DX200 OPTIONS INSTRUCTIONS
FOR PROFINET COMMUNICATIONS FUNCTION
(FOR CP1616 MADE BY Siemens)

Upon receipt of the product and prior to initial operation, read these instructions thoroughly, and retain for future reference.

MOTOMAN INSTRUCTIONS
MOTOMAN-- INSTRUCTIONS
DX200 INSTRUCTIONS
DX200 OPERATOR’S MANUAL (for each purpose)
DX200 MAINTENACE MANUAL

The DX200 operator’s manual above corresponds to specific usage. Be sure to use the appropriate manual.

Part Number: 165837-1CD
Revision: 1
MANDATORY

• This manual explains the PROFINET board (CP1616 made by Siemens) of the DX200 system and general operations. Read this manual carefully and be sure to understand its contents before handling the DX200.

• General items related to safety are listed in Chapter 1: Safety of the DX200 Instructions. To ensure correct and safe operation, carefully read the DX200 Instruction before reading this manual.

CAUTION

• Some drawings in this manual are shown with the protective covers or shields removed for clarity. Be sure all covers and shields are replaced before operating this product.

• The drawings and photos in this manual are representative examples and differences may exist between them and the delivered product.

• YASKAWA may modify this model without notice when necessary due to product improvements, modifications, or changes in specifications. If such modification is made, the manual number will also be revised.

• If your copy of the manual is damaged or lost, contact a YASKAWA representative to order a new copy. The representatives are listed on the back cover. Be sure to tell the representative the manual number listed on the front cover.

• YASKAWA is not responsible for incidents arising from unauthorized modification of its products. Unauthorized modification voids your product’s warranty.
We suggest that you obtain and review a copy of the ANSI/RIA National Safety Standard for Industrial Robots and Robot Systems (ANSI/RIA R15.06-2012). You can obtain this document from the Robotic Industries Association (RIA) at the following address:

Robotic Industries Association
900 Victors Way
P.O. Box 3724
Ann Arbor, Michigan 48106
TEL: (734) 994-6088
FAX: (734) 994-3338
www.roboticsonline.com

Ultimately, well-trained personnel are the best safeguard against accidents and damage that can result from improper operation of the equipment. The customer is responsible for providing adequately trained personnel to operate, program, and maintain the equipment. NEVER ALLOW UNTRAINED PERSONNEL TO OPERATE, PROGRAM, OR REPAIR THE EQUIPMENT!

We recommend approved YASKAWA training courses for all personnel involved with the operation, programming, or repair of the equipment.

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications.
Notes for Safe Operation

Read this manual carefully before installation, operation, maintenance, or inspection of the DX200.

In this manual, the Notes for Safe Operation are classified as “DANGER”, “WARNING”, “CAUTION”, “MANDATORY”, or “PROHIBITED”.

**DANGER**
Indicates an imminent hazardous situation which, if not avoided, could result in death or serious injury to personnel.

**WARNING**
Indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury to personnel.

**CAUTION**
Indicates a potentially hazardous situation which, if not avoided, could result in minor or moderate injury to personnel and damage to equipment. It may also be used to alert against unsafe practices.

**MANDATORY**
Always be sure to follow explicitly the items listed under this heading.

**PROHIBITED**
Must never be performed.

Even items described as “CAUTION” may result in a serious accident in some situations. At any rate, be sure to follow these important items.

---

**NOTE**
To ensure safe and efficient operation at all times, be sure to follow all instructions, even if not designated as “DANGER”, “WARNING” and “CAUTION”.
ProfiNet Communications
Function

Notes for Safe Operation

PROHIBITED

- Do not use or keep the board in the following environmental conditions.
  - Where exposed to direct sunshine
  - Where vibration or impact occurs
  - Where high humidity exists
  - Where a strong magnetic field exists
  - Where much dust exists
  - Where a sudden change in the temperature occurs
  - Where corrosive gases occur
  - Where condensation occurs

Improper usage of the board may damage the board.
Notes for Safe Operation

WARNING

• Before operating the manipulator, check that servo power is turned OFF when the emergency stop buttons on the front door of the DX200 and programming pendant are pressed. When the servo power is turned OFF, the SERVO ON LED on the programming pendant is turned OFF.

Injury or damage to machinery may result if the emergency stop circuit cannot stop the manipulator during an emergency. The manipulator should not be used if the emergency stop buttons do not function.

Fig. : Emergency Stop Button

• Once the emergency stop button is released, clear the cell of all items which could interfere with the operation of the manipulator. Then turn the servo power ON.

Injury may result from unintentional or unexpected manipulator motion.

Fig. : Release of Emergency Stop

• Observe the following precautions when performing teaching operations within the P-point maximum envelope of the manipulator
  – Be sure to use a lockout device to the safeguarding when going inside. Also, display the sign that the operation is being performed inside the safeguarding and make sure no one closes the safeguarding.
  – View the manipulator from the front whenever possible.
  – Always follow the predetermined operating procedure.
  – Keep in mind the emergency response measures against the manipulator’s unexpected motion toward you.
  – Ensure that you have a safe place to retreat in case of emergency.

Improper or unintended manipulator operation may result in injury.

• Confirm that no persons are present in the P-point maximum envelope of the manipulator and that you are in a safe location before:
  – Turning ON the DX200 power
  – Moving the manipulator with the programming pendant
  – Running the system in the check mode
  – Performing automatic operations

Injury may result if anyone enters the P-point maximum envelope of the manipulator during operation. Always press an emergency stop button immediately if there are problems. The emergency stop buttons are located on the right of the front door of the DX200 and the programming pendant.

• Before wiring, be sure to turn OFF the power supply and put up a warning sign, such as “DO NOT TURN ON THE POWER.”

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

- Do not touch the inside of the panel for 5 minutes after the power is turned OFF. The remaining charged voltage in the capacitor may cause an electric shock or an injury.
- Be sure to close the door and install the protection cover while the power is turned ON.

Failure to observe this warning may result in a fire or an electric shock.
CAUTION

• Perform the following inspection procedures prior to conducting manipulator teaching. If problems are found, repair them immediately, and be sure that all other necessary processing has been performed.
  – Check for problems in manipulator movement.
  – Check for damage to insulation and sheathing of external wires.

• Always return the programming pendant to the hook on the cabinet of the DX200 after use.

The programming pendant can be damaged if it is left in the manipulator's work area, on the floor, or near fixtures.

Read and understand the Explanation of Warning Labels in the DX200 Instructions before operating the manipulator:
  • The wiring and mounting must be performed by authorized and qualified personnel.

Failure to observe this caution may result in a fire or an electric shock.
  • Make sure that there is no foreign matter such as metal chips on the board.

In case of malfunction, etc., it may result in an injury or damage the board.
  • Make sure that there is no damage or deflection of parts on the board.

In case of malfunction, etc., it may result in an injury or damage the board.
  • Correctly connect each cable and connector.

Failure to observe this caution may result in a fire or damage the board.
  • Set the switches, etc. correctly.

Malfunction, caused by an incorrect setting, may result in an injury or damage the board.
  • Never touch the mounting surfaces of the board parts directly with fingers.

The generated static electricity may damage the IC.
  • Never touch the soldered surfaces of the board directly with fingers.

Protrusions on the soldered surface may result in an injury.
  • No shock to the board.

The shock may damage the board.
Definition of Terms Used Often in This Manual

The MOTOMAN is the YASKAWA industrial robot product.

The MOTOMAN usually consists of the manipulator, the controller, the programming pendant, and supply cables.

In this manual, the equipment is designated as follows:

<table>
<thead>
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<th>Equipment</th>
<th>Manual Designation</th>
</tr>
</thead>
<tbody>
<tr>
<td>DX200 controller</td>
<td>DX200</td>
</tr>
<tr>
<td>DX200 programming pendant</td>
<td>Programming pendant</td>
</tr>
<tr>
<td>Cable between the manipulator and the controller</td>
<td>Manipulator cable</td>
</tr>
</tbody>
</table>

Descriptions of the programming pendant, buttons, and displays are shown as follows:

<table>
<thead>
<tr>
<th>Equipment</th>
<th>Manual Designation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Programming Pendant</td>
<td>Character Keys/Symbol Keys: The keys which have characters printed on them are denoted with [], ex. [ENTER]</td>
</tr>
<tr>
<td>Axis Keys/Number Keys</td>
<td>“Axis Keys” and “Number Keys” are generic names for the keys for axis operation and number input.</td>
</tr>
<tr>
<td>Keys pressed simultaneously</td>
<td>When two keys are to be pressed simultaneously, the keys are shown with a “+” sign between them, ex. [SHIFT]+[COORD]</td>
</tr>
<tr>
<td>Displays</td>
<td>The menu displayed in the programming pendant is denoted with {}. ex. {JOB}</td>
</tr>
</tbody>
</table>

Registered Trademark

In this manual, names of companies, corporations, or products are trademarks, registered trademarks, or brand names for each company or corporation. The indications of (R) and TM are omitted.
Safeguarding Tips

All operators, programmers, maintenance personnel, supervisors, and anyone working near the system must become familiar with the operation of this equipment. All personnel involved with the operation of the equipment must understand potential dangers of operation. General safeguarding tips are as follows:

- Improper operation can result in personal injury and/or damage to the equipment. Only trained personnel familiar with the operation of this equipment, the operator's manuals, the system equipment, and options and accessories should be permitted to operate this equipment.
- Improper connections can damage the equipment. All connections must be made within the standard voltage and current ratings of the equipment.
- The system must be placed in Emergency Stop (E-Stop) mode whenever it is not in use.
- In accordance with ANSI/RIA R15.06-2012, section 4.2.5, Sources of Energy, use lockout/tagout procedures during equipment maintenance. Refer also to Section 1910.147 (29CFR, Part 1910), Occupational Safety and Health Standards for General Industry (OSHA).

