



ZEF005850903

Abbycooder®

EtherNet/IP™

ABSOCODER Converter

NCW-3DHIPV1R

Specifications & Instruction Manual

Applicable sensor:

VRE-P061

VRE-P074

VRE-P097

VRE-P101



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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.

COPYRIGHT

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- Company and product names that appear in this manual are registered trademarks or trademarks of their respective holders.

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.

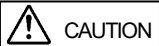
This product is designed to be used under the industrial environments categorized in Class A device.

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  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 | |
|--|---|
|  | <ul style="list-style-type: none"> - 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. |
|  | <ul style="list-style-type: none"> - 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. |
|  | <ul style="list-style-type: none"> - 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. |
|  | <ul style="list-style-type: none"> - Be sure to store the converter in designed temperature and humidity range, and do not expose 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 | |
|---|---|
|  | <ul style="list-style-type: none"> - 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. |
|  | <ul style="list-style-type: none"> - 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 | |
|--|--|
|  | <ul style="list-style-type: none"> - 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 | |
|---|--|
|  | <ul style="list-style-type: none"> - 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 | |
|---|--|
|  | <ul style="list-style-type: none"> - 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. |
|  | <ul style="list-style-type: none"> - 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. |

- MEMO -

1. OVERVIEW

NCW-3DHIPV1R (hereinafter referred to as NCW-3DHIP) is an ABSOCODER converter, a slave unit for EtherNet/IP, can communicate with EtherNet/IP. With the use of NCW-3DHIP in combination with a single-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 EtherNet /IP communication. Or, the PLC and industrial computer can readout the converter status information and set parameters.

This manual assumes that NCW-3DHIP and a programmable controller which is manufactured by Rockwell Automation, Inc. are connected by the network. Therefore, we explain the manual by using the following software.

- ①BOOTP/DHCP Server
- ②RSLinx Classic
- ③RSLogix5000
- ④RSNetWorx

For details of software instruction, refer to each product manual.

If the configuration tool is needed the definition file (EDS 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) EtherNet/IP communication

A position, preset, alarm, and parameter data can be transmitted through the EtherNet/IP network.

- The converter supports full duplex (100BASE-TX), so data can be transmitted faster.
- The minimum cycle for communication is 2ms.

(5) Two axes ABSOCODER sensor 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 EtherNet/IP 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 EtherNet/IP master.

(8) Configuration tool (software for configuring the system)

Settings are available by using EtherNet/IP software.

(9) Supporting the device level ring function (DLR)

NCW-3DHIP can connect to the network by ring topology (redundancy) of EtherNet/IP network.

(10) Applicable with JKPEV-S cable

A commercially available cable (JKPEV-S 1.25mm² x 5P) can be used between the converter and ABSOCODER sensor.

(11) Compliance with CE standards

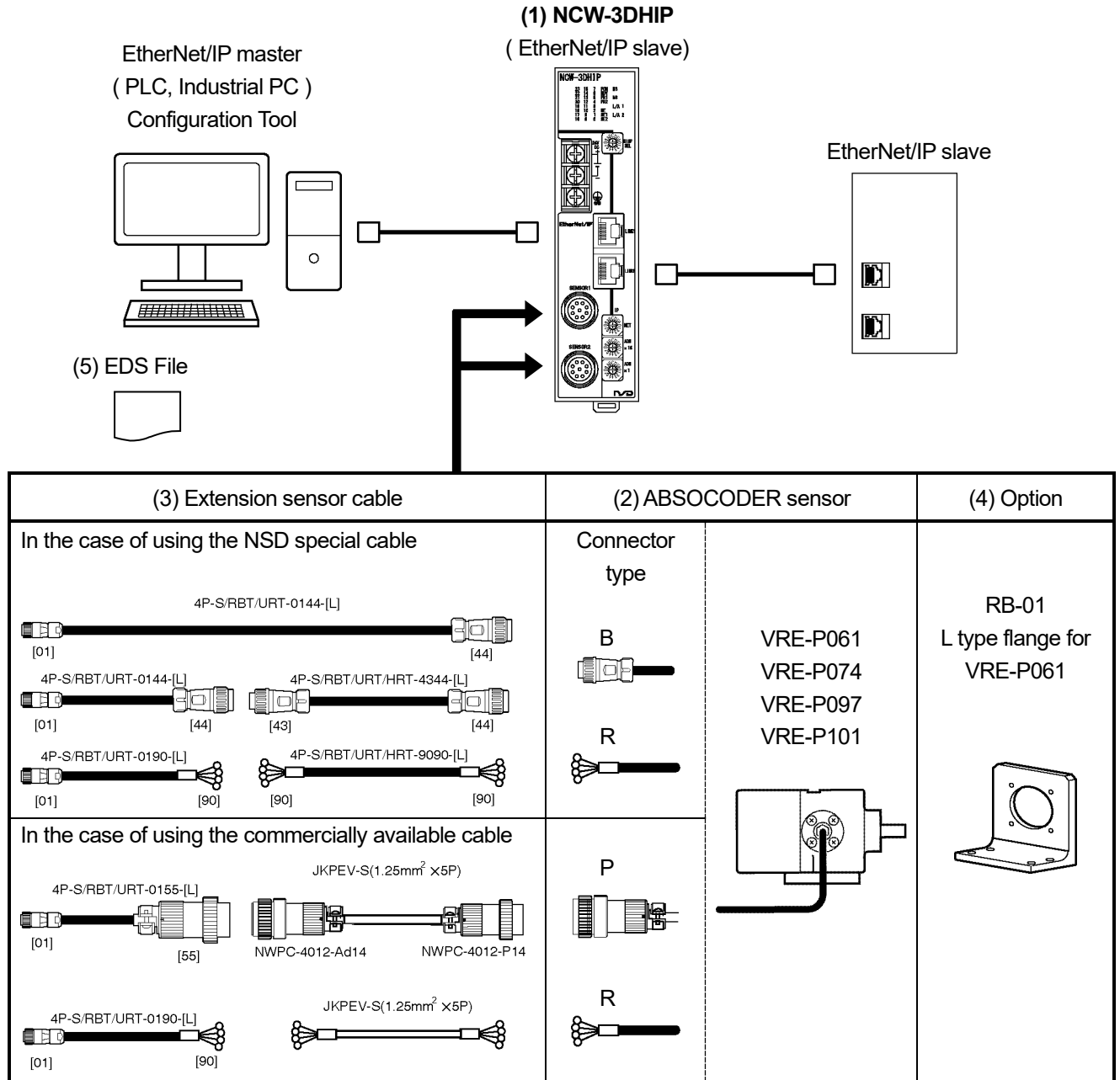
The converter complies with CE (EMC Directive) standards.

2. MODEL SELECTION WHEN ORDERING

The following figure indicates the connection configuration of NCW-3DHIP.

Before ordering, refer to the connection configuration and model list. Please prepare by customer except (1) to (5) in the connection configuration.

● Connection configuration

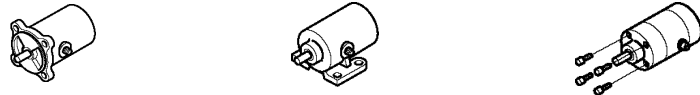



● **Model List**

◆ **Converter**

| No. | Model | Description |
|-----|--------------|---|
| ① | NCW-3DHIPV1R | For multi-turn type ABSOCODER sensor Position data 13-bit binary code output |

◆ **ABSOCODER sensor**

| No. | Model | Description |
|-----|--|--|
| | VRE-P061FK[2] | General environment type Flange-mount type With Interconnecting cable 2m |
| | VRE-P074[1]K[2][L][-G] | Compact size heavy duty type, SUS |
| | VRE-P097[1]K[2][L][-G] | Heavy duty type, cast iron |
| | VRE-P101[1]K[2][L][-G] | Heavy duty type, SUS |
| | [1]: Mounting format F: Flange-mount type L: Base-mount type M: Face-mount type (Only available for MRE-SP074) |  |
| (2) | K: Input shaft (sunk key) |  |
| | [2]: 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-[1]-[2][3]-[L] | [1]...Cable type S: Standard cable, RBT: Robotic cable, URT: Semi-heat-resistant robotic cable, HRT: Heat-resistant robotic cable [2]...Connector (Converter side) 01: Connector for connecting to a converter (R04-PB9M8.0A) 43: Standard connector (NJW-2012-PM8) 90: Crimping terminals (R-1.25-4) [3]...Connector (Sensor side) 44: Standard connector (NJW-2012-AdF8) 55: Large connector (NWPC-4012-P12) 90: Crimping terminals (R-1.25-4) [L]...Cable length (m) Contact your NSD representative for the cable length. |
| | JKPEV-S(1.25mm ² ×5P) | Commercially available cable |

◆ **Option**

| No. | Model | Description |
|-----|-------|----------------------------|
| (4) | RB-01 | L-type flange for VRE-P061 |

◆ **EDS File**

| No. | Model | Description |
|-----|---|-------------------------------|
| (5) | File name: EDS_Rev000000**_NSD_NCW-3D_IP_*****.eds | 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-3DHIPV1R | |
| Applicable sensor | VRE-P061, VRE-P074 VRE-P097, VRE-P101 | |
| Total number of divisions | 8192 (2 ¹³) | |
| Number of effective bits | 13 (D0 to D12) | |
| Position detection format | Absolute format | |
| Output code | Binary code | |
| Number of detection axes | 2 | |
| Position data update interval | Minimum 2 ms By RPI (EtherNet/IP 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 | EtherNet/IP Communication monitor |
| | NS: Network status | |
| | L/A1/L/A2: Communication status | |
| | PON: Power ON | |
| | RDY: Converter normal (ready for operation) | |
| | 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 | |
| | Sensor code | |
| | Converter's diagnosis data | |
| | Parameter | |
| Communication diagnostic data | | |
| Communication diagnostic data | | |
| Front panel operation | LED display selecting: DISP SEL | Rotary switch |
| | IP address setting (IP / NET): x1 IP address setting (IP / ADR): x16, x1 | Rotary switch |
| | LINK1/LINK2 communication setting (Communication speed, Communication format) | DIP 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 (Selectable) | 100Mbit/s, 10Mbit/s, Auto-Negotiation |
| | Communication format (Selectable) | Full Duplex, Half Duplex, Auto-Negotiation |
| | Communication cycle time (RPI) | Minimum 2 ms |
| | Protocol | CIP Conformance Test CT-15 |
| | Basic protocol | <ul style="list-style-type: none"> - 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) - Bootstrap Protocol(BOOTP)(RFC951) - Dynamic Host Configuration Protocol(DHCP)(RFC2131) |
| | Network topology | <ul style="list-style-type: none"> - Star topology - Linear bus topology - Ring topology (DLR function) |
| | DLR function | |
| | Web server function | |
| | Recommended cable | CAT-5e STP straight cable |
| Cable length | Between nodes: Max. 100m | |
| Function | IP address setting | <ul style="list-style-type: none"> - Sets manually by using switches on the NCW-3DHIP panel side. - Sets automatically from the BOOTP or DHCP server. |
| | Communication setting (Speed and format) | <ul style="list-style-type: none"> - Sets manually by using DIP switches on the NCW-3DHIP rear side. - Sets automatically by the Auto-Negotiation. |
| | Parameter settings | Axis Unavailable Error Clear 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 Specifications

(1) VRE-P061, VRE-P074

| Items | | Specifications | |
|---|------------------------------------|--|--|
| Sensor model | | VRE-P061 | VRE-P074 |
| Total number of turns | | 1 | |
| Number of divisions | | 8192 (2 ¹³) | |
| Mass | | 1.3kg | 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 | | 1° Max. | 0.7° Max. |
| Moment of inertia GD ² /4(J) | | 6.4 x 10 ⁻⁶ kg·m ² (6.5 x 10 ⁻⁵ kgf·cm·s ²) | 3.3 x 10 ⁻⁵ kg·m ² (3.4 x 10 ⁻⁴ kgf·cm·s ²) |
| Starting torque | | 4.9 x 10 ⁻² N·m or less (0.5 kgf·cm or less) | 9.8 x 10 ⁻² N·m or less (1 kgf·cm or less) |
| Permissible shaft load | Radial | 98N (10 kgf) | |
| | Thrust | 49N (5 kgf) | |
| Permissible mechanical speed | | 3600r/min | 4000r/min |
| Bearing life | | 5.5 x 10 ⁴ h (at 3600r/min) | 8 x 10 ⁴ h (at 4000r/min) |
| Ambient temperature | Operating | -20 to +80°C | -20 to +120°C |
| | Storage | -30 to +90°C | -30 to +120°C |
| Vibration resistance | | 2.0 x 10 ² m/s ² (20G) 2000Hz, up/down 4 h, forward/back 2 h, conforms to JIS D 1601 standard | 2.0 x 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 x 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 | | IP65, conforms to JEM1030 standard | IP67, conforms to JEM1030 standard IP69K, conforms to ISO20653 standard |
| Interconnecting cable | | 2m | 2 · 5 · 10 · 20m |
| Max. sensor cable length | 4P-S | 500m | |
| | 4P-RBT/URT /HRT | 250m | |
| | JKPEV-S (1.25mm ² × 5P) | 300m | |
| Surface treatment | | Electroless nickel plate | Not treated |
| Material | | Steel | Stainless |

(2) VRE-P097, VRE-P101

| Items | | Specifications | |
|---|------------------------------------|--|-------------|
| Sensor model | | VRE-P097 | VRE-P101 |
| Total number of turns | | 1 | |
| Number of divisions | | 8192 (2 ¹³) | |
| Mass | | 6.5+0.1 x cable length (m) kg | |
| Linearity error | | 0.7° Max. | |
| Moment of inertia GD ² /4(J) | | 3.3 x 10 ⁻⁵ kg·m ² (3.4 x 10 ⁻⁴ kgf·cm·s ²) | |
| Starting torque | | 9.8 x 10 ⁻² N·m or less (1 kgf·cm or less) | |
| Permissible shaft load | Radial | 1.5 x 10 ² N (15kgf) | |
| | Thrust | 78N (8kgf) | |
| Permissible mechanical speed | | 4000r/min | |
| Bearing life | | 8 x 10 ⁴ h (at 4000r/min) | |
| Ambient temperature | Operating | -20 to +120°C | |
| | Storage | -30 to +120°C | |
| Vibration resistance | | 2.0 x 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 x 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 JEM1030 standard IP69K, conforms to ISO20653 standard | |
| Interconnecting cable | | 2 · 5 · 10 · 20m | |
| Max. sensor cable length | 4P-S | 500m | |
| | 4P-RBT/URT /HRT | 250m | |
| | JKPEV-S (1.25mm ² × 5P) | 300m | |
| Surface treatment | | Coated (epoxy resin) | Not treated |
| Material | | Cast iron | Stainless |

3-3. Extension Sensor Cable Specification

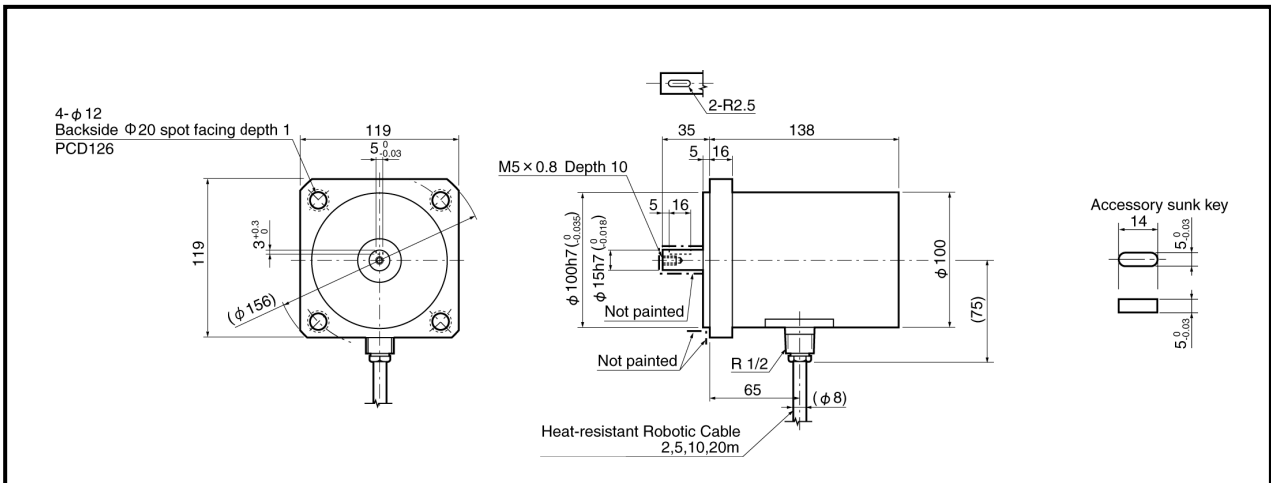
| Items | Specifications | | | |
|-----------------------------|--|--|---|---|
| Model code | 4P-S | 4P-RBT | 4P-URT | 4P-HRT |
| Cable type | Standard cable | Robotic cable | Semi heat-resistant robotic cable | Heat-resistant robotic cable |
| Diameter | $\phi 8$ | | | |
| Operating temperature range | -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 | Fluoro-rubber |
| 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]

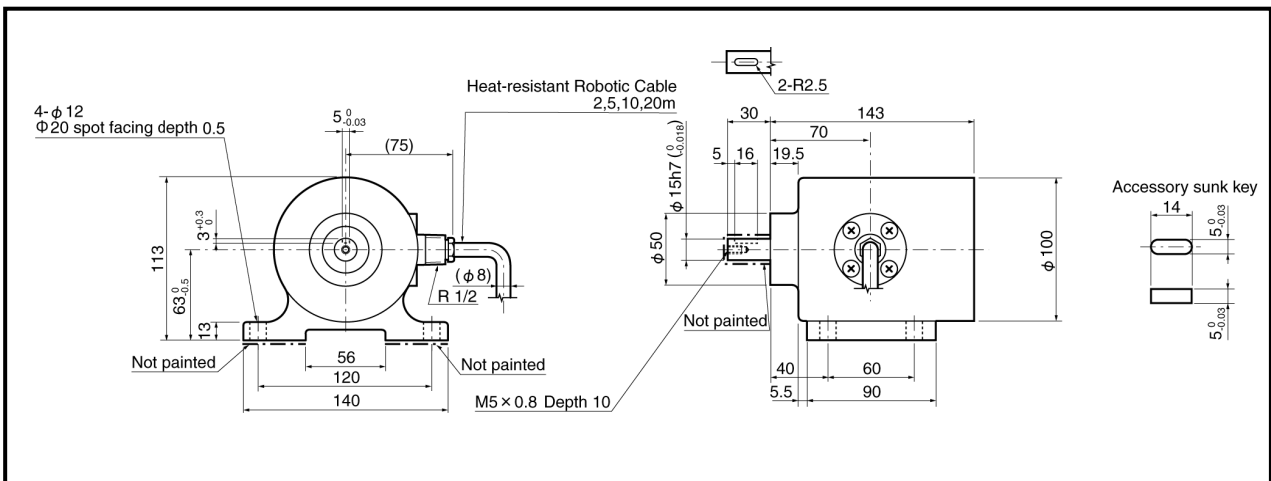
Contact your NSD representative when the extension cable combines different types of cables.

(6) VRE-P097FK[] (Flange-mount type)

Units: mm

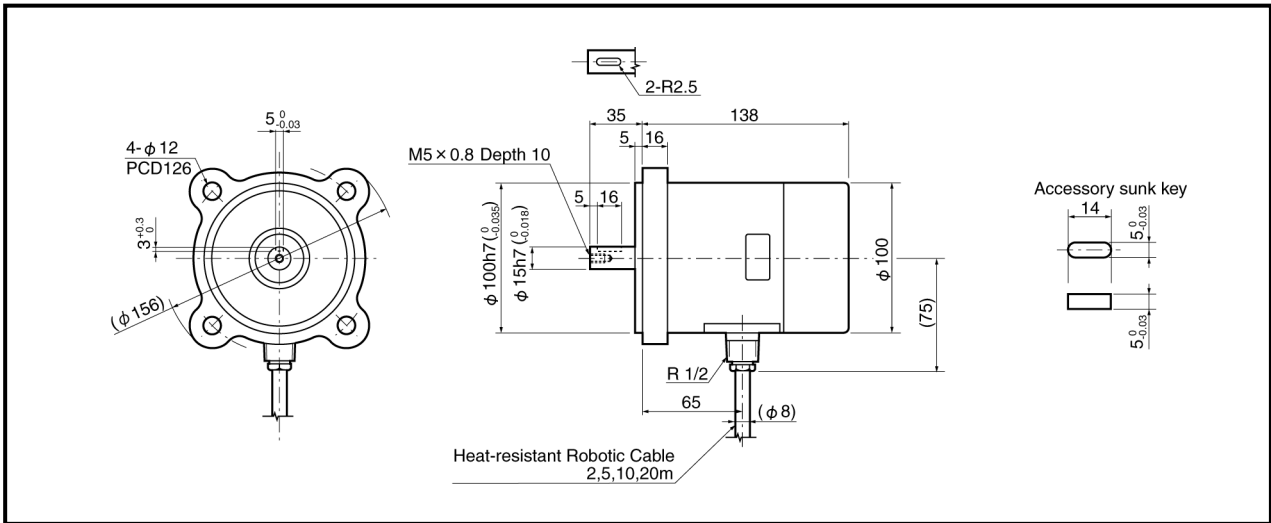


(7) VRE-P097LK[] (Base-mount type)

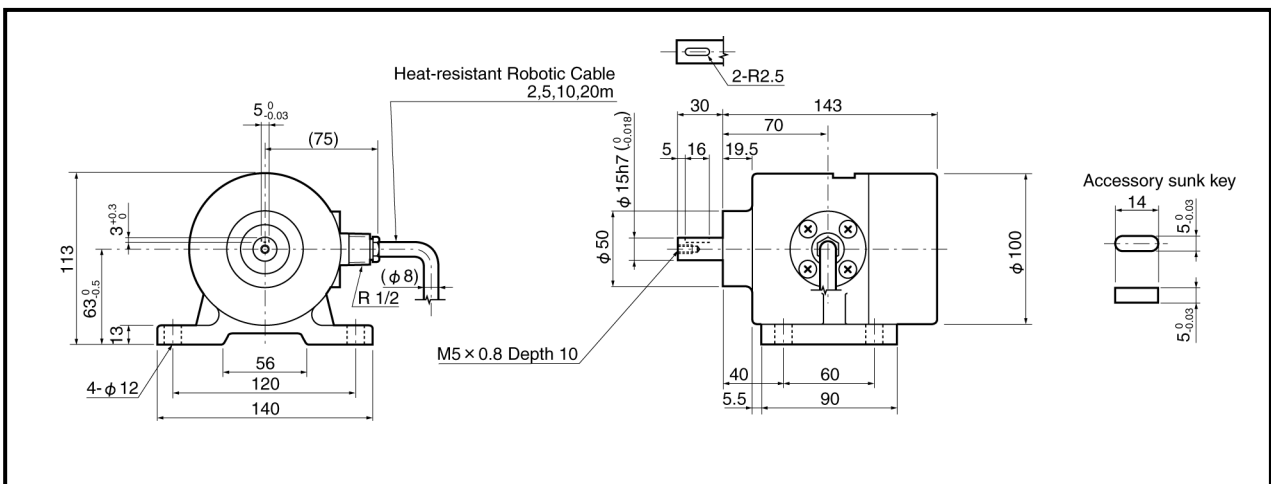


(8) VRE-P101FK[] (Flange-mount type)

Units: mm



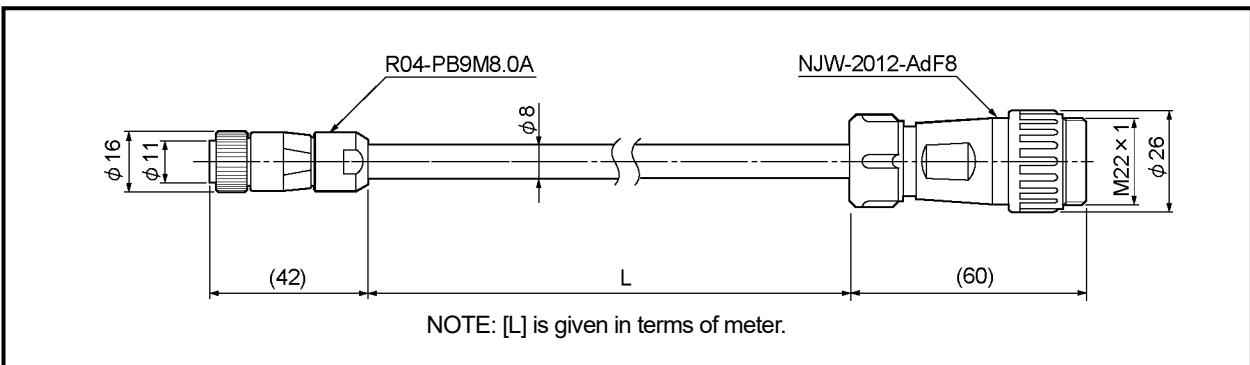
(9) VRE-P101LK[] (Base-mount type)



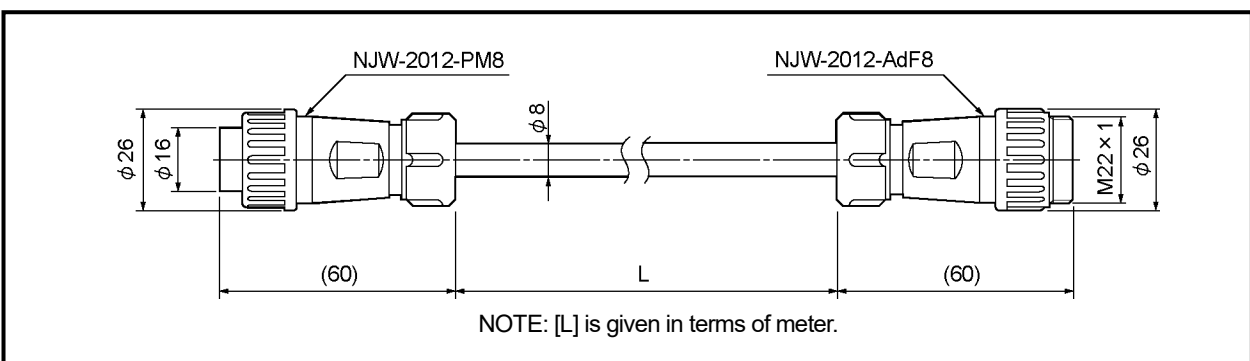
4-3. Extension Sensor Cable Dimensions

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

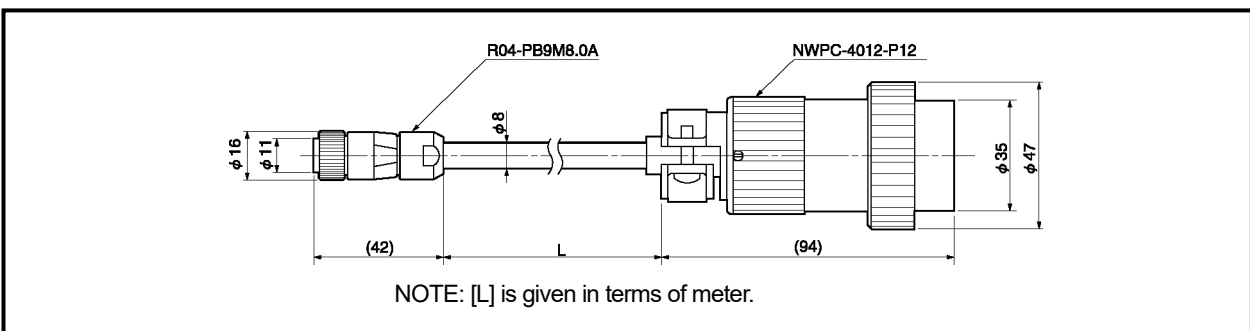
Units: mm



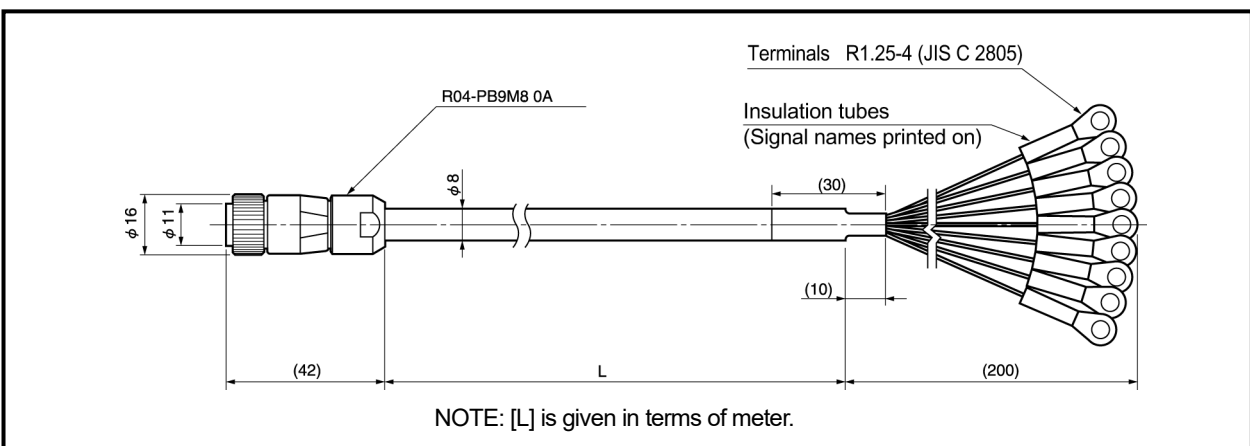
(2) 4P-S-4344-[L] / 4P-RBT-4344-[L] / 4P-URT-4344-[L] / 4P-HRT-4344-[L]



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

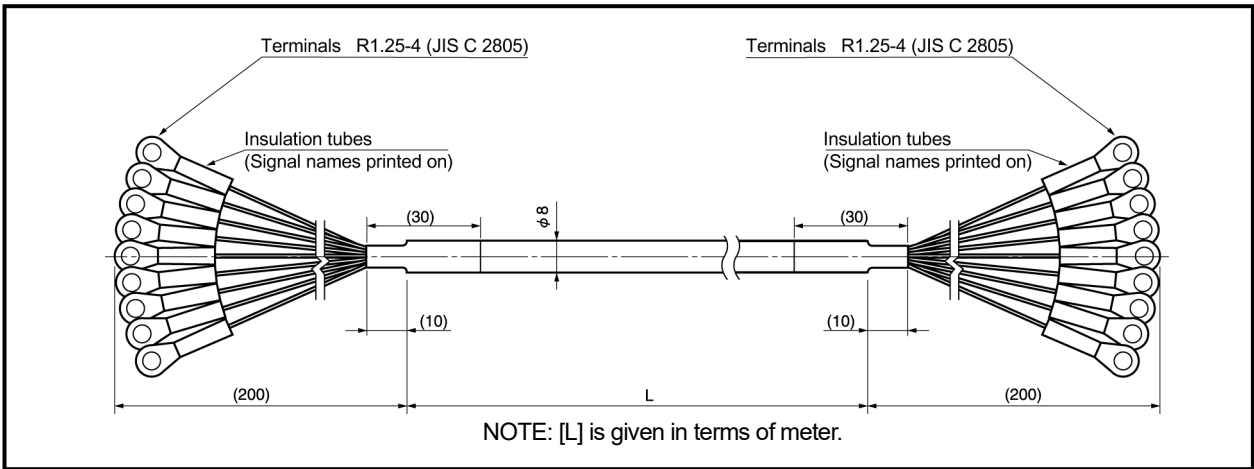


(4) 4P-S-0190-[L] / 4P-RBT-0190-[L] / 4P-URT-0190-[L]



(5) 4P-S-9090-[L] / 4P-RBT-9090-[L] / 4P-URT-9090-[L] / 4P-HRT-9090-[L]

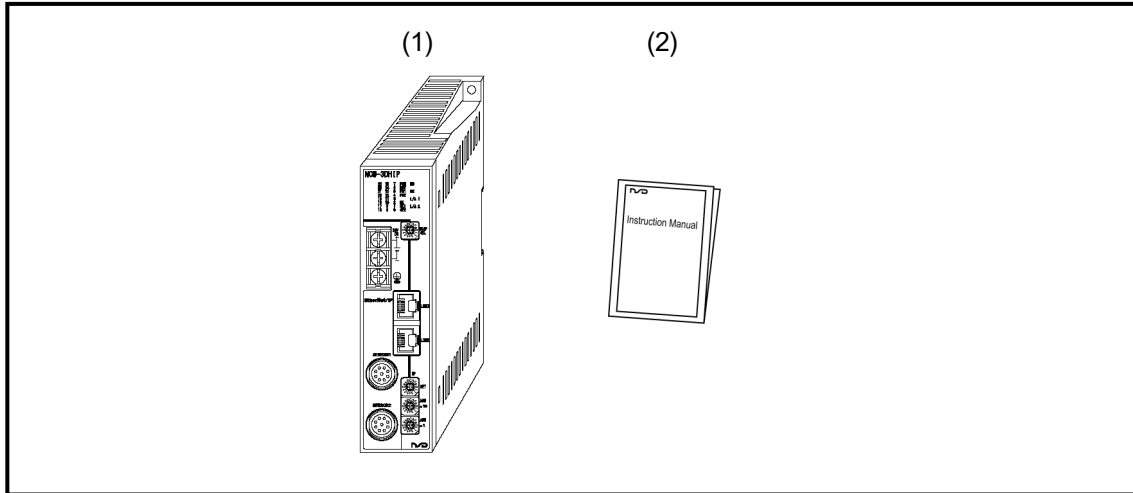
Units: mm



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.



(1) Converter 1 unit

(2) Manual 1 piece

6. INSTALLATION

6-1. Converter Installation Conditions and Precautions

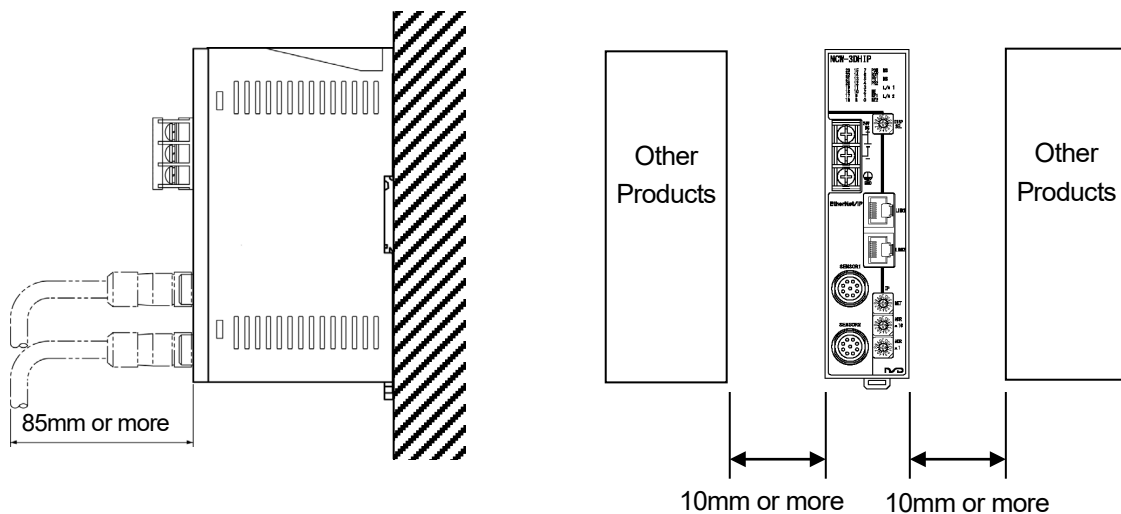
When installing the converter, the following conditions and precautions should be observed.

-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 sensor installation procedures and precautions are described in this section.

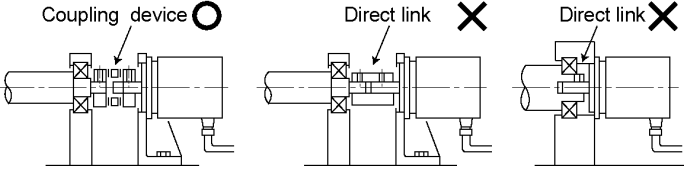
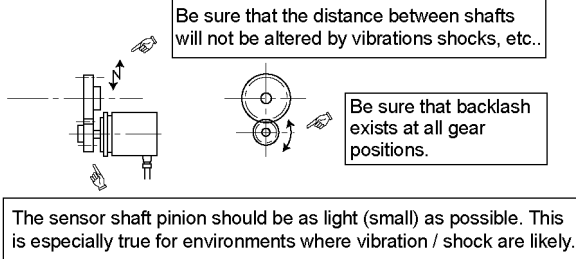
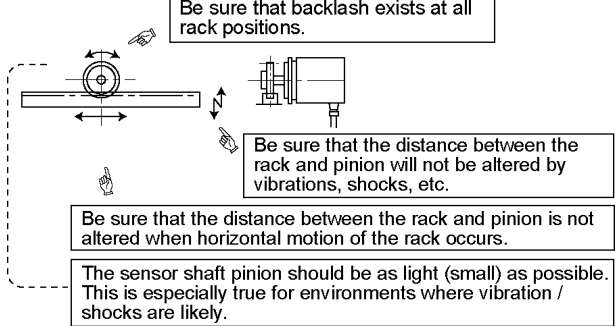
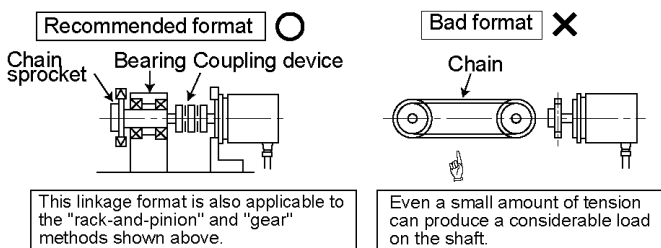

● Handling of Turn-type ABSOCODER Sensor

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

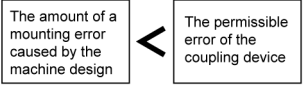
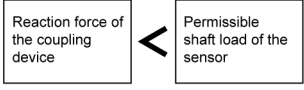
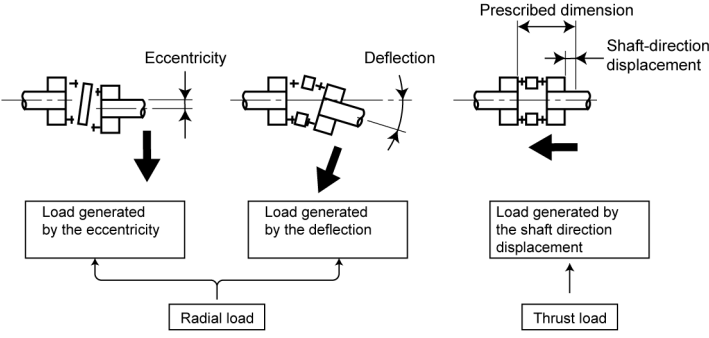
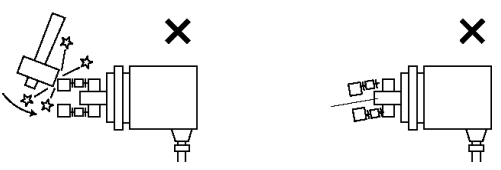
● Mounting of Turn-type ABSOCODER Sensor

| Item | Explanation | Precaution |
|----------------|---|---|
| (1) Mounting | For details regarding mounting dimensions, refer to each ABSOCODER sensor dimensions. | |
| (2) Cable port | <p>Cable port should face downward.</p> | |
| (3) Cable | <p>The bend radius for movable parts should never be less than 75 mm ($\phi 150$) (robotic cable).</p> | Do not use the standard cable for movable parts. (Use robotic cable.) |
| (4) Wiring | <p>The sensor cable should be located at least 300mm away from power lines and other lines which generate a high level of electrical noise.</p> | |

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

| Item | Explanation | Precaution |
|--|--|---|
| (1) Coupling of machine shaft and sensor shaft | <p>Be sure to use a coupling device to link the 2 shafts.</p>  <p>Coupling device ○ Direct link ✕ Direct link ✕</p> | <p>A “direct-link” format will result in shaft fatigue and / or breakage after long periods.</p> <p>Therefore, be sure to use a coupling device to link the shafts.</p> |
| (2) For gear-type linkage | <p>If a gear linkage is used, be sure that some backlash exists.</p>  <p>Be sure that the distance between shafts will not be altered by vibrations shocks, etc..</p> <p>Be sure that backlash exists at all gear positions.</p> <p>The sensor shaft pinion should be as light (small) as possible. This is especially true for environments where vibration / shock are likely.</p> | <p>Incorrect gear mounting can result in shaft bending or breakage.</p> |
| (3) For rack and pinion type linkage | <p>Be sure that backlash exists at all rack positions.</p>  <p>Be sure that backlash exists at all rack positions.</p> <p>Be sure that the distance between the rack and pinion will not be altered by vibrations, shocks, etc.</p> <p>Be sure that the distance between the rack and pinion is not altered when horizontal motion of the rack occurs.</p> <p>The sensor shaft pinion should be as light (small) as possible. This is especially true for environments where vibration / shocks are likely.</p> | <p>Incorrect rack and pinion mounting can result in shaft bending or breakage.</p> |
| (4) Chain or timing belt linkage | <p>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.</p>  <p>Recommended format ○ Bad format ✕</p> <p>Chain sprocket Bearing Coupling device Chain</p> <p>This linkage format is also applicable to the "rack-and-pinion" and "gear" methods shown above.</p> <p>Even a small amount of tension can produce a considerable load on the shaft.</p> | |
| (5) Shaft mounting position | <p>The shaft should be attached to the coupling device or gear at a point which is as near to the sensor body as possible.</p>  <p>Recommended format ○ Bad format ✕ Coupling device or</p> <p>This distance should be as short as possible. When this distance is short, the load placed on the bearing by vibrations / shocks is slight.</p> <p>Never use an extended shaft format.</p> | |

● Coupling of Turn-type ABSOCODER Sensor

| Item | Explanation | Precaution |
|--|---|--|
| <p>(1) Coupling device selection precaution</p> | <p>1. Selection of the coupling device should be based on the following factors;</p> <ul style="list-style-type: none"> - The amount of a mounting error caused by the machine design. - The permissible error of coupling device. - Reaction force of coupling device. - Permissible shaft load of the sensor. <div style="text-align: center; margin: 10px 0;">   </div> <p>Mounting error</p> <div style="text-align: center; margin: 10px 0;">  </div> <p>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.</p> <p>3. Be sure to select a coupling device with an adequate transmission torque surplus relative to the sensor shaft's torque.</p> | <p>The selection of a larger coupling than necessary will increase the shaft load which is caused by the mounting error amount.</p> <p>Excessive force applied to the shaft can deform the coupling and reduce durability.</p> |
| <p>(2) Coupling device installation precaution</p> | <p>Avoid bending or damaging the coupling.</p> <div style="text-align: center; margin: 10px 0;">  </div> | |

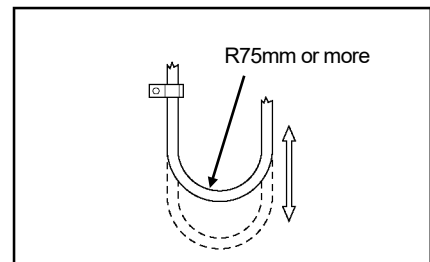
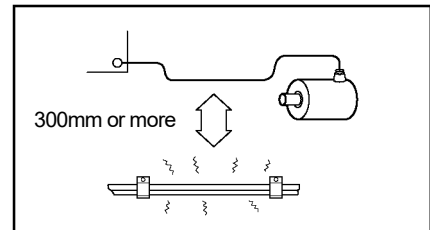
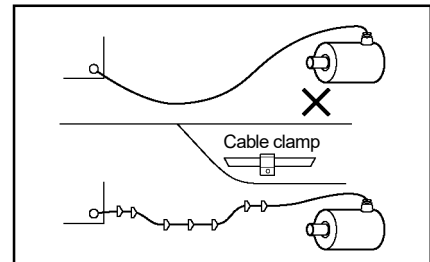
7. WIRING

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".

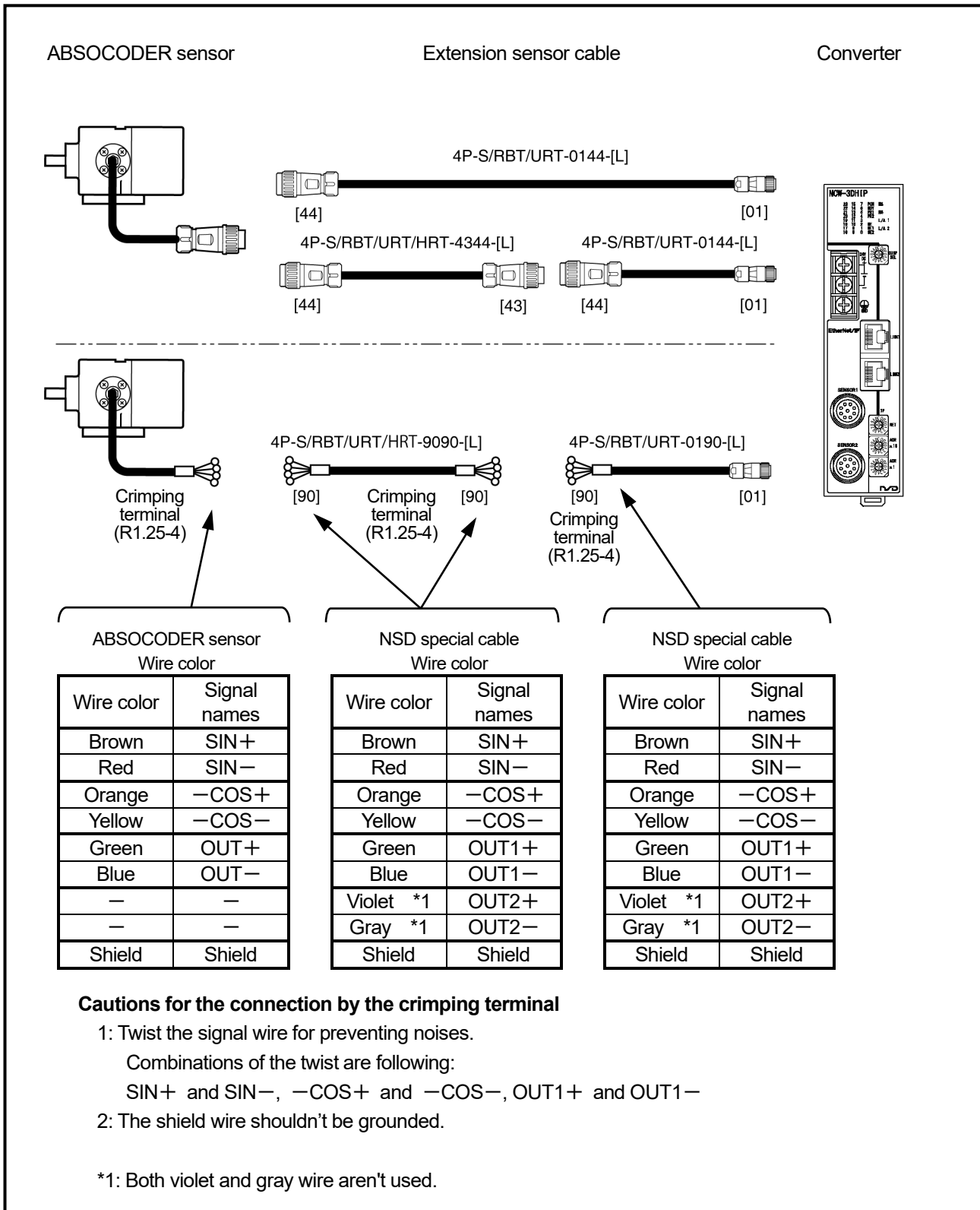
-Wiring Precautions

- (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.

