YASKAWA

YRC1000 OPTIONS
INSTRUCTIONS

EtherNet/IP COMMUNICATION FUNCTION
(FOR STANDARD LAN PORT)

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)

Have the following information available when contacting the YASKAWA Representative:
- System
- Primary Application
- Software Version *(Located on Programming Pendant by selecting: {Main Menu} - {System Info} - {Version})*
- Warranty ID *(Located on Robot Controller)*
- Robot Serial Number *(Located on Manipulator data plate)*
- Robot Sales Order Number *(Located on Robot controller data plate)*

Part Number: 178651-1CD
Revision: 7

MANUAL NO.
HW1483560 ⑦

DANGER

- This manual explains the EtherNet/IP communication function of the YRC1000 system. Read this manual carefully and be sure to understand its contents before handling the YRC1000. Anything, 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

- 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. 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 your product.

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

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.

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.

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 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.
Be sure to follow these important instructions.

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

DANGER

- 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.

Fig. : 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.

Fig. : 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 upper right of the programming pendant.

- Read and understand the Explanation of the Warning Labels before operating the manipulator.

WARNING

- Do not touch any part inside the YRC1000 for at least five minutes after turning OFF the power supply.

Failure to observe this instruction may result in electric shock and/or personal injury due to residual voltage in the capacitor.

- Perform the following inspection procedures prior to conducting manipulator teaching. If there is any problem, immediately take necessary steps to solve it, such as maintenance and repair.
  - Check for a problem in manipulator movement.
  - Check for damage to insulation and sheathing of external wires.
- Always return the programming pendant to the hook on the YRC1000 cabinet after use.

If the programming pendant is left unattented 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.

- Wiring must be performed only by authorized personnel.

Failure to observe this instruction may result in fire and/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.

In case of malfunction, etc. it 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 and the soldered surfaces of the board parts directly with fingers.

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.

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.

Equipment	Manual Designation
YRC1000 controller	YRC1000
YRC1000 programming pendant	Programming pendant
Cable between the manipulator and the controller	Manipulator cable

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

Equipment		Manual Designation
Programming Pendant	Character Keys /Symbol Keys	The keys which have characters or symbols printed on them are denoted with [ ]. e.g. [ENTER]
	Axis Keys /Numeric Keys	[Axis Key] and [Numeric Key] are generic names for the keys for axis operation and number input.
	Keys pressed simultaneously	When two keys are to be pressed simultaneously, the keys are shown with a “+” sign between them, e.g. [SHIFT]+[COORD].
	Mode Switch	Mode Switch can select three kinds of modes that are denoted as follows: REMOTE, PLAY or TEACH. (The switch names are denoted as symbols)
	Button	The three buttons on the upper side of the programming pendant are denoted as follows: START, HOLD, or EMERGENCY STOP. (The button names are denoted as symbols)
	Displays	The menu displayed in the programming pendant is denoted with { }. e.g. {JOB}

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.

Contents

1 Introductions

In the YRC1000 system, the EtherNet/IP communication function (hereinafter referred to as EtherNet/IP (CPU board)) to which a standard LAN port of the ACP01 board (CN106 connector) is used can be employed. The Ethernet communication function of the YRC1000 provides the following features: an IO transmission/reception function that enables to exchange external input/output signals between the YRC1000 and other EtherNet/IP supported devices and a message communication function that realizes data transmission equal to the one realized by the YRC1000 Ethernet function. Also, this function makes it possible to carry out IO communication by InputOnly as well as message communication using CIP. This manual describes the settings necessary for using this function and its related information.

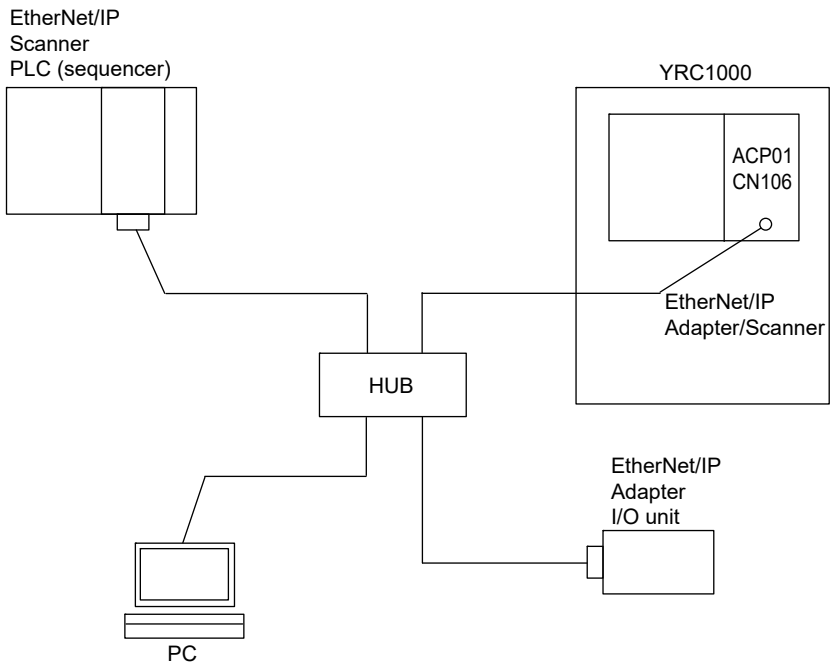
SUPPLE -MENT

This manual describes the operating procedures using the Programming Pendant. For Smart Pendant, the same operating procedures can be performed by using the Classic Interface.

1.1 System Configuration

1.1.1 System Configuration Example

A system configuration example when using the EtherNet/IP (CPU board) is as follows.



1.1.2 Adapter

When the IO transmission/reception function is used, the YRC1000 can operate as an adapter (communication server) for the scanner (communication client). In the system configuration example, IO communication is carried out with the external PLC being a scanner and the YRC1000's EtherNet/IP (CPU board) being an adapter.

1.1.3 Scanner

When the IO transmission/reception function is used, the YRC1000 can operate as a scanner (communication client) for the adapter (communication server). In the system configuration example, IO communications is carried out with YRC1000's EtherNet/IP (CPU board) being a scanner and the IO unit being an adapter.

1.1.4 Message Communication

Message communication can be carried out in parallel with IO transmission and reception. In the system configuration example, message communication with a PC is carried out. The YRC1000 Ethernet function, the FTP function, and the EtherNet server function (the latter two are extended functions) can be used for this message communication. Also, communication using CIP is possible. To use the YRC1000 Ethernet function and the extended option function, settings need to be made separately.

1.1.5 IO Communication by InputOnly

When communication stations on the network communicate with one another, in conventional ExlusiveOwner connection, as the number of communication stations increases, the number of transmitted packets increases sharply, placing considerable strain on the network band. To cope with this problem, the multicast communication called InputOnly connection is introduced to keep the increase in the number of packets low.

1.1.6 Message Communication Using CIP

CIP for message communication is used so that communication with general panel computer is possible.

2 Board Specifications

Items	Specifications
Interface to external devices	EtherNet/IP
Transmission I/O points (max.)	Input: 4040 points/Output: 4040 points
Processing capacity (max. number of packets)	3000 packets/sec
Connection type	Star (Connection by HUB)
Communication speed	10 Mbps/100 Mbps (Detected automatically during startup)
Communication media	Use category 5 or higher shielded Ethernet cables.

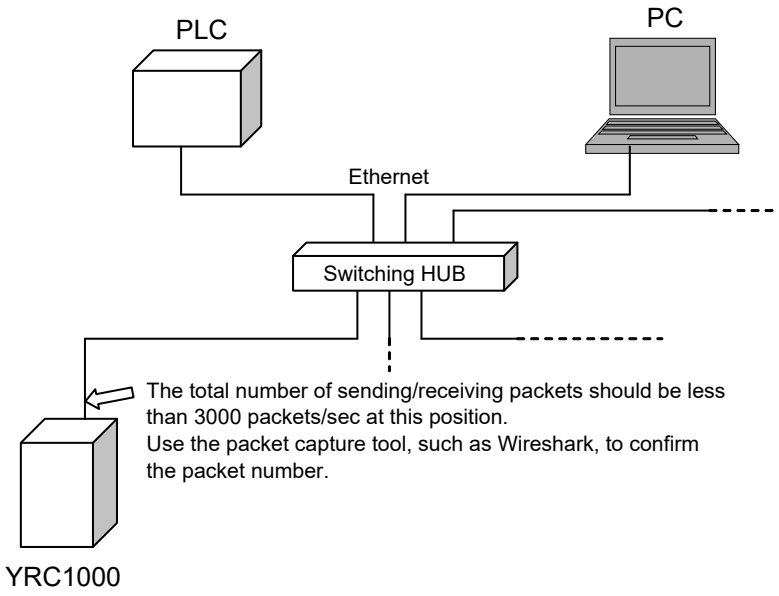
NOTE

The above mentioned maximum transmission I/O points (input: 4040 points/output: 4040 points) is a limitation by EtherNet/IP communication specification. Because the upper limit of the I/O points in the YRC1000 system is 4096 points when using this board with other board simultaneously, the upper limit of the total of the I/O points and the communication status used by this function or other functions is also 4096 points. The communication status occupies either 8points or 16points per network. For the details, refer to the instructions of the I/O circuit board.

NOTE

Use this board within the above mentioned processing capacity (3000 packets/sec). If it is used process beyond its processing capacity, the alarm 100 “COMMUNICATION ERROR (SV#1)” or 500 “SEGMENT PROC NOT READY” may occur so that it won’t work properly.

Fig. 2-1: Description of the Processing Capacity



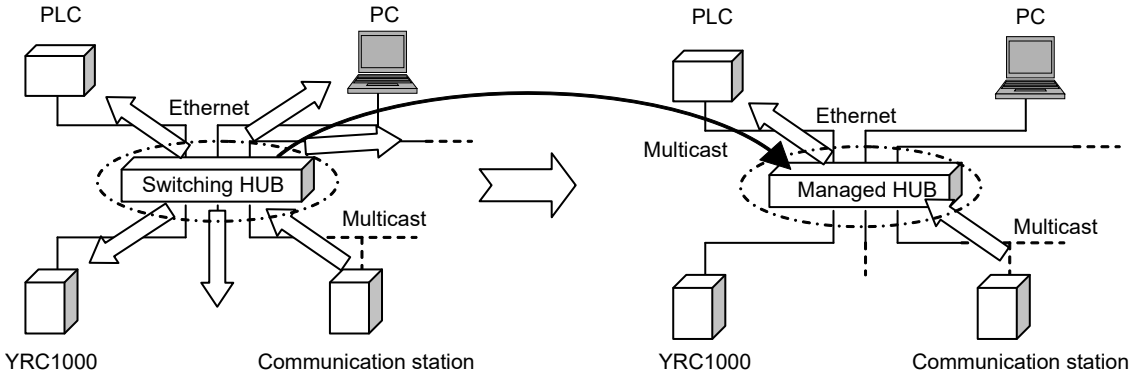
Reference: Solution to reduce the packet numbers

A packet carrying the large data in the network might be caused by the communication station performing a broadcast (a message or signal is sent to all connected devices) or a multicast (one device communicates with several devices with a single transmission). Perform the following measures to reduce the packet numbers in the network.

(1) Limits the packet transmission route by Managed HUB

Install the Managed HUB instead of the Switching HUB, and set it to send the packets to the necessary route. In addition, refer to a guide book of installing the Managed HUB for installation procedures.

Fig. 2-2: Limits the Packet Transmission Route by Managed HUB



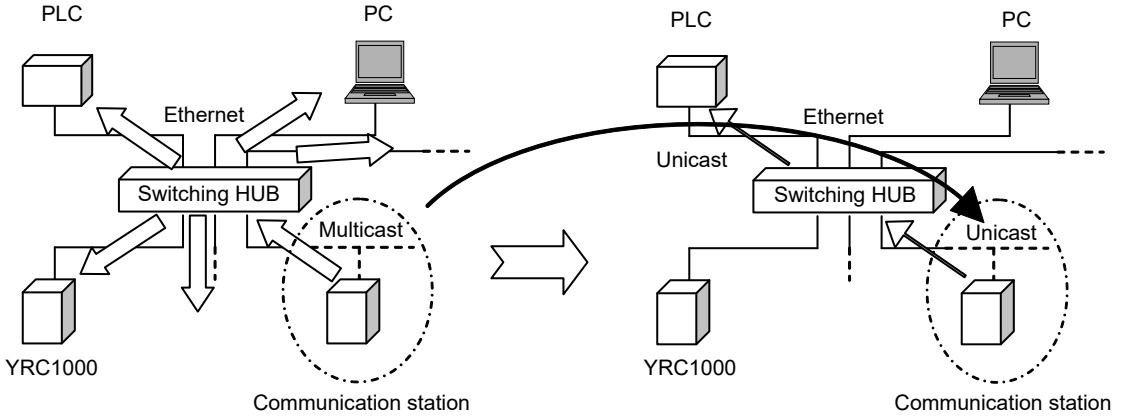
Use of the Switching HUB transmits the packets to all devices

Use of the Managed HUB transmits the packets with a single transmission

(2) Change the packet transmission method

Change the packet transmission method of communication station from broadcast/ multicast to the unicast (point-to-point transmission from one device to another). Refer to a guide book of each device for setup procedures.

Fig. 2-3: Limits the Packet Transmission Route by Unicast



Broadcast/multicast transmits the packets to all devices.

Unicast transmits the packets to a specified device.

3 How to Connect Communication Cable

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.

In case of malfunction, etc. it 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 How to Connect Communication Cable

NOTICE

- Never touch the mounting surfaces and the soldered surfaces of the board parts directly with fingers.

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.

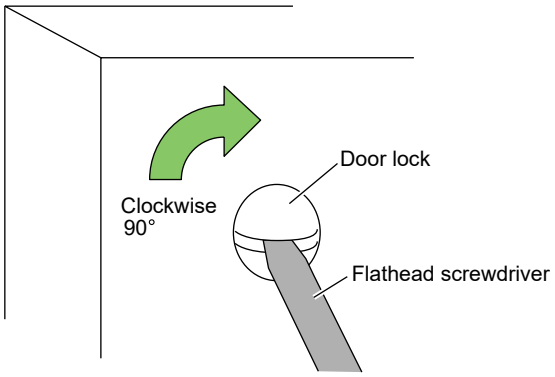
3.1 Operating the Front Door of the YRC1000 (Controller)

Take the following procedure to mount the EtherNet/IP (CPU board).

1. Open the front door of the YRC1000.

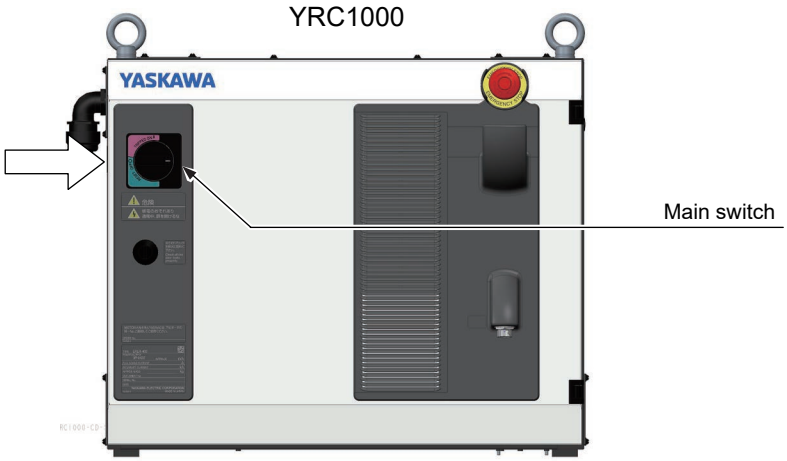
   (1) Using a coin or a flathead screwdriver, rotate the door lock on the front of the YRC1000 (one place) 90 degrees to clockwise.

Fig. 3-1: Door Unlock



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

Fig. 3-2: Open the Door "OFF" Position (Horizontal)



3.2 Mounting the EtherNet/IP (CPU board) to YRC1000

Category 5 or higher shielded cable to the connector CN106 (RJ-45) for LAN connection which is mounted on the front of ACP01 board in the CPU rack.

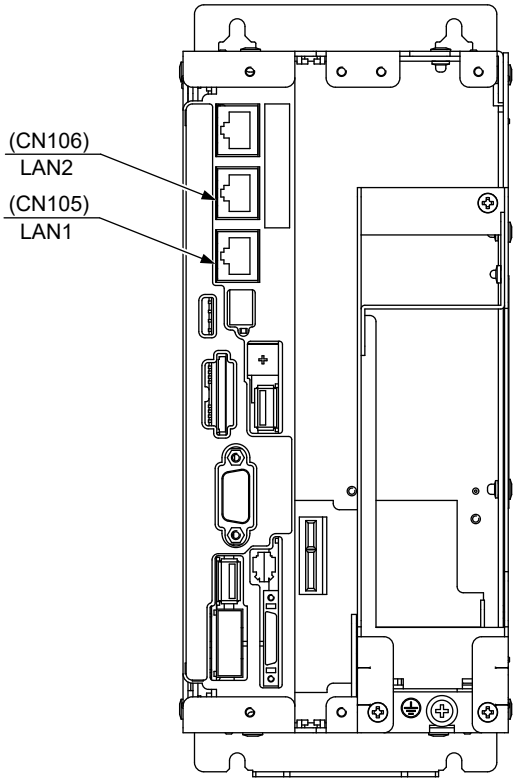
NOTE

Three RJ-45 connectors are mounted on the front side of the ACP01 board.

Among these connectors, CN106 (the middle connector) is available in the EtherNet/IP communication function.

Do not use CN105 connector (the lower connector) since it is for the programming pendant.

Fig. 3-3: Front View of CPU Rack (Uncovered)



NOTE

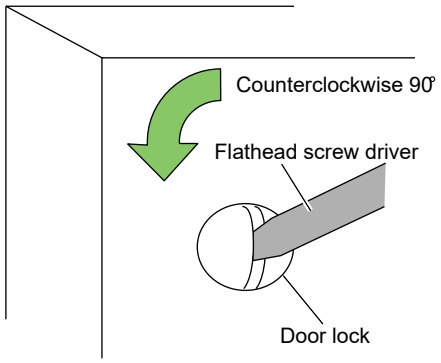
When a switching hub is used for conneting commnunication cables, it is highly recommended to use an industrial switching hub which is recommended by YASKAWA.

Recommended switching hub
Type: EDS-205 (MOXA Inc. made)

3.3 Closing the Front Door of the YRC1000

1. Close the front door of the YRC1000.
   (1) Close the door gently.
   (2) Using a coin or a flathead screwdriver, rotate the door lock on the front of the YRC1000 (one place) 90 degrees to counterclockwise.

Fig. 3-4: 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 EtherNet/IP Function Setting

4.1 Outline

To use the EtherNet/IP (CPU board) in the YRC1000 system, settings of the optional function and I/O module are required.

NOTE

Customer cannot alternate the usage of the EtherNet/IP (CPU board) function between use and not use, please contact YASKAWA representative.

Set the mode to the management mode before performing the following settings.

The setting cannot be performed in the operation or edit mode.

4.1.1 Window Composition

Select the maintenance mode to set up the EtherNet/IP (CPU board) function. The composition of the SETUP window is as follows.

Window Composition	Explanation
OPTION FUNCTION	Select EtherNet/IP (CPU board) from the list on the OPTIONFUNCTION window. Detailed settings are performed on the subsequent windows.
EtherNet/IP (CPU board)	Set up the EtherNet/IP (CPU board). Detailed settings are performed on the subsequent windows.
EtherNet/IP (CPU board)	Set up the EtherNet/IP (CPU board). Detailed settings are performed on the subsequent windows.
USED/NOT USED	Set whether to use the EtherNet/IP (CPU board). (Customer cannot change this setting.)
IO SIZE	Displays the IO size totally used by the EtherNet/IP (CPU board) (displays a total of IO sizes set for adapter and scanner).
ADAPTER	Configure the settings for communication with sequencers. Detailed settings are performed on the subsequent windows.
SCANNER	Configure the settings for communication with lower level tools. Detailed settings are performed on the subsequent windows. Note that before configuring these settings, “Device information list” setting is required.
DEVICE INFORMATION LIST	To configure the scanner settings, definition of a adapter as the communication target station is required on this window. Detailed settings are performed on the subsequent windows.
LAN INTERFACE SETTING	Configure the settings for TCP/IP communication. For details, refer to YRC1000 OPTIONS INSTRUCTION For Ethernet FUNCTION.
IO MODULE	Checks and revises signals used by the YRC1000 for input/output from/to outside.

4.2 Setup Procedure

Followings are the procedures for setting up the EtherNet/IP (CPU board).

4.2.1 Calling the SETUP Window for the EtherNet/IP (CPU board)

First, take the following procedure to display the SETUP window for the EtherNet/IP (CPU board).

1. • For the programming pendant
   Turn ON the power supply again while pressing [MAIN MENU] on the programming pendant simultaneously.

   • For Smart Pendant
   In the Start Window (Exit the Classic Interface and restart, if smart pendant is already in the Classic Interface), select {Special Mode}, and then {Maintenance Mode}.

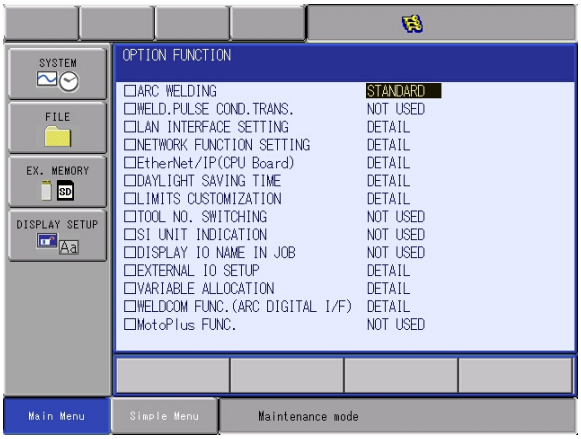
   – The maintenance mode starts-up.

2. Change the security mode to management mode.
3. Select [SYSTEM] under the main menu.

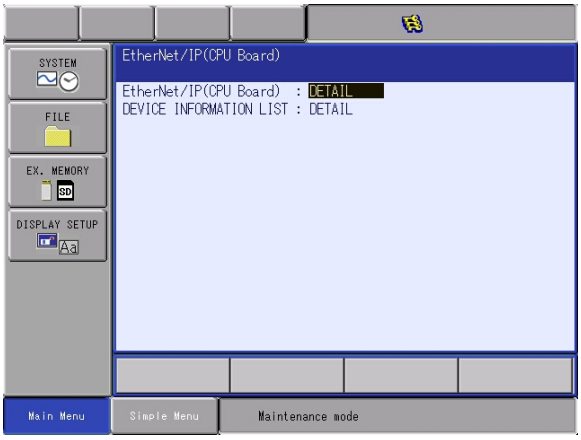
   – The sub menu appears.

4. Select [SETUP].
   – The SETUP window appears.

5. Select {OPTION FUNCTION}.
   – The OPTION FUNCTION window appears.



6. Select {DETAIL} on the EtherNet/IP(CPU Board) window.
   – The EtherNet/IP(CPU board) DETAIL window appears.



4.2.2 Setting the Device Information List

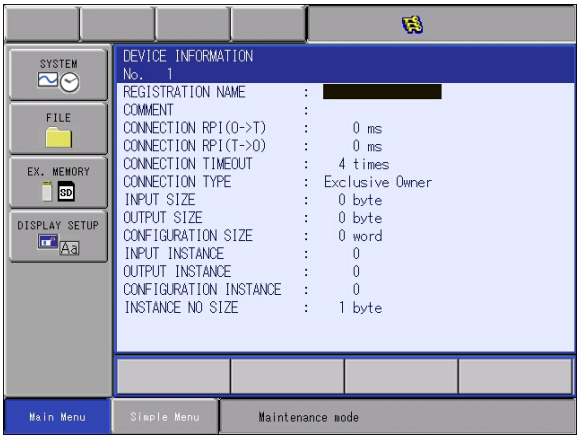
To use the EtherNet/IP (CPU board) as a scanner, advanced settings of the network information such as lower tools is required. This chapter describes how to register such information into the device information list. If registration in the device information list is not necessary, move to the next chapter.

1. Select [DETAIL] in DEVICE INFORMATION LIST.

   – The DEVICE INFORMATION LIST window appears.
   In the example shown below, no device information has been registered; only the cursor is displayed on the screen.

2. Press [SELECT].

   – The DEVICE INFORMATION setting window appears.



   – (Description of each setting item)

   (1) REGISTRATION NAME
   Enter a name to be registered as a device.
   Without this name, registration in the device information list is not executed.
   To delete an already registered device, make this field blank.

   (2) COMMENT
   Enter a comment as needed.

   (3) CONNECTION RPI (O->T)
   Set the revision processing interval (RPI) for data to be sent from the originator to the target.
   When setting RPI, set 4 msec or more.

(4) CONNECTION RPI (T->O)
Set the revision processing interval (RPI) for data to be sent from the target to the originator.
When setting RPI, set 4 msec or more.

(5) CONNECTION TIME OUT
Set the period of the connection time out.

(6) CONNECTION TYPE
Set the connection type for connection. Either ExclusiveOwner or InputOnly can be used.

NOTE

For YAS4.23.00A-00 or later versions, the following items can be set:

- Exclusive Owner (Unicast): T->O is unicast
- Exclusive Owner (Multicast): T->O is multicast
- Input Only: O->T no transmission data
- USER: 0 bytes can be set in Exclusive Owner (Multicast)

Exclusive Owner T->O is multicast in versions earlier than YAS4.23.00A-00.

(7) INPUT SIZE
Set the size of the IN signal to be input into the YRC1000 (Unit: Byte).

(8) OUTPUT SIZE
Set the size of the OUT signal to be output from the YRC1000 (Unit: Byte).

(9) CONFIGURATION SIZE
Set the size of configuration data (Unit: Word).

(10) INPUT INSTANCE
Set the instance number of the IN signal to be input into YRC1000.

(11) OUTPUT INSTANCE
Set the instance number of the OUT signal to be output from YRC1000.

(12) CONFIGURATION INSTANCE
Set the instance number of configuration data.

(13) INSTANCE NO SIZE
Set the size of the instance number in bytes.

NOTE

The upper limit of the setting value of the input instance, output instance, and configuration instance varies depending on the system version.

Earlier than the YAS2.82.00A-00 version: 0 to 255

The YAS2.82.00A-00 or later version: 0 to 65534

When using the EtherNet/IP Safety, the setting value 768 to 776, 896 to 904, and1024 to 1032 are not available.

NOTE

The instance number size can only be set in the YAS2.82.00A-00 or later versions of the YRC1000 controller.

This item will not be displayed in controllers earlier than the YAS2.82.00A-00 version. In earlier versions, the instance number size is always 1 byte.

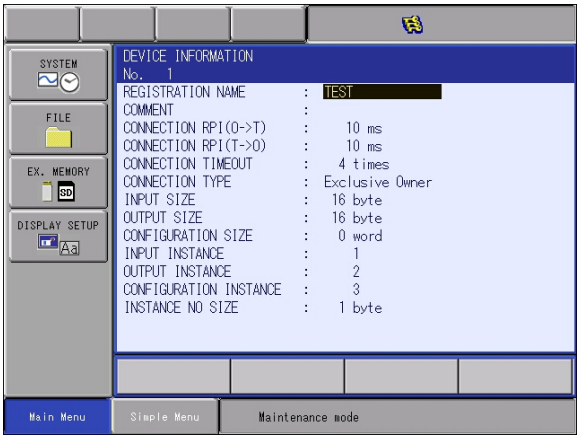
When the input instance, output instance, and configuration instance are set to 256 or more, the size of instance number can not be set to 1 byte.

