

Motoman NX100 Controller

**Search Function
User's Manual**

Part Number: 150010-1CD
Revision 0



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Chapter 1

Introduction

1.1 About This Document

This manual provides instructions for the Search Function and contains the following sections:

SECTION 1 - INTRODUCTION

Provides general information about the structure of this manual, a list of reference documents, and customer service information.

SECTION 2 - SAFETY

This section provides information regarding the safe use and operation of Motoman products.

SECTION 3 - SEARCH FUNCTION INSTRUCTIONS

Provides detailed information for the Search Function.

1.2 Reference to Other Documentation

For additional information refer to the following:

- NX100 Controller Manual (P/N 149201-1)
- Concurrent I/O Manual (P/N 149230-1)
- Motoman Manipulator Manual
- Operator's Manual for your application
- Vendor manuals for system components not manufactured by Motoman

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 (Search Function)
- Application Type (arcwelding, spot welding, handling)
- Robot Serial Number (located on back side of robot arm)
- Robot Sales Order Number (located on back of controller)

Chapter 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 R15.06-1999. 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
INTERNET: www.roboticsonline.com

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, Operation, and Maintenance Safety (Section 2.6)

2.2 Standard Conventions

This manual includes the following alerts – in descending order of severity – that are essential to the safety of personnel and equipment. As you read this manual, pay close attention to these alerts to insure safety when installing, operating, programming, and maintaining this equipment.



DANGER!

Information appearing in a **DANGER** 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 in a **WARNING** 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 in a **CAUTION** 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 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 R15.06-1999, section 4.2.5, Sources of Energy, 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 R15.06-1999 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 equipment is provided as standard:

- Safety fences and barriers
- Light curtains and/or safety mats
- Door interlocks
- Emergency stop palm buttons located on operator station, robot controller, and programming pendant

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 R15.06-1999 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, Operation, and 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. 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 program, operate, and maintain the system. All personnel involved with the operation of the equipment must understand potential dangers of operation.

- 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 all safety equipment for proper operation. Repair or replace any non-functioning safety equipment immediately.
- Do not enter the robot cell while it is in automatic operation. Be sure that only the person holding the programming pendant enters the workcell.
- Check the E-STOP button on the programming pendant for proper operation before programming. The robot must be placed in Emergency Stop (E-STOP) mode whenever it is not in use.
- Back up all programs and jobs onto suitable media before 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.

- Any modifications to PART 1, System Section, of the robot controller concurrent I/O program can cause severe personal injury or death, as well as damage to the robot! Do not make any modifications to PART 1, System Section. 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.
- The robot controller allows modifications of PART 2, User Section, of the concurrent I/O program and modifications to controller parameters for maximum robot performance. Great care must be taken when making these modifications. 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 and other parts of the system. Double-check all modifications under every mode of robot operation to ensure that you have not created hazards or dangerous situations.
- Check and test any new or modified program at low speed for at least one full cycle.
- This equipment has multiple sources of electrical supply. Electrical interconnections are made between the controller and other equipment. Disconnect and lockout/tagout all electrical circuits before making any modifications or connections.
- Do not perform any maintenance procedures before reading and understanding the proper procedures in the appropriate manual.
- Use proper replacement parts.
- 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).

NOTES

NX100 OPTIONS INSTRUCTIONS

FOR SEARCH FUNCTION

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

MOTOMAN INSTRUCTIONS

MOTOMAN-□□□ INSTRUCTIONS
NX100 INSTRUCTIONS
NX100 OPERATOR'S MANUAL
NX100 MAINTENANCE MANUAL

The NX100 operator's manuals above correspond to specific usage.
Be sure to use the appropriate manual.



 **MANDATORY**

- **This manual explains the search function of the NX100. Read this manual carefully and be sure to understand its contents before handling the NX100.**
- **General items related to safety are listed in Section 1: Safety of the NX100 Instructions. To ensure correct and safe operation, carefully read the NX100 Instructions 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 NX100.

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.



