

Motoman XRC Controller

Macro Function

Instruction Manual

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Motoman, Incorporated
805 Liberty Lane
West Carrollton, OH 45449
TEL: (937) 847-6200
FAX: (937) 847-6277
24-Hour Service Hotline: (937) 847-3200

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NOTES

SECTION 1

INTRODUCTION

1.1 About this Document

This manual provides instructions for Macro 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 –MACRO FUNCTION INSTRUCTIONS

Provides detailed instructions to utilize the Macro Function.

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 UP20, XRC Manipulator Manual (P/N 144342-1)
- Motoman UP50, XRC Manipulator Manual (P/N 144343-1)
- 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, UP20, 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 INSTRUCTIONS

FOR MACRO COMMAND 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.





MANDATORY

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



CAUTION

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

NOTES FOR SAFE OPERATION

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

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



WARNING

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



CAUTION

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



MANDATORY

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



PROHIBITED

Must never be performed.

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



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



WARNING

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

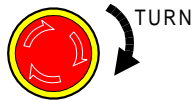
Injury or damage to machinery may result if the emergency stop circuit cannot stop the manipulator during an emergency. The manipulator should not be used if the emergency stop buttons do not function.



Emergency Stop Button

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

Injury may result from unintentional or unexpected manipulator motion.



Release of Emergency Stop

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

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

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

Improper or unintended manipulator operation may result in injury.

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

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



CAUTION

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

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

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

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

Definition of Terms Used Often in This Manual

The MOTOMAN manipulator is the YASKAWA industrial robot product.


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

The MOTOMAN manipulator is the YASKAWA industrial robot product.

In this manual, the equipment is designated as follows.

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

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

Equipment		Manual Designation
Programming Pendant	Character Keys	The keys which have characters printed on them are denoted with []. ex. [ENTER]
	Symbol Keys	The keys which have a symbol printed on them are not denoted with [] but depicted with a small picture. ex. page ke  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 macro command function registers a prepared job as a macro command and then carries out the job by the macro command.

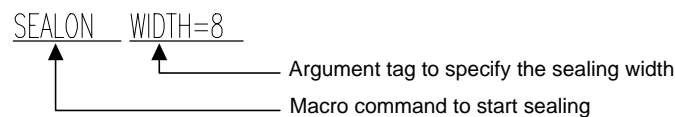
The macro command function is only for the customers who construct various MOTOMAN robot systems.

Using the macro command function together with the key customize function can make robot systems that are easier to use. Refer to “3.14 Number Key Customize Function” of the YASNAC XRC Instructions for details.

■ Features

- The user-prepared job is registered as a macro command by the macro command function.
- Using INFORM, the contents of macro command can be prepared in the same manner as the data for a normal job.
- An argument tag can be added to a macro command like a normal instruction. Macro commands and their argument tags can be easily programmed as you like in the job data display.

< Example > Macro command for sealing



- The macro commands can be used in the same way as other instructions. Unlike the CALL instruction, end users do not have to think of the restarting method if an interruption occurs when carrying out a job.
- The process that should be done after a job is interrupted, such as the cancellation of the work instruction at interruption, can be set.
- If a macro command is suspended, the operation starts again from the beginning of that macro command when the operation restarted.



The macro command function is enabled only when security mode is the management mode.



2 Preparation of Macro Commands

The execution sequence of a macro command is registered as a macro job.



The macro command function is enabled only when security mode is the management mode.

2.1 Preparing a Macro Job

Depending on its applications, there are three types of macro jobs: a robot macro job with a designated control group, a robot macro job without a control group, and a concurrent macro job.

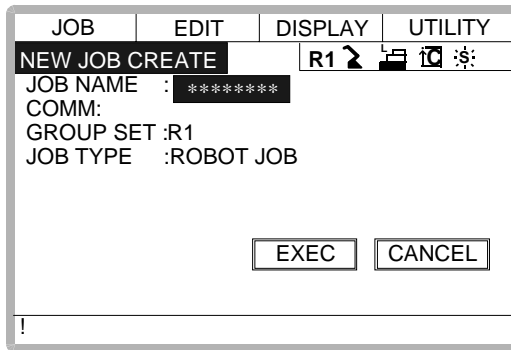
- Robot macro job with a designated control group
A move instruction can be registered in a macro command.
A macro command prepared as a robot macro job can be used only in the jobs configured for the same control groups.
For example, the macro command prepared as a robot macro job for R1 cannot be used in a job for R2.
- Robot macro job without a control group
Can be used for all robot jobs. Because the control group is not designated, no move instruction can be registered.
- Concurrent macro job
Can be used in a concurrent job. Because the control group is not designated, no move instruction can be registered.