NOTE

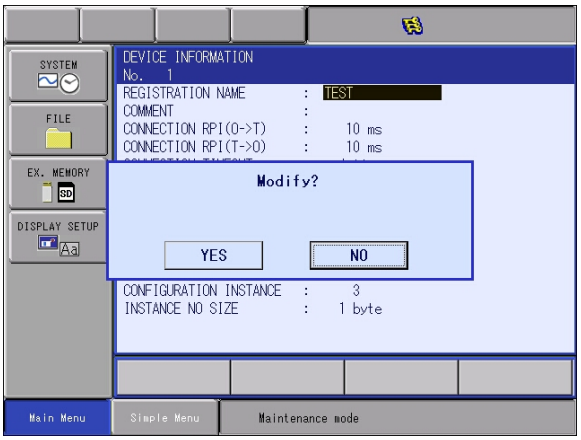
For YAS4.23.00A-00 or later versions, the instance number size can be set to "AUTO".

When set to "AUTO", the instance number size changes according to the instance number. In this case, when the instance number is set to 0 to 255, the instance number size is 1 byte. When the instance number is set to 256 to 65534, the instance number size is 2 bytes.

3. Enter the desired values.
   – An input example is shown below. (Configure the settings that suits the actual communication target.)



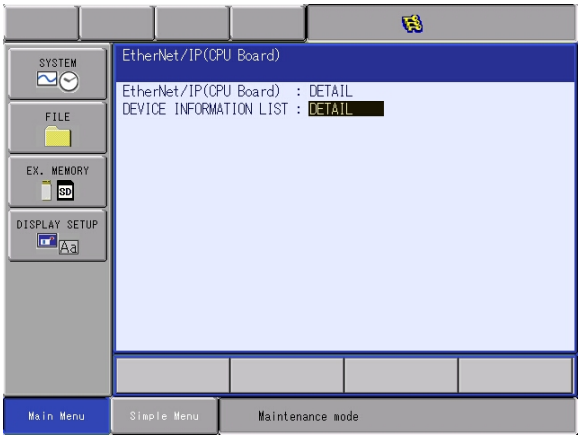
4. Press [ENTER].
   – The confirmation dialog box appears.



5. Select “Yes”.
   – The DEVICE INFORMATION LIST window appears again.

   – In the window example, the device information named “TEST” has been registered. A maximum of 32 devices can be set into the device information list. Move the cursor over the field where no string is displayed and press [SELECT] to register new device information.

6. Press [ENTER].
   – The EtherNet/IP (CPU board) SETUP window appears again.



4.2.3 General Setup for the EtherNet/IP (CPU board)

Indicate the window general setup for the EtherNet/IP (CPU board).

1. Select {EtherNet/IP (CPU board)} in the EtherNet/IP (CPU board) SETUP window.
   – The EtherNet/IP (CPU board) SETUP window appears.

NOTE The content and setting items displayed on the EtherNet/IP(CPU Board) setup window depend on the version.

– (Description of each item)

{EtherNet/IP(CPU Board)}

One of the following items must be set.

Display	Applicable Version	Description
USED	Earlier than YAS4.23.00A-00	Only one station can be set for the adapter.
USED(STANDARD)	YAS4.23.00A-00 or later	Only one station can be set for the adapter.
USED(EX.ADAPTER)		32 stations can be set for the adapter.
The "USED(STANDARD)" and "USED(EX.ADAPTER)" settings can be changed by the customer.		

{IO SIZE(IN/OUT)}

Displays the total I/O size used by the adapters and scanners

Display	Applicable Version	Description
Number of used bytes only	Earlier than YAS4.23.00A-00	The I/O size cannot be changed on this window.
Number of used bytes and "RECALC"	YAS4.23.00A-00 or later	The I/O size to use can be entered manually. Use "RECALC" and the currently set I/O size can also be changed.

{ADAPTER}

Configures detailed settings for adapter communication.

{SCANNER}

Configures detailed settings for scanner communication.

{TERMINAL OUTPUT FUNCTION}/{TERMINAL OUTPUT SETTING}/{M REGISTER}

These functions allow EtherNet/IP adapters with communication errors to be identified. EtherNet/IP scanners with communication errors can also be identified in extended adapter settings. In this case, scanner and adapter appear side by side for TERMINAL OUTPUT FUNCTION.

For details, refer to *chapter 4.9 "Terminal Output Function/Scanner Terminal Output Function"* . For a description of the function that can specify the adapter and scanner to output communication errors with the terminal output function/scanner terminal output function, refer to *chapter 4.10 "Terminal Output Setting Function"* .

The terminal output function is available in YAS2.43.00A-00 or later versions. The scanner terminal output function is available in YAS4.23.00A-00 or later versions.

{QC TRIGGER}/{M REGISTER}

For the EtherNet/IP QuickConnect function, reconnecting communication at high speed is supported in YAS2.43.00A-00 or later versions. QuickConnect is also supported using an M register setting value as triggers in YAS4.23.00A-00 or later versions. For details, refer to *chapter 4.11 "QuickConnect Function (Specifying a Short Cycle for Reconnection Processing)"* and *chapter 4.12 "QuickConnect Function (Specifying Triggers)"* .

{EtherNet/IP Safety}

This function is used with EtherNet/IP Safety, which is a separate optional function.

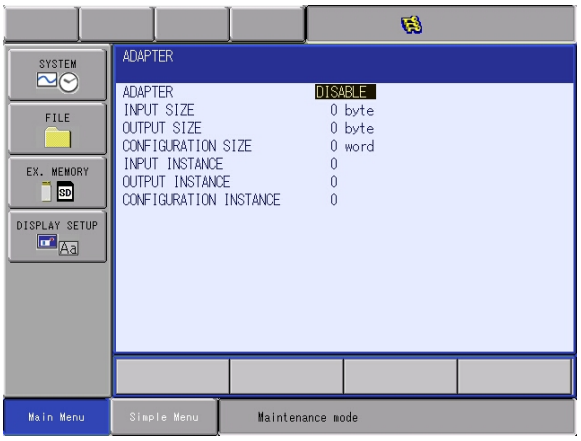
4.2.4 Adapter Setting

The settings for adapter are required for IO transmission and reception to and from the scanner (communication client such as PLC) during EtherNet/IP IO communication. This chapter describes the adapter setting procedure.

4.2.4.1 When Using Standard Settings

When {EtherNet/IP(CPU Board} is set to "USED" or "USED(STANDARD)" in the EtherNet/IP (CPU board) general settings, configure the following settings.

1. Select {ADAPTER} in the EtherNet/IP (CPU board) general setup window.
   – The Adapter setting window appears.



   – (Description of each setting item)

   (1) Adapter
   Select this item using a toggle switch to alternately change between “ENABLE” and “DISABLE”.
   For use as an adapter, set this item as “ENABLE”.

   (2) Input size
   Set the size of the IN signal to be input into the YRC1000 (Unit: Byte).

   (3) Output size
   Set the size of the OUT signal to be output from the YRC1000 (Unit: Byte).

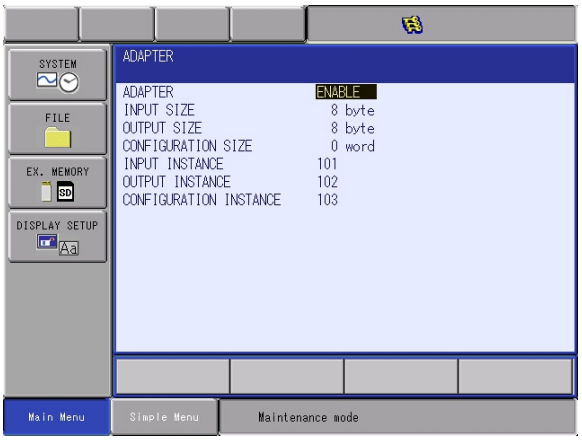
   (4) Configuration size
   Set the size of configuration data (Unit: Word).

   (5) Input instance
   Set the instance number of the IN signal to be input into YRC1000.

   (6) Output instance
   Set the instance number of the OUT signal to be output from YRC1000.

   (7) Configuration instance
   Set the instance number of configuration data.

2. Enter the desired values.
   – An input example is shown below. (Configure the settings that suits the actual communication target.)

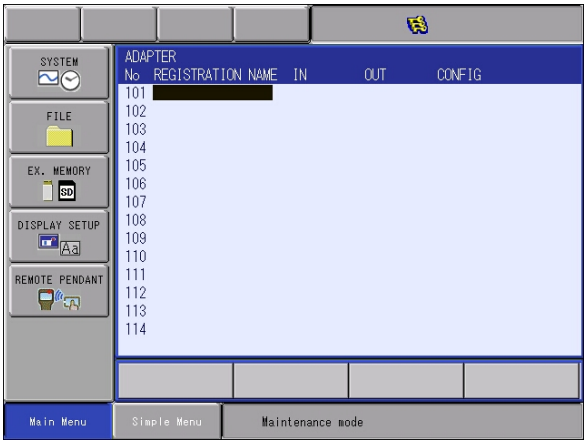


3. Press [ENTER].
   – The EtherNet/IP (CPU board) general setup window appears again.

4.2.4.2 When Using Extended Adapter Settings

When {EtherNet/IP(CPU Board)} is set to "USED(EX.ADAPTER)" in the EtherNet/IP (CPU board) general settings, configure the following settings.

1. Select {ADAPTER} in the EtherNet/IP (CPU board) general setup window.
   – The adapter list window appears.



(Description of each item)

(1) No
Displays the number to allocate. The numbers are 101 to 132. This number is used in the external IO setup and the communication monitor.
When this number is selected, the selection dialog box appears and the following items can be selected.

Item	Description
DISABLE	Changes the number display to "-" and removes the settings from the total IO size, IO module allocations, and external IO setup.
ENABLE	Enables the settings.

(2) REGISTRATION NAME
Shows the name of the adapter to allocate.
When this name is selected, the selection dialog box appears and the following items can be selected.

Item	Description
DETAIL	Accesses the adapter settings window. Refer to step 2.
DELETE(PACK)	Deletes these settings. The settings for numbers after the deleted settings move to fill in the empty space.
DELETE(NOT PACK)	Deletes these settings. The settings for numbers after the deleted settings do not move to fill in the empty space.

(3) IN
Shows the size (bytes) and number of the input instance (display only).

(4) OUT
Shows the size (bytes) and number of the output instance (display only).

(5) CONFIG
Shows the size (words) and number of the configuration instance (display only).

2. Select the registration name, and then select {DETAIL} on the displayed dialog box.

– The adapter settings window appears.

(Description of each item)

(1) REGISTRATION NAME
Set the name to allocate.

(2) INPUT SIZE
Set the size of the IN signal to be input into the YRC1000 (Unit: Byte).

(3) OUTPUT SIZE
Set the size of the OUT signal to be output from the YRC1000 (Unit: Byte).

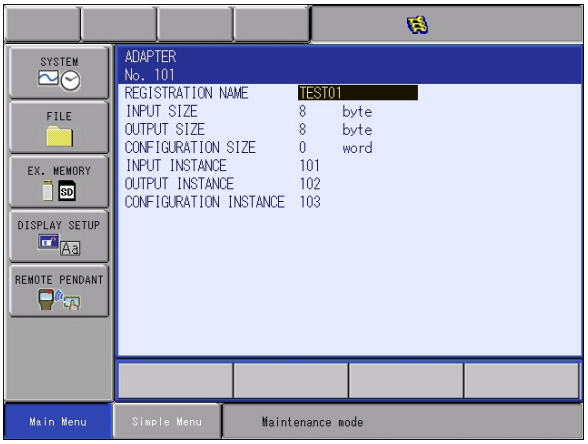
(4) CONFIGURATION SIZE
Set the size of configuration data (Unit: Word).

(5) INPUT INSTANCE
Set the instance number of the IN signal to be input into the YRC1000.

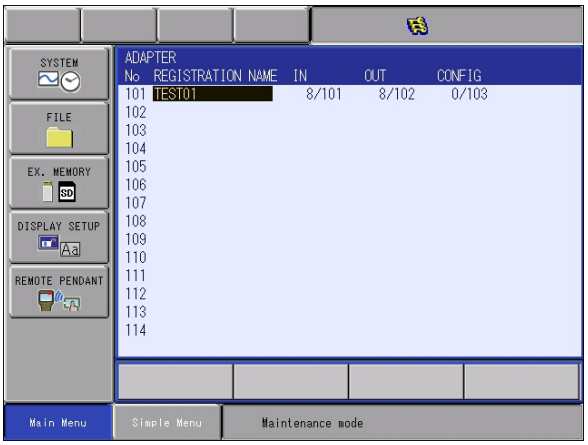
(6) OUTPUT INSTANCE
Set the instance number of the OUT signal to be output from the YRC1000.

(7) CONFIGURATION INSTANCE
Set the instance number of configuration data.

3. Enter the desired values.
   – An input example is shown below. (Configure the settings for the actual communication target.)

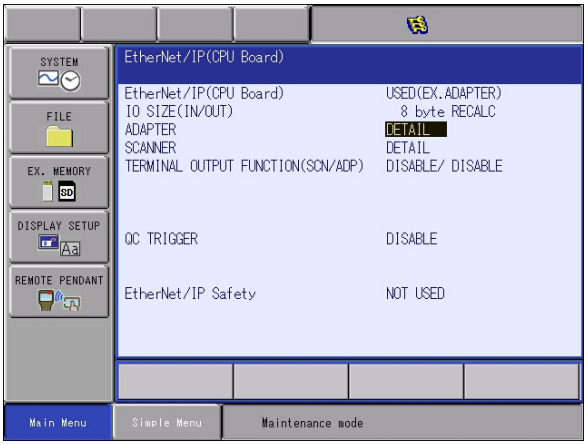


4. Press [ENTER].
   – The adapter list window appears again.



   Repeat steps 2 to 4 and configure the necessary adapter settings.

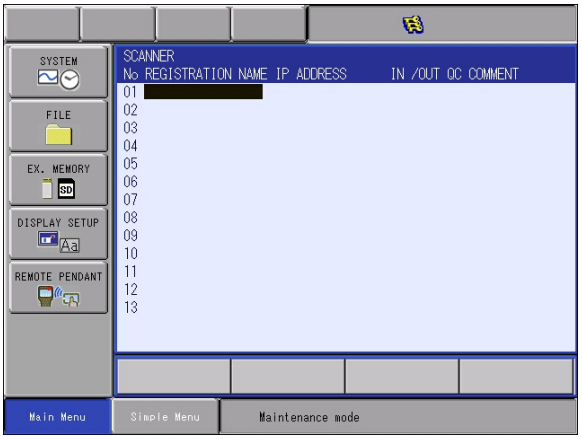
5. Press [ENTER].
   – The EtherNet/IP (CPU board) general setup window appears again.



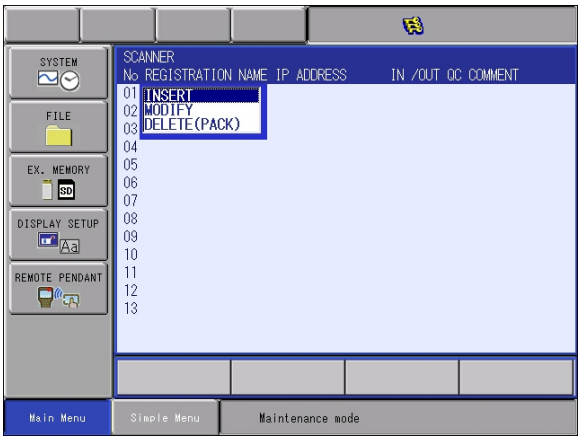
4.2.5 Scanner Setting

The settings for scanner are required for IO transmission and reception to and from the adapter (communication server such as tool) during EtherNet/IP IO communication. This chapter describes how to configure such settings.

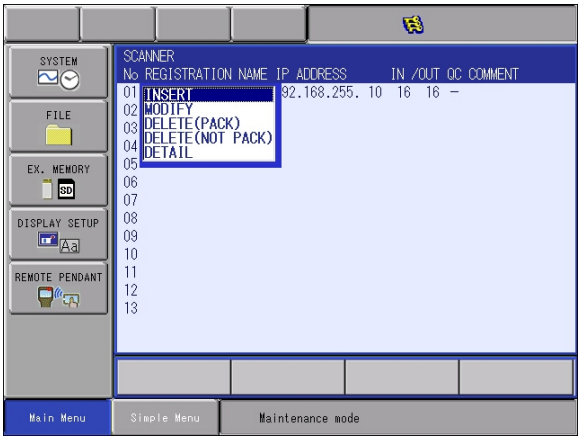
1. Select [SCANNER] in the EtherNet/IP (CPU board) general setup window.
   – The SCANNER window appears.



2. Press [SELECT].
   – When a blank field with no registered name in it is selected, the following appears.



   – When a field with a registered name already set to it is selected, the following appears.



– (Description of each item)

(1) Insert
Add new settings to the current number. If settings have been already registered into the current number, such registered settings shift to the next number.

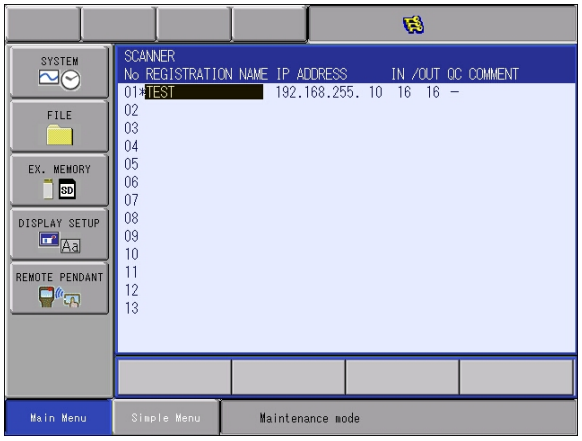
(2) Modify
Change the target registered name (if there is no registered name, register a new name).

(3) DELETE(PACK)
Delete the settings. The settings for numbers after the deleted settings move to fill in the empty space.
The behavior is the same as the "Delete" item in versions earlier than YAS4.23.00A-00.

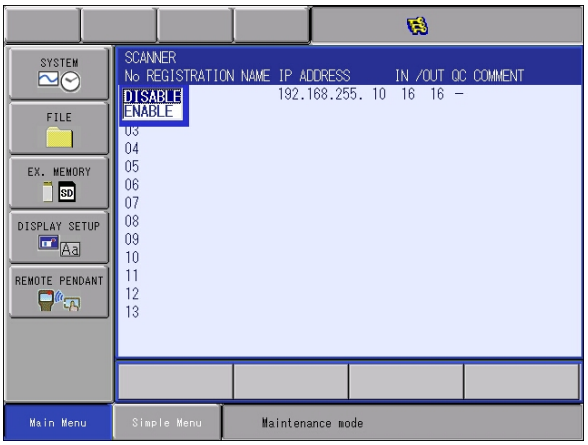
(4) DELETE(NOT PACK)
Delete the settings. The settings for numbers after the deleted settings do not move to fill in the empty space.
This item is available in YAS4.23.00A-00 or later versions.

(5) DETAIL
Display detailed content of the device information list.

– When the details are displayed and some current value is changed, an asterisk “∗” is displayed as follows.



– For YAS4.12.00A-00 or later versions, when the number that corresponds to No is selected, the selection dialog box appears and the following items can be selected.

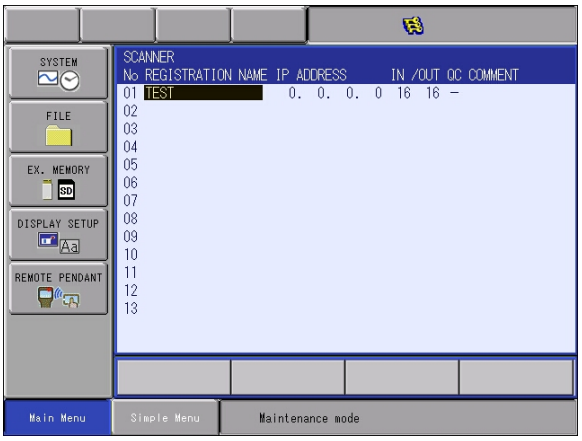


Item	Description
DISABLE	Changes the number display to "-" and removes the settings from the total IO size, IO module allocations, and external IO setup.
ENABLE	Enables the settings.

3. Select [MODIFY].
   – The registered device information list appears.

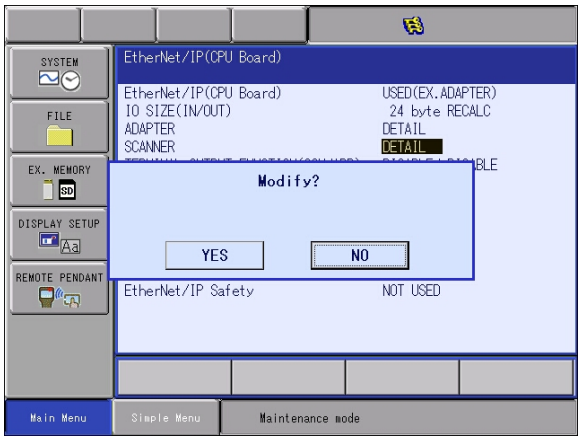
   – For details on how to set the device information list, see *chapter 4.2.2 “Setting the Device Information List”* .

4. Select a device to be used.
   – Information on the selected device appears in the Scanner setting window.



5. Enter the IP address.
   – Enter the IP address.

6. Press [ENTER].
   – The EtherNet/IP (CPU board) general setup window appears again.
7. Press [ENTER].
   – The confirmation dialog box appears.



8. Select “Yes”.
   – The IO module window appears.

The EtherNet/IP (CPU board) setting ends here. Then, re-configuration of the IO module according to the settings for the board is required. Move on to the next setting procedure.

NOTE

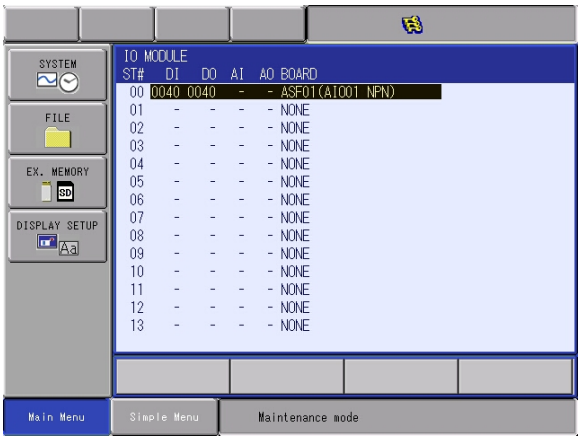
If the settings for the optional functions are not matched to the settings for the IO module, the YRC1000 will not operate correctly.

To prevent the above, after the option board setting process is complete, be sure to execute the IO module setting that appears next.

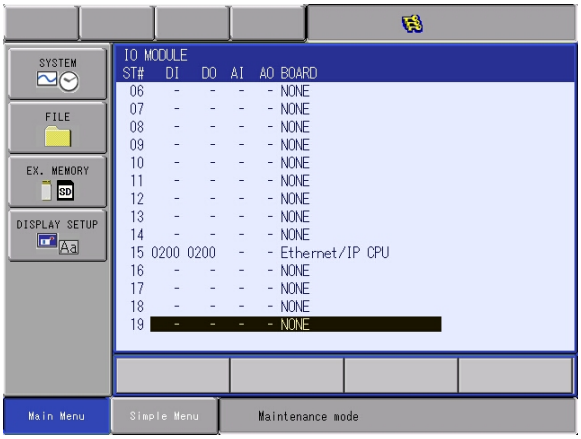
4.2.6 IO Module Re-configuration

When changes are made to the settings for the EtherNet/IP (CPU board), re-configuration of the IO module is also required. Take the following procedure to reconfigure the IO module.

1. (Continued from the EtherNet/IP (CPU board) setting)
   – The IO module window (1st half) appears.

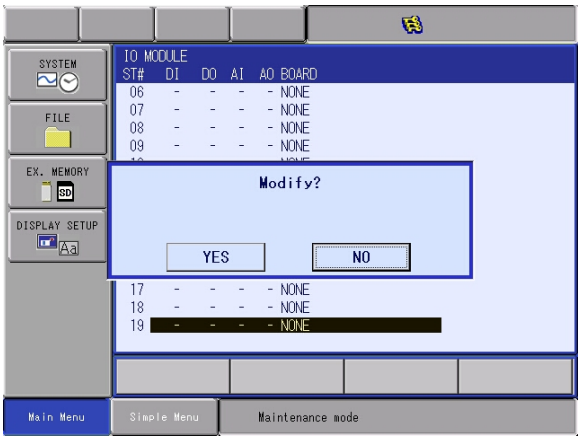


2. Press [ENTER].
   – The IO module window (2nd half) appears.



   – Check that the values set as “IO size (unit: bit) plus 8” are assigned to the DI and DO of the slot is attached (ST#16).

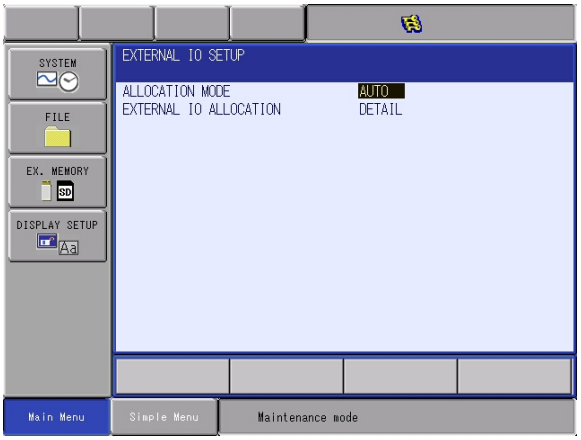
3. Press [ENTER].
   – The confirmation dialog box appears.



4. Select “Yes”.
   – When the I/O module is appropriately set, select “Yes”. The settings are updated and the EXTERNAL IO SETUP window appears again.

4.2.7 External I/O Setup

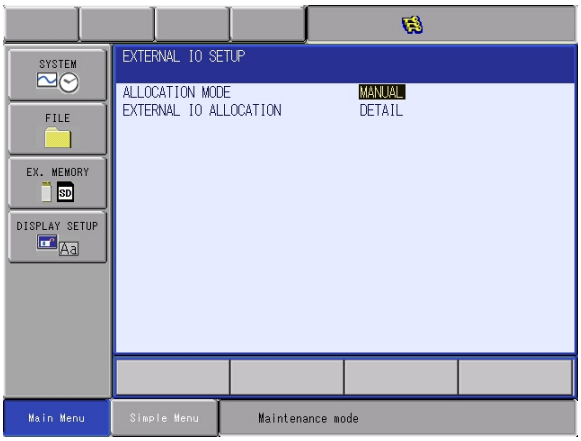
1. The EXTERNAL IO SETUP window appears.



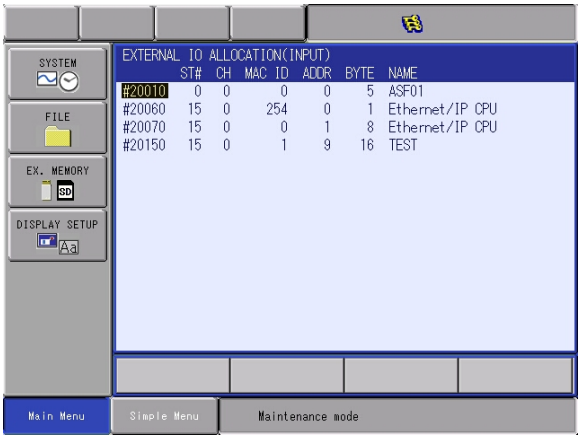
2. Select “AUTO” or “MANUAL” at {ALLOCATION MODE}.
   – A selection menu appears when select either “AUTO” or “MANUAL”.