Mechanical Safety Devices

The safe operation of this equipment is ultimately the users responsibility. The conditions under which the equipment will be operated safely should be reviewed by the user. The user must be aware of the various national codes, ANSI/RIA R15.06-2012 safety standards, and other local codes that may pertain to the installation and use of this equipment.

Additional safety measures for personnel and equipment may be required depending on system installation, operation, and/or location. The following safety equipment is provided as standard:

- Safety barriers
- Door interlocks
- Emergency stop palm buttons located on operator station

Check all safety equipment frequently for proper operation. Repair or replace any non-functioning safety equipment immediately.
Programming, Operation, and Maintenance Safety

All operators, programmers, maintenance personnel, supervisors, and anyone working near the system must become familiar with the operation of this equipment. Improper operation can result in personal injury and/or damage to the equipment. Only trained personnel familiar with the operation, manuals, electrical design, and equipment interconnections of this equipment should be permitted to program, or maintain the system. All personnel involved with the operation of the equipment must understand potential dangers of operation.

- Inspect the equipment to be sure no potentially hazardous conditions exist. Be sure the area is clean and free of water, oil, debris, etc.
- Be sure that all safeguards are in place. Check all safety equipment for proper operation. Repair or replace any non-functioning safety equipment immediately.
- Check the E-Stop button on the operator station for proper operation before programming. The equipment must be placed in Emergency Stop (E-Stop) mode whenever it is not in use.
- Back up all programs and jobs onto suitable media before program changes are made. To avoid loss of information, programs, or jobs, a backup must always be made before any service procedures are done and before any changes are made to options, accessories, or equipment.
- Any modifications to the controller unit can cause severe personal injury or death, as well as damage to the robot! Do not make any modifications to the controller unit. Making any changes without the written permission from YASKAWA will void the warranty.
- Some operations require a standard passwords and some require special passwords.
- The equipment allows modifications of the software for maximum performance. Care must be taken when making these modifications. All modifications made to the software will change the way the equipment operates and can cause severe personal injury or death, as well as damage parts of the system. Double check all modifications under every mode of operation to ensure that the changes have not created hazards or dangerous situations.
- This equipment has multiple sources of electrical supply. Electrical interconnections are made between the controller and other equipment. Disconnect and lockout/tagout all electrical circuits before making any modifications or connections.
- Do not perform any maintenance procedures before reading and understanding the proper procedures in the appropriate manual.
- Use proper replacement parts.
- Improper connections can damage the equipment. All connections must be made within the standard voltage and current ratings of the equipment.
**Maintenance Safety**

Turn the power OFF and disconnect and lockout/tagout all electrical circuits before making any modifications or connections.

Perform only the maintenance described in this manual. Maintenance other than specified in this manual should be performed only by YASKAWA-trained, qualified personnel.

**Summary of Warning Information**

This manual is provided to help users establish safe conditions for operating the equipment. Specific considerations and precautions are also described in the manual, but appear in the form of Dangers, Warnings, Cautions, and Notes.

It is important that users operate the equipment in accordance with this instruction manual and any additional information which may be provided by YASKAWA. Address any questions regarding the safe and proper operation of the equipment to YASKAWA Customer Support.
Customer Support Information

If you need assistance with any aspect of your ProfiNet Communications Function system, please contact YASKAWA Customer Support at the following 24-hour telephone number:

(937) 847-3200

For routine technical inquiries, you can also contact YASKAWA Customer Support at the following e-mail address:

techsupport@motoman.com

When using e-mail to contact YASKAWA Customer Support, please provide a detailed description of your issue, along with complete contact information. Please allow approximately 24 to 36 hours for a response to your inquiry.

Please use e-mail for routine inquiries only. If you have an urgent or emergency need for service, replacement parts, or information, you must contact YASKAWA Customer Support at the telephone number shown above.

Please have the following information ready before you call Customer Support:

- System
  - ProfiNet Communications Function

- Primary Application

- Controller
  - DX200

- Software Version
  - Access this information on the Programming Pendant’s LCD display screen by selecting {MAIN MENU} - {SYSTEM INFO} - {VERSION}

- Robot Serial Number
  - Located on the robot data plate

- Robot Sales Order Number
  - Located on the DX200 controller data plate
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This instruction manual describes settings and other information required for the PROFINET board CP1616 (made by Siemens, hereinafter referred to as the CP1616) to be used with DX200.

The use of this board enables DX200 general IO data to be transferred to and from other PROFINET communication stations.

The CP1616 has multiple firmware versions. Depending on the DX200 software version, use the following firmware version for the CP1616:

<table>
<thead>
<tr>
<th>DX200 software version</th>
<th>CP1616 firmware version</th>
</tr>
</thead>
<tbody>
<tr>
<td>DN1.47.00A(-00 or earlier)</td>
<td>V2.5.2.0</td>
</tr>
<tr>
<td>From DN1.50.00A(-00 to DN1.80.00A(-00)</td>
<td>V2.6.1.0</td>
</tr>
<tr>
<td>DN1.81.00A(-00 or later)</td>
<td>V2.6.1.6</td>
</tr>
</tbody>
</table>

If an unsupported firmware version is used with the software version of DN1.56.00A(-00 or later, an alarm 4918 "PROFINET SETTING ERROR" occurs.

This manual describes communication settings of the CP1616 board using the Siemens "STEP 7" software application. When using other software, refer to the manual of each software.

### 1.1 System Configuration

- **Example of system configuration when using as PROFINET IO Device**

![PROFINET IO Controller
External PLC (sequencer)](image)

![PROFINET Cable](image)

![HUB](image)

![PROFINET IO Device CP1616](image)

![DX200 Controller](image)
1. Outline
1.1 System Configuration

- Example of system configuration when using as PROFINET IO Controller

- Example of system configuration when using as PROFINET IO Controller and IO Device simultaneously

The CP1616 can be used as the IO Controller and the IO Device simultaneously only when connecting equipment made by Siemens as the host IO Controller. When connecting equipment not made by Siemens, the CP1616 cannot be used as the IO Controller and the IO Device simultaneously.
2 Hardware Specifications

2.1 Board External View

![PROFINET Connector (RJ45)](image)

- SF (group fault) LED
- BF (bus fault) LED
- link LED
- Activity LED
2.2 Board Specifications

<table>
<thead>
<tr>
<th>Items</th>
<th>Specifications</th>
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<tbody>
<tr>
<td>Interface to external devices</td>
<td>PROFINET</td>
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<tr>
<td>Board mounting position</td>
<td>PCI Slot in the DX200</td>
</tr>
<tr>
<td>Error display</td>
<td>LED display</td>
</tr>
<tr>
<td>Maximum number of I/O</td>
<td>Input: 4048 points  Output: 4048 points</td>
</tr>
<tr>
<td></td>
<td>However, the Input points and Output points cannot be set individually.</td>
</tr>
</tbody>
</table>

The maximum I/O numbers above (Input: 4048 points  Output: 4048 points) only applies when this board is used as the optional IO module. If optional IO modules other than this board have been installed, the I/O number above may not be available.

2.3 Communication Specifications

<table>
<thead>
<tr>
<th>Explanation</th>
</tr>
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<tbody>
<tr>
<td><strong>Connection type</strong></td>
</tr>
<tr>
<td>Star (connected via a HUB)</td>
</tr>
<tr>
<td><strong>Communication speed</strong></td>
</tr>
<tr>
<td>10Mbps/100Mbps (detected automatically when startup)</td>
</tr>
<tr>
<td><strong>Communication media</strong></td>
</tr>
<tr>
<td>Use a PROFINET cable</td>
</tr>
</tbody>
</table>
3 Attaching of the Board

**WARNING**

- Before wiring, be sure to turn OFF the power supply and put up a warning sign, such as “DO NOT TURN ON THE POWER.”
- Do not touch the inside of the panel for 5 minutes after the power is turned OFF.
- Be sure to close the door and install the protection cover while the power is turned ON.

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

**CAUTION**

- The wiring and mounting must be performed by authorized and qualified personnel.
- Make sure that there is no foreign matter such as metal chips on the board.
- Make sure that there is no damage or deflection of parts on the board.
- Correctly connect each cable and connector.
- Set the switches, etc. correctly.
- Never touch the mounting surfaces and the soldered surfaces of the board parts directly with fingers.

Failure to observe this caution may result in a fire or damage the board.

In case of malfunction, etc. it may result in an injury or damage the board.

The generated static electricity may damage the IC, and protrusions on the soldered surface may result in an injury.

Never give any shock to the board.

The shock may damage the board.
3.1 Operating the Front Door of DX200 (Controller)

1. Open the front door of the DX200.
   
   (1) Using a flathead screwdriver, rotate the door locks on the front of the DX200 (two places) 90 degrees clockwise.

   *Fig. 3-1: Rotating the Door Lock Clockwise*

   ![Diagram of door lock rotation](image)

   (2) Rotate the main power supply switch to the "OFF" position and open the door gently.

   *Fig. 3-2: Rotating the Main Power Supply Switch to the OFF Position?*

   ![Diagram of main power supply switch](image)
3.2 Attaching the CP1616 to the DX200

1. Remove the riser card (JANCD-YBB02-E) from the CPU rack.
2. Insert the CP1616 into the PCI slot of the riser card, and tighten the support clamps to ensure it does not come lose.
3. Attach the riser card to the CPU rack.

3.3 Connecting the Cable

1. Connect the PROFINET cable to the CP1616 PROFINET connector.
3.4 Closing the Front Door of the DX200

Close the DX200 door.

(1) Close the door gently.

(2) Rotate the door lock counterclockwise 90 degrees.

