

Motoman XRC Controller

**Ethernet I/F Board
Instruction Manual
for UP/SKX-Series Robots**

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NOTES

SECTION 1

INTRODUCTION

1.1 About this Document

This manual provides instructions for Ethernet I/F Board and contains the following sections:

SECTION 1 – INTRODUCTION

General information about this manual, a list of reference documents, and customer service information.

SECTION 2 – SAFETY

Provides information for the safe use and operation of Motoman products.

SECTION 3 – ETHERNET I/F BOARD

Provides detailed instructions to utilize the Ethernet I/F Board.

1.2 Reference to Other Documentation

For additional information refer to the following:

- Concurrent I/O Parameters Manual (P/N 142102-1)
- Operator's Manual for General Purpose (P/N 142099-1)
- Operator's Manual for Handling (P/N 142100-1)
- Operator's Manual for Spot Welding (P/N 142101-1)
- Operator's Manual for Arc Welding (P/N 142098-1)
- Motoman UP6, XRC Manipulator Manual (P/N 142104-1)
- Motoman SK16X, XRC Manipulator Manual (P/N 142105-1)
- Motoman SK45X, XRC Manipulator Manual (P/N 142106-1)
- Motoman UP130, XRC Manipulator Manual (P/N 142107-1)

1.3 Customer Service Information

If you are in need of technical assistance, contact the Motoman service staff at (937) 847-3200. Please have the following information ready before you call:

- Robot Type (UP6, SK16X, etc.)
- Application Type (welding, handling, etc.)
- Robot Serial Number (located on the back side of the robot arm)
- Robot Sales Order Number (located on back side of XRC controller)

NOTES

SECTION 2

SAFETY

2.1 Introduction

It is the purchaser's responsibility to ensure that all local, county, state, and national codes, regulations, rules, or laws relating to safety and safe operating conditions for each installation are met and followed.

We suggest that you obtain and review a copy of the ANSI/RIA National Safety Standard for Industrial Robots and Robot Systems. This information can be obtained from the Robotic Industries Association by requesting ANSI/RIA R15.06. The address is as follows:

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

Ultimately, the best safeguard is trained personnel. The user is responsible for providing personnel who are adequately trained to operate, program, and maintain the robot cell. **The robot must not be operated by personnel who have not been trained!**

We recommend that all personnel who intend to operate, program, repair, or use the robot system be trained in an approved Motoman training course and become familiar with the proper operation of the system.

This safety section addresses the following:

- Standard Conventions (Section 2.2)
- General Safeguarding Tips (Section 2.3)
- Mechanical Safety Devices (Section 2.4)
- Installation Safety (Section 2.5)
- Programming Safety (Section 2.6)
- Operation Safety (Section 2.7)
- Maintenance Safety (Section 2.8)

2.2 Standard Conventions

This manual includes information essential to the safety of personnel and equipment. As you read through this manual, be alert to the four signal words:

- DANGER
- WARNING
- CAUTION
- NOTE

Pay particular attention to the information provided under these headings which are defined below (in descending order of severity).



DANGER!

Information appearing under the DANGER caption concerns the protection of personnel from the immediate and imminent hazards that, if not avoided, will result in immediate, serious personal injury or loss of life in addition to equipment damage.



WARNING!

Information appearing under the WARNING caption concerns the protection of personnel and equipment from potential hazards that can result in personal injury or loss of life in addition to equipment damage.



CAUTION!

Information appearing under the CAUTION caption concerns the protection of personnel and equipment, software, and data from hazards that can result in minor personal injury or equipment damage.

NOTE:

Information appearing in a NOTE caption provides additional information which is helpful in understanding the item being explained.

2.3 **General Safeguarding Tips**

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

- Improper operation can result in personal injury and/or damage to the equipment. Only trained personnel familiar with the operation of this robot, the operator's manuals, the system equipment, and options and accessories should be permitted to operate this robot system.
- Do not enter the robot cell while it is in automatic operation. Programmers must have the teach pendant when they enter the robot cell.
- Improper connections can damage the robot. All connections must be made within the standard voltage and current ratings of the robot I/O (Inputs and Outputs).
- The robot must be placed in Emergency Stop (E-STOP) mode whenever it is not in use.
- In accordance with ANSI/RIA R15.06, section 6.13.4 and 6.13.5, use lockout/tagout procedures during equipment maintenance. Refer also to Section 1910.147 (29CFR, Part 1910), Occupational Safety and Health Standards for General Industry (OSHA).

2.4 **Mechanical Safety Devices**

The safe operation of the robot, positioner, auxiliary equipment, and system is ultimately the user's responsibility. The conditions under which the equipment will be operated safely should be reviewed by the user. The user must be aware of the various national codes, ANSI/RIA R15.06 safety standards, and other local codes that may pertain to the installation and use of industrial equipment. Additional safety measures for personnel and equipment may be required depending on system installation, operation, and/or location. The following safety measures are available:

- Safety fences and barriers
- Light curtains
- Door interlocks
- Safety mats
- Floor markings
- Warning lights

Check all safety equipment frequently for proper operation. Repair or replace any non-functioning safety equipment immediately.

2.5 *Installation Safety*

Safe installation is essential for protection of people and equipment. The following suggestions are intended to supplement, but not replace, existing federal, local, and state laws and regulations. Additional safety measures for personnel and equipment may be required depending on system installation, operation, and/or location. Installation tips are as follows:

- Be sure that only qualified personnel familiar with national codes, local codes, and ANSI/RIA R15.06 safety standards are permitted to install the equipment.
- Identify the work envelope of each robot with floor markings, signs, and barriers.
- Position all controllers outside the robot work envelope.
- Whenever possible, install safety fences to protect against unauthorized entry into the work envelope.
- Eliminate areas where personnel might get trapped between a moving robot and other equipment (pinch points).
- Provide sufficient room inside the workcell to permit safe teaching and maintenance procedures.

