

XRC Controller
UniWire
Function Manual
for UP/SKX-Series Robots
Part Number 142973-1

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NOTES

SECTION 1

INTRODUCTION

1.1 About this Document

This manual provides instructions for UniWire Function with the JARCR-MS01 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 – UNIWIRE FUNCTION

Provides detailed instructions to utilize the UniWire Function with the JARCR-MS01 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

FOR JARCR-MSC01 BOARD FOR UNIWIRE SYSTEM

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 JARCR-MS01 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.

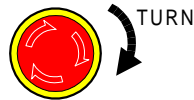
Injury or damage to machinery may result if the emergency stop circuit cannot stop the manipulator during an emergency. The manipulator should not be used if the emergency stop buttons do not function.



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.



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 remained 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

- 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.

- Make sure that there is no foreign matters such as metal chips on the board.

In case of malfunction,etc., it may cause an injury or the product damage.

- Make sure that there is no damage or deflection of parts on the board.

In case of malfunction,etc., it may cause an injury or the product damage.

- Set correctly the switches, etc.

Malfunction caused by incorrect setting, may result in an injury or the product damage.

- 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.

- 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

The Uniwire System, a product of NKE Co., Ltd., is a small-/medium scale distribution system to perform medium-distance transmission. It is designed to reduce the number of wiring cables necessary for directly connecting I/O devices such as sequencers, actuators, and 2-core cable is used for connection between control devices.

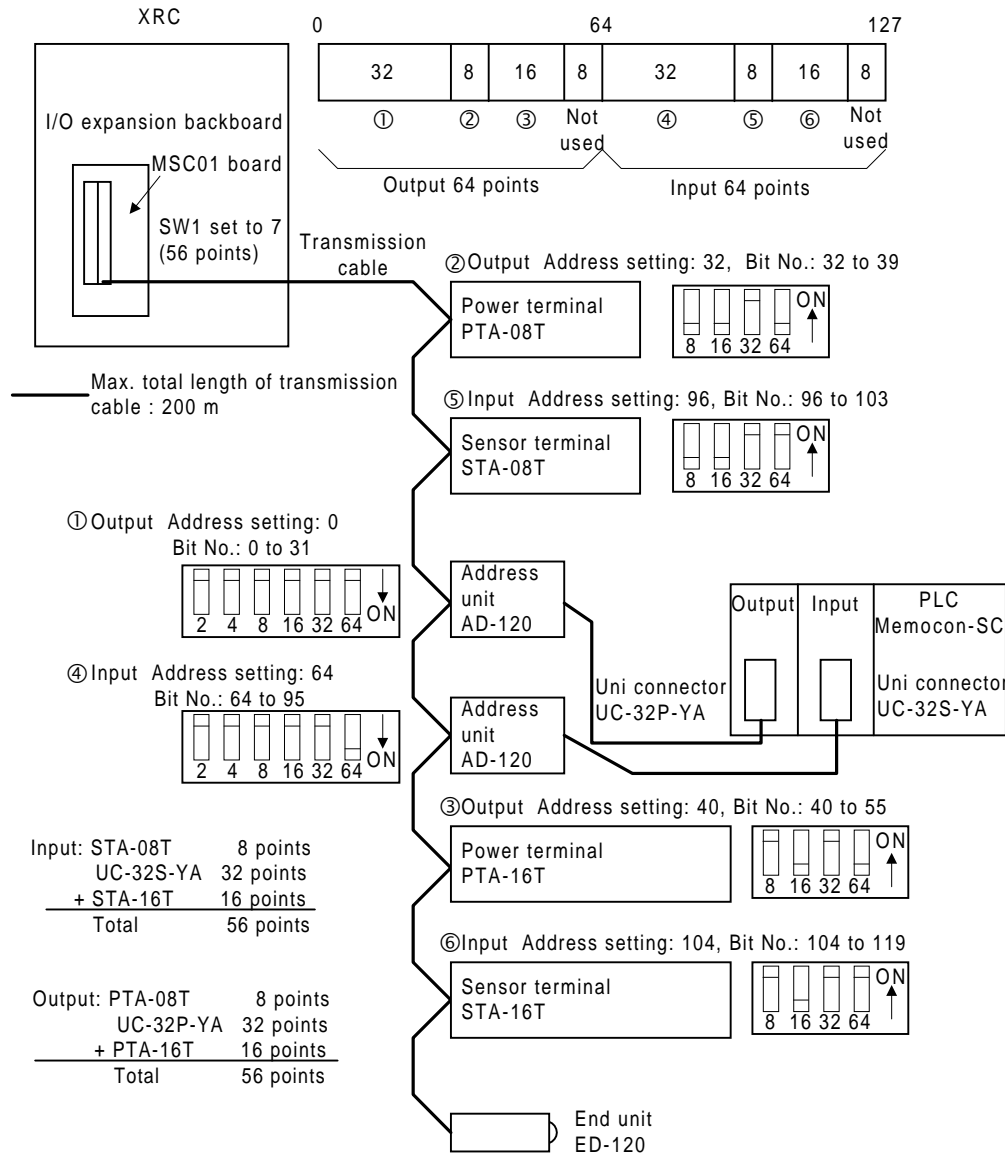
Introducing the Uniwire System to the XRC can reduce the cost and increases the efficiency because of less number of wirings around a robot. To use the Uniwire System with the XRC, an Uniwire interface board (JARCR-MS01) is required to be mounted on the I/O expansion backboard (JARCR-XEB01) of the XRC.