**Fig. 3-3: Rotating the Door Lock Counterclockwise**

**CAUTION**

- Always close the door of the controller (DX200) except for maintenance.
- Make sure to rotate all the door locks counterclockwise.
- If dust or water enter inside the controller, electric shock or breakdown of DX200 may result.
4 Setting of the Board

4.1 CP1616 Communication Settings

To perform the CP1616 communication settings, it requires the setting tool made by Siemens. This section explains the setting method using "STEP 7". The STEP 7's version used is V5.5 + SP2. Refer to the instruction manual of STEP 7 for more information on the setting method.

4.1.1 Network Interface Settings

In order to access to the devices, such as the CP1616 and the PLC, from the PC on which STEP 7 is installed, it requires the PC network interface settings.

1. Start SIMATIC Manager (STEP 7).
2. Select {Options} - {Set PG/PC Interface...} to display the following dialogue.

3. Select the network interface of the PC to be used from the (Access Path) tab list, and then select (OK) at the following dialogue.

For the network interface selected at this step, an optional fixed IP address should be set. When allocated automatically by DHCP, it is not allowed to access to the devices such as the CP1616 and the PLC.
4. The selected network interface is displayed at "Access Point of the Application:" and "Interface Parameter Assignment Used:".

5. Select {OK} to close the window.
4 Setting of the Board

4.1 CP1616 Communication Settings

4.1.2 IO Controller Settings

For using the CP1616 as the IO controller, conduct the communication settings using STEP 7 first, and then write the settings to the CP1616.

1. Connect the PC with STEP 7 installed to the CP1616 with the Ethernet cable, and then turn ON the DX200 pressing {MAIN MENU}.

2. Start SIMATIC Manager (STEP 7).

3. Select {File} - {New…}, and then create a new project.
4. Setting of the Board
4.1 CP1616 Communication Settings

4. Add a station. Right-click the created project name, and then select {Insert New Object} - {SIMATIC PC Station}.

5. Set the hardware. Double-click {Configuration} under the added station, and then start the {HW Config}.
4. Setting of the Board
4.1 CP1616 Communication Settings

6. Select the CP1616 module from {SIMATIC PC Station} - {CP Industrial Ethernet} - {CP1616} of the hardware catalog, and then drag and drop it to the rack.
When the CP1616 is not displayed on the hardware catalog, select {Options} - {Install HW Updates...} to install a catalog. After installation, select {Options} - {Update Catalog} to update the catalog.

7. The Property window of the network is displayed. Select {New...} to add a network. Also, enter an IP address for assigning it to the CP1616, and then select {OK}.
8. Add the IO device as follows. From the hardware catalog, select an IO device to be used, and then drag and drop it to the network. When there is no hardware catalog of the IO device to be used, import the GSD file of the equipment, and then register it to the hardware catalog.

9. Double-click the added IO device icon to open the Property window, and then enter the device name and the IP address assigned to the IO device.

For the information about how to assign the device name and the IP address of equipment made by Siemens, refer to section 4.1.3.1 “Settings of Device Name and IP Address”.

For the information about how to assign the device name and the IP address of equipment not made by Siemens, refer to the instruction manual for each equipment.
10. Insert the IO module to the IO Device. Make sure to insert the IO module to the IO Device according to the actual IO Device configuration.

11. Save and compile the settings.
12. Download the compiled project to the CP1616.

13. Continuously, refer to section 4.3 “IO Controller Settings”, and perform the settings of the CP1616.
4 Setting of the Board

4.1 CP1616 Communication Settings

4.1.3 IO Device Settings

4.1.3.1 Settings of Device Name and IP Address

When using the CP1616 as the IO Device, set the device name and the IP address for the CP1616.

1. Connect the PC with STEP 7 installed to the CP1616 with the Ethernet cable, and then turn ON the DX200 pressing {MAIN MENU}.

2. Start SIMATIC Manager (STEP 7), and then select {PLC} - {Edit Ethernet Node…}.

3. Detect the CP1616 by selecting {Browse…}, and then assign the IP address and the device name.
4.1.3.2 CP1616 (IO Device) Settings with IO Controller

The procedures to set the CP1616 as the IO device at the IO controller side (such as PLC) are described. When setting the CP1616 as the IO device, the CP1616 GSD file supplied by YASKAWA is necessary. Depending on the software version of the DX200, available GSD files vary.

<table>
<thead>
<tr>
<th>DX200 software version</th>
<th>GSD File</th>
</tr>
</thead>
<tbody>
<tr>
<td>DN1.47.00A(□□)-00 or earlier</td>
<td>GSDML-V2.25-Yaskawa-PROFIsafe-CP1616-20130906.xml</td>
</tr>
<tr>
<td>From DN1.50.00A(□□)-00 to DN1.70.01A(□□)-00</td>
<td>GSDML-V2.31-Yaskawa-PROFIsafe-CP1616-20140729.xml</td>
</tr>
<tr>
<td>DN1.71.00A(□□)-00 or later</td>
<td>GSDML-V2.31-Yaskawa-PROFIsafe-CP1616-20150514.xml or later</td>
</tr>
</tbody>
</table>

For how to obtain the GSD file, refer to section 4.7 “GSD File Creation”.

This section explains the procedures when using equipment made by Siemens as the IO controller with using STEP 7. When using equipment not made by Siemens as the IO controller, refer to the instruction manual for each equipment.

1. Add the IO controller (CPU314C-2 PN/DP made by Siemens in this manual) referring to step 1 to step 7 of section 4.1.2 “IO Controller Settings”.

2. Select {Options} - {Install GSD File...} to install the GSD file for the CP1616.

In case modifying the IP address and device name allocated to the CP1616, please do not fail to allocate them after the factory resetting is executed. Press {Reset} on the Edit Ethernet Node window.

NOTE

- Reset to factory settings

Reset to factory settings
3. Add the CP1616 (IO device) as follows. Select \{V2.6\} from \{6GK1 161-6AA02\} or \{6GK1 161-6AA02(Migration)\} under \{PROFINET IO\} - \{Additional Field Devices\} - \{I/O\} - \{SIMATIC PC-CP\} - \{CP1616\} of the hardware catalog, and then drag and drop it on the network.

V2.6 (Non-migration module) under 6GK1 161-6AA02

: Select this when the CP1616 is used as an IO device only.

V2.6 (Migration module) under 6GK1 161-6AA02 (Migration)

: Select this when the CP1616 is used as an IO device + IO controller simultaneously.

- When the version of the GSD file is older than "GSDML-V2.25-Yaskawa-PROFIsafe-CP1616-20130906.xml", select V2.6 under \{PROFINET IO\} - \{I/O\} - \{SIMATIC PC-CP\} - \{CP1616\} of the hardware catalog. The start slot number of the CP1616 is 0.

- When the version of the GSD file is older than "GSDML-V2.31-Yaskawa-PROFIsafe-CP1616-20150514.xml", any non-migration modules are not displayed. Select a migration module in spite of the usage method of the CP1616.
4 Setting of the Board

4.1 CP1616 Communication Settings

4. Double-click the added CP1616 icon to open the Property window, and enter the same device name and IP address as the one allocated to the CP1616 in section 4.1.3.1 “Settings of Device Name and IP Address”, and then select {OK}.

5. Insert the IO module to the CP1616 according to the size for the communication.

6. Download the project file to the IO controller referring to step 11 and 12 of section 4.1.2 “IO Controller Settings”.
Setting of the Board

4.1 CP1616 Communication Settings

7. Download the error program (OB: Organization Block), which is executed when an error occurs, to the IO controller. For example, in order to enable to restore from the communication error such as disconnection, create and download OB86 to the IO controller. For the details of the organization block, refer to the instructions of STEP 7. Select {Blocks} - {Insert New Object} - {Organization Block} from the project tree in the SIMATIC Manager window to create OB86.

8. Select OB86 to download to the IO controller.

9. Continuously, refer to section 4.4 “IO Device Settings”, and perform the settings of the CP1616.
4.1.4 Coupling Settings

Coupling is a method for the DX200 to recognize that each CP1616 set separately on two kinds of network is identical. With this method, the CP1616 can be used as the IO Controller and the IO Device simultaneously. By conducting this settings, for example the PROFINET communication can be established with the combination of [CPU 314C-2 PN/DP]-[CP1616 (1)] or [CP1616 (1)]-[CP1616 (2)] as shown in the following configuration.

<table>
<thead>
<tr>
<th>IO Controller</th>
<th>IO Device</th>
</tr>
</thead>
<tbody>
<tr>
<td>CPU 314C-2 PN/DP</td>
<td>CP 1616 (1)</td>
</tr>
<tr>
<td>CP 1616 (1)</td>
<td>CP 1616 (2)</td>
</tr>
</tbody>
</table>
### Communication settings for [CP1616 (1)]-[CP1616 (2)]

1. Assign the IP address and the device name to the CP1616 (2) by referring to section 4.1.3.1 “Settings of Device Name and IP Address”.

2. Perform the IO Controller settings for the CP1616 (1). Make sure to add the CP1616 (2) as the IO Device in the settings. Select (File) - (New…) to create a new project.

3. Add a station as follows. Right-click the created project name, and then select (Insert New Object) - (SIMATIC PC Station).
4. Perform the hardware setting as follows. Double-click {Configuration} under the added station to start the {HW Config}.

5. Select the CP1616 module from the hardware catalog, and then drag and drop it to the rack.

6. The Properties window of the network is displayed. Select {New…} to add a network. Also, enter an IP address to be assigned to the CP1616, and then select {OK}.
4 Setting of the Board

4.1 CP1616 Communication Settings

7. Add the IO device as follows. From the hardware catalog, select an IO device to be used, and then drag and drop it to the network. When there is no hardware catalog of the IO device to be used, import the GSD file of the equipment, and then register it to the hardware catalog.

