FUJI ELECTRIC

MICREX-SX *SERIES*

SPH

USER'S MANUAL

Conformance with Standards

FEH249

Preface

Thank you very much for purchasing the FUJI MICREX-SX Series SPH.
This users' manual describes operational instructions and restrictions on MICREX-SX Series products that conform to various standards (CE marking, Lloyd's Register of Shipping, etc.)
Please read this manual carefully to correctly use your device.
If your MICREX-SX Series product does not need to conform to CE marking or Lloyd's Register of Shipping, there is no need to execute the content of this manual. There will be no problem with performance and functionality.

If your MICREX-SX Series product is required to conform to those standards, you must execute the content of this manual. Note that this manual deals with MICREX-SX Series products of "basic structure," and therefore additional measures may be necessary depending on the configuration of your system, the structure of the control panel, or the product's work environment.

<Notes>

1. This manual may not be reproduced in whole or part in any form without prior written approval by the manufacturer.
2. The contents of this manual (including specifications) are subject to change without prior notice.
3. If you find any ambiguous or incorrect descriptions in this manual, please write then down (along with the manual No. Shown on the cover) and contact FUJI.

Revision

*Manual No. is shown on the cover.

Printed on	*Manual No.	Revision contents
May.2000	FEH249	First edition

Contents

Section1 Standards Conformed Product

1-1 Standards conformed products list

Component	Type	Specification	CE	UL	cUL	LR	NK	
CPU module	NP1PS-74	High-performance CPU module Program memory:74K steps	yes	no	no	no	no	
	NP1PS-32	High-performance CPU module Program memory:32K steps	yes	yes	yes	yes	yes	
	NP1PH-08	Standard CPU module Program memory:8K steps	yes	yes	yes	yes	yes	
	NP1PH-16	Standard CPU module Program memory:16K steps	yes	yes	yes	yes	yes	
Power supply module	NP1PS-22	100/200V AC	yes	yes	yes	yes	yes	
	NP1PS-42	24V DC	yes	yes	yes	yes	yes	
Base board	NP1BS-06	No.of slots:6	yes	yes	yes	yes	yes	
	NP1BS-08	No.of slots:8	yes	yes	yes	yes	yes	
	NP1BS-11	No.of slots:11	yes	yes	yes	yes	yes	
	NP1BS-13	No.of slots:13	yes	yes	yes	yes	yes	
	NP1BP-13	No.of slots:13 No.of processor buses:10	yes	yes	yes	yes	yes	
SX bus expansion cable	NP1C-P3	Cable length:30cm	yes	yes	yes	yes	yes	To adapt to CE marking, the measures described in 2-2-2 need to be taken.
	NP1C-P6	Cable length:60cm	yes	yes	yes	yes	yes	
	NP1C-P8	Cable length:80cm	yes	yes	yes	yes	yes	
	NP1C-02	Cable length:2m	yes	yes	yes	yes	yes	
	NP1C-05	Cable length:5m	yes	yes	yes	yes	yes	
	NP1C-10	Cable length:10m	yes	yes	yes	yes	yes	
	NP1C-25	Cable length:25m	yes	yes	yes	yes	yes	
SX bus T-branch uint	NP8B-TB	For SX bus T-branch	yes	yes	yes	yes	yes	
Digital input module	NP1X1606-W	24V DC, 16 points	yes	yes	yes	yes	yes	
	NP1X3206-W	24V DC, 32 points	yes	yes	yes	yes	yes	
	NP1X3202-W	5/12V DC, 32 points	yes	yes	yes	yes	yes	
	NP1X3206-A	24V DC, 32 points High-speed counter 4 channels 20kHz	yes	yes	yes	no	no	
	NP1AX6406-W	24V DC, 64 points	yes	yes	yes	yes	yes	
	NP1X0810	100 to 120V AC, 8 points	yes	yes	yes	yes	yes	
	NP1X1610	100 to 120V AC, 16 points	no	no	no	yes	yes	
	NP1X0811	200 to 240V AC, 8 points	yes	yes	yes	yes	yes	
Digital output module	NP1Y08T0902	Tr sink 12 to 24V DC, 8 points	yes	yes	yes	yes	yes	
	NP1Y16T09P6	Tr sink 12 to 24V DC, 16 points	yes	yes	yes	yes	yes	
	NP1Y32T09P1	Tr sink 12 to 24V DC, 32 points	yes	yes	yes	yes	yes	
	NP1Y64T09P1	Tr sink 12 to 24V DC, 64 points	yes	yes	yes	yes	yes	
	NPY32T09P1-A	Tr sink 24V DC, 32 points Pulse train output function	yes	yes	yes	no	no	

(Continued on next page)

