

Σ-II シリーズ SGDH
Profibus-DP
アプリケーションモジュール
取扱説明書

形式 JUSP-NS500, JUSP-NS500-E

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Σ-II Series SGDH
Profibus-DP
Application Module
INSTRUCTIONS

Type JUSP-NS500, JUSP-NS500-E

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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INTRODUCTION

■ Manual Contents

This manual consists of Japanese Version and English Version.

- Japanese Version: Described on pages J-1 to J-20.
- English Version: Described on pages E-1 to E-20.

Use the Japanese Version or English Version as needed.

■ User Instructions

Use these instructions for the following jobs:

- Checking Σ -II Series SERVOPACK on delivery
- Installing Σ -II Series SERVOPACK
- Wiring Σ -II Series SERVOPACK
- Operating Σ -II Series SERVOPACK
- Inspecting and maintenance of Σ -II Series SERVOPACK

INSTRUCTIONS

Σ-II Series SGDH Profibus-DP Application Module

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This instruction manual covers Σ -II series SGDH Profibus-DP Application Module (hereinafter called NS500 Module), which is an application module to be connected to Σ -II series SGDH SERVOPACK for Profibus-DP.

To properly use the NS500 Module, read this manual thoroughly and retain for easy reference for inspections and maintenance etc.

Reference materials are listed below:

Manual Titles	Manual No.
Σ -II series SGM□H/SGDH User's Manual	SIEPS80000005
Σ -II series SGDH Profibus-DP Application Module User's Manual	SIE-C718-8
AC SERVOMOTOR INSTRUCTIONS	TOE-C231-2
Σ -II series SGDH Instruction Manual	TOB-S800-32

SYMBOLS FOR SAFE OPERATION

In this manual, the NOTES FOR SAFE OPERATION are classified as “WARNING” or “CAUTION”. The following symbols are used.



Indicates a potentially hazardous situation which, if not avoided, could result in death or serious personal injury.



Indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate personal injury and/or damage to the equipment.

In some instances, items described in  may also result in a serious accident. In either case, follow these important items.

NOTES FOR SAFE OPERATION

Read this manual thoroughly before installation, operation, maintenance or inspection of the AC Servo Drives.

■ CHECKING ON DELIVERY

 CAUTION	
<ul style="list-style-type: none">When SGDH SERVOPACK is used with a NS500 Module mounted, the parameters are automatically set so that the NS500 Module can be operated from the first power ON. <p>For details of parameter setting methods, refer to Σ-II Series SGM□H/SGDH User's Manual (SIEPS8000005).</p>	<p>(Ref.No.) E-8</p>

■ STORAGE AND TRANSPORTATION

 CAUTION	
<ul style="list-style-type: none">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. <p>Example: Heat treatment, where materials are kiln-dried to a core temperature of 56°C for 30 minutes or more.</p> <p>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.</p>	<p>(Ref.No.)</p>

■ INSTALLATION

 CAUTION	
	(Ref.No.)
<ul style="list-style-type: none">• Never use the equipment where it may be exposed to splashes of water, corrosive or flammable gases, or near flammable materials.	E-12
Failure to observe this caution may lead to electric shock or fire.	

■ WIRING

 WARNING	
	(Ref.No.)
<ul style="list-style-type: none">• SERVOPACK grounding must be in accordance with the national code and consistent with sound local practices.	E-14
Failure to observe this warning may lead to electric shock or fire.	

 CAUTION	
	(Ref.No.)
<ul style="list-style-type: none">• Do not connect three-phase power supply to SERVOPACK output terminals U, V, and W.	E-14
Failure to observe this caution may lead to personal injury or fire.	
<ul style="list-style-type: none">• Securely tighten screws on the power supply and motor output terminals.	E-14
Failure to observe this caution can result in a fire.	

■ OPERATION

 CAUTION	
	(Ref.No.)
<ul style="list-style-type: none">• To avoid inadvertent accidents, run the servomotor only in test run (without load).	E-17
Failure to observe this caution may result in personal injury.	
<ul style="list-style-type: none">• Before starting operation with a load connected, set up parameters suitable for the machine.	E-17
Starting operation without setting up parameters may lead to overrun failure.	
<ul style="list-style-type: none">• Before starting operation with a load connected, make sure emergency-stop procedures are in place.	E-17
Failure to observe this caution may result in personal injury.	
<ul style="list-style-type: none">• During operation, do not touch the SERVOPACK's heatsink.	E-18
Failure to observe this caution may result in burns.	