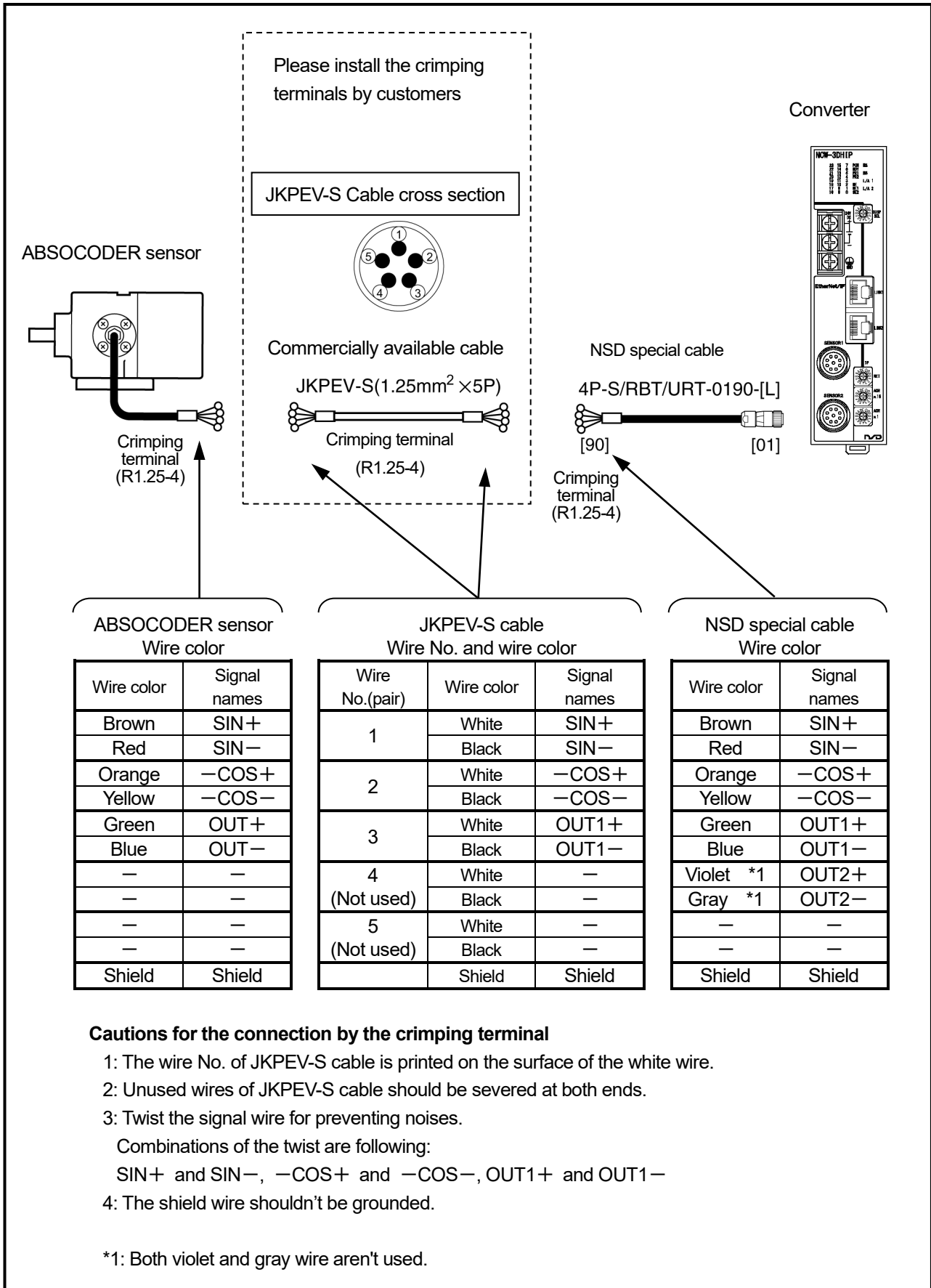


7-1-1. Connection configure example of the sensor cable

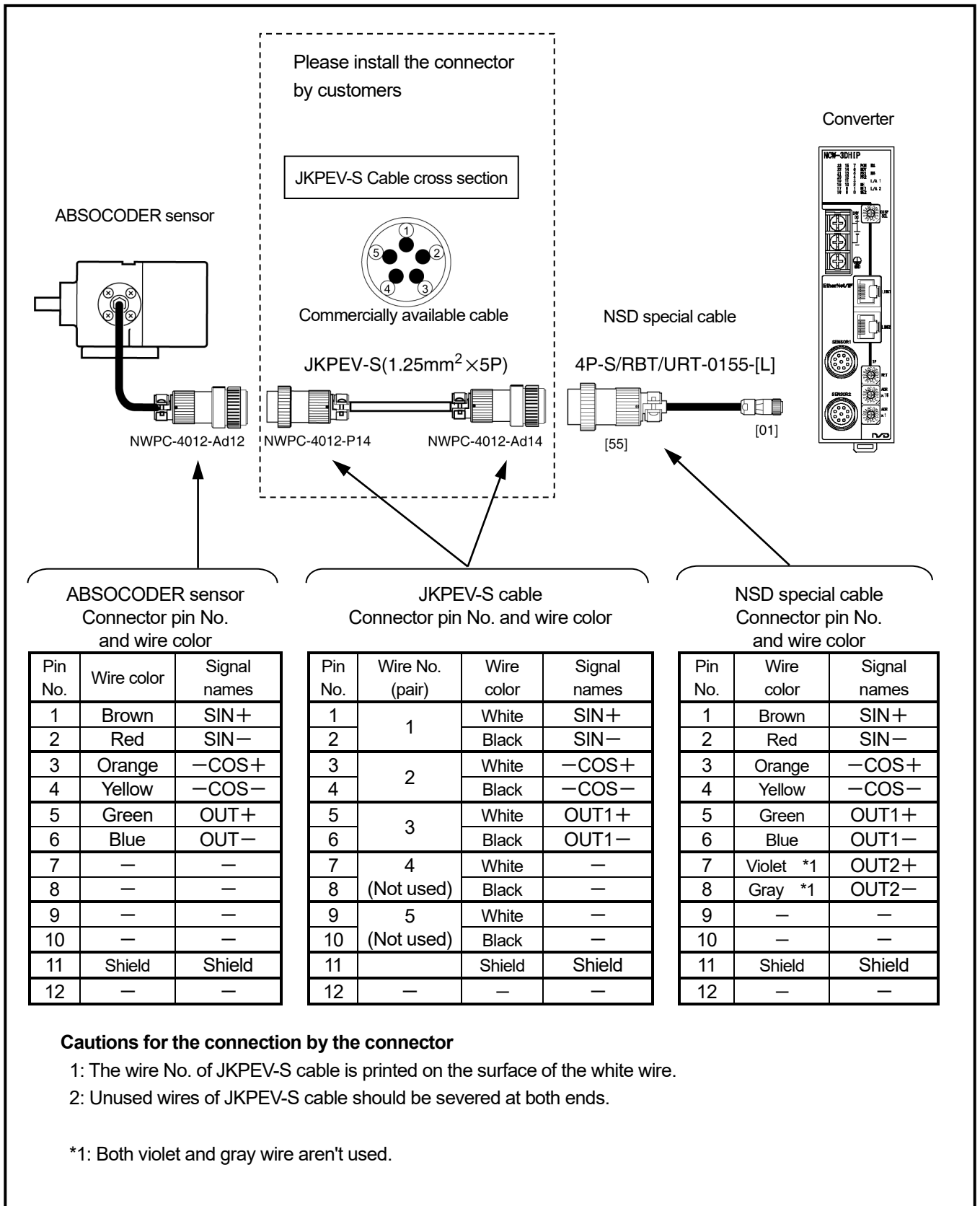
● In the case of using the NSD special cable



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



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



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.

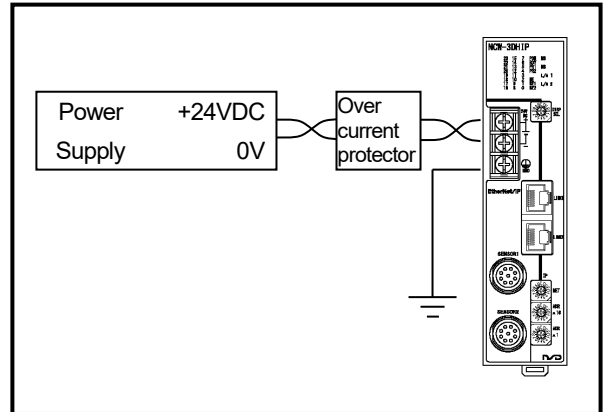
- The input power supply should be isolated from the commercial power supply.

- 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).

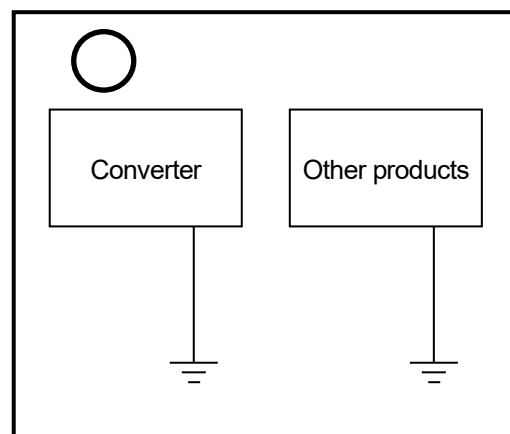
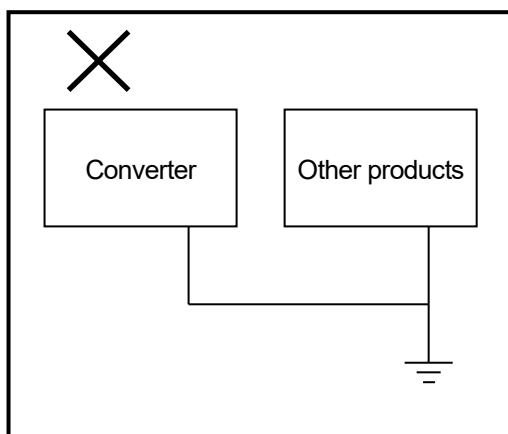


●Ground

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

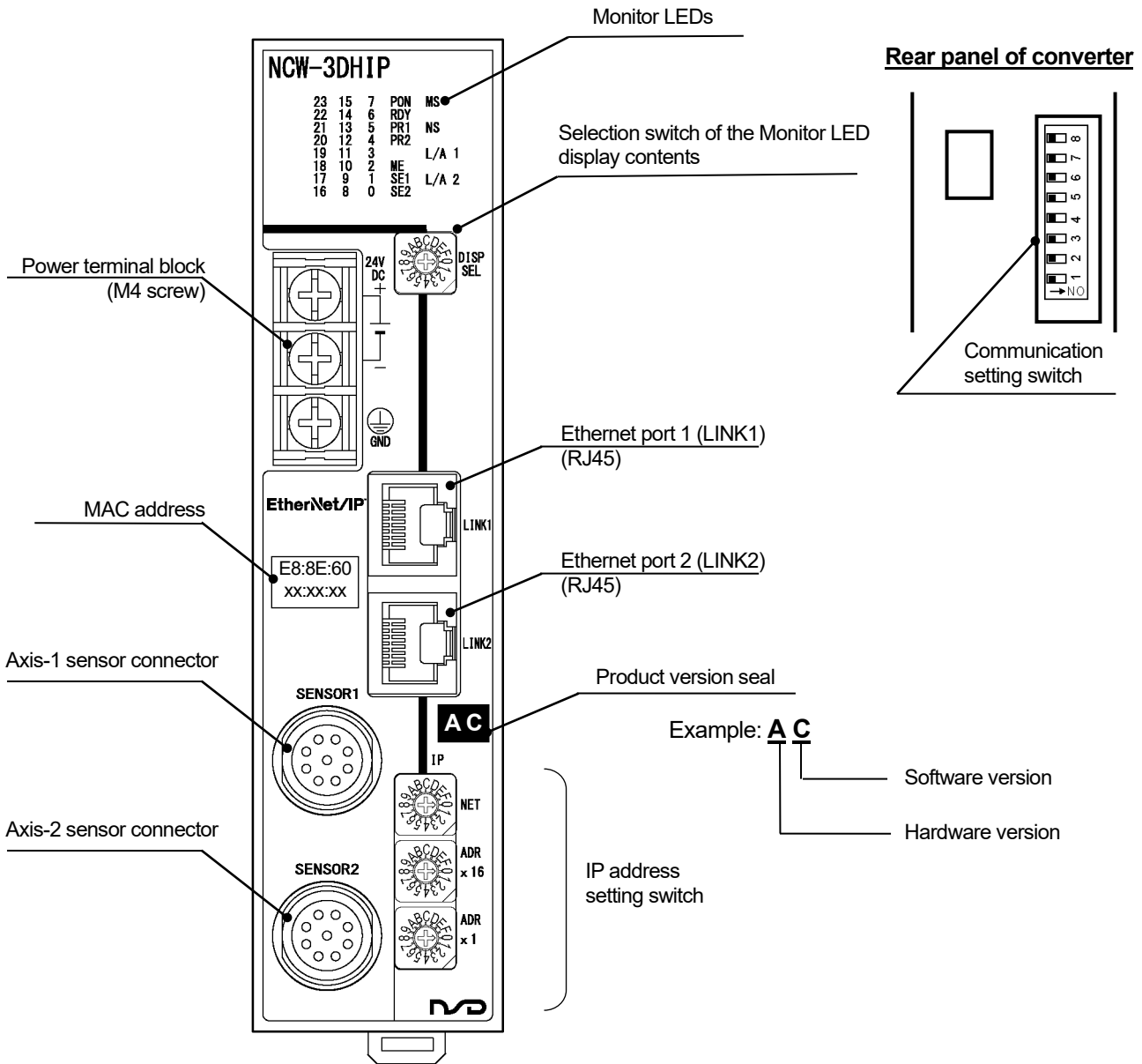
- The ground wire should be connected to the ground terminal directly.

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



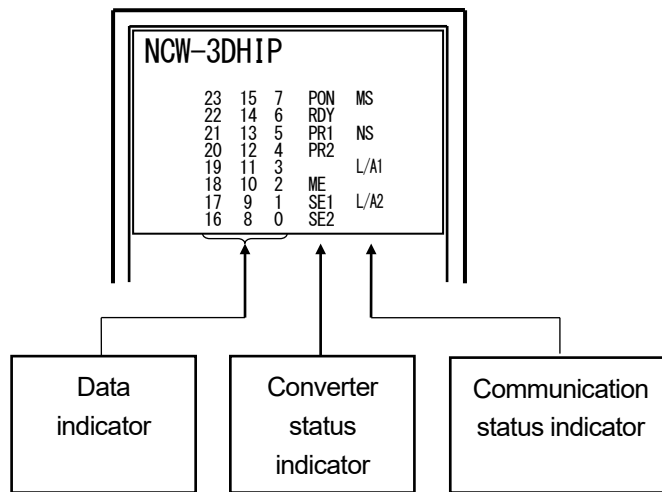
8. NOMENCLATURE

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-3DHIP. |
| | NS | Green / Red | Indicates the EtherNet/IP communication status of NCW-3DHIP. |
| | 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 | LED turns ON when Converter status is normal. |
| | PR1 | Green | ON for approximately 1 second when the preset function (Current position setting) operation occurs with axis-1. |
| | PR2 | Green | ON for approximately 1 second when the preset function (Current position setting) operation 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 | Monitor LED 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.

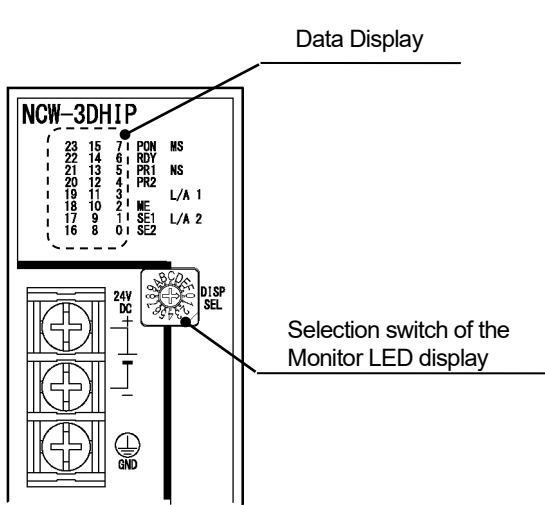
8-2-1. Contents of the communication status indicator area

Explains the overview of the Ethernet/IP 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 Green | No IP address |
| | | Flashing Red | A recoverable fault occurs |
| | | Steady Red | An unrecoverable fault occurs |
| | | Flashing Green / Red | Self test in progress |
| NS | Green/Red | OFF | Not powered, no IP address |
| | | Flashing Green | No connection is established |
| | | Steady Green | Connection is established |
| | | Flashing Red | Connection timeout occurs |
| | | Steady Red | IP address is duplicated |
| | | Flashing Green / Red | Self 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 | TCP/IP Interface object information 1 *5 |
| B | TCP/IP Interface object information 2 *6 |
| C | Reserved |
| D | Sensor circuit control information *7 |
| 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: Parameter data

| | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
|-----------------------|----------|----|----|----|----|------------------------------------|---------------|--------------------|
| Axis-1 parameter data | Reserved | | | | | Position Data Increase Direction 1 | Error Clear 1 | Axis Unavailable 1 |
| | 15 | 14 | 13 | 12 | 11 | 10 | 9 | 8 |
| Axis-2 parameter data | Reserved | | | | | Position Data Increase Direction 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 | 10 Mbps | 100 Mbps |
| | 15 | 14 | 13 | 12 | 11 | 10 | 9 | 8 |
| LINK2 | Reserved | | | | | Full Duplex | 10 Mbps | 100 Mbps |
| | 23 | 22 | 21 | 20 | 19 | 18 | 17 | 16 |
| IP address | IP Host address [IP.ADR] 8-bit | | | | | | | |

- Lights status of the full duplex
Light turns ON: Full Duplex Light turns OFF: Half Duplex
- Either 10Mbps or 100Mbps light turns ON when it is normal. Lights turn OFF when an error occurs.

*5: TCP/IP Interface object information 1

Indicates the low-order 24-bit information of attribute 1 (Status) of instance 1 in TCP/IP interface object (0xF5). For more details, refer to "APPENDIX 2-8. TCP/IP Interface Object (Class ID: 0xF5)".

| | | | | | | | | |
|-------------------|----|----|--------------------------|---------------|--------------------------------|----|----|----|
| | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| Status (Bit0-7) | 0 | 0 | Interface Config Pending | Mcast Pending | Interface Configuration Status | | | |
| | 15 | 14 | 13 | 12 | 11 | 10 | 9 | 8 |
| Status (Bit8-15) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | 23 | 22 | 21 | 20 | 19 | 18 | 17 | 16 |
| Status (Bit16-23) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

*6: TCP/IP Interface object information 2

Indicates the low-order 24-bit information of attribute 3 (Configuration Control) of instance 1 TCP/IP interface object (0xF5). For more details, refer to "APPENDIX 2-8. TCP/IP Interface Object (Class ID: 0xF5)".

| | | | | | | | | |
|---------------------------|----|----|----|------------|-----------------------|----|----|----|
| | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| Config Control (Bit0-7) | 0 | 0 | 0 | DNS Enable | Startup Configuration | | | |
| | 15 | 14 | 13 | 12 | 11 | 10 | 9 | 8 |
| Config Control (Bit8-15) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | 23 | 22 | 21 | 20 | 19 | 18 | 17 | 16 |
| Config Control (Bit16-23) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

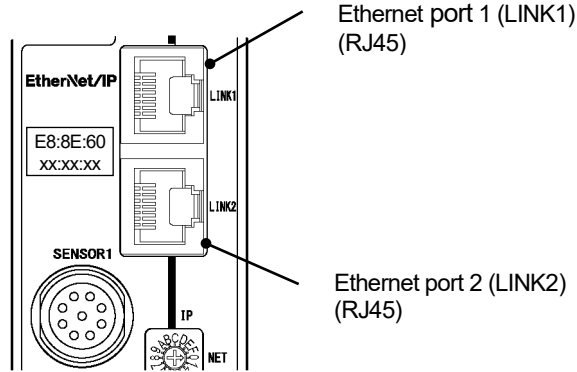
*7: Sensor circuit control information

Indicates the low-order 8-bit information of Output data "Axis-1 control flag" and "Axis-2 control flag" in Exclusive-Owner Connection. For more details, refer to "9-9-1. Exclusive-Owner Connection".

| | | | | | | | | |
|--------------------------|--------|--------|----|----|----|----|----|----|
| | 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 connector (LINK1/LINK2)

Ethernet communication cables are connected to these ports.

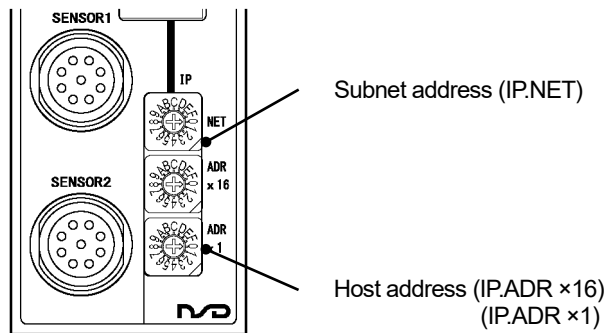


8-2-4. Ethernet IP address setting switch (IP)

The IP address is designated by "Subnet address [NET]" and "Host address [ADR]"

The Subnet address [NET] range is from 0 to F in the hex (0, ..., 15 in dec).

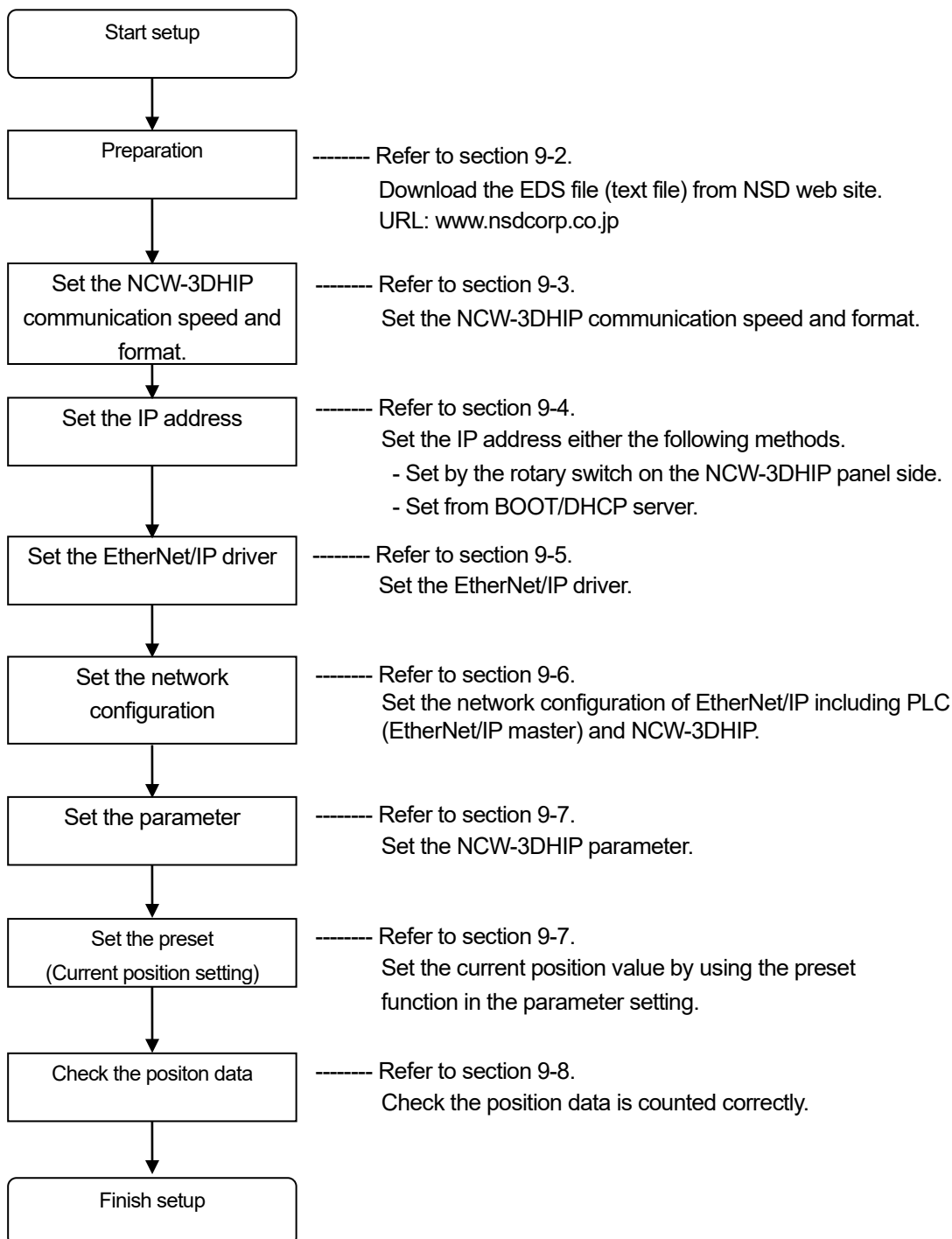
The Host address [ADR] range is from 0, ..., FF in the hex (0, ..., 255 in dec). The NCW-3DHIP obtains the IP address from the BOOTP/DHCP server when the switch is set to either "0" or "255".



9. EtherNet/IP COMMUNICATION SETUP

9-1. Procedure Before the Operation

Indicates procedure before the operation



Note

When setting parameters, switch the operation mode of the host PLC to program mode (PROG). Cannot be set in run mode (RUN). This operation is performed by using the PLC's configuration tool (a PLC development tool software).
*: Depending on the PLC model, this operation can also be performed by the mode selection switch on the CPU card.

9-2. Preparation

Prepares that NCW-3DHIP connects the EtherNet/IP network

This manual assumes that NCW-3DHIP and a programmable controller which is manufactured by Rockwell Automation, Inc. are connected by the network. Therefore, this manual explains a connection method using following software.

- ①BOOTP/DHCP Server
- ②RSLinx Classic
- ③RSLogix5000
- ④RSNetWorx

For details of software instruction, refer to each product manual.

●EDS file

If the configuration tool is needed the definition file (EDS file), download it from NSD website.

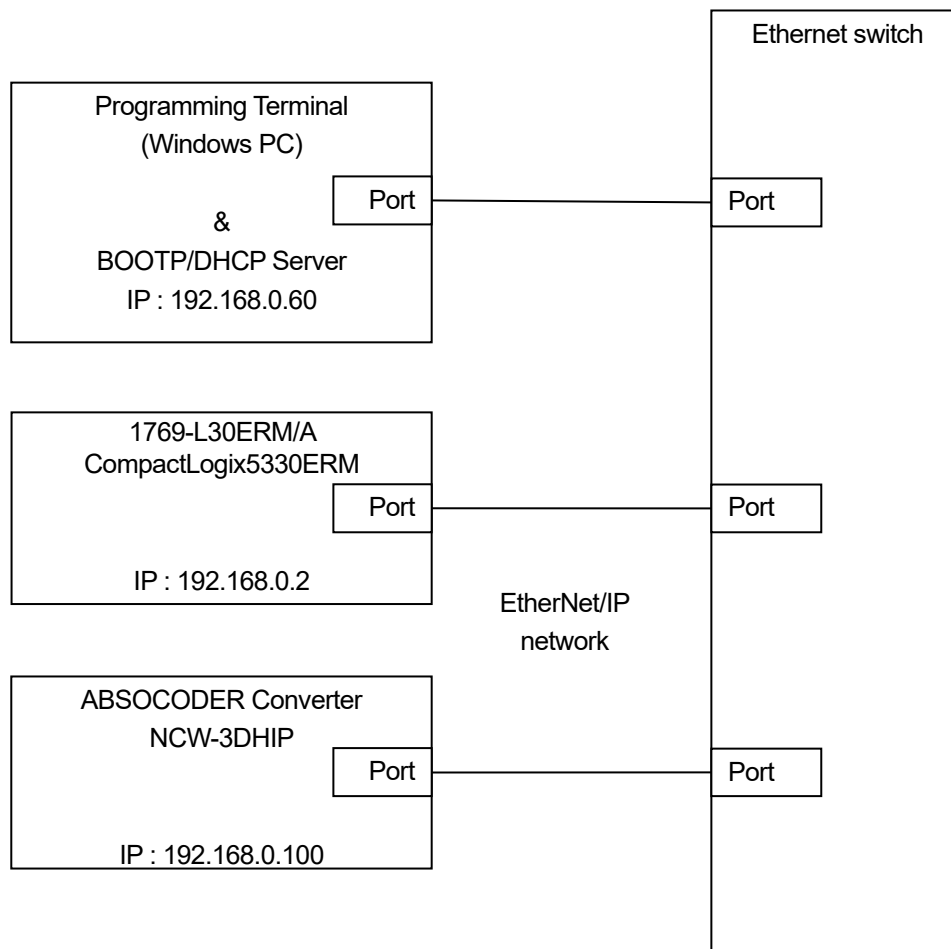
URL: www.nsdcorp.com

File name: EDS_Rev000000**_NSD_NCW-3D_IP_*****.eds

●Hardware Setup

The following figure indicates the connection of NCW-3DHIP as an example.

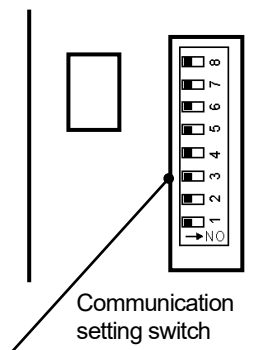
The NCW-3DHIP is connected to the controller (1769-L30ERM CompactLogix5330ERM) through the EtherNet switch as shown below.



9-3. Communication Speed and Format Setting

Sets communication method for the Ethernet port (LINK1, LINK2) by the switch on the NCW-3DHIP's rear panel.

Rear panel of converter



"AUTO (automatic detection)" is set before the shipment, so setting usually isn't required.

Set it manually (MANUAL) if the communication method of the PLC (EtherNet/IP master) cannot be changed.

*: The setting should be same as the communication method of the PLC (EtherNet/IP master).

The communication won't be available or will be unstable if the settings aren't matched between devices.

| Switch No. | Item | Setting description | Factory setting |
|------------|----------------------------|---|-----------------|
| 1 | LINK1 communication method | OFF: AUTO (automatic detection) ON : MANUAL(Sets the switch No.2 and 3 manually.) | OFF |
| 2 | LINK1 communication speed | OFF: 100Mbps ON: 10Mbps | OFF |
| 3 | LINK1 communication format | OFF: Full-Duplex ON: Half-Duplex | OFF |
| 4 | Reserved | Fixed at OFF (Don't turn "ON".) | OFF |
| 5 | LINK2 communication method | OFF: AUTO (automatic detection) ON : MANUAL(Sets the switch No.6 and 7 manually .) | OFF |
| 6 | LINK2 communication speed | OFF: 100Mbps ON: 10Mbps | OFF |
| 7 | LINK2 communication format | OFF: Full-Duplex ON: Half-Duplex | OFF |
| 8 | Reserved | Fixed at OFF (Don't turn "ON".) | OFF |

9-4. Set the IP Address of NCW-3DHIP

There are two methods for setting the IP address of NCW-3DHIP.

- ① Sets the subnet address "x" and host address "y" of (192.168.x.y) manually by the IP address setting switch on the NCW-3DHIP's front panel.
- ② Allocates the IP address for NCW-3DHIP automatically by the BOOTP/DHCP server.

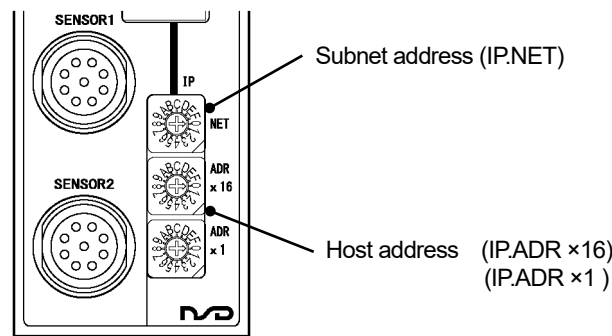
9-4-1. Manual setting method of the IP address by IP address setting switch

The manual setting method of the IP address by the IP address setting switch on the front panel of NCW-3DHIP is described below.

The IP address is designated by "Subnet address [NET]" and "Host address [ADR]"

The Subnet address [NET] range is from 0 to F in the hex (0,...,15 in dec).

The Host address [ADR] range is from 0,...,FF in the hex (0,...,255 in dec). 0 and 255 are invalid values and are not able to use for the Host address.



● Setting Method

- (1) Sets the Host Address rotary switch to "FF (255)".
- (2) Supplies power to NCW-3DHIP.
- (3) Sets the address switch in the following ranges.
Subnet address: from 0,...,F(0,...,15)
Host address: from 1,...,FE(1,...,254)
- (4) Supplies power to NCW-3DHIP once again.
- (5) NCW-3DHIP is accessible with IP address which was set.

9-4-2. Allocation method of an IP address by the BOOTP/DHCP server

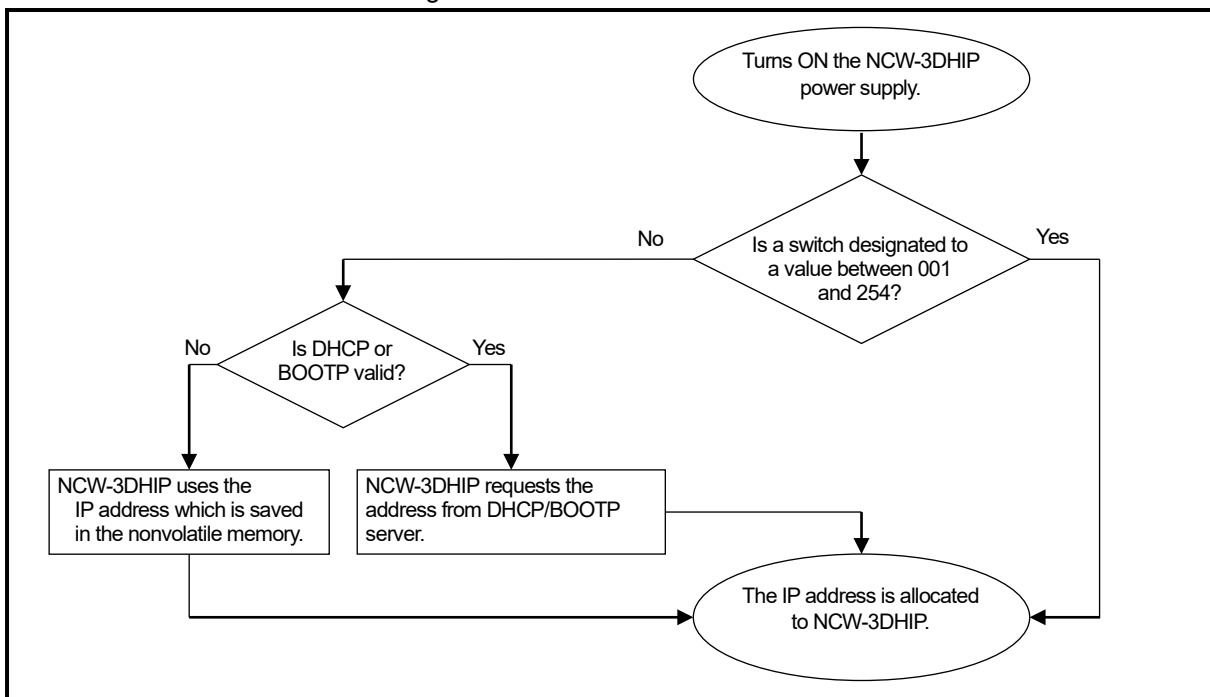
The automatic allocation method of an IP address by the BOOTP/DHCP server is described below.

The BOOTP/DHCP server is a stand-alone server that can set an IP address and other Transport Control Protocol (TCP) parameters.

The factory setting of NCW-3DHIP is described below; therefore, the NCW-3DHIP can be allocated the IP address automatically by default.

IP address setting switch on the front panel: IP.NET=0, IP.ADR(x16)=0, IP.ADR(x1)=0

Indicates the flow chart when allocating an IP address.



BOOTP/DHCP is selected by the attribute 3 (Configuration Control) of TCP/IP Interface object.

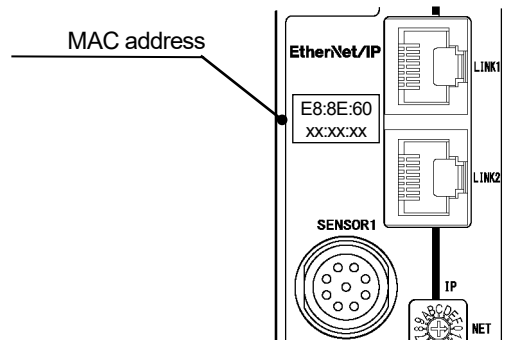
Overview of the TCP/IP Interface object "attribute 3 (Configuration Control)"

| Bit | Name | Description |
|-----|------------------------------|--|
| 0-3 | Startup Configuration | 0: The device use the previously saved interface setting value. (Such as the value in the non-volatile memory or the value of the hardware switch) 1: The device obtain its interface configuration values via BOOTP. 2: The device obtain its interface configuration values via DHCP. (Default) 3-15: Reserved |
| 4 | DNS Enable | NCW-3DHIP doesn't support. |

● Setting Method

Assign "Relation List" of the MAC address for NCW-3DHIP to the BOOTP/DHCP server before next procedures below.

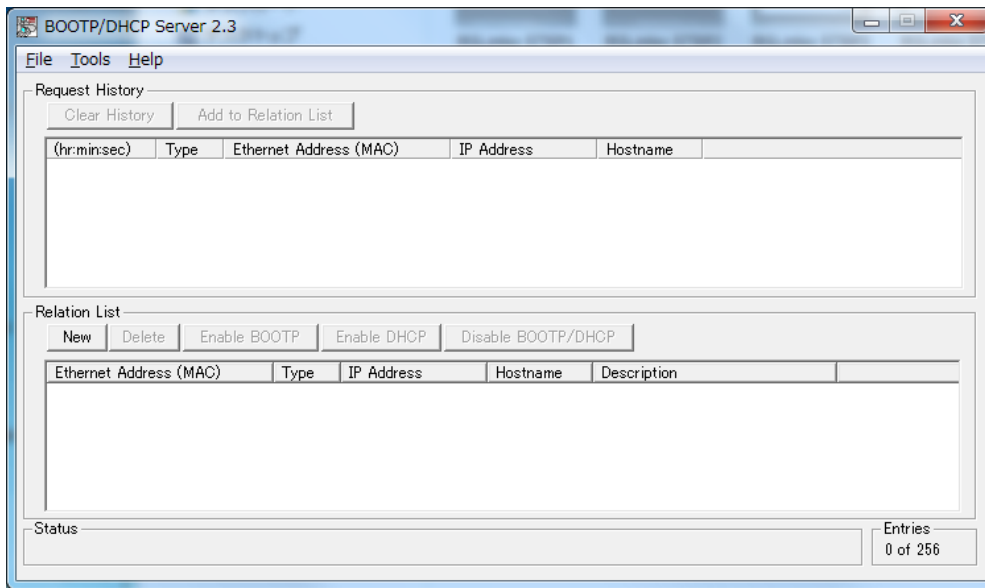
Check the MAC address on the panel side of NCW-3DHIP.



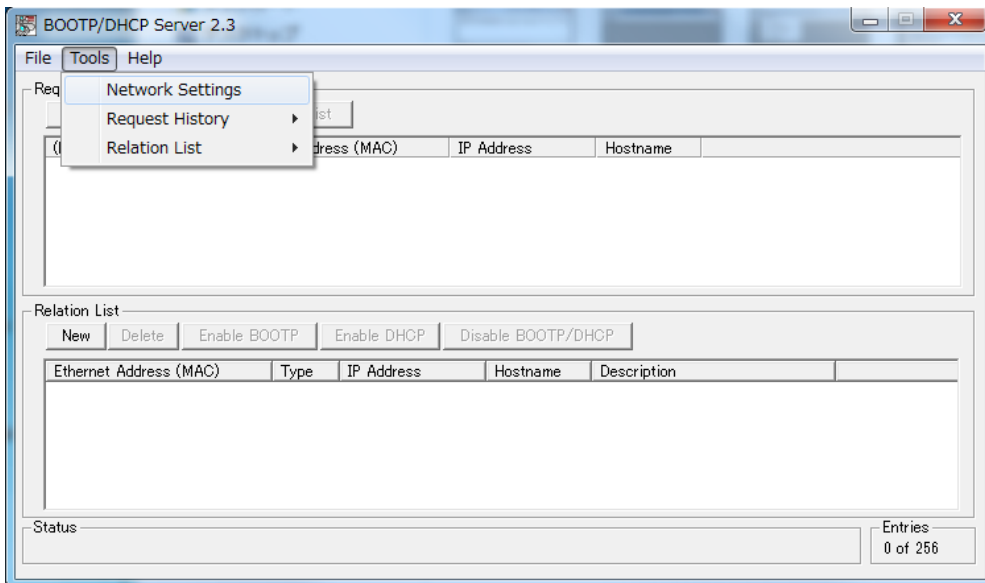
- (1) Set the Host Address rotary switch to FF (255), and then supply power to NCW-3DHIP.
- (2) Change the Host Address rotary switch to 00 (0), and then supply power to NCW-3DHIP once again.
- (3) NCW-3DHIP sends a request to receive an IP address from the BOOTP/DHCP server.
- (4) The BOOTP/DHCP server will allocate an IP address to NCW-3DHIP if it is on "Relation List" already.

The operation method of the detailed BOOTP/DHCP server is indicated from next page.

(1) Start "BOOTP/DHCP Server2.3 software" manufactured by Rockwell Automation, Inc.



(2) Configure the TCP (Transport Control Protocol) parameters
From the Tools menu, choose "Network Settings".

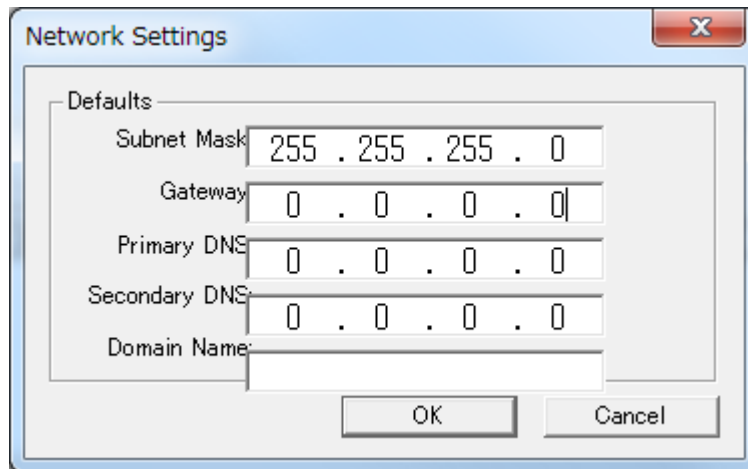


(3) Enter values on “Subnet Mask”

On the “Network Settings” dialog box, enter values on “Subnet Mask”, and then click “OK”.

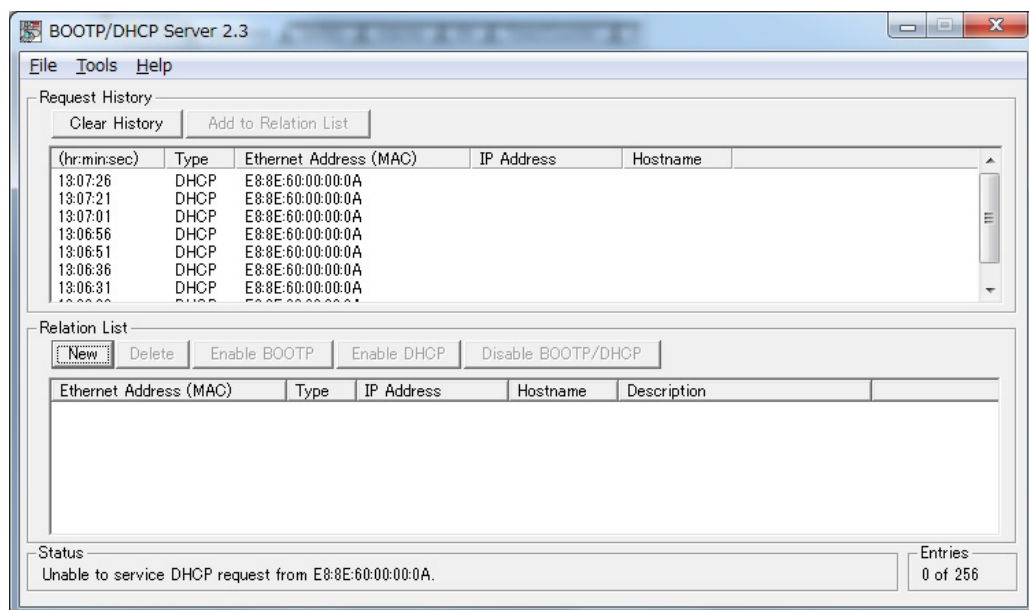
The next items are options.

- Gateway - Primary DNS - Secondary DNS - Domain Name.



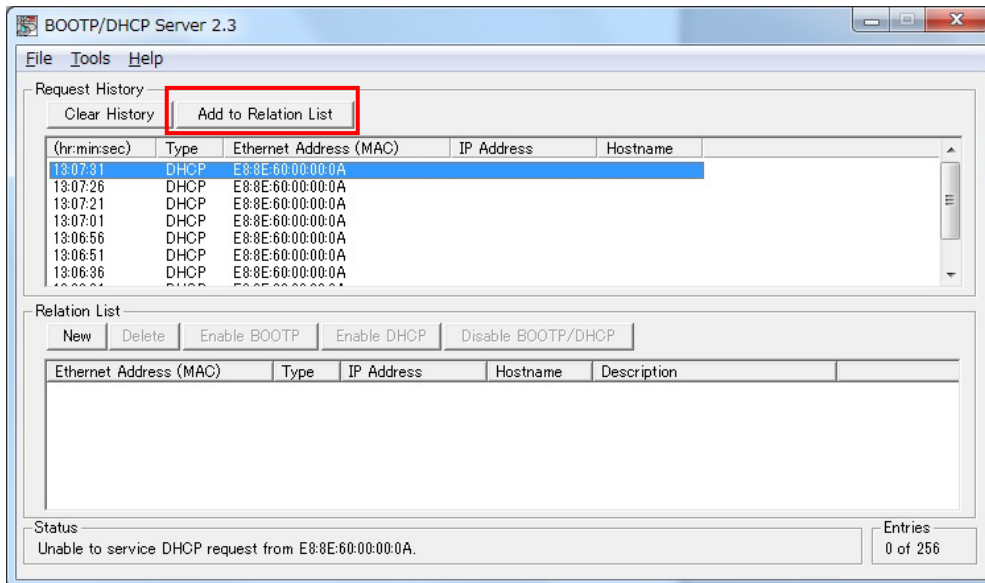
(4) BOOTP/DHCP request history display

The “Request History” field displays the hardware addresses (MAC addresses) of all modules that issue BOOTP/DHCP requests.