Section1 Standards Conformed Product

Component	Type	Specification	CE	UL	cUL	LR	NK	
Digital output module	NP1Y08U0902	Tr source 12 to 24V DC, 8 points	yes	yes	yes	yes	yes	
	NP1Y16U09P6	Tr source 12 to 24V DC, 16 points	yes	yes	yes	yes	yes	
	NP1Y32U09P1	Tr source 12 to 24V DC, 32 points	yes	yes	yes	yes	yes	
	NP1Y64U09P1	Tr source 12 to 24V DC, 64 points	yes	yes	yes	yes	yes	
	NP1Y06S	Triac 100 to 200V AC, 6 points	yes	yes	yes	yes	yes	
	NP1Y08S	Triac 100 to 200V AC, 8 points	no	no	no	yes	yes	
	NP1Y08R-04	Ry 110V DC,240V AC, 8 points	yes	yes	yes	yes	yes	
	NP1Y16R-08	Ry 110V DC,240V AC, 16 points	no	no	no	yes	yes	
Digital input/output module	NP1W1606T	input : sourse type24V DC, 8 points output : Tr sink12 to 24V DC, 8 points	yes	yes	yes	yes	yes	
	NP1W3206T	input : source type24V DC, 16 points output : Tr sink12 to 24V DC, 16 points	yes	yes	yes	yes	yes	
	NP1W1606U	input : sink type24V DC, 8 points output : Tr source12 to 24V DC, 8 points	yes	yes	yes	yes	yes	
	NP1W3206U	input : sink type24V DC, 16 points output : Tr source12 to 24V DC, 16 points	yes	yes	yes	yes	yes	
Multi-range Analog input module	NP1AXH4-MR	4 channels, Resolution : 14bits	yes	yes	yes	yes	yes	
	NP1AX04-MR	4 channels, Resolution : 10bits	yes	yes	yes	yes	yes	
	NP1AX08-MR	8 channels, Resolution : 10bits	yes	yes	yes	no	no	
Multi-range Analog output module	NP1AYH2-MR	2 channels, Resolution : 10bits	yes	yes	yes	yes	yes	
	NP1AY02-MR	2 channels, Resolution : 10bits	yes	yes	yes	yes	yes	
General purpose communication module	NP1L-RS1	RS-232C : 1 channel, RS-485 : 1 channel	yes	yes	yes	yes	yes	
	NP1L-RS2	RS-232C : 1 channel	yes	yes	yes	yes	yes	
	NP1L-RS4	RS-485 : 1 channel	yes	yes	yes	yes	yes	
FL-net (OPCN-2) module	NP1L-FL1	FL-net (OPCN-2) : 1 channel	yes	no	no	no	no	(Note)
P-link module	NP1L-PL1	P-link : 1channel	no	yes	yes	no	no	
PE-link module	NP1L-PE1	PE-link : 1 channel	no	yes	yes	no	no	
OPCN-1 master module	NP1L-JP1	OPCN-1 : 1 channel	yes	yes	yes	yes	yes	To adapt to CE marking, the measures described in 2-2-3 need to be taken.
OPCN-1 interface module	NP1L-RJ1	interface module to expansion OPCN-1	yes	yes	yes	yes	yes	
DeviceNet master module	NP1L-DN1	DeviceNet : 1 channel	yes	no	no	no	no	
AS-i master module	NP1L-AS1	AS-i master : 1 channel	yes	no	no	no	no	
T-link master module	NP1L-TL1	T-link master : 1 channel	yes	yes	yes	yes	yes	
T-link interface module	NP1L-RT1	interface module to expansion T-link	yes	yes	yes	yes	yes	
PC card interface module	NP1F-PC2	General purpose PC card : 1 channel memory card : 1 channel	yes	no	no	no	no	
Memory card interface module	NP1F-MM1	SRAM memory card : 1 channel	yes	no	no	no	no	

(Note)To adapt to CE marking, the measures described in 2-2-3 need to be taken.

(Continued on next page)

Section1 Standards Conformed Product

Component	Type	Specification	CE	UL	cUL	LR	NK	
Dummy module	NP1F-DMY	substitute for the failed module	yes	no	no	no	no	To adapt to CE marking, the measures described in 2-2-3 need to be taken.
High-speed counter module	NP1F-HC2	2 channels 500kHz	yes	no	no	no	no	
	NP1F-HC8	8 channels 50kHz	yes	no	no	no	no	
Pulse train output module	NP1F-HP2	Pulse train command, 2 channels 250kHz Forward pulse + reverse pulse	yes	no	no	no	no	
Pulse train multiple module	NP1F-MP2	Positioning control multiple module 2 axes, Pulse train command	yes	no	no	no	no	
Analog multiplemodule	NP1F-MA2	Positioning control multiple module 2 axes, Analog command	yes	no	no	no	no	
Signal converter	NP2F-LEV	Convert signal level, From open collector signal to RS-485 or vice versa	yes	no	no	no	no	
D300win cable	NP4H-CNV	Personal computer cable for loader with converter	yes	yes	yes	yes	yes	
	NP4H-CA2	Personal computer cable for loader	yes	yes	yes	yes	yes	
Simulative-input swich	NP8X-SW	16 points	yes	yes	yes	yes	yes	
Data backup battery	NP8P-BT	Lithium primary battery	yes	yes	yes	yes	yes	
User ROM card	NP8PMF-16	User ROM card 16k steps Dedicated to standard CPU	yes	yes	yes	yes	yes	
CPU mode selection key swich	NP8P-KY	For CPU mode selection	yes	yes	yes	yes	yes	
Base board mounting stud	NP8P-ST	For DIN rail (in pairs)	yes	yes	yes	yes	yes	
SX bus terminating plug	NP8P-BP	For SX bus terminating	yes	yes	yes	yes	yes	
T-link connector, JPCN-1 connector	FCT120T		yes	yes	yes	yes	yes	
P/PE-link connector	FTC120P		yes	yes	yes	yes	yes	
T-link/JPCN-1 terminating resistor	FRT120A100	**100Ω/1W**	yes	yes	yes	yes	yes	
P/PE terminating resister	FRT220A75	**75Ω/1W**	yes	yes	yes	yes	yes	
I/O connector, Positioning control module connector	NP8V-CN	Soldered socket type,connector cover (Fujitsu Co.,Ltd.)	yes	yes	yes	yes	yes	

Section2 Conformance with CE marking

2-1 CE marking

<Product standard>

IEC 61131-2

EMI = CISPR11, Gr. 1, Class A

EMS = IEC 61000-4-2 to -6, -8 and -12

<Classification of product>

Enclosed type equipment, which is defined as follows:

"To prevent accidents due to a charged or operating part coming into contact with the human body, the product should be installed in a metal enclosure when used."

