YRC1000 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
YRC1000 INSTRUCTIONS
YRC1000 OPERATOR'S MANUAL (GENERAL) (SUBJECT SPECIFIC)
YRC1000 MAINTENANCE MANUAL
YRC1000 ALARM CODES (MAJOR ALARMS) (MINOR ALARMS)

The YRC1000 operator’s manual above corresponds to specific usage. Be sure to use the appropriate manual.
The YRC1000 operator’s manual above consists of “GENERAL” and “SUBJECT SPECIFIC”.
The YRC1000 alarm codes above consists of “MAJOR ALARMS” and “MINOR ALARMS”.

Please have the following information available when contacting Yaskawa Customer Support:
• System
• Primary Application
• Software Version (Located on Programming Pendant by selecting: {Main Menu} - {System Info} - {Version})
• Robot Serial Number (Located on robot data plate)
• Robot Sales Order Number (Located on controller data plate)

Part Number: 178946-1CD
Revision: 0
DANGER

- This manual explains the PROFINET communications function of the YRC1000 system (CP1616 made by Siemens). Read this manual carefully and be sure to understand its contents before handling the YRC1000. Any matter, including operation, usage, measures, and an item to use, not described in this manual must be regarded as “prohibited” or “improper”.
- General information related to safety are described in “Chapter 1. Safety” of the YRC1000 INSTRUCTIONS. To ensure correct and safe operation, carefully read “Chapter 1. Safety” of the YRC1000 INSTRUCTIONS.

CAUTION

- In some drawings in this manual, protective covers or shields are removed to show details. Make sure that all the covers or shields are installed in place before operating this product.
- YASKAWA is not responsible for incidents arising from unauthorized modification of its products. Unauthorized modification voids the product warranty.

NOTICE

- 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.
Notes for Safe Operation

Read this manual carefully before installation, operation, maintenance, or inspection of the YRC1000.

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

**DANGER**
Indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury. Safety Signs identified by the signal word DANGER should be used sparingly and only for those situations presenting the most serious hazards.

**WARNING**
Indicates a potentially hazardous situation which, if not avoided, will result in death or serious injury. Hazards identified by the signal word WARNING present a lesser degree of risk of injury or death than those identified by the signal word DANGER.

**CAUTION**
Indicates a hazardous situation, which if not avoided, could result in minor or moderate injury. It may also be used without the safety alert symbol as an alternative to “NOTICE”.

**NOTICE**
NOTICE is the preferred signal word to address practices not related to personal injury. The safety alert symbol should not be used with this signal word. As an alternative to “NOTICE”, the word “CAUTION” without the safety alert symbol may be used to indicate a message not related to personal injury.

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”. 


<table>
<thead>
<tr>
<th>NOTICE</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Do not use or keep the board in the following environmental conditions.</td>
</tr>
<tr>
<td>– Where exposed to direct sunshine</td>
</tr>
<tr>
<td>– Where vibration or impact occurs</td>
</tr>
<tr>
<td>– Where high humidity exists</td>
</tr>
<tr>
<td>– Where a strong magnetic field exists</td>
</tr>
<tr>
<td>– Where much dust exists</td>
</tr>
<tr>
<td>– Where a sudden change in the temperature occurs</td>
</tr>
<tr>
<td>– Where corrosive gases occur</td>
</tr>
<tr>
<td>– Where condensation occurs</td>
</tr>
<tr>
<td>• Improper usage of the board may damage the board.</td>
</tr>
</tbody>
</table>
Before operating the manipulator, make sure the servo power is turned OFF by performing the following operations. When the servo power is turned OFF, the SERVO ON LED on the programming pendant is turned OFF.

- Press the emergency stop buttons on the front door of the YRC1000, on the programming pendant, on the external control device, etc.
- Disconnect the safety plug of the safety fence.
  (when in the play mode or in the remote mode)

If operation of the manipulator cannot be stopped in an emergency, personal injury and/or equipment damage may result.

![Emergency Stop Button]

Before releasing the emergency stop, make sure to remove the obstacle or error caused the emergency stop, if any, and then turn the servo power ON.

Failure to observe this instruction may result in personal injury caused by unintended manipulator movement.

![Release of Emergency Stop]

Observe the following precautions when performing a teaching operation within the P-point maximum envelope of the manipulator:

- Be sure to perform lockout by putting a lockout device on the safety fence when going into the area enclosed by the safety fence. In addition, the operator of the teaching operation must display the sign that the operation is being performed so that no other person closes the safety fence.
- View the manipulator from the front whenever possible.
- Always follow the predetermined operating procedure.
- Always keep in mind emergency response measures against the manipulator’s unexpected movement toward a person.
- Ensure a safe place to retreat in case of emergency.

