

- 24-hour Telephone Number: (937) 847-3200
Use for urgent or emergency needs for technical support, service and/or replacement parts
- Routine Technical Inquiries: techsupport@motoman.com
Allow up to 36 hours for response

YRC1000 OPERATOR'S MANUAL

FOR LADDER EDITOR

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

MOTOMAN INSTRUCTIONS

MOTOMAN-□□□ INSTRUCTIONS

YRC1000 INSTRUCTIONS

YRC1000 OPERATOR'S MANUAL (GENERAL) (SUBJECT SPECIFIC)

YRC1000 MAINTENANCE MANUAL

YRC1000 ALARM CODES (MAJOR ALARMS) (MINOR ALARMS)

The YRC1000 operator's manual above corresponds to specific usage. Be sure to use the appropriate manual.

The YRC1000 operator's manual above consists of "GENERAL" and "SUBJECT SPECIFIC".

The YRC1000 alarm codes above consists of "MAJOR ALARMS" and "MINOR ALARMS".

Please have the following information available when contacting Yaskawa Customer Support:

- System
- Primary Application
- Software Version (*Located on Programming Pendant by selecting: {Main Menu} - {System Info} - {Version}*)
Robot Serial Number (*Located on robot data plate*)
Robot Sales Order Number (*Located on controller data plate*)

Part Number: 179482-1CD
Revision: 0



DANGER

- This manual explains the ladder editor function of the YRC1000 system. Read this manual carefully and be sure to understand its contents before handling the YRC1000. Any matter not described in this manual must be regarded as "prohibited" or "improper".
- General information related to safety are described in "Chapter 1. Safety" of the YRC1000 INSTRUCTIONS. To ensure correct and safe operation, carefully read "Chapter 1. Safety" of the YRC1000 INSTRUCTIONS.



CAUTION

- In some drawings in this manual, protective covers or shields are removed to show details. Make sure that all the covers or shields are installed in place before operating this product.
- YASKAWA is not responsible for incidents arising from unauthorized modification of its products. Unauthorized modification voids the product warranty.

NOTICE

- 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.

NOTES FOR SAFE OPERATION

Read this manual carefully before installation, operation, maintenance, or inspection of the YRC1000.

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



DANGER

Indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury. Safety Signs identified by the signal word DANGER should be used sparingly and only for those situations presenting the most serious hazards.



WARNING

Indicates a potentially hazardous situation which, if not avoided, will result in death or serious injury. Hazards identified by the signal word WARNING present a lesser degree of risk of injury or death than those identified by the signal word DANGER.



CAUTION

Indicates a hazardous situation, which if not avoided, could result in minor or moderate injury. It may also be used without the safety alert symbol as an alternative to “NOTICE”.

NOTICE

NOTICE is the preferred signal word to address practices not related to personal injury. The safety alert symbol should not be used with this signal word. As an alternative to “NOTICE”, the word “CAUTION” without the safety alert symbol may be used to indicate a message not related to personal injury.

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 “DANGER”, “WARNING” and “CAUTION”.



DANGER

- Before operating the manipulator, make sure the servo power is turned OFF by performing the following operations. When the servo power is turned OFF, the SERVO ON LED on the programming pendant is turned OFF.
 - Press the emergency stop buttons on the front door of the YRC1000, on the programming pendant, on the external control device, etc.
 - Disconnect the safety plug of the safety fence. (when in the play mode or in the remote mode)

If operation of the manipulator cannot be stopped in an emergency, personal injury and/or equipment damage may result.

Fig. : Emergency Stop Button



- Before releasing the emergency stop, make sure to remove the obstacle or error caused the emergency stop, if any, and then turn the servo power ON.

Failure to observe this instruction may cause unintended movement of the manipulator, which may result in personal injury.

Fig. : Release of Emergency Stop



- Observe the following precautions when performing a teaching operation within the manipulator's operating range:
 - Be sure to perform lockout by putting a lockout device on the safety fence when going into the area enclosed by the safety fence. In addition, the operator of the teaching operation must display the sign that the operation is being performed so that no other person closes the safety fence.
 - View the manipulator from the front whenever possible.
 - Always follow the predetermined operating procedure.
 - Always keep in mind emergency response measures against the manipulator's unexpected movement toward a person.
 - Ensure a safe place to retreat in case of emergency.

Failure to observe this instruction may cause improper or unintended movement of the manipulator, which may result in personal injury.

- Confirm that no person is present in the manipulator's operating range and that the operator is in a safe location before:
 - Turning ON the YRC1000 power
 - Moving the manipulator by using the programming pendant
 - Running the system in the check mode
 - Performing automatic operations

Personal injury may result if a person enters the manipulator's operating range during operation. Immediately press an emergency stop button whenever there is a problem. The emergency stop buttons are located on the front panel of the YRC1000 and on the right of the programming pendant.

- Read and understand the Explanation of the Warning Labels before operating the manipulator.



WARNING

- Perform the following inspection procedures prior to conducting manipulator teaching. If there is any problem, immediately take necessary steps to solve it, such as maintenance and repair.
 - Check for a problem in manipulator movement.
 - Check for damage to insulation and sheathing of external wires.
- Always return the programming pendant to the hook on the YRC1000 cabinet after use.

If the programming pendant is left unattended on the manipulator, on a fixture, or on the floor, etc., the Enable Switch may be activated due to surface irregularities of where it is left, and the servo power may be turned ON. In addition, in case the operation of the manipulator starts, the manipulator or the tool may hit the programming pendant left unattended, which may result in personal injury and/or equipment damage.

Definition of Terms Used Often in This Manual

The MOTOMAN is the YASKAWA industrial robot product.

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

In this manual, the equipment is designated as follows.

Equipment	Manual Designation
YRC1000 Controller	YRC1000
YRC1000 Programming Pendant	Programming Pendant
Cable between the manipulator and the controller	Manipulator cable

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

Equipment		Manual Designation
Programming Pendant	Character Keys /Symbol Keys	The keys which have characters or symbols printed on them are denoted with []. ex. [ENTER]
	Axis Keys /Numeric Keys	[Axis Key] and [Numeric Key] 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 [SELECT] is pressed, or that the item is directly selected by touching the screen.

Registered Trademark

In this manual, names of companies, corporations, or products are trademarks, registered trademarks, or brand names for each company or corporation. The indications of (R) and TM are omitted.

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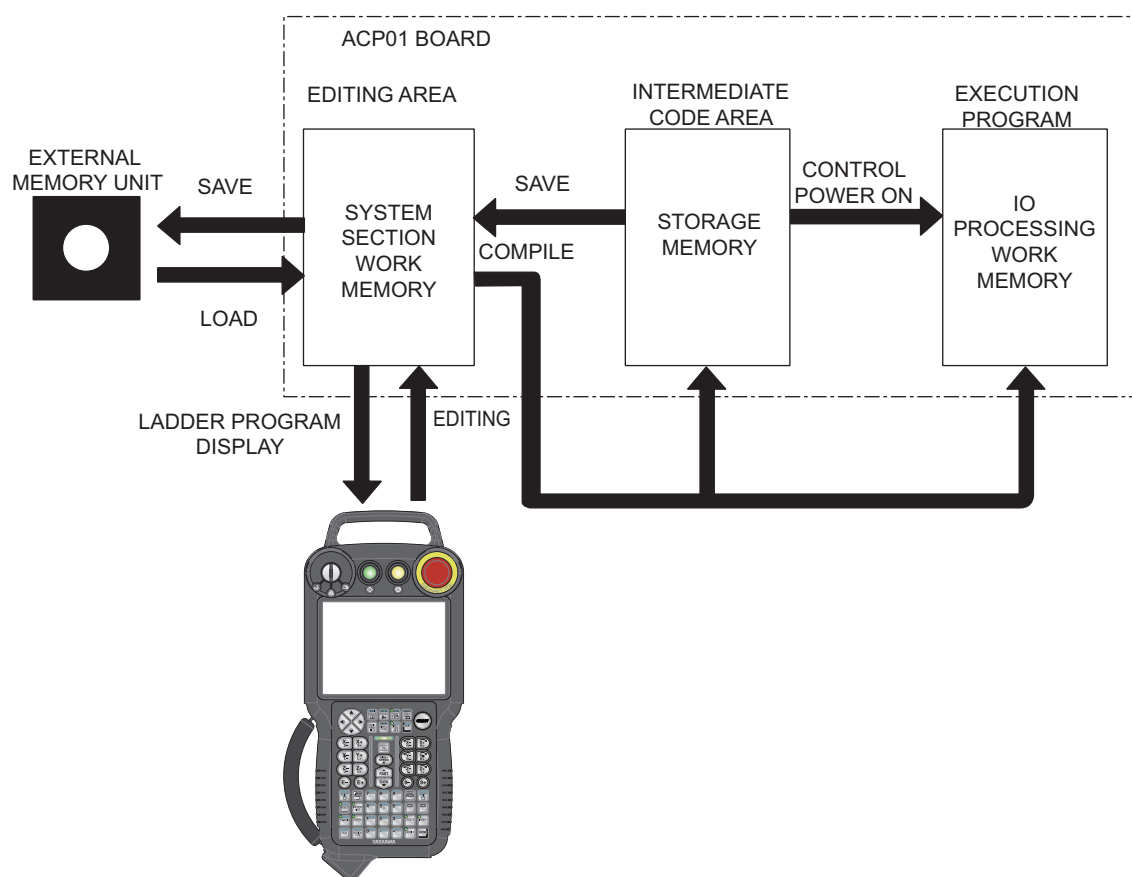
1 Editing Ladder Programs

1.1 Flow of Data by Ladder Programs

1 Editing Ladder Programs

1.1 Flow of Data by Ladder Programs

Flow of data in editing, storage, and execution areas by operation of ladder program is shown below.



NOTE

- Only the user ladder program can be edited. The system ladder program cannot be edited.
- When the system ladder program is changed, the ladder program from the external memory unit cannot be loaded.
- If control power is shut down while the ladder program is being edited, the edited ladder program is lost. The intact program remains in the execution area.
- During editing of ladder programs, "EDITING" is indicated on the upper right of the user section display. This indication appears only when the program in the editing area and that in the execution area do not match. No indication will be displayed after compilation or cancellation of editing when the programs in the two areas match.

1 Editing Ladder Programs

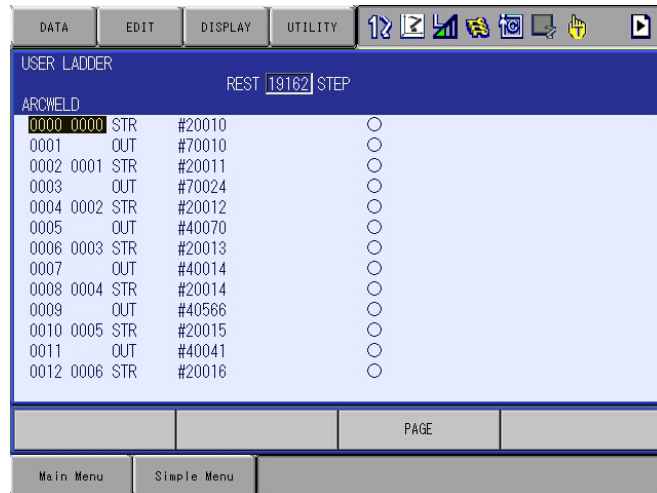
1.2 Editing by Mnemonic and Editing Program

1.2 Editing by Mnemonic and Editing Program

The editing operations for ladder programs are two ways as follows.

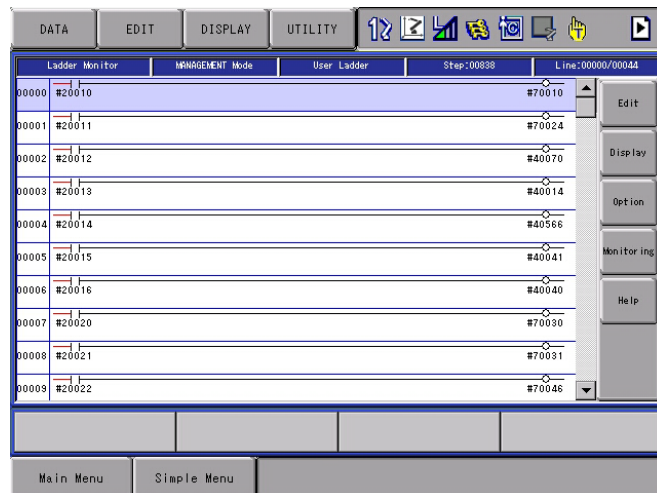
1. Editing by Mnemonic Codes

- Ladder programs can be edited in mnemonic codes as shown below.



2. Editing by Editing Program

- Ladder programs can be edited with the image of ladders as shown in the window below.



