

***XRC Controller***  
***DeviceNet***  
***Instruction Manual***  
***for UP/SKX-Series Robots***  
***Part Number 142975-1***

*May 15, 1999*

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# ***NOTES***

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# **SECTION 1**

## **INTRODUCTION**

### **1.1 About this Document**

This manual provides instructions for the DeviceNet JANCD-MFB01 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 – JANCD-MFB01 BOARD FOR DEVICENET**

Provides detailed instructions to operate the DeviceNet JANCD-MFB01 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***

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# 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

JANCD-MFB01 BOARD FOR DEVICENET

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

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## 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 JANCD-MFB01 board of the YASNAC XRC system. 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.

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## 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.

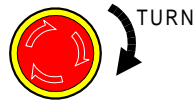
Injury or damage to machinery may result if the emergency stop circuit cannot stop the manipulator during an emergency. The manipulator should not be used if the emergency stop buttons do not function.



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 Outline

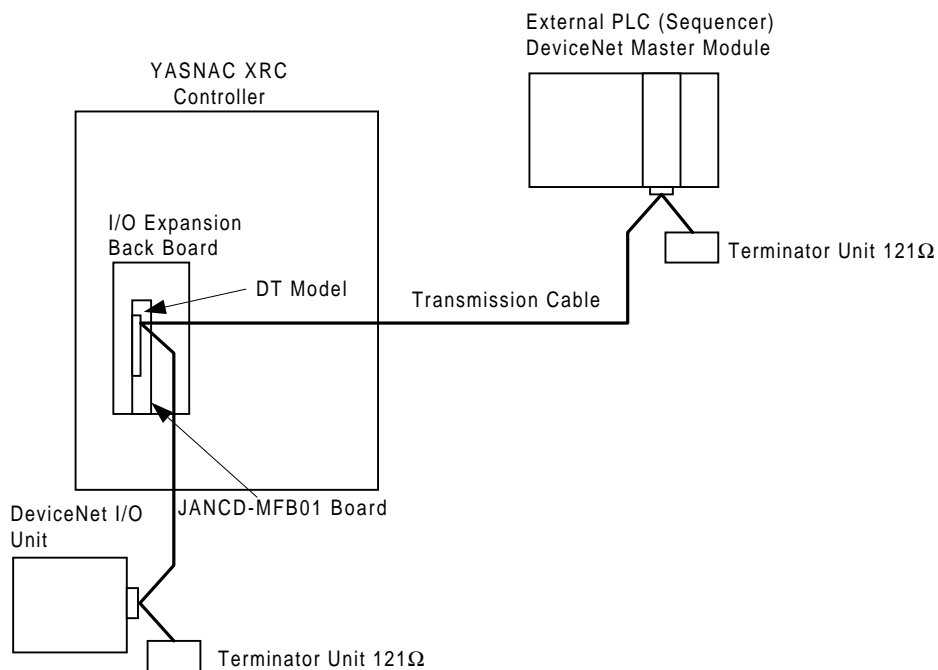
This manual gives the instructions for use the slave function of the DeviceNet on the YASNAC XRC.

The following boards are required to use the DeviceNet on the XRC.

Field bus interface board :	JANCD-MFB01
Communication board for DeviceNet :	Anybus <sup>®</sup> (Data Transfer model) made by Hassbjer Micro System
I/O expansion back board :	JARCR-XEB01

The JANCD-MFB01 board is designed for use on the MRC. Therefore, to use the JANCD-MFB01 on the XRC, an I/O expansion back board is required. For a communication board, an AnyBus is mounted on the JANCD-MFB01 board. Two Anybus models are applicable for the DeviceNet ; the Data Transfer model (DT) and the I/O model. For the XRC, only the DT model is used.

