functions			Gain adjustment, alarm history, jogging, origin search, etc.
Safety Functions	Inputs		/HWBB1 and /HWBB2: Base block signals for Power Modules
	Output		EDM1: Monitors the status of built-in safety circuit (fixed output).
	Applicable Standards*2		ISO13849-1 PLe (Category 3), IEC61508 SIL3
Applicable Option Modules			Fully-Closed Module Note: You cannot use a Safety Module if you are using an INDEXER Module.

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

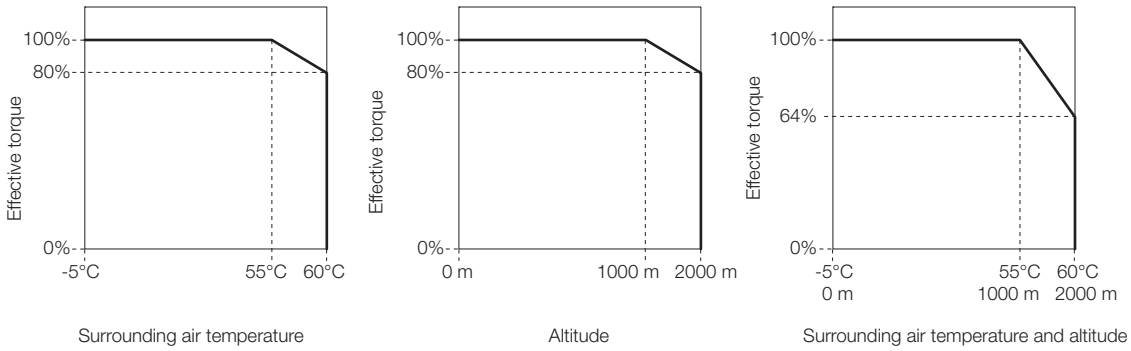
$$\text{Coefficient of speed fluctuation} = \frac{\text{No-load motor speed - Total-load motor speed}}{\text{Rated motor speed}} \times 100\%$$

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

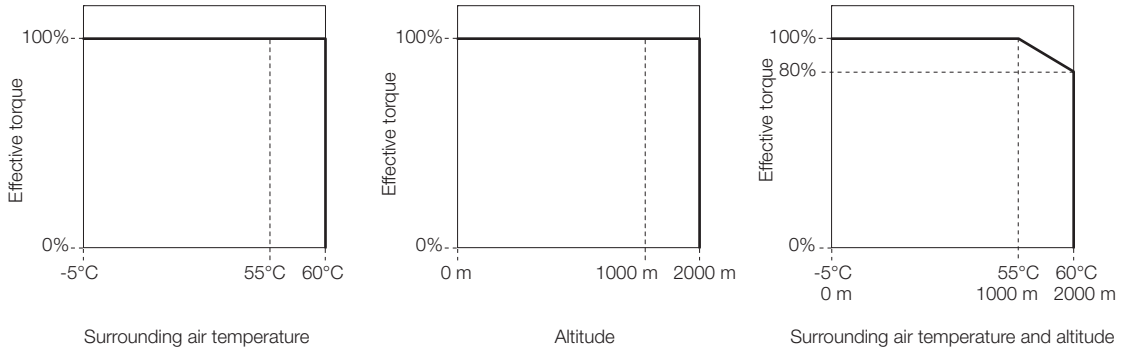
Derating Specifications

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-2R8A and -2R8F



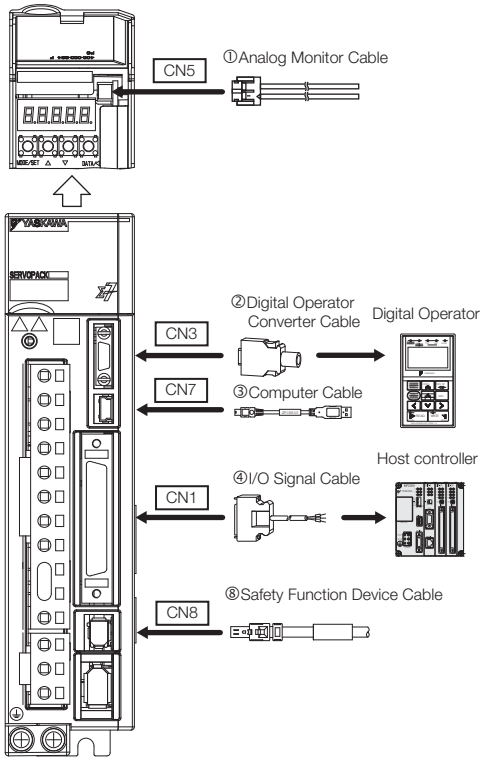
◆ SGD7S-120A



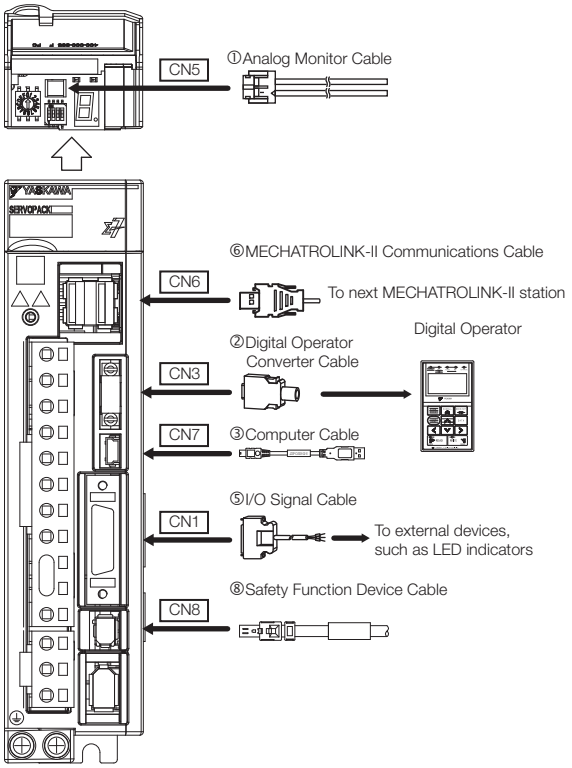
Selecting Cables

◆ System Configurations

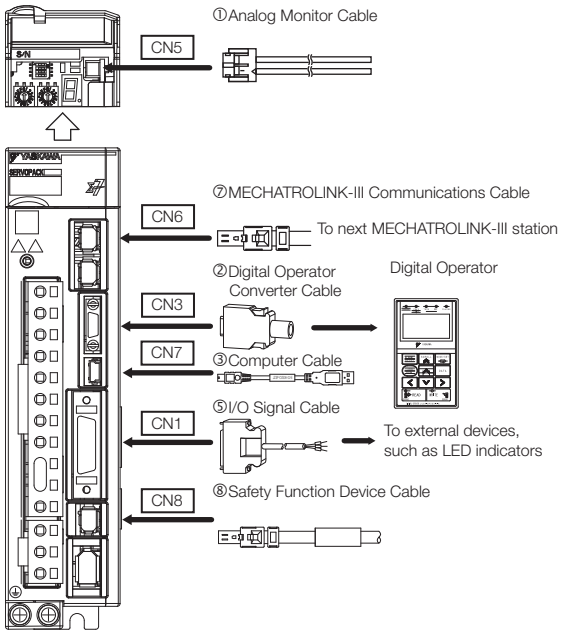
■ Σ-7S Single-axis Analog Voltage/Pulse Train Reference SERVOPACKs



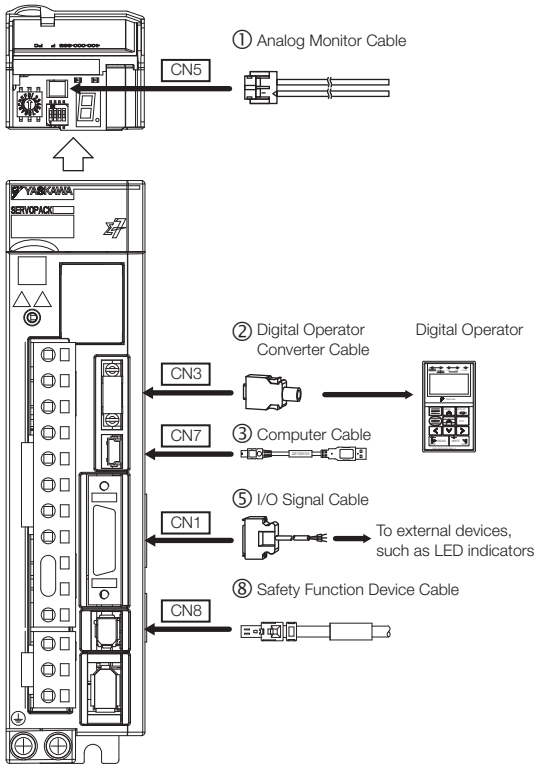
■ Σ-7S Single-axis MECHATROLINK-II Communications Reference SERVOPACKs



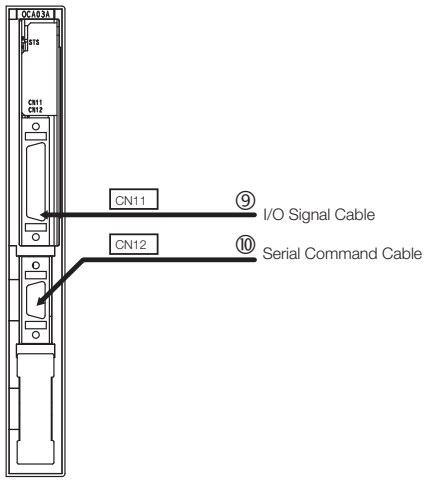
■ Σ-7S Single-axis MECHATROLINK-III Communications Reference SERVOPACKs



■ Σ-7S Single-axis Command Option Attachable-Type SERVOPACKs



■ Command Option Module: INDEXER Module



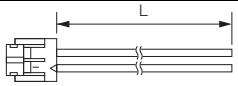
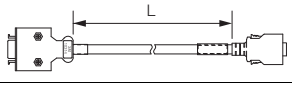
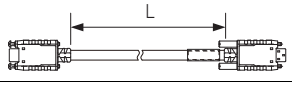
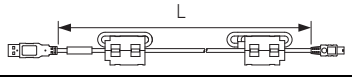
◆ Selection Table

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.

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

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

Code	Name	Length (L)	Order Number	Appearance
①	Analog Monitor Cable	1 m	JZSP-CA01-E	
②	Digital Operator Converter Cable	0.3 m	JZSP-CVS05-A3-E*1	
			JZSP-CVS07-A3-E*2	
③	Computer Cable	2.5 m	JZSP-CVS06-02-E	

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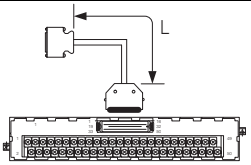
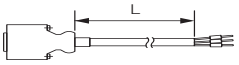
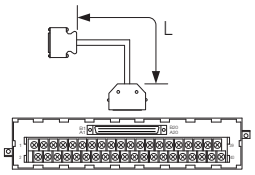
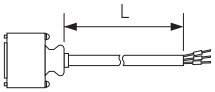
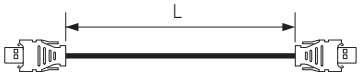
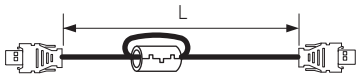
Code	Name		Length (L)	Order Number	Appearance
④	I/O Signal Cables	Soldered Connector Kit		JZSP-CSI9-1-E	
		Connector-Terminal Block Converter Unit (with cable)	0.5 m	JUSP-TA50PG-E	
			1 m	JUSP-TA50PG-1-E	
			2 m	JUSP-TA50PG-2-E	
		Cable with Loose Wires at One End (loose wires on peripheral device end)	1 m	JZSP-CSI01-1-E	
			2 m	JZSP-CSI01-2-E	
			3 m	JZSP-CSI01-3-E	
⑤	I/O Signal Cables	Soldered Connector Kit		JZSP-CSI9-2-E	
		Connector-Terminal Block Converter Unit (with cable)	0.5 m	JUSP-TA26P-E	
			1 m	JUSP-TA26P-1-E	
			2 m	JUSP-TA26P-2-E	
		Cable with Loose Wires at One End (loose wires on peripheral device end)	1 m	JZSP-CSI02-1-E	
			2 m	JZSP-CSI02-2-E	
			3 m	JZSP-CSI02-3-E	
⑥	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	

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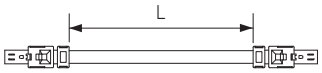
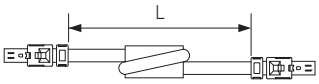
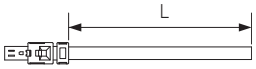
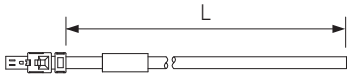
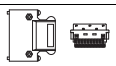
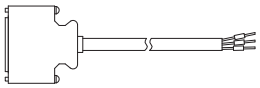
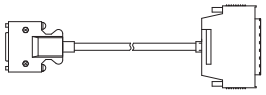
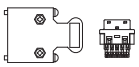
Code	Name		Length (L)	Order Number	Appearance
⑦	MECHATROLINK-III Communications Cables	Cables with Connectors on Both Ends	0.2 m	JEPMC-W6012-A2-E	
			0.5 m	JEPMC-W6012-A5-E	
			1 m	JEPMC-W6012-01-E	
			2 m	JEPMC-W6012-02-E	
			3 m	JEPMC-W6012-03-E	
			4 m	JEPMC-W6012-04-E	
			5 m	JEPMC-W6012-05-E	
			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	
⑧	Safety Function Device Cables	Cables with Connectors*3	1 m	JZSP-CVH03-01-E	
			3 m	JZSP-CVH03-03-E	
		Connector Kit*4		Contact Tyco Electronics Japan G.K. Product name: Industrial Mini I/O D-shape Type 1 Plug Connector Kit Model number: 2013595-1	
⑨	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	
⑩	Serial Command Cable	Connector Kit*4		JZSP-CHI9-1	Contact Yaskawa Controls Co., Ltd. for the cable. 

*1. This Converter Cable is required to use the Σ-III-series Digital Operator (JUSP-OP05A) for Σ-7-series SERVOPACKs.

*2. If you use a MECHATROLINK-III Communications Reference SERVOPACK, this Converter Cable is required to prevent the cable from disconnecting from the Digital Operator.

*3. When using safety functions, connect this Cable to the safety function devices.
When not using safety functions, connect the enclosed Safety Jumper Connector (JZSP-CVH05-E) to the SERVOPACK.

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

Σ-7S Single-axis FT83 SERVOPACKs
SGM7D Motor Drive with built-in INDEXER

Model Designations

SGD7S - 2R8 A 00 A 001 F83 B

Σ-7 Series Σ-7S SERVOPACKs	1st+2nd+3rd digits	4th digit	5th+6th digits	7th digit	8th+9th+10th digits	11th+12th+13th digits	14th digit
SGD7S	2R8	A	00	A	001	F83	B

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

Voltage	Code	Specification
Three-phase, 200 VAC	2R8*1	0.4 kW
	120*2	1.5 kW
Single-phase, 100 VAC	2R8	0.4 kW

4th digit Voltage

Code	Specification
A	200 VAC
F	100 VAC

5th+6th digits Interface

Code	Specification
00	Analog voltage/pulse train reference

7th digit Design Revision Order

A

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

Code	Specification	Applicable Models
None	Without options	All models
000		
001	Rack-mounted	All models
002	Varnished	All models
008	Single-phase, 200-VAC power supply input	SGD7S-120A
020*3	No dynamic brake	SGD7S-2R8A
		SGD7S-2R8F
	External dynamic brake resistor	SGD7S-120A

11th+12th+13th digits FT/EX Specification

Code	Specification
F83*4	Application function option for special motors, SGM7D motor drive, indexing

14th digit BTO Specification*5 (Available in Japan only)

Code	Specification
None	None
B	BTO Specification

*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-120A00A008).

*3. Refer to the following manual for details.
📖 *Σ-7-Series AC Servo Drive Σ-7S/Σ-7W SERVOPACK with Hardware Option Specifications Dynamic Brake Product Manual* (Manual No.: SIEP S800001 73)

*4. Refer to the following manual for details.
📖 *Σ-7-Series AC Servo Drive Σ-7S SERVOPACK with FT/EX Specification for SGM7D Motor Product Manual* (Manual No.: SIEP S800001 91)

*5. The BTO specification indicates if the SERVOPACK is customized by using the MechatroCloud BTO service. You need a BTO number to order SERVOPACKs with customized specifications.
Refer to page M-15 for the details on the BTO service.

Ratings and Specifications

Ratings

◆ Three-Phase, 200 VAC

Model SGD7S-			2R8A	120A
Maximum Applicable Motor Capacity [kW]			0.4	1.5
Continuous Output Current [Arms]			2.8	11.6
Instantaneous Maximum Output Current [Arms]			9.3	28
Main Circuit	Power Supply		200 VAC to 240 VAC, -15% to +10%, 50 Hz/60 Hz	
	Input Current [Arms]*		2.5	7.3
Control	Power Supply		200 VAC to 240 VAC, -15% to +10%, 50 Hz/60 Hz	
	Input Current [Arms]*		0.2	0.2
Power Supply Capacity [kVA]*			1.0	3.2
Power Loss*	Main Circuit Power Loss [W]		22.5	72.6
	Control Circuit Power Loss [W]		12	15
	Built-in Regenerative Resistor Power Loss [W]		–	10
	Total Power Loss [W]		34.5	97.6
Regenerative Resistor	Built-In Regenerative Resistor	Resistance [Ω]	–	20
		Capacity [W]	–	60
	Minimum Allowable External Resistance [Ω]		40	20
Overvoltage Category			III	

* This is the net value at the rated load.

◆ Single-Phase, 200 VAC

Model SGD7S-			2R8A	120A
Maximum Applicable Motor Capacity [kW]			0.4	1.5
Continuous Output Current [Arms]			2.8	11.6
Instantaneous Maximum Output Current [Arms]			9.3	28
Main Circuit	Power Supply		200 VAC to 240 VAC, -15% to +10%, 50 Hz/60 Hz	
	Input Current [Arms]*		5.0	16
Control	Power Supply		200 VAC to 240 VAC, -15% to +10%, 50 Hz/60 Hz	
	Input Current [Arms]*		0.2	0.25
Power Supply Capacity [kVA]*			1.2	4.0
Power Loss*	Main Circuit Power Loss [W]		23.7	71.8
	Control Circuit Power Loss [W]		12	16
	Built-in Regenerative Resistor Power Loss [W]		–	16
	Total Power Loss [W]		35.7	103.8
Regenerative Resistor	Built-In Regenerative Resistor	Resistance [Ω]	–	12
		Capacity [W]	–	60
	Minimum Allowable External Resistance [Ω]		40	12
Overvoltage Category			III	

* This is the net value at the rated load.

◆ Single-phase, 100 VAC

Model SGD7S-		2R8F
Maximum Applicable Motor Capacity [kW]		0.4
Continuous Output Current [Arms]		2.8
Instantaneous Maximum Output Current [Arms]		9.3
Main Circuit	Power Supply	100 VAC to 120 VAC, -15% to +10%, 50 Hz/60 Hz
	Input Current [Arms]*	10
Control	Power Supply	100 VAC to 120 VAC, -15% to +10%, 50 Hz/60 Hz
	Input Current [Arms]*	0.38
Power Supply Capacity [kVA]*		1.4
Power Loss*	Main Circuit Power Loss [W]	26.2
	Control Circuit Power Loss [W]	12
	Total Power Loss [W]	38.2
Regenerative Resistor	Minimum Allowable External Resistance [Ω]	40
Overvoltage Category		III

* This is the net value at the rated load.

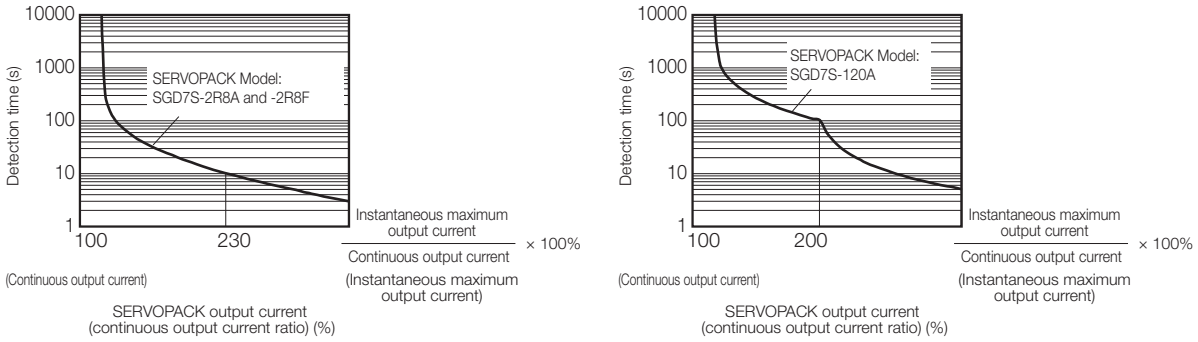
SERVOPACK Overload Protection Characteristics

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.

