Single Axis

SGD7S-□□□DA0B

EtherCAT
Communication
Reference

SGD7S-□□□D30B

MECHATROLINK-III
Communication
Reference

SGD7S-□□□DC0B

PROFINET
Communication
Reference

SGD7S-□□□DM0B

Siec (with integrated
iec-Controller)

Dual Axis

SGD7W-□□□DA0B

EtherCAT
Communication
Reference

SGD7W-□□□D30B

MECHATROLINK-III
Communication
Reference

SERVOPACKs

SGD7S 106
SGD7W 128

SGD7S Single Axis

Model Designation

Single Axis Amplifier

SGD7S	-	1R9	D	A0	B	000	F64	
Sigma-7 Series Sigma-7S Models		1st ... 3rd	4th	5th + 6th	7th	8th ... 10th	11th ... 13th	digit

1st ... 3rd digit - Maximum Applicable Motor Capacity	
Code	**Specification**
Three-phase, 400 V	
1R9	**0.5 kW**
3R5	**1.0 kW**
5R4	**1.5 kW**
8R4	**2.0 kW**
120	**3.0 kW**
170	**5.0 kW**
210	**6.0 kW**
260	**7.5 kW**
280	**11.0 kW**
370	**15.0 kW**

4th digit - Voltage	
Code	**Specification**
D	**400 V AC**

5th + 6th digit - Interface*2	
Code	**Specification**
A0	**EtherCAT communication reference**
C0	**PROFINET communication reference**
30	**MECHATROLINK-III *, RJ45 communication reference**
M0	**Sigma-7Siec (with built-in single-axis control)**

7th digit - Design Revision Order	
B	**Standard Model**

8th ... 10th digit - Hardware Options Specifications		
Code	**Specification**	**Applicable Models**
000	**Without Options**	**All models**
026*3	With relay for holding brake	All models

11th ... 13th digit - FT/EX Specification	
Code	**Specification**
F64*1	**Zone table**
F50	**Application function for Sigma-7Siec**

Bolded options are considered standard warehouse products.

*1. Only available for EtherCAT (CoE) and MECHATROLINK-III communication references.
*2. The same SERVOPACKs are used for both rotary and linear servomotors.
*3. For specification of the internal brake relay, please refer to the hardware manual of the amplifier.

Ratings and Specifications

Ratings

Three-phase, 400 VAC

Model SGD7S-			1R9D	3R5D	5R4D	8R4D	120D	170D	210D	260D	280D	370D
Maximum Applicable Motor Capacity [kW]			0.5	1	1.5	2	3	5	6	7.5	11	15
Continuous Output Current [A]			1.9	3.5	5.4	8.4	11.9	16	20.8	25.7	28.1	37.2
Instantaneous Maximum Output Current [A]			5.5	8.5	14	21	28	42	55	65	70	85
Main Circuit	Power Supply		Three-phase, 380 VAC to 480 VAC, -15 % to +10 %, 50 Hz/60 Hz									
	Input Current [A]*		1.4	2.9	4.3	5.8	8.6	14.5	17.4	21.7	31.8	43.4
Control Power Supply	Power Supply		24 VDC ±15 %									
	Input Current [A]*		1.2						1.4		1.5	
Power Supply Capacity [kVA]*			1.1	2.3	3.5	4.5	7.1	11.7	12.4	14.4	21.9	30.6
Power Loss*	Main Circuit Power Loss [W]		19.2	30	62.3	89.4	136.8	188.7	188.4	228.5	278.2	389.8
	Control Circuit Power Loss [W]		21					22	28		32	
	Built-in Regenerative Resistor Power Loss [W]		14	14	28	28	28	36	(180)*		(240)*	
	Total Power Loss [W]		54.2	65	111.3	138.4	185.5	246.7	216.4	256.5	310.2	389.8
Regenerative Resistor	Built-In Regenerative Resistor	Resistance [Ω]	75	75	75	43	43	27	-			
		Capacity [W]	70	70	140	140	140	180	-			
	Minimum Allowable External Resistance [Ω]		75	75	75	43	43	27	18		14.25	
Overvoltage Category			III									

* This is the net value at the rated load.

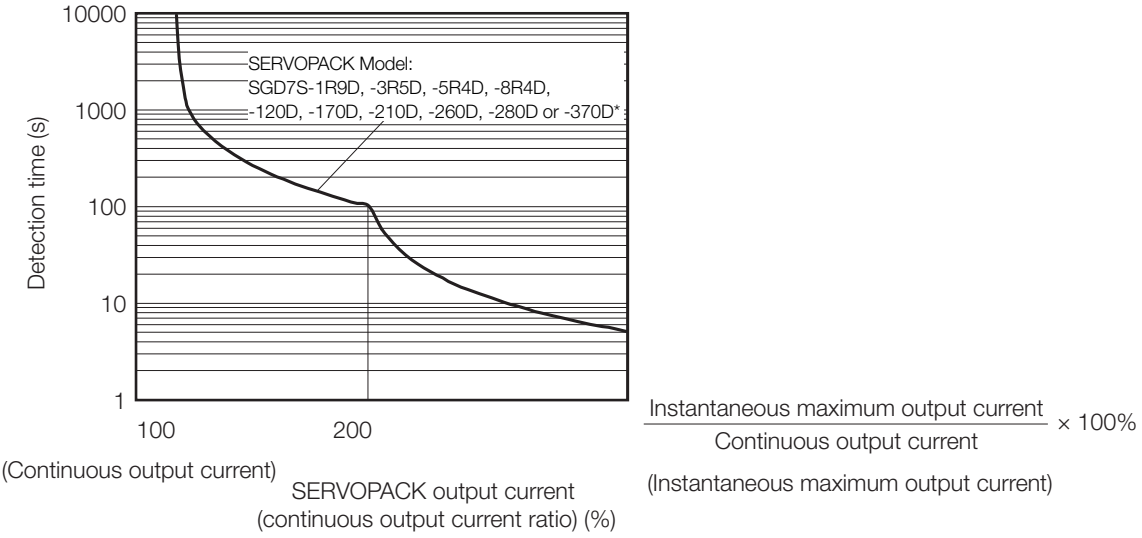
540 VDC

Model SGD7S-			1R9D	3R5D	5R4D	8R4D	120D	170D	210D	260D	280D	370D
Maximum Applicable Motor Capacity [kW]			0.5	1	1.5	2	3	5	6	7.5	11	15
Continuous Output Current [A]			1.9	3.5	5.4	8.4	11.9	16	20.8	25.7	28.1	37.2
Instantaneous Maximum Output Current [A]			5.5	8.5	14	21	28	42	55	65	70	85
Main Circuit	Power Supply		513 VDC to 648 VDC, -15 % to +10 %									
	Input Current [A]*		2	3.3	5.5	6.8	11	18	19.6	26.2	38.3	47.6
Control Power Supply	Power Supply		24 VDC ±15 %									
	Input Current [A]*		1.2						1.4		1.5	
Power Supply Capacity [kVA]*			1.1	2.3	3.5	4.5	7.1	11.7	12.4	14.4	21.9	30.6
Power Loss*	Main Circuit Power Loss [W]		16.4	24.4	48.5	73.7	110.4	144.5	188.4	228.5	278.2	389.8
	Control Circuit Power Loss [W]		21					22	28		32	
	Built-in Regenerative Resistor Power Loss [W]		14	14	28	28	28	36	(180)*		(240)*	
	Total Power Loss [W]		37.4	45.4	69.5	94.7	131.4	166.5	216.4	228.5	310.2	389.8
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 within the continuous duty zone of the torque-motor speed characteristic of the Servomotor.
* However, the range for the SGD7S-370D is -5°C to 40°C.

Specifications using EtherCAT Communication Reference

Item			Specification
Control Method			IGBT-based PWM control, sine wave current drive
Feedback	With Rotary Servomotor		Serial encoder: 24 bits (incremental encoder/absolute encoder)
	With Linear Servomotor		• Absolute linear encoder (The signal resolution depends on the absolute linear encoder.) • Incremental linear encoder (The signal resolution depends on the incremental linear encoder or Serial Converter Unit.)
Environmental Conditions	Surrounding Air Temperature*1		-5°C to 55°C (60°C with derating) However, the range for the SGD7S-370D is -5°C to 40°C.
	Storage Temperature		-20°C to 85°C
	Surrounding Air Humidity		95 % relative humidity max. (with no freezing or condensation)
	Storage Humidity		95 % relative humidity max. (with no freezing or condensation)
	Vibration Resistance		4.9 m/s^2
	Shock Resistance		19.6 m/s^2
	Degree of Protection		IP10
	Pollution Degree		2 • Must be no corrosive or flammable gases. • Must be no exposure to water, oil, or chemicals. • Must be no dust, salts, or iron dust.
	Altitude		1,000 m or less (above 1,000 m with derating)
	Others		Do not use the SERVOPACK in the following locations: Locations subject to static electricity noise, strong electromagnetic/magnetic fields, or radioactivity
Applicable Standards			Refer to the section Compliance with UL Standards, EU Directives, and Other Safety Standards (in Combination with SERVOPACK).
Mounting			Base-mounted
Performance	Speed Control Range		1:5,000 (At the rated torque, the lower limit of the speed control range must not cause the Servomotor to stop.)
	Coefficient of Speed Fluctuation*2		±0.01 % of rated speed max. (for a load fluctuation of 0 % to 100 %)
			0% of rated speed max. (for a voltage fluctuation of ±10 %)
			±0.1 % of rated speed max. (for a temperature fluctuation of 25 °C ±25 °C)
	Torque Control Precision (Repeatability)		±1 %
	Soft Start Time Setting		0 s to 10 s (Can be set separately for acceleration and deceleration.)
I/O Signals	Encoder Divided Pulse Output		Phase A, phase B, phase C: Line-driver output Number of divided output pulses: Any setting is allowed
	Linear Servomotor Overheat Protection Signal Input		Number of input points: 1 Input voltage range: 0 V to +5 V
	Sequence Input Signals	Input Signals that can be allocated	Allowable voltage range: 24 VDC ±20 % Number of input points: 7 Input method: Sink inputs or source inputs Input Signals • P-OT (Forward Drive Prohibit) and N-OT (Reverse Drive Prohibit) signals • /Probe1 (Probe 1 Latch Input) signal • /Probe2 (Probe 2 Latch Input) signal • /Home (Home Switch Input) signal • /P-CL (Forward External Torque Limit) and /N-CL (Reverse External Torque Limit) signals • /SI0 and /SI3 (General-Purpose Input) signals A signal can be allocated and the positive and negative logic can be changed.
	Sequence Output Signals	Fixed Output	Allowable voltage range: 5 VDC to 30 VDC Number of output points: 1 Output signal: ALM (Servo Alarm) signal
		Output Signals that can be allocated	Allowable voltage range: 5 VDC to 30 VDC Number of output points: 5 (A photocoupler output (isolated) is used.) Output Signals • /COIN (Positioning Completion) signal • /V-CMP (Speed Coincidence Detection) signal • /TGON (Rotation Detection) signal • /S-RDY (Servo Ready) signal • /CLT (Torque Limit Detection) signal • /VLT (Speed Limit Detection) signal • /BK (Brake) signal • /WARN (Warning) signal • /NEAR (Near) signal • /ZONE0 (ZONE Signal 1 Output) signal • /ZONE1 (ZONE Signal 2 Output) signal • /ZONE2 (ZONE Signal 3 Output) signal • /ZONE3 (ZONE Signal 4 Output) signal • /nZONE (nZONE Output) signal A signal can be allocated and the positive and negative logic can be changed.
Communications	RS-422A Communications (CN502)	Interfaces	Digital Operator (JUSP-OP05A-1-E)
		1:N Communications	Up to N = 15 stations possible for RS-422A port
		Axis Address Setting	Set with parameters.
	USB Communications (CN7)	Interface	Personal Computer (with SigmaWin+) The software version of the SigmaWin+ must be version 7.11 or higher.
		Communications Standard	Conforms to USB 2.0 standard (12 Mbps).

