Motoman XRC 2001 Controller

Search Function Manual

for UP/SP-Series Robots

Part Number: 147768-1CD
Revision: 0

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SECTION 1
INTRODUCTION

1.1 About this Document

This manual provides instructions for the Search Function 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 – SEARCH FUNCTION
Provides detailed instructions to utilize the Search Function.

1.2 Reference to Other Documentation

For additional information refer to the following:

- Concurrent I/O Parameters Manual for XRC 2001 (P/N 147626-1)
- 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 2001 Manipulator Manual (P/N 145960-1)
- Motoman UP20, XRC 2001 Manipulator Manual (P/N 145965-1)
- Motoman UP50, XRC 2001 Manipulator Manual (P/N 145964-1)
- Motoman UP130/165, XRC 2001 Manipulator Manual (P/N 145967-1)

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, UP50, 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

SEARCH FUNCTION

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.

YASKAWA

MANUAL NO. RE-CKI-A420

MANDATORY

- This manual explains the search function of the YASNAC XRC. 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

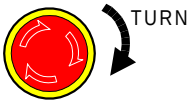
- Before operating the manipulator, check that servo power is turned off when the emergency stop buttons on the playback panel or programming pendant are pressed.
  When the servo power is turned off, the SERVO ON READY lamp on the playback panel and the SERVO ON LED on the programming pendant are turned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

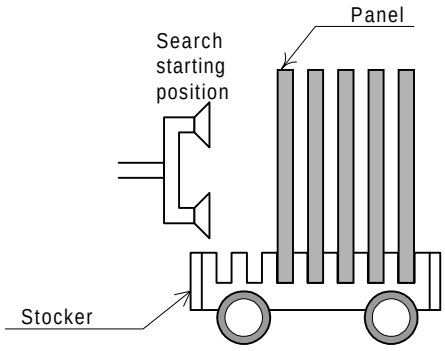
In the explanation of the operation procedure, the expression "Select • • • " means that the cursor is moved to the object item and the SELECT key is pressed.

1 Search Function

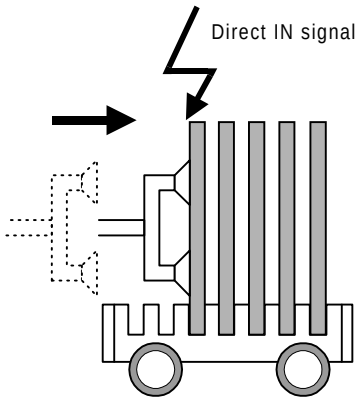
The search function moves the manipulator to a specified position and stops it when a specified direct input signal comes ON.
Position data at the point the manipulator stops can be taken-in. This information can be used with other instructions, for instance, to obtain the distance from a goal position and modify operation accordingly.

<Example> A manipulator performs a handling operation of panels.

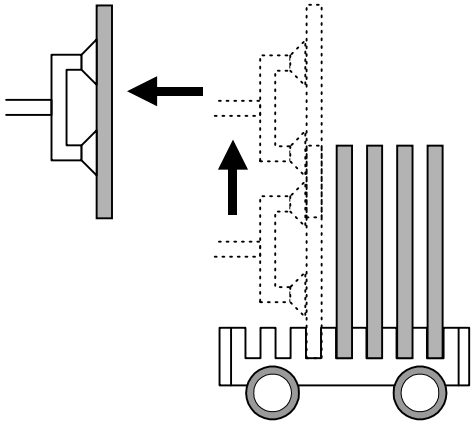
1. The manipulator moves to the search starting position.



2. The manipulator moves to the goal position in the search operation at low-speed. When the manipulator comes to the position to take the panel, a input signal (Direct-IN signal) from the sensor comes ON, then the manipulator stops. At this moment, the difference between the search starting position and the detected position is calculated.



3. On the base of the calculated difference, the program is modified to proceed the operation.



2 Wiring

The output signal of the sensor is connected to the direct-input signal input port of XRC. The signal input from this port is called a direct IN signal.
The output signal of the sensor can be connected via a sequencer to the direct-input signal input port. However, in this case, variation due to the scanning timing of the sequencer may be caused. Therefore, it is recommended to connect the output signal of the sensor directly to the port of XRC.

2.1 Direct IN Signal Connection to XRC

Connect the direct IN signal to the XRC in the following manner.