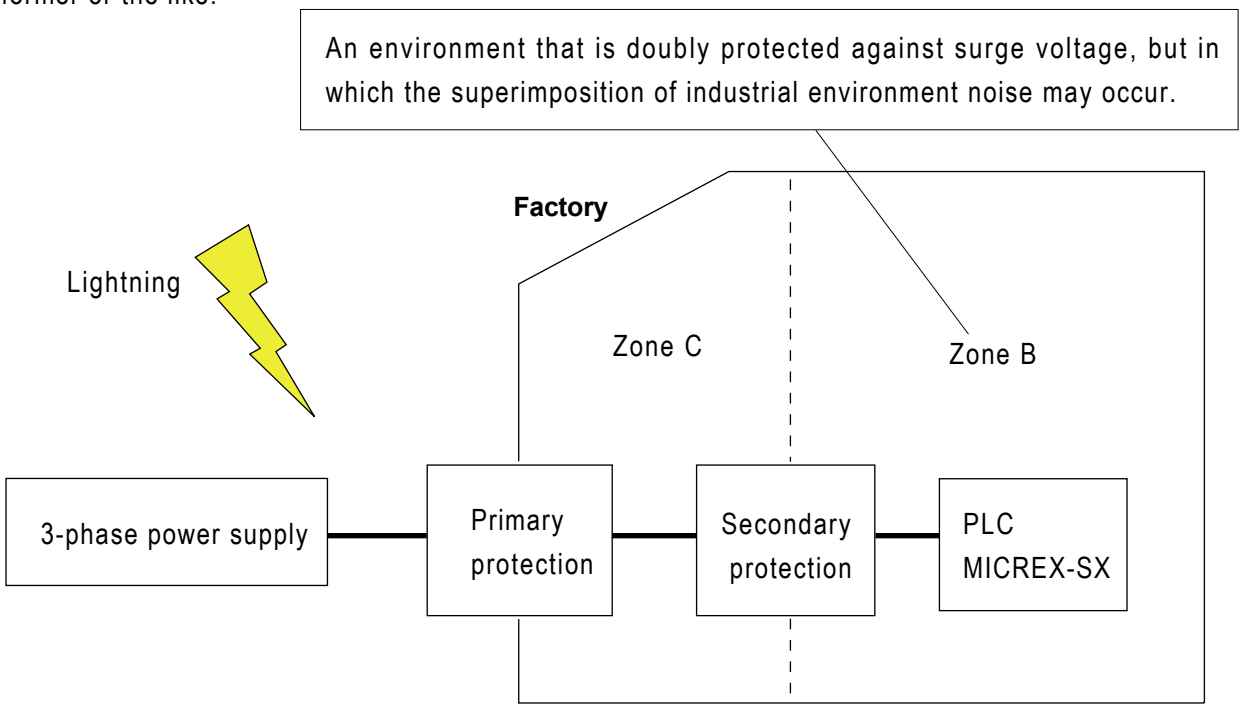
<Safety level>

Overvoltage Category II

<EMC classification when installing PLC defined in IEC 61131-2>

Zone B, which is defined as follows:

"An environment where power from an external power supply, which supplies power to the factory (the building in which the device is installed), is used after doubly protecting against surge voltage with an insulating transformer or the like.



Section2 Conformance with CE marking

2-2 Method for adapting to CE marking

2-2-1 Metal Enclosure

MICREX-SX Series products are classified as "enclosed type" equipment. "Enclosed type" means equipment that is designed on the condition that it is installed in an enclosure such as a metal enclosure, so that electric shock or other accidents do not occur due to the human body coming into contact with the product (MICREX-SX). In other words, there may be danger of an electric shock, etc., if the product is not accommodated in an enclosure. (For example, a steel wire may be inserted in one of the cooling slots provided on the product body.)

MICREX-SX Series products also need to be installed in a metal enclosure in order to control the electromagnetic radiation noise (EMI) they emit. Basic specifications for the metal enclosure are as follows.

Material : SPCC (high-tensile-strength steel)

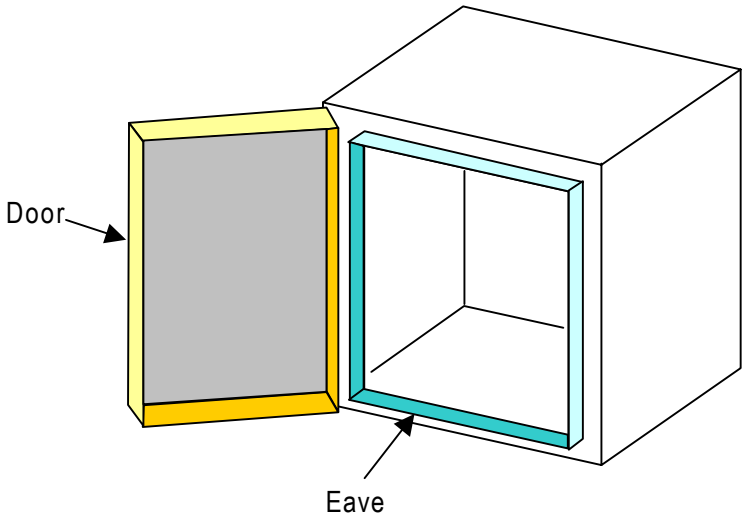
Plate thickness: Min. 1.6 mm

Power supply : Power supplied to the control panel should be protected from external surge voltage with an insulating transformer.