NOTE When “MANUAL” at {ALLOCATION MODE} is changed to “AUTO”, the already -specified allocation data is deleted and allocation at the auto mode starts. In case the already-specified allocation data is supposed to be saved, save it to the external memory device before changing the settings to “AUTO”.

3. Select an allocation mode.
   – Select “AUTO” when performing the automatic allocation.
   – Select “MANUAL” when performing the manual allocation.
   – The selected allocation mode is specified.

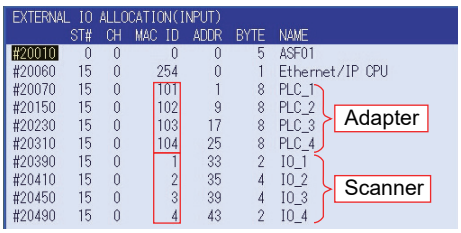


4. Select “DETAIL” at {EXTERNAL IO ALLOCATION}.
   – If “AUTO” is already selected at {ALLOCATION MODE}, performing of the following steps from 5 to 7 is not necessary. Start the operation from step 8.
   – If “MANUAL” is already selected at {ALLOCATION MODE}, perform the following steps from 5 to 7 in accordance with the items to be manually specified.

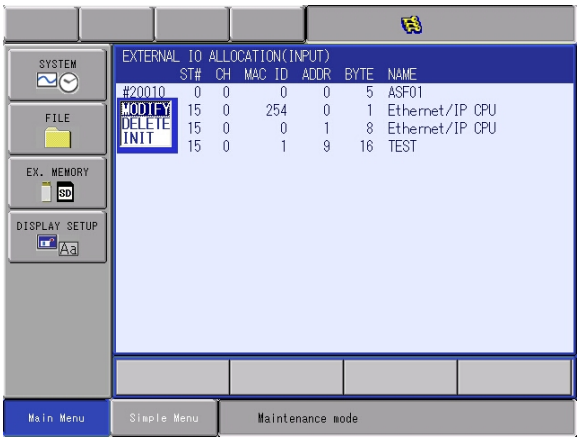


NOTE

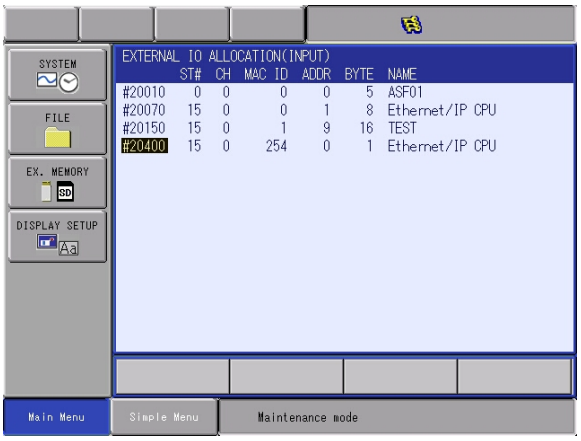
When {EtherNet/IP(CPU Board)} is set to "USED(EX.ADAPTER)" in the EtherNet/IP (CPU board) general settings, the initial setting of the external IO allocations is adapter→scanner order. For this reason, the MAC IDs are also in 101 to 132→1 to 32 order.



5. Select a number of an external I/O signal (original) to which modification is to be performed ({#20060} is used in this explanation as an example.).
   – A selection menu appears.

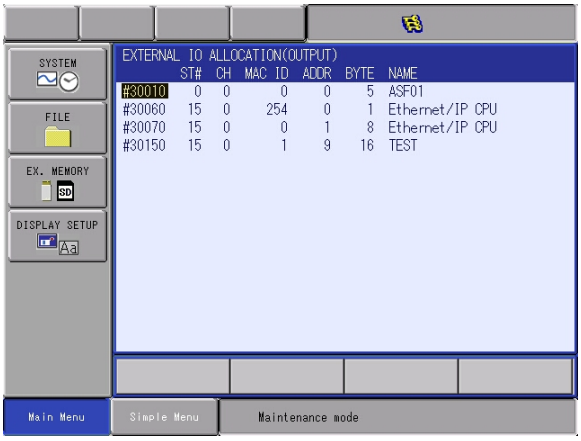


6. Select “MODIFY” and input a number of an external I/O signal (object) to which the above mentioned modification is performed ({#20400} is used in this explanation as an example.)
   – The number of the external input signal is modified.

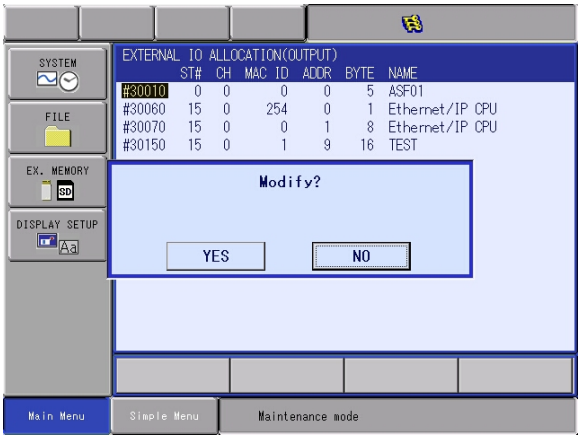


7. Press [SELECT] and “MODIFY” for the external input signal following the same manners as above.
   – Repeat pressing [SELECT] and “MODIFY” till the desired settings of the allocation is indicated.

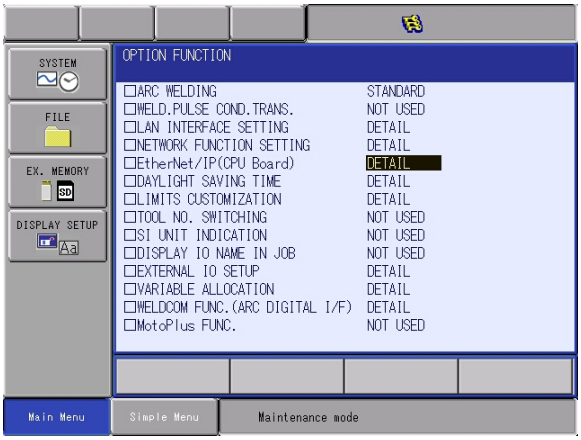
8. Press [ENTER]
   – The EXTERNAL IO ALLOCATION(OUTPUT) window appears.



9. Press [SELECT] and “MODIFY” for the external output signal following the same manners as performed for the external input signal.
   – Repeat pressing [SELECT] and “MODIFY” operations till the desired settings of the allocation is indicated.
10. Press [ENTER]
   – A confirmation dialog box appears.

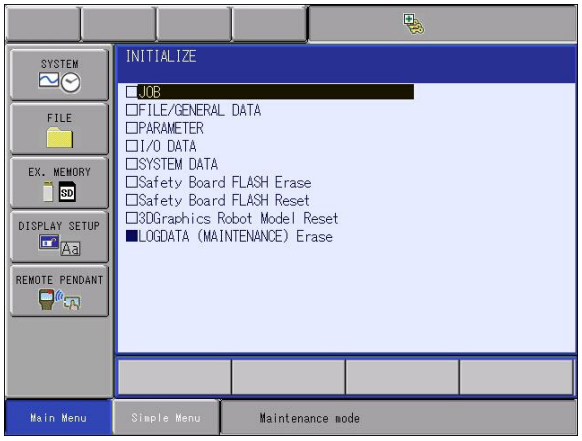


11. Select “YES”
   – The settings are fixed and the window returns to the SETUP window.

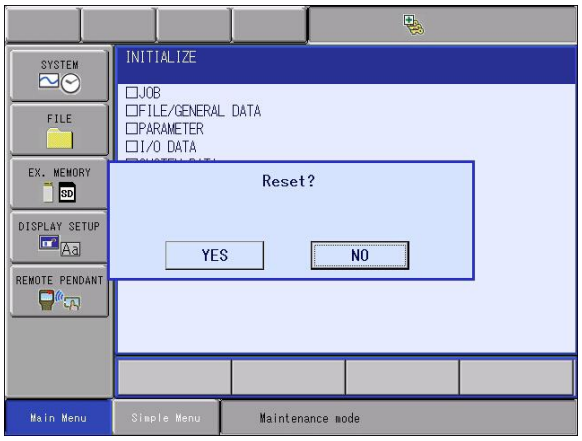


12. Set the security mode to the safety mode.

13. Select {FILE} from the Main Menu, and select {INITIALIZE} .
    – The INITIALIZE window is shown.



14. Select “Safety Board FLASH Reset”.
    – The confirmation dialog is shown.



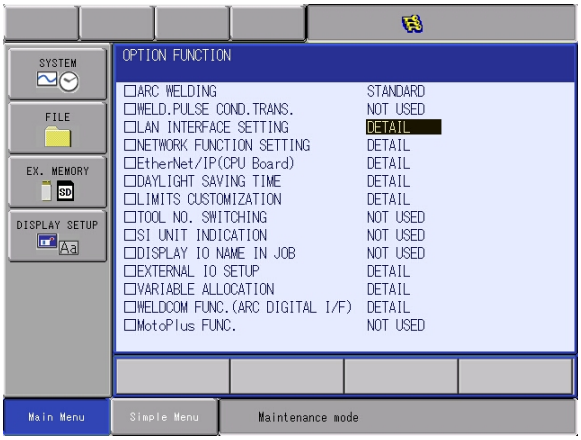
15. Select {Yes}.
    – The settings are completed when the beep sounds.

4.2.8 LAN Interface Setting

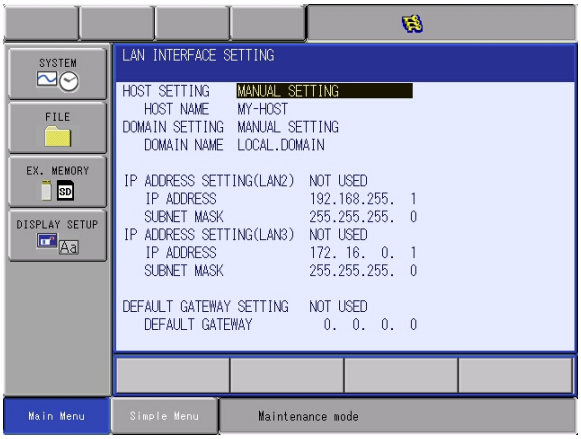
For the EtherNet/IP communication, settings such as the IP address for Ethernet communication are required.

This chapter describes how to configure those settings.

1. Select {SYSTEM} - {SETUP} - {OPTION FUNCTION}.
   – The OPTION FUNCTION window appears.

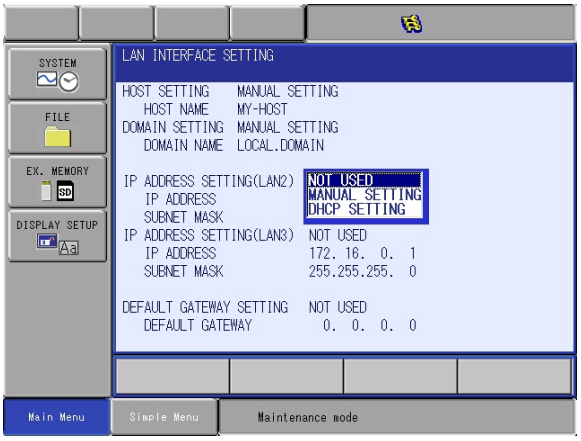


2. Select {LAN INTERFACE SETTING}.
   – The LAN INTERFACE SETTING window appears.



3. Set IP address (LAN2).

   – At “IP ADDRESS SETTING(LAN2)”, specify the method of setting the IP address for YRC1000 LAN2 port (CN106).
   Using the pull-down menu, select ether "MANUAL SETTING" or "DHCP SETTING".
   Note that when “MANUAL SETTING” is selected, be sure to set also “IP ADDRESS” and “SUBNET MASK”.



4. Others
   For other items, set as needed.
   For detail settings, refer to YRC1000 OPTIONS INSTRUCTION FOR ETHERNET FUNCTION (HW1483358).

4.3 IO Assignment Example

4.3.1 Setting ExclusiveOwner Communication

■ **Adapter setting**
An example of settings for ExclusiveOwner connection is as follows:

Scanner (PLC etc.)			**Adapter (YRC1000)**	
IP Address	192.168.255.1		IP Address	192.168.255.2
Connection RPI (O->T)	8 msec	->	Connection RPI (O->T)	Undefined
Connection RPI (T->O)	8 msec	<-	Connection RPI (T->O)	Undefined
Connection type	ExclusiveOwner		Connection type	Undefined
Output size	8 Byte	->	Input size	8 Byte
Input size	12 Byte	<-	Output size	12 Byte
Configuration size	0 Word		Configuration size	0 Word
Output instance	101	->	Input instance	101
Input instance	102	<-	Output instance	102
Configuration instance	103		Configuration instance	103

4.3.2 Setting InputOnly Communication

■ **Adapter setting**
An example of settings as an adapter (the YRC1000 is the data transmission side) for InputOnly connection is as follows:

Scanner (PLC etc.)			**Adapter (YRC1000)**	
IP Address	192.168.255.1		IP Address	192.168.255.2
Connection RPI (O->T)	64 msec	->	Connection RPI (O->T)	Undefined
Connection RPI (T->O)	8 msec	<-	Connection RPI (T->O)	Undefined
Connection type	InputOnly		Connection type	Undefined
Output size	0 Byte	->	Input size	0 Byte
Input size	12 Byte	<-	Output size	12 Byte
Configuration size	0 Word		Configuration size	0 Word
Output instance	198	->	Input instance	101
Input instance	102	<-	Output instance	102
Configuration instance	103		Configuration instance	103

NOTE

For InputOnly communication, when {EtherNet/IP(CPU Board)} is set to "USED(STANDARD)" in the EtherNet/IP (CPU board) general settings, the YRC1000 (adapter) uses the dedicated heartbeat instance number 198 as the input instance number regardless of the input instance settings. For this reason, set the output (O->T) instance number on the scanner side to 198.

When {EtherNet/IP(CPU Board)} is set to "USED(EX.ADAPTER)" in the EtherNet/IP (CPU board) general settings, the instance number 198 cannot be shared, so use an instance number with the input (O->T) size set to 0 for the heartbeat. For this reason, set the input instance number of the YRC1000 and the output instance number of the scanner side to the same value even in InputOnly settings.

■ **Scanner setting**

An example of settings as a scanner (the YRC1000 is the data receiving side) for InputOnly connection is as follows:

Adapter (PLC etc.)			**Scanner (YRC1000)**	
IP Address	192.168.255.1		IP Address	192.168.255.2
Connection RPI (O->T)	Undefined	<-	Connection RPI (O->T)	64 msec
Connection RPI (T->O)	Undefined	->	Connection RPI (T->O)	8 msec
Connection type	Undefined		Connection type	InputOnly
Output size	8 Byte	->	Input size	8 Byte
Input size	0 Byte	<-	Output size	0 Byte
Configuration size	0 Word		Configuration size	0 Word
Output instance	101	->	Input instance	101
Input instance	102	<-	Output instance	0
Configuration instance	103		Configuration instance	103
Instance number size	1 Byte		Instance number size	1 Byte

NOTE

In InputOnly communications, only heartbeat data is transmitted as output. There is no output (O->T) data on the scanner side. For this reason, many devices use a dedicated instance number for output (O->T). This instance number depends on the communication device. For the value to set as the output instance number on the scanner side of InputOnly communication, refer the user's manual for the communication target device.

NOTE

The instance number size can only be set in YAS2.82.00A-00 or later versions of the YRC1000 controller.

This item will not be displayed in controllers earlier than the YAS2.82.00A-00 version. In earlier versions, the instance number size is always 1 byte.

The size of the instance number varies depending on the communication device.

For details on how to set the size of instance number, refer to the instruction manual for the target communication device.

If the size of the instance number does not match the target communication device, the following message will be sent by the general device in response to the request to start communication. This message will appear in the ADP Device Response window of the communication monitor.

Gen STS :0x01

Ext STS :0x315

Message: INVALID SEGMENT IN CONNECTION PATH

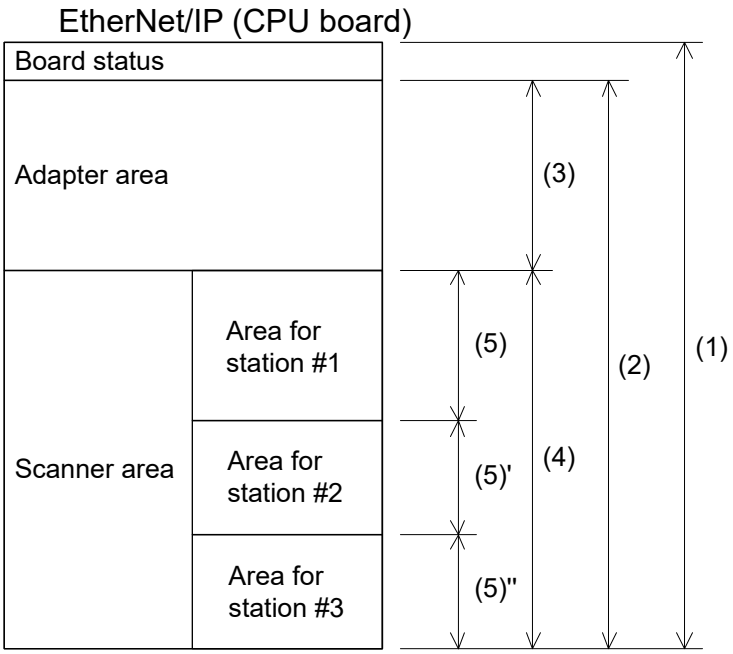
4.4 Communication Data

As IO data transferred into the YRC1000 from the EtherNet/IP (CPU board), besides input/output data transmitted from external EtherNet/IP-supported equipment, the status of the EtherNet/IP (CPU board) is also transferred.

Thus, in addition to the contact data area, an eight-point-worth (1 Byte) area, for input and output each, for the status of the EtherNet/IP (CPU board) is secured inside the YRC1000 (the output area cannot be used).

EtherNet/IP (CPU board) communication data are assigned to the concurrent I/O signal external input/output signals.

Assignments to external input/output signals inside the EtherNet/IP (CPU board) are made as follows:



(1) Number of bytes occupied by the YRC1000 as an IO module
Consists of the current value in item (2) below + status 1 byte. A value displayed in *chapter 4.2.6 "IO Module Re-configuration"* is a value obtained by converting this value into a bit count (x8).

(2) Number of bytes set for the EtherNet/IP (CPU board) I/O area
A value displayed as 'IO size (IN/OUT)' in *chapter 4.2.3 "General Setup for the EtherNet/IP (CPU board)"* .
This value can also be entered manually for YAS4.23.00A-00 or later versions. However, the following expression must be satisfied: (2) ≥ (3) + (4)

(3) Number of bytes set for the adapter I/O area
A greater value between the values set for 'Input size'/'Output size' in *chapter 4.2.4 "Adapter Setting"* .
For YAS4.23.00A-00 or later versions, multiple adapters can be set. In this case, (3) is the total of each adapter setting value.

(4) Number of bytes set for the scanner I/O area
This value cannot be set.

(5) Number of bytes set for the I/O areas (5), (5)', and (5)" of the stations (devices) managed by scanner.
The number of bytes is to be set using ‘Input size’ or ‘Output size’ in *chapter 4.2.2 “Setting the Device Information List”* . Set which device to use by making a choice from the registered device information list in *chapter 4.2.5 “Scanner Setting”* .

The following chapter shows a concurrent I/O assignment example when only the EtherNet/IP (CPU board) is installed. In the example, communication is carried out assuming the quantity of data being 16 bytes for adapter, 8 bytes for station #1 of scanner, and 8 bytes for station #2 of scanner (the same number of bytes for IN/OUT). And the 20010 - 20057 and 30010 - 30057 input/output areas are used by the YRC1000 standard I/O unit.

4.4.1 YRC1000 IO Data Allocation (For the Handling Purpose)

Note1: Following is an example when a standard settings are executed. This allocation is subject to change according to the modification of the external input/output signal allocations or concurrent ladder programs.

Note2: For the details of the JANCD-AIO01-E (standard I/O board) input/ output data, refer to the “YRC1000 INSTRUCTIONS (RE-CTO-A221)”.
Note3:On the JANCD-AIO01-E (standard I/O board) I/O module setting window, the ASF01 (the base board of the AIO01) is indicated.

Table 4-1: Example of I/O Data Allocation (For the Handling Purpose)

JANCD-AIO01-E (Standard I/O)	I/O Input	External Input Signal	User Input Signal	Meaning
		20010 ～ 20017	No signal (Already allocated by the system)	Input data (1)
		20020 ～ 20027	No signal (Already allocated by the system)	Input data (2)
		20030 ～ 20037	00010 ～ 00017 (IN0001 ～ IN0008)	Input data (3)
		20040 ～ 20047	00020 ～ 00027 (IN0009 ～ IN00016)	Input data (4)
		20050 ～ 20057	No signal (Already allocated by the system)	Input data (5)
	I/O Output	External Input Signal	User Input Signal	Meaning
		30010 ～ 30017	No signal (Already allocated by the system)	Output data (1)
		30020 ～ 30027	No signal (Already allocated by the system)	Output data (2)
		30030 ～ 30037	10010 ～ 10017 (OT0001 ～ OT0008)	Output data (3)
		30040 ～ 30047	10020 ～ 10027 (OT0009 ～ OT00016)	Output data (4)
		30050 ～ 30057	No signal (Already allocated by the system)	Output data (5)
EtherNet/IP (Standard LAN port)	I/O Input	External Input Signal	User Input Signal	Meaning
		20060 ～ 20067	00030 ～ 00037 (IN00017 ～ IN0024)	Communication Status[1)]
		20070 ～ 20077	00040 ～ 00047 (IN00025 ～ IN0032)	Adapter area input data (1)
		20080 ～ 20087	00050 ～ 00057 (IN00033 ～ IN0040)	Adapter area input data (2)
		20090 ～ 20097	00060 ～ 00067 (IN00041 ～ IN0048)	Adapter area input data (3)
		20100 ～ 20107	00070 ～ 00077 (IN00049 ～ IN0056)	Adapter area input data (4)
		20110 ～ 20117	00080 ～ 00087 (IN00057 ～ IN0064)	Adapter area input data (5)
		20120 ～ 20127	00090 ～ 00097 (IN00065 ～ IN0072)	Adapter area input data (6)
		20130 ～ 20137	00100 ～ 00107 (IN00073 ～ IN0080)	Adapter area input data (7)
		20140 ～ 20147	00110 ～ 00117 (IN00081 ～ IN0088)	Adapter area input data (8)
		20150 ～ 20157	00120 ～ 00127 (IN00089 ～ IN0096)	Adapter area input data (9)
		20160 ～ 20167	00130 ～ 00137 (IN00097 ～ IN0104)	Adapter area input data (10)
		20170 ～ 20177	00140 ～ 00147 (IN00105 ～ IN0112)	Adapter area input data (11)
		20180 ～ 20187	00150 ～ 00157 (IN00113 ～ IN0120)	Adapter area input data (12)

Table 4-1: Example of I/O Data Allocation (For the Handling Purpose)

EtherNet/IP (Standard LAN port)	I/O Input	20190 ~ 20197	00160 ~ 00167 (IN00121 ~ IN0128)	Adapter area input data (13)
		20200 ~ 20207	00170 ~ 00177 (IN00129 ~ IN0136)	Adapter area input data (14)
		20210 ~ 20217	00180 ~ 00187 (IN00137 ~ IN0144)	Adapter area input data (15)
		20220 ~ 20227	00190 ~ 00197 (IN00145 ~ IN0152)	Adapter area input data (16)
		20230 ~ 20237	00200 ~ 00207 (IN00153 ~ IN0160)	Scanner first area input data (1)
		20240 ~ 20247	00210 ~ 00217 (IN00161 ~ IN0168)	Scanner first area input data (2)
		20250 ~ 20257	00220 ~ 00227 (IN00169 ~ IN0176)	Scanner first area input data (3)
		20260 ~ 20267	00230 ~ 00237 (IN00177 ~ IN0184)	Scanner first area input data (4)
		20270 ~ 20277	00240 ~ 00247 (IN00185 ~ IN0192)	Scanner first area input data (5)
		20280 ~ 20287	00250 ~ 00257 (IN00193 ~ IN0200)	Scanner first area input data (6)
		20290 ~ 20297	00260 ~ 00267 (IN00201 ~ IN0208)	Scanner first area input data (7)
		20300 ~ 20307	00270 ~ 00277 (IN00209 ~ IN0216)	Scanner first area input data (8)
		20310 ~ 20317	00280 ~ 00287 (IN00217 ~ IN0224)	Scanner second area input data (1)
		20320 ~ 20327	00290 ~ 00297 (IN00225 ~ IN0232)	Scanner second area input data (2)
		20330 ~ 20337	00300 ~ 00307 (IN00233 ~ IN0240)	Scanner second area input data (3)
		20340 ~ 20347	00310 ~ 00317 (IN00241 ~ IN0248)	Scanner second area input data (4)
		20350 ~ 20357	00320 ~ 00327 (IN00249 ~ IN0256)	Scanner second area input data (5)
		20360 ~ 20367	00330 ~ 00337 (IN00257 ~ IN0264)	Scanner second area input data (6)
		20370 ~ 20377	00340 ~ 00347 (IN00265 ~ IN0272)	Scanner second area input data (7)

Table 4-1: Example of I/O Data Allocation (For the Handling Purpose)

EtherNet/IP (Standard LAN port)	I/O Input	20380 ~ 20387	00350 ~ 00357 (IN00273 ~ IN0280)	Scanner second area input data (8)
EtherNet/IP (Standard LAN port)	I/O Output	External Output Signal	User Output Signal	Meaning
		30060 ~ 30067	10030 ~ 10037 (OT0017 ~ OT0024)	Reserved[1)]
		30070 ~ 30077	10040 ~ 10047 (OT0025 ~ OT0032)	Adapter area output data (1)
		30080 ~ 30087	10050 ~ 10057 (OT0033 ~ OT0040)	Adapter area output data (2)
		30090 ~ 30097	10060 ~ 10067 (OT0041 ~ OT0048)	Adapter area output data (3)
		30100 ~ 30107	10070 ~ 10077 (OT0049 ~ OT0056)	Adapter area output data (4)
		30110 ~ 30117	10080 ~ 10087 (OT0057 ~ OT0064)	Adapter area output data (5)
		30120 ~ 30127	10090 ~ 10097 (OT0065 ~ OT0072)	Adapter area output data (6)
		30130 ~ 30137	10100 ~ 10107 (OT0073 ~ OT0080)	Adapter area output data (7)
		30140 ~ 30147	10110 ~ 10117 (OT0081 ~ OT0088)	Adapter area output data (8)
		30150 ~ 30157	10120 ~ 10127 (OT0089 ~ OT0096)	Adapter area output data (9)
		30160 ~ 30167	10130 ~ 10137 (OT0097 ~ OT0104)	Adapter area output data (10)
		30170 ~ 30177	10140 ~ 10147 (OT0105 ~ OT0112)	Adapter area output data (11)
		30180 ~ 30187	10150 ~ 10157 (OT0113 ~ OT0120)	Adapter area output data (12)
		30190 ~ 30197	10160 ~ 10167 (OT0121 ~ OT0128)	Adapter area output data (13)
		30200 ~ 30207	10170 ~ 10177 (OT0129 ~ OT0136)	Adapter area output data (14)
		30210 ~ 30217	10180 ~ 10187 (OT0137 ~ OT0144)	Adapter area output data (15)
		30220 ~ 30227	10190 ~ 10197 (OT0145 ~ OT0152)	Adapter area output data (16)
		30230 ~ 30237	10200 ~ 00207 (OT0153 ~ OT0160)	Scanner first area output data (1)
		30240 ~ 30247	10210 ~ 10217 (OT0161 ~ OT0168)	Scanner first area output data (2)
		30250 ~ 30257	10220 ~ 10227 (OT0169 ~ OT0176)	Scanner first area output data (3)
		30260 ~ 30267	10230 ~ 10237 (OT0177 ~ OT0184)	Scanner first area output data (4)
		30270 ~ 30277	10240 ~ 10247 (OT0185 ~ OT0192)	Scanner first area output data (5)

Table 4-1: Example of I/O Data Allocation (For the Handling Purpose)

EtherNet/IP (Standard LAN port)	I/O Output	30280 ～ 30287	10250 ～ 10257 (OT0193 ～ OT0200)	Scanner first area output data (6)
		30290 ～ 30297	10260 ～ 10267 (OT0201 ～ OT0208)	Scanner first area output data (7)
		30300 ～ 30307	10270 ～ 10277 (OT0209 ～ OT0216)	Scanner first area output data (8)
		30310 ～ 30317	10280 ～ 10287 (OT0217 ～ OT0224)	Scanner second area output data (1)
		30320 ～ 30327	10290 ～ 10297 (OT0225 ～ OT0232)	Scanner second area output data (2)
		30330 ～ 30337	10300 ～ 10307 (OT0233 ～ OT0240)	Scanner second area output data (3)
		30340 ～ 30347	10310 ～ 10317 (OT0241 ～ OT0248)	Scanner second area output data (4)
		30350 ～ 30357	10320 ～ 10327 (OT0249 ～ OT0256)	Scanner second area output data (5)
		30360 ～ 30367	10330 ～ 10337 (OT0257 ～ OT0264)	Scanner second area output data (6)
		30370 ～ 30377	10340 ～ 10347 (OT0265 ～ OT0272)	Scanner second area output data (7)
		30380 ～ 30387	10350 ～ 10357 (OT0273 ～ OT0280)	Scanner second area output data (8)

1Communication status and Reserved parts are not available to allocate as I/O signals.
Also, this data is not transmitted by the EtherNet/IP.