Specifications

◆ FT83 SERVOPACKs with Analog Voltage/Pulse Train References

Item		Specification
Control Method		IGBT-based PWM control, sine wave current drive
Feedback		Serial encoder: 24 bits (incremental encoder/absolute encoder)
Environmental Conditions	Surrounding Air Temperature*1	0°C to 55°C
	Storage Temperature	-20°C to 85°C
	Surrounding Air Humidity	90% relative humidity max. (with no freezing or condensation)
	Storage Humidity	90% relative humidity max. (with no freezing or condensation)
	Vibration Resistance	4.9 m/s^2
	Shock Resistance	19.6 m/s^2
	Degree of Protection	IP10
	Pollution Degree	2 • Must be no corrosive or flammable gases. • Must be no exposure to water, oil, or chemicals. • Must be no dust, salts, or iron dust.
	Altitude*1	1,000 m max.
	Others	Do not use the SERVOPACK in the following locations: Locations subject to static electricity noise, strong electro-magnetic/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		Base-mounted or rack-mounted
Performance	Speed Control Range	1:5000 (At the rated torque, the lower limit of the speed control range must not cause the Servomotor to stop.)
	Coefficient of Speed Fluctuation*2	±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	Encoder Divided Pulse Output	Phase A, phase B, phase C: Line-driver output Number of divided output pulses: Any setting is allowed.

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Item				Specification
I/O Signals	Sequence Input Signals	SERVOPACKs	Fixed Input	Allowable voltage range: 5 VDC ±5% Number of input points: 1 SEN (Absolute Data Request) signal
			Input Signals for Which Allocations Can Be Changed	Number of input points: 1 Input method: Line driver or open collector Input Signals • /DEC (Origin Return Deceleration Switch) signal • /RGRT (Registration Input) signal • CLR (Clear) signal
				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 • /P-DET (Polarity Detection) signal • /G-SEL (Gain Selection) signal • /PSEL (Reference Pulse Input Multiplication Switch) Signal • SEN (Absolute Data Request) signal • /DEC (Origin Return Deceleration Switch) signal • /MODE 0/1 (Mode Switch Input) signal • /START-STOP (Program Table Operation Start-Stop Input) signal • /JOGP (Forward Jog Input) signal • /JOGN (Reverse Jog Input) signal • /HOME (Origin Return 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 • /JOG0 (Jog Speed Table Selection Input 0) signal • /JOG1 (Jog Speed Table Selection Input 1) signal • /JOG2 (Jog Speed Table Selection Input 2) signal A signal can be allocated and the positive and negative logic can be changed.

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Item				Specification
I/O Signals	Sequence Output Signals	SERVOPACKs	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: 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 • /POUT0 (Programmable Output 0) signal • /POUT1 (Programmable Output 1) signal • /POUT2 (Programmable Output 2) signal • /POUT3 (Programmable Output 3) signal • /POUT4 (Programmable Output 4) signal • /POSRDY (Origin Return Completed Output) signal • DEN (Position Reference Distribution Completed) signal A signal can be allocated and the positive and negative logic can be changed.
Communications	Digital Operator Communications (CN3)		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+)
			Communications Standard	Conforms to USB2.0 standard (12 Mbps).
Displays/ Indicators	SERVOPACK			CHARGE indicator and five-digit seven-segment display
Panel Operator				Four push switches
Operating Methods	Program Table			• Program table positioning in which steps are executed in sequence with commands from contact inputs • Positioning by specifying station numbers with commands from contact inputs
		Max. Number of Steps		256 steps (32 steps max. if input signals are used)
	Other Functions			Registration (positioning with external signals) and origin returns.
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 ☞ *Built-In Regenerative Resistor* (page 472)
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.

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Item					Specification
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
Applicable Option Modules					Fully-closed Modules and Safety Modules Note: You cannot use a Fully-closed Module and a Safety Module together.
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 Σ-7-Series SERVOPACK with a Σ-V-Series Option Module, the following Σ-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.

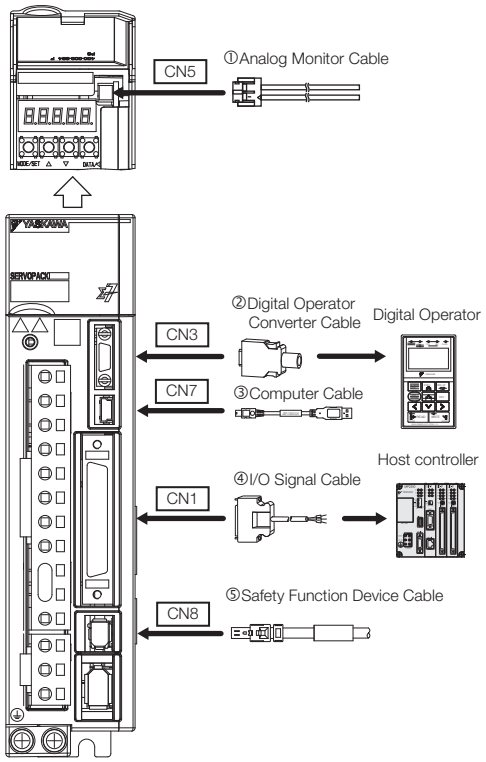
*2. The coefficient of speed fluctuation for load fluctuation is defined as follows:

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

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

Selecting Cables

◆ System Configurations



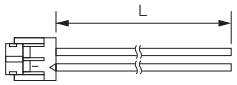
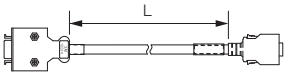
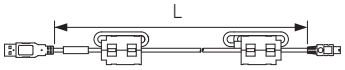
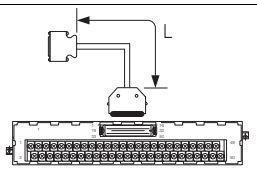
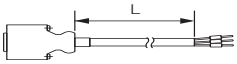
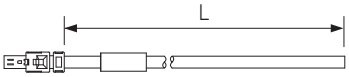
◆ Selection Table

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.

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

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

Code	Name		Length (L)	Order Number	Appearance
①	Analog Monitor Cable		1 m	JZSP-CA01-E	
②	Digital Operator Converter Cable		0.3 m	JZSP-CVS05-A3-E*1	
③	Computer Cable		2.5 m	JZSP-CVS06-02-E	
④	I/O Signal Cables	Soldered Connector Kit		JZSP-CSI9-1-E	
		Connector-Terminal Block Converter Unit (with cable)	0.5 m	JUSP-TA50PG-E	
			1 m	JUSP-TA50PG-1-E	
			2 m	JUSP-TA50PG-2-E	
		Cable with Loose Wires at One End (loose wires on peripheral device end)	1 m	JZSP-CSI01-1-E	
			2 m	JZSP-CSI01-2-E	
			3 m	JZSP-CSI01-3-E	
⑤	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 Σ-III-series Digital Operator (JUSP-OP05A) for Σ-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.

MEMO

Σ-7W Two-axis MECHATROLINK-III Communications Reference SERVOPACKs

Model Designations

SGD7W - 1R6 A 20 A 001 000 B

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

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

Voltage	Code	Specification
Three-phase, 200 VAC	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

5th+6th digits Interface*3

Code	Specification
20	MECHATROLINK-III communications reference

7th digit Design Revision Order

A

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

Code	Specification	Applicable Models
None	Without options	All models
000		
001	Rack-mounted	
002	Varnished	
020*4	No dynamic brake	SGD7W-1R6A to -2R8A
	External dynamic brake resistor	SGD7W-5R5A to -7R6A
700*5	HWBB option	All models

11th+12th+13th digits FT/EX Specification

Code	Specification
None	None
000	

14th digit BTO Specification*6 (Available in Japan only)

Code	Specification
None	None
B	BTO Specification

*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.
📖 *Σ-7-Series AC Servo Drive Σ-7S/Σ-7W SERVOPACK with Hardware Option Specifications Dynamic Brake Product Manual* (Manual No.: SIEP S800001 73)

*5. Refer to the following manual for details.
📖 *Σ-7-Series AC Servo Drive Σ-7W/Σ-7C SERVOPACK with Hardware Option Specifications HWBB Function Product Manual* (Manual No.: SIEP S800001 72)

*6. The BTO specification indicates if the SERVOPACK is customized by using the MechatroCloud BTO service.
You need a BTO number to order SERVOPACKs with customized specifications.
Refer to page M-15 for the details on the BTO service.

Ratings and Specifications

Ratings

◆ Three-phase, 200 VAC

Model SGD7W-			1R6A	2R8A	5R5A	7R6A
Maximum Applicable Motor Capacity per Axis [kW]			0.2	0.4	0.75	1.0
Continuous Output Current per Axis [Arms]			1.6	2.8	5.5	7.6
Instantaneous Maximum Output Current per Axis [Arms]			5.9	9.3	16.9	17.0
Main Circuit	Power Supply		200 VAC to 240 VAC, -15% to +10%, 50 Hz/60 Hz			
	Input Current [Arms]*		2.5	4.7	7.8	11
Control	Power Supply		200 VAC to 240 VAC, -15% to +10%, 50 Hz/60 Hz			
	Input Current [Arms]*		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.

◆ Single-phase, 200 VAC

Model SGD7W-			1R6A	2R8A	5R5A*1
Maximum Applicable Motor Capacity per Axis [kW]			0.2	0.4	0.75
Continuous Output Current per Axis [Arms]			1.6	2.8	5.5
Instantaneous Maximum Output Current per Axis [Arms]			5.9	9.3	16.9
Main Circuit	Power Supply		200 VAC to 240 VAC, -15% to +10%, 50 Hz/60 Hz		
	Input Current [Arms]*2		5.5	11	12
Control	Power Supply		200 VAC to 240 VAC, -15% to +10%, 50 Hz/60 Hz		
	Input Current [Arms]*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.

◆ 270 VDC

Model SGD7W-		1R6A	2R8A	5R5A	7R6A
Maximum Applicable Motor Capacity [kW]		0.2	0.4	0.75	1.0
Continuous Output Current [Arms]		1.6	2.8	5.5	7.6
Instantaneous Maximum Output Current [Arms]		5.9	9.3	16.9	17.0
Main Circuit	Power Supply	270 VDC to 324 VDC, -15% to +10%			
	Input Current [Arms]*	3.0	5.8	9.7	14
Control	Power Supply	270 VDC to 324 VDC, -15% to +10%			
	Input Current [Arms]*	0.25	0.25	0.25	0.25
Power Supply Capacity [kVA]*		1.2	2	3.2	4.6
Power Loss*	Main Circuit Power Loss [W]	18.7	33.3	58.4	73.7
	Control Circuit Power Loss [W]	17	17	17	17
	Total Power Loss [W]	36	50	75	91
Overvoltage Category		III			

* This is the net value at the rated load.

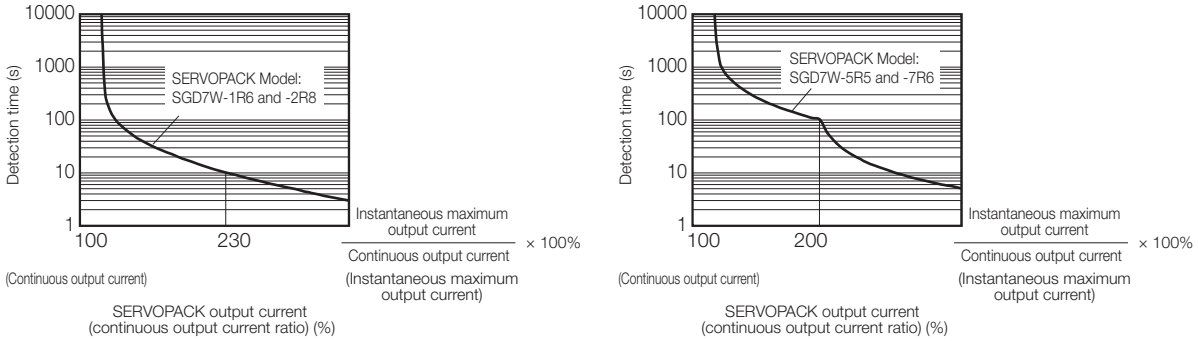
SERVOPACK Overload Protection Characteristics

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.

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	Surrounding 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. ☞ *Derating Specifications* (page 417)
	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	IP20
	Pollution Degree	2 • Must be no corrosive or flammable gases. • Must be no exposure to water, oil, or chemicals. • Must be no dust, salts, or iron dust.
	Altitude	1,000 m or less. With derating, usage is possible between 1,000 m and 2,000 m. Refer to the following section for derating specifications. ☞ *Derating Specifications* (page 417)
	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	1:5000 (At the rated torque, the lower limit of the speed control range must not cause the Servomotor to stop.)
	Coefficient of Speed Fluctuation*	±0.01% of rated speed max. (for a load fluctuation of 0% to 100%)
		0% of rated speed max. (for a voltage fluctuation of ±10%)
		±0.1% of rated speed max. (for a temperature fluctuation of 25°C ±25°C)
	Torque Control Precision (Repeatability)	±1%
	Soft Start Time Setting	0 s to 10 s (Can be set separately for acceleration and deceleration.)

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Item				Specification
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: 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 (CN3)	Interfaces		Digital Operator (JUSP-OP05A-1-E) and personal computer (with SigmaWin+)
		1:N Communications		Up to N = 15 stations possible for RS-422A port
		Axis Address Settings		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, CN, L1, and L2 indicators, and two, one-digit seven-segment displays
MECHATROLINK-III Communications		Communications Protocol		MECHATROLINK-III
		Station Address Settings		03 to EF hex (maximum number of slaves: 62) The rotary switches (S1 and S2) are used to set the station address.
		Extended Address Setting		Axis 1: 00 hex, Axis 2: 01 hex
		Baud Rate		100 Mbps
		Transmission Cycle		250 μs, 500 μs, 750 μs, 1.0 ms to 4.0 ms (multiples of 0.5 ms)
		Number of Transmission Bytes		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 Module	Option Module cannot be attached.

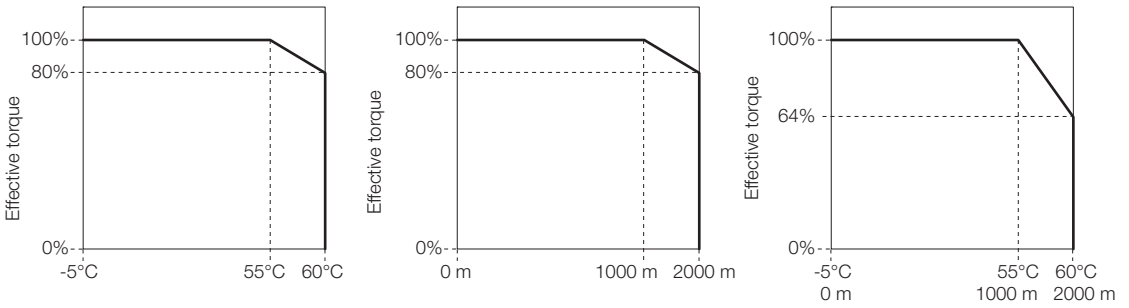
* The coefficient of speed fluctuation for load fluctuation is defined as follows:

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

Derating Specifications

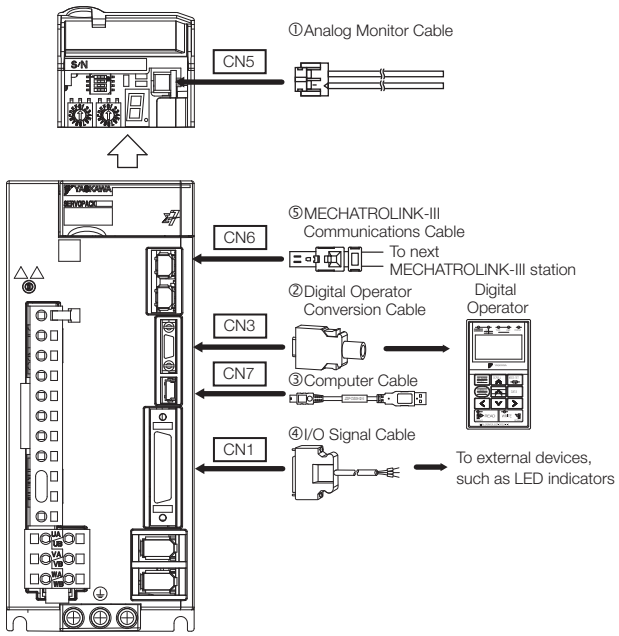
If you use the SERVOPACK at a surrounding air temperature of 55°C to 60°C or at an altitude of 1,000 m to 2,000 m, you must apply the derating rates given in the following graphs.

◆ SGD7W-1R6A, -2R8A, -5R5A, and -7R6A



Selecting Cables

◆ System Configurations



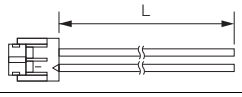
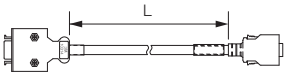
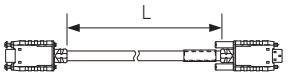
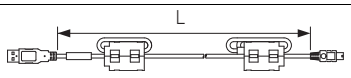
◆ Selection Table

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.

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

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

Code	Name	Length (L)	Order Number	Appearance
①	Analog Monitor Cable	1 m	JZSP-CA01-E	
②	Digital Operator Converter Cable	0.3 m	JZSP-CVS05-A3-E*1	
			JZSP-CVS07-A3-E*2	
③	Computer Cable	2.5 m	JZSP-CVS06-02-E	

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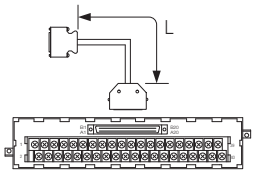
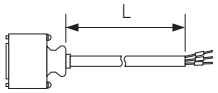
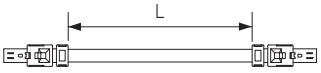
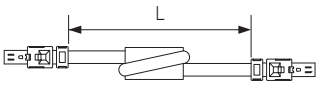
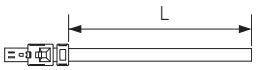
Code	Name		Length (L)	Order Number	Appearance
④	I/O Signal Cables	Soldered Connector Kit		DP9420007-E	
		Connector-Terminal Block Converter Unit (with cable)	0.5 m	JUSP-TA36P-E	
			1 m	JUSP-TA36P-1-E	
			2 m	JUSP-TA36P-2-E	
		Cable with Loose Wires at One End (loose wires on peripheral device end)	1 m	JZSP-CSI03-1-E	
			2 m	JZSP-CSI03-2-E	
			3 m	JZSP-CSI03-3-E	
⑤	MECHATROLINK-III Communications Cables	Cables with Connectors on Both Ends	0.2 m	JEPMC-W6012-A2-E	
			0.5 m	JEPMC-W6012-A5-E	
			1 m	JEPMC-W6012-01-E	
			2 m	JEPMC-W6012-02-E	
			3 m	JEPMC-W6012-03-E	
			4 m	JEPMC-W6012-04-E	
			5 m	JEPMC-W6012-05-E	
			10 m	JEPMC-W6012-10-E	
			20 m	JEPMC-W6012-20-E	
			30 m	JEPMC-W6012-30-E	
			50 m	JEPMC-W6012-50-E	
		Cables with Connectors on Both Ends (with core)	10 m	JEPMC-W6013-10-E	
			20 m	JEPMC-W6013-20-E	
			30 m	JEPMC-W6013-30-E	
			50 m	JEPMC-W6013-50-E	
		Cable with Loose Wires at One End	0.5 m	JEPMC-W6014-A5-E	
			1 m	JEPMC-W6014-01-E	
			3 m	JEPMC-W6014-03-E	
			5 m	JEPMC-W6014-05-E	
			10 m	JEPMC-W6014-10-E	
			30 m	JEPMC-W6014-30-E	
			50 m	JEPMC-W6014-50-E	

*1. This Converter Cable is required to use the Σ-III-series Digital Operator (JUSP-OP05A) for Σ-7-series SERVOPACKs.

*2. If you use a MECHATROLINK-III Communications Reference SERVOPACK, this Converter Cable is required to prevent the cable from disconnecting from the Digital Operator.