8. Double-click the added IO device icon to open the Property window, and then enter the device name and the IP address assigned to the IO device. For the information about how to assign the device name and the IP address of equipment made by Siemens, refer to section 4.1.3 “IO Device Settings”. For the information about how to assign the device name and the IP address of equipment not made by Siemens, refer to the instruction manual for each equipment.
9. Insert the IO module to the IO device. Make sure to insert the IO module to the IO device according to the actual IO device configuration.

10. Right-click the CP1616 (1), and then select {Object Properties…}.

11. Specify the operating mode for the CP1616 (1) on {PROFINET} tab on the Property window. To use the CP1616 (1) as the IO controller and the IO Device, put a check mark in the check box for both {IO controller} and {Enable IO device mode}, and then select {OK}.

---

ProfiNet Communications Function
4 Setting of the Board
4.1 CP1616 Communication Settings
12. Save and compile the settings.
4 Setting of the Board

4.1 CP1616 Communication Settings

Communication settings for [CPU 314C-2 PN/DP]-[CP1616 (1)]

1. Assign the IP address and the device name to the CP1616 (1) by referring to section 4.1.3.1 “Settings of Device Name and IP Address”.

2. Perform the IO controller (CPU 314C-2 PN/DP) settings as follows. Make sure to add the CP1616 (1) as the IO device in the settings. In the project used for the communication settings for [CP1616(1)]-[CP1616(2)], add (SIMATIC 300 Station) as shown below.

3. Perform the hardware setting as follows. Double-click (Hardware) under the added station to start the (HW Config).
4. Select the rack from the hardware catalog, and then drag and drop it.

5. Select a power supply used for [CPU 314C-2 PN/DP], and then drag and drop it to the rack.

6. Select a CPU module for [CPU 314C-2 PN/DP], and then drag and drop it to the rack.
7. Select a network which has been created. Enter an IP address for assigning to [CPU 314C-2 PN/DP], and then select [OK].

8. Add an IO device as follows. Select an IO device to be used from the hardware catalog, and then drag and drop it to the network.

9. Insert an IO module to the IO device. Make sure to insert an IO module to the IO device according to the actual IO device configuration.
10. After the settings, save and compile the settings.
4 Setting of the Board
4.1 CP1616 Communication Settings

- Coupling settings
  1. Open (HW Config) for the CP1616 (1) from the SIMATIC Manager. Right-click the CP1616 (1), and then select (Object Properties…).

  ![Image of HW Config](image)

  2. Click (IO Device Coupling…) on (PROFINET) tab of the Property window.

  ![Image of IO Device Coupling](image)
3. Mark the check box of "Allow coupling with third-party IO devices." to display an IO Device. Select the IO Device, and then press {Couple}.

4. After the selected IO Device is displayed at Active Coupling, select {OK}.

5. Select {OK}.
6. Perform "Save and Compile" again at the HW Config window of each communication setting for [CP1616(1)]-[CP1616(2)] and [CPU 314C-2 PN/DP]-[CP1616(1)].

7. Download the compiled configuration to the CP1616(1) and CPU 314C-2 PN/DP respectively.

8. Continuously, perform the settings of the CP1616, by referring to section 4.3 "IO Controller Settings" and section 4.4 "IO Device Settings".
4.2 Calling Up the CP1616 Setting Window

Make sure to perform this setting in the management mode after installing the CP1616.
If the CP1616 is not installed or the DX200 is in the operation mode or the editing mode, the settings cannot be performed.

To use the CP1616 with the DX200, the option board and I/O module settings must be changed using the following steps.

1. Turn the power supply ON again while pressing {Main Menu} simultaneously.
   - The maintenance mode is displayed.

2. Change the security mode to the management mode.

3. Select {SYSTEM} under the main menu.
   - The sub menu is displayed.
4 Setting of the Board

4.2 Calling Up the CP1616 Setting Window

4. Select {SETUP}.
   - The SETUP window is displayed.

5. Select [OPTION BOARD].
   - The OPTION BOARD window is displayed.
6. Select “CP1616”.

- The CP1616 SETUP window is displayed.

- (Description of each setting item)

1. **CP1616**
   Set whether the CP1616 will be used. "USED" and "NOT USED" can be selected and switched using the toggle.

2. **IO SIZE**
   The IO size is automatically calculated if the IO size (IN/OUT) is set on the IO CONTROLLER or the IO DEVICE window.

3. **IO CONTROLLER**
   Perform the IO Controller settings.

4. **IO DEVICE**
   Perform the IO Device settings.

5. **ALARM AT INITIALIZE ERROR**
   To use the CP1616, perform the communication settings using STEP 7 made by Siemens. (Refer to chapter 4.1 CP1616 Communication Settings.) If this communication settings are not performed, the initializing process of the CP1616 at the start of the DX200 will be terminated abnormally. In this setting item, set whether the alarm which indicates that the abnormal termination of initializing process occurs will be displayed on the window.

6. **PROFIsafe**
   Set whether the CP1616 will be used for the PROFIsafe communication. This is an optional function to be paid. Contact a YASKAWA representative to use this function.
7. Change CP1616 to "USED".
4.3 IO Controller Settings

For sending or receiving the IO with the IO device (communication slave such as Tool) in the PROFINET communication, the IO controller setting is necessary. This section explains how to perform the IO controller settings.

1. Select "DETAIL" for the IO CONTROLLER on the CP1616 setting window.
   - The IO CONTROLLER setting window is displayed.

   ![IO Controller Window](image)

   - (Description of each setting item)

   (1) IO CONTROLLER
      "ENABLE" or "DISABLE" can be selected and switched using the toggle. When using as the IO controller, "ENABLE" should be selected.

   (2) IO SIZE (IN/OUT)
      Set the IO size to be used for the communication.

   (3) IOPS STATUS MONITOR
      Set the leading number of the M register to display the IOPS status received from the IO device. For IOPS status, refer to section 7.1 “IOPS Status Monitor Function”. This item is displayed when the software version of the DX200 is DN1.50.00A(□□)-00 or later.

2. Perform each IO controller settings according to the actual communication station.
3. Press [ENTER].
   – Return to the CP1616 setting window.
### 4.4 IO Device Settings

For sending or receiving the IO with the IO controller (communication master such as PLC) in the PROFINET communication, the IO device setting is necessary. This section explains how to perform the IO device settings.

1. Select "DETAIL" of the IO DEVICE on the CP1616 setting window.
   - The IO device setting window is displayed. (The display depends on the DX200 software version.)

   When the software version is DN1.47.00A(-00)-00 or earlier.

2. "ENABLE" or "DISABLE" for Slot 0 - CP1616 can be selected and switched using the toggle.

   When using the CP1616 as the IO device, "ENABLE" should be selected.

3. Set the IO size used for the communication to Slot 1 - 64.

   The IO allocation contents set here should be matched with the IO allocation settings set at the IO controller side (at step 5 of section 4.1.3.2 “CP1616 (IO Device) Settings with IO Controller”).
When the software version is from DN1.50.00A(...) to DN1.70.01A(...)...

2. "ENABLE” or "DISABLE” for Slot 1 - CP1616 can be selected and switched using the toggle. When using the CP1616 as the IO device, "ENABLE” should be selected.

3. Set the IO size used for the communication to Slot 2: 64. The IO allocation set in the IO device settings and the IO allocation set in the IO controller settings (Refer to the step 5 of section 4.1.3.2 “CP1616 (IO Device) Settings with IO Controller”) should match.
ProfiNet Communications Function

4 Setting of the Board

4.4 IO Device Settings

When the software version is DN1.71.00A(□□)-00 or later.

2. Press "CP1616" of Slot 1, and then select one from "DISABLE", "ENABLE(No Migration)", or "ENABLE(Migration)".

When a non-migration module is set, in step 3 of section 4.1.3.2 "CP1616 (IO Device) Settings with IO Controller", select "ENABLE(No Migration)", when a migration module is set, select "ENABLE(Migration)".

When the CP1616 is used as an IO device + IO controller simultaneously (when conducting section 4.1.4 "Coupling Settings", "ENABLE(Migration)" should be set.

3. Set the IO size used for the communication to Slot 2 - 64.

The IO allocation set in the IO device settings and the IO allocation set in the IO controller settings (Refer to the step 5 of section 4.1.3.2) should match.
4. Select "GSDML" to see each slot’s module information.

5. Press [ENTER] on the IO device window.
   – Return to the CP1616 setting window.
6. Press [ENTER].
   – The confirmation dialog box is displayed.

[Image of a dialogue box with options: YES and NO]

7. Select {Yes}.
   – The IO MODULE window is displayed.

The CP1616 settings are complete here. Next, the IO module needs to be set based on the board settings. Continue the settings for the following items.

When "Select 'Machine Safety Board FLASH Reset'." is displayed in the message area, after the IO module settings and the external IO settings described in the following chapters are completed, select {FILE} - {INITIALIZE} - "Machine Safety Board FLASH Reset" under the main menu to set the machine safety board FLASH data again.

---

If there is an unconformity between the option board and IO module settings, the DX200 cannot operate properly. To avoid such unconformity, be sure to perform the IO module settings displayed successively after the option board settings.
4.5 IO Module Settings

If the CP1616 settings are changed, the IO module needs to be set as well. Set the IO module settings using the following steps.

1. (the continuation of the CP1616 settings)
   – The IO MODULE window (the first half) is displayed.

2. Press [ENTER].
   – The IO MODULE window (the latter half) is displayed.

   – Ensure that the following value is allocated to DI and DO for the number of the slot (ST#16) to which the CP1616 is installed: the set IO size (unit: bit) + 8.
3. Press [ENTER].
   – The confirmation dialog box is displayed.