This manual explains how to use the JARCR-MS01 board.

1.1 Features

- Can be easily connected to the Uniwire System with one 2-core cable
- A low-cost system can be constructed with minimal wiring.
- Maximum number of I/O points : 128 points
- Maximum total length of cables: 200 m
- Maximum number of slave stations : 20 stations

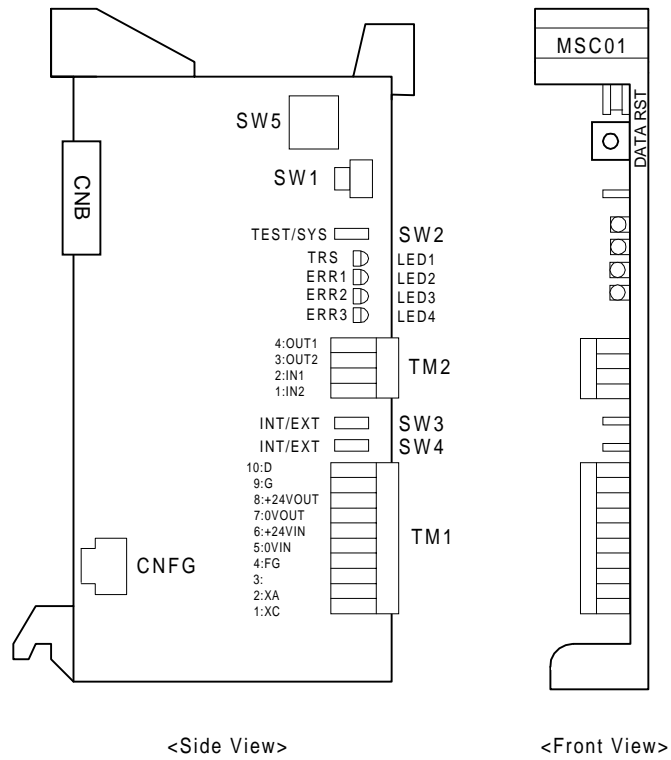
1.2 System Configuration Example



- The transmission between the JARCR-MSC01 board and the Uniwire System is performed with a maximum of 128 I/O points. Even if the total of inputs and outputs points is less than 128, the transmission speed does not change.
- It is necessary for the Uniwire System to set an address for each unit. When an address is set using the address switch of each unit, an output address should be set in the range of 0 to 63 and an input address in the range of 64 to 127. Even if all the outputs up to 64 points are not used, start setting an input address from 64. (Unused area is set to OFF.)