Σ-7C Two-axis Bus Connection Reference SERVOPACKs with built-in Controllers

Model Designations

SGD7C - 1R6 A MA A 001

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

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

Voltage	Code	Specification
Three-phase, 200 VAC	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

5th+6th digits Interface*3

Code	Specification
MA	Bus connection references

7th digit Design Revision Order

A

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

Code	Specification	Applicable Models
None	Without options	All models
000		
001	Rack-mounted	
002	Varnished	
020*4	No dynamic brake	SGD7C-1R6A to -2R8A
	External dynamic brake resistor	SGD7C-5R5A to -7R6A
700*5	HWBB option	All models

*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.
📖 *Σ-7-Series AC Servo Drive Σ-7S/Σ-7W SERVOPACK with Hardware Option Specifications Dynamic Brake Product Manual* (Manual No.: SIEP S800001 73)

*5. Refer to the following manual for details.
📖 *Σ-7-Series AC Servo Drive Σ-7W/Σ-7C SERVOPACK with Hardware Option Specifications HWBB Function Product Manual* (Manual No.: SIEP S800001 72)

Ratings and Specifications

Ratings

◆ 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 [Arms]			1.6	2.8	5.5	7.6
Instantaneous Maximum Output Current per Axis [Arms]			5.9	9.3	16.9	17.0
Main Circuit	Power Supply		200 VAC to 240 VAC, -15% to +10%, 50 Hz/60 Hz			
	Input Current [Arms]*		2.5	4.7	7.8	11
Control	Power Supply		200 VAC to 240 VAC, -15% to +10%, 50 Hz/60 Hz			
	Input Current [Arms]*		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.

◆ 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 [Arms]			1.6	2.8	5.5
Instantaneous Maximum Output Current per Axis [Arms]			5.9	9.3	16.9
Main Circuit	Power Supply		200 VAC to 240 VAC, -15% to +10%, 50 Hz/60 Hz		
	Input Current [Arms]*2		5.5	11	12
Control	Power Supply		200 VAC to 240 VAC, -15% to +10%, 50 Hz/60 Hz		
	Input Current [Arms]*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 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.

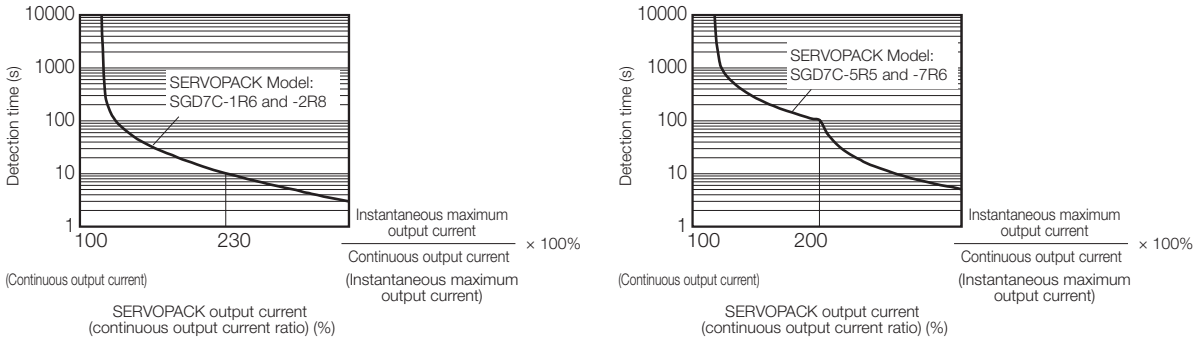
SERVOPACK Overload Protection Characteristics

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.

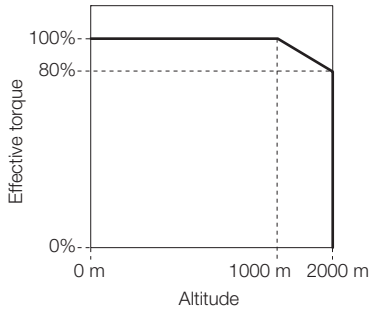
General Specifications

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	Surrounding Air Temperature	0°C to 55°C
	Storage Temperature	-20°C to 85°C
	Surrounding Air Humidity	10% to 95% relative humidity (with no freezing or condensation)
	Storage Humidity	10% to 95% relative humidity (with no freezing or condensation)
	Vibration Resistance	4.9 m/s^2
	Shock Resistance	19.6 m/s^2
	Protection Class	IP20
	Pollution Degree	2 • Must be no corrosive or flammable gases. • Must be no exposure to water, oil, or chemicals. • Must be no excessive dust, salts, or iron dust.
	Altitude	1,000 m max. Note: With derating, usage is possible between 1,000 m and 2,000 m. Refer to the following section for the derating specifications. ☞ *Derating Specifications* (page 424)
	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		1:5000 (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 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 USB2.0 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

This section provides the specifications of the Controller Section.

◆ 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. 📖 *Σ-7-Series Σ-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)	1000	
	Number of Low-Speed Scan Drawings (DWG.L)	2000	
	Number of User Function Drawings	2000	
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	–

Continued on next page.

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Item			Specification	Remarks
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	
Common 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 No-protocol 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. 📖 *Σ-7-Series Σ-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. 📖 *Σ-7-Series Σ-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. 📖 *Σ-7-Series Σ-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 Σ-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 No. / 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 following section for details. ☞ ■ *Recommended USB Memory Device* (page 431)
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. 📖 *Σ-7-Series Σ-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.

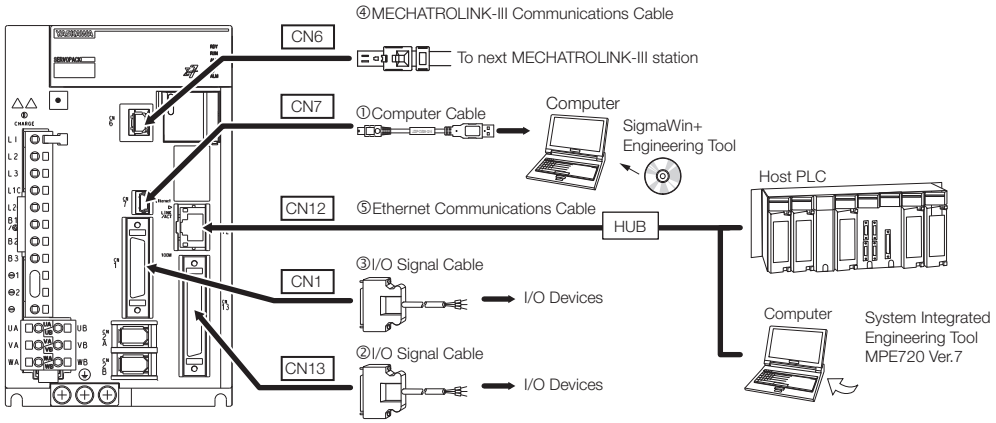
📖 *Σ-7-Series Σ-7C SERVOPACK Product Manual* (Manual No.: SIEP S800002 04)

📖 *Σ-7-Series Σ-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
SW00080 to SW00089	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	System I/O Error 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

◆ System Configurations



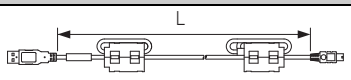
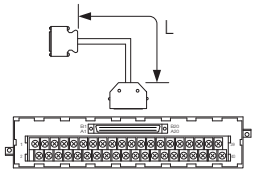
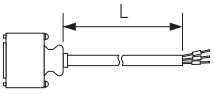
◆ Selection Table

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.

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

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

Code	Name		Length (L)	Order Number	Appearance
①	Computer Cable		2.5 m	JZSP-CVS06-02-E	
②	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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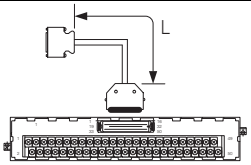
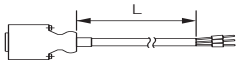
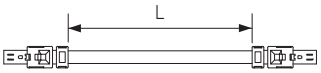
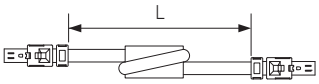
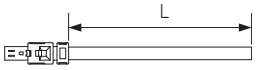
Code	Name		Length (L)	Order Number	Appearance
③	I/O Signal Cables	Soldered Connector Kit		JZSP-CSI9-1-E	
		Connector-Terminal Block Converter Unit (with cable)	0.5 m	JUSP-TA50PG-E	
			1 m	JUSP-TA50PG-1-E	
			2 m	JUSP-TA50PG-2-E	
		Cable with Loose Wires at One End (loose wires on peripheral device end)	1 m	JZSP-CSI01-1-E	
			2 m	JZSP-CSI01-2-E	
			3 m	JZSP-CSI01-3-E	
④	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	
⑤	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	

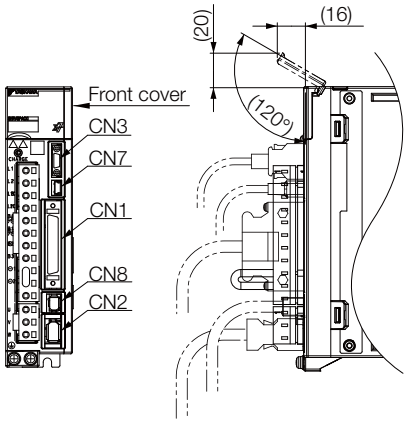
SERVOPACK External Dimensions

Front Cover Dimensions and Connector Specifications

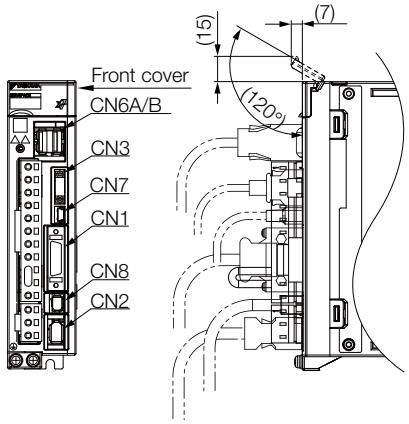
The front cover dimensions and panel connectors depend on the SERVOPACK interface. Refer to the following figures.

Front Cover Dimensions

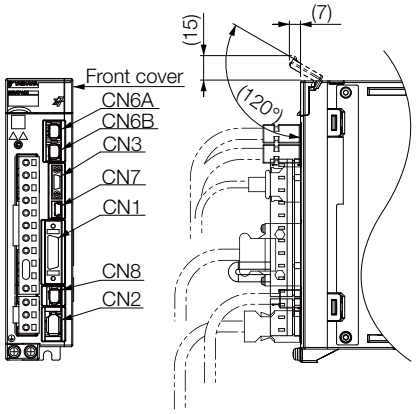
■ Σ-7S Analog Voltage/Pulse Train Reference SERVOPACKs



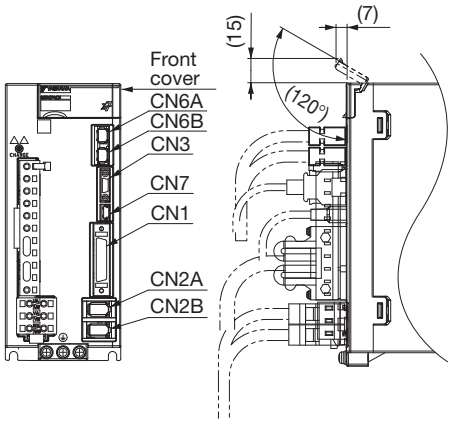
■ Σ-7S MECHATROLINK-II Communications Reference SERVOPACKs



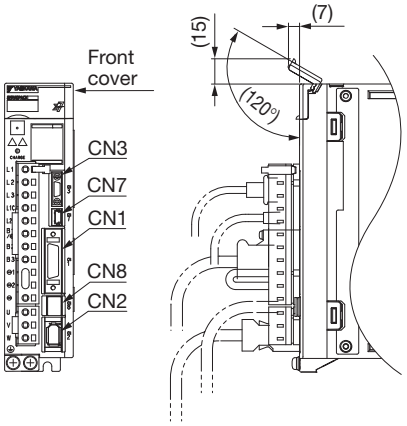
■ Σ-7S MECHATROLINK-III Communications Reference SERVOPACKs



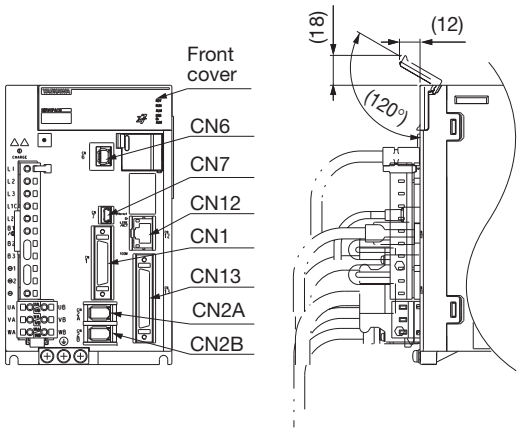
■ Σ-7W MECHATROLINK-III Communications Reference SERVOPACKs



■ Σ-7S Command Option Attachable-Type SERVOPACKs*



■ Σ-7C Bus Connection Reference SERVOPACKs



* A Command Option Module must be attached to the Command Option Attachable-Type SERVOPACK. To find the dimensions of the SERVOPACK with a Command Option Module attached, add the dimensions of the Command Option Module (refer to page 447 and following pages).

Connector Specifications

SERVOPACK	Connector No.	Model	Number of Pins	Manufacturer
Σ-7S Analog Voltage/Pulse Train Reference SERVOPACK	CN1	10250-59A3MB	50	3M Japan Ltd.
	CN2	3E106-0220KV	6	3M Japan Ltd.
	CN3	HDR-EC14LFDTN-SLD-PLUS	14	Honda Tsushin Kogyo Co., Ltd.
	CN7	2172034-1	5	Tyco Electronics Japan G.K.
	CN8	1981080-1	8	Tyco Electronics Japan G.K.
Σ-7S MECHATROLINK-II Communications Reference SERVOPACK	CN1	10226-59A3MB	26	3M Japan Ltd.
	CN2	3E106-0220KV	6	3M Japan Ltd.
	CN3	HDR-EC14LFDTN-SLD-PLUS	14	Honda Tsushin Kogyo Co., Ltd.
	CN6A/B	1903815-1	8	Tyco Electronics Japan G.K.
	CN7	2172034-1	5	Tyco Electronics Japan G.K.
	CN8	1981080-1	8	Tyco Electronics Japan G.K.
Σ-7S MECHATROLINK-III Communications Reference SERVOPACK	CN1	10226-59A3MB	26	3M Japan Ltd.
	CN2	3E106-0220KV	6	3M Japan Ltd.
	CN3	HDR-EC14LFDTN-SLD-PLUS	14	Honda Tsushin Kogyo Co., Ltd.
	CN6A, CN6B	1981386-1	8	Tyco Electronics Japan G.K.
	CN7	2172034-1	5	Tyco Electronics Japan G.K.
	CN8	1981080-1	8	Tyco Electronics Japan G.K.
Σ-7S Command Option Attachable-Type SERVOPACK	CN1	10226-59A3MB	26	3M Japan Ltd.
	CN2	3E106-0220KV	6	3M Japan Ltd.
	CN3	HDR-EC14LFDTN-SLD-PLUS	14	Honda Tsushin Kogyo Co., Ltd.
	CN7	2172034-1	5	Tyco Electronics Japan G.K.
	CN8	1981080-1	8	Tyco Electronics Japan G.K.
Σ-7W MECHATROLINK-III Communications Reference SERVOPACK	CN1	10236-59A3MB	36	3M Japan Ltd.
	CN2A, CN2B	3E106-2230KV	6	3M Japan Ltd.
	CN3	HDR-EC14LFDTN-SLD-PLUS	14	Honda Tsushin Kogyo Co., Ltd.
	CN6A, CN6B	1981386-1	8	Tyco Electronics Japan G.K.
	CN7	2172034-1	5	Tyco Electronics Japan G.K.
Σ-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.

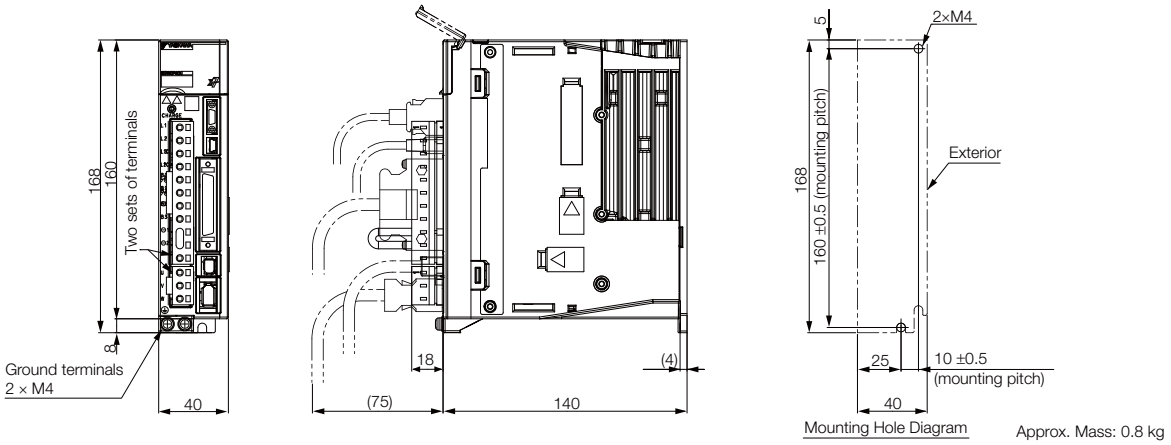
Note: The above connectors or their equivalents are used for the SERVOPACKs.

SERVOPACK External Dimensions

Σ-7S SERVOPACKs: Base-mounted

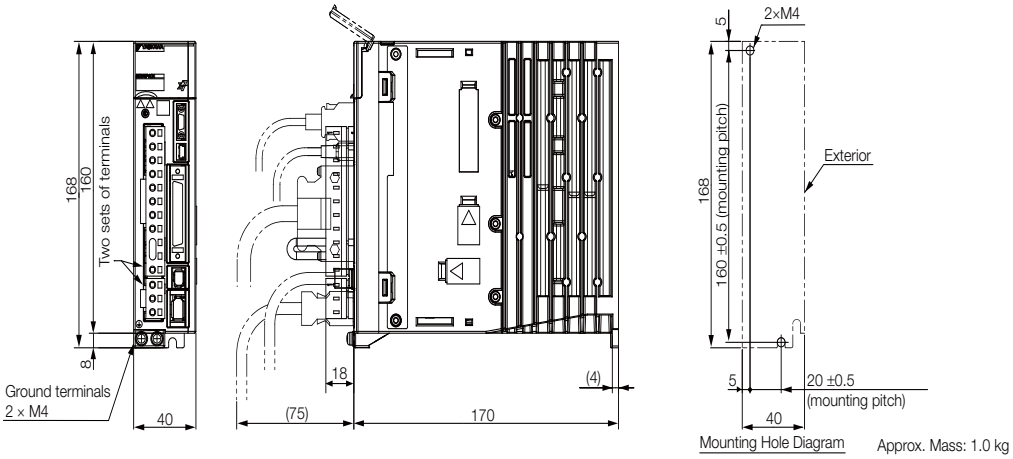
All of the dimensional drawings show Analog Voltage/Pulse Train Reference SERVOPACKs as typical examples.