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Item		Specification
Displays/Indicators		CHARGE, PWR, RUN, ERR, and L/A (A and B) indicators, and one-digit seven-segment display
EtherCAT Communications Setting Switches		EtherCAT secondary address (S1 and S2), 16 positions
EtherCAT Communications	Applicable Communications Standards	IEC 61158 Type 12, IEC 61800-7 CiA402 Drive Profile
	Physical Layer	100BASE-TX (IEEE 802.3)
	Communications Connectors	CN6A (RJ45): EtherCAT signal input connector CN6B (RJ45): EtherCAT signal output connector
	Cable	Category 5, 4 shielded twisted pairs * The cable is automatically detected with AUTO MDIX.
	Sync Manager	SM0: Mailbox output, SM1: Mailbox input, SM2: Process data output, and SM3: Process data input
	FMMU	FMMU 0: Mapped in process data output (RxPDO) area. FMMU 1: Mapped in process data input (TxPDO) area. FMMU 2: Mapped to mailbox status.
	EtherCAT Commands (Data Link Layer)	APRD, FPRD, BRD, LRD, APWR, FPWR, BWR, LWR, ARMW, and FRMW (APRW, FPRW, BRW, and LRW commands are not supported.)
	Process Data	Assignments can be changed with PDO mapping.
	Mailbox (CoE)	Emergency messages, SDO requests, SDO responses, and SDO information (TxPDO/RxPDO and remote TxPDO/RxPDO are not supported.)
	Distributed Clocks	Free-Run Mode and DC Mode (Can be switched.) Applicable DC cycles: 125 µs to 4 ms in 125-µs increments
	Slave Information Interface	256 bytes (read-only)
	Indicators	EtherCAT communications in progress: Link/Activity x 2 EtherCAT communications status: RUN x 1 EtherCAT error status: ERR x 1
CiA402 Drive Profile		• Homing Mode • Profile Position Mode • Interpolated Position Mode • Profile Velocity Mode • Profile Torque Mode • Cyclic Synchronous Position Mode • Cyclic Synchronous Velocity Mode • Cyclic Synchronous Torque Mode • Touch Probe Function • Torque Limit Function
Analog Monitor (CN5)		Number of points: 2 Output voltage range: ±10 VDC (effective linearity range: ±8 V) Resolution: 16 bits Accuracy: ±20 mV (Typ) Maximum output current: ±10 mA Settling time (±1 %): 1.2 ms (Typ)
Dynamic Brake (DB)		Activated when a servo alarm or overtravel (OT) occurs, or when the power supply to the main circuit or servo is OFF.
Regenerative Processing		Built-in Refer to the catalog for details.
Overtravel (OT) Prevention		Stopping with dynamic brake, deceleration to a stop, or coasting to a stop for the P-OT (Forward Drive Prohibit) or N-OT (Reverse Drive Prohibit) signal
Protective Functions		Overcurrent, overvoltage, low voltage, overload, regeneration error, etc.
Utility Functions		Gain adjustment, alarm history, jogging, origin search, etc.
Safety Functions	Inputs	/HWBB1 and /HWBB2: Base block signals for Power Modules
	Output	EDM1: Monitors the status of built-in safety circuit (fixed output).
	Applicable Standards*3	ISO13849-1 PLe (Category 3), IEC61508 SIL3
Applicable Option Modules		Fully-closed Modules, Option Module Safety

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

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

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

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

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

Specifications using Sigma-7Siec Communication Reference

Item			Specification
Control Method			IGBT-based PWM control, sine wave current drive
Feedback	With Rotary Servomotor		Serial encoder: 24 bits (incremental encoder/absolute encoder)
	With Linear Servomotor		• Absolute linear encoder (The signal resolution depends on the absolute linear encoder.) • Incremental linear encoder (The signal resolution depends on the incremental linear encoder or Serial Converter Unit.)
Environmental Conditions	Surrounding Air Temperature*1		-5°C to 55°C (60°C with derating) However, the range for the SGD7S-370D is -5°C to 40°C.
	Storage Temperature		-20°C to 85°C
	Surrounding Air Humidity		95 % relative humidity max. (with no freezing or condensation)
	Storage Humidity		95 % relative humidity max. (with no freezing or condensation)
	Vibration Resistance		4.9 m/s^2
	Shock Resistance		19.6 m/s^2
	Degree of Protection		IP10
	Pollution Degree		2 • Must be no corrosive or flammable gases. • Must be no exposure to water, oil, or chemicals. • Must be no dust, salts, or iron dust.
	Altitude		1,000 m or less (above 1,000 m with derating)
	Others		Do not use the SERVOPACK in the following locations: Locations subject to static electricity noise, strong electromagnetic/magnetic fields, or radioactivity
Applicable Standards			Refer to the section Compliance with UL Standards, EU Directives, and Other Safety Standards (in Combination with SERVOPACK).
Mounting			Base-mounted
Performance	Speed Control Range		1:5,000 (At the rated torque, the lower limit of the speed control range must not cause the Servomotor to stop.)
	Coefficient of Speed Fluctuation*2		±0.01 % of rated speed max. (for a load fluctuation of 0 % to 100 %)
			0% of rated speed max. (for a voltage fluctuation of ±10 %)
			±0.1 % of rated speed max. (for a temperature fluctuation of 25 °C ±25 °C)
	Torque Control Precision (Repeatability)		±1 %
	Soft Start Time Setting		0 s to 10 s (Can be set separately for acceleration and deceleration.)
I/O Signals	Encoder Divided Pulse Output		Phase A, phase B, phase C: Line-driver output Number of divided output pulses: Any setting is allowed
	Linear Servomotor Overheat Protection Signal Input		Number of input points: 1 Input voltage range: 0 V to +5 V
	Sequence Input Signals	Input Signals that can be allocated	Allowable voltage range: 24 VDC ±20 % Number of input points: 7 Input method: Sink inputs or source inputs Input Signals • P-OT (Forward Drive Prohibit) and N-OT (Reverse Drive Prohibit) signals • /Probe1 (Probe 1 Latch Input) signal • /Probe2 (Probe 2 Latch Input) signal • /Home (Home Switch Input) signal • /P-CL (Forward External Torque Limit) and /N-CL (Reverse External Torque Limit) signals • /SI0 and /SI3 (General-Purpose Input) signals A signal can be allocated and the positive and negative logic can be changed.
	Sequence Output Signals	Fixed Output	Allowable voltage range: 5 VDC to 30 VDC Number of output points: 1 Output signal: ALM (Servo Alarm) signal
		Output Signals that can be allocated	Allowable voltage range: 5 VDC to 30 VDC Number of output points: 5 (A photocoupler output (isolated) is used.) Output Signals • /COIN (Positioning Completion) signal • /V-CMP (Speed Coincidence Detection) signal • /TGON (Rotation Detection) signal • /S-RDY (Servo Ready) signal • /CLT (Torque Limit Detection) signal • /VLT (Speed Limit Detection) signal • /BK (Brake) signal • /WARN (Warning) signal • /NEAR (Near) signal • /ZONE0 (ZONE Signal 1 Output) signal • /ZONE1 (ZONE Signal 2 Output) signal • /ZONE2 (ZONE Signal 3 Output) signal • /ZONE3 (ZONE Signal 4 Output) signal • /nZONE (nZONE Output) signal A signal can be allocated and the positive and negative logic can be changed.
Communications	RS-422A Communications (CN502)	Interfaces	Digital Operator (JUSP-OP05A-1-E)
		1:N Communications	Up to N = 15 stations possible for RS-422A port
		Axis Address Setting	Set with parameters.
	USB Communications (CN7)	Interface	Personal Computer (with SigmaWin+) The software version of the SigmaWin+ must be version 7.11 or higher.
		Communications Standard	Conforms to USB 2.0 standard (12 Mbps).

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Item		Specification
Displays/Indicators		CHARGE, PWR, RUN, ERR, and L/A (A and B) indicators, and one-digit seven-segment display
EtherCAT Communications Setting Switches		EtherCAT secondary address (S1 and S2), 16 positions
EtherCAT Communications	Applicable Communications Standards	IEC 61158 Type 12, IEC 61800-7 CiA402 Drive Profile
	Physical Layer	100BASE-TX (IEEE 802.3)
	Communications Connectors	CN6A (RJ45): EtherCAT signal input connector CN6B (RJ45): EtherCAT signal output connector
	Cable	Category 5, 4 shielded twisted pairs * The cable is automatically detected with AUTO MDIX.
	Sync Manager	SM0: Mailbox output, SM1: Mailbox input, SM2: Process data output, and SM3: Process data input
	FMMU	FMMU 0: Mapped in process data output (RxPDO) area. FMMU 1: Mapped in process data input (TxPDO) area. FMMU 2: Mapped to mailbox status.
	EtherCAT Commands (Data Link Layer)	APRD, FPRD, BRD, LRD, APWR, FPWR, BWR, LWR, ARMW, and FRMW (APRW, FPRW, BRW, and LRW commands are not supported.)
	Process Data	Assignments can be changed with PDO mapping.
	Mailbox (CoE)	Emergency messages, SDO requests, SDO responses, and SDO information (TxPDO/RxPDO and remote TxPDO/RxPDO are not supported.)
	Distributed Clocks	Free-Run Mode and DC Mode (Can be switched.) Applicable DC cycles: 125 µs to 4 ms in 125-µs increments
	Slave Information Interface	256 bytes (read-only)
	Indicators	EtherCAT communications in progress: Link/Activity x 2 EtherCAT communications status: RUN x 1 EtherCAT error status: ERR x 1
CiA402 Drive Profile		• Homing Mode • Profile Position Mode • Interpolated Position Mode • Profile Velocity Mode • Profile Torque Mode • Cyclic Synchronous Position Mode • Cyclic Synchronous Velocity Mode • Cyclic Synchronous Torque Mode • Touch Probe Function • Torque Limit Function
Analog Monitor (CN5)		Number of points: 2 Output voltage range: ±10 VDC (effective linearity range: ±8 V) Resolution: 16 bits Accuracy: ±20 mV (Typ) Maximum output current: ±10 mA Settling time (±1 %): 1.2 ms (Typ)
Dynamic Brake (DB)		Activated when a servo alarm or overtravel (OT) occurs, or when the power supply to the main circuit or servo is OFF.
Regenerative Processing		Built-in Refer to the catalog for details.
Overtravel (OT) Prevention		Stopping with dynamic brake, deceleration to a stop, or coasting to a stop for the P-OT (Forward Drive Prohibit) or N-OT (Reverse Drive Prohibit) signal
Protective Functions		Overcurrent, overvoltage, low voltage, overload, regeneration error, etc.
Utility Functions		Gain adjustment, alarm history, jogging, origin search, etc.
Safety Functions	Inputs	/HWBB1 and /HWBB2: Base block signals for Power Modules
	Output	EDM1: Monitors the status of built-in safety circuit (fixed output).
	Applicable Standards*3	ISO13849-1 PLe (Category 3), IEC61508 SIL3
Applicable Option Modules		Fully-closed Modules, Option Module Safety

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

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

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

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

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

Specifications using MECHATROLINK-III Communication Reference

Item			Specification
Drive Method			IGBT-based PWM control, sine wave current drive
Feedback	With Rotary Servomotor		Serial encoder: 24 bits (incremental encoder/absolute encoder)
	With Linear Servomotor		• Absolute linear encoder (The signal resolution depends on the absolute linear encoder.) • Incremental linear encoder (The signal resolution depends on the incremental linear encoder or Serial Converter Unit.)
Environmental Conditions	Surrounding Air Temperature*1		-5°C to 55°C (60°C with derating) However, the range for the SGD7S-370D is -5°C to 40°C.
	Storage Temperature		-20°C to 85°C
	Surrounding Air Humidity		95 % relative humidity max. (with no freezing or condensation)
	Storage Humidity		95 % relative humidity max. (with no freezing or condensation)
	Vibration Resistance		4.9 m/s^2
	Shock Resistance		19.6 m/s^2
	Degree of Protection		IP10
	Pollution Degree		2 • Must be no corrosive or flammable gases. • Must be no exposure to water, oil, or chemicals. • Must be no dust, salts, or iron dust.
	Altitude		1,000 m or less (above 1,000 m with derating)
	Others		Do not use the SERVOPACK in the following locations: Locations subject to static electricity noise, strong electromagnetic/magnetic fields, or radioactivity
Applicable Standards			Refer to the section Compliance with UL Standards, EU Directives, and Other Safety Standards (in Combination with SERVOPACK).
Mounting			Base-mounted
Performance	Speed Control Range		1:5,000 (At the rated torque, the lower limit of the speed control range must not cause the Servomotor to stop.)
	Coefficient of Speed Fluctuation*2		±0.01 % of rated speed max. (for a load fluctuation of 0 % to 100 %) 0 % of rated speed max. (for a voltage fluctuation of ± 10 %) ±0.1 % of rated speed max. (for a temperature fluctuation of 25 °C ± 25 °C)
	Torque Control Precision (Repeatability)		±1 %
	Soft Start Time Setting		0 s to 10 s (Can be set separately for acceleration and deceleration.)
I/O Signals	Encoder Divided Pulse Output		Phase A, phase B, phase C: Line-driver output Number of divided output pulses: Any setting is allowed.
	Linear Servomotor Overheat Protection Signal Input		Number of input points: 1 Input voltage range: 0 V to +5 V
	Sequence Input Signals	Input Signals that can be allocated	Allowable voltage range: 24 VDC ±20 % Number of input points: 7 Input method: Sink inputs or source inputs Input Signals • /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: 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 • /ZONE0 (ZONE Signal 1 Output) signal • /ZONE1 (ZONE Signal 2 Output) signal • /ZONE2 (ZONE Signal 3 Output) signal • /ZONE3 (ZONE Signal 4 Output) signal • /nZONE (nZONE output) 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)
		1:N Communications	Up to N = 15 stations possible for RS-422A port
		Axis Address Setting	Set with parameters.
	USB Communications (CN7)	Interface	Personal Computer (with SigmaWin+) The software version of the SigmaWin+ must be version 7.11 or higher.
		Communications Standard	Conforms to USB 2.0 standard (12 Mbps).
Displays/Indicators			CHARGE, PWR, CN, L1, and L2 indicators, and one-digit seven-segment display

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Item		Specification
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.
	Transmission Speed	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	MEACHATROLINK-III standard servo profile
MECHATROLINK-III Communications Setting Switches		Rotary switch (S1 and S2) positions: 16 Number of DIP switch (S3) pins: 4
Analog Monitor (CN5)		Number of points: 2 Output voltage range: ±10 VDC (effective linearity range: ±8 V) Resolution: 16 bits Accuracy: ±20 mV (Typ) Maximum output current: ±10 mA Settling time (±1%): 1.2 ms (Typ)
Dynamic Brake (DB)		Activated when a servo alarm or overtravel (OT) occurs, or when the power supply to the main circuit or servo is OFF.
Regenerative Processing		Built-in Refer to the catalog for details.
Overtravel (OT) Prevention		Stopping with dynamic brake, deceleration to a stop, or coasting to a stop for the P-OT (Forward Drive Prohibit) or N-OT (Reverse Drive Prohibit) signal
Protective Functions		Overcurrent, overvoltage, low voltage, overload, regeneration error, etc.
Utility Functions		Gain adjustment, alarm history, jogging, origin search, etc.
Safety Functions	Inputs	/HWBB1 and /HWBB2: Base block signals for Power Modules
	Output	EDM1: Monitors the status of built-in safety circuit (fixed output).
	Applicable Standards*3	ISO13849-1 PLe (Category 3), IEC61508 SIL3
Applicable Option Modules		Fully-closed Modules