1. Turn the breaker handle of XRC to the OFF position to turn OFF the main power supply.
2. Remove the CN06 connector of the I/O contactor unit, then make connection as shown in Fig. 1.
   (Fig.1 shows the connection diagram for a direct IN signal DIN1. For direct IN signals DIN2 to 4, refer to Fig. 2.)
3. Install the CN6 connector to the I/O contactor unit.

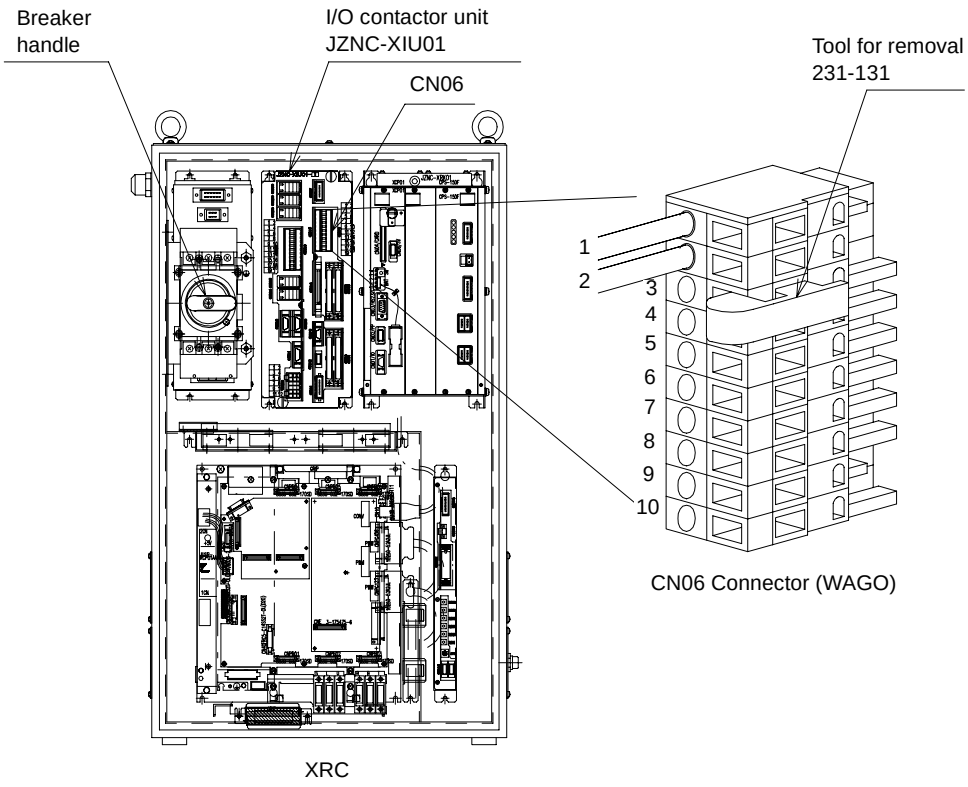


Fig 1 Direct IN Signal DIN1 Connection Diagram

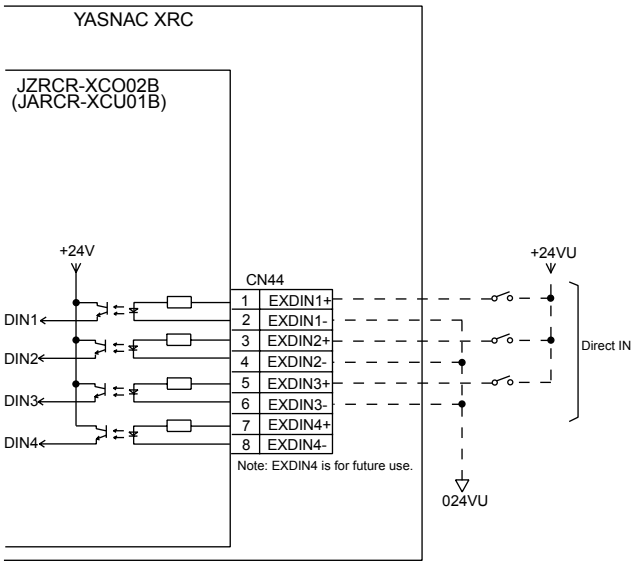


Fig 2 Direct IN Signals Connection Diagram

2.2 Confirmation of Direct IN Signal Status

Check the status of direct-input signal on the RIN input status display.

