

ACサーボパック Σ-IIIシリーズ 安全上のご注意

形式：SGDS-□□A□□□
SGDS-□□F□□□
SGDS-□□B□□□

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AC SERVOPACK Σ-III Series SAFETY PRECAUTIONS

Model: SGDS-□□A□□□
SGDS-□□F□□□
SGDS-□□B□□□

To properly use the product, read this manual thoroughly and retain
for easy reference, inspection, and maintenance. Ensure the end user
receives this manual.

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1 Introduction

This safety precautions manual covers Σ -III series SERVOPACK controlling Σ -III series AC servomotor. To properly use the Σ -III series SERVOPACK, read this safety precautions manual and user's manual (see the following table) thoroughly, and retain for easy reference for inspections and maintenance, and so on. Make sure that these manuals reach the end user.

2 Reference Manuals

This table lists related reference manuals:

Manual Titles	Manual No.
Σ -III Series SGM□□/SGDS User's Manual	SIEPS80000000
Σ -III Series SGM□□/SGDS Digital Operator INSTRUCTIONS	TOBPS80000001
Σ -III Series SGM□□/SGDS User's Manual For DeviceNet communications	SIEPS80000002
Σ -III Series SGM□□/SGDS User's Manual For MECHATROLINK-II communications	SIEPS80000011
Linear Σ Series SGL□□/SGDS User's Manual	SIEPS80000016

3 General Precautions

The following describes general precautions. Note the following to ensure safe application.

- The drawings presented in this manual are sometimes shown without covers or protective guards. Always replace the cover or protective guard as specified first, and then operate the products in accordance with the manual.
- The drawings presented in this manual are typical examples and may not match the product you received.
- This manual is subject to change due to product improvement, specification modification, and manual improvement. When this manual is revised, the manual code is updated and the new manual is published as a next edition. The edition number appears on the front and back covers.
- If the manual must be ordered due to loss or damage, inform your nearest Yaskawa representative or one of the offices listed on the back of this manual.
- Yaskawa will not take responsibility for the results of unauthorized modifications of this product. Yaskawa shall not be liable for any damages or troubles resulting from unauthorized modification.

4 Safety Information

The following conventions are used to indicate precautions in this manual. Failure to heed precautions provided in this manual can result in serious or possibly even fatal injury or damage to the products or to related equipment and systems.




Indicates precautions that, if not heeded, could possibly result in loss of life or serious injury.




Indicates precautions that, if not heeded, could result in relatively serious or minor injury, damage to the product, or faulty operation.

In some situations, the precautions indicated could have series consequences if not heeded.



Indicates prohibited actions that must not be performed. For example, this symbol would be used to indicate that fire is prohibited as follows: .



Indicates compulsory actions that must be performed. For example, this symbol would be used as follows to indicate that grounding is compulsory: .

5 Notes for Safe Operation

Read this manual thoroughly before checking products on delivery, storage and transportation, installation, wiring, operation and inspection, and disposal of the AC servo drives.

WARNING

- Never touch any rotating motor parts while the motor is running.
Failure to observe this warning may result in injury.
- Before starting operation with a machine connected, make sure that an emergency stop can be applied at any time.
Failure to observe this warning may result in injury.
- Never touch the inside of the SERVOPACKs.
Failure to observe this warning may result in electric shock.
- Do not remove the panel cover while the power is ON.
Failure to observe this warning may result in electric shock.
- Do not touch terminals for five minutes after the power is turned OFF.
Residual voltage may cause electric shock.
- Do not touch terminals for five minutes after voltage resistance test.
Residual voltage may cause electric shock.
- Follow the procedures and instructions for trial operation precisely as noted in the Σ -III series User's Manual (Manual No.: SIEPS80000000A).
- Follow the procedures and instructions for the trial operation as noted in the applicable manual for that product.
Malfunctions that occur after the servomotor is connected to the equipment not only damage the equipment, but may also cause an accident resulting in death or injury.
- The output range of multi-turn data for Σ -III series absolute detection system differs from that for conventional systems (15-bit encoder and 12-bit encoder). Especially when "Infinite length positioning system" of conventional type is to be configured with Σ -III series, be sure to make the system modification.
- The multi-turn limit value must be changed only for special applications.
Changing it inappropriately or unintentionally can be dangerous.
- If the Multi-turn Limit Disagreement alarm occurs, check the setting of parameter Pn205 in the SERVOPACK to be sure that it is correct.

If Fn013 is executed when an incorrect value is set in Pn205, an incorrect value will be set in the encoder. The alarm will disappear even if an incorrect value is set, but incorrect positions will be detected, resulting in a dangerous situation where the machine will move to unexpected positions.



WARNING

- Do not remove the front cover, cables, connectors, or optional items while the power is ON.

Failure to observe this warning may result in electric shock.

- Do not damage, press, exert excessive force or place heavy objects on the cables.

Failure to observe this warning may result in electric shock, stopping operation of the product, or burning.

- Do not modify the product.

Failure to observe this warning may result in injury or damage to the product.

- Provide an appropriate stopping device on the machine side to ensure safety. A holding brake for a servomotor with brake is not a stopping device for ensuring safety.

Failure to observe this warning may result in injury.

- Do not come close to the machine immediately after resetting momentary power loss to avoid an unexpected restart. Take appropriate measures to ensure safety against an unexpected restart.

Failure to observe this warning may result in injury.



- Connect the ground terminal to electrical codes (ground resistance: 100 Ω or less).

Improper grounding may result in electric shock or fire.



- Installation, disassembly, or repair must be performed only by authorized personnel.

Failure to observe this warning may result in electric shock or injury.

■ Checking on Delivery



CAUTION

- Always use the servomotor and SERVOPACK in one of the specified combinations.

Failure to observe this caution may result in fire or malfunction.

■ Storage and Transportation

CAUTION

- Do not store or install the product in the following places.
 - Locations subject to direct sunlight.
 - Locations subject to temperatures outside the range specified in the storage/installation temperature conditions.
 - Locations subject to humidity outside the range specified in the storage/installation humidity conditions.
 - Locations subject to condensation as the result of extreme changes in temperature.
 - Locations subject to corrosive or flammable gases.
 - Locations subject to dust, salts, or iron dust.
 - Locations subject to exposure to water, oil, or chemicals.
 - Locations subject to shock or vibration.

Failure to observe this caution may result in fire, electric shock, or damage to the product.
- Do not hold the product by the cables or motor shaft while transporting it.

Failure to observe this caution may result in injury or malfunction.
- Do not place any load exceeding the limit specified on the packing box.

Failure to observe this caution may result in injury or malfunction.
- If disinfectants or insecticides must be used to treat packing materials such as wooden frames, pallets, or plywood, the packing materials must be treated before the product is packaged, and methods other than fumigation must be used.

Example: Heat treatment, where materials are kiln-dried to a core temperature of 56°C for 30 minutes or more.