Failure to observe this instruction may result in personal injury caused by improper or unintended manipulator movement.

Confirm that no person is present in the P-point maximum envelope of the manipulator and that the operator is in a safe location before:

- Turning ON the YRC1000 power
- Moving the manipulator by using the programming pendant
- Running the system in the check mode
- Performing automatic operations

Injury may result if any person should enter the P-point maximum envelope of the manipulator during operation. Immediately press an emergency stop button whenever there is a problem. The emergency stop buttons are located on the front panel of the YRC1000 and on the right of the programming pendant.

Read and understand the Explanation of the Warning Labels before operating the manipulator.
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.
- 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 YRC1000 after use.
If the programming pendant is left unattended on the manipulator, on a fixture, or on the floor, the Enable Switch may be activated due to surface irregularities of where it is left, and the servo power may be turned ON. In addition, in case the operation of the manipulator starts, the manipulator or the tool may hit the programming pendant left unattended, which may result in personal injury and/or equipment damage.
  - The wiring and mounting must be performed by authorized and qualified personnel.
Failure to observe this caution may result in fire or electric shock.
**CAUTION**

- 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 soldered surfaces of the board directly with fingers.
  Protrusions on the soldered surface may result in an injury.

**NOTICE**

- Never touch the mounting surfaces of the board parts directly with fingers.
  The generated static electricity may damage the IC.
- 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>
<tr>
<th>Equipment</th>
<th>Manual Designation</th>
</tr>
</thead>
<tbody>
<tr>
<td>YRC1000 controller</td>
<td>YRC1000</td>
</tr>
<tr>
<td>YRC1000 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 keys, 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</td>
</tr>
<tr>
<td></td>
<td>The keys which have characters or its symbols printed on them are denoted with [ ]. ex. [ENTER]</td>
</tr>
<tr>
<td>Axis Keys /Numeric Keys</td>
<td>[Axis Key] and [Numeric Key] 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>

Description of the Operation Procedure

In the explanation of the operation procedure, the expression “Select • • •” means that the cursor is moved to the object item and [SELECT] is pressed, or that the item is directly selected by touching the screen.

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.
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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 YRC1000. The use of this board enables YRC1000 general IO data to be transferred to and from other PROFINET communication stations.

**NOTE**
The CP1616 has multiple firmware versions. With the YRC1000, use the CP1616 whose firmware version is V2.6.1.6.

**NOTE**
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.

**NOTE**
The standard riser card JANCD-ABB02-E (for PCI Express only) of the YRC1000 cannot be used since the interface of the CP1616 is PCI. Use the CP1616 with the other optional riser cards (JANCD-ABB03-E or JANCD-ABB04-E).

### 1.1 System Configuration

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

[Diagram of system configuration]

PROFINET IO Controller
External PLC (sequencer)

YRC1000 Controller

PROFINET Cable

HUB

PROFINET IO Device
CP1616
1 Outline
1.1 System Configuration

**Example of system configuration when using as PROFINET IO Controller**

```
YRC1000 Controller

PROFINET IO Controller CP1616

HUB

PROFINET Cable

PROFINET IO Device
```

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

```
PROFINET IO Controller
External PLC (Made by Siemens)

YRC1000 Controller

PROFINET IO Controller

HUB

PROFINET Cable

PROFINET IO Device
```

**NOTE**
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

- SF (group fault) LED
- BF (bus fault) LED
- link LED
- activity LED
- PROFINET Connector (RJ45)
## 2.2 Board Specifications

<table>
<thead>
<tr>
<th>Items</th>
<th>Specifications</th>
</tr>
</thead>
<tbody>
<tr>
<td>Interface to external devices</td>
<td>PROFINET</td>
</tr>
<tr>
<td>Board mounting position</td>
<td>PCI Slot in the YRC1000</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>
</thead>
<tbody>
<tr>
<td>Connection type</td>
</tr>
<tr>
<td>Star (connected via a HUB)</td>
</tr>
<tr>
<td>Communication speed</td>
</tr>
<tr>
<td>10Mbps/100Mbps (detected automatically when startup)</td>
</tr>
<tr>
<td>Communication media</td>
</tr>
<tr>
<td>Use a PROFINET cable</td>
</tr>
</tbody>
</table>
3 Mounting the CCS-PCIE 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”.

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

• 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.

• 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.

CAUTION

• 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 soldered surfaces of the board directly with fingers.