2 Hardware Specification

2.1 Board External View



2.2 Board Specifications

Items	Specifications
Interface to external devices	Uniwire System
Board mounting position	I/O expansion backboard slot inside the XRC
Error display	LED display
Number of transmission I/O points	Maximum number of I/O points Input: 64 points Output: 64 points Note : The number of input points and the number of output points can not be set individually.
External power supply ^{*1}	22.8 to 26.4 VDC, ripple 0.5 VP-P or less 0.2 A TYP (excluding the Uniwire System side)

***1** It shows the specifications only for the JARCR-MSC01 board. When supplying the power for the Uniwire System side, set the power supply capacity considering a consumed current according to each model of the Uniwire System. For details of consumed current, refer to a manual of NKE Co., Ltd.

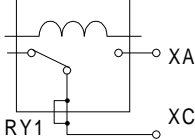
2.3 Communication Specifications

Item	Specifications
Communication method	Interactive time-sharing multiplex
Synchronization method	Bit synchronization
Transmission procedure	Uniwire protocol
Transmission cable	Max. 200m
Transmission cable specifications	Cable of 0.5 mm ² and more
Number of units to be connected	Max. 20 units
Number of points to be transmitted	Max. 128 points

2.4 Connectors

TM1 (Connector for Uniwire System)

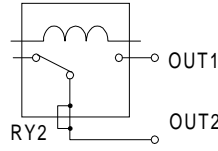
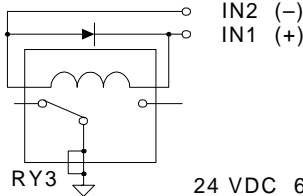
Terminal No.	Signal Name	Meanings
10	D	Uniwire System transmission cable connecting terminal
9	G	
8	+24VOUT	Selects a 24 VDC power supply source by SW3 and SW4. VIN: External power supply connecting terminal VOUT: 24 VDC power supply output terminal (can not be used. It is used for test.)
7	0VOUT	
6	+24VIN	
5	0VIN	
4	FG	Frame ground
3	-	Not used
2	XA	A relay contact, which is "closed" at normal transmission between the JARCR-MSC01 and the Uniwire System. It is "open" when an error is detected or at interruption of transmission. This relay can be used for an emergency stop for external devices.
1	XC	



RY1 XA XC 24 VDC 0.1 A or less

2.4 Connectors

TM2 (Connector for Relay)

Terminal No.	Signal Name	Meanings
4	OUT1	<p>A relay contact which can be used for an output port. This relay can be used even during occurring of error concerned with the Uniwire System (refer to Section 6.2 "Error Contents and Corrective Actions".)</p>  <p style="text-align: right;">24 VDC 0.1 A or less</p>
3	OUT2	
2	IN1 (+)	<p>An input port using the relay operating coil. This relay can be used even during occurring of error concerned with the Uniwire System (refer to Section 6.2 "Error Contents and Corrective Actions".)</p>  <p style="text-align: right;">24 VDC 6.25 mA (standard)</p>
1	IN2 (-)	

3 Function Setting Method

3.1 Function Setting Switches

The switches to set each function of the JARCR-MSC01 board are explained. Make the proper settings following the instructions.

SW1: Sets the number of transmission I/O points.
(Set value of SW1) × 8 is the actual number of I/O points.
The SW1 setting range is “1” to “8”. (Max. 64 points)
Set the number of points to be transferred to the sequencer side.

<Example>

When SW1 is set to “7”,

Input: 56 points

Output: 56 points

SW2: Sets the operation mode of the JARCR-MSC01 board.
Set to “System mode”.



Never set to “Test mode” since “Test mode” is for maintenance only.

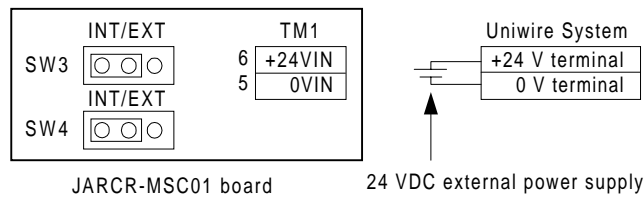
SW3 and SW4: Select a 24 VDC power supply source.
Select which 24 V power supply is used, 24 V power supplied through the connector CNB of the I/O expansion backboard or 24 V power input through the VIN terminal of the connector TM1 of the JARCR-MSC01 board.
In case of long-distance wiring connection between the JARCR-MSC01 board and the Uniwire System as shown in the example 2, care should be taken for a voltage drop. If the voltage drop exceeds the allowable range (22.8 VDC or less), provide a separate power supply.