■ INSPECTION AND MAINTENANCE

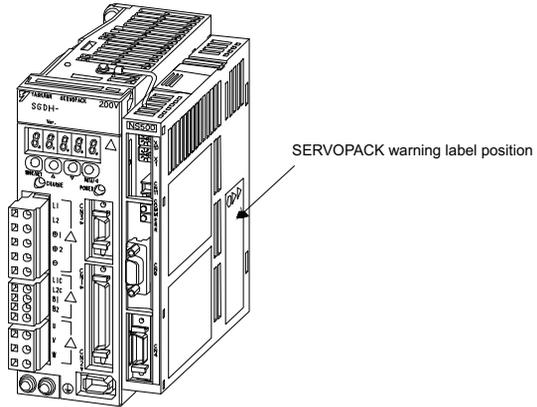
 WARNING	
	(Ref.No.)
<ul style="list-style-type: none"> • Be sure to turn OFF power before inspection or maintenance. Otherwise, electric shock may result. 	E-18
<ul style="list-style-type: none"> • Never open the terminal cover while power is ON, and never turn ON power when the terminal cover is open. Otherwise, electric shock may result. 	E-18
<ul style="list-style-type: none"> • After turning OFF power, wait at least five minutes before servicing the product. Otherwise, residual electric charges may result in electric shock. 	E-18

 CAUTION	
	(Ref.No.)
<ul style="list-style-type: none"> • Never change wiring while power is ON. Failure to observe this caution may result in electric shock or personal injury. 	E-18

Note the following to ensure safe application.	
<ul style="list-style-type: none"> • Some drawings in this manual are shown with the protective cover or shields removed, in order to describe the detail with more clarity. Make sure all covers and shields are replaced before operating this product. • Some drawings in this manual are shown as typical example and may differ from the shipped product. • This manual may be modified when necessary because of improvement of the product, modification or changes in specifications. Such modification is made as a revision by renewing the manual No. • To order a copy of this manual, if your copy has been damaged or lost, contact your YASKAWA representative listed on the last page stating the manual No. on the front cover. • YASKAWA is not responsible for accidents or damages due to any modification of the product made by the user since that will void our guarantee. 	

WARNING LABEL

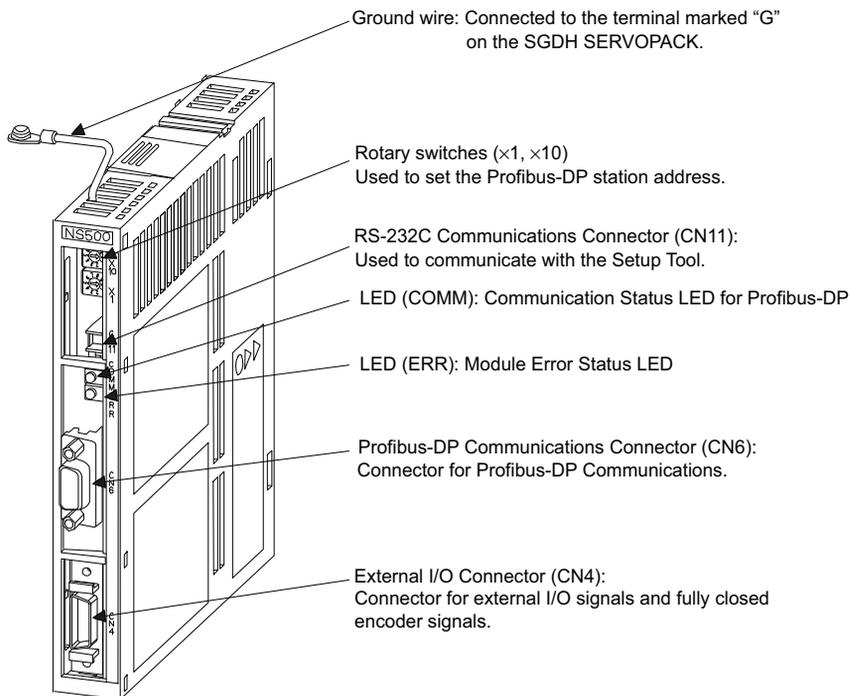
	危険 WARNING	通電中および電源オフ後、5分間端子部に触るな！感電の恐れあり Disconnect all power and wait 5 min. before servicing. May cause electric shock.
	注意 CAUTION	通電中はヒートシンクに触るな！火傷の恐れあり Do not touch heat sink when power is ON. May cause burn.
	必ずアース線を接続せよ	Use proper grounding techniques.