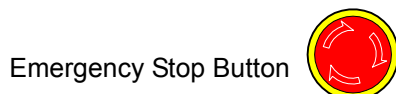
To ensure safe and efficient operation at all times, be sure to follow all instructions, even if not designated as “CAUTION” and “WARNING.”



WARNING

- **Before operating the manipulator, check that servo power is turned OFF when the emergency stop buttons on the front door of the NX100 and programming pendant are pressed. When the servo power is turned OFF, the SERVO ON LED on the programming pendant is 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.



- **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.



- **Observe the following precautions when performing teaching operations within the P-point maximum 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 P-point maximum envelope of the manipulator and that you are in a safe location before:**
 - **Turning ON the NX100 power**
 - **Moving the manipulator with the programming pendant**
 - **Running the system in the check mode**
 - **Performing automatic operations**

Injury may result if anyone enters the P-point maximum envelope of the manipulator during operation. Always press an emergency stop button immediately if there are problems. The emergency stop buttons are located on the right of the front door of the NX100 and the 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 NX100 cabinet after use.**

The programming pendant can be damaged if it is left in the P-point maximum envelope of the manipulator, on the floor, or near fixtures.

- **Read and understand the Explanation of Warning Labels in the NX100 Instructions 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 programming pendant, and supply cables.

In this manual, the equipment is designated as follows.

Equipment	Manual Designation
NX100 Controller	NX100
NX100 Programming Pendant	Programming Pendant

Descriptions of the programming pendant 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 Numeric Keys	“Axis Keys” and “Numeric 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}

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, or that the item is directly selected by touching the screen.

1 Search Function

2 Wiring

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6 Instruction List

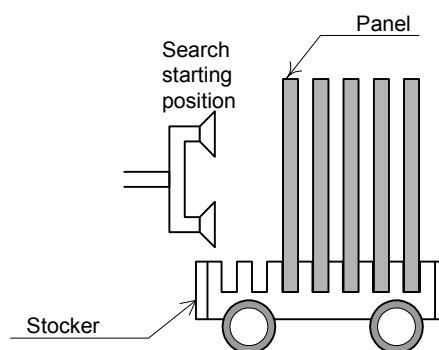
1 Search Function

The search function moves the manipulator to a specified position and stops it when a specified direct input signal comes ON.

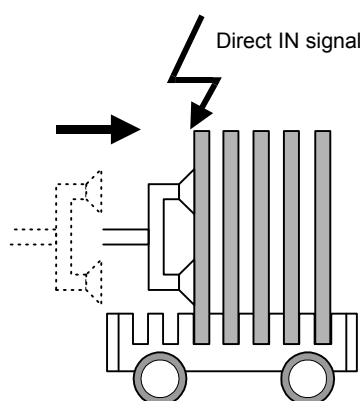
Position data at the point the manipulator stops can be taken-in. This information can be used with other instructions, for instance, to obtain the distance from a goal position and modify operation accordingly.

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

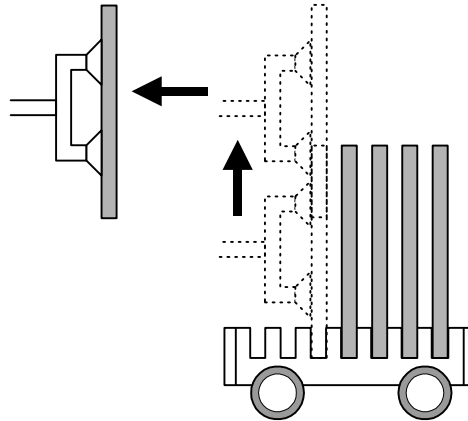
1. The manipulator moves to the search starting position.



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 NX100.

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 NX100.

2.1 Direct IN Signal Connection to NX100

Connect the direct IN signal to the NX100 in the following manner.

1. Turn the breaker handle of NX100 to the OFF position to turn OFF the main power supply.
2. Open the door of the NX100 and connect the direct IN signals to the robot system input terminal block (MXT) which is located at the bottom as shown in "Fig. 1 Configuration of the NX100".

For connection of the direct IN signals, refer to "Fig. 2 Direct IN Signals Connection Diagram".