Protrusions on the soldered surface may result in an injury.
3 Mounting the CCS-PCIE Board

NOTICE

• Never touch the mounting surfaces of the board parts directly with fingers.
  The generated static electricity may damage the IC.
• No shock to the board.
  The shock may damage the board.
3.1 Opening the Front Door of the YRC1000

Mount the CP1616 board in the following manner.

1. Open the front door of YRC1000.
   (1) Turn the door lock on the front face of the YRC1000 clockwise for 90 ° with a coin or a flat tip screwdriver.

   ![Door Unlock Diagram](image)

   Fig. 3-1: Door Unlock

   (2) With the door locks turned clockwise for 90 °, turn the main switch handle to the “OFF” position, and slowly open the door.

   ![Open the Door “OFF” Position (Horizontal) Diagram](image)

   Fig. 3-2: Open the Door “OFF” Position (Horizontal)
3.2 Mounting the CP1616 Board on the YRC1000

1. Remove the riser card (JANCD-ABB03-E/JANCD-ABB04-E) from the CPU rack.

2. Insert the CP1616 board into the PCI slot of the riser card, then securely tighten the CP1616 board with a screw.

3. Mount the riser card in the CPU rack.

*Fig. 3-3: (Mounting Example) When the CP1616 Board is Inserted into Option: Slot1*
3.3 Cable Connection

1. Connect the PROFINET cable with arbitrary connector of the CP1616 board.

Fig. 3-4: (Mounting Example) When the CP1616 Board is Inserted into Option: Slot1
3.4 Closing Front Door of the YRC1000

1. Close the front door of YRC1000.
   (1) Close the door gently.
   (2) Turn the door lock on the front face of the YRC1000 counterclockwise for 90°.

*Fig. 3-5: Lock the Door*

**WARNING**

Make sure to close the door and close all the door locks of the YRC1000 whenever it is used, except for maintenance.

Failure to observe this instruction may cause the ingress of dust, dirt, or water, which may result in electric shock and/or mechanical failure.
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.

![Set PG/PC Interface 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.

![Warning 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. Setting of the Board

4.1 CP1616 Communication Settings

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.
4.1.2 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 PROFINET cable, and then turn ON the YRC1000 pressing {MAIN MENU}.

2. Start SIMATIC Manager (STEP 7).

3. Select {File} - {New…}, and then create a new project.
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 chapter 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 chapter 4.3 “IO Controller Settings”, and perform the settings of the CP1616.
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 PROFINET cable, and then turn ON the YRC1000 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 Setting of the Board
4.1 CP1616 Communication Settings

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.

For how to obtain the GSD file, refer to chapter 4.8 “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 chapter 4.1.2 “IO Controller Settings”.

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

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.

NOTE
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.

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.

For how to obtain the GSD file, refer to chapter 4.8 “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 chapter 4.1.2 “IO Controller Settings”.

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

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.

NOTE
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.
4 Setting of the Board
4.1 CP1616 Communication Settings
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 chapter 4.1.3.1 "Settings for 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 chapter 4.1.2 “IO Controller Settings”.
4 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 chapter 4.4 “IO Device Settings”, and perform the settings of the CP1616.
4.1.4 Coupling Settings

Coupling is a method for the YRC1000 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)] and [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 chapter 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. Setting of the Board

4.1 CP1616 Communication Settings

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 chapter 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}.
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 chapter 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. Setting of the Board

4.1 CP1616 Communication Settings

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.
4 Setting of the Board
4.1 CP1616 Communication Settings

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.
4. Setting of the Board

4.1 CP1616 Communication Settings

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…}.

2. Click {IO Device Coupling…} on {PROFINET} tab of the Property window.
4. Setting of the Board

4.1 CP1616 Communication Settings

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}.

Object Properties (4502:955)

Changes have been made to device "SIMATIC 300(0) CP1616". Please compile station "SIMATIC 300(0)" again.

{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 chapter 4.3 "IO Controller Settings" and chapter 4.4 "IO Device Settings".
4 Setting of the Board
4.2 Calling Up the CP1616 Setting Window

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 YRC1000 is in the operation mode or the editing mode, the settings cannot be performed.

To use the CP1616 with the YRC1000, 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}.
   - 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.
### 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.
Set “USED”.

(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 YRC1000 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.
4 Setting of the Board
4.2 Calling Up the CP1616 Setting Window

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.
   - (Description of each setting item)

   (1) IO CONTROLLER
   "ENABLE" or "DISABLE" can be selected and their ON/OFF status can be switched every time the key is pressed.
   When using as the IO controller, “ENABLE” must 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 chapter 7.1 “IOPS Status Monitor Function”.