2.6 *Programming Safety*

All operators, programmers, plant and tooling engineers, maintenance personnel, supervisors, and anyone working near the robot must become familiar with the operation of this equipment. All personnel involved with the operation of the equipment must understand potential dangers of operation. Programming tips are as follows:

- Any modifications to PART 1 of the MRC controller PLC can cause severe personal injury or death, as well as damage to the robot! Do not make any modifications to PART 1. Making any changes without the written permission of Motoman will **VOID YOUR WARRANTY!**
- Some operations require standard passwords and some require special passwords. Special passwords are for Motoman use only. **YOUR WARRANTY WILL BE VOID** if you use these special passwords.
- Back up all programs and jobs onto a floppy disk whenever program changes are made. To avoid loss of information, programs, or jobs, a backup must always be made before any service procedures are done and before any changes are made to options, accessories, or equipment.
- The concurrent I/O (Input and Output) function allows the customer to modify the internal ladder inputs and outputs for maximum robot performance. Great care must be taken when making these modifications. Double-check all modifications under every mode of robot operation to ensure that you have not created hazards or dangerous situations that may damage the robot or other parts of the system.
- Improper operation can result in personal injury and/or damage to the equipment. Only trained personnel familiar with the operation, manuals, electrical design, and equipment interconnections of this robot should be permitted to operate the system.

- Inspect the robot and work envelope to be sure no potentially hazardous conditions exist. Be sure the area is clean and free of water, oil, debris, etc.
- Be sure that all safeguards are in place.
- Check the E-STOP button on the teach pendant for proper operation before programming.
- Carry the teach pendant with you when you enter the workcell.
- Be sure that only the person holding the teach pendant enters the workcell.
- Test any new or modified program at low speed for at least one full cycle.

2.7 **Operation Safety**

All operators, programmers, plant and tooling engineers, maintenance personnel, supervisors, and anyone working near the robot must become familiar with the operation of this equipment. All personnel involved with the operation of the equipment must understand potential dangers of operation. Operation tips are as follows:

- Be sure that only trained personnel familiar with the operation of this robot, the operator's manuals, the system equipment, and options and accessories are permitted to operate this robot system.
- Check all safety equipment for proper operation. Repair or replace any non-functioning safety equipment immediately.
- Inspect the robot and work envelope to ensure no potentially hazardous conditions exist. Be sure the area is clean and free of water, oil, debris, etc.
- Ensure that all safeguards are in place.
- Improper operation can result in personal injury and/or damage to the equipment. Only trained personnel familiar with the operation, manuals, electrical design, and equipment interconnections of this robot should be permitted to operate the system.
- Do not enter the robot cell while it is in automatic operation. Programmers must have the teach pendant when they enter the cell.
- The robot must be placed in Emergency Stop (E-STOP) mode whenever it is not in use.
- This equipment has multiple sources of electrical supply. Electrical interconnections are made between the controller, external servo box, and other equipment. Disconnect and lockout/tagout all electrical circuits before making any modifications or connections.
- All modifications made to the controller will change the way the robot operates and can cause severe personal injury or death, as well as damage the robot. This includes controller parameters, ladder parts 1 and 2, and I/O (Input and Output) modifications. Check and test all changes at slow speed.

2.8 **Maintenance Safety**

All operators, programmers, plant and tooling engineers, maintenance personnel, supervisors, and anyone working near the robot must become familiar with the operation of this equipment. All personnel involved with the operation of the equipment must understand potential dangers of operation. Maintenance tips are as follows:

- Do not perform any maintenance procedures before reading and understanding the proper procedures in the appropriate manual.
- Check all safety equipment for proper operation. Repair or replace any non-functioning safety equipment immediately.
- Improper operation can result in personal injury and/or damage to the equipment. Only trained personnel familiar with the operation, manuals, electrical design, and equipment interconnections of this robot should be permitted to operate the system.
- Back up all your programs and jobs onto a floppy disk whenever program changes are made. A backup must always be made before any servicing or changes are made to options, accessories, or equipment to avoid loss of information, programs, or jobs.
- Do not enter the robot cell while it is in automatic operation. Programmers must have the teach pendant when they enter the cell.
- The robot must be placed in Emergency Stop (E-STOP) mode whenever it is not in use.
- Be sure all safeguards are in place.
- Use proper replacement parts.
- This equipment has multiple sources of electrical supply. Electrical interconnections are made between the controller, external servo box, and other equipment. Disconnect and lockout/tagout all electrical circuits before making any modifications or connections.
- All modifications made to the controller will change the way the robot operates and can cause severe personal injury or death, as well as damage the robot. This includes controller parameters, ladder parts 1 and 2, and I/O (Input and Output) modifications. Check and test all changes at slow speed.
- Improper connections can damage the robot. All connections must be made within the standard voltage and current ratings of the robot I/O (Inputs and Outputs).

YASNAC XRC OPTIONS INSTRUCTIONS

Ethernet I/F BOARD

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

MOTOMAN INSTRUCTIONS

- MOTOMAN SETUP MANUAL
- MOTOMAN-□□□ INSTRUCTIONS
- YASNAC XRC INSTRUCTIONS
- YASNAC XRC OPERATOR'S MANUAL
- YASNAC XRC OPERATOR'S MANUAL for BEGINNERS

The YASNAC XRC operator's manuals above correspond to specific usage.
Be sure to use the appropriate manual.





MANDATORY

- This manual explains the Ethernet I/F board of the YASNAC XRC system and general operations. Read this manual carefully and be sure to understand its contents before handling the YASNAC XRC.
- General items related to safety are listed in Section 1: Safety of the Setup Manual. To ensure correct and safe operation, carefully read the Setup Manual before reading this manual.



