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Chapter 1

Introduction

Ladder Editor 32NX is used to display and edit I/O ladder programs. The robot controller (NX100) has a concurrent I/O function that processes I/O related control independently from the manipulator, and in parallel with manipulator operation. Ladder Editor 32NX software is used to graphically display ladder programs as a signal connection diagram, and edit ladder programs easily using pasting commands and drag-and-drop operations.

1.1 Hardware Requirements

Ladder Editor 32NX operates with the configurations shown below.

<table>
<thead>
<tr>
<th>OS</th>
<th>Microsoft Windows XP/2000</th>
</tr>
</thead>
<tbody>
<tr>
<td>Required Memory</td>
<td>16 Mbytes or more</td>
</tr>
<tr>
<td>CPU</td>
<td>Pentium or Pentium compatible processor</td>
</tr>
<tr>
<td>Hardware Disk Capacity for Installation</td>
<td>10 Mbytes or more</td>
</tr>
<tr>
<td>Disk Drive</td>
<td>Hard disk drive and CD-ROM drive</td>
</tr>
<tr>
<td>Display</td>
<td>Supported by MS-Windows</td>
</tr>
<tr>
<td>Mouse</td>
<td>Supported by MS-Windows</td>
</tr>
<tr>
<td>Robot Controller</td>
<td>NX100</td>
</tr>
<tr>
<td>Hardware Lock Key</td>
<td>Used under single user environment. For details, refer to the following section “Hardware Lock.”</td>
</tr>
</tbody>
</table>

Note: A personal computer and OS are not included with this software.

For NX100 concurrent I/O, refer to the NX100 Concurrent I/O Manual (P/N 149230-1).
1.2 Hardware Key

**CAUTION!**
Keep the hardware key in a safe place. If you lose the hardware key, LadderEditorPC will not work and you will need to purchase a new copy of the software. If the key is accidentally damaged, return it to Motoman for a replacement.

Observe the following guidelines to protect your hardware key:

- Remove hardware key from computer if parallel port is used for any other operation.
- Key may not operate properly when stacked with any additional keys or if attached to anything other than a parallel port (e.g. SCSI adapter).

It is highly recommended that the key(s) be insured for the full value of the software package. Lost or stolen keys cannot be replaced. If the key is lost, users will have no alternative other than to purchase a new copy of the software. If the key is accidentally damaged, return it to Motoman for a replacement. There is a charge for key replacement.

For proper operation, connect provided hardware key to personal computer before using this software.

Two types of hardware lock keys are available:

- USB type
- D-sub type

Followings are the connection methods of each key type.

1.2.1 Connecting USB type key

Check and execute the following items before connecting the key to USB port

**Check the computing environment**
Multi-connection of USB type key is not available for one USB port because of hardware structure. Therefore, only one key should be connected to one USB port. When multi-connecting USB keys installing multiple offline software into one personal computer, use the personal computer which is provided same numbers of USB ports as the number of software to be installed.
1.3 Features

Ladder mnemonic code can be edited using an image of a ladder diagram.

With the “ladder preview” display, the entire line of the ladder program can be easily previewed. Simple drag and drop operations can edit connections between ladder parts. Cross reference function is enriched. Information such as Relay No. Use State or the place where an arbitrary Relay No. is used can be referenced easily.

History jump function is available. This function records the history of jumping to other lines, and easily returns to the previous line before jumping.

Printing function is enriched. Cross reference information can also be printed, as well as ladder diagrams. This function is very useful when a created ladder is stored as reference material.

Print images are stored in the text file. Print images obtained by printing ladder diagrams can be stored in the text file. This function is useful when the data is filed and stored as an electronic document.
1.4 Terms

The following terms are frequently used in this manual.

<table>
<thead>
<tr>
<th>Terms</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ladder Parts</td>
<td>Object of matrix composing a ladder program such as STR, TMR or GRP</td>
</tr>
<tr>
<td>Set Value</td>
<td>Value set to ladder parts such as relay numbers, register numbers or constants</td>
</tr>
<tr>
<td>Line</td>
<td>One line indicates one section divided with OUT codes in a ladder mnemonic. Normally, there is one OUT part per line (excluding when GRP parts are used).</td>
</tr>
</tbody>
</table>
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
900VictorsWay
P.O.Box3724
AnnArbor,Michigan48106
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
Chapter 3

Installation

3.1 System Requirements

To run Ladder EditorNX, the following hardware and software are required:

<table>
<thead>
<tr>
<th>Computer</th>
<th>IBM compatible personal computer (PC)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Processor</td>
<td>Pentium, 400 Mhz (700 Mhz recommended)</td>
</tr>
<tr>
<td>Memory</td>
<td>128 MB minimum (256 MB recommended)</td>
</tr>
<tr>
<td>Hard Disk</td>
<td>200 MB</td>
</tr>
<tr>
<td>CD-ROM Drive</td>
<td>4x speed or faster</td>
</tr>
<tr>
<td>Monitor</td>
<td>SVGA, 800x600 resolution, 16 million colors, small fonts selected</td>
</tr>
<tr>
<td>Input device</td>
<td>Mouse</td>
</tr>
<tr>
<td>Operating System</td>
<td>Microsoft® Windows® 2000, XP</td>
</tr>
<tr>
<td>Web Browser</td>
<td>Internet Explorer 5.5 or greater</td>
</tr>
</tbody>
</table>

3.2 Installing Motoman Ladder EditorNX

Ladder EditorNX is installed by default under the Motoman program manager group (C:\Program Files\Motoman\LadderEditor). To install Ladder EditorNX, proceed as follows:

1. Insert CD-ROM installer into CD-ROM drive.
2. The setup program executes automatically.

Note: Setup executes automatically when the CD is inserted into the CD-ROM drive unless autoexecute has been disabled on your computer. If the setup program fails to autoexecute, refer to the directions on the CD label for more information.

3. Follow the Ladder EditorNX install wizard instructions as it guides you through the installation process.
### 3.3 Installing the Hardware Key

The hardware key supplied with Ladder EditorNX must be installed on your computer or Ladder EditorNX will not function properly. The hardware key attaches to the computer’s parallel port. This port is commonly used to connect printers and other peripheral devices to your computer. To attach the hardware key, proceed as follows:

1. Disconnect any device currently connected to your computer’s parallel port.
2. Carefully insert the hardware key into the parallel port. If the key does not fit, do not force it. The key should fit snugly but does not require significant force to insert.
3. Connect your peripheral cable to the free end of the hardware key. The key will not interfere with the operation of your printer or other peripheral devices.

If you are using two or more MotoSoft products that require the use of different hardware keys, you can stack the keys (connect in series).

*Note: Due to hardware configuration, it is not possible to stack USB keys.*

**CAUTION!**  
Keep the hardware key in a safe place. If you lose the hardware key, Ladder EditorNX will not work and you will need to purchase a new copy of the software. If the key is accidentally damaged, return it to Motoman for a replacement.

Observe the following guidelines to protect your hardware key:

- Remove hardware key from computer if parallel port is used for any other operation.
- Key may not operate properly when stacked with any additional keys or if attached to anything other than a parallel port (e.g. SCSI adapter).

It is highly recommended that the key(s) be insured for the full value of the software package. Lost or stolen keys cannot be replaced. If the key is lost, users will have no alternative but to purchase a new copy of the software.

If the key is accidentally damaged, return it to Motoman for replacement. There is a charge for key replacement.
Chapter 4
Operation

4.1 Ladder Editor 32NX Basic Display

The following shows the “basic” display of Ladder Editor 32NX. The “basic” display is divided into two displays: “ladder preview” display and “ladder editing” display. Editing is available as referring to the ladder image before and after the ladder diagram in the editing line.

Figure 1 Basic Display
4.2 Flowchart of Basic Editing

The following shows the basic flowchart of ladder editing.

![Flowchart of Basic Editing](image_url)

**Figure 2** Ladder Editing Operation Flow
4.3 Starting and Ending Ladder Editor 32NX

4.3.1 How to Start

To start up Ladder Editor 32NX, open the [Start] menu in the Windows tool bars, and select “Ladder Editor 32NX” from [Program] – [Motoman] – [Ladder Editor 32NX].

When this application is initially started or when [Manage type] is set to “Easy Mode”, the [Enter Password] dialog box for the Easy Mode (Fig. 3) appears. When the [Manage type] is set to “Standard Mode”, the [Enter Password] dialog box for the Standard Mode (Fig. 4) appears. For details on managing user accounts, refer to Section 4.3.1, "User Information Management".