2. Perform each IO controller settings according to the actual communication station.
3. Press [ENTER].
   - Return to the CP1616 setting window.

4. To set the coupling, perform the procedures described in chapter 4.4 “IO Device Settings”. For other than the coupling setting, press [ENTER] and perform the following operation.
   The confirmation dialog is shown.
4 Setting of the Board
4.3 IO Controller Settings

5. Select {YES}.
   – The confirmation dialog is shown.

It is necessary to set the IO module in accordance with the setting of this board. Perform the procedures in chapter 4.5 “IO Module Settings”.

**NOTE**
If there is an unconformity between the option board and IO module settings, the YRC1000 cannot operate properly. To avoid such unconformity, be sure to perform the IO module settings displayed successively after the option board settings.
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 devise 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.

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 chapter 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 chapter 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 chapter 4.1.3.2) should match.
4. Setting of the Board
4.4 IO Device Settings

4. Select "GSDML" to see the 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.

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

Next, the IO module needs to be set based on the board settings. Continue the settings in chapter 4.5 "IO Module Settings".

**NOTE**

If there is an unconformity between the option board and IO module settings, the YRC1000 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. Although the message “Select ‘Safety Board FLASH Reset” is shown, do not perform the reset and continue the settings.

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

   ![IO Module Window (First Half)](image1)

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

   ![IO Module Window (Latter Half)](image2)

   - Ensure that the following value is allocated to DI and DO for the number of the station (ST#16 in the above figure) 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”/“MANUAL” is selected, the selection menu is displayed.

   ![External IO Setup Window]

   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.
4 Setting of the Board
4.6 External IO 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.
4. Setting of the Board
4.6 External IO Settings

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) is also allocated with the same steps.
4.7 Reset Safety Circuit Board FLASH Data

After the PROFINET communication setting, the safety circuit board FLASH reset must be performed in accordance with the following procedures.

1. Set the security mode to the safety mode.
2. Select {FILE} from the Main Menu. Select {INITIALIZE} to open the INITIALIZE window.
3. Select “Safety Board FLASH Reset”.
   - The confirmation dialog is shown.
4.8 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.

**4.8.1 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.

**NOTE**

- Before creating a GSD file, complete all the procedures until chapter 4.6 “External IO Settings”. Before completing the settings of the optional board and/or IO module, a GSD file cannot be created correctly.
3. Select {SAVE}.
   - The SAVE window is displayed.

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.

5. Select "CP1616" of the relevant slot number.
   - "★" is displayed before the name of the selected board.
6. Press [ENTER].
   - The confirmation dialog box is displayed.

7. Select {YES}.
   - A GSD file is created in an enabled device (SD card or USB memory).

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 YRC1000 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 YRC1000, 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.

When the PROFINET communication is disconnected, the transmission data allocated for the concurrent I/O keeps the previous value. (The value is not cleared to 0.) Also, when the CP1616 is used as an IO controller, the previous value is also kept when the IOPS status of the communication destination (IO device) has an error. However, when turning ON the YRC1000, the previous value is cleared to 0, not kept.

If only the CP1616 is installed as the 16Byte optional I/O board, concurrent I/O allocation is as follows (20010 to 20057 used by the YRC1000 standard I/O unit).

5.1.1 I/O Allocation Examples for YRC1000 (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-AIO01-E (Standard I/O Board), refer to YRC1000 Instructions.

Note 3) Regarding JANCD-AIO01-E (standard I/O board), ASF01 (AIO01 base board) is displayed on IO Module Setup display.

I/O Allocation Examples (For Handling)