CAUTION

- Some drawings in this manual are shown with the protective covers or shields removed for clarity. Be sure all covers and shields are replaced before operating this product.
- The drawings and photos in this manual are representative examples and differences may exist between them and the delivered product.
- YASKAWA may modify this model without notice when necessary due to product improvements, modifications, or changes in specifications. If such modification is made, the manual number will also be revised.
- If your copy of the manual is damaged or lost, contact a YASKAWA representative to order a new copy. The representatives are listed on the back cover. Be sure to tell the representative the manual number listed on the front cover.
- YASKAWA is not responsible for incidents arising from unauthorized modification of its products. Unauthorized modification voids your product's warranty.

NOTES FOR SAFE OPERATION

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

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



WARNING

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



CAUTION

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



MANDATORY

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



PROHIBITED

Must never be performed.

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



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



WARNING

- Before operating the manipulator, check that servo power is turned off when the emergency stop buttons on the playback panel or programming pendant are pressed.
When the servo power is turned off, the SERVO ON READY lamp on the playback panel and the SERVO ON LED on the programming pendant are turned off.

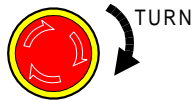
Injury or damage to machinery may result if the emergency stop circuit cannot stop the manipulator during an emergency. The manipulator should not be used if the emergency stop buttons do not function.



Emergency Stop Button

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

Injury may result from unintentional or unexpected manipulator motion.



Release of Emergency Stop

- Always set the Teach Lock before entering the robot work envelope to teach a job.

Operator injury can occur if the Teach Lock is not set and the manipulator is started from the playback panel.

- Observe the following precautions when performing teaching operations within the working envelope of the manipulator :
 - View the manipulator from the front whenever possible.
 - Always follow the predetermined operating procedure.
 - Ensure that you have a safe place to retreat in case of emergency.

Improper or unintended manipulator operation may result in injury.

- Confirm that no persons are present in the manipulator's work envelope and that you are in a safe location before:
 - Turning on the YASNAC XRC power
 - Moving the manipulator with the programming pendant
 - Running check operations
 - Performing automatic operations

Injury may result if anyone enters the working envelope of the manipulator during operation. Always press an emergency stop button immediately if there are problems. The emergency stop button is located on the right side of both the YASNAC XRC playback panel and programming pendant.



CAUTION

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

- Always return the programming pendant to the hook on the XRC cabinet after use.

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

- Read and understand the Explanation of the Alarm Display in the setup manual before operating the manipulator.

Definition of Terms Used Often in This Manual

The MOTOMAN manipulator is the YASKAWA industrial robot product.


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

The MOTOMAN manipulator is the YASKAWA industrial robot product.

In this manual, the equipment is designated as follows.

Equipment	Manual Designation
YASNAC XRC Controller	XRC
YASNAC XRC Playback Panel	Playback Panel
YASNAC XRC Programming Pendant	Programming Pendant

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

Equipment		Manual Designation
Programming Pendant	Character Keys	The keys which have characters printed on them are denoted with []. ex. [ENTER]
	Symbol Keys	The keys which have a symbol printed on them are not denoted with [] but depicted with a small picture. ex. page key  The cursor key is an exception, and a picture is not shown.
	Axis Keys Number Keys	“Axis Keys” and “Number Keys” 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, ex. [SHIFT]+[COORD]
	Displays	The menu displayed in the programming pendant is denoted with { }. ex. {JOB}
Playback Panel	Buttons	Playback panel buttons are enclosed in brackets. ex. [TEACH] on the playback panel

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 the SELECT key is pressed.

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1 Preface

The JANCD-XIF02 Ethernet interface board for the XRC, hereinafter referred to as the XIF02 board, allows data to be transmitted with the Ethernet as a transmission medium. (Ethernet is a registered trademark of Xerox Corporation, U.S.A.) The XIF02 board must be installed on the JANCD-XCP02 optional base board for the XRC, hereinafter referred to as the XCP02 board. The XIF02 board uses TCP/IP, a general transmission standard used by the Ethernet, as a communication protocol(TCP/IP: Transmission Control Protocol / Internet Protocol). This instruction manual describes how to make a TCP/IP communication system using the XIF02 board with the Ethernet as a transmission medium.

1.1 System Features

1.1.1 High-speed Transmission

The XIF02 board uses the Ethernet as a transmission medium. Since the transmission speed of the Ethernet is 10 Mbps, higher-speed communication can be provided when compared with conventional serial communication using the R232C at 9600 bps.

1.1.2 Communication Between Several Stations

The Ethernet is a bus-type LAN so a multiple number of stations can be connected on one transmission line. Therefore, without changing the connection, communication is made with another station by specifying the target station. The communication stations include XRC connected with the XIF02 board and personal computers connected with network boards.

1.1.3 Parallel Processing with Robot

Since network communication is processed by the CPU used exclusively for the XIF02 board, robot performance will never deteriorate.

1.1.4 Easy Setup

For Ethernet-based data transmission, just insert the XCP02 board with the XIF02 board mounted into the XRC CPU rack, and set the parameters by using the programming pendant.

1.1 System Features

2 Ethernet Specifications

The Ethernet is a LAN with a bus type transmission path. It uses a method called CSMA/CD (Carrier Sense Multiple Access with Collision Detection) for access. This method detects packet errors, packet collisions in the transmission path, and packets shorter than the specified length.

2.1 MAC Address

In the communication using the Ethernet, data is sent to the targeted station via an identification number called a MAC address which is also known as an Ethernet address or as a physical address. A MAC address is assigned to each station connected to the Ethernet. This MAC address is assigned to the hardware unit of the XIF02's network I/F board, and is determined prior to shipment. Each board has a different number.

2.2 Communication Cable Specifications

Physical specifications such as the communication cables and the characteristics of electric signals are mainly classified into 10Base5, 10Base2 and 10BaseT. For the XIF02 board, 10Base2 is recommended. Table 2-1 outlines the specifications of this cable.