4.4.2 YRC1000 IO Data Allocation (For other than Handling Purpose)

Note1: Following is an example when a standard settings are executed. This allocation is subject to change according to the modification of the external input/output signal allocations or concurrent ladder programs.

Note2: For the details of the JANCD-AIO01-E (standard I/O board) input/output data, refer to the “YRC1000 INSTRUCTIONS (RE-CTO-A221)”.
Note3:On the JANCD-AIO01-E (standard I/O board) I/O module setting window, the ASF01 (the base board of the AIO01) is indicated.

Table 4-2: Example of I/O Data Allocation (For other than Handling Purpose)

JANCD-AIO01-E (Standard I/O)	I/O Input	External Input Signal	User Input Signal	Meaning
		20010 ～ 20017	No signal (Already allocated by the system)	Input data (1)
		20020 ～ 20027	No signal (Already allocated by the system)	Input data (2)
		20030 ～ 20037	00010 ～ 00017 (IN0001 ～ IN0008)	Input data (3)
		20040 ～ 20047	00020 ～ 00027 (IN0009 ～ IN00016)	Input data (4)
		20050 ～ 20057	00030 ～ 00037 (IN0017 ～ IN00024)	Input data (5)
	I/O Output	External Output Signal	User Input Signal	Meaning
		30010 ～ 30017	No signal (Already allocated by the system)	Output data (1)
		30020 ～ 30027	No signal (Already allocated by the system)	Output data (2)
		30030 ～ 30037	10010 ～ 10017 (OT0001 ～ OT0008)	Output data (3)
		30040 ～ 30047	10020 ～ 10027 (OT0009 ～ OT00016)	Output data (4)
		30050 ～ 30057	10030 ～ 10037 (OT0017 ～ OT00024)	Output data (5)
EtherNet/IP (Standard LAN port)	I/O Input	External Input Signal	User Input Signal	Meaning
		20060 ～ 20067	00040 ～ 00047 (IN00025 ～ IN0032)	Communication Status[1)]
		20070 ～ 20077	00050 ～ 00057 (IN00033 ～ IN0040)	Adapter area input data (1)
		20080 ～ 20087	00060 ～ 00067 (IN00041 ～ IN0048)	Adapter area input data (2)
		20090 ～ 20097	00070 ～ 00077 (IN00049 ～ IN0056)	Adapter area input data (3)
		20100 ～ 20107	00080 ～ 00087 (IN00057 ～ IN0064)	Adapter area input data (4)
		20110 ～ 20117	00090 ～ 00097 (IN00065 ～ IN0072)	Adapter area input data (5)
		20120 ～ 20127	00100 ～ 00107 (IN00073 ～ IN0080)	Adapter area input data (6)
		20130 ～ 20137	00110 ～ 00117 (IN00081 ～ IN0088)	Adapter area input data (7)
		20140 ～ 20147	00120 ～ 00127 (IN00089 ～ IN0096)	Adapter area input data (8)
		20150 ～ 20157	00130 ～ 00137 (IN00097 ～ IN0104)	Adapter area input data (9)
		20160 ～ 20167	00140 ～ 00147 (IN00105 ～ IN0112)	Adapter area input data (10)
		20170 ～ 20177	00150 ～ 00157 (IN00113 ～ IN0120)	Adapter area input data (11)

Table 4-2: Example of I/O Data Allocation (For other than Handling Purpose)

EtherNet/IP (Standard LAN port)	I/O Input	20180 ～ 20187	00160 ～ 00167 (IN00121 ～ IN0128)	Adapter area input data (12)
		20190 ～ 20197	00170 ～ 00177 (IN00129 ～ IN0136)	Adapter area input data (13)
		20200 ～ 20207	00180 ～ 00187 (IN00137 ～ IN0144)	Adapter area input data (14)
		20210 ～ 20217	00190 ～ 00197 (IN00145 ～ IN0152)	Adapter area input data (15)
		20220 ～ 20227	00200 ～ 00207 (IN00153 ～ IN0160)	Adapter area input data (16)
		20230 ～ 20237	00210 ～ 00217 (IN00161 ～ IN0168)	Scanner first area input data (1)
		20240 ～ 20247	00220 ～ 00227 (IN00169 ～ IN0176)	Scanner first area input data (2)
		20250 ～ 20257	00230 ～ 00237 (IN00177 ～ IN0184)	Scanner first area input data (3)
		20260 ～ 20267	00240 ～ 00247 (IN00185 ～ IN0192)	Scanner first area input data (4)
		20270 ～ 20277	00250 ～ 00257 (IN00193 ～ IN0200)	Scanner first area input data (5)
		20280 ～ 20287	00260 ～ 00267 (IN00201 ～ IN0208)	Scanner first area input data (6)
		20290 ～ 20297	00270 ～ 00277 (IN00209 ～ IN0216)	Scanner first area input data (7)
		20300 ～ 20307	00280 ～ 00287 (IN00217 ～ IN0224)	Scanner first area input data (8)
		20310 ～ 20317	00290 ～ 00297 (IN00225 ～ IN0232)	Scanner second area input data (1)
		20320 ～ 20327	00300 ～ 00307 (IN00233 ～ IN0240)	Scanner second area input data (2)
		20330 ～ 20337	00310 ～ 00317 (IN00241 ～ IN0248)	Scanner second area input data (3)
		20340 ～ 20347	00320 ～ 00327 (IN00249 ～ IN0256)	Scanner second area input data (4)
		20350 ～ 20357	00330 ～ 00337 (IN00257 ～ IN0264)	Scanner second area input data (5)
		20360 ～ 20367	00340 ～ 00347 (IN00265 ～ IN0272)	Scanner second area input data (6)
		20370 ～ 20377	00350 ～ 00357 (IN00273 ～ IN0280)	Scanner second area input data (7)

Table 4-2: Example of I/O Data Allocation (For other than Handling Purpose)

EtherNet/IP (Standard LAN port)	I/O Input	20380 ~ 20387	00360 ~ 00367 (IN00281 ~ IN0288)	Scanner second area input data (8)
EtherNet/IP (Standard LAN port)	I/O Output	External Output Signal	User Output Signal	Meaning
		30060 ~ 30067	10040 ~ 10047 (OT0025 ~ OT0032)	Reserved[1)]
		30070 ~ 30077	10050 ~ 10057 (OT0033 ~ OT0040)	Adapter area output data (1)
		30080 ~ 30087	10060 ~ 10067 (OT0041 ~ OT0048)	Adapter area output data (2)
		30090 ~ 30097	10070 ~ 10077 (OT0049 ~ OT0056)	Adapter area output data (3)
		30100 ~ 30107	10080 ~ 10087 (OT0057 ~ OT0064)	Adapter area output data (4)
		30110 ~ 30117	10090 ~ 10097 (OT0065 ~ OT0072)	Adapter area output data (5)
		30120 ~ 30127	10100 ~ 10107 (OT0073 ~ OT0080)	Adapter area output data (6)
		30130 ~ 30137	10110 ~ 10117 (OT0081 ~ OT0088)	Adapter area output data (7)
		30140 ~ 30147	10120 ~ 10127 (OT0089 ~ OT0096)	Adapter area output data (8)
		30150 ~ 30157	10130 ~ 10137 (OT0097 ~ OT0104)	Adapter area output data (9)
		30160 ~ 30167	10140 ~ 10147 (OT0105 ~ OT0112)	Adapter area output data (10)
		30170 ~ 30177	10150 ~ 10157 (OT0113 ~ OT0120)	Adapter area output data (11)
		30180 ~ 30187	10160 ~ 10167 (OT0121 ~ OT0128)	Adapter area output data (12)
		30190 ~ 30197	10170 ~ 10177 (OT0129 ~ OT0136)	Adapter area output data (13)
		30200 ~ 30207	10180 ~ 10187 (OT0137 ~ OT0144)	Adapter area output data (14)
		30210 ~ 30217	10190 ~ 10197 (OT0145 ~ OT0152)	Adapter area output data (15)
		30220 ~ 30227	10200 ~ 00207 (OT0153 ~ OT0160)	Adapter area output data (16)
		30230 ~ 30237	10210 ~ 10217 (OT0161 ~ OT0168)	Scanner first area output data (1)
		30240 ~ 30247	10220 ~ 10227 (OT0169 ~ OT0176)	Scanner first area output data (2)
		30250 ~ 30257	10230 ~ 10237 (OT0177 ~ OT0184)	Scanner first area output data (3)
		30260 ~ 30267	10240 ~ 10247 (OT0185 ~ OT0192)	Scanner first area output data (4)
		30270 ~ 30277	10250 ~ 10257 (OT0193 ~ OT0200)	Scanner first area output data (5)

Table 4-2: Example of I/O Data Allocation (For other than Handling Purpose)

EtherNet/IP (Standard LAN port)	I/O Output	30280 ～ 30287	10260 ～ 10267 (OT0201 ～ OT0208)	Scanner first area output data (6)
		30290 ～ 30297	10270 ～ 10277 (OT0209 ～ OT0216)	Scanner first area output data (7)
		30300 ～ 30307	10280 ～ 10287 (OT0217 ～ OT0224)	Scanner first area output data (8)
		30310 ～ 30317	10290 ～ 10297 (OT0225 ～ OT0232)	Scanner second area output data (1)
		30320 ～ 30327	10300 ～ 10307 (OT0233 ～ OT0240)	Scanner second area output data (2)
		30330 ～ 30337	10310 ～ 10317 (OT0241 ～ OT0248)	Scanner second area output data (3)
		30340 ～ 30347	10320 ～ 10327 (OT0249 ～ OT0256)	Scanner second area output data (4)
		30350 ～ 30357	10330 ～ 10337 (OT0257 ～ OT0264)	Scanner second area output data (5)
		30360 ～ 30367	10340 ～ 10347 (OT0265 ～ OT0272)	Scanner second area output data (6)
		30370 ～ 30377	10350 ～ 10357 (OT0273 ～ OT0280)	Scanner second area output data (7)
		30380 ～ 30387	10360 ～ 10367 (OT0281 ～ OT0288)	Scanner second area output data (8)

1Communication status and Reserved parts are not available to allocate as I/O signals.
Also, this data is not transmitted by the EtherNet/IP.

4.5 Communication Status

To the one byte at the head of EtherNet/IP(CPU board) input data which is allocated to an external input signal (20060 to 20067 in the above mentioned example) indicates the communication status of EtherNet/IP (CPU board).

Signal	Description
2xxx0 to 2xxx3	Vendor-reserved (not available)
2xxx4	Indicates the existence of an error at the EtherNet/IP adapter communication. Normal status: 0 Communication error: 1
2xxx5	Indicates the existence of a non-connected device at the EtherNet/IP scanner communication. Connecting to all devices normally: 0 Non-connected device exists: 1
2xxx6	Indicates the status of EtherNet/IP communication. Normal status: 0 Communication error: 1
2xxx7	Indicates the operating status of the EtherNet/IP (CPU board). Normal status: 0 Communication error: 1

■ **Alarming for communication error using a status**

By using CIO ladder and universal alarms, an alarm can be generated when EtherNet/IP(CPU board) detects a communication error.

Following is the example of above mentioned case.

Regard that following two alarms are generated.

- EtherNet/IP operation error
- EtherNet/IP communication error

For the registration of the universal alarms, refer to “Chap. 13.7 I/O Message and I/O Alarms” in “YRC1000 OPTIONS INSTRUCTIONS FOR Concurrent I/O (RE-CKI-A467)”.

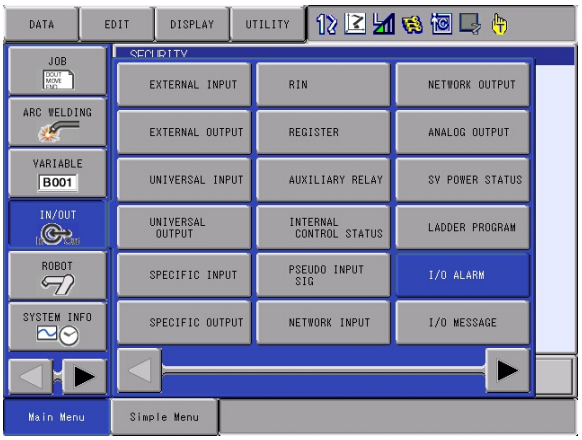
[Alarm No.] Alarm name	Signal No. (Communication status signal	Meanings
[9065] EtherNet/IP operation error	20067 (Communication status signal: 2xxx7)	EtherNet/IP board Operation status error
[9066] EtherNet/IP communication error	20066 (Communication status signal: 2xxx6)	Communication error

When the EtherNet/IP(CPU board) detects an error and it is reported by a communication status error, a ladder program in which an alarm is generated in accordance with an error signal is created.

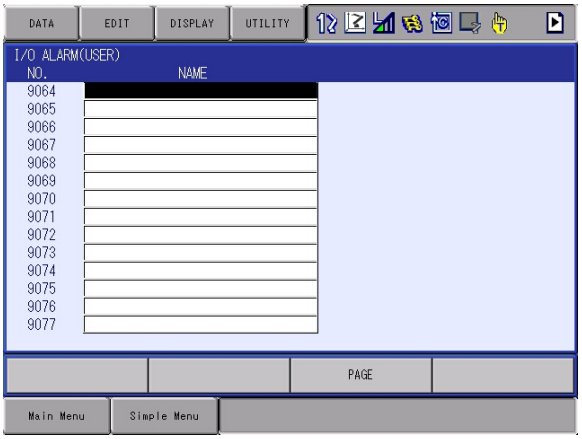
Followings are the procedures for registering the above mentioned alarms by universal alarms. Also, a ladder program which generates the error is indicated.

■ **Register an universal alarm**

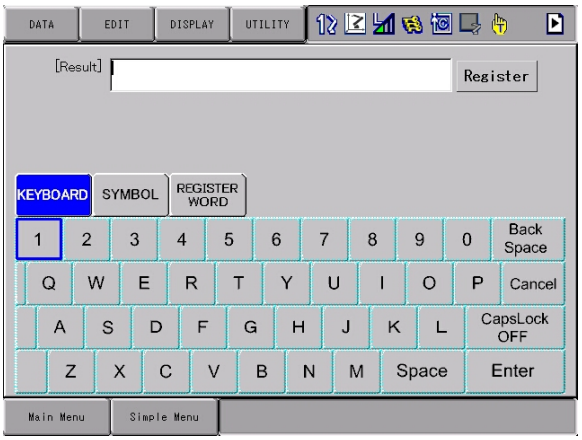
1. Change the mode to the management mode.
2. Select {I/O ALARM} from {IN/OUT} under the main menu.



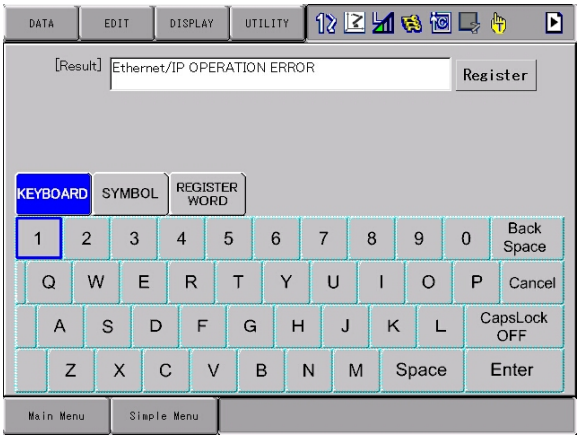
3. The I/O ALARM(USER) window appers.



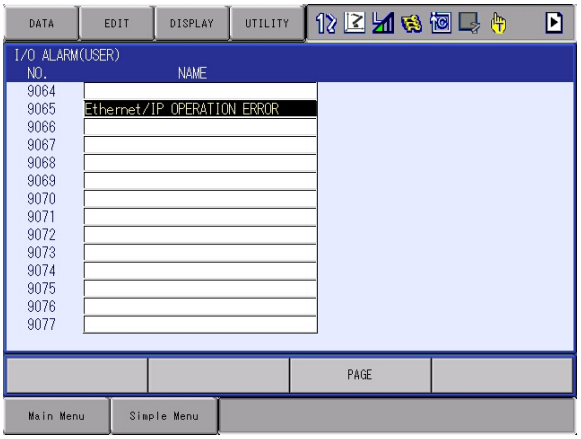
4. Move the cursor to characters of the registering alarm name and press [SELECT].
   – A window for inputting characters appears.



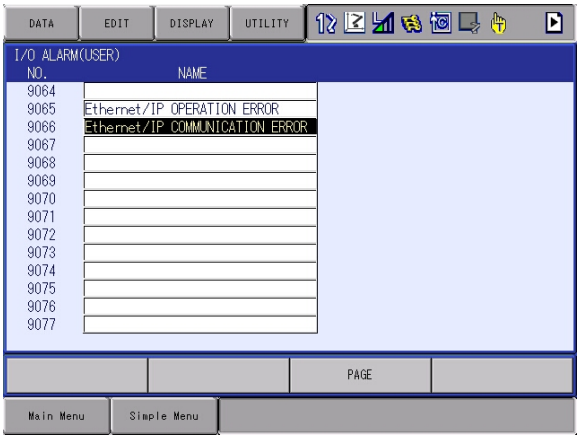
5. Input the I/O alarm name.



6. Press [ENTER].
   – The alarm name is registered.



7. Register other alarm names.
   – Register other alarm names in the same manners.



■ **IO allocation and ladder program**

Create a ladder program to generate an alarm when the EtherNet/IP detects an error using the following signals.

External Input

Signal	Meanings
20066	Communication status (EtherNet/IP communication status)
20067	Communication status (EtherNet/IP operation status)

User Input signal

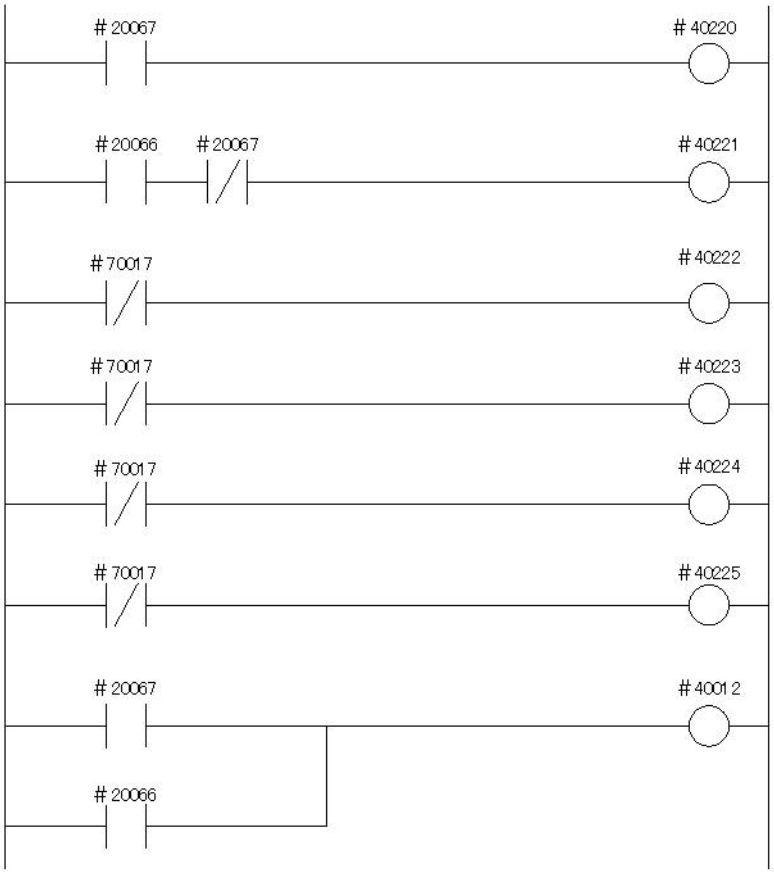
Signal	Meanings
40012	Universal part alarm request
40220	Universal part alarm code d0
40221	Universal part alarm code d1
40222	Universal part alarm code d2
40223	Universal part alarm code d3
40224	Universal part alarm code d4
40225	Universal part alarm code d5

Auxiliary relay

Signal	Meanings
70017	Power supply to the YRC1000 is turned ON (always ON)

Ladder program (figure)

By creating the following ladder program, alarms can be generated in accordance with the status error signal of the EtherNet/IP(CPU board).

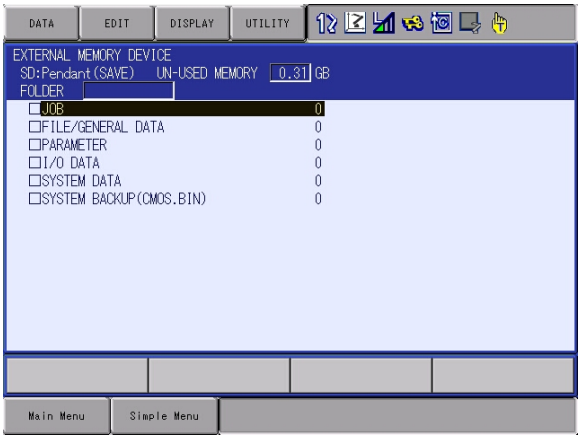


4.6 Managing Setting Data

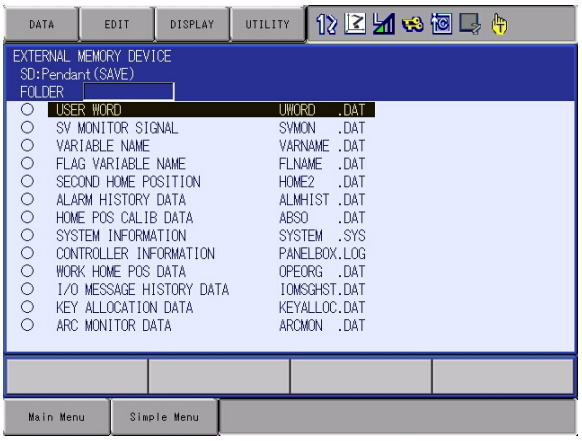
EtherNet/IP (CPU board) setting information can be saved and loaded using an external storage device. The procedure is shown below. For general instructions on how to operate an external storage device, see "Chap. 7 External Memory Devices" in "YRC1000 GENERAL OPERATOR'S MANUAL(RE-CSO-A051)".

4.6.1 How to Save Data

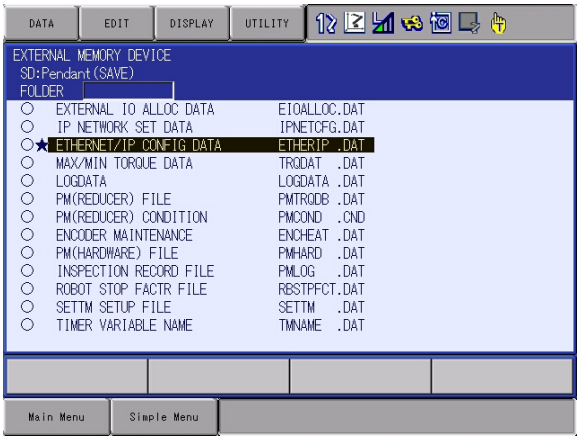
1. • For the programming pendant
   Turn ON the power supply again while pressing [MAIN MENU] on the programming pendant simultaneously.
   • For Smart Pendant
   In the Start Window (Exit the Classic Interface and restart, if smart pendant is already in the Classic Interface), select {Special Mode}, and then {Maintenance Mode}.
2. Select [EXTERNAL MEMORY DEVICE] under the main menu.
3. Select [SAVE].
   – The SAVE window appears.



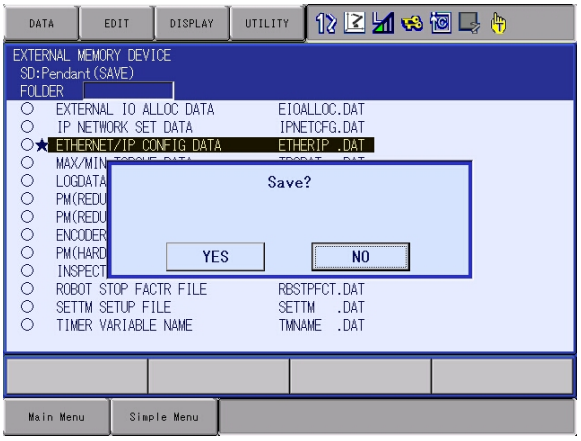
4. Select [SYSTEM DATA].
   – The System data selection window appears.



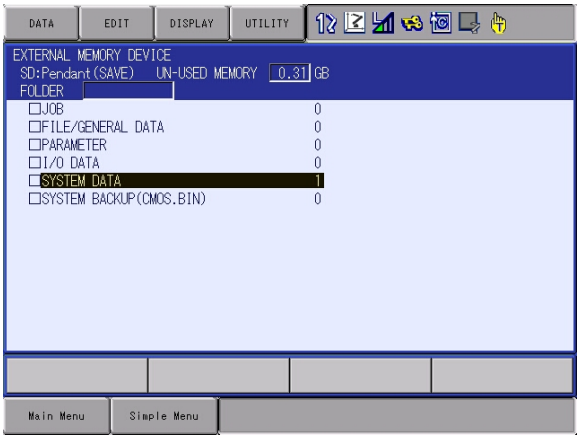
5. Select [ETHERNET/IP CONFIG DATA].
   – "★" is marked to the selected system data.



