ZEF005960100

For Iron and Steel Industry

ABSOCODER Converter

NCW-3DHPNM2R

Specifications & Instruction Manual

Applicable sensor:

MRE-32SP061

MRE-G[ ]SP061

MRE-32SP074

MRE-G[ ]SP074

MRE-32SP097

MRE-G[ ]SP097

MRE-32SP101

MRE-G[ ]SP101

CONTENTS

INTRODUCTION

Thank you very much for purchasing our product.
Before operating this product, be sure to carefully read this manual so that you may fully understand the product, safety instructions and precautions.

- Please submit this manual to the operators actually involved in operation.
- Please keep this manual in a handy place.

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GENERAL SAFETY RULES

● Application Limitation

This product is not designed to be used under any situation affecting human life. When you are considering using this product for special purposes such as medical equipment, aerospace equipment, nuclear power control systems, traffic systems, and etc., please consult with NSD.

This product is designed to be used under the industrial environments categorized in Class A device.
The supplier and user may be required to take appropriate measures.

● Signal Words

Safety precautions in this guide are classified into DANGER and CAUTION.

Symbol	Meaning
⚠ DANGER	Incorrect handling may cause a hazardous situation that will result in death or serious injury.
⚠ CAUTION	Incorrect handling may cause a hazardous situation that will result in moderate injury or physical damage.

Instructions accompanied by a symbol ⚠ CAUTION may also result in serious damage or injury. Be sure to follow the all instructions accompanied by the symbol.

● Graphic Symbols

Symbol	Meaning
⃠	Indicates prohibited items.
❗	Indicates items that must be performed to.

1. Handling Precautions

⚠ DANGER	
⃠	- Do not touch components inside of the converter; otherwise, it will cause electric shock. - Do not damage the cable by applying excessive load, placing heavy objects on it, or clamping; otherwise, it will cause electric shock or fire.
❗	- Turn the power supply OFF before wiring, transporting, and inspecting the converter; otherwise, it may cause electric shock. - Provide an external safety circuit so that the entire system functions safely even when the converter is faulty. - Connect the grounding terminal of the converter; otherwise, it may cause electric shock or malfunction.

⚠ CAUTION	
⃠	- Do not use the converter in the following places; water splashes, the atmosphere of the corrosion, the atmosphere of the flammable vapor, and the side of the combustibility. Doing so may result in fire or the converter may become faulty.
❗	- Be sure to use the converter and the ABSOCODER sensor in the environment designated by the general specifications in the manual. Failure to do so may result in electric shock, fire, malfunction or unit failure. - Be sure to use the specified combination of the ABSOCODER sensor, the converter and sensor cable; otherwise, it may cause fire or the converter malfunction.

2. Storage

⚠ CAUTION	
⃠	- Do not store the converter in a place exposed to water, or toxic gas and liquid.
❗	- Be sure to store the converter in designed temperature and humidity range, and do not exposed to direct sunlight. - Be sure to consult with NSD when the converter is stored for long periods.

3. Transport

⚠ CAUTION	
⃠	- Do not hold the cable or shaft of ABSOCODER sensor during transport; otherwise, it will cause injury or malfunction.

4. Installation

⚠ CAUTION	
⃠	- Do not step on ABSOCODER sensor or place heavy objects on the converter; otherwise, it will cause injury or malfunction. - Do not block the exhaust port or allow any foreign matter to enter the converter; otherwise, it will cause fire or the converter failure.
❗	- Be sure to secure the converter and ABSOCODER sensor with the provided brackets; otherwise, it may cause malfunction, injury, or drop. - Be sure to secure the specified distance between the converter and the control panel or other equipment; otherwise, it may cause malfunction.

5. Wiring

⚠ DANGER	
❗	- Be sure to secure the terminal block firmly; otherwise, it will cause fire. - Be sure to mount the terminal cover provided with the converter, before supplying the power, starting operation after the installation, and wiring; otherwise, it may cause electric shock.

⚠ CAUTION	
❗	- Be sure to keep the sensor cable, control cable, and communication cable at least 300 mm away from the main circuit and power line; otherwise it may cause injury or malfunction. - Be sure to connect all cables correctly; otherwise, it may cause injury or malfunction. - Be sure to firmly connect the external I/O connectors and sensor connectors; otherwise, it may cause incorrect inputs and outputs or injury.

6. Operation

⚠ CAUTION	
⃠	- Do not change the converter 's function switch settings during the operation; otherwise, it will cause injury. - Do not approach the machine after instantaneous power failure has been recovered. Doing so may result in injury if the machine starts abruptly.
❗	- Be sure to check that the power supply specifications are correct; otherwise, it may cause the converter failure. - Be sure to provide an external emergency stop circuit so that operation can be stopped with power supply terminated immediately. - Be sure to conduct independent trial runs for the converter before mounting ABSOCODER sensor to the machine; otherwise, it may cause injury. - When an error occurs, be sure to eliminate the cause, ensure safety, and reset the error before restarting operation; otherwise, it may cause injury.

7. Maintenance and Inspection

⚠ CAUTION	
⃠	- Do not disassemble, remodel, or repair the unit; otherwise, it will cause electric shock, fire, and unit malfunction.
❗	- The capacitor of the power line deteriorates through prolonged use. We recommended that the capacitor be replaced every five years to prevent secondary damage.

8. Disposal

⚠ CAUTION	
⃠	- Be sure to handle the converter and ABSOCODER sensor as industrial waste while disposing of it.

REVISION HISTORY

The Document No. appears at the upper right of this manual's cover page.

Document No.	Date	Revision Description
ZEF005960100	13, Mar., 2018	1st Edition Japanese document: ZEF005960000

- MEMO -

1. OVERVIEW

NCW-3DHPNM2R (hereinafter referred to as NCW-3DHPN) is an ABSOCODER converter, a slave unit for PROFINET, can communicate with PROFINET. With the use of NCW-3DHPN in combination with the multi-turn type of ABSOCODER sensor, the machine position can be detected. The detected position data can be transmitted to the programmable logic controller (PLC) and industrial computer through the PROFINET communication.
Or, the PLC and industrial computer can readout the converter status information and set parameters.

This manual assumes that NCW-3DHPN and a programmable controller which is manufactured by Siemens AG, Inc. are connected by the network. Therefore, we explain the manual by using a configuration tool "STEP7 V14 Professional SP1" developed by Siemens AG, Inc.. For the details of the tool, refer to manual of the "STEP7 V14 Professional SP1".
If the configuration tool is needed the definition file (GSDML file), download it from NSD website.

1-1. Features

(1) High reliability
An absolute position detection format ensures accurate position detection even if a power interruption or unexpected noise condition occurs. An origin returning operation is not required.

(2) Superior durability
ABSOCODER sensor is not used electronic parts except coils and resistance, and it features a no-contact construction excepting bearing. This sensor offers problem-free operation, even in environment where it is exposed to vibration, impact shocks, extreme temperatures, oil, and dust.

(3) Compact design
The unit's outside dimensions (39(W) x 155(H) x 93(D)) were miniaturized. DIN rail can be used, so mounting is much easier.

(4) PROFINET communication
A position, preset, alarm, and parameter data can be transmitted through the PROFINET network.
- The communication speed and format is decided by Auto-Negotiation function.

(5) Two ABSOCODER sensors can connect
The machine positions for two axes can be detected by one converter. The space-saving in the control panel can be conducted.

(6) Diagnosis function
The error information can be expressed both by PROFINET alarm data and by monitor LEDs on the converter’s front panel.

(7) Preset function
The position data can be preset to the desired value from the PROFINET controller.

(8) Configuration tool (software for configuring the system)
Settings are available by using PROFINET software.

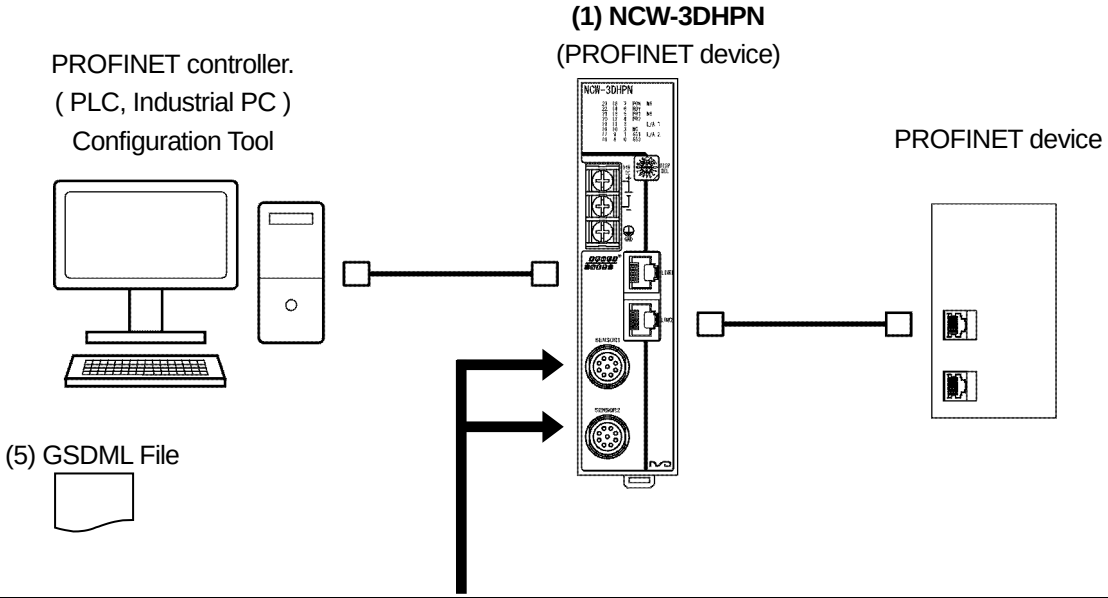
(9) Applicable with JKPEV-S cable
A commercially available cable (JKPEV-S 1.25mm^2 x 5P) can be used between the converter and ABSOCODER sensor.

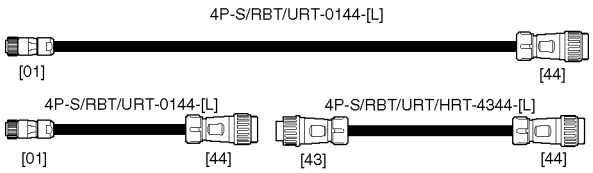
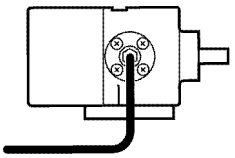
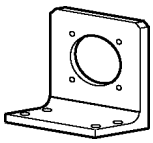
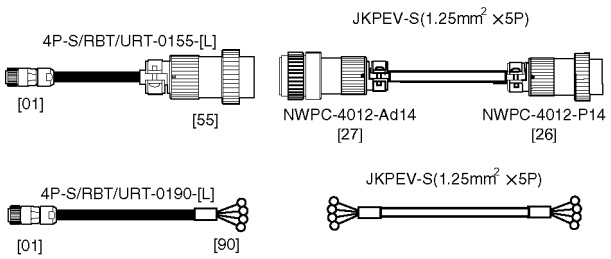
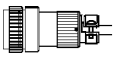
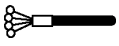
(10) Compliance with CE standards
The converter complies with CE (EMC Directive) standards.

2. MODEL SELECTION WHEN ORDERING

The following figure indicates the connection configuration of NCW-3DHPN.
Before ordering, refer to the connection configuration and model list. Please prepare by customer except (1) to (5) in the connection configuration.

● Connection configuration



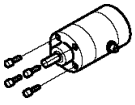
(3) Extension sensor cable	(2) ABSOCODER sensor		(4) Option
In the case of using the NSD special cable  	Connector type B 	MRE-[ ]SP061 MRE-[ ]SP074 MRE-[ ]SP097 MRE-[ ]SP101 	RB-01 L type flange for MRE-[ ]SP061 
In the case of using the commercially available cable  	P  R 		

● Model List

◆Converter

No.	Model	Description
①	NCW-3DHPNM2R	For multi-turn type ABSOCODER sensor Position data 17-bit binary code output

◆ABSOCODER sensor

No.	Model	Description	
(2)	MRE-[1]SP061FK[3]	General environment type Flange-mount type With Interconnecting cable 2m	[1]: Total number of turns 32, G64, G128, G160, G256, G320
	MRE-[1]SP074[2] K [3][L]-G	Compact size heavy duty type, SUS	
	MRE-[1]SP097[2] K [3][L]-G	Heavy duty type, cast iron	[1]: Total number of turns 32, G64, G128, G160, G256, G320, G512, G1280, G2048
	MRE-[1]SP101[2] K [3][L]-G	Heavy duty type, SUS	[1]: Total number of turns 32, G64, G128, G160, G256, G320, G512, G1280, G2048, G2560, G3072
	[2]: Mounting format F: Flange-mount type  L: Base-mount type  M: Face-mount type (Only available for MRE-SP074)  K: Input shaft (sunk key)  [3]: Connector type B: Standard connector for the NSD special cable (NJW-2012-PM8, manufacturer: Nanaboshi Electric Mfg.Co,Ltd.) P: Large connector for JKPEV-S cable (NWPC-4012-Ad12, manufacturer: Nanaboshi Electric Mfg.Co,Ltd.) R: Crimping terminals for JKPEV-S cable and the NSD special cable (R1.25-4) [L]: Interconnecting sensor cable length (m): 2, 5,10, 20 G: Silicon oil injected, no code: no oil injected		

◆Extension sensor cable

No.	Model	Description		
(3)	4P-S-0144-[L]	Standard cable	Standard connector	
	4P-RBT-0144-[L]	Robotic cable		
	4P-URT-0144-[L]	Semi-heat-resistant robotic cable		
	4P-S-4344-[L]	Standard cable		
	4P-RBT-4344-[L]	Robotic cable		
	4P-URT-4344-[L]	Semi-heat-resistant robotic cable		
	4P-HRT-4344-[L]	Heat-resistant robotic cable		
	4P-S-0155-[L]	Standard cable	Large connector	For JKPEV-S cable
	4P-RBT-0155-[L]	Robotic cable		
	4P-URT-0155-[L]	Semi-heat-resistant robotic cable		
	4P-S-0190-[L]	Standard cable	Crimping terminals	
	4P-RBT-0190-[L]	Robotic cable		
	4P-URT-0190-[L]	Semi-heat-resistant robotic cable		
	JKPEV-S(1.25mm^2×5P)	Commercially available cable		

[L]: Specify the cable length (m) that you need.

◆Option

No.	Model	Description
(4)	RB-01	L-type flange for MRE-32SP061, MRE-G[ ]SP061

◆GSDML

No.	Model	Description
(5)	File name: GSDML-V***-NSD_Corporation-NCW3D_PN-********xml	Download it from NSD website.

3. SPECIFICATIONS

3-1. Converter Specifications

(1) General specification

Items	Specifications
Power supply voltage	24VDC±10% (including ripple)
Power consumption	10W or less
Insulation resistance	20 M-Ohms or more between external DC power terminals and ground (by 500 VDC insulation resistance tester)
Withstand voltage	500 VAC, 60Hz for 1 minute between external DC power terminals and ground
Vibration resistance	20m/s^2 10 to 500Hz, 10cycles of 5 minutes in 3 directions, conforms to JIS C 0040 standard
Ambient operating temperature	0 to +55°C (No freezing)
Ambient operating humidity	20 to 90 %RH (No condensation)
Ambient operating environment	Free from corrosive gases and excessive dust
Ambient storage temperature	-25 to +70°C
Grounding	Must be securely grounded (ground resistance of 100 ohm or less)
Construction	Book-shelf type within enclosure, DIN rail mountable
Outside dimension (mm)	39(W) x 155(H) x 93(D) Refer to dimensions for details.
Mass	Approx. 0.4kg

(2) Performance specification

Items	Specifications	Notes
Converter model	NCW-3DHPNM2R	
Applicable sensor	MRE-[ ]SP061, MRE-[ ]SP074 MRE-[ ]SP097, MRE-[ ]SP101	
Total number of divisions	131072 (2^{17})	
Number of effective bits	17 (D0 to D16)	
Position detection format	Absolute format	
Output code	Binary code	
Number of detection axes	2	
Position data update interval	Minimum 2ms Update time : By PROFINET communication cycle setting	
Error detection	Sensor error, Memory error, Watchdog timer error, Internal I/F error	
Auxiliary functions	Preset function	
Monitor LED	MS: Module status	PROFINET Communication monitor
	NS: Network status	
	L/A1/L/A2: Communication status	
	PON: Power ON	
	RDY: Converter normal	
	PR1/PR2: Preset operation (Current position setting)	
	ME: Memory error	
	SE1/SE2: Sensor error	
	Position data: D0 to D23	LED display changes by selecting the DISP. SEL switch.
	Preset data: D0 to D23	
	Converter's diagnosis data	
	Parameter	
	Communication diagnostic data	
Front panel operation	LED display selecting: DISP SEL	Rotary switch
Applicable standard	CE Marking (EMC directive)	

(3) Communication specification

Items		Specifications
Communication	Physical layer	Ethernet 10Base-T, 100Base-TX, ISO/IEC 8802-3
	Number of communication ports	2 (connector: RJ45)
	Communication speed	Auto-Negotiation(100Mbit/s)
	Communication format	Auto-Negotiation(Full Duplex)
	Communication cycle time(Update time)	Minimum 2 ms
	RT Class	RT Class 1
	Conformance class	Class B
	PROFINET version	PN2.3
	Basic protocol	• Internet Protocol (IP version 4) (RFC 791) • User Datagram Protocol (UDP) (RFC 768) • Transfer Control Protocol (TCP) (RFC 793) • Address Resolution Protocol (ARP) (RFC 826) • Internet Control Message Protocol (ICMP) (RFC 792) •Simple Network Management Protocol (SNMP)(RFC1157) •Link Layer Discovery Protocol (LLDP)(IEEE802.1AB) •Media Redundancy Protocol (MRP)(IEC 62439-2)
	Recommended cable	CAT-5e STP straight cable
	Cable length	Between nodes: Max. 100m
Function	IP address setting	Sets manually by using the configuration tool.
	Communication setting (Speed and format)	Sets automatically by the Auto-Negotiation.
	I&M (Identification & Maintenance)	I&M0, 1, 2, 3
	Network redundancy	MRP (Only MRC is supported.)
	Parameter settings	Axis Unavailable Error Clear Code Sequence (Position Data Increase Direction) Preset Value
	Control (OUTPUT)	Preset (PRESET) Error Clear (ERRCLR)
	Diagnosis status reference (INPUT)	Device Not Ready (NRDY) Device watchdog timer error (WDTE) Device memory error (ME) Internal I/F error (I/F ERR) Axis-n Sensor Error (SE) Axis-n Disconnected Sensor Error (SSE) Axis-n Sensor Circuit Power Error (SPF) Axis-n Sensor Data Error (DE) Axis-n Position Data
	Operation and abnormality occurrence history	Newest 32 error contents or operation histories
	Maintenance information	Cumulative energization time Writing in and reference of maintenance information
	Communication indicator	"MS" (Green / Red) : Module status "NS" (Green / Red) : Network status "L/A1" (Green) : Link status "L/A2" (Green) : Link status

3-2. ABSOCODER Sensor Specification

(1) MRE-[ ]SP061

Items		Specifications					
Sensor model		MRE-32SP061	MRE-[ ]SP061 [ ]: Total number of turns, and with a gear(G) or without gear				
			[G64]	[G128]	[G160]	[G256]	[G320]
Total number of turns		32	64	128	160	256	320
Divisions / turn		4096	2048	1024	819.2	512	409.6
Total number of divisions		131072 (2^{17})					
Mass		1.5kg	1kg				
Linearity error		0.7° Max.	1.4° Max.	2.8° Max.	3.5° Max.	5.6° Max.	7.0° Max.
Moment of inertia $GD^2/4(J)$		6.7×10^{-6}kg·m^2 (6.8×10^{-5} kgf·cm·s^2)	3.9×10^{-6}kg·m^2 (4×10^{-5} kgf·cm·s^2)				
Starting torque		4.9×10^{-2} N·m or less (0.5 kgf·cm or less)					
Permissible shaft load	Radial	98N (10 kgf)					
	Thrust	49N (5 kgf)					
Permissible mechanical speed		2000r/min	3600r/min				
Bearing life		4.5×10^4h (at 2000r/min)	1.5×10^4h (at 3600 r/min)				
Ambient temperature	Operating	-20 to +80°C					
	Storage	-30 to +90°C					
Vibration resistance		2.0×10^2 m/s^2 (20G)	98m/s^2 (10G)				
		200Hz, up/down 4 h, forward/back 2 h, conforms to JIS D 1601 standard					
Shock resistance		4.9×10^3 m/s^2 (500G)	2.9×10^3m/s^2 (300G)				
		0.5 ms, up/down/forward/back x 3 times each, conforms to JIS C 5026 standard					
Protection rating		IP65, conforms to JEM 1030 standard					
Interconnecting cable		2m					
Max. sensor cable length	4P-S	200m	300m				
	4P-RBT/URT /HRT	100m	150m				
	JKPEV-S (1.25mm^2×5P)	200m	300m				
Surface treatment		Case: electroless nickel plated Cap: anodic oxide coated	Anodic oxide coated				
Material		Case: steel Cap: aluminum	Aluminum				

(2) MRE-[ ]SP074

Items		Specifications					
Sensor model		MRE-[ ]SP074 [ ]: Total number of turns, and with a gear(G) or without gear					
		[32]	[G64]	[G128]	[G160]	[G256]	[G320]
Total number of turns		32	64	128	160	256	320
Divisions / turn		4096	2048	1024	819.2	512	409.6
Total number of divisions		131072 (2^{17})					
Mass		Flange-mount type: 3.5+0.1 x cable length (m) kg Base-mount type: 5.5+0.1 x cable length (m) kg Face-mount type: 3.0+0.1 x cable length (m) kg					
Linearity error		0.6° Max.	1.2° Max.	2.4° Max.	3.0° Max.	4.8° Max.	6.0° Max.
Moment of inertia $GD^2/4$(J)		3.3×10^{-5} kg·m^2 (3.4×10^{-4} kgf·cm·s^2)					
Starting torque		9.8×10^{-2} N·m or less (1 kgf·cm or less)					
Permissible shaft load	Radial	98N (10kgf)					
	Thrust	49N (5kgf)					
Permissible mechanical speed		4000r/min					
Bearing life		8×10^4h (at 4000r/min)					
Ambient temperature	Operating	-20 to +120°C					
	Storage	-30 to +120°C					
Vibration resistance		2.0×10^2 m/s^2 (20G) 200Hz, up/down 4 h, forward/back 2 h, conforms to JIS D 1601 standard					
Shock resistance		4.9×10^3 m/s^2 (500G) 0.5 ms, up/down/forward/back x 3 times each, conforms to JIS C 5026 standard					
Protection rating		IP67, conforms to JEM 1030 standard					
Interconnecting cable		2・5・10・20m					
Max. sensor cable length	4P-S	300m					
	4P-RBT/URT /HRT	150m					
	JKPEV-S (1.25mm^2×5P)	300m					
Surface treatment		Not treated					
Material		Stainless					

(3) MRE-[ ]SP097 / MRE-[ ]SP101

Items		Specifications										
Sensor model		MRE-[ ]SP097 / MRE-[ ]SP101 [ ]: Total number of turns, and with a gear (G) or without gear										
		[32]	[G64]	[G128]	[G160]	[G256]	[G320]	[G512]	[G1280]	[G2048]	*1 [G2560]	*1 [G3072]
Total number of turns		32	64	128	160	256	320	512	1280	2048	2560	3072
Divisions / turn		4096	2048	1024	819.2	512	409.6	256	102.4	64	51.2	42.6
Total number of divisions		131072 (2^{17})										
Mass		7+0.1 x cable length (m) kg										
Linearity error		0.6° Max.	1.2° Max.	2.4° Max.	3.0° Max.	4.8° Max.	6.0° Max.	9.6° Max.	24° Max.	38.4° Max.	48° Max.	56° Max.
Moment of inertia $GD^2/4$(J)		3.3×10^{-5}kg·m^2 (3.4×10^{-4} kgf·cm·s^2)										
Starting torque		9.8×10^{-2}N·m or less (1 kgf·cm or less)										
Permissible shaft load	Radial	1.5×10^2 N (15kgf)										
	Thrust	78N (8kgf)										
Permissible mechanical speed		4000r/min										
Bearing life		8×10^4h (at 4000r/min)										
Ambient temperature	Operating	-20 to +120℃										
	Storage	-30 to +120℃										
Vibration resistance		2.0×10^2m/s^2 (20G) 200Hz, up/down 4 h, forward/back 2 h, conforms to JIS D 1601 standard										
Shock resistance		4.9×10^3m/s^2 (500G) 0.5 ms, up/down/forward/back x 3 times each, conforms to JIS C 5026 standard										
Protection rating		IP67, conforms to JEM 1030 standard										
Interconnecting cable		2・5・10・20m										
Max. sensor cable length	4P-S	300m										
	4P-RBT/URT /HRT	150m										
	JKPEV-S (1.25mm^2×5P)	300m										
Surface treatment		MRE-[ ]SP097: coated (epoxy resin) MRE-[ ]SP101: not treated										
Material		MRE-[ ]SP097: Cast iron MRE-[ ]SP101: stainless										

*1: MRE-G2560SP097 and MRE-G3072SP097 cannot be selected.