SERVOPACK Warning Label and Grounding Mark Position

1 PARTS

The NS500 Module parts names are as follows:



2 CHECKING ON DELIVERY

CAUTION

- When SGD_H SERVOPACK is used with a NS500 Module mounted, the parameters are automatically set so that the NS500 Module can be operated from the first power ON.

For details of parameter setting methods, refer to Σ -II Series SGM□H/SGD_H User's Manual (SIEPS8000005).

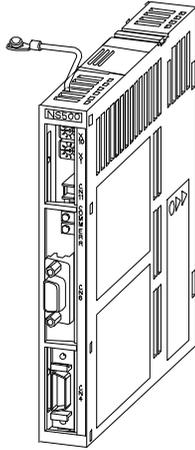
2.1 Checking Items

When Σ -II Series products are delivered, check the following items:

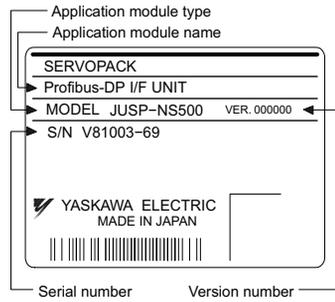
Check Items	Remarks
Check if the delivered products are the ones you ordered.	Check the types marked on the nameplates of the NS500 Module.
Check if the motor shaft rotates smoothly.	If the motor shaft is smoothly turned by hand, it is normal. However, if the motor has brakes, it cannot be turned manually.
Check for damage.	Check the overall appearance, and check for damage or scratches resulting from transportation.
Check if SERVOPACK is the type applicable for NS500 Module?	Check the nameplate of SERVOPACK. SERVOPACK Type SGDH-□□□E-□ ① ② “SGDH” in ①, and “E” in ②

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

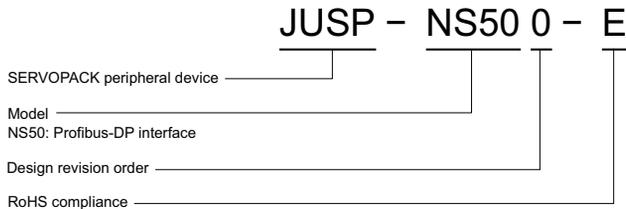
2.2 Appearance and Nameplate



NS500 Module



2.3 Type Designation

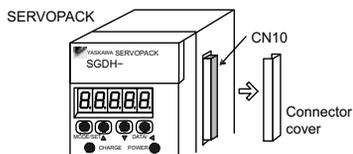


2.4 Mounting NS500 Module

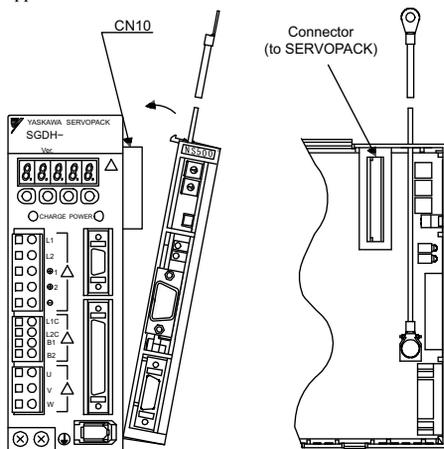
Mount a NS500 Module on a SGDH SERVOPACK in the following manner. Provide the screws for connecting ground wire as shown below.