Remarks : Should be structured so that an electromagnetic radiation noise does not leak from the enclosure.

For example, in the figure below, a box-type door is used, and the enclosure has an eave-like protrusion that overlaps on the side faces of the door when closed.

The important point here is that the overlap of the door and the enclosure's main body effectively prevents electromagnetic radiation noise from leaking out of the enclosure.



Section2 Conformance with CE marking

2-2-2 How to lay the SX bus cable

<Mounting the ferrite core>

A high-speed electric signal flows through the SX bus cable. Therefore, high-frequency noise is emitted from the SX bus cable, making it impossible for the product to conform to the EMC directive concerning CE marking.

To solve this problem, a ferrite core is mounted at the base of the SX bus cable.

Mount the ferrite core according to the figure below.

Commendable ferrite core
: ZCAT 3035-1330 from TDK

<How to affix the cable to the metal enclosure>

When affixing the SX bus cable to the metal enclosure, be sure to secure a 1-cm or wider gap so that the SX bus cable does not come into contact with the metal plate.

On the one hand, the metal enclosure provides an effective shield fromelectromagnetic radiation noise; on the other hand, it becomes an effective antenna that electromagnetic radiation noise if a cable as a noise source is nearby or comes into actual contact with it. Not only the SX bus cable, but also other high-speed signal transmission cables need to be kept away from the metal walls of the enclosure.

Section2 Conformance with CE marking

2-2-3 Adaptation of individual module

(1) T-link master/interface module (NP1L-TL1 / RT1)

When a T-link master module is used, it is necessary to mount the ferrite core at the base of the communication cable as well as affix insulating sheet. When the T-link interface module is used, it is necessary to mount the ferrite core at the base of the communication cable.

1) Mount the ferrite core at the root of the communication cable.

* Ferrite core mounting may be unnecessary if all of the communication cable is laid only inside the metal enclosure, or even when it is laid outside the metal enclosure, if it is laid in EMI shielding tube or metal tube so that no noise leaks out.

Commendable ferrite core
: ZCAT 3035-1330 from TDK

Note:
If vibration or shock is applied to the product, a strong force due to the weight of the ferrite core may act on the cable to damage it. Be sure to affix the cable to a firm object such as a duct so that the cable does not swing under vibration.

2) Affix the static electricity preventive insulating sheet to the station number-setting switch

When a station number needs to be changed while the module is operating, it is once necessary to remove the insulating sheet for this work. For this operation, the operator must remove static electricity accumulated on his body by means of a static elimination band or the like before touching the station number-setting switch. This is necessary only for the T-link master module (NP1L-TL1), and not necessary for the T-link interface module (NP1L-RT1).

Affix the insulating sheet supplied with the product on the station number-setting switch.

Note: For the purpose of explanation, a colored sheet is used in the photo at left. The actual insulating sheet supplied with the product is transparent.

Section2 Conformance with CE marking

(2)OPCN-1 master module (NP1L-JP1)

When a OPCN-1 master module is used, it is necessary to the stick-insulating sheet.

1) Affix the static electricity preventive insulating sheet to the station number-setting switch

When a station number needs to be changed while the module is operating, it is once necessary to remove the insulating sheet for this work. For this operation, the operator must remove static electricity accumulated on his body by means of a static elimination band or the like before touching the station number-setting switch.

Affix the insulating sheet supplied with the product on the station number-setting switch.

Note: For the purpose of explanation, a colored sheet is used in the photo at left. The actual insulating sheet supplied with the product is transparent.

(3) FL-net (OPCN-2) module (NP1L-FL1)

When the "FL-net (OPCN-2)" module is used, in order to control electromagnetic radiation noise emitted from the communication cable, a ferrite core needs to be mounted at the base of the cable.

1) Mount the ferrite core at the base of the communication cable.

Commendable ferrite core
: ZCAT 3035-1330 from TDK

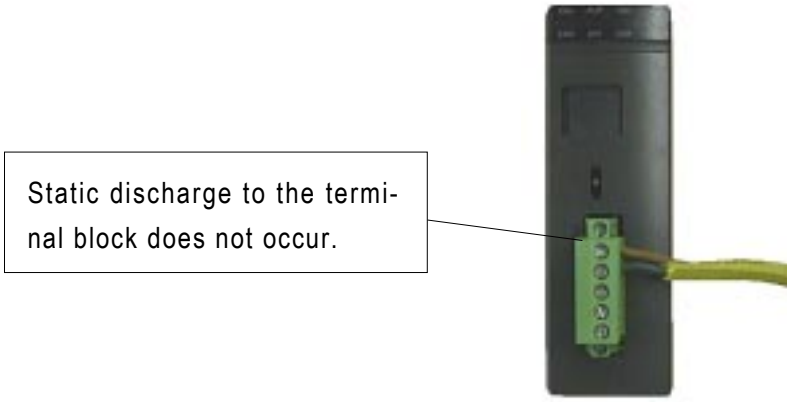
Note:
If vibration or shock is applied to the product, a strong force due to the weight of the ferrite core may act on the cable to damage it. Be sure to affix the cable to a firm object such as a duct so that the cable does not swing under vibration.