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



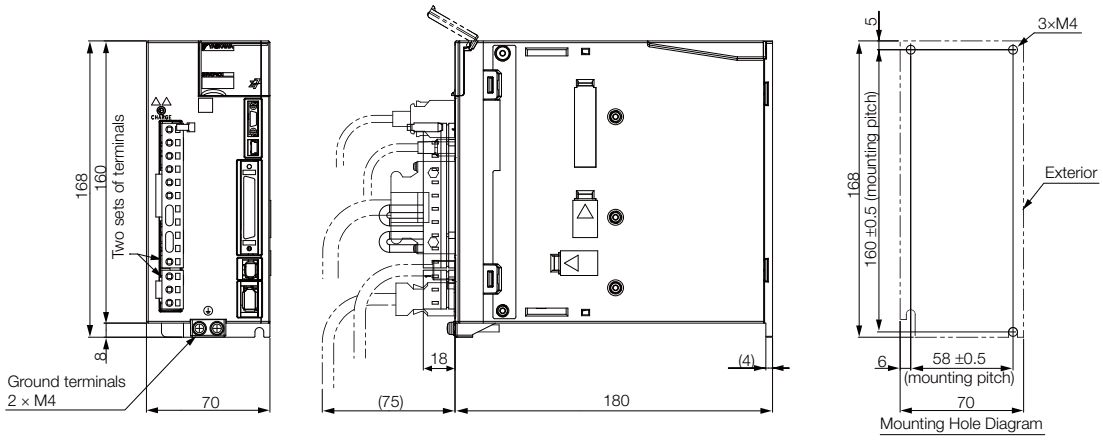
Approx. Mass: 0.8 kg
Unit: mm

◆ Three-phase, 200 VAC: SGD7S-2R8A
Single-phase, 100 VAC: SGD7S-R70F, -R90F, and -2R1F



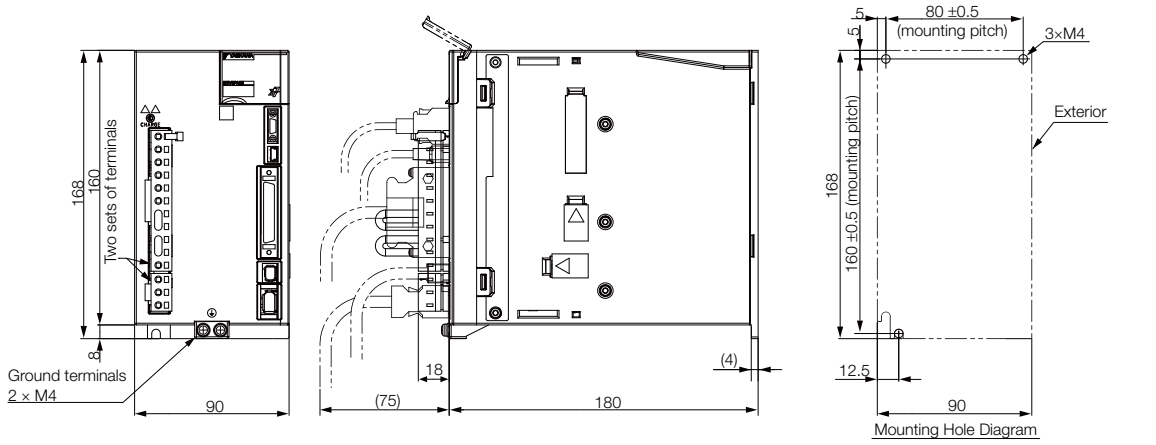
Approx. Mass: 1.0 kg
Unit: mm

◆ Three-phase, 200 VAC: SGD7S-3R8A, -5R5A, and -7R6A
Single-phase, 100 VAC: SGD7S-2R8F



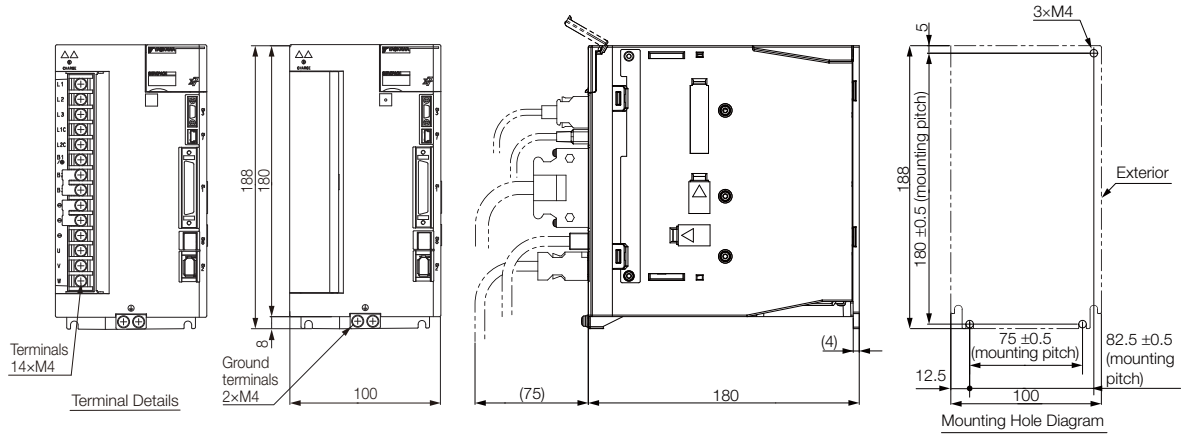
Approx. Mass: 1.6 kg
Unit: mm

◆ Three-phase, 200 VAC: SGD7S-120A



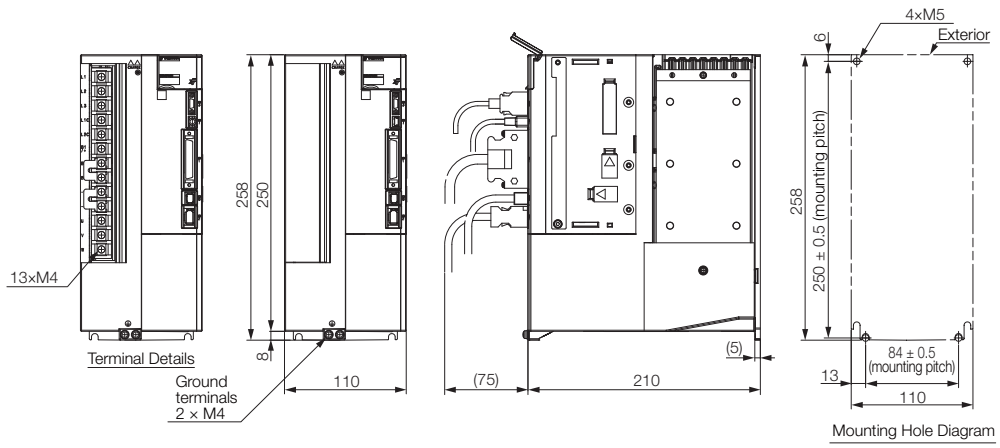
Approx. Mass: 2.2 kg
Unit: mm

◆ Three-phase, 200 VAC: SGD7S-180A and -200A
Single-phase, 200 VAC: SGD7S-120A□□A008



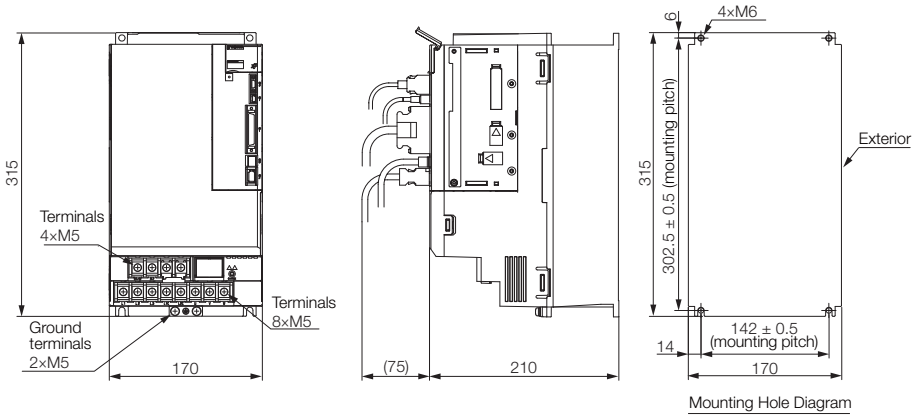
Approx. Mass: 2.7 kg
Unit: mm

◆ Three-phase, 200 VAC: SGD7S-330A



Approx. Mass: 4.4 kg
Unit: mm

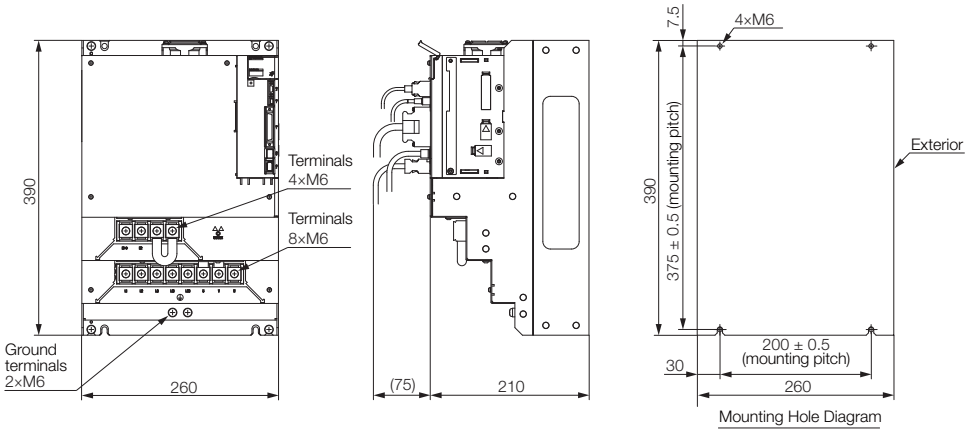
◆ Three-phase, 200 VAC: SGD7S-470A and -550A



Mounting Hole Diagram

Approx. Mass: 8.2 kg
Unit: mm

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



Mounting Hole Diagram

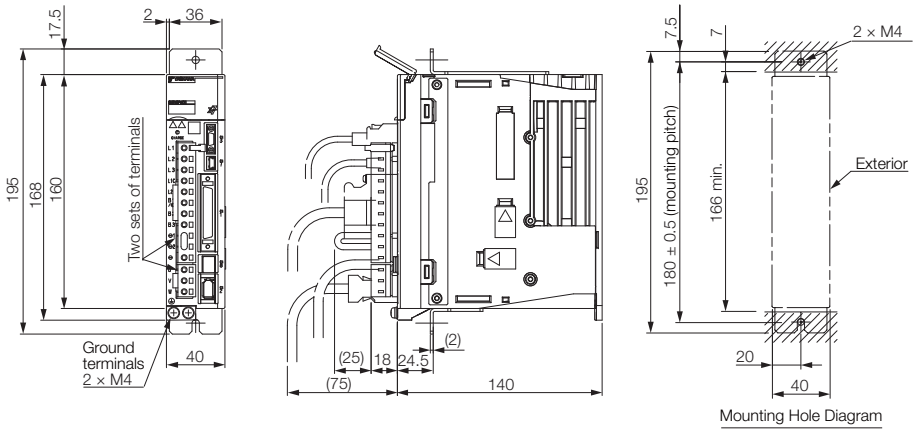
Approx. Mass: 15.5 kg
Unit: mm

Σ-7S SERVOPACKs: Rack-mounted

Hardware Option Code: 001

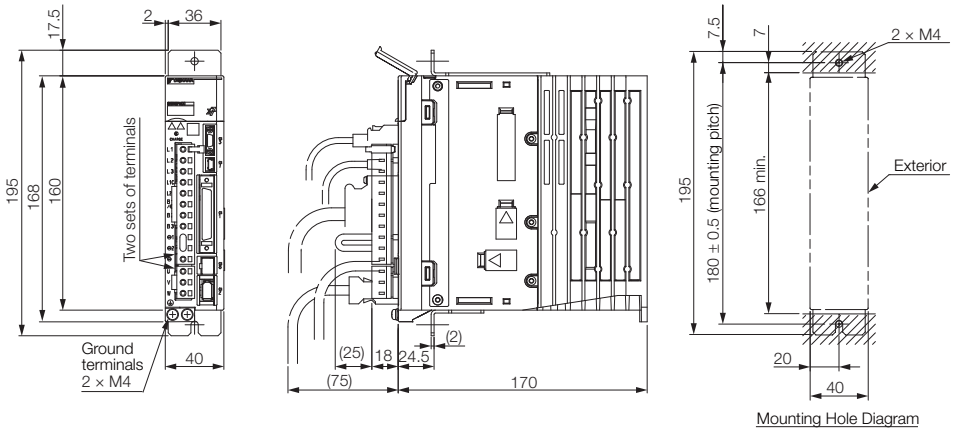
All of the dimensional drawings show Analog Voltage/Pulse Train Reference SERVOPACKs as typical examples.

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



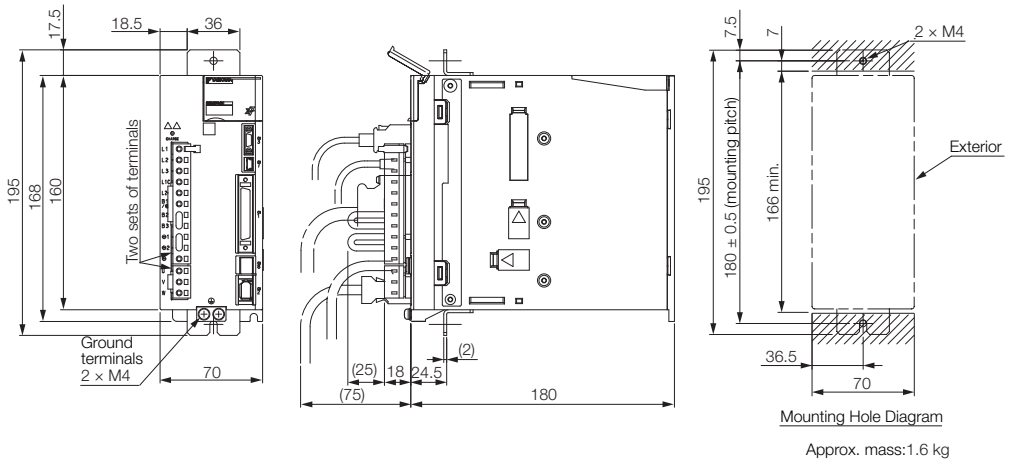
Approx. mass: 0.8 kg
Unit: mm

◆ Three-phase, 200 VAC: SGD7S-2R8A
Single-phase, 100 VAC: SGD7S-R70F, -R90F, and -2R1F



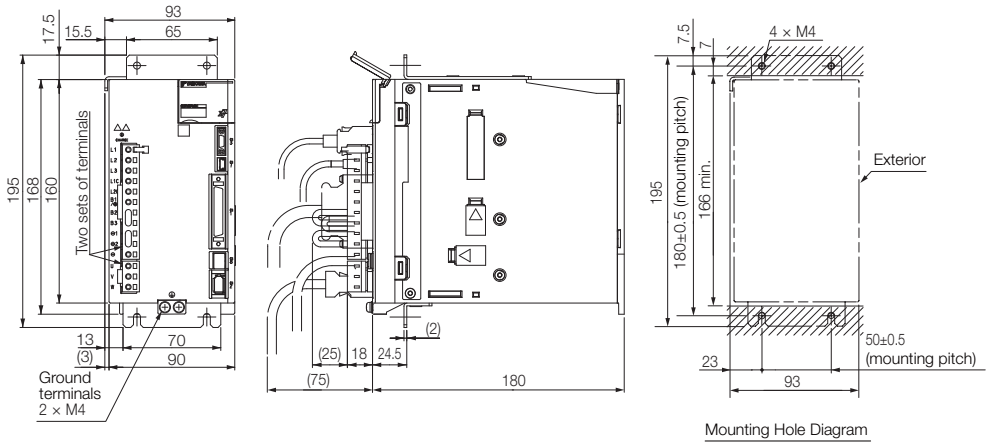
Approx. mass: 1.0 kg
Unit: mm

◆ Three-phase, 200 VAC: SGD7S-3R8A, -5R5A, and -7R6A
Single-phase, 100 VAC: SGD7S-2R8F



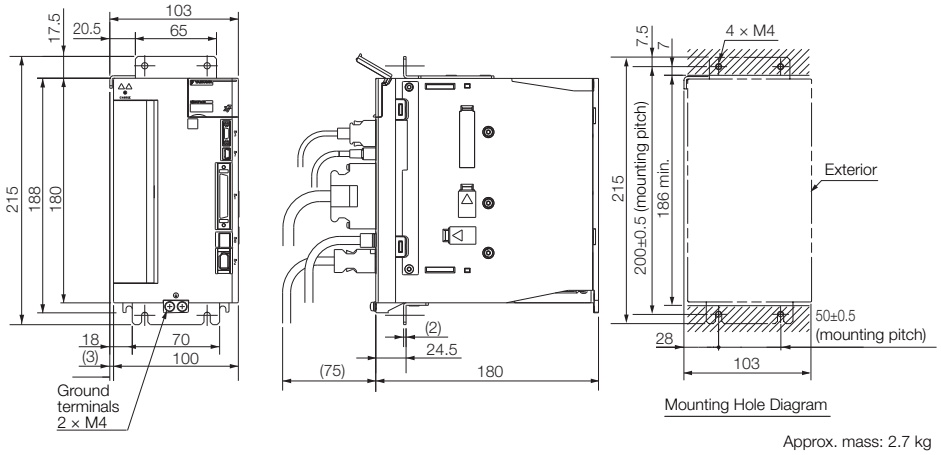
Approx. mass:1.6 kg
Unit: mm

◆ Three-phase, 200 VAC: SGD7S-120A



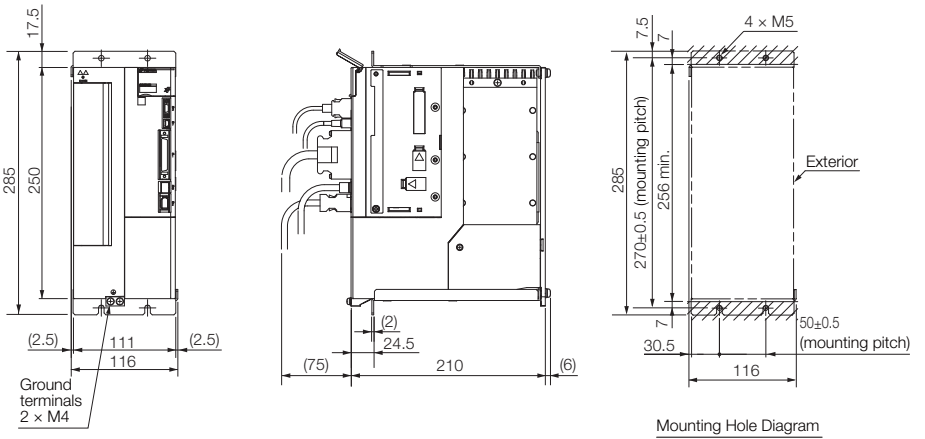
Approx. mass: 2.2 kg
Unit: mm

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



Approx. mass: 2.7 kg
Unit: mm

◆ Three-phase, 200 VAC: SGD7S-330A



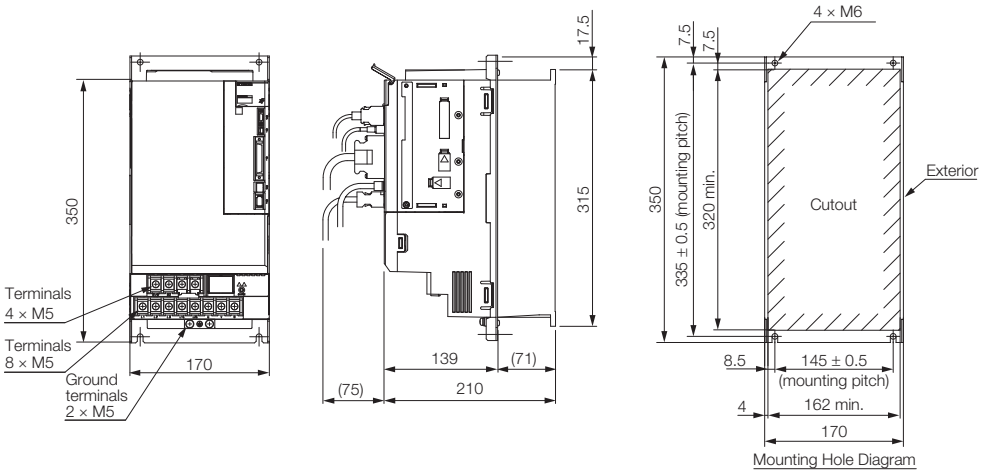
Approx. mass: 4.9 kg
Unit: mm

Σ-7S SERVOPACKs: Duct-ventilated

Hardware Option Code: 001

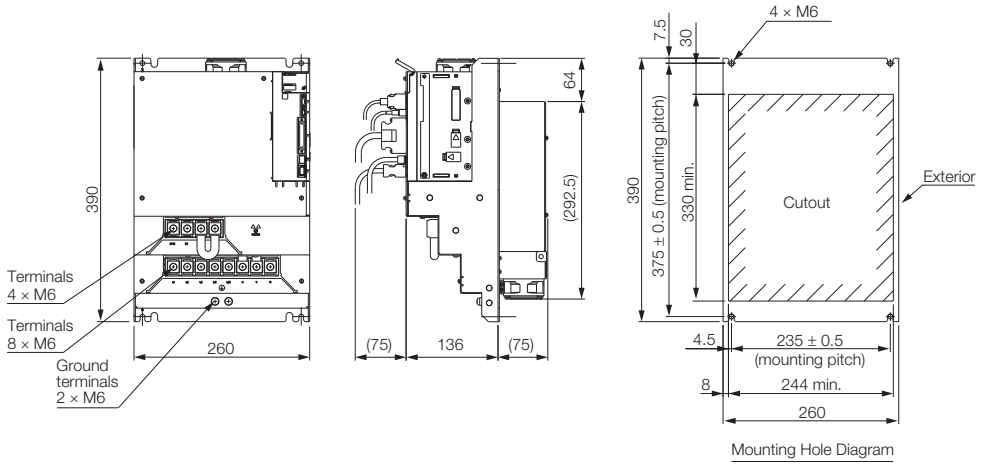
All of the dimensional drawings show Analog Voltage/Pulse Train Reference SERVOPACKs as typical examples.