Table 2-1 Cable Specifications

Item	10Base2 Cable
Transmission method (Sign)	Base band (Manchester sign)
Transmission speed	10 Mbps
Transmission medium	RG58A/U, RG58C/U coaxial cable (50 Ω)
Cable diameter	5 mm
Maximum segment length ^{*1}	185 m
Maximum number of nodes per segment ^{*2}	30
Node interval ^{*3}	0.5 m
Maximum network length or Maximum node interval ^{*5}	925 m (5segments ^{*4})

- *1 Maximum cable length per segment
- *2 Maximum number of network devices per segment
- *3 Minimum distance to be secured between nodes
- *4 Single network without being through repeater (signal amplifier)
- *5 Maximum length when multiple number of segments are connected through repeater

The XIF02 board is provided with an AUI (Attachment Unit Interface) connector. To use an Ethernet cable, a transceiver is required to change the electric characteristics.

2.2.1 Typical Network Configuration

Fig. 2-1 shows a typical network configuration for Ethernet communication.

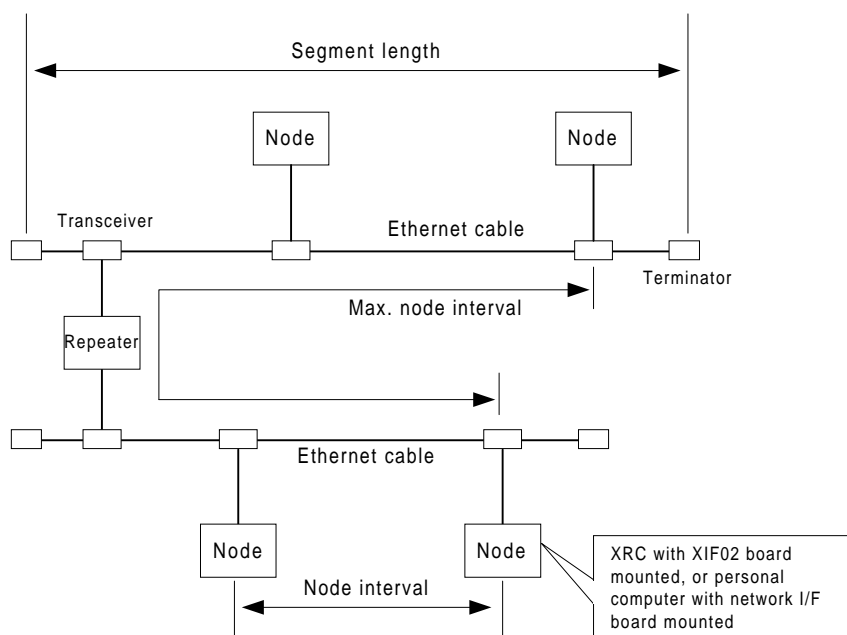


Fig 2-1 Typical Network Configuration

2.2.2 Required Hardware

Table 2-2 shows the devices required for using the Ethernet function on the XRC.

Table 2-2 Required Hardware

Ethernet cable specifications	Item	Manufacturer	Type
10Base2	Optional base board	Yaskawa Electric Corporation	JANCD-XCP02
	Ethernet interface board	Yaskawa Electric Corporation	JANCD-XIF02
	Transceiver cable	Mitsubishi Cable Industries, Ltd.	M2058
	Transceiver	Mitsubishi Cable Industries, Ltd.	ET10071 (BNC)
	Ethernet cable	Mitsubishi Cable Industries, Ltd.	M-2075
	Terminator	Allied Telesis Ltd.	A0173

2.2 Communication Cable Specifications

3 TCP/IP Specifications

TCP/IP (Transmission Control Protocol/Internet Protocol) is a standard protocol for communication using the Ethernet. This protocol is widely used for communication between clients and servers in an open system.

3.1 Typical Network Configuration

Fig. 3-1 shows a typical network configuration for communication with TCP/IP protocol. In Fig. 3-1, network A with 4 nodes and network B with 2 nodes are connected via a relay station called "gateway". "Node" indicates the XRC with the XIF02 board mounted, or a communication station, such as a personal computer, with a network I/F board mounted.

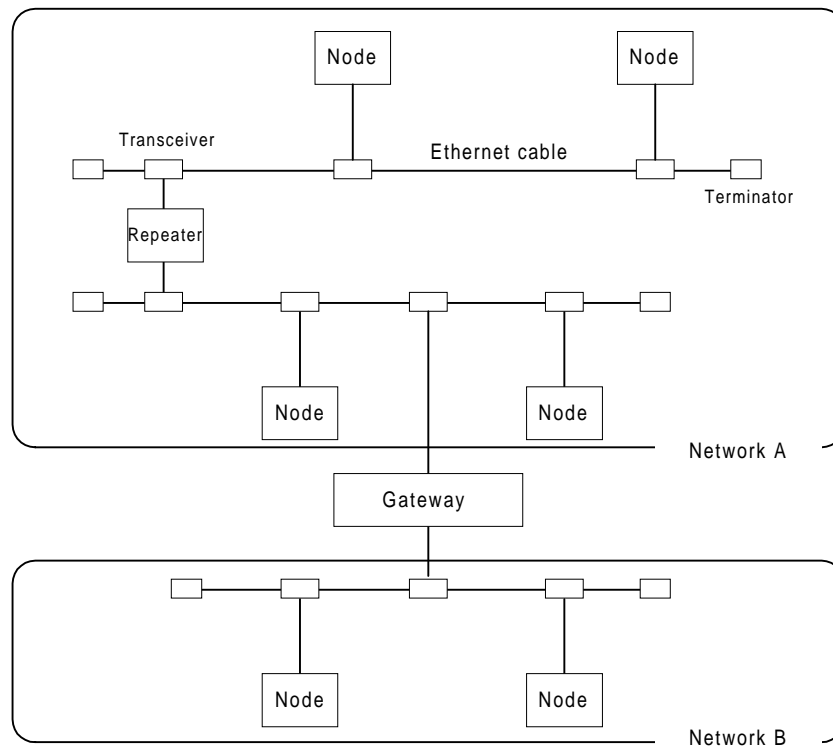


Fig 3-1 Typical Network Configuration

3.2 Network Setting Data

The following settings are required to use the XIF02 board for TCP/IP communication.