(5) Choose the appropriate module (NCW-3DHIP)

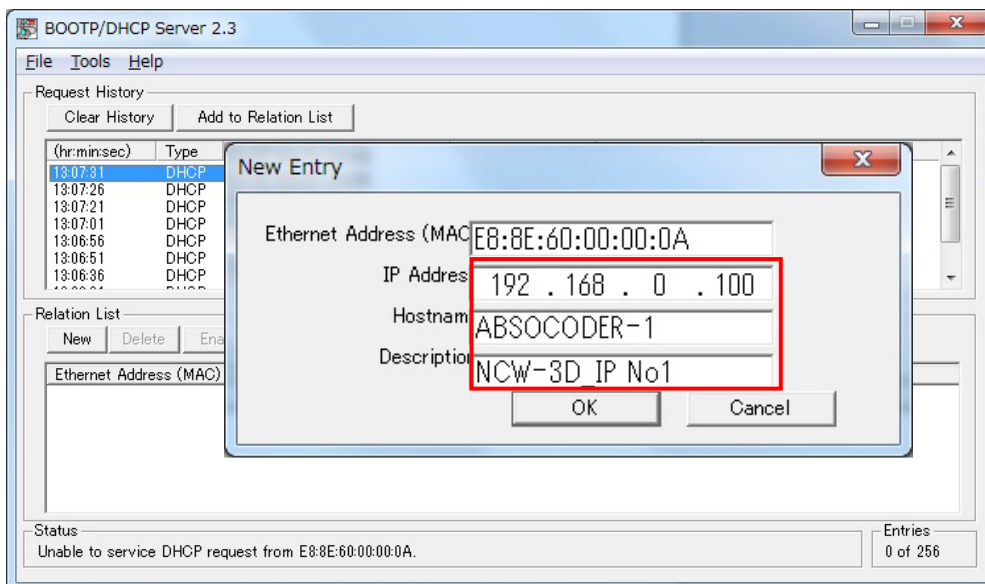
Choose the appropriate module (NCW-3DHIP) in the “Request History” field, and then click “Add to Relation List”.



(6) Associate the MAC address with an IP address

The “New Entry” dialog box appears. Associate MAC address with IP address.

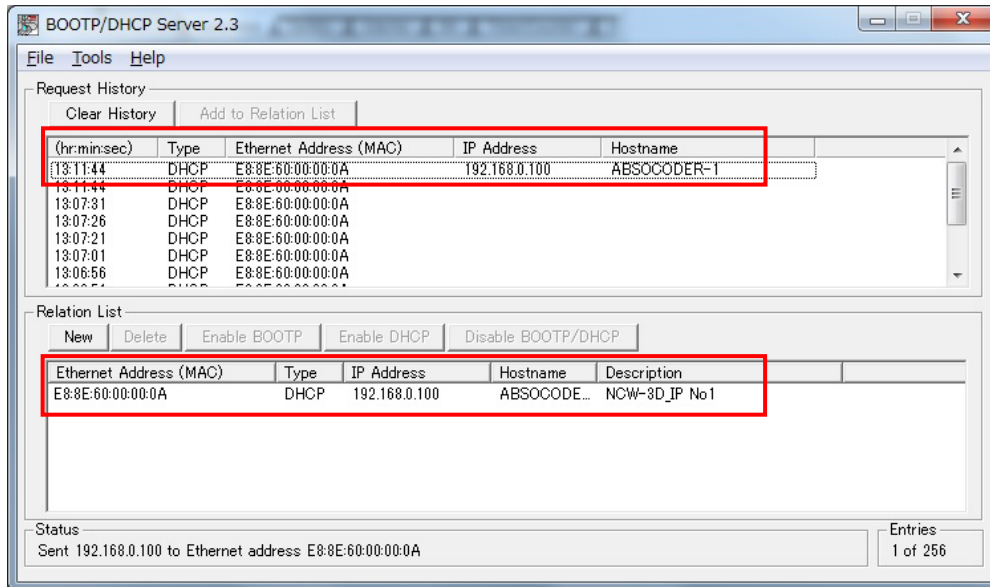
Enter an IP Address, Hostname, and Description for NCW-3DHIP, and then click “OK”.



(7) Confirm that NCW-3DHIP is added on the "Relation list"

Confirm that NCW-3DHIP is added on the "Relation list" field.

Also, allocated IP address to NCW-3DHIP is displayed in the "Request History".

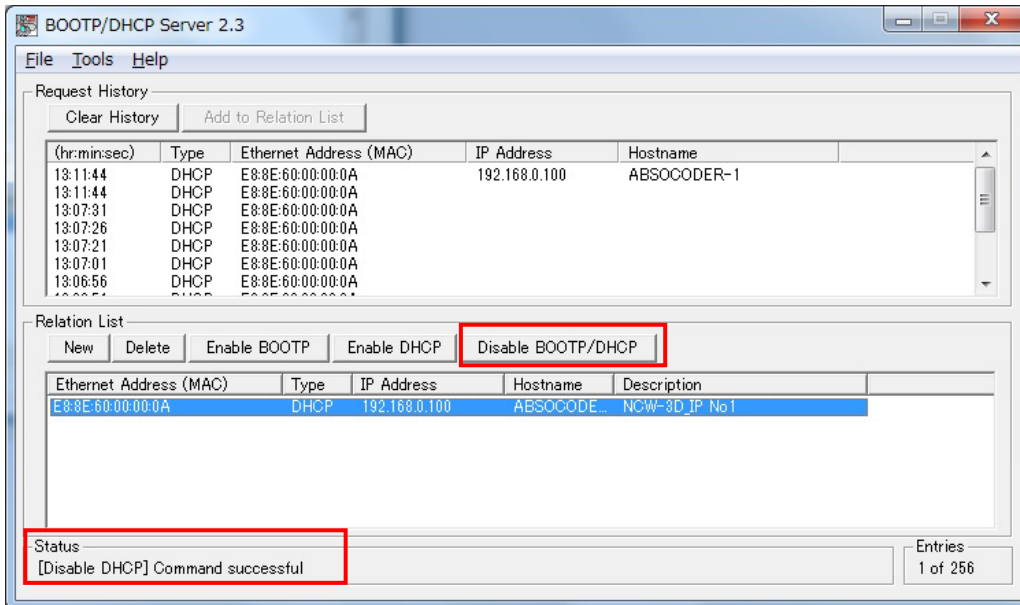


(8) Disable NCW-3DHIP requests to BOOTP/DHCP server

Choose NCW-3DHIP in the "Relation List" field, and click "Disable BOOTP/DHCP".

Then, a message of "[Disable DHCP] Command successful" is displayed in the status field.

When turning on the power supply again, NCW-3DHIP doesn't issue a DHCP request.



 Note

The above operation sets Bit0-3: Startup Configuration in attribute 3 (Configuration Control) of the TCP/IP Interface object to "0: The device use the previously saved interface setting value."
After this setting, the IP address setting via BOOTP/DHCP will not be accepted.

To set the IP address setting via BOOTP/DHCP again, do the following.

(1) Shut off the power to NCW-3DHIP.

(2) Set the Host address rotary switch (IP.ADR ×16, ×1) on the panel of NCW-3DHIP to FF (255).

(3) Supply the power to NCW-3DHIP.

At this time, "2: The device obtain its interface configuration values via DHCP.(Default)" is set to Bit0-3: Startup Configuration in attribute 3 (Configuration Control) of the TCP/IP Interface object.

(4) Shut off the power to NCW-3DHIP again.

(5) Set the Subnet address (IP.NET) on the panel of NCW-3DHIP to 0 (0) and the Host address rotary switch (IP.ADR ×16, ×1) to 00 (0).

(6) Supply the power to NCW-3DHIP again.

At this time, the IP address setting via BOOTP/DHCP is available.

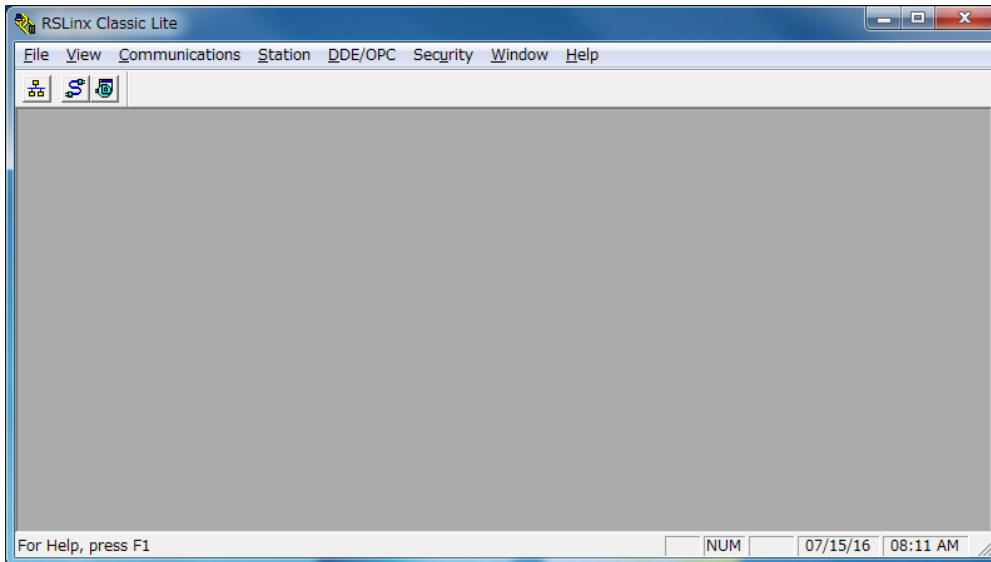
(9) The allocation of an IP address is completed.

9-5. Configure the EtherNet/IP Driver

Configures an Ethernet communication driver by using RSLinx Classic.

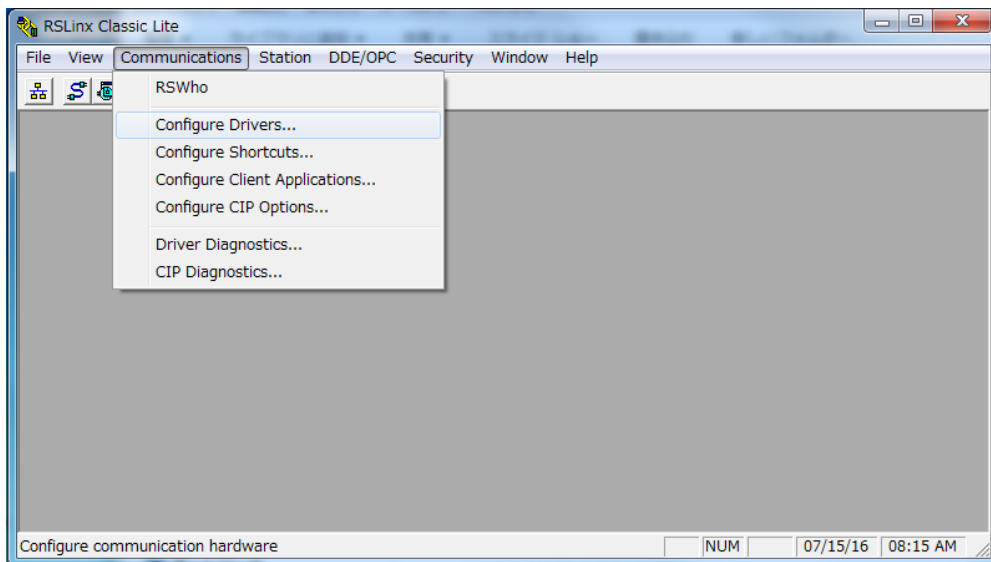
Configure the EtherNet/IP Driver to the programming terminal (Windows PC) in order to set the network between the controller (1769-L30ERM/A CompactLogix5330ERM) and NCW-3DHIP.

(1) Start the RSLinx Classic Software.



(2) Configure Communication Drivers

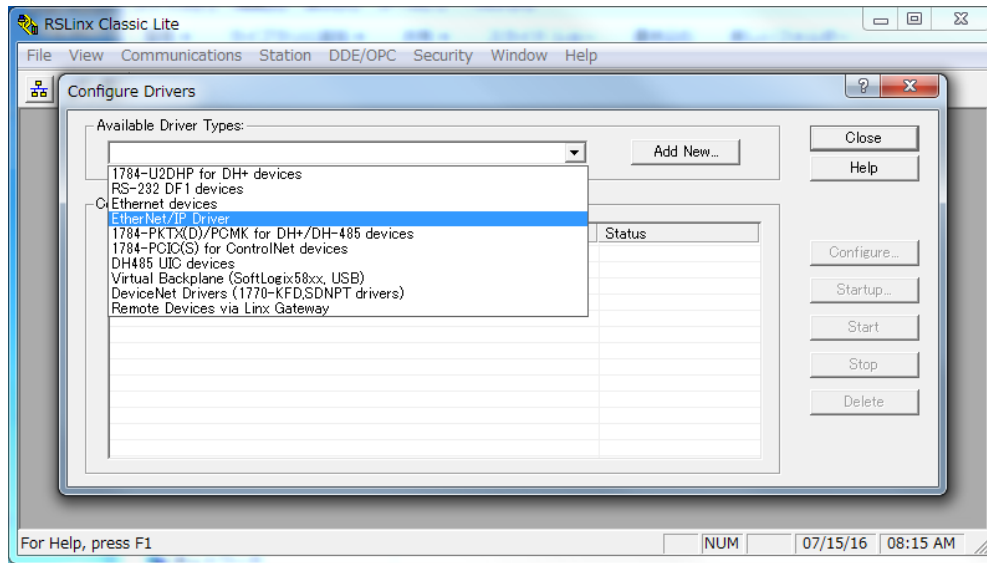
From the "Communications" menu, choose "Configure Drivers".



(3) Choose the EtherNet/IP Driver

From the “Available Driver Types” pull-down menu, choose “EtherNet/IP Driver”.

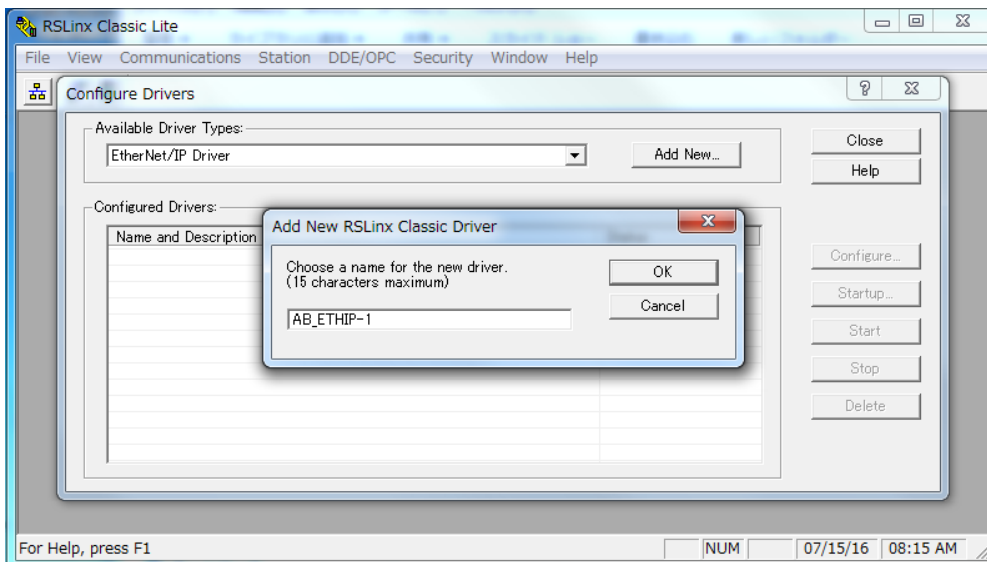
Then click “Add New ...”.



(4) Enter a name for the new driver

The “Add New RSLinx Classic Driver” dialog box appears.

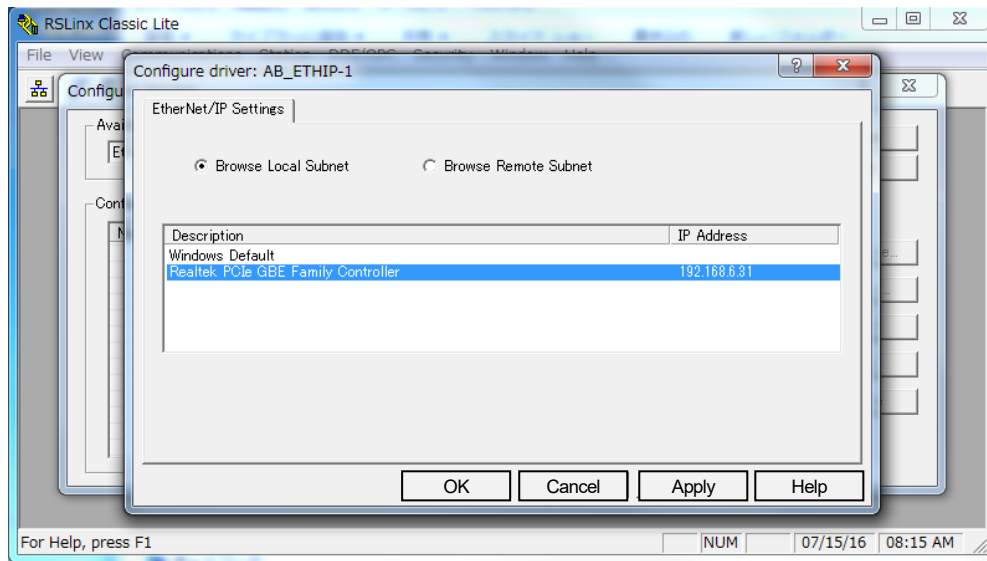
Enter a name for the new driver, and click “OK”.



(5) Choose the Ethernet device on the EtherNet/IP network

The “Configure driver” dialog box appears, and then click “Browse Local Subnet” checkbox.

Choose the desired device, and click “OK”.

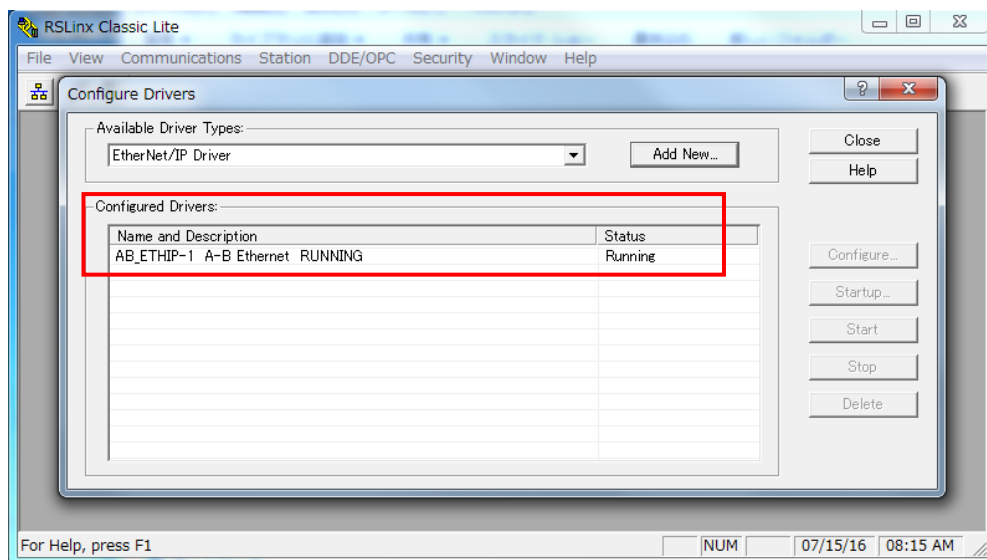


(6) Confirm the status with the new driver

The added driver appears on the “Configure Drivers” dialog box.

Confirm that the status message of added driver is “Running”. Then click “Close”.

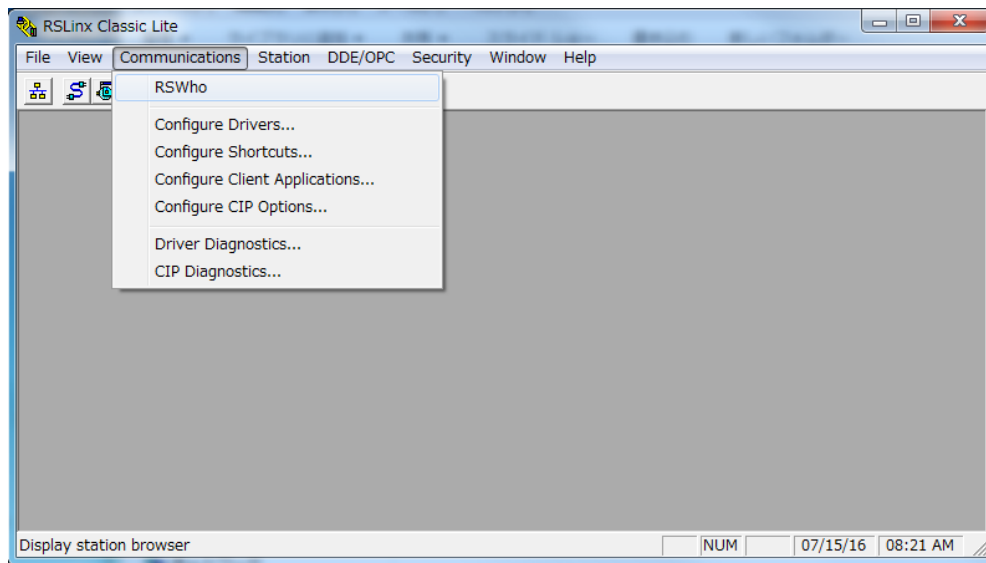
In the above procedure, you can access controller (CompactLogix) and NCW-3DHIP via the EtherNet/IP network from RSLogix5000.



(7) Find devices

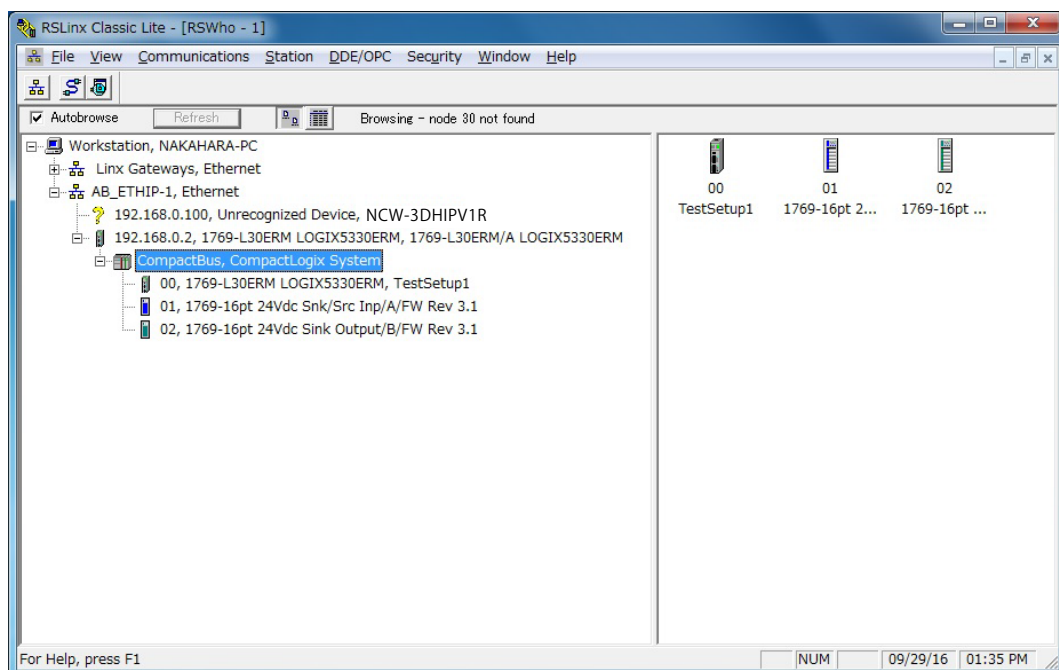
Search a device connected on the EtherNet/IP network.

From the "Communications" menu, choose "RSWho".



(8) Confirm the connection between the controller and NCW-3DHIP

The "RSWho" dialog box appears, and it indicates that the controller is connected with NCW-3DHIP via the EtherNet/IP network.



9-6. Configuration of EtherNet/IP Network

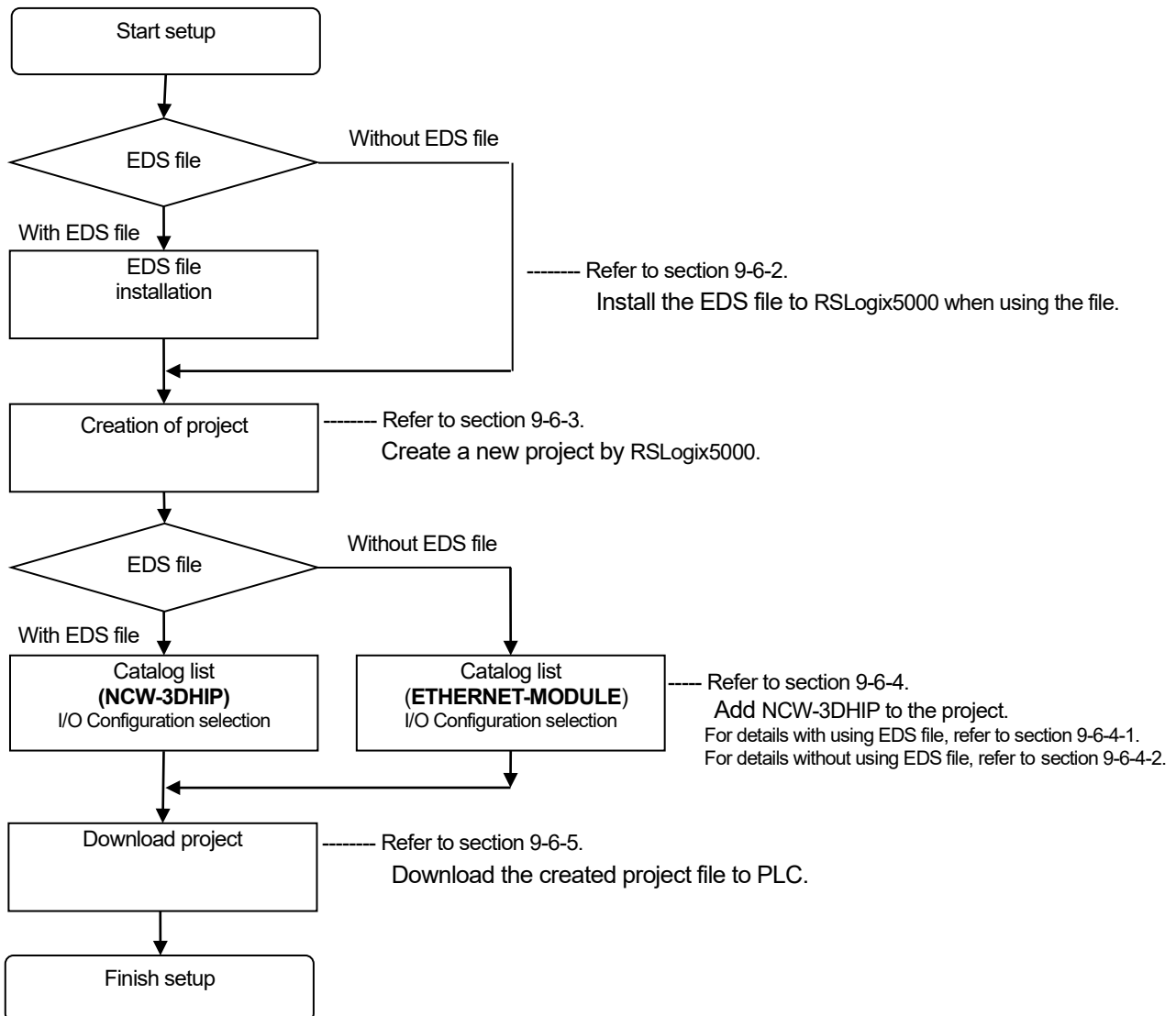
Configure the EtherNet/IP network by the RSLogix5000 software.

RSLogix5000 is a PLC development tool software manufactured by Rockwell Automation, Inc..

9-6-1. Configuration procedure

Set the network configuration by following procedures.

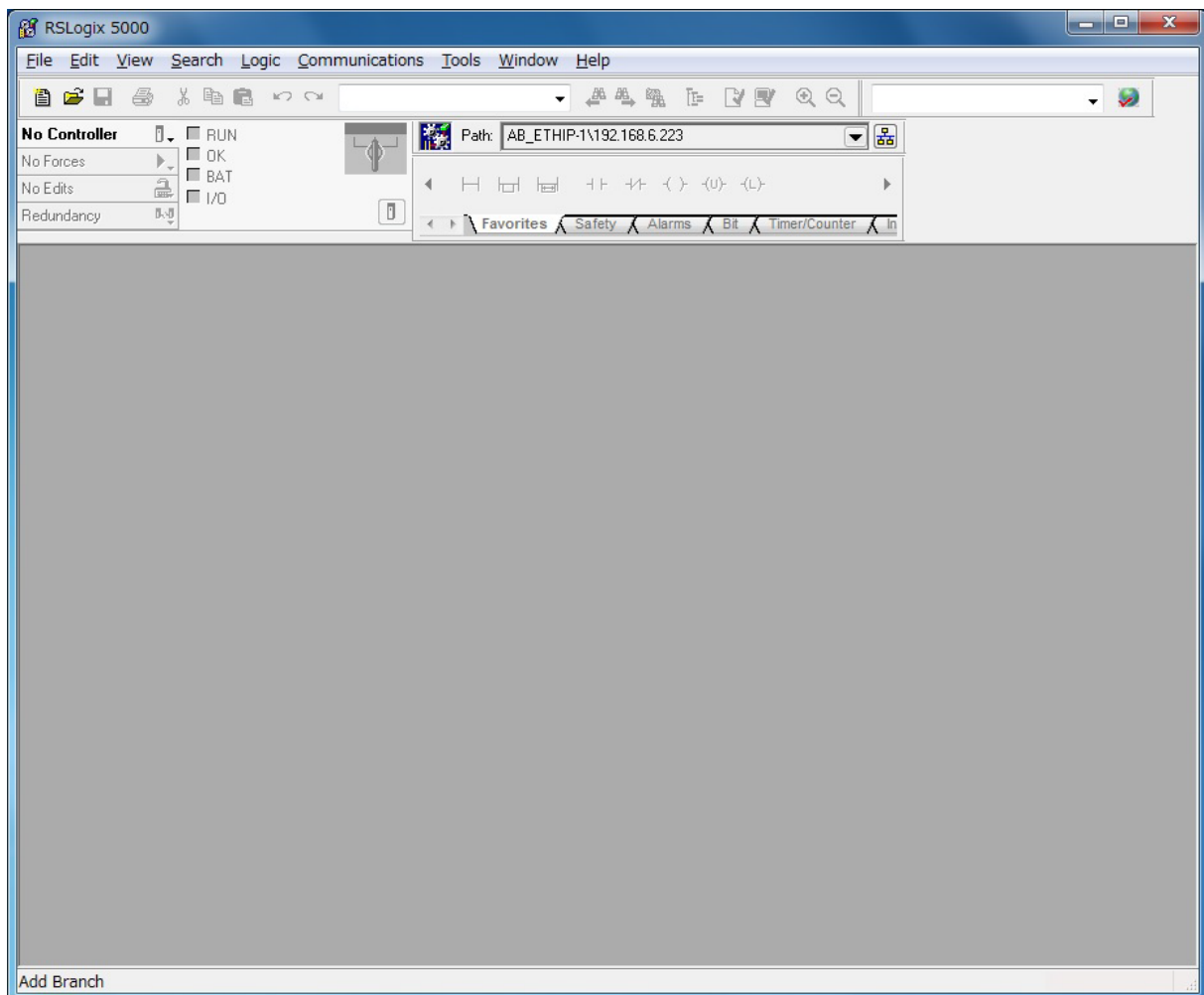
The procedures and settings are different whether EDS file is used or not.



9-6-2. Installation of the EDS file

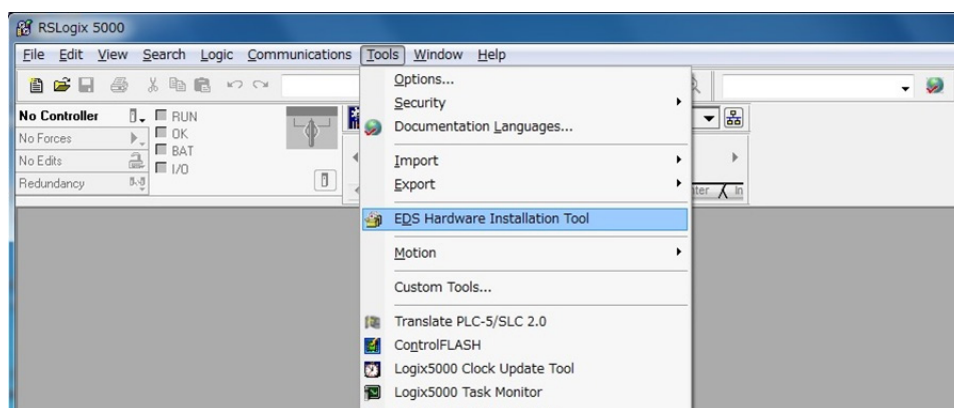
If EDS file isn't installed, proceed to the next "9-6-3.Creation of controller project".

(1) Starting the RSLogix5000 software



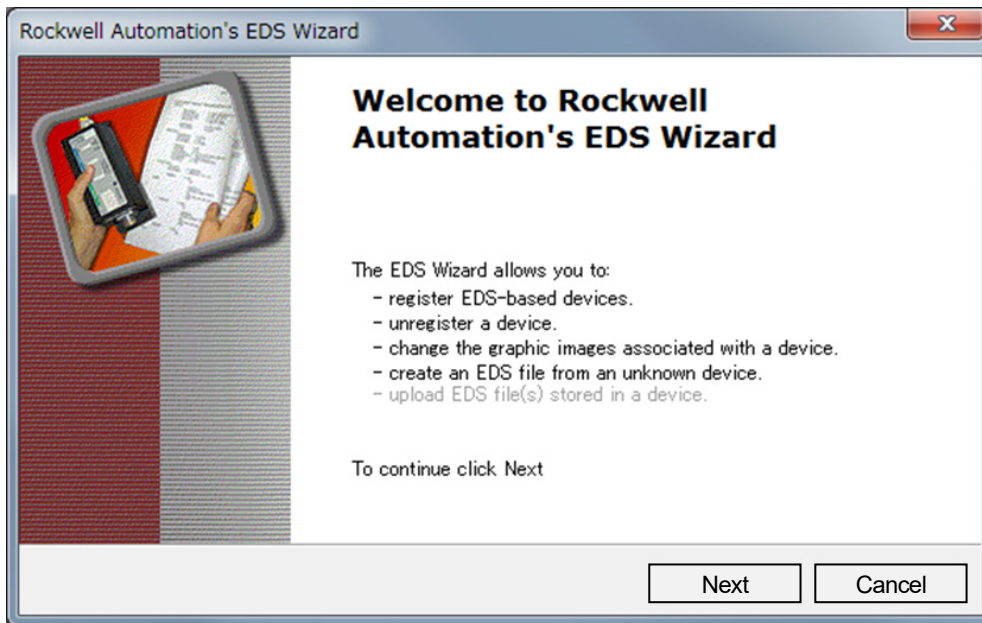
(2) Choose the EDS file installation tool

From the "Tools" pull-down menu, choose "EDS Hardware Installation Tool".



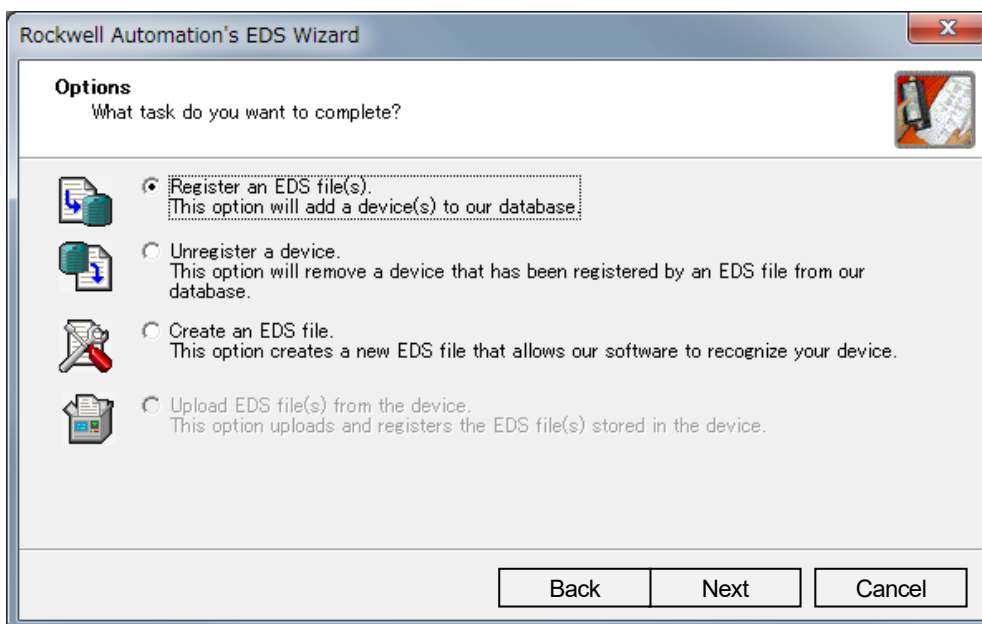
(3) Start EDS Wizard

Click "Next".



(4) Registration of the EDS file

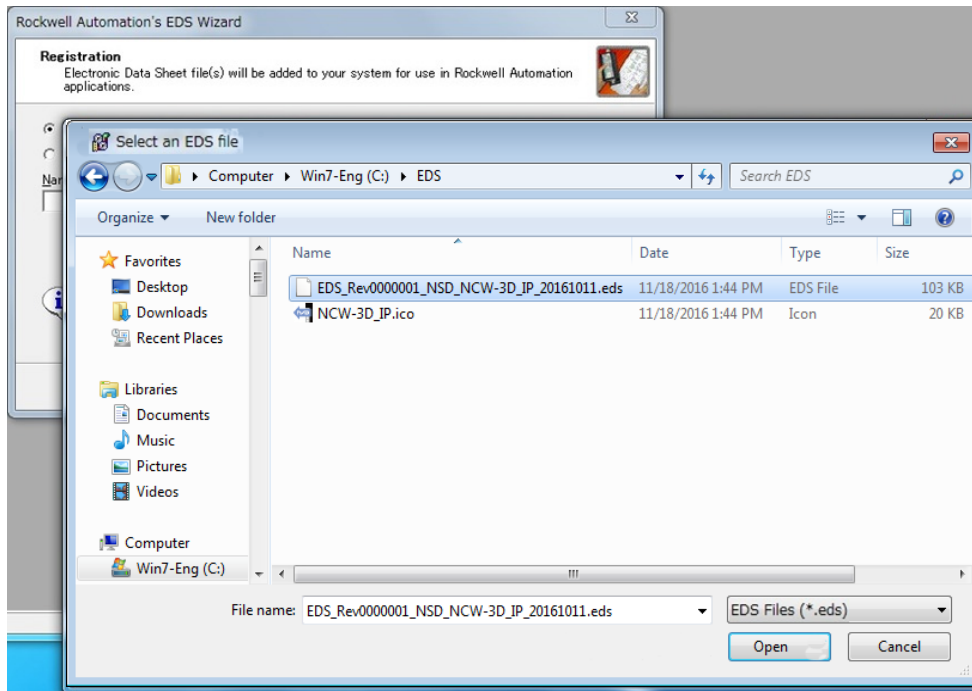
Click the "Register an EDS files(s)" checkbox, and then click "Next".



(5) Select the EDS file

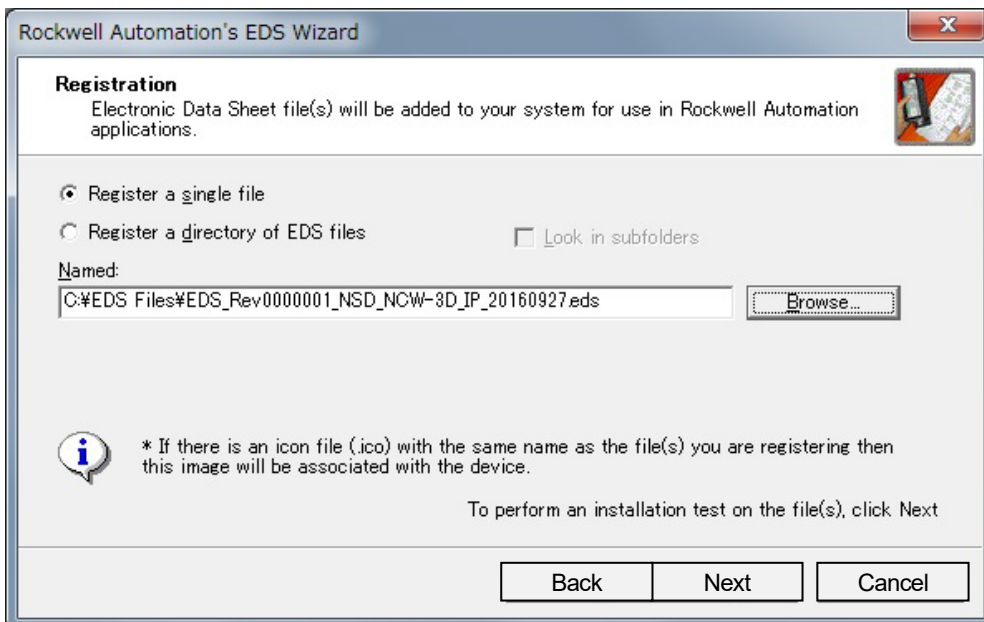
Click the “Register a single file” checkbox, and then click the “Browse...”.

On the “Select an EDS file” dialog box, choose the desired file and click “Open”.



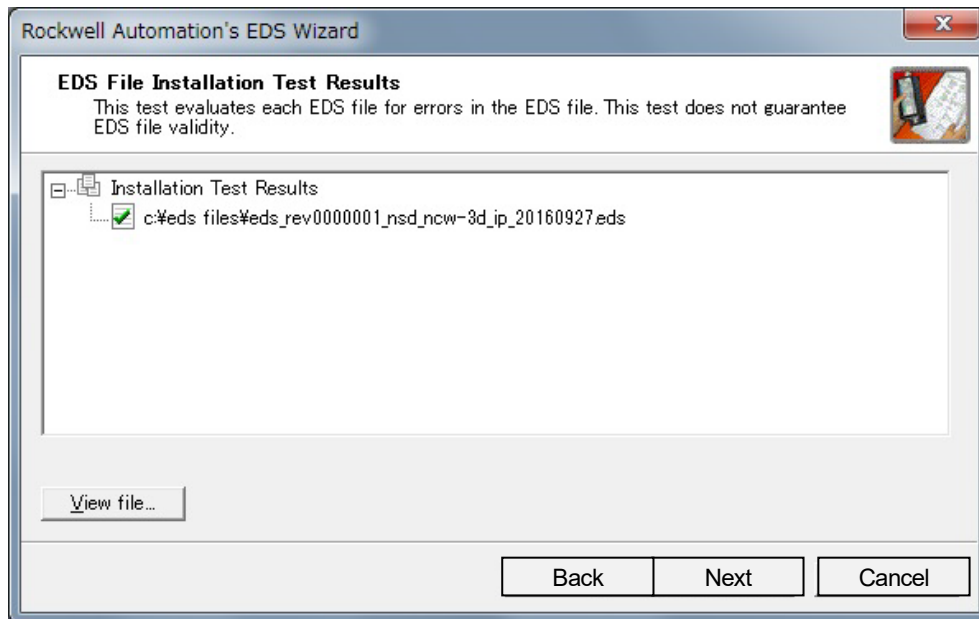
(6) Completion of the selected EDS file

On the “Rockwell Automation’s EDS Wizard” dialog box, click “Next”.



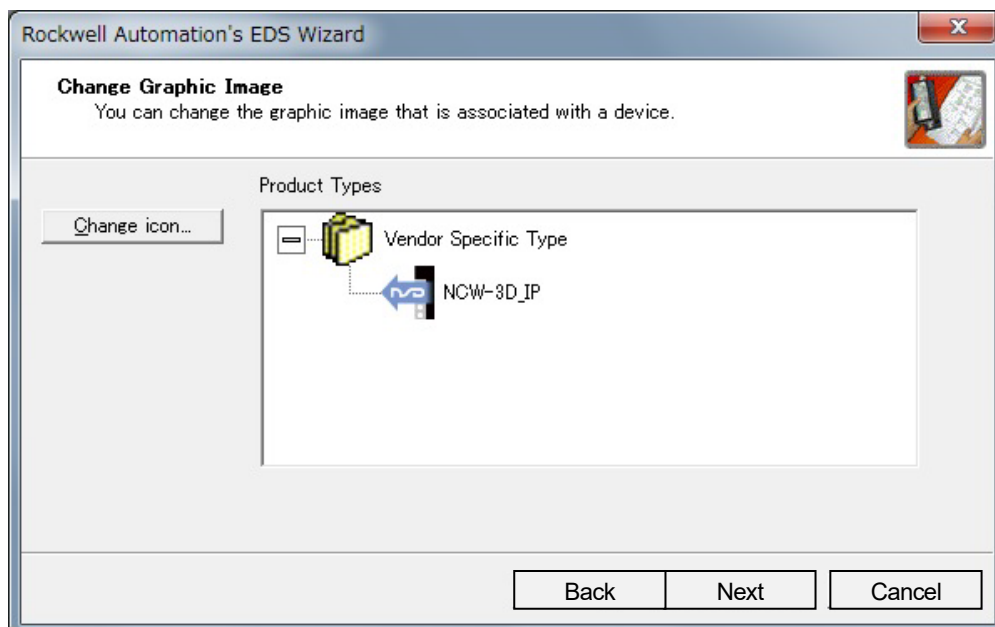
(7) EDS File Installation Test

Displays EDS File Installation Test Results on the “Rockwell Automation’s EDS Wizard” dialog box. Click “Next”.