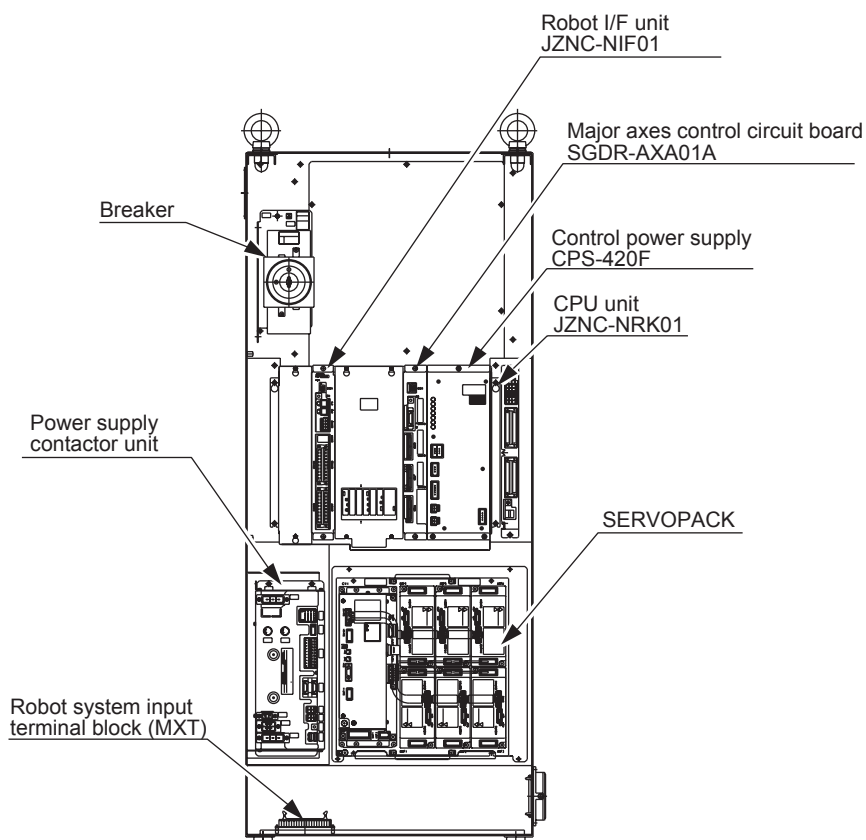


Fig. 1 Configuration of the NX100

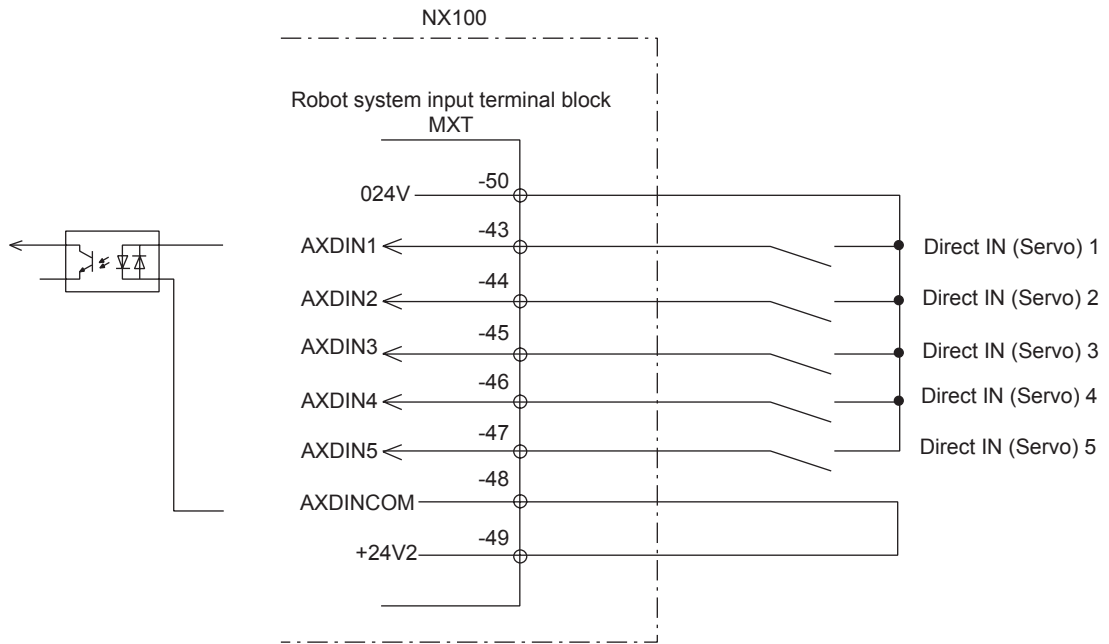


Fig. 2 Direct IN Signals Connection Diagram



When connecting the direct IN signals, be sure to short-circuit the pins 48 and 49 of the direct IN common on the robot system input terminal block (MXT).

2.2 Direct IN Signal Connection of More than One Manipulator to NX100

In case of connecting more than one manipulator (up to 4 manipulators), connect the 1st manipulator following the procedures in "2.1 Direct IN Signal Connection to NX100". The 2nd and the rest of the manipulators can be connected using a servo interface unit for coordination "JZNC-NRK02", mounted inside the controller depending on the number of the manipulators to be connected. Connect the direct IN signal to the connector "CNM" on the JZNC-NRK02 of the manipulator to load the signals.

For the pin assignment of the CNM connector and direct IN signals 1 to 5, refer to "Fig. 3 Direct IN Signals Connection Diagram for More than One Manipulator" below:

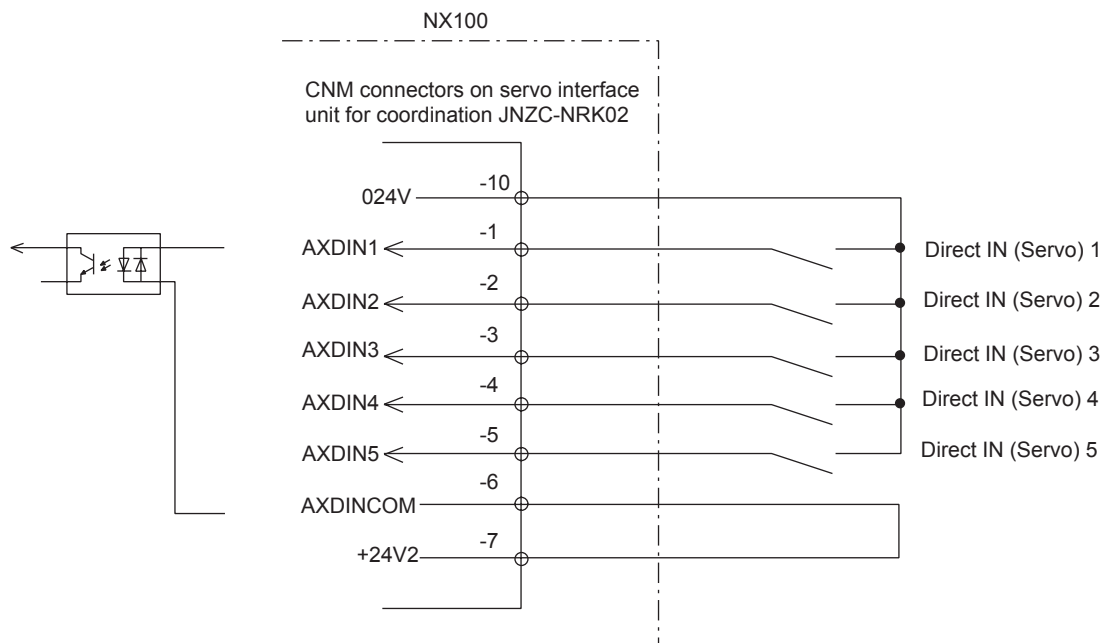


Fig. 3 Direct IN Signals Connection Diagram for More than One Manipulator

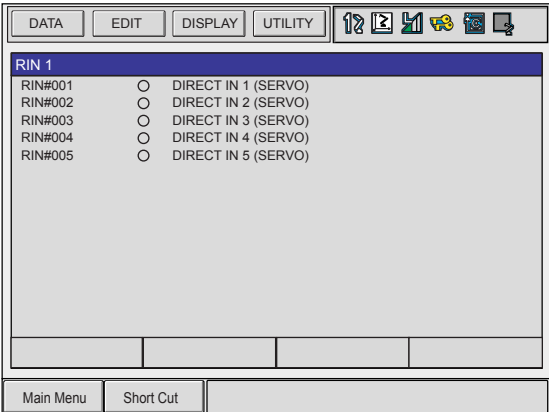



When connecting the direct IN signals, be sure to short-circuit the pins 6 and 7 of the CNM connector of the direct IN common.

2.3 Confirmation of Direct IN Signal Status

Check the status of direct-input signal on the RIN INPUT window.

2.3.1 RIN INPUT Window

	Operation	Explanation
1	Select {IN/OUT} under the main menu.	
2	Select {RIN}.	<p>The RIN INPUT window appears.</p> <p>“●” indicates the ON status of direct IN signal. “○” indicates the OFF status of direct IN signal.</p>  <p>*Press the page key  to display windows for each manipulator if more than one manipulator is connected. The window can be changed each time the page key is pressed.</p>

NOTE The "RIN 1" in the window represents the direct IN signals of Robot 1, and the same applies to RIN 2, RIN 3, and RIN 4 in case of more than one manipulator connection.