3-3. Extension Sensor Cable Specification

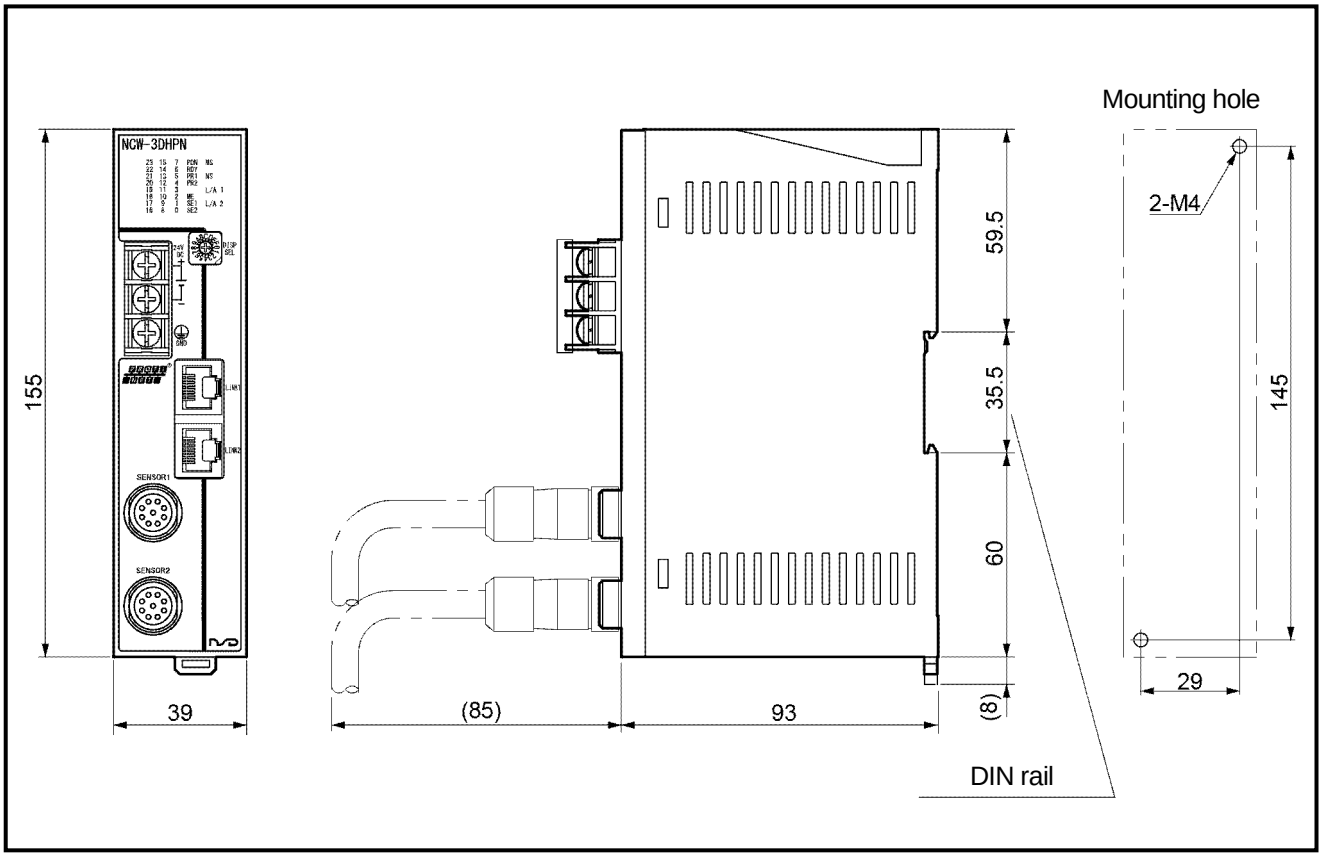
Items	Specifications			
Model code	4P-S	4P-RBT	4P-URT	4P-HRT
Cable type	Standard cable	Robotic cable	Semi heat-resistant robotic cable	Heat-resistant robotic cable
Diameter	ϕ8			
Operating temperature range	-5 to +60°C		-5 to +105°C	0 to +150°C
Insulator	Irradiated cross linked foamed polyethylene	ETFE plastic		
Sheath	Polyvinyl chloride mixture		Heat-resistant polyvinyl chloride mixture	Fluonlex
Construction	8-core, 2 pairs without shield + 2 pairs with shield			
Color	Gray	Black		
Advantage	Extensible for long distances	Superior flexibility; ideal for moving place		Heat treatment and flexible; ideal for moving place

[Remark]
Contact your NSD representative when the extension cable combines different types of cables.

4. DIMENSIONS

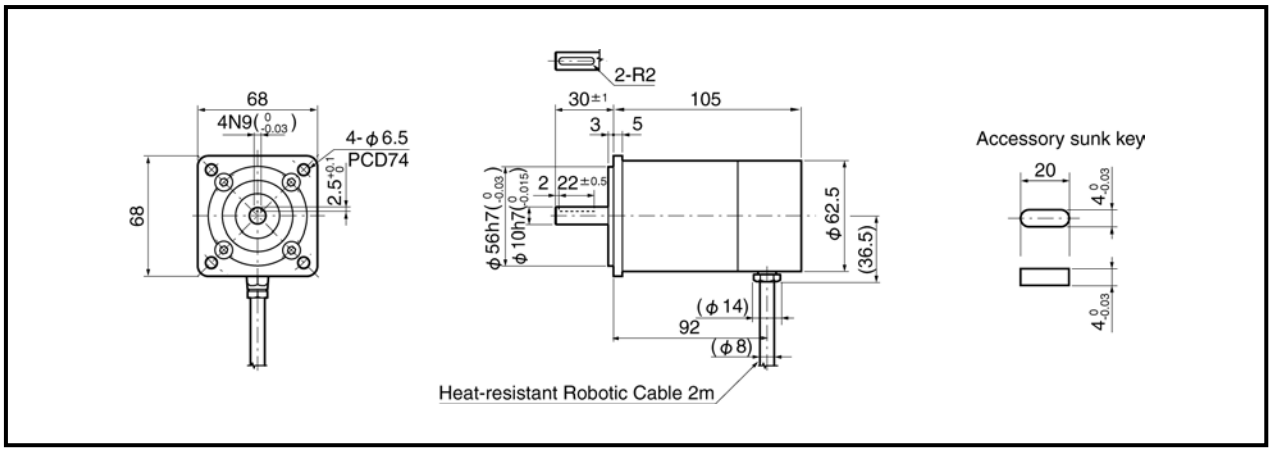
4-1. Converter Dimension

Units: mm

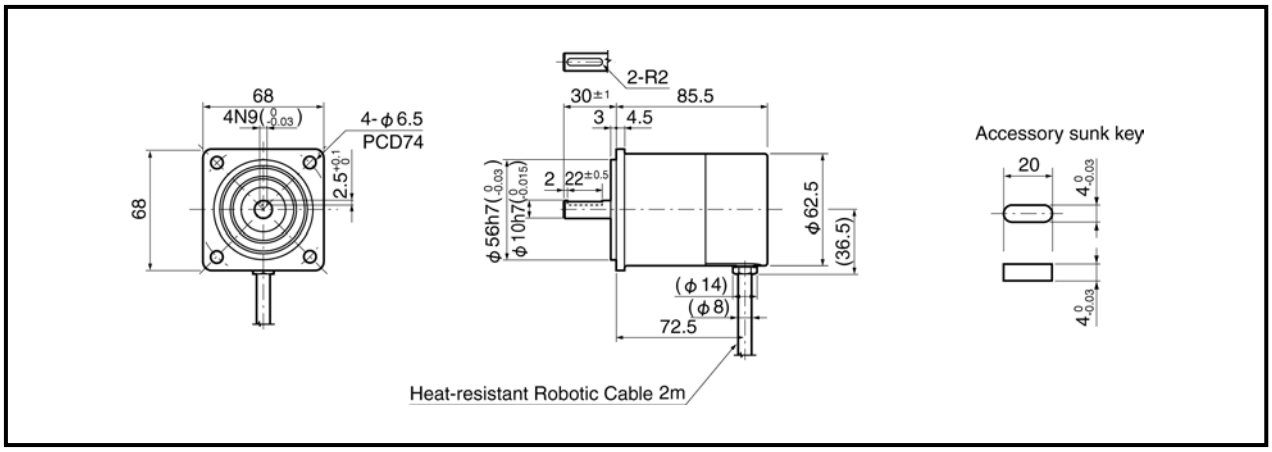


4-2. ABSOCODER Sensor Dimensions

(1) MRE-32SP061FK[ ] (Flange-mounting type) Units: mm

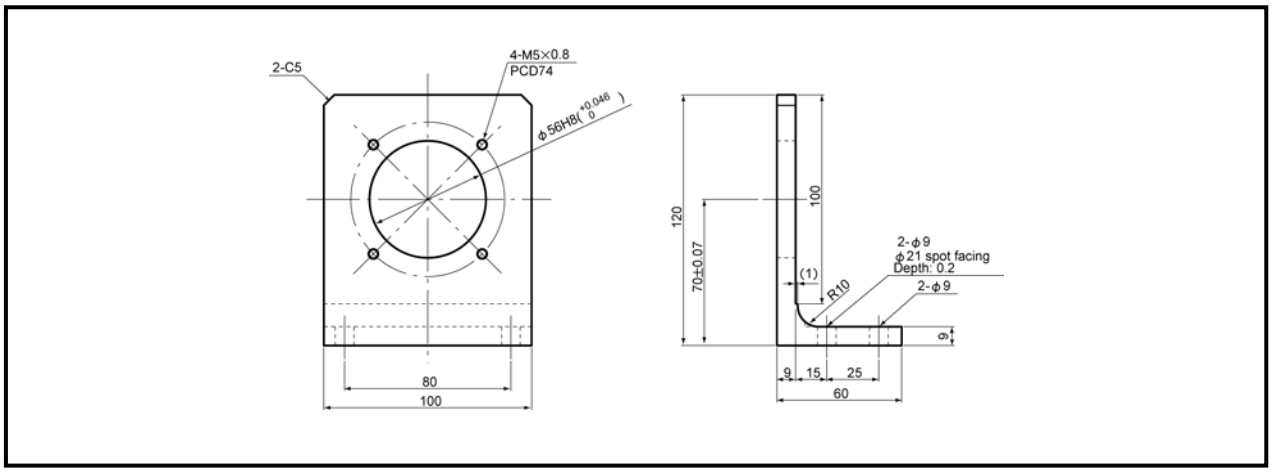


(2) MRE-G[ ]SP061FK[ ] (Flange-mount type)



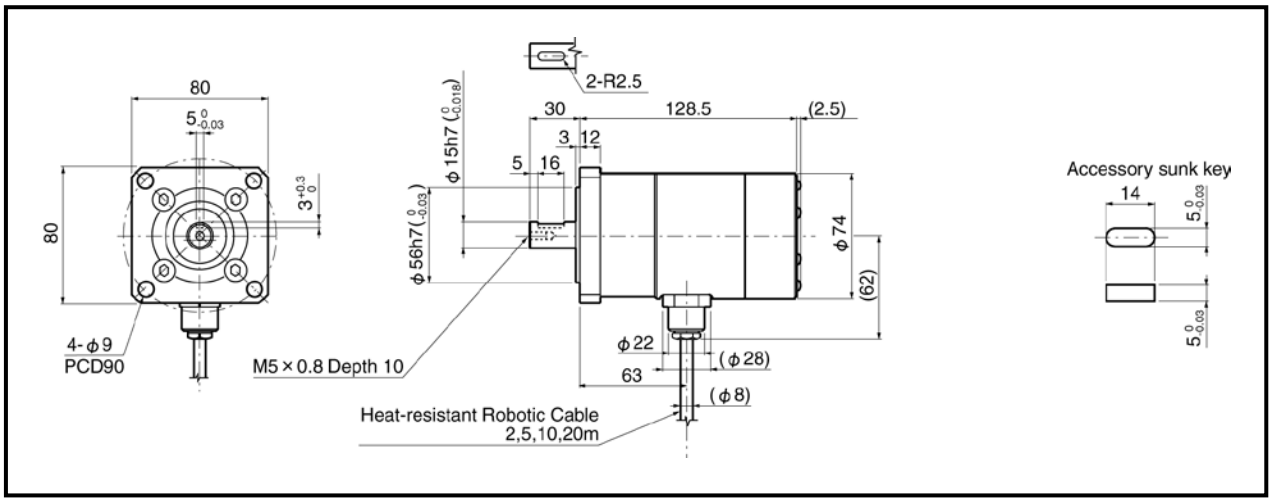
(3) Option: RB-01

L-type flange for MRE-32SP061, MRE-G[ ]SP061

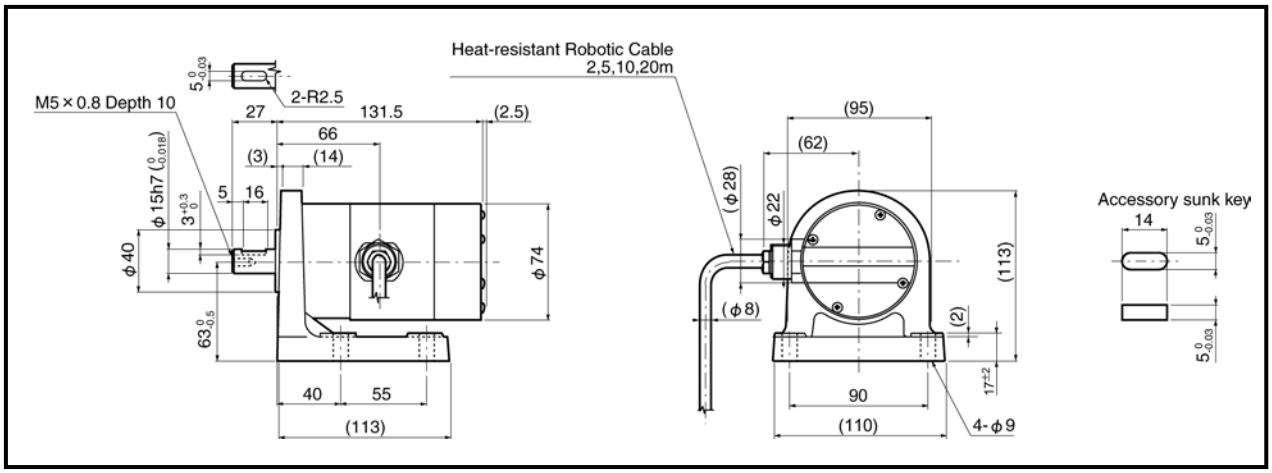


(4) MRE-[ ]SP074FK[ ] (Flange-mount type)

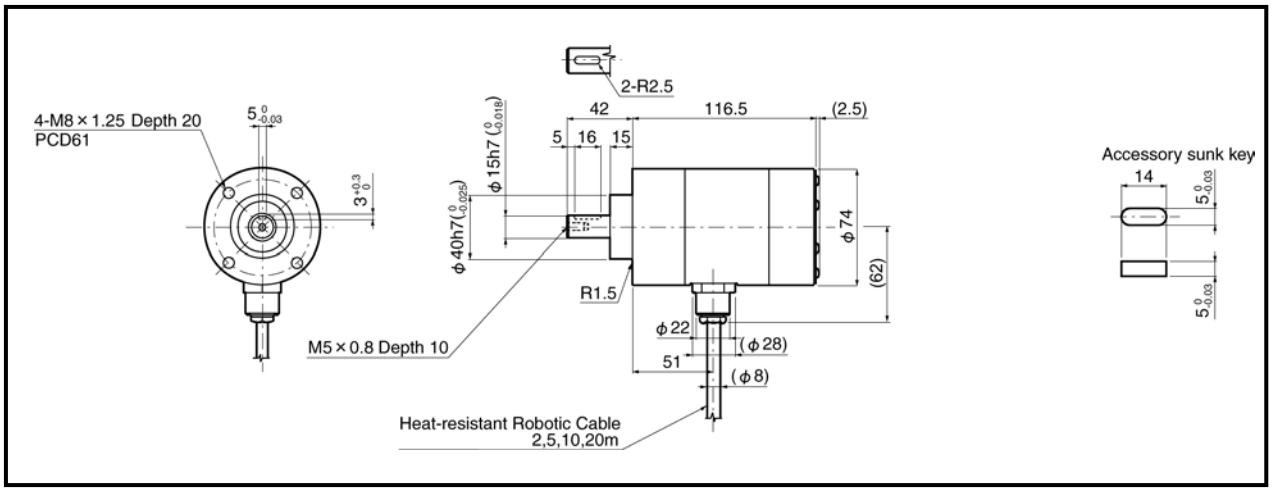
Units: mm



(5) MRE-[ ]SP074LK[ ] (Base-mount type)

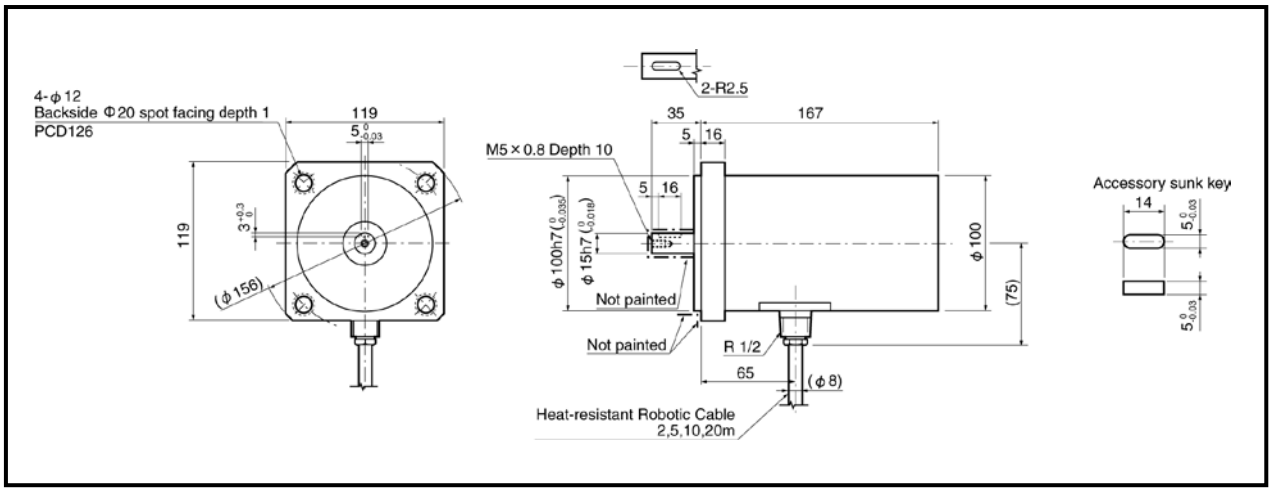


(6) MRE-[ ]SP074MK[ ] (Face-mount type)

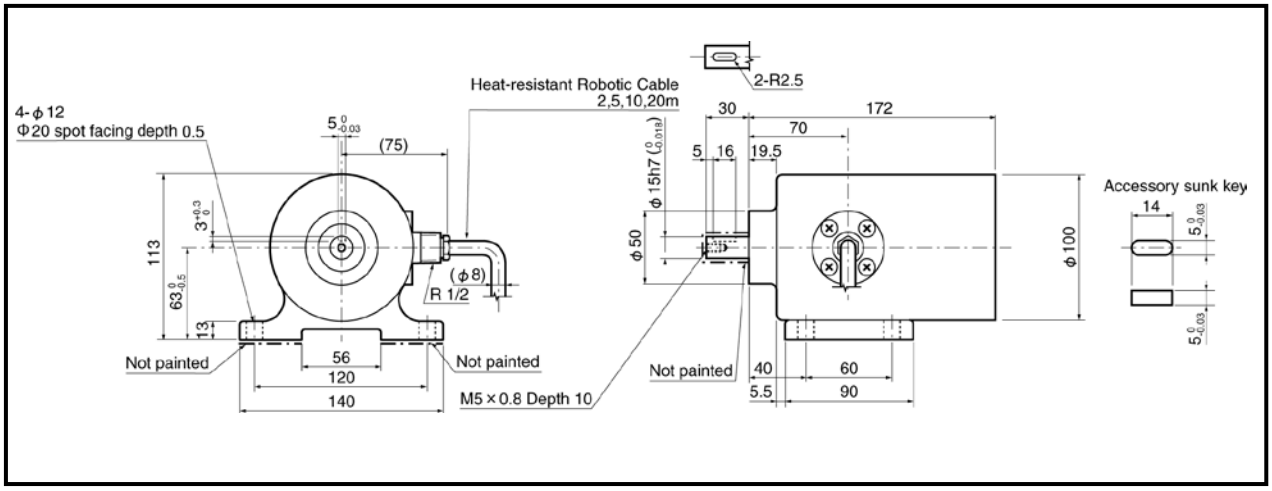


(7) MRE-[ ]SP097FK[ ] (Flange-mount type)

Units: mm

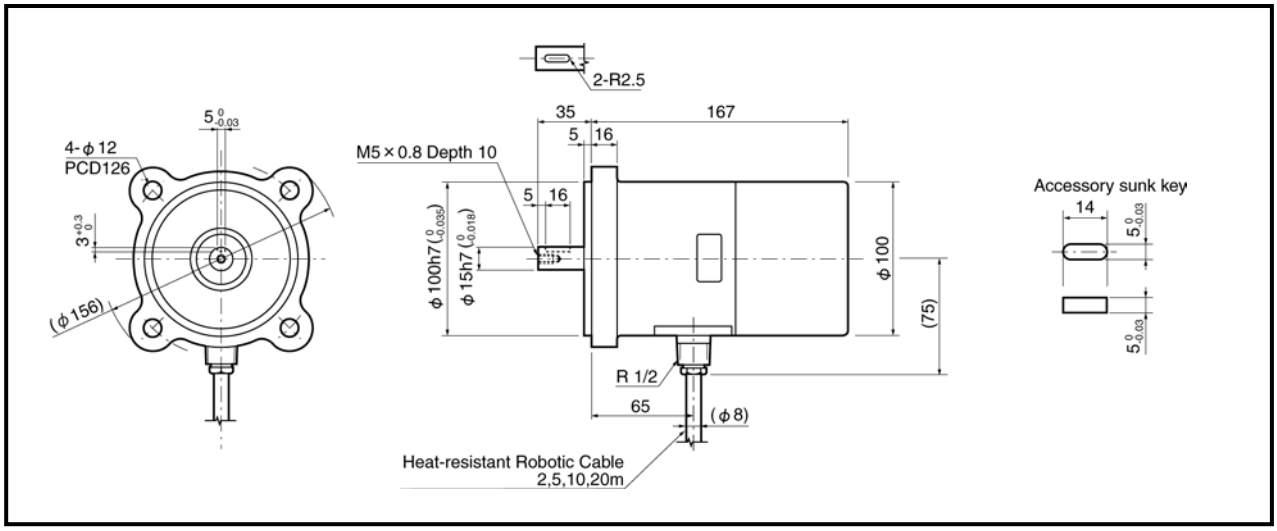


(8) MRE-[ ]SP097LK[ ] (Base-mount type)

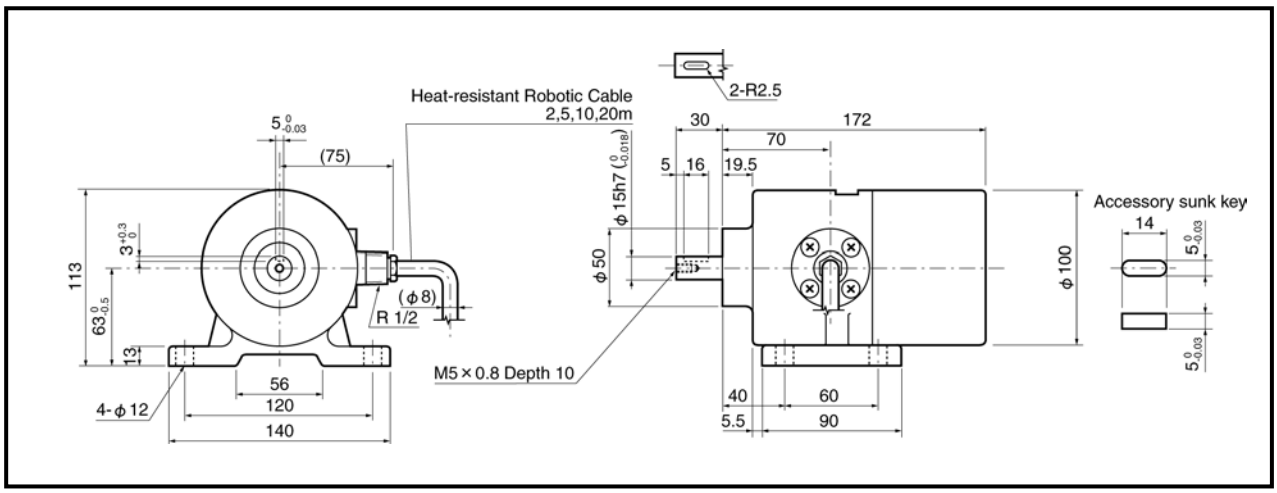


(9) MRE-[ ]SP101FK[ ] (Flange-mount type)

Units: mm

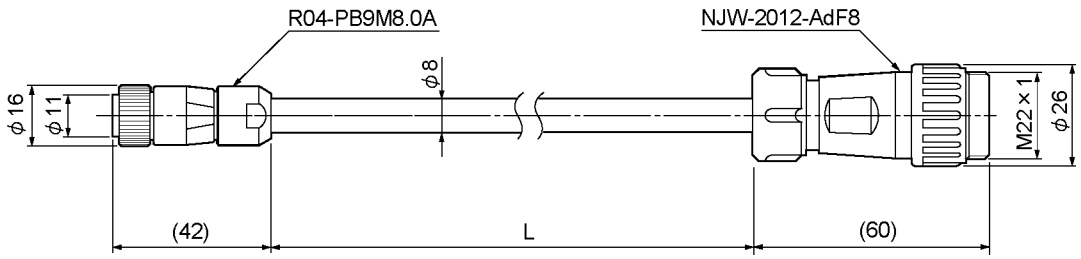


(10) MRE-[ ]SP101LK[ ] (Base-mount type)



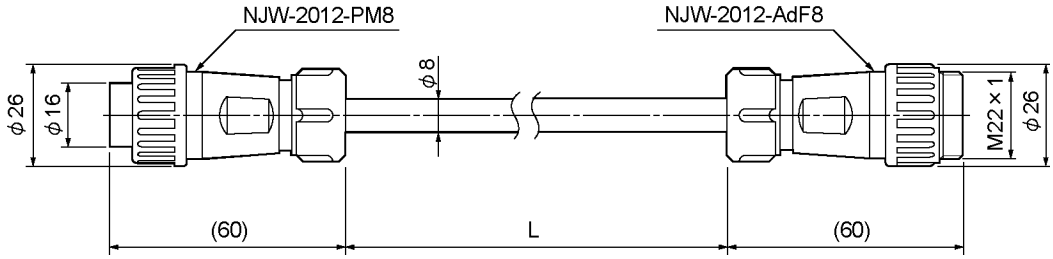
4-3. Extension Sensor Cable Dimensions

(1) 4P-S-0144-[L] / 4P-RBT-0144-[L] / 4P-URT-0144-[L] Units: mm



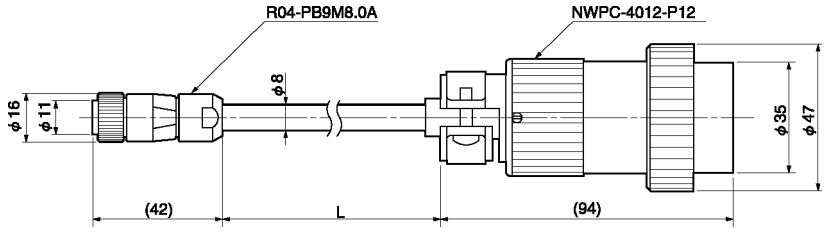
NOTE: [L] is given in terms of meter.