Operation

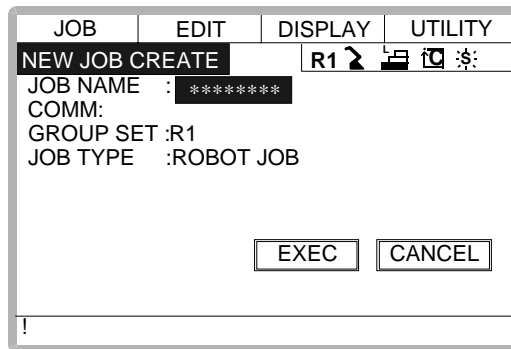
Change the security mode to "management mode" ➡ Select {JOB} under the top menu
 ➡ Select {NEW JOB CREATE}*1 ➡ Type a job name ➡ Move the cursor to "ROBOT JOB" and press [SELECT] *2 ➡ Select "ROBOT MACRO" or "CONCURRENT MACRO"
 ➡ Select "EXEC" *3

Explanation

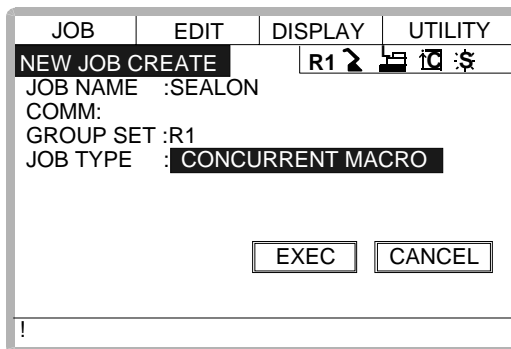
*1 The NEW JOB CREATE display appears.



*2 A list of job selections appears.



Select "ROBOT MACRO" or "CONCURRENT MACRO."



*3 The macro job is prepared, and the JOB CONTENT display appears.

2.2 Teaching of a Macro Job

Teach a macro job that was prepared as a macro command in the same manner as normal jobs. Sixteen argument tags can be added to a macro command. The data of the argument tag is stored in a local variable to be used, and so, the required number of local variables must be set in the job header display before teaching the macro job.



For the setting procedure of the local variables, refer to “5.3.5 Editing Local Variables” of the YASNAC XRC OPERATOR’S MANUAL.”



In a macro job, job execution instructions such as JUMP, CALL, and PSTART cannot be registered.

GETARG Instruction

■ Function

The instruction to receive an argument for macro command. When the macro command is carried out, the GETARG instruction gets the data of the argument tag that was added to the macro command and stores it in a local variable to be used in the macro job.

■ Format

GETARG	<u>LB000</u>	<u>IARG#(1)</u>	Stores the data of the first argument in the local variable LB000.
	‡	‡	
	@	A	

① Designation of the local variable as the storage destination of the argument data

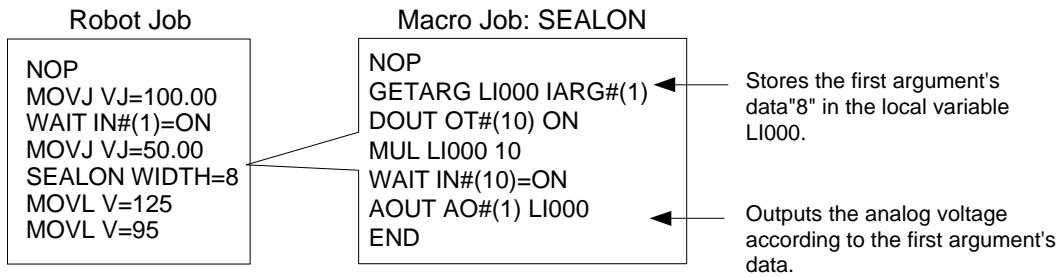
These types of local variables can be used as storage destinations:

- Byte-type
- Integer-type
- Double-precision integer type
- Real-number type
- Robot-axis-position type
- Base-axis-position type
- Station-axis-position type

② Designation of argument data

Specify the number of the argument from which the data is to be taken.

■ Job Example



3 Registration of Macro Commands

The macro job prepared in " 2.1 Preparing a Macro Job " is registered as a macro command.


NOTE The macro command function is enabled only when security mode is the management mode.


Operation


Change the security mode to "management mode" ➡ Select {SETUP} under the top menu ➡ Select {MACRO INST.} *1

Explanation

*1 The macro command setting display appears.