1 Editing Ladder Programs

1.3 Ladder Editor Window

1.3 Ladder Editor Window

1.3.1 Basic Operation

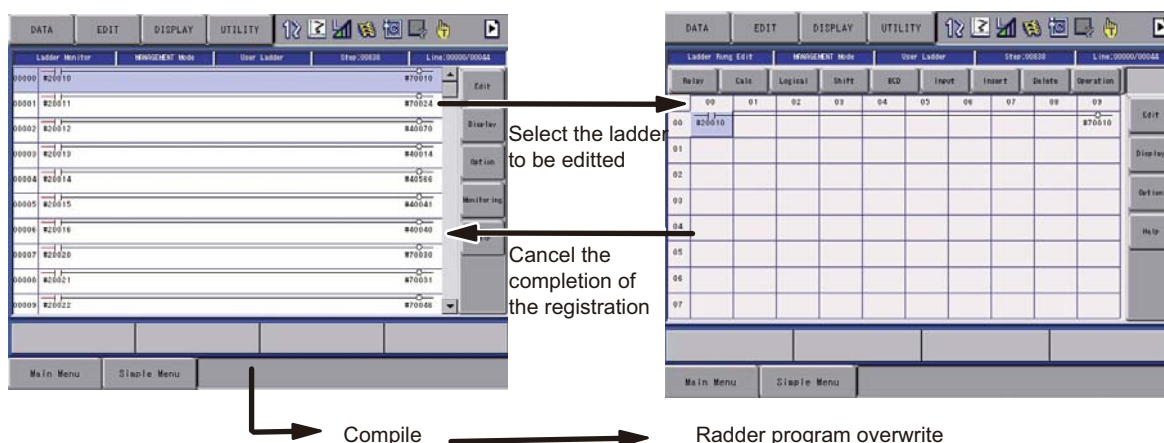
The Ladder Editor consists of Ladder View window and Ladder Editing window.

The ladders to be edited are selected in the Ladder View window.

Ladder programs are edited in the Ladder Editing window.

Radder View Window

Radder Editing Window



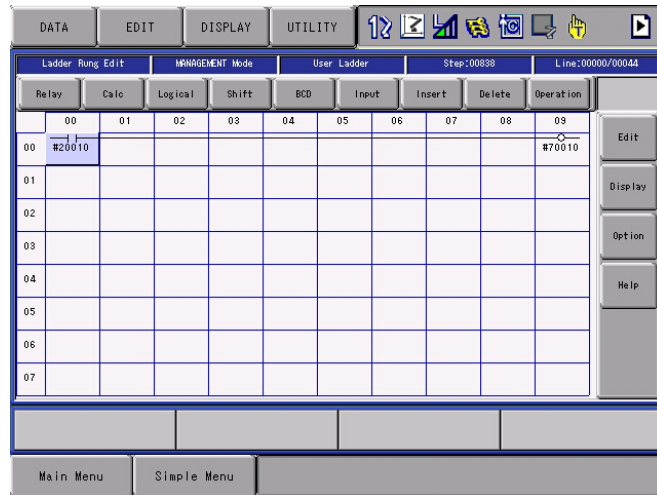
1. Select {IN/OUT} under the main menu.
2. Select {LADDER EDITOR}.
- The view window of the User Ladder appears.



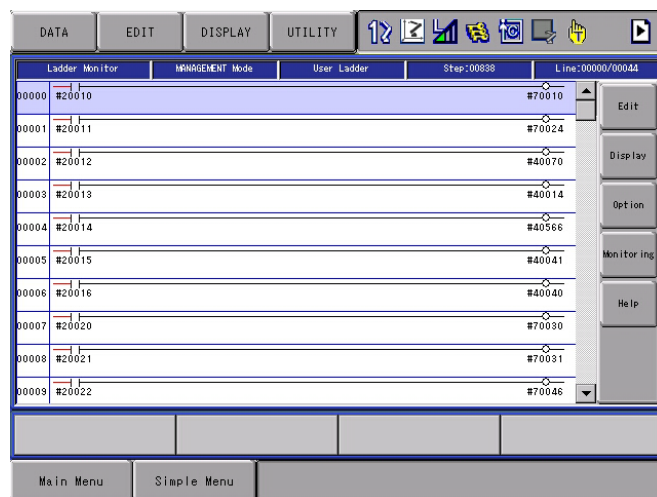
1 Editing Ladder Programs

1.3 Ladder Editor Window

3. Move the cursor to the ladder program to be edited.
 - The selected one row appears in the Ladder Editing window.



4. Edit Operation.
 - For each editing operation, see *chapter 1.3.3 "Editing Operation of Ladder Editing Window"* on the following pages. The system ladder section cannot be edited.
5. Move the cursor to the menu pressing [AREA] .
6. Select {EDIT}.
7. Select {SAVE RUNG (OVERWRITE)}.
- Returns to the view window of the User Ladder section.



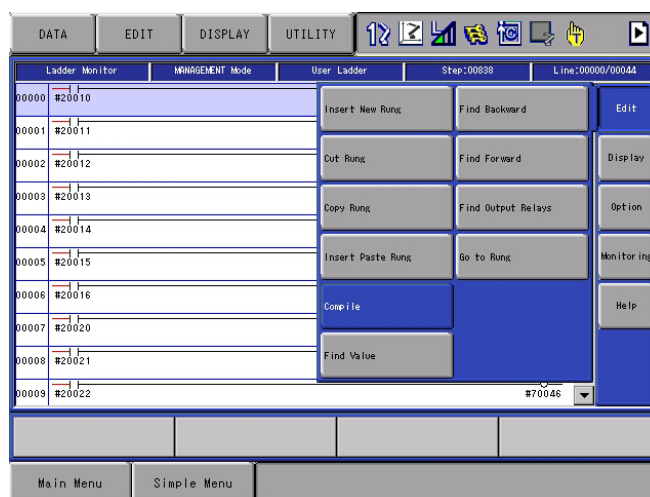
8. Select {EDIT}.

1 Editing Ladder Programs

1.3 Ladder Editor Window

9. Select {COMPILE}.

- The edited ladder program is checked for syntax error. If no error is found, the new program is written into the execution area to run. If any error is found in the edited ladder program, the erroneous step is identified. In this case, the program stored in the execution area remains unchanged.



- Ladder operation and editing are prohibited depending on YRC1000 security level as listed in the following table.



Security Level	Operational Item
Operation	Referring to ladder diagram, monitoring signals (Operation and editing of ladders are not allowed.)
Editing	
Management	Referring to ladder diagram, monitoring signals, editing and operating user ladders.

- Cursor key operation on Ladder View window. The cursor moves up/down line by line each time the up/down cursor key is pressed. The cursor moves up/down five lines at a time each time [SHIFT] + up/down cursor keys are pressed.

1 Editing Ladder Programs
1.3 Ladder Editor Window

NOTE

- Ladder View Window

The Ladder View window consists of the ladder view and menu. The position of a cursor in the window switches every pressing [AREA] as shown in the following pictures.

DATAEDITDISPLAYUTILITY

Menu area

00000#20010#70010

00001#20012#40070

00002#20013#40014

00003#20015#40041

00004#20016#40040

00005#20020#70030

00006#20021#70231

00007#20022#70040

00008#20023#70041

00009#20024#70430

Main menu

Edit

Display

Option

Help

Status area

- Ladder Editing Window

The Ladder Editing window consists of the ladder editing, menu, and instruction menu. The position of a cursor in the window switches every pressing [AREA] as shown in the following pictures.

DATAEDITDISPLAYUTILITY

Menu area

RelayCalcLogicalShiftBCDInputInsertDeleteOperation

Parts menu

0001010203040506070809

00#20010#70010

01

02

03

04

05

06

07

Main menu

Edit

Display

Option

Help

Status area

1-6

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1 Editing Ladder Programs

1.3 Ladder Editor Window

1.3.2 Editing Operation of Ladder View Window

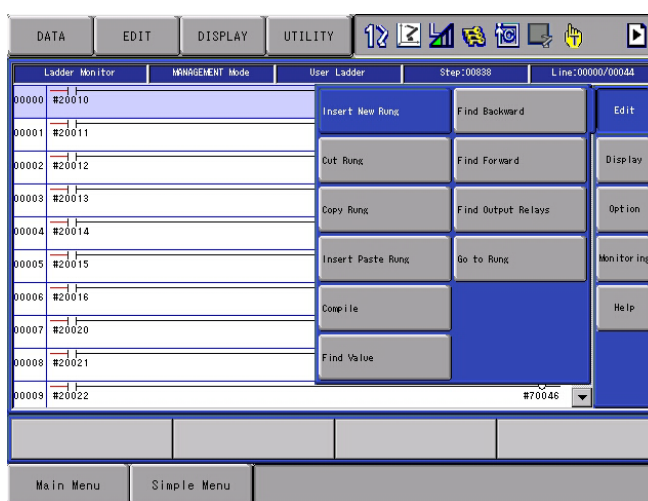
The Ladder View window allows to insert new rungs, and cut (copy) and paste rungs.

1.3.2.1 Insert New Rungs

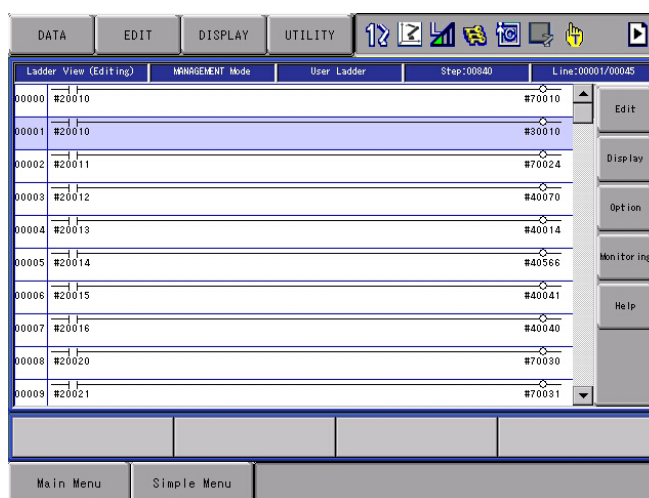
The following explains the insertion of new rungs. Perform appropriate ladder editing as a default value is already set for the rung to be inserted.

A new rung is inserted after the rung where a cursor locates in the Ladder View window.

1. Move the cursor to the rung to be inserted.
2. Move the cursor to the menu pressing [AREA] .
3. Select {EDIT}.



4. Select {INSERT NEW RUNG}
 - New rung (input: #20010 - output: #30010) is inserted under the rung where a cursor locates.



1 Editing Ladder Programs

1.3 Ladder Editor Window

1.3.2.2 Cut (Copy) and Paste Rungs

■ 1. Selecting Subject Rungs

Subject rungs for cut and copy can be specified as follows.

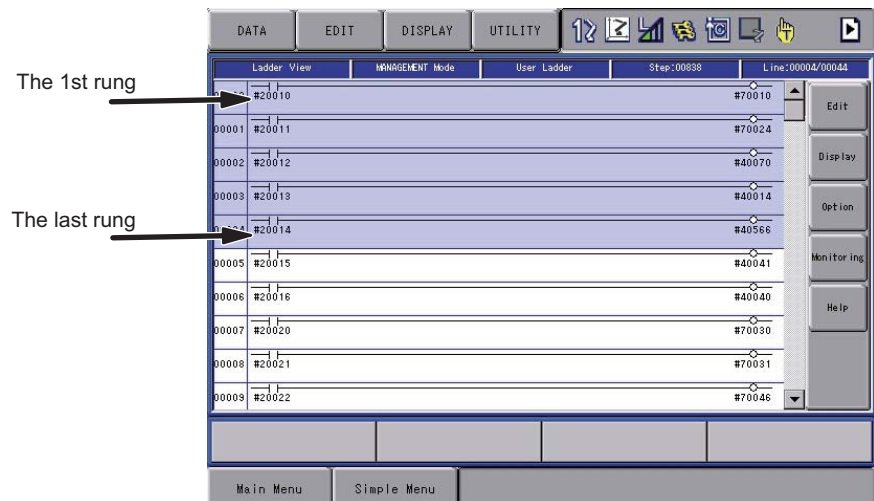
1. Move the cursor to the rung where selection starts.



2. Press [SHIFT] + [SELECT].

– Start on a multiple rung selection.

3. Move the cursor to the last rung to be selected.



Press [CANCEL] to release the multiple rung selection status during the multiple selection.

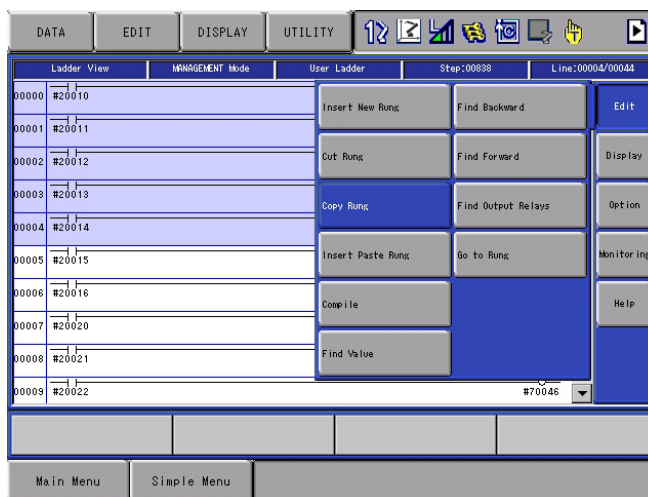
1 Editing Ladder Programs

1.3 Ladder Editor Window

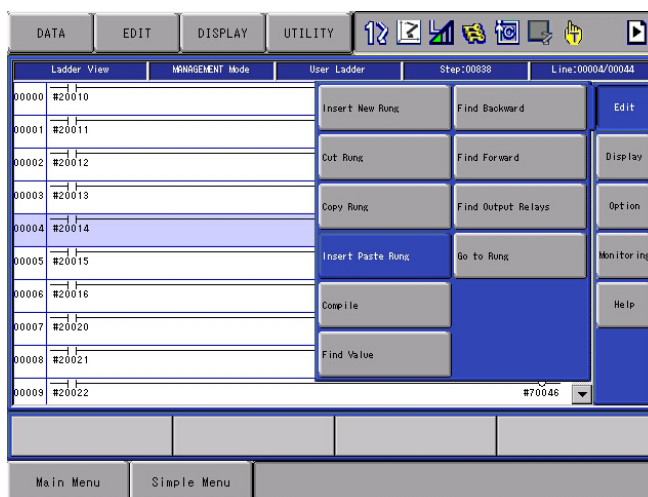
■ 2. Copy and Paste Rungs

This function allows to copy and paste ladders.