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



Approx. mass: 8.4 kg
Unit: mm

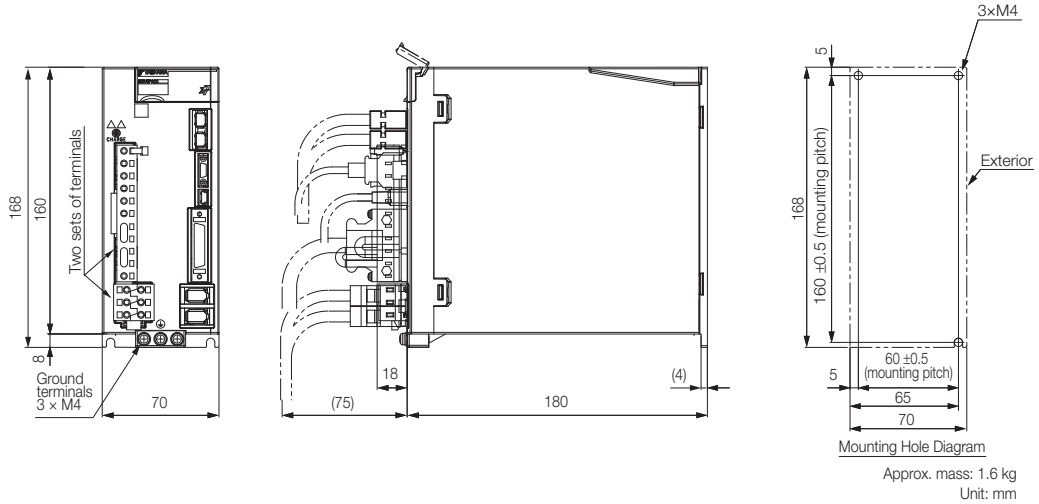
◆ Three-phase, 200 VAC: SGD7S-590A and -780A



Approx. mass: 13.8 kg
Unit: mm

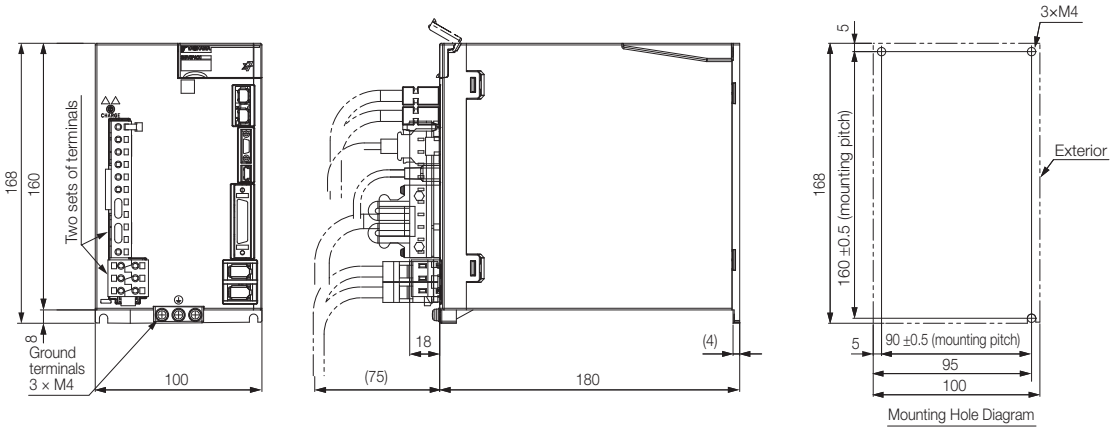
Σ-7W SERVOPACKs: Base-mounted

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



Approx. mass: 1.6 kg
Unit: mm

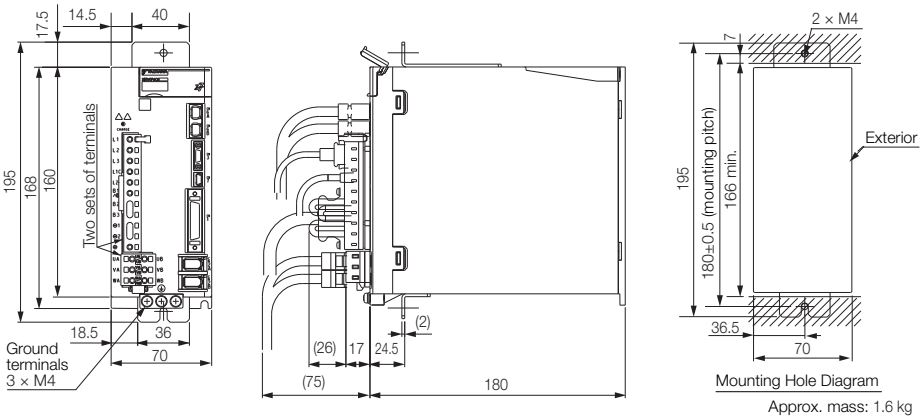
◆ Three-phase, 200 VAC: SGD7W-5R5A and -7R6A



Approx. mass: 2.3 kg
Unit: mm

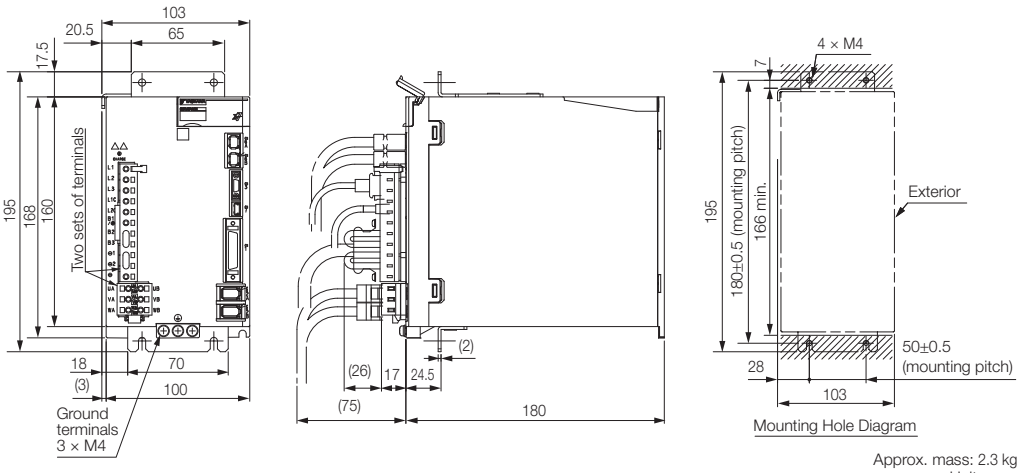
Σ-7W SERVOPACKs: Rack-mounted

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



Approx. mass: 1.6 kg
Unit: mm

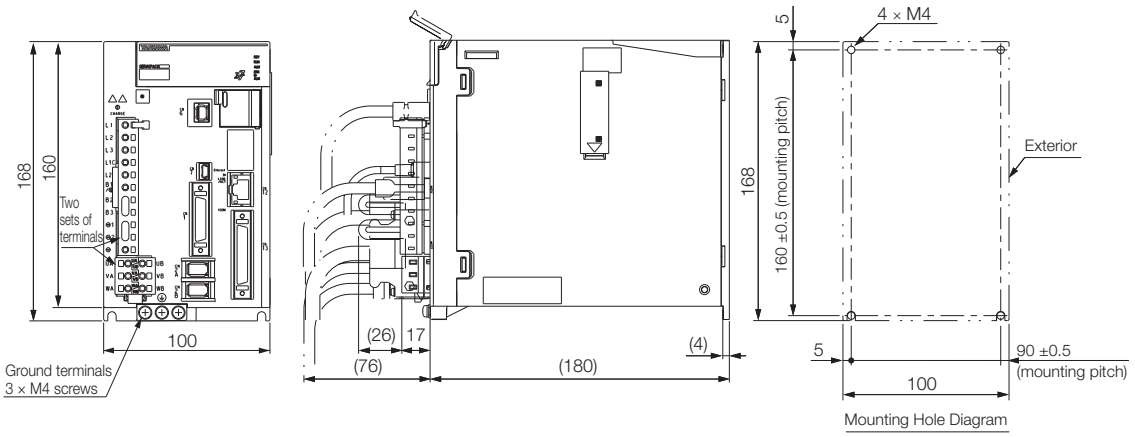
◆ Three-phase, 200 VAC: SGD7W-5R5A and -7R6A



Approx. mass: 2.3 kg
Unit: mm

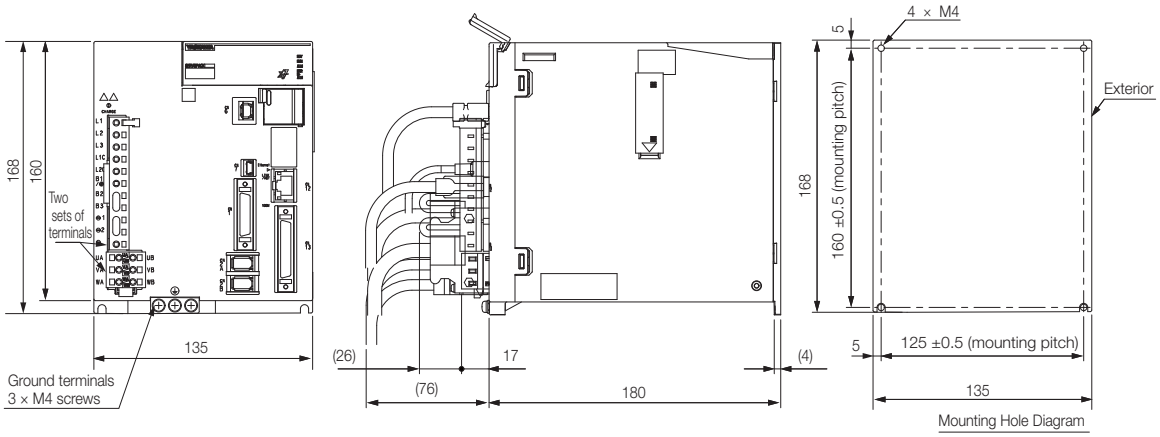
Σ-7C SERVOPACKs: Base-Mounted

◆ Three-phase, 200 VAC: SGD7C-1R6A and -2R8A



Approx. mass: 2.0 kg
Unit: mm

◆ Three-phase, 200 VAC: SGD7C-5R5A and -7R6A

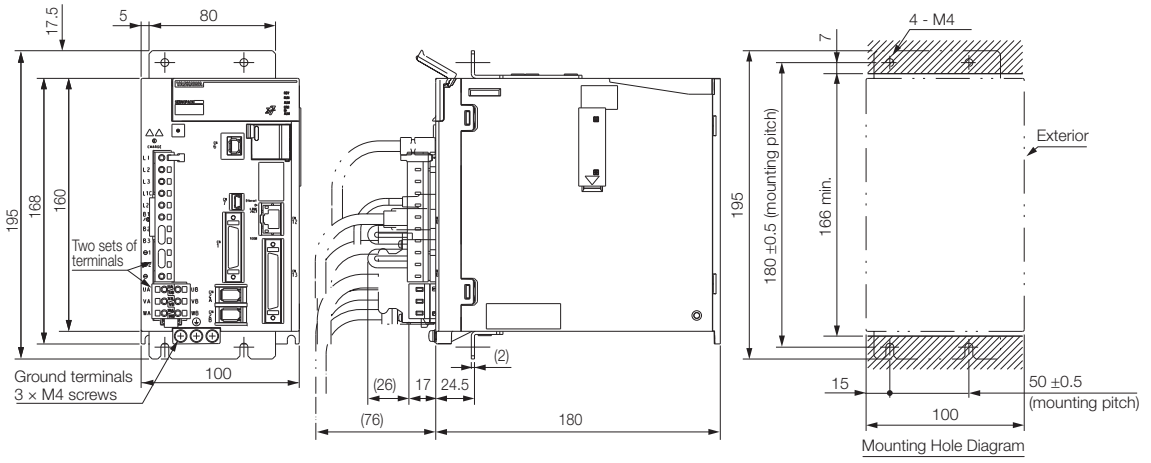


Approx. mass: 2.8 kg
Unit: mm

Σ-7C SERVOPACKs: Rack-Mounted

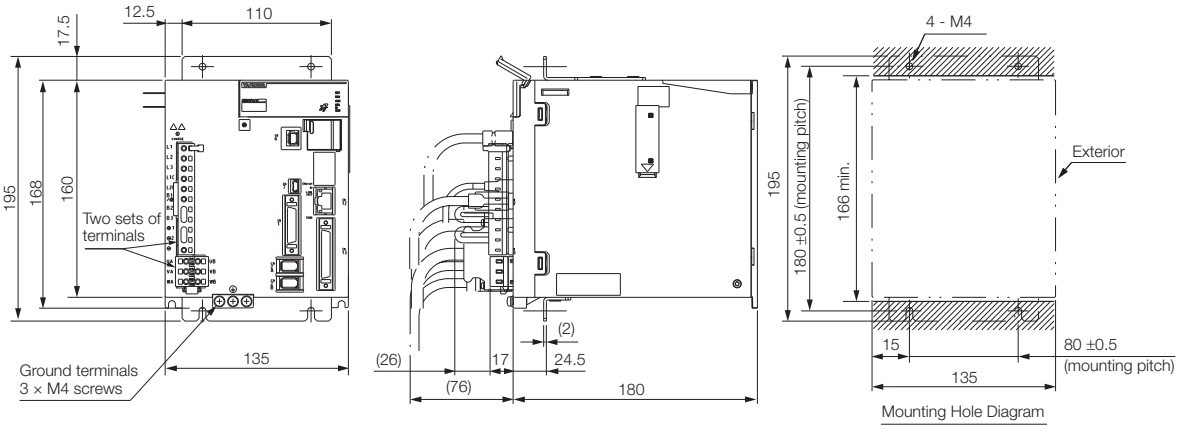
Hardware Option Code: 001

◆ Three-phase, 200 VAC: SGD7C-1R6A and -2R8A



Approx. mass: 2.0 kg
Unit: mm

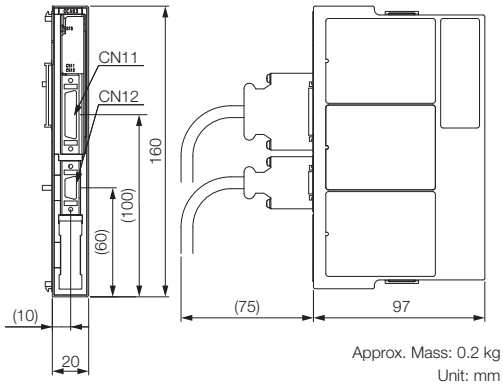
◆ Three-phase, 200 VAC: SGD7C-5R5A and -7R6A



Approx. mass: 2.8 kg
Unit: mm

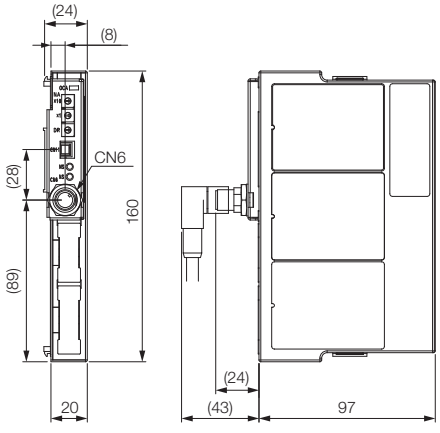
Command Option Module External Dimensions

◆ INDEXER Module



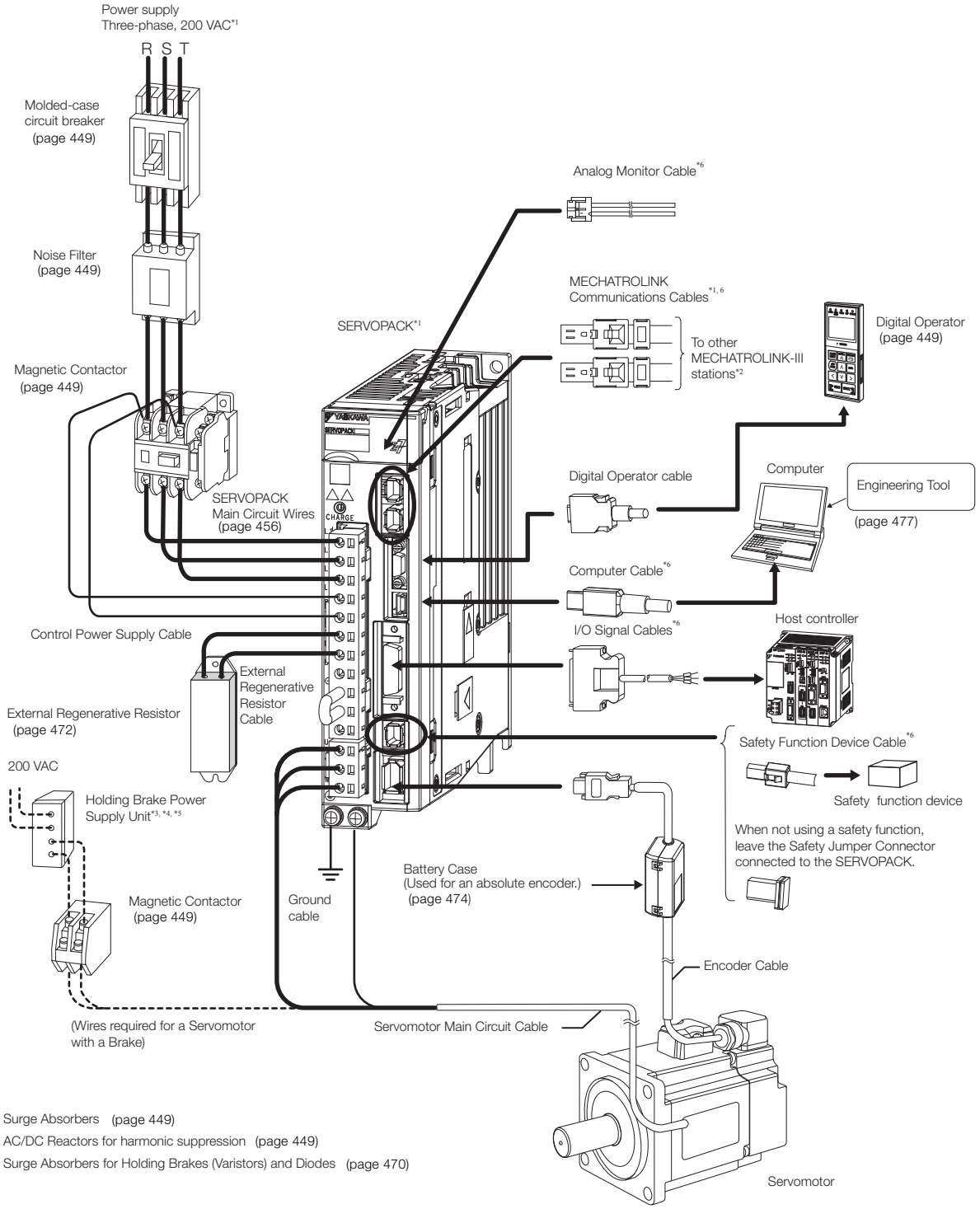
Approx. Mass: 0.2 kg
Unit: mm

◆ DeviceNet Module



Approx. Mass: 0.3 kg
Unit: mm

Peripheral Devices



*1. The peripheral devices are described using a MECHATROLINK-III Communications Reference, Three-phase 200 VAC SERVOPACK as an example. The shapes of the connectors may be different for other interfaces.

*2. The connected devices depend on the interface.
For MECHATROLINK-II communications references: Other MECHATROLINK-II stations
For analog voltage/pulse train references: There is no CN6 connector.

*3. A Holding Brake Power Supply Unit is required to use a Servomotor with a Holding Brake. Holding Brake Power Supply Units for 24 VDC are not provided by Yaskawa. Obtain these from other manufacturers.
Never connect Holding Brake Power Supply Units with different output voltages to a SERVOPACK. Overcurrent may result in burning in the brake.