Mounting Method	SERVOPACK Type	Screw	Remarks
Base mounted	SGDH-A3 to 02BE SGDH-A3 to 10AE	M3×10 round head screws (with spring washer and plain washer)	Attachments.
	SGDH-15 to 50AE SGDH-05 to 50DE	M4×10 round head screws (with spring washer and plain washer)	Attachments.
	SGDH-60 to 1EAE SGDH-60 to 1EDE	M4×8 round head screws (with spring washer and plain washer)	Use the screw of the front panel.
Rack mounted	SGDH-A3 to 02BE-R SGDH-A3 to 50AE-R SGDH-05 to 50DE-R	M4×6 round head screws (with spring washer and plain washer)	Attachments. Note: Make sure that spring washers and plain washers are used for mounting. (Otherwise, the screw for connecting ground wire sticks out from the other side of the flange, and the SERVOPACK cannot be mounted properly.)
Duct ventilated	SGDH-60 to 1EAE-P SGDH-60 to 1EDE-P	M4×8 round head screws (with spring washer and plain washer)	Use the screw of the front panel.

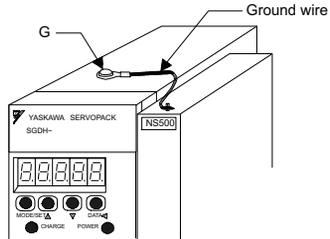
1. Remove the connector cover mounted on CN10 of SERVOPACK.



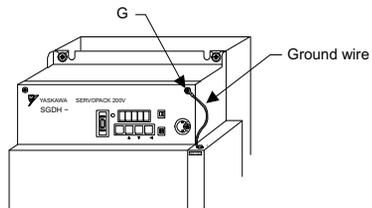
2. Mount an application module.



3. For grounding, connect a ground wire of the NS500 Module to the marked “G” on the SERVOPACK.

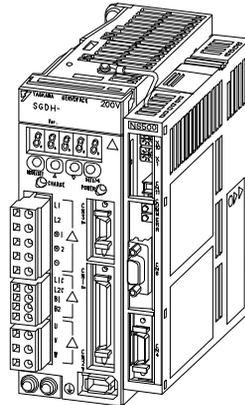


For SERVOPACK (30 W to 5.0 kW)



For SERVOPACK (6.0 kW to 7.5 kW)

The appearance of SERVOPACK with NS500 Module properly mounted is shown below.



3 INSTALLATION

Σ -II Series SGDH SERVOPACK is a base-mount type servo controller. Incorrect installation will cause problems. Always observe the installation instructions described below.

CAUTION

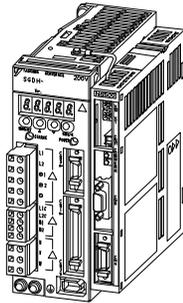
- Never use the equipment where it may be exposed to splashes of water, corrosive or flammable gases, or near flammable materials.

Failure to observe this caution may lead to electric shock or fire.

3.1 Storage

When the SERVOPACK is to be stored with the power cable disconnected, store it in the following temperature range:

Between -20 to $+85^{\circ}\text{C}$



Σ -II Series
SGDH SERVOPACK with NS500 Module mounted

3.2 Installation Sites

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

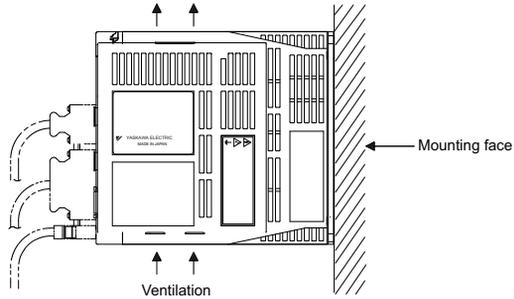
Situation	Notes on Installation
When installed in a control panel	Design the control panel size, unit layout, and cooling method so that the temperature around the periphery of the SERVOPACK does not exceed 55°C .
When installed near a heating unit	Suppress radiation heat from the heating unit and a 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	Avoid installation in a hot and humid place or where excessive dust or iron powder is present in the air. Install in a place where the altitude is 1000 m or less.

3.3 Orientation

Install the SERVOPACK perpendicular to the wall as shown in the figure below.

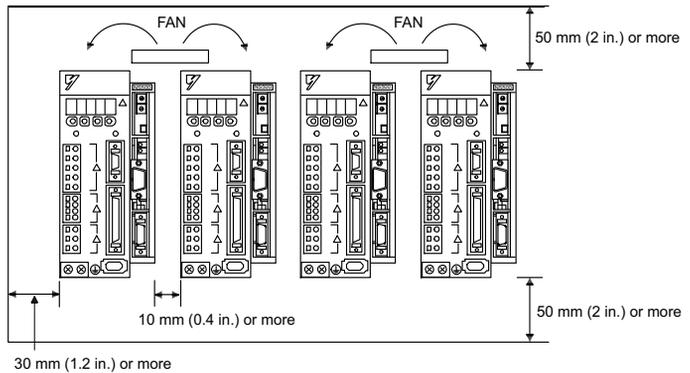
The SERVOPACK is cooled by fan or natural convection. The SERVOPACK must be oriented as shown in the figure.