(2) 4P-S-4344-[L] / 4P-RBT-4344-[L] / 4P-URT-4344-[L] / 4P-HRT-4344-[L]



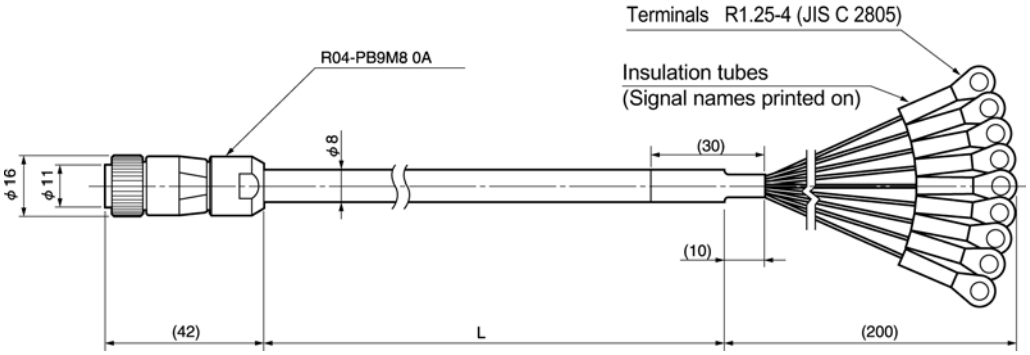
NOTE: [L] is given in terms of meter.

(3) 4P-S-0155-[L] / 4P-RBT-0155-[L] / 4P-URT-0155-[L]



NOTE: [L] is given in terms of meter.

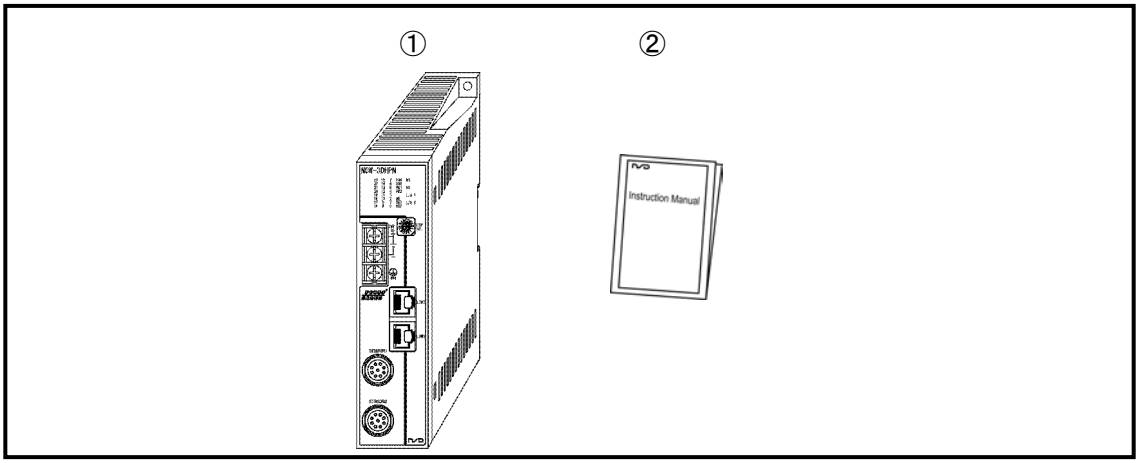
(4) 4P-S-0190-[L] / 4P-RBT-0190-[L] / 4P-URT-0190-[L]



NOTE: [L] is given in terms of meter.

5. CHECKING THE CONTENTS OF THE SHIPPING CASE

Open the packing case, and verify that all items are present.
When extension sensor cables are ordered, they are packed separately.



①Converter····· 1 unit

②Manual (Simple edition) ····· 1 piece

6. INSTALLATION

6-1. Converter Installation Conditions and Precautions

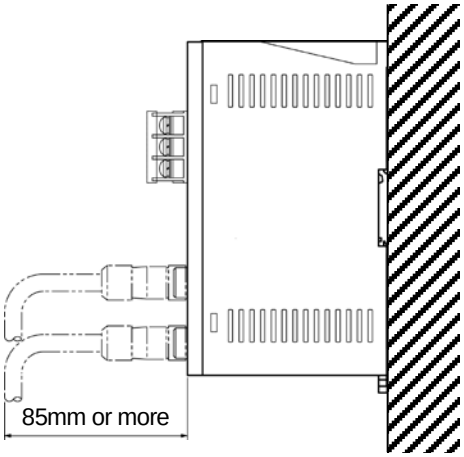
When installing the converter, the following conditions and precautions should be observed.

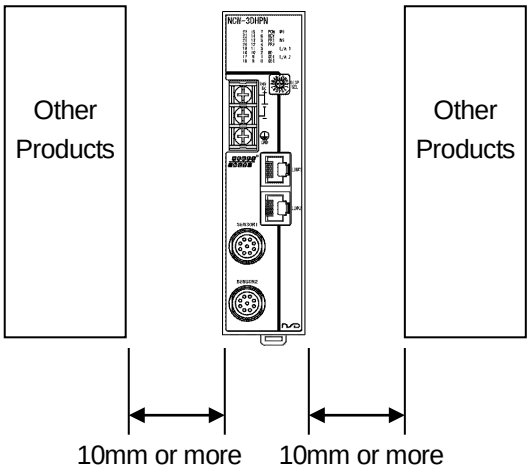
-Installation Site

(1) Avoid sites where the unit is exposed to direct sunlight.
(2) The ambient temperature should never exceed a 0 to 55°C range.
(3) The ambient humidity should never exceed a 20 to 90% RH range.
(4) Do not install the unit in areas where condensation is likely to occur (high humidity with extreme temperature changes).
(5) Avoid sites where dust is excessive.
(6) Do not install in areas with an excessive amount of salt and/or metal chips.
(7) Do not install in areas where flammable and / or corrosive gases are present.
(8) Avoid areas where splashing water, oil or chemicals are likely to occur.
(9) Avoid areas where vibration and shocks are excessive.

-Installation cautions

(1) Install inside the control cabinet.
(2) Install in a vertical direction so that the characters are visible.
(3) If a DIN rail mounting format is used, insert until the latch mechanism catches with an audible click. Secure between end plates at both sides.
(4) In high vibration areas, secure tightly with 2 M4 screws.
(5) Install as far from high voltage lines and power lines as possible in order to minimize noise influences.
(6) Allow 85mm or more space at the converter's front side for plugging in and unplugging the connector.
(7) Peripheral components should be arranged so as not to obstruct converter installation, removal, and connector plugging/unplugging.
(8) Space out 10mm or more between the converter and peripheral components in order not to obstruct the converter's heat dissipation.

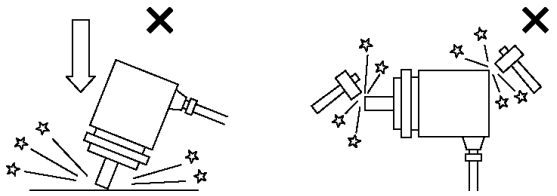
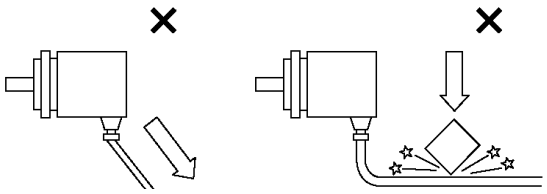




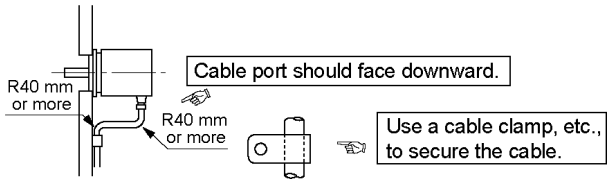
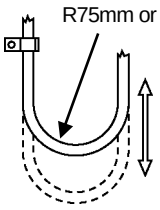
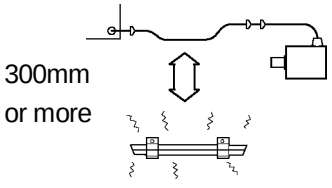
6-2. ABSOCODER Sensor Installation Conditions and Precautions

The ABSOCODER installation procedures and precautions are described in this section.

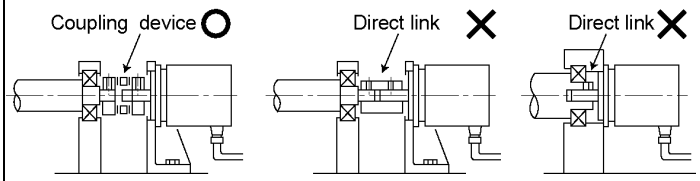
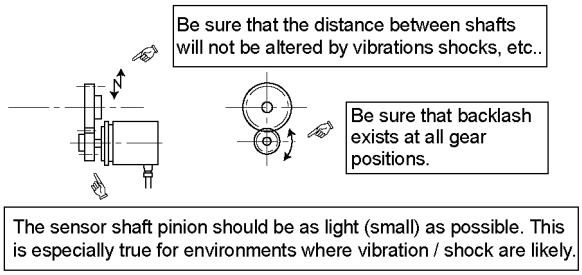
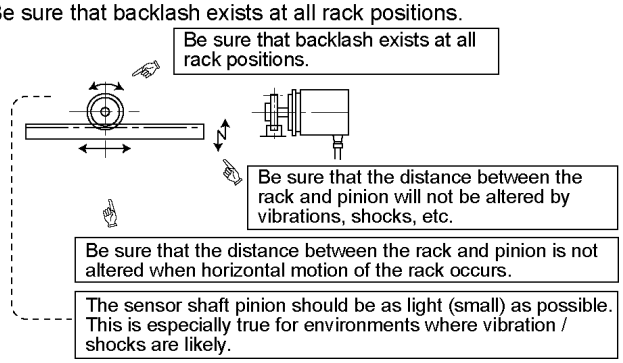
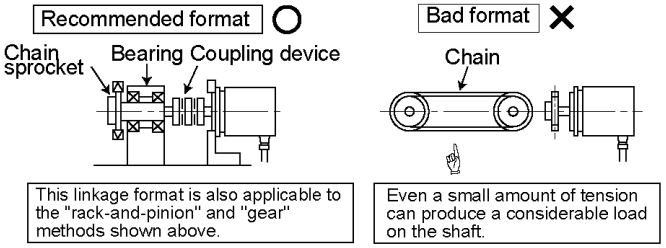
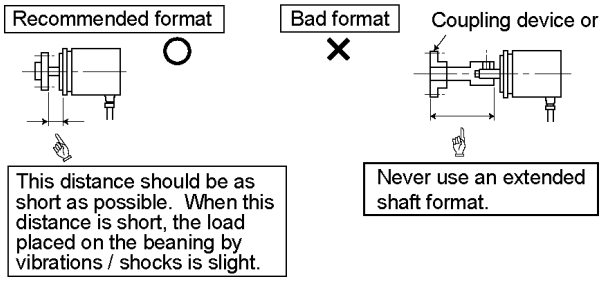
● **Handling of Turn-type ABSOCODER Sensor**

Item	Explanation
(1) Main unit	Never drop the Sensor, or subject it to excessive forces or shocks. 
(2) Cable	Avoid stepping on, or applying excessive stress to the cable. 

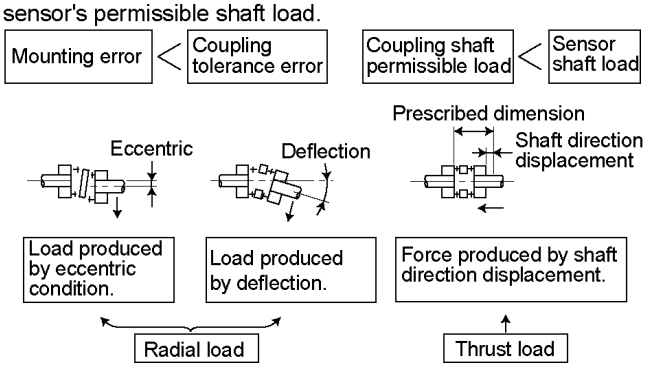
● **Mounting of Turn-type ABSOCODER Sensor**

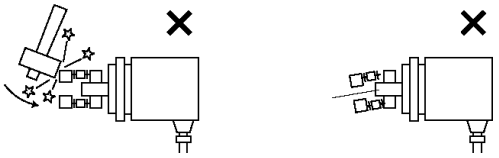
Item	Explanation	Precaution
(1) Mounting	For details regarding mounting dimensions, refer to each ABSOCODER dimensions.	
(2) Cable port	Cable port should face downward. 	
(3) Cable	The bend radius for movable parts should never be less than 75 mm(ϕ150) (robotic cable). 	Do not use the standard cable for movable parts. (Use robotic cable.)
(4) Wiring	The sensor cable should be located at least 300mm away from power lines and other lines which generate a high level of electrical noise. 	

● **Mounting of Turn-type ABSOCODER Sensor**

Item	Explanation	Precaution
(1) Coupling of machine shaft and sensor shaft	Be sure to use a coupling device to link the 2 shafts. 	A "direct-link" format will result in shaft fatigue and / or breakage after long periods. Therefore, be sure to use a coupling device to link the shafts.
(2) For gear-type linkage	If a gear linkage is used, be sure that some backlash exists. 	Incorrect gear mounting can result in shaft bending or breakage.
(3) For rack and pinion type linkage	Be sure that backlash exists at all rack positions. 	Incorrect rack and pinion mounting can result in shaft bending or breakage.
(4) Chain or timing belt linkage	When a chain or timing belt linkage format is used, there is an inherent risk of the shaft's load being increased by the resulting tension. Therefore, a bearing should be used, with the shafts being linked by a coupling device immediately behind the bearing. 	
(5) Shaft mounting position	The shaft should be attached to the coupling device or gear at a point which is as near to the sensor body as possible. 	

● **Coupling of Turn-type ABSOCODER Sensor**

<table>
<tr><th>Item</th><th>Explanation</th><th>Precaution</th></tr>
<tr><td rowspan="3">(1) Coupling device selection precaution</td><td>1. When selecting a coupling, consider factors such as the design mounting error, the coupling tolerance error, and the sensor's permissible shaft load.
 
</td><td rowspan="3">The selection of a larger coupling than necessary will increase the shaft load which is caused by the mounting error amount.

Excessive force applied to the shaft can deform the coupling and reduce durability.</td></tr>
<tr><td>2. If the selected coupling device is larger than necessary (When used in high vibration/shock environments), the load which is applied to the shaft by the vibrations/shocks will be increased by the weight of the coupling device.</td></tr>
<tr><td>3. Be sure to select a coupling device with an adequate transmission torque surplus relative to the sensor shaft's torque.</td></tr>
<tr><td>(2) Coupling device installation precaution</td><td>Avoid bending or damaging the coupling.
  </td><td></td></tr>
</table>

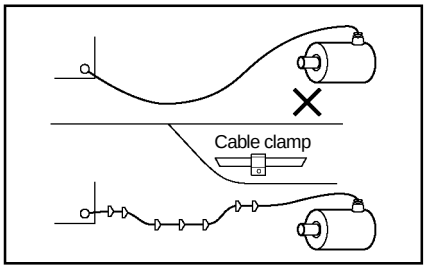
7. WIRING

7-1. Connection between Converter and ABSOCODER Sensor

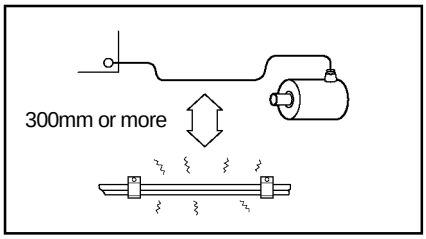
The maximum extension sensor cable length varies according to the ABSOCODER sensor and cable model being used. For more details refer to “3-2. ABSOCODER Sensor Specifications".

-Wiring Precautions

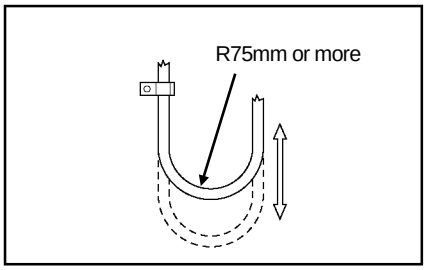
(1) The sensor cable should be clamped as shown in the right figure to prevent excessive tension from being applied to the cable connectors.



(2) The sensor cable should be located at least 300mm away from power lines and other lines which generate a high level of electrical noise.

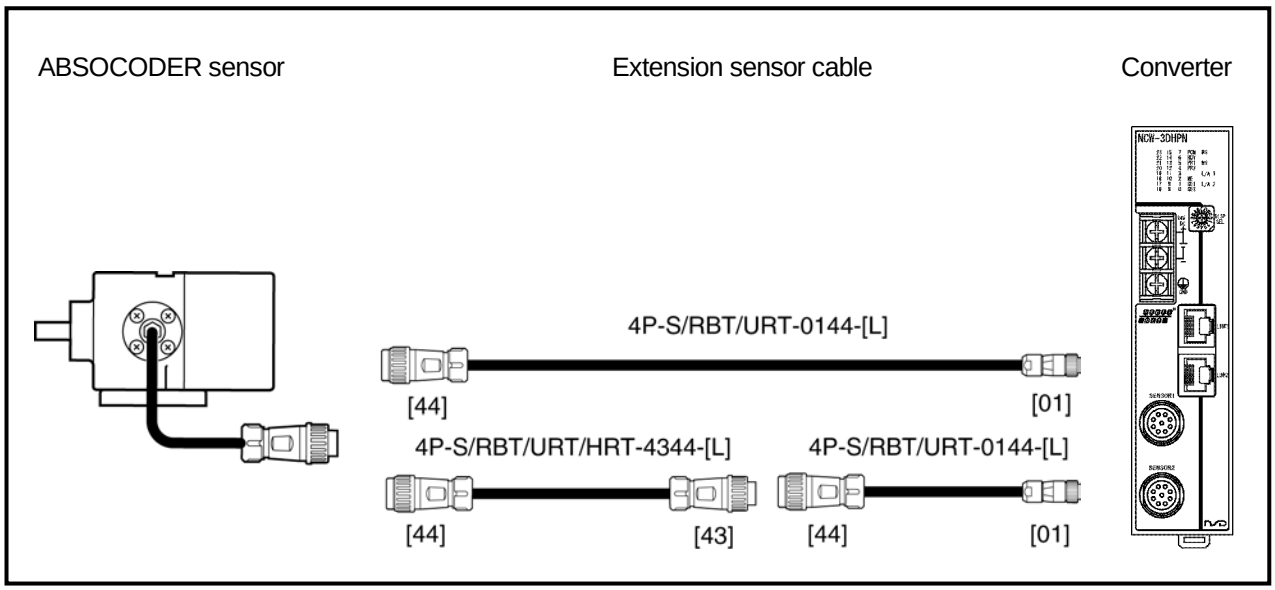


(3) If the cable is moved under the state of bending like a horseshoe, a robotic cable should be used. The bend radius should never be less than 75 mm.

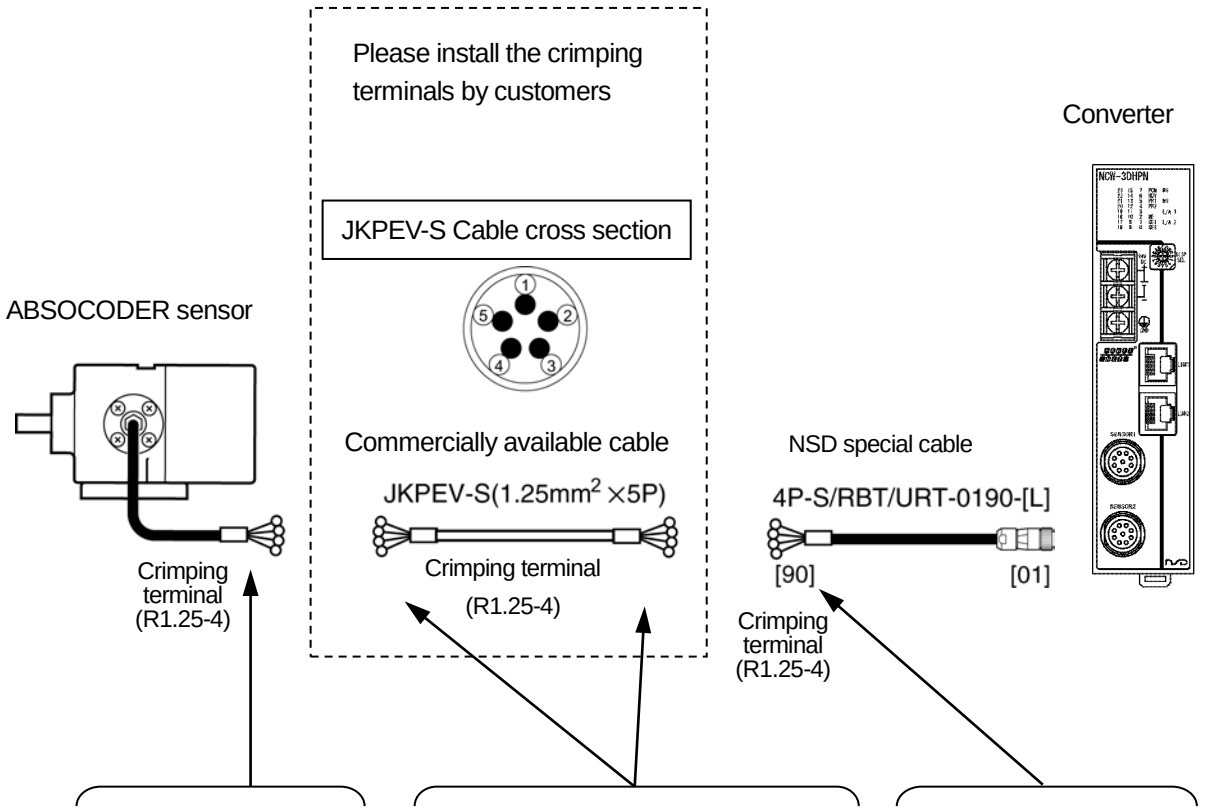


7-1-1. Connection configure example of the sensor cable

● **In the case of using the NSD special cable**



● **In the case of using the commercially available cable (JKPEV-S 1.25mm2×5P) and connecting with crimping terminals**



ABSOCODER sensor Wire color

Wire color	Signal names
Brown	SIN＋
Red	SIN－
Orange	－COS＋
Yellow	－COS－
Green	OUT1＋
Blue	OUT1－
Violet	OUT2＋
Gray	OUT2－
－	－
－	－
Shield	Shield

JKPEV-S cable Wire No. and wire color

Wire No.(pair)	Wire color	Signal names
1	White	SIN＋
	Black	SIN－
2	White	－COS＋
	Black	－COS－
3	White	OUT1＋
	Black	OUT1－
4	White	OUT2＋
	Black	OUT2－
5 (Not used)	White	－
	Black	－
	Shield	Shield

NSD special cable Wire color

Wire color	Signal names
Brown	SIN＋
Red	SIN－
Orange	－COS＋
Yellow	－COS－
Green	OUT1＋
Blue	OUT1－
Violet	OUT2＋
Gray	OUT2－
－	－
－	－
Shield	Shield

Cautions for the connection by the crimping terminal

1: The wire No. of JKPEV-S cable is printed on the surface of the white wire.