![Figure 3][Enter Password] Dialog Box for Easy Mode

![Figure 4][Enter Password] Dialog Box for Standard Mode

If the “Require Password to Start Ladder Editor” check box is cleared in the [User Manager] dialog box, the password dialog boxes do not appear.

The “Default User Names and Password List” managed and stored by the software administrator describes the “Login Name” and “Password”. This list is included with the shipment.
Input the password. The “Startup” display for Ladder Editor 32NX appears.

![Figure 5 “Startup” Display](image)

### 4.3.2 How to End

Select [File] – [Exit] in the Ladder Editor 32NX menu to close Ladder Editor 32NX.

![Figure 6 Exit Menu](image)
4.4 Reading and Storing Edited Ladder Files

4.4.1 Reading Ladder Data

To perform ladder editing, read in the ladder program to be edited by Ladder Editor 32NX. The following two types of files can be edited by Ladder Editor 32NX:

- Ladder program file (text file)
- CMOS file (binary file)

To read ladder data, proceed as follows:


![Figure 7](image)

**Figure 7** [Open] Dialog Box

2. To read in a ladder program file, select the ladder program file and click [Open].

*Note: To read in a CMOS file, select “CMOS file (*.HEX)” from [Files of type] box in [Open] dialog box. When the list of CMOS. HEX files appears, select the CMOS file to be edited, and click [Open].*
4.4.2 Reading Several Ladder Files

Ladder Editor 32NX is an MDI (Multi Document Interface) application used to read in several ladder program files simultaneously. To select the ladder program to be edited, select the file name displayed in the [Window] menu, or select the window with the targeted ladder program among overlapping windows by selecting [Window] - [Cascade].

In addition, target ladder programs can also be selected when several editing windows are displayed and overlapped by selecting [Window] – [Cascade] menu.

![Editing Window Overlapped* Display](image)

4.4.3 Storing Edited Data

When ladder editing is completed, store the information in a file. **Before storing, be sure to compile the data when the ladder was edited using Ladder Editor 32NX.** Unless compiled, data may not be stored completely. To store edited data, proceed as follows:

1. Select [File] – [Save] to store the overwritten data to an existing file.
2. Selecting [File] – [Save As] displays the [Save As] dialog box. Set an arbitrary file name to the data to be stored.

To store the file, the following three types of file forms are available, depending on the method used to read in a file.
Storing when a Ladder Program File (CIOPRG.LST) is Open
When a ladder program file is read in, only a ladder program file (text file) can be stored in an output file form.

Storing when a CMOS File (CMOS.HEX) is Open
When a CMOS file is read in, the data can be stored in the two types of output file forms, a ladder program file (text file), and a CMOS file (binary file).

Storing a Ladder Program that is Being Edited
A ladder program being edited cannot be stored if it has a detected error, even if compiled. The ladder program being edited can be stored as a work file. For details, refer to Section 4.29.6, "Rough Draft File Forced Output Function".

4.5 Creating a Ladder Diagram

To create a new ladder program, use the standard ladder program as a base for editing. The standard ladder program is supplied as a template. To create a ladder diagram, proceed as follows:


![Select Standard Ladder Template](image)

Figure 9  [Select standard ladder template] Dialog Box

2. Select the template to be set and click [Open].
4.6 Editing a Ladder Diagram

All ladder diagrams are edited in the “Basic” Display shown in (Fig. 1).

4.6.1 Ladder Parts Specifications

Ladder Editor 32NX supports the ladder parts corresponding to the new ladder codes employed for the NX100.

4.6.2 Selecting a Ladder Edited Line

A ladder diagram is edited in the “ladder editing” display, and the line to be displayed in the “ladder editing” display is selected in the “ladder preview” display (Fig. 10). In the “ladder preview” display, ladder diagrams of all the lines can be viewed set in the current ladder section (either system section or user section).

![Ladder Diagram](image)

**Figure 10** “Ladder Preview” Display

To view the ladder image of a line that is not displayed, use the scroll bar. In the “ladder preview” display, right-click the mouse on the line to be edited. The “ladder editing” display with the ladder diagram of the selected line appears.
4.6.3 Adding New Ladder Parts

New ladder parts can be added when editing a ladder diagram. To add ladder parts, proceed as follows:

1. Select parts to be added
   a. Select [Tool] – [Add Instructions] to display the list of ladder parts.
   b. Select the ladder parts, or select the parts to be added from the ladder parts tool bar (refer to Table 8 "Ladder Parts Tool Bar").

   **Example** - Adding the ladder parts of the NC contact.

2. Paste new parts on the matrix to be added in the “ladder editing” display.
   a. When the ladder parts to be added are determined, the mouse form changes in the “ladder editing” display. The selected ladder parts appear at the side of the mouse pointer. **Left-click** on the matrix location where the ladder parts are to be added.

   ![Paste of Ladder Parts](image)

   **Figure 11** Paste of Ladder Parts
   
   b. “????” may appear for the added ladder parts. This is because the relay No. or register No. is not set for these ladder parts, and is not an error. Set the relay No. or register No.. For information on setting relay Nos. or register Nos., refer to Section 4.8, "Setting Relay No., Register No., and Constants".
4.6.4 Deleting Ladder Parts

To delete ladder parts, proceed as follows:

1. **Enter parts deletion mode.**
   Select [Tool] – [Edit Instructions] – [Delete Instructions], or select ![x] from the parts control tool bar (refer to Table 6 "Parts Control Tool Bar").

2. Select the ladder parts to be deleted in the “ladder editing” display. **Left-click** on the matrix location where the ladder parts are to be deleted in the “ladder editing” display.

4.7 Connecting andDisconnecting Lines between Ladder Parts

Ladder parts on a certain matrix are connected to ladder parts on another matrix with a line. The connection method of the line determines the ladder process. The following paragraph describes how to connect and disconnect the line between ladder parts.

4.7.1 Connecting with a Line

Connect ladder parts with a line in the following manner.

1. **Left-click** the mouse on the first ladder part.
2. While pressing the mouse, drag the mouse to the second ladder part.
3. Release the **left button** at the second ladder part.

Two parts are connected by a drag and drop operation.

![Figure 12 Line Connection Process](image)

**Ladder Parts Connection Terminals**

Ladder parts have IN and OUT terminals. A connecting line connects the IN and OUT terminals. A drag and drop operation determines which are IN and which are OUT terminals and connects them automatically. However, when two connection ladder parts are placed vertically as shown in (Fig. 13), the user must decide to connect the IN or OUT side.
**Figure 13** Vertically Placed Parts

In (Fig. 14), the mouse pointer is dragged from the center of a ladder part and dropped on the IN side of the other part, to make the connecting line on the IN side.

Dropping on the IN side makes a line which connects to the IN side of the other ladder part. Dropping on the OUT side makes a line that connects to the other OUT side.

**Figure 14** Connection on IN Side

### 4.7.2 Disconnecting Two Parts

Erase the line between ladder parts to disconnect them in the following manner.

1. Right-click the mouse on the first ladder part.
2. While pressing the mouse, drag the mouse to the second ladder part.
3. Release the **right button** at the second ladder part.

Two parts are disconnected by a right-click, drag and drop operation.

**Figure 15** Disconnection Process
4.8 Setting Relay No., Register No., and Constants

Relay No., register No., and constants can be set for each ladder parts. Set these values in the following manner.

1. **Enter the set value input mode.**
   Select [Tool] – [Edit Instruction] – [Edit Instruction Parameters.], or select [No.] from the parts control tool bar (refer to Table 6 "Parts Control Tool Bar").

2. **Select the ladder parts that the set values are input in the “ladder editing” display.**
   **Left-click** the mouse on the ladder parts in the “ladder editing” display. The “Input Value” dialog box appears.

![Select type of set value.]

Figure 16 [Input Value] Dialog Box

3. **Input the set values.**
   Select the type of the set value in the combo box of the [Input Value] dialog box, and then input a value suitable for the type of set value. Click [OK] to set the values.

4.8.1 Setting Values Using a Pop-up Menu

Values can also be set using a pop-up menu. The pop-up menu appears by right-clicking the mouse.

1. **Right-click on the ladder parts that the set values are input, and select the pop-up menu.**
   Right-click on the ladder parts that the set values are input in the “ladder editing” display. The pop-up menu appears. Select [Edit Instruction Parameters]. The [Input Value] dialog box appears.

2. **Input the set values.**
   Input the set values in the [Input Value] dialog box.
4.9 Inputting Relay No. and Register No. Names

Names can be set for the relay Nos. and register Nos. When editing name, a new name can be input or name information read from the external name file can be edited. Set the name for a relay No. or a register No. in the following manner.