- JANCD-AIO01-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-AIO01-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></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>000010 - 00017 (IN0001 - IN0008)</td>
<td>Input Data (3)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>20040 - 20047</td>
<td>000200 - 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>I/O Output</th>
<th>External Output Signal</th>
<th>General Output Signal</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>30010 - 30017</td>
<td>None (Already allocated with the system)</td>
<td>Output Data (1)</td>
<td></td>
</tr>
<tr>
<td>30020 - 30027</td>
<td>None (Already allocated with the system)</td>
<td>Output Data (2)</td>
<td></td>
</tr>
<tr>
<td>30030 - 30037</td>
<td>10010 - 10017 (OT0001 - OT0008)</td>
<td>Output Data (3)</td>
<td></td>
</tr>
<tr>
<td>30040 - 30047</td>
<td>10020 - 10027 (OT0009 - OT0016)</td>
<td>Output Data (4)</td>
<td></td>
</tr>
<tr>
<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 (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></td>
<td>20060 - 20067</td>
<td>000300 - 00037 (IN0017 - IN0024)</td>
<td>Board Status 1)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>20070 - 20077</td>
<td>000400 - 00047 (IN0025 - IN0032)</td>
<td>Input Data (1)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>20080 - 20087</td>
<td>000500 - 00057 (IN0033 - IN0040)</td>
<td>Input Data (2)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>20090 - 20097</td>
<td>000600 - 00067 (IN0041 - IN0048)</td>
<td>Input Data (3)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>20100 - 20107</td>
<td>000700 - 00077 (IN0049 - IN0056)</td>
<td>Input Data (4)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>20110 - 20117</td>
<td>000800 - 00087 (IN0057 - IN0064)</td>
<td>Input Data (5)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>20120 - 20127</td>
<td>000900 - 00097 (IN0065 - IN0072)</td>
<td>Input Data (6)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>20130 - 20137</td>
<td>001000 - 00107 (IN0073 - IN0080)</td>
<td>Input Data (7)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>20140 - 20147</td>
<td>001100 - 00117 (IN0081 - IN0088)</td>
<td>Input Data (8)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>20150 - 20157</td>
<td>001200 - 00127 (IN0089 - IN0096)</td>
<td>Input Data (9)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>20160 - 20167</td>
<td>001300 - 00137 (IN0097 - IN0104)</td>
<td>Input Data (10)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>20170 - 20177</td>
<td>001400 - 00147 (IN0105 - IN0112)</td>
<td>Input Data (11)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>20180 - 20187</td>
<td>001500 - 00157 (IN0113 - IN0120)</td>
<td>Input Data (12)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>20190 - 20197</td>
<td>001600 - 00167 (IN0121 - IN0128)</td>
<td>Input Data (13)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>20200 - 20207</td>
<td>001700 - 00177 (IN0129 - IN0136)</td>
<td>Input Data (14)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>20210 - 20217</td>
<td>001800 - 00187 (IN0137 - IN0144)</td>
<td>Input Data (15)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>20220 - 20227</td>
<td>001900 - 00197 (IN0145 - 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 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>
</tr>
<tr>
<td></td>
<td>30070 - 30077</td>
<td>10040 - 10047 (OT0025 - OT0032)</td>
<td>Output Data (1)</td>
</tr>
<tr>
<td></td>
<td>30080 - 30087</td>
<td>10050 - 10057 (OT0033 - OT0040)</td>
<td>Output Data (2)</td>
</tr>
<tr>
<td></td>
<td>30090 - 30097</td>
<td>10060 - 10067 (OT0041 - OT0048)</td>
<td>Output Data (3)</td>
</tr>
<tr>
<td></td>
<td>30100 - 30107</td>
<td>10070 - 10077 (OT0049 - OT0056)</td>
<td>Output Data (4)</td>
</tr>
<tr>
<td></td>
<td>30110 - 30117</td>
<td>10080 - 10087 (OT0057 - OT0064)</td>
<td>Output Data (5)</td>
</tr>
<tr>
<td></td>
<td>30120 - 30127</td>
<td>10090 - 10097 (OT0065 - OT0072)</td>
<td>Output Data (6)</td>
</tr>
<tr>
<td></td>
<td>30130 - 30137</td>
<td>10100 - 10107 (OT0073 - OT0080)</td>
<td>Output Data (7)</td>
</tr>
<tr>
<td></td>
<td>30140 - 30147</td>
<td>10110 - 10117 (OT0081 - OT0088)</td>
<td>Output Data (8)</td>
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<tr>
<td></td>
<td>30150 - 30157</td>
<td>10120 - 10127 (OT0089 - OT0096)</td>
<td>Output Data (9)</td>
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<tr>
<td></td>
<td>30160 - 30167</td>
<td>10130 - 10137 (OT0097 - OT0104)</td>
<td>Output Data (10)</td>
</tr>
<tr>
<td></td>
<td>30170 - 30177</td>
<td>10140 - 10147 (OT0105 - OT0112)</td>
<td>Output Data (11)</td>
</tr>
<tr>
<td></td>
<td>30180 - 30187</td>
<td>10150 - 10157 (OT0113 - OT0120)</td>
<td>Output Data (12)</td>
</tr>
<tr>
<td></td>
<td>30190 - 30197</td>
<td>10160 - 10167 (OT0121 - OT0128)</td>
<td>Output Data (13)</td>
</tr>
<tr>
<td></td>
<td>30200 - 30207</td>
<td>10170 - 10177 (OT0129 - OT0136)</td>
<td>Output Data (14)</td>
</tr>
<tr>
<td></td>
<td>30210 - 30217</td>
<td>10180 - 10187 (OT0137 - OT0144)</td>
<td>Output Data (15)</td>
</tr>
<tr>
<td></td>
<td>30220 - 30227</td>
<td>10190 - 10197 (OT0145 - OT0152)</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.)
### 5.1.2 I/O Allocation Examples for YRC1000 (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-AIO01-E (Standard I/O Board), refer to YRC1000 Instructions.