4. Select {Yes}.
   – If the IO module is properly installed, select {Yes}. The IO module settings will be updated, and the EXTERNAL IO SETUP window is displayed.
4.6 External IO Settings

1. The EXTERNAL IO SETUP window is displayed.

2. Select "AUTO" or "MANUAL" for the allocation mode.
   - After "AUTO" or "MANUAL" is selected, the selection menu is displayed.

---

Note:
If the allocation mode is changed from "MANUAL" to "AUTO", the allocation data that has been set will be lost, and re-allocating will be executed in the auto mode. If the set allocation data need to be kept, save the data in the external memory menu in advance.
3. Select the allocation mode to be set.
   - When allocating the I/O signal automatically, select "AUTO". When allocating the I/O signal manually, select "MANUAL".
   - The selected allocation mode will be set.

4. Select "DETAIL" of [EXTERNAL IO ALLOCATION].
   - When selecting "AUTO" for the allocation mode, the following steps 5-7 are not necessary. Perform the operation from step 8.
   - When selecting "MANUAL" for the allocation mode, perform the following steps 5-7 for the items necessary for manual settings.
5. Select the external I/O signal number to be changed from the original. ("#20060" is selected in the setting example.)
   - The select menu is displayed.

6. Select "MODIFY" and enter the desired external input signal number to replace the original. ('20300' is entered in the setting example.)
   - The external input signal number will be changed.

7. Select and change the external input signal number with the same steps.
   - Repeat the selecting and changing operation for the desired allocation.
8. Press [ENTER].
   - The EXTERNAL IO ALLOCATION(OUTPUT) window is displayed.

9. Select and change the external output signal number with the same procedure as the external input signal number.
   - Repeat the selecting and changing operation for the desired allocation.

10. Press [ENTER].
    - The confirmation dialog box is displayed.

11. Select {Yes}.
    - Return to the setting window after the setting contents are confirmed.
Setting Example When the CP1616 is Used as IO Controller and IO Device Simultaneously

Here is an example of allocation method of the CP1616 simultaneously used as follows;

IO controller: 20 byte

IO device: 8 byte

The total size is 28 byte. Therefore, it is displayed as follows after performing the procedures from step 1 to 3.

Out of 28 byte, the former 20 byte is allocated for the IO controller, and the latter 8 byte is for the IO device. So change the value of the {BYTE} column to divide it into 20 byte and 8 byte. In this example, 20 byte for the IO controller data with #20070 in the lead and 8 byte for the IO device with #20300 in the lead are allocated.
EXTERNAL IO ALLOCATION(OUTPUT) can be changed with the same steps.
4 Setting of the Board

4.7 GSD File Creation

When performing the communication settings of the PROFINET communication, a GSD (Generic Station Description) file is required for setting of the communication master (IO controller). Use a GSD file created with the following procedures.

4.7.1 Creating Procedures of GSD File

1. Turn ON the power supply while pressing Main Menu.
   - The maintenance mode is displayed.

2. Select {EX. MEMORY} under the main menu.
   - The sub menu is displayed.

- GSD file creation by this procedure can be performed when the software version of the DX200 is DN1.71.00A(-00)-00 or later. When the version DN1.70.01A(-00)-00 or earlier is used, contact your YASKAWA representative.

- Before creating a GSD file, complete the settings described in section 4.4 "IO Device Settings". Before completing the settings of the optional board and/or IO module, a GSD file cannot be created correctly.
4. Setting of the Board

4.7 GSD File Creation

3. Select {SAVE}.

   – The SAVE window is displayed.

![SAVE window]

4. Select "EDS/GSD FILE SAVE".

   – The EDS/GSD FILE SAVE window is displayed.

   – A list of such as the CP1616 board which is set for the IO device and the DeviceNet board which is set for the slave is displayed.

![EDS/GSD FILE SAVE window]

5. Select "CP1616" of the relevant slot number.

   – "★" is displayed before the name of the selected board.

![Selected CP1616]

4 Setting of the Board
4.7 GSD File Creation

6. Press [ENTER].
   – The confirmation dialog box is displayed.
   ![Confirmation dialog box]

7. Select {YES}.
   – A GSD file is created in an enabled device (CompactFlash or USB memory).
   ![GSD file creation]

The file name to be created will be as follows:
GSDML-Version-Yaskawa-PROFIsafe-CP1616-Date.xml

Version: GSD file version
Date: Released date of GSD file

<File name example>
GSDML-V2.31-Yaskawa-PROFIsafe-CP1616-20150514.xml
5 Allocating I/O Signals

5.1 Transmission Data

Data transferred from the CP1616 to within the DX200 includes I/O data sent from other PROFINET devices, as well as the CP1616 board status. Accordingly, in addition to the area for contact point data within the DX200, there are eight points (1 byte) for both input/output in the area for the CP1616 board status (the output area cannot be used).

The CP1616 board communication data is allocated as the external I/O signal for the concurrent I/O signal.

If only the CP1616 is installed as the 16 Byte optional I/O board, concurrent I/O allocation is as follows (20010 to 20057 used by the DX200 standard I/O unit).

5.1.1 I/O Allocation Examples for DX200 (For Handling)

Note 1) The following allocation examples are in case of the standard setting. If the external input/output signal allocation or concurrent ladder program is changed, the allocation will be changed according to the content changed.

Note 2) Regarding the detail of input data/output data on JANCD-YIO21-E (Standard I/O Board), refer to DX200 Instructions.

Note 3) Regarding JANCD-YIO21-E (standard I/O board), YSF21 (YIO21 base board) is displayed on IO Module Setup display.

I/O Allocation Examples (For Handling)

- JANCD-YIO21-E (Standard I/O)  IO size: 5 Byte (fixed)
- CP1616 (PROFINET)  (1) IO controller: Enabled  (2) IO size (IN/OUT): 16 Byte
### Allocating I/O Signals

#### 5.1 Transmission Data

<table>
<thead>
<tr>
<th>JANCD-YIO21-E</th>
<th>I/O Input</th>
<th>External Input Signal</th>
<th>General Input Signal</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>(Standard I/O)</td>
<td>20010 - 20017</td>
<td>None (Already allocated with the system)</td>
<td>Input Data (1)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>20020 - 20027</td>
<td>None (Already allocated with the system)</td>
<td>Input Data (2)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>20030 - 20037</td>
<td>00010 - 00017 (IN0001 - IN0008)</td>
<td>Input Data (3)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>20040 - 20047</td>
<td>00020 - 00027 (IN0009 - IN0016)</td>
<td>Input Data (4)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>20050 - 20057</td>
<td>None (Already allocated with the system)</td>
<td>Input Data (5)</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>JANCD-YIO21-E</th>
<th>I/O Output</th>
<th>External Output Signal</th>
<th>General Output Signal</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>(Standard I/O)</td>
<td>30010 - 30017</td>
<td>None (Already allocated with the system)</td>
<td>Output Data (1)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>30020 - 30027</td>
<td>None (Already allocated with the system)</td>
<td>Output Data (2)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>30030 - 30037</td>
<td>10010 - 10017 (OT0001 - OT0008)</td>
<td>Output Data (3)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>30040 - 30047</td>
<td>10020 - 10027 (OT0009 - OT0016)</td>
<td>Output Data (4)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>30050 - 30057</td>
<td>None (Already allocated with the system)</td>
<td>Output Data (5)</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>CP1616</th>
<th>I/O Input</th>
<th>External Input Signal</th>
<th>General Input Signal</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>(PROFINET)</td>
<td>20060 - 20067</td>
<td>00030 - 00037 (IN00017 - IN0024)</td>
<td>Board Status 1)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>20070 - 20077</td>
<td>00040 - 00047 (IN00025 - IN0032)</td>
<td>Input Data (1)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>20080 - 20087</td>
<td>00050 - 00057 (IN00033 - IN0040)</td>
<td>Input Data (2)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>20090 - 20097</td>
<td>00060 - 00067 (IN00041 - IN0048)</td>
<td>Input Data (3)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>20100 - 20107</td>
<td>00070 - 00077 (IN00049 - IN0056)</td>
<td>Input Data (4)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>20110 - 20117</td>
<td>00080 - 00087 (IN00057 - IN0064)</td>
<td>Input Data (5)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>20120 - 20127</td>
<td>00090 - 00097 (IN00065 - IN0072)</td>
<td>Input Data (6)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>20130 - 20137</td>
<td>00100 - 00107 (IN00073 - IN0080)</td>
<td>Input Data (7)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>20140 - 20147</td>
<td>00110 - 00117 (IN00081 - IN0088)</td>
<td>Input Data (8)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>20150 - 20157</td>
<td>00120 - 00127 (IN00089 - IN0096)</td>
<td>Input Data (9)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>20160 - 20167</td>
<td>00130 - 00137 (IN00097 - IN0104)</td>
<td>Input Data (10)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>20170 - 20177</td>
<td>00140 - 00147 (IN00105 - IN0112)</td>
<td>Input Data (11)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>20180 - 20187</td>
<td>00150 - 00157 (IN00113 - IN0120)</td>
<td>Input Data (12)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>20190 - 20197</td>
<td>00160 - 00167 (IN00121 - IN0128)</td>
<td>Input Data (13)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>20200 - 20207</td>
<td>00170 - 00177 (IN00129 - IN0136)</td>
<td>Input Data (14)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>20210 - 20217</td>
<td>00180 - 00187 (IN00137 - IN0144)</td>
<td>Input Data (15)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>20220 - 20227</td>
<td>00190 - 00197 (IN00145 - IN0152)</td>
<td>Input Data (16)</td>
<td></td>
</tr>
</tbody>
</table>
## Allocating I/O Signals