3.2.1 IP Address

An IP address (Internet address) is used to identify a network and station. A different number should be set to each node.

This address consists of 4 bytes, and each byte ends with a period (.).

<Example>

Current station IP address : 192.168.10.1

3.2.2 Sub Net Mask

An IP address is composed of a network address and a host address. However, normal notation does not differentiate between the network address and the host address. Therefore, a sub net mask divides the different sections of an IP address.

For network address, the same number is specified for each network. For example, Networks A and B in Fig. 3-1 have different network addresses. The 4 nodes in Network A have the same network address as each other, and the 2 nodes in Network B have the same network address as each other. In the same network, each node can be specified by a host address. The following is an example of sub net mask settings.

<Example>

When the current station IP address is 192.168.10.1, and the sub net mask is 255.255.255.0:

Sub net mask : 255.255.255.0 → 11111111.11111111.11111111.00000000

| ← Network address → | Host address | ←

Therefore, its network address and host address are as follows.

Network address : 192.168.10.0

Host address : 1

3.2.3 Gateway

For communicating between networks with network addresses differentiated by the sub net mask, packets of data are sent or received through a “gateway” relay station. Set the IP address of the gateway for communication between different networks.

When sending data through the gateway from a node in Network A to a node in Network B as in Fig.3-1, be sure to set the IP address of the gateway. It is the same when sending or receiving data from Network B to Network A.

For communication among the 4 nodes in Network A, or between 2 nodes in Network B, setting the IP address of the gateway is not necessary.

3.2 Network Setting Data

4 Hardware Specifications

Fig.4-1 shows the external view of the XCP02 board with the XIF02 board mounted. Table 4-1 explains the connectors and LEDs provided on the XIF02 board.

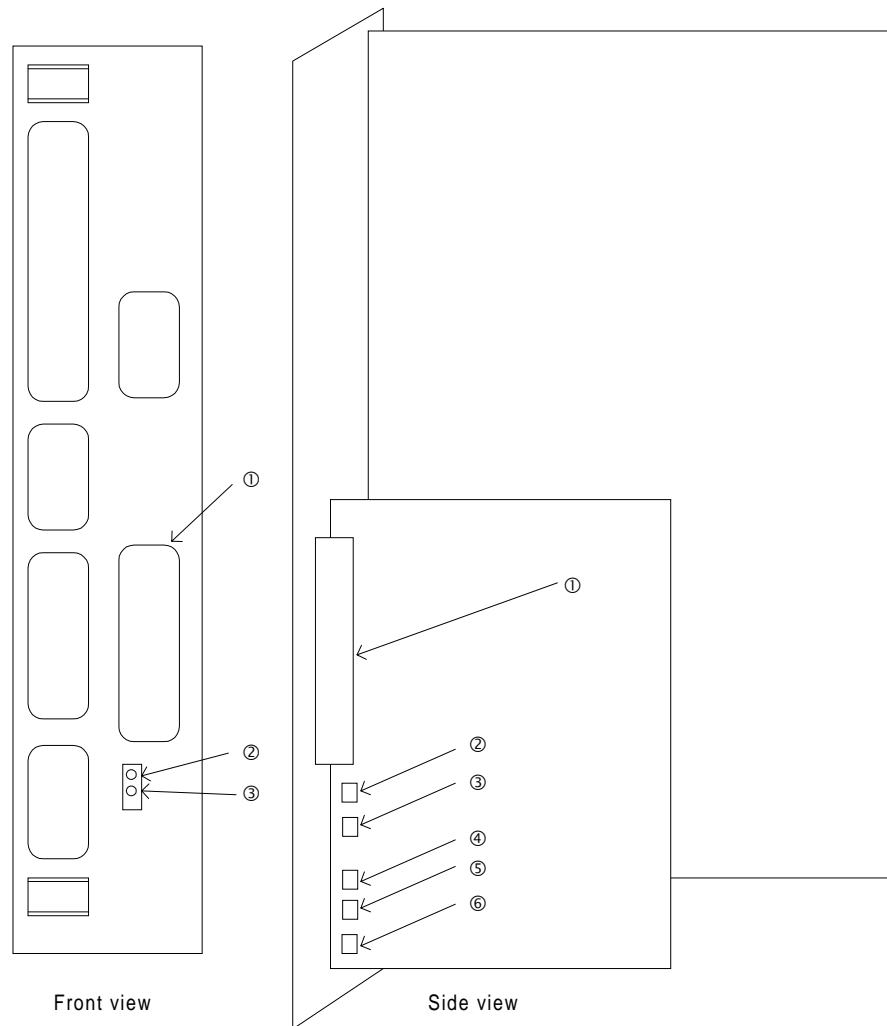


Fig 4-1 Board External View

Table 4-1 Connectors and LEDs on XIF02 Board

No. in Fig.4-1	Connector Name (①)/ LED display(②to⑥)	Color	Meaning	Explanation
①	CN06	—	—	Connector for transceiver cable (AUI specifications)
②	RUN	Green	During operation	The XIF02 board is operating normally.
③	ERR	Red	Malfunction	XIF02 board system error
④	COL	Green	Abnormal packet detected	An abnormal packet is being detected.
⑤	RX	Green	Packet received	Packet is being received.
⑥	TX	Green	Packet sent	Packet is being sent.