6. Press [ENTER].
   – The confirmation dialog box appears.

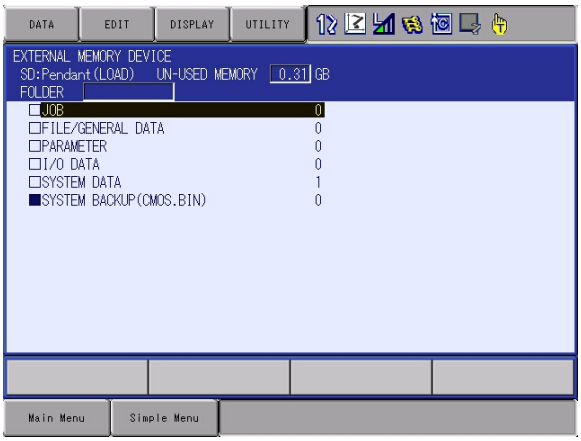


7. Select "Yes".
   – The file saving process will start and the transmission window appears. Press [STOP] to stop the saving process.
   – When the saving process is complete or cancelled, the file selection window appears again.

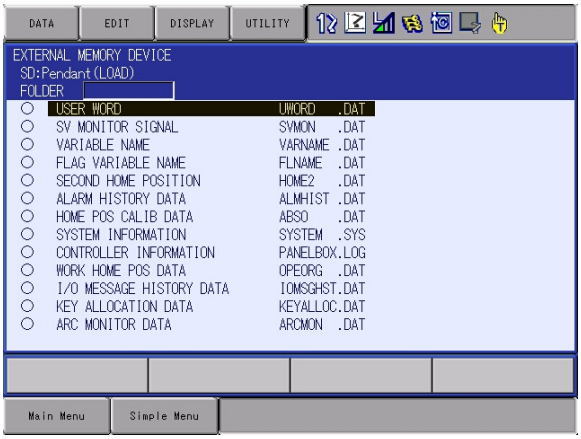


4.6.2 How to Load Data

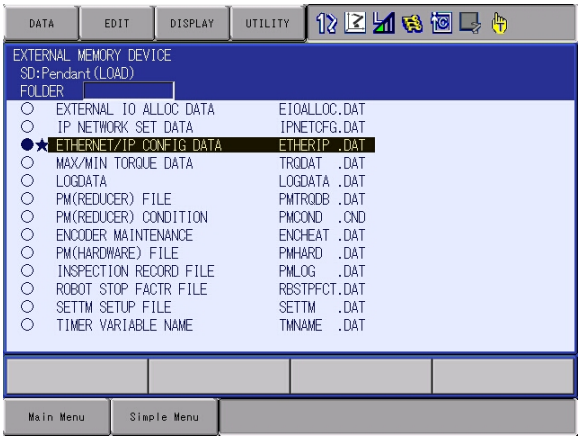
1. Turn on the YRC1000 power supply.
2. The security mode is changed to the management mode.
3. Select [EXTERNAL MEMORY DEVICE] under the main menu.
4. Select [LOAD].
   – The LOAD window appears.



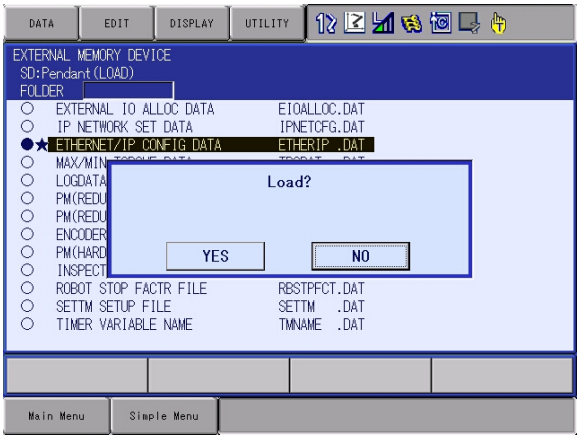
5. Select [SYSTEM DATA].
   – The System data selection window appears.



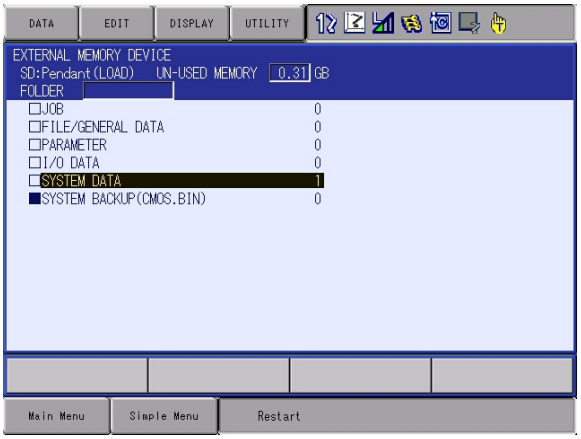
6. Select [ETHERNET/IP CONFIG DATA].
   – “★” is marked to the selected system data.



7. Press [ENTER].
   – The confirmation dialog box appears.



8. Select “Yes”.
   – The file loading process will start and the transmission window appears.
   – When the loading process is complete, the file selection window appears again.



9. After the loading process becomes complete, turn the power ON again.

NOTE

"ETHERIP.DAT" which is the ETHERNET/IP CONFIG DATA, is for the backup data of the EtherNet/IP communication setting.

Therefore, only when the IO points used for the EtherNet/IP communication are the same as the file settings of "ETHERIP.DAT" file of the YRC1000/YRC1000micro/YRC1100micro to load and the settings of the YRC1000 to be loaded, the loading can be performed.

"ETHERIP.DAT" file of the DX200 cannot be loaded to the YRC1000/YRC1000micro/YRC1100micro.

Also, if the "ETHERIP.DAT" file, which the total IO points are the same but the contents of the IO allocation are different from the settings of the YRC1000, is loaded, the external IO allocation data requires to be updated.
To update the external IO allocation data, perform either operation described below.

- Load "EIOALLC.DAT", the external IO allocation data which is correctly IO allocated.
- Perform the setting for the external IO allocation in the maintenance mode again.

NOTE

If the "ETHERIP.DAT" file saved with YAS2.82.00A-00 or later versions is loaded into the YRC1000 with a version earlier than YAS2.82.00A-00, the following error will appear, but the ETHERNET/IP setting data will be loaded.

Error 3140 Wrong pseudo instruction

[ETHERIP.DAT]

NOTE

If the "ETHERIP.DAT" file saved with YAS4.23.00A-00 or later versions is loaded into the YRC1000 with a version earlier than YAS4.23.00A-00 or if the "ETHERIP.DAT" file saved with {EtherNet/IP(CPU Board} set to "USED(EX.ADAPTER)" is loaded into a YRC1000 set to "USED(STANDARD)", the following error will appear, but the ETHERNET/IP setting data will be loaded.

Error 3140 Wrong pseudo instruction.

[ETHERIP.DAT]

4.7 Creating an EDS File

Performing the communication settings of EtherNet/IP Safety needs an EDS file (Electronic Data Sheet). Use the EDS file created by the following procedures.

For the details of the configurator and EDS file, refer to the Ethernet/IP specifications. For how to use the communication client and the created EDS file, refer to the instructions of the communication client.

NOTE

The created EDS file will vary depending on whether the EtherNet/IP Safety function is enabled or disabled. When the EtherNet/IP Safety function is disabled, use the EDS file created while the EtherNet/IP Safety function is set to “NOT USED”.

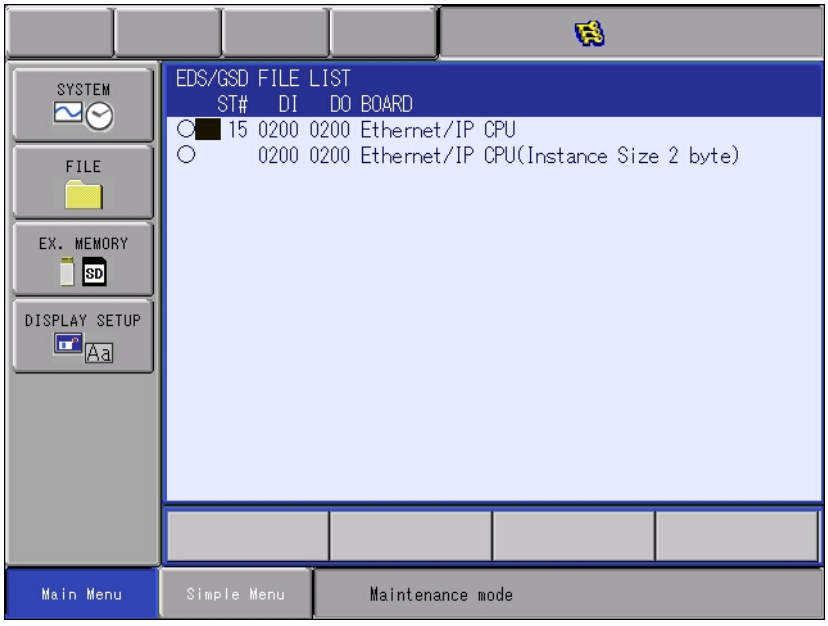
When the EtherNet/IP Safety function is enabled, use the EDS file created while the EtherNet/IP Safety function is set to “USED”.

4.7.1 Creating Procedures of EDS File

1. Start the Maintenance mode, and then select {EX. MEMORY} in the Main Menu.
   – The sub menu appears.

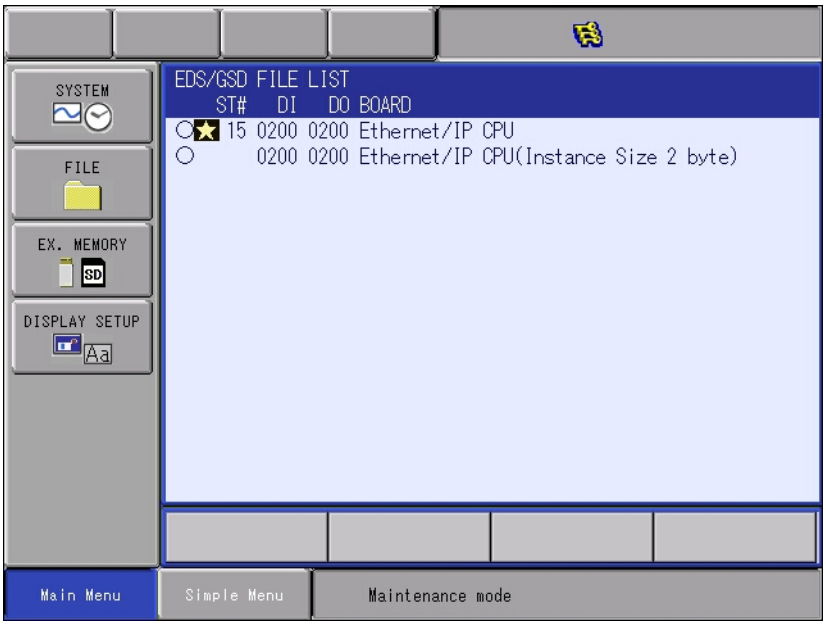
2. Select {SAVE}.
   – The SAVE window appears.

3. Select “EDS/GSD FILE SAVE”.
   – The EDS/GSD FILE SAVE window appears.



NOTE Ethernet/IP CPU (Instance Size 2 byte) will be displayed in the YAS2.82.00A-00 or later versions of the YRC1000 controller.

4. Select “Ethernet/IP CPU” or “Ethernet/IP CPU(Instance Size 2 byte)”.
   – "★" appears to the selected file.



NOTE

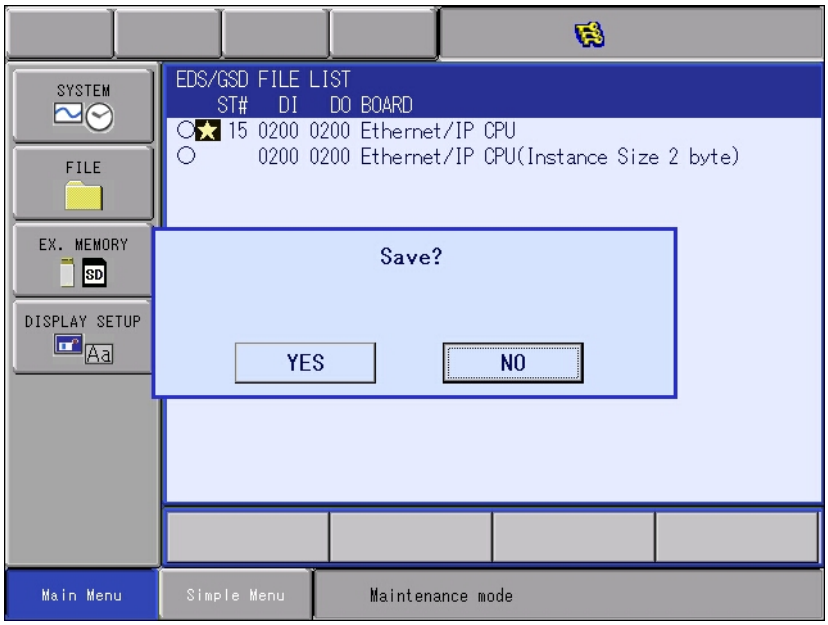
"Ethernet/IP CPU" is for communication devices with an instance number size of 1 byte. Therefore, this EDS file cannot be selected if the instance number is set to 256 or greater.

"Ethernet/IP CPU(Instance Size 2 byte)" is for communication devices with an instance number size of 2 bytes.

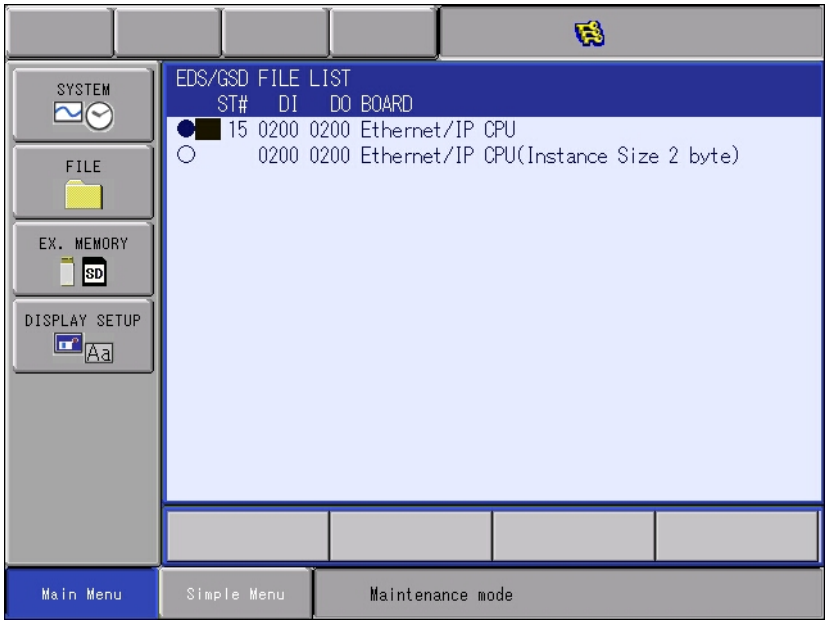
When {EtherNet/IP(CPU Board} is set to "USED(EX.ADAPTER)" in the EtherNet/IP (CPU board) general settings, EDS files for the number of configured adapters can be saved. To identify the multiple adapters, No (assigned number) displayed on the adapter list is added to the file name of the saved EDS files.

(Example)
ST15_EIP_Ethernet_IP CPU_**101**.eds
ST15_EIP_Ethernet_IP CPU_**101**_Instance_2byte.eds

5. Press [Enter].
   – The confirmation dialog box appears.



6. Select {YES}.
   – An EDS file is created in the valid device (SD Card or USB memory).



4.7.2 Maintenance Mode Settings and EDS File Contents

For YAS4.25.00A-00 or later versions, the maintenance mode settings are applied to the EDS file. Therefore, if the adapter settings are changed, create the EDS file again, and then configure the communication settings again using a network configuration tool or other tool.

Maintenance mode settings are not applied to EDS files created with versions earlier than YAS4.25.00A-00 and EDS files created with other YRC1000. Therefore, the same settings must be configured as those configured in maintenance mode when configuring the communication settings using a network configuration tool or other tool. This configuration work can also be accomplished by changing the default values in the EDS file using a text editor (e.g., Notepad) on a computer.

The locations to edit in the EDS file are shown next.

Change the values in red boxes to the settings in maintenance mode.

(Only the pertinent parts of the EDS file for an instance number size of 1 byte are shown in this example.)

<OUTPUT SIZE> (INPUT in the scanner)

```
Param2 =
        0,              $ first field shall equal 0
        ,,              $ path size,path
        0x0000,         $ descriptor
        0xC7,           $ data type : 16-bit Unsigned Integer
        2,              $ data size in bytes
        "Input Size",   $ name
        "Bytes",        $ units
        "Input size",   $ help string
        0,509,0,        $ min,max,default data values
        ,,,,            $ mult,dev,base,offset scaling not used
        ,,,,            $ mult,dev,base,offset link not used
        ;               $ decimal places not used
```

<INPUT SIZE> (OUTPUT in the scanner)

```
Param1=
        0,              $ first field shall equal 0
        ,,              $ path size,path
        0x0000,         $ descriptor
        0xC7,           $ data type : 16-bit Unsigned Integer
        2,              $ data size in bytes
        "Output Size",  $ name
        "Bytes",        $ units
        "Output size",  $ help string
        0,505,0,        $ min,max,default data values
        ,,,,            $ mult,dev,base,offset scaling not used
        ,,,,            $ mult,dev,base,offset link not used
        ;               $ decimal places not used
```

<CONFIGURATION SIZE> (Do not change if set to 0.)

```
Param3=
        0,                          $ first field shall equal 0
        ,,                          $ path size,path
        0x0000,                     $ descriptor
        0xDC,                       $ data type : Path
        ,                           $ data size in bytes
        "Data Configuration  Size", $ name
        "",                         $ units
        "Configuration buffer added to the path. Example of the format:
        20 0C 21 01"                $ help string
        ,400,"",                    $ min,max,default data values
        ,,,,                        $ mult,dev,base,offset scaling not used
        ,,,,                        $ mult,dev,base,offset link not used
        ;                           $ decimal places not used
```

<OUTPUT INSTANCE> (INPUT in the scanner)

```
Param5=
        0,                          $ first field shall equal 0
        ,,                          $ path size,path
        0x0000,                     $ descriptor
        0xC6,                       $ data type : 8-bit Unsigned Integer
        1,                          $ data size in bytes
        "Input Instance",           $ name
        "",                         $ units
        "Input instance of the connection",          $ help string
        0,255,0,                    $ min,max,default data values
        ,,,,                        $ mult,dev,base,offset scaling not used
        ,,,,                        $ mult,dev,base,offset link not used
        ;                           $ decimal places not used
```

<INPUT INSTANCE> (OUTPUT in the scanner)

```
Param4=
        0,                          $ first field shall equal 0
        ,,                          $ path size,path
        0x0000,                     $ descriptor
        0xC6,                       $ data type : 8-bit Unsigned Integer
        1,                          $ data size in bytes
        "Output Instance",          $ name
        "",                         $ units
        "Output instance of the connection",         $ help string
        0,255,0,                    $ min,max,default data values
        ,,,,                        $ mult,dev,base,offset scaling not used
        ,,,,                        $ mult,dev,base,offset link not used
        ;                           $ decimal places not used
```

<CONFIGURATION INSTANCE>

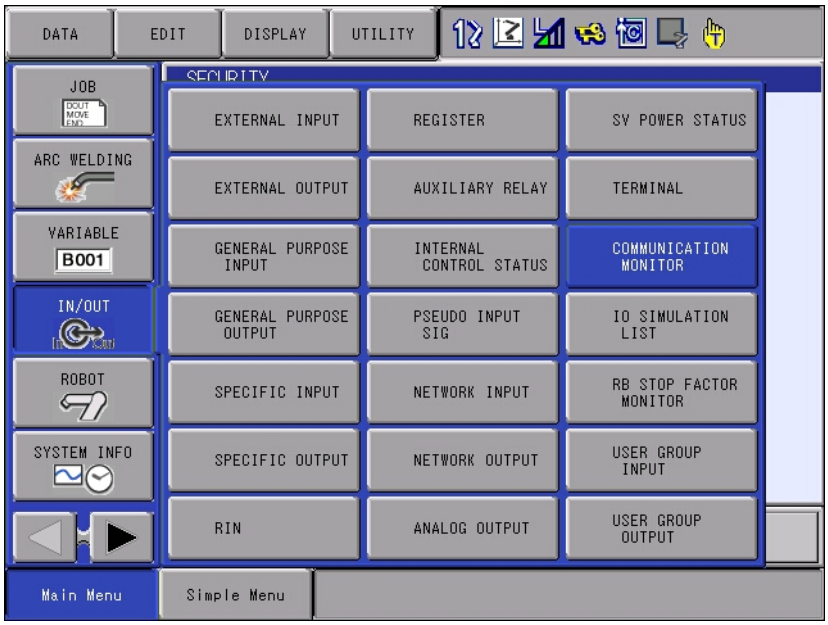
```
Param6=
        0,                          $ first field shall equal 0
        ,,                          $ path size,path
        0x0000,                     $ descriptor
        0xC6,                       $ data type : 8-bit Unsigned Integer
        1,                          $ data size in bytes
        "Configuration Instance",   $ name
        "",                         $ units
        "Configuration instance of the connection",          $ help string
        0,255,0,                    $ min,max,default data values
        ,,,,                        $ mult,dev,base,offset scaling not used
        ,,,,                        $ mult,dev,base,offset link not used
        ;                           $ decimal places not used
```

4.8 Communication Monitor Window

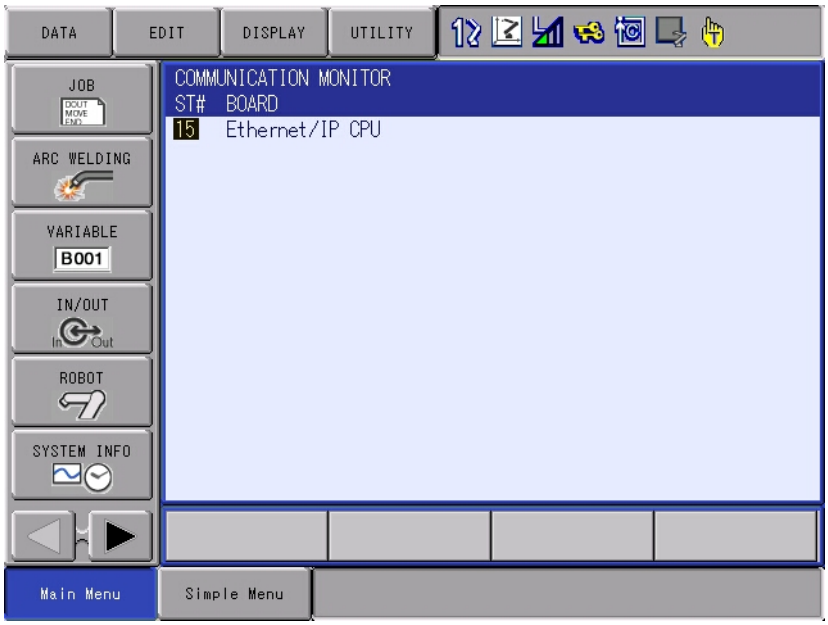
4.8.1 Communication Monitor

The status of I/O communication with each communication target of the EtherNet/IP can be checked by the communication monitor window.

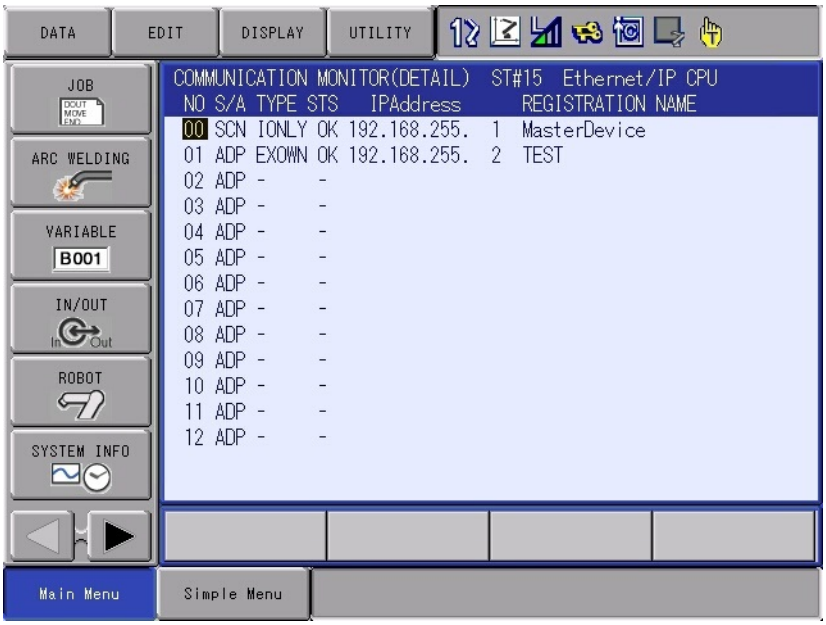
1. Select {IN/OUT} under the main menu.



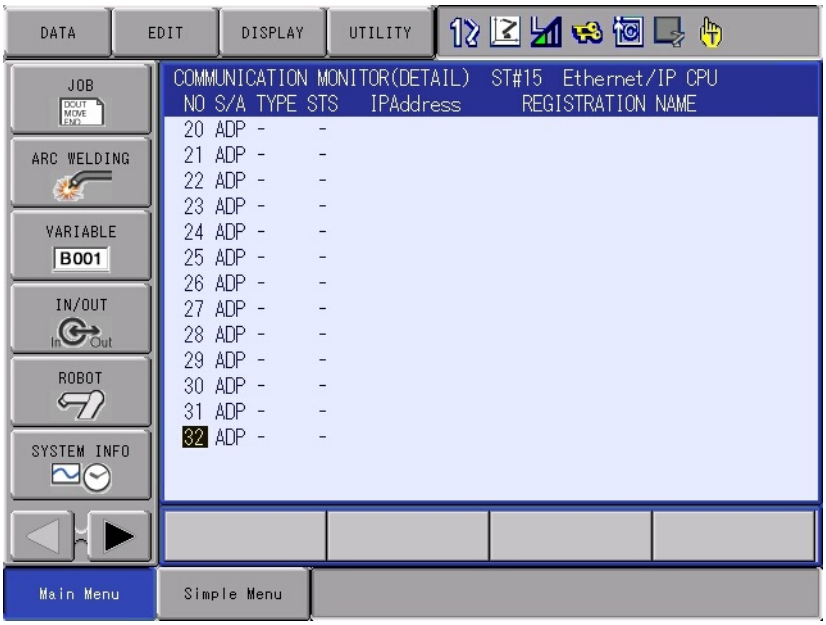
2. Select {COMMUNICATION MONITOR}.
   – The following window appears.



3. Select {15}.
   – Communication monitor window of the EtherNet/IP is shown.

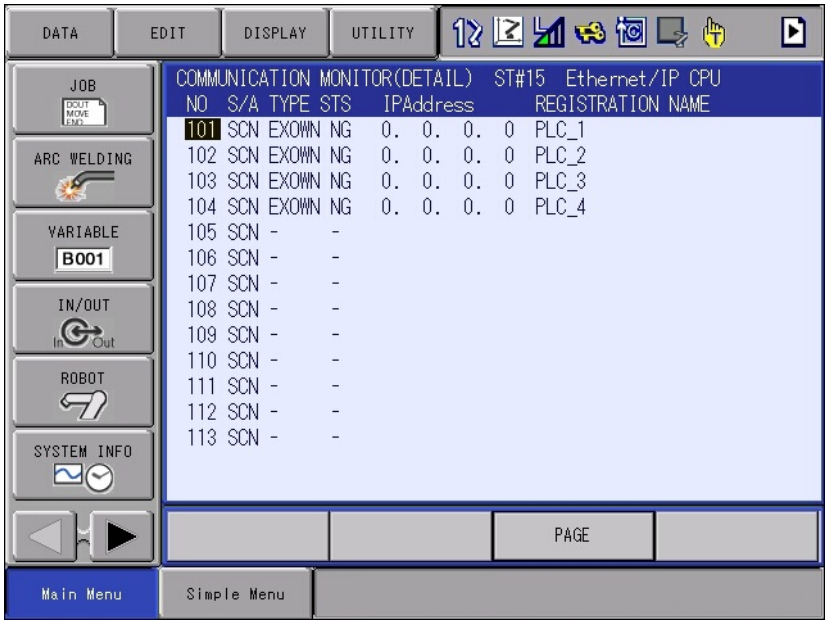


   – Press the up/down cursor key then the window scrolls.