1. **Enter name input mode.**
   Select [Tool] – [Edit Instruction] – [Edit Labels and Comments], or select 
   from the parts control tool bar (refer to Table 6 "Parts Control Tool Bar").

2. **Select the ladder parts where the number of the name to be selected is set.**
   **Left-click** the ladder parts where the number of the name to be selected is set in the “ladder editing” display. The [Edit Labels and Comments] dialog box appears.

![Edit Labels and Comments](image)

**Figure 17** [Edit Labels and Comments] Dialog Box

The relay No. or register No. appears in the No. selection list box as shown below.

Relay No.: #xxxxx, W#xxxxx  
Register No.: Mxxx

⚠️ **Note:** Some ladder parts have several relay Nos. or register Nos. In this case, several numbers appear in the No. selection list box.

Verify that the targeted relay Nos. or register Nos. appear and are selected in the relay No. selection list box.

3. **Set the name.**
   Two types of names, a short name and a long name can be used. They are treated as follows with Ladder Editor 32NX.

**Short name**
Appears overlapped on the relay No. or register No. of the ladder diagram in the “ladder editing” display. (Refer to Section 4.29.8, "Switching Short Name Display/Non-Display").

**Long name**
Appears in the column of OUT relay names in the “ladder editing” display, and in the row of output signal names in the “ladder preview” display.

**When setting is complete, be sure to click the [Update] button.** This button records the set information.
4.9.1 Setting Names Using a Pop-up Menu

Names can be also set in the following manner using the pop-up menu.

1. Select the ladder parts where the relay No. or register No. of the name to be edited is set.
   a. Right-click on the ladder parts where the relay No. or register No. of the name to be edited is set in the “ladder editing” display. The pop-up menu appears.
   b. Select the [Edit Labels and Comments], the [Edit Labels and Comments] dialog box appears.
2. Edit the name.
   a. Edit the displayed name for a relay No. or register No. in the [Edit Labels and Comments] dialog box.

4.10 Inserting Editing Matrix Row and Column

Even though new ladder parts are to be inserted immediately before the ladder parts that have already been set, there may be no matrix for insertion as shown in the following diagram.

![Figure 18 No Space for Matrix](image)

In this case, insert a row to secure the matrix where the ladder parts are to be inserted.
4.10.1 Inserting a Column

Insert a column in the following manner.

1. **Enter the column insertion mode.**
   Select [Tool] – [Edit Instructions] – [Edit Entire Column] – [Insert Column]. Or select from the parts control tool bar (refer to Table 6 "Parts Control Tool Bar").

2. **Specify the matrix where a column is to be inserted.**
   Left-click on the matrix where a column is to be inserted.

   ![Figure 19 Result of Column Insertion](image)

**Column Insertion Disabled Pattern**

A column cannot be inserted if even one part exists in the column just before the last column on the right after the second line of the matrix in the “ladder editing” display.

![Figure 20 Disabled Row Insertion](image)
4.10.2 Inserting a Row

Insert a Row in the following manner.

1. **Enter the row insertion mode.**
   Select [Tool] – [Edit Instructions] – [Edit Entire Row] – [Insert Row]. Or select ρ from the parts control tool bar (refer to Table 6 "Parts Control Tool Bar").

2. **Specify the matrix where a row is to be inserted.**
   Left-click on the matrix where a row is to be inserted.

![Diagram of matrix with row insertion](image)

**Figure 21** Result of Row Insertion

**Row Insertion Disabled Pattern**
A row cannot be inserted if even one part exists in the lowest row of the matrix in the “ladder editing” display.

![Diagram of disabled row insertion](image)

**Figure 22** Disabled Row Insertion
4.11 Deleting Editing Matrix Row and Column

Unnecessary columns or rows can be deleted.

4.11.1 Deleting a Column

Delete a column in the following manner.

1. **Enter column deletion mode.**
   Or select $\mathbb{C}$ from parts control tool bar (refer to Table 6 "Parts Control Tool Bar").

2. **Specify the matrix where column is to be deleted.**
   Left-click on the matrix where a column is to be deleted.

![Figure 23 Result of Column Deletion](image)

*Note: Deletion of a column deletes all ladder parts that are set in the column to be deleted.*

4.11.2 Deleting a Row

Delete a row in the following manner.

1. **Enter Row deletion mode.**
   Or select $\mathbb{E}$ from parts control tool bar (refer to Table 6 "Parts Control Tool Bar").

2. **Specify the matrix where a row is to be deleted.**
   Left-click on the matrix where a row is to be deleted.
Figure 24  Result of Row Deletion

Note: Deletion of a row deletes all the ladder parts set to the row to be deleted.

4.12 Clearing Displays

The contents of the “ladder editing” display can be cleared when editing. This function is useful when the current display is to be re-edited from the beginning.

Select [Edit] – [Clear Current Rung]. Or select \[\] from the parts control tool bar (refer to Table 6 "Parts Control Tool Bar").

4.13 Inserting a New Line

A new line is inserted into an arbitrary line. Since default values are set to the new line, change the values to the correct ladder information. The new line is inserted into the next line of the line selected in the ladder preview display.

Select [Edit] – [Insert new Rung], or select \[\] from the main tool bar (refer to Table 5 "Main Tool Bar").
4.14 Line Operation of Ladder Diagram

Be sure to select [Overwrite] or [Insert] for the contents edited in the “ladder editing” display before editing another line. Without this operation, the contents edited immediately before will be deleted. Ladder Editor 32NX checks the ladder information that is being currently edited when another line appears. If the [Overwrite] or [Insert] is not selected, an editing confirmation message appears. (Refer to 4.29.7 Automatic Updating Function.)

![Auto Save Current Rung: Ask Before Saving Option Dialog Box](image)

**Figure 26** [Auto Save Current Rung: Ask Before Saving Option] Dialog Box

Normally, the operator uses the menu or tool button to perform [Overwrite] or [Insert].
4.15 Changing an Edited Ladder Line

Overwrite the contents edited in the “ladder editing” display on the line currently being edited, in the following manner.

Select [Edit] – [Save Current Rung] – [Overwrite], or select from the main tool bar (refer to Table 5 "Main Tool Bar").

4.16 Inserting an Edited Ladder Line

Insert the contents edited in the “ladder editing” display into the next line of the line currently being edited, in the following manner. Therefore, the ladder data after the inserting line will be shifted backward.

Select [Edit] – [Save Current Rung] – [Insert], or select from the main tool bar (refer to Table 5 "Main Tool Bar").

4.17 Cutting, Copying and Pasting Lines

4.17.1 Cutting a Ladder Diagram Line

Cut the line selected in the “ladder preview” display. The ladder information of the cut line can be pasted to another line by pressing [Paste Rung] or [Insert Cut/Copied Rung].

Select the line to be cut in the “ladder preview” display, and select [Edit] – [Cut Rung]. Or select from the main tool bar (refer to Table 5 "Main Tool Bar").

To select several lines simultaneously, hold down the [SHIFT] or [CTRL] key when selecting lines.

4.17.2 Copy a Ladder Diagram Line

Copy the line selected in the “ladder preview” display. The ladder information of the copied line can be pasted onto another line by pressing [Paste Rung] or [Insert Cut/Copied Rung].

Select the line to be copied in the “ladder preview” display. Then select [Edit] – [Copy Rung] menu. Or select from the main tool bar (refer to Table 5 "Main Tool Bar").

To select several lines simultaneously, hold down the [SHIFT] or [CTRL] key when selecting lines.
4.17.3  Pasting a Ladder Diagram Line

Paste the cut or copied contents of the line by pressing [Cut Rung] or [Copy Rung] over the line selected in the “ladder preview” display. When several ladder list files are open simultaneously, the ladder diagram can be pasted onto another ladder list file.

Select the line to be pasted in the “ladder preview” display, and select [Edit] – [Paste Rung]. Or select ?? from the main tool bar (refer to Table 5 "Main Tool Bar").

Note: This function is disabled if several lines were cut or copied by pressing [Cut Rung] or [Copy Rung] in the operation immediately before. After selecting only one line and pressing [Cut Rung] or [Copy Rung], try pasting again.

4.17.4  Inserting and Pasting Ladder Diagram Lines

Insert the cut or copied contents of the line into the line selected in the “ladder preview” display. Therefore, the ladder data after the inserting/pasting line will be shifted backward. When several ladder list files are open simultaneously, the ladder diagram can be inserted and pasted onto another ladder list file.

Select the line to be inserted and pasted in the “ladder preview” display. Then select [Edit] – [Insert Cut/Copied Rung]. Or select ?? from the main tool bar (refer to Table 5 "Main Tool Bar").