5 System Setting

This chapter describes how to set the hardware for the XIF02 board.

5.1 Hardware Mounting

Mount the hardware of the XIF02 board in the following manner.

1. Turn the two door locks on the front face of the XRC clockwise for 90° with a screwdriver.

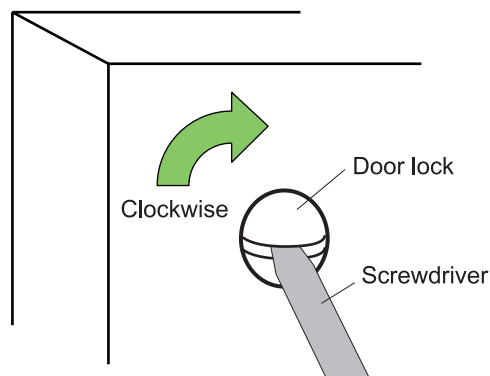


Fig 5-1 Releasing Door Lock

2. Turn the main switch handle to the "OPEN RESET" position, and then open the front door slowly.

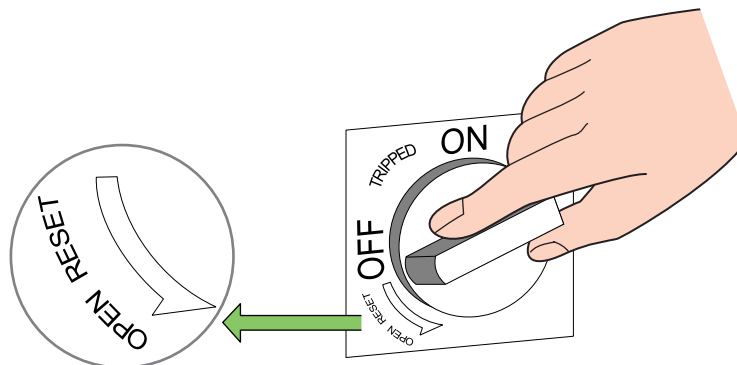


Fig 5-2 Turning the Main Switch Handle to the "OPEN RESET" Position (1)

3. Confirm that the main power supply is turned OFF.
4. On the XCP02 board, confirm that the XIF02 board is firmly inserted in an option slot of the CPU rack.

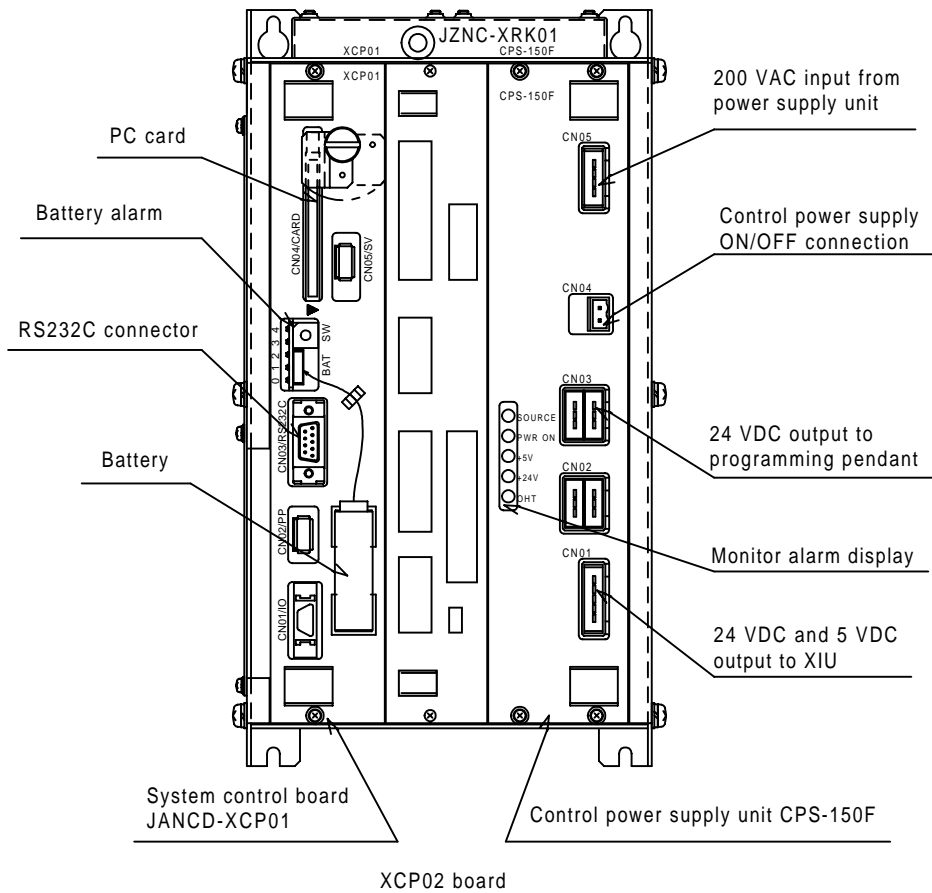


Fig 5-3 CPU Rack External View

5. Connect the transceiver cable to the AUI connector (CN06) on the front of the XIF02 board. Then, connect the other end of the transceiver cable to the transceiver connected to the Ethernet cable.



For the connection of a transceiver to an Ethernet cable of 10Base2 specifications, refer to the instruction manual of the transceiver.