## ■ System Configuration Example

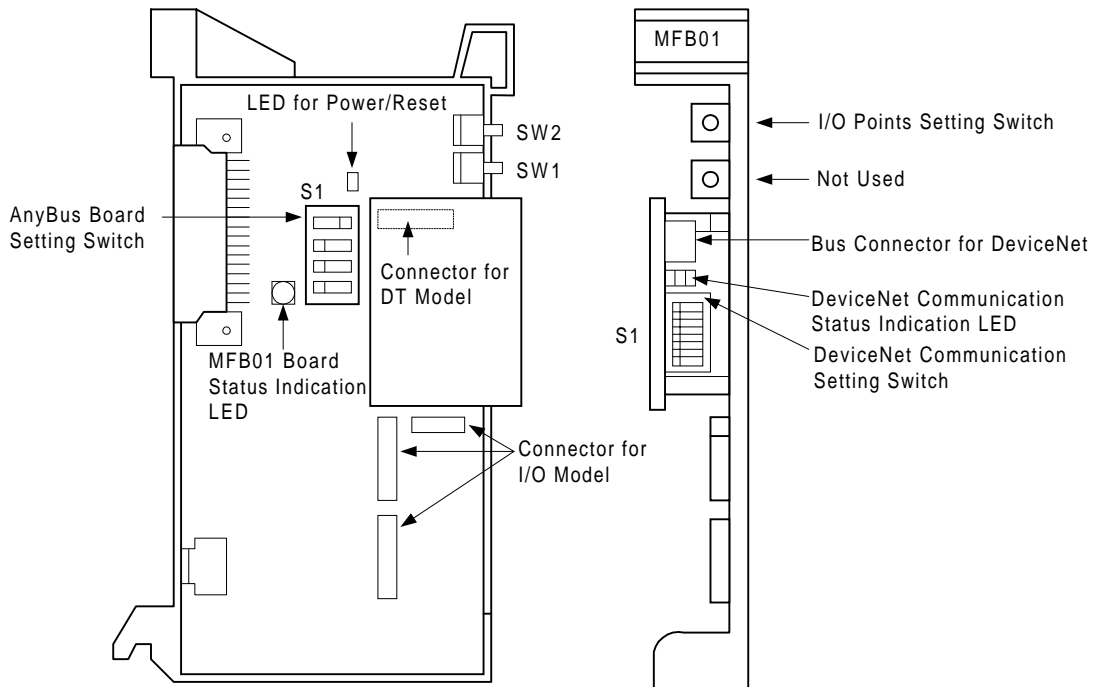


Be sure to connect the terminal resistor units.  
Otherwise, proper communication can not be performed.



## 2 Hardware Specifications

### 2.1 Board External View



### 2.2 Board Specifications

Items	Specifications
Interface to the external devices	DeviceNet
Board mounting position	I/O expansion back board slot in the YASNAC XRC controller
Error indicator	LED display
Number of transmission I/O points	Maximum number of I/O points Input : 112 points Output : 112 points Note : The number of input points and the number of output points can not be set individually.

## 2.3 Communication Specifications

Items	Specifications			
Connecting form	Multi-drop, T-branch (1:N communication)			
Transmission speed	Selectable among 500/250/125 Kbps			
Transmission media	Dedicated 5 cables (2 cables for signals, 2 cables for power supply, 1 shielded line) Or 3 cables (the cables for power supply to be prepared separately)			
Communication distance	Transmission speed 500 Kbps 250 Kbps 125 Kbps	Network max. distance 100 m and less 250 m and less 500 m and less	Branch line length 6 m and less 6 m and less 6 m and less	Total length of branch lines 39 m and less 78 m and less 156 m and less
Power supply voltage for communication	24 VDC (supplied through the communication connector)			

## 2.4 Connector

S1 (Bus connector for DeviceNet)

Terminal No.	Signal Name	Explanation
1	V-	0 <sub>24</sub> V power supply line connecting terminal
2	CAN_L	DeviceNet signal line connecting terminal
3	Shield	Shielded line connecting terminal
4	CAN_H	DeviceNet signal line connecting terminal
5	V+	+ 24 V power supply line connecting terminal



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## 3 Function Setting Method

### 3.1 Function Setting Switches

The switches to set the functions of the JANCD-MFB01 are explained. Make the proper settings following the instructions. For details of setting, refer to Section 3.2.