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>: TCP speed (Set a speed for the object to be searched)

<Direct IN No.>: 1 to 5

<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 0.01s)

Before the starting point detecting unit relay is switched (to 200V), direct IN may be input continuously. Therefore, T must be set to 0.1s or longer.

<Distance> : Specifies a length of passing over the target point specified by the position variable, in units of 0.1mm, 0 to 6553.4mm

3.2 GETS (System Variable Fetch Instruction)

Saves the system variable (\$ variable) as a user variable.

NX100 cannot 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 CNVRT (Position Type Variable Conversion Instruction)

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 indicates the following variables.

P000 : R2 (slave)

P001 : R1 (master)

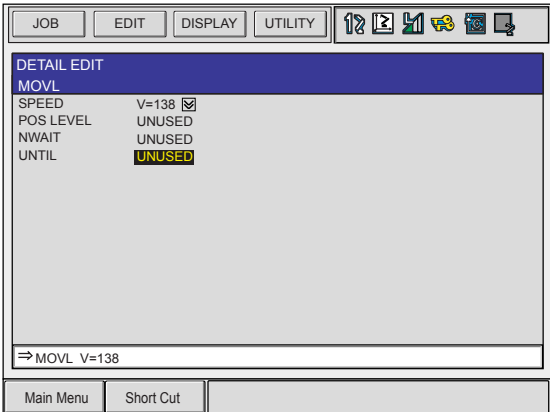
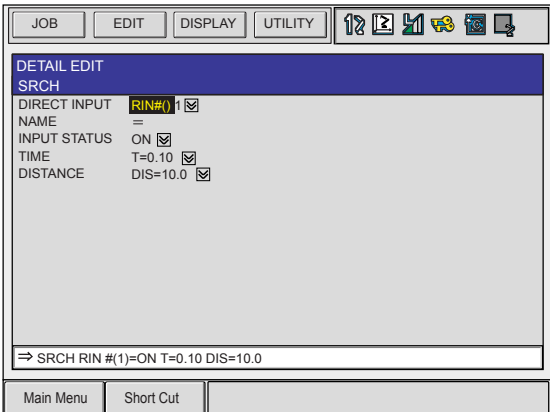
BP000 : B2 (slave)

BP001 : B1 (master)