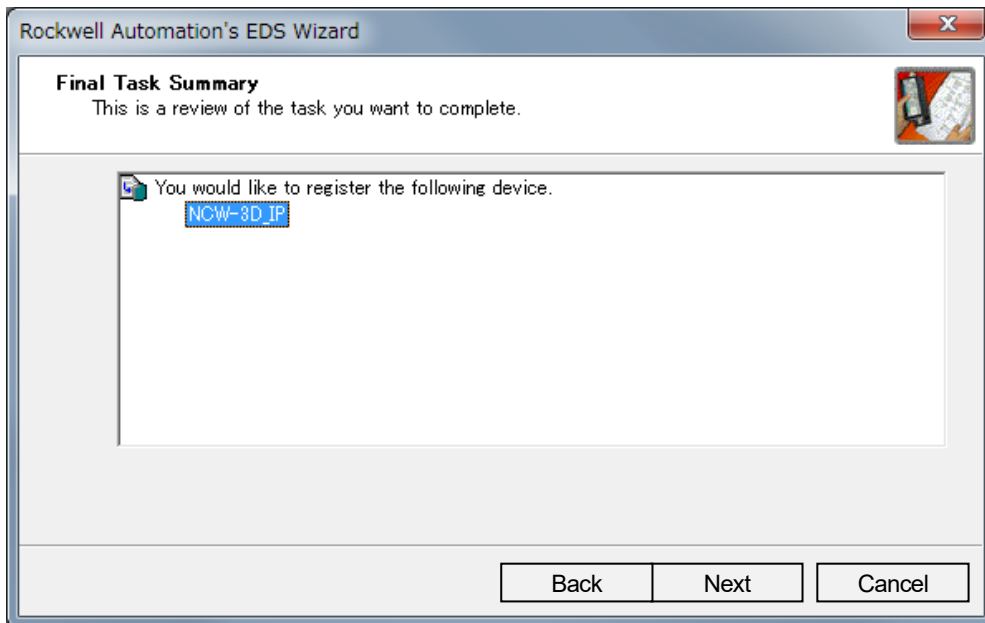


(8) Graphic Image for the device

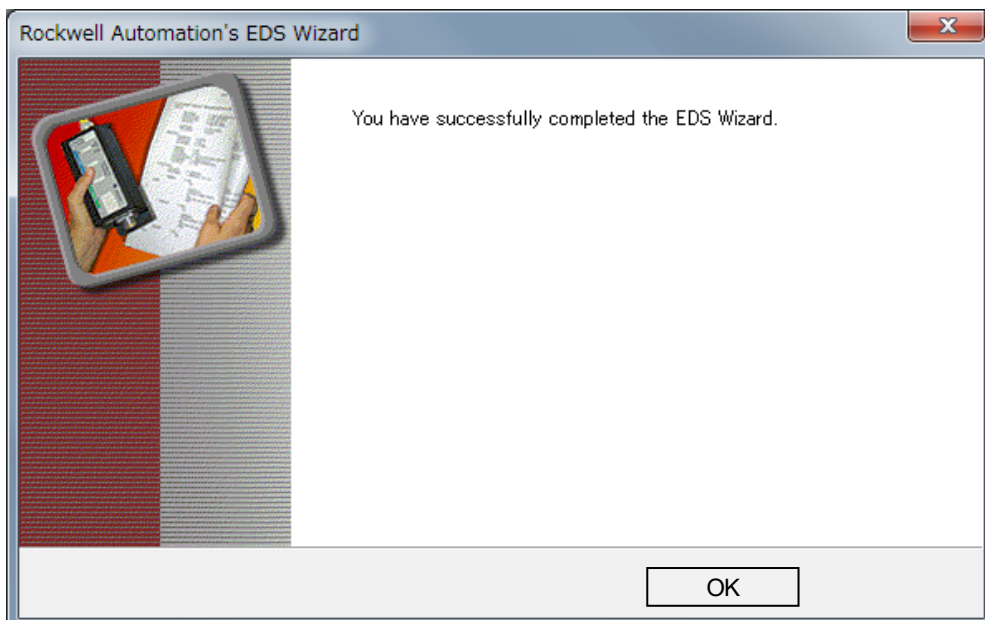
It is not necessary to change Graphic Image for the device. Click “Next”.



- (9) Confirm the registration of NCW-3DHIP
Confirm that NCW-3DHIP is successfully registered.
Click "Next".



- (10) Close the EDS Wizard
The EDS file of NCW-3DHIP is successfully installed by the EDS Wizard.
Click "OK" to close the dialog box.

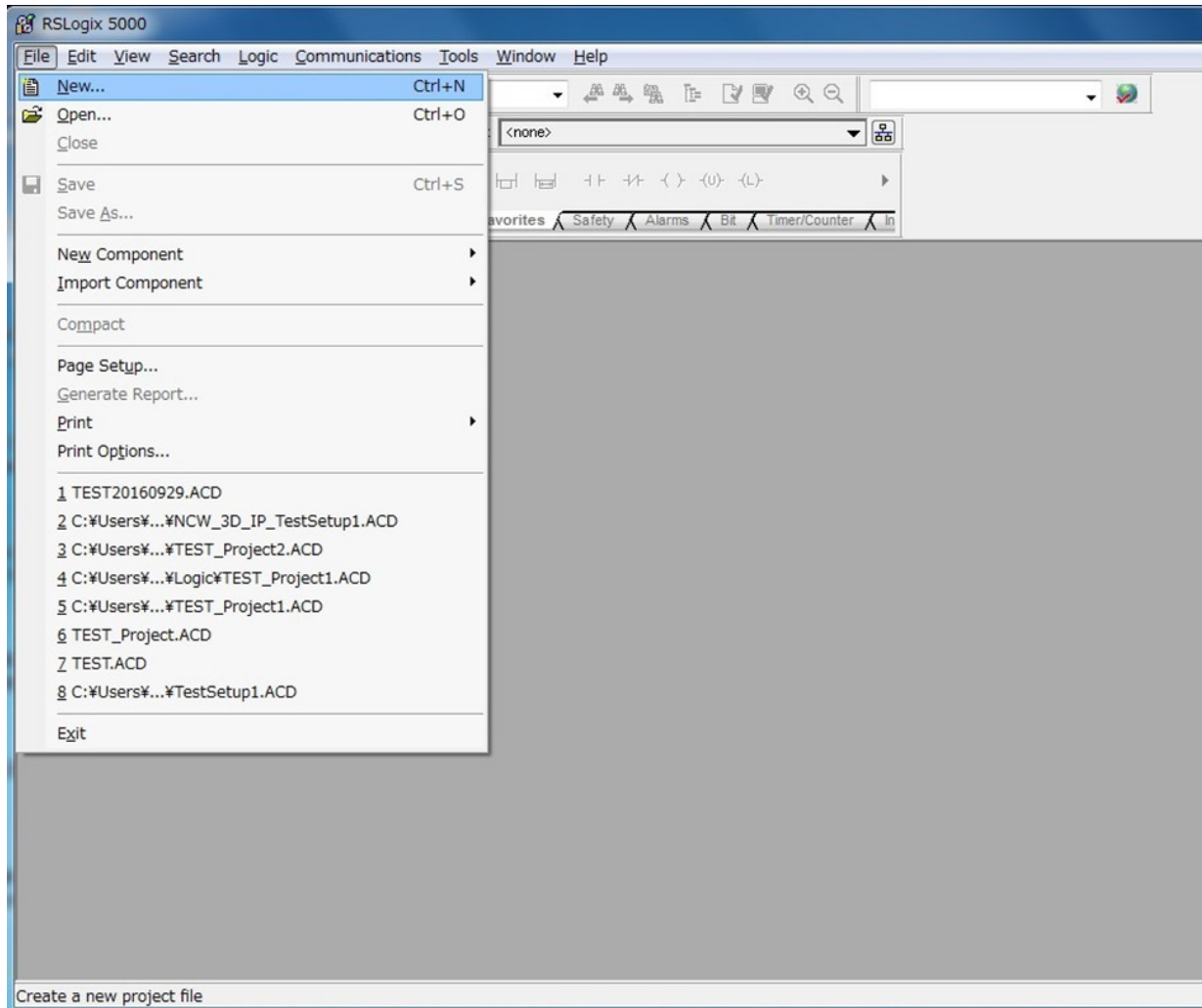


9-6-3. Creation of a controller project

Create a new controller project for the Network.

(1) Create a new controller project

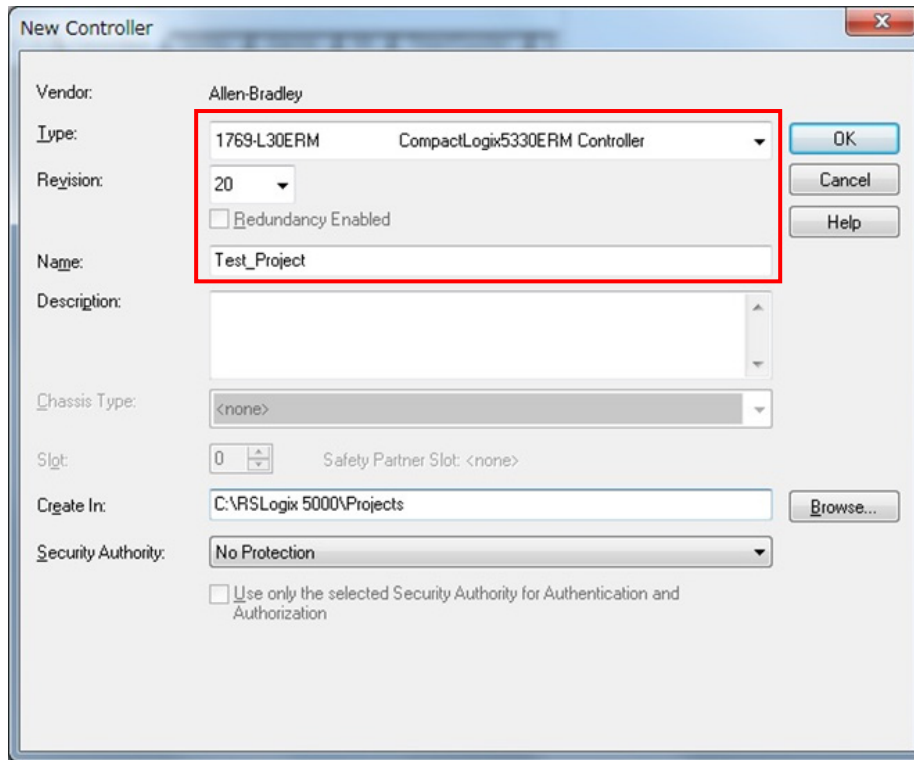
From the “File” menu, choose “New” to create a new controller project for the Network.



(2) Configure a new controller project

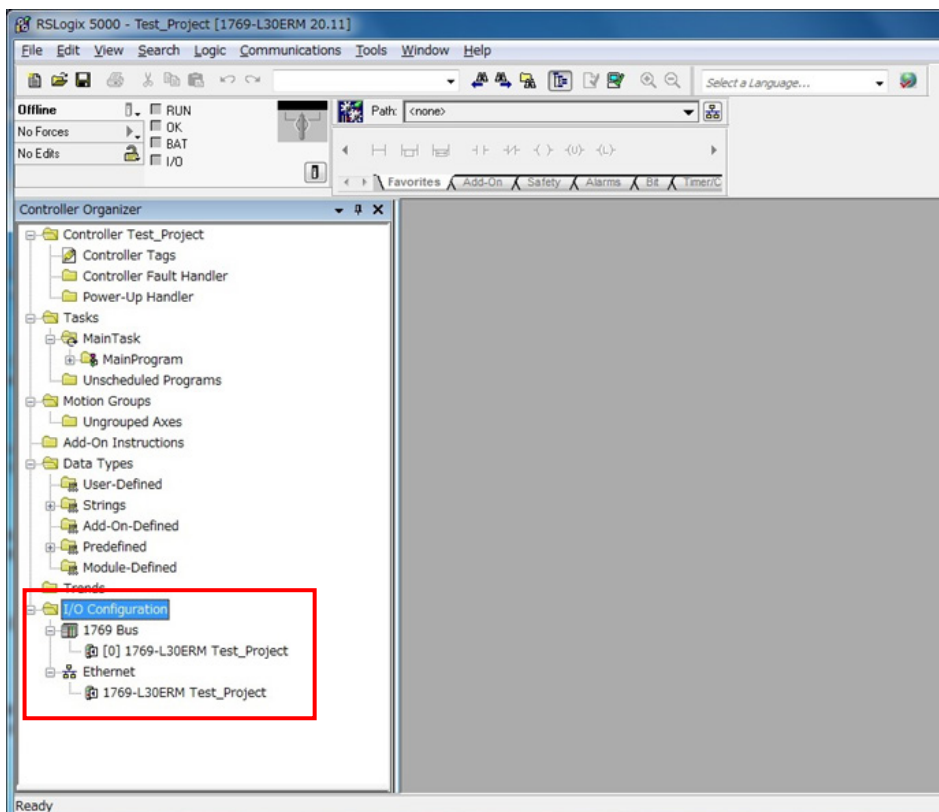
On the "New Controller" dialog box, enter the following items, and then click "OK".

- Desired controller type
- Revision number of RSLogix5000 software
- Project name



(3) Confirmation of a new controller project

A new project is created, and the controller (1769-L30ERM/A CompactLogix5330ERM) is displayed in the "I/O Configuration" folder.



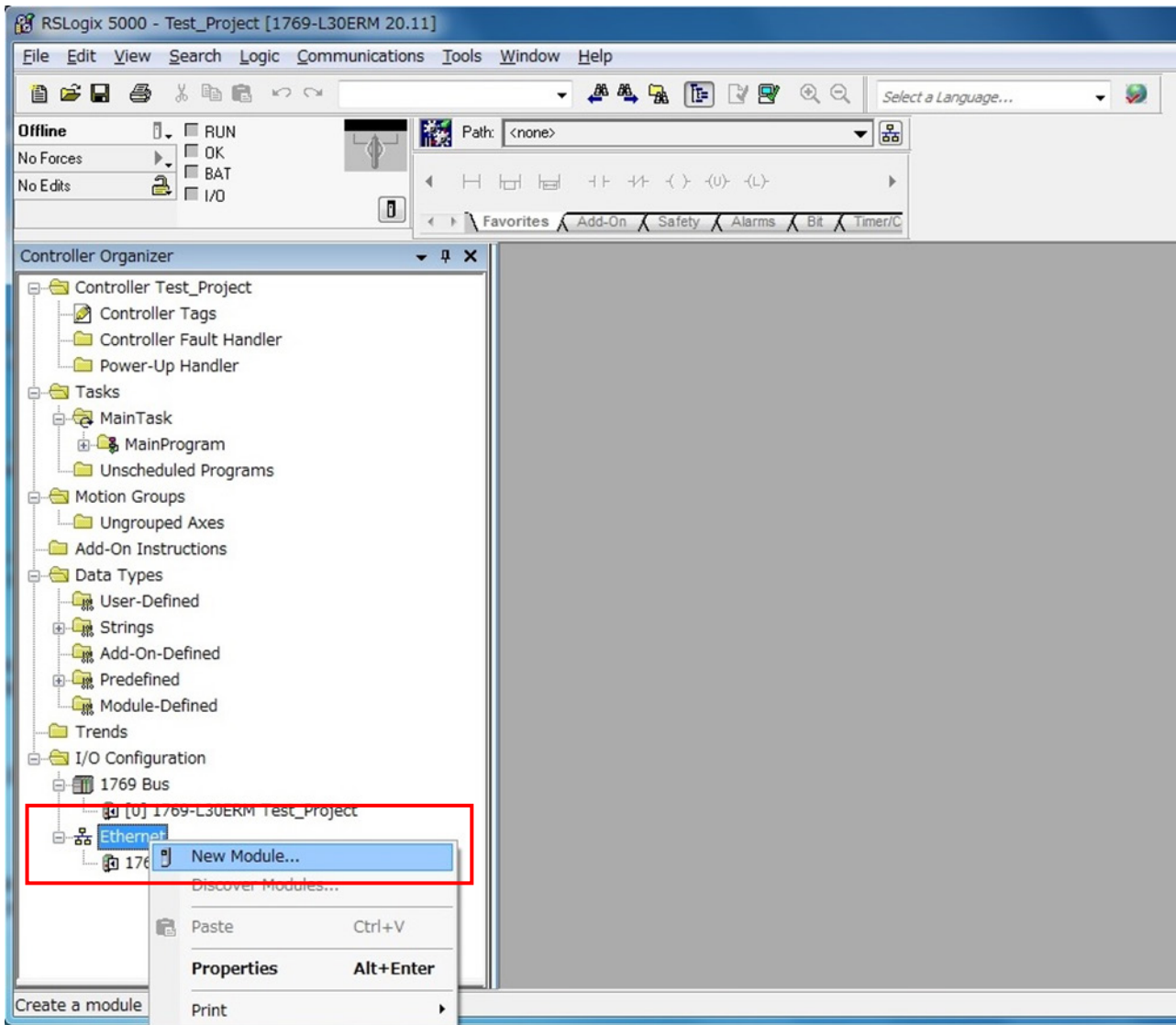
9-6-4. Adding NCW-3DHIP to the controller project

Add the NCW-3DHIP to the controller project as an I/O device.
There are two ways to add NCW-3DHIP as described below.

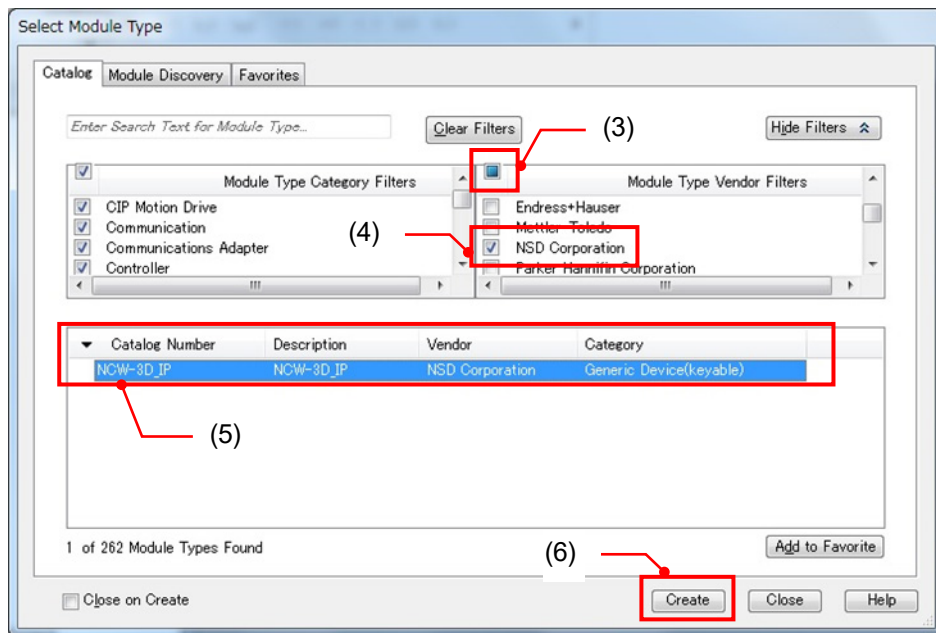
- ① In case EDS file is installed (refer to section 9-6-4-1)
- ② In case EDS file isn't installed (refer to section 9-6-4-2)

9-6-4-1. In case EDS file is installed

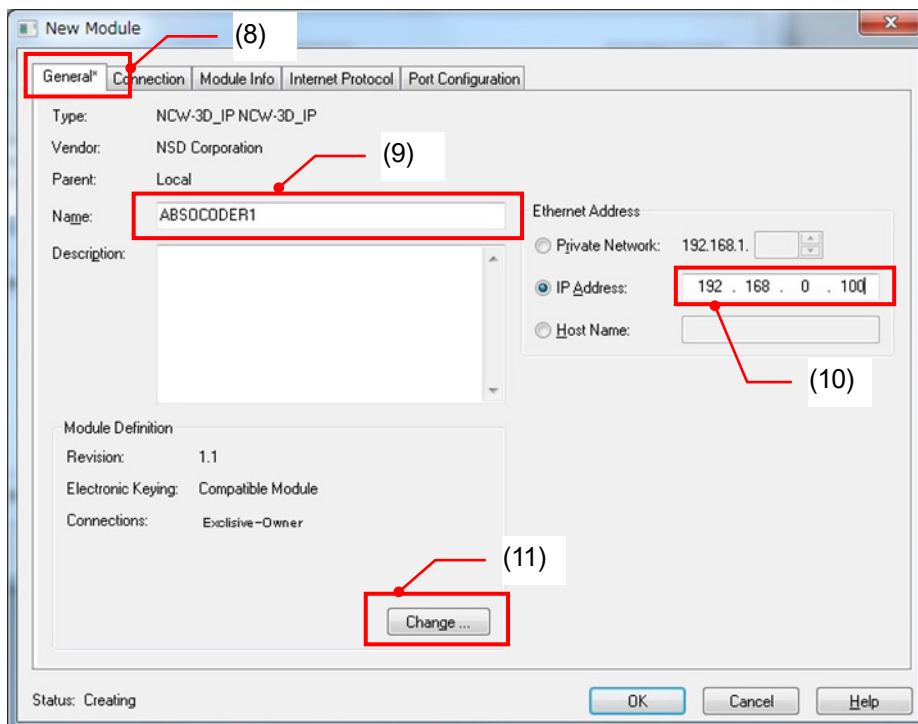
(1) Right-click the "Ethernet" in the I/O Configuration folder, and choose "New Module".



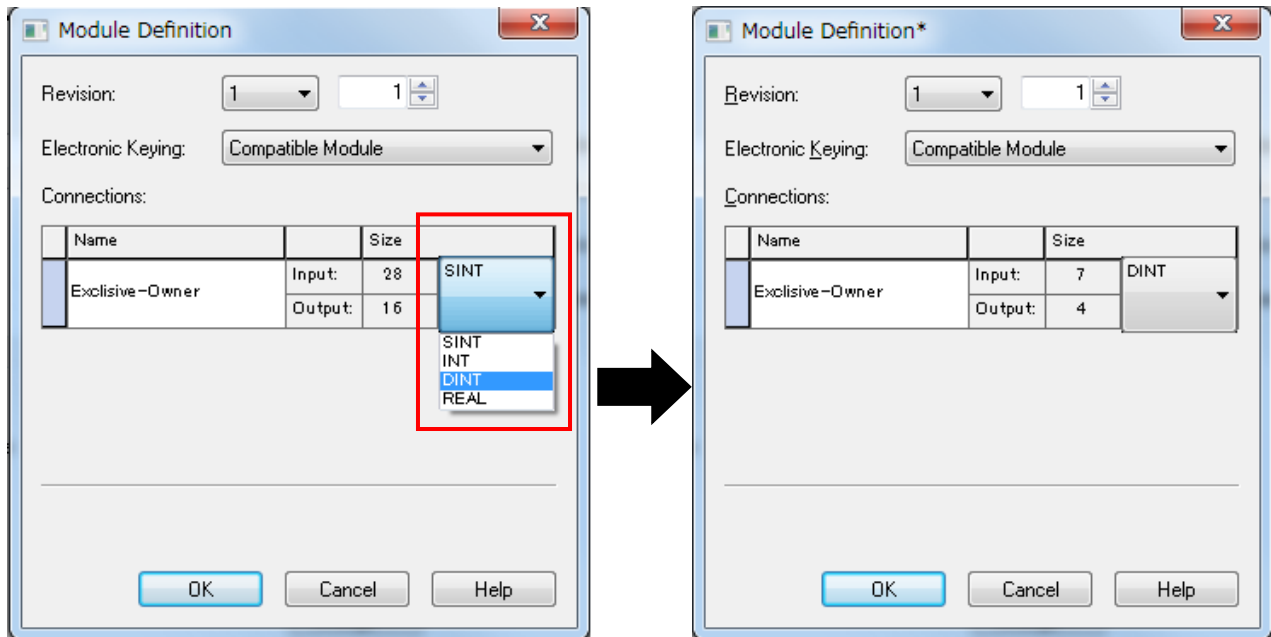
- (2) The “Select Module Type” dialog box appears
- (3) Uncheck the “Module Type Vendor Filters” checkbox.
- (4) Check the “NSD Corporation” checkbox.
- (5) Choose NCW-3DHIP which is displayed in the “Catalog Number field”.
- (6) Click “Create”.



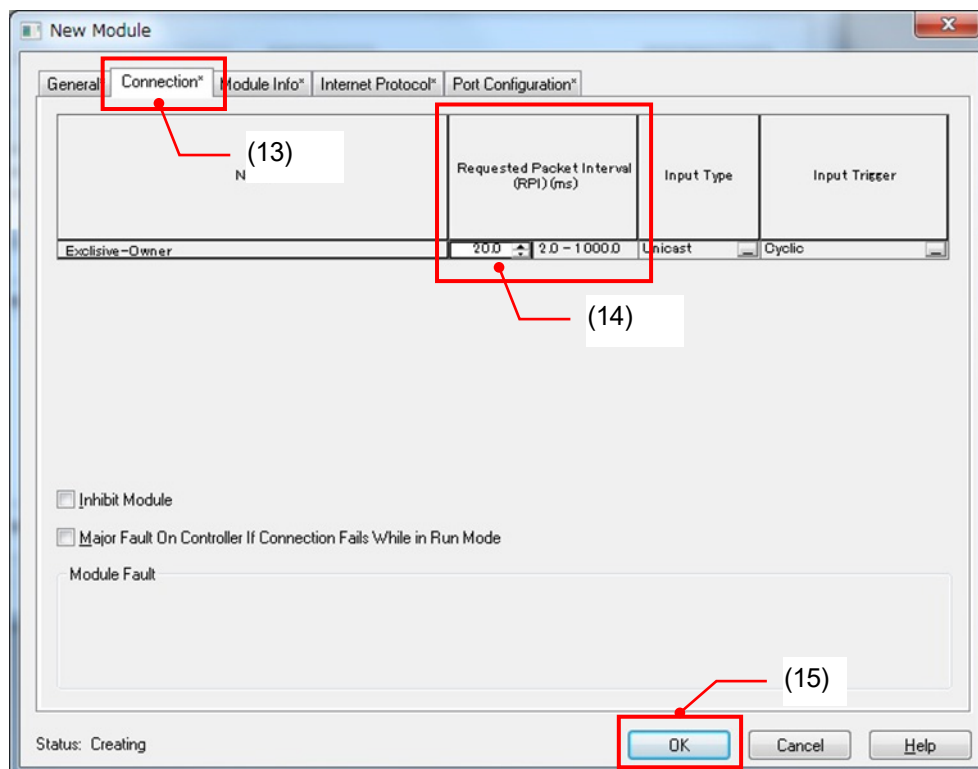
- (7) The “New Module” dialog box appears
- (8) Choose the “General” tab.
- (9) Type the name of NCW-3DHIP.
- (10) Enter the IP address of NCW-3DHIP.
- (11) Click “Change ...” to change the connection data size of NCW-3DHIP.



- (12) The “Module Definition” dialog box appears.
Choose “DINT”, and then click “OK”.

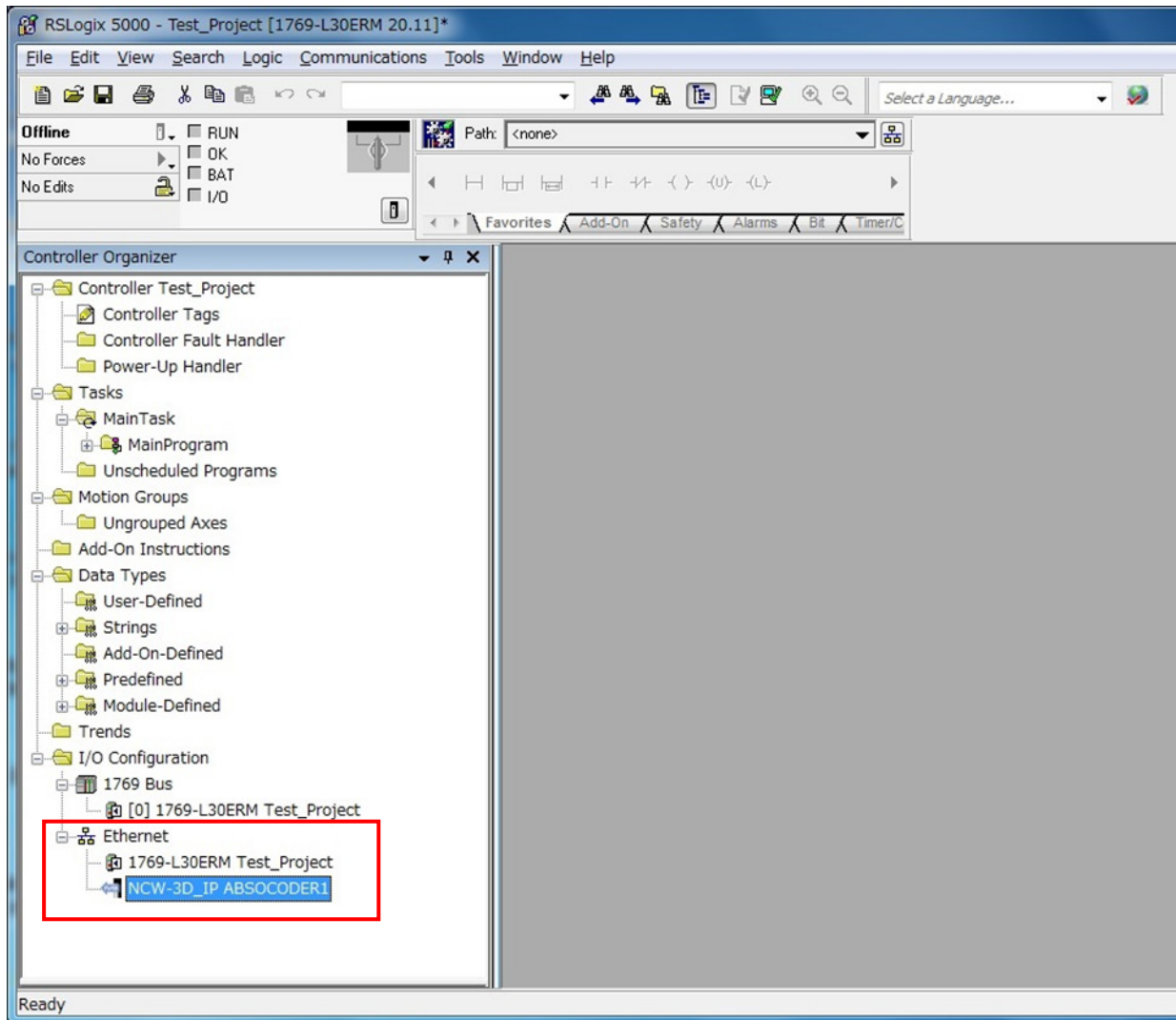


- (13) Choose the “Connection” tab.
(14) Designate the RPI (Request Packet Interval).
(15) Click “OK”.



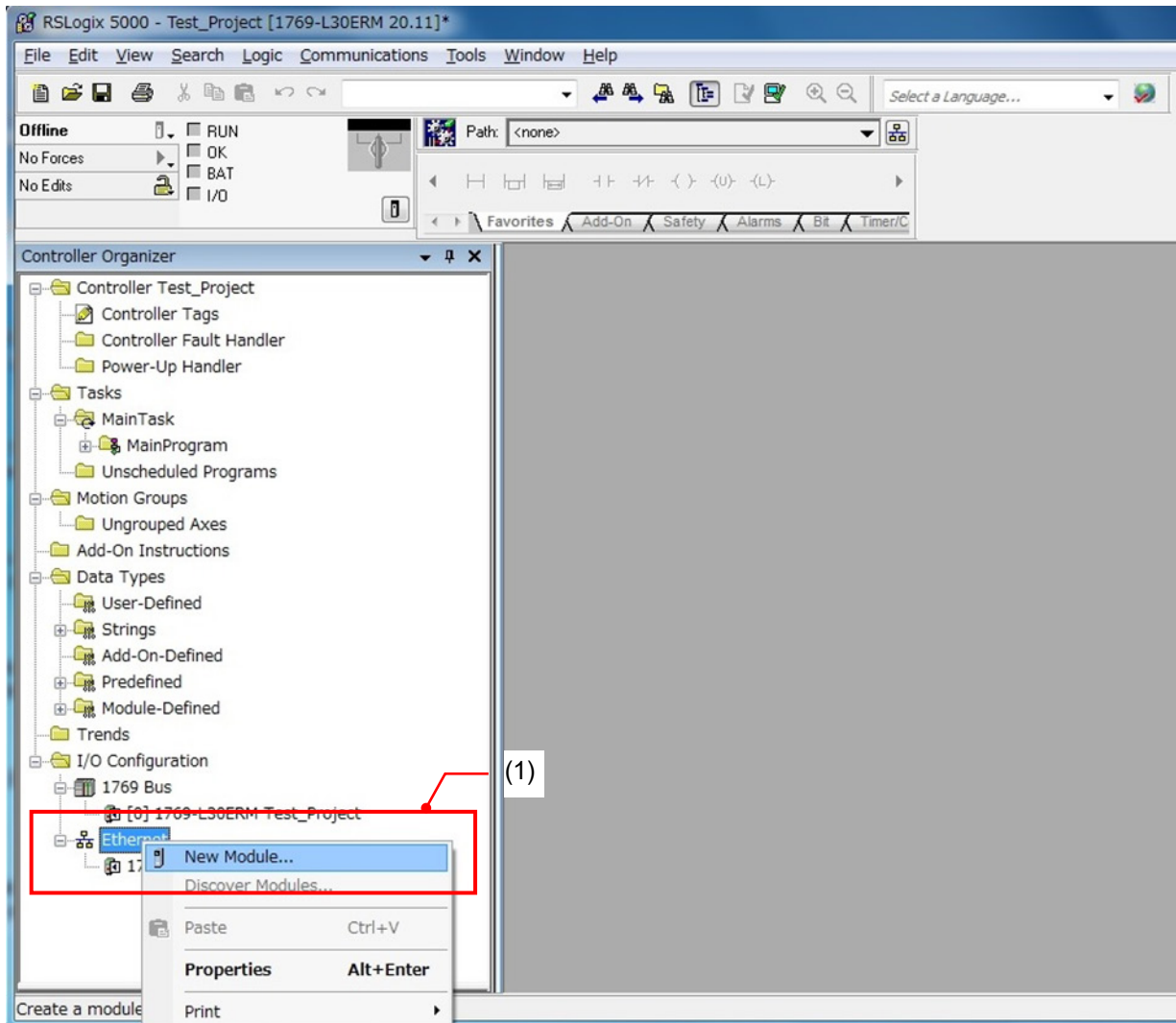
(16) "Adding NCW-3DHIP to the controller project" is completed.

Confirm that NCW-3D_IP is added on "EtherNet" of the "I/O Configuration" folder.

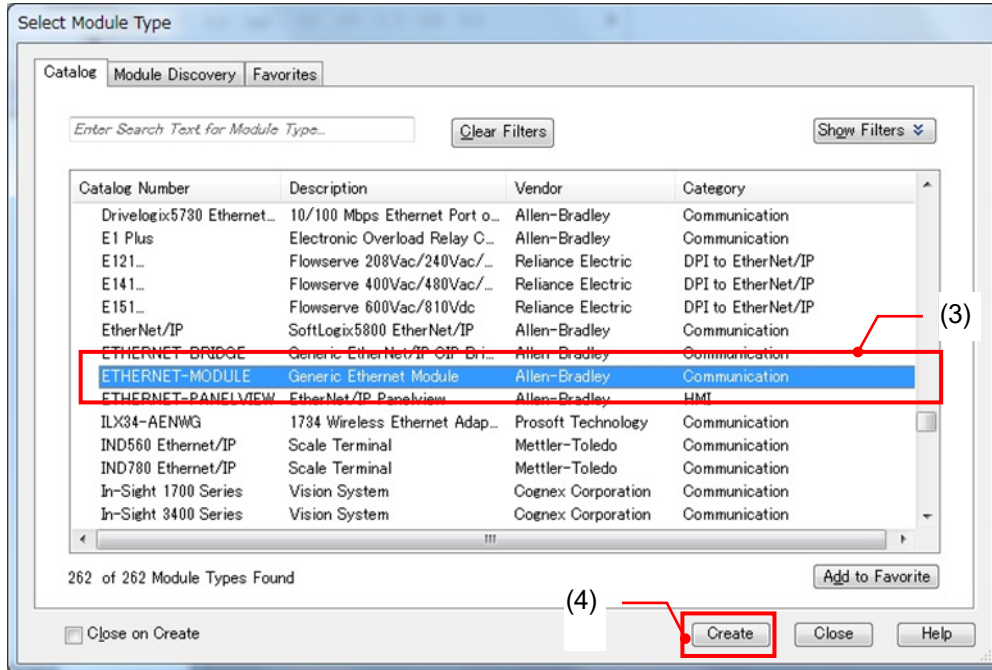


9-6-4-2. In case EDS file isn't installed

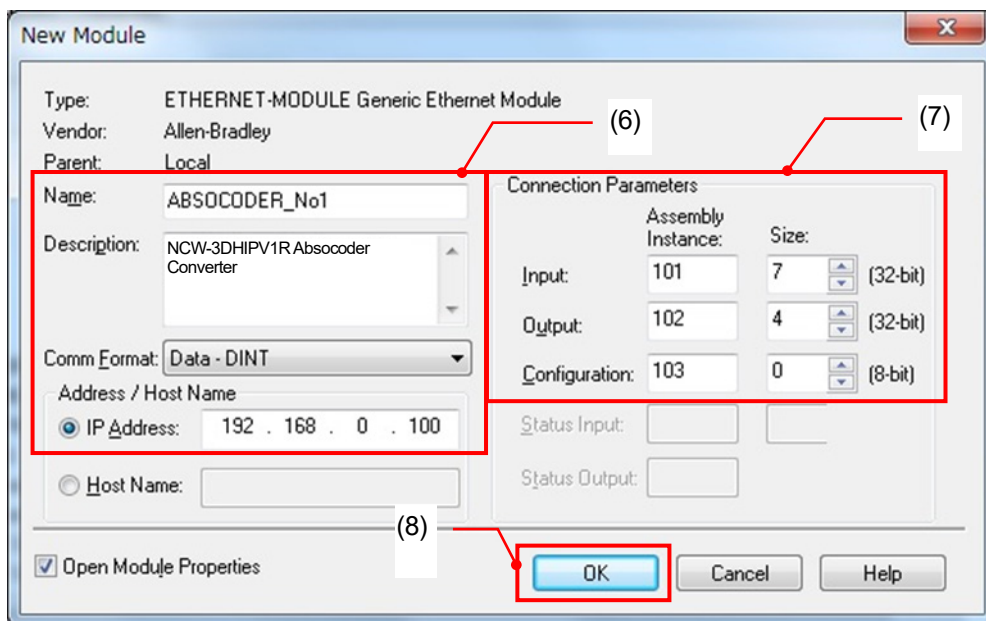
(1) Right-click the "Ethernet" in the I/O Configuration folder, and choose "New Module".



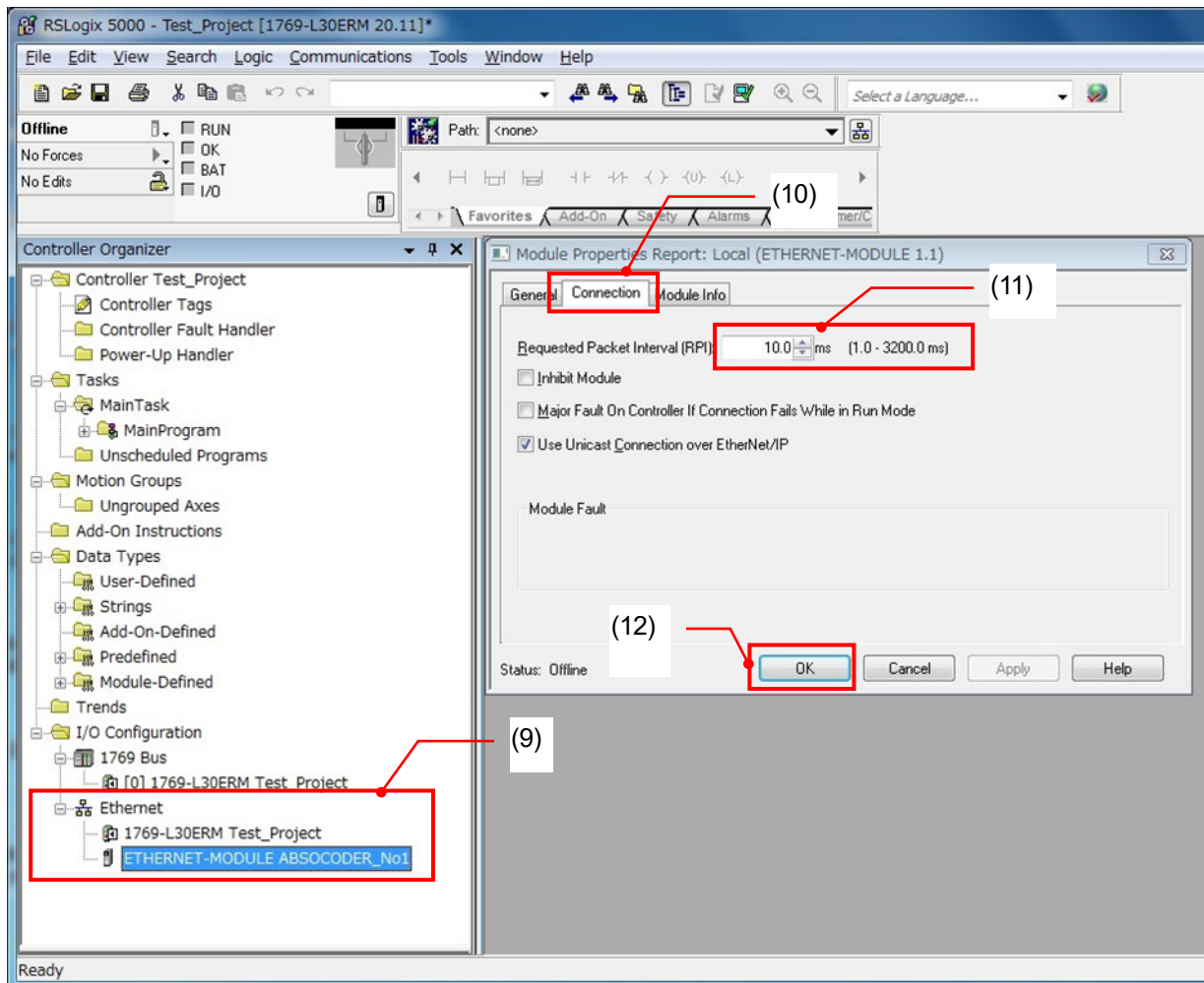
- (2) The "Select Module Type" dialog box appears
- (3) Select "ETHERNET-MODULE"
- (4) Click "Create".



- (5) The "New Module" dialog box appears
- (6) Enter the information of "ETHERNET-MODULE" which is newly added.
 - Name
 - Description
 - Comm Format
 - IP Address
- (7) Enter value to the connection parameter as follows.
- (8) Click "OK".



- (9) Right-click newly added "ETHERNET-MODULE", and choose the property.
- (10) Choose the "Connection" tab on the "Module Property Report" dialog box.
- (11) Designate the RPI (Request Packet Interval).
- Notice: RPI of NCW-3DHIP should be specified to 2.0ms or more.
- (12) Click "OK".
- (13) "Adding NCW-3DHIP to the controller project" is completed.

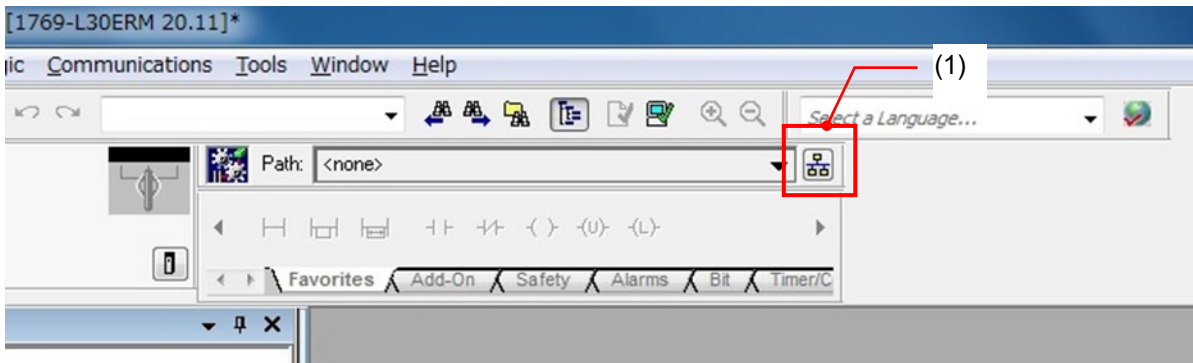


9-6-5. Download the project

Downloads the created project to the controller (1769-L30ERM/A CompactLogix5330ERM).
For downloading, the communication path must be specified to RSLogix5000 software.

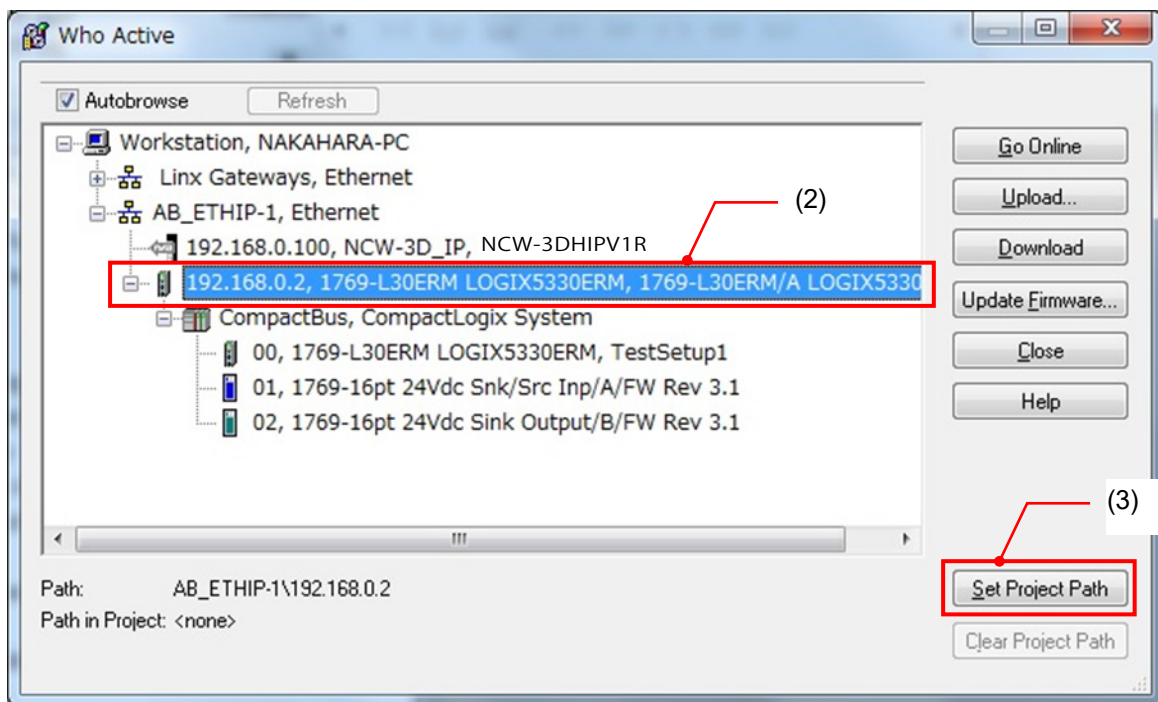
(1) Specifies the communication path to the controller

Click “Brows  ” icon




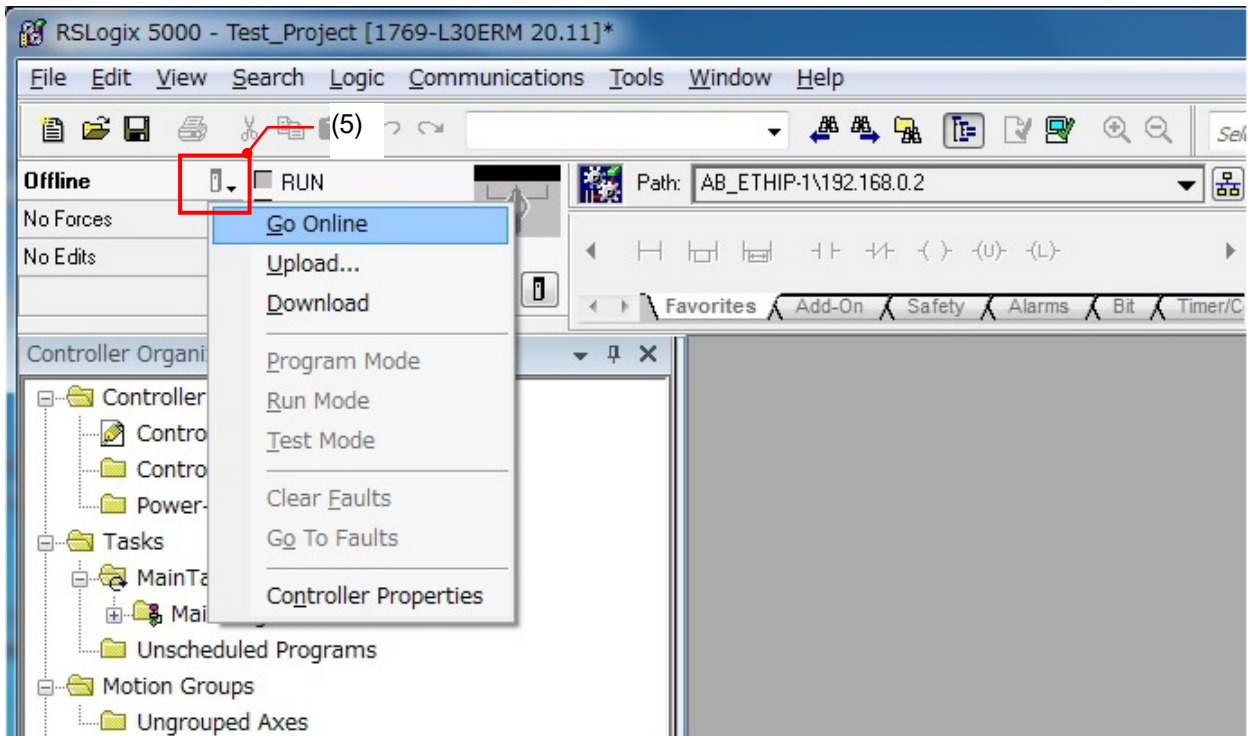
(2) On the “Who Active” dialog box, choose the controller (1769-L30ERM/A CompactLogix5330ERM).