1. Move the cursor to the menu pressing [AREA] .
2. Select {EDIT}.



3. Select {COPY}.
4. Move the cursor to the rung position in which the copied rung is pasted.
5. Move the cursor to the menu pressing [AREA] .
6. Select {EDIT}.

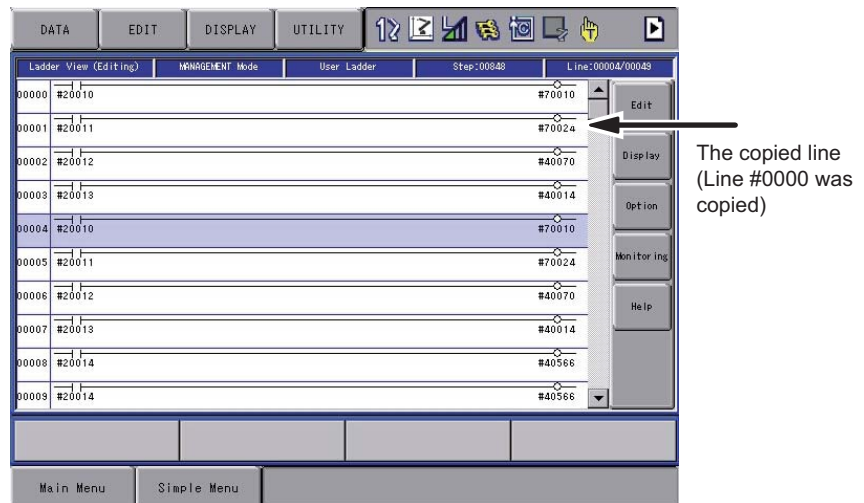


1 Editing Ladder Programs

1.3 Ladder Editor Window

7. Select {INSERT PASTE RUNG}.

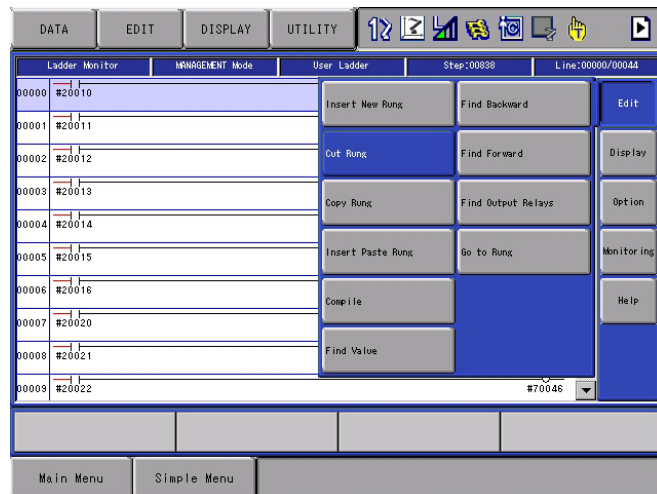
- The copied rung is inserted under the cursor position.



3. Cut (Copy) and Paste Rungs

This function allows to cut (copy) and paste rungs.

1. Move the cursor to the menu pressing [AREA] .
2. Select {EDIT}.

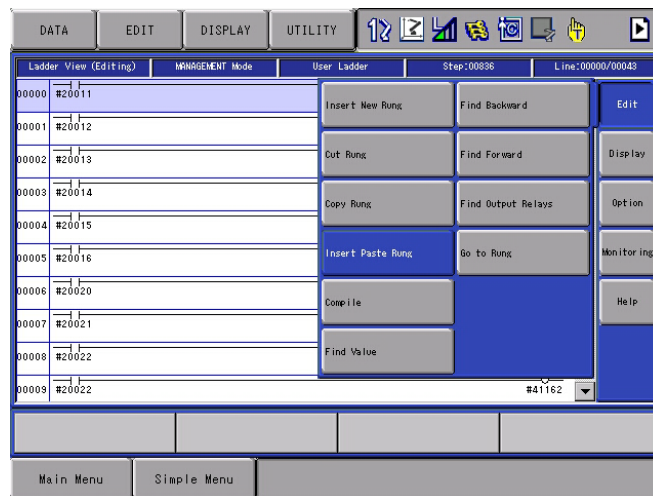


3. Select {CUT RUNG}.
4. Move the cursor to the rung position in which the cut rung is pasted.
5. Move the cursor to the menu pressing [AREA] .
6. Select {EDIT}.

1 Editing Ladder Programs

1.3 Ladder Editor Window

7. Select {INSERT PASTE RUNG}.



1 Editing Ladder Programs

1.3 Ladder Editor Window

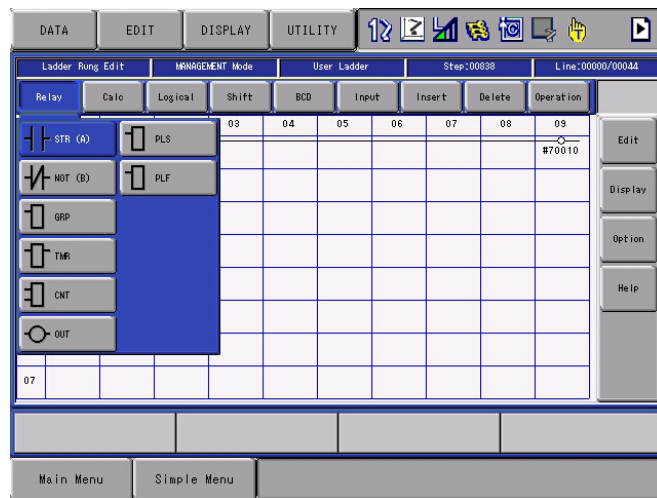
1.3.3 Editing Operation of Ladder Editing Window

The Ladder Editing window allows registration of instructions (including adding, changing, and deleting instructions), operands editing, and other operations such as inserting and deleting rows and columns.

1.3.3.1 Inserting and Changing Instructions

■ 1. Selecting and Pasting Instructions

1. Move the cursor to the instruction menu pressing [AREA] .
2. Select an instruction to be added under the instruction menu.



- The following instructions are ready to be selected under the instruction menu.



{RELAY}:	STR (A contact), NOT (B contact), GRP (GSTR-GOUT), TMR, CNT, OUT, PLS, PLF
{CALC}:	ADD, SUB, MUL, DIV, MOD
{LOGIC}:	WAND, WOR, WXOR, WNOT, MOV, BMOV, CMP
{SHIFT}:	SHL, SHR, ROL, ROR
{BCD}:	BIN, BCD

- For details on each instructions, refer to “12.2 Instruction Description” in the YRC1000 Concurrent I/O.

1 Editing Ladder Programs

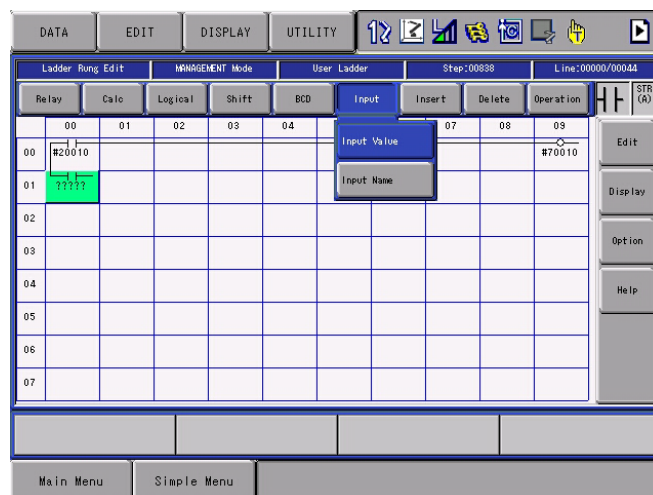
1.3 Ladder Editor Window

3. Move the cursor to the pasting position of the detailed window, then select it.
 - Paste the instruction selected under the instruction menu.



■ 2. Input Value

1. Move the cursor to the instruction menu pressing [AREA] .
2. Select {INPUT}.



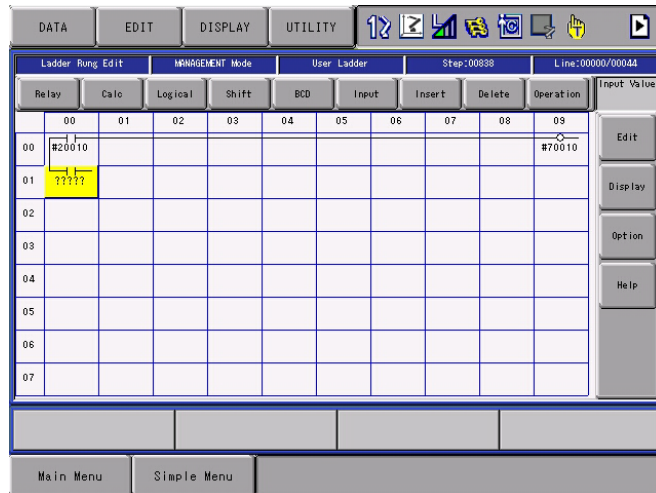
1 Editing Ladder Programs

1.3 Ladder Editor Window

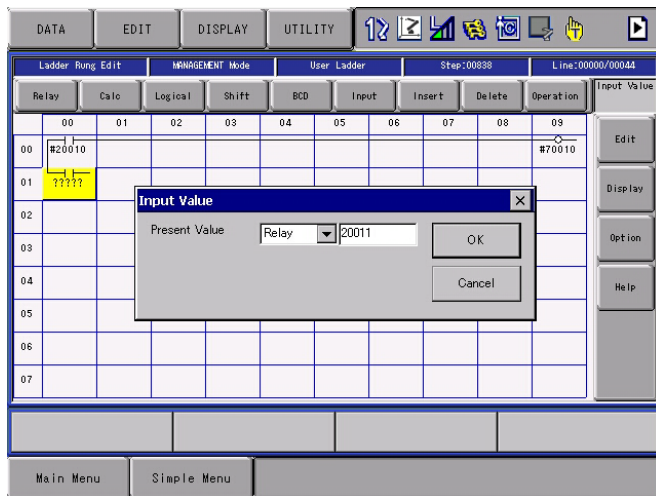
3. Select {INPUT VALUE}.

4. Input values.

- Move the cursor to the instruction to which the value is input, then select it.



- Input the value when the following dialog box appears.

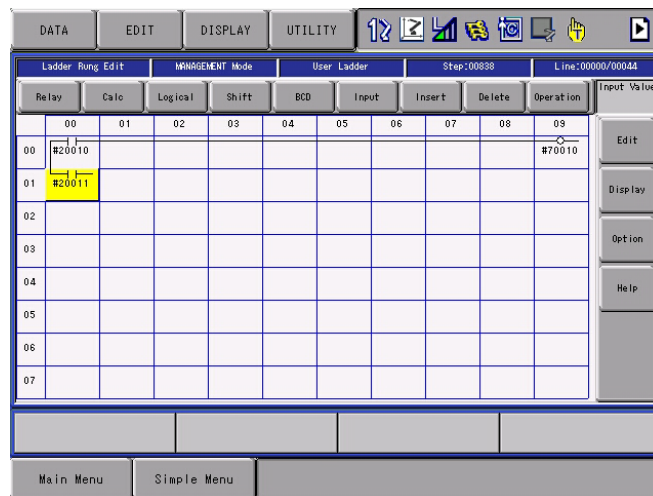


1 Editing Ladder Programs

1.3 Ladder Editor Window

5. Press [ENTER].

– The value is registered.

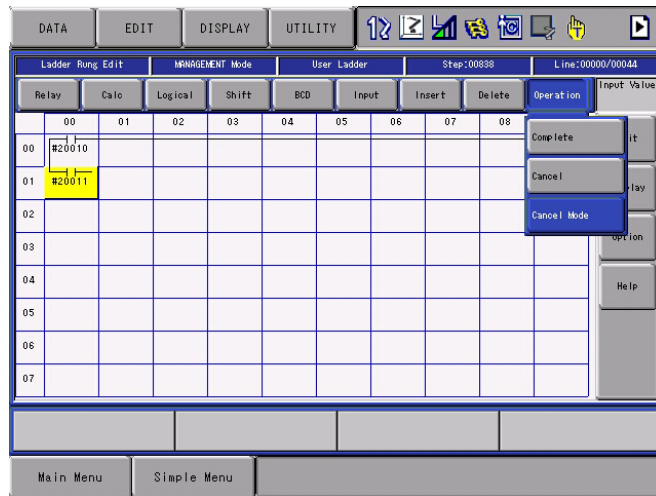


1 Editing Ladder Programs

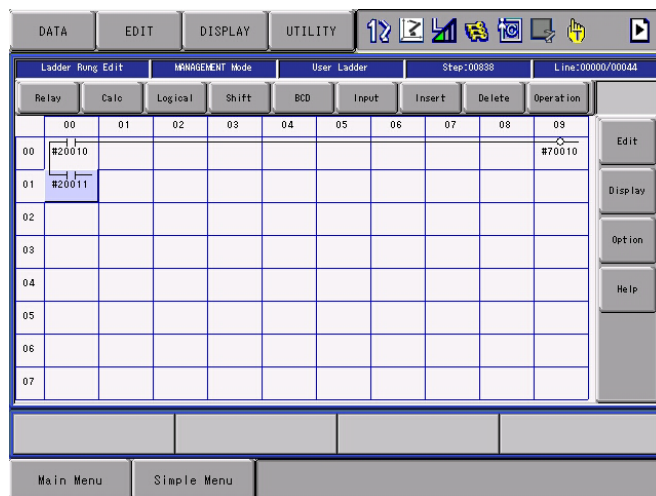
1.3 Ladder Editor Window

3. Connect Instructions

1. Move the cursor to the instruction menu pressing [AREA] .
2. Select {OPERATION}.



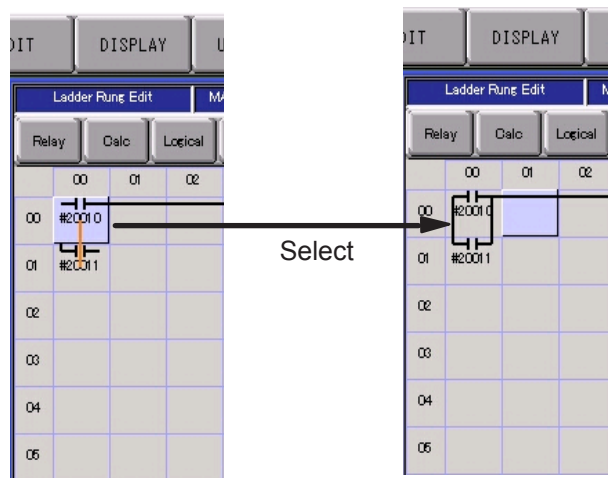
3. Select {CANCEL MODE}.
4. Connect instructions.
 - Move the cursor to the starting position of the connection, then select it.