### 5.1 Transmission Data

<table>
<thead>
<tr>
<th>CP1616 (PROFINET)</th>
<th>I/O Output</th>
<th>External Output Signal</th>
<th>General Output Signal</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>30060 - 30067</td>
<td>10030 - 10037 (OT0017 - OT0024)</td>
<td>System Reservation¹</td>
<td></td>
</tr>
<tr>
<td></td>
<td>30070 - 30077</td>
<td>10040 - 10047 (OT0025 - OT0032)</td>
<td>Output Data (1)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>30080 - 30087</td>
<td>10050 - 10057 (OT0033 - OT0040)</td>
<td>Output Data (2)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>30090 - 30097</td>
<td>10060 - 10067 (OT0041 - OT0048)</td>
<td>Output Data (3)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>30100 - 30107</td>
<td>10070 - 10077 (OT0049 - OT0056)</td>
<td>Output Data (4)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>30110 - 30117</td>
<td>10080 - 10087 (OT0057 - OT0064)</td>
<td>Output Data (5)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>30120 - 30127</td>
<td>10090 - 10097 (OT0065 - OT0072)</td>
<td>Output Data (6)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>30130 - 30137</td>
<td>10100 - 10107 (OT0073 - OT0080)</td>
<td>Output Data (7)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>30140 - 30147</td>
<td>10110 - 10117 (OT0081 - OT0088)</td>
<td>Output Data (8)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>30150 - 30157</td>
<td>10120 - 10127 (OT0089 - OT0096)</td>
<td>Output Data (9)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>30160 - 30167</td>
<td>10130 - 10137 (OT0097 - OT0104)</td>
<td>Output Data (10)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>30170 - 30177</td>
<td>10140 - 10147 (OT0105 - OT0112)</td>
<td>Output Data (11)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>30180 - 30187</td>
<td>10150 - 10157 (OT0113 - OT0120)</td>
<td>Output Data (12)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>30190 - 30197</td>
<td>10160 - 10167 (OT0121 - OT0128)</td>
<td>Output Data (13)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>30200 - 30207</td>
<td>10170 - 10177 (OT0129 - OT0136)</td>
<td>Output Data (14)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>30210 - 30217</td>
<td>10180 - 10187 (OT0137 - OT0144)</td>
<td>Output Data (15)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>30220 - 30227</td>
<td>10190 - 10197 (OT0145 - OT0152)</td>
<td>Output Data (16)</td>
<td></td>
</tr>
</tbody>
</table>

¹ The board status and system reservation cannot be allocated as the IO signal. The data are not transmitted from PROFINET. (Cannot communicate with the IO device.)
5 Allocating I/O Signals

5.1 Transmission Data

5.1.2 I/O Allocation Examples for DX200 (Except for Handling)

Note 1) The following allocation examples are in case of the standard setting. If the external input/output signal allocation or concurrent ladder program is changed, the allocation will be changed according to the content changed.

Note 2) Regarding the detail of input data/output data on JANCD-YIO21-E (Standard I/O Board), refer to DX200 Instructions.

Note 3) Regarding JANCD-YIO21-E (standard I/O board), YSF21 (YIO21 base board) is displayed on IO Module Setup display.

I/O Allocation Examples (Except for Handling)

- JANCD-YIO21-E (Standard I/O)  IO size: 5 Byte (fixed)
- CP1616 (PROFINET)  (1) IO controller: Enabled
  (2) IO size (IN/OUT): 16 Byte

<table>
<thead>
<tr>
<th>JANCD-YIO21-E (Standard I/O)</th>
<th>I/O Input</th>
<th>External Input Signal</th>
<th>General Input Signal</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>20010 - 20017</td>
<td>None</td>
<td>None (Already allocated with the system)</td>
<td>Input Data (1)</td>
<td></td>
</tr>
<tr>
<td>20020 - 20027</td>
<td>None</td>
<td>None (Already allocated with the system)</td>
<td>Input Data (2)</td>
<td></td>
</tr>
<tr>
<td>20030 - 20037</td>
<td>00010 - 00017 (IN0001 - IN0008)</td>
<td>Input Data (3)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>20040 - 20047</td>
<td>00020 - 00027 (IN0009 - IN0016)</td>
<td>Input Data (4)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>20050 - 20057</td>
<td>00030 - 00037 (IN0017 - IN0024)</td>
<td>Input Data (5)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>CP1616 (PROFINET)</th>
<th>I/O Input</th>
<th>External Input Signal</th>
<th>General Input Signal</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>20060 - 20067</td>
<td>00040 - 00047 (IN00025 - IN0032)</td>
<td>Board Status</td>
<td></td>
<td></td>
</tr>
<tr>
<td>20070 - 20077</td>
<td>00050 - 00057 (IN00033 - IN0040)</td>
<td>Input Data (1)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>20080 - 20087</td>
<td>00060 - 00067 (IN00041 - IN0048)</td>
<td>Input Data (2)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>20090 - 20097</td>
<td>00070 - 00077 (IN00049 - IN0056)</td>
<td>Input Data (3)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>20100 - 20107</td>
<td>00080 - 00087 (IN00057 - IN0064)</td>
<td>Input Data (4)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>20110 - 20117</td>
<td>00090 - 00097 (IN00065 - IN0072)</td>
<td>Input Data (5)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>20120 - 20127</td>
<td>00100 - 00107 (IN00073 - IN0080)</td>
<td>Input Data (6)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>20130 - 20137</td>
<td>00110 - 00117 (IN00081 - IN0088)</td>
<td>Input Data (7)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>20140 - 20147</td>
<td>00120 - 00127 (IN00089 - IN0096)</td>
<td>Input Data (8)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>20150 - 20157</td>
<td>00130 - 00137 (IN00097 - IN0104)</td>
<td>Input Data (9)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>20160 - 20167</td>
<td>00140 - 00147 (IN00105 - IN0112)</td>
<td>Input Data (10)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>20170 - 20177</td>
<td>00150 - 00157 (IN00113 - IN0120)</td>
<td>Input Data (11)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>20180 - 20187</td>
<td>00160 - 00167 (IN00121 - IN0128)</td>
<td>Input Data (12)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>20190 - 20197</td>
<td>00170 - 00177 (IN00129 - IN0136)</td>
<td>Input Data (13)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>20200 - 20207</td>
<td>00180 - 00187 (IN00137 - IN0144)</td>
<td>Input Data (14)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>20210 - 20217</td>
<td>00190 - 00197 (IN00145 - IN0152)</td>
<td>Input Data (15)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>20220 - 20227</td>
<td>00200 - 00207 (IN00153 - IN0160)</td>
<td>Input Data (16)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
## Allocating I/O Signals

### 5.1 Transmission Data

<table>
<thead>
<tr>
<th>CP1616</th>
<th>I/O Output</th>
<th>External Output Signal</th>
<th>General Output Signal</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>(PROFINET)</td>
<td></td>
<td>30060 - 30067</td>
<td>10040 - 10047 (OT0025 - OT0032)</td>
<td>System Reservation¹</td>
</tr>
<tr>
<td></td>
<td></td>
<td>30070 - 30077</td>
<td>10050 - 10057 (OT0033 - OT0040)</td>
<td>Output Data (1)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>30080 - 30087</td>
<td>10060 - 10067 (OT0041 - OT0048)</td>
<td>Output Data (2)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>30090 - 30097</td>
<td>10070 - 10077 (OT0049 - OT0056)</td>
<td>Output Data (3)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>30100 - 30107</td>
<td>10080 - 10087 (OT0057 - OT0064)</td>
<td>Output Data(4)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>30110 - 30117</td>
<td>10090 - 10097 (OT0065 - OT0072)</td>
<td>Output Data (5)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>30120 - 30127</td>
<td>10100 - 10107 (OT0073 - OT0080)</td>
<td>Output Data (6)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>30130 - 30137</td>
<td>10110 - 10117 (OT0081 - OT0088)</td>
<td>Output Data (7)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>30140 - 30147</td>
<td>10120 - 10127 (OT0089 - OT0096)</td>
<td>Output Data (8)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>30150 - 30157</td>
<td>10130 - 10137 (OT0097 - OT0104)</td>
<td>Output Data (9)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>30160 - 30167</td>
<td>10140 - 10147 (OT0105 - OT0112)</td>
<td>Output Data (10)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>30170 - 30177</td>
<td>10150 - 10157 (OT0113 - OT0120)</td>
<td>Output Data (11)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>30180 - 30187</td>
<td>10160 - 10167 (OT0121 - OT0128)</td>
<td>Output Data (12)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>30190 - 30197</td>
<td>10170 - 10177 (OT0129 - OT0136)</td>
<td>Output Data (13)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>30200 - 30207</td>
<td>10180 - 10187 (OT0137 - OT0144)</td>
<td>Output Data (14)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>30210 - 30217</td>
<td>10190 - 10197 (OT0145 - OT0152)</td>
<td>Output Data (15)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>30220 - 30227</td>
<td>10210 - 10207 (OT0153 - OT0160)</td>
<td>Output Data (16)</td>
</tr>
</tbody>
</table>

¹ The board status and system reservation cannot be allocated as the IO signal. The data are not transmitted from PROFINET. (Cannot communicate with the IO device.)
5.2 Board Status

[CP1616 board status]

The first 1 byte of the input data of CP1616 allocated to the external input signal (20060 to 20067 in the allocation example above) represents the CP1616 board status.