3.1 Function Setting Switches

<Example 1>

JARCR-MSC01 board side: Power supplied from the I/O expansion backboard

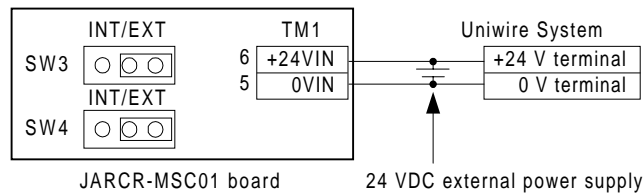
Uniwire System Side: External power supply



<Example 2>

JARCR-MSC01 board side: External power supply

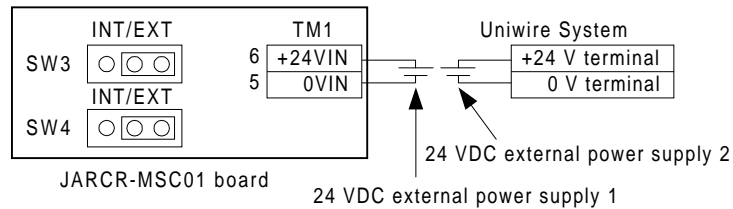
Uniwire System side: External power supply



<Example 3>

JARCR-MSC01 board side: External power supply 1

Uniwire System side: External power supply 2




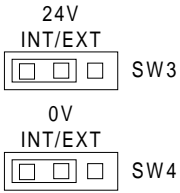
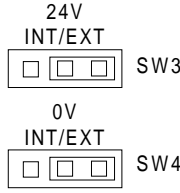




SW5: Resets the JARCR-MSC01 board.



Do not use the SW5 since it is for maintenance only.

3.2 List of Switches

Switches	Setting Method																
SW1 Setting of number of transmission I/O points	 <p>Sets the number of I/O points to be transmitted. The relation between the switch setting and the actual number of I/O points is explained below. Move the arrow to the numbers corresponding to the desired number of I/O points (Use a precision flat tipped driver.)</p> <table border="0"> <tr> <td>0: Setting error (SW error)</td> <td>8: 64 [72]</td> </tr> <tr> <td>1: 8 [16]</td> <td>9: Setting error (SW error)</td> </tr> <tr> <td>2: 16 [24]</td> <td>A: Setting error (SW error)</td> </tr> <tr> <td>3: 24 [32]</td> <td>B: Setting error (SW error)</td> </tr> <tr> <td>4: 32 [40]</td> <td>C: Setting error (SW error)</td> </tr> <tr> <td>5: 40 [48]</td> <td>D: Setting error (SW error)</td> </tr> <tr> <td>6: 48 [56]</td> <td>E: Setting error (SW error)</td> </tr> <tr> <td>7: 56 [64]</td> <td>F: Setting error (SW error)</td> </tr> </table> <p>The value in [] is the number of I/O points reserved for the JARCR-MS01 board inside the XRC. (The area for the board status is included.)</p>	0: Setting error (SW error)	8: 64 [72]	1: 8 [16]	9: Setting error (SW error)	2: 16 [24]	A: Setting error (SW error)	3: 24 [32]	B: Setting error (SW error)	4: 32 [40]	C: Setting error (SW error)	5: 40 [48]	D: Setting error (SW error)	6: 48 [56]	E: Setting error (SW error)	7: 56 [64]	F: Setting error (SW error)
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5: 40 [48]	D: Setting error (SW error)																
6: 48 [56]	E: Setting error (SW error)																
7: 56 [64]	F: Setting error (SW error)																
SW2 Setting of operation mode	 <p>TEST: Test mode (this setting is prohibited since it is for maintenance only.)</p>  <p>SYS: Normal mode Be sure to set the SW2 to "SYS" (normal mode).</p>																
SW3 and SW4 Selection of power supply	 <p>Uses the power supplied from the I/O expansion backboard.</p> <p>24 VDC power supplied through the connector CNB from the I/O expansion backboard, is used. Whether this 24 VDC power source is CPS power supply of the XRC or other external power supply, is decided by the setting of the power selection connectors (CN3, CN4) of the I/O expansion backboard.</p>  <p>Uses an external power supply connected to the connector TM1.</p> <p>For the source of 24 VDC power required for the Uniwire interface board, an external power supply connected to the terminals +24VIN and 0VIN of the connector TM1 is used.</p>																
SW5 Reset	 <p>Resets the JARCR-MS01 board.</p>  <p>Never use the SW5 since it is for maintenance only.</p>																

3.2 List of Switches

4 Mounting JANCD-MSC01 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 remained 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.