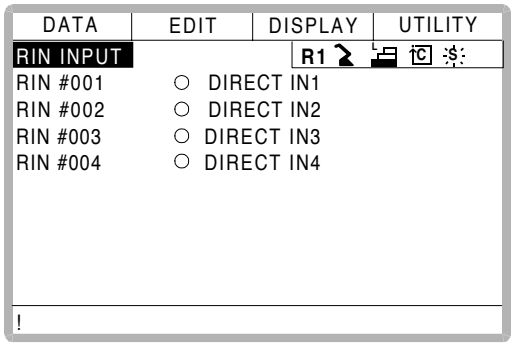
2.2.1 RIN Input Status Display

Operation

Select {IN/OUT} under the top menu ➡ Select {RIN}*1*

Explanation

1 The RIN input status display is shown.
{I } indicates the ON status of direct IN signal.
{ } indicates the OFF status of direct IN signal.



3 Instructions

3.1 SRCH (Search Instruction)

The SRCH is an instruction to execute the search function. It is set as an additional item to the move instruction.

Format : MOVL <position type variable> <V = Speed> SRCH RIN# (direct IN No.) =
<status><T = time> DIS = <distance>

<Position type variable>: Robot position type variable
<Speed>: Control point speed (Set a speed for the object to be searched)
<Direct IN No.>:1 to 3
<Status> : Status of direct IN No.
ON or OFF, or B type variable
<Time>: Direct IN signal input check start delay time (in units of 0.01 s)
Before the starting point detecting unit relay is switched (to 200 V), direct IN may be input continuously. Therefore, T must be set to 0.1 s or longer.
<Distance> : Specifies a length of passing over the target point specified by the position variable, in units of 0.1 mm, 0 to 6553.4 mm

3.2 GETS (System Variable Fetch Instruction)

Save the system variable ($ variable) as a user variable.
XRC can not use system variables directly for operating instructions. Use GETS instruction to fetch the values as a user variable.

Format : GETS <user variable> <system variable>

- The user and the system variables must be of the same type.
  <Example>GETS B000 $B000
- Position type variable can be specified by only PX variables.
- PX variables are position type variables that are defined in a job. In a job for a single manipulator, PX000 equals to P000.

3.2.1 System Variables

The GETS is the only instruction that refers to system variables written by the controller system.

System Variable	Type	Explanation
$B type	B type	$B002 : Specifies detected/not detected of the SRCH instruction 0 : Not detected 1 : Detected
$PX type	PX type	$PX000 : Current pulse $PX002 : Detecting position pulse $PX011 : REFP1 pulse ⋮ $PX018 : REFP8 pulse $PX021 : SREFP1 pulse ⋮ $PX028 : SREFP8 pulse

3.3 CNVRT (Position Type Variable Conversion Instruction)

The CNVRT is an instruction to convert a pulse data position type variable into a Cartesian data position type variable using a specified coordinate system.

Format : CNVRT <PX variable> <PX variable> <coordinate system>
B A

<PX variable (A)> : Pulse data
<PX variable (B)> : Cartesian data (the converted Cartesian data are stored.)
<Coordinate system> : Base coordinate system : BF
Robot coordinate system : RF
Tool coordinate system :TL
User coordinate system : UF
Master tool coordinate system : MTF

Specifying the master tool coordinate system is to convert into a relative position with the master manipulator when the coordinated system is set.

3.3.1 PX Variables

The PX variables are a group of position type variables that are defined by the control group specified in the job header.

- When the control group is R1, PX000 indicates P000.
- When the control group is R1 + B1, PX000 indicates P000 and BP000.
- When the control group is R1 + B1 + ST1, PX000 indicates P000, BP000 and EX000.
- When the control group is R1 + R2 + B1 + B2 + ST1 and the master in the coordinated job is R1 + B1, PX000 incidates the following variables.

P000 :	R2 (slave)
P001 :	R1 (master)
BP000 :	B2 (slave)
BP001 :	B1 (master)
EX000 :	ST1