1 Editing Ladder Programs

1.3 Ladder Editor Window

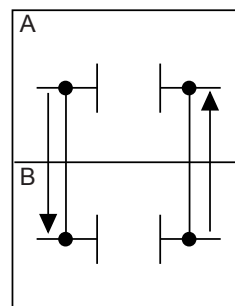
- Move the cursor to the end position of the connection, then select it. The selected instructions are connected.



- The selected mode can be cancelled by pressing [CANCEL] instead of following the procedures 1 to 3 of "3. Connect Instructions" described above.
- Connecting instructions of OR circuit in the same column can be achieved by:

Front connection (instructions connected in the order of upper instruction to lower instruction).

Rear connection (instructions connected in the order of lower instruction to upper instruction).

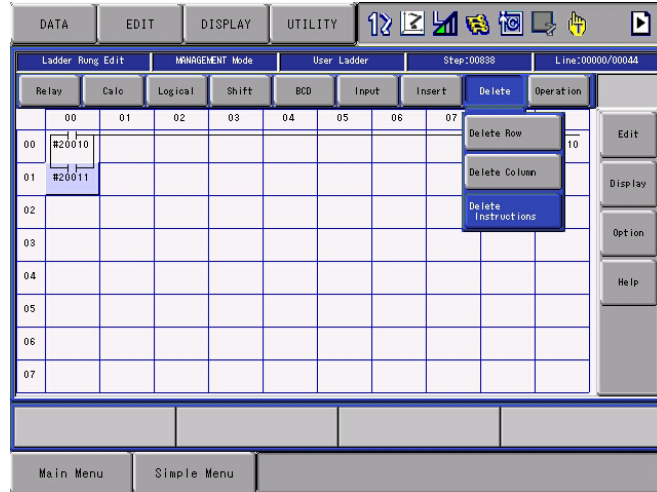


1 Editing Ladder Programs

1.3 Ladder Editor Window

1.3.3.2 Delete Instructions

1. Move the cursor to the instruction menu pressing [AREA] .
2. Select {DELETE}.



3. Select {DELETE INSTRUCTIONS}.
4. Move the cursor to the instruction to be deleted, then select it.
5. The instruction is deleted.



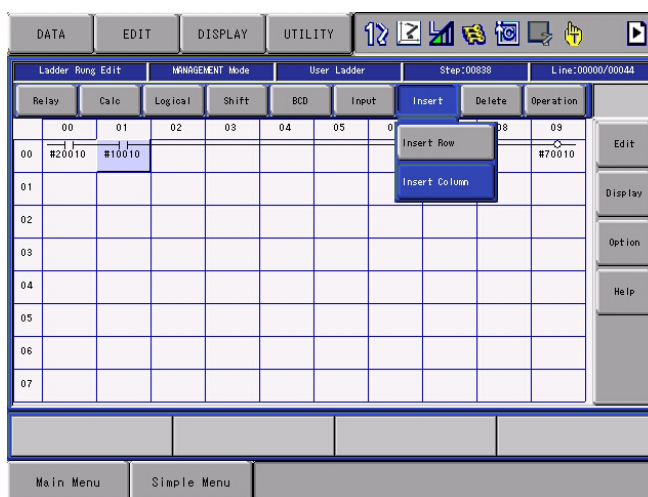
1 Editing Ladder Programs

1.3 Ladder Editor Window

1.3.3.3 Insert Columns

The following explains how to insert a new instruction between the instructions already set when editing ladders. The function “INSERT COLUMN” allows to shift all the columns behind the designated cursor position by one column at a time.

1. Move the cursor to the instruction menu pressing [AREA] .
2. Select {INSERT}.



3. Select {INSERT COLUMN}.
4. Move the cursor to the column to which the new column is inserted, then select it.
 - A new column is inserted.



1

Editing Ladder Programs

1.3

Ladder Editor Window

Insertion of column is invalid if there is an instruction in the column "08" as shown below.

SUPPLEMENT

DATA		EDIT		DISPLAY		UTILITY											
Ladder Rung Edit				MANAGEMENT Mode				User Ladder				Step:00030		Line:00000/00044			
Relay	Calc	Logical	Shift	BCD	Input	Insert	Delete	Operation	Insert Column								
	00	01	02	03	04	05	06	07	08	09							
00	#20010	#10010							#10011	#70010							
01																	
02																	
03																	
04																	
05																	
06																	
07																	

Insertion of column is invalid when there is an instruction in this raw.

1-20

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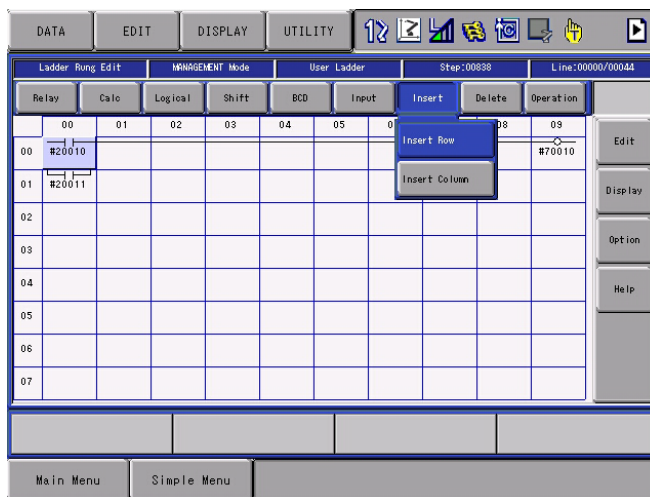
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1 Editing Ladder Programs

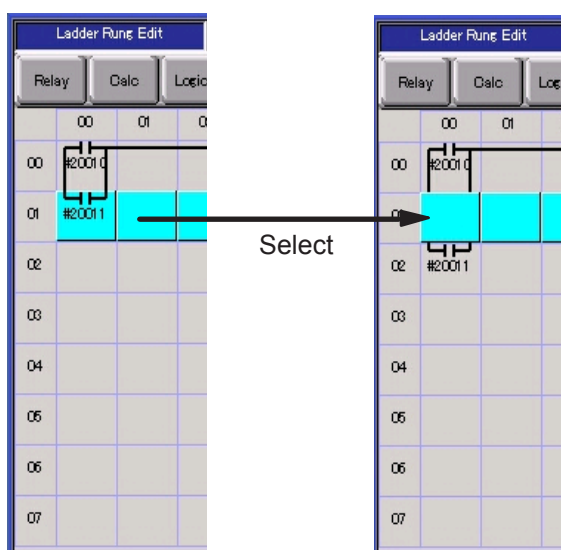
1.3 Ladder Editor Window

1.3.3.4 Insert Rows

1. Move the cursor to the instruction menu pressing [AREA] .
2. Select {INSERT}.



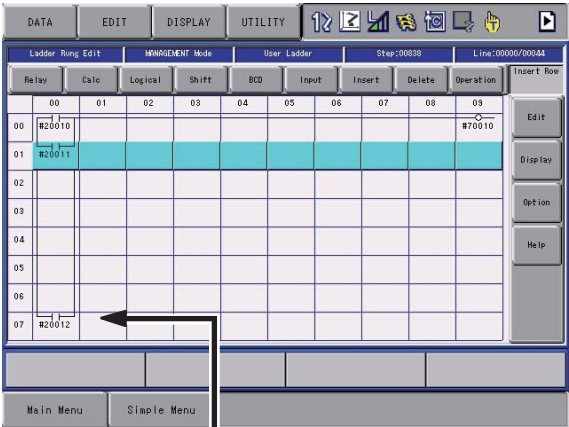
3. Select {INSERT ROW}.
4. Move the cursor to the row to which a new row is inserted, then select it.
 - A new row is inserted.



1 Editing Ladder Programs
1.3 Ladder Editor Window

Insertion of row is invalid if there is an instruction in the row "07" as shown below.

SUPPLEMENT



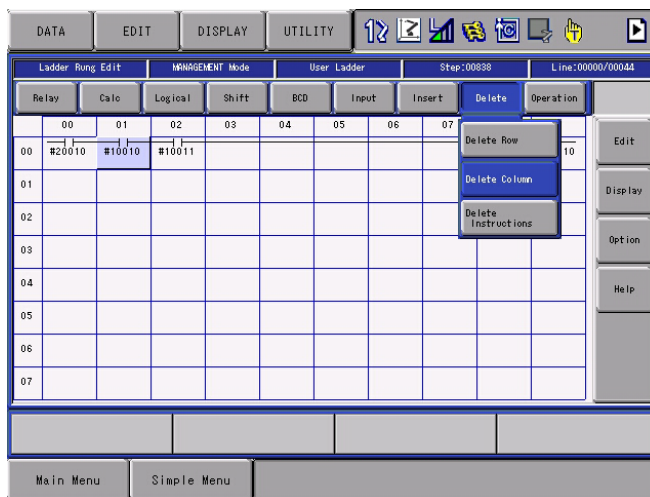
Insertion of row is invalid when there is an instruction in this row.

1 Editing Ladder Programs

1.3 Ladder Editor Window

1.3.3.5 Delete Columns

1. Move the cursor to the instruction menu pressing [AREA] .
2. Select {DELETE}.



3. Select {DELETE COLUMN}.
4. Move the cursor to the column to be deleted, then select it.
 - The selected column is deleted.

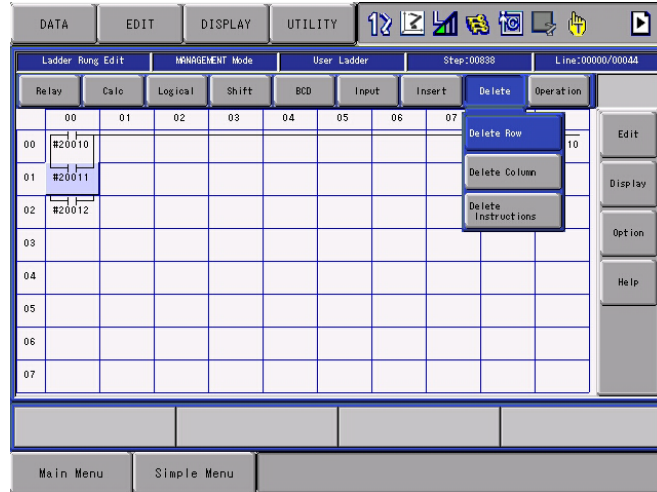


1 Editing Ladder Programs

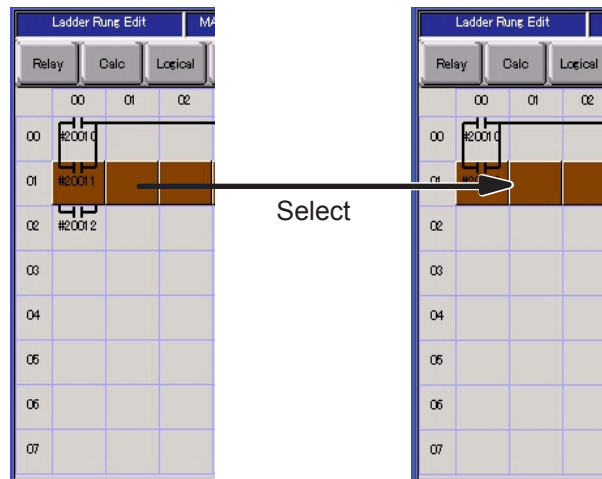
1.3 Ladder Editor Window

1.3.3.6 Delete Rows

1. Move the cursor to the instruction menu pressing [AREA] .
2. Select {DELETE}.



3. Select {DELETE ROW}.
- The selected row is deleted.



1 Editing Ladder Programs

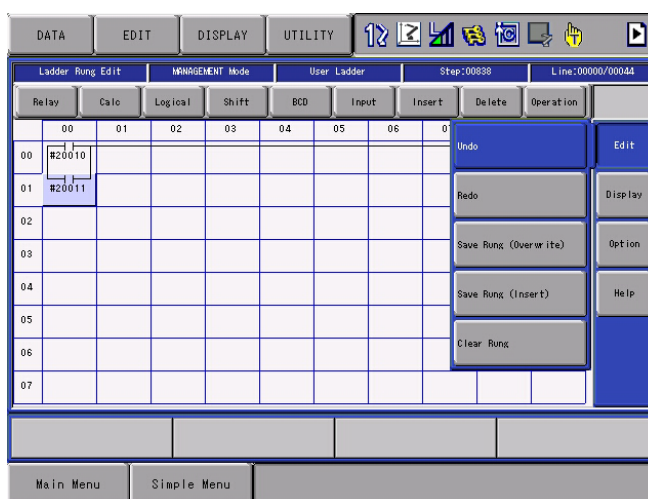
1.3 Ladder Editor Window

1.3.3.7 Undo and Redo

Use these functions when restoring the editing ladders to the status immediately before the operation.