#### 3.1.1 Switches on JANCD-MFB01 Side

**SW1** : Not used

**SW2** : Sets the number of transmission I/O points

(Set value of SW2) × 8 is the actual number of I/O points.

The SW2 setting range is “1” to “E”. (Max. 112 points)

Set the number of points to be transferred to the sequencer side.

<Example>

When the SW2 is set to “E”,

Input 112 points

Output 112 points

**S1** : Sets the AnyBus model mounted on the JANCD-MFB01.

Since only the DT model is used on the XRC, never set the S1 to I/O model.

#### 3.1.2 Switch on DT Side

**S1** : Sets the node address (the switch Nos. 3 to 8) and the transmission baud rate (switch Nos. 1 and 2).


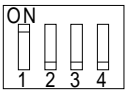
The node address setting range is 1 to 63.

The transmission baud rate can be selected from the following three.

- 125 Kbps
- 250 Kbps
- 500 Kbps

## 3.2 List of Switches

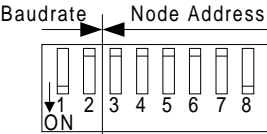
### 3.2.1 Switches on JANDC-MFB01 Side

Switches	Setting Method																
SW1	Not used																
SW2  Setting of the number of I/O points	 <p>Sets the number of I/O points to be transmitted. The relationship between the switch setting and the actual number of I/O points is explained below. Move the nozzles to the numbers corresponding to the desired number of I/O points. (Use a precision flat tipped driver.)</p> <table data-bbox="501 801 826 1059"> <tr> <td>0 : 0 [8]</td> <td>8 : 64 [72]</td> </tr> <tr> <td>1 : 8 [16]</td> <td>9 : 72 [80]</td> </tr> <tr> <td>2 : 16 [24]</td> <td>A : 80 [88]</td> </tr> <tr> <td>3 : 24 [32]</td> <td>B : 88 [96]</td> </tr> <tr> <td>4 : 32 [40]</td> <td>C : 96 [104]</td> </tr> <tr> <td>5 : 40 [48]</td> <td>D : 104 [112]</td> </tr> <tr> <td>6 : 48 [56]</td> <td>E : 112 [120]</td> </tr> <tr> <td>7 : 56 [64]</td> <td>F : 112 [120]</td> </tr> </table> <p>The value in [ ] is the number of I/O points reserved for the JANCD-MFB01 board inside the XRC. (The area for the board status is included.)</p>	0 : 0 [8]	8 : 64 [72]	1 : 8 [16]	9 : 72 [80]	2 : 16 [24]	A : 80 [88]	3 : 24 [32]	B : 88 [96]	4 : 32 [40]	C : 96 [104]	5 : 40 [48]	D : 104 [112]	6 : 48 [56]	E : 112 [120]	7 : 56 [64]	F : 112 [120]
0 : 0 [8]	8 : 64 [72]																
1 : 8 [16]	9 : 72 [80]																
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5 : 40 [48]	D : 104 [112]																
6 : 48 [56]	E : 112 [120]																
7 : 56 [64]	F : 112 [120]																
S1  Setting of the AnyBus model	 <p>Sets the board type of the Anybus model, etc. On the XRC, only the DT model is used. Normally, select the setting in <input type="checkbox"/>.</p> <p>1 : Sets the AnyBus model  <input checked="" type="checkbox"/> ON : DT model    OFF : I/O model</p> <p>2 : Sets the board type when the I/O model is mounted. (Valid only when the I/O model is mounted.)            ON : 32I/O model    <input checked="" type="checkbox"/> OFF : 64I/O model</p> <p>3 : Sets the input when the DeviceNet is interrupted.            ON : Input stopped    <input checked="" type="checkbox"/> OFF : Input held (default setting)</p> <p>4 : Not used            ON : Not used    <input checked="" type="checkbox"/> OFF : Not used</p>																

### 3.2.2 Switch on DT Model Side

■ Switch S1

Switch S1 is used for setting the DeviceNet communication.