(3) Click “Set Project Path”.

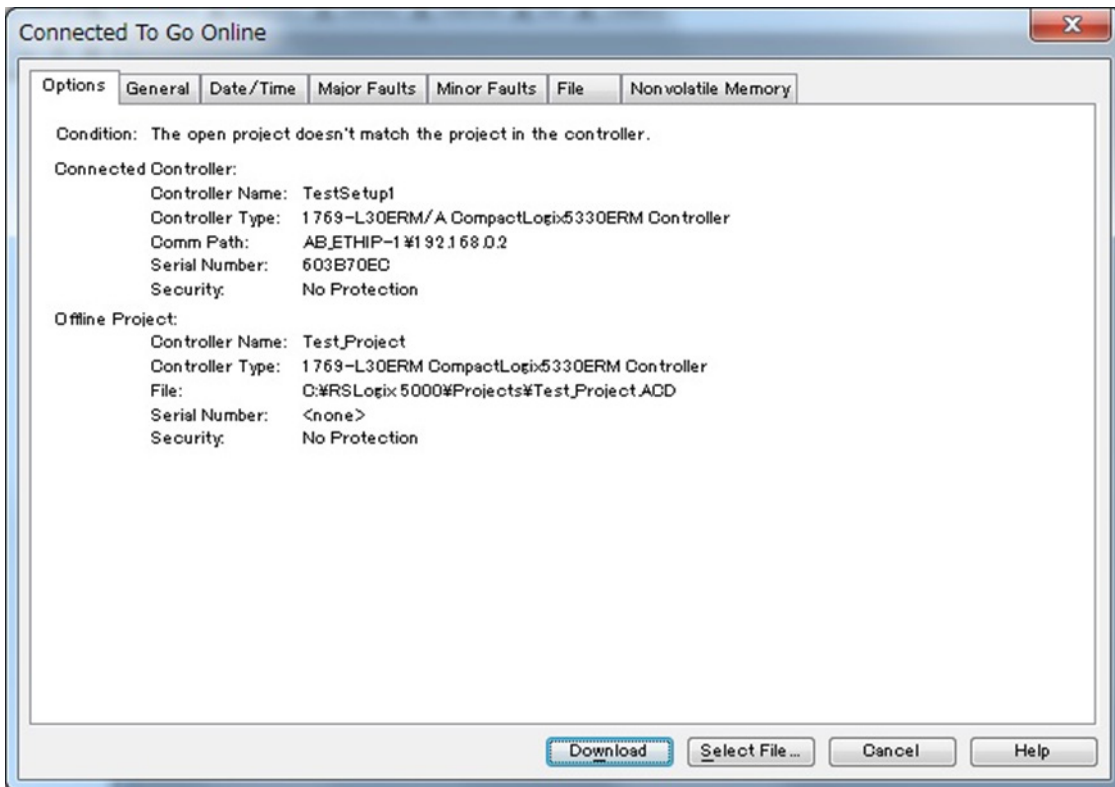


(4) Turn the mode switch on the controller (1769-L30ERM/A CompactLogix5330ERM) to the “PROG” position to online.

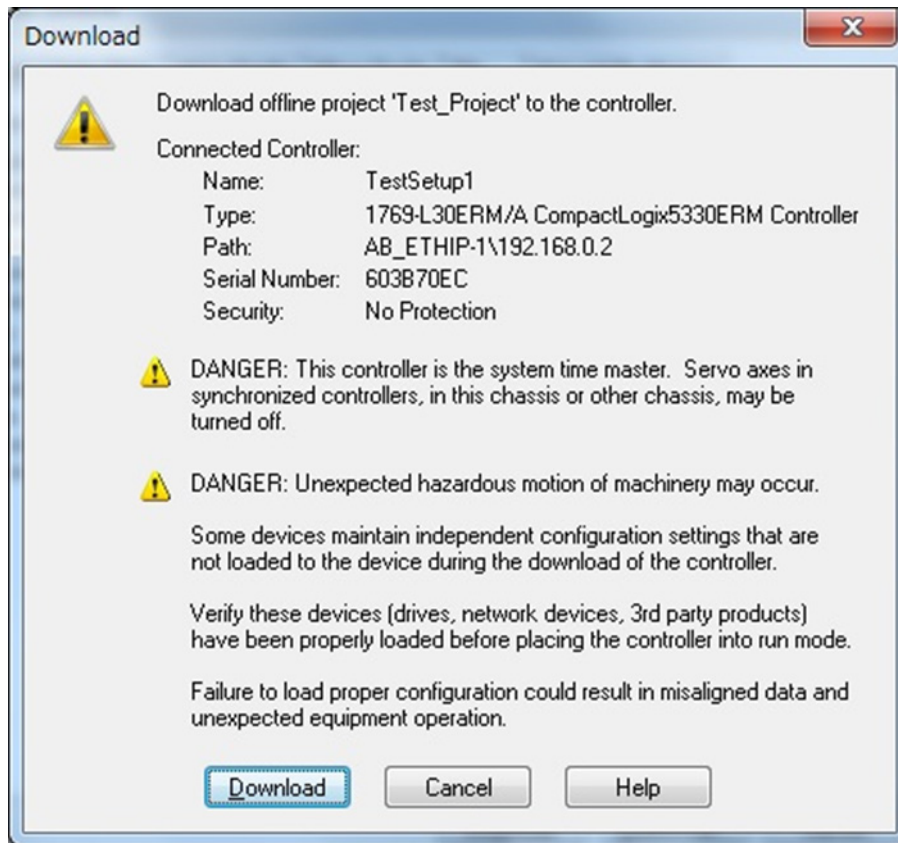
(5) Click the “Controller Status ” icon, and choose “Go Online”.



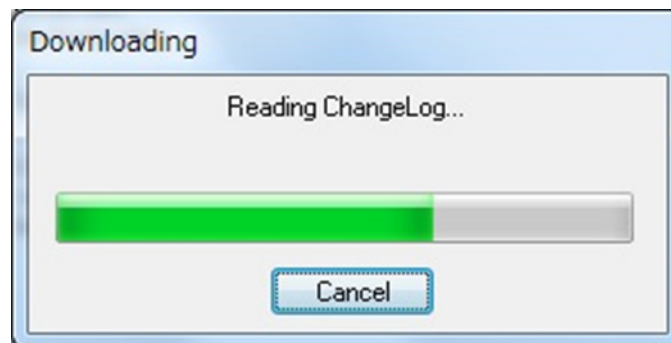
(6) On the “Connected To Go Online” dialog box, click “Download”.



- (7) On the “Download” dialog box, click “Download”.
Downloading a project is started.



- (8) The following dialog box is displayed during downloading.
The dialog box closes when the download is completed.



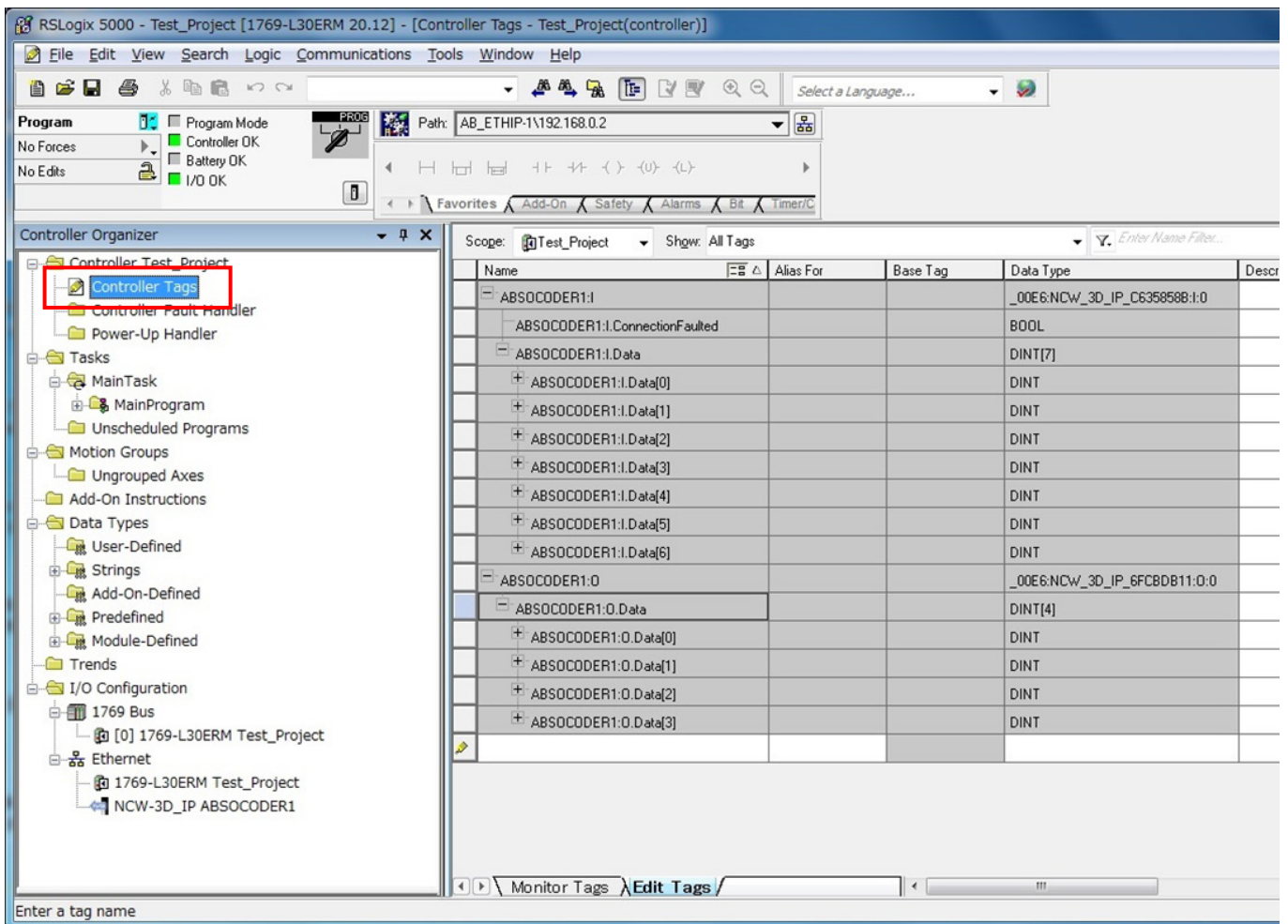
- (9) Save the project
From the “File” menu, click “Save” to save all configurations described above.

(10) Confirm “Controller tags”

Double-click the “Controller tags”.

On the “Controller Tags” dialog box, I/O information of NCW-3DHIP can be confirmed.

NCW-3DHIP can be accessed by the controller program.



9-7. Set Parameter of NCW-3DHIP

Before NCW-3DHIP is used, parameters must be configured.



Note

In the case of using one sensor, NCW-3DHIP might not operate normally when the parameter is set by a configuration tool except RSNetWorx manufactured by Rockwell Automation, Inc.

In this case, set "1 (disable)" to "Axis Unavailable" of the axis-2 parameter, and use the axis-1 sensor connector (SENSOR 1).



Note

When setting parameters, switch the operation mode of the host PLC to program mode (PROG).

Cannot be set in run mode (RUN).

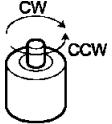
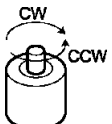
This operation is performed by using the PLC's configuration tool (a PLC development tool software).

*: Depending on the PLC model, this operation can also be performed by the mode selection switch on the CPU card.

9-7-1. Parameter List

NCW-3DHIP has following parameters.

Parameter setting values except a preset value are saved in the nonvolatile memory; therefore, NCW-3DHIP can operate with previous designated parameters after turning on the power supply again.

| Axis | Parameters | ABSOCODER Object (Class ID: 0x64) | | Descriptions |
|----------------------|----------------------------------|--------------------------------------|--------------|--|
| | | Instance ID | Attribute ID | |
| For axis-1 sensor | Axis Unavailable | 0x01 | 0x64 | Specify "Enable" or "Disable" for the axis. 0: Enable (Default) 1: Disable |
| | Error Clear | 0x01 | 0x65 | Specify "Error recovery behavior". 0: Auto clearing (Default) Automatically clears the error when removing the cause of the error. 1: Manual clearing |
| | Position Data Increase Direction | 0x01 | 0x0C | Specify the ABSOCODER sensor rotation direction in which the position data increases. 0: CW (Default) 1: CCW  |
| | Preset Value | 0x01 | 0x13 | Specify "Preset Value". Axis-1 current position value is changed to a value which is specified at this parameter after setting it. NOTE The setting value is deleted and reset to the initial value "0" when restarting the power supply or resetting the device. |
| For axis-2 sensor | Axis Unavailable | 0x02 | 0x64 | Specify "Enable" or "Disable" for the axis. 0: Enable (Default) 1: Disable |
| | Error Clear | 0x02 | 0x65 | Specify "Error recovery behavior". 0: Auto clearing (Default) Automatically clears the error when removing the cause of the error. 1: Manual clearing |
| | Position Data Increase Direction | 0x02 | 0x0C | Specify the ABSOCODER sensor rotation direction in which the position data increases. 0: CW (Default) 1: CCW  |
| | Preset Value | 0x02 | 0x13 | Specify "Preset Value". Axis-2 current position value is changed to a value which is specified at this parameter after setting it. NOTE The setting value is deleted and reset to the initial value "0" when restarting the power supply or resetting the device. |

9-7-2. Parameters Setting Procedure

Use the RSNetWorx software to set parameters.

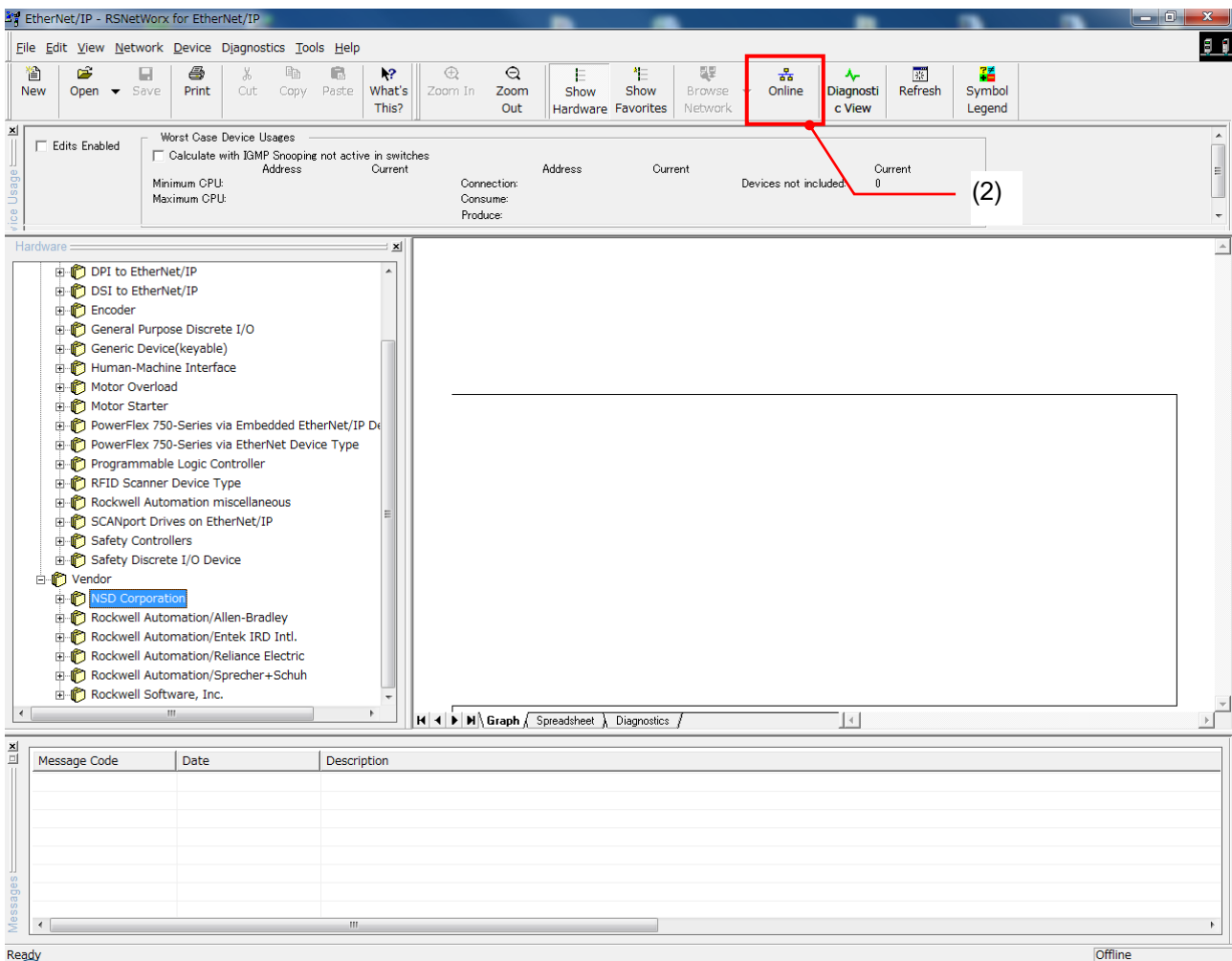
NCW-3DHIP can set parameters by using the web server function.
(Refer to "APPENDIX 3" for the web server function.)

In this section, setting procedures of the parameters are described below.

(1) Start RSNetWorx software

(2) Go online

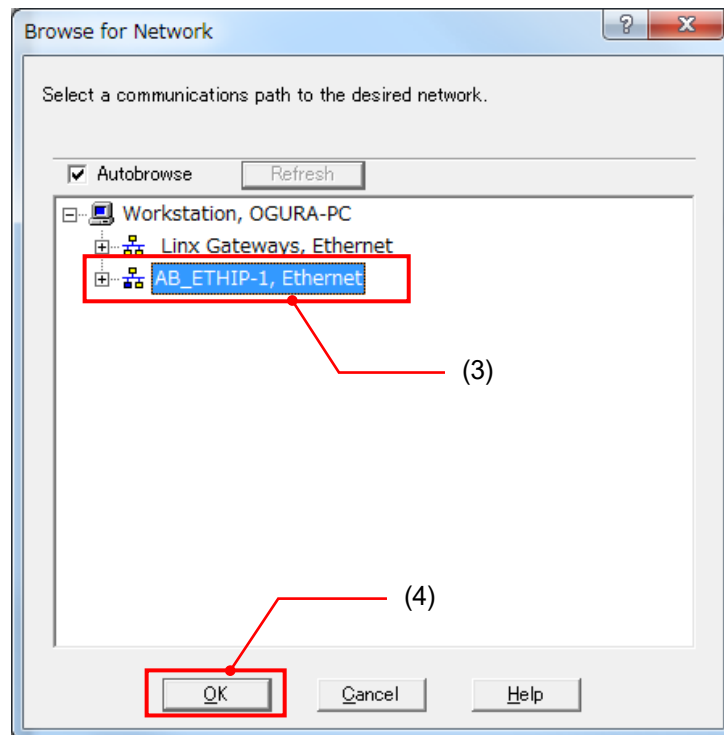
Click "Online"



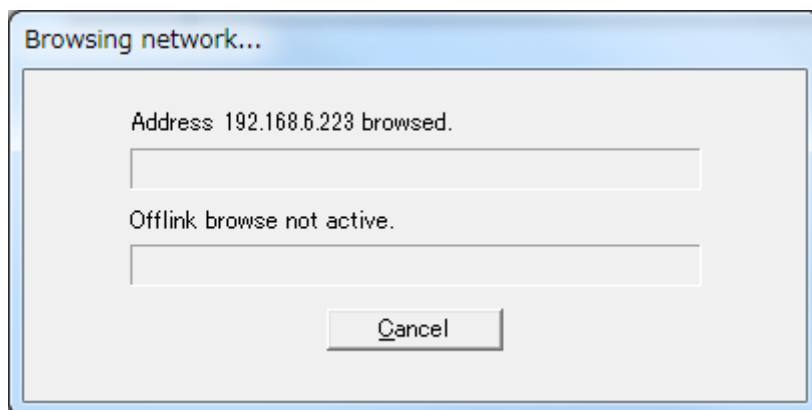
(3) Browse Network

On the “Browse for Network” dialog box, choose a desired network.

(4) Click “OK”.



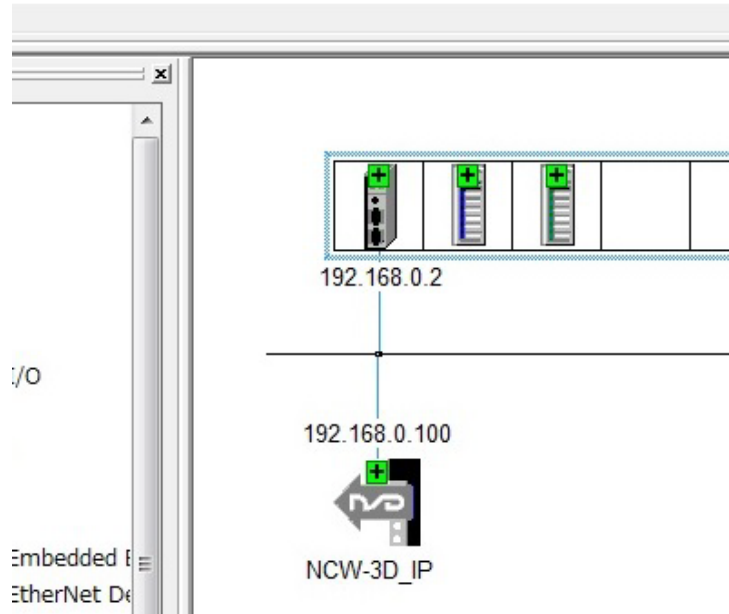
(5) On the “Browsing network...” dialog box, the progress of searching network is shown.



(6) Confirm your network device

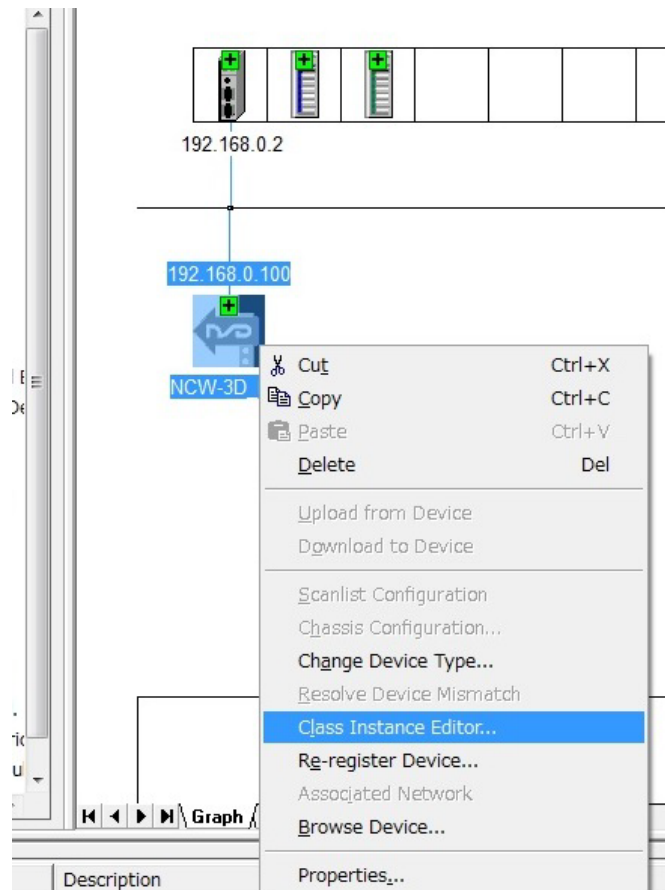
The configured devices are indicated in network.

Confirms the network at which the controller (1769-L30ERM/A CompactLogix5330ERM) is connected to NCW-3DHIP.

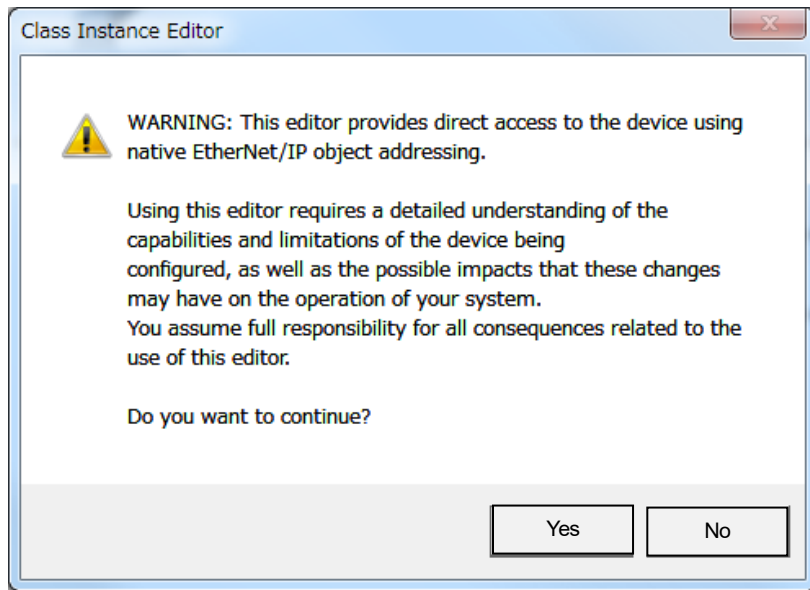


(7) Start "Class Instance Editor"

Right-click NCW-3DHIP, and choose "Class Instance Editor".



(8) Confirm the WARNING on “Class Instance Editor” dialog box, and click “Yes”.



(9) Set the parameter

There are parameters which are for axis-1 and axis-2.

Set the following contents.

A) Position Data Increase Direction

B) Axis Unavailable

C) Error Clear

B) and C) usually don't need to be set. Set them if you need.

For the setting, enter the setting values from (a) to (f) in the dialog "Class Instance Editor", and click the "Execute" button.

| | Items | Values | Remarks |
|-----|--|----------------------|--|
| (a) | Service Code | Set Single Attribute | Service code for the attribute |
| (b) | Object Address Class (Class ID) | 0x64 | ABSOCODER Object |
| (c) | Object Address Instance (Instance ID) | 0x01 | Instance: for axis-1 |
| | | 0x02 | Instance: for axis-2 |
| (d) | Object Address Attribute (Attribute ID) | 0x0C | Attribute: Position Data Increase Direction |
| | | 0x64 | Attribute: Axis Unavailable |
| | | 0x65 | Attribute: Error Clear |
| (e) | Transmit data size | Byte | 1Byte |
| (f) | Data sent to the device | 0x0 or 0x1 | Enters the parameter setting value (0 or 1). |

The screenshot shows the "Class Instance Editor" dialog box for Node 192.168.0.100. The dialog is divided into several sections:

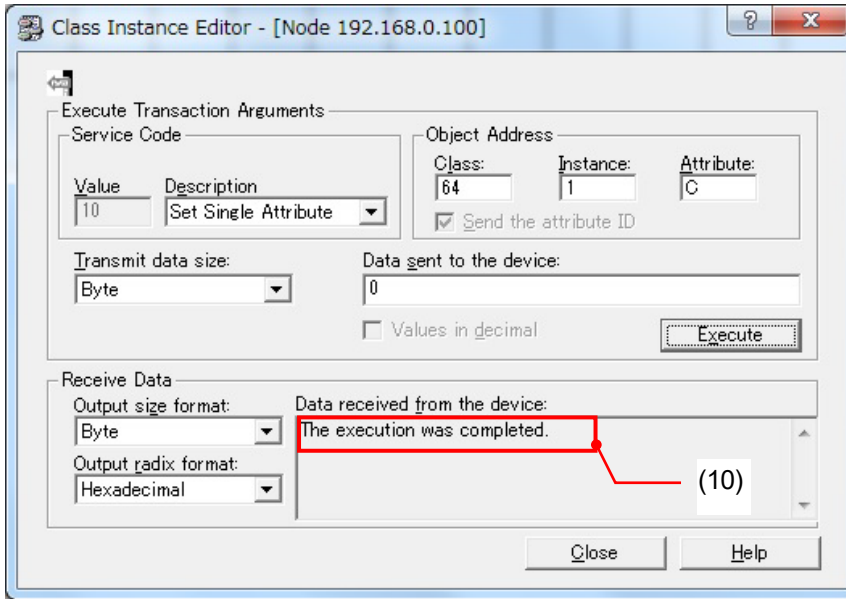
- Execute Transaction Arguments:**
 - Service Code:** Value: 10, Description: Set Single Attribute (labeled (a)).
 - Object Address:** Class: 64 (labeled (b)), Instance: 1 (labeled (c)), Attribute: C (labeled (d)).
 - Transmit data size:** Byte (labeled (e)).
 - Data sent to the device:** 0 (labeled (f)).
 - Execute button:** A red box highlights the "Execute" button.
- Receive Data:**
 - Output size format:** Byte (labeled (e)).
 - Output radix format:** Hexadecimal.
 - Data received from the device:** An empty text area.

Additional callouts on the right side of the image provide further details for labels (b) through (f):

- (b) Enter Class ID: 0x64: 64
- (c) Enter Instance ID: 0x01: 1, 0x02: 2
- (d) Enter Attribute ID: 0x0C: C, 0x64: 64, 0x65: 65
- (f) Enter the setting value for each parameter.

(10) Confirm "Position Data Increase Direction" setting

"The execution was completed." is displayed in the "Data received from the device" field when "Position Data Increase Direction" is set correctly. Confirm both axes.

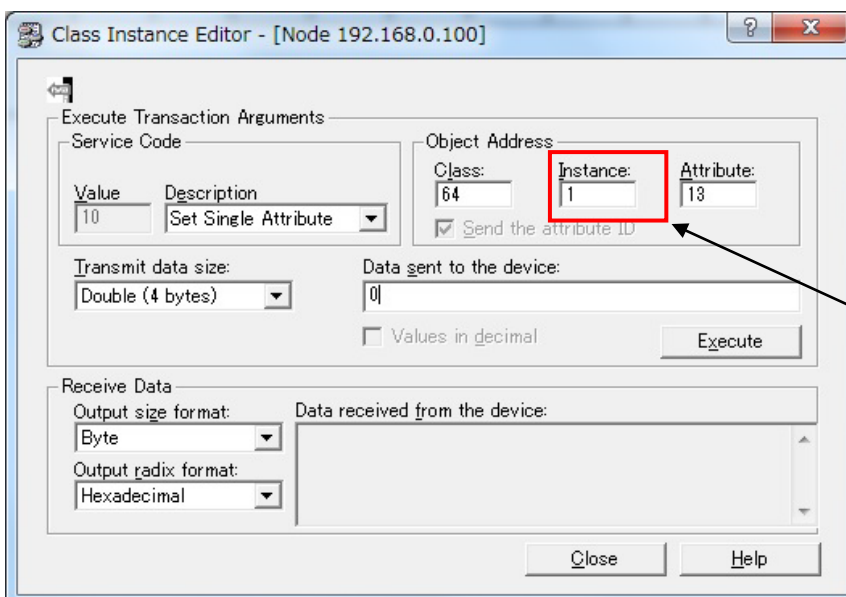


(11) Specify "Preset Value"

"Preset Value" is specified to each two settings (for axis-1 and for axis-2).

Enter a setting value in "Class Instance Editor" dialog box, and click the "Execute" button.

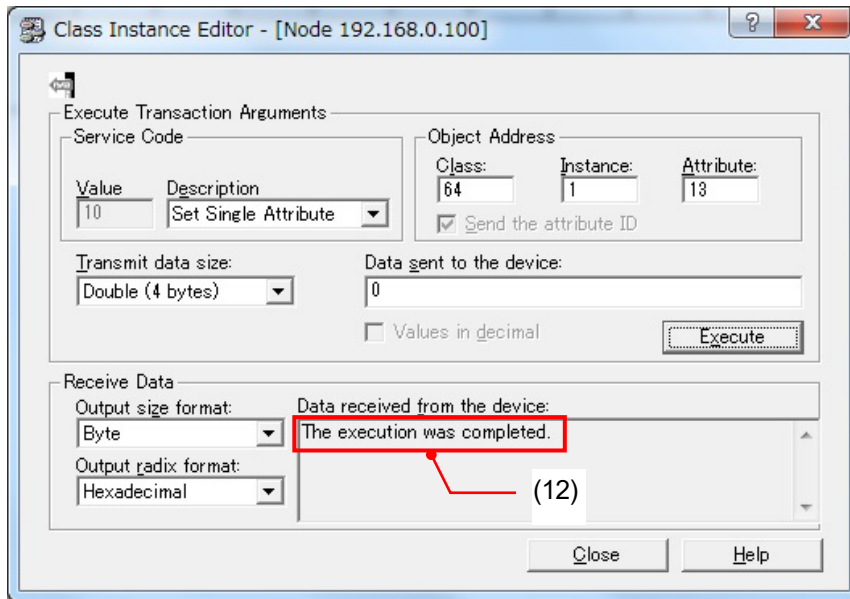
| Items | Values | Remarks |
|--------------------------|----------------------|---|
| Service Code | Set Single Attribute | Service code for the attribute |
| Object Address Class | 0x64 | ABSOCODER Object |
| Object Address Instance | 0x01 | Instance: for axis-1 |
| | 0x02 | Instance: for axis-2 |
| Object Address Attribute | 0x13 | Attribute: Preset Value |
| Transmit data size | DINT | 4Byte |
| Data sent to the device | 0x00000000 | A value of "Values" is indicated as an example when "Preset Value" is set to "0". |



A setting value for axis-1 is different from for axis-2.
For axis-1: 1 (0x01)
For axis-1: 2 (0x02)

(12) Confirm "Preset Value"

"The execution was completed." is displayed in the "Data received from the device" field when "Preset Value" is set correctly. Confirm both axes.



9-8. Confirm Position Data of NCW-3DHIP

All settings are completed, and NCW-3DHIP is ready to use.

Double-click the “Controller tags” of RSLogix5000.

The “Controller Tags” dialog box appears.

The position data can be confirmed by the tag of NCW-3DHIP.

The tags which indicate each position data are as follows.

Axis-1 Position Data → ABSOCODER1:I:Data[1]

Axis-2 Position Data → ABSOCODER1:I:Data[4]

The screenshot shows the RSLogix 5000 software interface. The 'Controller Organizer' on the left shows the 'Controller Tags' folder highlighted with a red box. The main window displays a list of tags for ABSOCODER1:I and ABSOCODER1:O. The tags are listed in a table with columns for Name, Value, Force Mask, Style, and Data Type.

| Name | Value | Force Mask | Style | Data Type |
|--------------------------------|--------------|------------|---------|-------------|
| ABSOCODER1:I | {...} | {...} | | _00E6:NCW_3 |
| ABSOCODER1:I.ConnectionFaulted | 0 | | Decimal | BOOL |
| ABSOCODER1:I.Data | {...} | {...} | Hex | DINT[7] |
| ABSOCODER1:I.Data[0] | 16#0000_0000 | | Hex | DINT |
| ABSOCODER1:I.Data[1] | 16#0001_fdf9 | | Hex | DINT |
| ABSOCODER1:I.Data[2] | 16#0000_0000 | | Hex | DINT |
| ABSOCODER1:I.Data[3] | 16#0000_0000 | | Hex | DINT |
| ABSOCODER1:I.Data[4] | 16#0001_f8d6 | | Hex | DINT |
| ABSOCODER1:I.Data[5] | 16#0000_0000 | | Hex | DINT |
| ABSOCODER1:I.Data[6] | 16#0000_0021 | | Hex | DINT |
| ABSOCODER1:O | {...} | {...} | | _00E6:NCW_3 |
| ABSOCODER1:O.Data | {...} | {...} | Hex | DINT[4] |
| ABSOCODER1:O.Data[0] | 16#0000_0000 | | Hex | DINT |
| ABSOCODER1:O.Data[1] | 16#0000_0000 | | Hex | DINT |
| ABSOCODER1:O.Data[2] | 16#0000_0000 | | Hex | DINT |
| ABSOCODER1:O.Data[3] | 16#0000_0000 | | Hex | DINT |

At the bottom of the window, there is a text input field with the placeholder text "Enter display style for the value".

9-9. CIP Implicit Messaging (I/O Connection)

NCW-3DHIP has the "Exclusive-Owner Connection" for the unicast connection which can connect with the real-time I/O communication connection. It lets control the I/O data of NCW-3DHIP.

The connection summary and data format are described below.

9-9-1. Exclusive-Owner Connection

(1) Connection Attribute

| Item | | Description |
|------------------------------|--------------------------|----------------------------------|
| Transport Type | | Client , Exclusive-Owner |
| Transport Class | | 1 |
| Production Trigger | | Cyclic |
| Scanner -> Slave (Output) | Size | 16Byte |
| | Realtime Transfer Format | 32bit Run/Idle Header |
| | Connection Type | Point to Point |
| | Priority | High |
| | RPI | 20ms (min.: 2ms, max.: 100ms) |
| Slave -> Scanner (Input) | Size | 28Byte |
| | Realtime Transfer Format | Modeless |
| | Connection Type | Point to Point |
| | Priority | High |
| | RPI | 20ms (min.: 2ms, max.: 100ms) |
| Configuration | Size | 0Byte |
| Connection Name | | "Input / Output / Configuration" |
| Help String | | "Exclusive-Owner" |
| Connection Path | | 20 04 24 67 2C 66 2C 65 |

(2) Scanner -> Slave (Output) Data Format (Size: 16-byte)

| Offset Address (Byte) | Data Format | | | | | | | | | | | | |
|--------------------------|--|-----------------------|---|-----|-------------|-----|----------|---|---|---|--|------|----------|
| | Size | Name | Description | | | | | | | | | | |
| +0 | WORD | Axis-1 Control | <table border="1"> <thead> <tr> <th>Bit</th> <th>Description</th> </tr> </thead> <tbody> <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> </tbody> </table> | Bit | Description | 0-5 | Reserved | 6 | ERRCLR (Error Clear Command) Clears an error that is monitored from Axis-1 Status. 0: Not clear an error 1: Clear an error | 7 | 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 | 8-15 | Reserved |
| Bit | Description | | | | | | | | | | | | |
| 0-5 | Reserved | | | | | | | | | | | | |
| 6 | ERRCLR (Error Clear Command) Clears an error that is monitored from Axis-1 Status. 0: Not clear an error 1: Clear an error | | | | | | | | | | | | |
| 7 | 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 | | | | | | | | | | | | |
| 8-15 | Reserved | | | | | | | | | | | | |
| +2 | WORD | Reserved | — | | | | | | | | | | |
| +4 | UDINT | Axis-1 PresetValue | 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. | | | | | | | | | | |
| +8 | WORD | Axis-2 Control | <table border="1"> <thead> <tr> <th>Bit</th> <th>Description</th> </tr> </thead> <tbody> <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> </tbody> </table> | Bit | Description | 0-5 | Reserved | 6 | ERRCLR (Error Clear Command) Clears an error that is monitored from Axis-2 Status. 0: Not clear an error 1: Clear an error | 7 | 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 | 8-15 | Reserved |
| Bit | Description | | | | | | | | | | | | |
| 0-5 | Reserved | | | | | | | | | | | | |
| 6 | ERRCLR (Error Clear Command) Clears an error that is monitored from Axis-2 Status. 0: Not clear an error 1: Clear an error | | | | | | | | | | | | |
| 7 | 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 | | | | | | | | | | | | |
| 8-15 | Reserved | | | | | | | | | | | | |
| +10 | WORD | Reserved | — | | | | | | | | | | |
| +12 | UDINT | Axis-2 PresetValue | 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. | | | | | | | | | | |

(3) Slave -> Scanner (Input) Data Format (Size: 28-byte)

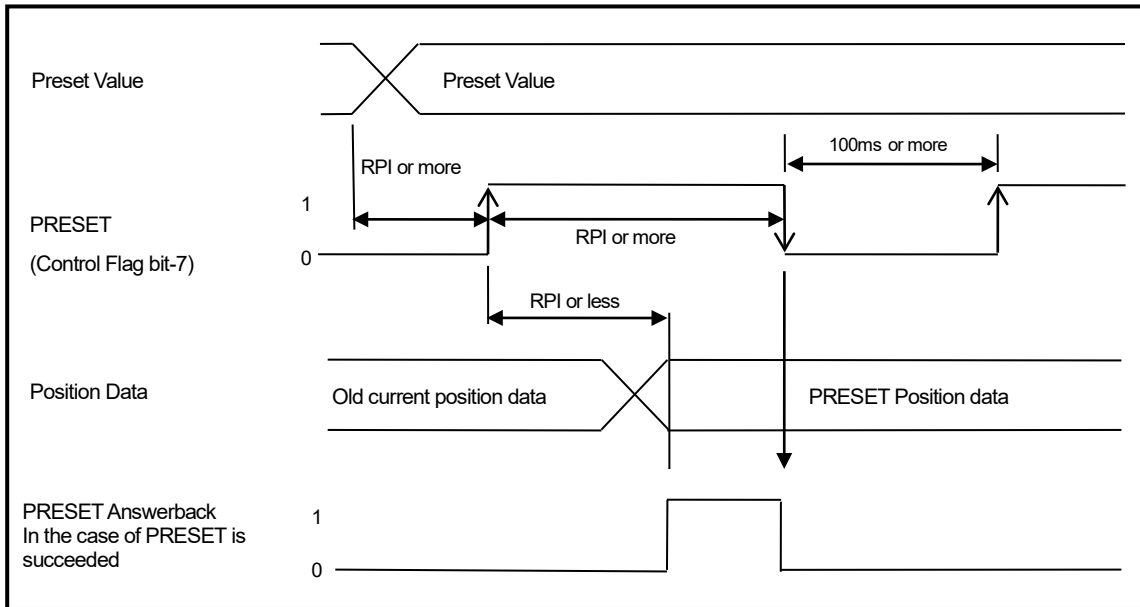
| Offset Address (Byte) | Data Format | | | | | | | | | | | | | | | | |
|--------------------------|---|---------------------------|--|-----|-------------|-----|---|-----|--|---|--|------|--|---|--|------|----------|
| | Size | Name | Description | | | | | | | | | | | | | | |
| +0 | DWORD | System Status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

Continued from the previous page

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

(4) Preset procedure

Indicates PRESET procedure of the current position value which is using the I/O communication data (Implicit message).

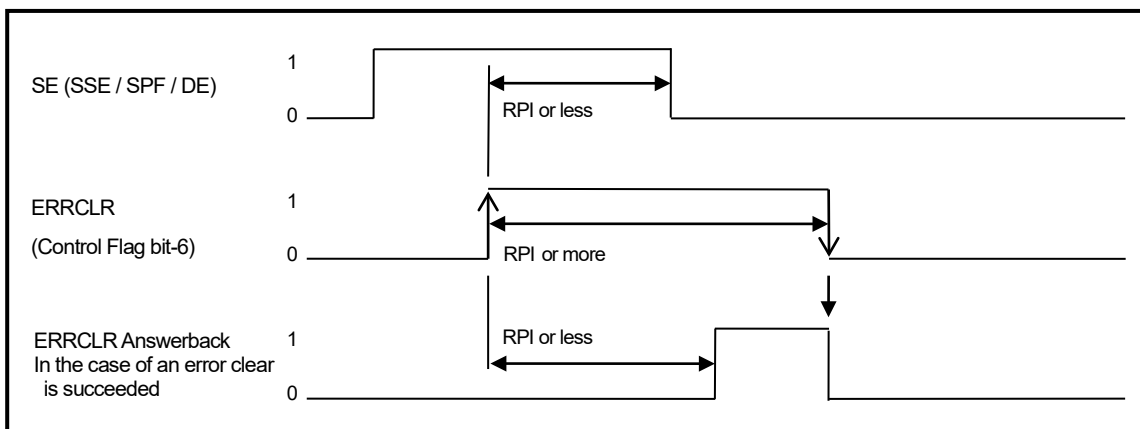


● PRESET procedure

- 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 a period of RPI 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".

(5) Error clear procedure

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



● 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 a period of RPI 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".

9-10. Device Level Ring (DLR) Function

NCW-3DHIP can be used as a ring node for device level ring (DLR) function.

All ring nodes on the network must support DLR function when using this function.

All settings of DLR function are done by "Supervisor node". NCW-3DHIP doesn't need any setting.

Refer to the "Supervisor node manual in-use" for the network setting and operation methods with using DLR function.

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 VRE-P061: -20 to +80°C VRE-P074: -20 to +120°C VRE-P097: -20 to +120°C VRE-P101: -20 to +120°C Converter: 0 to +55°C | Thermometer |
| | There should be no accumulation of dust. | None | |
| Mount Conditions | Verify that the sensor is securely mounted. | There should be no looseness. | Visual Inspection |
| | 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-3DHIP.

11-1. Check Methods during an Error Is Occurred

Error details can be checked by the indicator light status of NCW-3DHIP or using the following software (RSLogix5000 or RSNetWorx).

- ① Each status in Implicit (Input) message
(Use RSLogix5000)
- ② Instance 0x01 and 0x02 of the ABSOCODER object 0x64 in the Explicit message
(Use RSNetWorx)
- ③ Instance 0x01 of the Info Log object 0xC5 in the Explicit message
(Use RSNetWorx)
- ④ Instance 0x01 of the Info Diagnosis object 0xC6 in the Explicit message
(Use RSNetWorx)

For the methods for checking each error on the scanner system (master), refer to the scanner system manual.

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 is connected or not.
- The length of the communication cable connected with NCW-3DHIP is 100m or less.
- The communication cable is category 5e specification.
- The Ethernet/IP scanner (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-3DHIP from the Ethernet/IP scanner (master). NCW-3DHIP might be failure if only NCW-3DHIP cannot be communicated through the Ethernet/IP network. Check the light status of the NCW-3DHIP indicators (L/A1, L/A2).