* Ferrite core mounting may be unnecessary if all of the communication cable is laid only inside the metal enclosure, or even when it is laid outside the metal enclosure, if it is laid in EMI shielding tube or metal tube so that no noise leaks out.

Section2 Conformance with CE marking

(4) Precautions for using the "AS-i" master module (NP1L-AS1)

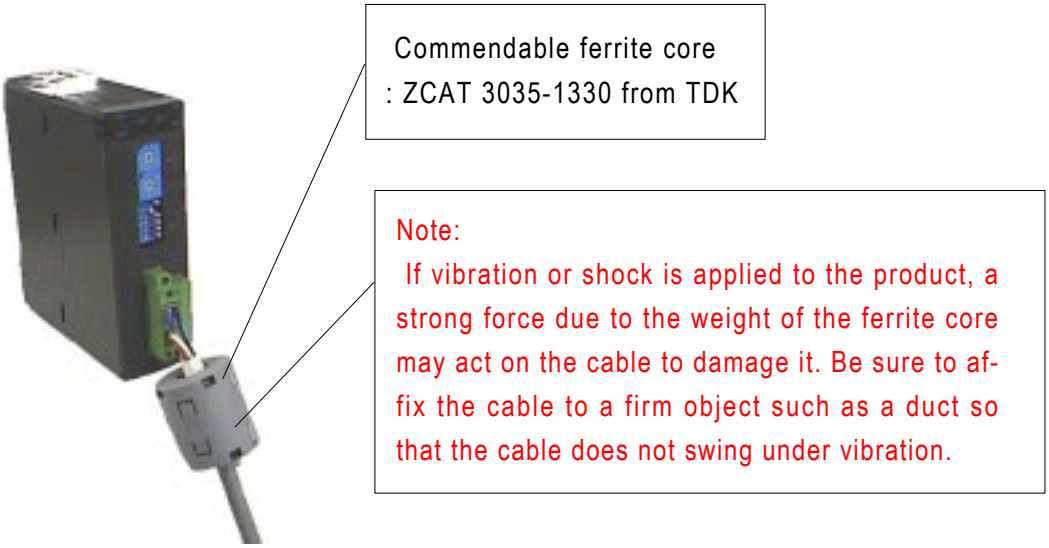
When the "AS-i" module is used, the operator who works on the terminal block for connecting the signal cable must discharge static electricity accumulated on his body by means of a static elimination band or the like before touching the terminal block so that static discharge to the terminal block does not occur.



(5) DeviceNet master module (NP1L-DN1)

When the "DeviceNet" master module is used, be sure to take the following measure.

1) Mount the ferrite core at the base of the communication cable.



* Ferrite core mounting may be unnecessary if all of the communication cable is laid only inside the metal enclosure, or even when it is laid outside the metal enclosure, if it is laid in EMI shielding tube or metal tube so that no noise leaks out.

2) Affix the static electricity-preventive insulating sheet on the station number-setting switch. Take measures to prevent static discharge to the terminal block for the signal cable.

Affix the static electricity preventive insulating sheet to the station number-setting switch.

When a station number needs to be changed while the module is operating, it is once necessary to remove the insulating sheet for this work. For this operation, the operator must remove static electricity accumulated on his body by means of a static elimination band or the like before touching the station number-setting switch.

Affix the insulating sheet supplied with the product on the station number-setting switch.

Note: For the purpose of explanation, a colored sheet is used in the photo at left. The actual insulating sheet supplied with the product is transparent.

Static discharge to the terminal block does not occur.

(6) Measures for the positioning modules

When one of the following modules is used, a ferrite core needs to be mounted at the base of all the cables connected to the module as well as the power and FG cables leading to the power module mounted on the baseboard on which the positioning module is also mounted.

NP1F-HC2/NP1F-HC8

NP1F-HP2/NP1F-MP2/NP1F-MA2

Wire to a power supply and grounding wire

Commendable ferrite core
: ZCAT 3035-1330 from TDK

Note:
If vibration or shock is applied to the product, a strong force due to the weight of the ferrite core may act on the cable to damage it. Be sure to affix the cable to a firm object such as a duct so that the cable does not swing under vibration.