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

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

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

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

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

Specifications using PROFINET Communication Reference

Item			Specification
Control Method			IGBT-based PWM control, sine wave current drive
Feedback	With Rotary Servomotor		Serial encoder: 24 bits (incremental encoder/absolute encoder)
	With Linear Servomotor		• Absolute linear encoder (The signal resolution depends on the absolute linear encoder.) • Incremental linear encoder (The signal resolution depends on the incremental linear encoder or Serial Converter Unit.)
Environmental Conditions	Surrounding Air Temperature*1		-5°C to 55°C (60°C with derating) However, the range for the SGD7S-370D is -5°C to 40°C.
	Storage Temperature		-20°C to 85°C
	Surrounding Air Humidity		95 % relative humidity max. (with no freezing or condensation)
	Storage Humidity		95 % relative humidity max. (with no freezing or condensation)
	Vibration Resistance		4.9 m/s^2
	Shock Resistance		19.6 m/s^2
	Degree of Protection		IP10
	Pollution Degree		2 • Must be no corrosive or flammable gases. • Must be no exposure to water, oil, or chemicals. • Must be no dust, salts, or iron dust.
	Altitude		1,000 m or less (above 1,000 m with derating)
	Others		Do not use the SERVOPACK in the following locations: Locations subject to static electricity noise, strong electromagnetic/magnetic fields, or radioactivity
Applicable Standards			Refer to the section Compliance with UL Standards, EU Directives, and Other Safety Standards (in Combination with SERVOPACK).
Mounting			Base-mounted
Performance	Speed Control Range		1:5,000 (At the rated torque, the lower limit of the speed control range must not cause the Servomotor to stop.)
	Coefficient of Speed Fluctuation*2		±0.01 % of rated speed max. (for a load fluctuation of 0 % to 100 %) 0% of rated speed max. (for a voltage fluctuation of ±10 %) ±0.1 % of rated speed max. (for a temperature fluctuation of 25 °C ±25 °C)
	Torque Control Precision (Repeatability)		±1 %
	Soft Start Time Setting		0 s to 10 s (Can be set separately for acceleration and deceleration.)
I/O Signals	Encoder Divided Pulse Output		Phase A, phase B, phase C: Line-driver output Number of divided output pulses: Any setting is allowed
	Linear Servomotor Overheat Protection Signal Input		Number of input points: 1 Input voltage range: 0 V to +5 V
	Sequence Input Signals	Input Signals that can be allocated	Allowable voltage range: 24 VDC ±20 % Number of input points: 7 Input method: Sink inputs or source inputs Input Signals • P-OT (Forward Drive Prohibit) and N-OT (Reverse Drive Prohibit) signals • /EXT1 (Probe 1 Latch Input) signal • /EXT2 (Probe 2 Latch Input) signal • /DEC (Home Switch Input) signal • /P-CL (Forward External Torque Limit) and /N-CL (Reverse External Torque Limit) signals • /SI0 and /SI6 (General-Purpose Input) signals A signal can be allocated and the positive and negative logic can be changed.
	Sequence Output Signals	Fixed Output	Allowable voltage range: 5 VDC to 30 VDC Number of output points: 1 Output signal: ALM (Servo Alarm) signal
		Output Signals that can be allocated	Allowable voltage range: 5 VDC to 30 VDC Number of output points: 5 (A photocoupler output (isolated) is used.) Output Signals • /COIN (Positioning Completion) signal • /V-CMP (Speed Coincidence Detection) signal • /TGON (Rotation Detection) signal • /S-RDY (Servo Ready) signal • /CLT (Torque Limit Detection) signal • /VLT (Speed Limit Detection) signal • /BK (Brake) signal • /WARN (Warning) signal • /NEAR (Near) signal A signal can be allocated and the positive and negative logic can be changed.
Communications	RS-422A Communications (CN502)	Interfaces	Digital Operator (JUSP-OP05A-1-E)
		1:N Communications	Up to N = 15 stations possible for RS-422A port
		Axis Address Setting	Set with parameters.
	USB Communications (CN7)	Interface	Personal Computer (with SigmaWin+) The software version of the SigmaWin+ must be version 7.28 or higher.
		Communications Standard	Conforms to USB 2.0 standard (12 Mbps).

Continued on next page.

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

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

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

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

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

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

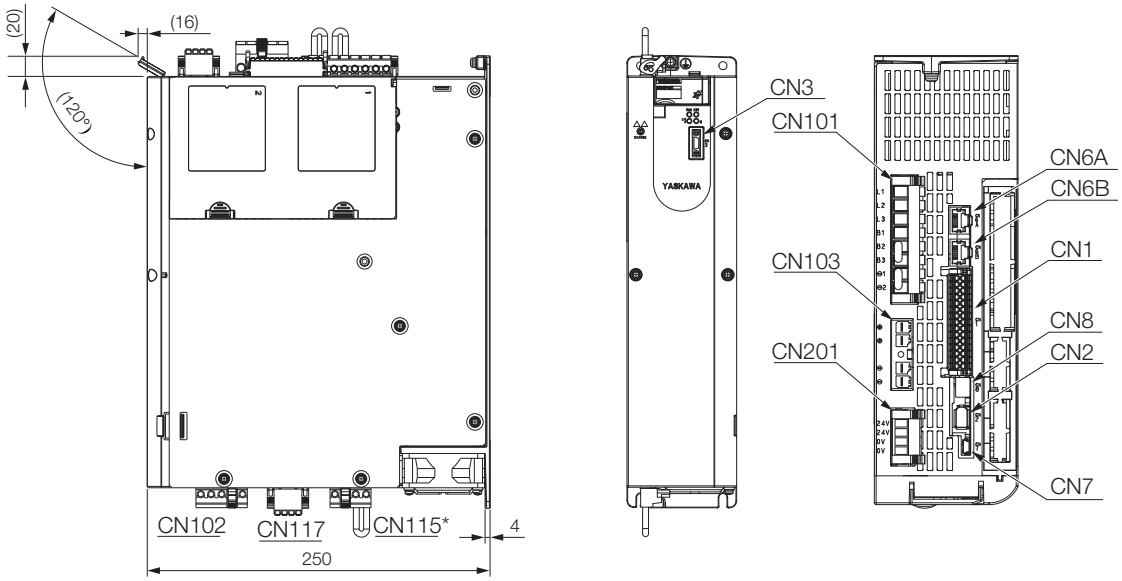
Front Cover Dimensions and Connector Specifications

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

Front Cover Dimensions and Connector Specifications

The front cover dimensions and panel connector section are the same for all models.
Refer to the following figures and table.

• Front Cover Dimensions and Connectors



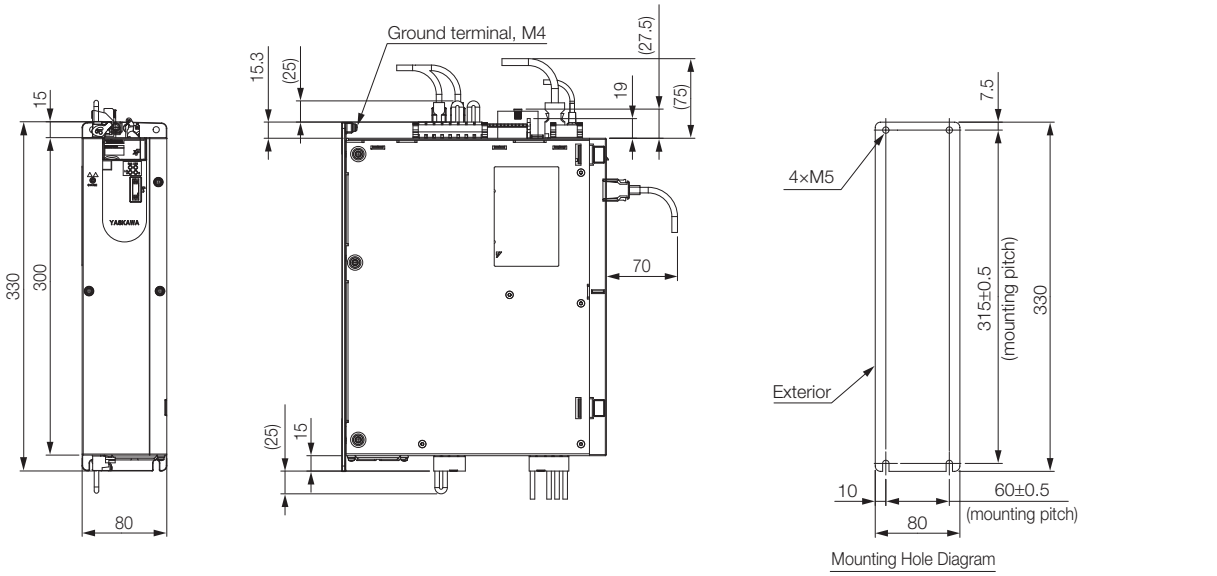
* Dynamic Brake Connector only for SGD7S-1R9D up to -170D.

• Connector Specifications

Connector No.	Function	Model	YASKAWA Order Code	Number of Pins	Manufacturer
CN1	I/O Connector	DFMC1,5/15-ST-3,5-LRBK	JUSP-7CN001	30	Phoenix Contact
CN2	Encoder Connector	-	JZSP-CMP9-1-E	6	Sumitomo 3M Ltd.
CN3	Digital Operator	-	-	14	Honda Tsushin Kogyo Co., Ltd.
		-			
CN6A/ CN6B	Fieldbus Connector	-	-	8	Tyco Electronics Japan G.K.
CN7	USB Connector for SigmaWin	-	-	5	Tyco Electronics Japan G.K.
CN8	Safety Connector Kit	-	2013595-1	8	Tyco Electronics Japan G.K.
CN8	Safety Jumper Connector	-	JZSP-CVH05-E	8	Tyco Electronics Japan G.K.
CN101	Main Power Connector SGD7S-1R9D to -170D	BLZ 7.62HP/08/180LR SN BK BX PRT	JUSP-7CN101	8	Weidmüller
	Main Power Connector SGD7S-210D to -370D	BUZ 10.16HP/07/180F AG BK BX LPR SO	JUSP-7CN101-1	7	Weidmüller
CN102	Motor Power Connector SGD7S-1R9D to -170D	BLZ 7.62IT/04/180MF4 SN BK BX PRT	JUSP-7CN102	4	Weidmüller
	Motor Power Connector SGD7S-210D to -370D	BUZ 10.16IT/04/180MF4 AG BK BX LPR SO	JUSP-7CN102-1	4	Weidmüller
CN103	DC Power Input SGD7S-1R9D to -170D	BVZ 7.62IT/04/180MF3 SN BK BX PRT	JUSP-7CN103	4	Weidmüller
	DC Power Input SGD7S-210D to -370D	BUZ 10.16IT/04/180MF3 AG BK BX LPR SO	JUSP-7CN103-1	4	Weidmüller
CN115	Dynamic Brake Connector SGD7S-1R9D to -170D	BLZ 7.62IT/03/180MF2 SN BK BX PRT	JUSP-7CN115	3	Weidmüller
	Dynamic Brake Connector SGD7S-210D to -370D	No integrated Dynamic Brake circuit. External Dynamic Brake circuit is possible as an option.			
CN117	Holding Brake Connector	BLF 5.08HC/04/180LR SN BK BX SO	JUSP-7CN117	4	Weidmüller
CN201	24 V Control Power Input	BLF 5.08HC/04/180LR SN OR BX SO	JUSP-7CN201	4	Weidmüller