■ 1. Undo

1. Move the cursor to the instruction menu pressing [AREA] .
 2. Select {EDIT}.
 3. Select {UNDO}.
- Cancel the last editing operation.

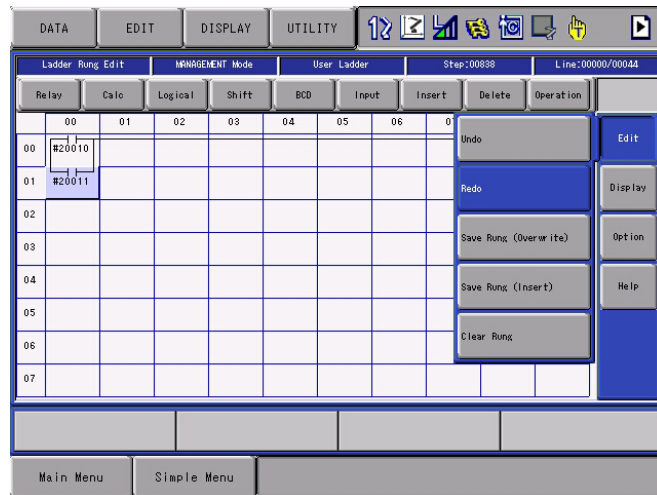


1 Editing Ladder Programs

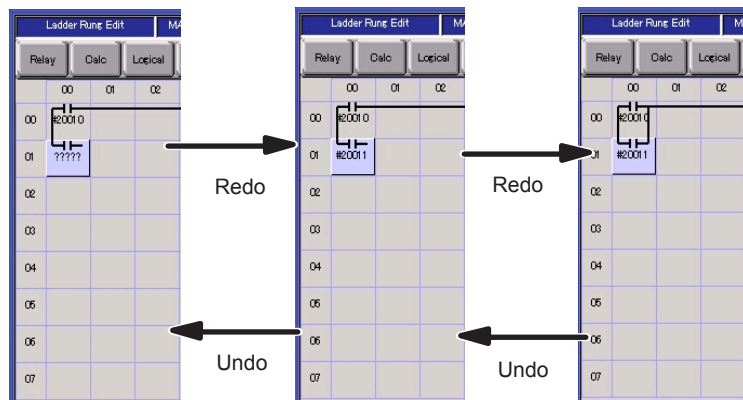
1.3 Ladder Editor Window

■ 2. Redo

1. Move the cursor to the instruction menu pressing [AREA] .
 2. Select {EDIT}.
 3. Select {REDO}.
- Cancel the last “UNDO” operation.



- The following is an example of displays showing [UNDO]/[REDO] operations when pasting the ladder instructions.



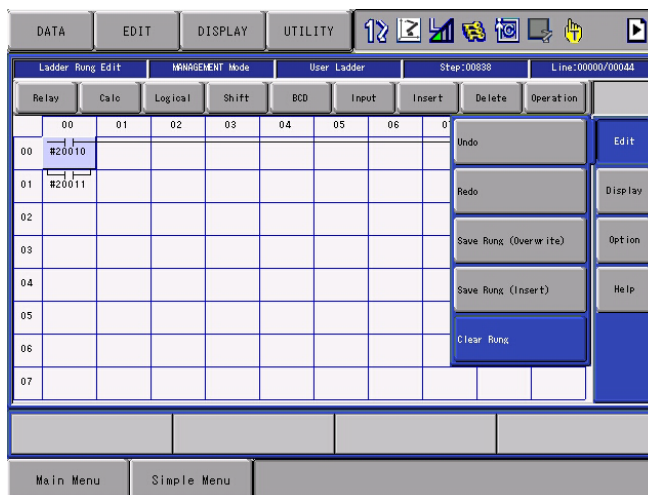
1 Editing Ladder Programs

1.3 Ladder Editor Window

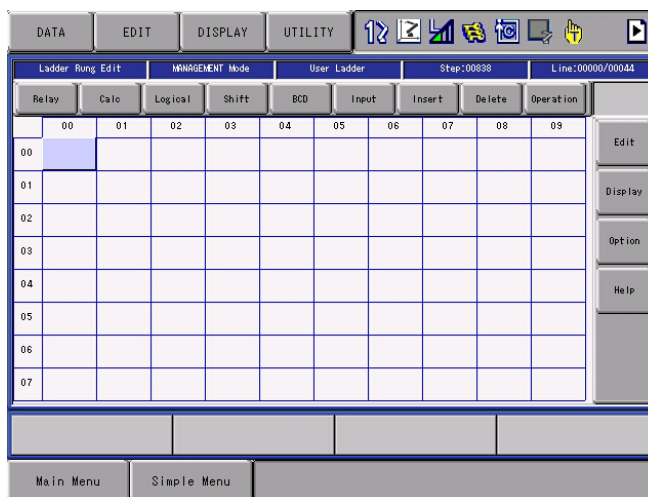
1.3.3.8 Clear Rungs

This function allows to clear rungs of the Ladder Editing window on the edit. Use this function when re-editing the current status of the Ladder Editing window from the beginning.

1. Move the cursor to the instruction menu pressing [AREA] .
2. Select {EDIT}.



3. Select {CLEAR RUNG}.
- The rungs of the edit window are all cleared.



1 Editing Ladder Programs

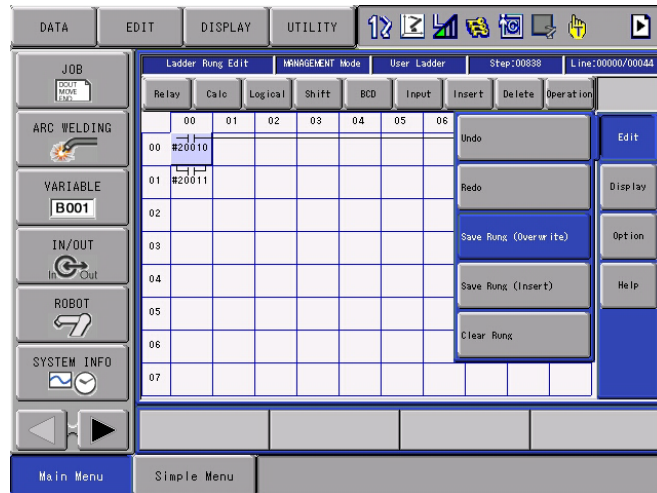
1.3 Ladder Editor Window

1.3.3.9 Save Edited Ladders

The followings explain how to save (overwrite/ insert) or cancel the edited ladders of the Ladder Edit window. After saving or canceling, the display returns to the Ladder View window.

■ 1. Save (Overwrite)

1. Move the cursor to the instruction menu pressing [AREA] .
2. Select {EDIT}.

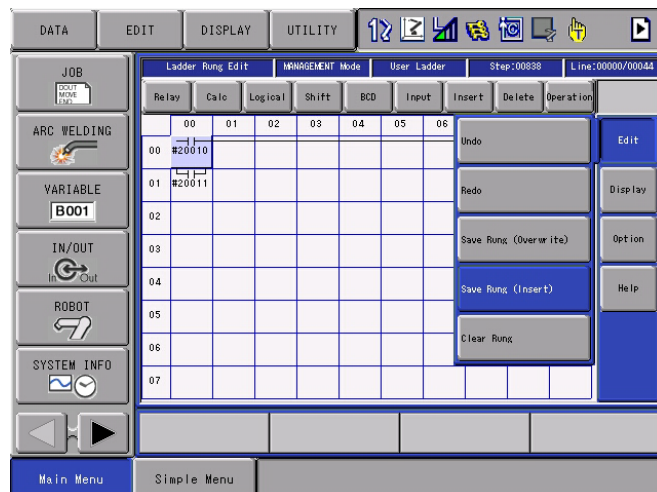


3. Select {SAVE (OVERWRITE)}.

– The edited ladders are saved/ overwritten, then the display returns to the Ladder View window.

■ 2. Save (Insert)

1. Move the cursor to the instruction menu pressing [AREA] .
2. Select {EDIT}.



3. Select {SAVE (INSERT)}.

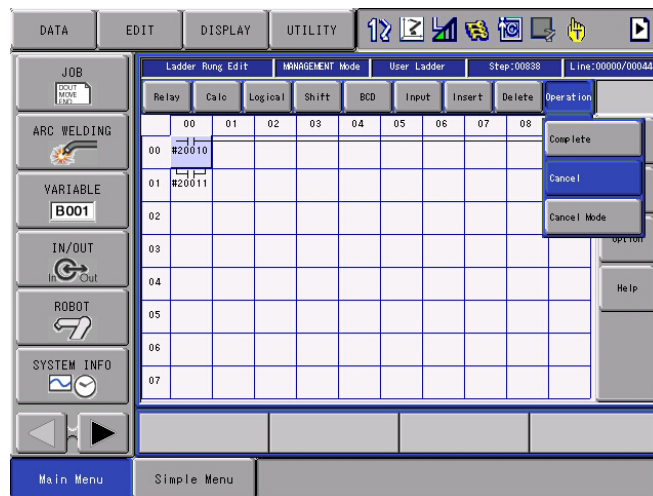
– The edited ladder is inserted under the selected rung, then the display returns to the Ladder View window.

1 Editing Ladder Programs

1.3 Ladder Editor Window

■ 3. Cancel

1. Move the cursor to the instruction menu pressing [AREA] .
2. Select {OPERATION}.



3. Select {CANCEL}.
- The status of the display returns to the one before edited, the Ladder View window appears.
(The editing operation of the Ladder Edit window is not reflected.)

1

Editing Ladder Programs

1.3

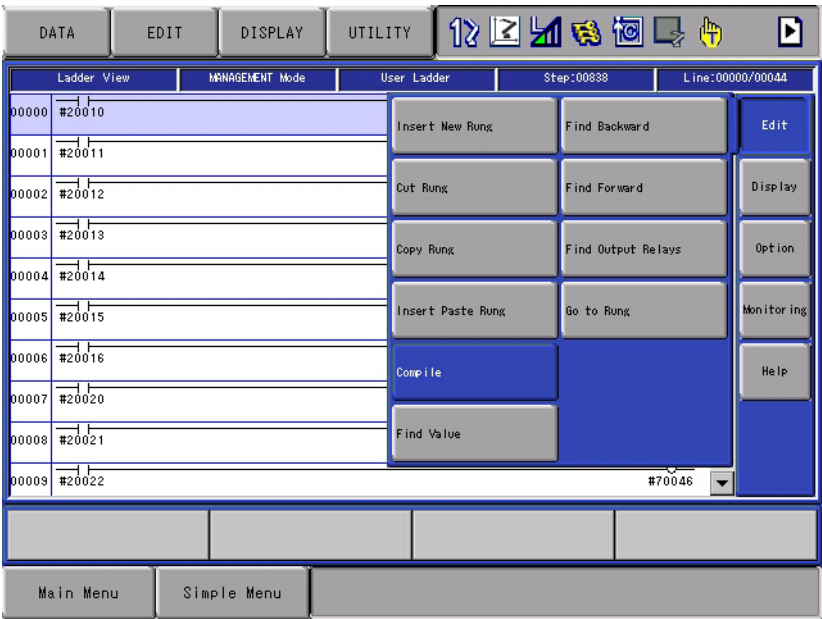
Ladder Editor Window

1.3.4 Compile

Use the following steps to compile ladder programs after editing.

1.
- Move the cursor to the instruction menu pressing [AREA] .
2.
- Select {EDIT}.
3.
- Select {COMPILE}.

The ladder program starts compiling.
The edited ladder program is checked for syntax errors. If no error is found, the new program is saved as a new executing program to run. If any error is found in the edited ladder program, the error message appears on the window. In this case, the executing program remains unchanged.



1 Editing Ladder Programs

1.3 Ladder Editor Window

1.3.5 Search

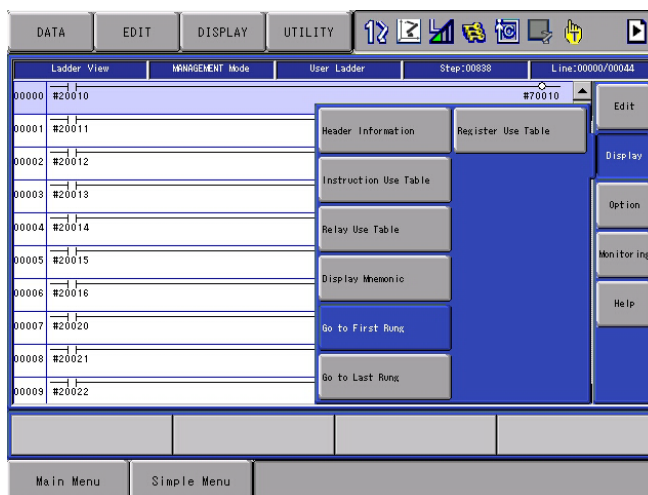
The search operation is available only in the Ladder View window when editing and confirming programs.

1.3.5.1 Go to the First Rung / Last Rung

These functions allow to go to the first or last rung of the ladder program.