4.18  Compiling Edited Contents

Be sure to compile the ladder information of each line after editing. Compiling performs final checking such as the relay No. overlapping check, etc. to load the information to the controller.

Note: Without this operation, the edited data cannot be correctly stored. Since compiling processes the system section and the user section of the ladder program, it is unnecessary to change to a system ladder or a user ladder.

Select [Tools] – [Check the Ladder], or select ?? from the main tool bar (refer to Table 5 "Main Tool Bar").
4.19 Printing

4.19.1 Printing a Ladder Diagram

Print an image of a ladder diagram. For the ladder program to be printed, the line Nos. of other lines referring to the OUT terminal relay Nos. appear. The information of the reference lines appears as the system section and user section together.


![Diagram of Ladder Image Printing]

**Figure 27** Ladder Image Printing
4.19.2 Printing Relay No. Using List

Print the list of used relay Nos. and the line Nos. referring to each relay No. in a list. List information of the reference lines appears as the system section and user section together.


Figure 28 Printing Relay No. List
4.19.3 Printing Register No. Using List

Print the list of used register Nos. and line Nos. referring to each register No. in a list. List information of the reference lines appears as the system section and user section together.


![Figure 29 Printing Register No. List](image-url)
4.19.4 Printing Relay No. Use State

Print the relay No. use state in the “matrix” display.

Select [File] – [Print] – [Relay State Table].

Relay Nos. for the system section and user section appear together, indicated by the following symbols.

S: Relay Nos. used in a system section
U: Relay Nos. used in a user section
B: Relay Nos. used in both system and user sections

A relay No. in a matrix is regarded as YYYYXY when the vertical is “YYYY” and the horizontal axis value is “X”.

![Figure 30 Printing Relay No. Use State](image)
### 4.19.5 Printing User Alarms and User Messages

Print the lists of user alarms and user messages.


![User Alarm and User Message Information](image)

**First language**

<table>
<thead>
<tr>
<th>No.</th>
<th>Alarm Label (First Language)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Missing arc start condition</td>
</tr>
<tr>
<td>2</td>
<td>ARC FAILURE</td>
</tr>
<tr>
<td>3</td>
<td>G2S FAILURE (RESTART)</td>
</tr>
<tr>
<td>4</td>
<td>G2S FAILURE (RESET)</td>
</tr>
<tr>
<td>5</td>
<td>G2S FAILURE (RESTART)</td>
</tr>
<tr>
<td>6</td>
<td>G2S FAILURE (RESET)</td>
</tr>
<tr>
<td>7</td>
<td>G2S FAILURE (RESTART)</td>
</tr>
<tr>
<td>8</td>
<td>G2S FAILURE (RESET)</td>
</tr>
<tr>
<td>9</td>
<td>NO TELEPHONE INSTRUCTION</td>
</tr>
<tr>
<td>10</td>
<td></td>
</tr>
<tr>
<td>11</td>
<td></td>
</tr>
<tr>
<td>12</td>
<td></td>
</tr>
<tr>
<td>13</td>
<td></td>
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<tr>
<td>14</td>
<td></td>
</tr>
<tr>
<td>15</td>
<td></td>
</tr>
<tr>
<td>16</td>
<td></td>
</tr>
</tbody>
</table>

**Second language**

From 1 to 64 alarms can be registered.
(Alarm information after No. 16 is omitted.)

![User Alarm Section Relay No. Information](image)

**User alarm section Relay No. information**

<table>
<thead>
<tr>
<th>Relay No.</th>
<th>Range No.</th>
<th>Ladder Section</th>
</tr>
</thead>
<tbody>
<tr>
<td>40010</td>
<td>68</td>
<td>System Section</td>
</tr>
<tr>
<td>40011</td>
<td>64</td>
<td>System Section</td>
</tr>
<tr>
<td>40012</td>
<td>65</td>
<td>System Section</td>
</tr>
<tr>
<td>40013</td>
<td>66</td>
<td>System Section</td>
</tr>
<tr>
<td>40014</td>
<td></td>
<td>System Section</td>
</tr>
<tr>
<td>40015</td>
<td></td>
<td>System Section</td>
</tr>
</tbody>
</table>

![User Alarm Display Relay No. Information](image)

**User alarm display Relay No. information**

From 65 to 128 alarms can be registered.
(Alarm information after No. 80 is omitted.)

![Type Selection Signal Delay No.](image)

<table>
<thead>
<tr>
<th>Relay No.</th>
<th>Range No.</th>
<th>Ladder Section</th>
</tr>
</thead>
<tbody>
<tr>
<td>40449</td>
<td></td>
<td>System Section</td>
</tr>
<tr>
<td>40444</td>
<td></td>
<td>System Section</td>
</tr>
<tr>
<td>40443</td>
<td></td>
<td>System Section</td>
</tr>
<tr>
<td>40442</td>
<td></td>
<td>System Section</td>
</tr>
</tbody>
</table>

![Request Signal Relay No.](image)

**Request Signal Relay No.**

<table>
<thead>
<tr>
<th>Relay No.</th>
<th>Range No.</th>
<th>Ladder Section</th>
</tr>
</thead>
<tbody>
<tr>
<td>40012</td>
<td></td>
<td>System Section</td>
</tr>
</tbody>
</table>

**Figure 31 Printing User Alarm List**
**User Message (System Section)**

<table>
<thead>
<tr>
<th>No. Message (1st Language)</th>
<th>No. Message (2nd Language)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>2  WIRE STICKEL/SHORT</td>
<td>2</td>
</tr>
<tr>
<td>3  GAS FAILURE</td>
<td>3</td>
</tr>
<tr>
<td>4  WIRE FAILURE</td>
<td>4</td>
</tr>
<tr>
<td>5  RESTARTING FOR ARC</td>
<td>5</td>
</tr>
<tr>
<td>6  RESTARTING FOR GAS</td>
<td>6</td>
</tr>
<tr>
<td>7  RESTARTING FOR WIND</td>
<td>7</td>
</tr>
<tr>
<td>8  END OF ARC RESTARTING</td>
<td>8</td>
</tr>
<tr>
<td>9  ARC CONFIRM RELAY STICKING</td>
<td>9</td>
</tr>
<tr>
<td>10</td>
<td></td>
</tr>
<tr>
<td>11</td>
<td></td>
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<tr>
<td>15</td>
<td></td>
</tr>
<tr>
<td>16</td>
<td></td>
</tr>
</tbody>
</table>

**Type Selection Signal Relay No.**

<table>
<thead>
<tr>
<th>Relay No.</th>
<th>Rung No.</th>
<th>Ladder Section</th>
</tr>
</thead>
<tbody>
<tr>
<td>40153</td>
<td>69</td>
<td>System Section</td>
</tr>
<tr>
<td>40151</td>
<td>70</td>
<td>System Section</td>
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<tr>
<td>40152</td>
<td>71</td>
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<td>40153</td>
<td>72</td>
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<tr>
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<td>---------</td>
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</tr>
<tr>
<td>40155</td>
<td>---------</td>
<td></td>
</tr>
</tbody>
</table>

**User Message (User Section)**

<table>
<thead>
<tr>
<th>No. Message (1st Language)</th>
<th>No. Message (2nd Language)</th>
</tr>
</thead>
<tbody>
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<td>65</td>
<td>65</td>
</tr>
<tr>
<td>66</td>
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<td>80</td>
</tr>
</tbody>
</table>

**Type Selection Signal Relay No.**

<table>
<thead>
<tr>
<th>Relay No.</th>
<th>Rung No.</th>
<th>Ladder Section</th>
</tr>
</thead>
<tbody>
<tr>
<td>40160</td>
<td>---------</td>
<td></td>
</tr>
<tr>
<td>40161</td>
<td>---------</td>
<td></td>
</tr>
<tr>
<td>40162</td>
<td>---------</td>
<td></td>
</tr>
<tr>
<td>40163</td>
<td>---------</td>
<td></td>
</tr>
<tr>
<td>40164</td>
<td>---------</td>
<td></td>
</tr>
<tr>
<td>40165</td>
<td>---------</td>
<td></td>
</tr>
</tbody>
</table>

**Request Signal Relay No.**

<table>
<thead>
<tr>
<th>Relay No.</th>
<th>Rung No.</th>
<th>Ladder Section</th>
</tr>
</thead>
<tbody>
<tr>
<td>40013</td>
<td>---------</td>
<td></td>
</tr>
</tbody>
</table>

---

**Figure 32** Printing User Message List
The following describes the items of printed information. User alarms and user messages can be printed. Since each display item is the same, this paragraph describes printing of the user alarm list as an example.