The transmission baud rate and the node address for the DeviceNet should be set. The transmission baud rate can be set with the switch Nos. 1 and 2, and the node address can be set with the switch Nos. 3 to 8.

**Baud Rate Setting**

The baud rate settings are shown below.

1 : ON  
0 : OFF

Baud Rate	Switch Nos. 1 and 2
125 Kbps	00
250 Kbps	01
500 Kbps	10
Not used	11

**Node Address Setting**

Examples of node address setting are shown below.

1 : ON  
0 : OFF

Switch No.		3	4	5	6	7	8
Binary code		32	16	8	4	2	1
Node address setting	1	0	0	0	0	0	1
	37	1	0	0	1	0	1
	63	1	1	1	1	1	1

---

## 3.2 List of Switches

---

---

## 4 Mounting the JANCD-MFB01 Board



### WARNING

- Before wiring, be sure to turn off the power supply and put up a warning sign, such as “DO NOT TURN ON THE POWER”.  
Failure to observe this warning may result in a fire or an electric shock.
- Do not touch the inside of the panel for 5 minutes after the power is turned OFF.  
The remaining charged voltage in the condenser may cause an electric shock or an injury.
- Be sure to close the door and install the protection cover while the power is turned ON.  
Failure to observe this warning may result in a fire or an electric shock.



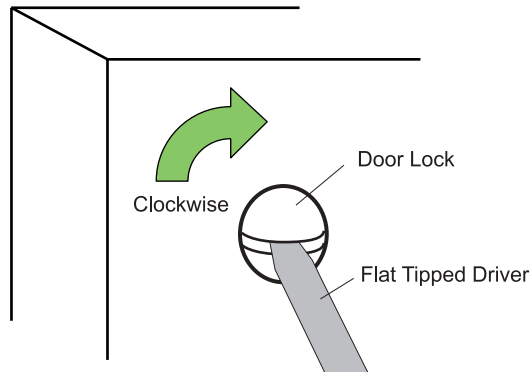
### CAUTION

- The wiring must be performed by authorized and qualified personnel.  
Failure to observe this caution may result in a fire or an electric shock.
- Connect the power supply corresponding to the rating.  
Failure to observe this caution may result in a fire or an electric shock.
- Be sure that the screws of the terminals for the main circuit and the control circuit are securely tightened.  
Failure to observe this caution may result in a fire or an electric shock.
- Never touch the board directly with fingers.  
Otherwise, the generated static electricity may damage the IC.

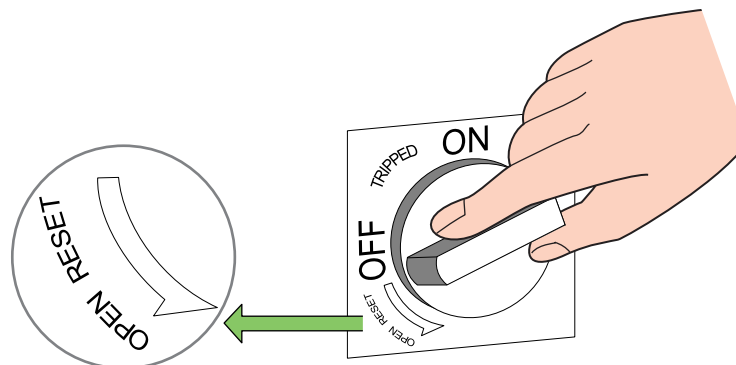
Mount the JANCD-MFB01 board in the following manner.