Section3
Adaptation to UL standard / Lloyd's Register of Shipping / NK

3-1 Adaptation to UL standard

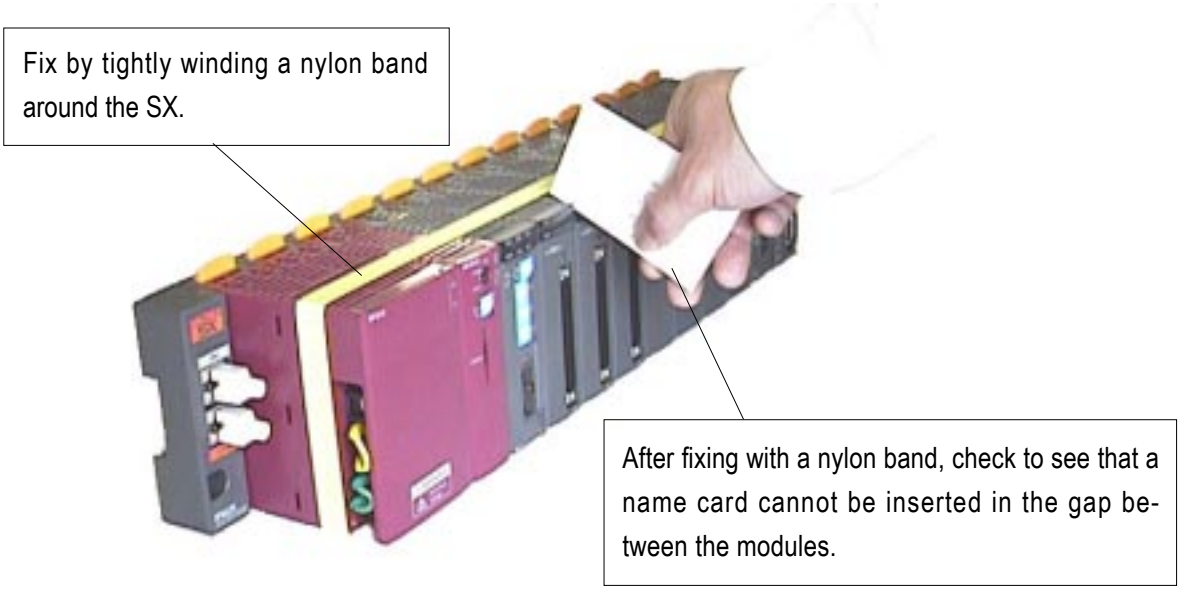
No restriction

3-2 Adaptation to Lloyd's Register of Shipping / NK

Ship standards such as Lloyd's Register of Shipping and NK (Nippon Kaiji Kyokai) are almost the same as that for CE marking, except that vibration- related rules are more severe in the former than in the latter.

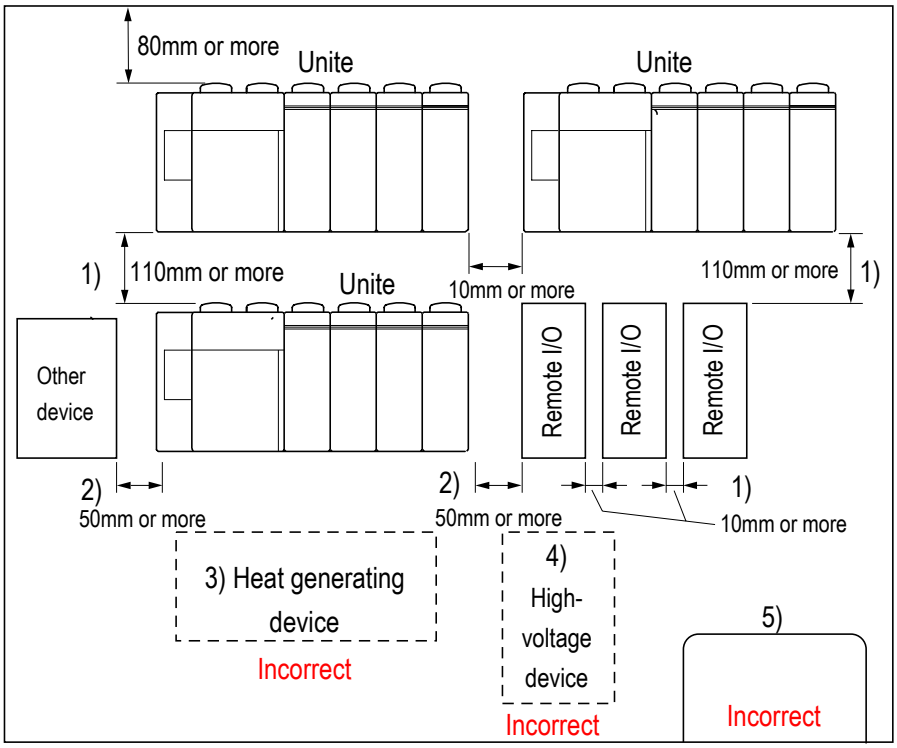
Therefore, when a MICREX-SX Series product is used for marine equipment, tightly wind a strong nylon band around the entire PLC so that the modules come in close contact with each other, as shown in the figure below.

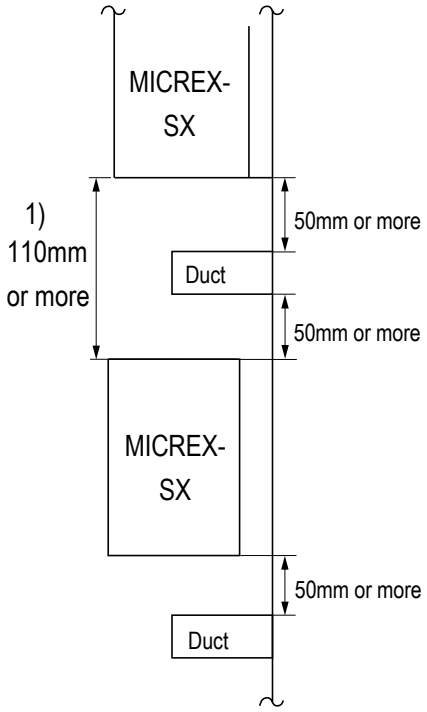
A guideline for checking the propriety of the contact is whether or not a name card can be inserted in between the modules.