Note 3) Regarding JANCD-AIO01-E (standard I/O board), ASF01 (AIO01 base board) is displayed on IO Module Setup display.

#### I/O Allocation Examples (Except for Handling)

- JANCD-AIO01-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-AIO01-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>(Already allocated with the system)</td>
<td>Input Data (1)</td>
<td></td>
</tr>
<tr>
<td>20020 - 20027</td>
<td>None</td>
<td>(Already allocated with the system)</td>
<td>Input Data (2)</td>
<td></td>
</tr>
<tr>
<td>20030 - 20037</td>
<td>00010 - 00017</td>
<td>(IN0001 - IN0008)</td>
<td>Input Data (3)</td>
<td></td>
</tr>
<tr>
<td>20040 - 20047</td>
<td>00020 - 00027</td>
<td>(IN0009 - IN0016)</td>
<td>Input Data (4)</td>
<td></td>
</tr>
<tr>
<td>20050 - 20057</td>
<td>00030 - 00037</td>
<td>(IN0017 - IN0024)</td>
<td>Input Data (5)</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>I/O Output</th>
<th>External Output Signal</th>
<th>General Output Signal</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>30010 - 30017</td>
<td>None</td>
<td>(Already allocated with the system)</td>
<td>Output Data (1)</td>
</tr>
<tr>
<td>30020 - 30027</td>
<td>None</td>
<td>(Already allocated with the system)</td>
<td>Output Data (2)</td>
</tr>
<tr>
<td>30030 - 30037</td>
<td>10010 - 10017</td>
<td>(OT0001 - OT0008)</td>
<td>Output Data (3)</td>
</tr>
<tr>
<td>30040 - 30047</td>
<td>10020 - 10027</td>
<td>(OT0009 - OT0016)</td>
<td>Output Data (4)</td>
</tr>
<tr>
<td>30050 - 30057</td>
<td>10030 - 10037</td>
<td>(OT0017 - OT0024)</td>
<td>Output Data (5)</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</td>
<td>(IN0025 - IN0032)</td>
<td>Board Status 1)</td>
<td></td>
</tr>
<tr>
<td>20070 - 20077</td>
<td>00050 - 00057</td>
<td>(IN0033 - IN0040)</td>
<td>Input Data (1)</td>
<td></td>
</tr>
<tr>
<td>20080 - 20087</td>
<td>00060 - 00067</td>
<td>(IN0041 - IN0048)</td>
<td>Input Data (2)</td>
<td></td>
</tr>
<tr>
<td>20090 - 20097</td>
<td>00070 - 00077</td>
<td>(IN0049 - IN0056)</td>
<td>Input Data (3)</td>
<td></td>
</tr>
<tr>
<td>20100 - 20107</td>
<td>00080 - 00087</td>
<td>(IN0065 - IN0064)</td>
<td>Input Data (4)</td>
<td></td>
</tr>
<tr>
<td>20110 - 20117</td>
<td>00090 - 00097</td>
<td>(IN0065 - IN0072)</td>
<td>Input Data (5)</td>
<td></td>
</tr>
<tr>
<td>20120 - 20127</td>
<td>00100 - 00107</td>
<td>(IN0073 - IN0080)</td>
<td>Input Data (6)</td>
<td></td>
</tr>
<tr>
<td>20130 - 20137</td>
<td>00110 - 00117</td>
<td>(IN0081 - IN0088)</td>
<td>Input Data (7)</td>
<td></td>
</tr>
<tr>
<td>20140 - 20147</td>
<td>00120 - 00127</td>
<td>(IN0089 - IN0096)</td>
<td>Input Data (8)</td>
<td></td>
</tr>
<tr>
<td>20150 - 20157</td>
<td>00130 - 00137</td>
<td>(IN0097 - IN0104)</td>
<td>Input Data (9)</td>
<td></td>
</tr>
<tr>
<td>20160 - 20167</td>
<td>00140 - 00147</td>
<td>(IN0105 - IN0112)</td>
<td>Input Data (10)</td>
<td></td>
</tr>
<tr>
<td>20170 - 20177</td>
<td>00150 - 00157</td>
<td>(IN0113 - IN0120)</td>
<td>Input Data (11)</td>
<td></td>
</tr>
<tr>
<td>20180 - 20187</td>
<td>00160 - 00167</td>
<td>(IN0121 - IN0128)</td>
<td>Input Data (12)</td>
<td></td>
</tr>
<tr>
<td>20190 - 20197</td>
<td>00170 - 00177</td>
<td>(IN0129 - IN0136)</td>
<td>Input Data (13)</td>
<td></td>
</tr>
<tr>
<td>20200 - 20207</td>
<td>00180 - 00187</td>
<td>(IN0137 - IN0144)</td>
<td>Input Data (14)</td>
<td></td>
</tr>
<tr>
<td>20210 - 20217</td>
<td>00190 - 00197</td>
<td>(IN0145 - IN0152)</td>
<td>Input Data (15)</td>
<td></td>
</tr>
<tr>
<td>20220 - 20227</td>
<td>00200 - 00207</td>
<td>(IN0153 - IN0160)</td>
<td>Input Data (16)</td>
<td></td>
</tr>
</tbody>
</table>
## Allocating I/O Signals