Press the page key  alternately display the MACRO (ROBOT) display and the MACRO (CONCURRENT) display.

DATA	EDIT	DISPLAY	UTILITY
MACRO (ROBOT)		R1	
	EXECUTE JOB	SUSPEND JOB	
MACRO1	*****	*****	
MACRO2	*****	*****	
MACRO3	*****	*****	
MACRO4	*****	*****	
MACRO5	*****	*****	
MACRO6	*****	*****	
MACRO7	*****	*****	
MACRO8	*****	*****	
!			

DATA	EDIT	DISPLAY	UTILITY
MACRO i CONCURRENT		R1	
	EXECUTE JOB	SUSPEND JOB	
MACRO1	*****	*****	
MACRO2	*****	*****	
MACRO3	*****	*****	
MACRO4	*****	*****	
MACRO5	*****	*****	
MACRO6	*****	*****	
MACRO7	*****	*****	
MACRO8	*****	*****	
!			

3.1 Setting an Execution Macro Job

The execution macro jobs are macro jobs where the operations to be carried out by a macro command are programmed. In the JOB CONTENT display of a macro command, the names of the jobs that are specified as execution macro jobs are displayed.

Operation

Move the cursor to "EXECUTE JOB" to be set in the macro command setting display, and press [SELECT]^{*1} → Select "SETTING MACRO JOB" ^{*2} → Select a macro job ^{*3}

Explanation

^{*1} A dialog box appears.

DATA	EDIT	DISPLAY	UTILITY
MACRO (ROBOT)		R1	⏪ ⏩ ⏴ ⏵ ⏶ ⏷
	EXECUTE JOB	SUSPEND JOB	
MACRO1	*****	*****	
MACRO2	*****	*****	
MACRO3	SETTING MACRO JOB	*****	
MACRO4	CANCEL MACRO JOB	*****	
MACRO5	*****	*****	
MACRO6	*****	*****	
MACRO7	*****	*****	
MACRO8	*****	*****	

^{*2} The MACRO JOB NAME display appears.

JOB	EDIT	DISPLAY	UTILITY
MACRO JOB NAME		R1	⏪ ⏩ ⏴ ⏵ ⏶ ⏷
LASERON	SEALON	LASEROFF	
ARCON	GUNON	PAINTON	
ARCOFF	SEALOFF	CANCEL	
GUNOFF			

^{*3} The selected macro job is registered as an execution macro job.

DATA	EDIT	DISPLAY	UTILITY
MACRO (ROBOT)		R1	⏪ ⏩ ⏴ ⏵ ⏶ ⏷
	EXECUTE JOB	SUSPEND JOB	
MACRO1	SEALON	*****	
MACRO2	*****	*****	
MACRO3	*****	*****	
MACRO4	*****	*****	
MACRO5	*****	*****	
MACRO6	*****	*****	
MACRO7	*****	*****	
MACRO8	*****	*****	

3.2 Setting Contents of the Argument Tag Added to the Macro Command

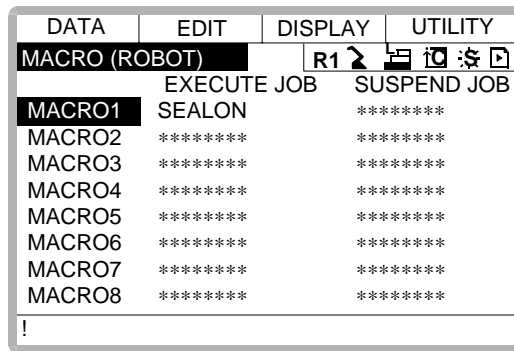
Set the contents of argument tag to be added to the registered macro command.
 For the macro command to which no argument has been added, this setting is not necessary.

Operation


Open the macro command setting display^{*1} → Move the cursor to the macro number to which the argument is to be set → Press [SELECT]^{*2} → Enter the items to be added to the macro command

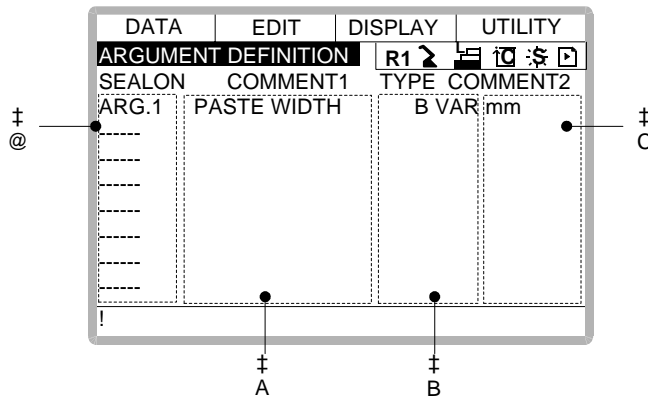
Explanation

*1 The macro command setting display appears.