11-3. CIP General Status Code

The following table lists the Status Codes that may be present in the General Status Code field of an Error Response message.

Note that the Extended Code Field is available for use in further describing any General Status Code. For the Extended Status code, refer to “11-4.”

Codes in the gray area aren't available NCW-3DHIP.

(1/3)

| General Status Code (in hex) | Status Name | Description of Status |
|------------------------------|------------------------------------|---|
| 00 | Success | Service was successfully performed by the object specified. |
| 01 | Connection failure | A connection related service failed along the connection path. |
| 02 | Resource unavailable | Resources needed for the object to perform the requested service were unavailable. |
| 03 | Invalid parameter value | See Status Code 0x20, which is the preferred value to use for this condition. |
| 04 | Path segment error | The path segment identifier or the segment syntax was not understood by the processing node. Path processing shall stop when a path segment error is encountered. |
| 05 | Path destination unknown | The path is referencing an object class, instance or structure element that is not known or is not contained in the processing node. Path processing shall stop when a path destination unknown error is encountered. |
| 06 | Partial transfer | Only part of the expected data was transferred. |
| 07 | Connection lost | The messaging connection was lost. |
| 08 | Service not supported | The requested service was not implemented or was not defined for this Object Class/Instance. |
| 09 | Invalid attribute value | Invalid attribute data detected. |
| 0A | Attribute list error | An attribute in the Get_Attribute_List or Set_Attribute_List response has a non-zero status. |
| 0B | Already in requested mode/state | The object is already in the mode/state being requested by the service. |
| 0C | Object state conflict | The object cannot perform the requested service in its current mode/state. |
| 0D | Object already exists | The requested instance of object to be created already exists. |
| 0E | Attribute not settable | A request to modify a nonmodifiable attribute was received. |
| 0F | Privilege violation | A permission/privilege check failed. |
| 10 | Device state conflict | The device's current mode/state prohibits the execution of the requested service. |
| 11 | Reply data too large | The data to be transmitted in the response buffer is larger than the allocated response buffer. |
| 12 | Fragmentation of a primitive value | The service specified an operation that is going to fragment a primitive data value, i.e. half a REAL data type. |
| 13 | Not enough data | The service did not supply enough data to perform the specified operation. |
| 14 | Attribute not supported | The attribute specified in the request is not supported. |
| 15 | Too much data | The service supplied more data than was expected. |
| 16 | Object does not exist | The object specified does not exist in the device. |

| General Status Code (in hex) | Status Name | Description of Status |
|------------------------------|--|---|
| 17 | Service fragmentation sequence not in progress | The fragmentation sequence for this service is not currently active for this data. |
| 18 | No stored attribute data | The attribute data of this object was not saved prior to the requested service. |
| 19 | Store operation failure | The attribute data of this object was not saved due to a failure during the attempt. |
| 1A | Routing failure, request packet too large | The service request packet was too large for transmission on a network in the path to the destination. The routing device was forced to abort the service. |
| 1B | Routing failure, response packet too large | The service response packet was too large for transmission on a network in the path from the destination. The routing device was forced to abort the service. |
| 1C | Missing attribute list entry data | The service did not supply an attribute in a list of attributes that was needed by the service to perform the requested behavior. |
| 1D | Invalid attribute value list | The service is returning the list of attributes supplied with status information for those attributes that were invalid. |
| 1E | Embedded service error | An embedded service resulted in an error. |
| 1F | Vendor specific error | A vendor specific error has been encountered. The Additional Code Field of the Error Response defines the particular error encountered. Use of this General Error Code should only be performed when none of the Error Codes presented in this table or within an Object Class definition accurately reflect the error. |
| 20 | Invalid parameter | A parameter associated with the request was invalid. This code is used when a parameter does not meet the requirements of this specification and/or the requirements defined in an Application Object Specification. |
| 21 | Write-once value or medium already written | An attempt was made to write to a write-once medium (e.g. WORM drive, PROM) that has already been written, or to modify a value that cannot be changed once established. |
| 22 | Invalid Reply Received | An invalid reply is received (e.g. reply service code does not match the request service code, or reply message is shorter than the minimum expected reply size). This status code can serve for other causes of invalid replies. |
| 23 | Buffer Overflow | The message received is larger than the receiving buffer can handle. The entire message was discarded. |
| 24 | Message Format Error | The format of the received message is not supported by the server. |
| 25 | Key Failure in path | The Key Segment that was included as the first segment in the path does not match the destination module. The object specific status shall indicate which part of the key check failed. |
| 26 | Path Size Invalid | The size of the path which was sent with the Service Request is either not large enough to allow the Request to be routed to an object or too much routing data was included. |
| 27 | Unexpected attribute in list | An attempt was made to set an attribute that is not able to be set at this time. |
| 28 | Invalid Member ID | The Member ID specified in the request does not exist in the specified Class/Instance/Attribute. |
| 29 | Member not settable | A request to modify a non-modifiable member was received. |

| General Status Code (in hex) | Status Name | Description of Status |
|------------------------------|---|---|
| 2A | Group 2 only server general failure | This error code may only be reported by DeviceNet Group 2 Only servers with 4K or less code space and only in place of Service not supported, Attribute not supported and Attribute not settable. |
| 2B | Unknown Modbus Error | A CIP to Modbus translator received an unknown Modbus Exception Code. |
| 2C | Attribute not gettable | A request to read a non-readable attribute was received. |
| 2D | Instance Not Deletable | The requested object instance cannot be deleted. |
| 2E | Service Not Supported for Specified Path | The object supports the service, but not for the designated application path (e.g. attribute). NOTE: Not to be used for any set service (use General Status Code 0x0E or 0x29 instead) |
| 2F ~ CF | Reserved | Reserved by CIP for future extensions. |
| D0 ~ F9 | Reserved for Object Class specific errors | This range of error codes is to be used to indicate Object Class specific errors. |
| FA | Error in Function Call | Detected a CIP error in Function. |
| FB | Error from Lower Level(CIP) | Detected an error from lower level (CIP). |
| FC | Error from Lower Level(NET) | Detected an error from lower level (NET). |
| FD | Error from Lower Level(EPIC) | Detected an error from lower level (EPIC). |
| FE | Error from Lower Level(TCP) | Detected an error from lower level (TCP). |
| FF | Reserved for Object Class specific error | This error code is to be used to indicate Object Class specific errors. |

11-4. CIP Extended Status Code

Status Codes may be present in the General Status and the Extended Status of an Error Response message.

11-4-1. Connection Manager Object Instance Extended Status Code

The error codes are returned with the response to a Connection Manager Service Request that resulted in an error. These error codes shall be used to help diagnose the problem with a Service Request. The error code shall be split into an 8 bit general status and one or more 8/16-bit words of extended status.

Codes in the gray area aren't available NCW-3DHIP.

(1) General Status Code: 01h (connection failure)

(1/3)

| Extended Status Code (in hex) | Description of Status |
|-------------------------------|---|
| 0100 | Connection in use or duplicate Forward Open |
| 0101 - 0102 | Reserved |
| 0103 | Transport Class and trigger combination not supported |
| 0104 - 0105 | Reserved |
| 0106 | Ownership conflict |
| 0107 | Target connection not found |
| 0108 | Invalid network connection parameter |
| 0109 | Invalid connection size |
| 010A - 010F | Reserved |
| 0110 | Target for connection not configured |
| 0111 | RPI not supported. |
| 0112 | RPI value not acceptable |
| 0113 | Out of connections |
| 0114 | Vender ID or product code mismatch |
| 0115 | Device type mismatch |
| 0116 | Revision mismatch |
| 0117 | Invalid produced or consumed application path |
| 0118 | Invalid or inconsistent configuration application path |
| 0119 | Non-listen only connection not opened |
| 011A | TARGET object out of connections |
| 011B | The Production Inhibit Time is greater than the RPI |
| 011C | Transport class not supported |
| 011D | Target to originator production trigger not supported |
| 011E | Direction not supported |
| 011F | Invalid originator to target network connection fixvar |
| 0120 | Invalid target to originator network connection fixvar |
| 0121 | Invalid originator to target network connection priority |
| 0122 | Invalid target to originator network connection priority |
| 0123 | Invalid originator to target network connection type |
| 0124 | Invalid target to originator network connection type |
| 0125 | Invalid originator to target network connection redundant_owner |
| 0126 | Invalid configuration size |

| Extended Status Code (in hex) | Description of Status |
|-------------------------------|---|
| 0127 | Invalid originator to target network connection size |
| 0128 | Invalid target to originator network connection size |
| 0129 | Invalid configuration application path |
| 012A | Invalid consuming application path |
| 012B | Invalid producing application path |
| 012C | Configuration symbol does not exist |
| 012D | Consuming symbol does not exist |
| 012E | Producing symbol does not exist |
| 012F | Inconsistent application path combination |
| 0130 | Inconsistent consume data format |
| 0131 | Inconsistent produce data format |
| 0132 | Null forward open function not supported |
| 0133 | Connection timeout multiplier not acceptable |
| 0134 - 0202 | Reserved |
| 0203 | Connection timed out |
| 0204 | Unconnected request timed out |
| 0205 | Parameter error in unconnected request service |
| 0206 | Message too large for unconnected_Send service |
| 0207 | Unconnected acknowledge without reply |
| 0208 - 0300 | Reserved |
| 0301 | No buffer memory available (Connection buffer memory shortage) |
| 0302 | Network bandwidth not available for data |
| 0303 | No consumed connection ID filter available |
| 0304 | Not configured to send scheduled priority data |
| 0305 | Schedule signature mismatch |
| 0306 | Schedule signature validation not possible |
| 0307 - 0310 | Reserved |
| 0311 | Port not available |
| 0312 | Link address not valid |
| 0313 - 0314 | Reserved |
| 0315 | Invalid segment in connection path |
| 0316 | Forward close service connection path mismatch |
| 0317 | Scheduling not specified |
| 0318 | Link address to self invalid |
| 0319 | Secondary resources unavailable |
| 031A | Rack connection already established |
| 031B | Module connection already established |
| 031C | Miscellaneous (This extended status is returned when no other extended status code applies for a connection related error.) |
| 031D | Redundant connection mismatch |
| 031E | No more user configurable link consumer resources available in the producing module |
| 031F | No user configurable link consumer resources configured in the producing module |
| 0320 | Connection is forbidden |
| 0800 | Network link in path to module is offline |
| 0801 - 080F | Reserved |

| Extended Status Code (in hex) | Description of Status |
|-------------------------------|--|
| 0810 | No target application data available |
| 0811 | No originator application data available |
| 0812 | Node address has changed since the network was scheduled |
| 0813 | Not configured for off-subnet multicast |
| 0814 | Invalid produce / Consume data format |
| 0815 - FCFF | Reserved |
| FD00 - FFFF | Do not use |

11-4-2. Extended status codes for protocol stack (communication control part)

The error codes indicate the response to the communication control part including CIP.

These error codes shall be used to help diagnose the problem with a Service Request.

The error code shall be split into an 8-bit general status and one or more 8-bit words of extended status.

(1) General Status Code: FBh (network action error)

| Extended Status Code (in hex) | Description of Status |
|-------------------------------|---|
| 01 | CIP IO FORWARD OPEN TARGET to originator action |
| 02 | Invalid socket address |
| 03 | Invalid originator to target network parameter |
| 04 | Invalid target to originator network parameter |
| 05 | Invalid UDP port |
| 06 | Invalid multicast JOIN (invalid muticast address) |
| 07 | Unequipped CIP IO packet (lack of resource) |
| 08 | Unequipped CIP IO producer |
| 09 | Unequipped CIP IO producer |
| 0A | Lack of the CIP resource |
| 0B | CIP IO timeout action |
| 0C | CIP IO close action |
| 0D | CIP IO stop action |
| 0E | CIP adapter stop action |

11-5. NCW-3DHIP Indicator

11-5-1. 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 | Self-test | MS/NS indicators alternately blink each 0.25s. |
| OFF | OFF | No power | The power doesn't supply to NCW-3DHIP. - Check wirings of the power supply terminal block of NCW-3DHIP. - Check that the power voltage is within the range of specification. - Check whether the power supply capacities are enough or not. |
| Flashing Green | OFF | No IP address | The converter cannot get a valid IP address. (This error is detected only when the automatic IP address setting is selected.) Check the BOOTP or DHCP server operates in the network system. |
| Flashing Red | — | Major Recoverable Fault | The sensor error (SE) occurred. For more details, refer to "11-5-3". |
| Red | — | Major Unrecoverable Fault | NCW-3DHIP 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 converter. |
| Green | Flashing Green | No connections | Communication is available, but a connection is not established. |
| Green | Flashing Red | Connection timeout | Detects one or more connection is timeout during the communication. - The communication band width of the whole network system might be lack. Reallocate the communication band width of the whole network system including NCW-3DHIP RPI setting by the configuration tool. - Irregular communication interrupt might have occurred. Investigate a conceivable cause in the system. |
| Green | Red | Duplicate IP address | The IP address is duplicated in the network. |

11-5-2. Link status indicator (L/A1·L/A2)

The Link Status indicator (L/A1, L/A2) monitors communication state.

L/A1: Monitors the Ethernet port 1 state.

L/A2: Monitors 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. |

11-5-3. 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-3DHIP. - Check wirings of the power supply terminal block of NCW-3DHIP. - 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-3DHIP operation is abnormal. Restart the power supply. Hardware might have a malfunction if the operation is not back to normal. Thus, replace NCW-3DHIP. |
| ON | OFF | ON | — | Memory Error | A parameter memory for NCW-3DHIP is abnormal. Restart the power supply. Hardware might have a malfunction if memory error occurred repeatedly. Thus, replace NCW-3DHIP. |
| 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. - A sensor cable is severed. - A parameter (Axis valid / Axis Unavailable) whose axis isn't used is set to "0: valid". - NCW-3DHIP has a malfunction. - ABSOCODER has a malfunction. Check the following content. - Check whether the sensor connector is connected or not. - Check whether a sensor cable is severed or not. - Check the unused axis parameter. Remove the error, and execute the error clear from the Ethernet/IP scanner. Hardware might have a malfunction if errors occurred repeatedly. Thus, replace the converter. |

11-6. Reset Service

The state of NCW-3DHIP (slave) can be reset by using a configuration tools or EtherNet/IP scanner (master) if EhterNet/IP communication is available.

Use Reset (ID: 0x05) in an Instance Service (InstanceID: 0x01) of the Identity object (ClassID: 0x01), and the device can be reset.

The following parameter can be specified when resetting.

| Parameter | Description |
|-----------|---|
| 0 | Restart |
| 1 | All NCW-3DHIP parameters' setting is redesignated to initial values (factory setting), and restart. |
| 2 | All NCW-3DHIP parameters' setting is redesignated to initial values (factory setting) except communication LINK parameter, and restart. |

12. STORE OF MAINTENANCE INFORMATION

NCW-3DHIP can store maintenance information to the Info Maintenance object (Class ID: 0xC07).

The maintenance information should be store if it is required.

Stored information can be checked when doing periodic maintenance NCW-3DHIP or having an error.

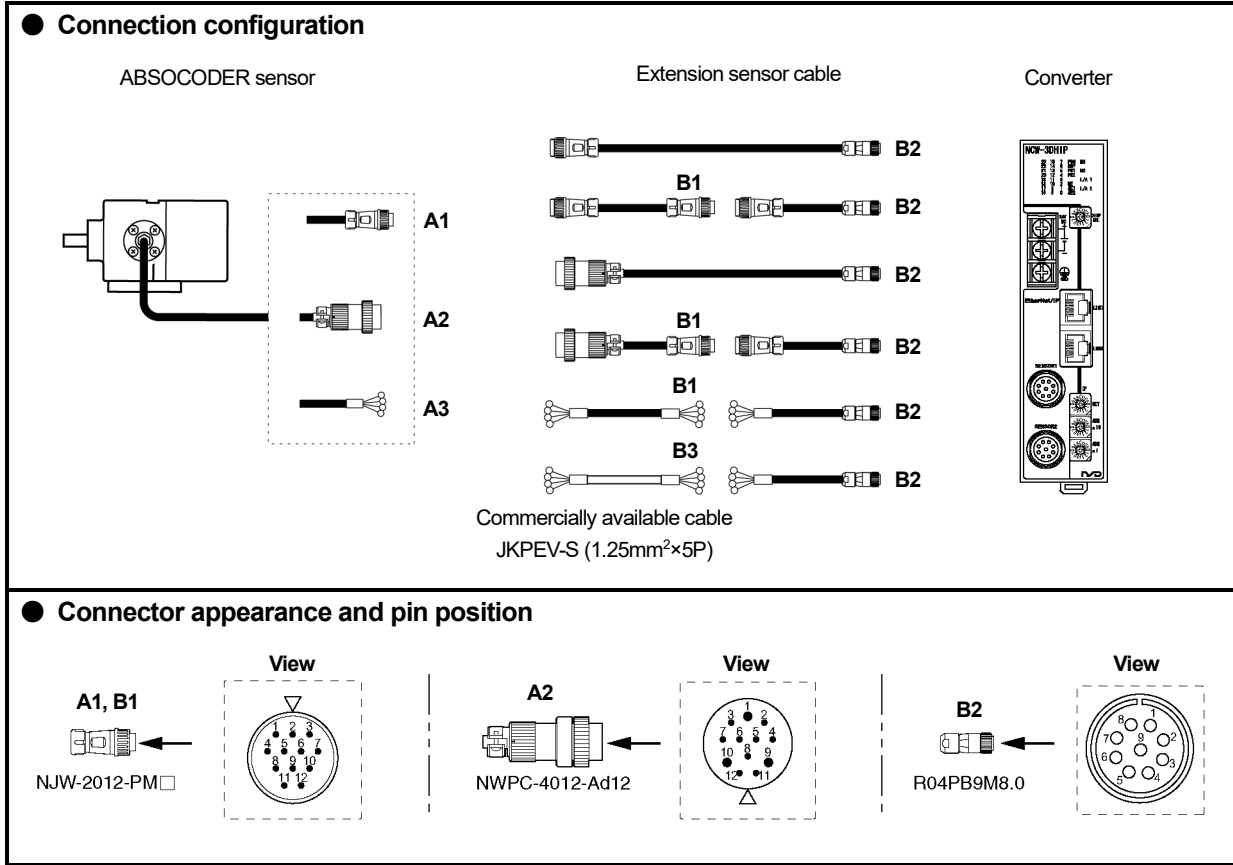
For more details, refer to "APPENDIX 2-12. Info Maintenance Object (Class ID: 0xC7)".

| No. | Name | Data Type | Description |
|-----|-------------------------|-----------|---|
| 1 | Power Distribution Time | UDINT | NCW-3DHIP cumulative energization time can be check. Unit: sec |
| 2 | Function | UDINT | Stores a function code. |
| | | STRING | Stores a function comment. Max.character No.: 58 |
| 3 | Location | UDINT | Stores an installation location code. |
| | | STRING | Stores an installation location comment. Max.character No.: 58 |
| 4 | Installation Date | UDINT | Stores an installation date code. |
| | | STRING | Stores an installation date comment. Max.character No.: 58 |
| 5 | Descriptor 1 | UDINT | Stores a descriptor 1 code. |
| | | STRING | Stores a descriptor 1 comment. Max.character No.: 58 |
| 6 | Descriptor 2 | UDINT | Stores a descriptor 2 code. |
| | | STRING | Stores a descriptor 2 comment. Max.character No.: 58 |
| 7 | Security | UDINT | Stores a security code. |
| | | STRING | Stores a security name comment. Max. character No.:58 |

13. ABSOCODER SENSOR CHECK LIST

● **Applicable ABSOCODER sensor models**

VRE-P061, VRE-P074, VRE-P097, VRE-P101



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

| Check position | | | | | | Signal names | Standard coil resistance [Ω] | |
|----------------|--------------|---------|--------------|-----------------|--------------|--------------|---------------------------------------|----------------------------------|
| A1, A2, A3, B1 | | B2 | | B3 | | | VRE-P061 | VRE-P074 VRE-P097 VRE-P101 |
| Pin No. | Wiring color | Pin No. | Wiring color | Wire No. (pair) | Wiring color | | | |
| 1 | Brown | 1 | Brown | 1 | White | SIN+ | 219 to 229 | 227 to 243 |
| 2 | Red | 2 | Red | | Black | SIN- | | |
| 3 | Orange | 3 | Orange | 2 | White | -COS+ | 219 to 229 | 227 to 243 |
| 4 | Yellow | 4 | Yellow | | Black | -COS- | | |
| 5 | Green | 5 | Green | 3 | White | OUT+ | 3.5 to 5.5 | 28.5 to 40.5 |
| 6 | Blue | 6 | Blue | | Black | OUT- | | |
| 7 | - | 7 | Violet | 4 | White | - | | |
| 8 | - | 8 | Gray | | Black | - | | |
| 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, shield | ∞ |
| Between orange and yellow | | Between orange and green, shield | |
| Between green and blue | | Between green 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, shield | 10MΩ or more |
| Between orange and green, shield | |
| Between green 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. Measures for EMC Compliance

Describes measures for EMC compliance when testing the compatibility verification.

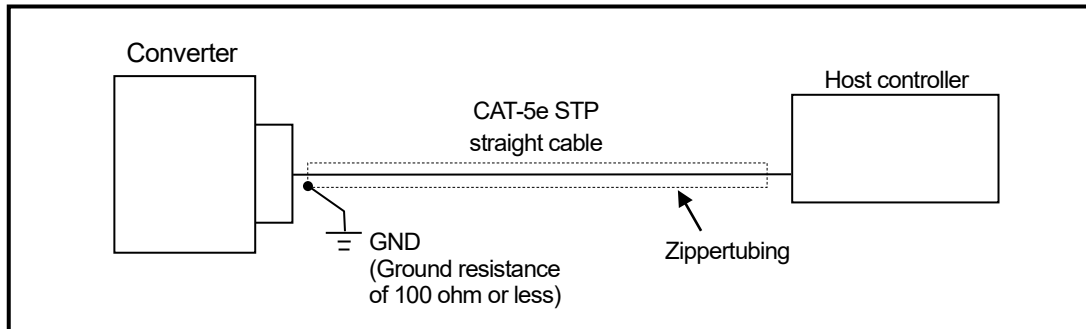
●LAN cable (Communication cable for EtherNet/IP)

A CAT-5e STP straight cable was used as the LAN cable.

The LAN cable was covered with the shielded zippertubing, and the shield was grounded.

Zippertubing

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



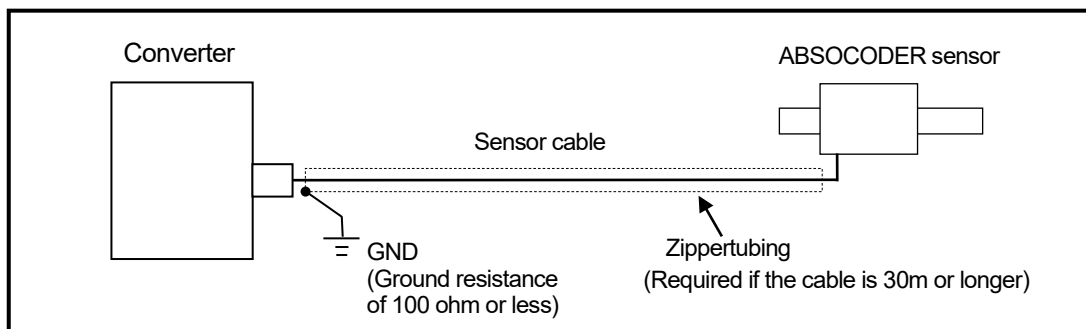
14-5. Restrictions

●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 20 ϕ | ZIPPERTUBING (JAPAN), LTD. |



[Reference]

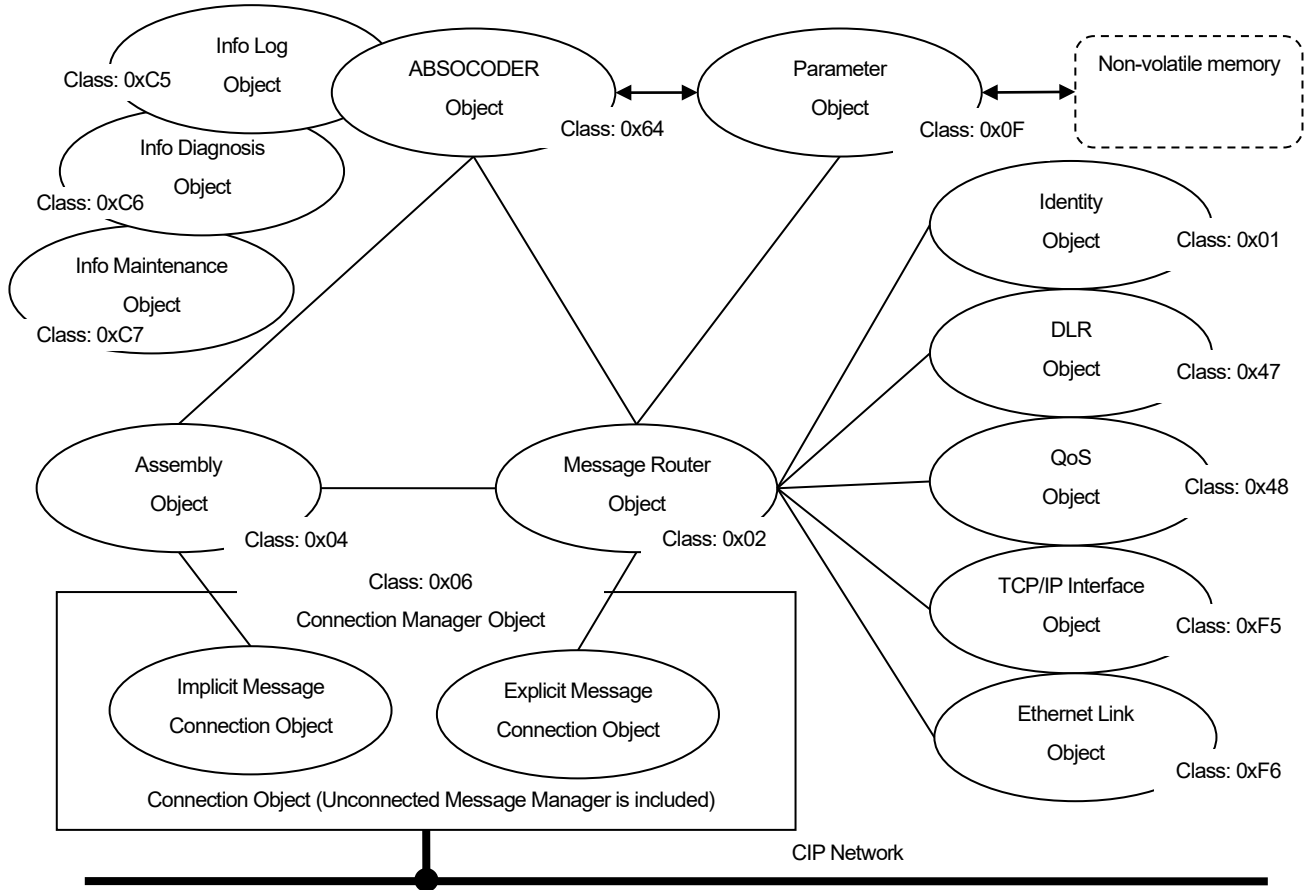
It might be improved when the clamp filter is installed to the power supply or sensor cable when it operates faultily by the influence from the peripheral devices.

Clamp Filter

| Mounting location | Clamp filter model | Manufacturer |
|--|---|--------------|
| - Power supply cable - Sensor cable | ZCAT2032-0930 (inner dimensions: $\phi 9$) | TDK |

APPENDIX 1. CIP OBJECT MODEL

The following figure illustrates the CIP object model of the NCW-3DHIP.



| Class Code | Object Name | Description | Number of Instances |
|------------|--------------------|---|---------------------|
| 0x01 | Identity | Provides NCW-3DHIP node information on the network. | 1 |
| 0x02 | Message Router | All communication messages are processed, and then they are sorted to proper objects. | 1 |
| 0x04 | Assembly | The object is assembled for ABOSOCODER. I/O message data for the NCW-3DHIP's Exclusive-Owner connection can be read or written. | 3 |
| 0x06 | Connection Manager | Manages the communication status. | 1 |
| 0x0F | Parameter | Provides parameter information of NCW-3DHIP. | 8 |
| 0x47 | DLR | Provides the ring topology information | 1 |
| 0x48 | QoS | Provides relative priority setting information of different transmission traffics | 1 |
| 0x64 | ABSOCODER | Provides parameters and status information of ABSOCODER. | 2 |
| 0xC5 | Info Log | Provides NCW-3DHIP operation and error histories (max.32) | 1 |
| 0xC6 | Info Diagnosis | Provides NCW-3DHIP diagnosis information. | 1 |
| 0xC7 | Info Maintenance | Provides NCW-3DHIP maintenance information. | 1 |
| 0xF5 | TCP/IP Interface | Provides Ethernet TCP/IP interface information. | 1 |
| 0xF6 | Ethernet Link | Provides Ethernet interface information. | 2 |

APPENDIX 2. DETAILS OF CIP OBJECT

Data handled by NCW-3DHIP supporting Ethernet / IP is managed by CIP object.
 Access the CIP object using various services that are installed in each CIP object.

APPENDIX 2-1. Identity Object (Class ID: 0x01)

It holds NCW - 3DHIP node information on the network.
 The specification of the Identity object is shown below.
 Identity object has one instance.

Class Attribute (Class ID: 0x01)

| ID | Name | Access | | Data Type | Description |
|------|---------------------|--------|-----|-----------|-------------|
| | | Get | Set | | |
| 0x01 | Revision | ○ | - | UINT | 1 |
| 0x02 | Max Instance | ○ | - | UINT | 1 |
| 0x03 | Number of Instances | ○ | - | UINT | 1 |

Class Service (Class ID: 0x01, Instance ID: 0x00)

| ID | Name | Description | | | | | | | | | | |
|------|---------------------------------|---|----|-------------|------|--------------|------|------------------|------|---------------------------------|------|---------------------------------|
| 0x01 | Get_Attribute_All | Read out all attribute values from NCW-3DHIP. Responded Attribute information for the request is following; <table border="1" style="margin-left: 20px;"> <thead> <tr> <th>ID</th> <th>Description</th> </tr> </thead> <tbody> <tr> <td>0x01</td> <td>1 (Revision)</td> </tr> <tr> <td>0x02</td> <td>1 (Max Instance)</td> </tr> <tr> <td>0x06</td> <td>0 (Not available for NCW-3DHIP)</td> </tr> <tr> <td>0x07</td> <td>0 (Not available for NCW-3DHIP)</td> </tr> </tbody> </table> | ID | Description | 0x01 | 1 (Revision) | 0x02 | 1 (Max Instance) | 0x06 | 0 (Not available for NCW-3DHIP) | 0x07 | 0 (Not available for NCW-3DHIP) |
| ID | Description | | | | | | | | | | | |
| 0x01 | 1 (Revision) | | | | | | | | | | | |
| 0x02 | 1 (Max Instance) | | | | | | | | | | | |
| 0x06 | 0 (Not available for NCW-3DHIP) | | | | | | | | | | | |
| 0x07 | 0 (Not available for NCW-3DHIP) | | | | | | | | | | | |
| 0x0E | Get_Attribute_Single | Read out one attribute value from NCW-3DHIP. | | | | | | | | | | |

Instance Attribute (Class ID: 0x01, Instance ID: 0x01)

| ID | Name | Access | | Data Type | Description |
|------|---------------|--------|-----|--------------|---|
| | | Get | Set | | |
| 0x01 | Vendor ID | ○ | — | UINT | Indicates the product vendor ID. (230: NSD Corporation) |
| 0x02 | Device Type | ○ | — | UINT | Indicates the product device type. (43: Generic Device) |
| 0x03 | Product Code | ○ | — | UINT | Indicates the product code. (30101) |
| 0x04 | Revision | ○ | — | USINT | Indicates the product major revision. |
| | | | | USINT | Indicates the product minor revision. |
| 0x05 | Status | ○ | — | WORD | Indicates the product status. *1: Please refer to the next page for definition of Bit. |
| 0x06 | Serial Number | ○ | — | UDINT | Indicates the product serial number. |
| 0x07 | Product Name | ○ | — | SHORT_STRING | Indicates the product name. (NCW-3DHIPV1R) |

Instance Service (Class ID: 0x01, Instance ID: 0x01)

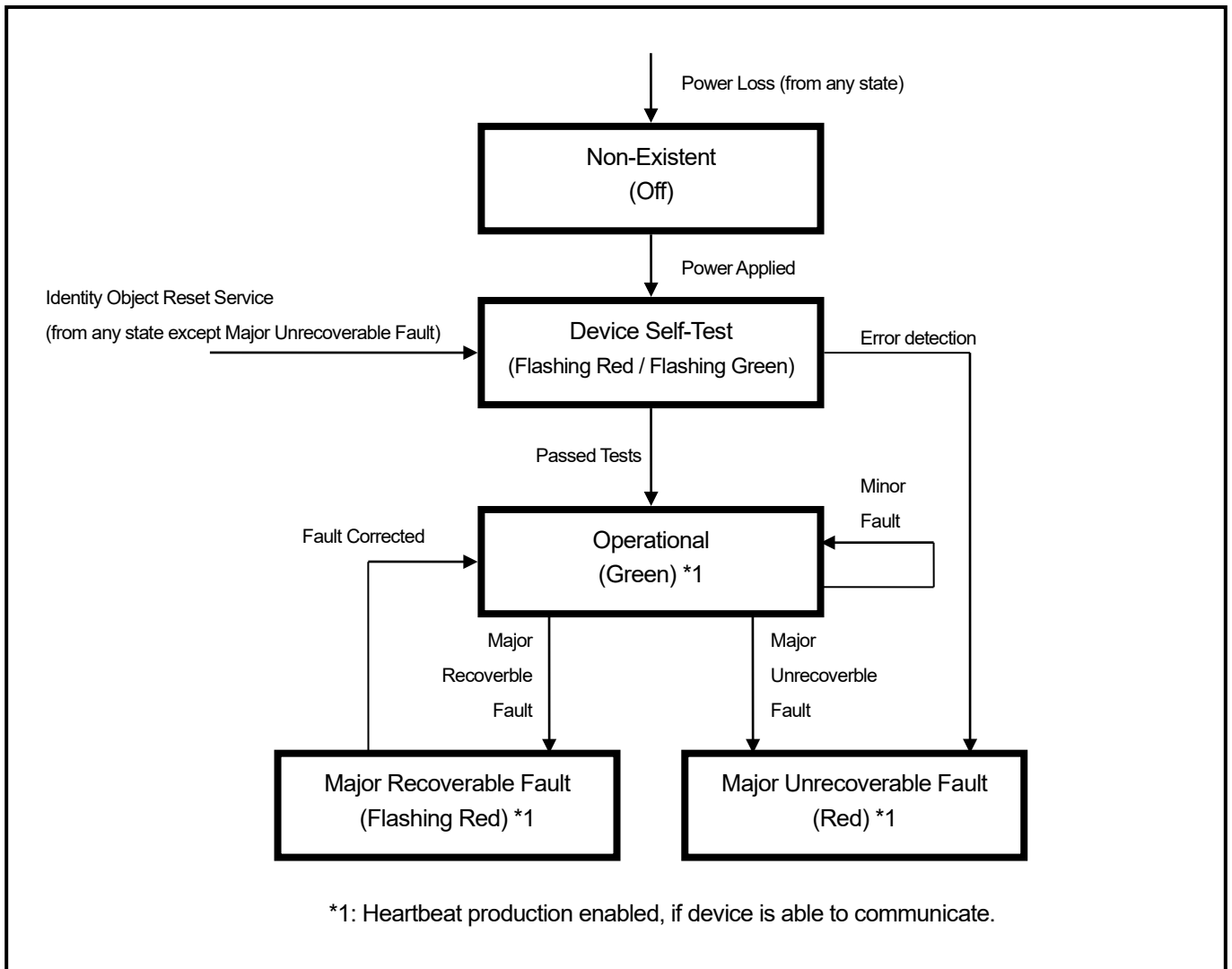
| ID | Name | Description |
|------|----------------------|--|
| 0x01 | Get_Attribute_All | Read out all attribute values from NCW-3DHIP. |
| 0x05 | Reset | Reset service The Reset service parameters are the following; 0: Restart 1: All NCW-3DHIP parameters' setting is redesignated to initial values (factory setting), and restart. 2: All NCW-3DHIP parameters' setting is redesignated to initial values (factory setting) except communication LINK parameter, and restart. |
| 0x0E | Get_Attribute_Single | Read out one attribute value from NCW-3DHIP. |

*1 : Instance Attribute 0x05: Bit definition of Status

| Bit | Name | Definition | | | | | | | | | | | | | | | | | | | | |
|-----------|---|---|-----------|-------------|-------|-------------------------|-------|-------------------------------------|-------|--------------------------------|-------|--------------------------------|-------|---|-------|---|-------|---|-------|----------|-------|----------|
| 0 | Owned | FALSE: Indicates NCW-3DHIP has no owner. TRUE: Indicates NCW-3DHIP has an owner. | | | | | | | | | | | | | | | | | | | | |
| 1 | — | Reserved (fixed at 0) | | | | | | | | | | | | | | | | | | | | |
| 2 | Configured | FALSE: Indicates that NCW-3DHIP is set initial (factory setting) values. TRUE: Indicates that NCW-3DHIP is changed from initial (factory setting) values. (The communication setting isn't included.) | | | | | | | | | | | | | | | | | | | | |
| 3 | — | Reserved (fixed at 0) | | | | | | | | | | | | | | | | | | | | |
| 4-7 | Extended Device Status | Indicates current NCW-3DHIP status. This attribute value is changed depending on the device state. <table border="1" data-bbox="603 1146 1426 1554"> <thead> <tr> <th>Bit value</th> <th>Description</th> </tr> </thead> <tbody> <tr> <td>0000b</td> <td>Self-Testing or Unknown</td> </tr> <tr> <td>0010b</td> <td>At least one faulted I/O connection</td> </tr> <tr> <td>0011b</td> <td>No I/O connections established</td> </tr> <tr> <td>0100b</td> <td>Non-Volatile Configuration bad</td> </tr> <tr> <td>0101b</td> <td>Major Fault – either bit 10 or bit 11 is true</td> </tr> <tr> <td>0110b</td> <td>At least one I/O connection in run mode</td> </tr> <tr> <td>0111b</td> <td>At least one I/O connection established, all in idle mode</td> </tr> <tr> <td>1000b</td> <td>Reserved</td> </tr> <tr> <td>1001b</td> <td>Reserved</td> </tr> </tbody> </table> | Bit value | Description | 0000b | Self-Testing or Unknown | 0010b | At least one faulted I/O connection | 0011b | No I/O connections established | 0100b | Non-Volatile Configuration bad | 0101b | Major Fault – either bit 10 or bit 11 is true | 0110b | At least one I/O connection in run mode | 0111b | At least one I/O connection established, all in idle mode | 1000b | Reserved | 1001b | Reserved |
| Bit value | Description | | | | | | | | | | | | | | | | | | | | | |
| 0000b | Self-Testing or Unknown | | | | | | | | | | | | | | | | | | | | | |
| 0010b | At least one faulted I/O connection | | | | | | | | | | | | | | | | | | | | | |
| 0011b | No I/O connections established | | | | | | | | | | | | | | | | | | | | | |
| 0100b | Non-Volatile Configuration bad | | | | | | | | | | | | | | | | | | | | | |
| 0101b | Major Fault – either bit 10 or bit 11 is true | | | | | | | | | | | | | | | | | | | | | |
| 0110b | At least one I/O connection in run mode | | | | | | | | | | | | | | | | | | | | | |
| 0111b | At least one I/O connection established, all in idle mode | | | | | | | | | | | | | | | | | | | | | |
| 1000b | Reserved | | | | | | | | | | | | | | | | | | | | | |
| 1001b | Reserved | | | | | | | | | | | | | | | | | | | | | |
| 8 | Minor Recoverable Fault | FALSE: - TRUE: Indicates that a minor fault (recoverable fault) is detected. | | | | | | | | | | | | | | | | | | | | |
| 9 | Minor Unrecoverable Fault | FALSE: - TRUE: Indicates that a minor fault (unrecoverable fault) is detected. | | | | | | | | | | | | | | | | | | | | |
| 10 | Major Recoverable Fault | FALSE: - TRUE: Indicates that a major fault (recoverable fault) is detected. | | | | | | | | | | | | | | | | | | | | |
| 11 | Major Unrecoverable Fault | FALSE: - TRUE: Indicates that a major fault (unrecoverable fault) is detected. | | | | | | | | | | | | | | | | | | | | |

● Identity (ClassID: 0x01) State transition diagram of object

The Identity object defines the NCW-3DHIP's behavior.



The state transition diagram of the Identity object includes the following events.

- **Minor fault:** A fault classified as either a Minor Unrecoverable Fault or a Minor Recoverable Fault has occurred.
- **Major Recoverable Fault:** An event classified as Major Recoverable Fault has occurred.
- **Major Unrecoverable Fault:** An event classified as a Major Unrecoverable Fault has occurred.

APPENDIX 2-2. Message Router Object (Class ID: 0x02)

All communication messages are processed, and then they are sorted to proper objects.

Following tables indicate specifications of the Message Router object.

The Message Router object has one instance; however, all attribute isn't opened to the public.

Class Attribute (Class ID: 0x02)

| ID | Name | Access | | Data Type | Description |
|------|---------------------------------------|--------|-----|-----------|-------------|
| | | Get | Set | | |
| 0x01 | Revision | — | — | UINT | — |
| 0x04 | Optional attribute list | — | — | UINT | — |
| | | | | UINT[] | — |
| 0x05 | Optional service list | — | — | UINT | — |
| | | | | UINT[] | — |
| 0x06 | Maximum ID Number Class Attributes | — | — | UINT | — |
| 0x07 | Maximum ID Number Instance Attributes | — | — | UINT | — |

Instance Attribute (Class ID: 0x02, Instance ID: 0x01)

| ID | Name | Access | | Data Type | Description |
|------|--------------------|--------|-----|-----------|-------------|
| | | Get | Set | | |
| 0x01 | Object List | — | — | UINT | — |
| | | | | UINT[] | — |
| 0x02 | Number Available | — | — | UINT | — |
| 0x03 | Number active | — | — | UINT | — |
| 0x04 | Active Connections | — | — | UINT[] | — |

APPENDIX 2-3. Assembly Object (Class ID: 0x04)

This object is assembled for ABSOCODER.

I/O message data for the NCW-3DHIP's Exclusive-Owner connection can be read or written.

Following tables indicate specifications of the Assembly object.

NCW-3DHIP has the following Assembly object instances.

0x65: For Exclusive-Owner (Input) Connection

0x66: For Exclusive-Owner (Output) Connection

0x67: For Exclusive-Owner (Configuration) Connection

Class Attribute (Class ID: 0x04)

| ID | Name | Access | | Data Type | Description |
|------|---------------------|--------|-----|-----------|-------------|
| | | Get | Set | | |
| 0x01 | Revision | ○ | — | UINT | 2 |
| 0x02 | Max Instance | ○ | — | UINT | 0x67(103) |
| 0x03 | Number of Instances | ○ | — | UINT | 3 |

Class Service (Class ID: 0x04, Instance ID: 0x00)

| ID | Name | Description |
|------|----------------------|--|
| 0x0E | Get_Attribute_Single | Read out one attribute value from NCW-3DHIP. |

Instance Attribute (Class ID: 0x04, Instance ID: 0x65)

| ID | Name | Access | | Data Type | Description |
|------|------|--------|-----|-----------|--|
| | | Get | Set | | |
| 0x03 | Data | ○ | — | USINT[28] | Indicates the Input (Exclusive-Owner) data. For more details, refer to "section 9-9". *: The general status code "0x0E (not settable) will be returned to the EtherNet/IP master if the Set operation is done. |

Instance Attribute (Class ID: 0x04, Instance ID: 0x66)

| ID | Name | Access | | Data Type | Description |
|------|------|--------|-----|-----------|--|
| | | Get | Set | | |
| 0x03 | Data | ○ | ○ | USINT[16] | Indicates the Output (Exclusive-Owner) data. For more details, refer to "section 9-9". *: PRESET or ERRCLR can be operated by Output data format except during I/O communication if the Set operation is done. The general status code "0x0F (Privilege violation) will be returned to the EtherNet/IP master during I/O communication. |

Instance Attribute (Class ID: 0x04, Instance ID: 0x67)

| ID | Name | Access | | Data Type | Description |
|------|------|--------|-----|-----------|---|
| | | Get | Set | | |
| 0x03 | Data | ○ | — | USINT[0] | Indicates the Configuration (Exclusive-Owner) data. *: The general status code "0x0E (not settable) will be returned to the EtherNet/IP master if the Set operation is done. |

Instance Service (Class ID: 0x04, Instance ID: 0x65,0x66,0x67)

| ID | Name | Description |
|------|----------------------|--|
| 0x0E | Get_Attribute_Single | Read out one attribute value from NCW-3DHIP. |
| 0x10 | Set_Attribute_Single | Write one attribute value to NCW-3DHIP. |

APPENDIX 2-4. Connection Manager Object (Class ID: 0x06)

The Connection Manager object manages the communication status, and has one instance. Following tables indicate specifications of the Connection Manager object.

Class Attribute (Class ID: 0x06)

| ID | Name | Access | | Data Type | Description |
|------|---------------------|--------|-----|-----------|-------------|
| | | Get | Set | | |
| 0x01 | Revision | ○ | — | UINT | 1 |
| 0x02 | Max Instance | ○ | — | UINT | 1 |
| 0x03 | Number of Instances | ○ | — | UINT | 1 |

Class Service (Class ID: 0x06, Instance ID: 0x00)

| ID | Name | Description | | | | | | | | | | |
|------|---------------------------------|--|----|-------------|------|--------------|------|------------------|------|---------------------------------|------|---------------------------------|
| 0x01 | Get_Attribute_All | <p>Read out all attribute values from NCW-3DHIP. Responded Attribute information for the request is following;</p> <table border="1"> <thead> <tr> <th>ID</th> <th>Description</th> </tr> </thead> <tbody> <tr> <td>0x01</td> <td>1 (Revision)</td> </tr> <tr> <td>0x02</td> <td>1 (Max Instance)</td> </tr> <tr> <td>0x06</td> <td>0 (Not available for NCW-3DHIP)</td> </tr> <tr> <td>0x07</td> <td>0 (Not available for NCW-3DHIP)</td> </tr> </tbody> </table> | ID | Description | 0x01 | 1 (Revision) | 0x02 | 1 (Max Instance) | 0x06 | 0 (Not available for NCW-3DHIP) | 0x07 | 0 (Not available for NCW-3DHIP) |
| ID | Description | | | | | | | | | | | |
| 0x01 | 1 (Revision) | | | | | | | | | | | |
| 0x02 | 1 (Max Instance) | | | | | | | | | | | |
| 0x06 | 0 (Not available for NCW-3DHIP) | | | | | | | | | | | |
| 0x07 | 0 (Not available for NCW-3DHIP) | | | | | | | | | | | |
| 0x0E | Get_Attribute_Single | Read out one attribute value from NCW-3DHIP. | | | | | | | | | | |

Instance Attribute (Class ID: 0x06, Instance ID: 0x01)

| ID | Name | Access | | Data Type | Description |
|------|-----------------------|--------|-----|-----------|---|
| | | Get | Set | | |
| 0x01 | Open Requests | ○ | — | UINT | Number of Forward Open service requests received. |
| 0x02 | Open Format Rejects | ○ | — | UINT | Number of Forward Open service requests which were rejected due to bad format. |
| 0x03 | Open Resource Rejects | ○ | — | UINT | Number of Forward Open service requests which were rejected due to lack of resources. |
| 0x04 | Open Other Rejects | ○ | — | UINT | Number of Forward Open service requests which were rejected for reasons other than bad format or lack of resources. |
| 0x05 | Close Requests | ○ | — | UINT | Number of Forward Close service requests received. |
| 0x06 | Close Format Requests | ○ | — | UINT | Number of Forward Close service requests which were rejected due to bad format. |
| 0x07 | Close Other Requests | ○ | — | UINT | Number of Forward Close service requests which were rejected for reasons other than bad format. |
| 0x08 | Connection Timeouts | ○ | — | UINT | Total number of connection timeouts that have occurred in connections controlled by the Connection Manager. |

Instance Service (Class ID: 0x06, Instance ID: 0x01)

| ID | Name | Description |
|------|----------------------|---|
| 0x01 | Get_Attribute_All | Read out all attribute values from NCW-3DHIP. |
| 0x0E | Get_Attribute_Single | Read out one attribute value from NCW-3DHIP. |
| 0x4E | Forward_Close | Close the connection. |
| 0x54 | Forward_Open | Open the connection. |

APPENDIX 2-5. Parameter Object (Class ID: 0x0F)

Parameter object provides parameter information of NCW-3DHIP.