2: Unused wires of JKPEV-S cable should be severed at both ends.

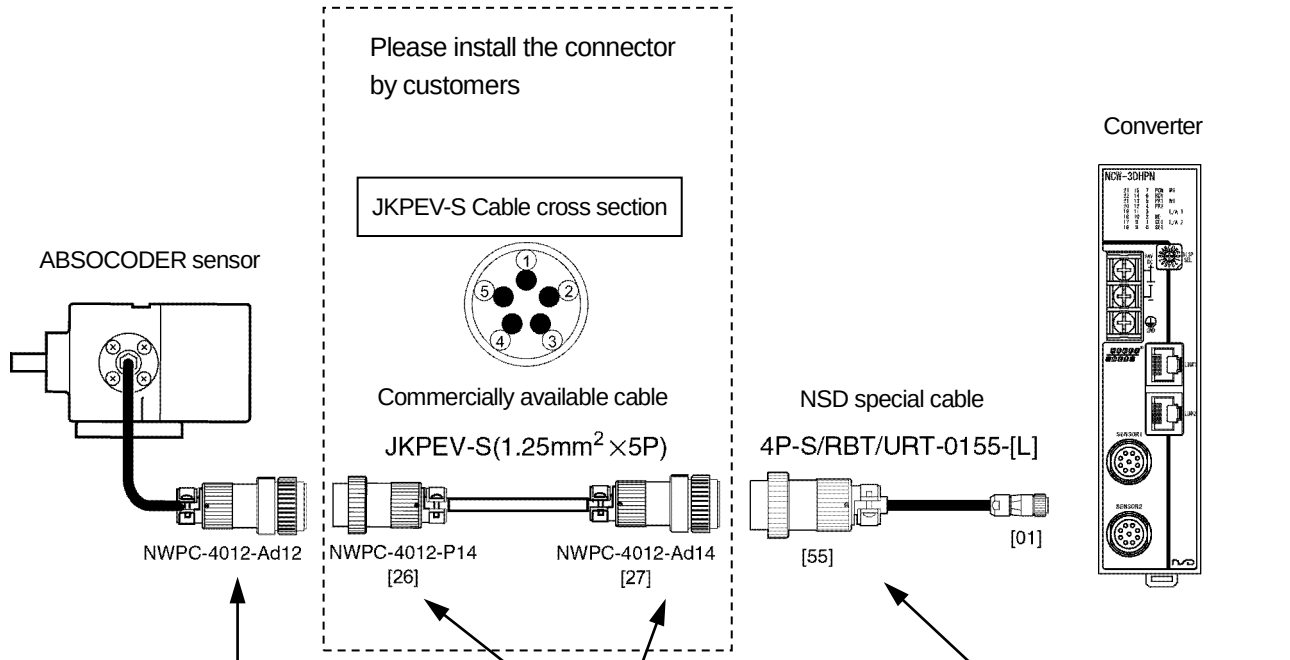
3: Twist the signal wire for preventing noises.

Combinations of the twist are following:

SIN+ and SIN－, －COS+ and －COS－, OUT1+ and OUT1－, OUT2＋ and OUT2－

4: The shield wire shouldn't be grounded.

● **In the case of using the commercially available cable (JKPEV-S 1.25mm²×5P) and connecting with a connector**



ABSOCODER sensor Connector pin No. and wire color

Pin No.	Wire color	Signal names
1	Brown	SIN＋
2	Red	SIN－
3	Orange	－COS＋
4	Yellow	－COS－
5	Green	OUT1＋
6	Blue	OUT1－
7	Violet	OUT2＋
8	Gray	OUT2－
9	－	－
10	－	－
11	Shield	Shield
12	－	－

JKPEV-S cable Connector pin No. and wire color

Pin No.	Wire No. (pair)	Wire color	Signal names
1	1	White	SIN＋
2		Black	SIN－
3	2	White	－COS＋
4		Black	－COS－
5	3	White	OUT1＋
6		Black	OUT1－
7	4	White	OUT2＋
8		Black	OUT2－
9	5 (Not used)	White	－
10		Black	－
11		Shield	Shield
12	－	－	－

NSD special cable Connector pin No. and wire color

Pin No.	Wire color	Signal names
1	Brown	SIN＋
2	Red	SIN－
3	Orange	－COS＋
4	Yellow	－COS－
5	Green	OUT1＋
6	Blue	OUT1－
7	Violet	OUT2＋
8	Gray	OUT2－
9	－	－
10	－	－
11	Shield	Shield
12	－	－

Cautions for the connection by the connector

1: The wire No. of JKPEV-S cable is printed on the surface of the white wire.

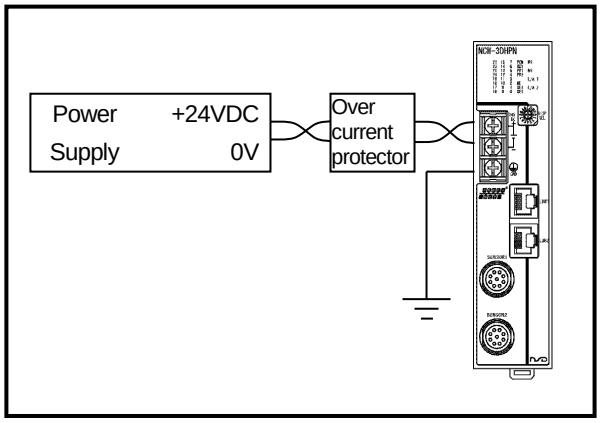
2: Unused wires of JKPEV-S cable should be severed at both ends.

7-2. Power Supply Connection

The power supply should be connected as described below:

●Power Supply

- Choose the power supply capacity which is more than twice the power consumption of the converter.
  The power consumption of the converter is 10W or less.



-The input power supply should be isolated from the commercial power supply.

- The power cable should be as thick as possible to minimize voltage drops.

-Twist the power cable for preventing noises.

-Use the M4 size crimp lug terminals with insulating sleeves in order to prevent short circuit caused by loose screws.

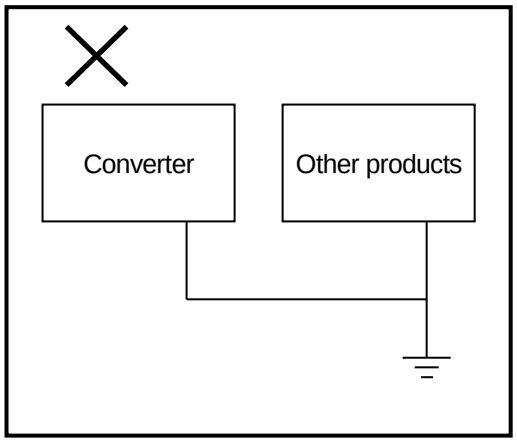
-The terminal block tightening torque is 1.8 N･m (16 lb･in).

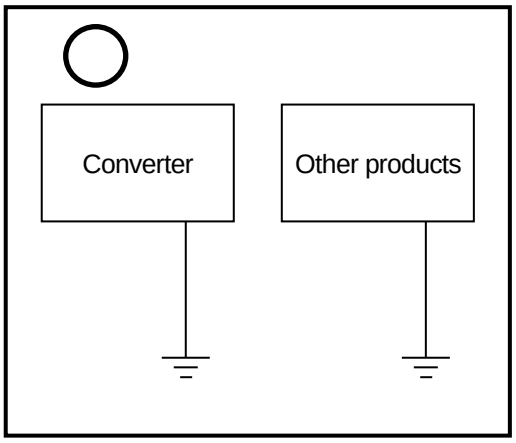
●Ground

-The unit should be securely grounded (ground resistance of 100ohm or less) to prevent electrical shocks.

-The ground wire should be connected to the ground terminal directly.

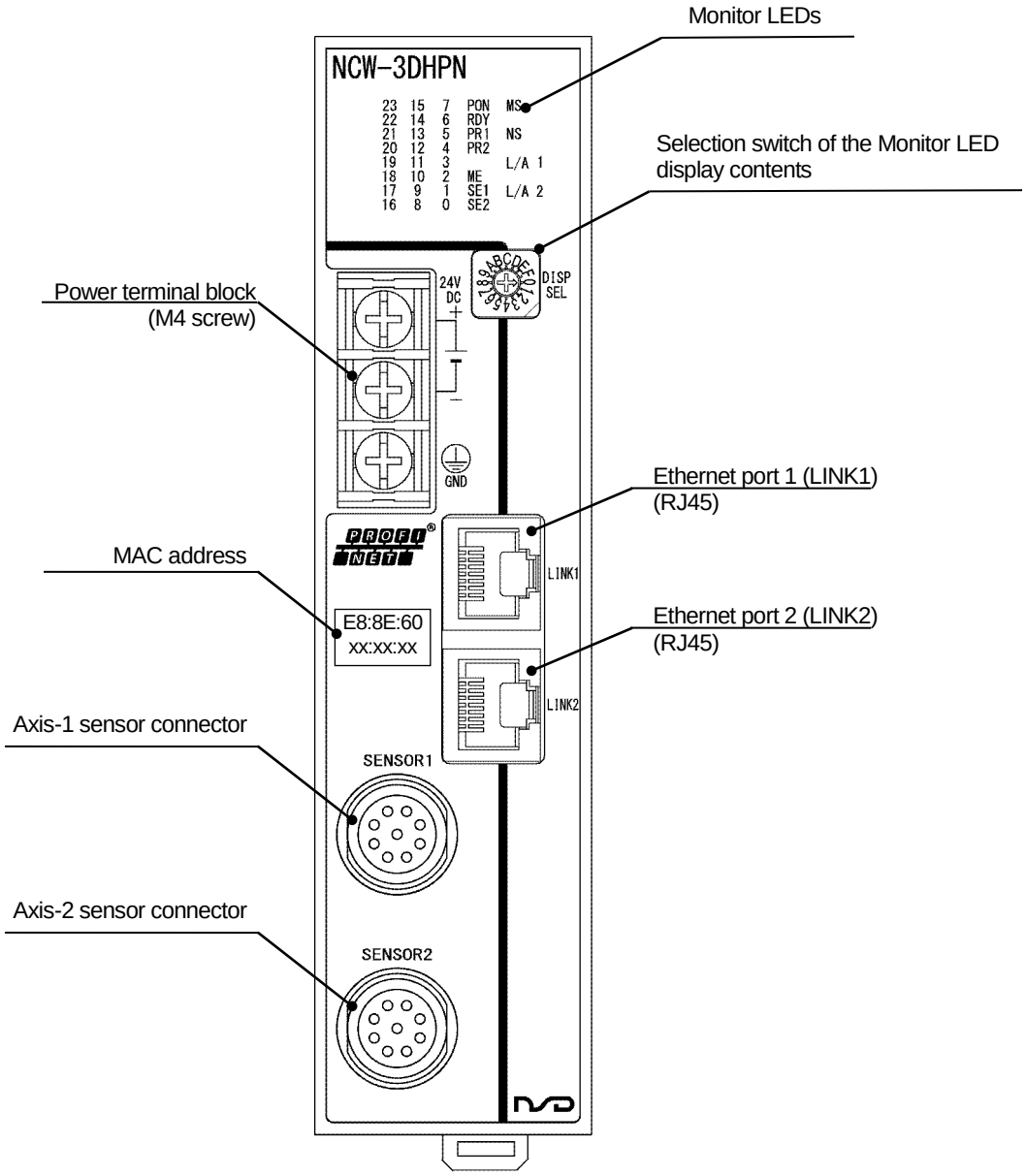
-The terminal block tightening torque is 1.8 N･m (16 lb･in).





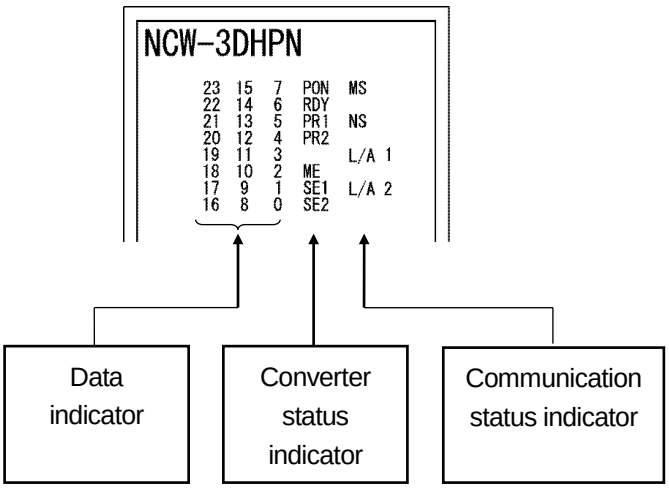
8. NOMENCLATURE

8-1. Part Identification



8-2. Function and Name of Indicator and Setting Area

Contents on the monitor LEDs are described in this section.



Indicator		LED color	Description
Communication status indicator *1	MS	Green / Red	Indicates the operation status of NCW-3DHPN.
	NS	Green / Red	Indicates the EtherNet/IP communication status of NCW-3DHPN.
	L/A1	Green	Indicates data sent and received status for the Ethernet port 1 (LINK 1).
	L/A2	Green	Indicates data sent and received status for the Ethernet port 2 (LINK 2).
Converter status indicator	PON	Green	ON when the power supply is functioning normally.
	RDY	Green	ON when Converter status is normal.
	PR1	Green	ON for approximately 1 second when the preset function operation (Current position setting) occurs with axis-1.
	PR2	Green	ON for approximately 1 second when the preset function operation (Current position setting) occurs with axis-2.
	ME	Red	ON when a memory error is occurred.
	SE1	Red	ON when the axis-1 sensor error is occurred.
	SE2	Red	ON when the axis-2 sensor error is occurred.
Data indicator *2	0 to 23	Green	Displays the content which was selected by the selecting switch (DISP SEL).

*1: For the communication status indicator, refer to section 8-2-1.

*2: For the data indicator, refer to section 8-2-2.

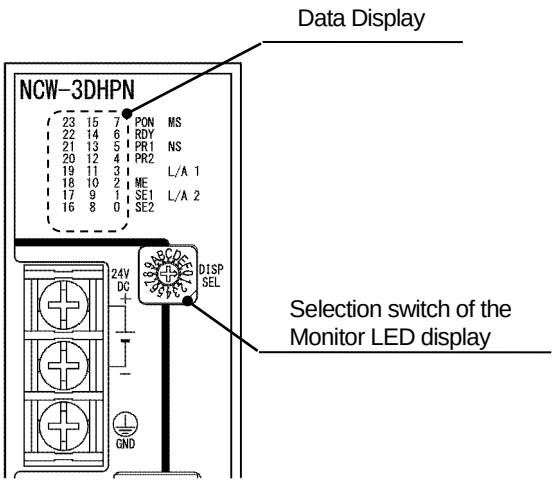
8-2-1. Contents of the communication status indicator area

Explains the overview of the PROFINET communication status indicator area.
For more details, refer to “11. TROUBLE SHOOTING”.

Indicator	Color	Light status	Description
MS	Green/Red	OFF	No power
		Steady Green	Normal operation
		Flashing Red	A recoverable fault occurs
		Steady Red	An unrecoverable fault occurs
		Flashing Green / Red	LED test in progress
NS	Green/Red	OFF	No power
		Flashing Green	No connection is established
		Steady Green	Connection is established
		Flashing Red	GSDML error
		Steady Red	Faulty connection
		Flashing Green / Red	LED test in progress
L/A1	Green	OFF	LINK1 port: No link
		ON	LINK1 port: Link
		Flashing	LINK1 port: Link (during the communication)
L/A2	Green	OFF	LINK2 port: No link
		ON	LINK2 port: Link
		Flashing	LINK2 port: Link (during the communication)

8-2-2. Contents of the data indicator area

The data indicator content is changed by the display selection switch (DISP SEL).



DISP SEL	Display content	
0	Axis-1 position data D0-D23	
1	Axis-2 position data D0-D23	
2	Axis-1 preset data D0-D23	*1
3	Axis-2 preset data D0-D23	*1
4	Reserved	
5	Reserved	
6	Reserved	
7	Converter diagnosis data	*2
8	Parameter data	*3
9	Ethernet network transmission setting	*4
A	Reserved	
B	Reserved	
C	Reserved	
D	Sensor circuit control information	*5
E	Reserved	
F	Reserved	

*1: Displays the preset data which is transmitted from the master.

*2: Converter diagnosis data

	7	6	5	4	3	2	1	0
Axis-1 diagnosis data	DE1	SPF1	SSE1	0	0	0	0	SE1
	15	14	13	12	11	10	9	8
Axis-2 diagnosis data	DE2	SPF2	SSE2	0	0	0	0	SE2
	23	22	21	20	19	18	17	16
Converter diagnosis data	0	0	0	0	I/F ERR	ME	WDTE	NRDY

*3: Sensor parameter data

	7	6	5	4	3	2	1	0
Axis-1 parameter data	Reserved					Code Sequence 1	Error Clear 1	Axis Unavailable 1
	15	14	13	12	11	10	9	8
Axis-2 parameter data	Reserved					Code Sequence 2	Error Clear 2	Axis Unavailable 2
	23	22	21	20	19	18	17	16
Unused	0							

*4: Ethernet network transmission setting

	7	6	5	4	3	2	1	0
LINK1	Reserved					Full Duplex	Reserved	100 Mbps
	15	14	13	12	11	10	9	8
LINK2	Reserved					Full Duplex	Reserved	100 Mbps
	23	22	21	20	19	18	17	16
IP address	IP Host address [IP.ADR] 8-bit							

- 100Mbps light turns ON when it is normal. Lights turn OFF when an error occurs.

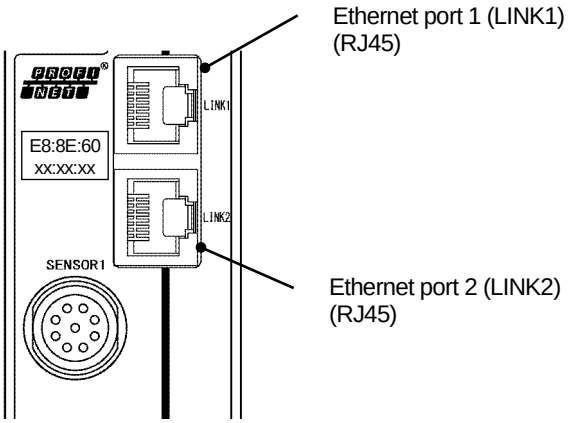
*5: Sensor circuit control information

Indicates the low-order 8-bit information of Output data (Axis-1 control flag and Axis-2 control flag) for Real-Time communication. For more details, refer to “9-9-1. I/O data format for Real-Time communication”.

	7	6	5	4	3	2	1	0
Axis-1 Control (Bit0-7)	PRESET	ERRCLR	0	0	0	0	0	0
	15	14	13	12	11	10	9	8
Axis-2 Control (Bit8-15)	PRESET	ERRCLR	0	0	0	0	0	0
	23	22	21	20	19	18	17	16
Reserved	0	0	0	0	0	0	0	0

8-2-3. Ethernet port (LINK1/LINK2)

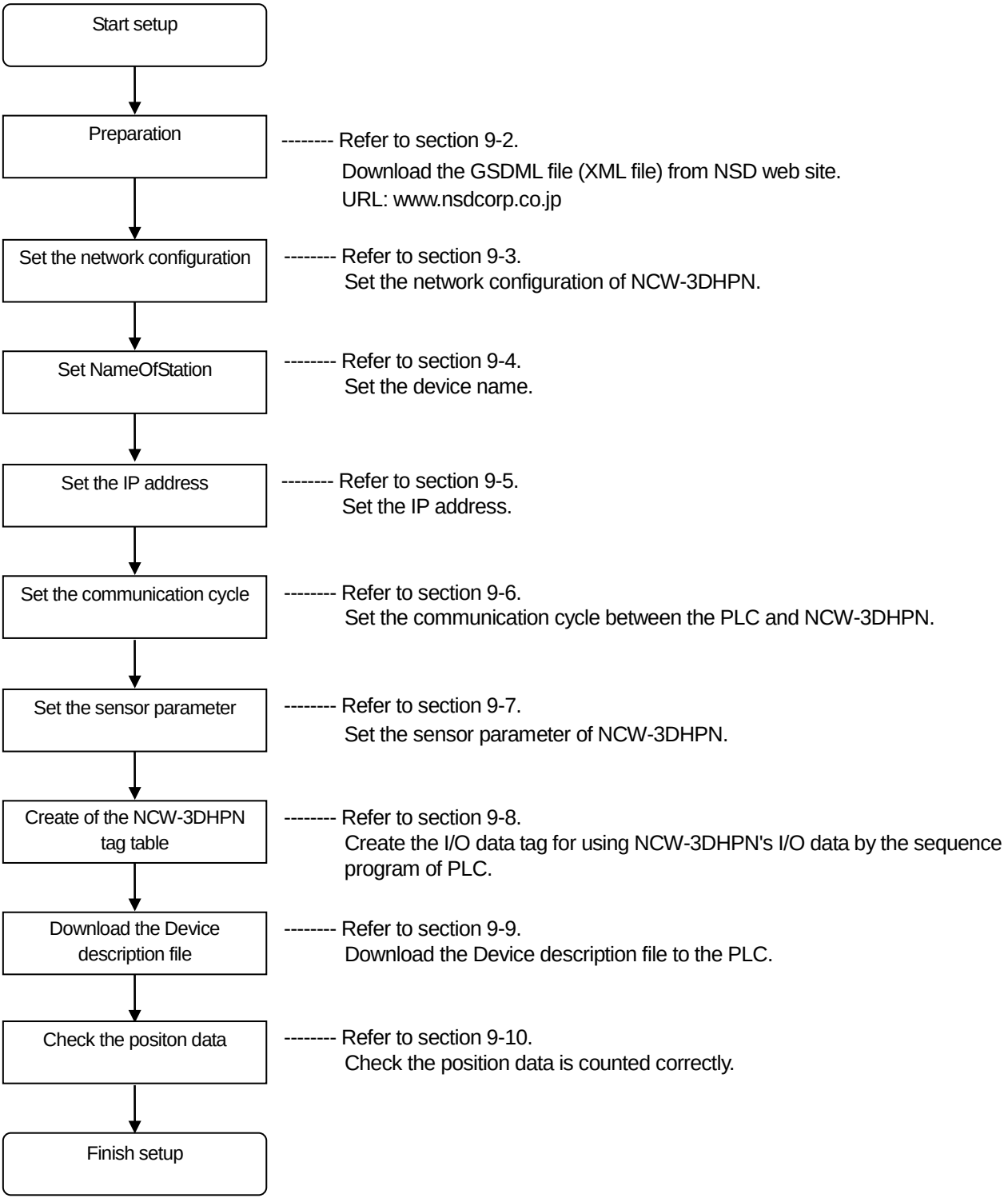
Ethernet communication cables are connected to these ports.



9. PROFINET COMMUNICATION SETUP

9-1. Procedure Before the Operation

Indicates procedure before the operation.