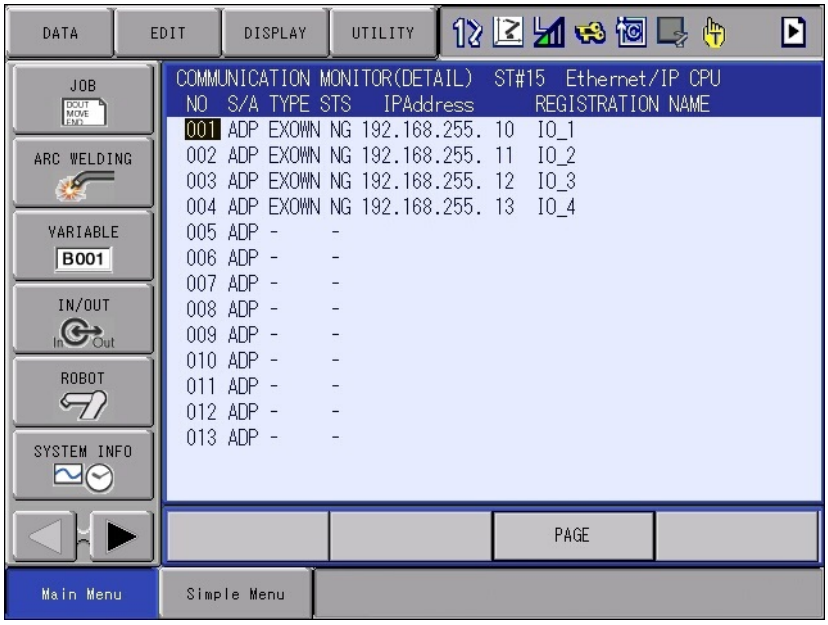


When {EtherNet/IP(CPU Board} is set to "USED(EX.ADAPTER)" in the EtherNet/IP (CPU board) general settings, the scanners and adapters appear on separate windows. Use {PAGE} to switch the scanner window and adapter window.

– The scanners appear as shown below.



– The adapters appear as shown below.



In the communication monitor window, the following contents are shown.

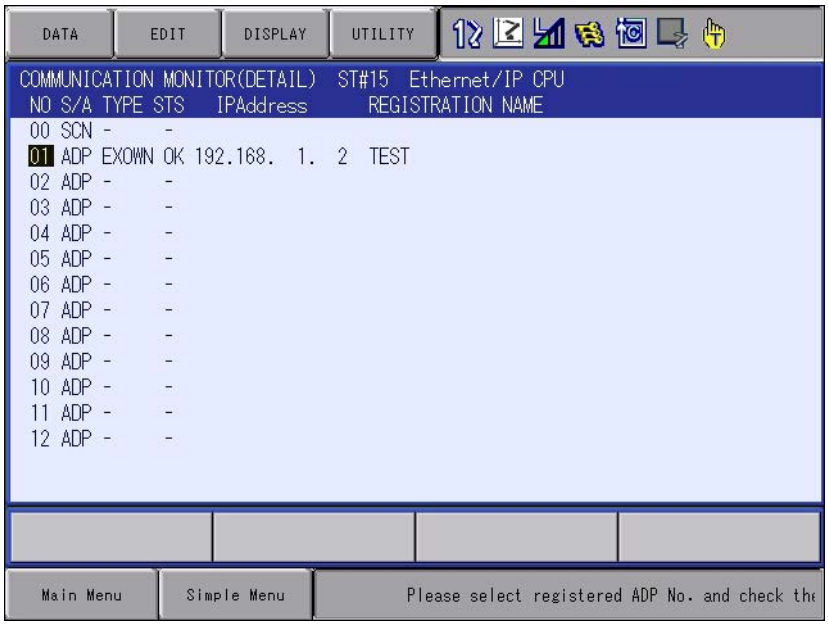
Item	Contents
NO	00: Scanner (standard) 01 to 32: Adapter 101 to 132: Scanner (extended adapter) The setting information and communication status of the scanner registered in *chapter 4.2.4.1 "When Using Standard Settings"* appear on the line of No. 00. The setting information and communication status of adapters registered to each No in *chapter 4.2.5 "Scanner Setting"* appear on the line of No. 01 to 32. The setting information and communication status of scanners registered to each No in *chapter 4.2.4.2 "When Using Extended Adapter Settings"* appear on the line of No. 101 to 132.
S/A	The station type of the device is shown in this area. "SCN": The communication target is the scanner. "ADP": The communication target is the adapter.
TYPE	The communication type is shown in this area. "IONLY": The connection type is InputOnly. "EXOWN": The connection type is ExclusiveOwner. USER: Indicates ExclusiveOwner communication that can be set to 0 bytes. Shown only when the communication target is an adapter. "-": No setting of the device.
STS	The I/O communication status is shown in this area. "OK": The communication with the communication target is established. "NG": The communication with the communication target is not established. "-": No setting of the device.
IPAddress	The IP Address of the device which communicates with the YRC1000 is shown in this area. The IP addresses shown in the line of No. 00 and the line of No. 101 to 132 are enabled after communication is established with the scanner. ("0.0.0.0" is shown when communication is not established with the scanner)
REGISTRATION NAME	The registration name of the device which communicates with the YRC1000 is shown in this area. In the line of No.00, "MasterDevice" is shown. In the line of No.01 to 32, the registration names of the adapter which is registered with each number in *chapter 4.2.5 "Scanner Setting"* are shown. In the line of No.101 to 132, the registration names of the scanner which is registered with each number in *chapter 4.2.4.2 "When Using Extended Adapter Settings"* are shown.

4.8.2 Detailed Communication Status with the Adapter

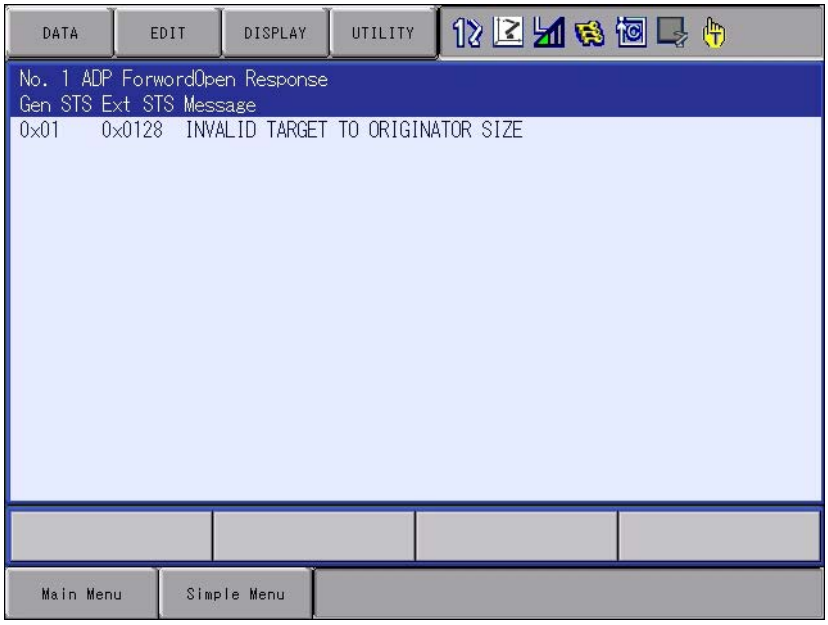
The detailed communication status with the adapter can be seen using the following procedure.

NOTE This function can be used with the YAS2.43.00A-00 or later.

1. Display the communication monitor window.
   – See “4.8.1 Communication Monitor” to display the window.



2. Select the number of the adapter to see the detailed status on the communication monitor window.
   – The ADP Device Response window appears.



The contents displayed on ADP Device Response window are as follows.

Gen STS (General Status)	Ext STS (Extended Status)	Message (Descriptions)
0x00		Service completed successfully
0x01	0x0100	CONNECTION IN USE OR DUPLICATE FORWARD OPEN
0x01	0x0103	TRANSPORT CLASS AND TRIGGER COMBINATION NOT SUPPORTED
0x01	0x0106	OWNERSHIP CONFLICT
0x01	0x0107	TARGET CONNECTION NOT FOUND
0x01	0x0108	INVALID NETWORK CONNECTION PARAMETER
0x01	0x0109	INVALID CONNECTION SIZE
0x01	0x0110	TARGET FOR CONNECTION NOT CONFIGURED
0x01	0x0111	RPI NOT SUPPORTED
0x01	0x0112	RPI VALUE NOT ACCEPTABLE
0x01	0x0113	OUT OF CONNECTIONS
0x01	0x0114	VENDOR ID OR PRODUCT CODE MISMATCH
0x01	0x0115	PRODUCT TYPE MISMATCH
0x01	0x0116	REVISION MISMATCH
0x01	0x0117	INVALID PRODUCED OR CONSUMED APPLICATION PATH
0x01	0x0118	INVALID OR INCONSISTENT CONFIGURATION APPLICATION PATH
0x01	0x0119	NON-LISTEN ONLY CONNECTION NOT OPENED
0x01	0x011A	TARGET OBJECT OUT OF CONNECTIONS
0x01	0x011B	RPI IS SMALLER THAN THE PRODUCTION INHIBIT TIME
0x01	0x011C	TRANSPORT CLASS NOT SUPPORTED
0x01	0x011D	PRODUCTION TRIGGER NOT SUPPORTED
0x01	0x011E	DIRECTION NOT SUPPORTED
0x01	0x011F	INVALID ORIGINATOR TO TARGET NETWORK CONNECTION FIXVAR
0x01	0x0120	INVALID TARGET TO ORIGINATOR NETWORK CONNECTION FIXVAR
0x01	0x0121	INVALID ORIGINATOR TO TARGET NETWORK CONNECTION PRIORITY
0x01	0x0122	INVALID TARGET TO ORIGINATOR NETWORK CONNECTION PRIORITY
0x01	0x0123	INVALID ORIGINATOR TO TARGET NETWORK CONNECTION TYPE
0x01	0x0124	INVALID TARGET TO ORIGINATOR NETWORK CONNECTION TYPE
0x01	0x0125	INVALID ORIGINATOR TO TARGET NETWORK CONNECTION REDUNDANT_OWNER
0x01	0x0126	INVALID CONFIGURATION SIZE
0x01	0x0127	INVALID ORIGINATOR TO TARGET SIZE
0x01	0x0128	INVALID TARGET TO ORIGINATOR SIZE
0x01	0x0129	INVALID CONFIGURATION APPLICATION PATH
0x01	0x012A	INVALID CONSUMING APPLICATION PATH

Gen STS (General Status)	Ext STS (Extended Status)	Message (Descriptions)
0x01	0x012B	INVALID PRODUCING APPLICATION PATH
0x01	0x012C	CONFIGURATION SYMBOL DOES NOT EXIST
0x01	0x012D	CONSUMING SYMBOL DOES NOT EXIST
0x01	0x012E	PRODUCING SYMBOL DOES NOT EXIST
0x01	0x012F	INCONSISTENT APPLICATION PATH COMBINATION
0x01	0x0130	INCONSISTENT CONSUME DATA FORMAT
0x01	0x0131	INCONSISTENT PRODUCE DATA FORMAT
0x01	0x0132	NULL FORWARD OPEN FUNCTION NOT SUPPORTED
0x01	0x0133	CONNECTION TIMEOUT MULTIPLIER NOT ACCEPTABLE
0x01	0x0134	MISMATCH T->O NETWORK CONNECTION SIZE
0x01	0x0135	MISMATCH T->O NETWORK CONNECTION FIXE/ VARIABLE
0x01	0x0136	MISMATCH T->O NETWORK CONNECTION PRIORITY
0x01	0x0137	MISMATCH T->O TRANSPORT CLASS
0x01	0x0138	MISMATCH T->O PRODUCTION TRIGGER
0x01	0x0139	MISMATCH T->O PRODUCTION INHIBIT TIME SEGMENT
0x01	0x0203	CONNECTION TIMED OUT
0x01	0x0204	UNCONNECTED REQUEST TIMED OUT
0x01	0x0205	PARAMETER ERROR IN UNCONNECTED REQUEST SERVICE
0x01	0x0206	MESSAGE TOO LARGE FOR UNCONNECTED_SEND SERVICE
0x01	0x0207	UNCONNECTED ACKNOWLEDGE WITHOUT REPLY
0x01	0x0301	NO BUFFER MEMORY AVAILABLE
0x01	0x0302	NETWORK BANDWIDTH NOT AVAILABLE FOR DATA
0x01	0x0303	NO CONSUMED CONNECTION ID FILTER AVAILABLE
0x01	0x0304	NOT CONFIGURED TO SEND SCHEDULED PRIORITY DATA
0x01	0x0305	SCHEDULE SIGNATURE MISMATCH
0x01	0x0306	SCHEDULE SIGNATURE VALIDATION NOT POSSIBLE
0x01	0x0311	PORT NOT AVAILABLE
0x01	0x0312	LINK ADDRESS NOT VALID
0x01	0x0315	INVALID SEGMENT IN CONNECTION PATH
0x01	0x0316	ERROR IN FORWARD CLOSE SERVICE CONNECTION PATH
0x01	0x0317	SCHEDULING NOT SPECIFIED
0x01	0x0318	LINK ADDRESS TO SELF INVALID
0x01	0x0319	SECONDARY RESOURCES UNAVAILABLE
0x01	0x031A	RACK CONNECTION ALREADY ESTABLISHED

Gen STS (General Status)	Ext STS (Extended Status)	Message (Descriptions)
0x01	0x031B	MODULE CONNECTION ALREADY ESTABLISHED
0x01	0x031C	MISCELLANEOUS
0x01	0x031D	REDUNDANT CONNECTION MISMATCH
0x01	0x031E	NO MORE USER CONFIGURABLE LINK CONSUMER RESOURCES AVAILABLE IN THE PRODUCING MODULE
0x01	0x031F	NO MORE USER CONFIGURABLE LINK CONSUMER RESOURCES AVAILABLE IN THE PRODUCING MODULE
0x01	0x0320 – 0x07FF	Vendor specific
0x01	0x800	Network link in path to module is offline
0x01	0x810	NO TARGET APPLICATION DATA AVAILABLE
0x01	0x811	NO ORIGINATOR APPLICATION DATA AVAILABLE
0x01	0x812	NODE ADDRESS HAS CHANGED SINCE THE NETWORK WAS SCHEDULED
0x01	0x813	NOT CONFIGURED FOR OFF-SUBNET MULTICAST
0x09	Index to Element	ERROR IN DATA SEGMENT.
0x0C	Optional	OBJECT STATE ERROR
0x10	Optional	DEVICE STATE ERROR
-	-	NO DEVICE RESPONSE

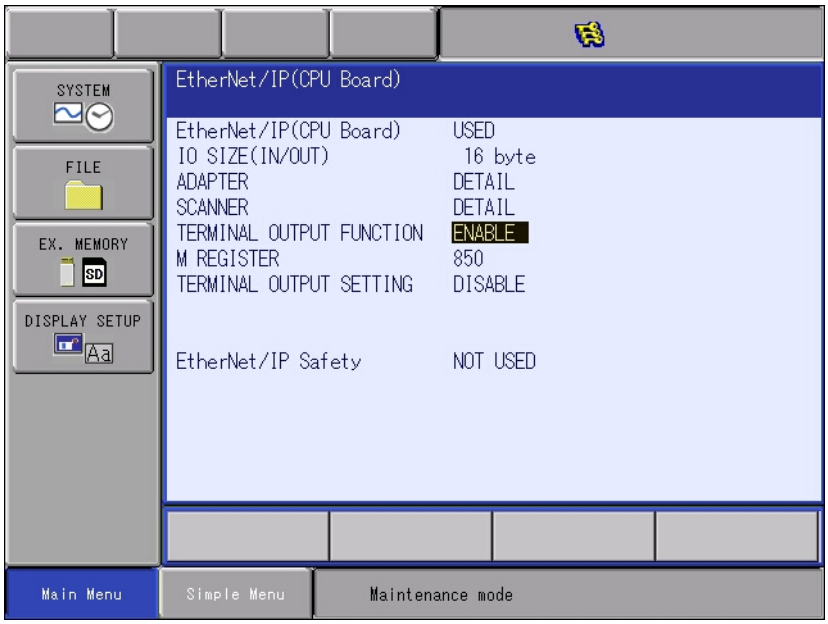
4.9 Terminal Output Function/Scanner Terminal Output Function

Terminal output function enables the identification of adapters that are not communicating when the EtherNet/IP (CPU board) is used as a scanner.

NOTE Terminal output function can be used with the YAS2.43.00A-00 or later.

To utilize this function, set the “TERMINAL OUTPUT FUNCTION” to “ENABLE” on the EtherNet/IP (CPU board) general setting window. Then, set the “M Register” to the leading number of the M register, which is the destination of the terminal output function.

The following is an example of the settings for the Terminal Output Function.



Leading number of the register (No. 1 to 16 error information: register 850 in the example above)

No. 16	No. 15	No. 14	No. 13	No. 12	No. 11	No. 10	No. 9	No. 8	No. 7	No. 6	No. 5	No. 4	No. 3	No. 2	No. 1

Leading number of the register +1 (No. 17 to 32 error information: register 851 in the example above)

No. 32	No. 31	No. 30	No. 29	No. 28	No. 27	No. 26	No. 25	No. 24	No. 23	No. 22	No. 21	No. 20	No. 19	No. 18	No. 17

The communication status of each adapter is output to 2 registers (32 bits) starting from the leading number of the M register that is specified on the setting window.
The bit equivalent to the non communicating adapter number is “1”. The bit equivalent to the communicating or non-allocated adapter numbers are “0”.
The following is an example of output to the M register for the terminal output function.

<Example of EtherNet/IP(CPU board) scanner setting>

No. 1 to 6 : Allocated

No. 7 to 32 : No allocation

No.	32	...	7	6	5	4	3	2	1
Communication Setting	No	...	No	Yes	Yes	Yes	Yes	Yes	Yes
Communication Status	-	...	-	Not connected	Not connected	Error	Error	Normal	Normal
Terminal Output Function M Register Output Value (Bit)	0	... ...	0	1	1	1	1	0	0
	M851		M850						

Output communication status

For YAS4.23.00A-00 or later versions, the terminal output function has been expanded so that scanners with communication errors can also be checked. This is because communication with multiple scanners was made possible when using extended adapter settings. The settings for scanners and the behavior of this function is the same as that for adapters. Scanner and adapter are set side by side.

An example of these settings is shown below.

Leading number of the register (No. 1 to 16 error information: register 850 in the example above)

No. 16	No. 15	No. 14	No. 13	No. 12	No. 11	No. 10	No. 9	No. 8	No. 7	No. 6	No. 5	No. 4	No. 3	No. 2	No. 1

Leading number of the register +1 (No. 17 to 32 error information: register 851 in the example above)

No. 32	No. 31	No. 30	No. 29	No. 28	No. 27	No. 26	No. 25	No. 24	No. 23	No. 22	No. 21	No. 20	No. 19	No. 18	No. 17

Leading number of the register (No. 101 to 116 error information: register 854 in the example above)

No. 116	No. 115	No. 114	No. 113	No. 112	No. 111	No. 110	No. 109	No. 108	No. 107	No. 106	No. 105	No. 104	No. 103	No. 102	No. 101

Leading number of the register +1 (No. 117 to 132 error information: register 855in the example above)

No. 132	No. 131	No. 130	No. 129	No. 128	No. 127	No. 126	No. 125	No. 124	No. 123	No. 122	No. 121	No. 120	No. 119	No. 118	No. 117

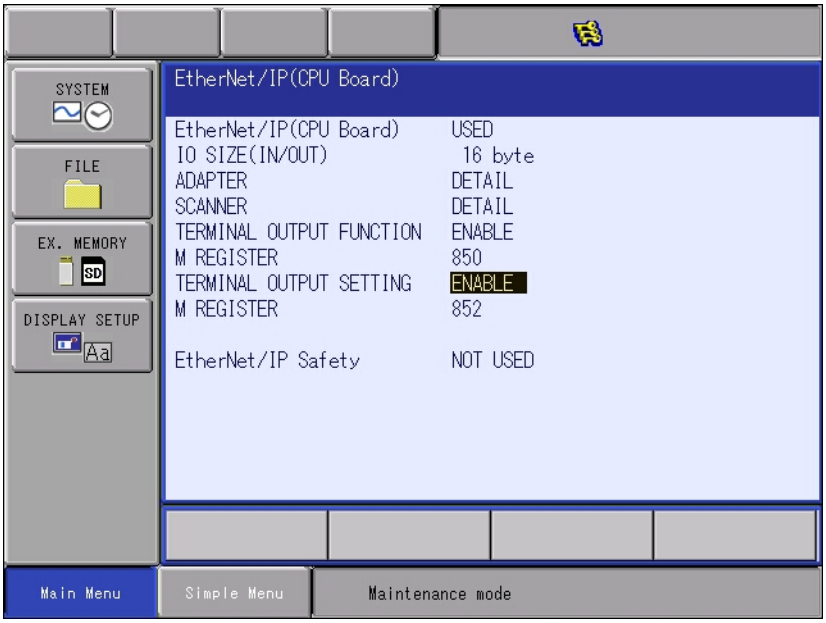
4.10 Terminal Output Setting Function

This function enables identifying adapter that are not communicating when the terminal output function is used as a scanner.

NOTE This function can be used with the YAS2.43.00A-00 or later.

To use this function, select “ENABLE” for “TERMINAL OUTPUT SETTING” after completing settings for the terminal output function and enter a leading number of the M register where communication error output for adapter number is specified in “M Register” (displayed right under “TERMINAL OUTPUT SETTING”). In the M register for the terminal output setting, set a bit to “1” for adapter number for which a communication error will be output.

The following is an example of the settings for the Terminal Output Setting Function.



Leading number of the register

(No. 1 to 16: designation of output terminal: register 852 in the example above)

No. 16	No. 15	No. 14	No. 13	No. 12	No. 11	No. 10	No. 9	No. 8	No. 7	No. 6	No. 5	No. 4	No. 3	No. 2	No. 1

Leading number of the register +1

(No. 17 to 32: designation of output terminal: register 853 in the example above)

No. 32	No. 31	No. 30	No. 29	No. 28	No. 27	No. 26	No. 25	No. 24	No. 23	No. 22	No. 21	No. 20	No. 19	No. 18	No. 17

Adapter numbers for which a communication error is output can be specified by using 2 registers (32 bits) starting from the M register's leading number specified for the terminal output setting. When a bit for an adapter number is set to "1", a communication error will be output to the corresponding bit in the M register for the terminal output function. When the bit is set to "0", a communication error ("1") will not be output and output for the terminal output function will always be "0".

The following is an example of output to the M register for the terminal output function when "ENABLE" is set for the terminal output setting.

<Example of EtherNet/IP(CPU board) scanner setting>

No. 1 to 6 : Allocated

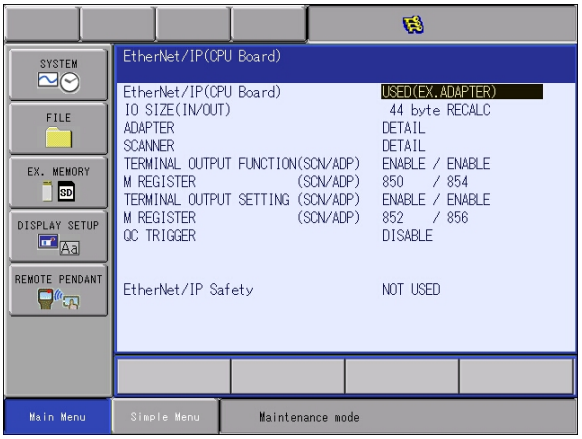
No. 7 to 32 : No allocation

No.	32	...	7	6	5	4	3	2	1
Communication Setting	No	...	No	Yes	Yes	Yes	Yes	Yes	Yes
Communication Status	-	...	-	Not connected	Not connected	Error	Error	Normal	Normal
Terminal Output Setting M Register Setting Value (Bit)	0	...	0	1	0	1	0	1	0
	M853			M852					
Terminal Output Function M Register Output Value (Bit)	0	...	0	1	0	1	0	0	0
	M851			M850					

Mask communication status with the terminal output setting and then output

For YAS4.23.00A-00 or later versions, the terminal output setting function has been expanded so that scanners with communication errors can also be specified. This is because communication with multiple scanners was made possible when using extended adapter settings. The settings for scanners and the behavior of this function is the same as that for adapters.

An example of these settings is shown below.



Leading number of the register (No. 1 to 16 designation of output terminal: register 852 in the example above)

No. 16	No. 15	No. 14	No. 13	No. 12	No. 11	No. 10	No. 9	No. 8	No. 7	No. 6	No. 5	No. 4	No. 3	No. 2	No. 1

Leading number of the register +1 (No. 17 to 32 designation of output terminal: register 853 in the example above)

No. 32	No. 31	No. 30	No. 29	No. 28	No. 27	No. 26	No. 25	No. 24	No. 23	No. 22	No. 21	No. 20	No. 19	No. 18	No. 17

Leading number of the register (No. 101 to 116 designation of output terminal: register 856 in the example above)

No. 116	No. 115	No. 114	No. 113	No. 112	No. 111	No. 110	No. 109	No. 108	No. 107	No. 106	No. 105	No. 104	No. 103	No. 102	No. 101

Leading number of the register +1 (No. 117 to 132 designation of output terminal: register 857 in the example above)

No. 132	No. 131	No. 130	No. 129	No. 128	No. 127	No. 126	No. 125	No. 124	No. 123	No. 122	No. 121	No. 120	No. 119	No. 118	No. 117

4.11 QuickConnect Function (Specifying a Short Cycle for Reconnection Processing)

The QuickConnect function can be used for EtherNet/IP (CPU board) scanner setting. This function can perform high speed reconnection when frequently switching tools etc. This function is achieved by shortening the cycle for reconnections.

To use the QuickConnect function, you must enable the QuickConnect function for both the scanner and the adapter.

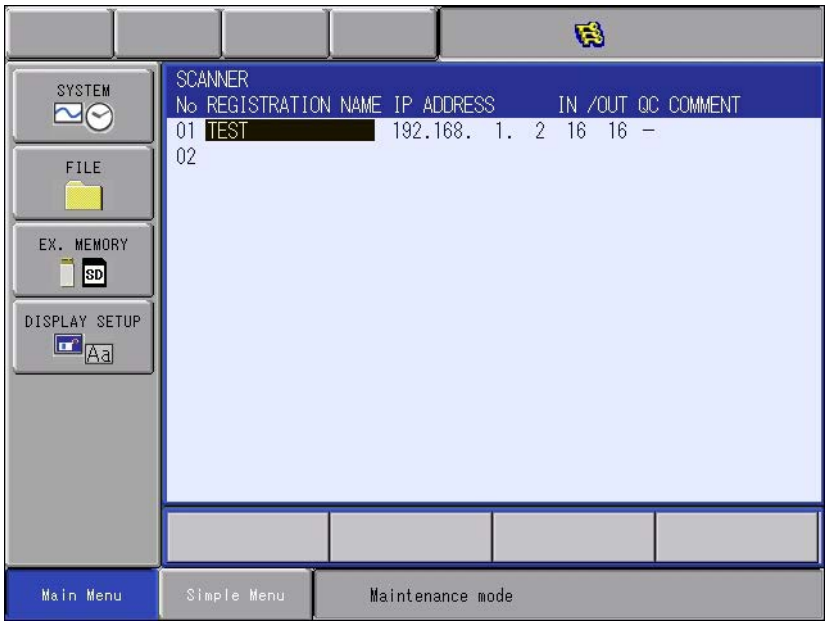
QuickConnect function cannot be used for EtherNet/IP (CPU board) adapter setting.