EX000 : ST1

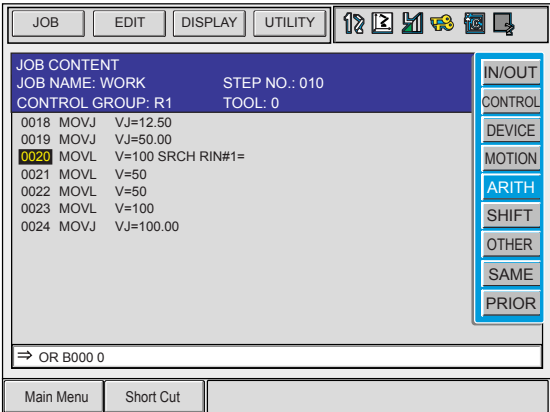
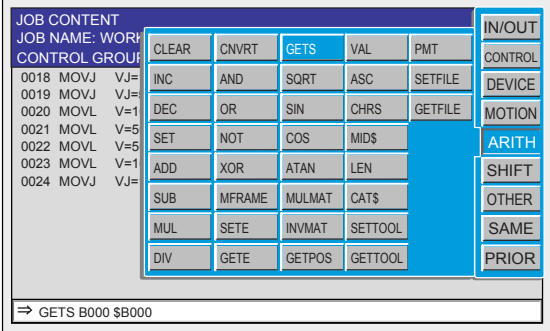
4 Registration of Instructions

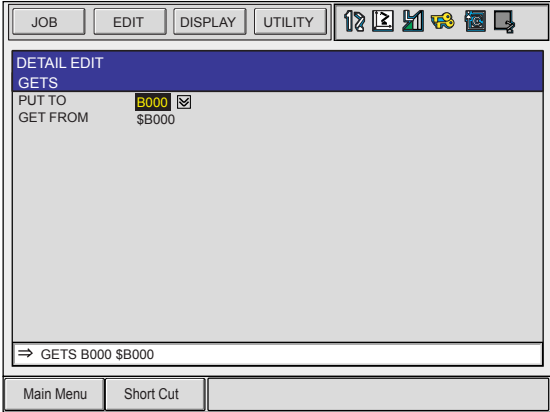
4.1 SRCH Instruction

	Operation	Explanation
1	Move the cursor to the instruction area.	
2	Move the cursor to the move instruction where SRCH instruction is to be registered.	
3	Press [SELECT] twice.	<p>Press [SELECT] once to display the contents registered in the job in the input buffer line. Press [SELECT] once more, and the DETAIL EDIT window of the move instruction appears.</p> 
4	Select {UNTIL}.	
5	Select {SRCH}.	<p>The DETAIL EDIT window of SRCH instruction appears.</p> 
6	Set each item on the DETAIL EDIT window of SRCH instruction.	
7	Press [ENTER].	Returns to the DETAIL EDIT window of the move instruction.
8	Press [ENTER] twice.	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.