## 4.1 Opening Front Door of YASNAC XRC

1. Turn the two door locks on the front face of the XRC clockwise for 90° by using a coin or a flat tipped driver.



2. With the door locks turned clockwise for 90°, turn the main switch handle to the "OPEN RESET" position, and then slowly open the door.



---

## 4.2 Confirming Switch Settings on JANCD-MFB01 Board

1. Be sure that the main power supply is OFF.
2. Loosen the board fixing screws to remove the JANCD-MFB01 board from the I/O expansion back board.
3. Confirm that the settings of switches on the board are properly made.
4. For the settings of switches, refer to Chapter 3 "Function Setting Method".

---

## 4.3 Connecting Transmission Cable

1. Connect the transmission cable to the bus connector for the DeviceNet.
2. Connect the other end of the cable to the device used to communicate with the DeviceNet.

---

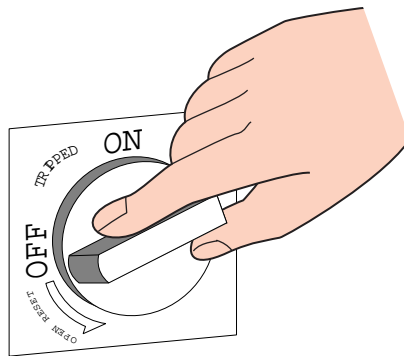
## 4.4 Mounting JANCD-MFB01 Board on I/O Expansion Board

1. Fix the JANCD-MFB01 board on the I/O expansion board with the board fixing screws securely tightened.

---

## 4.5 Closing Front Door of YASNAC XRC

1. Turn the main switch handle, which is now in the OFF position, to the "OPEN RESET" position, and then slowly close the door.



2. Turn the two door locks counterclockwise for 90°.

---

4.5 Closing Front Door of YASNAC XRC

---



## 5 Allocating I/O Signals

### 5.1 I/O Module Setting

In order to use the JANCD-MFB01 board on the XRC, the system configuration should be set in the following manner.

Make sure that the power supply of the XRC is OFF. Then, mount the JANCD-MFB01 board, for which all of its switches have been set, in either slot CNB1 or CNB2 on the I/O expansion board. For the board mounting method, refer to Chapter 4 “Mounting the JANCD-MFB01 Board”.



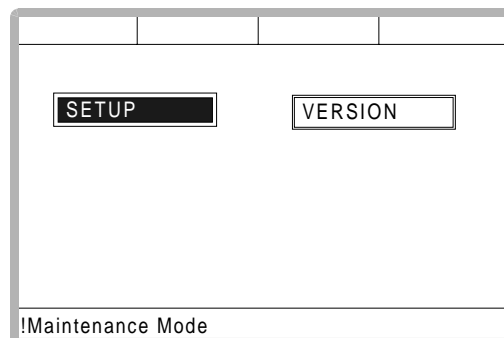
Add an I/O module in the maintenance mode.  
In the operation mode and the edit mode, the settings are for reference only.

#### Operation

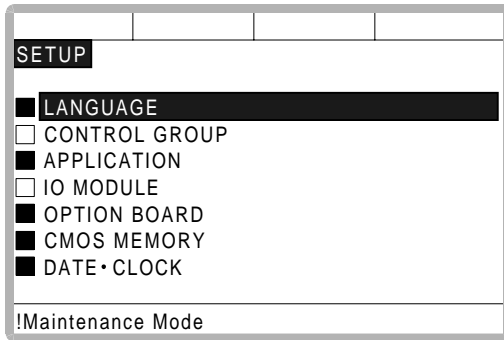
Turn ON the power supply, pressing [TOP MENU] ➔ Select {SYSTEM} from the top menu<sup>\*1</sup> ➔ Select {SETUP}<sup>\*2</sup> ➔ Select {I/O MODULE}<sup>\*3</sup> ➔ Confirm the status of the mounted I/O module<sup>\*4</sup> ➔ Press [ENTER]<sup>\*5</sup> ➔ Press [ENTER]<sup>\*6</sup> ➔ Select {YES}<sup>\*7</sup>

#### Explanation

<sup>\*1</sup> The system display appears.