NOTE

- This function can be used with the YAS2.43.00A-00 or later.
- To use this function with YAS4.23.00A-00 or later versions, set the QuickConnect trigger to "DISABLE" in *chapter 4.12 "QuickConnect Function (Specifying Triggers)"* .
- If the adapter that does not support the QuickConnect function is connected, EtherNet/IP communication can be performed, but high-speed communication connection cannot be performed.

4.11.1 QuickConnect Setting for EtherNet/IP (CPU board) Scanner Setting

1. Scanner Setting
   – In the maintenance mode, configure scanner of EtherNet/IP (CPU board).
   Refer to “4.2.5 Scanner Setting”, and execute until the procedure “5. Enter the IP address”.



2. Set “○” in “QC”.

   – Select with "QC" of the device to be set on the scanner setting window and set it to "○".

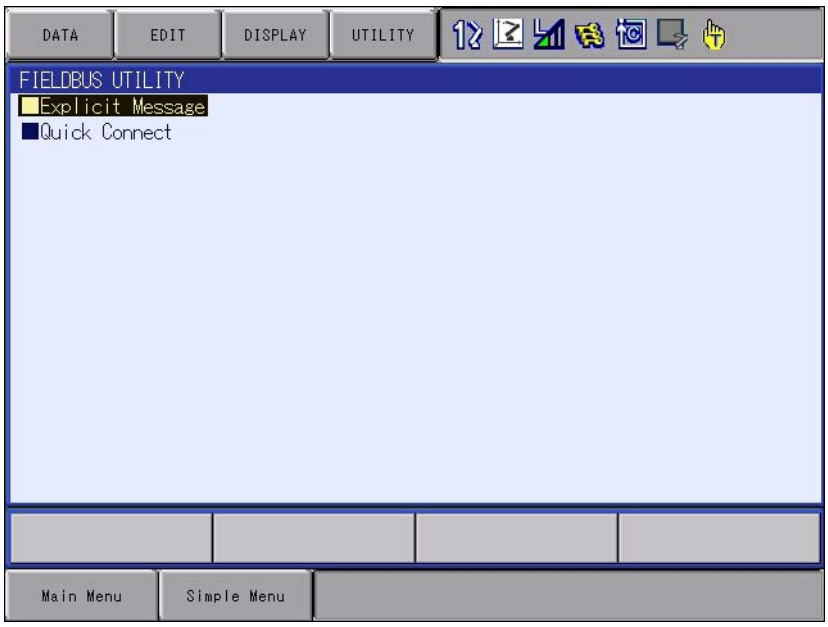
3. Complete the scanner setting.

   – Perform remaining procedure of the "4.2.5 Scanner setting" and complete the scanner setting.

4.11.2 Enabling QuickConnect Setting for Adapter Device

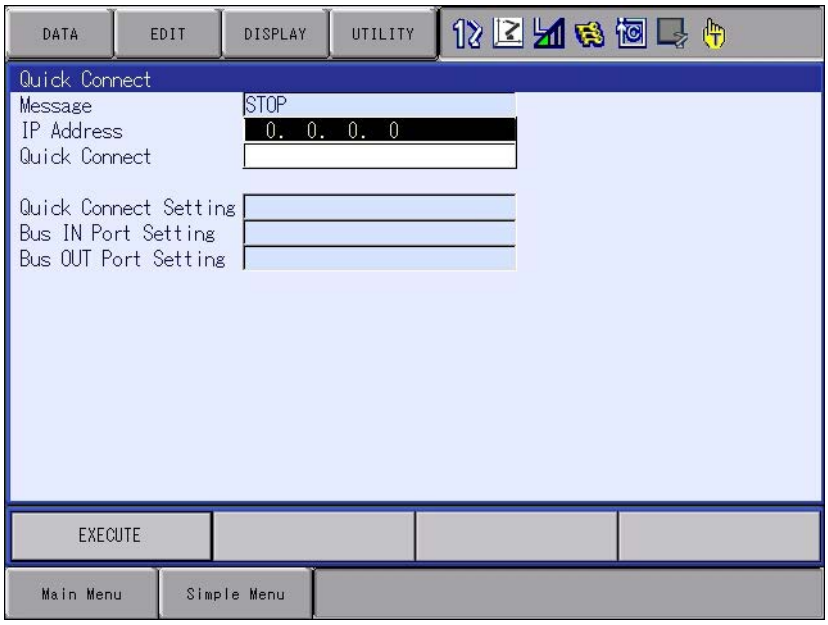
If the adapter device requires QuickConnect setting from the scanner, follow the procedure below.

1. Turn ON the power to the YRC1000.
2. Set the security mode to management mode.
3. Select {IN/OUT}-{FIELDBUS UTILITY} under the main menu.
   – The FIELDBUS UTILITY window appears.

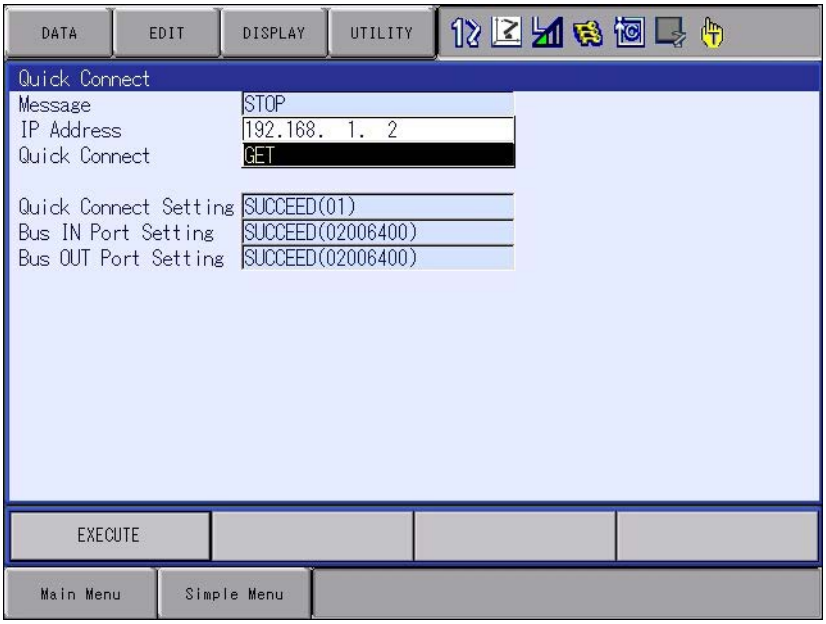


NOTE {QuickConnect} is displayed only when one or more “QC” are set with "○" in the scanner setting of EtherNet/IP (CPU board). {QuickConnect} will not be displayed if “QC” is not set.

4. Select {QuickConnect}.
   – The QuickConnect window appears.

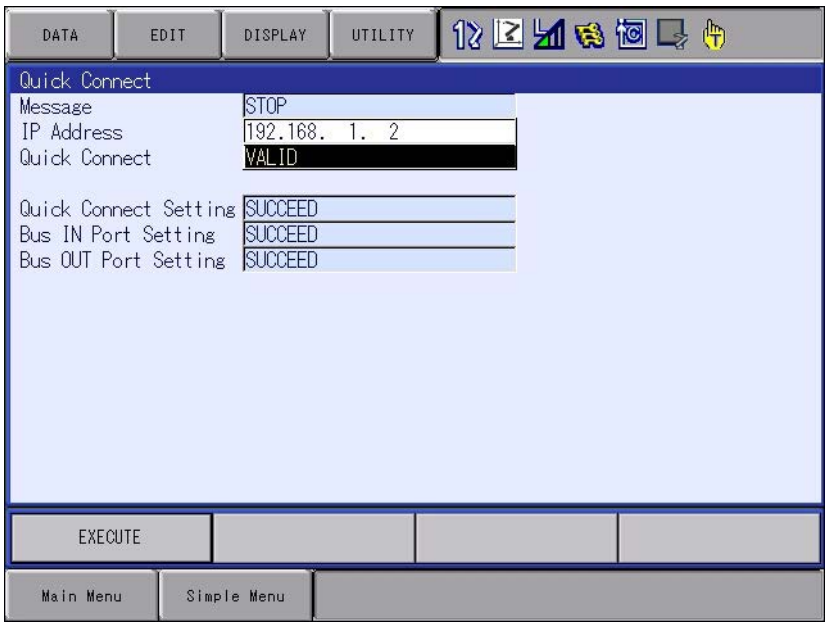


5. Set the IP address of the adapter to the “IP Address”.
6. Set “QuickConnect” to “GET”.
7. Select “EXECUTE”.
   – The QuickConnect setting information to the adapter device is requested.
   After getting the response from the adapter device, the QuickConnect setting information is displayed.



   – If the QuickConnect setting information is as following, the QuickConnect setting is valid, and the setting after step 8 is unnecessary.
   Quick Connect Setting SUCCEED (01)
   Bus IN Port Setting SUCCEED (02006400)
   Bus OUT Port Setting SUCCEED (02006400)
8. Set “QuickConnect” to “VALID”.
9. Select “EXECUTE”.

– A QuickConnect setting enable request is sent to the adapter device.
After getting the response from the adapter device, the QuickConnect setting information is displayed.



– After the QuickConnect setting is enabled, the result is displayed as follows.
Quick Connect Setting SUCCEED
Bus IN Port Setting SUCCEED
Bus OUT Port Setting SUCCEED

– If other than the above are displayed, first, check the communication status with the adapter device. Although the connection status is OK, if other than the above are displayed, special command setting may be necessary to validate the QuickConnect setting of the connected adapter device. In this case, check the instruction manual of the adapter device and perform necessary command setting, referring to "4.12 Explicit Message Communication Function".

10. Restart adapter device.

4.12 QuickConnect Function (Specifying Triggers)

The QuickConnect function can be used for the EtherNet/IP (CPU board) scanner setting. This function can perform high speed reconnection when frequently switching tools etc. This function enables the EtherNet/IP communication start and communication stop to be executed with triggers. These triggers are bits that correspond to preset M registers and that can be turned ON and OFF.

To use the QuickConnect function, QuickConnect function must be enable for both the scanner and the adapter.

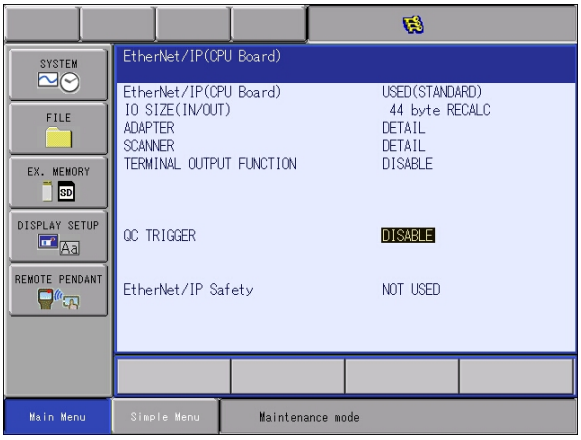
The QuickConnect function cannot be used in the EtherNet/IP (CPU board) adapter settings.

NOTE

- This function can be used with the YAS4.23.00A-00 or later.
- When using this function, the QuickConnect function cannot be used in *chapter 4.11 "QuickConnect Function (Specifying a Short Cycle for Reconnection Processing)"*
- If the adapter that does not support the QuickConnect function is connected, EtherNet/IP communication can be performed, but high-speed communication connection cannot be performed.

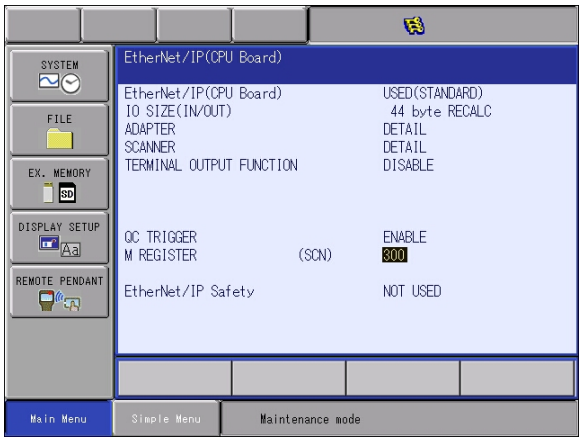
4.12.1 QuickConnect Setting for EtherNet/IP (CPU board) Scanner Setting

1. Enable the QuickConnect trigger.
   – Set to "ENABLE" for {QC TRIGGER} in *chapter 4.2.3 "General Setup for the EtherNet/IP (CPU board)"* .
   The setting is toggled each time "ENABLE" and "DISABLE" is selected.



2. Specify the M register to use for the QuickConnect trigger.

   – When {QC TRIGGER} is set to "ENABLE" in step 1 above, {M REGISTER (SCN)} appears on the line below it. Set the leading number of the M registers to use for the QC trigger here.



   – Two registers (32 bits) from the M register set on this window correspond to the adapter number that is triggered by the bit as shown below.

Leading register (No. 1 to 16 trigger targets: register 300 in the example above)

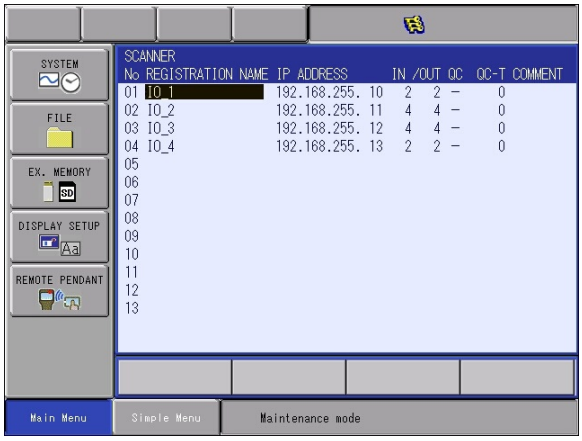
No. 16	No. 15	No. 14	No. 13	No. 12	No. 11	No. 10	No. 9	No. 8	No. 7	No. 6	No. 5	No. 4	No. 3	No. 2	No. 1

Leading register +1 (No. 17 to 32 trigger targets: register 301 in the example above)

No. 32	No. 31	No. 30	No. 29	No. 28	No. 27	No. 26	No. 25	No. 24	No. 23	No. 22	No. 21	No. 20	No. 19	No. 18	No. 17

3. Select "DETAIL" of the scanner.

– The scanner settings window appears.



– (Description of items related to QuickConnect triggers)

(1) QC
Specify whether to use QuickConnect. The setting is toggled each time "-" and "○" is selected.
- : QuickConnect is not used.
○: Communication start/communication stop with QuickConnect.

(2) QC-T
Set the adapter startup wait time from when the signal that corresponds to the adapter number is turned ON to when the communication start command is actually transmitted. The unit is msec and the setting range is 0 to 65535.

NOTE

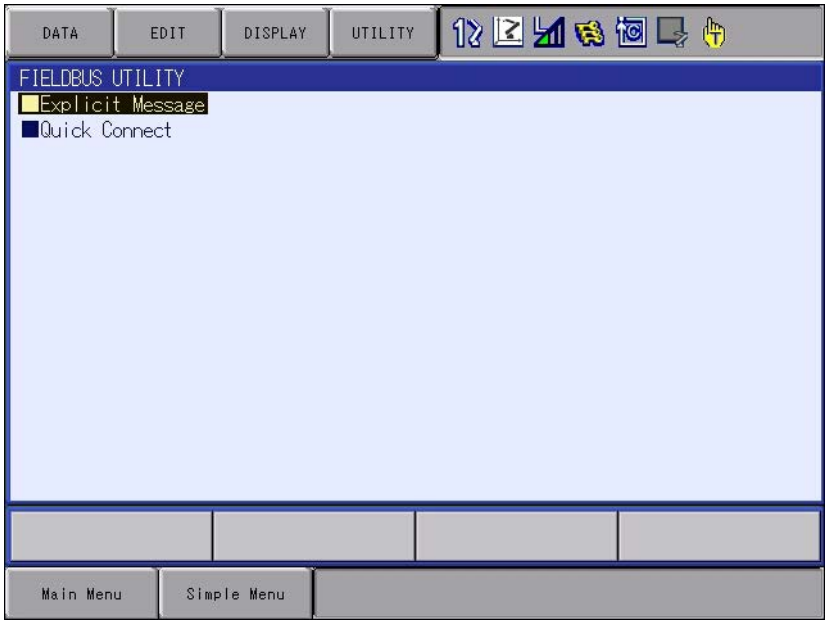
Send the communication start command (set corresponding bit in M registers to 1) and the communication stop command (set corresponding bit in M registers to 0) when communication is physically possible. If the communication start command and communication stop command are sent when communication is not physically possible, resend processing will be performed automatically in the network processing section, and it may no longer be possible to perform high-speed communication reconnection processing.

4.13 ExplicitMessage Communication Function

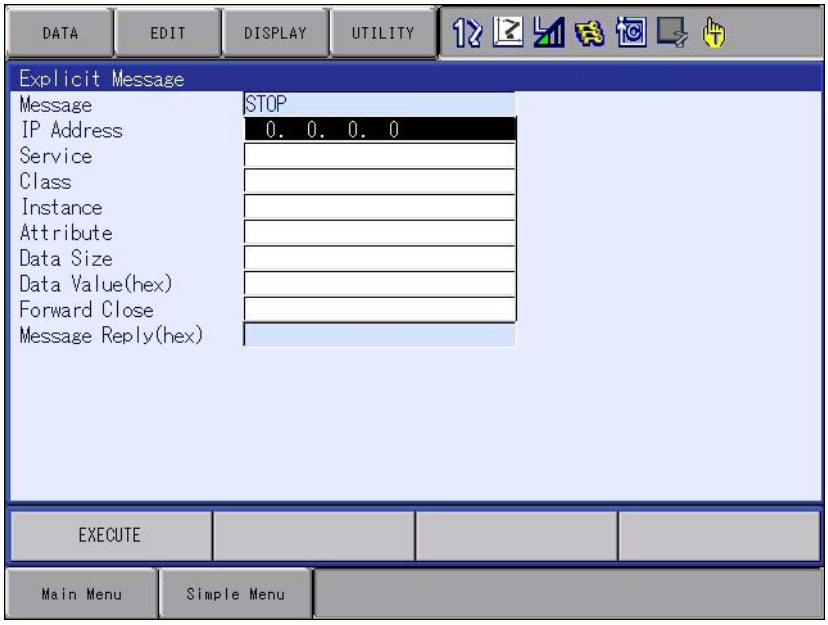
EtherNet/IP (CPU board) can use the ExplicitMessage communication function of EtherNet/IP.

NOTE This function can be used with the YAS2.43.00A-00 or later.

1. Turn ON the power to the YRC1000.
2. Set the security mode to management mode.
3. Select {IN/OUT} - {FIELDBUS UTILITY} under the main menu.
   – The FIELDBUS UTILITY window appears.



4. Select {ExplicitMessage}.
   – The ExplicitMessage window appears.



– Explanation of each setting item

(1) Message
The execution status of the ExplicitMessage communication is displayed. This item is displayed only.

(2) IP Address
Set the IP address of the target of ExplicitMessage communication.

(3) Service
Set the Service number of the ExplicitMessage communication.
Set it in decimal.

(4) Class
Set the Class number of the ExplicitMessage communication.
Set it in decimal.

(5) Instance
Set the Instance number of the ExplicitMessage communication.
Set it in decimal.

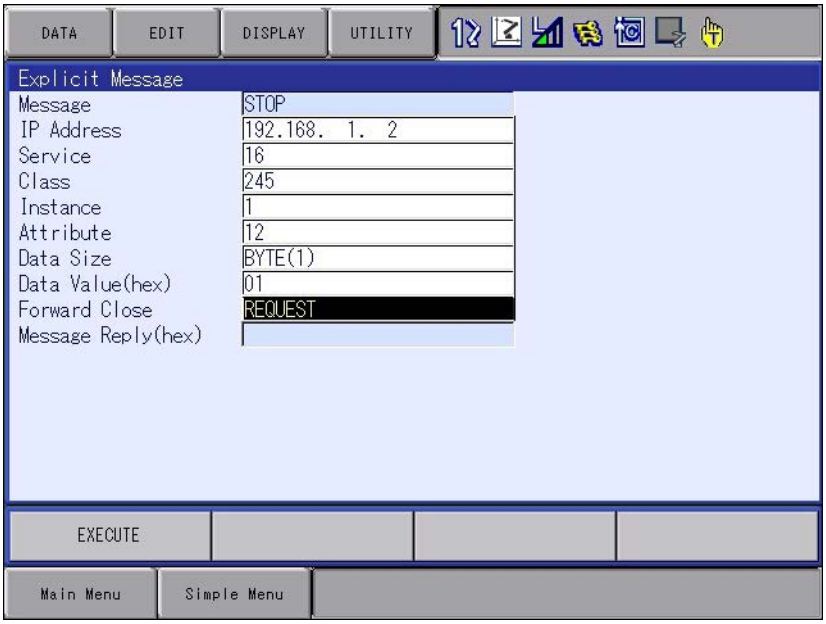
(6) Attribute
Set the Attribute number of the ExplicitMessage communication.
Set it in decimal.

(7) Data Size
Set the Data Size of the ExplicitMessage communication.
Set either "BYTE (1)" / "WORD (2)" / "LONG (4)".
This item can be set only when Service is 16.

(8) Data Value (hex)
Set the Data Value of the ExplicitMessage communication.
Set it in hexadecimal.

(9) ForwardClose
Choose whether to send the ForwardClose command.
Set "REQUEST" for transmission and "NOT REQUEST" for not transmitting.

(10) Message Reply (hex)
After sending the ExplicitMessage command, the contents of the response are displayed.
This item is displayed only.



5. Select “EXECUTE”.
   – A ExplicitMessage command is sent to the communication target. After getting the response from the target, message reply is displayed.

4.14 Special Settings in the Scanner Settings

The following special settings can be used when setting a scanner.

These settings should be configured for each adapter station, so the settings are available only when the device information window appears with the following procedure. The settings are not available when using the procedure in chapter 4.2.2 "Setting the Device Information List" (the setting items are not displayed).

- Real time format
- Electronic key
- Input range settings

NOTE The real time format and electronic key settings are available in YAS4.23.00A-00 or later versions.

1. Select {SCANNER} in the EtherNet/IP (CPU board) general setup window.
   – The scanner settings window appears.

2. Select the registration name of the adapter number to set or modify.
   – The selection dialog box appears.

3. Select {DETAIL} on the displayed selection dialog box.
   – The details page of the device information list appears.
   – For the setting procedure of each item, refer to the following sections.

4.14.1 Advanced Settings

Configure the real time format and electronic key settings.

1. Select {DETAIL} for {ADVANCED SETTING} on the device information.
   – The advanced settings window appears.

   – (Description of each item)

   (1) ADVANCED SETTING
   Displays the connection type (display only).
   Displays the connection type set on the device information window.

   (2) REAL TIME FORMAT (O->T)
   Set the O->T format with the selection dialog box.
   The following formats can be selected.

Format	Description
32bit header	Adds a leading 32-bit header (Run/Idle Header) that provides notification of the Run/Idle status.
Modeless	Does not add a header to provide notification of Run/Idle information.
Zero length	Does not add a header. The data size is 0 bytes for the Idle status.
Heartbeat	Does not add a header to provide notification of Run/Idle information. The data size is fixed to 0 bytes. Used when the connection type is InputOnly.

The formats that can be selected depend on the connection type and data transmission direction.

Connection Type	REAL TIME FORMAT (O->T)	REAL TIME FORMAT (T->O)
Exclusive Owner<Multicast> Exclusive Owner<Unicast> USER	32bit header Modeless Zero length	32bit header Modeless Zero length
Input Only	Heartbeat (fixed)	32bit header Modeless Zero length

(3) REAL TIME FORMAT (T->O)
Set the T->O format with the selection dialog box.
For details, refer to "(2) REAL TIME FORMAT (O->T)".

(4) ELECTRONIC KEY
Set the checking method of the electronic key with the selection dialog box.
The electronic key sets information, such as the vendor ID, in the communication start request command from the scanner. The adapter then performs a consistency check on this information. If the result of the consistency check is OK, the adapter returns a normal response to the scanner and establishes communication.
The following checking methods can be selected.

Checking Method	Description
EXACT MATCH	The adapter returns a normal response to the scanner and establishes communication when all items described below from "(5) VENDOR ID" to "(9) MINOR REVISION" are matched. Items set to 0 are not checked.
COMPATIBLE MODULE	The adapter returns a normal response to the scanner and establishes communication when "(5) PRODUCT CODE" is the same and one of the following conditions is satisfied. Items set to 0 are not checked. • "(6) MAJOR REVISION" is the same and "(7) MINOR REVISION" is greater than or equal to the setting. • "(6) MAJOR REVISION" is greater than or equal to the setting.

(5) VENDOR ID
Set the vendor ID registered with ODVA (Open DeviceNet Vendor Association, Inc.). For the value to set, refer the user's manual for the communication target device.
The setting range is 0 to 65535.

(6) DEVICE TYPE
Set the device type of the communication target device. For the value to set, refer the user's manual for the communication target device.
The setting range is 0 to 65535.

(7) PRODUCT CODE
Set the product code of the communication target device. For the value to set, refer the user's manual for the communication target device.
The setting range is 0 to 65535.

(8) MAJOR REVISION
Set the major revision of the communication target device. For the value to set, refer the user's manual for the communication target device.
The setting range is 0 to 127.

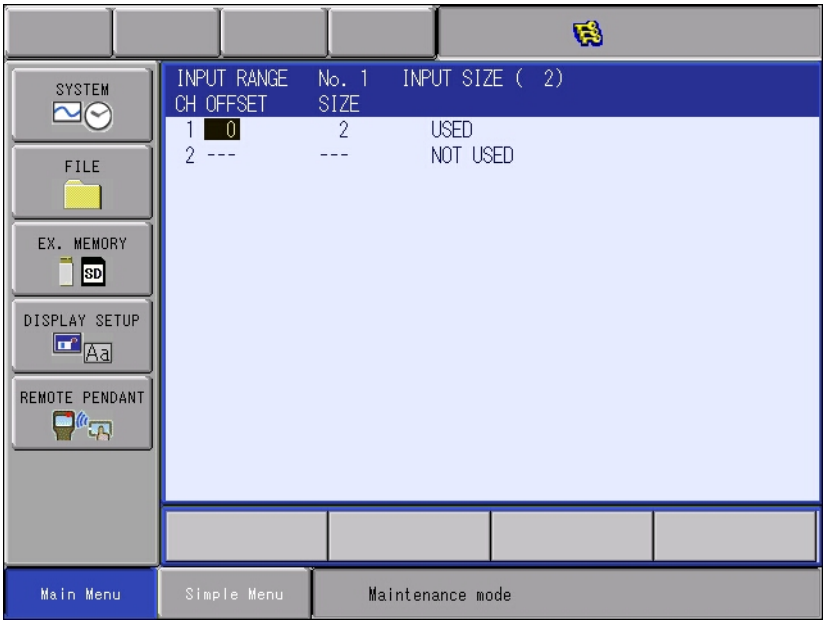
(9) MINOR REVISION
Set the minor revision of the communication target device. For the value to set, refer the user's manual for the communication target device.
The setting range is 0 to 255.