4.19.6 User Alarm System Section and User Section

A user alarm can be roughly classified as a system section that the system uses or a user section that the user can define freely. When printing, this information appears as the follows:

[User Alarm(****** Section)]

4.19.7 User Alarm Selection Relay No. Information

Relay No. information is displayed to help select a used user alarm. A user alarm is specified by turning the following six relays ON/OFF.

40130, 40131, 40132, 40133, 40134, 40135

When printing, this information appears as the following word.

[Type Selection Signal Relay No.]

When each relay No. is actually used in a code, the line No. appears.

4.19.8 User Alarm Display Relay No. Information

Relay No. information which becomes a trigger to help display a user alarm appears. The relay No. that becomes a display trigger is 40010.

When printing, this information appears with the following word.

[Request Signal Relay No.]

When each relay No. is actually used in a code, the line No. appears.
4.20 Transferring Printing Information to a Text File

4.20.1 Transferring Ladder Diagrams to a Text File

Transfers an image of a ladder diagram to a text file.

Select [File] – [Save As Text Files] – [Ladder Diagram] – [System Section (or User Section)].

4.20.2 Transferring Used Relay No. Lists to a Text File

Transfers the lists of relay Nos. used and the line Nos. referring to each relay No. to a text file. The system section and the user section are transferred together in the list of reference lines.

Select [File] – [Save As Text Files] – [Relay List] – [System Section (or User Section)].

4.20.3 Transferring Used Register No. Lists to a Text File

Transfers the lists of register Nos. used and the line Nos. referring to each register No. to a text file. The system section and the user section are transferred together in the list of reference lines.

Select [File] – [Save As Text Files] – [Register List] – [System Section (or User Section)].

4.20.4 Transferring Relay No. Use State to a Text File

Transfers the relay number use state to the text file in a “matrix” display.

Select [File] – [Save As Text Files] – [Relay State Table].

4.20.5 Transferring User Alarms and User Messages to a Text File

Transfers the user alarms and user messages to a text file.

4.21  Header Information

4.21.1  Ladder Name and System Register Editing

Edit the ladder program names and system registers.

Select [Edit] – [Header Information], or select [ ] from the main tool bar (refer to Table 5 "Main Tool Bar").

![Header Information Dialog Box](image)

**Figure 33**  [Header Information] Dialog Box

**[Name] combo box**
Selects a ladder name. Normally, select one from the list in the combo box. A name can be entered directly. **However, an improper name interrupts the loading to the controller.**

**System registers**
Sets the number of system registers.

4.22  User Alarm and User Message Information

Edit the user alarms and user messages.

Select [Edit] – [Alarms and Messages], or select [ ] from the main tool bar (refer to Table 5 "Main Tool Bar").
Figure 34  [Message Information] Dialog Box

Click the tag to select the user alarm and user message.

**Language combo box**
Each message has a first and a second languages. Select your desired language from the language combo box.

**Editing area**
Click the message to be edited in the message list, and the same message appears in the editing area. Edit the message in this area. When editing is completed, press the [Change] button.

4.22.1 **User Alarm and User Message in System Section**

If the user account level does not reach the management level, only the information in the user section appears in the message list. To display or edit the information in the system section, change the user account level. (Refer to Section 4.31 User Information Management.)

4.23 **System Ladders and User Ladders**

A ladder program has a system ladder in the system section and a user ladder in the user section. Because the manipulator may not move properly unless the system section is correctly edited, general users cannot edit the system section as well as the XRC. General users can edit only in the user ladder section. (Contact your Motoman representative when editing in the system section of the ladder program is required.)
4.24 Name File

4.24.1 What is a Name File?

Name file is a name information file to add a name to a relay No. or register No. used in the ladder program. (For the format of the name file, refer to Section A.1.1 Name File Format.)

4.24.2 Reading Name File

Name file is read in at either one of the following cases.

1. When a ladder program file or CMOS file is open
2. When a name file is read in from the menu

When a ladder program file or COMS file is open, the name file is read in at the same time as the ladder program file or CMOS file. When a name file is read in from the menu, any existing name file can be read in whenever necessary.

The name file is saved in the same folder as the ladder program file or the CMOS file. (Even if a name file has not been prepared, the ladder program can still be edited. Refer to Section 4.24.2.1 Reading Name File Automatically (With Name File).)

4.24.2.1 Reading Name File Automatically (With Name File)

When reading in a ladder program file or a CMOS file, Ladder Editor 32NX automatically reads in the name file, too. The name file read in is determined by the ladder name of the ladder program used as a keyword (refer to Section 4.21.1 Ladder Name and System Register Editing).

Example)

Ladder program name : ARCWELD
Read in file name : ARCWELD.NAM

4.24.2.2 Reading Name File Automatically (Without Name File)

If the desired name file is not available when automatically reading the name file, Ladder Editor 32NX performs the operation in the following manner.

1. Selects a file suitable for the desired ladder program from the name template file prepared in default.
2. Copies the selected template file to the same directory as the ladder program file.
3. Reads in the copied template file as a name file.

In this case, Ladder Edit 32NX refers to the ladder names to be read in to select the template file. However, when the user changes the ladder name of the ladder program file, Ladder Editor 32NX may not find any file name that coincides with the ladder name template file. In such a case, the [Select name template] dialog box appears.
Figure 35 [Select Name Template] Dialog Box

Select the template suitable for the desired ladder program. Clicking the [Cancel] button stops the automatic reading of the name file. The following shows the simple flowchart of the automatic reading.

```
Ladder file read-in
  Read-in name file determined
  Name file searched
    Found
    Name template file searched
      Found
      Name template file copied to the targeted directory
    Not found
    Name template file searched
      Selected
      Name template copied with name changed to the targeted directory (Ladder name: nam)
    Not found
    Name file read-in
  Not found
  Completed
```

The selected label file will be saved as:
F:\Documents and Settings\Administrator\Desktop\NAM.
**4.24.3 Storing Name File**

Store the edited name information by one of the following two methods.

**Manually**

Select [File] – [Save Relay Label Files]. When the [Save As] dialog box appears, input an arbitrary name for the name file to store it. Normally, the file name is stored in the following format.

Ladder name. NAM

(Example)

ARCWELD. NAM

For the ladder names, refer to “15 HEADER INFORMATION”.

**Automatically**

Setting the option stores the name file automatically. Refer to Section 4.29.3 Automatic Storing Function of Name File.

**4.24.4 Name Template File**

Name template file is installed automatically when Ladder Editor 32NX is setup. The following folder is created in the folder where the Ladder Editor 32NX execution module exists, and the name template file is stored in this folder.

**4.25 Relay/Register Name List Display Function**

The relay name list display function and register name list display function can display the name list for all relay Nos. and register Nos.. All the data of the read-in name files can be cross referenced. This “list display” dialog box has the editing function. The name information of an arbitrary relay or register No. can be edited.

("Edit Relay Labels & Comments” Display)

Select [Edit] – [Relay Labels and Rung Comments]. The [Edit Relay Labels & Comments] dialog box appears. (Some machines take time to display it.)
Figure 36 [Edit Relay Labels & Comments] Dialog Box

By selecting any desired relay No. from the list, the currently set data appears in the [No.], [Label] and [Comment] columns. Edit the data here. After editing, click the [Update] button to register the edited data.

If the [Label] and the [Comment] are similar for two or more relay Nos., change only the [No.], and then click the [Update] button. The name previously entered will remain. Because the names are similar, change only the characters that are different. The entire name does not have to be re-entered.

(“Edit Register Labels & Comments” Display)

Select [Edit] – [Register Labels]. The [Edit Register Labels & Comments] dialog box appears. (Some machines take time to display it.)
Editing procedure is the same as that of “Edit Relay Labels & Comments” Display.

Normally, edit a relay or register name by opening the [Edit Relay Labels & Comments] dialog box on the ladder diagram. However, relay Nos. or register Nos. not used for ladder diagrams cannot be less of edited. These lists can be used to edit the names for all the relay or register Nos. regardless whether or not they are used on the ladder diagram.

4.26 Line Jump Function

The line jump function searches for and jumps to the line with the keyword.

4.26.1 Line No. Search Jump

This function jumps to the specified line No.

Select [Edit] – [Go to Rung], or select \( \text{R} \) (black) from the search jump tool bar (refer to Table 7 "Search Jump Tool Bar").

When the dialog box appears, enter the line No. to jump and click [OK].

**Figure 37** [Edit Register Labels & Comments] Dialog Box

**Figure 38** Enter a Rung No. Dialog Box
4.26.2 Parts Set Value Search Jump

This function searches for values such as relay Nos., register Nos., and constants set to the ladder parts, and then jumps to the line with the set values.