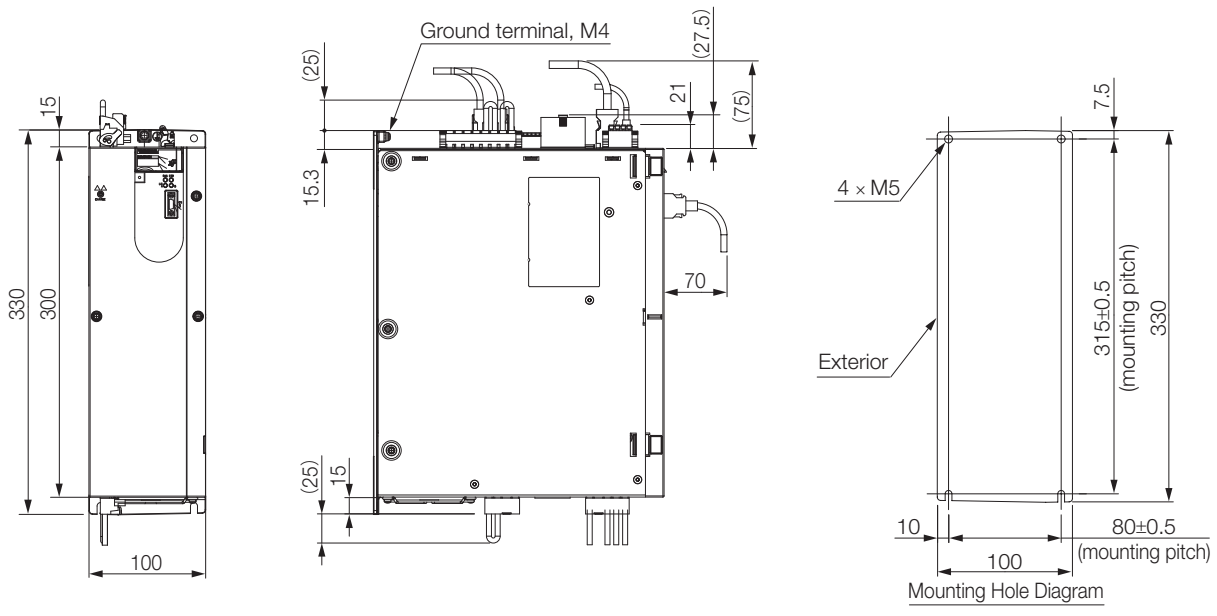
Dimensions of base-mounted SERVOPACKs

• Three-Phase, 400 VAC: SGD7S-1R9D, -3R5D, -5R4D, -8R4D, and -120D



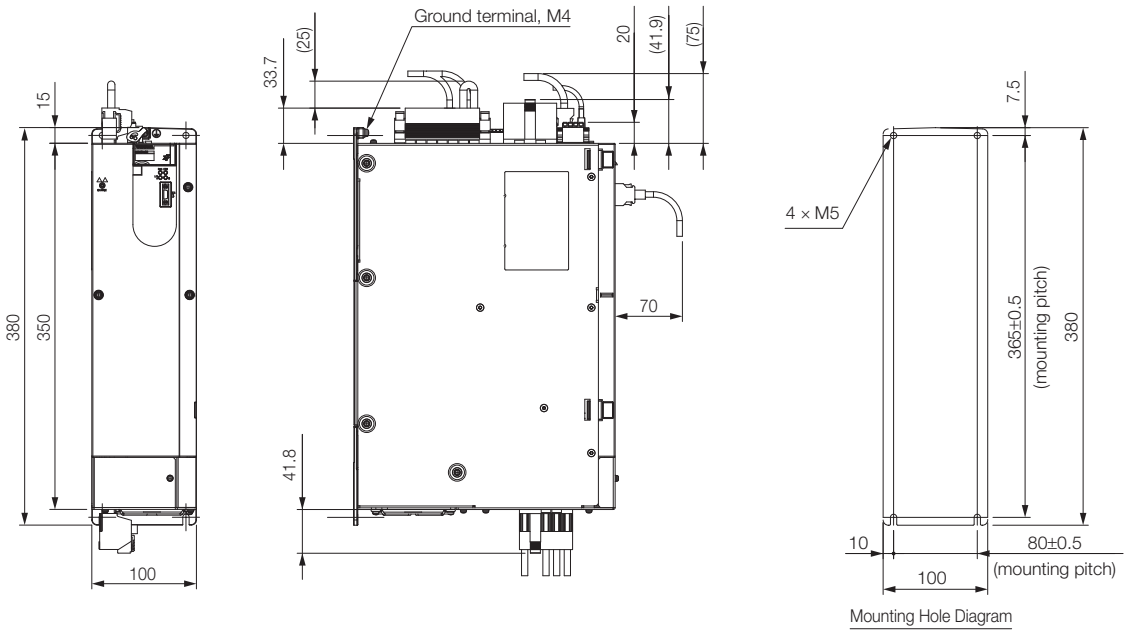
Approx. mass: SGD7S-1R9D, -3R5D, or -5R4D: 3.4 kg
SGD7S-8R4D or -120D: 3.7 kg
Unit: mm

• Three-Phase, 400 VAC: SGD7S-170D



Approx. mass: 5.5 kg
Unit: mm

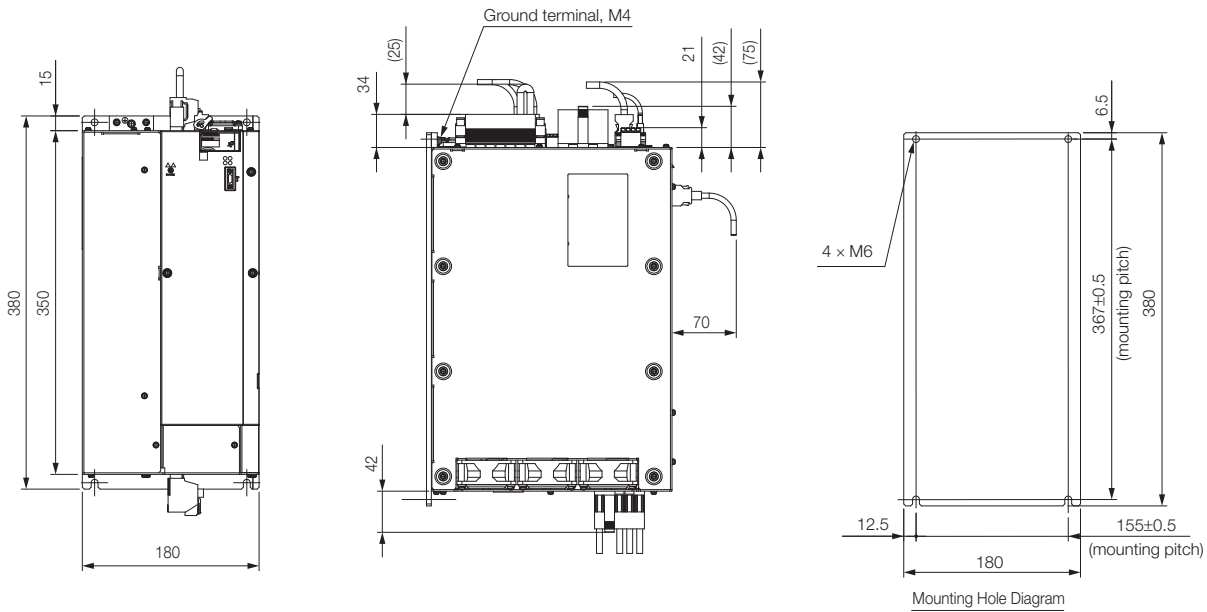
• **Three-Phase, 400 VAC: SGD7S-210D and -260D**



Mounting Hole Diagram

Approx. mass: 7.0 kg
Unit: mm

• **Three-Phase, 400 VAC: SGD7S-280D and -370D**

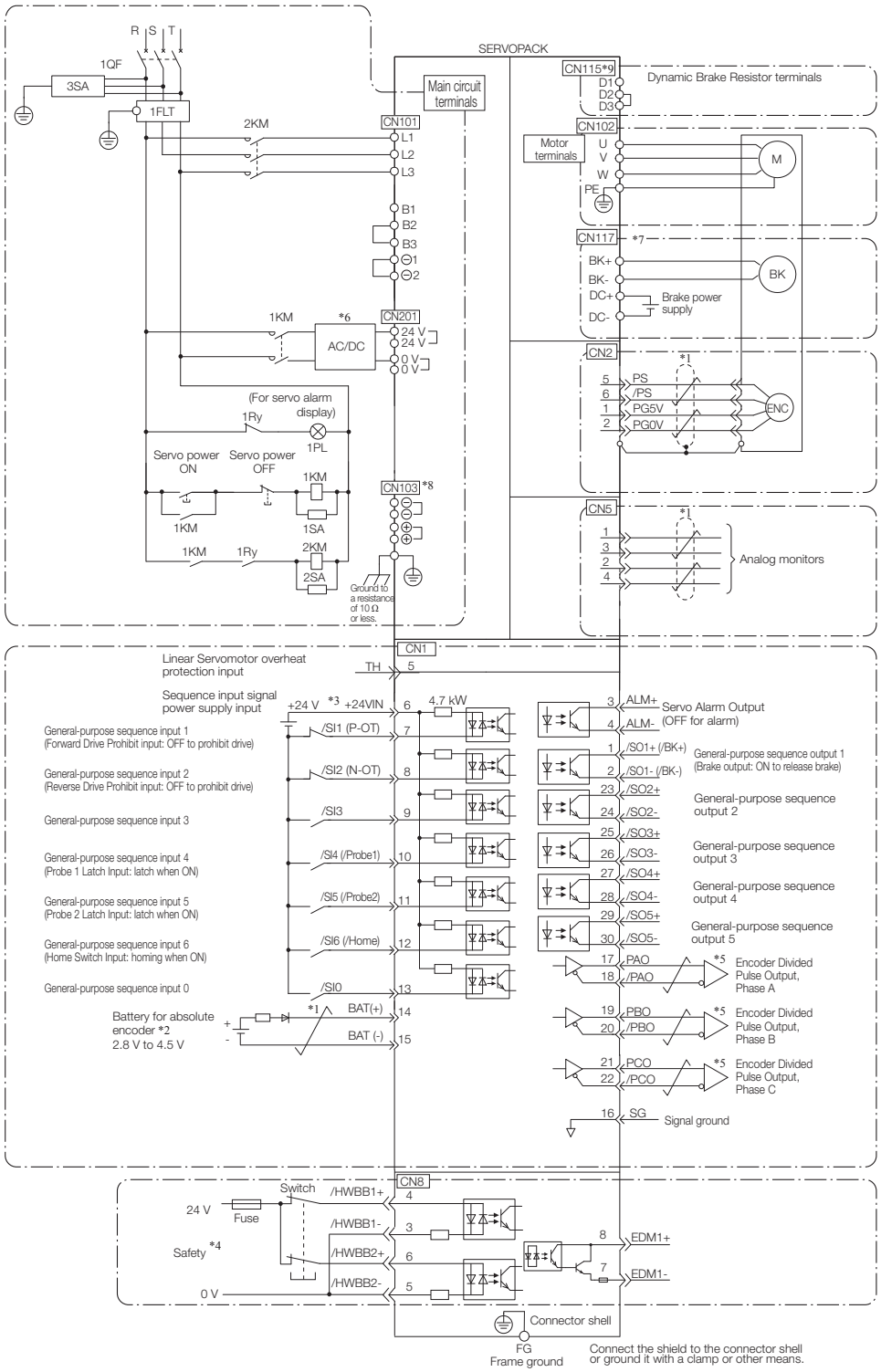


Mounting Hole Diagram

Approx. mass: 13.5 kg
Unit: mm

System Configurations up to 5 kW

SGD7S Single-axis EtherCAT Reference SERVOPACKs

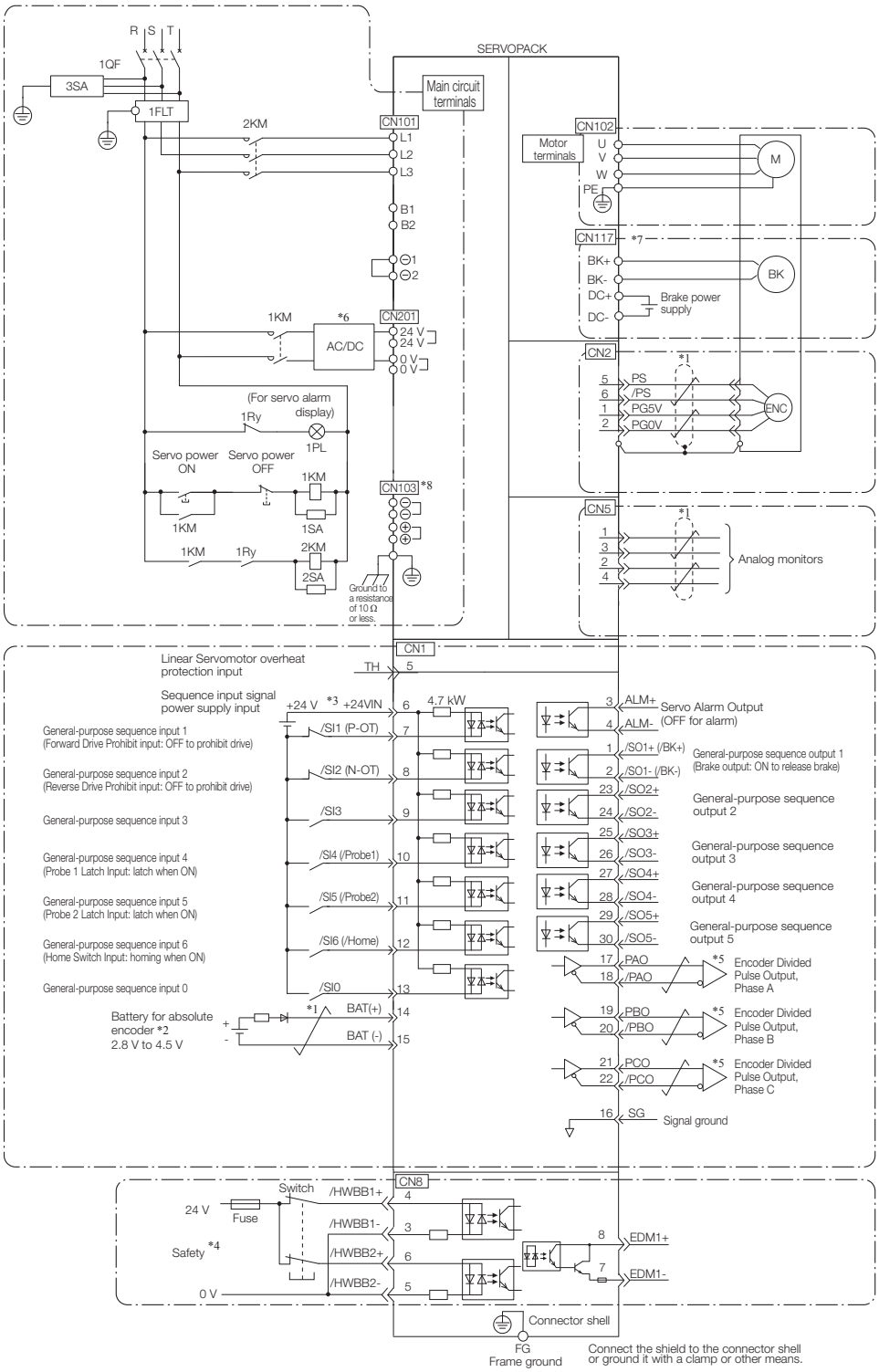


*1. represents twisted-pair wires.