4 Registration of Instructions

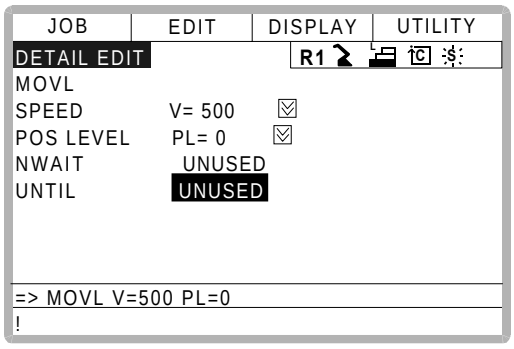
4.1 SRCH Instruction

Operation

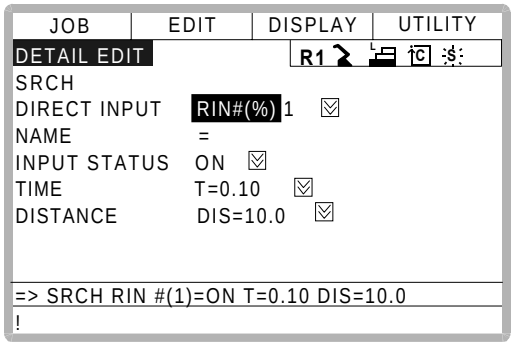
Move the cursor to the instruction area ➡ Move the cursor to the move instruction where SRCH instruction is to be registered ➡ Press [SELECT] two times*1 ➡ Select {UNTIL} ➡ Select {SRCH}*2 ➡ Set each item on the detail edit display of SRCH instruction ➡ Press [ENTER]*3 ➡ Press [ENTER] two times*4

Explanation

1 Press [SELECT] once to display the contents registered in the job in the input buffer line. Press [SELECT] once more, and the detail edit display of the move instruction is shown.



2 The detail edit display of SRCH instruction is shown.



3 Returns to the detail edit display of the move instruction.

4 Press [ENTER] once to display the set contents in the input buffer line. Press [ENTER] once more, and the set contents are registered in the job.

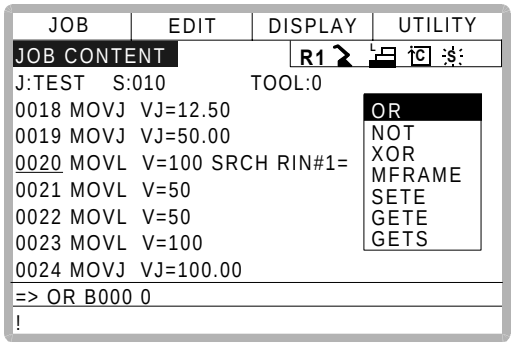
4.2 GETS Instruction

Operation

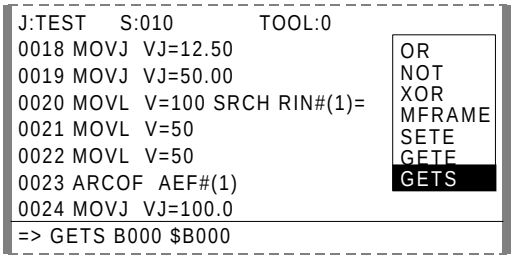
Move the cursor to the address area ➡ Move the cursor to the line where GETS instruction is to be registered ➡ Press [INFORM LIST]*1 ➡ Select {GETS}*2 ➡ Press [ENTER] two times*3 ➡ Set variables in the detail edit display of GETS instruction ➡ Press [ENTER] two times*4

Explanation

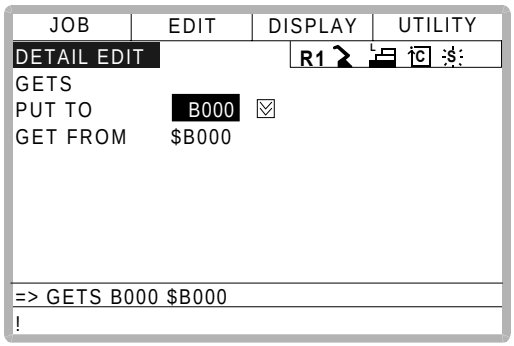
1 The instruction list dialog is displayed. The cursor moves to the instruction list dialog while the cursor in the address area changes to an under bar.



2 At this stage, the instruction on the cursor position is diaplayed with the previously registered additional items in the input buffer line.



3 The detail edit display of GETS instruction is shown.



4 Press [ENTER] once to display the set contents in the input buffer line. Press [ENTER] once more, and the set contents are registered in the job.