1. Select [Edit] – [Find Input Relays, Registers or Constants] – [Specify Parameter], or select (brown) from the search jump tool bar (refer to Table 7 "Search Jump Tool Bar").

2. When the dialog box appears, enter the type of the value and the set value to be searched and click [OK].

![Image](image_url)

**Figure 39 “Relay, Register or Constant” Dialog Box**

4.26.2.1 Previous/Next Search Jump

Previous search and next search functions can be used for searching for parts set values only.

For a backward search, select [Edit] – [Find Input Relays, Registers or Constants] – [Backward], or select (brown) from the search jump tool bar (refer to Table 7 "Search Jump Tool Bar"). For forward search, select [Edit] – [Find Input Relays, Registers or Constants] – [Forward], or select (brown) from the search jump tool bar.

**Backward**

Backward search is a function to search for the set value in front of the current line (in the direction of smaller line No.).

**Forward**

Forward search is a function to search for the set value behind the current line (in the direction of greater line No.).

Unless new set values are entered by pressing [Edit] - [Find Input Relays, Registers or Constants]-[Backward search] or [Forward search], the set values to be searched for do not change.

This function can be used to easily know where and how the set values are used.
4.26.3 OUT Parts Relay No. Search Jump

The OUT parts relay No. search jump function searches only for the relay No. set to the OUT parts of the ladder parts and jumps there. Other ladder parts cannot be searched for.

1. Select [Edit] – [Find Output Relays]. Or select [ ] from the search jump tool bar (refer to Table 7 "Search Jump Tool Bar").

2. When the dialog box appears, input the relay No. to be searched for and click [OK].

![Figure 40 “Input Relay No." Dialog Box](image)

This function can be used to analyze the conditions in which the relay used in the line turns ON retroactively.

4.26.4 History Jump

The history jump function stores the line jump functions used in the past as the history and easily returns to the previous jump source.

This function does not exist as a menu item; Only available as a tool bar button.

Select [ ] or [ ] from the search jump tool bar (refer to Table 7 "Search Jump Tool Bar").

Using this history jump button, you can freely move to the line registered in the jump history. Normally, this function is disabled. When jumps are performed, this function becomes enabled.

[Application]

An example of its most useful application is used together with “OUT parts relay No. search jump”. When searching for certain relay No. ON/OFF conditions using the “OUT parts relay No. search jump”, a search jump may also be performed in the further advanced lines for retroactive analyses. After completion of analysis, this history jump function can easily return to the previous line.
4.27 Cross Reference Function

4.27.1 Ladder Parts Set Value and Reference Line List Display Function

The ladder parts set value and reference line list display function displays on which line and for which ladder parts the specified set values are used.

1. Select [Tools] – [Instruction Use Table]. The dialog box shown in Fig. 41 appears.

![Figure 41](image)

**Figure 41** [Relay, Register or Constant] Dialog Box

2. After inputting the targeted set value type and the value, click [OK]. The [Instruction Use Table] dialog box appears.

![Figure 42](image)

**Figure 42** [Instruction Use Table] Dialog Box

[Relay, Register or Constant] (Reference Data) List Box

The list contains the set values to be searched for. Normally, there is only one item. However, since more than two items may appear occasionally, select one.

[Instruction Type] Tree

The tree consists of ladder parts. Selecting this tree item can limit the line Nos. displayed in the [Rang Containing Item] matrix.
For example, selecting “STR” item displays only the line Nos. with the set values for “STR” parts.  

**[Rang Containing Item] Matrix**  
Displays the line Nos. referring to the set values selected in the [Relay, Register or Constant] (reference data) list box. The line No. appears in red if the detected line No. is within the system ladder area, and in blue if it is within the user ladder area.  

**[Application]**  
Set values in the ladder parts may be referenced by several other lines. In such cases, this function is useful to analyse where it is used or to know how it is used in other lines.  

### 4.27.1.1 Line Jump from [Instruction Use Table] Dialog Box  

The line jump from [Instruction Use Table] dialog box function can jump to an arbitrary line from the [Instruction Use Table] dialog box. Double-clicking the desired line No. on the [Rung Containing Item] matrix moves to the targeted line.

![Double-clicking Rungs Containing Item](image)

**Figure 43** Double-clicking Rungs Containing Item

Even if a line jump is performed by double-clicking, the [Instruction Use Table] dialog box does not disappear. Another jump to another line can be performed.

### 4.27.2 Function to Display the Relay No. Use Table and Register No. Use Table  

This function displays which relay Nos. or register Nos. are used or not used in the ladder program that is being edited.

1. Select [Tools] – [Relay Use Table]. The dialog box shown in Fig. 44 appears.  
2. Select [Tools] - [Register Use Table]. The dialog box shown in Fig. 45 appears.
Figure 44  [Relay Use Table] Dialog Box

Figure 45  Register Use Table] Dialog Box
Use State Display Matrix
Relay Nos. (Register Nos.) used are displayed in the following colors:

- **Red**: Used in a system ladder.
- **Blue**: Used in a user ladder.
- **Purple**: Used in both system and user ladders.

In the matrix, the vertical axis displays the 10th or higher digits of the relay Nos. (Register Nos.) in units of 10, while the horizontal axis displays the 1st digit of the relay Nos. Therefore, in the case of the use state display matrix in Fig. 44, the left top matrix is the relay No. 40007.

Clicking the colored matrix displays the list of used line Nos. in the [Use in Rang] list box.

**[1St Digit] Combo box**
The use state appears in the “Use Table matrix” in units of 10000. Select the unit in the [1St Digit] combo box.

**[Enter Number] Input Box**
Inputting the relay No. (Register Nos.) in this input box and clicking the [Find] button displays the specified relay No. in the matrix display.