*2. Connect these when using an absolute encoder. If the Encoder Cable with a Battery Case is connected, do not connect a backup battery.
*3. The 24-VDC power supply is not provided by Yaskawa. Use a 24-VDC power supply with double insulation or reinforced insulation.
*4. Refer to the manual if you use a safety function device. If you do not use the safety function, insert the Safety Jumper Connector (provided as an accessory) into CN8 when you use the SERVOPACK.
*5. Always use line receivers to receive the output signals.
*6. Use an SELV-compliant power supply according to EN/IEC 60950-1 to input 24-VDC to the control power supply input terminals.
*7. The CN117 connector is only used for SERVOPACKs with built-in Servomotor brake control, SGD7S-oooDooB026F64 and SGD7W-oooDooB026.
*8. If using these terminals, contact your YASKAWA representative.
*9. The CN115 Dynamic Brake Connector is only for SGD7S-1R9D up to -170D.

System Configurations with 6 kW and more

SGD7S Single-axis EtherCAT Reference SERVOPACKs



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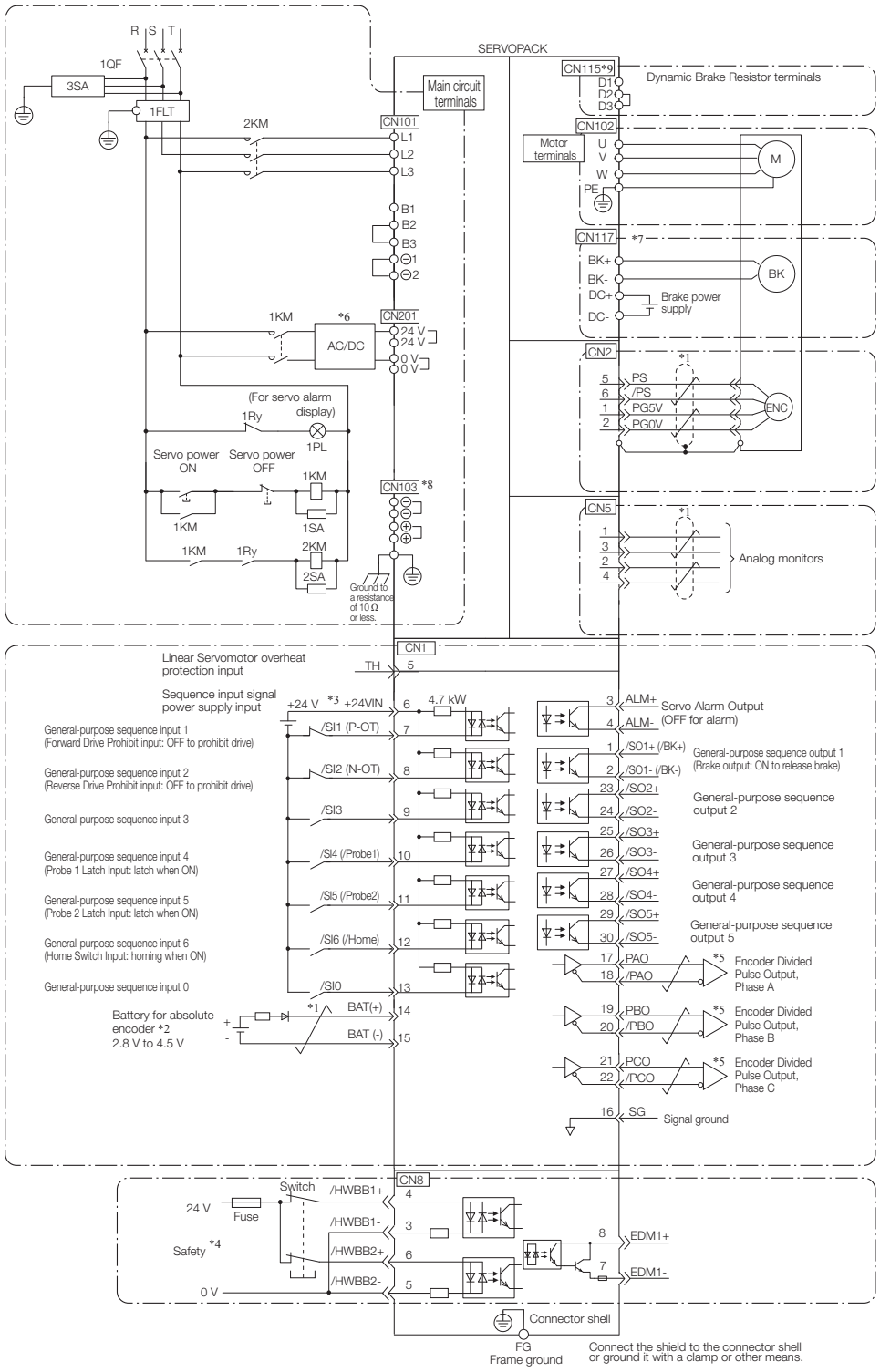
*8. If using these terminals, contact your YASKAWA representative.

With the SGD7S-210D, -260D, -280D, or -370D, connect a Regenerative Resistor Unit between B1 and B2.

System Configurations up to 5 kW

SGD7S Single-axis PROFINET Reference SERVOPACKs



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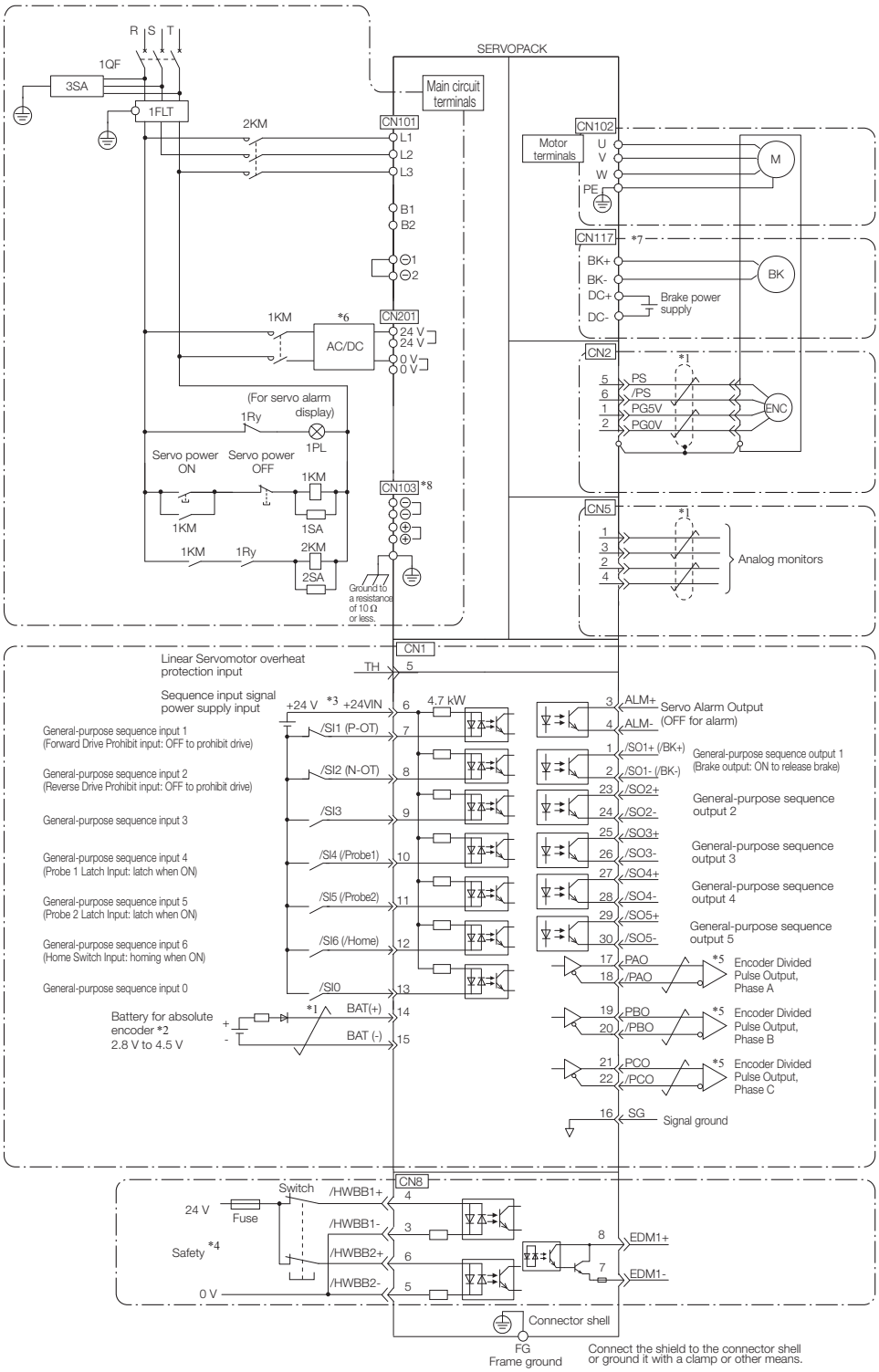
System Configurations with 6 kW and more

SGD7S Single-axis PROFINET Reference SERVOPACKs



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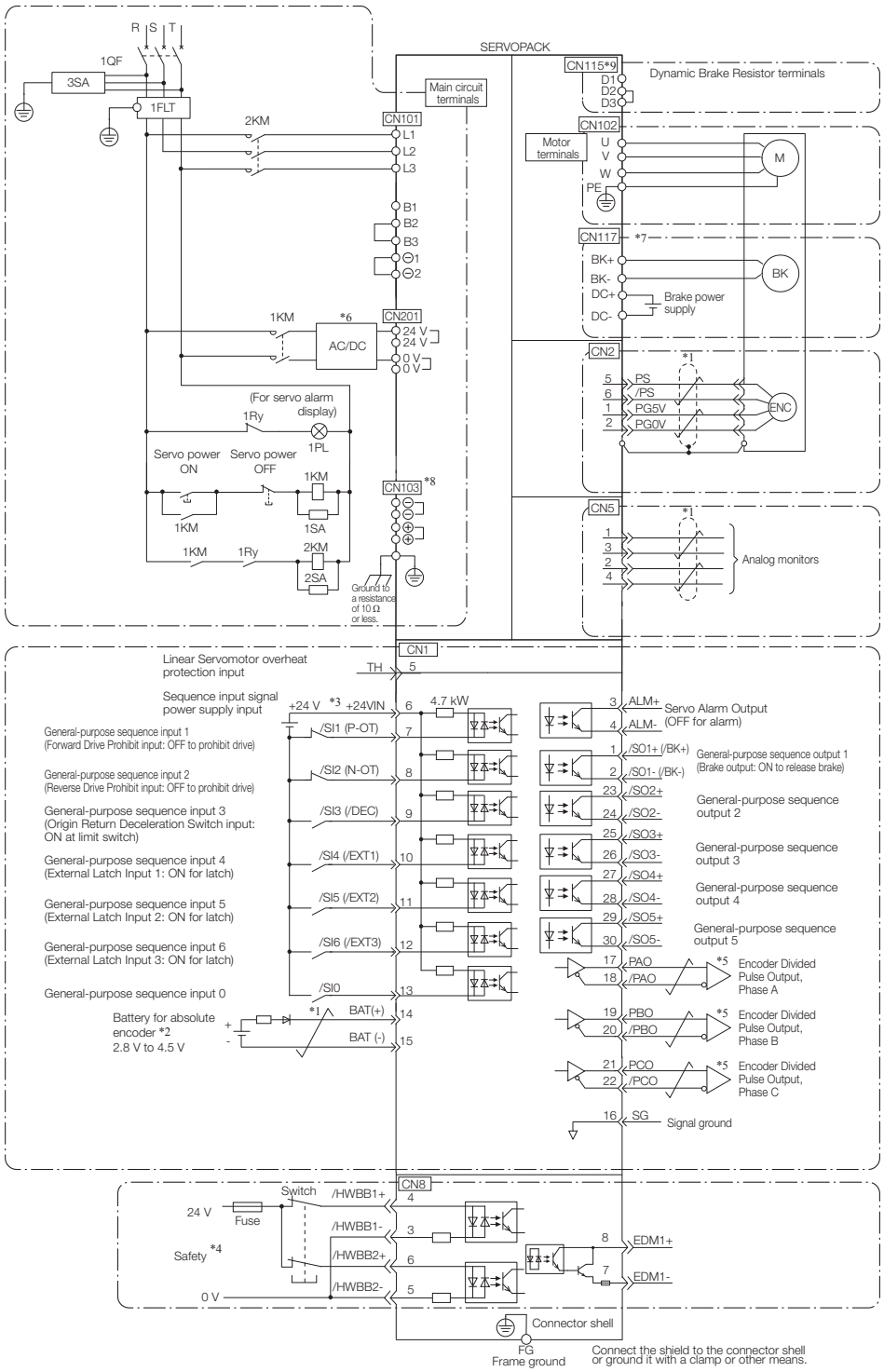
*7. The CN117 connector is only used for SERVOPACKs with built-in Servomotor brake control, SGD7S-oooDooB026F64 and SGD7W-oooDooB026.
*8. If using these terminals, contact your YASKAWA representative.