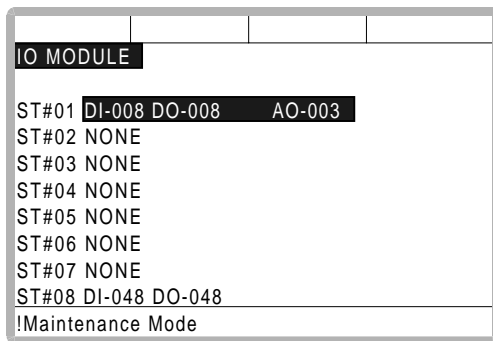


\*2 The setup display appears.



The items marked with ■ can not be used.

\*3 The current mounted status of the I/O modules are shown as in the example below.

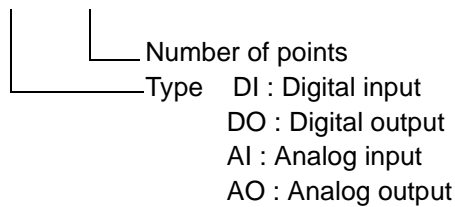


JANCD-XEW01 S1:(1)

JANCD-MFB01 SW2:(5)

\*4 Confirm that each slot (ST #) indicates the actual mounted status of an I/O module.

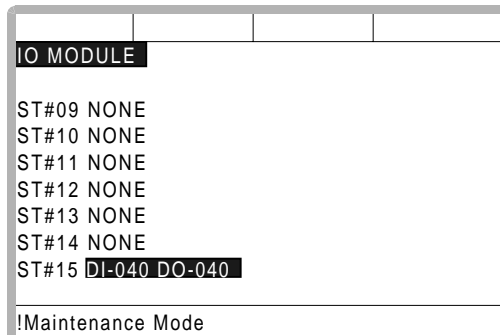
DI - 016



\*5 The mounted status of the I/O module for the rest of the slots (ST #) appear. Confirm that they correspond to the actual mounted status.



If the display does not correspond to the actual mounted status, recheck the actual mounted status.  
If the mounted status is correct, the I/O module is defective.  
Contact your Yaskawa representative.



JANCD-XIO01, 02



The following should be taken into consideration when reading the display. For the JANCD-MFB01 board, as the number of I/O points reserved for the board status exists other than the number of transmission I/O points set at SW2, the number of I/O points shown on the display is the number calculated by “the set value of SW2 + 1 (for the board status)”.

<Example>

When SW2 is set to “5”, it is understood that 48  $((5+1) \times 8)$  I/O points are reserved for the I/O board.

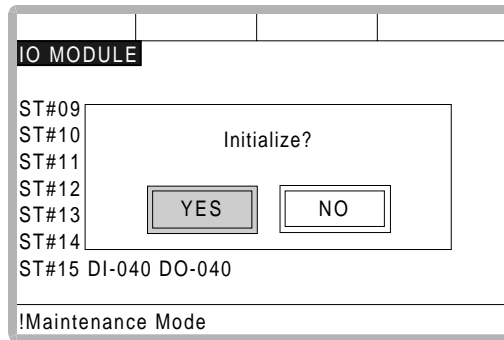
Accordingly, “DI-048 DO-048” is displayed.

The relationship between the set value of SW2 and the I/O module display is shown below.