■ 1. Go to the First Rung

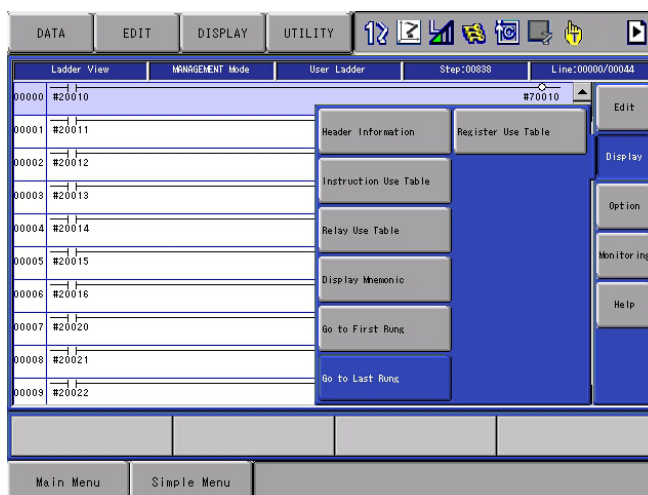
1. Move the cursor to the instruction menu pressing [AREA].
2. Select {DISPLAY}.



3. Select {GO TO FIRST RUNG}.
 - Goes to the first rung of the ladder program.

■ 2. Go to the Last Rung

1. Move the cursor to the instruction menu pressing [AREA].
2. Select {DISPLAY}.



3. Select {GO TO LAST RUNG}.
 - Goes to the last rung of the ladder program.

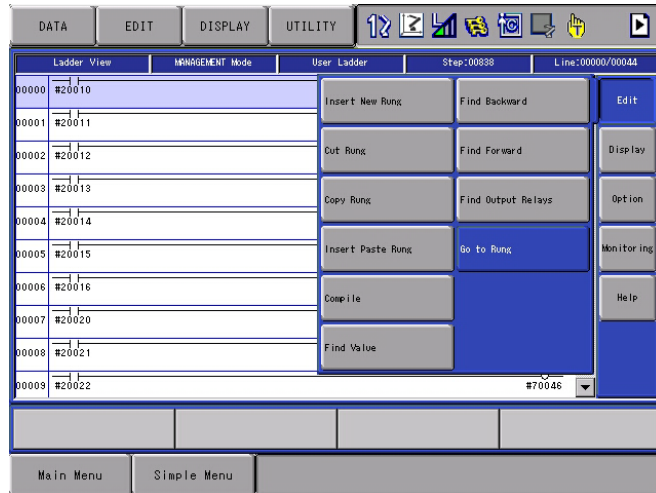
1 Editing Ladder Programs

1.3 Ladder Editor Window

1.3.5.2 Go to Rung

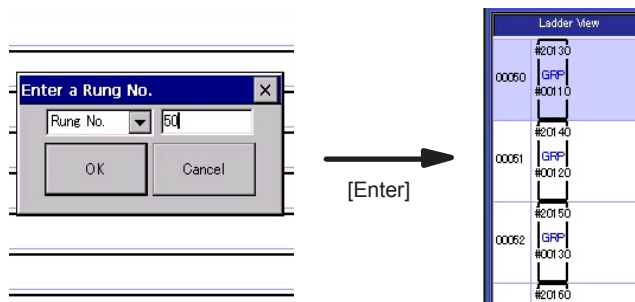
This function allows to go to the designated line number.

1. Move the cursor to the instruction menu pressing [AREA] .
2. Select {EDIT}.



3. Select {GO TO RUNG}.

- The following dialog box appears. Enter the line number, then press [ENTER] . The cursor goes to the destination line number.



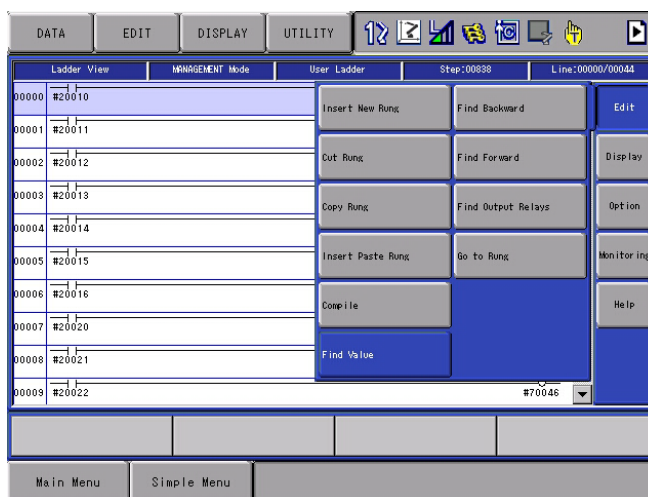
1 Editing Ladder Programs

1.3 Ladder Editor Window

1.3.5.3 Find Value

This function allows to search values such as relay, register, and decimal numbers, then go to the ladders where the searched values are used.

1. Move the cursor to the instruction menu pressing [AERA] .
2. Select {EDIT}.



3. Select {FIND VALUE}.
 - The dialog box to enter values appears. Enter the relay number to refer to, then press [ENTER]. The cursor goes to the destination ladder in use.



The values can be designated by kinds.

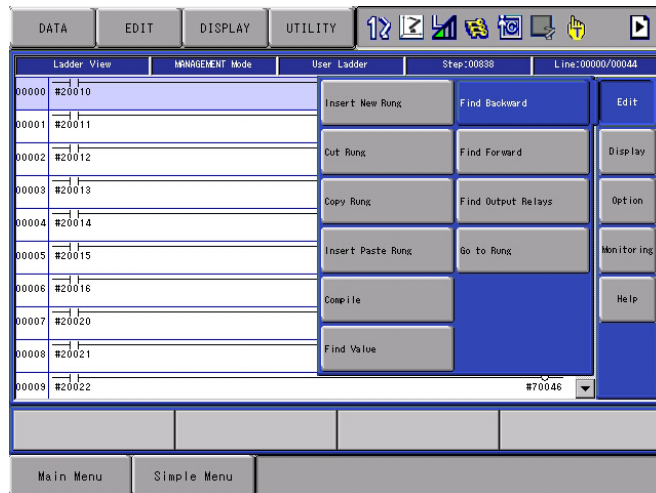
Relay: Relay Number (#xxxxx)
 Register: Register Number (Mxxx)
 Constant: Decimal Number

1 Editing Ladder Programs

1.3 Ladder Editor Window

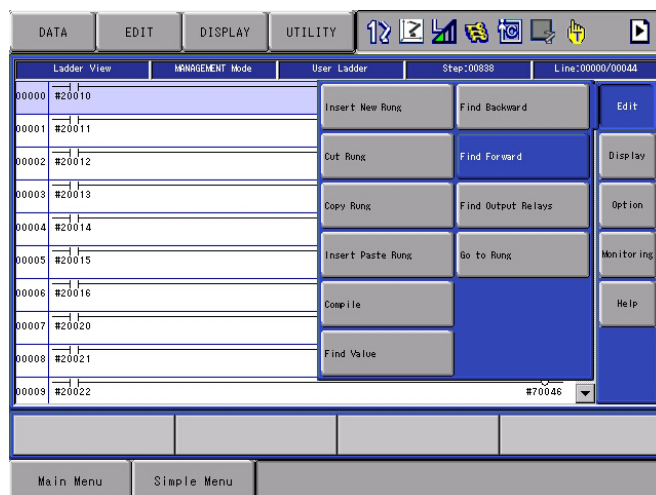
The functions “FIND BACKWARD” and “FIND FORWARD” are available only for the search-value operation.

1. Select {EDIT} after finding values.
2. Select {FIND BACKWARD/FIND FORWARD}



1.3.5.4 Find Forward

This function allows to find the designated value forward from the current line, that is searching toward the bigger line numbers than the current line number.



The retrieval object data for “FIND BACKWARD” or “FIND FORWARD” functions is the value set by “FIND VALUE” function.

The value of the retrieval object remains unchanged unless the new value is entered by “FIND VALUE” function.

This function allows to grasp where and how the value is used easily.

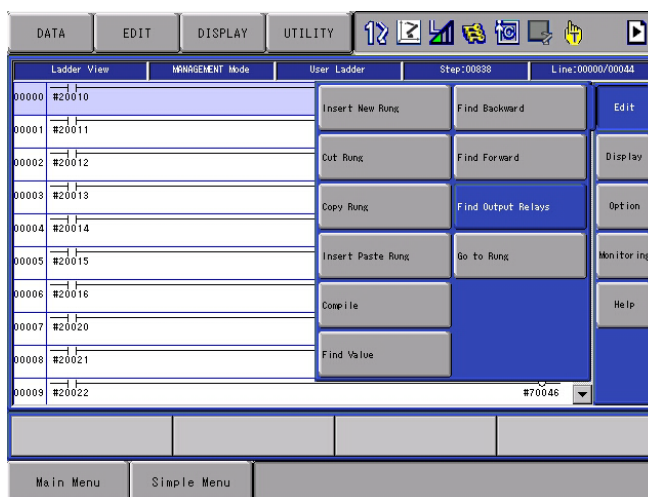
1 Editing Ladder Programs

1.3 Ladder Editor Window

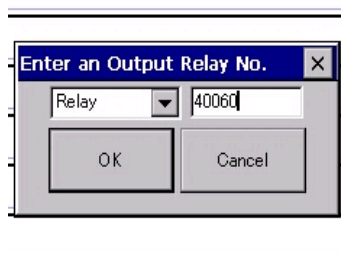
1.3.5.5 Find Output Relays

This function allows to find relay numbers set for output instructions of the ladder program.

1. Move the cursor to the instruction menu pressing [AREA] .
2. Select {EDIT}.



3. Select {FIND OUTPUT RELAYS}.
- The dialog box to enter values appears. Enter the relay number to refer to, then press [ENTER]. The cursor goes to the destination ladder in use.



1

Editing Ladder Programs

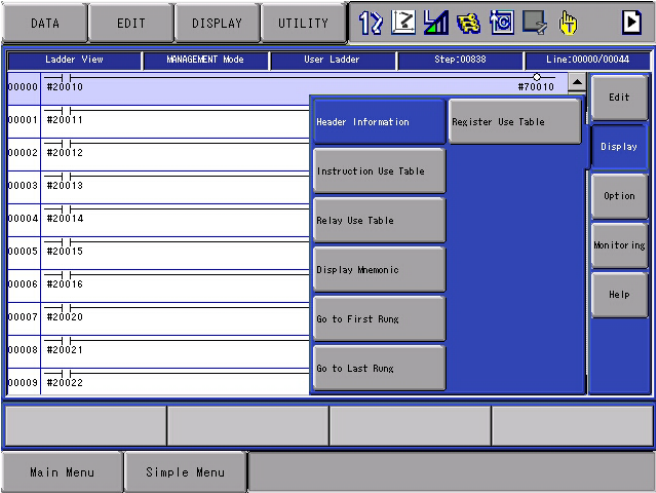
1.3

Ladder Editor Window

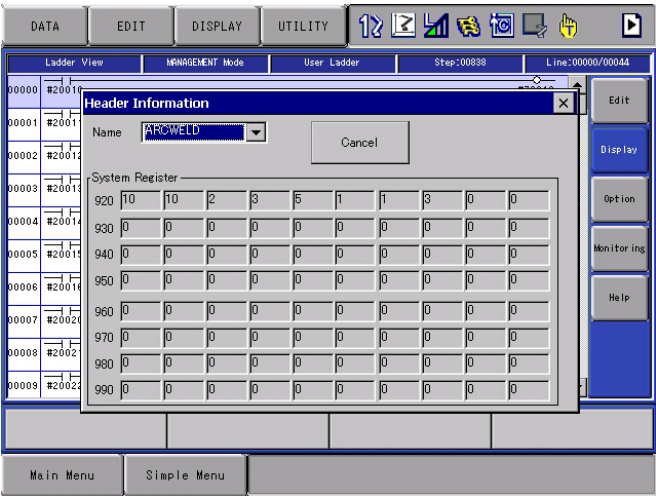
1.3.6 Other Functions

1.3.6.1 Header Information

1.
- Move the cursor to the instruction menu pressing [AREA] .
2.
- Select {DISPLAY}.



3.
- Select {HEADER INFORMATION}.
- The Header Information dialog window appears.



- The Header Information dialog box consists of the followings:
- NAME:
Indicates ladder names. (The ladder names cannot be edited.)
 - SYSTEM REGISTER
Sets the initial value for the system register.
The register numbers to be allocated are as follows:

Register Numbers	System Register Numbers in the Header Information Dialog Box
M920 to 929	920
M930 to 939	930
:	:
M990 to 999	990

1 Editing Ladder Programs

1.3 Ladder Editor Window

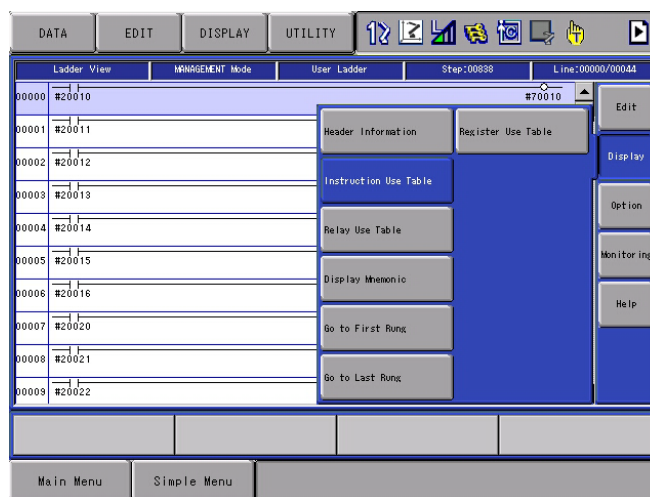
1.3.6.2 Instruction Use Table

Various relay numbers are used when editing ladder programs.