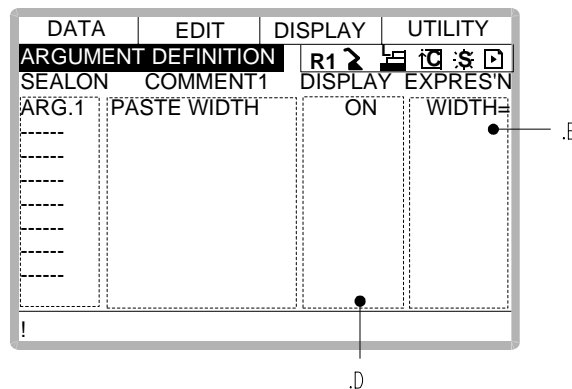


*2 The macro ARGUMENT DEFINITION display appears.

There are two displays for defining the macro argument. Press the page key  to switch the displays.



3.2 Setting Contents of the Argument Tag Added to the Macro Command



①Argument number (ARG. 1 to 16)

Move the cursor to the argument number to be set, and press [SELECT].
A selection dialog box appears. Select “USE” or “NOT USE.”
For the numbers of the argument not to be used, “-----” is displayed.

②COMMENT 1 (16 characters maximum)

Move the cursor to COMMENT 1 and press [SELECT]. The character input display appears.
Enter the contents of the argument tag added to the macro command in the “COMMENT 1” column. These contents are displayed as the comment for the argument tag in the details editing display of the macro command.

③TYPE

Move the cursor to TYPE and press [SELECT]. The selection dialog box appears.
Select a data type of the argument tag. The following types of data can be set.

<Constants or variables>

- Byte-type
- Integer-type
- Double-precision integer type
- Real-number type

<Variables or teaching points>

- Robot-axis-position type
- Base-axis-position type
- Station-axis-position type

④COMMENT 2 (8 characters maximum)

Move the cursor to COMMENT 2 and press [SELECT]. The character input display appears. Enter the unit for inputting data in the argument tag to be added to the macro command in “COMMENT 2.” The units are displayed as the comment for the argument tag data input units in the details editing display of the macro command.

⑤DISPLAY

Select whether or not to display the expression set in EXPRES’N in the job contents display. Pressing [SELECT] displays “ON” and “OFF” alternately: “ON” to display the expression; OFF to not display the expression. Even if “ON” is selected, the teaching point’s tag will not be displayed in the job contents when the teaching point for the robot position, base position, or station position is set in “TYPE.”

⑥EXPRES'N (8 characters maximum)

Move the cursor to EXPRES'N and press [SELECT]. The character input display appears. Type the expression for the argument tag in the job contents.

3.3 Setting an Interruption Macro Job

When a process is necessary a macro command is interrupted, an interruption macro job, called SUSPEND JOB, for the processing can be added to the program.

When a macro command that includes an interruption macro job (SUSPEND JOB) is interrupted by being putting on hold or for an emergency or switching modes, the interruption macro job is carried out.



In the interruption macro job for the robot macro command, only a robot job without a designated control group can be registered.

Operation

Move the cursor to the "SUSPEND JOB" column of the macro job for which an interruption macro job is to be added, and press [SELECT]^{*1} → Select "SETTING MARCO JOB"^{*2}
 → Select the macro job to be the interruption macro job^{*3}

Explanation

^{*1} The selection dialog box appears.

DATA	EDIT	DISPLAY	UTILITY
MACRO (ROBOT)		R1	⏏ ⏏ ⏏ ⏏
	EXECUTE JOB		SUSPEND JOB
MACRO1	*****		*****
MACRO2	*****		*****
MACRO3		SETTING MACRO JOB	****
MACRO4		CANCEL MACRO JOB	****
MACRO5	*****		*****
MACRO6	*****		*****
MACRO7	*****		*****
MACRO8	*****		*****
!			

3.3 Setting an Interruption Macro Job

*2 The MACRO JOB NAME display appears.

JOB	EDIT	DISPLAY	UTILITY
MACRO JOB NAME		R1	⏏ ⏏ ⏏ ⏏ ⏏ ⏏
LASERON	SEALON	LASEROFF	
ARCON	GUNON	PAINTON	
ARCOFF	SEALOFF	CANCEL	
GUNOFF			

*3 The selected macro job is registered as the interruption macro job.