Firmly secure the SERVOPACK through two to four mounting holes depending on the SERVOPACK capacity.



3.4 Installation Precautions

When installing multiple SERVOPACKs side by side in a control panel, observe the following installation method:



■ Front Panel

Install SERVOPACK perpendicular to the wall so that the front panel (digital operator mounted face) faces outward.

■ Cooling

Provide sufficient space around each SERVOPACK to allow cooling by fan and natural convection.

■ Where mounted side by side

When installing SERVOPACKs side by side, provide at least 10 mm (0.4 in.) space between them and at least 50 mm (2 in.) space above and below them as shown in the figure above. Install cooling fans above the SERVOPACKs to prevent the temperature around each SERVOPACK from increasing excessively and also to maintain the temperature inside the control panel evenly.

■ Environments in Control Panel

Maintain the following conditions inside the control panel:

- Ambient temperature for SERVOPACK: 0 to 55°C
- Humidity: 90%RH or less
- Vibration: 4.9 m/s²
- Condensation and freezing: None
- Ambient temperature to ensure long-term reliability: 45°C or less
- Altitude of 1000 m max.

4 WIRING

This section shows a standard example for connecting Σ -II series products to peripheral devices and briefly explains how to connect each peripheral device.

WARNING

- SERVOPACK grounding must be in accordance with the national code and consistent with sound local practices.

Failure to observe this warning may lead to electric shock or fire.

CAUTION

- Do not connect three-phase power supply to SERVOPACK output terminals U, V, and W.

Failure to observe this caution may lead to personal injury or fire.

- Securely tighten screws on the power supply and motor output terminals.

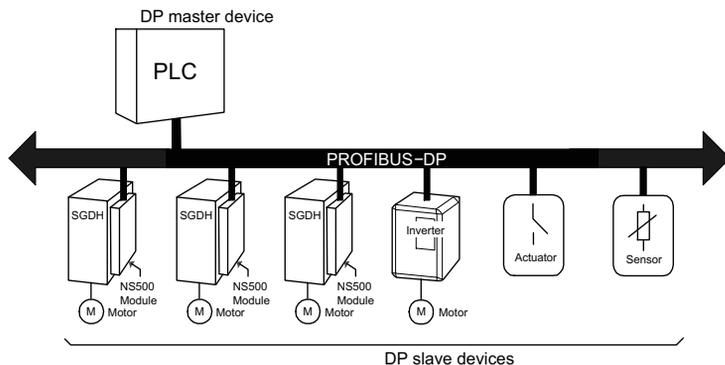
Failure to observe this caution can result in a fire.

For the following wiring, refer to Σ -II series SGM□H/SGDH User's Manual (SIEPS8000005) and Σ -II series SGDH Profibus-DP Application Module User's Manual (SIE-C718-8).

- Main circuit wiring
- I/O signal wiring
- Encoder wiring
- Example of connections

4.1 Profibus-DP Connection Example

An example of Profibus-DP connection is shown below.



4.2 Precautions on Wiring

Take note the following precautions at wiring.

■ Connectable Maximum Number of Stations

Up to 32 slave stations can be connected.

Using a repeater, up to 126 slave stations can be connected.

■ Cables

Use the special A cable.

For other peripheral devices, refer to Σ -II series SGM□H/SGDH User's Manual (SIEPS80000005) and Σ -II series SGDH Profibus-DP Application Module User's Manual (SIE-C718-8).

■ Total cable length

The following table shows the relation between the baud rate and the communications distance when using the A cable.

Baud rate (kbps)	9.6	19.2	93.75	187.5	500	1500	12000
Communications distance (m)	1200			1000	400	200	100

■ Terminator

The last station in the network must have a terminator for electrical resistance.

5 GSD File

A GSD file is required to operate the NS500 Module as a slave of the PROFIBUS-DP. After registering a GSD file to the PROFIBUS-DP master, the NS500 can be used as a slave.