<table>
<thead>
<tr>
<th>Signal</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>2xxx0 ~ 2xxx4</td>
<td>Reservation area with manufacturer</td>
</tr>
<tr>
<td>2xxx5</td>
<td>(For IO controller) Represents whether the not-communicating IO device exists. 0: Not-communicating IO device does not exist. 1: Not-communicating IO device exists. (For IO device) Represents whether the not-communicating module exists. 0: Not-communicating module does not exist. 1: Not-communicating module exists.</td>
</tr>
<tr>
<td>2xxx6</td>
<td>Represents the PROFINET communication status. 0: Normal status 1: Communication error</td>
</tr>
<tr>
<td>2xxx7</td>
<td>Represents the operating status of the board. 0: Normal status 1: Communication error</td>
</tr>
</tbody>
</table>

- **Alarm occurrence using the status when there is a communication error**

  By using the CIO Ladder and the User Alarm, alarms can be raised when the option board detects a communication error.

  An example of the method is shown below. The two types of alarm below are described as alarm occurrence.

  - I/O board operation error
  - I/O communication error

  Refer to section 13.7 "I/O Messages and I/O Alarms" in "DX200 OPTIONS INSTRUCTIONS FOR CONCURRENT I/O" for how to register a user alarm.

<table>
<thead>
<tr>
<th>[Alarm No.]</th>
<th>Signal No. (Board Status Signal)</th>
<th>Meaning of Alarms</th>
</tr>
</thead>
<tbody>
<tr>
<td>9065 I/O board operation error</td>
<td>20067 (Board status signal: 2xxx7)</td>
<td>Board operation error</td>
</tr>
<tr>
<td>9066 I/O communication error</td>
<td>20066 (Board status signal: 2xxx6)</td>
<td>Communication error</td>
</tr>
</tbody>
</table>

When the option board detects an error and notifies the error with the board status signal, a ladder program will be created to raise an alarm according to the error signal.

The procedures of registering the alarms in the above table as user alarms and the ladder program for raising alarms are described.
Registering the user alarms

1. Change security mode to "management mode".
2. Select {I/O ALARM} from {IN/OUT} under the main menu.
3. The I/O alarm (system) window is displayed.
4. Press the {PAGE}.
   - The I/O alarm (user) window is displayed.
5 Allocating I/O Signals

5.2 Board Status

5.  Move the cursor over the number to be registered, and press the [Select].
   - Moves to the character input window.

6. Enter the I/O alarm name.

7. Press [ENTER].
   - The entered alarm information will be registered.
8. Register the other alarms.
   – Register the desired alarm with the same procedures.

### IO allocation and ladder program
The signals below are used to create the ladder program that raises an alarm when the option board detects an error.

**External input**

<table>
<thead>
<tr>
<th>Signal</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>20066</td>
<td>Option board status (IO communication status)</td>
</tr>
<tr>
<td>20067</td>
<td>Option board status (operation status of the board)</td>
</tr>
</tbody>
</table>

**Specific Input signal**

<table>
<thead>
<tr>
<th>Signal</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>40012</td>
<td>USER ALM REQ</td>
</tr>
<tr>
<td>40220</td>
<td>USER ALM code d0</td>
</tr>
<tr>
<td>40221</td>
<td>USER ALM code d1</td>
</tr>
<tr>
<td>40222</td>
<td>USER ALM code d2</td>
</tr>
<tr>
<td>40223</td>
<td>USER ALM code d3</td>
</tr>
<tr>
<td>40224</td>
<td>USER ALM code d4</td>
</tr>
<tr>
<td>40225</td>
<td>USER ALM code d5</td>
</tr>
</tbody>
</table>

**Auxiliary relay**

<table>
<thead>
<tr>
<th>Signal</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>70017</td>
<td>The control power has been turned ON (Always ON).</td>
</tr>
</tbody>
</table>
The ladder program (the ladder diagram)
Alarms can be raised according to the status error signal of the option board by creating the ladder shown below.
6 Management of Setting Data

Setting information of PROFINET (The CP1616 board) can be saved/loaded using the external memory devices. The procedures are as follows. For the operation of external memory devices, refer to chapter 7 "External Memory Devices" of "DX200 OPERATOR’S MANUAL".

The data saved by the PROFINET (The CP1616 board) can be loaded as the setting information of PROFINET only for the CP1616.

6.1 Procedures for Saving

1. Turn ON the DX200.
2. Select {EX. MEMORY} under the main menu.
   – The sub menu is displayed.
3. Select {SAVE}.
   – The SAVE window is displayed.
6 Management of Setting Data
6.1 Procedures for Saving

4. Select "SYSTEM DATA".
   – The SYSTEM DATA selection window is displayed.

5. Select "CP1616 INFO".
   – "★" is displayed before the name of the selected system data.

6. Press [ENTER].
   – The confirmation dialog box is displayed.
6   Management of Setting Data
6.1   Procedures for Saving

7. Select {YES}.

– The file is started to be saved, and the transmission window is displayed. When stopping in the middle of the save, press "STOP".

– When the save is completed or interrupted, the display returns to the file selection window.
6 Management of Setting Data
6.2 Procedures for Loading

1. Turn ON the DX200.
2. Change the security mode to the management mode.
3. Select {EX. MEMORY} under the main menu.
   - The sub menu is displayed.
4. Select {LOAD}.
   - The LOAD window is displayed.
5. Select "SYSTEM DATA".
   - The SYSTEM DATA selection window is displayed.

6. Select "CP1616 INFO".
   - "★" is displayed before the name of the selected data.

7. Press [ENTER].
   - The confirmation dialog box is displayed.
6 Management of Setting Data
6.2 Procedures for Loading

8. Select {YES}.
   - File loading is started, and the transmission window is displayed.
   - When loading is completed, the display returns to the file selection window.

9. After loading is completed, turn the power supply ON again.

NOTE
When, at saving, the slot in which the CP1616 board is inserted or the IO size (total size used for the IO controller and the IO device) differ from the current settings, the message "Error 1520 'Cannot be used on this system configuration'" appears, and loading cannot be executed.
7 Additional Functions for IO Controller

When the CP1616 board is used as an IO controller, the following functions are available. With using these functions, readout of diagnostic information of the connected IO device and monitoring of the communication status can be performed.

- IOPS Status Monitor Function
- Message Communication Function
- Alarm History Function

Explanation of each function is described below.

7.1 IOPS Status Monitor Function

7.1.1 Outline

IOPS (IO Provider Status) shows that the data sent from the IO device is enabled or not in each sub slot (sub module). IOPS is displayed on the M register of concurrent I/O.

7.1.2 Usage Method

At the IO CONTROLLER setting window of the CP1616 board, set the leading number of the M register which displays IOPS. (For settings, refer to section 4.3 “IO Controller Settings”.)

IOPS is displayed only the number of the sub slots for the IO device (excluding the sub slots only for inputting) by a bit unit from the set M register number. The number of IOPSs displaying is 512 bit (32 register).

When a communication error occurs due to the cable disconnection, etc., IOPS of each sub slot is '1' (error). When normal communication is properly executed, IOPS of each sub slot is '0' (normal).

NOTE

These functions are available when the software version of the DX200 is DN1.50.00A(□□)-00 or later.
The number of sub slots varies depending on the IO device to be used and allocation settings. It can be confirmed on the HW Config. window of STEP 7.

When setting the CP1616 board as the IO device as follows, for example, the number of sub slots is 9 (slot 1, X1, X1P1, X1P2, X1P3, X1P4, 2, 3, 4). Among these, the slot 3 as the input module (the output of the IO controller) is excluded. Therefore, following the lower bit of the specified M register number, 8 bit are displayed.

IOPSs for 8 sub slots out of 9, except for slot 3, are displayed.
7.2 Message Communication Function

7.2.1 Outline
Message Communication Function is for reading and writing the optional data strings for the module of the target IO device.

7.2.2 Usage Method
1. Displaying the message communication execution window
   – Start the DX200 in online mode, and then select {IN/OUT} - {PROFINET MESSAGE COMMUNICATION}.

(Description of each item)

(1) PCI
   Displays the PCI slot number of the DX200 to which the CP1616 board used for message communication is inserted. The PCI slot number is switched every time {DISPLAY} - {PCI CHANGE} in the menu is selected.
   • {PCI CHANGE} is displayed only when the IO controller is enabled on both PCI slot #1 and #2.
   • When the IO controller is enabled on either PCI slot #1 or #2, "#1" is displayed for the slot number (it cannot be changed).

(2) STATE
   Displays the execution status of massage communication. During the execution of message communication, {EXECUTE} cannot be selected.
   • Waiting for message communication execution: "READY" is displayed.
   • During the execution of message communication: "SENDING" or "RECEIVING" is displayed.
   • At completion for message communication: Either "RECEIVED", "SEND FAILURE", or "TIMEOUT" is displayed.

(3) OPERATION
   Specifies which to send, the read request or the write request to the module of the IO device. It has two operations, "READ" and "WRITE". "READ" and "WRITE" can be selected and switched using the toggle.
7 Additional Functions for IO Controller
7.2 Message Communication Function

(4) INDEX
Input the index of the record data to be read/written in the range of 0 to 65535 (in decimal) (displaying in hexadecimal).
For the explanation of the record data, refer to section 3.2.84 "record data object" of "Technical Specification for PROFINET IO Ver2.3Ed2MU1 – Date:March 2014 Order No.:2.722" issued by PI, and for the index value, refer to section 5.2.3.4.4 "Assigned numbers" of above specifications.

(5) DATA SIZE
Specifies the data size for the read/write request message in the range of 1 to 4000 byte. The data size depends on the record data index to be read/written.
When the data size is unknown, perform the following operations.
READ: Specify 4000 byte, the maximum size.
WRITE: Perform the READ operation, first. Confirm the actual record data size with using the packet capture data in reading, and then specify the value in writing as well.

(6) IO TYPE
Specifies the type of the address for module of the IO device. There are two types for IO TYPE, "IN" and "OUT". "IN" and "OUT" can be selected and switched using the toggle. For specifying IO TYPE, refer to section 7.2.3 "Supplementary Note".