*4. If you use a Servomotor with a Holding Brake, select a brake relay according to the power supply voltage and current of the brake. Yaskawa does not recommend any particular brake relays. Select an appropriate brake relay using the selection method of the brake relay manufacturer.

*5. The power supply for the holding brake is not provided by Yaskawa. Select a power supply based on the holding brake specifications. If you use a 24-V brake, install a separate power supply for the 24-VDC power supply from other power supplies, such as the one for the I/O signals of the CN1 connector. If the power supply is shared, the I/O signals may malfunction.

*6. For SERVOPACK cables, refer to the selection table for each type of SERVOPACK.

Peripheral Device Selection Table

◆ Σ-7S SERVOPACKs

Main Circuit Power Supply	Maximum Applicable Motor Capacity [kW]	SERVOPACK Model: SGD7S-	Noise Filter*1	AC Reactor*2	DC Reactor*2	Magnetic Contactor	Surge Absorber	Digital Operator
Three-phase, 200 VAC	0.05	R70A	HF3010C-SZC	–	X5061	SC-03	LT-C32G801WS	JUSP-OP05A-1-E
	0.1	R90A						
	0.2	1R6A						
	0.4	2R8A						
	0.5	3R8A						
	0.75	5R5A	HF3020C-SZC			SC-4-1		
	1.0	7R6A						
	1.5	120A			X5060			
	2.0	180A				SC-5-1		
	3.0	200A	HF3030C-SZC		X5059			
	5.0	330A	HF3050C-SZC -47EDD		X5068	SC-N1		
	6.0	470A			X008025			
	7.5	550A	HF3060C-SZC		X008026	SC-N2		
	11	590A	HF3100C-SZC		X008027	SC-N2S		
	15	780A			X008028	SC-N3		
Single-phase, 200 VAC	0.05	R70A	HF2010A-UPF		X5071	SC-03	LT-C12G801WS	
	0.1	R90A						
	0.2	1R6A			X5070			
	0.4	2R8A			X5069			
	0.75	5R5A	HF2020A-UPF-2BB		X5079	SC-4-1		
	1.5	120A□ □□008	HF2030A-UPF-2BB		X5078	SC-5-1		
Single-phase, 100 VAC	0.05	R70F	HF2010A-UPF	X5053	–	SC-03		
	0.1	R90F						
	0.2	2R1F		X5054				
	0.4	2R8F	HF2020A-UPF	X5056		SC-4-1		

Device	Inquiries
Noise Filters	Yaskawa Controls Co., Ltd.
Surge Absorbers	
AC/DC Reactors for harmonic suppression	
Magnetic Contactors	Fuji Electric FA Components & Systems Co., Ltd.

*1. Some Noise Filters have large leakage currents. The grounding conditions also affect the size of the leakage current. If necessary, select an appropriate leakage detector or leakage breaker taking into account the grounding conditions and the leakage current from the Noise Filter.

*2. The last digit of an RoHS-compliant serial number is R. Consult with Yaskawa Controls Co., Ltd. for RoHS-compliant reactors.

Note: 1. Consult the manufacturer for details on peripheral devices.

2. For Digital Operator Converter cables, refer to the selection table for each type of SERVOPACK.

3. Refer to the following manual for the following information.

- Dimensional drawings, ratings, and specifications of peripheral devices

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

◆ Σ-7W SERVOPACKs

Main Circuit Power Supply	Maximum Applicable Motor Capacity per Axis [kW]	SERVOPACK Model: SGD7W-	Noise Filter*1	AC Reactor*2	DC Reactor*2	Magnetic Contactor	Surge Absorber	Digital Operator
Three-phase, 200 VAC	0.2	1R6A	HF3010C-SZC	–	X5061	SC-03	LT-C32G801WS	JUSP-OP05A-1-E
	0.4	2R8A	HF3020C-SZC			SC-4-1		
	0.75	5R5A			X5060			
	1.0	7R6A				SC-5-1		
Single-phase, 200 VAC	0.2	1R6A	HF2010A-UPF		X5069	SC-03	LT-C12G801WS	
	0.4	2R8A	HF2020A-UPF-2BB		X5079	SC-4-1		
	0.75	5R5A	HF2030A-UPF-2BB		X5078	SC-5-1		

Device	Inquiries
Noise Filters	Yaskawa Controls Co., Ltd.
Surge Absorbers	
AC/DC Reactors for harmonic suppression	
Magnetic Contactors	Fuji Electric FA Components & Systems Co., Ltd.

*1. Some Noise Filters have large leakage currents. The grounding conditions also affect the size of the leakage current. If necessary, select an appropriate leakage detector or leakage breaker taking into account the grounding conditions and the leakage current from the Noise Filter.

*2. The last digit of an RoHS-compliant serial number is R. Consult with Yaskawa Controls Co., Ltd. for RoHS-compliant reactors.

Note: 1. Consult the manufacturer for details on peripheral devices.

2. Refer to the following section for information on Digital Operator Converter Cables.

☞ ◆ *Selection Table* (page 418)

3. Refer to the following manual for the following information.
   • Dimensional drawings, ratings, and specifications of peripheral devices

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

◆ Σ-7C SERVOPACKs

Main Circuit Power Supply	Maximum Applicable Motor Capacity per Axis [kW]	SERVOPACK Model: SGM7C-	Noise Filter*1	AC Reactor*2	DC Reactor*2	Magnetic Contactor	Surge Absorber
Three-phase, 200 VAC	0.2	1R6A	HF3010C-SZC	–	X5061	SC-03	LT-C32G801WS
	0.4	2R8A	HF3020C-SZC			SC-4-1	
	0.75	5R5A			X5060		
	1.0	7R6A				SC-5-1	
Single-phase, 200 VAC	0.2	1R6A	HF2010A-UPF		X5069	SC-03	LT-C12G801WS
	0.4	2R8A	HF2020A-UPF-2BB		X5079	SC-4-1	
	0.75	5R5A	HF2030A-UPF-2BB		X5078	SC-5-1	

Device	Inquiries
Noise Filters	Yaskawa Controls Co., Ltd.
Surge Absorbers	
AC/DC Reactors for harmonic suppression	
Magnetic Contactors	Fuji Electric FA Components & Systems Co., Ltd.

*1. Some Noise Filters have large leakage currents. The grounding conditions also affect the size of the leakage current. If necessary, select an appropriate leakage detector or leakage breaker taking into account the grounding conditions and the leakage current from the Noise Filter.

*2. The last digit of an RoHS-compliant serial number is R. Consult with Yaskawa Controls Co., Ltd. for RoHS-compliant reactors.

Note: 1. Consult the manufacturer for details on peripheral devices.

2. Refer to the following manual for the following information.
   • Dimensional drawings, ratings, and specifications of peripheral devices
   📖 *Σ-7-Series AC Servo Drive Peripheral Device Selection Manual* (Manual No.: SIEP S800001 32)

Molded-case Circuit Breakers and Fuses

Using an AC Power Supply

Use a molded-case circuit breaker and fuse to protect the power supply line. They protect the power line by shutting OFF the circuit when overcurrent is detected. Select these devices based on the information in the following tables.

Note: The following tables also provide the net values of the current capacity and inrush current. Select a fuse and a molded-case circuit breaker that meet the following conditions.
- Main circuit and control circuit: No breaking at three times the current value given in the table for 5 s.
- Inrush current: No breaking at the current value given in the table for 20 ms.

◆ Σ-7S SERVOPACKs

Main Circuit Power Supply	Maximum Applicable Motor Capacity [kW]	SERVOPACK Model: SGD7S-	Power Supply Capacity per SERVOPACK [kVA]*	Current Capacity		Inrush Current		Rated Voltage	
				Main Circuit [Arms]*	Control Power Supply [Arms]	Main Circuit [A0-p]	Control Power Supply [A0-p]	Fuse [V]	MCCB [V]
Three-phase, 200 VAC	0.05	R70A	0.2	0.4	0.2	34	34	250	240
	0.1	R90A	0.3	0.8					
	0.2	1R6A	0.5	1.3					
	0.4	2R8A	1.0	2.5					
	0.5	3R8A	1.3	3.0					
	0.75	5R5A	1.6	4.1					
	1.0	7R6A	2.3	5.7					
	1.5	120A	3.2	7.3					
	2.0	180A	4.0	10	0.25				
	3.0	200A	5.9	15					
	5.0	330A	7.5	25	0.3	68			
	6.0	470A	10.7	29					
	7.5	550A	14.6	37					
	11	590A	21.7	54	0.4	114			
	15	780A	29.6	73					
Single-phase, 200 VAC	0.05	R70A	0.2	0.8	0.2	34			
	0.1	R90A	0.3	1.6					
	0.2	1R6A	0.6	2.4					
	0.4	2R8A	1.2	5.0					
	0.75	5R5A	1.9	8.7					
	1.5	120A□□□008	4.0	16	0.25				
Single-phase, 100 VAC	0.05	R70F	0.2	1.5	0.38				
	0.1	R90F	0.3	2.5					
	0.2	2R1F	0.6	5					
	0.4	2R8F	1.4	10					

* This is the net value at the rated load.

◆ Σ-7W SERVOPACKs

Main Circuit Power Supply	Maximum Applicable Motor Capacity per Axis [kW]	SERVOPACK Model: SGD7W-	Power Supply Capacity per SERVOPACK [kVA]*1	Current Capacity		Inrush Current		Rated Voltage	
				Main Circuit [Arms]*1	Control Power Supply [Arms]	Main Circuit [A0-p]	Control Power Supply [A0-p]	Fuse [V]	MCCB [V]
Three-phase, 200 VAC	0.2	1R6A	1.0	2.5	0.25	34	34	250	240
	0.4	2R8A	1.9	4.7					
	0.75	5R5A	3.2	7.8					
	1.0	7R6A	4.5	11					
Single-phase, 200 VAC	0.2	1R6A	1.3	5.5					
	0.4	2R8A	2.4	11					
	0.75	5R5A*2	2.7	12					

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

*2. If you use the SGD7W-5R5A with a single-phase 200-VAC power supply input, derate the load ratio to 65%. 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%).

◆ Σ-7C SERVOPACKs

Main Circuit Power Supply	Maximum Applicable Motor Capacity per Axis [kW]	SERVOPACK Model: SGM7C-	Power Supply Capacity per SERVOPACK [kVA]*1	Current Capacity		Inrush Current		Rated Voltage	
				Main Circuit [Arms]*1	Control Power Supply [Arms]	Main Circuit [A0-p]	Control Power Supply [A0-p]	Fuse [V]	MCCB [V]
Three-phase, 200 VAC	0.2	1R6A	1.0	2.5	0.25	34	34	250	240
	0.4	2R8A	1.9	4.7					
	0.75	5R5A	3.2	7.8					
	1.0	7R6A	4.5	11					
Single-phase, 200 VAC	0.2	1R6A	1.3	5.5					
	0.4	2R8A	2.4	11					
	0.75	5R5A*2	2.7	12					

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

*2. If you use the SGM7C-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%).

Using a DC Power Supply

This section gives the power supply specifications for using a DC power supply input. Use the Fuses given in the following tables to protect the power supply line and SERVOPACK. They protect the power line by shutting OFF the circuit when overcurrent is detected.

Note: The following tables provide the net values of the current capacity and inrush current.

◆ Σ-7S SERVOPACKs

Main Circuit Power Supply	SERVOPACK Model: SGD7S-	Power Supply Capacity per SERVOPACK [kVA]*1	Current Capacity		Inrush Current		External Fuse		
			Main Circuit [Arms]*1	Control Power Supply [Arms]	Main Circuit [A0-p]	Control Power Supply [A0-p]	Order Number*2	Current Rating [A]	Voltage Rating [Vdc]
270 VDC	R70A	0.2	0.5	0.2	34	34	3,5URGJ17/16UL	16	400
	R90A	0.3	1.0						
	1R6A	0.5	1.5						
	2R8A	1.0	3.0				3,5URGJ17/20UL	20	
	3R8A	1.3	3.8	0.2			3,5URGJ17/40UL	40	
	5R5A	1.6	4.9						
	7R6A	2.3	6.9						
	120A	3.2	11	0.2					
	120A□□□008			0.25			3,5URGJ17/63UL	63	
	180A	4.0	14						
	200A	5.9	20						
	330A	7.5	34	0.3	68*3 (5 Ω external)		3,5URGJ17/100UL	100	
	470A	10.7	36				3,5URGJ23/160UL	160	
	550A	14.6	48						
	590A	21.7	68	0.4	114*3 (3 Ω external)		3,5URGJ23/200UL	200	
	780A	29.6	92						

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

*2. These Fuses are manufactured by MERSEN Japan.

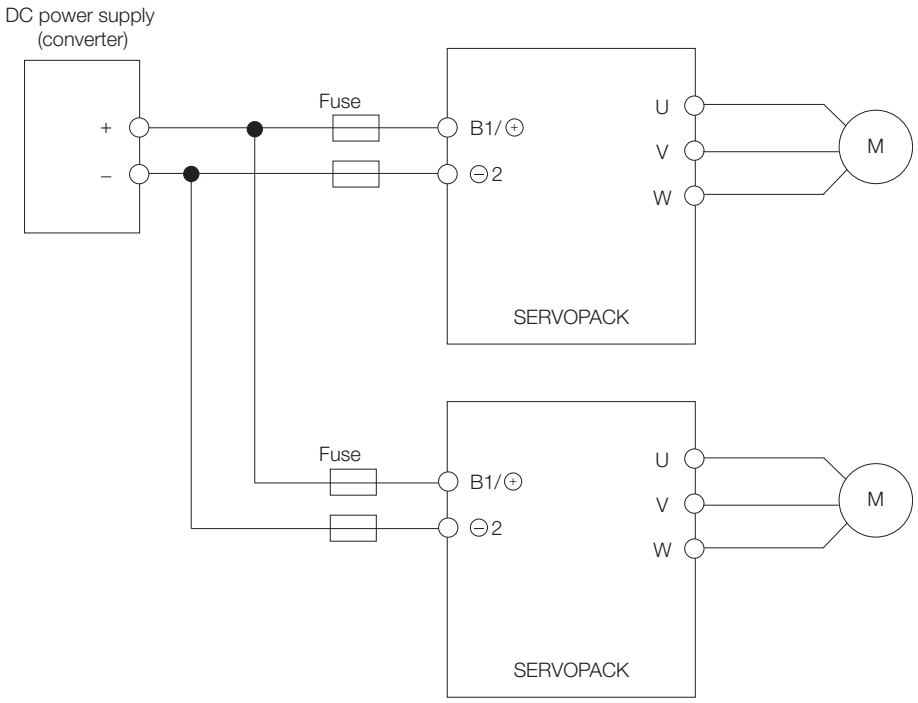
*3. If you use a DC power supply input with any of the following SERVOPACKs, externally connect an inrush current limiting circuit and use the power ON and OFF sequences recommended by Yaskawa: SGD7S-330A, -470A, -550A, -590A, or -780A.
There is a risk of equipment damage.
For information on the power ON and OFF sequences, refer to the product manual for the type of references used by your SERVOPACK.

◆ Σ-7W SERVOPACKs

Main Circuit Power Supply	SERVOPACK Model: SGD7W-	Power Supply Capacity per SERVOPACK [kVA]*1	Current Capacity		Inrush Current		External Fuse		
			Main Circuit [Arms]*1	Control Power Supply [Arms]	Main Circuit [A0-p]	Control Power Supply [A0-p]	Order Number*2	Current Rating [A]	Voltage Rating [Vdc]
270 VDC	1R6A	1	3.0	0.25	34	34	3,5URGJ17/40UL	40	400
	2R8A	1.9	5.8						
	5R5A	3.2	9.7				3,5URGJ17/63UL	63	
	7R6A	4.5	14						

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

*2. These Fuses are manufactured by MERSEN Japan.



Note: If you connect more than one SERVOPACK to the same DC power supply, connect Fuses for each SERVOPACK.

SERVOPACK Main Circuit Wires

This section describes the main circuit wires for SERVOPACKs.

Important

These specifications are based on IEC/EN 61800-5-1, UL 61800-5-1, and CSA C22.2 No.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 Σ-7S SERVOPACKs

SERVOPACK Model: SGD7S-	Terminals		Wire Size	Screw Size	Tightening Torque [N·m]
R70A	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
R90A	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
1R6A	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
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
3R8A	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	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

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

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

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

SERVOPACK Model: SGD7S-	Terminals		Wire Size	Screw Size	Tightening Torque [N·m]
R70A	Main Circuit Power Supply Cable	L1, L2	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
R90A	Main Circuit Power Supply Cable	L1, L2	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
1R6A	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
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 Cables	L1, L2	AWG14 (2.0 mm^2)	M4	1.0 to 1.2
	Servomotor Main Circuit Cables*	U, V, W			
	Control Power Supply Cables	L1C, L2C	AWG16 (1.25 mm^2)		
	External Regenerative Resistor Cables	B1/⊕, B2			
	Ground cable	⏚	AWG14 (2.0 mm^2) min.		1.2 to 1.4

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

Single-phase, 100-VAC Wires for Σ-7S SERVOPACKs

SERVOPACK Model: SGD7S-	Terminals		Wire Size	Screw Size	Tightening Torque [N·m]
R70F	Main Circuit Power Supply Cable	L1, L2	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
R90F	Main Circuit Power Supply Cable	L1, L2	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
2R1F	Main Circuit Power Supply Cable	L1, L2	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
2R8F	Main Circuit Power Supply Cable	L1, L2	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

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

DC Power Supply Wires for Σ-7S SERVOPACKs

SERVOPACK Model: SGD7S-	Terminals[*1]		Wire Size	Screw Size	Tightening Torque [N·m]
R70A	Servomotor Main Circuit Cables	U, V, W[*2]	AWG16 (1.25 mm^2)	–	–
	Control Power Supply Cables	L1C, L2C	AWG16 (1.25 mm^2)	–	–
	Main Circuit Power Supply Cables	B1/⊕, ⊖2	AWG16 (1.25 mm^2)	–	–
	Ground Cable	⏚	AWG14 (2.0 mm^2) min.	M4	1.2 to 1.4
R90A	Servomotor Main Circuit Cables	U, V, W[*2]	AWG16 (1.25 mm^2)	–	–
	Control Power Supply Cables	L1C, L2C	AWG16 (1.25 mm^2)	–	–
	Main Circuit Power Supply Cables	B1/⊕, ⊖2	AWG16 (1.25 mm^2)	–	–
	Ground Cable	⏚	AWG14 (2.0 mm^2) min.	M4	1.2 to 1.4
1R6A	Servomotor Main Circuit Cables	U, V, W[*2]	AWG16 (1.25 mm^2)	–	–
	Control Power Supply Cables	L1C, L2C	AWG16 (1.25 mm^2)	–	–
	Main Circuit Power Supply Cables	B1/⊕, ⊖2	AWG16 (1.25 mm^2)	–	–
	Ground Cable	⏚	AWG14 (2.0 mm^2) min.	M4	1.2 to 1.4
2R8A	Servomotor Main Circuit Cables	U, V, W[*2]	AWG16 (1.25 mm^2)	–	–
	Control Power Supply Cables	L1C, L2C	AWG16 (1.25 mm^2)	–	–
	Main Circuit Power Supply Cables	B1/⊕, ⊖2	AWG16 (1.25 mm^2)	–	–
	Ground Cable	⏚	AWG14 (2.0 mm^2) min.	M4	1.2 to 1.4
3R8A	Servomotor Main Circuit Cables	U, V, W[*2]	AWG16 (1.25 mm^2)	–	–
	Control Power Supply Cables	L1C, L2C	AWG16 (1.25 mm^2)	–	–
	Main Circuit Power Supply Cables	B1/⊕, ⊖2	AWG16 (1.25 mm^2)	–	–
	Ground Cable	⏚	AWG14 (2.0 mm^2) min.	M4	1.2 to 1.4
5R5A	Servomotor Main Circuit Cables	U, V, W[*2]	AWG16 (1.25 mm^2)	–	–
	Control Power Supply Cables	L1C, L2C	AWG16 (1.25 mm^2)	–	–
	Main Circuit Power Supply Cables	B1/⊕, ⊖2	AWG16 (1.25 mm^2)	–	–
	Ground Cable	⏚	AWG14 (2.0 mm^2) min.	M4	1.2 to 1.4
7R6A	Servomotor Main Circuit Cables	U, V, W[*2]	AWG16 (1.25 mm^2)	–	–
	Control Power Supply Cables	L1C, L2C	AWG16 (1.25 mm^2)	–	–
	Main Circuit Power Supply Cables	B1/⊕, ⊖2	AWG16 (1.25 mm^2)	–	–
	Ground Cable	⏚	AWG14 (2.0 mm^2) min.	M4	1.2 to 1.4
120A (three-phase, 200-VAC input)	Servomotor Main Circuit Cables	U, V, W[*2]	AWG14 (2.0 mm^2)	–	–
	Control Power Supply Cables	L1C, L2C	AWG16 (1.25 mm^2)	–	–
	Main Circuit Power Supply Cables	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 Cables	U, V, W[*2]	AWG14 (2.0 mm^2)	M4	1.0 to 1.2
	Control Power Supply Cables	L1C, L2C	AWG16 (1.25 mm^2)	M4	1.0 to 1.2
	Main Circuit Power Supply Cables	B1/⊕, ⊖2	AWG14 (2.0 mm^2)	M4	1.0 to 1.2
	Ground Cable	⏚	AWG14 (2.0 mm^2) min.	M4	1.2 to 1.4
180A	Servomotor Main Circuit Cables	U, V, W[*2]	AWG10 (5.5 mm^2)	M4	1.0 to 1.2
	Control Power Supply Cables	L1C, L2C	AWG16 (1.25 mm^2)	M4	1.0 to 1.2
	Main Circuit Power Supply Cables	B1/⊕, ⊖2	AWG10 (5.5 mm^2)	M4	1.0 to 1.2
	Ground Cable	⏚	AWG14 (2.0 mm^2) min.	M4	1.2 to 1.4