9-2. Preparation

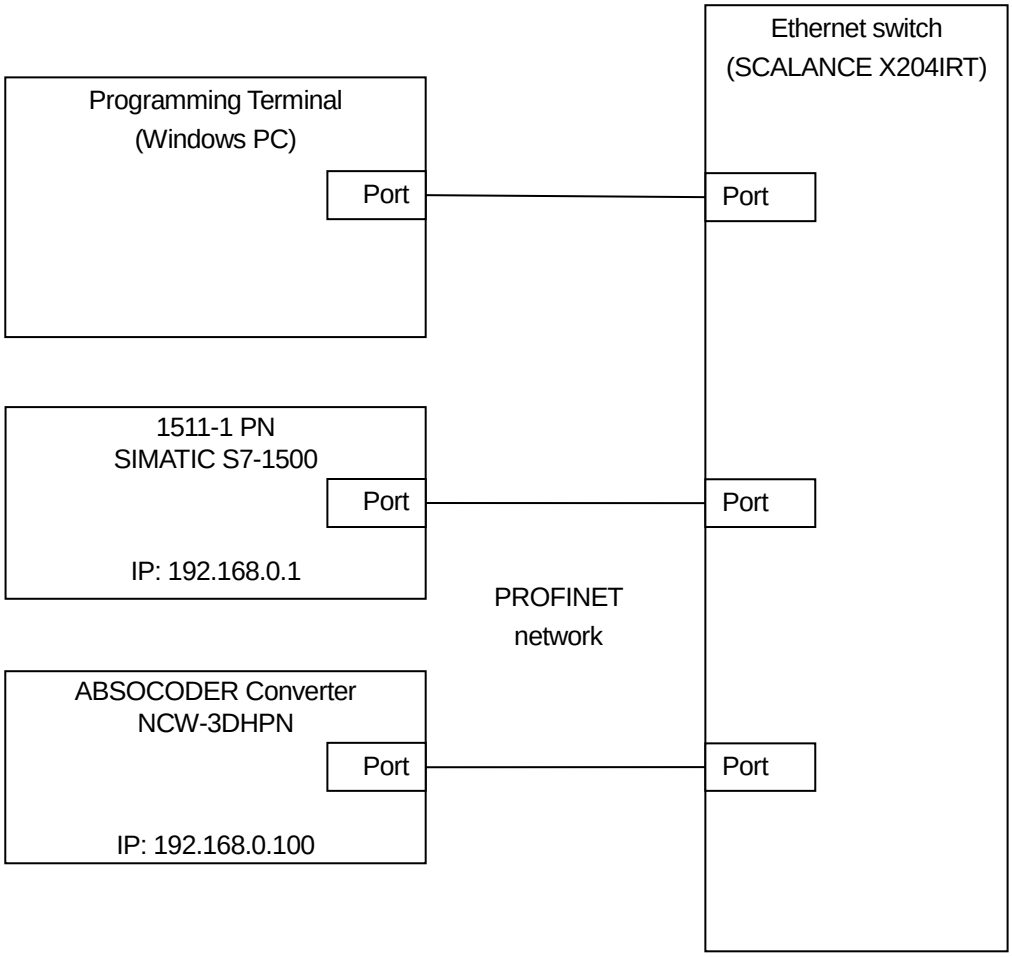
Prepares that NCW-3DHPN connects the PROFINET network.
This manual assumes that NCW-3DHPN and a programmable controller which is manufactured by Siemens AG, Inc. are connected by the network. Therefore, we explain the manual by using a configuration tool "STEP7 V14 Professional SP1" developed by Siemens AG, Inc.. For the details of the tool, refer to manual of the "STEP7 V14 Professional SP1".

●Preparation of GDSML file

If the configuration tool is needed the definition file (GSDML file), download it from NSD website.
URL: www.nsdcorp.co.jp
File name: GSDML-V***-NSD_Corporation-NCW3D_PN-********

●Hardware Setup

The following figure indicates the connection of NCW-3DHPN as an example.
The NCW-3DHPN is connected to the controller (SIMATIC S7-1500 1511-1 PN) through the EtherNet switch (SCALANCE X204IRT 204-0BA00-2BA3) as shown below.



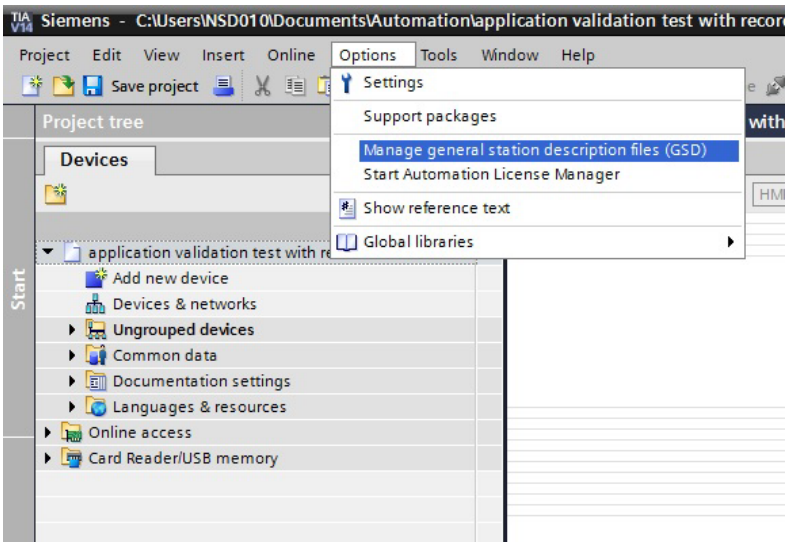
9-3. Set the Network Configuration

Set the network configuration of the converter after installing the GSDML file to the configuration tool.

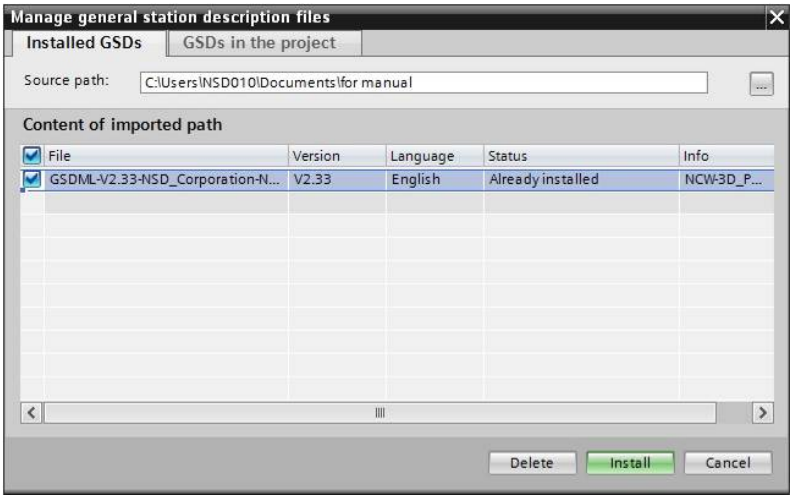
9-3-1. Installation of the GSDML file

Install the GSDML file of the converter to the configuration tool.

In the "Options" menu of the configuration tool, select the "Manage general station description files (GSD)" command.



In the "Installed GSDs" tab, select the directory in which the GSDML files are stored.
Check the box of the GSDML file which will be installed, and click on the "Install" button.

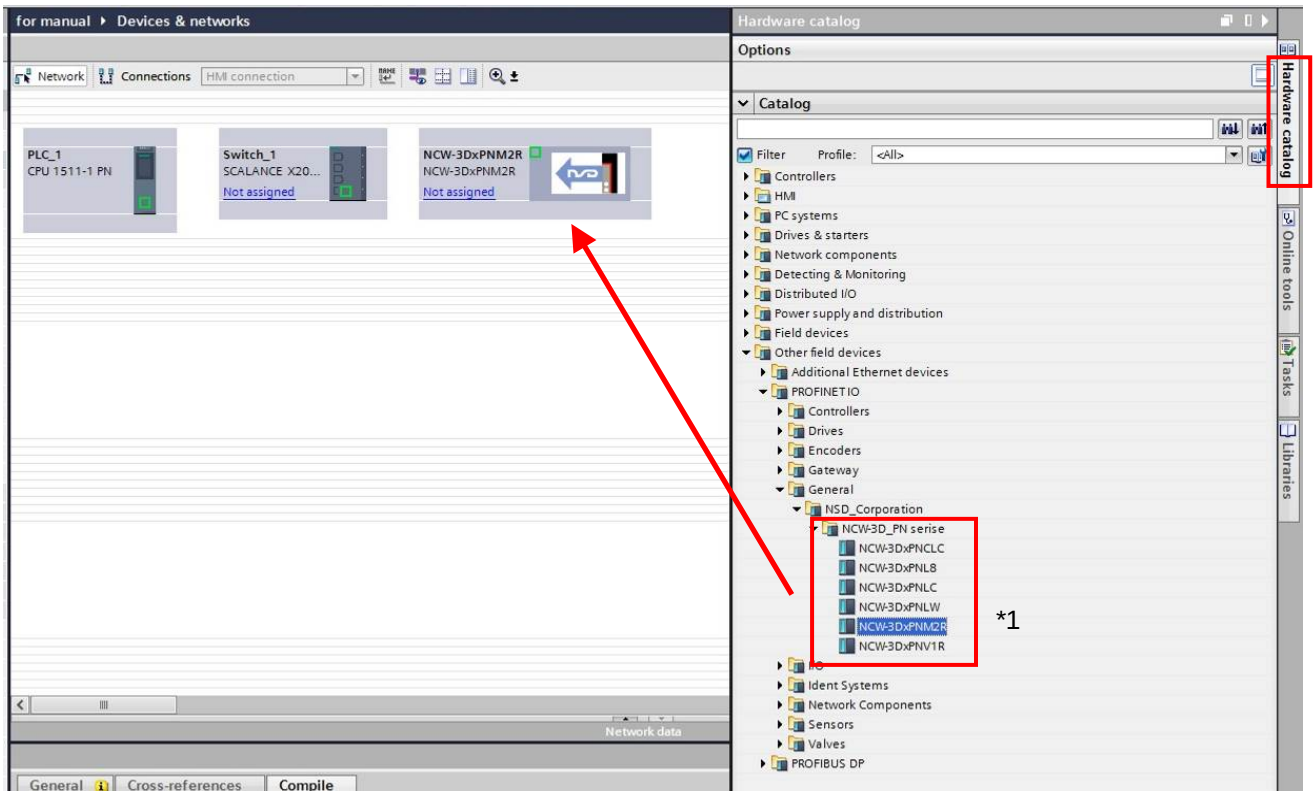


9-3-2. Creation of the network configuration

Select the GSDML file of the product which configures the network from "Hardware Catalog" after installing the GSDML file.

The GSDML file is stored in the following folders by each category.
PLC ····· Controllers
Switching hub ····· Network Components
NCW-3DHPN ····· Other field devices → General

Select the GSDML file, and add the product on the network by drag and drop.



*1: Select the converter model which is actually used because it changes depending on the sensor in-use.

Set the network configuration of the PLC and switching hub.

1. Select the PLC interface (indicated by green rectangle).

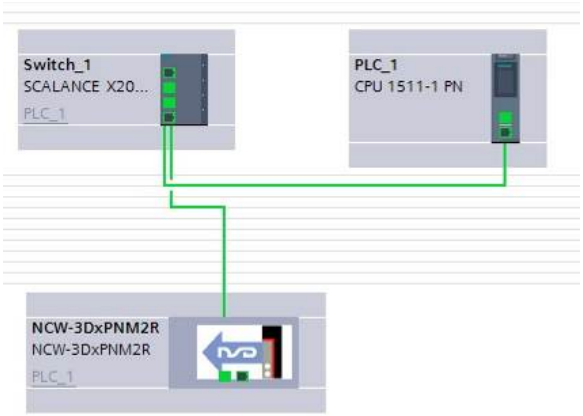
2. Drag the PLC interface to the switching hub interface to connect. A line appears when dragging.

3. PROFINET IO-System is configured between PLC and switching hub after releasing the drag.

4. PROFINET IO-System is configured by connecting the line between NCW-3DHPN and switching hub by following the procedure 1 to 3.

9-3-3. Set the topology

Sets the network topology.
Display the Topology view from main screen. Set the topology by following the actual network configuration.
The setting method is the same as the network configuration in "9-3-2".

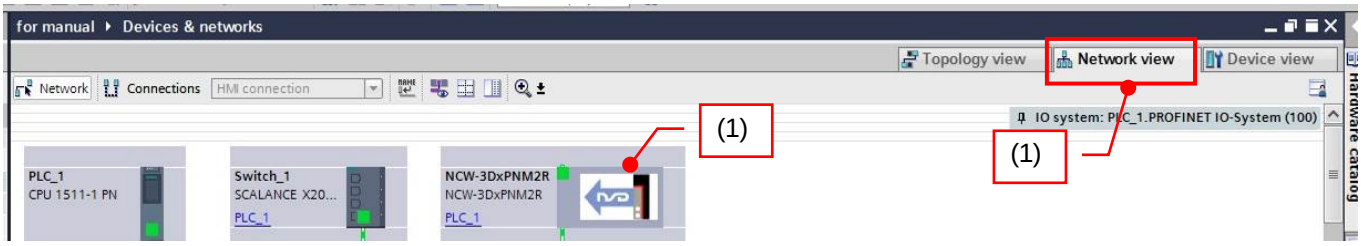


9-4. Set NameOfStation (Device Name)

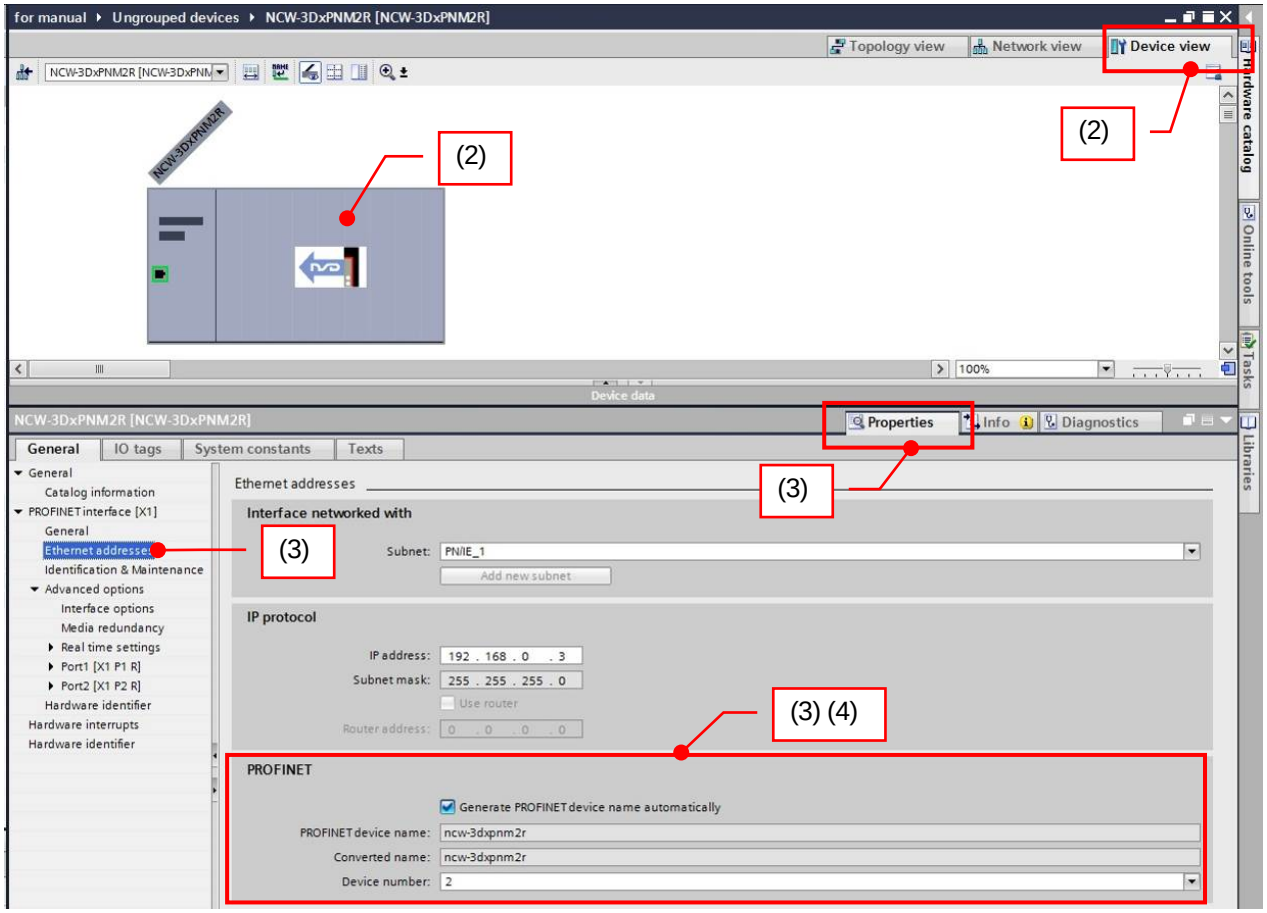
The PROFINET configuration is needed setting each device name which is called "NamaOfStation".
The device name is previously set as a default name to the GSDML file.
Thus, the default name is displayed on the configuration tool. The configuration tool automatically adjusts the device name if the same product name exists on the network.

Setting procedures are indicated below;

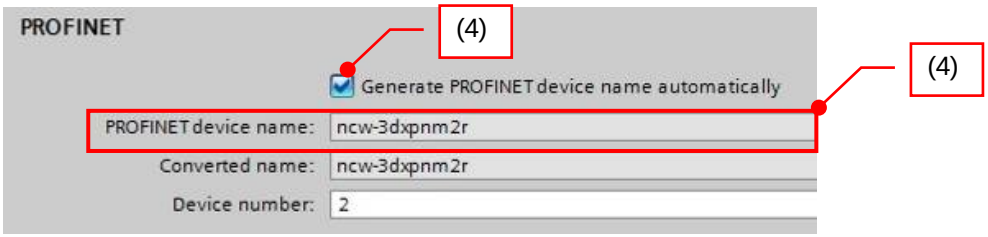
(1) In the "Network view" tab, double click the converter which is set the device name.



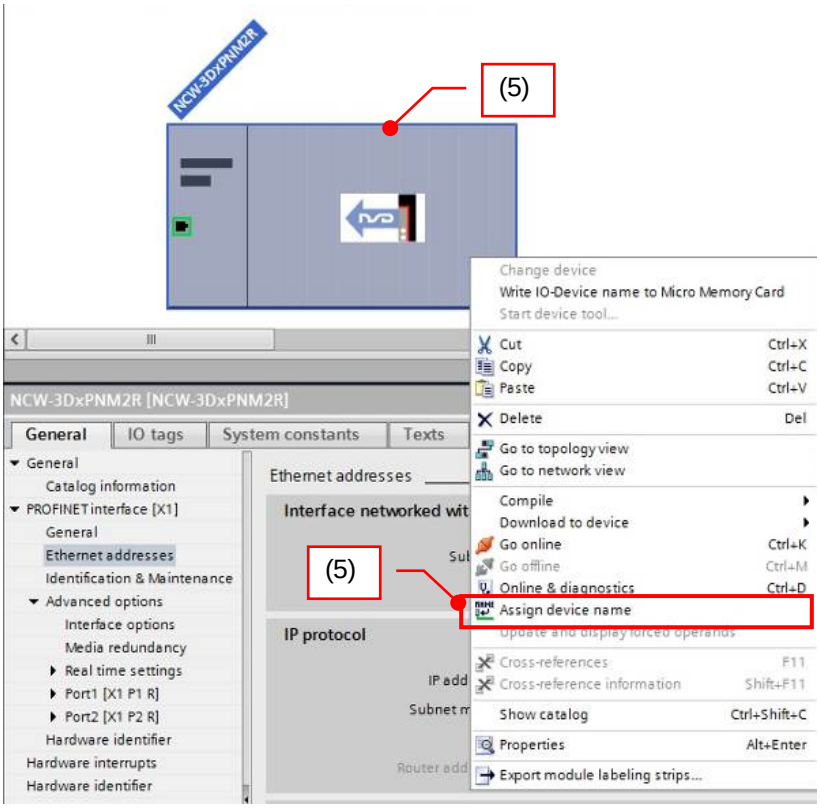
(2) Click the converter image when the "Device view" tab appears.
(3) Click "Ethernet Address" when "Properties" appears.



(4) Check the box on "Generate PROFINET device name automatically" when using the default name.
Remove the check-mark, and input a new device name on the "PROFINET device name" when changing the device name.

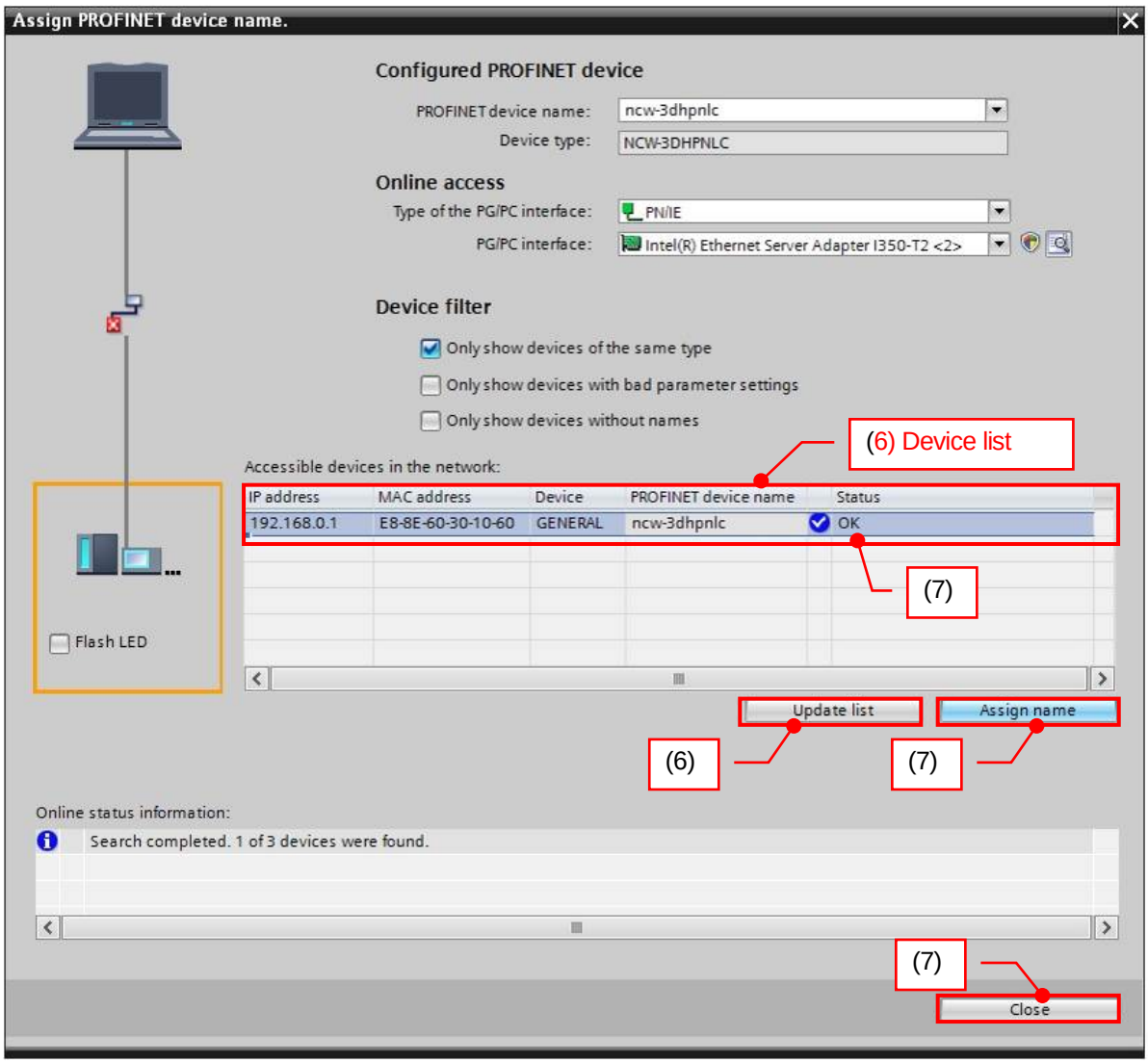


(5) Set the device name to the converter.
Right click on the converter image, and click "Assign device name".



(6) "Assign PROFINET device name" window is appears on the screen.
Click "Update list" button.
The devices which can be changed the name are listed.

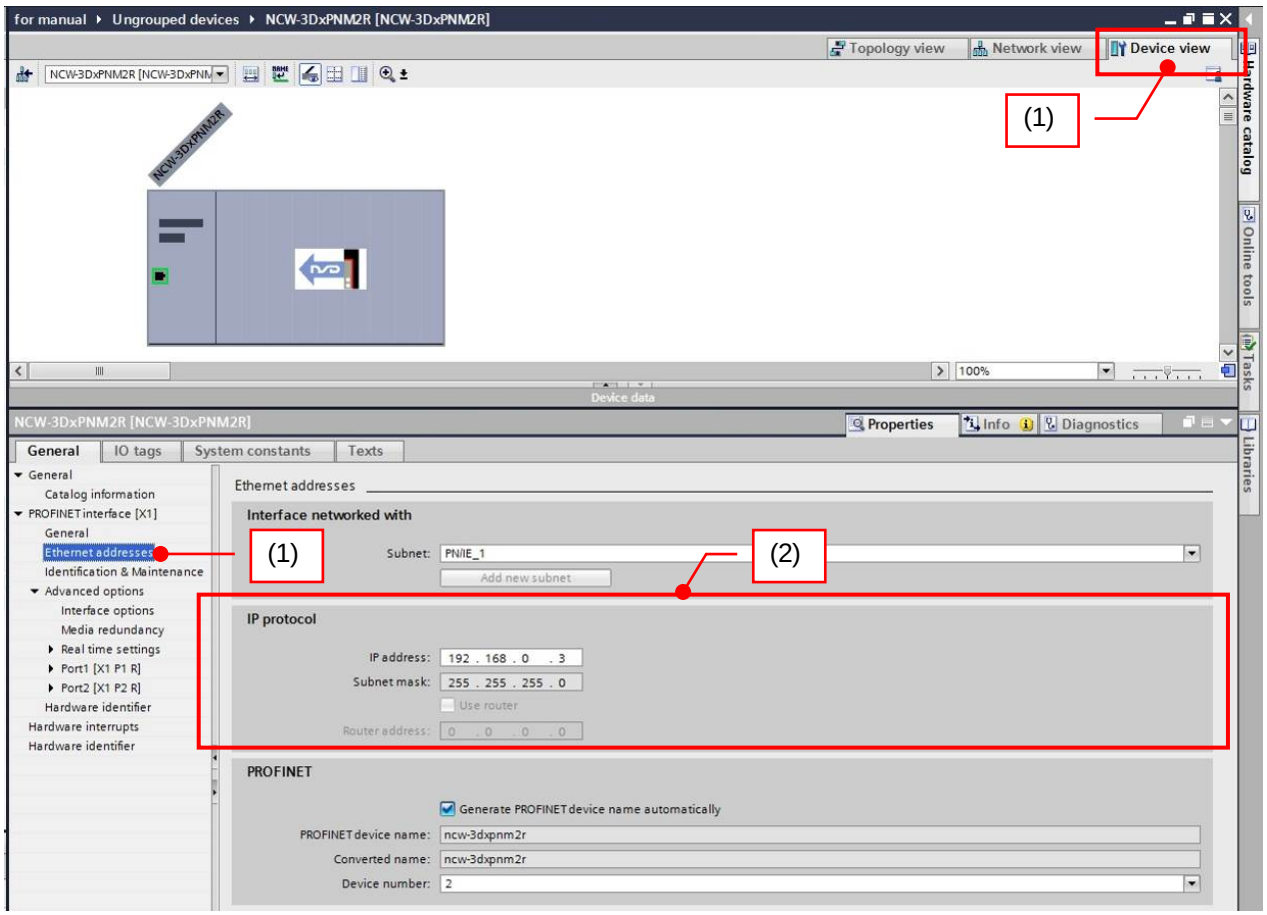
(7) Select the converter whose device name is changed, and click the "Assign name" button.
The device name is changed to the name which is set in procedure (4).
"OK" is displayed on the "Status" of the selected converter when changing of the device name is succeeded.
After the change, click "Close" button for closing the window.