**[Use in Rang] List Box**
In the [Use in Rang] list box, the line information referring to the relay No. (Register Nos.) selected in the “use state display matrix” appears in the format shown.

```
S:0008 - / / -

<table>
<thead>
<tr>
<th>Ladder parts</th>
</tr>
</thead>
<tbody>
<tr>
<td>Line No.</td>
</tr>
</tbody>
</table>

S: System ladder
U: User ladder```

*Figure 46 Format of [Use in Rang] List Box*

**[Application]**
When various relay Nos. are to be added or changed, this function is useful to use any unused relay Nos. (Register Nos.).
4.27.2.1 Line Jump from [Relay Use Table] Dialog Box

The line jump from [Relay Use Table] ([Register Use Table]) dialog box function can jump to an arbitrary line from the [Relay No. Use State] ([Register Use Table]) dialog box.

As shown in below, double-clicking an item in the [Use in Rang] list box moves to the targeted line.

![Double-clicking Use Line List Item](image)

**Figure 47 Double-clicking Use Line List Item**

Even if a line jump is performed by double-clicking an item, the [Relay Use Table] dialog box does not disappear. Another jump to another line can be performed.
4.28 **Mnemonic Display Function**

Mnemonic display function allows displaying the ladder diagrams, which are selected in the “ladder preview” display, in mnemonic codes.


![Mnemonic Code Display](image)

**Figure 48** Mnemonic Code Display

*Note: The mnemonic code display does not show mnemonic codes that are being edited in the “ladder editing” display. It only shows the mnemonic codes of ladder diagrams which went through the process of [Edit] – [Save Current Rung] – [Overwrite] or [Edit] – [Save Current Rung] – [Insert].*

4.28.1 **Mnemonic Editing Function**

If the following two conditions are fulfilled, mnemonic codes can be edited directly with the mnemonic code display as shown in Fig. 49 appears.

Condition 1) Mnemonic codes (error codes) cannot be analysed with Ladder Editor 32NX.

Condition 2) The user account level is “Operator” and above.

Press [Update] when completing the editing.
Figure 49 Mnemonic Editing Display

Note: The edited mnemonic codes are recognized as correct codes after pressing [Update], the display screen returns to the normal mnemonic code display shown in Fig. 49, and the mnemonic codes become unable to be edited directly. When editing the codes again, display the mnemonic editing display on the screen.
4.29 Other Settings

4.29.1 Setting Color

Set the colors of the information displayed in the “ladder editing” display.


![Color Scheme Dialog Box]

**Figure 50** [Color Scheme] Dialog Box

2. Select each item. The Color dialog box appears. Select and set any desired color.

![Color Dialog Box]

**Figure 51** [Color] Dialog Box
4.29.2 Setting Font

Set the character font in the “ladder editing” display. Fonts can be set individually for the editing display and the preview display.


![Font dialog box]

Figure 52 [Font] Dialog Box

2. Select any desired font name, the font style and size. Click [OK].

4.29.3 Automatic Storing Function of Name File

Ladder Editor 32NX has a function to store the name information automatically. Validating this function updates the name files automatically when storing the ladder information (refer to Section 4.29.9 File Settings).

If a relay name or register name is changed with this function invalid, an alarm message appears when the “ladder editing” display is closed. Store data by selecting [File] – [Save Relay Label File].
4.29.4 Automatic Rough Draft File Storing Function

If any interference occurs at editing and the application shuts down before storing the edited data, Ladder Editor 32NX will create a Rough Draft file (data file being edited) automatically (refer to Section 4.29.9 File Settings).

With this function, the data in its current state is stored in a work file when a line is changed, inserted, or deleted in the “ladder editing” display. The stored file is saved with the following file name in the same folder as the ladder program file or CMOS file that is being edited.

Opened file name + “. TMP”

Note: Even if a CMOS, HEX file is read in and edited, the work file is output as a ladder file (text file). The data that is being edited in the “ladder editing” display is not stored.

4.29.5 Automatic Backup Function of the Read-in File (Original File)

When storing edited data, Ladder Editor 32NX has a function to automatically back up the files before editing (refer to Section 4.29.9 File Settings).

The automatic backup function is available for the following files:

- Ladder files (*.LST)
- CMOS files (*.HEX)
- Name files (*.NAM)

A file name of one of these backup files has an “_” (under score) after each file extension in the same folder as the original files:

Relevant file name + extension + “_”

4.29.6 Rough Draft File Forced Output Function

Ladder Editor 32NX stores only the ladder programs in which compiling and grammatical checks, etc. are completed normally. However, the procedure may be interrupted temporarily during editing. To store a ladder program that cannot be compiled during editing, it can be forcibly stored as a rough draft file.

1. Select [File] – [Save As Rough Draft].
2. When the [Save File] dialog box appears, use an arbitrary file name to store it.

Note: Even if the reading source is a CMOS file, a work file can only output a text file as a ladder program file.
4.29.7 Automatic Updating Function

If an attempt to move to another line is made without selecting [Line Alt] or [Line Insert] when the data has been edited in the “ladder editing” display, one can select whether the [Verification] dialog box appears or the line is to be updated automatically. For automatic updating, select either [Overwrite Current Rung] or [Insert New Rung].

Displaying the [Verification] dialog box


Updating automatically


4.29.8 Switching Short Name Display/Non-Display

Relay names and register names have information for short names. A short name can appear along with the relay No. or register No. corresponding to it in the “ladder editing” display.

Select [View] – [Relay Labels] to place check mark in the box.

![Figure 53 Short Name Display](image)

4.29.9 File Settings

Select the Ladder Editor 32NX optional functions.

**Figure 54**  [File Management] Dialog Box

**Auto Save Label File When Save Ladder File:**  
Automatically stores a name file at the same time as a ladder file (or CMOS.HEX). Refer to Section 4.29.3  Automatic Storing Function of Name File.

**Auto Save Rough Draft if Ladder Editor Unexpectedly Closes:**  
Automatically stores the existing data as a temporary file before editing when overwriting a line or inserting a line. Refer to Section 4.29.4  Automatic Rough Draft File Storing Function.

**Automatic backup of reading file:**  
Creates a backup of an original file when storing a ladder file or name file. Refer to Section 4.29.5  Automatic Backup Function of the Read-in File (Original File).

**Specify Default Path for Opening Ladder Files:**  
Sets the default folder of the [Open] dialog box which appeared when [File] – [Open] were selected.
4.30 Changing User Account Level

Change the user account level in the [Enter Password] dialog box.

1. Displays the [Enter Password] dialog box for logging in.

2. Input the password.

3. When the [Enter Password] dialog box appears, input the log-in name and/or password, and click [OK].

![Figure 55](image1.png) [Enter Password] Dialog Box for Easy Mode

![Figure 56](image2.png) [Enter Password] Dialog Box for Standard Mode
4.31 User Information Management

4.31.1 How to Manage User Account

Ladder Editor 32NX manages the user accounts using log-in names and passwords to limit access to important data. The user accounts can be managed in “Easy Mode” and “Standard Mode”. The administrator of the user account levels can change the management mode. For strict user management, select “Standard Mode”. Table 1 describes the features of each management mode.

<table>
<thead>
<tr>
<th>Function</th>
<th>Easy Mode</th>
<th>Standard Mode</th>
</tr>
</thead>
<tbody>
<tr>
<td>User ID input at log-in</td>
<td>Not necessary. Only the password is necessary.</td>
<td>Necessary</td>
</tr>
<tr>
<td>Password input at application startup</td>
<td>Selectable</td>
<td>Necessary</td>
</tr>
<tr>
<td>Registration, modification, and deletion of user</td>
<td>Not available</td>
<td>Available</td>
</tr>
<tr>
<td>User account level when the password input is not necessary at the startup</td>
<td>Backup user</td>
<td>Necessary</td>
</tr>
</tbody>
</table>

Note: “Easy Mode” is the default management mode when Ladder Editor 32NX is initially started up, and an [Enter Password] dialog box appears at the startup.
4.31.2 Difference Depending of the Account Levels

Table 2 shows the authorized functions for each account level.

<table>
<thead>
<tr>
<th>Account Level</th>
<th>1 Low</th>
<th>2</th>
<th>3 High</th>
</tr>
</thead>
<tbody>
<tr>
<td>Classification</td>
<td>Backup Operator</td>
<td>Operator</td>
<td>Administrator</td>
</tr>
<tr>
<td>Meaning</td>
<td>Mode for backup operator</td>
<td>Mode for general operator</td>
<td>Mode for administrator who sets up Ladder Editor 32NX and is in charge of the maintenance of the system.</td>
</tr>
<tr>
<td>Authorized Functions</td>
<td>Reading, Reading-in name files, Printing, Cross-referencing, Text output</td>
<td>Reading, Read-in name files, Printing, Cross-referencing, Text output, Editing, Storing</td>
<td>Reading, Read-in name files, Printing, Cross-referencing, Text output, Editing, Storing, Setting account management modes, Managing user information</td>