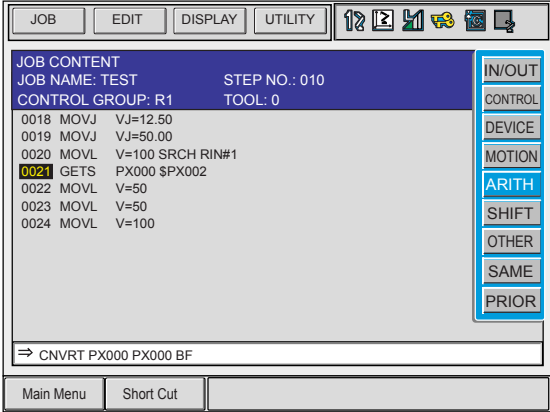
4.2 GETS Instruction

4.2 GETS Instruction

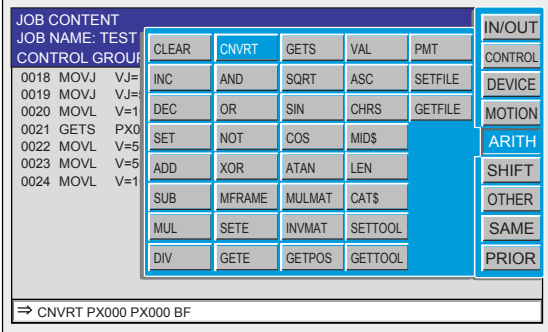
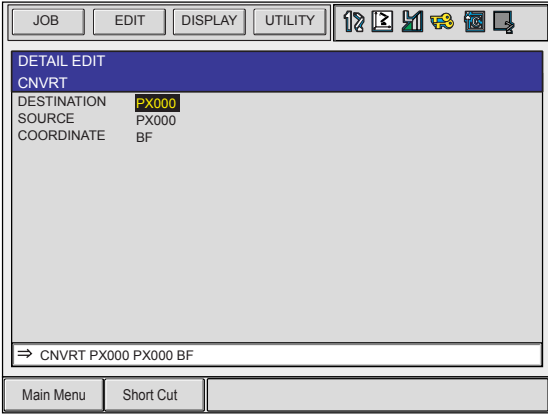
	Operation	Explanation
1	Move the cursor to the address area.	
2	Move the cursor to the line where GETS instruction is to be registered.	
3	Press [INFORM LIST].	<p>The instruction list dialog box appears. The cursor moves to the instruction list dialog box while the cursor in the address area changes to an under bar.</p> 
4	Select {GETS}.	<p>At this stage, the instruction on the cursor position is displayed with the previously registered additional items in the input buffer line.</p> 

	Operation	Explanation
5	Press [ENTER] twice.	The DETAIL EDIT window of GETS instruction appears. 
6	Set variables in the DETAIL EDIT window of GETS instruction.	
7	Press [ENTER] twice.	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	Explanation
1	Move the cursor to the address area.	
2	Move the cursor to the line where CNVRT instruction is to be registered.	
3	Press [INFORM LIST].	The instruction list dialog box appears. The cursor moves to the instruction list dialog box while the cursor in the address area changes to an under bar. 

4.3 CNVRT Instruction

	Operation	Explanation
4	Select {CNVRT}.	<p>At this stage, the instruction on the cursor position is displayed with the previously registered additional items in the input buffer line.</p> 
5	Press [ENTER] twice.	<p>The DETAIL EDIT window of CNVRT instruction appears.</p> 
6	Set variables on the DETAIL EDIT window of CNVRT instruction.	
7	Press [ENTER] twice.	<p>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.</p>

5 Alarm List

Alarm No.	Message	Cause	Remedy
4474	WRONG CONTROL GROUP AXIS	The CALL/JUMP destination job could not be executed. <ul style="list-style-type: none"> An attempt was made to call or jump to a job whose control group cannot be controlled. (Subcode: The related control-group) 	<ul style="list-style-type: none"> Make the setting in advance so that the control group of the CALL/JUMP destination job is included in that of the CALL/JUMP source job. Use a PSTART instruction when the independent control function is used.
4499	UNDEFINED POSITION VARIABLE	The position type variable is not registered. <ul style="list-style-type: none"> An attempt was made to use the position type variable that was not set. (Subcode: The variable number) 	Set the position type variable.
4507	REFP POS ERROR (SEARCH MOTION)	Incorrect teaching point for search detection <ul style="list-style-type: none"> The search start point and the motion target point are the same, or the distance between the two points is too short. 	<ul style="list-style-type: none"> Perform the teaching again so that the search start point and the motion target point are not the same. Increase the distance between the search start point and the motion target point.

6 Instruction List

- < > indicates numerical or alphabetical data.
- If multiple items are shown in one section, select one of the items.

SRCH	Function	Executes a search function.	
	Additional Item	RIN#(<direct IN No.>) = <status>	Direct IN No. : 1 to 5 Status : ON, OFF, B <vari- able No.>
		T = <time·s>	Direct IN sig- nal input check start delay time
		DIS = <distance·mm>	A length of passing over the target point speci- fied 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 Item	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 vari- able
Example	GETS B000 \$B000 GETS I001 \$I[1] GETS PX003 \$PX001		

CNVRT	Function	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	
	Additional Item	Data 1	PX <variable No.>
		Data 2	PX <variable No.>
		BF, RF, TF, UF# (<user coordinate system No.>), MTF	
Example	CNVRT PX000 PX001 BF CNVRT LPX000 LPX001 TF		

NX100 OPTIONS INSTRUCTIONS

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