### 5.1 Transmission Data

<table>
<thead>
<tr>
<th>I/O Output (PROFINET)</th>
<th>External Output Signal</th>
<th>General Output Signal</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>CP1616</td>
<td>30060 - 30067</td>
<td>10040 - 10047 (OT0025 - OT0032)</td>
<td>System Reservation(^1)</td>
</tr>
<tr>
<td></td>
<td>30070 - 30077</td>
<td>10050 - 10057 (OT0033 - OT0040)</td>
<td>Output Data (1)</td>
</tr>
<tr>
<td></td>
<td>30080 - 30087</td>
<td>10060 - 10067 (OT0041 - OT0048)</td>
<td>Output Data (2)</td>
</tr>
<tr>
<td></td>
<td>30090 - 30097</td>
<td>10070 - 10077 (OT0049 - OT0056)</td>
<td>Output Data (3)</td>
</tr>
<tr>
<td></td>
<td>30100 - 30107</td>
<td>10080 - 10087 (OT0057 - OT0064)</td>
<td>Output Data (4)</td>
</tr>
<tr>
<td></td>
<td>30110 - 30117</td>
<td>10090 - 10097 (OT0065 - OT0072)</td>
<td>Output Data (5)</td>
</tr>
<tr>
<td></td>
<td>30120 - 30127</td>
<td>10100 - 10107 (OT0073 - OT0080)</td>
<td>Output Data (6)</td>
</tr>
<tr>
<td></td>
<td>30130 - 30137</td>
<td>10110 - 10117 (OT0081 - OT0088)</td>
<td>Output Data (7)</td>
</tr>
<tr>
<td></td>
<td>30140 - 30147</td>
<td>10120 - 10127 (OT0089 - OT0096)</td>
<td>Output Data (8)</td>
</tr>
<tr>
<td></td>
<td>30150 - 30157</td>
<td>10130 - 10137 (OT0097 - OT0104)</td>
<td>Output Data (9)</td>
</tr>
<tr>
<td></td>
<td>30160 - 30167</td>
<td>10140 - 10147 (OT0105 - OT0112)</td>
<td>Output Data (10)</td>
</tr>
<tr>
<td></td>
<td>30170 - 30177</td>
<td>10150 - 10157 (OT0113 - OT0120)</td>
<td>Output Data (11)</td>
</tr>
<tr>
<td></td>
<td>30180 - 30187</td>
<td>10160 - 10167 (OT0121 - OT0128)</td>
<td>Output Data (12)</td>
</tr>
<tr>
<td></td>
<td>30190 - 30197</td>
<td>10170 - 10177 (OT0129 - OT0136)</td>
<td>Output Data (13)</td>
</tr>
<tr>
<td></td>
<td>30200 - 30207</td>
<td>10180 - 10187 (OT0137 - OT0144)</td>
<td>Output Data (14)</td>
</tr>
<tr>
<td></td>
<td>30210 - 30217</td>
<td>10190 - 10197 (OT0145 - OT0152)</td>
<td>Output Data (15)</td>
</tr>
<tr>
<td></td>
<td>30220 - 30227</td>
<td>10200 - 10207 (OT0153 - OT0160)</td>
<td>Output Data (16)</td>
</tr>
</tbody>
</table>

\(^{1}\) The board status and system reservation cannot be allocated as the I/O signal. The data are not transmitted from PROFINET. (Cannot communicate with the I/O device.)
5 Allocating I/O Signals
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 "13.7 I/O Messages and I/O Alarms" in "YRC1000 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.
5 Allocating I/O Signals
5.2 Board Status