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SERVOPACK Model: SGD7S-	Terminals[*1]		Wire Size	Screw Size	Tightening Torque [N·m]
200A	Servomotor Main Circuit Cables	U, V, W[*2]	AWG10 (5.5 mm^2)	M4	1.0 to 1.2
	Control Power Supply Cables	L1C, L2C	AWG16 (1.25 mm^2)	M4	1.0 to 1.2
	Main Circuit Power Supply Cables	B1/⊕, ⊖2	AWG10 (5.5 mm^2)	M4	1.0 to 1.2
	Ground Cable	⏚	AWG14 (2.0 mm^2) min.	M4	1.2 to 1.4
330A	Servomotor Main Circuit Cables	U, V, W	AWG8 (8.0 mm^2)	M4	1.0 to 1.2
	Control Power Supply Cables	L1C, L2C	AWG16 (1.25 mm^2)	M4	1.0 to 1.2
	Main Circuit Power Supply Cables	B1/⊕, ⊖2	AWG8 (8.0 mm^2)	M4	1.0 to 1.2
	Ground Cable	⏚	AWG14 (2.0 mm^2) min.	M4	1.2 to 1.4
470A	Servomotor Main Circuit Cables	U, V, W	AWG6 (14 mm^2)	M5	2.2 to 2.4
	Control Power Supply Cables	L1C, L2C	AWG16 (1.25 mm^2)	M5	2.2 to 2.4
	Main Circuit Power Supply Cables	B1/⊕, ⊖2	AWG8 (8.0 mm^2)	M5	2.2 to 2.4
	Ground Cable	⏚	AWG14 (2.0 mm^2) min.	M5	2.2 to 2.4
550A	Servomotor Main Circuit Cables	U, V, W	AWG4 (22 mm^2)	M5	2.2 to 2.4
	Control Power Supply Cables	L1C, L2C	AWG16 (1.25 mm^2)	M5	2.2 to 2.4
	Main Circuit Power Supply Cables	B1/⊕, ⊖2	AWG6 (14 mm^2)	M5	2.2 to 2.4
	Ground Cable	⏚	AWG14 (2.0 mm^2) min.	M5	2.2 to 2.4
590A	Servomotor Main Circuit Cables	U, V, W	AWG4 (22 mm^2)	M6	2.7 to 3.0
	Control Power Supply Cables	L1C, L2C	AWG16 (1.25 mm^2)	M6	2.7 to 3.0
	Main Circuit Power Supply Cables	B1/⊕, ⊖2	AWG3 (30 mm^2)	M6	2.7 to 3.0
	Ground Cable	⏚	AWG14 (2.0 mm^2) min.	M6	2.7 to 3.0
780A	Servomotor Main Circuit Cables	U, V, W	AWG3 (30 mm^2)	M6	2.7 to 3.0
	Control Power Supply Cables	L1C, L2C	AWG16 (1.25 mm^2)	M6	2.7 to 3.0
	Main Circuit Power Supply Cables	B1/⊕, ⊖2	AWG3 (30 mm^2)	M6	2.7 to 3.0
	Ground Cable	⏚	AWG14 (2.0 mm^2) min.	M6	2.7 to 3.0

*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.

Three-phase, 200-VAC Wires for Σ-7W SERVOPACKs

SERVOPACK Model: SGD7W-	Terminals		Wire Size	Screw Size	Tightening Torque [N·m]
1R6A	Main Circuit Power Supply Cable	L1, L2, L3	AWG16 (1.25 mm^2)	–	–
	Servomotor Main Circuit Cable*	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	Main Circuit Power Supply Cable	L1, L2, L3	AWG14 (2.0 mm^2)	–	–
	Servomotor Main Circuit Cable*	UA, VA, WA, UB, VB, WB	AWG16 (1.25 mm^2)		
	Control Power Supply Cable	L1C, L2C			
	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*	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
7R6A	Main Circuit Power Supply Cable	L1, L2, L3	AWG14 (2.0 mm^2)	–	–
	Servomotor Main Circuit Cable*	UA, VA, WA, UB, VB, WB	AWG16 (1.25 mm^2)		
	Control Power Supply Cable	L1C, L2C			
	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

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

Single-phase, 200-VAC Wires for Σ-7W SERVOPACKs

SERVOPACK Model: SGD7W-	Terminals		Wire Size	Screw Size	Tightening Torque [N·m]
1R6A	Main Circuit Power Supply Cable	L1, L2, L3	AWG16 (1.25 mm^2)	–	–
	Servomotor Main Circuit Cable*	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	Main Circuit Power Supply Cable	L1, L2, L3	AWG14 (2.0 mm^2)	–	–
	Servomotor Main Circuit Cable*	UA, VA, WA, UB, VB, WB	AWG16 (1.25 mm^2)		
	Control Power Supply Cable	L1C, L2C			
	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*	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

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

DC Power Supply Wires for Σ-7W SERVOPACKs

SERVOPACK Model: SGD7W-	Terminal[*1]		Wire Size	Screw Size	Tightening Torque [N·m]
1R6A	Servomotor Main Circuit Cables	UA, VA, WA, UB, VB, WB[*2]	AWG16 (1.25 mm^2)	–	–
	Control Power Supply Cables	L1C, L2C	AWG16 (1.25 mm^2)	–	–
	Main Circuit Power Supply Cables	B1/⊕, ⊖2	AWG16 (1.25 mm^2)	–	–
	Ground Cable	⏚	AWG14 (2.0 mm^2) min.	M4	1.2 to 1.4
2R8A	Servomotor Main Circuit Cables	UA, VA, WA, UB, VB, WB[*2]	AWG16 (1.25 mm^2)	–	–
	Control Power Supply Cables	L1C, L2C	AWG16 (1.25 mm^2)	–	–
	Main Circuit Power Supply Cables	B1/⊕, ⊖2	AWG16 (1.25 mm^2)	–	–
	Ground Cable	⏚	AWG14 (2.0 mm^2) min.	M4	1.2 to 1.4
5R5A	Servomotor Main Circuit Cables	UA, VA, WA, UB, VB, WB[*2]	AWG16 (1.25 mm^2)	–	–
	Control Power Supply Cables	L1C, L2C	AWG16 (1.25 mm^2)	–	–
	Main Circuit Power Supply Cables	B1/⊕, ⊖2	AWG14 (2.0 mm^2)	–	–
	Ground Cable	⏚	AWG14 (2.0 mm^2) min.	M4	1.2 to 1.4
7R6A	Servomotor Main Circuit Cables	UA, VA, WA, UB, VB, WB[*2]	AWG16 (1.25 mm^2)	–	–
	Control Power Supply Cables	L1C, L2C	AWG16 (1.25 mm^2)	–	–
	Main Circuit Power Supply Cables	B1/⊕, ⊖2	AWG14 (2.0mm^2)	–	–
	Ground Cable	⏚	AWG14 (2.0 mm^2) min.	M4	1.2 to 1.4

*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.

Three-phase, 200-VAC Wires for Σ-7C SERVOPACKs

SERVOPACK Model: SGM7C-	Terminals		Wire Size	Screw Size	Tightening Torque [N·m]
1R6A	Main Circuit Power Supply Cable	L1, L2, L3	AWG16 (1.25 mm^2)	–	–
	Servomotor Main Circuit Cable*	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	Main Circuit Power Supply Cable	L1, L2, L3	AWG14 (2.0 mm^2)	–	–
	Servomotor Main Circuit Cable*	UA, VA, WA, UB, VB, WB	AWG16 (1.25 mm^2)		
	Control Power Supply Cable	L1C, L2C			
	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*	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
7R6A	Main Circuit Power Supply Cable	L1, L2, L3	AWG14 (2.0 mm^2)	–	–
	Servomotor Main Circuit Cable*	UA, VA, WA, UB, VB, WB	AWG16 (1.25 mm^2)		
	Control Power Supply Cable	L1C, L2C			
	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

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

Single-phase, 200-VAC Wires for Σ-7C SERVOPACKs

SERVOPACK Model: SGM7C-	Terminals		Wire Size	Screw Size	Tightening Torque [N·m]
1R6A	Main Circuit Power Supply Cable	L1, L2, L3	AWG16 (1.25 mm^2)	–	–
	Servomotor Main Circuit Cable*	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	Main Circuit Power Supply Cable	L1, L2, L3	AWG14 (2.0 mm^2)	–	–
	Servomotor Main Circuit Cable*	UA, VA, WA, UB, VB, WB	AWG16 (1.25 mm^2)		
	Control Power Supply Cable	L1C, L2C			
	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*	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

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

Wire Types

The following table shows the wire sizes and allowable currents for three bundled leads.

HIV Specifications*		Allowable Current at Surrounding Air Temperatures [Arms]		
Nominal Cross-sectional Area [mm^2]	Configuration [Wires/mm]	30°C	40°C	50°C
0.9	7/0.4	15	13	11
1.25	7/0.45	16	14	12
2.0	7/0.6	23	20	17
3.5	7/0.8	32	28	24
5.5	7/1.0	42	37	31
8.0	7/1.2	52	46	39
14.0	7/1.6	75	67	56
22.0	7/2.0	98	87	73
38.0	7/2.6	138	122	103

* This is reference data based on JIS C3317 600-V-grade heat-resistant polyvinyl chloride-insulated wires (HIV).

Crimp Terminals and Insulating Sleeves

If you use crimp terminals for wiring, use insulating sleeves. Do not allow the crimp terminals to come close to adjacent terminals or the case.

To comply with UL standards, you must use UL-compliant closed-loop crimp terminals and insulating sleeves for the main circuit terminals. Use the tool recommended by the crimp terminal manufacturer to attach the crimp terminals.

The following tables give the recommended tightening torques, closed-loop crimp terminals, and insulating sleeves in sets. Use the set that is suitable for your model and wire size.

Σ-7S SERVOPACKs with Three-Phase, 200-VAC and DC Power Supply

SERVOPACK Model: SGD7S-	Main Circuit Terminals	Screw Size	Tightening Torque [N·m]	Crimp Terminal Horizontal Width	Recommended Wire Size	Crimp Terminal Model (From J.S.T. Mfg. Co., Ltd.)	Crimping Tool (From J.S.T. Mfg. Co., Ltd.)	Die (From J.S.T. Mfg. Co., Ltd.)	Insulating Sleeve Model (Tokyo Dip Co., Ltd.)
R70A, R90A, 1R6A, 2R8A, 3R8A, 5R5A, 7R6A, or 120A	Connector	–							
	⏚	M4	1.2 to 1.4	10 mm max.	AWG14 (2.0 mm²)	R2-4	YHT-2210	–	–
180A or 200A	Terminal block	M4	1.0 to 1.2	7.7 mm max.	AWG10 (5.5 mm²)	5.5-S4	YHT-2210	–	TP-005
					AWG14 (2.0 mm²)	2-M4		–	TP-003
					AWG16 (1.25 mm²)			–	
	⏚	M4	1.2 to 1.4	10 mm max.	AWG14 (2.0 mm²)	R2-4	YHT-2210	–	–
330A	Terminal block	M4	1.0 to 1.2	9.9 mm max.	AWG8 (8.0 mm²)	8-4NS	YPT-60N	TD-121 TD-111	TP-008
					AWG14 (2.0 mm²)	R2-4	YHT-2210	–	TP-003
					AWG16 (1.25 mm²)			–	
	⏚	M4	1.2 to 1.4	10 mm max.	AWG14 (2.0 mm²)	R2-4	YHT-2210	–	–
470A or 550A	Terminal block	M5	2.2 to 2.4	13 mm max.	AWG4 (22 mm²)	22-S5	YPT-60N	TD-123 TD-112	TP-022
					AWG6 (14 mm²)	R14-5		TD-122 TD-111	TP-014
					AWG8 (8.0 mm²)	R8-5		TD-121 TD-111	TP-008
					AWG10 (5.5 mm²)	R5.5-5	YHT-2210	–	TP-005
					AWG14 (2.0 mm²)	R2-5		–	TP-003
					AWG16 (1.25 mm²)			–	
	⏚	M5	2.2 to 2.4	12 mm max.	AWG14 (2.0 mm²)	R2-5	YHT-2210	–	–

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SERVOPACK Model: SGD7S-	Main Circuit Terminals	Screw Size	Tightening Torque [N·m]	Crimp Terminal Horizontal Width	Recommended Wire Size	Crimp Terminal Model	Crimping Tool	Die	Insulating Sleeve Model
						(From J.S.T. Mfg. Co., Ltd.)			(Tokyo Dip Co., Ltd.)
590A or 780A	Terminal block	M6	2.7 to 3.0	18 mm max.	AWG3 (30 mm^2)	38-S6	YPT-60N	TD-124 TD-112	TP-038
					AWG4 (22 mm^2)	R22-6		TD-123 TD-112	TP-022
					AWG8 (8.0 mm^2)	R8-6		TD-121 TD-111	TP-008
					AWG10 (5.5 mm^2)	R5.5-6	YHT-2210	–	TP-005
					AWG14 (2.0 mm^2)	R2-6		–	TP-003
					AWG16 (1.25 mm^2)			–	
	⏚	M6	2.7 to 3.0	12 mm max.	AWG14 (2.0 mm^2)	R2-6	YHT-2210	–	–

Σ-7S SERVOPACKs with Single-Phase, 200-VAC Power Supply

SERVOPACK Model: SGD7S-	Main Circuit Terminals	Screw Size	Tightening Torque [N·m]	Crimp Terminal Horizontal Width	Recommended Wire Size	Crimp Terminal Model	Crimping Tool	Die	Insulating Sleeve Model
						(From J.S.T. Mfg. Co., Ltd.)			(Tokyo Dip Co., Ltd.)
R70A, R90A, 1R6A, 2R8A, or 5R5A	Connector	–							
	⏚	M4	1.2 to 1.4	10 mm max.	AWG14 (2.0 mm^2)	R2-4	YHT-2210	–	–
120A□□□008	Terminal block	M4	1.0 to 1.2	7.7 mm max.	AWG14 (2.0 mm^2)	2-M4	YHT-2210	–	TP-003
					AWG16 (1.25 mm^2)			–	
	⏚	M4	1.2 to 1.4	10 mm max.	AWG14 (2.0 mm^2)	R2-4	YHT-2210	–	–

Σ-7S SERVOPACKs with Single-Phase, 100-VAC Power Supply

SERVOPACK Model: SGD7S-	Main Circuit Terminals	Screw Size	Tightening Torque [N·m]	Crimp Terminal Horizontal Width	Recommended Wire Size	Crimp Terminal Model	Crimping Tool	Die	Insulating Sleeve Model
						(From J.S.T. Mfg. Co., Ltd.)			(Tokyo Dip Co., Ltd.)
R70F, R90F, 2R1F, or 2R8F	Connector	–							
	⏚	M4	1.2 to 1.4	10 mm max.	AWG14 (2.0 mm^2)	R2-4	YHT-2210	–	–

Σ-7W SERVOPACKs with Three-Phase, 200-VAC and DC Power Supply

SERVOPACK Model: SGD7W-	Main Circuit Terminals	Screw Size	Tightening Torque [N·m]	Crimp Terminal Horizontal Width	Recommended Wire Size	Crimp Terminal Model	Crimping Tool	Die	Insulating Sleeve Model
						(From J.S.T. Mfg. Co., Ltd.)			(Tokyo Dip Co., Ltd.)
1R6A, 2R8A, 5R5A, or 7R6A	Connector	–							
	⏚	M4	1.2 to 1.4	10 mm max.	AWG14 (2.0 mm^2)	R2-4	YHT-2210	–	–

Σ-7W SERVOPACKs with Single-Phase, 200-VAC Power Supply

SERVOPACK Model: SGD7W-	Main Circuit Terminals	Screw Size	Tightening Torque [N·m]	Crimp Terminal Horizontal Width	Recommended Wire Size	Crimp Terminal Model	Crimping Tool	Die	Insulating Sleeve Model
						(From J.S.T. Mfg. Co., Ltd.)			(Tokyo Dip Co., Ltd.)
1R6A, 2R8A, or 5R5A	Connector	–							
	⏚	M4	1.2 to 1.4	10 mm max.	AWG14 (2.0 mm^2)	R2-4	YHT-2210	–	–

Σ-7C SERVOPACKs with Three-Phase, 200-VAC and DC Power Supply

SERVOPACK Model: SGM7C-	Main Circuit Terminals	Screw Size	Tightening Torque [N·m]	Crimp Terminal Horizontal Width	Recommended Wire Size	Crimp Terminal Model	Crimping Tool	Die	Insulating Sleeve Model
						(From J.S.T. Mfg. Co., Ltd.)			(Tokyo Dip Co., Ltd.)
1R6A, 2R8A, 5R5A, or 7R6A	Connector	–							
	⏚	M4	1.2 to 1.4	10 mm max.	AWG14 (2.0 mm^2)	R2-4	YHT-2210	–	–

Σ-7C SERVOPACKs with Single-Phase, 200-VAC Power Supply

SERVOPACK Model: SGM7C-	Main Circuit Terminals	Screw Size	Tightening Torque [N·m]	Crimp Terminal Horizontal Width	Recommended Wire Size	Crimp Terminal Model	Crimping Tool	Die	Insulating Sleeve Model
						(From J.S.T. Mfg. Co., Ltd.)			(Tokyo Dip Co., Ltd.)
1R6A, 2R8A, or 5R5A	Connector	–							
	⏚	M4	1.2 to 1.4	10 mm max.	AWG14 (2.0 mm^2)	R2-4	YHT-2210	–	–

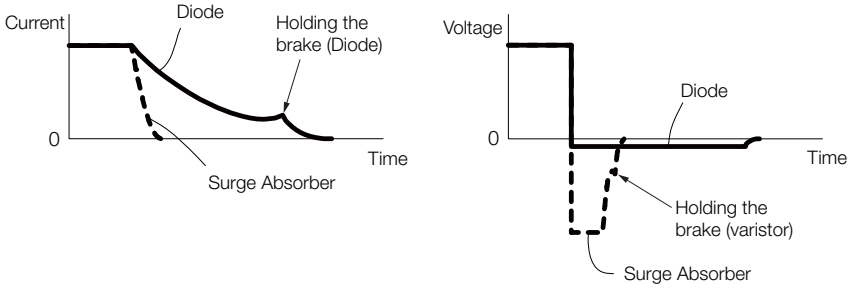
Surge Absorbers (Varistors) and Diodes for Holding Brake Power Supplies

Surge Absorbers (varistors) and Diodes for holding brake power supplies help prevent damage to brake coils caused by voltage surges.

If you use a Servomotor with a Holding Brake and switch the brake power supply circuit on the DC side, connect a Surge Absorber (varistor) or Diode that is suitable for the brake power supply voltage and current.

Note

- When you select a Surge Absorber, varistor, or Diode for your application, consider the service life and test all operations, including the brake timing, before you use the Servomotor.
- If you connect an SSR (i.e., a semiconductor relay) to switch the brake circuit, use a Diode.
- If you connect a Diode, more time is required to brake than with a Surge Absorber. (Refer to the following figure.) If you use a diode, consider this in the application.



◆ Surge Absorbers (Varistors) for Holding Brake Power Supplies

Use the following table as reference in selecting a Surge Absorber. Elements were selected for a Surge Absorber surrounding air temperature range of -20°C to 60°C and an ON/OFF switching frequency of 10 times or less per minute. The information in this table is for reference only, and does not ensure operation in combination with the holding brake.