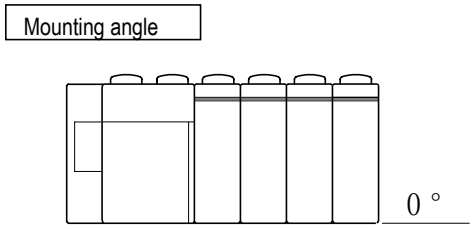


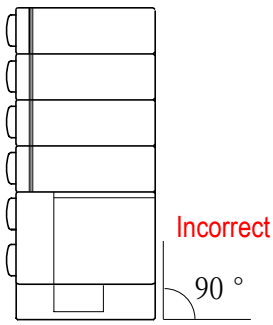
Section4 Installing the PC & Wiring of power supply

4-1 Installing PC uints









Keep an open space as follows:

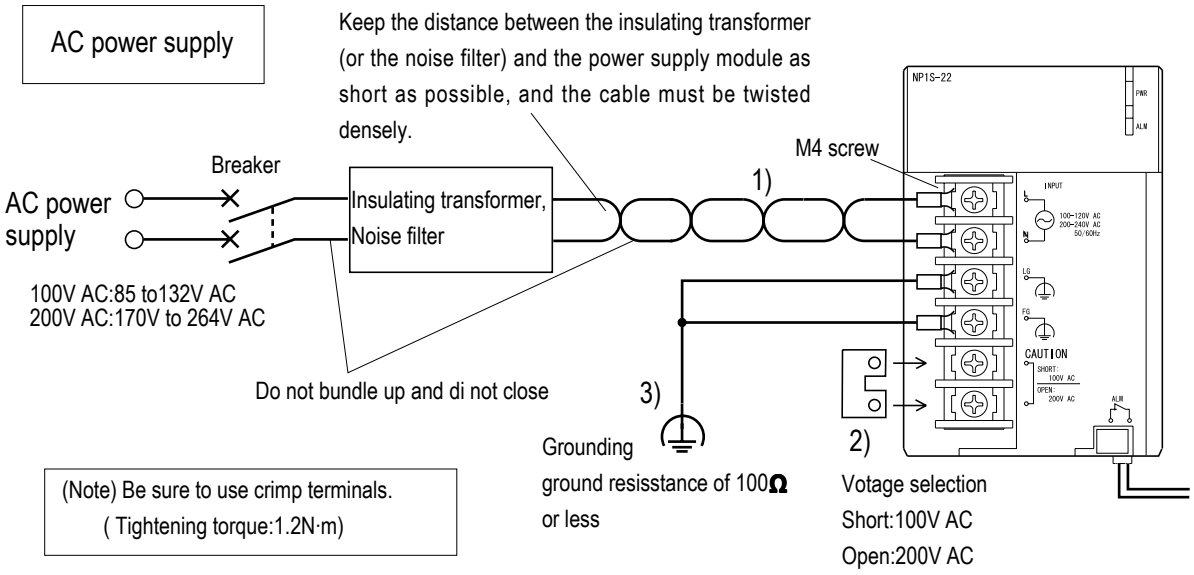
1) Keep an open space of 110mm (vertical) or 10mm (horizontal) between the PC unites, between remote I/O modules the PC unit and remote I/O module.

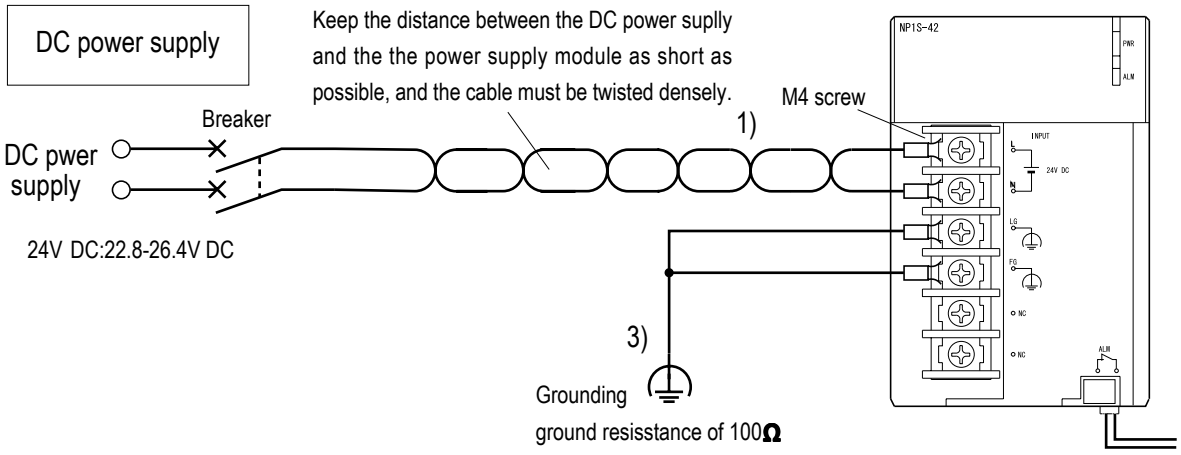
Note: When the base board is mounted on a DIN rail, keep an open space of 80mm in consideration of mounting bracket dimensions and the workability.

2) Keep an open space of 50mm between the PC unit and other device and between the PC unit and the wall to obtain sufficient ventilation.
3) Avoid installing heat generating devices (heaters, transformers, or resistors) underneath the PC unit.
4) Shield or separate the PC unit as far from high voltage device, high-voltage cables, or power equipment as possible. Avoid installing PC I/O cables unit and high-voltage or power equipment cables in parallel.
5) Install the PC unit perpendicular to the panel floor.
6) The PC must be installed in a vertical position. Do not install the PC in other position.

Section4 Installing the PC & Wiring of power supply

4-2 Wiring of power supply





1) Wiring of power supply

For AC power supply

Wire to a 100 to 120V AC or 200 to 240V AC power supply.

The thickness of the wire must be 2mm^2, and the wire must ne twisted densely.

For DC power supply

Wire to a 24V DC power supply (22.8-26.4V DC).

The thickness of the wire must be 2mm^2, and the wire must ne twisted densely.