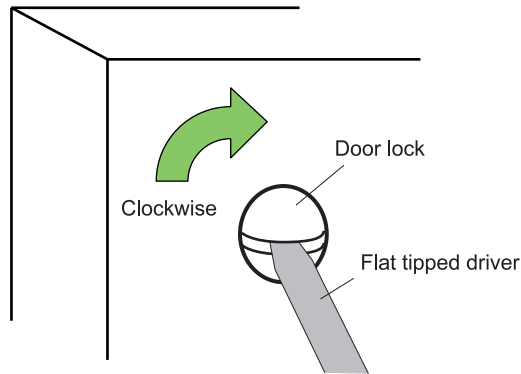
CAUTION

- 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.

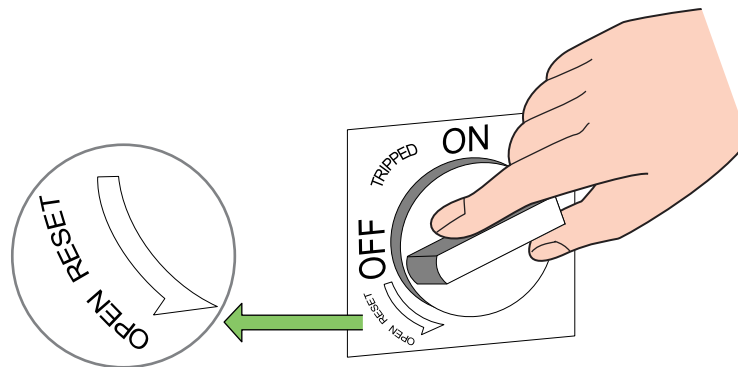
Mount the JARCR-MS01 board in the following manner.

4.1 Opening the Front Door of 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 the Switch Settings on the JARCR- MSC01 board

1. Be sure that the main power supply is OFF.
2. Loosen the board fixing screws to remove the JARCR-MSC01 board from the I/O expansion backboard.
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

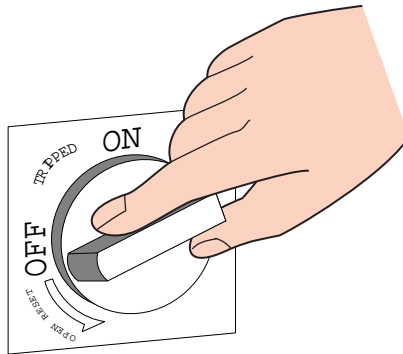
1. Connect the transmission cable to the TM1 (connector for Uniwire System).
2. Connect the other end of the cable to the device used to communicate with the Uniwire.

4.4 Mounting JARCR-MSC01 Board on the I/O Expansion Backboard

1. Fix the JARCR-MSC01 board on the I/O expansion backboard with the board fixing screws securely tightened.

4.5 Closing the Front Door of the 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 the Front Door of the XRC

5 Allocating I/O Signals

5.1 I/O Module Setting

In order to use the JARCR-MSC01 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 JARCR-MSC01 board, for which all of its switches have been set, in either slot CNB1 or CNB2 on the I/O expansion backboard. For the mounting method, refer to Chapter 4 “Mounting the JARCR-MSC01 Board”.



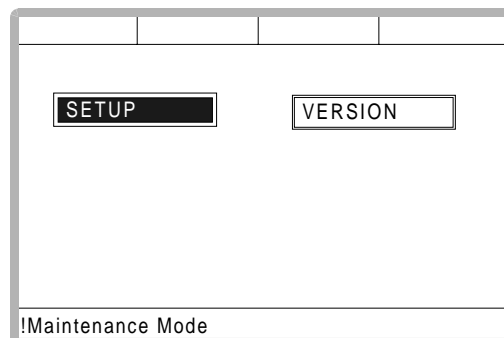
Add an I/O module in maintenance mode.
In the operation mode and the edit mode, the settings are for reference only.