Holding Brake Power Supply Voltage		24 VDC	
Manufacturer		Nippon Chemi-Con Corporation	Semitec Corporation
		Order Number	
Brake Rated Current	1 A max.	TNR5V121K	Z5D121
	2 A max.	TNR7V121K	Z7D121
	4 A max.	TNR10V121K	Z10D121
	8 A max.	TNR14V121K	Z15D121

◆ Diodes for Holding Brake Power Supplies

Select a Diode for the holding brake power supply with a rated current that is greater than that of the holding brake and with the recommended withstand voltage given in the following table.

Diodes are not provided by Yaskawa.

Holding Brake Power Supply Unit Specifications		Withstand Voltage
Rated Output Voltage	Input Voltage	
24 VDC	200 V	100 V to 200 V

Regenerative Resistors

Types of Regenerative Resistors

The following regenerative resistors can be used.

- Built-in regenerative resistors: Some models of SERVOPACKs have regenerative resistors built into them.
- External regenerative resistors: These resistors are used when the smoothing capacitor and built-in regenerative resistor in the SERVOPACK cannot consume all of the regenerative power. Use Yaskawa's SigmaSize+, an AC Servo drive capacity selection program, to determine if a regenerative resistor is required.

Note: If you use an External Regenerative Resistor, you must change the setting of the Pn600 (Regenerative Resistor Capacity) or Pn603 (Regenerative Resistance) parameters.

Selection Table

SERVOPACK Model			Built-In Regenerative Resistor	External Regenerative Resistor	Contents
SGD7S-	SGD7W-	SGD7C-			
R70A, R90A, 1R6A, 2R8A, R70F, R90F, 2R1F, 2R8F	–	–	None	Basically not required	There is no built-in regenerative resistor, but normally an external regenerative resistor is not required. Install an external regenerative resistor when the smoothing capacitor in the SERVOPACK cannot process all the regenerative power.*1
3R8A, 5R5A, 7R6A, 120A, 180A, 200A, 330A	1R6A, 2R8A, 5R5A, 7R6A	1R6A, 2R8A, 5R5A, 7R6A	Standard feature*2	Basically not required	A built-in regenerative resistor is provided as a standard feature. Install an external regenerative resistor when the built-in regenerative resistor cannot process all the regenerative power.*1
470A, 550A, 590A, 780A	–	–	None	Required.*3	A built-in regenerative resistor is not provided. An External Regenerative Resistor is required. If the External Regenerative Resistor is not connected to the SERVOPACK, a Regeneration Alarm (A.300) will occur.

*1. Use Yaskawa's SigmaSize+, an AC Servo drive capacity selection program, to select an external regenerative resistor.

*2. Refer to the following section for the specifications of built-in regenerative resistors.
☞ *Built-In Regenerative Resistor* (page 472)

*3. Regenerative Resistor Units are available. Refer to the following sections for details.
☞ *Regenerative Resistor Units* (page 473)

Built-In Regenerative Resistor

The following table gives the specifications of the built-in regenerative resistors in the SERVOPACKs and the amount of regenerative power (average values) that they can process.

SERVOPACK Model			Built-In Regenerative Resistor		Regenerative Power Processing Capacity of Built-In Regenerative Resistor [W]	Minimum Allowable Resistance [Ω]
SGD7S-	SGD7W-	SGD7C-	Resistance [Ω]	Capacity [W]		
R70A, R90A, 1R6A, 2R8A, R70F, R90F, 2R1F, 2R8F	–	–	–	–	–	40
3R8A, 5R5A, 7R6A	1R6A, 2R8A	1R6A, 2R8A	40	40	8	40
120A	–	–	20	60	10	20
120A□□□008, 180A, 200A	5R5A, 7R6A	5R5A, 7R6A	12	60	16	12
330A	–	–	8	180	36	8
470A	–	–	(6.25)*1	(880)*1	(180)*1	5.8
550A, 590A, 780A	–	–	(3.13)*2	(1760)*2	(350)*2	2.9

*1. Values in parentheses are for the optional JUSP-RA04-E Regenerative Resistor Unit.

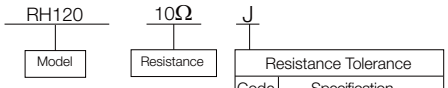
*2. Values in parentheses are for the optional JUSP-RA05-E Regenerative Resistor Unit.

External Regenerative Resistors

Model	Specification	Mass	Wire Size	Manufacturer	Inquiries
RH120	70 W, 1 Ω to 100 Ω	282 g	AWG16 (1.25 mm^2)	Iwaki Musen Kenkyusho Co., Ltd.	Yaskawa Controls Co., Ltd.
RH150	90 W, 1 Ω to 100 Ω	412 g	AWG16 (1.25 mm^2)		
RH220	120 W, 1 Ω to 100 Ω	500 g	AWG16 (1.25 mm^2)		
RH220B	120 W, 1 Ω to 100 Ω	495 g	AWG14 (2.0 mm^2)		
RH300C	200 W, 1 Ω to 10 kΩ	850 g	AWG14 (2.0 mm^2)		
RH450	150 W, 1 Ω to 100 Ω	880 g	AWG14 (2.0 mm^2)		
RH450FY	150 W, 2 Ω to 100 Ω	1.3 kg	AWG14 (2.0 mm^2)		
RH500	300 W, 2 Ω to 50 Ω	1.4 kg	AWG14 (2.0 mm^2)		

Note: 1. Consult Yaskawa Controls Co., Ltd. if you require a RoHS-compliant resistor.

2. Consult Yaskawa Controls Co., Ltd. for the model numbers and specifications of resistors with Thermal Protector.



Resistance Tolerance	
Code	Specification
K	±10%
J	±5%
H*	±3%

* There is no RH450FY model that has a resistance tolerance of H (±3%).

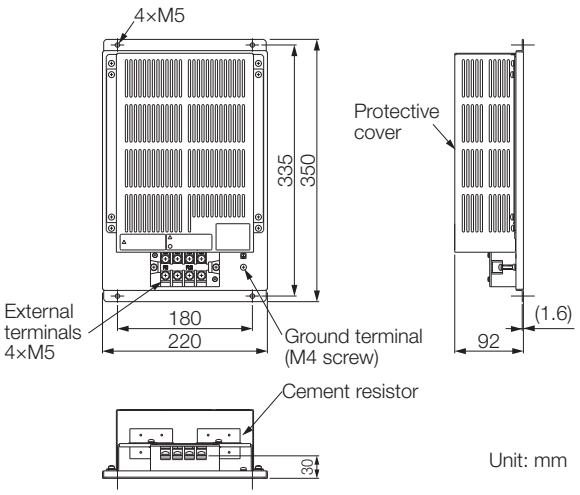
Regenerative Resistor Units

SERVOPACK Model: SGD7S-	Regenerative Resistor Unit Model	Specifications	Allowable Power Loss
470A	JUSP-RA04-E	6.25 Ω, 880 W	180 W
550A, 590A, or 780A	JUSP-RA05-E	3.13 Ω, 1,760 W	350 W

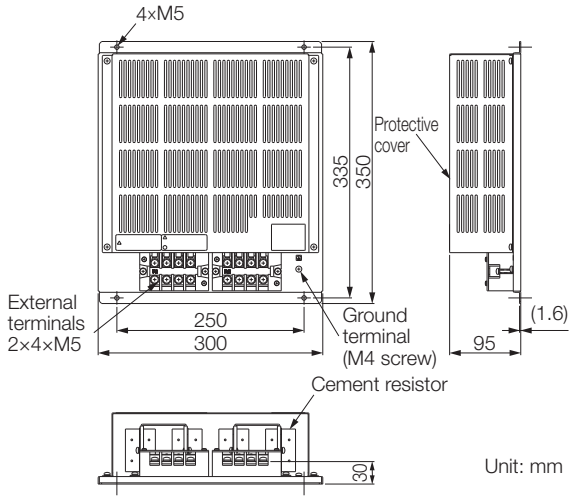
Note: If you use only the above Regenerative Resistor Units, you do not need to change the setting of the Pn600 (Regenerative Resistor Capacity) or Pn603 (Regenerative Resistance) parameters.

◆ External Dimensions

■ JUSP-RA04-E



■ JUSP-RA05-E



Batteries for Servomotors with Absolute Encoders

If you use an absolute encoder, you can use an Encoder Cable with a Battery Case connected to it to supply power and retain the absolute position data.

You can also retain the absolute position data by supplying power from a battery on the host controller.

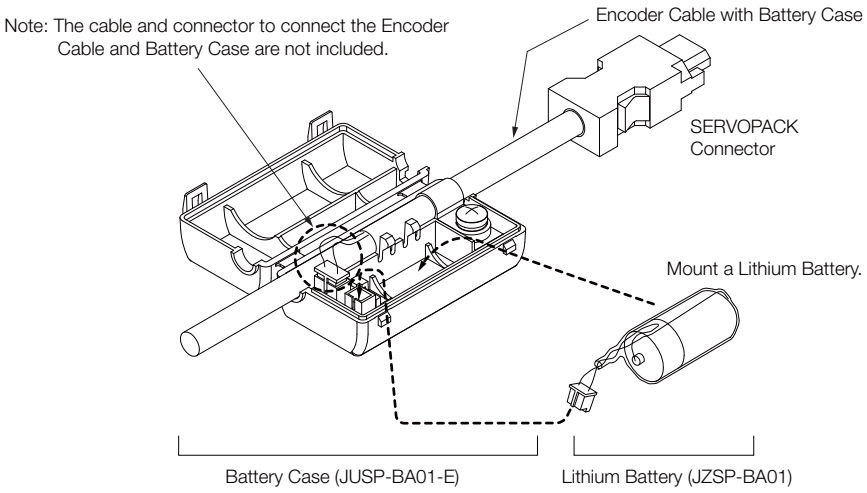
Note: A Battery Case is not required if you use a Servomotor with a Batteryless Absolute Encoder and connect a battery to the host controller.

Using Encoder Cables with Battery Cases

A Battery Case is attached to an Encoder Cable with a Battery Case. To replace the battery, obtain a Lithium Battery (JZSP-BA01) and mount it in the Battery Case.

Important

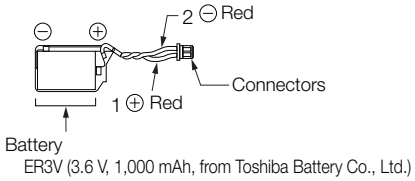
1. You cannot attach the Battery Case to an Incremental Encoder Cable.
2. Install the Battery Case where the surrounding air temperature is between -5°C and 60°C.



◆ Selection Table

Name	Order Number	Remarks
Battery Case (case only)	JUSP-BA01-E	The Encoder Cable and Battery are not included. (This is a replacement part for a damaged Battery Case.)
Lithium Battery	JZSP-BA01	This is a special battery that is mounted into the Battery Case.

◆ Lithium Battery Dimensional Drawing

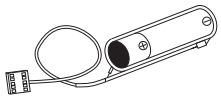


ER3V (3.6 V, 1,000 mAh, from Toshiba Battery Co., Ltd.)

When Installing a Battery on the Host Controller

Use a battery that meets the specifications of the host controller.

Use the recommended Battery given in the following table or the equivalent.



Inrush Current Suppression Devices

Inrush current suppression devices prevent equipment from being damaged by inrush current.

They are used only when using a SERVOPACK of 5 kW or higher (SGD7S-330A, -470A, -550A, -590A, or -780A) with a DC power supply input.

Selection Table

◆ External Inrush Current Suppression Resistors

Main Circuit Power Supply	SERVOPACK Model: SGD7S-	External Inrush Current Suppression Resistor			Manufacturer	Inquiries
		Order Number	Resistance [Ω]	Rated Power [W]		
270 VDC	330A	RH120-5ΩJ	5	70	Iwaki Musen Kenkyusho Co., Ltd.	Yaskawa Controls Co., Ltd.
	470A					
	550A					
	590A	RH120-3ΩJ	3			
	780A					

◆ Inrush Current Suppression Resistor Short Relays

Main Circuit Power Supply	SERVOPACK Model: SGD7S-	Main Circuit DC Current [Arms]	Contact Specification	Recommended Inrush Current Suppression Resistor Short Relay			Manufacturer
				Model	Voltage Rating [Vdc]	Current Rating [A]	
270 VDC	330A	34	NO	G9EA-1-B	400	60	OMRON Corporation
	470A	36					
	550A	48		G9EA-1-B-CA		100	
	590A	68		G9EA-1-B-CA*1		200	
	780A	92		G9EC-1-B*2			

*1. Connect two Relays in parallel. Also, maintain the same resistance between the DC power supply and SERVOPACK for the wiring for each Relay.

*2. This Relay is applicable only when the temperature of the Relay installation environment is 50°C or less.

Software

SigmaSize+: AC Servo Capacity Selection Program

You can use the SigmaSize+ to select Servomotors and SERVOPACKs. There are two versions of the software: A cloud version* and a stand-alone version.

The software supports all standard servo products sold by Yaskawa.

* SigmaSize+ is available in Japan only. Contact your Yaskawa representative for information on this program.

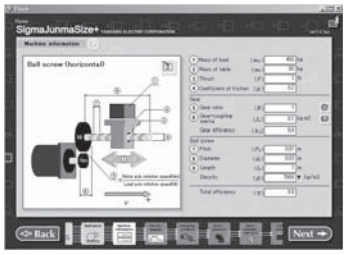
◆ Features

- Provides a vast amount of new product information.
- Lets you select servo products with a wizard.
- You can access and reuse previously entered data.

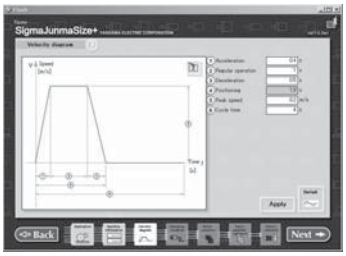
■ Examples of the Servo Selection Interface

Mechanism Selection View

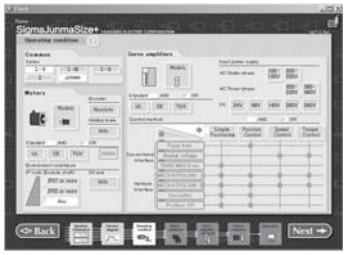
Machine Specification Entry View



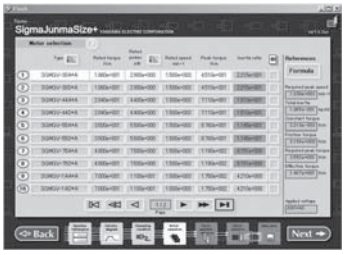
Speed Diagram Entry View



Operating Conditions Selection View



Servomotor Selection View



SERVOPACK Selection View

◆ System Requirements

Item	System Requirement
Browser	Internet Explorer version 10 or later
OS	Windows Vista or Windows 7 (32-bit or 64-bit edition)*
CPU	Pentium 200 MHz min.
Memory	64 MB min. (96 MB or greater recommended)
Available Hard Disk Space	20 MB min.

* 64-bit OS is applicable only for the stand-alone version.

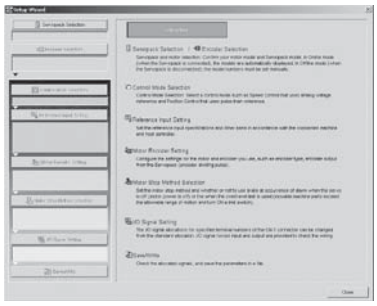
SigmaWin+: AC Servo Drive Engineering Tool

The SigmaWin+ Engineering Tool is used to set up and optimally tune Yaskawa Σ-series Servo Drives.

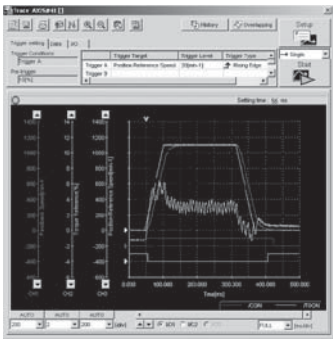
◆ Features

- Set parameters with a wizard.
- Display SERVOPACK data on a computer just like you would on a oscilloscope.
- Estimate moments of inertia and measure vibration frequencies.
- Display alarms and alarm diagnostics.

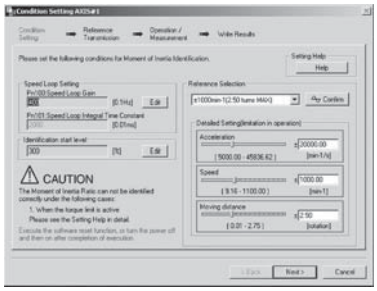
Setting Parameters with a Wizard



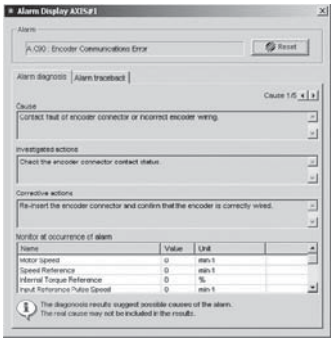
Displaying SERVOPACK Data on a Computer Just Like You Would on a Oscilloscope



Estimating Moments of Inertia and Measuring Vibration Frequencies



Displaying Alarms and Alarm Diagnostics



◆ System Requirements

Item	System Requirement	
	Ver.5	Ver.7
Supported Languages	English and Japanese	Japanese, English, and Chinese (simplified)
OS	Windows XP, Windows Vista, or Windows 7 (32-bit or 64-bit edition)	Windows 10, Windows 8, Windows 8.1, or Windows 7 (32-bit or 64-bit edition)
Software Environment	–	.NET Framework 4.5, .NET Framework 4.6
CPU	Pentium 200 MHz min.	1 GHz min. (recommended)
Memory	64 MB min. (96 MB or greater recommended)	1 GB min. (recommended)
Available Hard Disk Space	For Standard Setup: 350 MB min. (400 MB or greater recommended for installation)	500 MB min.
Browser used to display Help	–	Internet Explorer 9 or higher

MPE720 System Integrated Engineering Tool

MPE720 Ver.7 is a system integrated Engineering Tool that provides the complete development functionality to set up, adjust, program, maintain, and inspect not only Controller programs but also all of the devices necessary to design machine installations, including Servo Drives, AC Drives, and Distributed I/O Devices.

It is installed in a PC and operated on a PC interface through a connection between the PC and Machine Controller.

◆ Features

■ Complete Adjustment and Maintenance of Equipment Drive Devices

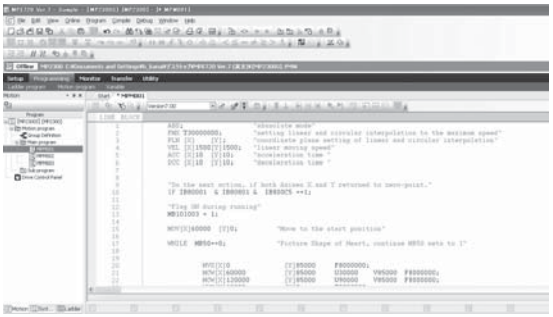
MPE720 Ver.7 connected to the Σ-7C or MP series machine controllers can be used to set up, adjust, and maintain Servo Drives, AC Drives, and I/O Devices connected to a network. There is no need to change connections, which increases efficiency.

■ Greater Efficiency with the Best Programming Method

Ladder Programming

- The new user interface lets just about anyone easily use the MPE720.
- An improved EXPRESSION instruction simplifies programming calculation in ladder diagrams.
- Support is provided for all types of control, including position, speed, torque, and phase control.

Motion Programming



- Positioning and interpolation can be programmed with one instruction.
- Programs can be very easily edited using expressions in a text format.
- New variable programming can provide PC-like programming.

◆ System Requirements

Item	Specification
CPU	1 GHz or more recommended (manufactured by Intel or other companies)
Memory Capacity	1 GB or more recommended*
Available Hard Disk Space	700 MB or more (includes standard workspace memory after installation of MPE720)
Display Resolution	1280 × 800 pixels or more recommended
CD Drive	1 (only for installation)
Communications Ports	RS-232C, Ethernet, MP2100 bus, and USB
OS	Windows 10, Windows 8, Windows 8.1, or Windows 7 (32-bit or 64-bit)
.NET Environment	.NET Framework 4.5
Supported Languages	English and Japanese

* Expand memory if other application programs are run simultaneously with MPE720 on the same computer. Performance may be slow due to the use of memory by multiple application programs that are run simultaneously.

Σ-7 SERIES

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Specifications are subject to change without notice for ongoing product modifications and improvements.

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