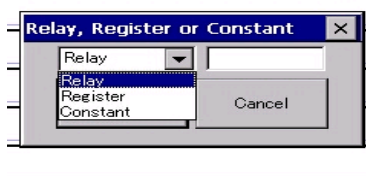
The other two or more lines may use the currently used relay number.

Refer to this instruction when grasping use status of the relay number by other lines.

1. Move the cursor to the menu pressing [AREA] .
2. Select {DISPLAY}.



3. Select {INSTRUCTION USE TABLE}.
 - The dialog box to enter values appears. Enter the value to refer to, then press [ENTER].



The values can be designated by kinds.

Relay : Relay Number (#xxxxx)

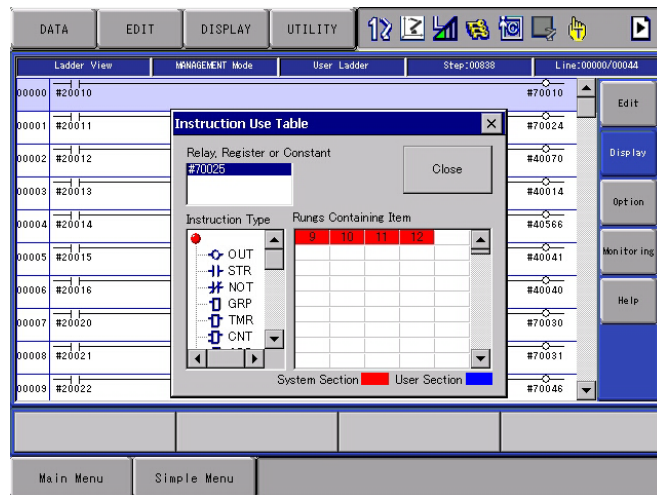
Register: Register Number (Mxxx)

Constant: Decimal Number

1 Editing Ladder Programs

1.3 Ladder Editor Window

- The dialog box of Instruction Use Table appears.



- The dialog box of the Instruction Use Table consists of the followings.
 - Relay, Registration or Constant:
The value is a retrieval object. Usually one item of the value is indicated, but two or more items are indicated for special occasions. In this case, choose one target value.
 - Instruction Type Tree:
The diagram indicates the ladder instructions. The line numbers indicated in the “Rungs Containing Item” can be limited by selecting items from this tree diagram.

For example, when selecting “STR” in Instruction Type Tree, only the line numbers using the relay number set to “STR” instruction are indicated in the matrix of Rungs Containing Item.

- Rungs Containing Item:
Indicates the line numbers using the value selected in “Relay, Registration or Constant”. The numbers currently used are indicated in the following colors.

Red: Used in the system ladder program.

Blue: Used in the user ladder program.

1 Editing Ladder Programs

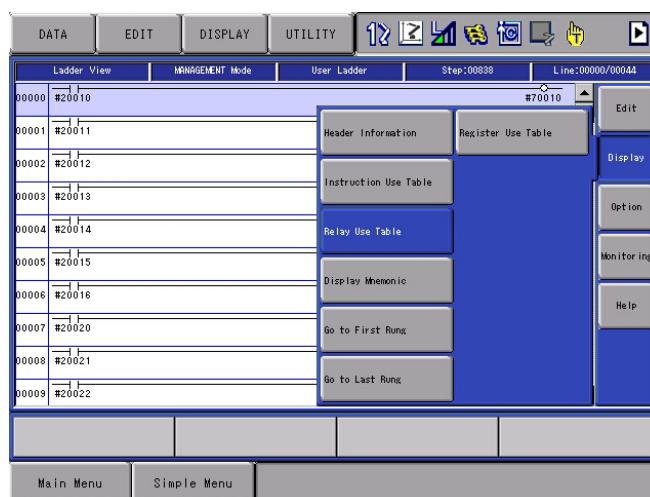
1.3 Ladder Editor Window

1.3.6.3 Relay Use Table

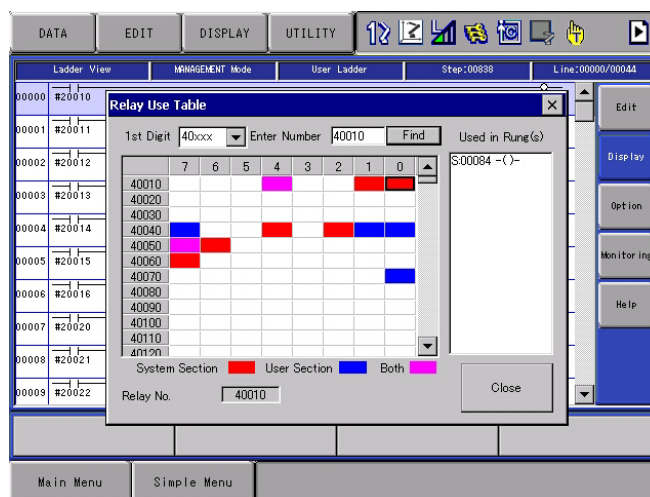
Various relay numbers are used when editing ladder programs.

Refer to this instruction when finding which line uses the currently used relay number or finding unused relay numbers.

1. Move the cursor to the menu pressing [AREA] .
2. Select {DISPLAY}.



3. Select {RELAY USE TABLE}.
- The Relay Use Table dialog box appears.



1 Editing Ladder Programs

1.3 Ladder Editor Window

– The Relay Use Table dialog consists of the followings.

- Use Status Matrix:

The used relay numbers are indicated in the following colors.

Red: Used in the system ladder program.

Blue: Used in the user ladder program.

Purple: Used both in the system and user ladder programs.

One cell of the vertical axis in the matrix indicates ten relay numbers as one unit (numbers above the digit of 10).

Whereas one cell of the horizontal axis in the matrix indicates the digit of 1 of the relay number.

When selecting the colored cell in the matrix, the list of the line numbers using the designated relays is indicated in the “Line No. Using the Relay” box.

- The 1st Digit

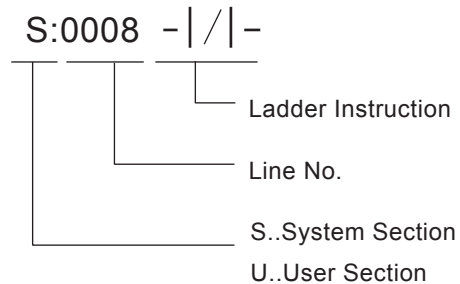
The use status is indicated in 10,000 numbers as one unit in the use status matrix. Select the 1st digit of the relay number you wish to indicate from the “1st Digit” box.

- Enter Number

Enter the relay number, then press {SEARCH}. The designated relay number is indicated in the use status matrix.

- Used in Rung(s)

Line numbers using the relay are indicated with following line information of the ladder programs.



It might take time to display the dialog box when the number of ladder program step is big.

1 Editing Ladder Programs

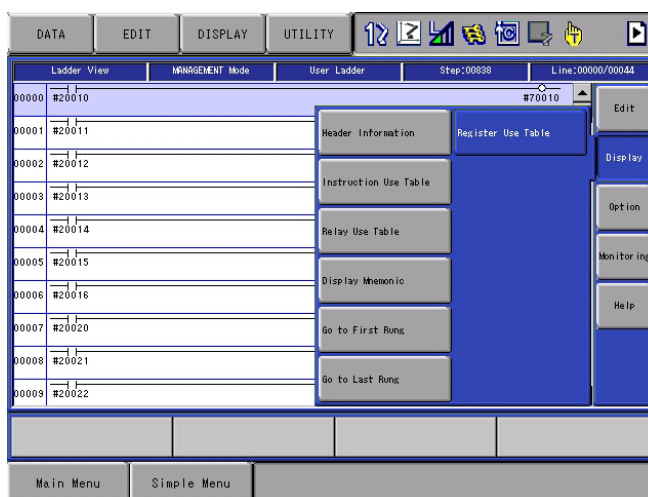
1.3 Ladder Editor Window

1.3.6.4 Register Specification List

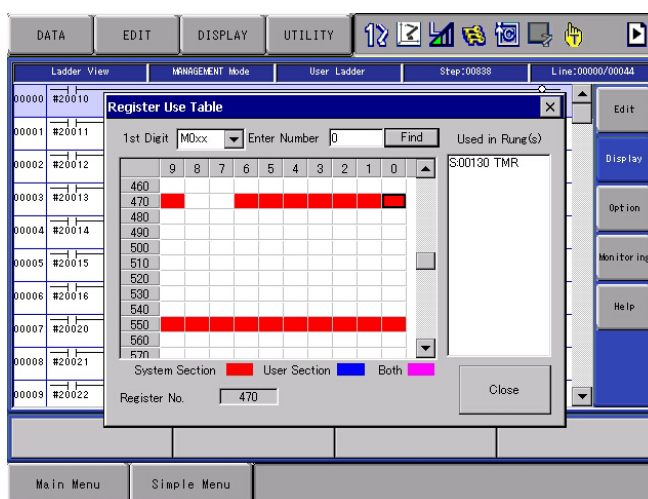
Various relay numbers are used when editing ladder programs.

Refer to this instruction when finding which line uses the currently used relay number or finding unused relay numbers.

1. Move the cursor to the menu pressing [AREA].
2. Select {DISPLAY}.



3. Select {RELAY USE TABLE}.
 - The Relay Use Table dialog box appears.



1 Editing Ladder Programs

1.3 Ladder Editor Window

- The Relay Use Table dialog consists of the followings.
- Use Status Matrix:

The used relay numbers are indicated in the following colors.

Red: Used in the system ladder program.

Blue: Used in the user ladder program.

Purple: Used both in the system and user ladder programs.

One cell of the vertical axis in the matrix indicates ten relay numbers as one unit.

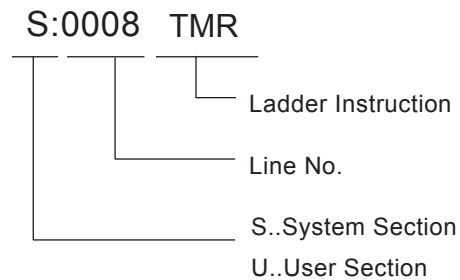
Whereas one cell of the horizontal axis in the matrix indicates the digit of 1 of the relay number.

When selecting the colored cell in the matrix, the list of the line numbers using the designated relays is indicated in the “Used Rungs” box.
- The 1st Digit

The use status is indicated in 100 numbers as one unit in the use status matrix. Select the 1st digit of the relay number you wish to indicate from the “1st Digit” box.
- Enter Number

Enter the relay number, then press {SEARCH}. The designated relay number is indicated in the use status matrix.
- Used in Rung(s)

Line numbers using the relay are indicated with following line information of the ladder programs.



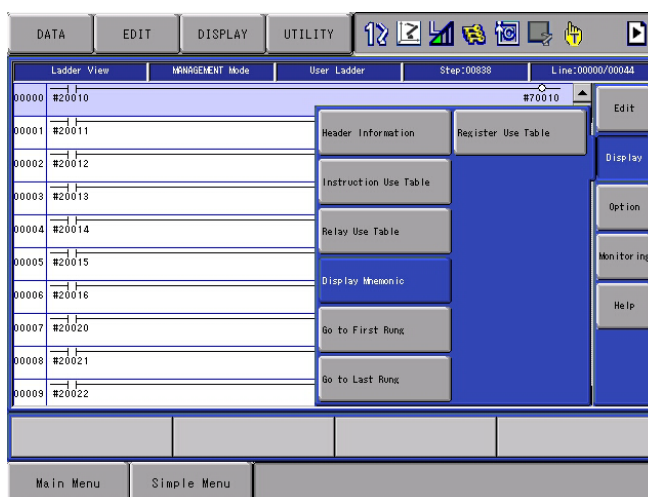
1 Editing Ladder Programs

1.3 Ladder Editor Window

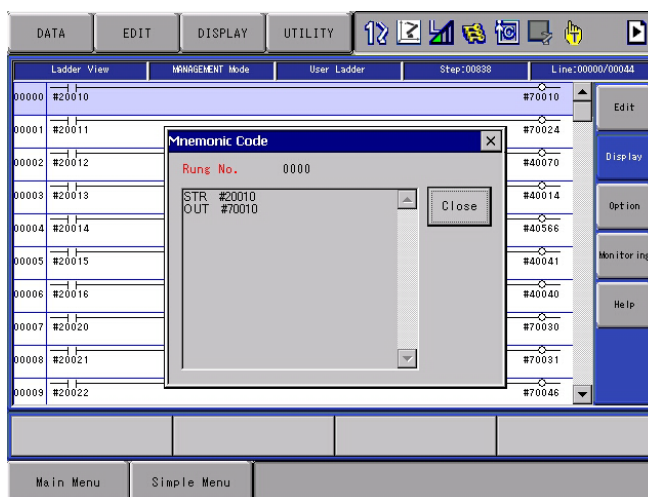
1.3.6.5 Mnemonic Display

This function allows to indicate one line of the designated ladder program in mnemonic codes.

1. Move the cursor to the ladder to be indicated in mnemonic codes.
2. Move the cursor to the menu pressing [AREA] .
3. Select {DISPLAY}.