9-5. Set the IP Address

IP address for each device is automatically allocated.
IP address of the converter can be changed in the following window when it needs to change.

(1) In the "Device view" tab, display "IP protocol" from "General ->PROFINET Interface->Ethernet Address".
(2) Change the value of "IP address".

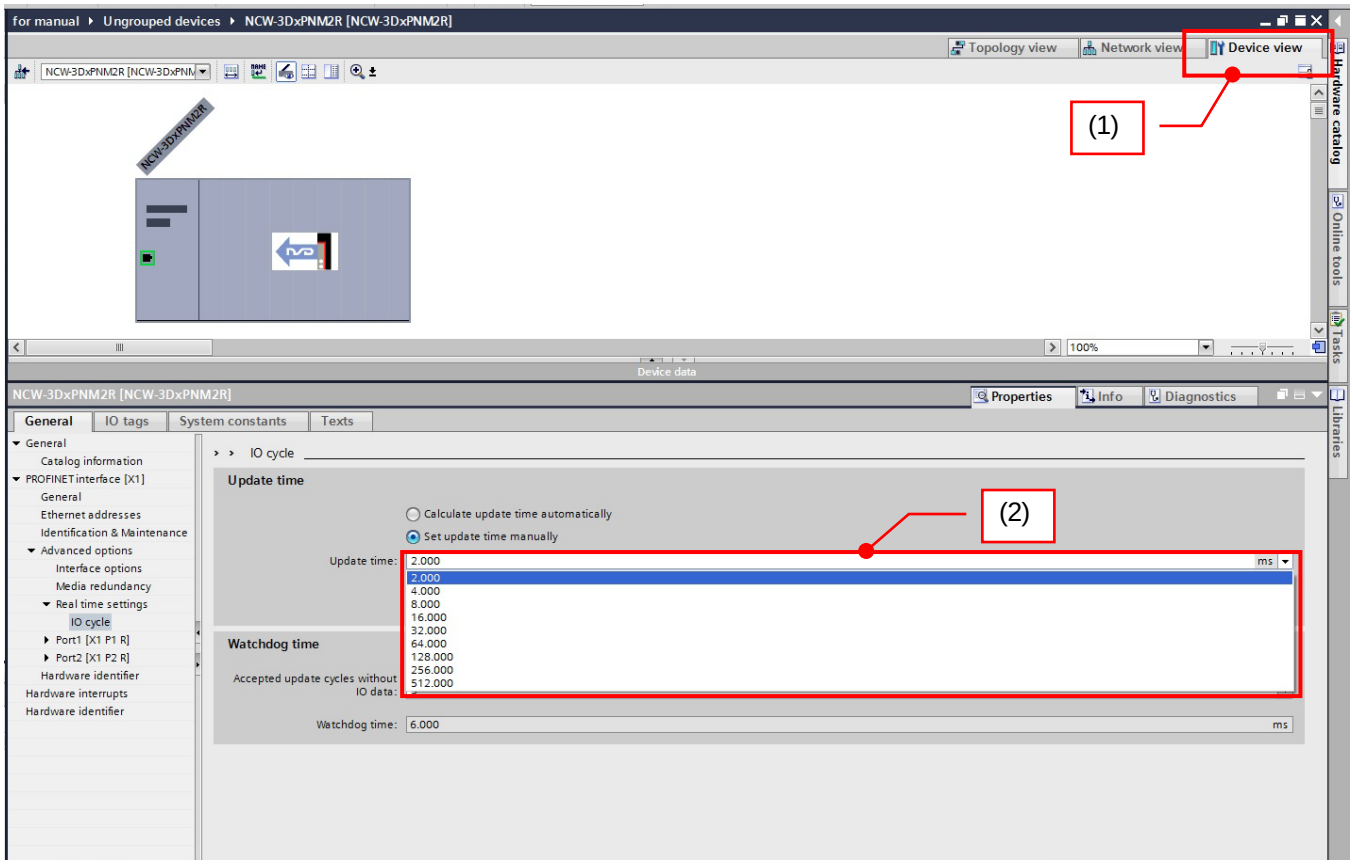


9-6. Set the Communication Cycle

Sets the communication cycle between the PLC and converter.
A default value of the communication cycle is set to "2ms (minimum value)".
Change the communication cycle in the following window if it needed to change.

(1) In the "Device view" tab, display "Update time" from General->PROFINET Interface->Advanced options->Real time settings->IO cycle.

(2) In the default setting, "Calculate update time automatically" is checked.
Check "Set update time manually", and select the update time when changing it.



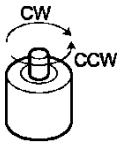
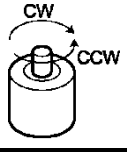
9-7. Set Sensor Parameter of NCW-3DHPN

Before NCW-3DHPN is used, parameters must be configured.
The parameter value set at configuration tool is written to NCW-3DHPN when the communication is established for PROFINET.

> ⚠ Note
>
> The sensor parameter can be also set from the WRREC of the PLC function.
> However, a value is change to it set by the configuration tool when communication is reestablished (relinking-up or restarting the power supply). In this case, set the parameter from the WRREC again.

9-7-1. Sensor parameter list

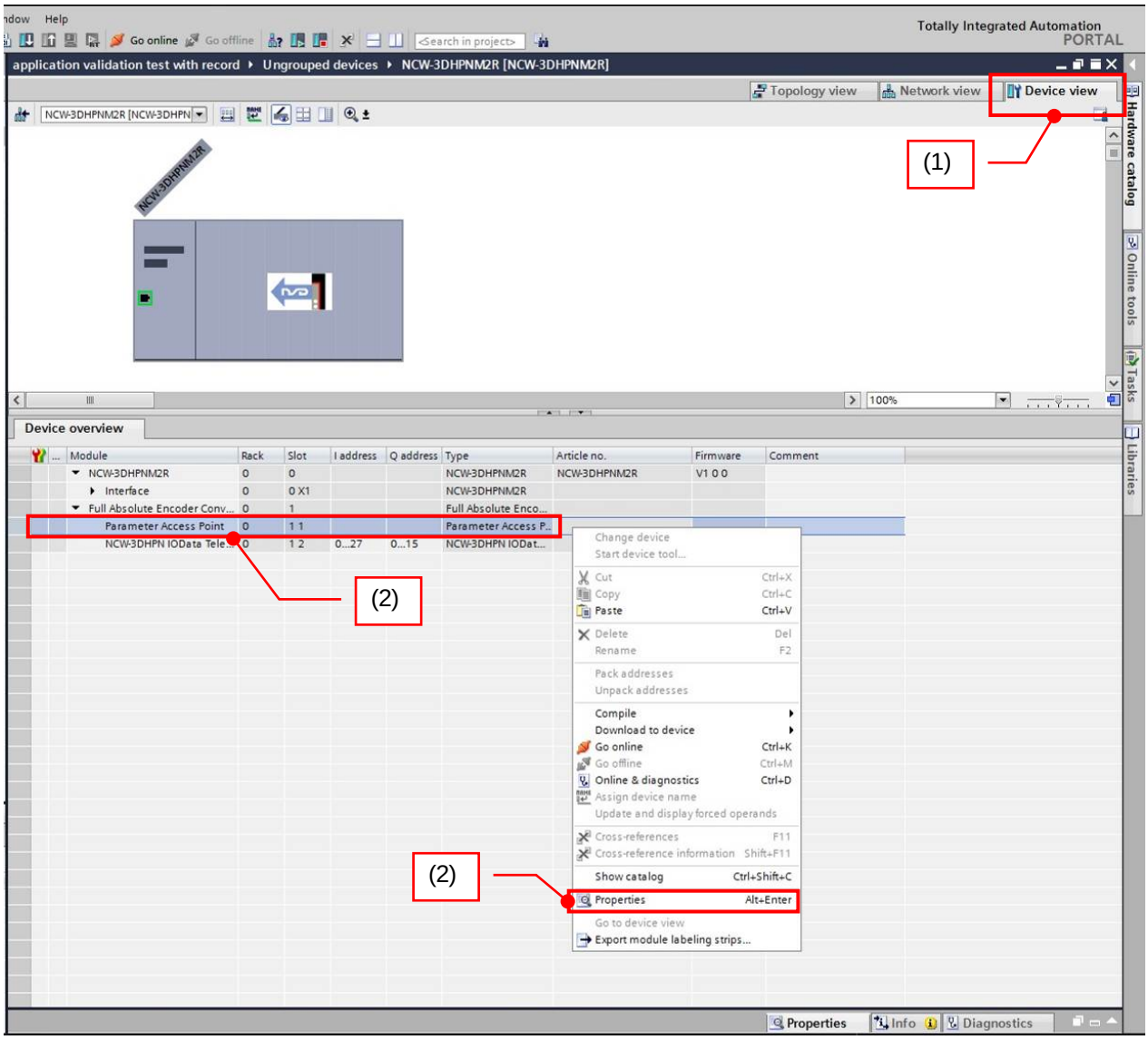
NCW-3DHPN has following sensor parameters.
Sensor parameter setting values are saved in the nonvolatile memory; therefore, NCW-3DHPN can operate with previous designated parameters after turning on the power supply again.

Axis	Parameter Name	Description
For axis-1 sensor	Axis Unavailable	Specify “Enable” or “Disable” for the axis. 0: Enable (Default) 1: Disable
	Error Clear	Specify “Error recovery behavior”. 0: Auto clearing (Default) Automatically clears the error when removing the cause of the error. 1: Manual clearing
	Code Sequence (Position Data Increase Direction)	Specify the ABSOCODER sensor rotation direction in which the position data increases. 0: CW (Default) 1: CCW 
For axis-2 sensor	Axis Unavailable	Specify “Enable” or “Disable” for the axis. 0: Enable (Default) 1: Disable
	Error Clear	Specify “Error recovery behavior”. 0: Auto clearing (Default) Automatically clears the error when removing the cause of the error. 1: Manual clearing
	Code Sequence (Position Data Increase Direction)	Specify the ABSOCODER sensor rotation direction in which the position data increases. 0: CW (Default) 1: CCW 

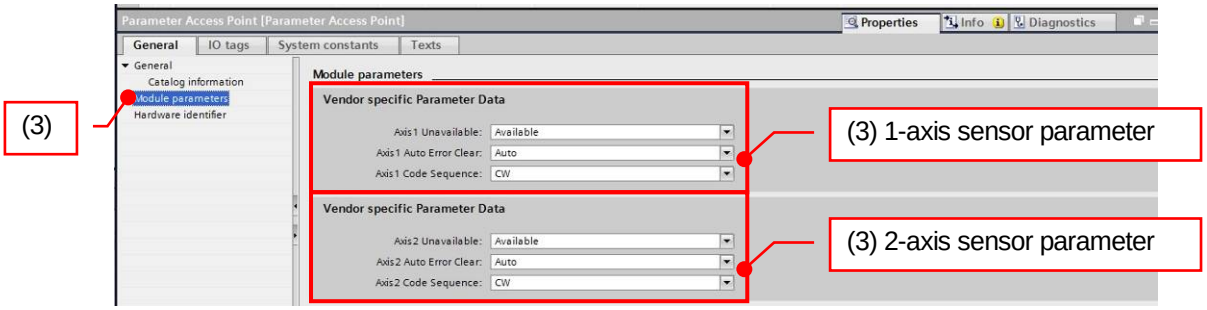
9-7-2. Sensor parameters setting procedure

Setting procedures of the sensor parameter is indicated below.

(1) Select "Device view->Device overview".
(2) Right-click "Parameter Access Point", and click "Properties".



(3) Set the sensor parameter.
Set the parameter when displaying "Module Parameters".

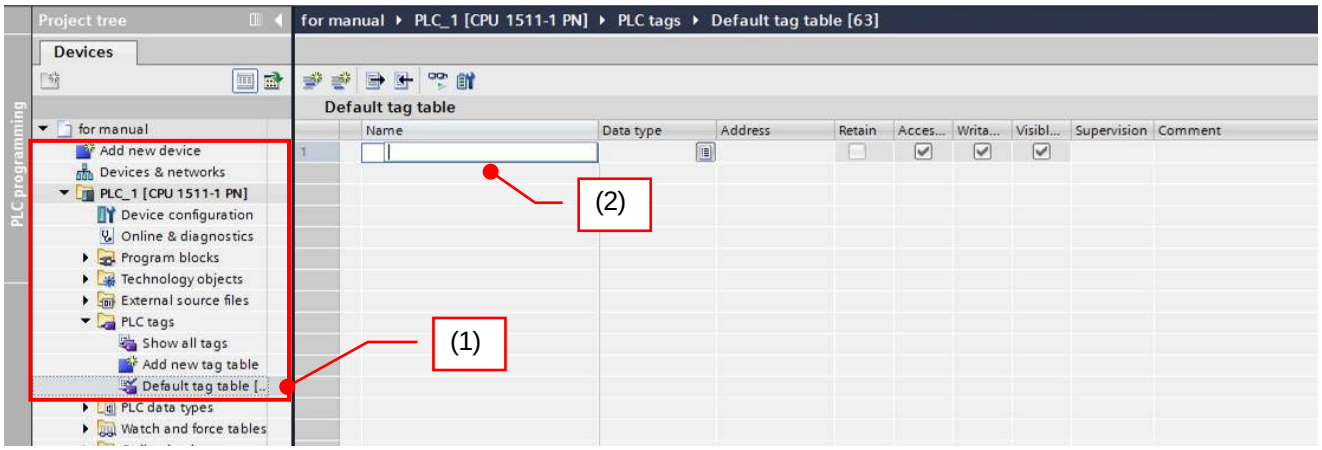


9-8. Create of the NCW-3DHPN Tag Table

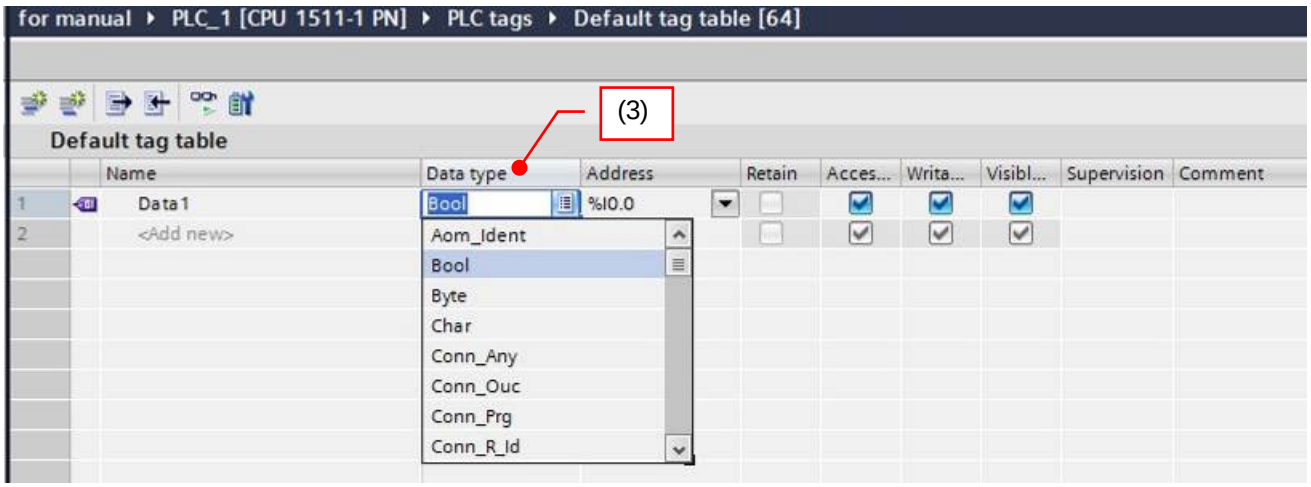
Create I/O data tag in "Default tag table" in order to use I/O data of NCW-3DHPN in the PLC sequence program. The I/O data tag is created for axis-1 and axis-2; however, a tag of unused axis doesn't need to create.

Indicates procedures of the I/O data tag.

(1) Select "PLC->PLC Tag->Default tag table", and display "default tag table".
(2) Input the data tag name.



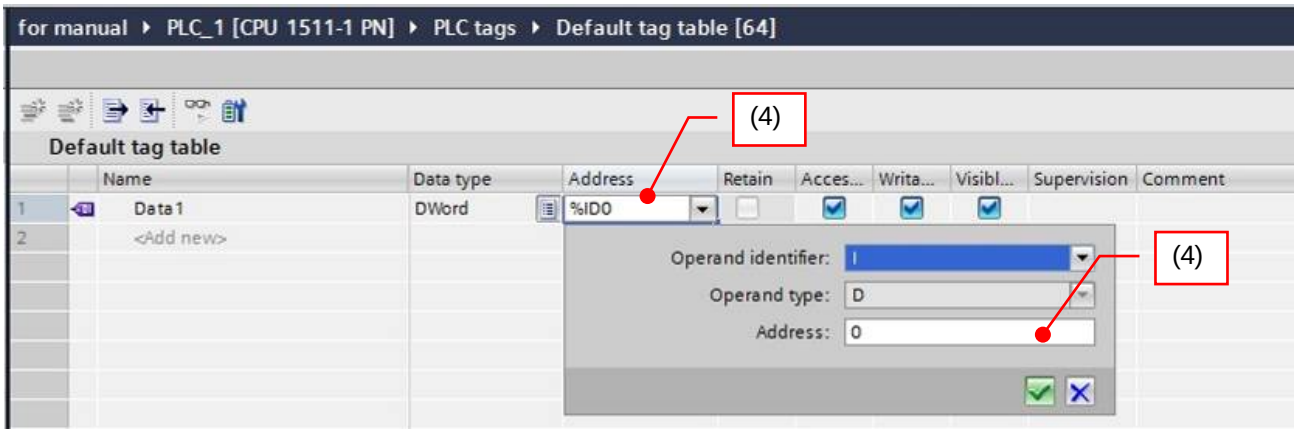
(3) Selects a data type of the data tag.
Check the data type for each I/O data by referring to "9-8-1. I/O data format".



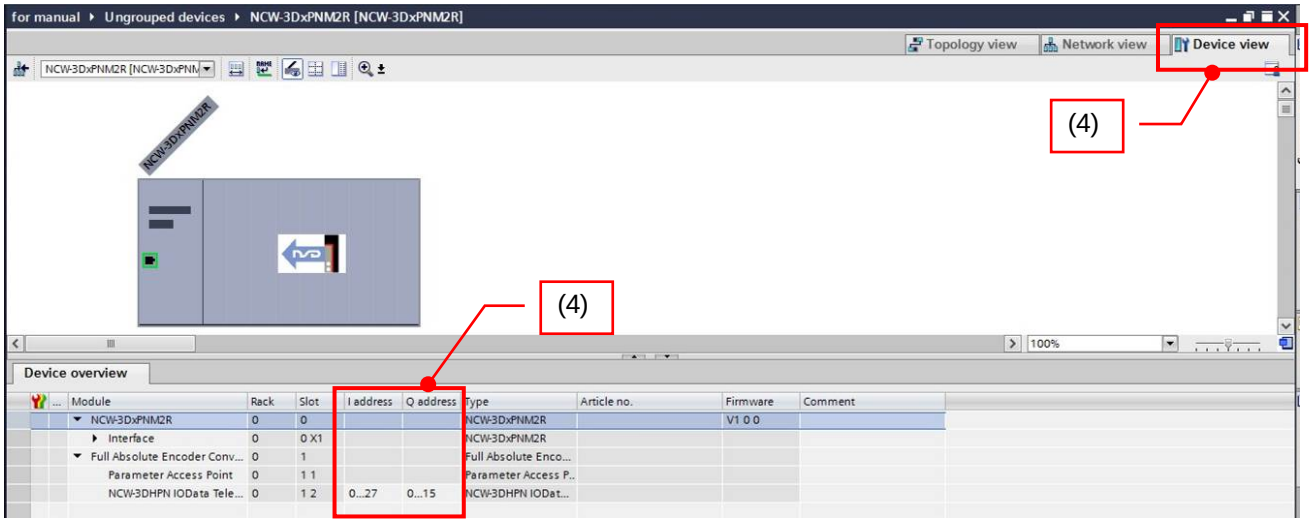
(4) Set the data tag address.

On "Operand identifier", "I" indicates the input of the I/O data, and "O" is the output.

For more details, refer to the "9-8-1. I/O data format".

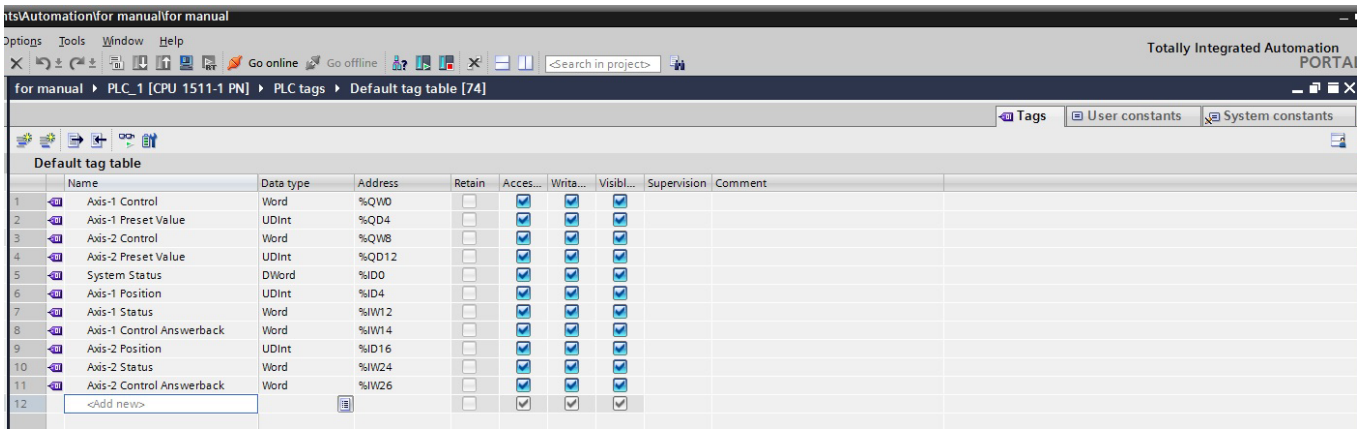


For each address of the I/O data, check I Address and Q Address in "Device view->Device overview".



(5) Create a data tag for either axis-1 or axis-2 by repeating the procedure (2) to (4).

Items indicated on the following data tags are the same as items written on "9-8-1. I/O data format".



9-8-1. I/O data format

Indicates the I/O data format of NCW-3DHPN.