The GSD file differs in accordance with the product used.

Product Model	GSD File Name
JUSP-NS500	YASK0508.GSD
JUSP-NS500-E	YASK0A62.GSD

Download the GSD File from the Profibus Organization's homepage or Yaskawa's e-mechatronics site (<http://www.e-mechatronics.com/>).

6 OPERATION

This section provides precautions at test run and operation. For instructions on test run and operation, refer to Σ -II series SGM□H/SGDH User's Manual (SIEPS80000005) and Σ -II series SGDH Profibus-DP Application Module User's Manual (SIE-C718-8).

6.1 Precautions at Test Run

CAUTION

- To avoid inadvertent accidents, run the servomotor only in test run (without load). Failure to observe this caution may result in personal injury.
- Before starting operation with a load connected, set up parameters suitable for the machine.
Starting operation without setting up parameters may lead to overrun failure.
- Before starting operation with a connected load, make sure emergency-stop procedures are in place.
Failure to observe this caution may result in personal injury.

■ Conducting Test Run for Servomotor without Load

When servomotor is operated without load, set the load inertia ratio (parameter Pn103) to 0. (Factory setting is 0)

When servomotor is rotated without load, if the value has been set to other than 0, the servomotor may oscillate.

To avoid this, make sure to set the load inertia ratio to 0 and then servo ON.

■ Conducting Test Run with Servomotor Connected to Machine

SERVOPACK initial parameters setting is performed assuming normal operation conditions. Before test run, set up parameters suitable for the machine.

Failure to set up the parameters initial setting may result in machine overrun or breakdown.

As for the setting procedures and methods, refer to Σ -II Series SGM□H/SGDH User's Manual (SIEPS80000005).

■ Check Item during Test Run

The following items should be checked during test run.

- Unusual vibration
- Abnormal noise
- Excessive temperature rise

6.2 Precautions at Operation

 CAUTION
<ul style="list-style-type: none">• During operation, do not touch the SERVOPACK's heatsink. <p>Failure to observe this caution may result in burns.</p>

7 INSPECTION AND MAINTENANCE

This section describes the basic inspections and maintenance. If any failure occurs on SERVOPACK, refer to Σ -II Series SGM□H/SGDH User's Manual Section 10.1 Troubleshooting (SIEPS80000005) and Σ -II Series SGDH Profibus-DP Application Module User's Manual (SIE-C718-8). Contact your Yaskawa representative if the problem cannot be solved by the procedures described.

 WARNING
<ul style="list-style-type: none">• Be sure to turn OFF power before inspection or maintenance. Otherwise, electric shock may result.• Never open the terminal cover while power is ON, and never turn ON power when the terminal cover is open. Otherwise, electric shock may result.• After turning OFF power, wait at least five minutes before servicing the product. Otherwise, residual electric charges may result in electric shock.

 CAUTION
<ul style="list-style-type: none">• Never change wiring while power is ON. <p>Failure to observe this caution may result in electric shock or personal injury.</p>

8 MEASURES TO SATISFY THE EMC DIRECTIVE

This section describes the measures required for NS500 Module to conform to EMC Directive (EN50081-2, EN50082-2, EN61000-6-2).

8.1 Profibus-DP Communication Cable

For Profibus-DP communication (CN6) connector, use the cable for special use.

For max. cable length, refer to 4.2 *Precautions on Wiring*.

8.2 Fully Closed Encoder Cable

For fully closed encoder (CN4) connector, use the following connector.

Use the twisted pair shielded cable.

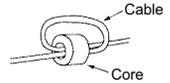
Connector: 54306-2011 (Made by Molex Japan Co., Ltd.)

Connector case: 54331-0201 (Made by Molex Japan Co., Ltd.)

8.3 The Core on the Cable

Attach the core on the cable as shown below:

Model	ESD-SR-25	ESD-SR-250 (RoHS compliance)
Quantity	1	
Turn	2	
Manufacturer	Tokin Corp.	



Cable line and the line position where the core are attached are shown below.