If the electronic products, which include stand-alone products and products installed in machines, are packed with fumigated wooden materials, the electrical components may be greatly damaged by the gases or fumes resulting from the fumigation process. In particular, disinfectants containing halogen, which includes chlorine, fluorine, bromine, or iodine can contribute to the erosion of the capacitors.

■ Installation

CAUTION

- Never use the products in an environment subject to water, corrosive gases, inflammable gases, or combustibles.

Failure to observe this caution may result in electric shock or fire.
- Do not step on or place a heavy object on the product.

Failure to observe this caution may result in injury.
- Do not cover the inlet or outlet ports and prevent any foreign objects from entering the product.

Failure to observe this caution may cause internal elements to deteriorate resulting in malfunction or fire.
- Be sure to install the product in the correct direction.

Failure to observe this caution may result in malfunction.
- Provide the specified clearances between the SERVOPACK and the control panel or with other devices.

Failure to observe this caution may result in fire or malfunction.
- Do not apply any strong impact.

Failure to observe this caution may result in malfunction.

■ Wiring

CAUTION

- Do not connect a three-phase power supply to the U, V, or W output terminals.

Failure to observe this caution may result in injury or fire.

- Securely connect the power supply terminal screws and motor output terminal screws.

Failure to observe this caution may result in fire.

- Do not bundle or run power and signal lines together in the same duct. Keep power and signal lines separated by at least 30 cm (11.81 in).
- Use twisted-pair shielded wires or multi-core twisted pair shielded wires for signal and encoder (PG) feedback lines.

The maximum length is 3 m (118.11 in) for reference input lines and is 20 m (787.40 in) for PG feedback lines.

- Do not touch the power terminals for 5 minutes after turning power OFF because high voltage may still remain in the SERVOPACK.

Make sure the charge indicator is out first before starting an inspection.

- Avoid frequently turning power ON and OFF. Do not turn power ON or OFF more than once per minute.

Since the SERVOPACK has a capacitor in the power supply, a high charging current flows for 0.2 seconds when power is turned ON. Frequently turning power ON and OFF causes main power devices like capacitors and fuses to deteriorate, resulting in unexpected problems.

- Observe the following precautions when wiring main circuit terminal blocks.

- Remove the terminal block from the SERVOPACK prior to wiring.
- Insert only one wire per terminal on the terminal block.
- Make sure that the core wire is not electrically shorted to adjacent core wires.

- Do not connect the SERVOPACK for 100 V and 200 V directly to a voltage of 400 V.

The SERVOPACK will be destroyed.

- Install the battery at either the host controller or the battery unit of the encoder.

It is dangerous to install batteries at both simultaneously, because that sets up a loop circuit between the batteries.

- Be sure to wire correctly and securely.

Failure to observe this caution may result in motor overrun, injury, or malfunction.

- Always use the specified power supply voltage.

An incorrect voltage may result in burning.

- Take appropriate measures to ensure that the input power supply is supplied within the specified voltage fluctuation range. Be particularly careful in places where the power supply is unstable.

An incorrect power supply may result in damage to the product.

- Install external breakers or other safety devices against short-circuiting in external wiring.

Failure to observe this caution may result in fire.

CAUTION

- Take appropriate and sufficient countermeasures for each when installing systems in the following locations.
 - Locations subject to static electricity or other forms of noise.
 - Locations subject to strong electromagnetic fields and magnetic fields.
 - Locations subject to possible exposure to radioactivity.
 - Locations close to power supplies.

Failure to observe this caution may result in damage to the product.
- Do not reverse the polarity of the battery when connecting it.

Failure to observe this caution may damage the battery or cause it to explode.

■ Operation

CAUTION

- Conduct trial operation on the servomotor alone with the motor shaft disconnected from machine to avoid any unexpected accidents.

Failure to observe this caution may result in injury.
- Before starting operation with a machine connected, change the settings to match the parameters of the machine.

Starting operation without matching the proper settings may cause the machine to run out of control or malfunction.
- Forward run prohibited (P-OT) and reverse run prohibited (N-OT) signals are not effective during JOG mode operation using parameter Fn002 and zero point search mode using parameter Fn003.
- When using the servomotor for a vertical axis, install the safety devices to prevent workpieces to fall off due to occurrence of alarm or overtravel. Set the servomotor so that it will stop in the zero clamp state at occurrence of overtravel.

Failure to observe this caution may cause workpieces to fall off due to overtravel.
- When not using the normal autotuning, set to the correct moment of inertia ratio.

Setting to an incorrect moment of inertia ratio may cause vibration.
- Do not touch the SERVOPACK heatsinks, regenerative resistor, or servomotor while power is ON or soon after the power is turned OFF.

Failure to observe this caution may result in burns due to high temperatures.
- Do not make any extreme adjustments or setting changes of parameters.

Failure to observe this caution may result in injury due to unstable operation.
- When an alarm occurs, remove the cause, reset the alarm after confirming safety, and then resume operation.

Failure to observe this caution may result in injury.
- Do not use the servo brake of the servomotor for ordinary braking.

Failure to observe this caution may result in malfunction.

■ Maintenance and Inspection



CAUTION

- Do not disassemble the SERVOPACK.

Failure to observe this caution may result in electric shock or injury.

- Do not attempt to change wiring while the power is ON.

Failure to observe this caution may result in electric shock or injury.

- When replacing the SERVOPACK, resume operation only after transferring the previous SERVOPACK parameters to the new SERVOPACK.

Failure to observe this caution may result in damage to the product.

■ Disposal



CAUTION

- When disposing of the products, treat them as ordinary industrial waste.

6 Checking Products on Delivery

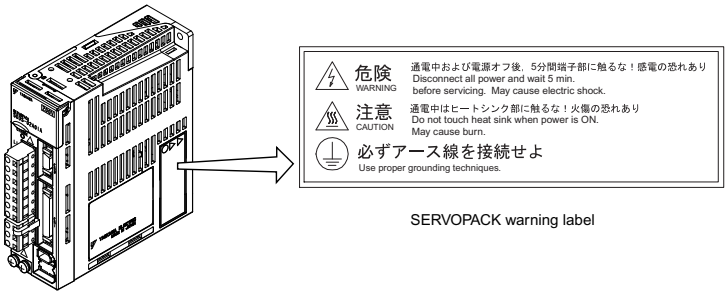
The following procedure is used to check Σ -III Series products upon delivery. Check the following items when Σ -III Series products are delivered.

Check Items	Comments
Are the delivered products the ones that were ordered?	Check the model numbers marked on the nameplates of the SERVOPACK.
Is there any damage?	Check the overall appearance, and check for damage or scratches that may have occurred during shipping.
Are there any loose screws?	Check screws for looseness using a screwdriver.

If any of the above items are faulty or incorrect, contact your Yaskawa sales representative or the dealer from whom you purchased the products.