4. Select {DISPLAY MNEMONIC}.
- The mnemonic code dialog appears.



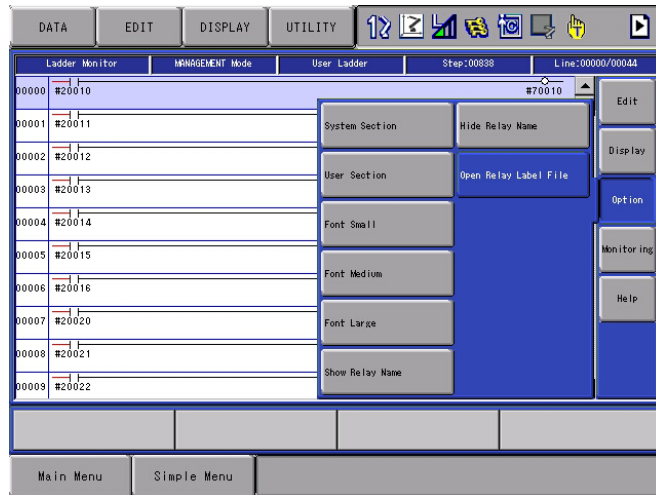
1 Editing Ladder Programs

1.3 Ladder Editor Window

1.3.6.6 Open Relay Label File

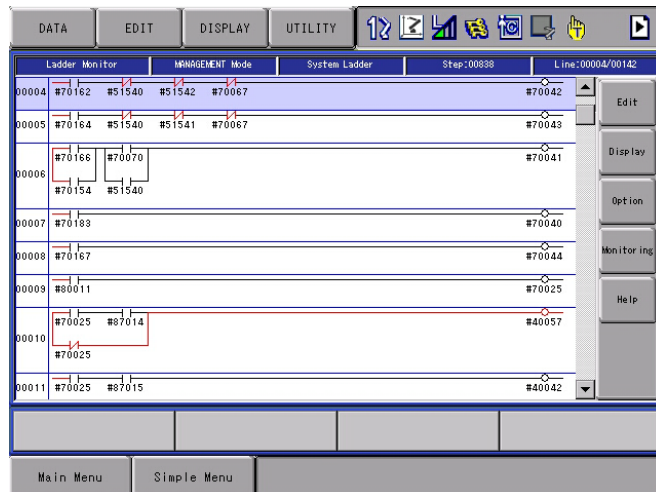
This function allows to display relay/register names.

1. Copy the name file (*.NAM) created with the Ladder Editor (off-line edition) to a SD card.
2. Insert the SD card into the slot on the programming pendant.
3. Select {Option}.



4. Select {Open Relay Label File}.

The relay/register names are displayed.



1 Editing Ladder Programs

1.3 Ladder Editor Window



- Store the name file (*.NAM) in the root directory of the SD card.
- The Ladder Editor displays the abbreviated name (composed of up to 8 one-byte characters) of the name file (*.NAM) for relay/register name indication.
Note, however, that it will read the name file of which file name and the header information are the same.
(Example)
If the ladders for arc welding application are displayed, the Ladder Editor reads the name file for arc welding application "ARCWELD.NAM" to indicate each relay/register name.
- The relay/register names will be automatically displayed if a SD card containing the name file is already in the slot of the programming pendant when the Ladder Editor starts running.
- To make the names invisible, select {Option}, then {Hide Relay Name} from the menu. To make the names visible again, select {Option}, then {Show Relay Name}.

1

Editing Ladder Programs

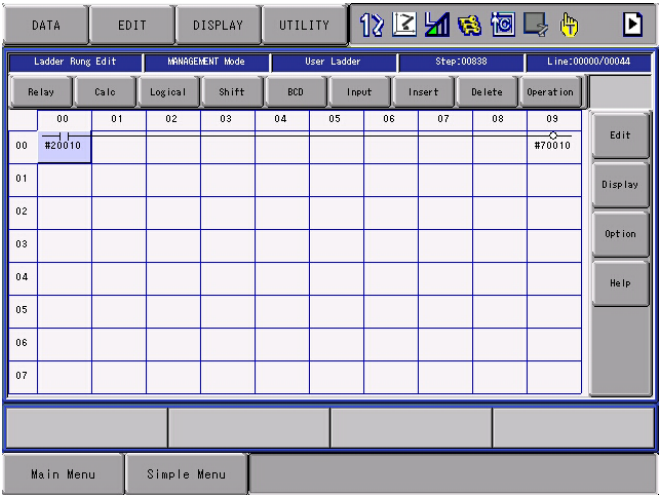
1.3

Ladder Editor Window

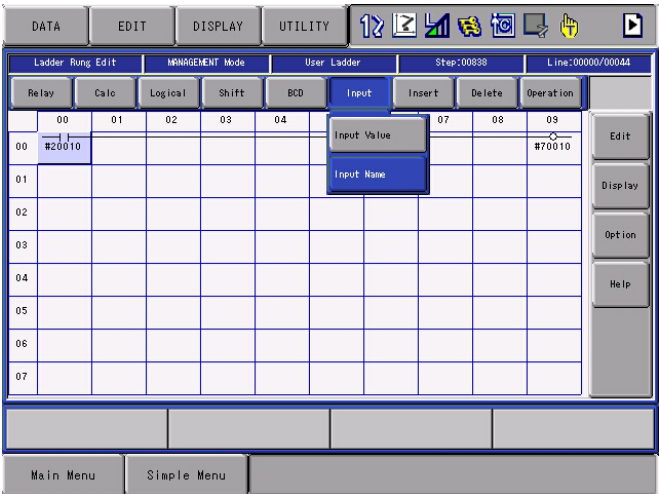
1.3.6.7 Input Name

This function allows editing operations of a relay/register name.

1.
- Move the cursor to the subject rung for name registration of relay/ register, and press [SELECT].



2.
- Select {Input}.



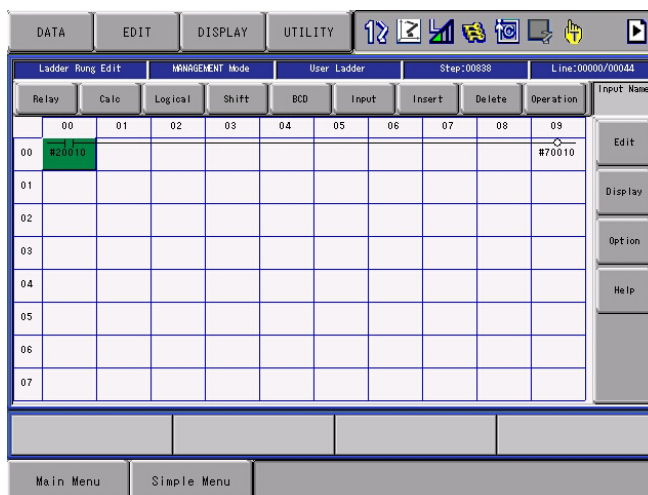
3.
- Select {Input Name}.

1 Editing Ladder Programs

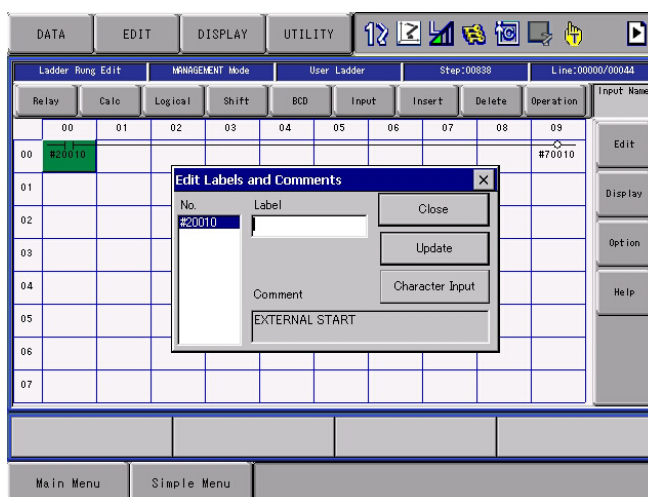
1.3 Ladder Editor Window

4. Enter a label and comments.

- Move the cursor to the subject instruction for label/comments entry, and press [SELECT].



- A dialog box Edit Labels and Comments appears.

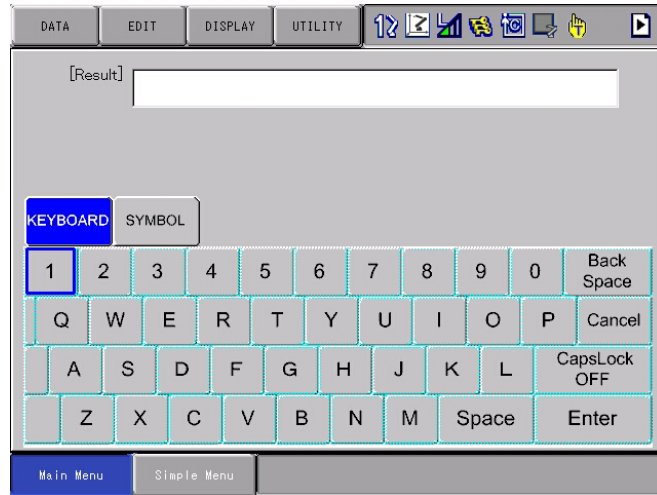


1 Editing Ladder Programs

1.3 Ladder Editor Window

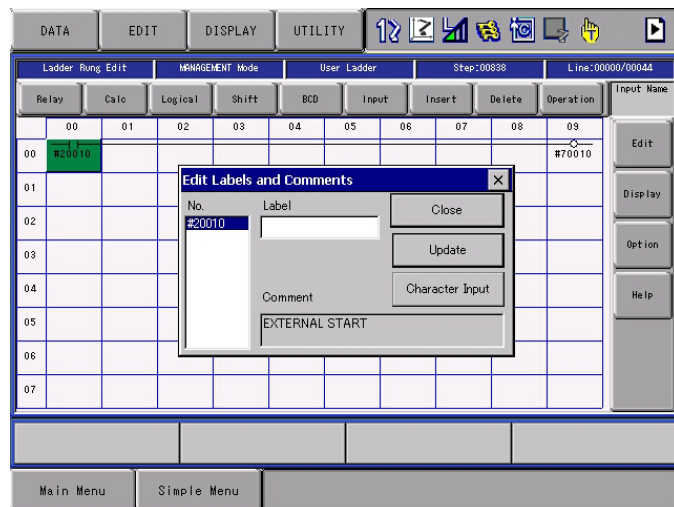
5. Select {Character Input}.

- A software keypad window appears. For the details on operation, refer to "1.2.6 Character Input" explained in "YRC1000 OPERATOR'S MANUAL" (application-specific).



6. Complete input operation.

- The input characters will be registered as "Label" in the Edit Labels and Comments dialog box upon the completion of input operation.

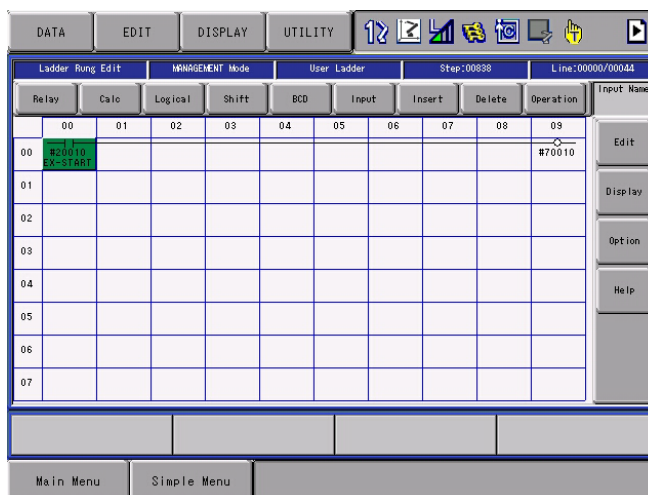


1 Editing Ladder Programs

1.3 Ladder Editor Window

7. Click on {Update} button.

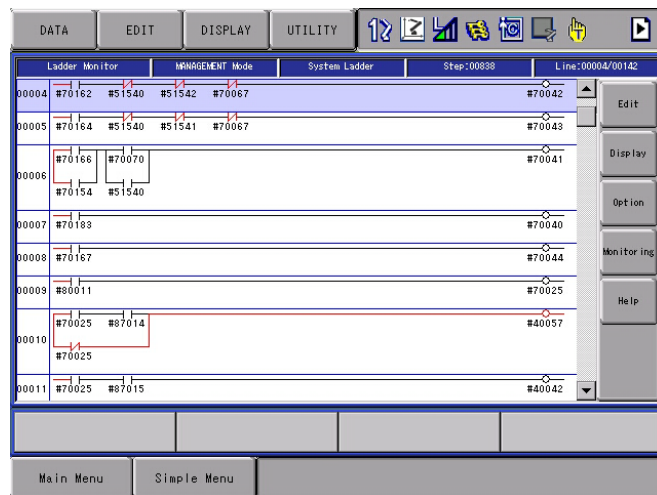
- The input characters will be registered as "Label" in the Edit Labels and Comments dialog box upon the completion of input operation.



- Display or editing operation of the relay/register names with the Ladder Editor is enabled only for the label (an abbreviated name composed of up to 8 one-byte characters) of the name file (*.NAM).
- An error message will appear if a SD card containing the name file is not set in the slot of the programming pendant. Click on the {Update} button once again after setting the SD card in the slot.

2 Ladder Monitoring Function

1. Select {IN/OUT} under the main menu
2. Select {LADDER EDITOR}
 - The User Ladder View window appears.
When the ladder circuit is in connected status, the ladder instruction on the window is displayed in red, and in black when it is not connected.



The ladder monitor is not available on the edit.
The ladder monitor function can be used either before editing or after compiling and saving the ladder program.

YRC1000

OPERATOR'S MANUAL

FOR LADDER EDITOR

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