DATA	EDIT	DISPLAY	UTILITY
MACRO (ROBOT)		R1	⏏ ⏏ ⏏ ⏏ ⏏ ⏏
	EXECUTE JOB	SUSPEND JOB	
MACRO1	SEALON	CANCEL	
MACRO2	*****	*****	
MACRO3	*****	*****	
MACRO4	*****	*****	
MACRO5	*****	*****	
MACRO6	*****	*****	
MACRO7	*****	*****	
MACRO8	*****	*****	
!			



If the following infinite loop is programmed in the interruption macro job, the start lamp stays lit but no operation is carried out. Do not add such a job to the program. In the interruption macro job, TIMER and WAIT instructions are not carried out.

< Example of an Inoperative Job >

```

NOP
*LOOP
DOUT OT#(1) OFF
AOUT AO#(1) 10.00
JUMP *LOOP IF IN#(1)=ON
END
    
```


YASNAC XRC INSTRUCTIONS

FOR MACRO COMMAND FUNCTION

TOKYO OFFICE

New Pier Takeshiba South Tower, 1-16-1, Kaigan, Minatoku, Tokyo 105-0022, Japan
Phone 81-3-5402-4511 Fax 81-3-5402-4580

MOTOMAN INC. HEADQUARTERS

805 Liberty Lane West Carrollton, OH 45449, U.S.A.
Phone 1-937-847-6200 Fax 1-937-847-6277

MOTOMAN INC. TROY FACILITY

1050 S. Dorset, Troy, OH 45373, U.S.A.
Phone 1-937-440-2600 Fax 1-937-440-2626

YASKAWA MOTOMAN CANADA LTD

2280 Argentia Road, Mississauga, Ontario, L5N 6H8, Canada
Phone 1-905-813-5901 Fax 1-905-813-5911

YASKAWA ELECTRIC EUROPE GmbH

Am Kronberger Hang 2, 65824 Schwalbach, Germany
Phone 49-6196-569-300 Fax 49-6196-888-301

Motoman Robotics Europe AB

Box 504 S38525 Torsås, Sweden
Phone 46-486-48800 Fax 46-486-41410

Motoman Robotec GmbH

Kammerfeldstraße 1, 85391 Allershausen, Germany
Phone 49-8166-900 Fax 49-8166-9039

YASKAWA ELECTRIC KOREA CORPORATION

Kfpa Bldg #1201, 35-4 Youido-dong, Yeongdungpo-Ku, Seoul 150-010, Korea
Phone 82-2-784-7844 Fax 82-2-784-8495

YASKAWA ELECTRIC (SINGAPORE) PTE. LTD.

151 Lorong Chuan, #04-01, New Tech Park Singapore 556741, Singapore
Phone 65-282-3003 Fax 65-289-3003

YATEC ENGINEERING CORPORATION

Shen Hsiang Tang Sung Chiang Building 10F 146 Sung Chiang Road, Taipei, Taiwan
Phone 886-2-2563-0010 Fax 886-2-2567-4677

BEIJING OFFICE

Room No. 301 Office Building of Beijing International Club, 21 Jianguomenwai Avenue, Beijing 100020, China
Phone 86-10-6532-1850 Fax 86-10-6532-1851

SHANGHAI OFFICE

27 Hui He Road Shanghai 200437, China
Phone 86-21-6553-6600 Fax 86-21-6531-4242

YASKAWA JASON (HK) COMPANY LIMITED

Rm. 2909-10, Hong Kong Plaza, 186-191 Connaught Road West, Hong Kong
Phone 852-2803-2385 Fax 852-2547-5773

TAIPEI OFFICE

Shen Hsiang Tang Sung Chiang Building 10F 146 Sung Chiang Road, Taipei, Taiwan
Phone 886-2-2563-0010 Fax 886-2-2567-4677

BEIJING YASKAWA BEIKE AUTOMATION ENGINEERING CO., LTD.

30 Xue Yuan Road, Haidian, Beijing P.R. China Post Code: 100083, China
Phone 86-10-6233-2782 Fax 86-10-6232-1536

SHOUGANG MOTOMAN ROBOT CO., LTD.

7, Yongchang-North Street, Beijing Economic Technological Investment & Development Area,
Beijing 100076, China
Phone 86-10-6788-0551 Fax 86-10-6788-2878



YASKAWA ELECTRIC CORPORATION

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