[Tips]

The tolerance range of MICREX-SX AC power supply is 85 to 132V AC for 100V AC, and 170 to 264V AC for 200V AC. But the voltage is recommended to be as near the rated voltage (100 to 110V AC, 200 to 220V AC) as possible.

In the case of the lower voltage, a small voltage drop will cause a power failure. In the case of the higher voltage, the heating value of the power supply module increases and it reduces the life of the module. If power supply voltage fluctuation exceeds the specified range, connect a voltage stabilizer to the power supply.

For noise reduction of the power supply, an insulating transformer or a noise filter is effective between the breaker and the power supply module. Take care of the following points:

- Do not bundle up or do not close the insulating transformer or the noise filter.
- Keep the distance between the insulating transformer (or the noise filter) and the power supply module as short as possible, and the cable must be twisted densely.

Section4 Installing the PC & Wiring of power supply

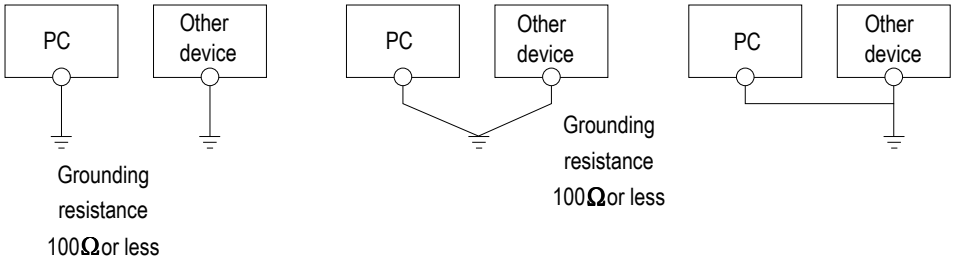
2) Voltage selection (for only AC power supply)

100V AC : Short (using a jumper cable)

200V AC : Open

3) Grounding

- Connect the FG terminal to the integrated ground section of each control panel (FG bus, FG integrated terminal block, or stud) in branch-type configuration. The thickness of the ground wire must be 2mm^2. Allocate the grounding point as near the module as possible, and keep the ground wire as short as possible.
- The integrated ground section of each control panel must be connected to the integrated ground board, which is installed according to the distribution of devices in a branch-type configuration. The thickness of the ground wire must be 5.5mm^2 or more.
- Separate the ground wire as far from the lines of high-voltage circuits and main circuit as possible. In addition, keep the distance at which they run in parallel as short as possible.
- For grounding, use an exclusive ground pole and wire which are separated from the ground system of other power cir cuits.
- The grounding should be exclusive. The grounding resistance is 100Ω or less. Separate the ground pole 10m or more from that of other power circuit.
- When installing in a place affected by frequent lighting surges, all the CPU modules and input/output modules should be electrically insulated from the control panel. Also, modules and units should be earthed to ground individually.

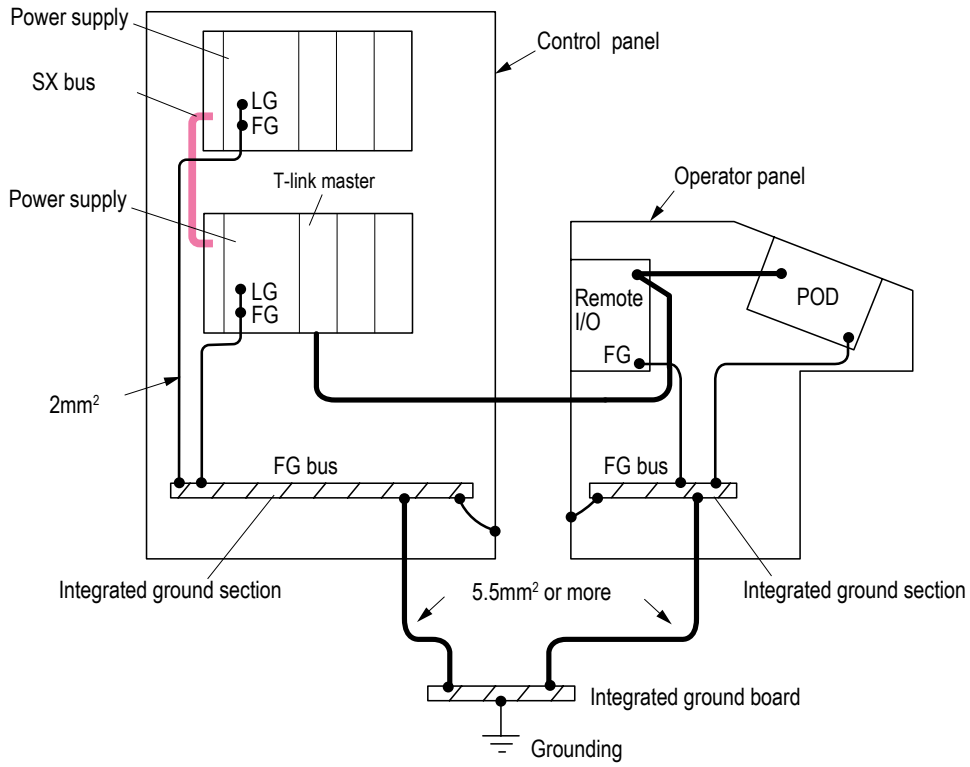


Exclusive grounding....Best Common grounding....Good Common grounding ....Not acceptable

⚠ Warning
Do not open the FG terminal with LG-FG short circuited. (It must be grounded, otherwise it might cause electric shock.)

Section4 Installing the PC & Wiring of power supply

<Grounding example>



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