With the SGD7S-210D, -260D, -280D, or -370D, connect a Regenerative Resistor Unit between B1 and B2.

System Configurations up to 5 kW

SGD7S Single-axis MECHATROLINK-III Reference SERVOPACKs



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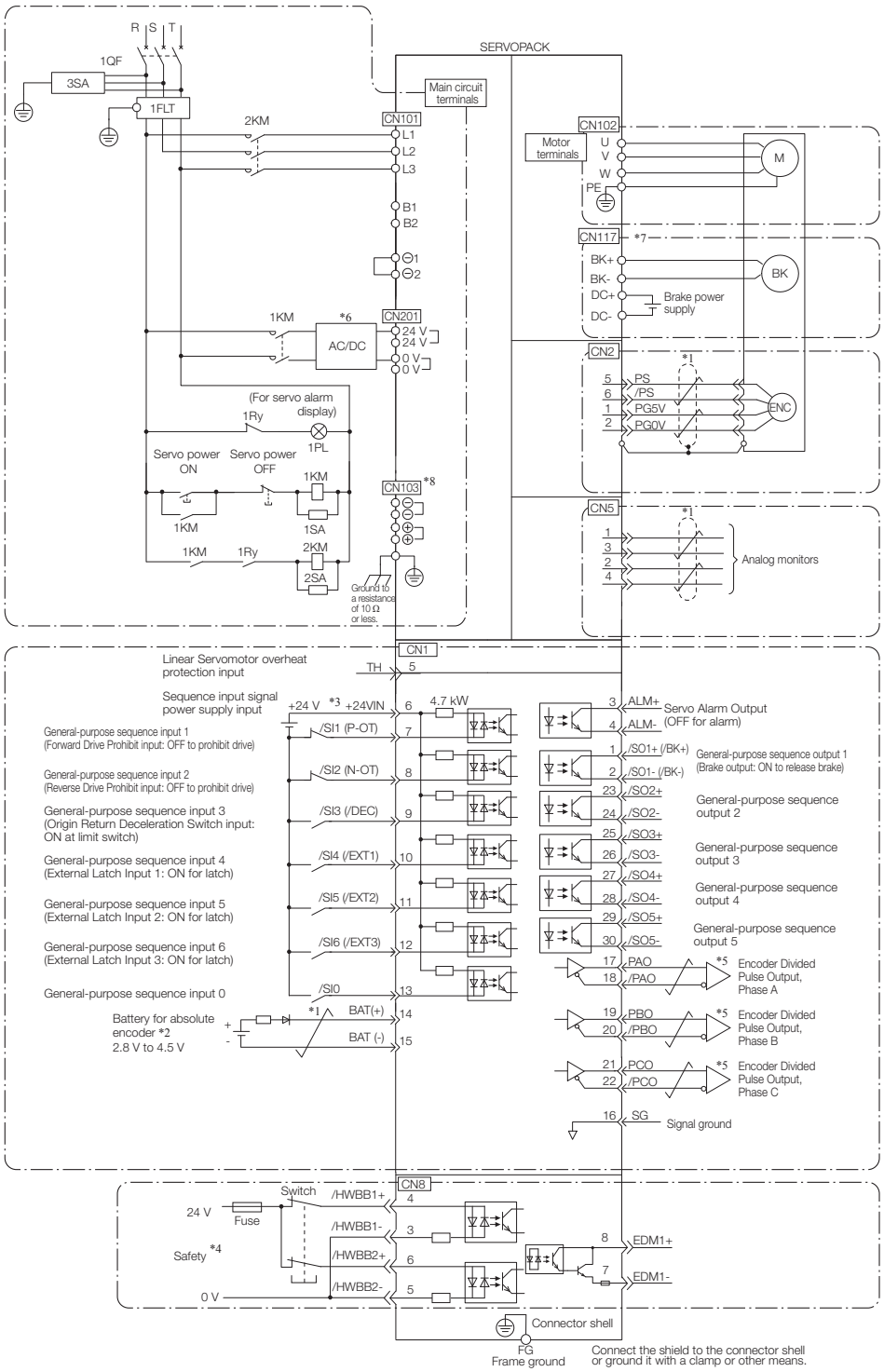
*9. The CN115 Dynamic Brake Connector is only for SGD7S-1R9D up to -170D.

System Configurations with 6 kW and more

SGD7S Single-axis MECHATROLINK-III Reference SERVOPACKs



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*7. The CN117 connector is only used for SERVOPACKs with built-in Servomotor brake control, SGD7S-oooDooB026F64 and SGD7W-oooDooB026.
*8. If using these terminals, contact your YASKAWA representative.

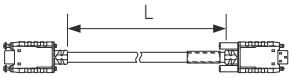
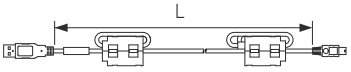
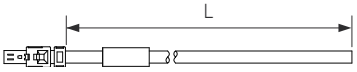
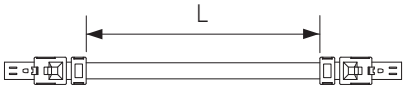
With the SGD7S-210D, -260D, -280D, or -370D, connect a Regenerative Resistor Unit between B1 and B2.

Cables for SERVOPACKs

Important

1. Use the cable specified by YASKAWA for the computer cable.
   Operation may not be dependable with any other cable.

Notes:
Refer to the manual for the following information. Cable dimensional drawings and cable connection specifications.
Order numbers and specifications of individual connectors for cables. Sigma-7-Series AC Servo Drive Peripheral Device Selection Manual.

Name		Length (L)	Order Number	Appearance
Analog Monitor Cable		1 m	JZSP-CA01-E	
Digital Operator (including 1 m cable)		1 m	JUSP-OP05A-1-E	
Digital Operator Cable		0.3 m	JZSP-CVS07-A3-E*2	
Computer Cable		2.5 m	JZSP-CVS06-02-E	
Safety Function Device Cable	Cables with Connectors*1	1 m	JZSP-CVH03-01-E-G#	
		3 m	JZSP-CVH03-03-E-G#	
	Connector Kit*2	Contact Tyco Electronics Japan G.K. Product name: Industrial Mini I/O D-shape Type 1 Plug Connector Kit Model number: 2013595-1		
MECHATROLINK-III EtherCAT PROFINET Communications Cables*3		0.2 m	CM3R☐M0-00P2-E	
		0.5 m	CM3R☐M0-00P5-E	
		1 m	JZSP-CM3R☐M0-01-E	
		3 m	JZSP-CM3R☐M0-03-E	
		5 m	JZSP-CM3R☐M0-05-E	
		10 m	JZSP-CM3R☐M0-10-E	
		20 m	JZSP-CM3R☐00-20-E	
		30 m	JZSP-CM3R☐00-30-E	
		40 m	JZSP-CM3R☐01-40-E	
		50 m	JZSP-CM3R☐01-50-E	

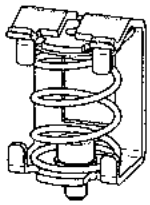
*1. When using the safety function, connect this cable to the safety devices.
Even when not using the safety function, use SERVOPACKs with the Safe Jumper Connector (model: JZSP-CVH05-E) connected.

*2. Use the connector kit when you make cables yourself.

*3. This cable is available in two variants. The order number for these cables differs at the marked ☐, an „R“ at this place is used for Cables with RJ45 Connectors on both ends, while an „M“ is used for Cables with RJ45 Connector on One End and IMI Connector on the other End. „M“ Variant not available for PROFINET cables.

Motor Connection Shielding Clamp

Shielding clamp mountable on Sigma-7 400 V SERVOPACKs up to 15 kW.
Contact your YASKAWA representative for more information.

SERVOPACK Model	Order No.	Specification
Sigma-7 400 V up to 3.0 kW	KLBUE 4-13.5_SC	
Sigma-7 400 V from 5 kW up to 7.5 kW	KLBUE 10-20_SC	
Sigma-7 400 V for 11 kW & 15 kW	KLBUE 15-32_SC	

SGD7W Dual Axis

Model Designation

Dual Axis Amplifier

SGD7W - 2R6 D A0 B -

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

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

Code	Specification
Three-phase, 400 V	
2R6	**2 × 0.75 kW**
5R4	**2 × 1.5 kW**

4th digit - Voltage

Code	Specification
D	**400 V AC**

5th + 6th digit - Interface

Code	Specification
A0	**EtherCAT communication reference**
30	**MECHATROLINK-III, RJ45 communication reference**

7th digit - Design Revision Order

B	**Standard Model**

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

Code	Specification	Applicable Models
-	**Without Options**	**All models**
026*	With relay for holding brake	All models

Bolded options are considered standard warehouse products.

* For specification of the internal brake relay, please refer to the hardware manual of the amplifier.

Ratings and Specifications

Ratings

Three-phase, 400 V AC

Model SGD7W-			2R6D	5R4D
Maximum Applicable Motor Capacity per Axis [kW]			0.75	1.5
Continuous Output Current per Axis [A]			2.6	5.4
Instantaneous Maximum Output Current per Axis [A]			8.5	14
Main Circuit	Power Supply		Three-phase, 380 V AC to 480 V AC, -15 % to +10 %, 50 Hz/60 Hz	
	Input Current [A]*		4.4	8.6
Control	Power Supply		24 V DC ±15 %	
	Input Current [A]*		1.2	
Power Supply Capacity [kVA]*			3.5	6.8
Power Loss*	Main Circuit Power Loss [W]		65.4	108.6
	Control Circuit Power Loss [W]		21	
	Built-in Regenerative Resistor Power Loss [W]		28	28
	Total Power Loss [W]		114.4	157.6
Regenerative Resistor	Built-In Regenerative Resistor	Resistance [Ω]	43	43
		Capacity [W]	140	140
	Minimum Allowable External Resistance [Ω]		43	43
Overvoltage Category			III	

* This is the net value at the rated load.

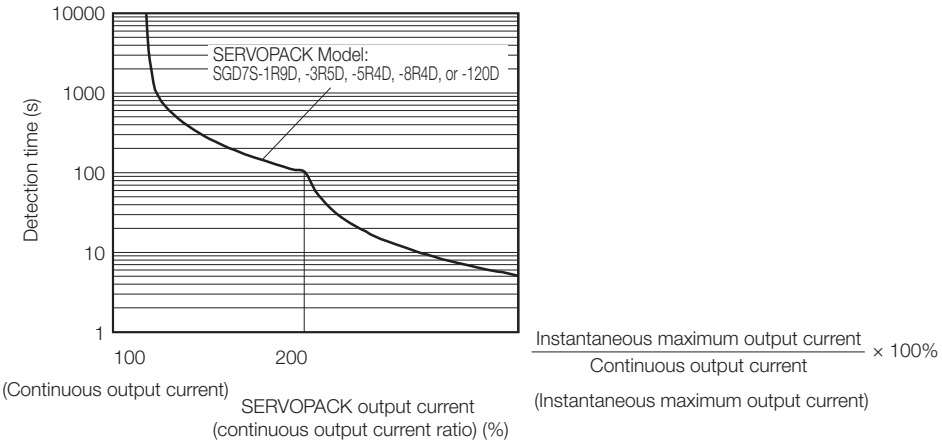
540 V DC

Model SGD7W-			2R6D	5R4D
Maximum Applicable Motor Capacity per Axis [kW]			0.75	1.5
Continuous Output Current per Axis [A]			2.6	5.4
Instantaneous Maximum Output Current per Axis [A]			8.5	14
Main Circuit	Power Supply		513 V DC to 648 V DC, -15 % to +10 %	
	Input Current [A]*		5	11
Control	Power Supply		24 V DC ±15 %	
	Input Current [A]*		1.2	
Power Supply Capacity [kVA]*			3.5	6.8
Power Loss*	Main Circuit Power Loss [W]		47.4	90.6
	Control Circuit Power Loss [W]		21	
	Total Power Loss [W]		68.4	111.6
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 within the continuous duty zone of the torque-motor speed characteristic of the Servomotor.

Specifications using EtherCAT Communication Reference

Item			Specification
Control Method			IGBT-based PWM control, sine wave current drive
Feedback	With Rotary Servomotor		Serial encoder: 24 bits (incremental encoder/absolute encoder)
	With Linear Servomotor		• Absolute linear encoder (The signal resolution depends on the absolute linear encoder.) • Incremental linear encoder (The signal resolution depends on the incremental linear encoder or Serial Converter Unit.)
Environmental Conditions	Surrounding Air Temperature		-5°C to 55°C (60°C with derating)
	Storage Temperature		-20°C to 85°C
	Surrounding Air Humidity		95 % relative humidity max. (with no freezing or condensation)
	Storage Humidity		95 % relative humidity max. (with no freezing or condensation)
	Vibration Resistance		4.9 m/s^2
	Shock Resistance		19.6 m/s^2
	Degree of Protection		IP10
	Pollution Degree		2 • Must be no corrosive or flammable gases. • Must be no exposure to water, oil, or chemicals. • Must be no dust, salts, or iron dust.
	Altitude		1,000 m or less (above 1,000 m with derating)
	Others		Do not use the SERVOPACK in the following locations: Locations subject to static electricity noise, strong electromagnetic/magnetic fields, or radioactivity
Applicable Standards			Refer to the section Compliance with UL Standards, EU Directives, and Other Safety Standards (in Combination with SERVOPACK).
Mounting			Base-mounted
Performance	Speed Control Range		1:5,000 (At the rated torque, the lower limit of the speed control range must not cause the Servomotor to stop.)
	Coefficient of Speed Fluctuation*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	Linear Servomotor Overheat Protection Signal Input		Number of input points: 1 Input voltage range: 0 V to +5 V
	Sequence Input Signals	Input Signals that can be allocated	Allowable voltage range: 24 VDC ±20 % Number of input points: 10 Input method: Sink inputs or source inputs Input Signals • P-OT (Forward Drive Prohibit) and N-OT (Reverse Drive Prohibit) signals • /Probe1 (Probe 1 Latch Input) signal • /Probe2 (Probe 2 Latch Input) signal • /Home (Home Switch Input) signal • /P-CL (Forward External Torque Limit) and /N-CL (Reverse External Torque Limit) signals 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.) Output Signals • /COIN (Positioning Completion) signal • /V-CMP (Speed Coincidence Detection) signal • /TGON (Rotation Detection) signal • /S-RDY (Servo Ready) signal • /CLT (Torque Limit Detection) signal • /VLT (Speed Limit Detection) signal • /BK (Brake) signal • /WARN (Warning) signal • /NEAR (Near) signal A signal can be allocated and the positive and negative logic can be changed.
Communications	RS-422A Communications (CN502)	Interfaces	Digital Operator (JUSP-OP05A-1-E)
		1:N Communications	Up to N = 15 stations possible for RS-422A port
		Axis Address Setting	Set with parameters.
	USB Communications (CN7)	Interface	Personal Computer (with SigmaWin+) The software version of the SigmaWin+ must be version 7.11 or higher.
		Communications Standard	Conforms to USB 2.0 standard (12 Mbps).