Following tables indicate specifications of the Parameter object.
This is objects for parameters which are used with NCW-3DHIP.

Class Attribute (Class ID: 0x0F)

| ID | Name | Access | | Data Type | Description | | | | | | | | | | |
|------|--|--------|-----|-----------|---|-----|-------------|---|---|---|--|---|--|---|--|
| | | Get | Set | | | | | | | | | | | | |
| 0x01 | Revision | ○ | — | UINT | 1 | | | | | | | | | | |
| 0x02 | Max Instance | ○ | — | UINT | 0x08(8) | | | | | | | | | | |
| 0x03 | Number of Instances | ○ | — | UINT | 8 | | | | | | | | | | |
| 0x08 | Parameter Class Descriptor | ○ | — | WORD | Indicates the following parameter characteristics (value: 0x000B). <table border="1" data-bbox="887 745 1465 1301"> <thead> <tr> <th>Bit</th> <th>Description</th> </tr> </thead> <tbody> <tr> <td>0</td> <td><u>Supports Parameter Instances</u> 1: Individual Parameter instances are supported.</td> </tr> <tr> <td>1</td> <td><u>Supports Full Attributes</u> 1: All Full Parameter Attributes are supported.</td> </tr> <tr> <td>2</td> <td><u>Must do non-volatile storage Save command</u> 0: Do not have to execute non-volatile storage save command. (It automatically executes inside of NCW-3DHIP.)</td> </tr> <tr> <td>3</td> <td><u>Param are stored in Non-Volatile Storage</u> 1: Parameters are stored in non-volatile storage.</td> </tr> </tbody> </table> | Bit | Description | 0 | <u>Supports Parameter Instances</u> 1: Individual Parameter instances are supported. | 1 | <u>Supports Full Attributes</u> 1: All Full Parameter Attributes are supported. | 2 | <u>Must do non-volatile storage Save command</u> 0: Do not have to execute non-volatile storage save command. (It automatically executes inside of NCW-3DHIP.) | 3 | <u>Param are stored in Non-Volatile Storage</u> 1: Parameters are stored in non-volatile storage. |
| Bit | Description | | | | | | | | | | | | | | |
| 0 | <u>Supports Parameter Instances</u> 1: Individual Parameter instances are supported. | | | | | | | | | | | | | | |
| 1 | <u>Supports Full Attributes</u> 1: All Full Parameter Attributes are supported. | | | | | | | | | | | | | | |
| 2 | <u>Must do non-volatile storage Save command</u> 0: Do not have to execute non-volatile storage save command. (It automatically executes inside of NCW-3DHIP.) | | | | | | | | | | | | | | |
| 3 | <u>Param are stored in Non-Volatile Storage</u> 1: Parameters are stored in non-volatile storage. | | | | | | | | | | | | | | |
| 0x09 | Configuration Assembly Instance | ○ | — | UINT | 0x67 | | | | | | | | | | |

Class Service (Class ID: 0x0F, Instance ID: 0x00)

| ID | Name | Description | | | | | | | | | | | | |
|------|---------------------------------|--|----|-------------|------|--------------|------|------------------|------|---------------------------------|------|---------------------------------|------|---|
| 0x01 | Get_Attribute_All | Read out all attribute values from NCW-3DHIP. Attribute information returned in response to a request is as follows. <table border="1" data-bbox="603 1641 1382 1888"> <thead> <tr> <th>ID</th> <th>Description</th> </tr> </thead> <tbody> <tr> <td>0x01</td> <td>1 (Revision)</td> </tr> <tr> <td>0x02</td> <td>1 (Max Instance)</td> </tr> <tr> <td>0x08</td> <td>0 (Not available for NCW-3DHIP)</td> </tr> <tr> <td>0x09</td> <td>0 (Not available for NCW-3DHIP)</td> </tr> <tr> <td>0x0A</td> <td>0</td> </tr> </tbody> </table> | ID | Description | 0x01 | 1 (Revision) | 0x02 | 1 (Max Instance) | 0x08 | 0 (Not available for NCW-3DHIP) | 0x09 | 0 (Not available for NCW-3DHIP) | 0x0A | 0 |
| ID | Description | | | | | | | | | | | | | |
| 0x01 | 1 (Revision) | | | | | | | | | | | | | |
| 0x02 | 1 (Max Instance) | | | | | | | | | | | | | |
| 0x08 | 0 (Not available for NCW-3DHIP) | | | | | | | | | | | | | |
| 0x09 | 0 (Not available for NCW-3DHIP) | | | | | | | | | | | | | |
| 0x0A | 0 | | | | | | | | | | | | | |
| 0x0E | Get_Attribute_Single | Read out one attribute value from NCW-3DHIP. | | | | | | | | | | | | |

Instance Attribute (Class ID: 0x0F, Instance ID: 0x01)

| ID | Name | Access | | Data Type | Description |
|------|-----------------------|--------|-----|------------------|--|
| | | Get | Set | | |
| 0x01 | Parameter Value | o | o | BOOL | Parameter value (Axis-1 parameter :Axis Unavailable) |
| 0x02 | Link Path Size | o | — | USINT | 3 |
| 0x03 | Link Path | o | — | Packed EPATH | "20 64 24 01 30 64" |
| 0x04 | Descriptor | o | — | WORD | 0x0000 |
| 0x05 | Data Type | o | — | EPATH | 0xC1 (Logical boolean) |
| 0x06 | Data Size | o | — | USINT | 1 |
| 0x07 | Parameter Name String | o | — | SHORT_ STRING | 0x10,"Axis-1 Unavailab" |
| 0x08 | Unit String | o | — | SHORT_ STRING | 0x00,"" |
| 0x09 | Help String | o | — | SHORT_ STRING | 0x22,"Axis-1 Parameter - Axis Unavailable" |
| 0x0A | Minimum Value | o | — | BOOL | 0 |
| 0x0B | Maximum Value | o | — | BOOL | 1 |
| 0x0C | Default Value | o | — | BOOL | 0 |
| 0x0D | Scaling Multiplier | o | — | UINT | 1 (Scaling factor) |
| 0x0E | Scaling Divisor | o | — | UINT | 1 (Scaling factor) |
| 0x0F | Scaling Base | o | — | UINT | 1 (Scaling factor) |
| 0x10 | Scaling Offset | o | — | INT | 0 (Scaling factor) |
| 0x11 | Multiplier Link | o | — | UINT | 0 (Scaling factor) |
| 0x12 | Divisor Link | o | — | UINT | 0 (Scaling factor) |
| 0x13 | Base Link | o | — | UINT | 0 (Scaling factor) |
| 0x14 | Offset Link | o | — | UINT | 0 (Scaling factor) |
| 0x15 | Decimal Precision | o | — | USINT | 0 (Number of decimal places of parameter value) |

Instance Attribute (Class ID: 0x0F, Instance ID: 0x02)

| ID | Name | Access | | Data Type | Description |
|------|-----------------------|--------|-----|------------------|---|
| | | Get | Set | | |
| 0x01 | Parameter Value | o | o | BOOL | Parameter value (Axis-1 parameter: Error Clear) |
| 0x02 | Link Path Size | o | — | USINT | 3 |
| 0x03 | Link Path | o | — | Packed EPATH | "20 64 24 01 30 65" |
| 0x04 | Descriptor | o | — | WORD | 0x0000 |
| 0x05 | Data Type | o | — | EPATH | 0xC1 (Logical boolean) |
| 0x06 | Data Size | o | — | USINT | 1 |
| 0x07 | Parameter Name String | o | — | SHORT_ STRING | 0x10,"Axis-1 Error Cle" |
| 0x08 | Unit String | o | — | SHORT_ STRING | 0x00,"" |
| 0x09 | Help String | o | — | SHORT_ STRING | 0x1E,"Axis-1 Parameter - Error Clear" |
| 0x0A | Minimum Value | o | — | BOOL | 0 |
| 0x0B | Maximum Value | o | — | BOOL | 1 |
| 0x0C | Default Value | o | — | BOOL | 0 |
| 0x0D | Scaling Multiplier | o | — | UINT | 1 (Scaling factor) |
| 0x0E | Scaling Divisor | o | — | UINT | 1 (Scaling factor) |
| 0x0F | Scaling Base | o | — | UINT | 1 (Scaling factor) |
| 0x10 | Scaling Offset | o | — | INT | 0 (Scaling factor) |
| 0x11 | Multiplier Link | o | — | UINT | 0 (Scaling factor) |
| 0x12 | Divisor Link | o | — | UINT | 0 (Scaling factor) |
| 0x13 | Base Link | o | — | UINT | 0 (Scaling factor) |
| 0x14 | Offset Link | o | — | UINT | 0 (Scaling factor) |
| 0x15 | Decimal Precision | o | — | USINT | 0 (Number of decimal places of parameter value) |

Instance Attribute (Class ID: 0x0F, Instance ID: 0x03)

| ID | Name | Access | | Data Type | Description |
|------|-----------------------|--------|-----|--------------|--|
| | | Get | Set | | |
| 0x01 | Parameter Value | ○ | ○ | BOOL | Parameter value (Axis-1 parameter: Position Data Increase Direction) |
| 0x02 | Link Path Size | ○ | — | USINT | 3 |
| 0x03 | Link Path | ○ | — | Packed EPATH | "20 64 24 01 30 0C" |
| 0x04 | Descriptor | ○ | — | WORD | 0x0000 |
| 0x05 | Data Type | ○ | — | EPATH | 0xC1 (Logical boolean) |
| 0x06 | Data Size | ○ | — | USINT | 1 |
| 0x07 | Parameter Name String | ○ | — | SHORT_STRING | 0x10,"Axis-1 Direction" |
| 0x08 | Unit String | ○ | — | SHORT_STRING | 0x00,"" |
| 0x09 | Help String | ○ | — | SHORT_STRING | 0x33,"Axis-1 Parameter - Position Data Increase Direction" |
| 0x0A | Minimum Value | ○ | — | BOOL | 0 |
| 0x0B | Maximum Value | ○ | — | BOOL | 1 |
| 0x0C | Default Value | ○ | — | BOOL | 0 |
| 0x0D | Scaling Multiplier | ○ | — | UINT | 1 (Scaling factor) |
| 0x0E | Scaling Divisor | ○ | — | UINT | 1 (Scaling factor) |
| 0x0F | Scaling Base | ○ | — | UINT | 1 (Scaling factor) |
| 0x10 | Scaling Offset | ○ | — | INT | 0 (Scaling factor) |
| 0x11 | Multiplier Link | ○ | — | UINT | 0 (Scaling factor) |
| 0x12 | Divisor Link | ○ | — | UINT | 0 (Scaling factor) |
| 0x13 | Base Link | ○ | — | UINT | 0 (Scaling factor) |
| 0x14 | Offset Link | ○ | — | UINT | 0 (Scaling factor) |
| 0x15 | Decimal Precision | ○ | — | USINT | 0 (Number of decimal places of parameter value) |

Instance Attribute (Class ID: 0x0F, Instance ID: 0x04)

| ID | Name | Access | | Data Type | Description |
|------|-----------------------|--------|-----|--------------|--|
| | | Get | Set | | |
| 0x01 | Parameter Value | ○ | ○ | DINT | Parameter value (Axis-1 parameter: Preset Value) |
| 0x02 | Link Path Size | ○ | — | USINT | 3 |
| 0x03 | Link Path | ○ | — | Packed EPATH | "20 64 24 01 30 13" |
| 0x04 | Descriptor | ○ | — | WORD | 0x0000 |
| 0x05 | Data Type | ○ | — | EPATH | 0xC4 (Signed 32-bit integer) |
| 0x06 | Data Size | ○ | — | USINT | 4 |
| 0x07 | Parameter Name String | ○ | — | SHORT_STRING | 0x10,"Axis-1 Preset Va" |
| 0x08 | Unit String | ○ | — | SHORT_STRING | 0x00,"" |
| 0x09 | Help String | ○ | — | SHORT_STRING | 0x1F,"Axis-1 Parameter - Preset Value" |
| 0x0A | Minimum Value | ○ | — | DINT | 0 |
| 0x0B | Maximum Value | ○ | — | DINT | 16777215 (0x00FFFFFF) |
| 0x0C | Default Value | ○ | — | DINT | 0 |
| 0x0D | Scaling Multiplier | ○ | — | UINT | 1 (Scaling factor) |
| 0x0E | Scaling Divisor | ○ | — | UINT | 1 (Scaling factor) |
| 0x0F | Scaling Base | ○ | — | UINT | 1 (Scaling factor) |
| 0x10 | Scaling Offset | ○ | — | INT | 0 (Scaling factor) |
| 0x11 | Multiplier Link | ○ | — | UINT | 0 (Scaling factor) |
| 0x12 | Divisor Link | ○ | — | UINT | 0 (Scaling factor) |
| 0x13 | Base Link | ○ | — | UINT | 0 (Scaling factor) |
| 0x14 | Offset Link | ○ | — | UINT | 0 (Scaling factor) |
| 0x15 | Decimal Precision | ○ | — | USINT | 0 (Number of decimal places of parameter value) |

Instance Attribute (Class ID: 0x0F, Instance ID: 0x05)

| ID | Name | Access | | Data Type | Description |
|------|-----------------------|--------|-----|------------------|--|
| | | Get | Set | | |
| 0x01 | Parameter Value | o | o | BOOL | Parameter value (Axis-2 parameter: Axis Unavailable) |
| 0x02 | Link Path Size | o | — | USINT | 3 |
| 0x03 | Link Path | o | — | Packed EPATH | "20 64 24 02 30 64" |
| 0x04 | Descriptor | o | — | WORD | 0x0000 |
| 0x05 | Data Type | o | — | EPATH | 0xC1 (Logical boolean) |
| 0x06 | Data Size | o | — | USINT | 1 |
| 0x07 | Parameter Name String | o | — | SHORT_ STRING | 0x10, "Axis-2 Unavailab" |
| 0x08 | Unit String | o | — | SHORT_ STRING | 0x00, "" |
| 0x09 | Help String | o | — | SHORT_ STRING | 0x22, "Axis-2 Parameter - Axis Unavailable" |
| 0x0A | Minimum Value | o | — | BOOL | 0 |
| 0x0B | Maximum Value | o | — | BOOL | 1 |
| 0x0C | Default Value | o | — | BOOL | 0 |
| 0x0D | Scaling Multiplier | o | — | UINT | 1 (Scaling factor) |
| 0x0E | Scaling Divisor | o | — | UINT | 1 (Scaling factor) |
| 0x0F | Scaling Base | o | — | UINT | 1 (Scaling factor) |
| 0x10 | Scaling Offset | o | — | INT | 0 (Scaling factor) |
| 0x11 | Multiplier Link | o | — | UINT | 0 (Scaling factor) |
| 0x12 | Divisor Link | o | — | UINT | 0 (Scaling factor) |
| 0x13 | Base Link | o | — | UINT | 0 (Scaling factor) |
| 0x14 | Offset Link | o | — | UINT | 0 (Scaling factor) |
| 0x15 | Decimal Precision | o | — | USINT | 0 (Number of decimal places of parameter value) |

Instance Attribute (Class ID: 0x0F, Instance ID: 0x06)

| ID | Name | Access | | Data Type | Description |
|------|-----------------------|--------|-----|------------------|---|
| | | Get | Set | | |
| 0x01 | Parameter Value | o | o | BOOL | Parameter value (Axis-2 parameter: Error Clear) |
| 0x02 | Link Path Size | o | — | USINT | 3 |
| 0x03 | Link Path | o | — | Packed EPATH | "20 64 24 02 30 65" |
| 0x04 | Descriptor | o | — | WORD | 0x0000 |
| 0x05 | Data Type | o | — | EPATH | 0xC1 (Logical boolean) |
| 0x06 | Data Size | o | — | USINT | 1 |
| 0x07 | Parameter Name String | o | — | SHORT_ STRING | 0x10, "Axis-2 Error Cle" |
| 0x08 | Unit String | o | — | SHORT_ STRING | 0x00, "" |
| 0x09 | Help String | o | — | SHORT_ STRING | 0x1E, "Axis-2 Parameter - Error Clear" |
| 0x0A | Minimum Value | o | — | BOOL | 0 |
| 0x0B | Maximum Value | o | — | BOOL | 1 |
| 0x0C | Default Value | o | — | BOOL | 0 |
| 0x0D | Scaling Multiplier | o | — | UINT | 1 (Scaling factor) |
| 0x0E | Scaling Divisor | o | — | UINT | 1 (Scaling factor) |
| 0x0F | Scaling Base | o | — | UINT | 1 (Scaling factor) |
| 0x10 | Scaling Offset | o | — | INT | 0 (Scaling factor) |
| 0x11 | Multiplier Link | o | — | UINT | 0 (Scaling factor) |
| 0x12 | Divisor Link | o | — | UINT | 0 (Scaling factor) |
| 0x13 | Base Link | o | — | UINT | 0 (Scaling factor) |
| 0x14 | Offset Link | o | — | UINT | 0 (Scaling factor) |
| 0x15 | Decimal Precision | o | — | USINT | 0 (Number of decimal places of parameter value) |

Instance Attribute (Class ID: 0x0F, Instance ID: 0x07)

| ID | Name | Access | | Data Type | Description |
|------|-----------------------|--------|-----|--------------|--|
| | | Get | Set | | |
| 0x01 | Parameter Value | ○ | ○ | BOOL | Parameter value (Axis-2 parameter: Position Data Increase Direction) |
| 0x02 | Link Path Size | ○ | — | USINT | 3 |
| 0x03 | Link Path | ○ | — | Packed EPATH | "20 64 24 02 30 0C" |
| 0x04 | Descriptor | ○ | — | WORD | 0x0000 |
| 0x05 | Data Type | ○ | — | EPATH | 0xC1 (Logical boolean) |
| 0x06 | Data Size | ○ | — | USINT | 1 |
| 0x07 | Parameter Name String | ○ | — | SHORT_STRING | 0x10,"Axis-2 Direction" |
| 0x08 | Unit String | ○ | — | SHORT_STRING | 0x00,"" |
| 0x09 | Help String | ○ | — | SHORT_STRING | 0x33,"Axis-2 Parameter - Position Data Increase Direction" |
| 0x0A | Minimum Value | ○ | — | BOOL | 0 |
| 0x0B | Maximum Value | ○ | — | BOOL | 1 |
| 0x0C | Default Value | ○ | — | BOOL | 0 |
| 0x0D | Scaling Multiplier | ○ | — | UINT | 1 (Scaling factor) |
| 0x0E | Scaling Divisor | ○ | — | UINT | 1 (Scaling factor) |
| 0x0F | Scaling Base | ○ | — | UINT | 1 (Scaling factor) |
| 0x10 | Scaling Offset | ○ | — | INT | 0 (Scaling factor) |
| 0x11 | Multiplier Link | ○ | — | UINT | 0 (Scaling factor) |
| 0x12 | Divisor Link | ○ | — | UINT | 0 (Scaling factor) |
| 0x13 | Base Link | ○ | — | UINT | 0 (Scaling factor) |
| 0x14 | Offset Link | ○ | — | UINT | 0 (Scaling factor) |
| 0x15 | Decimal Precision | ○ | — | USINT | 0 (Number of decimal places of parameter value) |

Instance Attribute (Class ID: 0x0F, Instance ID: 0x08)

| ID | Name | Access | | Data Type | Description |
|------|-----------------------|--------|-----|--------------|--|
| | | Get | Set | | |
| 0x01 | Parameter Value | ○ | ○ | DINT | Parameter value (Axis-2 parameter: Preset Value) |
| 0x02 | Link Path Size | ○ | — | USINT | 3 |
| 0x03 | Link Path | ○ | — | Packed EPATH | "20 64 24 02 30 13" |
| 0x04 | Descriptor | ○ | — | WORD | 0x0000 |
| 0x05 | Data Type | ○ | — | EPATH | 0xC4 (Signed 32-bit integer) |
| 0x06 | Data Size | ○ | — | USINT | 4 |
| 0x07 | Parameter Name String | ○ | — | SHORT_STRING | 0x10,"Axis-2 Preset Va" |
| 0x08 | Unit String | ○ | — | SHORT_STRING | 0x00,"" |
| 0x09 | Help String | ○ | — | SHORT_STRING | 0x1F,"Axis-2 Parameter - Preset Value" |
| 0x0A | Minimum Value | ○ | — | DINT | 0 |
| 0x0B | Maximum Value | ○ | — | DINT | 16777215 (0x00FFFFFF) |
| 0x0C | Default Value | ○ | — | DINT | 0 |
| 0x0D | Scaling Multiplier | ○ | — | UINT | 1 (Scaling factor) |
| 0x0E | Scaling Divisor | ○ | — | UINT | 1 (Scaling factor) |
| 0x0F | Scaling Base | ○ | — | UINT | 1 (Scaling factor) |
| 0x10 | Scaling Offset | ○ | — | INT | 0 (Scaling factor) |
| 0x11 | Multiplier Link | ○ | — | UINT | 0 (Scaling factor) |
| 0x12 | Divisor Link | ○ | — | UINT | 0 (Scaling factor) |
| 0x13 | Base Link | ○ | — | UINT | 0 (Scaling factor) |
| 0x14 | Offset Link | ○ | — | UINT | 0 (Scaling factor) |
| 0x15 | Decimal Precision | ○ | — | USINT | 0 (Number of decimal places of parameter value) |

Instance Service (Class ID: 0x0F, Instance ID: 0x01,0x02,0x03,0x04,0x05,0x06,0x07,0x08)

| ID | Name | Description |
|------|----------------------|---|
| 0x01 | Get_Attribute_All | Read out all attribute values from NCW-3DHIP. |
| 0x0E | Get_Attribute_Single | Read out one attribute value from NCW-3DHIP. |
| 0x10 | Set_Attribute_Single | Write one attribute value to NCW-3DHIP. |

APPENDIX 2-6. ABSOCODER Object (Class ID: 0x64)

ABSOCODER object provides setting information of the absolute encoder (ABSOCODER).

Following tables indicate specifications of the ABSOCODER object.
The ABSOCODER object has two instances for 2-axis NCW-3DHIP.

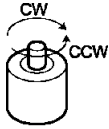
Class Attribute (Class ID: 0x64)

| ID | Name | Access | | Data Type | Description |
|------|---------------------|--------|-----|-----------|-------------|
| | | Get | Set | | |
| 0x01 | Revision | ○ | — | UINT | 1 |
| 0x02 | Max Instance | ○ | — | UINT | 2 |
| 0x03 | Number of Instances | ○ | — | UINT | 2 |

Class Service (Class ID: 0x64, Instance ID: 0x00)

| ID | Name | Description |
|------|----------------------|--|
| 0x05 | Reset | Reset service The Reset service parameters are the following; 0: Restart 1: All NCW-3DHIP parameters' setting is redesignated to initial values (factory setting), and restart. |
| 0x0E | Get_Attribute_Single | Read out one attribute value from NCW-3DHIP. |

Instance Attribute (Class ID: 0x64, Instance ID: 0x01[For axis-1], 0x02[For axis-2])

| ID | Name | Access | | Data Type | Description | | | | | | | | | | | | | | | | | | | | | | | | |
|------|----------------------------------|-----------|----------|-----------|--|-----|-------------|-----------|----------|---|-------------------|------|-----|------|----------|---|--|----|---------------------------------|------|-----|----|----------------------------------|------|-----|----|------------------------|------|-----|
| | | Get | Set | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 0x01 | Number of Attributes | ○ | — | USINT | Indicates Numbers of Attributes that are supported this product. Returns the Number of Attributes "9". | | | | | | | | | | | | | | | | | | | | | | | | |
| 0x02 | Attribute List | ○ | — | USINT[] | Indicates Attribute List that is supported this product. Attribute List: 03, 0C, 13, 2C, 2D, 2E, 64, 65, 96 | | | | | | | | | | | | | | | | | | | | | | | | |
| 0x03 | Position Value Unsigned | ○ | — | UDINT | Current position value | | | | | | | | | | | | | | | | | | | | | | | | |
| 0x0C | Position Data Increase Direction | ○ | ○ | BOOL | Specify the ABSOCODER sensor rotation direction in which the position data increases. 0: CW (Default) 1: CCW  | | | | | | | | | | | | | | | | | | | | | | | | |
| 0x13 | Preset Value | ○ | ○ | DINT | Specify "Preset Value". Every axis's current position value will be changed to a value which is set in this attribute if Preset is executed. A designated Preset Value of Output data is returned during Get access when I/O communication starts. | | | | | | | | | | | | | | | | | | | | | | | | |
| 0x2C | Alarms | ○ | — | WORD | Indicates an error detection state <table border="1" data-bbox="896 902 1444 1265"> <thead> <tr> <th>Bit</th> <th>Description</th> <th>FALSE (0)</th> <th>TRUE (1)</th> </tr> </thead> <tbody> <tr> <td>0</td> <td>SE (Sensor Error)</td> <td>None</td> <td>Yes</td> </tr> <tr> <td>1-12</td> <td>Reserved</td> <td colspan="2">—</td> </tr> <tr> <td>13</td> <td>SSE (Disconnected Sensor Error)</td> <td>None</td> <td>Yes</td> </tr> <tr> <td>14</td> <td>SPF (Sensor Circuit Power Error)</td> <td>None</td> <td>Yes</td> </tr> <tr> <td>15</td> <td>DE (Sensor Data Error)</td> <td>None</td> <td>Yes</td> </tr> </tbody> </table> | Bit | Description | FALSE (0) | TRUE (1) | 0 | SE (Sensor Error) | None | Yes | 1-12 | Reserved | — | | 13 | SSE (Disconnected Sensor Error) | None | Yes | 14 | SPF (Sensor Circuit Power Error) | None | Yes | 15 | DE (Sensor Data Error) | None | Yes |
| Bit | Description | FALSE (0) | TRUE (1) | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 0 | SE (Sensor Error) | None | Yes | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1-12 | Reserved | — | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 13 | SSE (Disconnected Sensor Error) | None | Yes | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 14 | SPF (Sensor Circuit Power Error) | None | Yes | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 15 | DE (Sensor Data Error) | None | Yes | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 0x2D | Supported Alarms | ○ | — | WORD | Indicates error detection information which is supported. <table border="1" data-bbox="896 1321 1444 1482"> <thead> <tr> <th>Bit</th> <th>Description</th> <th>FALSE (0)</th> <th>TRUE (1)</th> </tr> </thead> <tbody> <tr> <td>0</td> <td>SE (Sensor Error)</td> <td>None</td> <td>Yes</td> </tr> <tr> <td>1-12</td> <td>Reserved</td> <td colspan="2">—</td> </tr> </tbody> </table> | Bit | Description | FALSE (0) | TRUE (1) | 0 | SE (Sensor Error) | None | Yes | 1-12 | Reserved | — | | | | | | | | | | | | | |
| Bit | Description | FALSE (0) | TRUE (1) | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 0 | SE (Sensor Error) | None | Yes | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1-12 | Reserved | — | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 0x2E | Alarm Flag | ○ | — | BOOL | Indicates an error detection state 0: No error 1: With error * The flag is the logical sum of all alarm bits of 0x2C (Alarm). | | | | | | | | | | | | | | | | | | | | | | | | |
| 0x64 | AxisUnavailable | ○ | ○ | BOOL | Specify "Enable" or "Disable" for the axis. 0: Enable (Default) 1: Disable | | | | | | | | | | | | | | | | | | | | | | | | |
| 0x65 | Error Clear | ○ | ○ | BOOL | Specify "Error recovery behavior". 0: Auto clearing (Default) Automatically clears the error when removing the cause of the error. 1: Manual clearing | | | | | | | | | | | | | | | | | | | | | | | | |
| 0x96 | Reserved | ○ | — | DINT | Reserved | | | | | | | | | | | | | | | | | | | | | | | | |

APPENDIX 2-7. QoS Object (Class ID: 0x48)

The QoS object provides relative priority setting information of different transmission traffics.

A transmission traffic priority can be adjusted by a managed switch on the network when the relative priority is set.

The relative priority is specified by the QoS object attribute setting.

NCW-3DHIP uses DiffServ (QoS) (redefinition of the "ToS" field in IP head). Packets are classified by elements, and priorities (64 steps) are defined for each group. The packet transmission is executed according to the definition. (NCW-3DHIP doesn't support the 802.1Q tag.).

Note

Restart the power supply when settings are changed.

Following tables indicate specifications of the QoS object.

The QoS object has one instance.

Class Attribute (Class ID: 0x48)

| ID | Name | Access | | Data Type | Description |
|------|---------------------|--------|-----|-----------|-------------|
| | | Get | Set | | |
| 0x01 | Revision | ○ | — | UINT | 1 |
| 0x02 | Max Instance | ○ | — | UINT | 1 |
| 0x03 | Number of Instances | ○ | — | UINT | 1 |

Class Service (Class ID: 0x48, Instance ID: 0x00)

| ID | Name | Description |
|------|----------------------|--|
| 0x0E | Get_Attribute_Single | Read out one attribute value from NCW-3DHIP. |

Instance Attribute (Class ID: 0x48, Instance ID: 0x01)

| ID | Name | Access | | Data Type | Description |
|------|----------------|--------|-----|-----------|---|
| | | Get | Set | | |
| 0x04 | DSCP Urgent | ○ | ○ | USINT | Set the DSCP value for CIP transport class 0/1 messages with Urgent priority. Default: 55 (110 11 1b) This setting is invalid for NCW-3DHIP. |
| 0x05 | DSCP Scheduled | ○ | ○ | USINT | Set the DSCP value for CIP transport class 0/1 messages with Scheduled priority. Default: 47 (101 11 1b) This setting is invalid for NCW-3DHIP. |
| 0x06 | DSCP High | ○ | ○ | USINT | Set the DSCP value for CIP transport class 0/1 messages with High priority. Default: 43 (101 01 1b) This setting is for NCW-3DHIP I/O traffic. |
| 0x07 | DSCP Low | ○ | ○ | USINT | Set the DSCP value for CIP transport class 0/1 messages with Low priority. Default: 31 (011 11 1b) This setting is invalid for NCW-3DHIP. |
| 0x08 | DSCP Explicit | ○ | ○ | USINT | Set the DSCP value for CIP Explicit messages (Transport Class 2/3 and UCMM). Default: 27 (011 01 1b) This attribute setting is for NCW-3DHIP Explicit message traffic. |

Instance Service (Class ID: 0x48, Instance ID: 0x01)

| ID | Name | Description |
|------|----------------------|--|
| 0x0E | Get_Attribute_Single | Read out one attribute value from NCW-3DHIP. |
| 0x10 | Set_Attribute_Single | Write one attribute value to NCW-3DHIP. |

● Complement (DSCP value)

A packet priority allocation is classified for each DSCP value by a definition is called "PHB(Per-Hop Behavior)".
Default values for general Ethernet and Ethernet/IP are shown below

| PHB | DSCP value | Description | |
|---|---|--|---|
| | Bit5-3: high priority class Bit2-1: packet discard rate Bit0: Standard / Test | | |
| ■ General Ethernet definition | | | |
| AF(Assured Forwarding) | AF11 | 001 01 0b(10) | If the first 3 bits are larger, the priority will become higher. If the last 3 bits are larger, the discard priority will become higher. |
| | AF12 | 001 10 0b(12) | |
| | AF13 | 001 11 0b(14) | |
| | AF21 | 010 01 0b(18) | |
| | AF22 | 010 10 0b(20) | |
| | AF23 | 010 11 0b(22) | |
| | AF31 | 011 01 0b(26) | |
| | AF32 | 011 10 0b(28) | |
| | AF33 | 011 11 0b(30) | |
| | AF41 | 100 01 0b(34) | |
| | AF42 | 100 10 0b(36) | |
| AF43 | 100 11 0b(38) | | |
| EF(Expedited Forwarding) | 101 11 0b(46) | It means the highest priority packet. | |
| ■ Ethernet/IP CIP definition | | | |
| CIP UCMM CIP Transport Class 3 All Other EIP Encapsulation Message | 011 01 1b(27) | <u>CIP Explicit message transmitting *1</u> | |
| CIP Transport Class 0/1 | Low(0) | 011 11 1b(31) | Unrecommanded to use |
| | High(1) | 101 01 1b(43) | <u>CIP I/O (CIP Implicit message) transmitting*1</u> |
| | Scheduled(2) | 101 11 1b(47) | For CIP Safty I/O (CIP Implicitmessage) transmitting For CIP I/O (CIP Implicit message) transmitting |
| | Urgent(3) | 110 11 1b(55) | For CIP Motion transmitting |

*1: PHB for NCW-3DHIP

APPENDIX 2-8. TCP/IP Interface Object (Class ID: 0xF5)

The TCP/IP interface object provides Ethernet TCP/IP interface information.

The TCP/IP Interface Object provides the mechanism to configure the NCW-3DHIP's TCP/IP network interface (IP address, network mask, and gateway address).

Following tables indicate specifications of the TCP/IP Interface object.

The TCP/IP Interface object has one instance.

Class Attribute (Class ID: 0xF5)

| ID | Name | Access | | Data Type | Description |
|------|---------------------|--------|-----|-----------|-------------|
| | | Get | Set | | |
| 0x01 | Revision | ○ | — | UINT | 4 |
| 0x02 | Max Instance | ○ | — | UINT | 1 |
| 0x03 | Number of Instances | ○ | — | UINT | 1 |

Class Service (Class ID: 0xF5, Instance ID: 0x00)

| ID | Name | Description |
|------|----------------------|---|
| 0x01 | Get_Attribute_All | Read out all attribute values from NCW-3DHIP. |
| 0x0E | Get_Attribute_Single | Read out one attribute value from NCW-3DHIP. |

Instance Attribute (Class ID: 0xF5, Instance ID: 0x01)

(1/4)

| ID | Name | Access | | Data Type | Description | | | | | | | | |
|------|--|--------|-----|-----------|---|-----|-------------|-----|--|---|---|---|--|
| | | Get | Set | | | | | | | | | | |
| 0x01 | Status | ○ | — | DWORD | <p>Current status of NCW-3DHIP This attribute value changes due to the converter state.</p> <table border="1"> <thead> <tr> <th>Bit</th> <th>Description</th> </tr> </thead> <tbody> <tr> <td>0-3</td> <td> <p>Interface Configuration Status Indicates the status of the Interface Configuration Attribute. 0: The Interface Configuration attribute has not been configured. (It doesn't occur for NCW-3DHIP.) 1: The Interface Configuration attribute contains configuration obtained from BOOTP, DHCP or non-volatile storage. 2: The IP address member of the Interface Configuration attribute contains configuration, obtained from hardware settings. 3-15: Reserved</p> </td> </tr> <tr> <td>4</td> <td> <p>Mcast Pending NCW-3DHIP doesn't support. (Fixed at 0)</p> </td> </tr> <tr> <td>5</td> <td> <p>Interface Configuration Pending TRUE (1) when Interface Configuration attribute values are changed. The NCW-3DHIP requires a restart in order for the configuration change to take effect.</p> </td> </tr> </tbody> </table> | Bit | Description | 0-3 | <p>Interface Configuration Status Indicates the status of the Interface Configuration Attribute. 0: The Interface Configuration attribute has not been configured. (It doesn't occur for NCW-3DHIP.) 1: The Interface Configuration attribute contains configuration obtained from BOOTP, DHCP or non-volatile storage. 2: The IP address member of the Interface Configuration attribute contains configuration, obtained from hardware settings. 3-15: Reserved</p> | 4 | <p>Mcast Pending NCW-3DHIP doesn't support. (Fixed at 0)</p> | 5 | <p>Interface Configuration Pending TRUE (1) when Interface Configuration attribute values are changed. The NCW-3DHIP requires a restart in order for the configuration change to take effect.</p> |
| Bit | Description | | | | | | | | | | | | |
| 0-3 | <p>Interface Configuration Status Indicates the status of the Interface Configuration Attribute. 0: The Interface Configuration attribute has not been configured. (It doesn't occur for NCW-3DHIP.) 1: The Interface Configuration attribute contains configuration obtained from BOOTP, DHCP or non-volatile storage. 2: The IP address member of the Interface Configuration attribute contains configuration, obtained from hardware settings. 3-15: Reserved</p> | | | | | | | | | | | | |
| 4 | <p>Mcast Pending NCW-3DHIP doesn't support. (Fixed at 0)</p> | | | | | | | | | | | | |
| 5 | <p>Interface Configuration Pending TRUE (1) when Interface Configuration attribute values are changed. The NCW-3DHIP requires a restart in order for the configuration change to take effect.</p> | | | | | | | | | | | | |

| ID | Name | Access | | Data Type | Description | | | | | | | | | | | | | | | | |
|------|---|--------|-----|-----------|---|-----|-------------|-----|---|---|---|---|---|---|--|---|---|---|--|---|--|
| | | Get | Set | | | | | | | | | | | | | | | | | | |
| 0x02 | Configuration Capability | ○ | — | DWORD | <p>Fixed at 0x00000075</p> <p>The following table indicates the function which is supported by NCW-3DHIP.</p> <table border="1"> <thead> <tr> <th>Bit</th> <th>Description</th> </tr> </thead> <tbody> <tr> <td>0</td> <td> <u>BOOTP Client</u> 1: Indicates that NCW-3DHIP is capable of obtaining its network configuration via BOOTP. </td> </tr> <tr> <td>1</td> <td> <u>DNS Client</u> 0: Indicates NCW-3DHIP can not obtain host names from DNS server. </td> </tr> <tr> <td>2</td> <td> <u>DHCP Client</u> 1: Indicates NCW-3DHIP is capable of obtaining its network configuration via DHCP. </td> </tr> <tr> <td>3</td> <td> <u>DHCP-DNS Update</u> 0: Indicates NCW-3DHIP cannot return own host name by the DHCP request. </td> </tr> <tr> <td>4</td> <td> <u>Configuration Settable</u> 1: Indicates the Interface Configuration attribute is settable. </td> </tr> <tr> <td>5</td> <td> <u>Hardware Configurable</u> 1: Indicates the IP Address number of the Interface Configuration attribute can be obtained from hardware settings. </td> </tr> <tr> <td>6</td> <td> <u>Interface Configuration Change Requires Reset</u> 1: Indicates that NCW-3DHIP requires a restart in order for a change to the Interface Configuration attribute to take effect. </td> </tr> </tbody> </table> | Bit | Description | 0 | <u>BOOTP Client</u> 1: Indicates that NCW-3DHIP is capable of obtaining its network configuration via BOOTP. | 1 | <u>DNS Client</u> 0: Indicates NCW-3DHIP can not obtain host names from DNS server. | 2 | <u>DHCP Client</u> 1: Indicates NCW-3DHIP is capable of obtaining its network configuration via DHCP. | 3 | <u>DHCP-DNS Update</u> 0: Indicates NCW-3DHIP cannot return own host name by the DHCP request. | 4 | <u>Configuration Settable</u> 1: Indicates the Interface Configuration attribute is settable. | 5 | <u>Hardware Configurable</u> 1: Indicates the IP Address number of the Interface Configuration attribute can be obtained from hardware settings. | 6 | <u>Interface Configuration Change Requires Reset</u> 1: Indicates that NCW-3DHIP requires a restart in order for a change to the Interface Configuration attribute to take effect. |
| Bit | Description | | | | | | | | | | | | | | | | | | | | |
| 0 | <u>BOOTP Client</u> 1: Indicates that NCW-3DHIP is capable of obtaining its network configuration via BOOTP. | | | | | | | | | | | | | | | | | | | | |
| 1 | <u>DNS Client</u> 0: Indicates NCW-3DHIP can not obtain host names from DNS server. | | | | | | | | | | | | | | | | | | | | |
| 2 | <u>DHCP Client</u> 1: Indicates NCW-3DHIP is capable of obtaining its network configuration via DHCP. | | | | | | | | | | | | | | | | | | | | |
| 3 | <u>DHCP-DNS Update</u> 0: Indicates NCW-3DHIP cannot return own host name by the DHCP request. | | | | | | | | | | | | | | | | | | | | |
| 4 | <u>Configuration Settable</u> 1: Indicates the Interface Configuration attribute is settable. | | | | | | | | | | | | | | | | | | | | |
| 5 | <u>Hardware Configurable</u> 1: Indicates the IP Address number of the Interface Configuration attribute can be obtained from hardware settings. | | | | | | | | | | | | | | | | | | | | |
| 6 | <u>Interface Configuration Change Requires Reset</u> 1: Indicates that NCW-3DHIP requires a restart in order for a change to the Interface Configuration attribute to take effect. | | | | | | | | | | | | | | | | | | | | |
| 0x03 | Configuration Control | ○ | ○ | DWORD | <p>Configures a NCW-3DHIP network setting option control.</p> <p><u>This attribute is stored in the non-volatile memory.</u></p> <table border="1"> <thead> <tr> <th>Bit</th> <th>Description</th> </tr> </thead> <tbody> <tr> <td>0-3</td> <td> <u>Startup Configuration</u> 0: The device use the previously saved interface setting value. (Such as the value in the non-volatile memory or the value of the hardware switch) 1: The device obtain its interface configuration values via BOOTP. 2: The device obtain its interface configuration values via DHCP. (Default) 3-15: Reserved </td> </tr> <tr> <td>4</td> <td> <u>DNS Enable</u> NCW-3DHIP doesn't support. </td> </tr> </tbody> </table> | Bit | Description | 0-3 | <u>Startup Configuration</u> 0: The device use the previously saved interface setting value. (Such as the value in the non-volatile memory or the value of the hardware switch) 1: The device obtain its interface configuration values via BOOTP. 2: The device obtain its interface configuration values via DHCP. (Default) 3-15: Reserved | 4 | <u>DNS Enable</u> NCW-3DHIP doesn't support. | | | | | | | | | | |
| Bit | Description | | | | | | | | | | | | | | | | | | | | |
| 0-3 | <u>Startup Configuration</u> 0: The device use the previously saved interface setting value. (Such as the value in the non-volatile memory or the value of the hardware switch) 1: The device obtain its interface configuration values via BOOTP. 2: The device obtain its interface configuration values via DHCP. (Default) 3-15: Reserved | | | | | | | | | | | | | | | | | | | | |
| 4 | <u>DNS Enable</u> NCW-3DHIP doesn't support. | | | | | | | | | | | | | | | | | | | | |

| ID | Name | Access | | Data Type | Description | |
|------|------------------------|--------|-----|-----------------|--|--|
| | | Get | Set | | | |
| 0x04 | Physical Link Object | ○ | — | Structure | Identifies an object (Ethernet Link Object) related to the physical interface. The path indicates the Instance 1 of the Ethernet Link Object class. | |
| | | | | UINT | Path Size | 2 |
| | | | | Packed EPATH | Path | "20 F6 24 01" |
| 0x05 | Interface Configuraton | ○ | ○ | Structure | NCW-3DHIP configures necessary settings as a TCP/IP node. Bit5 (Interface Configuration Pending) of Attribute 1(Status) will be TRUE (1) if the settings are valid. Reset Service (0x05) of the Identify object must be requested when activating settings. <u>This attribute is stored in the non-volatile memory.</u> | |
| | | | | UDINT | IP Address | IP address (host address) *: This attribute is invalid when the IP address is set to a value at [ADR] rotary switch on the NCW-3DHIP panel side except "0". |
| | | | | UDINT | Network Mask | Network mask |
| | | | | UDINT | Gateway Address | Gateway IP address |
| | | | | UDINT | Name Server | Primary DNS server IP address |
| | | | | UDINT | Name Server2 | Secondary DNS server IP address |
| | | | | STRING | Domain Name | "nsdcorp.co.jp" (default) Default domain name The name should be less than 48 characters, and a length should be padded to the nearest even number. (The pad is not including in the length.) The Domain Name is not configured when the length is 0. |
| 0x06 | Host Name | ○ | ○ | STRING | "NCW-3DHIP" (defalt) A NCW-3DHIP host name is configured. <u>This attribute is stored in the non-volatile memory.</u> The name should be less than 64 characters, and a length should be padded to the nearest even number. (The pad is not including in the length.) *:A NCW-3DHIP doesn't support the DHCP-DNS update function. | |
| 0x07 | Safety Network Number | — | — | USINT[6] | NCW-3DHIP doesn't support this attribute. | |
| 0x08 | TTL Value | — | — | USINT | NCW-3DHIP doesn't support this attribute. | |

| ID | Name | Access | | Data Type | Description |
|------|----------------------------------|--------|-----|-----------|---|
| | | Get | Set | | |
| 0x09 | Mcast Config | — | — | Structure | NCW-3DHIP doesn't support this attribute. |
| | | | | USINT | |
| | | | | USINT | |
| | | | | UDINT | |
| 0x0A | Select ACD | — | — | BOOL | NCW-3DHIP doesn't support this attribute. |
| 0x0B | LastConflictDetected | — | — | Structure | NCW-3DHIP doesn't support this attribute. |
| | | | | USINT | |
| | | | | USINT[6] | |
| | | | | USINT[28] | |
| 0x0C | EIP Quick Connect | — | — | BOOL | NCW-3DHIP doesn't support this attribute. |
| 0x0D | Encapsulation Inactivity Timeout | ○ | ○ | UINT | The TCP socket is cleaned up (closed) when an encapsulation operation is not detected within the setting time (second). Setting range: 0 to 3600s 0: No Timeout detection Default: 120 <u>This attribute is stored in the non-volatile memory.</u> |

Instance Service (Class ID: 0xF5, Instance ID: 0x01)

| ID | Name | Description |
|------|----------------------|---|
| 0x01 | Get_Attribute_All | Read out all attribute values from NCW-3DHIP. |
| 0x0E | Get_Attribute_Single | Read out one attribute value from NCW-3DHIP. |
| 0x10 | Set_Attribute_Single | Write one attribute value to NCW-3DHIP. |

APPENDIX 2-9. Ethernet Link Object (Class ID: 0xF6)

The Ethernet Link object provides Ethernet Interface's MAC address, communication speed and format status information.

Following tables indicate specifications of the Ethernet Link object.
NCW-3DHIP has two ports, so the Ethernet Link object has two instances.