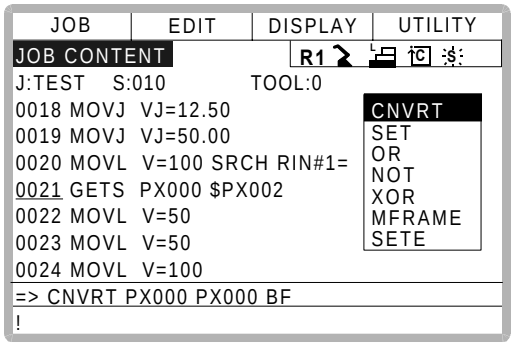
4.3 CNVRT Instruction

Operation

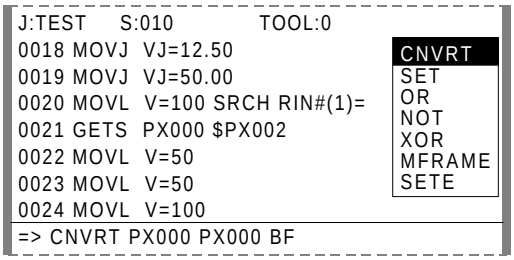
Move the cursor to the address area ➡ Move the cursor to the line where CNVRT instruction is to be registered ➡ Press [INFORM LIST]*1 ➡ Select {CNVRT}*2 ➡ Press [ENTER] two times*3 ➡ Set variables on the detail edit display of CNVRT instruction ➡ Press [ENTER] two times*4

Explanation

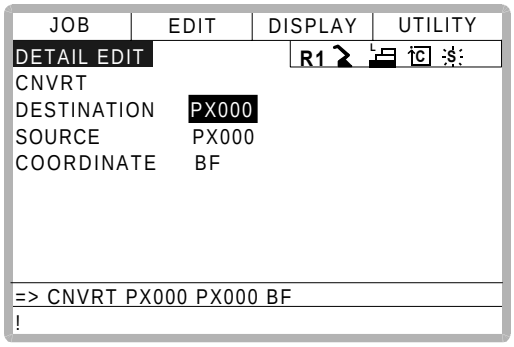
1 The instruction list dialog is displayed. The cursor moves to the instruction list dialog while the cursor in the address area changes to an under bar.



2 At this stage, the instruction on the cursor position is displayed with the previously registered additional items in the input buffer line.



3 The detail edit display of CNVRT instruction is shown.



4 Press [ENTER] once to display the set contents in the input buffer line. Press [ENTER] once more, and the set contents are registered in the job.

5 Alarm List

Alarm No.	Message	Cause	Remedy
4474	WRONG CONTROL GROUP AXIS	A jump call was made to a job which is different from the control group.	Call job to the control group which includes the control group to be called.
4499	UNDEFINED POSITION VARIABLE	An undefined position data was used.	Define the position data.
4507	REFP POS ERROR (SEARCH MOTION)	The distance between the search start point and target point was too short to determine the search direction.	Reset the alarm and increase the distance between the search start point and target point.

6 Instruction List

< > shows number or character data. When there are more than one item in the additional item, choose one.

SRCH	Function	Executes a search function.	
	Additional item	RIN#(<direct IN No.>) = <status>	Direct IN No. : 1 to 3 Status : ON, OFF, B <variable No.>
		T = <time･s>	Direct IN signal input check start delay time
		DIS = <distance･mm>	A length of passing over the target point specified by the position type variable
	Example	MOVL P000 V=138 SRCH RIN#(1)=ON T=1.00 DIS=10.0	
GETS	Function	Saves the system variable as a user variable.	
	Additional items	B <variable No.>, I <variable No.>, D <variable No.>, R <variable No.>, PX <variable No.>	User variable
		$B <variable No.>, $I <variable No.>, $D <variable No.>, $R <variable No.>, $PX <variable No.>	System variable
	Example	GETS B000 $B000 GETS I001 $I[1] GETS PX003 $PX001	

<table>
<tr><td rowspan="4">CNVRT</td><td>Function</td><td colspan="3">Converts a pulse data position type data of Data 2 into a Cartesian data position type variable using a specified coordinate system, then saves in Data 1.
Format : CNVRT <Data 1><Data 2> coordinate system</td></tr>
<tr><td rowspan="3">Additional items</td><td>Data 1</td><td>PX <variable No.></td><td></td></tr>
<tr><td>Data 2</td><td>PX <variable No.></td><td></td></tr>
<tr><td colspan="2">BF, RF, TF, UF# (<user coordinate systemNo.>) ,MTF</td><td>BF:Base coordinate system
RF : Robot coordinate system
TF : Tool coordinate system
UF : User coordinate system
MTF : Master tool coordinate system</td></tr>
<tr><td>Example</td><td colspan="3">CNVRT PX000 PX001 BF
CNVRT LPX000 LPX001 TF</td></tr>
</table>

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INSTRUCTIONS

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