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Item		Specification
Displays/Indicators		CHARGE, PWR, RUN, ERR, and L/A (A and B) indicators, and two, one-digit seven-segment display
EtherCAT Communications Setting Switches		EtherCAT secondary address (S1 and S2), 16 positions
EtherCAT Communications	Applicable Communications Standards	IEC 61158 Type 12, IEC 61800-7 CiA402 Drive Profile
	Physical Layer	100BASE-TX (IEEE 802.3)
	Communications Connectors	CN6A (RJ45): EtherCAT signal input connector CN6B (RJ45): EtherCAT signal output connector
	Cable	Category 5, 4 shielded twisted pairs The cable is automatically detected with AUTO MDIX.
	Sync Manager	SM0: Mailbox output, SM1: Mailbox input, SM2: Process data output, and SM3: Process data input
	FMMU	FMMU 0: Mapped in process data output (RxPDO) area. FMMU 1: Mapped in process data input (TxPDO) area. FMMU 2: Mapped to mailbox status.
	EtherCAT Commands (Data Link Layer)	APRD, FPRD, BRD, LRD, APWR, FPWR, BWR, LWR, ARMW, and FRMW (APRW, FPRW, BRW, and LRW commands are not supported.)
	Process Data	Assignments can be changed with PDO mapping.
	Mailbox (CoE)	Emergency messages, SDO requests, SDO responses, and SDO information (TxPDO/RxPDO and remote TxPDO/RxPDO are not supported.)
	Distributed Clocks	Free-Run Mode and DC Mode (Can be switched.) Applicable DC cycles: 125 µs to 4 ms in 125-µs increments
	Slave Information Interface	256 bytes (read-only)
	Indicators	EtherCAT communications in progress: Link/Activity x 2 EtherCAT communications status: RUN x 1 EtherCAT error status: ERR x 1
CiA402 Drive Profile		• Homing Mode • Profile Position Mode • Interpolated Position Mode • Profile Velocity Mode • Profile Torque Mode • Cyclic Synchronous Position Mode • Cyclic Synchronous Velocity Mode • Cyclic Synchronous Torque Mode • Touch Probe Function • Torque Limit Function
Analog Monitor (CN5)		Number of points: 2 Output voltage range: ±10 VDC (effective linearity range: ±8 V) Resolution: 16 bits Accuracy: ±20 mV (Typ) Maximum output current: ±10 mA Settling time (±1 %): 1.2 ms (Typ)
Dynamic Brake (DB)		Activated when a servo alarm or overtravel (OT) occurs, or when the power supply to the main circuit or servo is OFF.
Regenerative Processing		Built-in Refer to the catalog for details.
Overtravel (OT) Prevention		Stopping with dynamic brake, deceleration to a stop, or coasting to a stop for the P-OT (Forward Drive Prohibit) or N-OT (Reverse Drive Prohibit) signal
Protective Functions		Overcurrent, overvoltage, low voltage, overload, regeneration error, etc.
Utility Functions		Gain adjustment, alarm history, jogging, origin search, etc.
Safety Functions	Inputs	/HWBB_A1, /HWWB_A2, /HWWB_B1 and /HWBB_B2: Base block signals for Power Modules
	Output	EDM_A and EDM_B: Monitor the status of built-in safety circuits (fixed outputs).
	Applicable Standards*2	ISO13849-1 PLe (Category 3), IEC61508 SIL3
Applicable Option Modules		Option Module Safety

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

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

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

Specifications using MECHATROLINK-III Communication Reference

Item			Specification
Control Method			IGBT-based PWM control, sine wave current drive
Feedback	With Rotary Servomotor		Serial encoder: 24 bits (incremental encoder/absolute encoder)
	With Linear Servomotor		• Absolute linear encoder (The signal resolution depends on the absolute linear encoder.) • Incremental linear encoder (The signal resolution depends on the incremental linear encoder or Serial Converter Unit.)
Environmental Conditions	Surrounding Air Temperature		-5°C to 55°C (60°C with derating)
	Storage Temperature		-20°C to 85°C
	Surrounding Air Humidity		95 % relative humidity max. (with no freezing or condensation)
	Storage Humidity		95 % relative humidity max. (with no freezing or condensation)
	Vibration Resistance		4.9 m/s^2
	Shock Resistance		19.6 m/s^2
	Degree of Protection		IP10
	Pollution Degree		2 • Must be no corrosive or flammable gases. • Must be no exposure to water, oil, or chemicals. • Must be no dust, salts, or iron dust.
	Altitude		1,000 m or less (above 1,000 m with derating)
	Others		Do not use the SERVOPACK in the following locations: Locations subject to static electricity noise, strong electromagnetic/magnetic fields, or radioactivity
Applicable Standards			Refer to the section Compliance with UL Standards, EU Directives, and Other Safety Standards (in Combination with SERVOPACK).
Mounting			Base-mounted
Performance	Speed Control Range		1:5,000 (At the rated torque, the lower limit of the speed control range must not cause the Servomotor to stop.)
	Coefficient of Speed Fluctuation*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	Linear Servomotor Overheat Protection Signal Input		Number of input points: 1 Input voltage range: 0 V to +5 V
	Sequence Input Signals	Input Signals that can be allocated	Allowable voltage range: 24 VDC ±20 % Number of input points: 10 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: 6 (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)
		1:N Communications	Up to N = 15 stations possible for RS-422A port
		Axis Address Setting	Set with parameters.
	USB Communications (CN7)	Interface	Personal Computer (with SigmaWin+) The software version of the SigmaWin+ must be version 7.11 or higher.
		Communications Standard	Conforms to USB 2.0 standard (12 Mbps).

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Item		Specification
Displays/Indicators		CHARGE, PWR, CN, L1 and L2 indicators, and two, 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.
	Extended Address Setting	Axis A: 00 hex, Axis B: 01 hex
	Raud 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 per 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
Analog Monitor (CN5)		Number of points: 2 Output voltage range: ±10 VDC (effective linearity range: ±8 V) Resolution: 16 bits Accuracy: ±20 mV (Typ) Maximum output current: ±10 mA Settling time (±1 %): 1.2 ms (Typ)
Dynamic Brake (DB)		Activated when a servo alarm or overtravel (OT) occurs, or when the power supply to the main circuit or servo is OFF.
Regenerative Processing		Built-in Refer to the catalog for details.
Overtravel (OT) Prevention		Stopping with dynamic brake, deceleration to a stop, or coasting to a stop for the P-OT (Forward Drive Prohibit) or N-OT (Reverse Drive Prohibit) signal
Protective Functions		Overcurrent, overvoltage, low voltage, overload, regeneration error, etc.
Utility Functions		Gain adjustment, alarm history, jogging, origin search, etc.
Safety Functions	Inputs	/HWBB_A1, /HWWB_A2, /HWWB_B1 and /HWBB_B2: Base block signals for Power Modules
	Output	EDM_A and EDM_B: Monitor the status of built-in safety circuits (fixed outputs).
	Applicable Standards*2	ISO13849-1 PLe (Category 3), IEC61508 SIL3
Applicable Option Modules		Option Module Safety

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

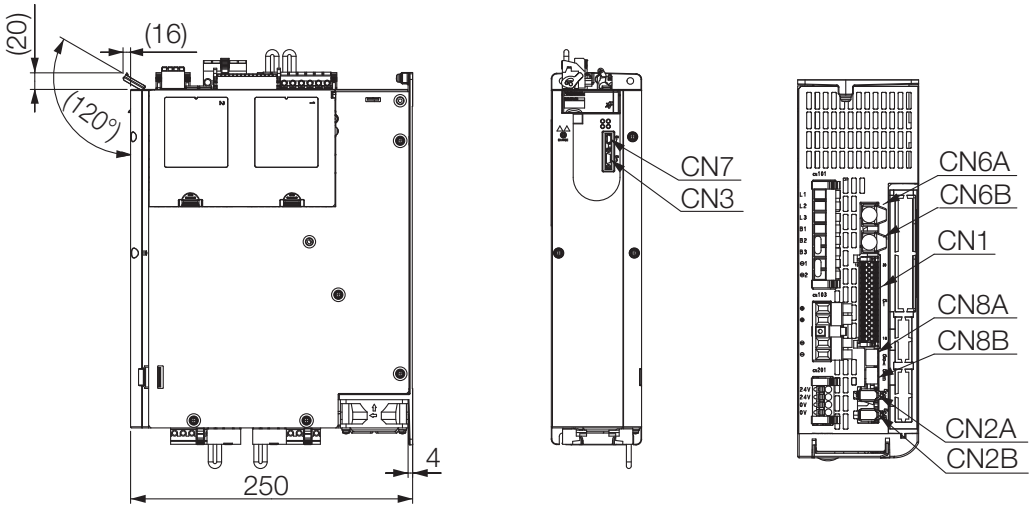
$$\text{Coeficient of speed fluctuation} = \frac{\text{No-load motor speed - Total-load motor speed}}{\text{Rated motor speed}} \times 100\%$$

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

Front Cover Dimensions and Connector Specifications

The front cover dimensions and panel connector section are the same for all models. Refer to the following figures and table.

• Front Cover Dimensions and Connectors



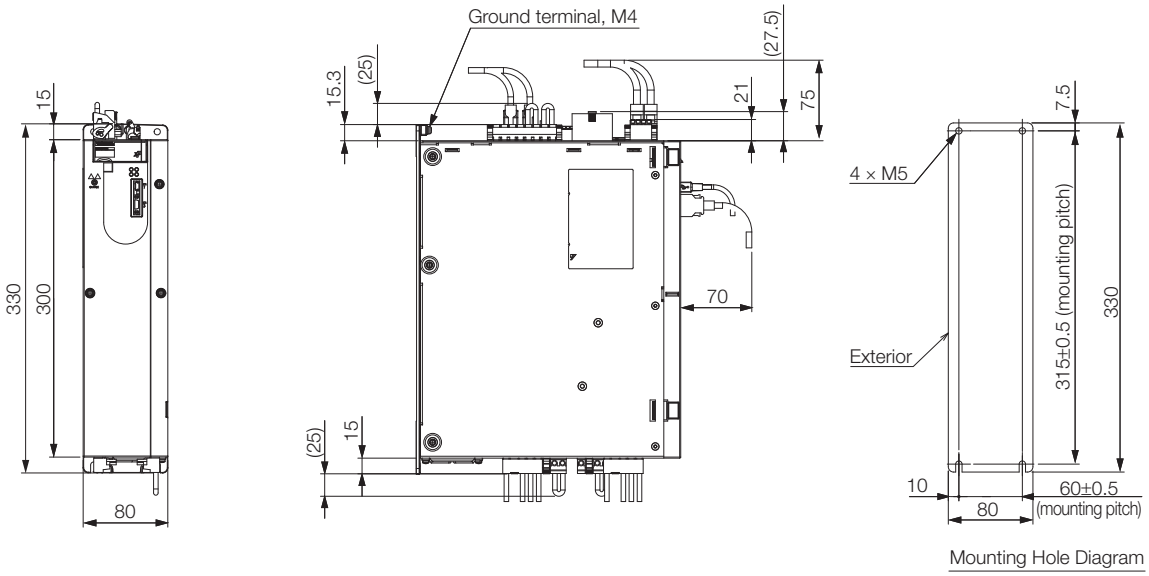
Unit: mm

• Connector Specifications

Connector No.	Function	Model	YASKAWA Order Code	Number of Pins	Manufacturer
CN1	I/O Connector	DFMC1,5/15-ST-3,5-LRBK	JUSP-7CN001	30	Phoenix Contact
CN2A/CN2B	Encoder Connector Axis A Encoder Connector Axis B	-	JZSP-CMP9-1-E	6	Sumitomo 3M Ltd.
CN3	Digital Operator	-	-	14	Honda Tsushin Kogyo Co., Ltd.
		-			
CN6A/CN6B	Fieldbus Connector	-		8	Tyco Electronics Japan G.K.
CN7	USB Connector for SigmaWin	-	-	5	Tyco Electronics Japan G.K.
CN8A	Safety Connector Kit	-	2013595-1	8	Tyco Electronics Japan G.K.
	Safety Jumper Connector	-	JZSP-CVH05-E		
CN8B	Safety Connector Kit	-	2013595-1	8	Tyco Electronics Japan G.K.
	Safety Jumper Connector	-	JZSP-CVH05-E		
CN101	Main Power Connector	BLZ 7.62HP/08/180LR SN BK BX PRT	JUSP-7CN101	8	Weidmüller
CN102A/CN102B	Motor Power Connector Axis A Motor Power Connector Axis B	BLZ 7.62IT/04/180MF4 SN BK BX PRT	JUSP-7CN102	4	Weidmüller
CN103	DC Power Input	BVZ 7.62IT/04/180MF3 SN BK BX PRT	JUSP-7CN103	4	Weidmüller
CN115A/CN115B	Dynamic Brake Connector Axis A Dynamic Brake Connector Axis B	BLZ 7.62IT/03/180MF2 SN BK BX PRT	JUSP-7CN115	3	Weidmüller
CN117	Holding Brake Connector	BLF 5.08HC/04/180LR SN BK BX SO	JUSP-7CN117	4	Weidmüller
CN201	24 V Control Power Input	BLF 5.08HC/04/180LR SN OR BX SO	JUSP-7CN201	4	Weidmüller