Class Attribute (Class ID: 0xF6)

| ID | Name | Access | | Data Type | Description |
|------|---------------------|--------|-----|-----------|-------------|
| | | Get | Set | | |
| 0x01 | Revision | ○ | — | UINT | 4 |
| 0x02 | Max Instance | ○ | — | UINT | 2 (2 ports) |
| 0x03 | Number of Instances | ○ | — | UINT | 2 (2 ports) |

Class Service(Class ID: 0xF6, Instance ID: 0x00)

| ID | Name | Description |
|------|----------------------|---|
| 0x01 | Get_Attribute_All | Read out all attribute values from NCW-3DHIP. |
| 0x0E | Get_Attribute_Single | Read out one attribute value from NCW-3DHIP. |

| ID | Name | Access | | Data Type | Description | | | | | | | | | | | | |
|------|---|--------|-----|-----------|---|-----|-------------|---|---|---|---|-----|---|---|--|---|---|
| | | Get | Set | | | | | | | | | | | | | | |
| 0x01 | Interface Speed | ○ | — | UDINT | NCW-3DHIP's current state Speed value (Mbps): 0, 10, 100, 1000, and etc... | | | | | | | | | | | | |
| 0x02 | Interface Flag | ○ | — | DWORD | NCW-3DHIP's current state <table border="1" data-bbox="887 405 1445 1570"> <thead> <tr> <th>Bit</th> <th>Description</th> </tr> </thead> <tbody> <tr> <td>0</td> <td><u>Link Status</u> Indicates the status of link 0: Inactive link 1: Active link</td> </tr> <tr> <td>1</td> <td><u>Half/Full Duplex</u> Indicates the duplex mode 0: Half duplex 1: Full duplex</td> </tr> <tr> <td>2-4</td> <td><u>Negotiation Status</u> Indicates the status of negotiation 0: Auto-negotiation in progress. 1: Auto-negotiation and speed detection failed. A default value of the Speed/Duplex when the detection is faulty: 10Mbps, half duplex 2: Auto negotiation failed but detected speed. Default value of the Duplex when detection is fault: half duplex 3: Successfully negotiated speed and duplex. 4: Auto-negotiation not attempted. Force Speed / Force Interface Speed value is used.</td> </tr> <tr> <td>5</td> <td><u>Manual Setting Requires Speed</u> Fixed at 0 Duplex, Speed Indicates the setting reflected status setting. 0: Auto-Negotiation / Duplex / Speed are automatically activated. 1: Indicates that you must issue a Reset service to the Identity object to activate the change.</td> </tr> <tr> <td>6</td> <td><u>Local Hardware Fault</u> Indicates the fault status of NCW-3DHIP. 0: Fault is not detected. 1: Fault is detected. This is assumed a hard-fault requiring user intervention.</td> </tr> </tbody> </table> | Bit | Description | 0 | <u>Link Status</u> Indicates the status of link 0: Inactive link 1: Active link | 1 | <u>Half/Full Duplex</u> Indicates the duplex mode 0: Half duplex 1: Full duplex | 2-4 | <u>Negotiation Status</u> Indicates the status of negotiation 0: Auto-negotiation in progress. 1: Auto-negotiation and speed detection failed. A default value of the Speed/Duplex when the detection is faulty: 10Mbps, half duplex 2: Auto negotiation failed but detected speed. Default value of the Duplex when detection is fault: half duplex 3: Successfully negotiated speed and duplex. 4: Auto-negotiation not attempted. Force Speed / Force Interface Speed value is used. | 5 | <u>Manual Setting Requires Speed</u> Fixed at 0 Duplex, Speed Indicates the setting reflected status setting. 0: Auto-Negotiation / Duplex / Speed are automatically activated. 1: Indicates that you must issue a Reset service to the Identity object to activate the change. | 6 | <u>Local Hardware Fault</u> Indicates the fault status of NCW-3DHIP. 0: Fault is not detected. 1: Fault is detected. This is assumed a hard-fault requiring user intervention. |
| Bit | Description | | | | | | | | | | | | | | | | |
| 0 | <u>Link Status</u> Indicates the status of link 0: Inactive link 1: Active link | | | | | | | | | | | | | | | | |
| 1 | <u>Half/Full Duplex</u> Indicates the duplex mode 0: Half duplex 1: Full duplex | | | | | | | | | | | | | | | | |
| 2-4 | <u>Negotiation Status</u> Indicates the status of negotiation 0: Auto-negotiation in progress. 1: Auto-negotiation and speed detection failed. A default value of the Speed/Duplex when the detection is faulty: 10Mbps, half duplex 2: Auto negotiation failed but detected speed. Default value of the Duplex when detection is fault: half duplex 3: Successfully negotiated speed and duplex. 4: Auto-negotiation not attempted. Force Speed / Force Interface Speed value is used. | | | | | | | | | | | | | | | | |
| 5 | <u>Manual Setting Requires Speed</u> Fixed at 0 Duplex, Speed Indicates the setting reflected status setting. 0: Auto-Negotiation / Duplex / Speed are automatically activated. 1: Indicates that you must issue a Reset service to the Identity object to activate the change. | | | | | | | | | | | | | | | | |
| 6 | <u>Local Hardware Fault</u> Indicates the fault status of NCW-3DHIP. 0: Fault is not detected. 1: Fault is detected. This is assumed a hard-fault requiring user intervention. | | | | | | | | | | | | | | | | |
| 0x03 | Physical Address | ○ | — | USINT[6] | MAC address of NCW-3DHIP (E8-8E-60-xx-xx-xx) *: NCW-3DHIP has two ports, but the Physical address is one. | | | | | | | | | | | | |

| ID | Name | Access | | Data Type | Description |
|------|--------------------|--------|-----|-----------|---|
| | | Get | Set | | |
| 0x04 | Interface Counters | — | — | Structure | NCW-3DHIP doesn't support this attribute. |
| | | | | UDINT | |
| | | | | UDINT | |
| | | | | UDINT | |
| | | | | UDINT | |
| | | | | UDINT | |
| | | | | UDINT | |
| | | | | UDINT | |
| | | | | UDINT | |
| | | | | UDINT | |
| | | | | UDINT | |
| | | | | UDINT | |
| 0x05 | Media Counters | — | — | Structure | NCW-3DHIP doesn't support this attribute. |
| | | | | UDINT | |
| | | | | UDINT | |
| | | | | UDINT | |
| | | | | UDINT | |
| | | | | UDINT | |
| | | | | UDINT | |
| | | | | UDINT | |
| | | | | UDINT | |
| | | | | UDINT | |
| | | | | UDINT | |
| | | | | UDINT | |
| 0x06 | Interface Control | — | — | Structure | NCW-3DHIP doesn't support this attribute. |
| | | | | WORD | |
| | | | | UINT | |
| 0x07 | Interface Type | — | — | USINT | NCW-3DHIP doesn't support this attribute. |
| 0x08 | Interface State | — | — | USINT | NCW-3DHIP doesn't support this attribute. |
| 0x09 | Admin State | — | — | USINT | NCW-3DHIP doesn't support this attribute. |

| ID | Name | Access | | Data Type | Description | |
|------|----------------------|--------|-----|---------------|--|---|
| | | Get | Set | | | |
| 0x0A | Interface Label | ○ | — | SHORT_ STING | Interface identifier Instance 0x01: "Port1" Instance 0x02: "Port2" | |
| 0x0B | Interface Capability | ○ | — | Structure | Interface function | |
| | | | | DWORD | [Capability Bits] The values (Bit0:0, Bit1:1, Bit2:1, and Bit3:0) are fixed. Indicates interface functions other than Speed / Duplex. Bit0: Manual Setting Requires Reset Bit1: Auto-negotiate Bit2: Auto-MDIX Bit3: Manual Speed/Duplex Bit4-31: Reserved | |
| | | | | Structure | [Speed/Duplex Options] A pair of Speed/Duplex supported by Interface Control attributes | |
| | | | | USINT | [Speed/Duplex element number] Fixed at 4 | |
| | | | | Structure [0] | UINT | [Interface Speed] Same contents as the Forced Interface Speed of the Interface Control Attribute (Element 0): 10 |
| | | | | | USINT | [Interface Duplex Mode] 0: Half Duplex 1: Full Duplex 2-255: Reserved (Element 0):0 |
| | | | | Structure [1] | UINT | [Interface Speed] (Element 1): 10 |
| | | | | | USINT | [Interface Duplex Mode] (Element 1): 1 |
| | | | | Structure [2] | UINT | [Interface Speed] (Element 2): 100 |
| | | | | | USINT | [Interface Duplex Mode] (Element 2): 0 |
| | | | | Structure [3] | UINT | [Interface Speed] (Element 3): 100 |
| | | | | | USINT | [Interface Duplex Mode] (Element 3): 1 |

Instance Service (Class ID: 0xF6, Instance ID: 0x01, 0x02)

| ID | Name | Description |
|------|----------------------|---|
| 0x01 | Get_Attribute_All | Read out all attribute values from NCW-3DHIP. |
| 0x0E | Get_Attribute_Single | Read out one attribute value from NCW-3DHIP. |

APPENDIX 2-10. Info Log Object (Class ID: 0xC5)

Info Log object provides NCW-3DHIP operation and error histories (max.32).
Stored information is saved in the non-volatile memory.

Following tables indicate specifications of the Info Log object.
Info Log object has one instance.

Class Attribute (Class ID: 0xC5)

| ID | Name | Access | | Data Type | Description |
|------|---------------------|--------|-----|-----------|-------------|
| | | Get | Set | | |
| 0x01 | Revision | ○ | — | UINT | 1 |
| 0x02 | Max Instance | ○ | — | UINT | 1 |
| 0x03 | Number of Instances | ○ | — | UINT | 1 |

Class Service (Class ID: 0xC5, Instance ID: 0x00)

| ID | Name | Description |
|------|----------------------|---|
| 0x01 | Get_Attribute_All | Read out all attribute values from NCW-3DHIP. |
| 0x0E | Get_Attribute_Single | Read out one attribute value from NCW-3DHIP. |

Instance Attribute (Class ID: 0xC5, Instance ID: 0x01)

| ID | Name | Access | | Data Type | Description |
|------|----------------------------------|--------|-----|-----------|---|
| | | Get | Set | | |
| 0x01 | LOG Data 1 (Newest LOG data) | ○ | — | Structure | History data 1 |
| | | | | UDINT | History message code 1 |
| | | | | UDINT | Cumulative energization system time (unit: sec) |
| | | | | STRING | History message |
| ~ | ~ | ○ | — | ~ | ~ (History data 2 to 31) |
| 0x20 | LOG Data 32 (Oldest LOG data) | ○ | — | Structure | History data 32 |
| | | | | UDINT | History message code 32 |
| | | | | UDINT | Cumulative energization system time (unit: sec) |
| | | | | STRING | History message |

Instance Service (Class ID: 0xC5, Instance ID: 0x01)

| ID | Name | Description |
|------|----------------------|--|
| 0x0E | Get_Attribute_Single | Read out one attribute value from NCW-3DHIP. |

| History message code (Hex) | History message | Message details |
|----------------------------|---|--|
| 0x00000001 | Power ON | The power was applied. |
| 0x00000002 | Power FAIL | A low power supply was detected. |
| 0x00000003 - 0x0000000E | — | |
| 0x0000000F | IP Address CONFLICT | IP Address CONFLICT was detected. |
| | | |
| 0x00000010 | LINK1 Settings - AUTO | LINK1 port settings is "AUTO" |
| 0x00000011 | LINK1 Settings - MANUAL | LINK1 port settings is "MANUAL" |
| 0x00000012 | LINK1 Settings - 100Mbps | LINK1 port speed rate is "100Mbps" |
| 0x00000013 | LINK1 Settings - 10Mbps | LINK1 port speed rate is "10Mbps" |
| 0x00000014 | LINK1 Settings – Full Duplex | LINK1 port transmit format is "Full Duplex" |
| 0x00000015 | LINK1 Settings – Half Duplex | LINK1 port transmit format is "Half Duplex" |
| 0x00000016 | LINK2 Settings - AUTO | LINK2 port settings is "AUTO" |
| 0x00000017 | LINK2 Settings - MANUAL | LINK2 port settings is "MANUAL" |
| 0x00000018 | LINK2 Settings - 100Mbps | LINK2 port speed rate is "100Mbps" |
| 0x00000019 | LINK2 Settings - 10Mbps | LINK2 port speed rate is "10Mbps" |
| 0x0000001A | LINK2 Settings – Full Duplex | LINK2 port transmit format is "Full Duplex" |
| 0x0000001B | LINK2 Settings – Half Duplex | LINK2 port transmit format is "Half Duplex" |
| | | |
| 0x00000020 | LINK1 Port is a LinkUP | LINK1 Port was Linked up. |
| 0x00000021 | LINK1 Port is a LinkDOWN | LINK1 Port was Linked down |
| 0x00000022 | LINK2 Port is a LinkUP | LINK2 Port was Linked up. |
| 0x00000023 | LINK2 Port is a LinkDOWN | LINK2 Port was Linked down |
| | | |
| 0x00000030 | IP Address Assign Mode - SWITCH | IP Address Assign Mode is "SWITCH" |
| 0x00000031 | IP Address Assign Mode - Disable BOOTP / DHCP | IP Address Assign Mode is "Disable BOOTP / DHCP" |
| 0x00000032 | IP Address Assign Mode - BOOTP | IP Address Assign Mode is "BOOTP" |
| 0x00000033 | IP Address Assign Mode - DHCP | IP Address Assign Mode is "DHCP" |
| | | |
| 0x00000040 | State in SELFTEST | State became into "SELFTEST" |
| 0x00000041 | State in NETBOOT | State became into "NETBOOT" |
| 0x00000042 | State in BOOTP | State became into "BOOTP" |
| 0x00000043 | State in DHCP | State became into "DHCP" |
| 0x00000044 | State in NETINIT | State became into "NETINIT" |
| 0x00000045 | — | |
| 0x00000046 | State in OPERATIONAL | State became into "OPERATIONAL" |
| 0x00000047 | State in MINOR RECOVERABLE FAULT | State became into "MINOR RECOVERABLE FAULT" |
| 0x00000048 | State in MAJOR UNRECOVERABLE FAULT | State became into MAJOR UNRECOVERABLE FAULT |
| | | |
| 0x00000050 | Access to an Identity OBJECT | An Identity OBJECT was accessed. |
| 0x00000051 | Access to an Assembly OBJECT | An Assembly OBJECT was accessed. |
| 0x00000052 | Access to a Connection Manager OBJECT | A Connection Manager OBJECT was accessed. |

| History message code (Hex) | History message | Message details |
|----------------------------|--|---|
| 0x00000053 | Access to a Parameter OBJECT | A Parameter OBJECT was accessed. |
| 0x00000054 | Access to a QoS OBJECT | A QoS OBJECT was accessed. |
| 0x00000055 | Access to an ABSOCODER OBJECT | An ABSOCODER OBJECT was accessed. |
| 0x00000056 | — | |
| 0x00000057 | Access to an Info Diagnosis OBJECT | An Info Diagnosis OBJECT was accessed. |
| 0x00000058 | Access to an Info Maintenance OBJECT | An Info Maintenance OBJECT was accessed. |
| 0x00000059 | — | — |
| 0x0000005A | Access to a TCP/IP Interface OBJECT | A TCP/IP Interface OBJECT was accessed. |
| 0x0000005B | Access to an Ethernet Link OBJECT | An Ethernet Link OBJECT was accessed. |
| | | |
| 0x00000060 | I/O Transmission Start | An I/O transmission was started |
| 0x00000061 | I/O Transmission End | An I/O transmission was ended |
| | | |
| 0x00000070 - 0x00000075 | — | |
| 0x00000076 | 1Axis ERRCLR | An axis-1 ERRCLR was Received. |
| 0x00000077 | 1Axis PRESET | An axis-1 PRESET was Received. |
| 0x00000078 - 0x0000007D | — | |
| 0x0000007E | 2Axis ERRCLR | An axis-2 ERRCLR was Received. |
| 0x0000007F | 2Axis PRESET | An axis-2 PRESET was Received. |
| | | |
| 0x00000080 | NRDY | A NRDY was Detected. |
| 0x00000081 | WDTE | A WDTE was Detected. |
| 0x00000082 | ME | A ME was Detected. |
| 0x00000083 - 0x00000087 | — | |
| 0x00000088 | I/F ERR | An I/F ERR was Detected. |
| 0x00000089 - 0x0000008F | — | |
| | | |
| 0x00000090 | I/F ERR - Timeout | An I/F ERR (Timeout) was Detected. |
| 0x00000091 | I/F ERR - Unknown Command | An I/F ERR (Unknown Command) was Detected. |
| 0x00000092 | I/F ERR - CheckSum Error [Sensor to Ethernet] | An I/F ERR (CheckSum Error) was Detected. |
| 0x00000093 | I/F ERR - CheckSum Error [Ethernet to Sensor] | An I/F ERR (CheckSum Error) was Detected. |
| | | |
| 0x000000A0 | 1Axis SE | An axis-1 sensor error was Detected. |
| 0x000000A1 - 0x000000A4 | — | |
| 0x000000A5 | 1Axis SSE | An axis-1 sensor error (Disconnected Sensor Error) was Detected. |
| 0x000000A6 | 1Axis SPF | An axis-1 sensor error (Sensor Circuit Power Error) was Detected. |
| 0x000000A7 | 1Axis DE | An axis-1 sensor error (Sensor Data Error) was Detected. |
| 0x000000A8 | 2Axis SE | An axis-2 sensor error was Detected. |
| 0x000000A9 - 0x000000AC | — | |
| 0x000000AD | 2Axis SSE | An axis-2 sensor error (Disconnected Sensor Error) was Detected. |
| 0x000000AE | 2Axis SPF | An axis-2 sensor error (Sensor Circuit Power Error) was Detected. |
| 0x000000AF | 2Axis DE | An axis-2 sensor error (Sensor Data Error) was Detected. |

APPENDIX 2-11. Info Diagnosis Object (Class ID: 0xC6)

This object provides NCW-3DHIP diagnosis information.

Following tables indicate specifications of the Info Diagnosis object.
The Info Diagnosis object has one instance.

Class Attribute (Class ID: 0xC6)

| ID | Name | Access | | Data Type | Description |
|------|---------------------|--------|-----|-----------|-------------|
| | | Get | Set | | |
| 0x01 | Revision | ○ | — | UINT | 1 |
| 0x02 | Max Instance | ○ | — | UINT | 1 |
| 0x03 | Number of Instances | ○ | — | UINT | 1 |

Class Service (Class ID: 0xC6, Instance ID: 0x00)

| ID | Name | Description |
|------|----------------------|---|
| 0x01 | Get_Attribute_All | Read out all attribute values from NCW-3DHIP. |
| 0x0E | Get_Attribute_Single | Read out one attribute value from NCW-3DHIP. |

Instance Attribute (Class ID: 0xC6, Instance ID: 0x01)

| ID | Name | Access | | Data Type | Description | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|-------|--|--------|-----|-----------|--|-----|-------------|------|-----------------------|---|-----------------------------|---|-------------------|-----|----------|---|------------------------------|------|----------|----|--------------------------|-------|----------|----|--|----|---|----|-------------------------------|----|--------------------------|-------|----------|----|--|----|---|----|-------------------------------|
| | | Get | Set | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 0x01 | Sensor Circuit Status | ○ | — | UDINT | <p>Indicates the sensor circuit status.</p> <table border="1"> <thead> <tr> <th>Bit</th> <th>Description</th> </tr> </thead> <tbody> <tr> <td>0</td> <td>NRDY (Internal Error)</td> </tr> <tr> <td>1</td> <td>WDTE (Watchdog Timer Error)</td> </tr> <tr> <td>2</td> <td>ME (Memory Error)</td> </tr> <tr> <td>3-7</td> <td>Reserved</td> </tr> <tr> <td>8</td> <td>I/F ERR (Internal I/F Error)</td> </tr> <tr> <td>9-15</td> <td>Reserved</td> </tr> <tr> <td>16</td> <td>Axis-1 SE (Sensor Error)</td> </tr> <tr> <td>17-20</td> <td>Reserved</td> </tr> <tr> <td>21</td> <td>Axis-1 SSE (Disconnected Sensor Error)</td> </tr> <tr> <td>22</td> <td>Axis-1 SPF (Sensor Circuit Power Error)</td> </tr> <tr> <td>23</td> <td>Axis-1 DE (Sensor Data Error)</td> </tr> <tr> <td>24</td> <td>Axis-2 SE (Sensor Error)</td> </tr> <tr> <td>25-28</td> <td>Reserved</td> </tr> <tr> <td>29</td> <td>Axis-2 SSE (Disconnected Sensor Error)</td> </tr> <tr> <td>30</td> <td>Axis-2 SPF (Sensor Circuit Power Error)</td> </tr> <tr> <td>31</td> <td>Axis-2 DE (Sensor Data Error)</td> </tr> </tbody> </table> | Bit | Description | 0 | NRDY (Internal Error) | 1 | WDTE (Watchdog Timer Error) | 2 | ME (Memory Error) | 3-7 | Reserved | 8 | I/F ERR (Internal I/F Error) | 9-15 | Reserved | 16 | Axis-1 SE (Sensor Error) | 17-20 | Reserved | 21 | Axis-1 SSE (Disconnected Sensor Error) | 22 | Axis-1 SPF (Sensor Circuit Power Error) | 23 | Axis-1 DE (Sensor Data Error) | 24 | Axis-2 SE (Sensor Error) | 25-28 | Reserved | 29 | Axis-2 SSE (Disconnected Sensor Error) | 30 | Axis-2 SPF (Sensor Circuit Power Error) | 31 | Axis-2 DE (Sensor Data Error) |
| Bit | Description | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 0 | NRDY (Internal Error) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1 | WDTE (Watchdog Timer Error) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 2 | ME (Memory Error) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 3-7 | Reserved | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 8 | I/F ERR (Internal I/F Error) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 9-15 | Reserved | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 16 | Axis-1 SE (Sensor Error) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 17-20 | Reserved | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 21 | Axis-1 SSE (Disconnected Sensor Error) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 22 | Axis-1 SPF (Sensor Circuit Power Error) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 23 | Axis-1 DE (Sensor Data Error) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 24 | Axis-2 SE (Sensor Error) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 25-28 | Reserved | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 29 | Axis-2 SSE (Disconnected Sensor Error) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 30 | Axis-2 SPF (Sensor Circuit Power Error) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 31 | Axis-2 DE (Sensor Data Error) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 0x02 | Ethernet Circuit Status | ○ | — | UINT | <p>Indicates the Ethernet circuit status.</p> <table border="1"> <thead> <tr> <th>Bit</th> <th>Description</th> </tr> </thead> <tbody> <tr> <td>0-15</td> <td>Reserved</td> </tr> </tbody> </table> | Bit | Description | 0-15 | Reserved | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Bit | Description | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 0-15 | Reserved | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 0x03 | Sensor - Ethernet Circuit Interface Status | | | UINT | <p>Indicates the I/F status between sensor and Ethernet circuits.</p> <p>0: No error 1: Timeout error (No response from sensor circuit) 2: command error 3: checksum error (Data from sensor circuit to Ethernet circuit) 4: checksum error (Data from Ethernet circuit to sensor circuit)</p> | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

Instance Service (Class ID: 0xC6, Instance ID: 0x01)

| ID | Name | Description |
|------|----------------------|---|
| 0x01 | Get_Attribute_All | Read out all attribute values from NCW-3DHIP. |
| 0x0E | Get_Attribute_Single | Read out one attribute value from NCW-3DHIP. |

APPENDIX 2-12. Info Maintenance Object (Class ID: 0xC7)

Stores NCW-3DHIP maintenance information in this object.
The maintenance information is saved in the non-volatile memory.

Following tables indicate specifications of the Info Maintenance object.
The Info Maintenance object has one instance.

Class Attribute (Class ID: 0xC7)

| ID | Name | Access | | Data Type | Description |
|------|---------------------|--------|-----|-----------|-------------|
| | | Get | Set | | |
| 0x01 | Revision | ○ | — | UINT | 1 |
| 0x02 | Max Instance | ○ | — | UINT | 1 |
| 0x03 | Number of Instances | ○ | — | UINT | 1 |

Class Service (Class ID: 0xC7, Instance ID: 0x00)

| ID | Name | Description |
|------|----------------------|---|
| 0x01 | Get_Attribute_All | Read out all attribute values from NCW-3DHIP. |
| 0x0E | Get_Attribute_Single | Read out one attribute value from NCW-3DHIP. |

Instance Attribute (Class ID: 0xC7, Instance ID: 0x01)

| ID | Name | Access | | Data Type | Description |
|------|-------------------------|--------|-----|-----------|---|
| | | Get | Set | | |
| 0x01 | Power Distribution Time | ○ | — | UDINT | NCW-3DHIP cumulative energization time can be check. Unit: sec |
| 0x02 | Function | ○ | ○ | Structure | Function information |
| | | | | UDINT | Stores a function code. |
| | | | | STRING | Stores a function comment. (Max.character No.: 58) |
| 0x03 | Location | ○ | ○ | Structure | Installation location information |
| | | | | UDINT | Stores an installation location code. |
| | | | | STRING | Stores an installation location comment. (Max.character No.: 58) |
| 0x04 | Installation Date | ○ | ○ | Structure | Installation date information |
| | | | | UDINT | Stores installation date code. |
| | | | | STRING | Stores installation date comment. (Max.character No.: 58) |
| 0x05 | Descriptor1 | ○ | ○ | Structure | Descriptor1 information |
| | | | | UDINT | Stores a descriptor 1 code. |
| | | | | STRING | Stores a descriptor 1 comment. (Max.character No.: 58) |
| 0x06 | Descriptor2 | ○ | ○ | Structure | Descriptor2 information |
| | | | | UDINT | Stores a descriptor 2 code. |
| | | | | STRING | Stores a descriptor 2 comment. (Max.character No.: 58) |
| 0x07 | Security | ○ | ○ | Structure | Security information |
| | | | | UDINT | Stores a security code. |
| | | | | STRING | Stores a security name comment. (Max. character No.:58) |

Instance Service (Class ID: 0xC7, Instance ID: 0x01)

| ID | Name | Description |
|------|----------------------|--|
| 0x0E | Get_Attribute_Single | Read out one attribute value from NCW-3DHIP. |
| 0x10 | Set_Attribute_Single | Write one attribute value to NCW-3DHIP. |

APPENDIX 2-13. Device Level Ring (DLR) Object (Class ID: 0x47)

This object can confirm the state of the NCW-3DHIP's Device Level Ring.

Following tables indicate specifications of the Device Level Ring object.
The Device Level Ring object has one instance.

Class Attribute (Class ID: 0x47)

| ID | Name | Access | | Data Type | Description |
|------|--------------------|--------|-----|-----------|-------------|
| | | Get | Set | | |
| 0x01 | Revision | ○ | — | UINT | 3 |
| 0x02 | Max Instance | ○ | — | UINT | 1 |
| 0x03 | Number of Instance | ○ | — | UINT | 1 |

Class Service (Class ID: 0x47, Instance ID: 0x00)

| ID | Name | Description |
|------|----------------------|---|
| 0x01 | Get_Attribute_All | Read out all attribute values from NCW-3DHIP. |
| 0x0E | Get_Attribute_Single | Read out one attribute value from NCW-3DHIP. |

Instance Attribute (Class ID: 0x47, Instance ID: 0x01)

| ID | Name | Access | | Data Type | Description | | |
|------|---|--------|-----|-----------|---|--|-------|
| | | Get | Set | | | | |
| 0x01 | Network Topology | ○ | — | USINT | Indicates the current network topology mode. | | |
| | | | | | Value | Description | |
| | | | | | 0 | Linear | |
| 1 | Ring | | | | | | |
| 0x02 | Network Status | ○ | — | USINT | Indicates the current status of the network. | | |
| | | | | | Value | Description | |
| | | | | | 0 | Normal operation in both Ring and Linear Network Topology modes. | |
| 1 | Ring Fault. A ring fault has been detected. Valid only when Network Topology is Ring. | | | | | | |
| 0x0A | Active Supervisor Address | ○ | — | Structure | Address information of the active ring supervisor | | |
| | | | | UDINT | Indicates the IP address of the active ring. | | |
| | | | | USINT[6] | Indicates the MAC address of the active ring. | | |
| 0x0C | Capability Flags | ○ | — | DWORD | Indicates DLR capabilities of NCW-3DHIP. | | |
| | | | | | Bit | Name | Value |
| | | | | | 0 | Announce-based Ring Node | 0 |
| | | | | | 1 | Becaon-based Ring Node | 1 |
| | | | | | 2-4 | Reserved | 0 |
| | | | | | 5 | Supervisor Capable | 0 |
| | | | | | 6 | Redundant Gateway Capable | 0 |
| | | | | | 7 | Flush_Table frame Capable | 1 |
| | | | | | 8-31 | Reserved | 0 |

Instance Service (Class ID: 0x47, Instance ID: 0x01)

| ID | Name | Description |
|------|----------------------|---|
| 0x01 | Get_Attribute_All | Read out all attribute values from NCW-3DHIP. Attribute ID 1 to 8 and 10 to12 can be read out. Attribute ID 3 to 8 and 11 aren't supported, thus initial values are read out. |
| 0x0E | Get_Attribute_Single | Read out one attribute value from NCW-3DHIP. |

APPENDIX 3. WEB SERVER FUNCTION

NCW-3DHIP can use the web server function.

The web server function can set and check the user management and information.

APPENDIX 3-1. Login Procedures

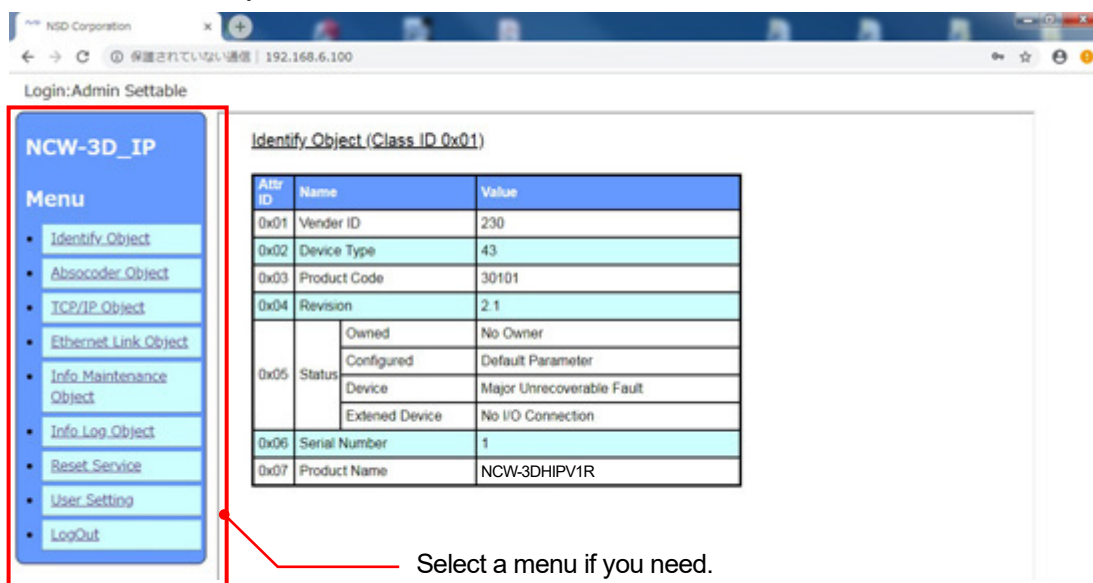
Login NCW-3DHIP for using the web server function.

●Login procedures

1. Enter NCW-3DHIP's IP address to the address bar of the internet browser.
2. A login window appears.
3. Enter "admin" to the user name and password fields, click "Login" button.
(*: The password can be changed at "user setting window".)



4. NCW-3D_IP's menu "Identity Object" appears after the login.
Select a menu if you need.

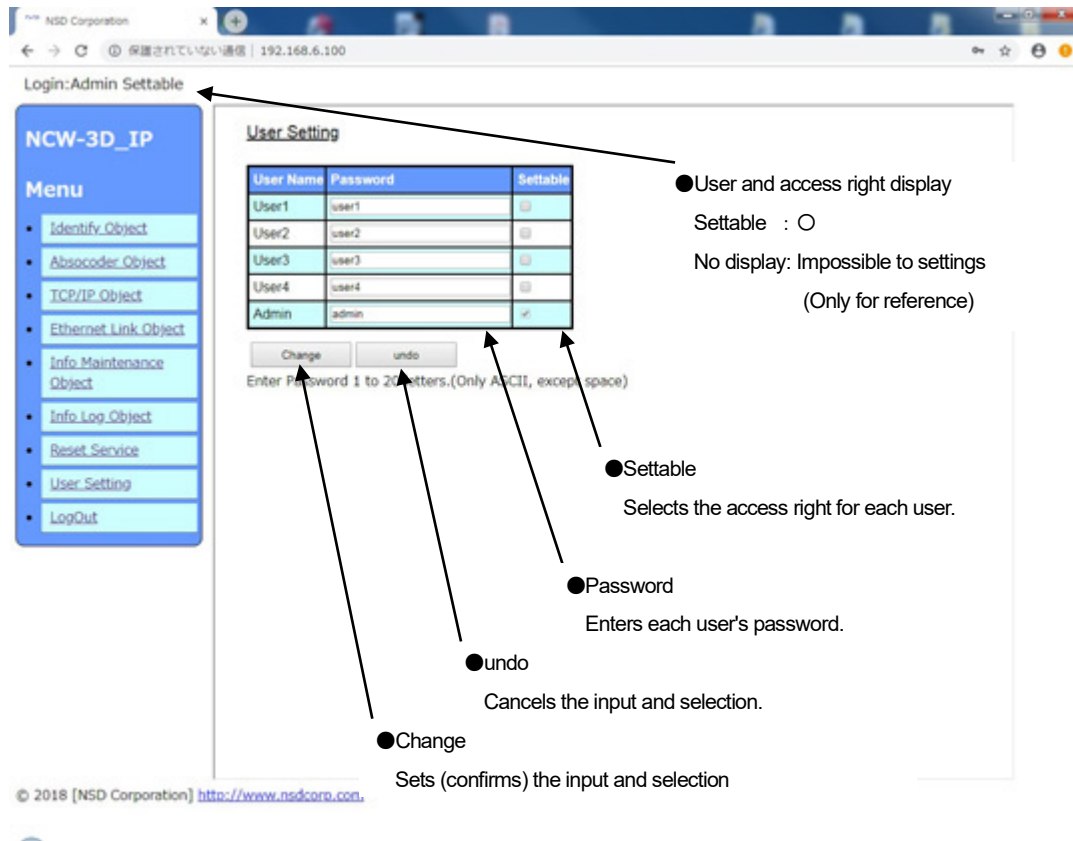


APPENDIX 3-2. User management function

User's setting operation can be restricted at the management function.

Click "User Setting" on the menu.

A User Setting window appears.



●Screen setting contents

Only administrator (admin) can set this screen setting.

The password for users (User 1 to 4) and administrator (admin) can be set.

The user name cannot be changed, but password can be set.

Users (users 1 to 4) can be selected "settable" or "unsettable" for the access right (settable).

●Operation method

The administrator sets the users' passwords (user 1 to 4).

Users can use after receiving "User name" and "Password" from the administrator.

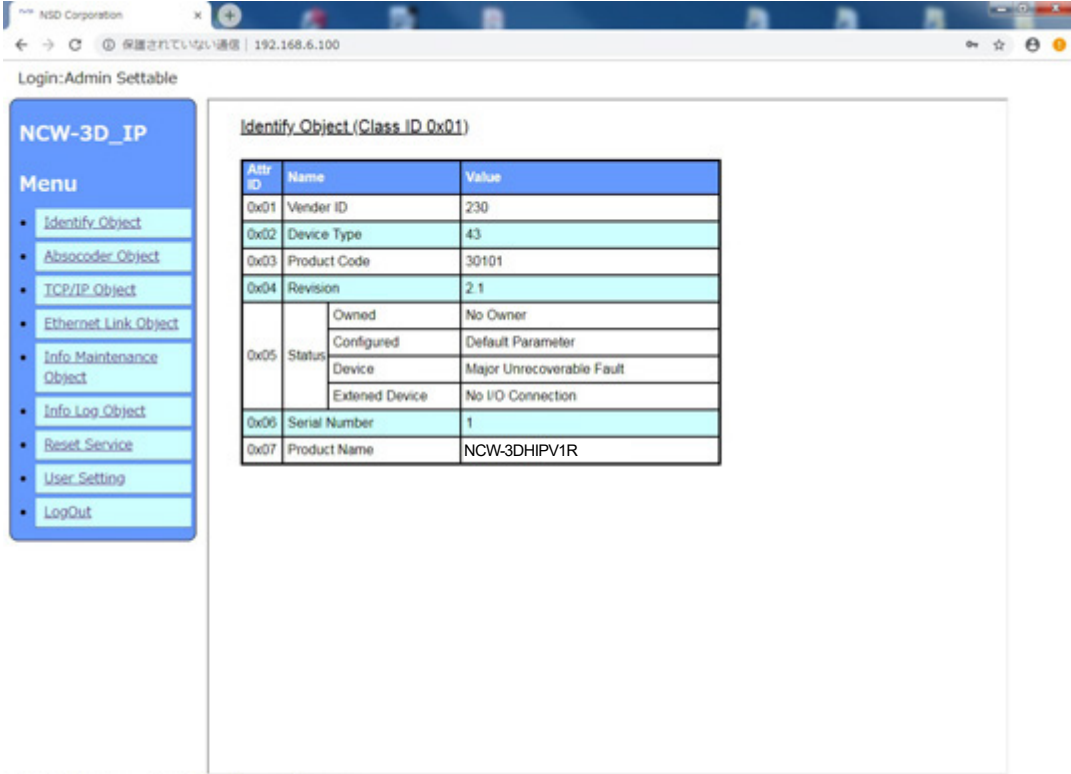
The factory settings for manageable user names and access rights are described below;

(User names cannot be changed.)

| No. | User name | Password (factory setting) | Access right (factory setting) | Access right | Note |
|-----|-----------|----------------------------|--------------------------------|--------------------------------------|----------------|
| 1 | User1 | user1 | Unsettable (for reference) | Select either settable or unsettable | General user1 |
| 2 | User2 | user2 | | | General user 2 |
| 3 | User3 | user3 | | | General user 3 |
| 4 | User4 | user4 | | | General user 4 |
| 5 | Admin | admin | Settable | Settable only | Administrator |

APPENDIX 3-3. Setting / Reference display

(1) Menu "Identity Object (ClassID: 0x01)" - Reference of the identity information



The screenshot shows a web browser window with the URL 192.168.6.100. The page title is "Login:Admin Settable". On the left, there is a blue sidebar menu for "NCW-3D_IP" with the following items: Identify Object, Absocoder Object, TCP/IP Object, Ethernet Link Object, Info Maintenance Object, Info Log Object, Reset Service, User Setting, and LogOut. The main content area displays "Identify Object (Class ID 0x01)" and a table with the following data:

| Attr ID | Name | Value | |
|---------|---------------|----------------|---------------------------|
| 0x01 | Vender ID | 230 | |
| 0x02 | Device Type | 43 | |
| 0x03 | Product Code | 30101 | |
| 0x04 | Revision | 2.1 | |
| 0x05 | Status | Owned | No Owner |
| | | Configured | Default Parameter |
| | | Device | Major Unrecoverable Fault |
| | | Extened Device | No I/O Connection |
| 0x06 | Serial Number | 1 | |
| 0x07 | Product Name | NCW-3DHIPV1R | |

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(2) Menu “Absocoder Object (ClassID: 0x64)” - References and settings of ABSOCODER's parameter and status

NCW-3D_IP

Menu

- Identify Object
- Absocoder Object
- TCP/IP Object
- Ethernet Link Object
- Info Maintenance Object
- Info Log Object
- Reset Service
- User Setting
- LogOut

Absocoder Object (Class ID 0x64)

| Attr ID | Name | Value | |
|---------|----------------------------------|---|---|
| | | Axis1(Inst ID 1) | Axis2(Inst ID 2) |
| 0x03 | Position Value Unsigned | 820 | 0 |
| 0x0C | Position Data Increase Direction | <input checked="" type="radio"/> CW <input type="radio"/> CCW | <input checked="" type="radio"/> CW <input type="radio"/> CCW |
| 0x13 | Preset Value Range: 0 to 131071 | <input type="text" value="0"/> Axis-1 Preset | <input type="text" value="0"/> Axis-2 Preset |
| 0x64 | Axis Unavailable | <input checked="" type="radio"/> Available <input type="radio"/> Unavailable | <input checked="" type="radio"/> Available <input type="radio"/> Unavailable |
| 0x65 | Error Clear | <input checked="" type="radio"/> Auto <input type="radio"/> Manual | <input checked="" type="radio"/> Auto <input type="radio"/> Manual |

Parameter Change

Axis-1 Parameter Axis-2 Parameter Undo

Info Diagnosis Object (Class ID 0xC8)

| Attr ID | Name | Value | |
|---------|-----------------------|---------------------|--|
| 0x01 | Sensor Circuit Status | Converter Error | <input checked="" type="checkbox"/> NRDY <input type="checkbox"/> WDTE <input checked="" type="checkbox"/> ME <input type="checkbox"/> IF ERR |
| | | Axis-1 Sensor Error | <input type="checkbox"/> SE <input type="checkbox"/> SSE <input type="checkbox"/> SPF <input type="checkbox"/> DE |
| | | Axis-2 Sensor Error | <input checked="" type="checkbox"/> SE <input checked="" type="checkbox"/> SSE <input type="checkbox"/> SPF <input type="checkbox"/> DE |

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Note

When setting parameters, switch the operation mode of the host PLC to program mode (PROG).
Cannot be set in run mode (RUN).

This operation is performed by using the PLC's configuration tool (a PLC development tool software).

*: Depending on the PLC model, this operation can also be performed by the mode selection switch on the CPU card.

(3) Menu “TCP/IP Object (ClassID: 0xF5)” - References and settings of Ethernet TCP/IP's parameter and status

NCW-3D_IP

Menu

- Identify Object
- AbsoCoder Object
- TCP/IP Object
- Ethernet Link Object
- Info Maintenance Object
- Info Log Object
- Reset Service
- User Setting
- LogOut

TCP/IP Object (Class ID 0xF5)

| Attr ID | Name | Value | |
|---------|--------------------------|---|---------------|
| 0x01 | Status | Hardware Setting <input type="checkbox"/> Interface Configuration Pending | |
| 0x02 | Configuration Capability | <input type="checkbox"/> BOOTP Client <input type="checkbox"/> DNS Client <input type="checkbox"/> DHCP Client <input type="checkbox"/> DHCP-DNS Update <input type="checkbox"/> Configuration Settable <input checked="" type="checkbox"/> Hardware Configurable <input checked="" type="checkbox"/> Interface Configuration Change Requires Reset | |
| 0x03 | Configuration Control | <input checked="" type="checkbox"/> Stored Value <input type="checkbox"/> BOOTP <input type="checkbox"/> DHCP | |
| 0x05 | Interface Configuration | IP Address | 192.168.6.100 |
| | | Network Mask | 255.255.255.0 |
| | | Default Gateway | 192.168.6.254 |
| | | Name Server | 0.0.0.0 |
| | | Name Server2 | 0.0.0.0 |
| | Domain Name | nsdcorp.co.jp | |

Interface Configuration is Hardware Setting, Can not change them.

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(4) Menu “Ethernet Link Object (ClassID: 0xF6)” - Reference of the Ethernet Link status

NCW-3D_IP

Menu

- Identify Object
- AbsoCoder Object
- TCP/IP Object
- Ethernet Link Object
- Info Maintenance Object
- Info Log Object
- Reset Service
- User Setting
- LogOut

Ethernet Link Object (Class ID 0xF6)

| Attr ID | Name | Value | | |
|---------|------------------|-------------------|------------------|-------------|
| | | Port1(Inst ID 1) | Port2(Inst ID 2) | |
| 0x01 | Interface Speed | 100Mbps | 0Mbps | |
| 0x02 | Interface Flag | Link | Link Up | Link Down |
| | | Duplex | Full | ----- |
| | | Negotiation | Succeeded | In Progress |
| 0x03 | Physical Address | a8-Ba-60-00-00-01 | | |

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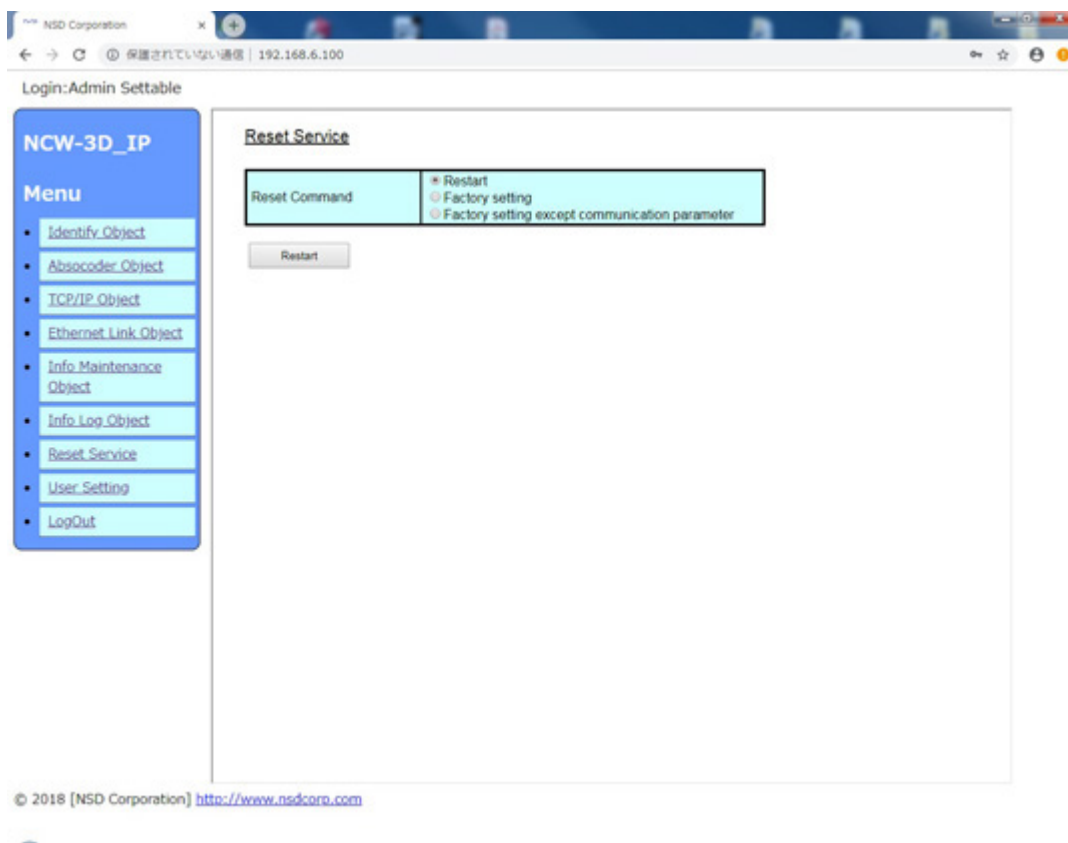
(5) Menu “Info Log Object (ClassID: 0xC5)” - Reference and settings of the log information

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(6) Menu “Info Maintenance Object (ClassID: 0xC7)” - Reference and settings of the maintenance information

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(7) Menu “Reset Service” - Reset operation of NCW-3DHIP



The reset operation can be selected from the following three types;

| No. | Type of Reset | Description |
|-----|--|---|
| 1 | Restart | Restart |
| 2 | Factory setting | All NCW-3DHIP parameters' setting is redesignated to initial values (factory setting), and restart. |
| 3 | Factory setting except communication parameter | All NCW-3DHIP parameters' setting is redesignated to initial values (factory setting) except communication LINK parameter, and restart. |



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