SW2	Display
0	DI-008 DO-008
1	DI-016 DO-016
2	DI-024 DO-024
3	DI-032 DO-032
4	DI-040 DO-040
5	DI-048 DO-048
6	DI-056 DO-056
7	DI-064 DO-064
8	DI-072 DO-072
9	DI-080 DO-080
A	DI-088 DO-088
B	DI-096 DO-096
C	DI-104 DO-104
D	DI-112 DO-112
E	DI-120 DO-120
F	DI-120 DO-120

Confirm that the display of each slot (ST #) corresponds to the actual mounted status of the I/O module.

- \*6 The confirmation dialog box appears.

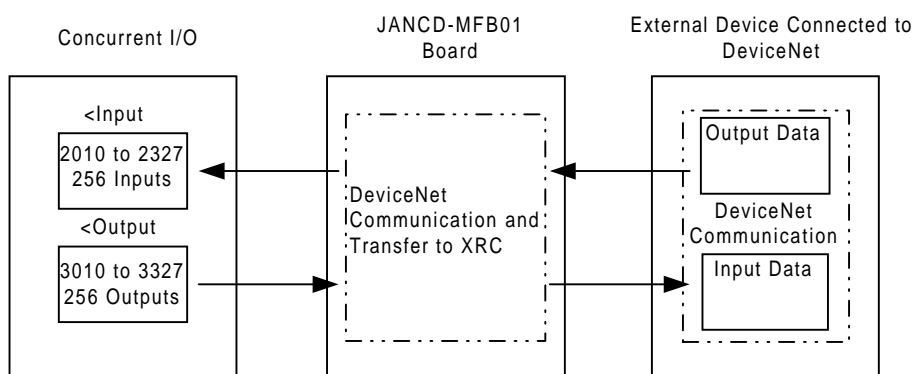


- \*7 The system parameters are automatically set according to the current mounted status of the hardware. The procedures to add I/O modules are completed.

## 5.2 Transmission Data

The data to be transferred from the JANCD-MFB01 board to the inside of the XRC is not only the I/O data from the external device connected to the DeviceNet, but also the status of the JANCD-MFB01. Therefore, inside the XRC, 8 points (1 byte) for both input and output are reserved for the status of the JANCD-MFB01 beside the area for the digital data. However, the output area can not be used.

The transmission data from the JANCD-MFB01 board is allocated to the external I/O signals of concurrent I/O.



When a JANCD-MIO04 (input : 24 points, output : 24 points) is mounted in slot 1 (CNB1) and

a JANCD-MFB01 (input : 40 points, output : 40 points) is mounted in slot 2 (CNB2), the concurrent I/O allocation of each board is as follows. (2010 to 2057 are used for the standard I/O of the XRC.)

Slot	Board	Input	Output
1	JANCD-MIO04	2060 to 2067 input data (1)	3060 to 3067 output data (1)
		2070 to 2077 input data (2)	3070 to 3077 output data (2)
		2080 to 2087 input data (3)	3080 to 3087 output data (3)
2	JANCD-MFB01	2090 to 2097 board status <b>*1</b>	3090 to 3097 can not be used
		2100 to 2107 input data (1)	3100 to 3107 output data (1)
		2110 to 2117 input data (2)	3110 to 3117 output data (2)
		2120 to 2127 input data (3)	3120 to 3127 output data (3)
		2130 to 2137 input data (4)	3130 to 3137 output data (4)
		2140 to 2147 input data (5)	3140 to 3147 output data (5)

**\*1** Explanation of Board Status 2090 to 2097

2090	Watchdog	Count from 0 to 7
2091		
2092		
2093	Discrimination of I/O model	64 : 0    32 : 1
2094	Access to DT	Error : 0    Normal : 1
2095	Discrimination of AnyBus model	DT : 0    I/O : 1
2096	DeviceNet communication	Normal : 0    Error : 1
2097	Board operation status	Normal : 0    Error : 1

---

## 5.2 Transmission Data

---

### [JANCD-MFB01 Board Status]

The status of the JANCD-MFB01 board (the lead 8 points of the allocation area) means as follows.