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

Base-mounted SERVOPACKs



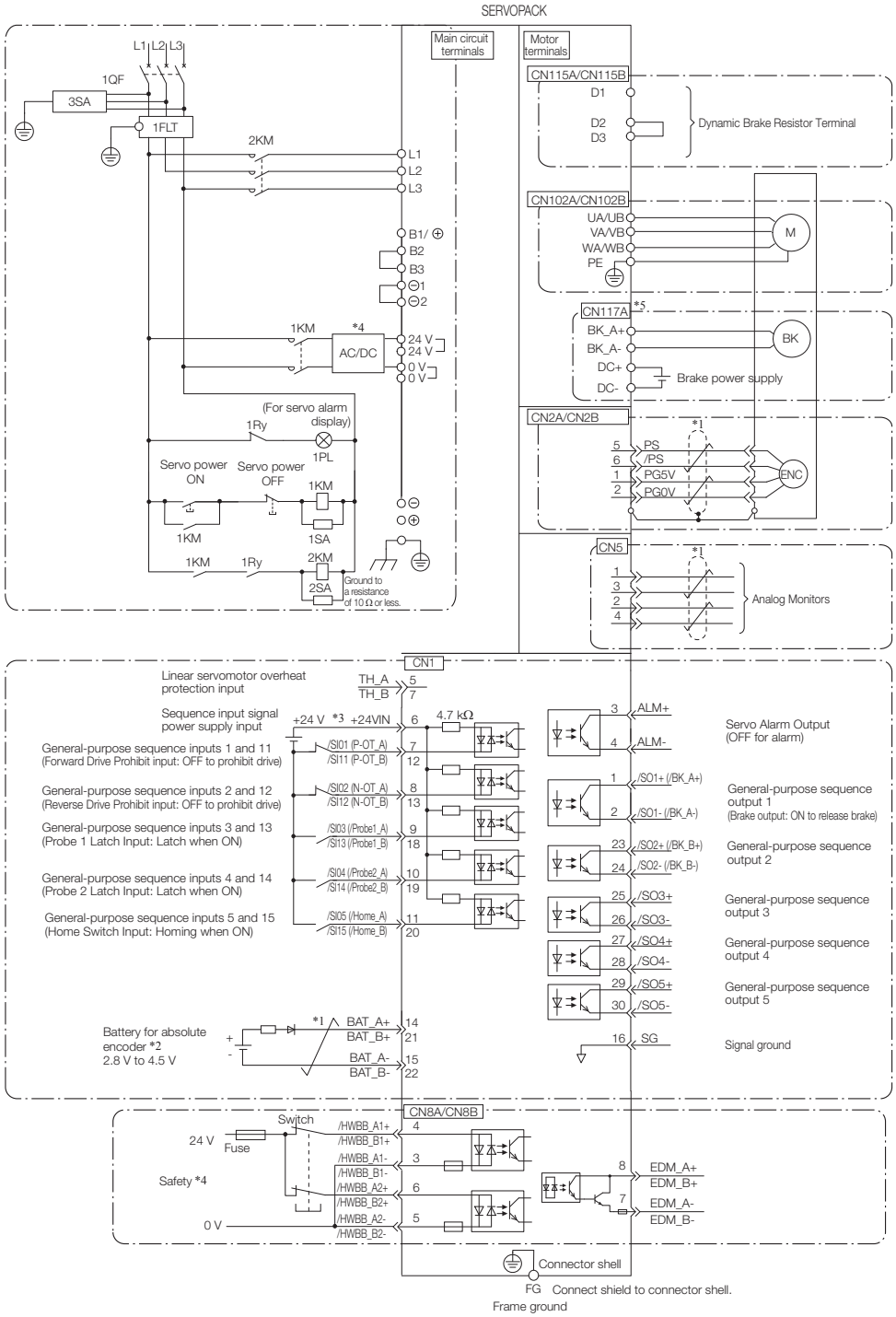
Mounting Hole Diagram

Approx. mass: 2R6D: 4.1 kg
5R4D: 4.3 kg

Unit: mm

System Configurations up to 2×1.5 kW

SGD7W Dual-axis EtherCAT Reference SERVOPACKs



*1. represents twisted-pair wires.

*2. Connect these when using an absolute encoder. If the Encoder Cable with a Battery Case is connected, do not connect a backup battery.

*3. The 24-VDC power supply is not provided by Yaskawa. Use a 24-VDC power supply with double insulation or reinforced insulation.

*4. Use an SELV-compliant power supply according to EN/IEC 60950-1 to input 24 VDC to the control power supply input terminals.

*5. The CN117 connector is used for SERVOPACKs with built-in Servomotor brake control. SERVOPACKs without built-in Servomotor brake control do not have the CN117 connector.

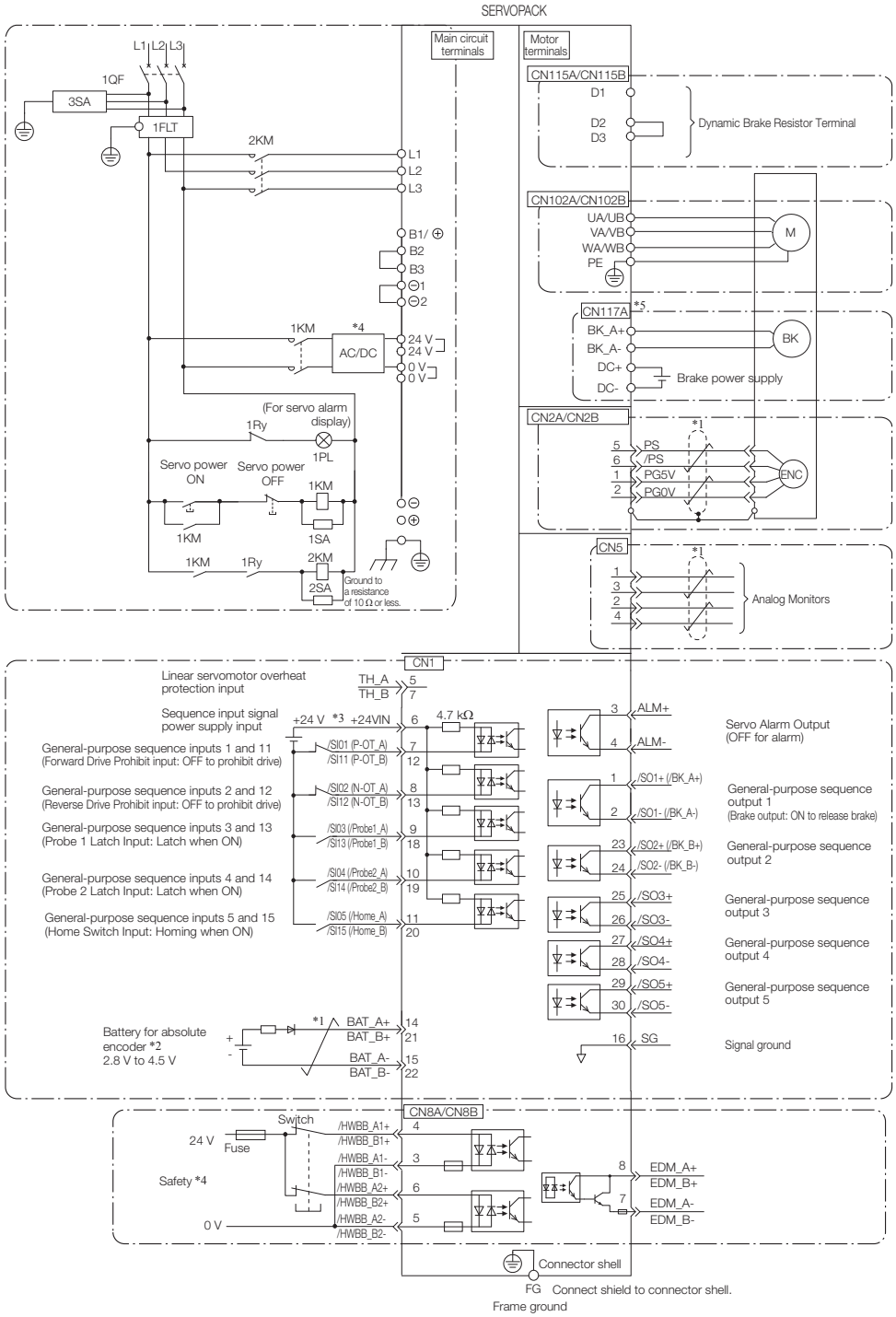
Note: 1. You can use parameter settings to change some of the I/O signal allocations.

2. 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.

3. Default settings are given in parentheses.

System Configurations up to 2×1.5 kW

SGD7W Dual-axis MECHATROLINK-III Reference SERVOPACKs



*1. represents twisted-pair wires.

*2. Connect these when using an absolute encoder. If the Encoder Cable with a Battery Case is connected, do not connect a backup battery.

*3. The 24-VDC power supply is not provided by Yaskawa. Use a 24-VDC power supply with double insulation or reinforced insulation.

*4. Use an SELV-compliant power supply according to EN/IEC 60950-1 to input 24 VDC to the control power supply input terminals.

*5. The CN117 connector is used for SERVOPACKs with built-in Servomotor brake control. SERVOPACKs without built-in Servomotor brake control do not have the CN117 connector.

Note: 1. You can use parameter settings to change some of the I/O signal allocations.

2. 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.

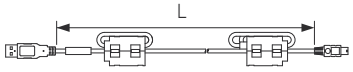
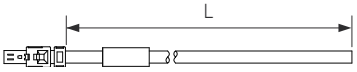
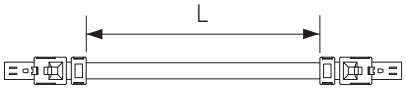
3. Default settings are given in parentheses.

Cables for SERVOPACKs

Important

1. Use the cable specified by YASKAWA for the computer cable.
   Operation may not be dependable with any other cable.

Notes:
Refer to the manual for the following information. Cable dimensional drawings and cable connection specifications.
Order numbers and specifications of individual connectors for cables. Sigma-7-Series AC Servo Drive Peripheral Device Selection Manual.

Name		Length (L)	Order Number	Appearance
Analog Monitor Cable		1 m	JZSP-CA01-E	
Digital Operator (including 1 m cable)		1 m	JUSP-OP05A-1-E	
Digital Operator Cable		0.3 m	JZSP-CVS07-A3-E*2	
Computer Cable		2.5 m	JZSP-CVS06-02-E	
Safety Function Device Cable	Cables with Connectors*1	1 m	JZSP-CVH03-01-E-G#	
		3 m	JZSP-CVH03-03-E-G#	
	Connector Kit*2		Contact Tyco Electronics Japan G.K. Product name: Industrial Mini I/O D-shape Type 1 Plug Connector Kit Model number: 2013595-1	
MECHATROLINK-III EtherCAT PROFINET Communications Cables*3		0.2 m	CM3R□M0-00P2-E	
		0.5 m	CM3R□M0-00P5-E	
		1 m	JZSP-CM3R□M0-01-E	
		3 m	JZSP-CM3R□M0-03-E	
		5 m	JZSP-CM3R□M0-05-E	
		10 m	JZSP-CM3R□M0-10-E	
		20 m	JZSP-CM3R□00-20-E	
		30 m	JZSP-CM3R□00-30-E	
		40 m	JZSP-CM3R□01-40-E	
		50 m	JZSP-CM3R□01-50-E	

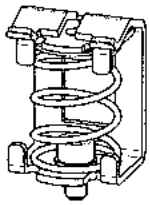
*1. When using the safety function, connect this cable to the safety devices.
Even when not using the safety function, use SERVOPACKs with the Safe Jumper Connector (model: JZSP-CVH05-E) connected.

*2. Use the connector kit when you make cables yourself.

*3. This cable is available in two variants. The order number for these cables differs at the marked □, an „R“ at this place is used for Cables with RJ45 Connectors on both ends, while an „M“ is used for Cables with RJ45 Connector on One End and IMI Connector on the other End.

Motor Connection Shielding Clamp

Shielding clamp mountable on Sigma-7 400 V SERVOPACKs up to 15 kW.
Contact your YASKAWA representative for more information.

SERVOPACK Model	Order No.	Specification
Sigma-7 400 V up to 3.0 kW	KLBUE 4-13.5_SC	
Sigma-7 400 V from 5 kW up to 7.5 kW	KLBUE 10-20_SC	
Sigma-7 400 V for 11 kW & 15 kW	KLBUE 15-32_SC	