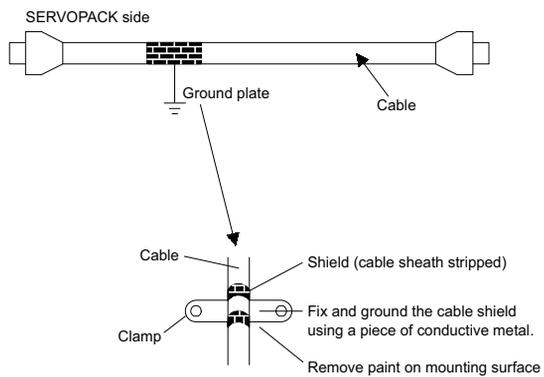
Cable Name	Mounting Position of Core
Profibus-DP Communication Cable	Near the host controller and SERVOPACK
Fully Closed Encoder Cable	Near the SERVOPACK

Note: For details on the SERVOPACK core and the line filter, refer to Σ -II series SGDh Instruction Manual (TOB-S800-32).

8.4 Cable Clamp

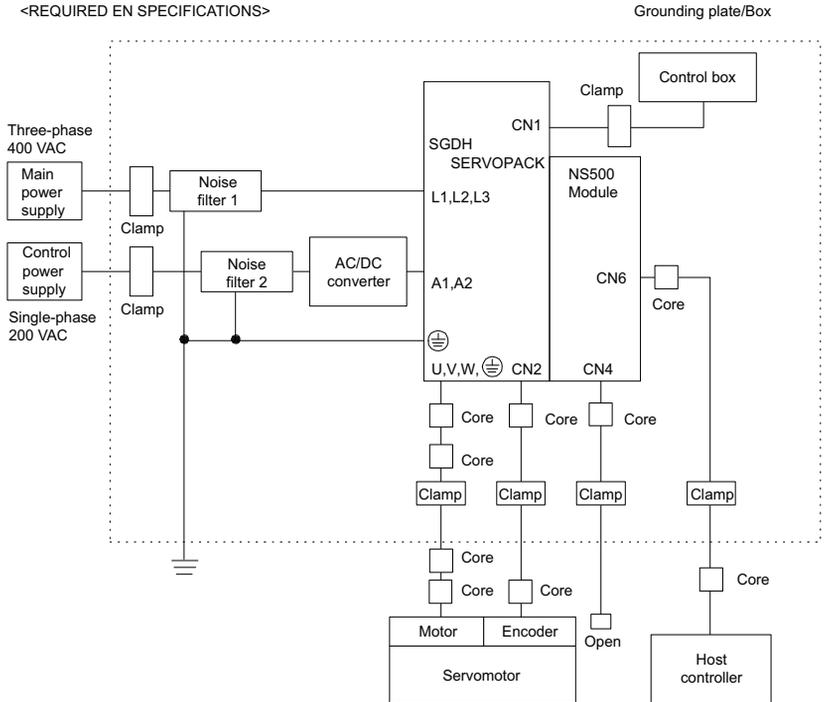
Fix and ground the cable shield using a piece of conductive metal.

<Example of Cable Clamp>



8.5 Wiring Examples

The following diagrams show the wiring example. Before wiring, turn OFF the power ON/OFF switch and post a notice of “No Conduction.” Only an electrical expert can perform the wiring. The noise filter and the core are shown in the diagram.



- Note: 1. Clamp: Secure cable shields and ground for conductive metal parts.
 2. Make sure that the grounding plate are securely connected to the grounding.
 3. Remove the paint from the grounding plate to insure a good Earth connection for filter, SERVOPACK, clamp, etc.

Revision History

The revision dates and numbers of the revised manuals are given on the bottom of the back cover.

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		Back cover	Revision: Address, format
June 2008	◇7	Back cover	Revision: Address
December 2007	◇6	Preface	Addition: PL on fumigation
		5	Addition: Description of GSD file
		Back cover	Revision: Address
December 2006	◇5	All chapters Overview, 2, 3	Interface Unit changed to application module, NS500 Unit changed to NS500 Module. Addition: RoHS-compliant model
		Back cover	Revision: Address
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September 2001	◇1	Back cover	Revision: Address
August 2000	—	—	First edition

Σ-II Series SGDH

Profibus-DP

Application Module

INSTRUCTIONS

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In the event that the end user of this product is to be the military and said product is to be employed in any weapons systems or the manufacture thereof, the export will fall under the relevant regulations as stipulated in the Foreign Exchange and Foreign Trade Regulations. Therefore, be sure to follow all procedures and submit all relevant documentation according to any and all rules, regulations and laws that may apply.

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

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