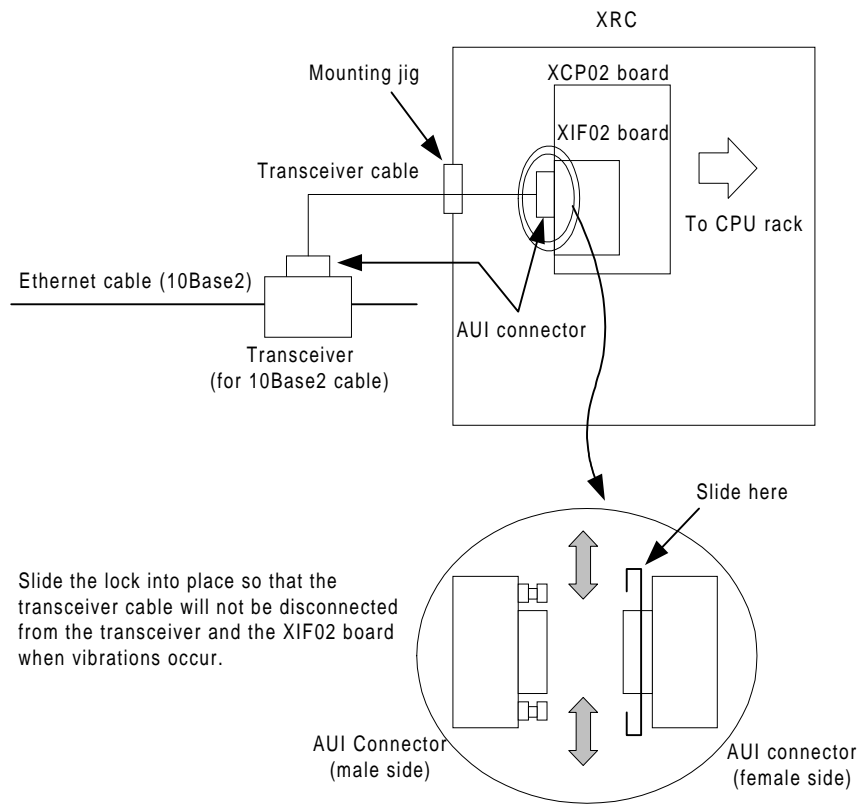


Fig 5-4 AUI Connector Connection Diagram

NOTE When the XIF02 board is connected with a network, select the optimum transceiver for the network to be constructed.

- When using an Ethernet cable of 10Base2 specifications, install terminators on both ends of the network.

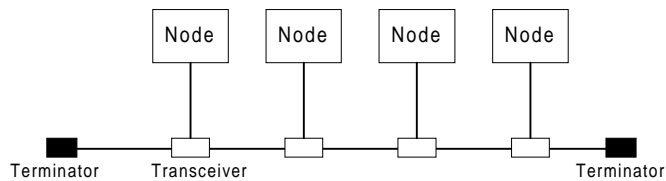


Fig 5-5 Terminator Connection Diagram

NOTE If terminators are not installed, packet collision in the transmission path will occur so frequently that data cannot be successfully transmitted. Be sure to install terminators correctly.

7. Turn the main handle switch, which is now in the OFF position to the “OPEN RESET” position. Then, close the front door slowly.

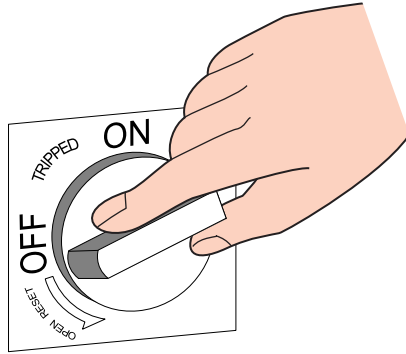


Fig 5-6 Turning the Main Switch Handle to the “OPEN RESET” Position (2)

5.2 Communication Parameter Settings

To use the Ethernet transmission function with a XIF02 board, communication parameters for each board must be set.

The parameters should be set properly so that conflicts will not occur between communication stations on the network. Determine the setting value according to the instructions given by the person in charge of network management. This section explains each setting. For the setting procedures, refer to Section 5.3 “Communication Parameter Setting Procedures”.

5.2.1 IP Address

Set the IP address of the current station. The address consists of 32 bits. Divide this address by 8 bits into 4 sections, and write each section in decimal notation.

<Example>

11000000.10101000.00001010.00001010 → 192.168.10.10

5.2.2 Sub Net Mask

Set the sub net mask for the IP address of the current station. The sub net mask consists of 32 bits; the range that includes bit 1 indicates the network address. Divide this address by 8 bits into 4 sections, and write each section in decimal notation.

<Example>

11111111.11111111.11111111.00000000 → 255.255.255.0

5.2.3 Default Gateway

The IP address of the gateway should be set for communicating with other networks through a gateway. The address of the gateway consists of 32 bits. Divide this address by 8 bits into 4 sections, and write each section in decimal notation.

<Example>

11000000,10101000.00001010.01100100 → 192.168.10.100

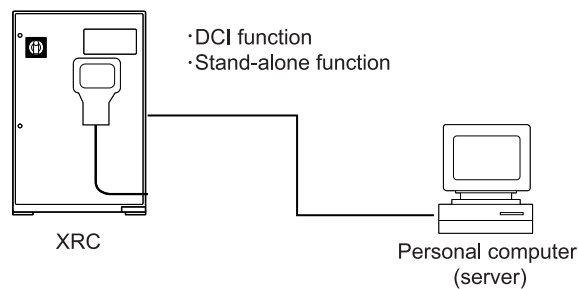
5.2.4 Server Address

In principle, when the DCI function or the stand-alone function is used with the XRC, the XRC is set as a client while the personal computer is set as a server.

To transmit with an XIF02 board when the XRC is the client and a personal computer is the server, the IP address of the personal computer should be set. Divide the 32 bits' IP address of the server (personal computer) by 8 bits into 4 sections, and write each section in decimal notation.

<Example>

11000000.10101000.00001010.01100101 → 192.168.10.101



5.3 Communication Parameter Setting Procedures



Communication parameters can be set in maintenance mode. Accordingly, set the security mode to maintenance mode, and then set the communication parameter. For details about the security mode, refer to Section 2 “Security System” of the YASNAC XRC Instruction manual.