7 Warning Label

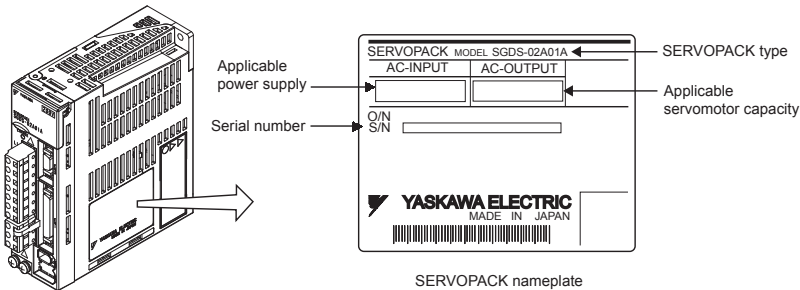
The following illustration shows the SERVOPACK warning label.



SERVOPACK warning label

8 Nameplate

The following illustration shows the SERVOPACK nameplate.



SERVOPACK nameplate

9 Installation

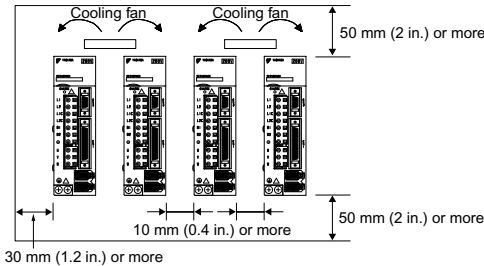
Observe the following precautions when installing SERVOPACK.

- Install SERVOPACK perpendicular to the wall so that the front panel (digital operator mounted face) faces outward.
- Firmly secure the SERVOPACK through two or three mounting holes depending on the SERVOPACK capacity.
- Install SERVOPACK so that SERVOPACK can be cooled by natural convection or fan.

■ Installation Sites

For installation sites, use proper care with the following notes.

Situation	Notes on Installation
When installed in a control panel	<ul style="list-style-type: none"> • Design the control panel size, unit layout, and cooling method so that the temperature around the periphery of the SERVOPACK does not exceed 55°C. • When installing multiple SERVOPACKs side by side in a control panel, install cooling fans and provide sufficient space around each SERVOPACK to allow cooling by fan and natural convection.
When installed near a heating unit	Suppress radiation heat from the heating unit and a temperature rise caused by convection so that the temperature around the periphery of the SERVOPACK does not exceed 55°C.
When installed near a source of vibration	Install a vibration isolator underneath the SERVOPACK to prevent it from receiving vibration.
When installed in a place receiving corrosive gases	Corrosive gases do not immediately affect the SERVOPACK but will eventually cause contactor-related devices to malfunction. Take appropriate action to protect against corrosive gases.
Others	<ul style="list-style-type: none"> • Avoid installation in a hot and humid place or where excessive dust or iron powder is present in the air. • Be sure there is no condensation or freezing. • Keep the surrounding air temperature 45 °C or less to ensure long-term reliability.



10 Wiring

10.1 Molded-case Circuit Breaker and Fuse Capacity

Main Circuit Power Supply	SERVOPACK Model		Power Supply Capacity per SERVOPACK (kVA)	Current Capacity of the Molded-case Circuit Breaker and the Fuse (A_{rms}) *1, *2	Rated Voltage					
	Capacity (kW)	SGDS-			Fuse	MCCB				
Single-phase 100 V	0.03	A3B	0.25	4	250 V	240 V				
	0.05	A5F	0.25							
	0.10	01F	0.40							
	0.20	02F	0.60	6						
	0.40	04F	1.2	12						
Single-phase 200 V	0.05	A5A	0.25	4			250 V	240 V		
	0.10	01A	0.40							
	0.20	02A	0.75							
	0.40	04A	1.2	8						
	0.80	08A	2.2	16						
Three-phase 200 V	0.45	05A	1.4	4					250 V	240 V
	1.0	10A	2.3	7						
	1.5	15A	3.2	10						
	2.0	20A	4.3	13						
	3.0	30A	5.9	17						
	5.0	50A	7.5	28						
	6.0	60A	12.5	32						
7.5	75A	15.5	41							

* 1. Nominal value at the rated load. The specified derating is required to select an appropriate fuse capacity.

* 2. Cutoff characteristics (25°C): 200% two seconds min. and 700% 0.01 seconds min.

Note: 1. Do not use a fast-acting fuse. Because the SERVOPACK's power supply is a capacitor input type, a fast-acting fuse may blow when the power is turned ON.

2. The SGDS SERVOPACK does not include a protective grounding circuit. Install a ground-fault protector to protect the system against overload and short-circuit or protective grounding combined with the molded-case circuit breaker.

10.2 Main Circuit Wiring

SGDS SERVOPACKs are suitable under the following conditions.

- With 100 V class: Less than 5000 Arms, 120 V maximum.
- With 200 V class: Less than 5000 Arms, 240 V maximum.

SERVOPACKs must be used with UL-listed fuses or circuit breakers, in accordance with the National Electrical Code (NEC).

Use 75 °C heat-resistant copper wires or an equivalent.

10.3 SERVOPACK Main Circuit Wire Size

■ Cable Types

Cable Types		Allowable Conductor Temperature °C (°F)
Symbol	Name	
PVC	Normal vinyl cable	—
IV	600-V vinyl cable	60 (140)
HIV	Temperature-resistant vinyl cable	75 (167)

- Wire sizes are selected for three cables per bundle at 40 °C (104 °F) surrounding air temperature with the rated current.
- Use cable with a minimum withstand voltage of 600 V for main circuits.
- If cables are bundled in PVC or metal ducts, consider the reduction ratio of the allowable current.
- Use heat-resistant cables under high surrounding air or panel temperatures where normal vinyl cables will rapidly deteriorate.
- Use cables within the allowable moment of inertia.
- Do not use cables under continuous regenerative state.

The following table shows the wire size and allowable current for three cables. Use a cable whose specifications meet or are less than the values in the table.

• 600-V Heat-resistant Vinyl Cables (HIV)

AWG Size	Nominal Cross Section Diameter mm ² (in ²)	Configuration Number of wires/mm ² (in ²)	Conductive Resistance Ω/km	Allowable Current at Surrounding Air Temperature A		
				30°C (86°F)	40°C (104°F)	50°C (122°F)
20	0.5 (0.00078)	19/0.18 (0.00028)	39.5	6.6	5.6	4.5
—	0.75 (0.00116)	30/0.18 (0.00028)	26.0	8.8	7.0	5.5
18	0.9 (0.00140)	37/0.18 (0.00028)	24.4	9.0	7.7	6.0
16	1.25 (0.00193)	50/0.18 (0.00028)	15.6	12.0	11.0	8.5
14	2.0 (0.00310)	7/0.6 (0.00093)	9.53	23	20	16
12	3.5 (0.00543)	7/0.8 (0.00124)	5.41	33	29	24
10	5.5 (0.00853)	7/1.0 (0.00155)	3.47	43	38	31
8	8.0 (0.0124)	7/1.2 (0.00186)	2.41	55	49	40
6	14.0 (0.0217)	7/1.6 (0.00248)	1.35	79	70	57
4	22.0 (0.0341)	7/2.0 (0.00310)	0.85	91	81	66

Note: The values in the table are only for reference.