2. Press [ENTER].
   – The device information window appears again.
3. Press [ENTER].
   – The scanner settings window appears again.
4. Press [ENTER].
   – The EtherNet/IP (CPU board) general setup window appears again.
5. Press [ENTER].
   – The selection dialog box appears. Select “YES”.
6. Reconfigure the IO module.
   – Configure the IO module as described in chapter 4.2.6 "IO Module Re-configuration".
7. Reconfigure external IO.
   – Configure the external IO as described in chapter 4.2.7 "External I/O Setup".

4.14.2 Input Range Settings

In EtherNet/IP IO communication, a portion of the input data, rather than the full input data, can be taken into the YRC1000 and allocated to external input signals.

1. Select {DETAIL} for {INPUT RANGE} on the device information.
   – The input range window appears.



   – (Description of each item)

   (1) CH
   The area with which to specify the input range can be set up to two locations.
   These locations are CH1 and CH2.

   (2) OFFSET
   Set the start of the input range as an offset from the start of the full input range. Specify this value in bytes.

   (3) SIZE
   Set the size of the input range area. Specify this value in bytes.

   (4) USED/NOT USED
   Set whether to use the specified input range.
   The setting is toggled each time "USED" and "NOT USED" is selected.

2. Press [ENTER].
   – The device information window appears again.
3. Press [ENTER].
   – The scanner settings window appears again.
4. Press [ENTER].
   – The EtherNet/IP (CPU board) general setup window appears again.
5. Press [ENTER].
   – The selection dialog box appears. Select “YES”.

6. Reconfigure the IO module.
   – Configure the IO module as described in chapter 4.2.6 "IO Module Re-configuration".
7. Reconfigure external IO.
   – Configure the external IO as described in chapter 4.2.7 "External I/O Setup".

5 Message Communication

5.1 Conventional Message Communication

In the EtherNet/IP (CPU board) message communication, it is possible to achieve the same level of data transmission/reception as the level achieved by the YRC1000 Ethernet function. For details, see the following manuals:

- YRC1000 OPTIONS INSTRUCTIONS FOR ETHERNET FUNCTION

5.2 Message Communication Using CIP

The following commands are available in message communication using CIP:

Class number	Function outline
0x70	Read a currently occurring alarm
0x71	Read an alarm history
0x72	Read the current status
0x73	Read the current active job information
0x74	Read the current axis configuration
0x75	Read the current robot position
0x76	Read the deviation of each axis position
0x77	Read the torque of each axis
0x78	Read and write IO data
0x79	Read and write register data
0x7A	Read and write a byte-type variable (B)
0x7B	Read and write an integer-type variable (I)
0x7C	Read and write a double precision integer-type variable (D)
0x7D	Read and write a real-type variable (R)
0x8C	Read and write a character-type variable (S)
0x7F	Read and write a robot position-type variable (P)
0x80	Read and write a base position-type variable (BP)
0x81	Read and write an external axis position-type variable (EX)

5.2.1 Details on Commands for Message Communication Using CIP

■ **Read a currently occurring alarm**

Table 5-1(a): Required Format

Division	Outline	Size	Data	Explanation
Header	Class	2 Byte	0x70	Vendor-specific
	Instance	2 Byte	Specify the read data division 1 to 4	Specify the alarm 1: Latest alarm 2: Alarm immediately before 1 3: Alarm immediately before 2 4: Alarm immediately before 3
	Attribute	1 Byte	Specify the read data type 1 to 5	1: Alarm code to 5: Alarm string name
	Service	1 Byte	Specify the data access method 0x01: Get Attribute All 0x0E: Get Attribute Single	

Table 5-1(b): Response Format (When Reading All Attributes/Omitting Headers)

Division	Outline	Size	Explanation
Data	Alarm code	4 Byte	Output the alarm code 0 to 9999
	Alarm data	4 Byte	Output the alarm data
	Alarm data type	4 Byte	Output the alarm data type 0: No supplementary indication 1: USHORT type decimal data 2: UCHAR type bit pattern 3: General-purpose axis type 4: Space coordinates type 5: Robot coordinates type 6: Servo axis type 8: Control group type 9: SHORT type decimal data 10: USHORT type bit pattern
	Alarm occurrence date/time	16 Byte	Output the alarm occurrence date/time as strings Example of display: 2010/10/10 10:10
	Alarm string	32 Byte	Output the alarm name as strings The same language as the one used for display on the pendant is used.

■ Read an alarm history

Table 5-2(a): Required Format

Division	Outline	Size	Data	Explanation
Header	Class	2 Byte	0x71	Vendor-specific
	Instance	2 Byte	Specify the read data division 1 to 100 1001 to 1100 2001 to 2100 3001 to 3100 4001 to 4100	Specify the alarm division 1 to 100: major failure 1001 to 1100: minor failure 2001 to 2100: User (System) 3001 to 3100: User (User) 4001 to 4100: Off-line
	Attribute	1 Byte	Specify the read data type 1 to 5	1: Alarm code to 5: Alarm string name
	Service	1 Byte	Specify the data access method 0x01: Get Attribute All 0x0E: Get Attribute Single	

Table 5-2(b): Response Format (When Reading All Attributes/Omitting Headers)

Division	Outline	Size	Explanation
Data	Alarm code	4 Byte	Output the alarm code 0 to 9999
	Alarm data	4 Byte	Output the alarm data
	Alarm data type	4 Byte	Output the alarm data type 0: No supplementary indication 1: USHORT type decimal data 2: UCHAR type bit pattern 3: General-purpose axis type 4: Space coordinates type 5: Robot coordinates type 6: Servo axis type 8: Control group type 9: SHORT type decimal data 10: USHORT type bit pattern
	Alarm occurrence date/time	16 Byte	Output the alarm occurrence date/time as strings Example of display: 2010/10/10 10:10
	Alarm string	32 Byte	Output the alarm name as strings The same language as the one used for display on the pendant is used.

■ Read the current status

Table 5-3(a): Required Format

Division	Outline	Size	Data	Explanation
Header	Class	2 Byte	0x72	Vendor-specific
	Instance	2 Byte	Specify “1”	
	Attribute	1 Byte	Specify the read data type 1 to 2	1: Data 1 2: Data 2
	Service	1 Byte	Specify the data access method 0x01: Get Attribute All 0x0E: Get Attribute Single	

Table 5-3(b): Response Format (When Reading All Attributes/Omitting Headers)

Division	Outline	Size	Explanation
Data	Data 1	4 Byte	Output one of the following statuses: bit 0: Step bit 1: 1 cycle bit 2: Auto bit 3: Running bit 4: Safety speed operation bit 5: Teach bit 6: Play bit 7: Command remote
	Data 2	4 Byte	Output one of the following statuses: bit 0: System-reserved bit 1: Hold (Programming pendant) bit 2: Hold (external) bit 3: Hold (Command) bit 4: Alarm bit 5: Error bit 6: Servo on bit 7: System-reserved

■ Read the current active job information

Table 5-4(a): Required Format

Division	Outline	Size	Data	Explanation
Header	Class	2 Byte	0x73	Vendor-specific
	Instance	2 Byte	Specify the read task series 1 to 16	Specify the serial number of the task to read 1: Master task 2: Sub task 1 to 16: Sub task 15
	Attribute	1 Byte	Specify the read data type 1 to 4	Data number of the active job information 1: Job name to 4: Speed override value
	Service	1 Byte	Specify the data access method 0x01: Get Attribute All 0x0E: Get Attribute Single	

Table 5-4(b): Response Format (When Reading Al Attributes/Omitting Headers)

Division	Outline	Size	Explanation
Data	Job name	32 Byte	Output the job name
	Line number	4 Byte	Output the line number 0 to 9999
	Step number	4 Byte	Output the step number 1 to 9998
	Speed override value	4 Byte	Output the speed override value Unit: 0.01%

■ Read the current axis configuration

Table 5-5(a): Required Format

Division	Outline	Size	Data	Explanation
Header	Class	2 Byte	0x74	Vendor-specific
	Instance	2 Byte	Specify the control group to read 1 to 8 11 to 18 21 to 44 101 to 108 111 to 118	Specify the control group and the coordinates system 1 to 8: Robot (pulse) 11 to 18: Base (pulse) 21 to 44: Station (Pulse) 101 to 108: Robot (robot coordinate) (X-Y coordinate) 111 to 118: Base (linear)
	Attribute	1 Byte	Specify the read data type 1 to 8	Specify the data number of the axis information 1: 1st axis coordinates name to 8: 8th axis coordinates name
	Service	1 Byte	Specify the data access method 0x01: Get Attribute All 0x0E: Get Attribute Single	

Table 5-5(b): Response Format (When Reading All Attributes/Omitting Headers)

Division	Outline	Size	Explanation
Data	1st axis coordinates name	4 Byte	The following will be output: For robot (pulse): 'S', 'L', …'T' For robot/base (X-Y coordinate): 'X', 'Y', …'Rz' For base/station (pulse): '1', '2', …'6' Data on each axis is set in ascending order. The value zero is set to a non-existing axis.
	2nd axis coordinates name	4 Byte	
	3rd axis coordinates name	4 Byte	
	4th axis coordinates name	4 Byte	
	5th axis coordinates name	4 Byte	
	6th axis coordinates name	4 Byte	
	7th axis coordinates name	4 Byte	
	8th axis coordinates name	4 Byte	

■ Read the current robot position

Table 5-6(a): Required Format

Division	Outline	Size	Data	Explanation
Header	Class	2 Byte	0x75	Vendor-specific
	Instance	2 Byte	Specify the control group to read 1 to 8 11 to 18 21 to 44 101 to 108	Specify the control group and the coordinates system 1 to 8: Robot (Pulse) 11 to 18: Base (Pulse) 21 to 44: Station (Pulse) 101 to 108: Robot (Base)
	Attribute	1 Byte	Specify the read data type 1 to 13	Specify the data number of the position information 1: Data type to 13: 8th axis data
	Service	1 Byte	Specify the data access method 0x01: Get Attribute All 0x0E: Get Attribute Single	

Table 5-6(b): Response Format (When Reading All Attributes/Omitting Headers)

Division	Outline	Size	Explanation
Data	Data type	4 Byte	The position data type will be output 0: Pulse 16: Base
	Configuration	4 Byte	The configuration will be output bit 0: Back bit 1: Lower arm bit 2: No flip bit 3: R axis ≥ 180° bit 4: T axis ≥ 180° bit 5: S axis ≥ 180°
	Tool number	4 Byte	
	Reservation	4 Byte	
	Extended configuration	4 Byte	Output the 7-axis robot extended configuration bit 0: θL ≥ 180° bit 1: θU ≥ 180° bit 2: θB ≥ 180° bit 3: θE ≥ 180° bit 4: θW ≥ 180°
	1st axis data	4 Byte	The following values will be output: For pulse: Each axis' pulse value For base: Length (μm) Angle (0.0001°) Data on each axis is set in ascending order. The value zero is set to a non-existing axis.
	2nd axis data	4 Byte	
	3rd axis data	4 Byte	
	4th axis data	4 Byte	
	5th axis data	4 Byte	
	6th axis data	4 Byte	
	7th axis data	4 Byte	
	8th axis data	4 Byte	

■ Read the deviation of each axis position

Table 5-7(a): Required Format

Division	Outline	Size	Data	Explanation
Header	Class	2 Byte	0x76	Vendor-specific
	Instance	2 Byte	Specify the control group to read 1 to 8 11 to 18 21 to 44	Specify the control group 1 to 8: Robot 11 to 18: Base 21 to 44: Station
	Attribute	1 Byte	Specify the read data type 1 to 8	Specify the data number of the position deviation information 1: 1st axis data to 8: 8th axis data
	Service	1 Byte	Specify the data access method 0x01: Get Attribute All 0x0E: Get Attribute Single	

Table 5-7(b): Response Format (When Reading All Attributes/Omitting Headers)

Division	Outline	Size	Explanation
Data	1st axis data	4 Byte	The pulse value of each axis will be output: Data on each axis is set in ascending order. The value zero is set to a non-existing axis.
	2nd axis data	4 Byte	
	3rd axis data	4 Byte	
	4th axis data	4 Byte	
	5th axis data	4 Byte	
	6th axis data	4 Byte	
	7th axis data	4 Byte	
	8th axis data	4 Byte	

■ Read the torque of each axis

Table 5-8(a): Required Format

Division	Outline	Size	Data	Explanation
Header	Class	2 Byte	0x77	Vendor-specific
	Instance	2 Byte	Specify the control group to read 1 to 8 11 to 18 21 to 44	Specify the control group 1 to 8: Robot 11 to 18: Base 21 to 44: Station
	Attribute	1 Byte	Specify the read data type 1 to 8	Specify the data number of each axis torque 1: 1st axis data to 8: 8th axis data
	Service	1 Byte	Specify the data access method 0x01: Get Attribute All 0x0E: Get Attribute Single	

Table 5-8(b): Response Format (When Reading All Attributes/Omitting Headers)

Division	Outline	Size	Explanation
Data	1st axis data	4 Byte	The value for the torque of each axis is output as a percentage when the nominal value is 100%. Data on each axis is set in ascending order. The value zero is set to a non-existing axis.
	2nd axis data	4 Byte	
	3rd axis data	4 Byte	
	4th axis data	4 Byte	
	5th axis data	4 Byte	
	6th axis data	4 Byte	
	7th axis data	4 Byte	
	8th axis data	4 Byte	

■ Read and write IO data

Table 5-9(a): Required Format/Data Omitted When Writing

Division	Outline	Size	Data	Explanation
Header	Class	2 Byte	0x78	Vendor-specific
	Instance	2 Byte	Specify the signal to read/write 1 to 512 1001 to 1512 2001 to 2512 3001 to 3512 4001 to 4256 5001 to 5512 6001 to 6064 7001 to 7999 2701 to 2956 3701 to 3956 8001 to 8512 8701 to 8720	Specify the value obtained by dividing the logical number of the signal by 10 1 to 512: General input 1001 to 1512: General output 2001 to 2512: External input 2701 to 2956: Network input * Writable 3001 to 3512: External output 3701 to 3956: Network output 4001 to 4256: Specific input 5001 to 5512: Specific output 6001 to 6064: Interface panel input 7001 to 7999: Auxiliary relay 8001 to 8512: Control status 8701 to 8720: Pseudo input
	Attribute	1 Byte	Specify “1”	
	Service	1 Byte	Specify the data access method 0x10: Set Attribute Single 0x0E: Get Attribute Single	

Table 5-9(b): Response Format (When Reading All Attributes/Omitting Headers)

Division	Outline	Size	Explanation
Data	IO data	1 Byte	When parameter:RS023=1 is set, the data will be treated as 2 byte data (only the 1 byte portion is treated as valid data).

■ Read and write register data

Table 5-10(a): Required Format/Data Omitted When Writing

Division	Outline	Size	Data	Explanation
Header	Class	2 Byte	0x79	Vendor-specific
	Instance	2 Byte	Specify the register to read/write 0 to 999 or 1 to 1000	Specify the register number (Parameter: RS022=1) Specify the register number +1 (Parameter: RS022=0)
	Attribute	1 Byte	Specify “1”	
	Service	1 Byte	Specify the data access method 0x0E: Get Attribute Single 0x10: Set Attribute Single	

Table 5-10(b): Response Format (When Reading All Attributes/Omitting Headers)

Division	Outline	Size	Explanation
Data	Register data	2 Byte	

■ Read and write a byte-type variable (B)

Table 5-11(a): Required Format/Data Omitted When Writing

Division	Outline	Size	Data	Explanation
Header	Class	2 Byte	0x7A	Vendor-specific
	Instance	2 Byte	Specify the variable B to read/write From 0 or from 1	Specify the variable B number (Parameter: RS022=1) Specify the variable B number +1 (Parameter: RS022=0)
	Attribute	1 Byte	Specify “1”	
	Service	1 Byte	Specify the data access method 0x0E: Get Attribute Single 0x10: Set Attribute Single	

Table 5-11(b): Response Format (When Reading All Attributes/Omitting Headers)

Division	Outline	Size	Explanation
Data	(B) variable data	1 Byte	When parameter: RS023=1 is set, the data will be treated as 2 byte data (only the 1 byte portion is treated as valid data).

■ Read and write an integer-type variable (I)

Table 5-12(a): Required Format/Data Omitted When Writing

Division	Outline	Size	Data	Explanation
Header	Class	2 Byte	0x7B	Vendor-specific
	Instance	2 Byte	Specify the variable I to read/write From 0 or from 1	Specify the variable I number (Parameter: RS022=1) Specify the variable I number +1 (Parameter: RS022=0)
	Attribute	1 Byte	Specify “1”	
	Service	1 Byte	Specify the data access method 0x0E: Get Attribute Single 0x10: Set Attribute Single	

Table 5-12(b): Response Format (When Reading All Attributes/Omitting Headers)

Division	Outline	Size	Explanation
Data	(I) variable data	2 Byte	

■ Read and write a double precision integer-type variable (D)

Table 5-13(a): Required Format/Data Omitted When Writing

Division	Outline	Size	Data	Explanation
Header	Class	2 Byte	0x7C	Vendor-specific
	Instance	2 Byte	Specify the variable D to read/write From 0 or from 1	Specify the variable D number (Parameter: RS022=1) Specify the variable D number +1 (Parameter: RS022=0)
	Attribute	1 Byte	Specify “1”	
	Service	1 Byte	Specify the data access method 0x0E: Get Attribute Single 0x10: Set Attribute Single	

Table 5-13(b): Response Format (When Reading All Attributes/Omitting Headers)

Division	Outline	Size	Explanation
Data	(D) variable data	4 Byte	

■ Read and write a real-type variable (R)

Table 5-14(a): Required Format/Data Omitted When Writing

Division	Outline	Size	Data	Explanation
Header	Class	2 Byte	0x7D	Vendor-specific
	Instance	2 Byte	Specify the variable D to read/write From 0 or from 1	Specify the variable R number (Parameter: RS022=1) Specify the variable R number +1 (Parameter: RS022=0)
	Attribute	1 Byte	Specify “1”	
	Service	1 Byte	Specify the data access method 0x0E: Get Attribute Single 0x10: Set Attribute Single	

Table 5-14(b): Response Format (When Reading All Attributes/Omitting Headers)

Division	Outline	Size	Explanation
Data	(R) variable data	4 Byte	A real value is output

■ Read and write a string-type variable (S)

Table 5-15(a): Required Format/Data Omitted When Writing

Division	Outline	Size	Data	Explanation
Header	Class	2 Byte	0x8C	Vendor-specific
	Instance	2 Byte	Specify the variable S to read/write From 0 or from 1	Specify the variable S number (Parameter: RS022=1) Specify the variable S number +1 (Parameter: RS022=0)
	Attribute	1 Byte	Specify “1”	
	Service	1 Byte	Specify the data access method 0x0E: Get Attribute Single 0x10: Set Attribute Single	

Table 5-15(b): Response Format (When Reading All Attributes/Omitting Headers)

Division	Outline	Size	Explanation
Data	(S) variable data	32 Byte	

NOTE The conventional command (Class=0x7E) is no longer used because the size of the S variable is expanded to 32 byte in the YRC1000 system.

■ Read and write a robot position-type variable (P)

Table 5-16(a): Required Format

Division	Outline	Size	Data	Explanation
Header	Class	2 Byte	0x7F	Vendor-specific
	Instance	2 Byte	Specify the variable P to read/write From 0 or from 1	Specify the variable P number (Parameter: RS022=1) Specify the variable P number +1 (Parameter: RS022=0)
	Attribute	1 Byte	Specify the read data type 1 to 13	Specify the data number of the position information 1: Data type to 13: 8th axis data
	Service	1 Byte	Specify the data access method 0x01: Get Attribute All 0x0E: Get Attribute Single 0x02: Set Attribute All 0x10: Set Attribute Single	

Table 5-16(b): Response Format (When Reading All Attributes/Omitting Headers)

Division	Outline	Size	Explanation
Data	Data type	4 Byte	The position data type will be output 0: Pulse 16: Base 17: Robot 18: Tool 19: User coordinates
	Configuration	4 Byte	The configuration will be output bit 0: Back bit 1: Lower arm bit 2: No flip bit 3: R axis ≥ 180° bit 4: T axis ≥ 180° bit 5: S axis ≥ 180°
	Tool number	4 Byte	
	User coordinate number	4 Byte	
	Extended configuration	4 Byte	Output the 7-axis robot extended configuration bit 0: θL ≥ 180° bit 1: θU ≥ 180° bit 2: θB ≥ 180° bit 3: θE ≥ 180° bit 4: θW ≥ 180°
	1st axis data	4 Byte	The following values will be output: For pulse: Each axis' pulse value For base: Length (μm) Angle (0.0001°) Data on each axis is set in ascending order. The value zero is set to a non-existing axis.
	2nd axis data	4 Byte	
	3rd axis data	4 Byte	
	4th axis data	4 Byte	
	5th axis data	4 Byte	
	6th axis data	4 Byte	
	7th axis data	4 Byte	
	8th axis data	4 Byte	

■ Read and write a base position-type variable (BP)

Table 5-17(a): Required Format

Division	Outline	Size	Data	Explanation
Header	Class	2 Byte	0x80	Vendor-specific
	Instance	2 Byte	Specify the variable BP to read/write From 0 or from 1	Specify the variable BP number (Parameter: RS022=1) Specify the variable BP number +1 (Parameter: RS022=0)
	Attribute	1 Byte	Specify the read data type 1 to 9	Specify the data number of the position information 1: Data type to 9: 8th axis data
	Service	1 Byte	Specify the data access method 0x01: Get Attribute All 0x0E: Get Attribute Single 0x02: Set Attribute All 0x10: Set Attribute Single	

Table 5-17(b): Response Format (When Reading All Attributes/Omitting Headers)

Division	Outline	Size	Explanation
Data	Data type	4 Byte	The position data type will be output 0: Pulse 16: Base
	1st axis data	4 Byte	The following values will be output: For pulse: Each axis' pulse value For base: Length (μm) Angle (0.0001°) Data on each axis is set in ascending order. The value zero is set to a non-existing axis.
	2nd axis data	4 Byte	
	3rd axis data	4 Byte	
	4th axis data	4 Byte	
	5th axis data	4 Byte	
	6th axis data	4 Byte	
	7th axis data	4 Byte	
	8th axis data	4 Byte	

■ Read and write an external axis position-type variable (EX)

Table 5-18(a): Required Format

Division	Outline	Size	Data	Explanation
Header	Class	2 Byte	0x81	Vendor-specific
	Instance	2 Byte	Specify the variable BP to read/write From 0 or from 1	Specify the variable EX number (Parameter: RS022=1) Specify the variable EX number +1 (Parameter: RS022=0)
	Attribute	1 Byte	Specify the read data type 1 to 9	Specify the data number of the position information 1: Data type to 9: 8th axis data
	Service	1 Byte	Specify the data access method 0x01: Get Attribute All 0x0E: Get Attribute Single 0x02: Set Attribute All 0x10: Set Attribute Single	

Table 5-18(b): Response Format (When Reading All Attributes/Omitting Headers)

Division	Outline	Size	Explanation
Data	Data type	4 Byte	The position data type will be output 0: Pulse
	1st axis data	4 Byte	The following values will be output: For pulse: Each axis' pulse value Data on each axis is set in ascending order. The value zero is set to a non-existing axis.
	2nd axis data	4 Byte	
	3rd axis data	4 Byte	
	4th axis data	4 Byte	
	5th axis data	4 Byte	
	6th axis data	4 Byte	
	7th axis data	4 Byte	
	8th axis data	4 Byte	

5.3 Related Parameters

For CIP message communication, according to the function of the communication target, set the following parameters:

Parameter No.	Description	Set Value	Initial Value
RS022	Specify permission of Instance 0 Some equipment capable of CIP message communication treats instance 0 as a regular instance number. To communicate with such a device, set this parameter to “1”. By setting this parameter to “1”, the variable or register number as is can be specified as an instance number. (When this parameter is set to “0”, specify the value by adding “1” to the variable or the register number.)	1	0
RS023	Specify prohibition of 1 byte input/ output Some equipment capable of CIP message communication cannot input or output one-byte data. To communicate with such a device, set this parameter to “1”. By setting this parameter to “1”, data whose size is originally one byte can be transmitted/received as byte. (Also in this case, only the one-byte portion is treated as valid data.)	1	0

YRC1000 OPTIONS
INSTRUCTIONS

EtherNet/IP COMMUNICATION FUNCTION (FOR STANDARD LAN PORT)

For inquiries or after-sales service on this product, contact your local YASKAWA representative as shown below.

YASKAWA ELECTRIC CORPORATION
2-1 Kurosakishiroishi, Yahatanishi-ku, Kitakyushu, 806-0004, Japan
Phone: +81-93-645-7703 Fax: +81-93-645-7802
www.yaskawa.jp

YASKAWA AMERICA, INC. (MOTOMAN ROBOTICS DIVISION)
100 Automation Way, Miamisburg, OH 45342, U.S.A.
Phone: +1-937-847-6200 Fax: +1-937-847-6277
www.motoman.com

YASKAWA EUROPE GmbH (ROBOTICS DIVISION)
Yaskawastrasse 1, 85391, Allerhausen, Germany
Phone: _49-8166-90-0 Fax: +49-8166-90-103
www.yaskawa.eu.com

YASKAWA NORIDC AB
Verkstadsgatan 2, Box 504, SE-385 25 Torsas, Sweden
Phone: +46-480-417-800 Fax: _46-486-414-10
www.yaskawa.com.cn

YASKAWA ELECTRIC (CHINA) CO., LTD.
22F, One Corporate Avenue, No.222 Hubin Road, Huangpu District, Shanghai 200021, China
Phone: +86-21-5385-2200 Fax: +86-21-5385-3299
www.yaskawa.com.cn

YASKAWA SHOUGANG ROBOT CO., LTD.
No.2 Building, No.6 Rongchang East Street, Beijing E&T Development Area, Beijing 100176, China
Phone: +86-10-6788-0545
www.ysr-motoman.cn

YASKAWA ELECTRIC KOREA CORPORATION
6F, 11, LS-ro, Dongang-gu, Anyang-si, Geyonggi-do, 14118, Korea
Phone: +82-31-8015-4224 Fax: +82-31-8015-5034
www.yaskawa.co.kr

YASKAWA ELECTRIC TAIWAN CORPORATION
12F, No.207, Sec. 3, Beishin Rd., Shindian District, New Taipei City 23143, Taiwan
Phone: +886-2-8913 Fax: +886-2-8913-1513
www.yaskawa.com.tw

YASKAWA ASIA PACIFIC PTE. LTD.
30A Kallang Place, #06-01, 339213, Singapore
Phone: +65-6282-3003 Fax: +65-6289-3003
www.yaskawa.com.sg

YASKAWA ELECTRIC (THAILAND) CO., LTD.
59, 1st-5th Floor, Flourish Building, Soi Ratchadapisek 18, Ratchadapisek Road, Huaykwang, Bangkok 10310, Thailand
Phone: +66-2-017-099 Fax: +66-2-017-0199
www.yaskawa.co.th

PT. YASKAWA ELECTRIC INDONESIA
Secure Building-Gedung B Lantai Dasar & Lantai 1 Jl. Raya Protokol Halim Perdanakusuma, Jakarta 12610, Indonesia
Phone: +62-21-2982-6470 Fax: +62-21-2982-6471
www.yaskawa.co.id

YASKAWA INDIA PRIVATE LIMITED (ROBOTICS DIVISION)
No. 136, Sector-8, Industrial Estate, IMT Manesar, Gurugram, Haryana 122050, India
Phone: +91-124-475-8500
www.yaskawaindia.in

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