Operation

Pressing [TOP MENU], turn ON the power supply to start-up maintenance mode ➔
 Select {SYSTEM} from the top menu ➔ Select {SETUP} ➔ Select {OPTION BOARD}
 ➔ Select {ETHERNET}*1 ➔ Select “USE”*2 ➔ Select the communication parameter
 to be changed ➔ Enter a new communication parameter, and then press [ENTER]*3 ➔
 Press [ENTER] again*4 ➔ Select “YES”

Explanation

*1 The Ethernet communication parameter setting display appears.

ETHERNET	R1
MAC ADDRESS	00:20:B5:32:00:01
ETHERNET	NOT USE
IP ADDRESS	0. 0. 0. 0
SUBNET MASK	0. 0. 0. 0
DEFAULT GATEWAY	0. 0. 0. 0
SERVER ADDRESS	0. 0. 0. 0
!Maintenance mode	

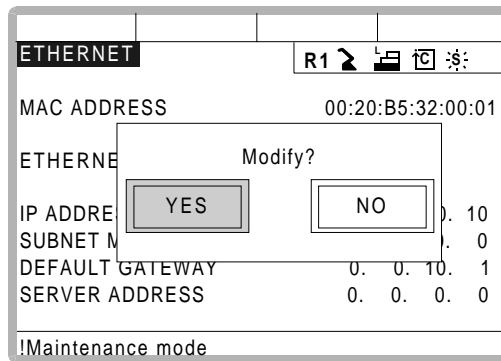
*2 Everytime [SELECT] is pressed, the command changes from “NOT USE” to “USE” and vice-versa.

ETHERNET	R1
MAC ADDRESS	00:20:B5:32:00:01
ETHERNET	NOT USE
IP ADDRESS	0. 0. 0. 0
SUBNET MASK	0. 0. 0. 0
DEFAULT GATEWAY	0. 0. 0. 0
SERVER ADDRESS	0. 0. 0. 0
!Maintenance mode	

*3 In the numerical value input mode, divide the 32 bits’ IP address by 8 bits into 4 sections with a period (.), and enter each section in decimal notation. For example, to set an IP address to “11000000.10101000.00001010.00001010”, enter “192.168.10.10”.

> 192.168.10.10

*4 The confirmation dialog box appears.



NOTE

- The numerical values in the figures are for reference only. Actual values may differ according to each network environment.
When setting parameters, enter the correct value according to the instructions given by the person in charge of network management.
- The “MAC ADDRESS” in the display indicates the Ethernet address. As this address is specified for each board prior to shipment, a different number is displayed for each board.
- The XIF02 board uses 10000 to 10008 as communication port numbers (service numbers) for TCP/IP. When the XIF02 board is used, the personnel in charge of network management should not connect the XIF02 board and the network devices using the port numbers 10000 to 10008, to the same network.

6 Alarm List

Table 6-1 shows the alarms which occur in the XRC when the transmission function is used with the XIF02 board.

These alarms are related to the XIF02 board; the alarms related to the transmission contents are not listed.

For the alarms related to the transmission contents, refer to YASNAC XRC Data Transmission Function Operator's Manual.

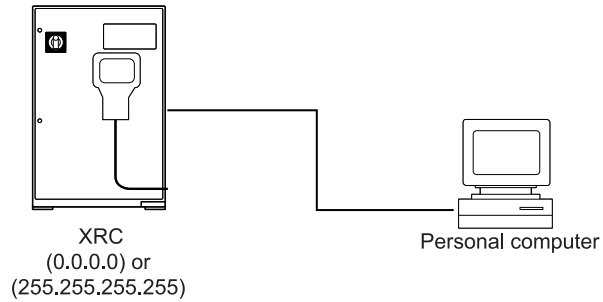
Table 6-1 List of Alarms Related to the XIF02

Alarm Number	Message	Cause	Attribute	Remedy
5000	PARAMETER ERROR (IP ADDRESS)	Self-station or server IP address is set to (0.0.0.0) or (255.255.255.255)	Minor	Check the set value again and change it to the proper value in the system configuration.
5001	PARAMETER ERROR (SUB NET MASK)	Sub net mask is set to (0.0.0.0) or (255.255.255.255)	Minor	Check the set value again and change it to the proper value in the system configuration.
5002	PARAMETER ERROR (GATEWAY)	Set value of gateway IP address does not exist in the same network as self-station.	Minor	Check the set value again and change it to the gateway IP address in the network specified by the sub net mask in the system configuration.
5003	SYSTEM ERROR (ETHERNET)	Improper initialization of the XIF02 board	Minor	If the control power supply is turned ON again and the alarm occurs again, contact your Yaskawa representative.

Fig. 6-1 shows an example where the alarm “5000: PARAMETER ERROR (IP ADDRESS)” may occur.

- When the control power supply is turned ON :

The IP address of the self-station (XRC) is set to (0.0.0.0) or (255.255.255.255).



- When communication starts with the DCI function or stand-alone function :

The IP address of the server (personal computer) is set to (0.0.0.0) or (255.255.255.255).

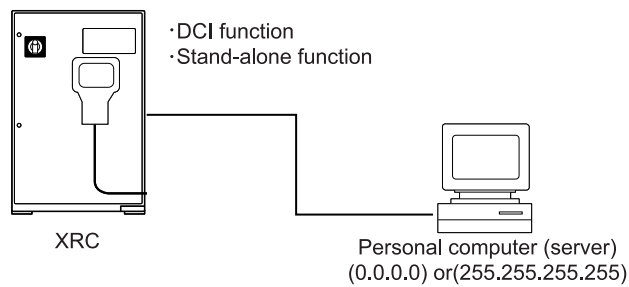


Fig 6-1 Example of Alarm 5000 : PARAMETER ERROR (IP ADDRESS)

YASNAC XRC OPTIONS INSTRUCTIONS

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