- Main Circuit Power Supply Input Terminals (L1, L2, L3), Servomotor Connection Terminals (U, V, W), Control Power Input Terminals (L1C, L2C), External Regenerative Resistor Terminals (B1, B2)

Units: mm²

Main Circuit Power Supply	Capacity (kW)	SERVO- PACK Model	Terminal Symbol			
		SGDS-	L1, L2, L3	U, V, W	L1C, L2C	B1, B2
Single- phase 100 V	0.03	A3B	HIV1.25	HIV1.25	HIV1.25	HIV1.25
	0.05	A5F				
	0.1	01F	HIV2.0			
	0.2	02F				
Single- phase 200 V	0.05	A5A	HIV1.25	HIV1.25	HIV1.25	HIV1.25
	0.1	01A				
	0.2	02A				
	0.4	04A	HIV2.0			
	0.75	08A				
Three- phase 200 V	0.45	05A	HIV2.0	HIV2.0	HIV1.25	HIV1.25
	1.0	10A				
	1.5	15A				
	2.0	20A	HIV3.5	HIV3.5		HIV2.0
	3.0	30A		HIV5.5		HIV3.5
	5.0	50A	HIV5.5	HIV8.0		HIV5.5
	6.0	60A	HIV8.0	HIV14		HIV8.0
	7.5	75A	HIV14			

Note: The wires for 0.03 kW to 1.5 kW SERVOPACKs need connectors for wiring. The wires for 2.0 kW to 7.5 kW SERVOPACKs do not need connectors for wiring.

■ Ground Terminal

Main Circuit Power Supply	Capacity (kW)	SERVOPACK Model	Ground Terminal		
		SGDS-	Wire Size (mm ²)	Terminal Screw Size	Tightening Torque (N·m)
Single-phase 100 V	0.05	A5F	HIV2.0 or more	M4	1.2 to 1.4
	0.1	01F			
	0.2	02F			
Single-phase 200 V	0.05	A5A	HIV2.0 or more	M4	1.2 to 1.4
	0.1	01A			
	0.2	02A			
	0.4	04A			
	0.75	08A			
Three-phase 200 V	0.45	05A	HIV2.0 or more	M4	1.2 to 1.4
	1.0	10A			
	1.5	15A			
	2.0	20A			
	3.0	30A			
	5.0	50A			
	6.0	60A			
	7.5	75A		M6	2.5 to 3.8

■ Signal Line Wire Sizes

Following table shows appropriate cables for CN1 and CN2 SERVOPACK connectors.

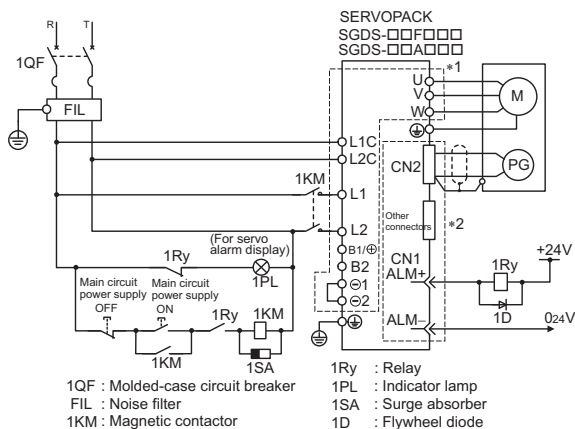
Wire sizes were selected for three cables per bundle at 40°C surrounding air temperature with the rated current.

Connector Name and Signal		Item	Specification
Control I/O Signal Connector	CN1	Cable	Use twisted-pair or shielded twisted-pair wire.
		Applicable wire	AWG24 (0.2 mm ²), AWG26 (0.12 mm ²), AWG28 (0.08 mm ²), AWG30 (0.05 mm ²)
		Finished cable dimension	φ16.0 mm (φ0.63 in) MAX.
PG Signal Connector	CN2	Cable	Use Yaskawa cable, or shielded twisted-pair wire if Yaskawa cable is not used.
		Applicable wire	AWG24 (0.2 mm ²), AWG26 (0.12 mm ²), AWG28 (0.08 mm ²), AWG30 (0.05 mm ²) Use AWG22 (0.33 mm ²) for the encoder power supply and AWG26 (0.12 mm ²) for other signals. These conditions permit wiring distances up to 20 m (65.6 ft).
		Finished cable dimension	φ6.8 mm (φ0.27 in) MAX.

10.4 Typical Main Circuit Wiring Examples

Only qualified personnel should perform the wiring. Design the circuit so that the main circuit power supply turns OFF at emergency stop.

■ Single-phase, 100/200 V

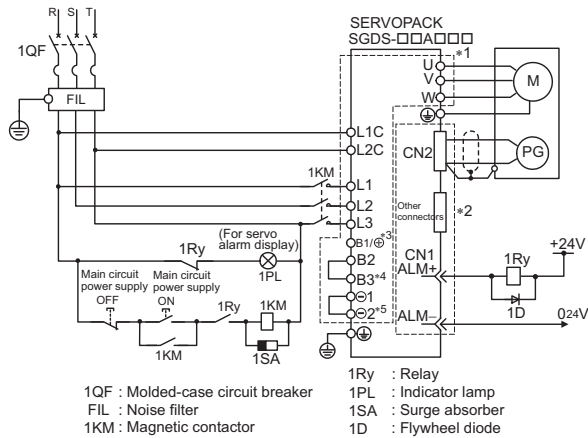


* 1. These circuits are power lines, separated by the protecting separator.
 Do not touch these terminals when the power is ON to avoid electric shock.

* 2. These circuits are SELV circuits and are separated from all other circuits by double and reinforced insulation. The CN1 input signal is available for sink or source circuits.

Note: Customers must purchase a 24-VDC power supply with a double-shielded enclosure.