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

5. Enter the I/O alarm name.

6. Press [ENTER].
   – The entered alarm information will be registered.
7. 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 Alarm Request</td>
</tr>
<tr>
<td>40220</td>
<td>USER Alarm No. d0</td>
</tr>
<tr>
<td>40221</td>
<td>USER Alarm No. d1</td>
</tr>
<tr>
<td>40222</td>
<td>USER Alarm No. d2</td>
</tr>
<tr>
<td>40223</td>
<td>USER Alarm No. d3</td>
</tr>
<tr>
<td>40224</td>
<td>USER Alarm No. d4</td>
</tr>
<tr>
<td>40225</td>
<td>USER Alarm No. d5</td>
</tr>
</tbody>
</table>

**Auxiliary relay**

<table>
<thead>
<tr>
<th>Signal</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>70017</td>
<td>Control Power ON Completed ( Normally ON ).</td>
</tr>
</tbody>
</table>
5 Allocating I/O Signals
5.2 Board Status

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 “YRC1000 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 YRC1000.
2. Select {EX. MEMORY} under the main menu.
   – The sub menu is displayed.
3. Select {SAVE}.
   – The SAVE window is displayed.
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.
7. Select {YES}.

– The file is started to be saved, and the transmission window is displayed.

– When the save is completed, the display returns to the file selection window.
6.2 Procedures for Loading

1. Turn ON the YRC1000.
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.
6 Management of Setting Data

### 6.2 Procedures for Loading

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.

![Image of a display showing file loading progress]

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.

9. After loading is completed, turn the power supply ON again.
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 chapter 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).
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 Additional Functions for IO Controller
7.2 Message Communication Function

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 YRC1000 in online mode, and then select {IN/OUT} - {PROFINET MESSAGE COMMUNICATION}.

   (Description of each item)

   (1) PCI

   Displays the PCI slot number of the YRC1000 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 their ON/OFF status can be switched every time the key is pressed.
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 chapter 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 chapter 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 their ON/OFF status can be switched every time the key is pressed.
For specifying IO TYPE, refer to chapter 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 chapter 7.2.3 “Supplementary Note”.

(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 chapter 7.2.3 “Supplementary Note”.)
   ADDRESS: 0 (Refer to chapter 7.2.3 “Supplementary Note”.)

(2) Select {EXECUTE}.
(3) Select [DETAIL] to confirm the read data.

(Example of the response packet from the IO device confirmed with the packet capture tool, Wireshark)
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.
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 YRC1000.)

7.3.2 Usage Method

1. Displaying the Alarm History Window
   
   – Start the YRC1000 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 YRC1000 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. Additional Functions for IO Controller

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.

4. Deleting the Alarm History

- When the security mode is “Management mode” or higher, selecting {DATA} - {CLEAR} in the menu deletes the whole page of the alarm history.
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></td>
<td>• A download is still taking place.</td>
</tr>
<tr>
<td>-</td>
<td>ON</td>
<td>Diagnostic information exists.</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 chapter 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 chapter 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 chapter 4.1.2.)
  • Confirm that the project file compiled at STEP 7 was appropriately
    downloaded to the CP1616.
    (Refer to Step 12 at chapter 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 chapter 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 chapter 4.1.3.1.)
    When the IP address and the device name have not been set to the
    CP1616, the following message is displayed on the message column of
    the programing pendant window. (n: Station No. of the IO module to
    which the CP1616 is installed)
    “Waiting for data setting command from upper unit. (The CP1616 board) [n]”
  • Confirm that the factory reset was executed before modifying the IP
    address and the device name of the CP1616.
    (Refer to Step 3 at chapter 4.1.3.1.)
  • Confirm that the IO allocation of the CP1616 is consistent with IO
    allocation of the CP1616 which was set by the IO controller.
    Confirm that whether each CP1616 have the migrations or not are
    also consistent. (Refer to Step 3 at chapter 4.1.3.2 “CP1616 (IO
    Device) Settings with IO Controller” and Step 3 at chapter 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 pro-
    gram was downloaded to the IO controller. (Refer to Step 7 at
    chapter 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 chapter 4.1.4 “Coupling Settings”.

- Confirm that both IO controller and the IO device are set in the maintenance mode. (Refer to chapter 4.3 “IO Controller Settings” and chapter 4.4 “IO Device Settings”.)

- Confirm that the CP1616 is set as the migration module. (Refer to Step 3 at chapter 4.4.)
YRC1000 OPTIONS
INSTRUCTIONS FOR PROFINET COMMUNICATIONS FUNCTION

(FOR CP1616 MADE BY Siemens)

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