(1) Output (Controller -> Device) Data Format (Size: 16-byte)

<table>
<tr><th rowspan="2">Offset Address
(Byte)</th><th colspan="3">Data Format</th></tr>
<tr><th>Data type</th><th>Name</th><th>Description</th></tr>
<tr><td>+0</td><td>WORD</td><td>Axis-1 Control</td><td>Axis-1 Control Flags
<table><tr><th>Bit</th><th>Description</th></tr><tr><td>0-5</td><td>Reserved</td></tr><tr><td>6</td><td>ERRCLR (Error Clear Command)
Clears an error that is monitored from Axis-1 Status.
0: Not clear an error
1: Clear an error</td></tr><tr><td>7</td><td>PRESET (Preset Command)
Presets a position data for Axis-1.
Specify "1: Execute PRESET" after setting the preset value for Axis-1.
0: Unexecute PRESET
1: Execute PRESET</td></tr><tr><td>8-15</td><td>Reserved</td></tr></table></td></tr>
<tr><td>+2</td><td>WORD</td><td>Reserved</td><td>－</td></tr>
<tr><td>+4</td><td>UDINT</td><td>Axis-1
PresetValue</td><td>Axis-1 Preset Value
Sets the preset value for Axis-1.
Set any value to the preset before operating the Bit7 (PRESET) of Axis-1 control flag.</td></tr>
<tr><td>+8</td><td>WORD</td><td>Axis-2 Control</td><td>Axis-2 Control Flags
<table><tr><th>Bit</th><th>Description</th></tr><tr><td>0-5</td><td>Reserved</td></tr><tr><td>6</td><td>ERRCLR (Error Clear Command)
Clears an error that is monitored from Axis-2 Status.
0: Not clear an error
1: Clear an error</td></tr><tr><td>7</td><td>PRESET (Preset Command)
Presets a position data for Axis-2.
Specify "1: Execute PRESET" after setting the preset value for Axis-2.
0：Unexecute PRESET
1：Execute PRESET</td></tr><tr><td>8-15</td><td>Reserved</td></tr></table></td></tr>
<tr><td>+10</td><td>WORD</td><td>Reserved</td><td>－</td></tr>
<tr><td>+12</td><td>UDINT</td><td>Axis-2
PresetValue</td><td>Axis-2 Preset Value
Sets the preset value for Axis-2.
Set any value to the preset before operating the Bit7 (PRESET) of Axis-2 control flag.</td></tr>
</table>

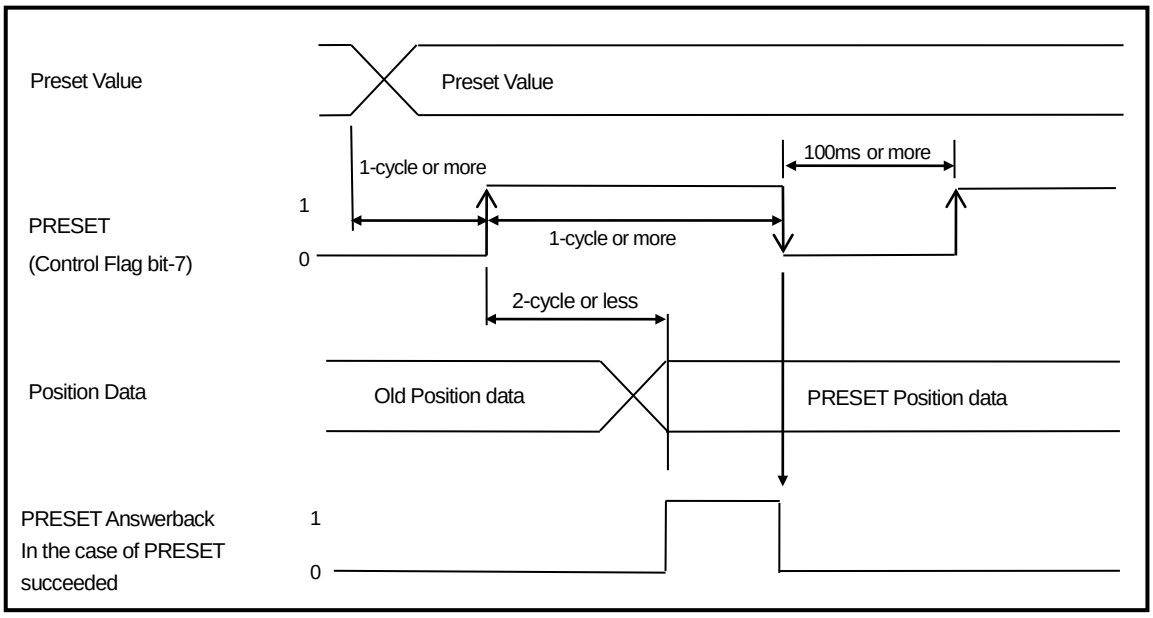
(2) Input (Device -> Controller) Data Format (Size: 28-byte)

<table>
<tr><th rowspan="2">Offset Address (Byte)</th><th colspan="3">Data Format</th></tr>
<tr><th>Data type</th><th>Name</th><th>Description</th></tr>
<tr><td>+0</td><td>DWORD</td><td>System Status</td><td>NCW-3DHPN Diagnosis Status<table><tr><th>Bit</th><th>Description</th></tr><tr><td>0</td><td>NRDY (Internal Error)
Indicates that an internal error of NCW-3DHPN occurred. The hardware might have malfunction if the converter doesn't operate normally after restarting the power supply. Replace NCW-3DHPN.
0: Normal
1: Error</td></tr><tr><td>1</td><td>WDTE (Watchdog Timer Error)
Indicates a watchdog timer error of NCW-3DHPN.
0: Normal
1: Error</td></tr><tr><td>2</td><td>ME (Memory Error)
Indicates that the internal memory (FRAM, EEPROM) of NCW-3DHPN is malfunction.
0: Normal
1: Error</td></tr><tr><td>3-7</td><td>Reserved</td></tr><tr><td>8</td><td>I/F ERR (Internal I/F Error)
Indicates that the internal I/F circuit has an error.
0: No error
1: Error</td></tr><tr><td>9-31</td><td>Reserved</td></tr></table></td></tr>
<tr><td>+4</td><td>UDINT</td><td>Axis-1 Position</td><td>Axis-1 Position data
Shows the Axis-1 Position data.</td></tr>
<tr><td>+8</td><td>UDINT</td><td>Reserved</td><td>Reserved</td></tr>
<tr><td>+12</td><td>WORD</td><td>Axis-1 Status</td><td>Axis-1 Status<table><tr><th>Bit</th><th>Description</th></tr><tr><td>0</td><td>SE (Sensor Error)
Indicates that a SSE/SPF/DE occurred.
0: No error
1: Error</td></tr><tr><td>1-4</td><td>Reserved</td></tr><tr><td>5</td><td>SSE (Disconnected Sensor Error)
Indicates that a sensor is disconnected.
0: Connected
1: Disconnected (Error)</td></tr><tr><td>6</td><td>SPF (Sensor Circuit Power Error)
Indicates that the internal power supply of NCW-3DHPN is malfunction.
0: Normal
1: Error</td></tr><tr><td>7</td><td>DE (Sensor Data Error)
Indicates that position data has an error.
0: No error
1: Error</td></tr><tr><td>8-15</td><td>Reserved</td></tr></table></td></tr>
<tr><td>+14</td><td>WORD</td><td>Axis-1 Control Answerback</td><td>Axis-1 Control Flag Answerback<table><tr><th>Bit</th><th>Description</th></tr><tr><td>0-5</td><td>Reserved</td></tr><tr><td>6</td><td>ERRCLR (Error Clear) Answerback
0: ”ERRCLR” failed.
1: ”ERRCLR” succeeded</td></tr><tr><td>7</td><td>PRESET Answerback
0: "PRESET" failed
1: "PRESET" succeeded.</td></tr><tr><td>8-15</td><td>Reserved</td></tr></table></td></tr>
</table>

<table>
<tr><th rowspan="2">Offset Address (Byte)</th><th colspan="3">Data Format</th></tr>
<tr><th>Data type</th><th>Name</th><th>Description</th></tr>
<tr><td>+16</td><td>UDINT</td><td>Axis-2 Position</td><td>Axis-2 Position data
Shows the Axis-2 Position data.</td></tr>
<tr><td>+20</td><td>UDINT</td><td>Reserved</td><td>Reserved</td></tr>
<tr><td>+24</td><td>WORD</td><td>Axis-2 Status</td><td>Axis-2 Status
<table>
<tr><th>Bit</th><th>Description</th></tr>
<tr><td>0</td><td>SE (Sensor Error)
Indicates that a SSE/SPF/DE occurred.
0: No error
1: Error</td></tr>
<tr><td>1-4</td><td>Reserved</td></tr>
<tr><td>5</td><td>SSE (Disconnected Sensor Error)
Indicates that a sensor is disconnected.
0: Connected
1: Disconnected (Error)</td></tr>
<tr><td>6</td><td>SPF (Sensor Circuit Power Error)
Indicates that the internal power supply of NCW-3DHPN is malfunction.
0: Normal
1: Error</td></tr>
<tr><td>7</td><td>DE (Sensor Data Error)
Indicates that position data has an error.
0: No error
1: Error</td></tr>
<tr><td>8-15</td><td>Reserved</td></tr>
</table></td></tr>
<tr><td>+26</td><td>WORD</td><td>Axis-2 Control Answerback</td><td>Axis-2 Control Flag Answerback
<table>
<tr><th>Bit</th><th>Description</th></tr>
<tr><td>0-5</td><td>Reserved</td></tr>
<tr><td>6</td><td>ERRCLR (Error Clear) Answerback
0: ”ERRCLR” failed.
1: ”ERRCLR” succeeded</td></tr>
<tr><td>7</td><td>PRESET Answerback
0: "PRESET" failed
1: "PRESET" succeeded.</td></tr>
<tr><td>8-15</td><td>Reserved</td></tr>
</table></td></tr>
</table>

(3) Preset procedure

Indicates PRESET procedure of the position data which is using the I/O communication data (Output).



● Preset procedure

① Set a desired Preset Value.

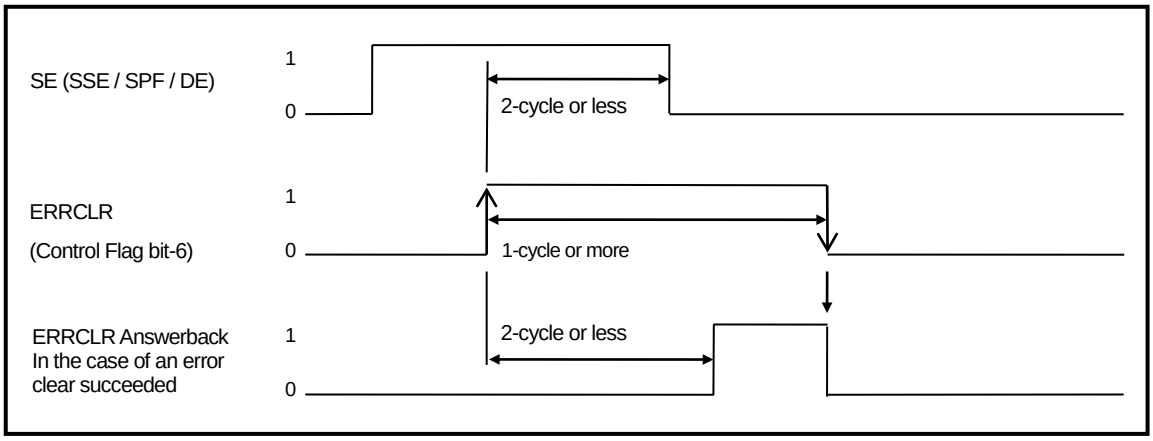
② Set the value “1” to PRESET (bit 7 of the control flag).
At this time, the PRESET (bit 7 of the control flag) should be kept setting to “1” in 1-cycle or more.

③ “1” is returned to the PRESET Answerback if the PRESET is executed correctly.
“0” is returned to the PRESET Answerback if an error (NRDY or SE) occurs.

④ The PRESET (bit 7 of the control flag) must be reset to “0”.
At this time, the PRESET Answerback is reset to “0”.

(4) Error clear procedure

Indicates the error clear procedure by using the I/O communication data (Output).



●Error clear procedure

① The ERRCLR (control flag bit 6) should be set to “1” after clearing an error cause.
At this time, the ERRCLR (control flag bit 6) should be kept setting to “1” in 1-cycle or more.

② “1” is returned to the ERRCLR Answerback if the error clear is executed correctly.

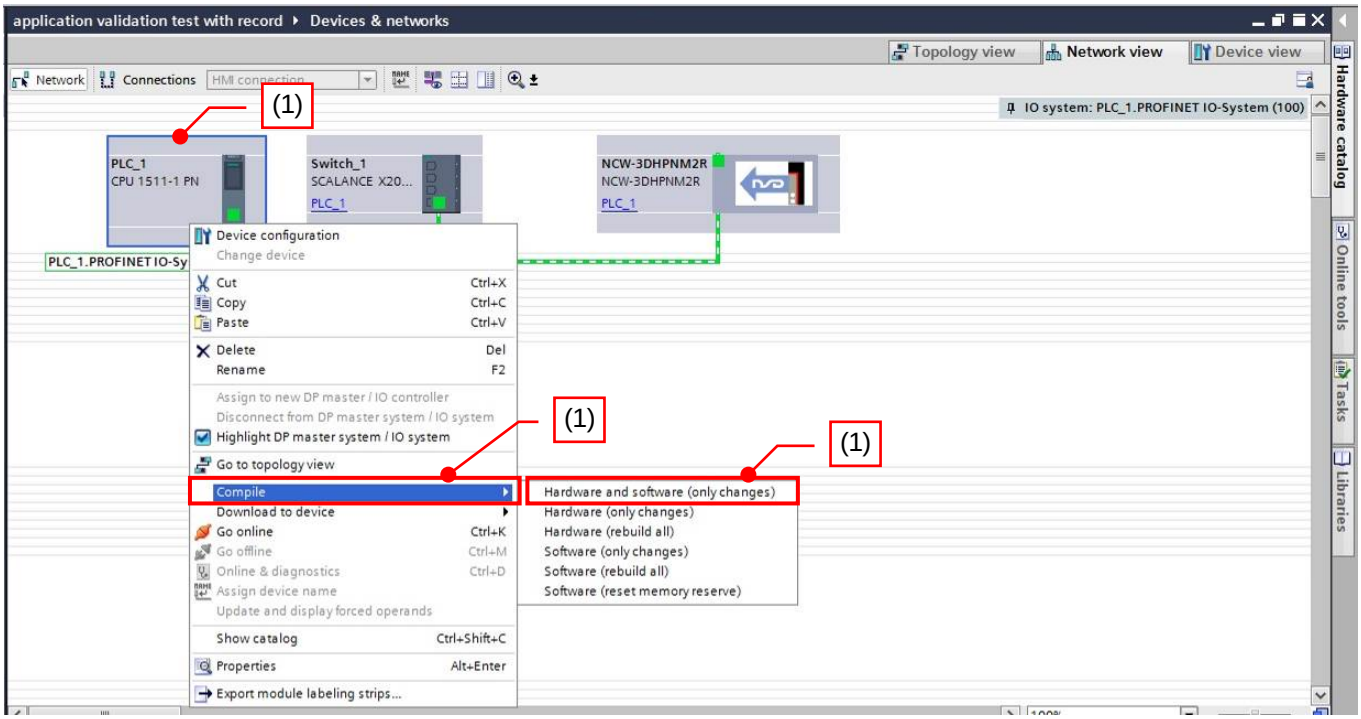
③ The ERRCLR (control flag bit 6) must be reset to “0”.
At this time, the ERRCLR Answerback is reset to “0”.

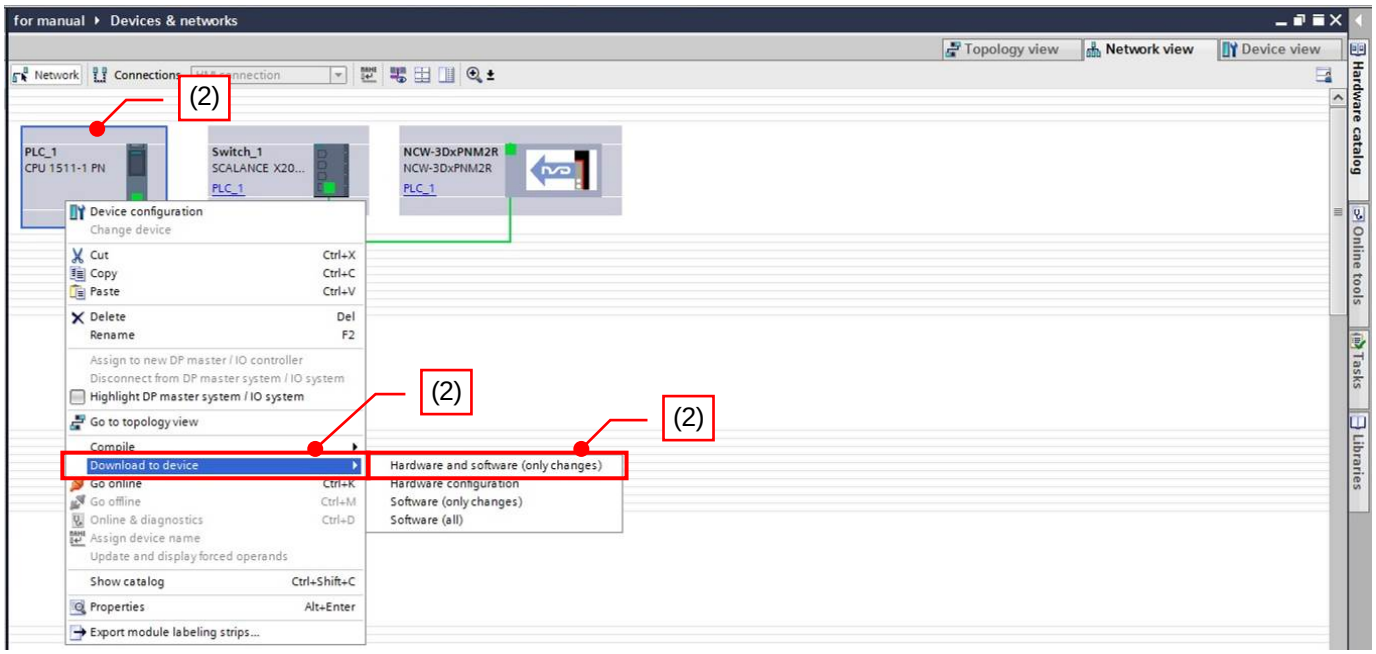
9-9. Download the Device Description File

Download the device description file to the PLC.

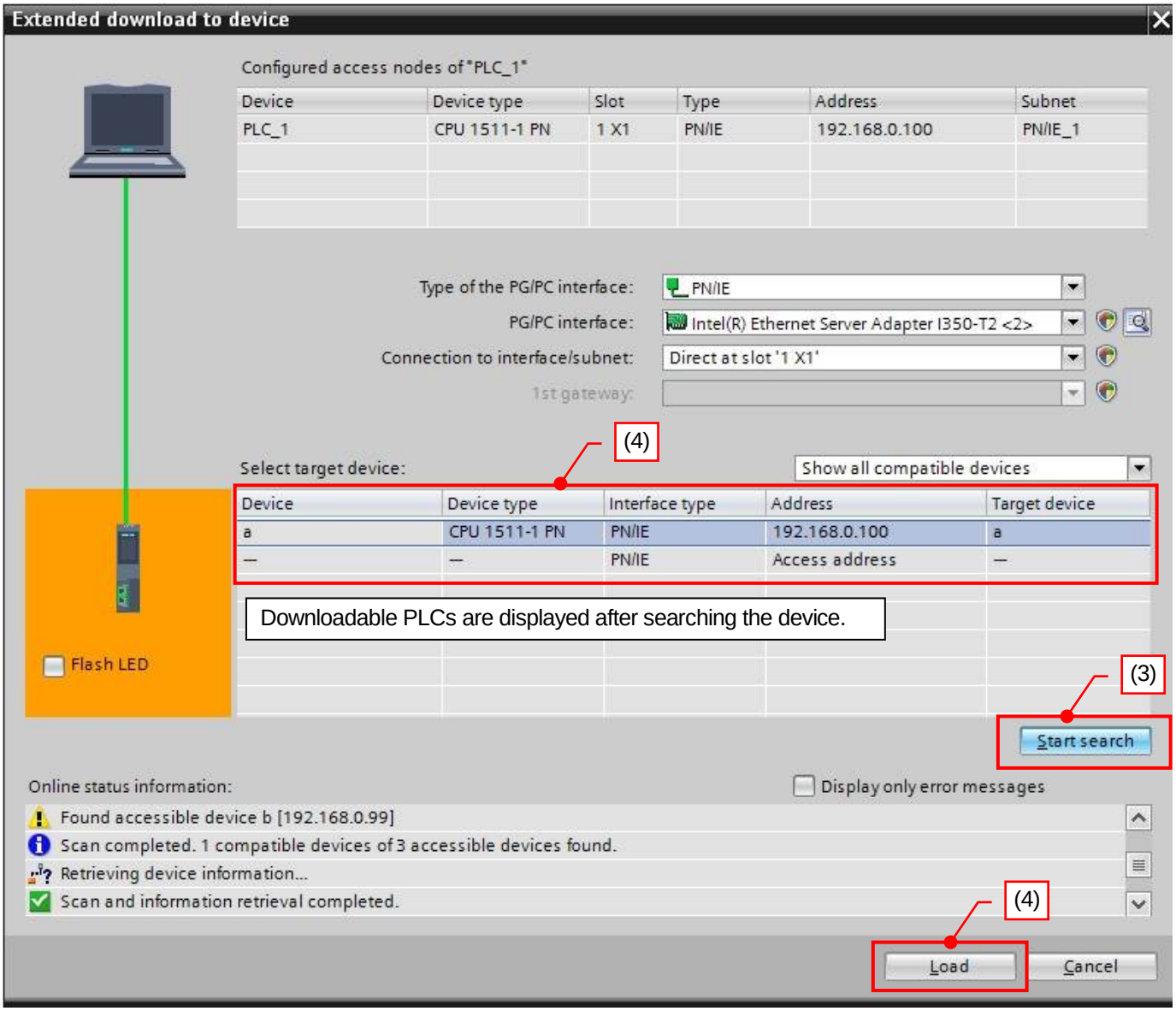
(1) Select the device, and Right-click. Select "Compile->Hardware and Software (only changes)"

(2) Reselect the device and right-click after the compile is completed. Select "Download to device->Hardware and Software (only changes) ", and download to the PLC.





(3) The following window is displayed after the download.
Search the PLC which is downloaded by clicking “Start search” button.
(4) Select target PLC, and click “Load” button. “Download” is executed.

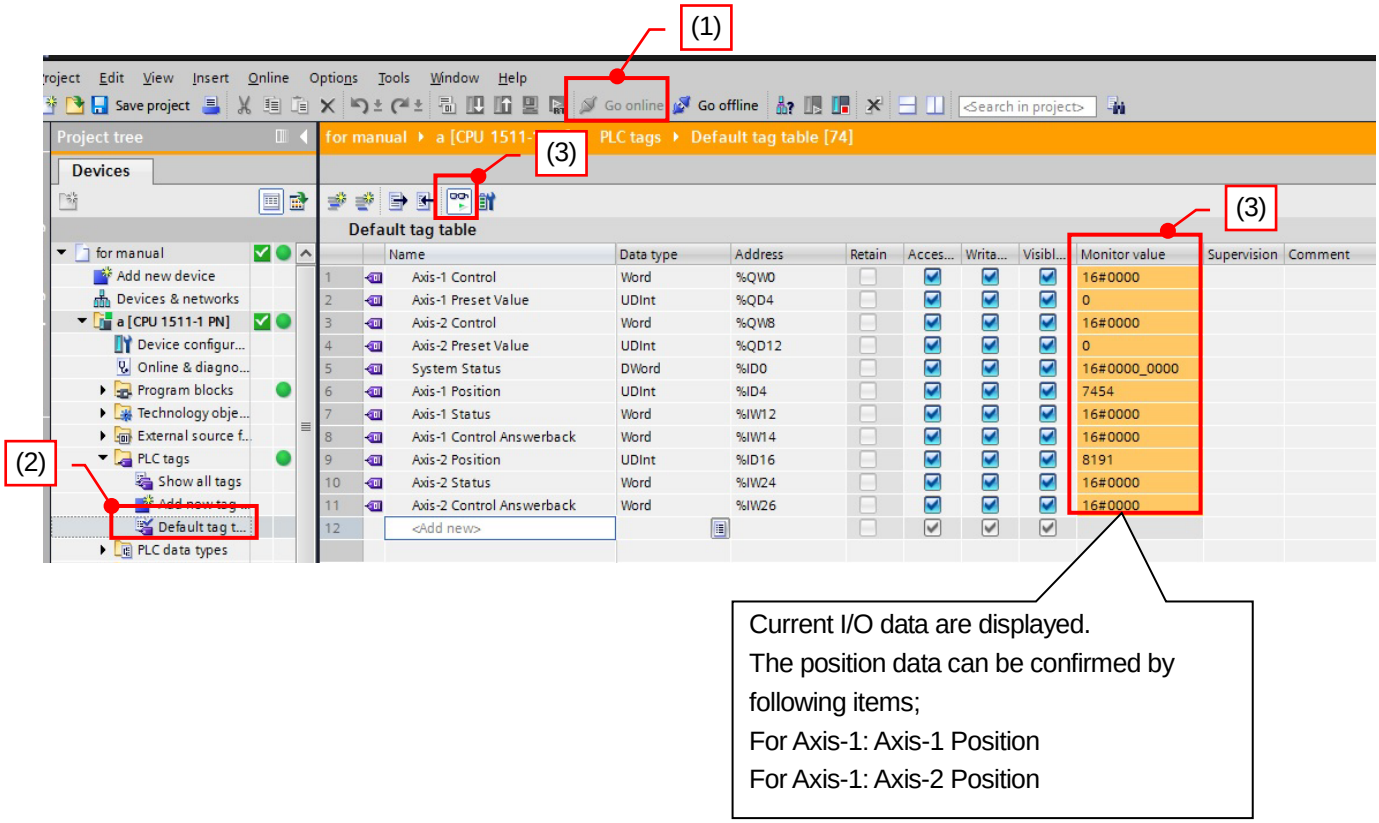


9-10. Confirm Position Data of NCW-3DHPN

(1) Click "Go online" when PLC is RUN mode.