Operation

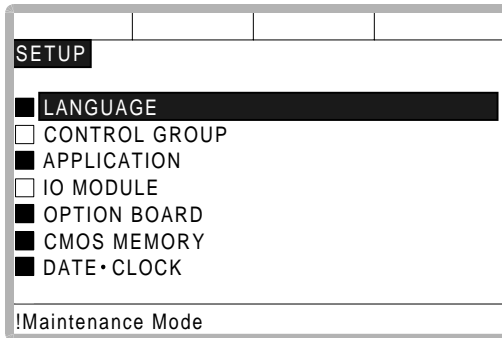
Turn ON the power supply, pressing [TOP MENU] ➔ Select {SYSTEM} under the top menu^{*1} ➔ Select {SETUP}^{*2} ➔ Select {I/O MODULE}^{*3} ➔ Confirm the status of the mounted I/O module^{*4} ➔ Press [ENTER]^{*5} ➔ Press [ENTER]^{*6} ➔ Select {YES}^{*7}

Explanation

^{*1} The system display appears.

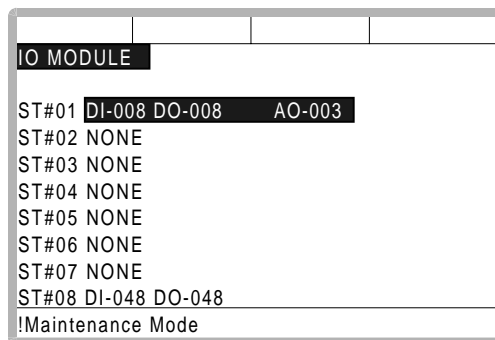


*2 The setup display appears.



The items marked with ■ can not be set.

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

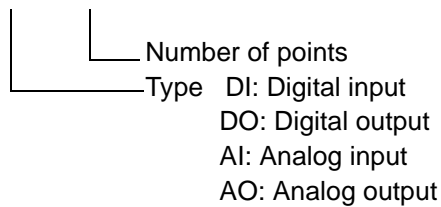


JANCD-XEW01:S1(1)

JARCR-MSC01:SW1(5)

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

DI - 016

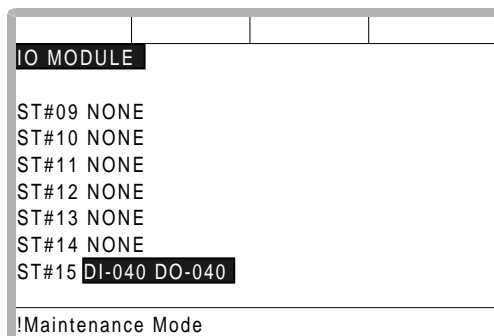


*5 The mounted status of the I/O module for the rest of the slots (ST#) appear. Confirm that they correspond to the actual mounted status.



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 JARCR-MSC01 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 SW1, the number of I/O points shown on the display is the number calculated by “the set value of SW1+1(for status)”.

<Example>

When SW1 is set to “5”, it is understood that 48 ((5+1) × 8) I/O points are reserved for the I/O board.

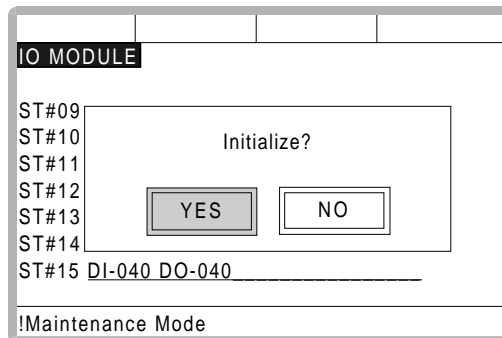
Accordingly, “DI-048 DO-048” is displayed.

The relationship between the set value of SW1 and the I/O module display is shown below.

SW1	Display
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

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

- *6** The confirmation dialog box appears.