(7) ADDRESS
Input the address value for module of the IO device in the range of 0 to 32767 (in decimal).
For specifying the address, refer to section 7.2.3.

(8) RESULT
Displays the execution result of message communication.

2. Execution of Message Communication

[For READ request]
(1) Set OPERATION to "READ".
(2) Set the other required items.
(3) Select {EXECUTE} to send the reading request to the IO device.
(4) Select {DETAIL} to display the data from the IO device in hexadecimal.

[For WRITE request]
(1) Set OPERATION to "WRITE".
(2) Select {DETAIL} to display the detail window.
(3) At the detail window, input the data to be written to the IO device in decimal (displaying in hexadecimal).
(4) Select {RETURN} to return to the previous window.
(5) Set the other required items.
(6) Select {EXECUTE} to send the writing request to the IO device.
3. Operation Example

The following is the operation example when reading RecordInputDataObjectElement from the module of slot 2/sub slot 1 of the IO device.

(1) Perform the following settings.
Operation: READ
Index: 32808(0x8028:RecordInputDataObjectElement)
Data Size: 16
IO TYPE: IN (Refer to section 7.2.3 “Supplementary Note”.)
ADDRESS: 0 (Refer to section 7.2.3.)

(2) Select {EXECUTE}.
7.2 Message Communication Function

(3) Select [DETAIL] to confirm the read data.

(Example of the response packet from the IO device confirmed with the packet capture tool, Wireshark)

```
+ Frame: 10744: 224 bytes on wire (1776 bits), 222 bytes captured (1776 bits)
+ Ethernet II, Src: 0014a8:af8b30 (00:14:8a:af:8b:30), Dst: 0014a8:af8b30 (00:14:8a:af:8b:30)
+ User Datagram Protocol, Src Port: 49232 (49232), Dst Port: 18426
+ Distributed Computing Environment / Remote Procedure Call (DCOM/RPC) Response, sa
+ PROFINET IO, Read
+ Operation: Read (2)
+ Request: 107322
+ Status: OK
+ Array length: 80
+ Arr. Max: 80, Offset: 0, Size: 80
+ IOReadDataHeader: Seq:0, ApiId:0x0, Stor:Dx/0,Len:10, AddVal:0, AddVal2:0
+ ioRecordDataStructSize: 12
+ BlockHeader: Type=RecordInputDataObjectElement, Length=12(+4), Version=1.0
+ Length+Type: 1
+ IOCI: 0x00 (good)
+ Length+Type: 1
+ Data: 4 bytes
```

```
0000 00 0d 02 95 00 0c 78 11 02 04 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 ...
0010 ...
0012 ...
0020 ...
0030 ...
0040 ...
0050 ...
0060 ...
0070 ...
0080 ...
0090 ...
00a0 ...
00b0 ...
00c0 ...
00d0 ...
```
### 7.2.3 Supplementary Note

The target module to send the reading/writing request is determined by the IO type and the address value set with STEP 7 made by Siemens.

When specifying the module of slot 2:
- IO TYPE: IN
- Address: 0 to 3

When specifying the module of slot 3:
- IO TYPE: OUT
- Address: 0 to 3

When specifying the module of slot 1:
- IO TYPE: IN or OUT
- Address: 16376

![Diagram of IO modules and their specifications](image-url)
7.3 Alarm History Displaying Function

7.3.1 Outline

Alarm history displaying function is for displaying the alarm data sent from the IO device. (Not displaying the alarm from the DX200.)

7.3.2 Usage Method

1. Displaying the Alarm History Window

   - Start the DX200 in online mode, and then select {IN/OUT} - {PROFINET ALARM HISTORY}.

   (Description of each item)

   (1) PAGE

      Displays the number of alarm history pages. Alarms on the PAGE 1 is the latest. Alarm history can be displayed up to 8 alarms (8 pages), and it is deleted from the oldest one when exceeds 8 alarms (8 pages).

   (2) PCI

      Displays the PCI slot number of DX200 to which the CP1616 board displaying the alarm history is inserted. Select {DISPLAY} - {PCI CHANGE} in the menu to switch the PCI slot number.

      • {PCI CHANGE} is displayed only when the IO controller is enabled on both PCI slot #1 and #2.

      • When the IO controller is enabled on either PCI slot #1 or #2, the slot number "#1" is displayed (it cannot be changed).

   (3) DEVICE NO/SLOT NO/SUB SLOT NO

      Displays the module information of the IO device of the target in which an alarm occurs.
7.3 Alarm History Displaying Function

2. Displaying the Content of Alarm

  - When an alarm is sent from the IO device, {READ} is displayed.

The content of the alarm sent from the IO device is displayed by selecting {READ}. Once {READ} is selected to display the content of the alarm, {READ} is not displayed until the next alarm occurs.

(Example of the packet of the alarm sent from the IO device which is confirmed with the packet capture tool, Wireshark)
7 Additional Functions for IO Controller

7.3 Alarm History Displaying Function

3. Displaying the Specified Alarm History
   – Selecting (PAGE) and then inputting the page number display the alarm content of the specified page out of the alarm history.

![Image of Alarm History Display]

4. Deleting the Alarm History
   – When the security mode is higher than "Management mode", selecting (DATA) - (CLEAR) in the menu deletes the whole page of the alarm history.

![Image of Alarm History Deletion]
8  Error Indication

8.1  LED Display

The front panel for the CP1616 has ten LEDs. The positions of each LED are shown below.

Each RJ-45 connector has two LEDs. Each LED is used to display the following information.

• link LED (green)
  Lights up when connected to the devices.

• activity LED (yellow)
  Blinks when sending or receiving data.

The detailed information for the BF (bus fault) and SF (group fault) are shown below.
## Error Indication

### 8.1 LED Display

<table>
<thead>
<tr>
<th>BF LED</th>
<th>SF LED</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>OFF</td>
<td>-</td>
<td>Communications connection is established.</td>
</tr>
<tr>
<td>ON</td>
<td>-</td>
<td>Link status error occurred.</td>
</tr>
<tr>
<td>Slow blinking</td>
<td>-</td>
<td>An IO device cannot be addressed.</td>
</tr>
<tr>
<td>-</td>
<td>OFF</td>
<td>• No error.</td>
</tr>
<tr>
<td></td>
<td>ON</td>
<td>• A download is still taking place.</td>
</tr>
<tr>
<td>-</td>
<td>Blinking at 2-second intervals</td>
<td>The firmware of the module is in an inconsistent status. This status is possible, for example, if the power supply was interrupted during the firmware update.</td>
</tr>
<tr>
<td>Alternating slow blinking</td>
<td>-</td>
<td>Flash test for module detection.</td>
</tr>
<tr>
<td>Alternating fast blinking</td>
<td>-</td>
<td>A disruption has occurred. In this case, diagnostics over the Web or SNMP is no longer possible. If this error occurs, please contact Technical Support.</td>
</tr>
</tbody>
</table>
9 Trouble Shooting

Confirm followings when communication is not appropriately executed.

**When the CP1616 is used as an IO controller**
- Confirm that the PROFINET cable is appropriately connected to the connectors of both the CP1616 and the IO device.
- Confirm that the IP address and the device name is appropriately set to both the CP1616 and the IO device. The IP address and the device name can be confirmed on the Edit Ethernet Node window. (Refer to Step 3 at section 4.1.3.1 “Settings of Device Name and IP Address”.)
- Confirm that the device name allocated to both IO device and the IO device set at STEP 7 are consistent. (Refer to Step 9 at section 4.1.2 “IO Controller Settings.”)
- Confirm that the IO allocation of IO device and the IO device set at STEP 7 are consistent. (Refer to Step 10 at section 4.1.2.)
- Confirm that the project file compiled at STEP 7 was appropriately downloaded to the CP1616. (Refer to Step 12 at section 4.1.2.)
- Confirm that the IO size allocated to the IO device and the IO size of the CP1616 are consistent. (Refer to Step 1 at section 4.3 “IO Controller Settings”.)

**When the CP1616 is used as an IO device**
- Confirm that the PROFINET cable is appropriately connected to the connectors of both the CP1616 and the IO controller.
- Confirm that the IP address and the device name are appropriately set to both the CP1616 and the IO device. The IP address and the device name can be confirmed on the Edit Ethernet Node window. (Refer to Step 3 at section 4.1.3.1.)
- Confirm that the factory reset was executed before modifying the IP address and the device name of the CP1616. (Refer to Step 3 at section 4.1.3.1.)
- Confirm that the IO allocation of the CP1616 and the IO allocation of the CP1616 which was set by the IO controller are consistent. When the software version of the DX200 is DN1.71.00A(□□)-00 or later, confirm that whether the migrations of each CP1616 are also consistent. (Refer to Step 3 at section 4.1.3.2 “CP1616 (IO Device) Settings with IO Controller” and Step 3 at section 4.4 “IO Device Settings”.)
- Confirm that the IO controller setting is executed by importing the GSD file delivered by Yaskawa.
- When re-connection cannot be performed, confirm that the error program was downloaded to the IO controller. (Refer to Step 7 at section 4.1.3.2.)
When the CP1616 is used as an IO controller and an IO device

- Confirm that the SF and BF LED of the CP1616 is not red lightning up/blinking.
- Confirm that the setting is executed according to section 4.1.4 “Coupling Settings”.
- Confirm that both IO controller and the IO device are set in the maintenance mode. (Refer to section 4.3 “IO Controller Settings” and section 4.4 “IO Device Settings”.)
- When the software version of the DX200 is DN1.71.00A(□□)-00 or later, confirm that the CP1616 is set as the migration module. (Refer to Step 3 at chapter 4.4.)
DX200 OPTIONS
INSTRUCTIONS FOR PROFINET COMMUNICATIONS FUNCTION

(FOR CP1616 MADE BY Siemens)

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

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