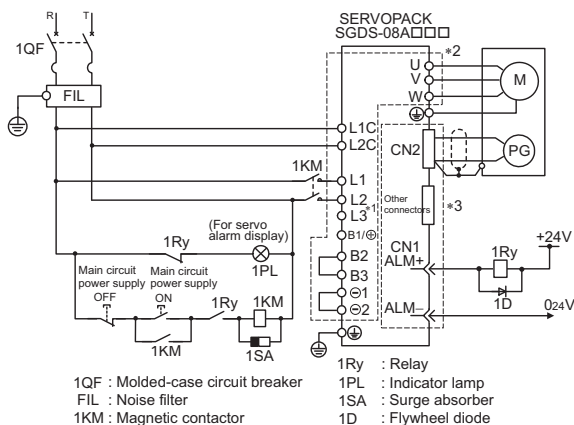
■ Three-phase 200 V



- * 1. These circuits are power lines, separated by the protecting separator.
Do not touch these terminals when the power is ON to avoid electric shock.
- * 2. These circuits are SELV circuits and are separated from all other circuits by double and reinforced insulation. The CN1 input signal is available for sink or source circuits.
- * 3. A SERVOPACK with a capacity of 6.0 kW or more has both the B1 terminal and the ⊕ terminal.
- * 4. SERVOPACKs with a capacity of 6.0 kW or more do not have a B3 terminal.
- * 5. SERVOPACKs with a capacity of 6.0 kW or more do not have terminals ⊖1 and ⊖2. Use terminal ⊖ instead.

Note: Customers must purchase a 24-VDC power supply with a double-shielded enclosure.

■ Single-phase 200 V, 800 W



* 1. The L3 terminal is not used for single-phase 200 V, 800 W SERVOPACKs. Do not use this terminal.

* 2. These circuits are power lines, separated by the protecting separator. Do not touch these terminals when the power is ON to avoid electric shock.

* 3. These circuits are SELV circuits and are separated from all other circuits by double and reinforced insulation. The CN1 input signal is available for sink or source circuits.

Note: Customers must purchase a 24-VDC power supply with a double-shielded enclosure.

11 Inspection

This section describes the SERVOPACK basic inspections and part replacement period.

■ SERVOPACK Inspection

For inspections and maintenance of the SERVOPACK, follow the inspection procedures in the table below at least once every year.

Item	Frequency	Procedure	Remedy
Exterior	At least once a year	Check for dust, dirt, and oil on surfaces.	Clean with compressed air or cloth.
Loose screws		Check for loose terminal block and connector screws.	Tighten any loose screws.

■ SERVOPACK's Parts Replacement Schedule

The following electric or electronic parts are subject to mechanical wear or deterioration over time. To avoid failure, replace these parts at the frequency indicated.

Refer to the standard replacement period in the following table, contact your Yaskawa representative. After an examination of the part in question, we will determine whether the parts should be replaced or not.

The parameters of any SERVOPACKs overhauled by Yaskawa are reset to the factory settings before shipping. Be sure to confirm that the parameters are properly set before starting operation.

Part	Standard Replacement Period	Operating Conditions
Cooling Fan	4 to 5 years	• Surrounding Air Temperature: Annual average of 30°C • Load Factor: 80% max. • Operation Rate: 20 hours/day max.
Smoothing Capacitor	7 to 8 years	
Relays	—	
Fuses	10 years	
Aluminum Electrolytic Capacitor on Circuit Board	5 years	

12 General Specifications

The following table shows the SERVOPACK general specifications.

Item	Specifications
Operating/Storage Temperature	0 to +55 °C/-20 to +85 °C
Operating/Storage Humidity	90 %RH or less (non-condensing)
Operating Environment	Installation category (Overvoltage category): III Pollution degree: 2 Protection class: IP00 Altitude: 1,000 m max.
Vibration Resistance	4.9 m/s ²
Shock Resistance	19.6 m/s ²
Voltage Resistance	Voltage: 1,500 V rms AC, for one minute Braking current: 30 mA Frequency: 50 Hz or 60 Hz Voltage applied points: Between the frame ground and the point where the terminals L1, L2, L3, L1C, L2C, U, V, and W connect.
Insulation Resistance	10 MΩ min. (500 VDC megger) between the frame ground and the power terminals U, V, and W
Overseas Standards	UL Standards: UL508C EMC Directives: EN61000-6-2, EN55011 (group1 class A) Low Voltage Directive: EN50178

13 Installation Conditions of EMC Directive

To adapt a combination of a SGM□S servomotor and a SGDS SERVOPACK to EMC Directives (EN55011 group1 classA, EN61000-6-2), the following conditions must be satisfied.

However, because this product is built-in, check that the following conditions are still met after being installed in the final product.

13.1 EMC Installation Conditions

This section describes the installation conditions that satisfy EMC guidelines for each model of the SGDS SERVOPACK. The conditions required for the standard type (base mounted) of SERVOPACK are described. Refer to this section for other SERVOPACK models such as the rack mounted types as well.

This section describes the EMC installation conditions satisfied in test conditions prepared by Yaskawa. The actual EMC level may differ depending on the actual system's configuration, wiring, and other conditions.

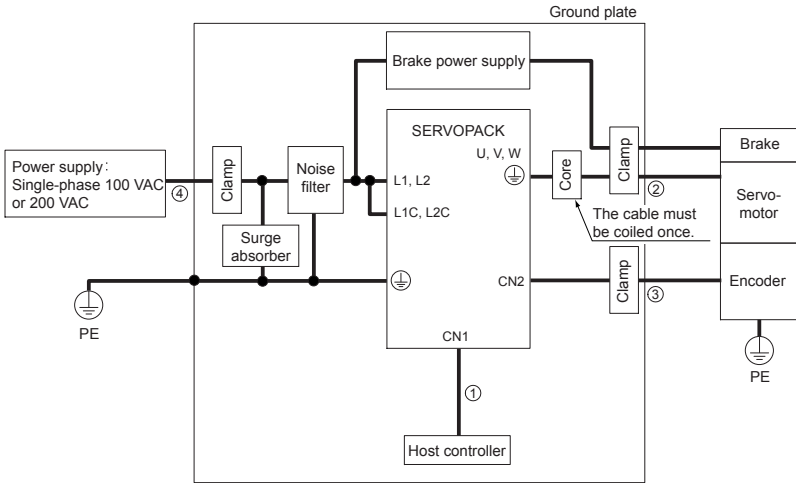
■ SGDS-□□□□A (Analog, Pulse-train Interface)

Single-phase 100 V/200 V:

SGDS-A5F0□A to -04F0□A: Single-phase 100 VAC, 50 W to 400 W

SGDS-A5A0□A to -08A0□A: Single-phase 200 VAC, 50 W to 400 W and 800 W

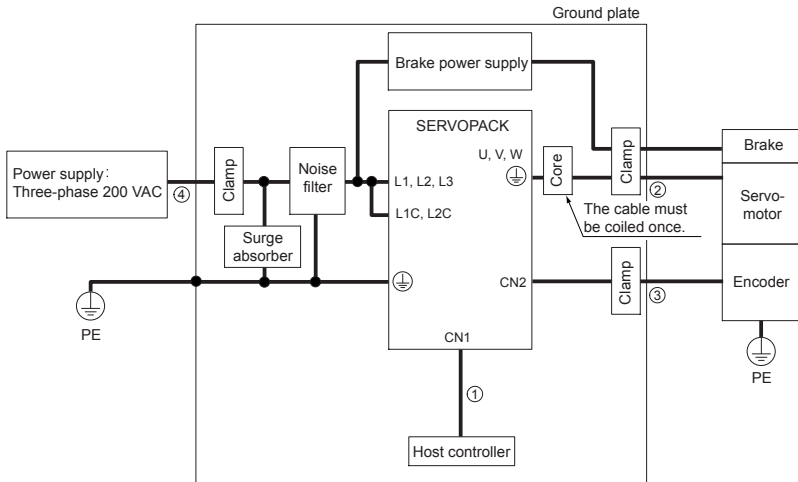
SGDS-A3B0□A: Single-phase 100 VAC, 30 W



Symbol	Cable Name	Specification
①	I/O signal cable	Shield cable
②	Servomotor cable	Shield cable
③	Encoder cable	Shield cable
④	AC power supply cable	Shield cable

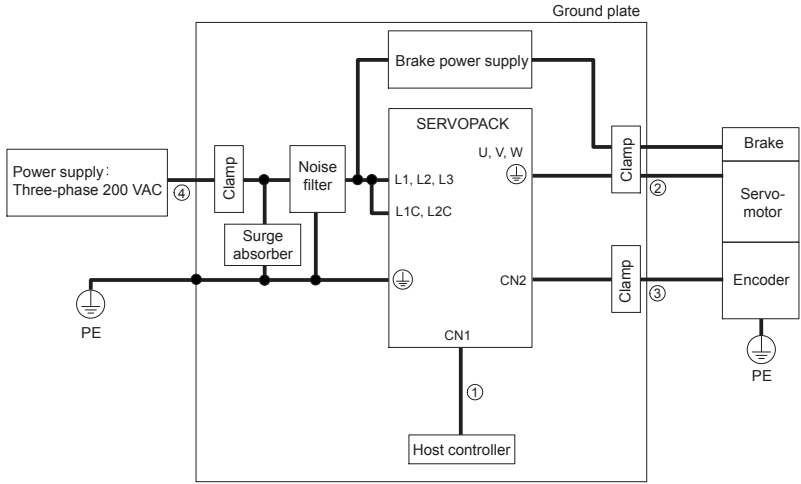
Three-phase 200 V:

SGDS-05A0□A, -10A0□A: Three-phase 200 VAC, 500 W, 1.0 kW



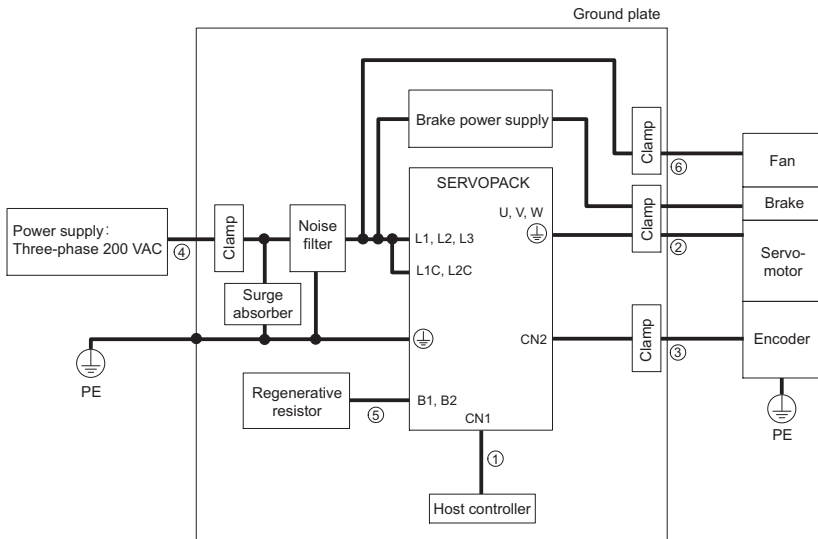
Symbol	Cable Name	Specification
①	I/O signal cable	Shield cable
②	Servomotor cable	Shield cable
③	Encoder cable	Shield cable
④	AC Line cable	Shield cable

SGDS-15A0□A to -50A0□A: Three-phase 200 VAC, 1.5 kW to 5.0 kW



Symbol	Cable Name	Specification
①	I/O signal cable	Shield cable
②	Servomotor cable	Shield cable
③	Encoder cable	Shield cable
④	AC Line cable	Shield cable

SGDS-60A0□A to -75A0□A: Three-phase 200 VAC, 6.0 kW to 7.5 kW



Symbol	Cable Name	Specification
①	I/O signal cable	Shield cable
②	Servomotor cable	Shield cable
③	Encoder cable	Shield cable
④	AC Line cable	Shield cable
⑤	Regenerative resistor cable	Shield cable
⑥	Fan cable (only for SGMSS-70A)	Shield cable

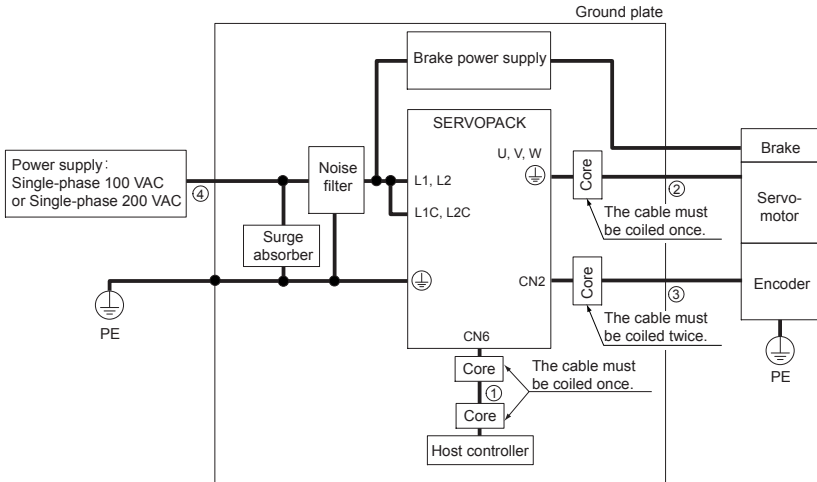
■ SGDS-□□□1□A (MECHATROLINK-II Interface)

Single-phase 100 V/200 V:

SGDS-A5F1□A to -04F1□A: Single-phase 100 VAC, 50 W to 400 W

SGDS-A5A1□A to -08A1□A: Single-phase 200 VAC, 50 W to 400 W and 800 W

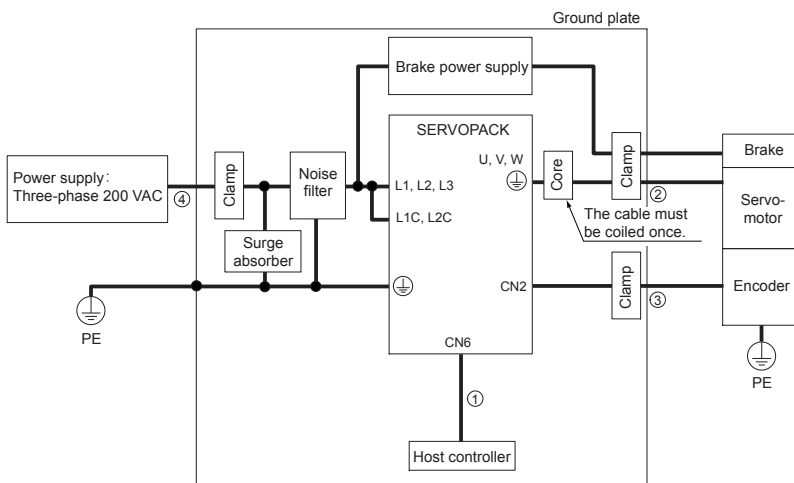
SGDS-A3B0□A: Single-phase 100 VAC, 30 W



Symbol	Cable Name	Specification
①	Serial communication cable	Shield cable
②	Servomotor cable	Shield cable
③	Encoder cable	Shield cable
④	AC Line cable	Shield cable

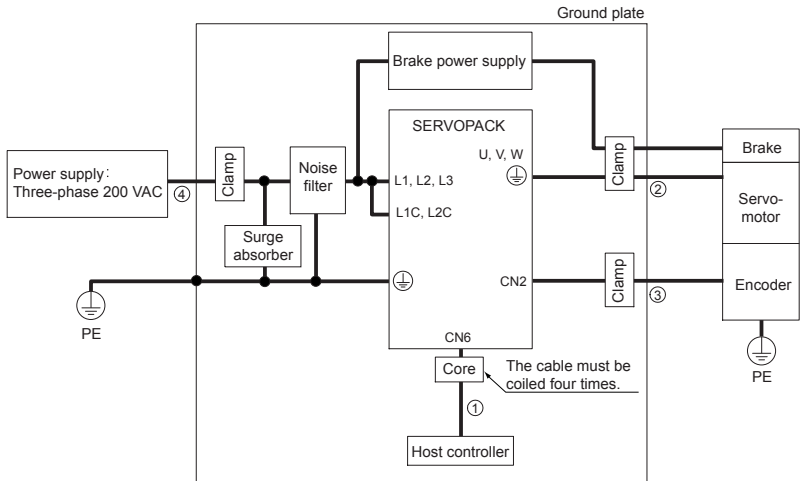
Three-phase 200 V:

SGDS-05A1□A, -10A1□A: Three-phase 200 VAC, 500 W, 1.0 kW



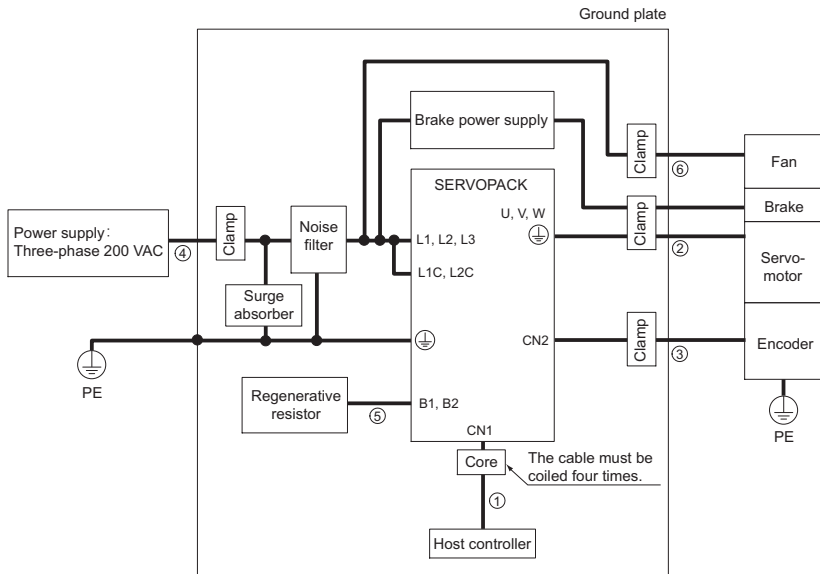
Symbol	Cable Name	Specification
①	I/O signal cable	Shield cable
②	Servomotor cable	Shield cable
③	Encoder cable	Shield cable
④	AC Line cable	Shield cable

SGDS-15A1□A to -50A1□A: Three-phase 200 VAC, 1.5 kW to 5.0 kW



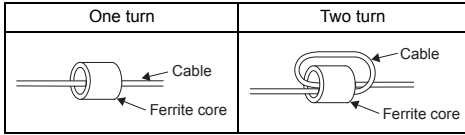
Symbol	Cable Name	Specification
①	Serial communication cable	Shield cable
②	Servomotor cable	Shield cable
③	Encoder cable	Shield cable
④	AC Line cable	Shield cable

SGDS-60A1□A to -75A1□A: Three-phase 200 VAC, 6.0 kW to 7.5 kW



Symbol	Cable Name	Specification
①	I/O signal cable	Shield cable
②	Servomotor cable	Shield cable
③	Encoder cable	Shield cable
④	AC Line cable	Shield cable
⑤	Regenerative resistor cable	Shield cable
⑥	Fan cable (only for SGMSS-70A)	Shield cable

Attaching the Ferrite Core



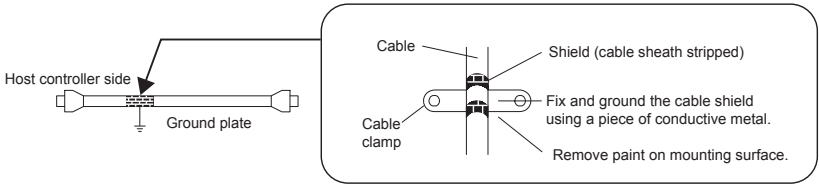
Recommended Ferrite Core

Cable Name	Ferrite Core Model	Manufacturer
Servomotor main circuit cable	ESD-SR-25	NEC TOKIN Corp.

Fixing the Cable

Fix and ground the cable shield using a piece of conductive metal.

- Example of Cable Clamp



Shield Box

A shield box, which is a closed metallic enclosure, should be used for shielding magnetic interference. The structure of the box should allow the main body, door, and cooling unit to be attached to the ground. The box opening should be as small as possible.

13.2 Hand-held Digital Operator and Analog Monitor Cable

Do not connect the hand-held digital operator and the analog monitor cable to the SERVO-PACK during operations. Connect them only when the machinery is stopped during maintenance.