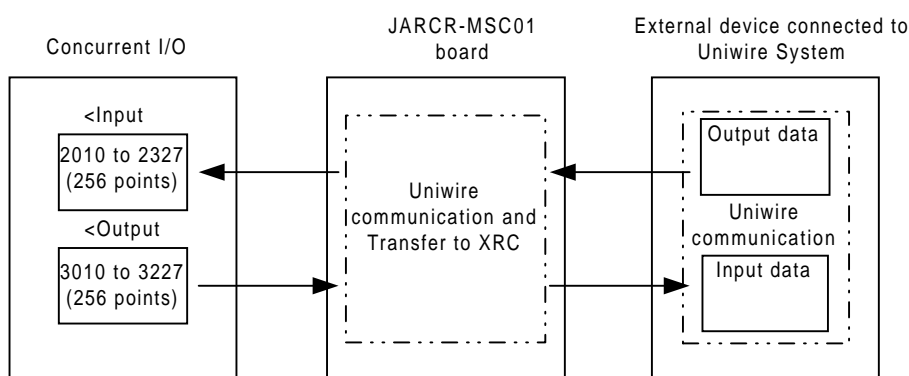
- *7** The system parameters are automatically set according to the current mounted status of the hardware.
The procedures to add I/O modules are completed.

5.2 Transmission Data

The data to be transferred from the JARCR-MSC01 board to the inside of the XRC is not only the I/O data from the external device connected to Uniwire System, but also the status of the JARCR-MSC01 board.

Therefore, inside the XRC, 8 points (1 byte) for both input and output are reserved for the status of the JARCR-MSC01 board beside the area for the digital data. However, the output area can not be used.

The transmission data from the JARCR-MSC01 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 JARCR-MSC01 (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	JARCR-MSC01	2090 to 2097 board status ^{*1}	3090 to 3097 board status ^{*2}
		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	ROM error	Normal: 0 Error: 1
2091	Switch error	Normal: 0 Error: 1
2092	Shortcircuit between D and 24V of the Uniwire 24 V not supplied	Normal: 0 Error: 1
2093	Shortcircuit between D and G of the Uniwire	Normal: 0 Error: 1
2094	Uniwire end unit error Uniwire D-line disconnected	Normal: 0 Error: 1
2095	Software resetting	Normal: 0 Reset: 1
2096	Reserved	Can not be used
2097	Input port	OFF: 0 ON: 1

***2** Explanation of Board Status 3090 to 3097

3090	Software reset	Normal: 0 Reset: 1
3091	Selection of automatic recovery mode	Normal: 0 Automatic: 1
3092	Reserved	Can not be used
3093	Reserved	Can not be used
3094	Reserved	Can not be used
3095	Reserved	Can not be used
3096	Reserved	Can not be used
3097	Output port	OFF: 0 ON: 1

[JARCR-MSC01 Board Status]

The status of JARCR-MSC01 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.

Board Status (Input)

Signal	Contents	Meanings
2xx0	ROM error	Indicates the SAM check status of ROM. During this error is occurring, the software reset is disabled. Normal: 0 Error: 1
2xx1	Switch error	Indicates the setting status of the switch SW1 on the JARCR-MSC01 board. Normal: 0 Error: 1
2xx2	Shortcircuit between D and 24V 24V not supplied	Indicates the status of 24 V power supply for the Uniwire. Normal: 0 Error: 1
2xx3	Shortcircuit between D and G	Indicates the connection status between D and G of the Uniwire. Normal: 0 Error: 1
2xx4	End unit error D-line disconnected	Indicates the status of Uniwire end unit and the connection status of Uniwire D-line. Normal: 0 Error: 1
2xx5	Software resetting	Indicates the software reset (3xx0) status of the board status (output). Normal operation: 0 Reset: 1
2xx6	Reserved	Reserved for system. Do not use.
2xx7	Input port	Input data from the connector TM2 (IN1 and 2). OFF: 0 ON: 1

Board Status (Output)