The value “xx” of the allocated input signals in the table differs depending on the board configuration at allocation.

Signal	Contents
2xx0 to 2xx2	Watchdog counter. This bit increases as 0, 1, 2, 3, 4, 5, 6, 7, 0,...
2xx3	Indicates the type of mounted I/O model. (Valid only when the I/O model is mounted.) 64I/O model : 0 32I/O model : 1
2xx4	Indicates the state of access to the DT model Error : 0 Normal : 1
2xx5	Indicates the model of the AnyBus mounted on the JANCD-MFB01 board. DT model : 0 I/O model : 1
2xx6	Indicates the state of the DeviceNet. (Valid only when the DT model is mounted.) Normal : 0 Error : 1
2xx7	Indicates the operation status of the JANCD-MFB01 board. Normal : 0 Error : 1

## 6 Error Indication

### 6.1 LED Indicators

#### 6.1.1 Power/Reset LED (on JANCD-MFB01 Board)

A green LED is on the JANCD-MFB01 board to indicate the status of the 5 V power supply. However, this LED does not indicate the status of the power supply to the DT model. For the DT model, 5 V power converted from the 24 V power by DC/DC on the JANCD-MFB01 board, is supplied to the board.

Refer to Section 2.1 “Board External View”.

LED	Indications
Green ON	5 V power is supplied to the JANCD-MFB01 board.
OFF	5 V power is not supplied to the JANCD-MFB01 board or the board is in the reset status.

#### 6.1.2 JANCD-MFB01 Board Status Indication LED (on JANCD-MFB01 Board)

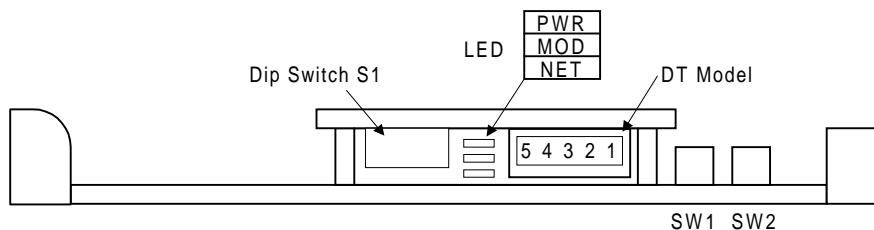
A LED with a green lamp and a red lamp is mounted on the JANCD-MFB01 board to indicate the board status.

LED	Indications
OFF	The CPU of the JANCD-MFB01 board is not operating.
Green ON	The JANCD-MFB01 and the DT model are set.
Green BLINK	Normal state
Red BLINK	An error in the interface (JL012C) to the XRC or in the DT model is detected.
Green and Red ON	The CPU of the JANCD-MFB01 board is not operating or is in reset status.

### 6.1.3 DeviceNet Communication Status Indication LED (on DT model)

Three LEDs for indication of the DT model status and the DeviceNet status are mounted on the DT model.

LED	Indications
PWR (Green)	Indicates the status of 5 V power supply of the DT model. OFF : 5 V power supply OFF ON : 5 V power supply ON
MOD (Red and Green)	Indicates the status of the DT model. Red BLINK : An error, which can be automatically restored, is detected. Red ON : A serious error is detected (an automatic restoration not possible.) Green BLINK : Under setting Green ON : Normal status
NET (Red and Green)	Indicates the status of the DeviceNet communication. Red BLINK : An error, which can be automatically restored, is detected. Red ON : A serious error is detected. OFF : Not in the on-line mode. (Network wiring failure, failure of 24 V power supply for communication, incorrect baud rate, etc.) Green BLINK : The communication can not be made in the on-line mode. (Incorrect setting of node address, etc.) Green ON : Normal status







# YASNAC XRC OPTIONS INSTRUCTIONS

JANCD-MFB01 BOARD FOR DEVICENET

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MANUAL NO. RE-CKI-A422  
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