13.3 Peripheral Device Types and Capacities

Main Circuit Power Supply	Model		Power Supply Capacity per SERVOPACK (kVA)	MCCB or Fuse Capacity (Arms) ※1	Recommended Noise Filter※2		Recom- mended Surge Absorber ※3	Magnetic Contactor ※4	Rated Voltage	
	Capacity (kW)	SGDS-			Model	Spec			Fuse	MCCE
Single- phase 100 V	0.03	A3B	0.25	4	FN2070 -6/07	Single-phase 250VAC, 6A	R.C.M- 601BQZ-4	HI-11J (20A)	250 V	240 V
	0.05	A5F	0.25	4		Single-phase 250VAC, 6A				
	0.10	01F	0.40	4		Single-phase 250VAC, 6A				
	0.20	02F	0.60	6	FN2070 -10/07	Single-phase 250VAC, 10A				
	0.40	04F	1.2	8		Single-phase 250VAC, 10A				
Single- phase 200 V	0.05	A5A	0.25	4	FN2070 -6/07	Single-phase 250VAC, 6A	R.C.M- 601BQZ-4	HI-11J (20A)	250 V	240 V
	0.10	01A	0.40	4	FN2070 -6/07	Single-phase 250VAC, 6A				
	0.20	02A	0.75		FN2070 -10/07	Single-phase 250VAC, 10A				
	0.40	04A	1.2	8	FN2070 -10/07	Single-phase 250VAC, 10A		HI-15J (35A)		
	0.80	08A	2.2	16	FN2070 -16/07	Single-phase 250VAC, 16A				
Three- phase 200V	0.50	05A	1.4	4	FN258L -7/07	Three-phase 480VAC, 7A	R.C.M- 601BUZ-4	HI-11J (20A)	250 V	240 V
	1.0	10A	2.3	7	FN258L -16/07	Three-phase 480VAC, 16A		HI-15J (35A)		
	1.5	15A	3.2	10				HI-20J (35A)		
	2.0	20A	4.3	13	FN258L -30/07	Three-phase 480VAC, 30A		HI-25J (50A)		
	3.0	30A	5.9	17	FMAC -0934 -5010	Three-phase 480VAC, 50A		HI-35J (65A)		
	5.0	50A	7.5	28	FMAC -0953 -6410	Three-phase 480VAC, 64A				
	6.0	60A	12.5	32						
	7.5	75A	15.5	41						

* 1. This is the net value for a rated load.

When selecting fuse, determine the capacity using the prescribed derating.

Braking characteristics 25 °C: 200 % for 2s min.; 700 % for 0.01s min.

* 2. The FN-type noise filter is made by SCHAFFNER.

The FMAC-type noise filter is made by SCHURTER (previously TIMONTA).

* 3. The R.C.M type surge absorber is made by OKAYA ELECTRIC INDUSTRIES CO., LTD.

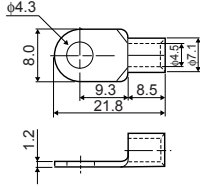
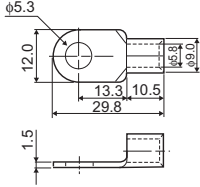
* 4. Made by YASKAWA Controls Co., Ltd.

■ Noise Filter for Brake Power Supply

Use an FN2070-6107 made by SCHAFFNER for a servomotor of 400 W or less.

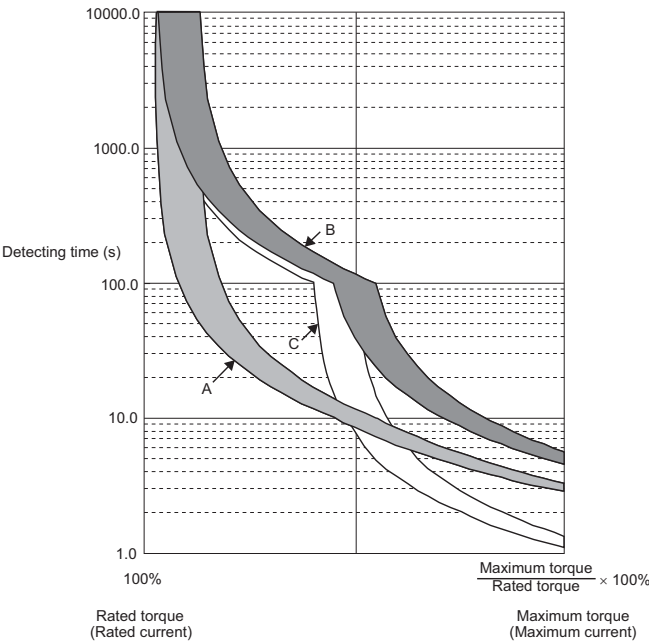
14 Installation Conditions of UL Standards

To adapt SERVOPACKs to UL Standards, use the following ring terminal kit for cables to connect the motor output terminals U, V, and W.

SERVOPACK Model	Terminals	Terminal Kit Model
SGDS-50A (5.0 kW)	U, V, W (Motor output)	JZSP-CST9-50A (Crimp terminals and Sleeves × 3 sets) Dimensional Drawings (Crimp terminal) 
SGDS-60A (6.0 kW) SGDS-75A (7.5 kW)	U, V, W (Motor output)	JZSP-CST9-75A (Crimp terminals and Sleeves × 3 sets) Dimensional Drawings (Crimp terminal) 

15 Overload Characteristics

The overload detection level is set under hot start* conditions at a servomotor surrounding air temperature of 40°C (104°F).



* A hot start indicates that both the SERVOPACK and the servomotor have run long enough at the rated load to be thermally saturated.

Note: The overload protection characteristics of A, B, and C in the figure are applicable when the SERVOPACK is combined with one of the following servomotors.

Graph Type	Motor Type					
	SGMAS	SGMPS	SGMSS	SGMCS	SGMMJ	SGMGH
A	-A5 to -04	-01 to -04	—	-02 to -35	-A1 to -A3	—
B	-06 to -12	-08 to -15	-10 to -30	-45 to -2Z	—	-03 to -30
C	—	—	-40 to -70	—	—	-40 to -75

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December 2007	<12>	Back cover	Revision: Address
November 2007	<11>	5	Addition: PL on fumigation
		All chapters	Revision: Surge protector → surge absorber
		Back cover	Revision: Address
July 2006	<10>	All chapters	Addition: 6-kW and 7.5-kW SERVOPACKs
July 2005	<9>	Back cover	Revision: Address
May 2005	<8>	All chapters	Addition: Description of SGMGH servomotor
September 2004	<7>	14	Addition: Installation conditions of UL standards
September 2004	<6>	All chapters	Addition: 5.0-kW SERVOPACK
August 2003	<5>	All chapters	Addition: New models of SERVOPACKs and servomotors
June 2003	<4>	Back cover	Revision: Address
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한국 전파법에 관한 주의사항

韓国電波法に関連する注意事項

Precautions for Korean Radio Waves Act

针对韩国电波法的注意事项

사용자 안내문

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