Signal	Contents	Meanings
3xx0	Software reset	Reset from the XRC. While this signal is 1, the transmission with the Uniwire is interrupted. After the reset status is cancelled, the transmission restarts. Normal operation: 0 Reset: 1
3xx1	Selection of automatic recovery mode	Indicates the recovery mode after error occurrence. With the automatic recovery mode selected, when an error concerned with the Uniwire (2xx3 to 2xx4) occurs, the operation is automatically recovered after the cause is removed. Normal mode: 0 Automatic recovery mode: 1
3xx2	Reserved	Reserved for system. Do not use.
3xx3	Reserved	Reserved for system. Do not use.
3xx4	Reserved	Reserved for system. Do not use.
3xx5	Reserved	Reserved for system. Do not use.
3xx6	Reserved	Reserved for system. Do not use.
3xx7	Output port	Output data from the connector TM2 (OUT1 and 2) Contact open: 0 Contact closed: 1

6 Error Indication

6.1 LED Display

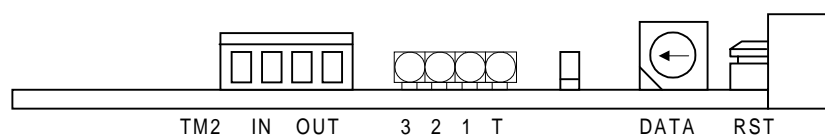
On the JARCR-MSC01 board, an error occurrence is displayed on LEDs. The LED display and its contents are explained.

LED No.	LED Name	Contents
1 (green)	TRS (T)	Indicates the transmission status between the JARCR-MSC01 board and the Uniwire system. Lit: Transmitting Unlit: Transmission interrupted
2 (red)	ERR1 (1)	Lits at error occurrence. Each LED indication at error occurrence is shown in the table below.
3 (red)	ERR2 (2)	
4 (red)	ERR3 (3)	

LED Indication

Meanings	ERR3	ERR2	ERR1	TRS
During normal transmission	×	×	×	○
ROM error	×	×	○	×
During software reset	×	○	×	×
Switch error	○	×	×	×
Shortcircuit between D and 24V of Uniwire, 24V not supplied	×	○	○	×
Shortcircuit between D and G of Uniwire	○	×	○	×
Uniwire end unit error, Uniwire D-line disconnected	○	○	×	×

Lit: ○ Unlit: ×



6.2 Error Contents and Corrective Actions

The corrective actions when a LED is lit or unlit at error occurrence are listed below.

Error Contents	Causes	Corrective Actions	Relay RY1 ^{*1}	Automatic Recovery ^{*2}	Software reset ^{*3}
ROM error	<ul style="list-style-type: none"> SAM check error of ROM (27C256) 	<ul style="list-style-type: none"> Replace the board 	Open	Disabled	Disabled
Switch error	<ul style="list-style-type: none"> Incorrect setting of SW1 (Setting other than 1 to 8) SW1 is changed during operation 	<ul style="list-style-type: none"> Set SW1, again. 	Open	Disabled	Enabled
Shortcircuit between D and 24V of Uniwire, 24V not supplied ^{*4}	<ul style="list-style-type: none"> Shortcircuit between D and 24 V of Uniwire 24 V power not supplied to JARCR-MS01 board (Can not be detected if the power supply to the board and the power supply to the Uniwire System are different.) 	<ul style="list-style-type: none"> Check the 24 V power supply and its connection Check the fuse FU1 (1A) 	Open	Enabled	Enabled
Shortcircuit between D and G of Uniwire ^{*4}	<ul style="list-style-type: none"> Shortcircuit between D and G of Uniwire 	<ul style="list-style-type: none"> Check the wiring 	Open	Enabled	Enabled
Uniwire end unit error, Uniwire D-line disconnected ^{*4}	<ul style="list-style-type: none"> End unit disconnected The transmission line is not connected up to the end unit. 	<ul style="list-style-type: none"> Check the end unit and its connection 	Open	Enabled	Enabled

^{*1} Status of transmission status of relay RY1 (TM1 XA and XC) at error occurrence

^{*2} Specifies whether a normal operation can be recovered automatically without resetting after correction of the error cause in the automatic recovery mode.

^{*3} Specifies whether reset can be executed by a software reset signal from XRC.

^{*4} Error concerned with the Uniwire System

YASNAC XRC OPTIONS INSTRUCTIONS

FOR JARCR-MSC01 BOARD FOR UNIWIRE SYSTEM

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