(2) "Default tag table" is displayed by selecting "PLC->PLC Tag->Default tag table".

(3) Current I/O data are displayed on "Monitor value" when clicking "Monitor" button.



10. INSPECTION

The inspection should be conducted once every 6 months to a year.
Any inspected items which do not satisfy the criteria shown below should be repaired

Inspection item	Inspection Description	Criteria	Remark
Power supply	Measure the voltage fluctuation at the power supply terminal block of the converter to determine if it is within the prescribed range.	Within 21.6V to 26.4VDC range	Tester
Ambient Conditions	Check the ambient temperature.	ABSOCODER sensor MRE-[ ]SP061: -20 to +80℃ MRE-[ ]SP074: -20 to +120℃ MRE-[ ]SP097: -20 to +120℃ MRE-[ ]SP101: -20 to +120℃ Converter: 0 to +55°C	Thermometer
	There should be no accumulation of dust.	None	Visual Inspection
Mount Conditions	Verify that the sensor is securely mounted.	There should be no looseness.	
	Verify that the sensor shaft is securely coupled to the machine shaft.	There should be no looseness.	
	Check for severed cables.	Cable should appear normal.	
	Verify that the sensor cable connector is plugged in all the way.	There should be no looseness.	
	Verify that the LAN cable connector is plugged in all the way.	There should be no looseness.	

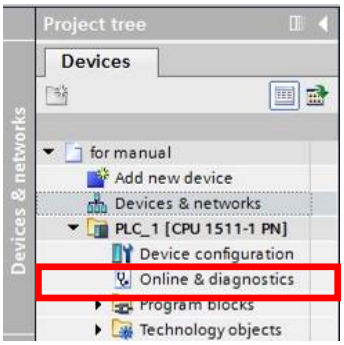
11. TROUBLE SHOOTING

Explains each error which is detected by NCW-3DHPN.

11-1.Check Methods during an Error Is Occurred

Error details can be checked by the indicator light status of NCW-3DHPN.
More over, the error details can be checked by following method with using configuration tool "STEP7 V14 Professional SP1"

①Each status in I/O data (Input data format)
②Index 0x3001 (Event Log) of the record data
③Online & Diagnosis (Select the red rectangular area.)



11-2. Measures when a Communication Error Occurs

Explains general error causes because of unstable communication and measures.

At first, check the following basic causes;

- The communication cable is connected correctly or not.
- The communication cable is served or not.
- Connectors of the communication cable are connected or not.
- The length of the communication cable connected with NCW-3DHPN is 100m or less.
- The communication cable is category 5e specification.
- The PROFINET controller (master) operates normally.

Check the following secondary causes if the above causes aren't applied.

- The communication cable isn't affected by noises.
- Appropriate distance should be kept between the communication cable and power supply cable.

After checking the above items, retry to communicate with NCW-3DHPN from the PROFINET controller (master).
NCW-3DHPN might be failure if only NCW-3DHPN cannot be communicated through the PROFINET network.
Check the light status of the NCW-3DHPN indicators (L/A1, L/A2).

11-3. NCW-3DHPN Indicator

11-3-1. Status indicator (MS/NS)

Error contents can be checked by lighting status of the status indicator (MS/NS) when an error occurs. Check the contents and take appropriate measures.

Light status		Name	Cause and Countermeasure
MS	NS		
Green	Green	Normal operation	Indicates that it is in the normal communication.
Flashing Green/ Red	Flashing Green/ Red	LED test in progress	LED lighting test is executed from the controller. MS/NS indicators blink 3 seconds.
OFF	OFF	No power	The power doesn't supply to NCW-3DHPN. - Check wirings of the power supply terminal block of NCW-3DHPN. - Check that the power voltage is within the range of specification. - Check whether the power supply capacities are enough or not.
Flashing Red	–	Major Recoverable Fault	The sensor error (SE) occurred. For more details, refer to "11-3-3".
Red	–	Major Unrecoverable Fault	NCW-3DHPN has the internal error (RDY LED is OFF). Restart the power supply. Hardware might have a malfunction if the operation is not back to normal. Thus, replace the NCW-3DHPN.
Green	Flashing Green	No connections	Communication is available, but a connection is not established. Check the Ethernet cable is connected with Ethernet portor properly.
Green	Flashing Red	Configuration error	The device's GSDML file might be different in the configuration tool setting. Check whether the GSDML file is selected correctly, and execute the configuration again.
Green	Red	Communication error	An error occurs in communicating I/O controller, and the connection is interrupted. - The communication band width of the whole network system might be lack. Reallocate the communication band width of the whole network system including NCW-3DHPN IO cycle setting by the configuration tool. - Irregular communication interrupt might have occurred. Investigate a conceivable cause in the system.

11-3-2. Link status indicator (L/A1･L/A2)

The Link Status indicator (L/A1, L/A2) indicates communication state.
L/A1: Indicates the Ethernet port 1 state.
L/A2: Indicates the Ethernet port 2 state.

Light status L/A1, L/A2	Name	Cause and Countermeasure
OFF	No link	Indicates Link is not established.
ON	Link	Indicates Link is established.
Flashing	During the communication	Indicates data is sent/received.

11-3-3. Converter status indicator

Indicates error causes and countermeasures regarding to the converter.

Light status				Name	Cause and Countermeasure
PON	RDY	ME	SE1 SE2		
ON	ON	OFF	OFF	Normal	－
OFF	OFF	OFF	OFF	Power Supply Error	The power doesn't supply to NCW-3DHPN. - Check wirings of the power supply terminal block of NCW-3DHPN. - Check that the power voltage is within the range of specification. - Check whether the power supply capacities are enough or not.
ON	**OFF**	OFF	OFF	Watchdog Timer Error or Internal Error	NCW-3DHPN operation is abnormal. Restart the power supply. Hardware might have a malfunction if the operation is not back to normal. Thus, replace NCW-3DHPN.
ON	OFF	**ON**	－	Memory Error	A memory for parameter of NCW-3DHPN is abnormal. Restart the power supply. Hardware might have a malfunction if memory error occurred repeatedly. Thus, replace NCW-3DHPN.
ON	ON	－	**ON**	SE1 Axis-1 Sensor Error SE2 Axis-2 Sensor Error	One of the following errors occurred. - The ABOSOCODER sensor isn't connected. - Sensor connector is disconnected or loose. - A sensor cable is severed. - A parameter (Axis Unavailable) whose axis isn't used is set to "0: valid". - NCW-3DHPN has a malfunction. - ABSOCODER has a malfunction. Remove the error, and execute the error clear from the PROFINET controller. Hardware might have a malfunction if errors occurred repeatedly. Thus, replace NCW-3DHPN.

11-4. Device Reset

The following parameter of NCW-3DHPN can be reset (factory setting) by using a configuration tool if PROFINET communication is available.
A memory error (ME) which is occurred on NCW-3DHPN will be cleared if reset (factory setting) is done.

Parameter	Description
2	- NameOfStation - IP Address - Subnet Mask - Default Gateway - sysContact - sysName - sysLocation

12. STORE OF MAINTENANCE INFORMATION

NCW-3DHPN can store maintenance information.
The maintenance information should be store if it is required.
Stored information can be checked when doing periodic maintenance NCW-3DHPN or having an error.

For more details, refer to "APPENDIX 1-2. Info Maintenance" and "APPENDIX 2. I&M DATA".

No.	Name	Data Type	Description
1	Power Distribution Time	Record data	NCW-3DHPN cumulative energization time can be check. Unit: sec
2	Function	I&M1	Stores a function information. Max.character No.: 32
3	Location	I&M1	Stores an installation location information. Max.character No.: 22
4	Installation Date	I&M2	Stores an installation date information. Max.character No.: 16 With installation time: YYYY-MM-DD-HH:MM Without installation time: YYYY-MM-DD
5	Descriptor	I&M3	Stores a comment. Max.character No.: 54

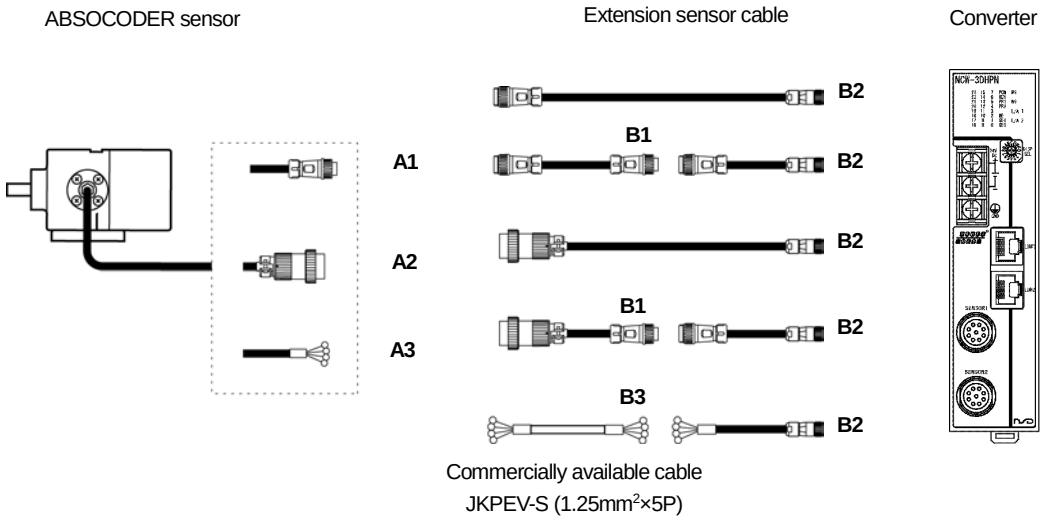
13. ABSOCODER SENSOR CHECK LIST

● **Applicable ABSOCODER sensor models**

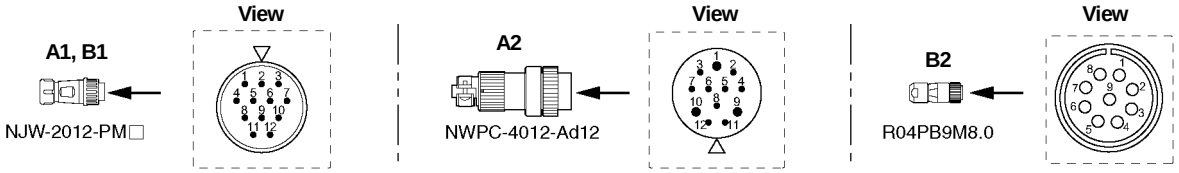
MRE-32SP061, MRE-32SP074, MRE-32SP097, MRE-32SP101

MRE-G[ ]SP061, MRE-G[ ]SP074, MRE-G[ ]SP097, MRE-G[ ]SP101

● **Connection configuration**



● **Connector appearance and pin position**



● **Connector pin position and standard coil resistance ranges (at 25℃)**

Check position						Signal names	Standard coil resistance [Ω]	
A1, A2, A3, B1		B2		B3			MRE-32SP061	MRE-32SP074, 097, 101 MRE-G[ ]SP061,074,097,101
Pin No.	Wiring color	Pin No.	Wiring color	Wire No. (pair)	Wiring color			
1	Brown	1	Brown	1	White	SIN＋	92 to 102	82 to 90
2	Red	2	Red		Black	SIN－		
3	Orange	3	Orange	2	White	－COS＋	92 to 102	82 to 90
4	Yellow	4	Yellow		Black	－COS－		
5	Green	5	Green	3	White	OUT1＋	10 to 20	15 to 27
6	Blue	6	Blue		Black	OUT1－		
7	Violet	7	Violet	4	White	OUT2＋	15 to 25	15 to 27
8	Gray	8	Gray		Black	OUT2－		
9	－	－	－	5	White	－		
10	－	－	－		Black	－		
11	Shield	9	Shield	－	Shield	Shield		
12	－	－	－	－	－	－		

The above standard coil resistance ranges are referential data to assist wiring disconnection diagnosis and are not product specification values. There may be no wiring disconnection even when the resistance measurement is out of the standard resistance range.

● **Circuit resistance check**

[Measurement method]

Measure resistance at Point A or B using a circuit tester or other appropriate device.
Have Point A connected to measure at Point B.
If the connector is off, identify the line by the wiring color.

[Check details]

Refer to the previous page for the connector pin number.

Check position	Criterion	Check position	Criterion
Between brown and red	The measured value should be in the range of the standard coil resistance. *1	Between brown and orange, green, violet, shield	∞
Between orange and yellow		Between orange and green, violet, shield	
Between green and blue		Between green, violet and shield	
Between violet and gray		Between violet and shield	
		Between frame and each wire or shield	

*1: If a check is done at Point B, the measurement value will be [Standard coil resistance + extension sensor cable resistance].
Extension sensor cable resistance value
The resistance value of the NSD special cable is 0.2Ω/m (loop resistance).
The resistance value of the JKPEV-S cable is 0.034Ω/m (loop resistance).

Consider resistance variations due to temperature, which, relative to the standard temperature (25°C), increases 0.4% when the temperature rises 1°C and decreases 0.4% when the temperature falls 1°C.

● **Insulation check**

[Measurement method]

Measure using a 500 VDC insulation tester.

[Check details]

Refer to the previous page for the connector pin number.

Check position	Criterion
Between brown and orange, green, violet, shield	10MΩ or more
Between orange and green, violet, shield	
Between green, violet and shield	
Between violet and shield	
Between frame and each wire or shield	

⚠ Note

1. Make sure to disconnect the ABSOCODER sensor from the converter before carrying out insulation checks.
2. If there is a risk that energization may cause damages to the electronic circuits in and around the machine, remove the ABSOCODER sensor from the machine.
3. After completing the checks, short-circuit between the pins to discharge remaining voltage before connecting the ABSOCODER sensor to the converter.

14. CE MARKING

This product conforms to the EMC Directive.

14-1. EMC Directives

It is necessary to do CE marking in the customer's responsibility in the state of a final product.
Confirm EMC compliance of the machine and the entire device by customer because EMC changes configuration of the control panel, wiring, and layout.

14-2. EMC Directive and Standards

EMC consists of emission and immunity items.
It conforms to Table (see below) of EMC standards and Testing.

Class	Standard No.	Standard Name
Emission (EMI)	EN61000-6-4	Generic standards. Emission standard for industrial environments
Immunity (EMS)	EN61000-6-2	Generic standards. Immunity standard for industrial environments
	EN61000-4-2	Electrostatic Discharge
	EN61000-4-3	Radiated, Radio frequency, Electromagnetic Field
	EN61000-4-4	Electrical Fast Transient / Burst
	EN61000-4-5	Surge Immunity
	EN61000-4-6	Conducted Disturbances, Induced by Radio-Frequency Fields
	EN61000-4-8	Power Frequency Magnetic Field

14-3. Low Voltage Directive

This product doesn't apply to low-voltage directive for the equipment of 24VDC power supply.

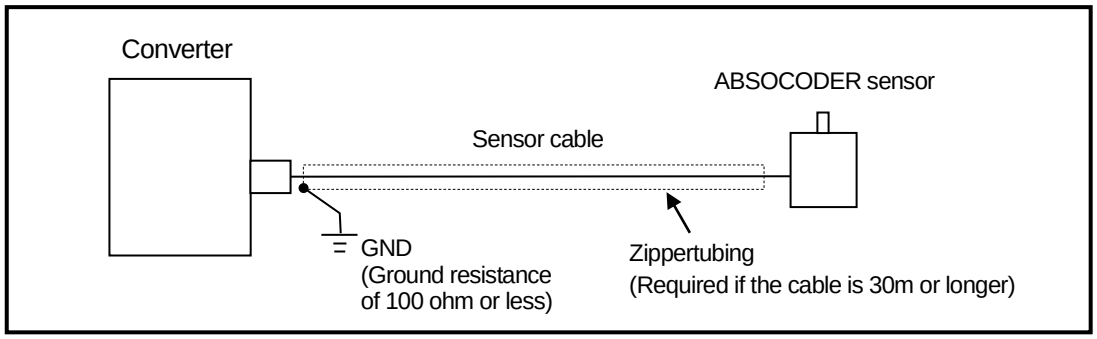
14-4. Restrictions

●Sensor cable

If a 30m or longer sensor cable is to be used, pass the sensor cable through a metal duct or cover the sensor cable with the shielded zippertubing and ground the tube shield.

Zippertubing

Model	Manufacturer
MTFS 20ϕ	ZIPPERTUBING (JAPAN), LTD.



[Reference]

It might be improved when the clamp filter is installed to the power supply or sensor cable when it operates faultily by the influence from the peripheral devices.

Clamp Filter

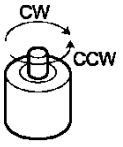
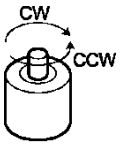
Mounting location	Clamp filter model	Manufacturer
- Power supply cable - Sensor cable	ZCAT2032-0930 (inner dimensions: ϕ9)	TDK

APPENDIX 1. RECORD DATA

The record data used in NCW-3DHPN is written in the GSDML file.

APPENDIX 1-1. Sensor Parameter

NCW-3DHPN has following sensor parameters.

Index	Name	Access		Data Type	Description
		Read	Write		
0x1000	Axis-1 Sensor Parameter	○	○	BYTE	Bit0 … Axis Unavailable Specify “Enable” or “Disable” for the axis. 0: Enable (Default) 1: Disable Bit1 … Error Clear Specify “Error recovery behavior”. 0: Auto clearing (Default) Automatically clears the error when removing the cause of the error. 1: Manual clearing Bit2 … Code Sequence (Position Data Increase Direction) Specify the ABSOCODER sensor rotation direction in which the position data increases. 0: CW (Default) 1: CCW 
0x1001	Axis-1 Preset	○	○	UDINT	Specify “Preset Value”. Axis-1 position data is changed to a value which is specified at this parameter after setting it.
0x2000	Axis-2 Sensor Parameter	○	○	BYTE	Bit0 … Axis Unavailable Specify “Enable” or “Disable” for the axis. 0: Enable (Default) 1: Disable Bit1 … Error Clear Specify “Error recovery behavior”. 0: Auto clearing (Default) Automatically clears the error when removing the cause of the error. 1: Manual clearing Bit2 … Code Sequence (Position Data Increase Direction) Specify the ABSOCODER sensor rotation direction in which the position data increases. 0: CW (Default) 1: CCW 
0x2001	Axis-2 Preset	○	○	UDINT	Specify “Preset Value”. Axis-2 position data is changed to a value which is specified at this parameter after setting it.

APPENDIX 1-2. Product Operation & Error History

The cumulative energization time, operation, and error history of NCW-3DHPN can be checked.

<table>
<tr><th rowspan="2">Index</th><th rowspan="2">Name</th><th colspan="2">Access</th><th rowspan="2">Data Type</th><th rowspan="2">Description</th></tr>
<tr><th>Read</th><th>Write</th></tr>
<tr><td>0x3000</td><td>Power Distribution Time</td><td>○</td><td>-</td><td>UDINT</td><td>Indicates the cumulative energization time of NCW-3DHPN.
(Unit: sec)</td></tr>
<tr><td>0x3100</td><td>Event Log</td><td>○</td><td>-</td><td>256
(8[32])</td><td>Indicates the operation and error information histories of NCW-3DHPN.
The history is stored in nonvolatile memory. (Max.32 histories)

Arrangement contents
<table>
<tr><th>Name</th><th>Data Type</th><th>Remarks</th></tr>
<tr><td>Message code</td><td>DWORD</td><td>History message code
Refer to next page.</td></tr>
<tr><td>Event occurrence time</td><td>UDINT</td><td>Time when an event occurs</td></tr>
</table>
</td></tr>
</table>

●History Message Lists

History message code (Hex)	History message	Message details
0x00000001	Power ON	The power was applied.
0x00000002	Power FAIL	Low power supply was detected.
0x00000020	LINK1 Port is LinkUP	LINK1 Port was Linked up.
0x00000021	LINK1 Port is LinkDOWN	LINK1 Port was Linked down
0x00000022	LINK2 Port is LinkUP	LINK2 Port was Linked up.
0x00000023	LINK2 Port is LinkDOWN	LINK2 Port was Linked down
0x00000050	Changes Axis-1 Sensor Parameter	Axis-1 sensor parameter was changed.
0x00000051	Changes Axis-2 Sensor Parameter	Axis-2 sensor parameter was changed.
0x00000060	I/O Transmission Start	I/O transmission was started
0x00000061	I/O Transmission End	I/O transmission was ended
0x00000070 - 0x00000075	―	
0x00000076	Axis-1 ERRCLR	Axis-1 ERRCLR was received.
0x00000077	Axis-1 PRESET	Axis-1 PRESET was received.
0x00000078 - 0x0000007D	―	
0x0000007E	Axis-2 ERRCLR	Axis-2 ERRCLR was received.
0x0000007F	Axis-2 PRESET	Axis-2 PRESET was received.
0x00000080	NRDY	NRDY was detected.
0x00000081	WDTE	WDTE was detected.
0x00000082	ME	ME was detected.
0x00000083 - 0x00000087	―	
0x00000088	I/F ERR	I/F ERR was detected.
0x00000089 - 0x0000008F	―	
0x00000090	I/F ERR - Timeout	I/F ERR (Timeout) was detected.
0x00000091	I/F ERR - Unknown Command	I/F ERR (Unknown Command) was detected.
0x00000092	I/F ERR – CheckSum Error [Sensor to Ethernet]	I/F ERR (CheckSum Error) was detected.
0x00000093	I/F ERR - CheckSum Error [Ethernet to Sensor]	I/F ERR (CheckSum Error) was detected.
0x000000A0	Axis-1 SE	Axis-1 sensor error was detected.
0x000000A1 - 0x000000A4	―	
0x000000A5	Axis-1 SSE	Axis-1 sensor error (Disconnected Sensor Error) was detected.
0x000000A6	Axis-1 SPF	Axis-1 sensor error (Sensor Circuit Power Error) was detected.
0x000000A7	Axis-1 DE	Axis-1 sensor error (Sensor Data Error) was detected.
0x000000A8	Axis-2 SE	Axis-2 sensor error was detected.
0x000000A9 - 0x000000AC	―	
0x000000AD	Axis-2 SSE	Axis-2 sensor error (Disconnected Sensor Error) was detected.
0x000000AE	Axis-2 SPF	Axis-2 sensor error (Sensor Circuit Power Error) was detected.
0x000000AF	Axis-2 DE	Axis-2 sensor error (Sensor Data Error) was detected.

APPENDIX 1-3. Interface Parameter

Indicates the current communication parameter of NCW-3DHPN.

Index	Name	Access		Data Type	Description
		Read	Write		
0x7000	NameOfStation	○	-	STRING [240]	NameOfStation of device (Max. 240-octet)
0x7001	IP Address	○	-	BYTE [4]	IP Address of device
0x7002	MAC Address	○	-	BYTE [6]	MAC Address
0x7003	Default Gateway	○	-	BYTE [4]	Default Gateway Address
0x7004	Subnet Mask	○	-	BYTE [4]	Subnet Mask

APPENDIX 2. I&M DATA (Identification & Maintenance Data)

I &M data indicates the product and maintenance information.
These are stored in the nonvolatile memory.

I&M	Access		I&M data	Description
	Read	Write		
0	○	-	VENDER_ID	NSD_Corp “0x0417”
			ORDER_ID	Model code of product “NCW-3DHPNM2R”
			SERIAL_NUMBER	Serial number of product
			HARDWARE_REVISION	Hardware version of product
			SOFTWARE_REVISION	Firmware version of product
			REV_COUNTER	0x0000
			PROFILE_ID	“0x0000” (unspecified device)
			PROFILE_SPECIFIC_TYPE	This product is “General”. “0x0000”
			IM_VERSION	Version of the I&M data
			IM_SUPPORTED	Support I&M number This product supports I&M0, 1, 2, and 3. “0x000E”
1	○	○	FUNCTION	Stores a function information. Max.character No.: 32
			LOCATION	Stores installation location information. Max.character No.: 22
2	○	○	INSTALLATION_DATE	Stores an installation date information. Max.character No.: 16 With installation time: YYYY-MM-DD-HH:MM Without installation time: YYYY-MM-DD
3	○	○	DESCRIPTOR	Stores a comment. Max.character No.: 54
4				Not supported
5				Not supported

APPENDIX 3. ALARM DATA

The alarm data used in NCW-3DHPN is written in GSDML file.
The text is displayed on the configuration tool when an alarm occurs.

AlarmType	Text display	Description
Process	Axis-1 SSE	Axis-1 sensor error (Disconnected Sensor Error) was detected.
	Axis-1 DE	Axis-1 sensor error (Sensor Data Error) was detected.
	Axis-2 SSE	Axis-2 sensor error (Disconnected Sensor Error) was detected.
	Axis-2 DE	Axis-2 sensor error (Sensor Data Error) was detected.
Diagnosis	Memory Error	Memory error was detected.
	WatchDog Error	Watch dog timer error was detected.
	Internal Bus Error	Bus error was detected.
	Axis-1 SPF	Axis-1 sensor error (Sensor Circuit Power Error) was detected.
	Axis-2 SPF	Axis-2 sensor error (Sensor Circuit Power Error) was detected.
	GSDML file is different	The configuration was executed by using a GSDML file of different product.

NSD Group

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