</tr>
</tbody>
</table>

The default users as shown in Table 3 have already been registered in the user accounts. Use the password assigned to each user.

<table>
<thead>
<tr>
<th>Account Level Name</th>
<th>User Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>Administrator</td>
<td>admin</td>
</tr>
<tr>
<td>Operator</td>
<td>user</td>
</tr>
<tr>
<td>Backup operator</td>
<td>backup</td>
</tr>
</tbody>
</table>

For each default user’s password, refer to the “Default User Names and Password List” included with the shipment. The software administrator is responsible for storage and management of this list.

Any user other than the default users can be registered in the [User Manager] dialog box. (However, it is needed to perform the log-in for the user account at the “administrator” level.) Select [Option] – [Access Control] – [User Manager], and the [User Manager] dialog box appears.
Figure 57 [User Manager] Dialog Box

[Add User] button:
Adds a new user.

Refer to Section 4.31.3 Adding/Changing the User.

[Edit User] button:
Changes the password or account level of the existing user. The default user information cannot be changed. (However, only password can be changed for the “user”.)

Refer to Section 4.31.3 Adding/Changing the User.

[Delete User] button:
deletes an existing user. The default users cannot be deleted.

Manage Type:
Select one of two methods to manage user accounts: “Standard Mode” and “Easy Mode”. Refer to Section 4.31.1 How to Manage User Account.

“Require Password to Start Ladder Editor” check box:
Select this check box and the [Enter Password] dialog box will always appear the next time Ladder Editor 32NX is started up.
4.31.3 Adding/Changing the User

Click the [Add User] or [Edit User] button, and the [Regist new user] dialog box or the [Edit an exist user] dialog box appears.

![Register new user Dialog Box](image)

**Figure 58** [Register new user] Dialog Box

![Edit an Existing User Dialog Box](image)

**Figure 59** [Edit an exist user] Dialog Box

Input the [Login Name], [Password], [Confirm Password], and [Account Level], and then click the [OK] button. The log-in name cannot be changed in the [Edit an exist user] dialog box.
Notes
Appendix A

Menu Descriptions

Table 4 Description of Menu

<table>
<thead>
<tr>
<th>Menu</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>File</td>
<td></td>
</tr>
<tr>
<td>New</td>
<td>Creates a new ladder program in default.</td>
</tr>
<tr>
<td>Open</td>
<td>Opens an existing ladder program.</td>
</tr>
<tr>
<td>Close</td>
<td>Closes the ladder program that is being edited.</td>
</tr>
<tr>
<td>Save</td>
<td>Saves an overwritten ladder program in which compiling after editing is completed successfully. To save a ladder program that is being edited and cannot be compiled, use [File] - [Save As Rough Draft].</td>
</tr>
<tr>
<td>Save As</td>
<td>Select the storage file name to save the ladder program in which compiling is completed successfully.</td>
</tr>
<tr>
<td>Save As Rough Draft</td>
<td>Outputs a rough draft file. Can be selected when [Overwrite] or [Insert] is selected.</td>
</tr>
<tr>
<td>Open Relay Label File</td>
<td>Reads in a name file for the ladder program that is being edited.</td>
</tr>
<tr>
<td>Save Relay Label File</td>
<td>Saves the relay name information. Can be selected when a relay name is edited.</td>
</tr>
<tr>
<td>Save As Text Files</td>
<td></td>
</tr>
<tr>
<td>Ladder Diagram</td>
<td></td>
</tr>
<tr>
<td>User Section</td>
<td>Save file ladder diagram images of the user ladder.</td>
</tr>
<tr>
<td>System Section</td>
<td>Save file ladder diagram images of the system ladder.</td>
</tr>
<tr>
<td>Relay List</td>
<td></td>
</tr>
<tr>
<td>User Section</td>
<td>Save file the relay No. list used in the user ladder.</td>
</tr>
<tr>
<td>Table 4 Description of Menu</td>
<td></td>
</tr>
<tr>
<td>---------------------------------------------</td>
<td></td>
</tr>
<tr>
<td><strong>System Section</strong></td>
<td></td>
</tr>
<tr>
<td>Save file the relay No. list used in the system ladder.</td>
<td></td>
</tr>
<tr>
<td><strong>Register List</strong></td>
<td></td>
</tr>
<tr>
<td>—</td>
<td></td>
</tr>
<tr>
<td><strong>User Section</strong></td>
<td></td>
</tr>
<tr>
<td>Save file the register No. list used in the user ladder.</td>
<td></td>
</tr>
<tr>
<td><strong>System Section</strong></td>
<td></td>
</tr>
<tr>
<td>Save file the register No. list used in the system ladder.</td>
<td></td>
</tr>
<tr>
<td><strong>Relay State Table</strong></td>
<td></td>
</tr>
<tr>
<td>Save file the relay No. use state matrix.</td>
<td></td>
</tr>
<tr>
<td><strong>Alarms and Messages.</strong></td>
<td></td>
</tr>
<tr>
<td>Save file user alarms and user messages.</td>
<td></td>
</tr>
<tr>
<td><strong>Print</strong></td>
<td></td>
</tr>
<tr>
<td>—</td>
<td></td>
</tr>
<tr>
<td><strong>Ladder Diagram</strong></td>
<td></td>
</tr>
<tr>
<td>—</td>
<td></td>
</tr>
<tr>
<td><strong>User Section</strong></td>
<td></td>
</tr>
<tr>
<td>Prints ladder diagram images of the user ladder.</td>
<td></td>
</tr>
<tr>
<td><strong>System Section</strong></td>
<td></td>
</tr>
<tr>
<td>Prints ladder diagram images of the system ladder.</td>
<td></td>
</tr>
<tr>
<td><strong>Relay List</strong></td>
<td></td>
</tr>
<tr>
<td>—</td>
<td></td>
</tr>
<tr>
<td><strong>User Section</strong></td>
<td></td>
</tr>
<tr>
<td>Prints the relay No. list used in the user ladder.</td>
<td></td>
</tr>
<tr>
<td><strong>System Section</strong></td>
<td></td>
</tr>
<tr>
<td>Prints the relay No. list used in the system ladder.</td>
<td></td>
</tr>
<tr>
<td><strong>Register List</strong></td>
<td></td>
</tr>
<tr>
<td>—</td>
<td></td>
</tr>
<tr>
<td><strong>User Section</strong></td>
<td></td>
</tr>
<tr>
<td>Prints the register No. list used in the user ladder.</td>
<td></td>
</tr>
<tr>
<td><strong>System Section</strong></td>
<td></td>
</tr>
<tr>
<td>Prints the register No. list used in the system ladder.</td>
<td></td>
</tr>
<tr>
<td><strong>Relay State Table</strong></td>
<td></td>
</tr>
<tr>
<td>Prints the relay No. use state matrix.</td>
<td></td>
</tr>
<tr>
<td><strong>Register State Table</strong></td>
<td></td>
</tr>
<tr>
<td>Prints the register No. use state matrix.</td>
<td></td>
</tr>
<tr>
<td><strong>Alarms and Messages</strong></td>
<td></td>
</tr>
<tr>
<td>Prints user alarms and user messages.</td>
<td></td>
</tr>
<tr>
<td><strong>Print Preview</strong></td>
<td></td>
</tr>
<tr>
<td>—</td>
<td></td>
</tr>
<tr>
<td><strong>Ladder Diagram</strong></td>
<td></td>
</tr>
<tr>
<td>—</td>
<td></td>
</tr>
<tr>
<td><strong>User Section</strong></td>
<td></td>
</tr>
<tr>
<td>Previews ladder diagram images of the user ladder.</td>
<td></td>
</tr>
<tr>
<td><strong>System Section</strong></td>
<td></td>
</tr>
<tr>
<td>Previews ladder diagram images of the system ladder.</td>
<td></td>
</tr>
<tr>
<td><strong>Relay List</strong></td>
<td></td>
</tr>
<tr>
<td>—</td>
<td></td>
</tr>
<tr>
<td><strong>User Section</strong></td>
<td></td>
</tr>
<tr>
<td>Previews the relay No. list used in the user ladder.</td>
<td></td>
</tr>
<tr>
<td><strong>System Section</strong></td>
<td></td>
</tr>
<tr>
<td>Previews the relay No. list used in the system ladder.</td>
<td></td>
</tr>
<tr>
<td><strong>Register List</strong></td>
<td></td>
</tr>
<tr>
<td>—</td>
<td></td>
</tr>
<tr>
<td><strong>User Section</strong></td>
<td></td>
</tr>
<tr>
<td>Previews the register No. list used in the user ladder.</td>
<td></td>
</tr>
<tr>
<td><strong>System Section</strong></td>
<td></td>
</tr>
<tr>
<td>Previews the register No. list used in the system ladder.</td>
<td></td>
</tr>
<tr>
<td><strong>Relay State Table</strong></td>
<td></td>
</tr>
<tr>
<td>Previews the relay No. use state matrix.</td>
<td></td>
</tr>
<tr>
<td><strong>Register State Table</strong></td>
<td></td>
</tr>
<tr>
<td>Previews the register No. use state matrix.</td>
<td></td>
</tr>
<tr>
<td>Table 4 Description of Menu</td>
<td></td>
</tr>
<tr>
<td>----------------------------------</td>
<td></td>
</tr>
<tr>
<td>Alarms and Messages</td>
<td>Prints user alarms and user messages.</td>
</tr>
<tr>
<td>Print Setup</td>
<td>Displays the “printer setting” dialog box.</td>
</tr>
<tr>
<td>Exit</td>
<td>Closes Ladder Editor 32NX.</td>
</tr>
<tr>
<td>Edit</td>
<td>—</td>
</tr>
<tr>
<td>Undo</td>
<td>Returns the edited contents to the previous state.</td>
</tr>
<tr>
<td>Redo</td>
<td>Retries the operation that was returned to by [Return]</td>
</tr>
<tr>
<td></td>
<td>operation.</td>
</tr>
<tr>
<td>Insert New Rung</td>
<td>Inserts a new line after the selected line.</td>
</tr>
<tr>
<td>Cut Rung</td>
<td>Deletes the ladder diagram information of the selected line.</td>
</tr>
<tr>
<td>Copy Rung</td>
<td>Copies the ladder diagram information of the selected line.</td>
</tr>
<tr>
<td>Paste Rung</td>
<td>Pastes the contents of [Cut Rang] or [Copy Rang] on the</td>
</tr>
<tr>
<td></td>
<td>selected line. The ladder information that existed before</td>
</tr>
<tr>
<td></td>
<td>pasting disappears.</td>
</tr>
<tr>
<td>Insert Cut Copied Rung</td>
<td>Inserts the contents of [Cut Rang] or [Copy Rang] into the</td>
</tr>
<tr>
<td></td>
<td>selected line. All the lines after the selected line are</td>
</tr>
<tr>
<td></td>
<td>moved backward.</td>
</tr>
<tr>
<td>Save Current Rung</td>
<td>—</td>
</tr>
<tr>
<td>Overwrite</td>
<td>Overwrites and updates the ladder diagram information on</td>
</tr>
<tr>
<td></td>
<td>the currently edited ladder diagram information for the</td>
</tr>
<tr>
<td></td>
<td>currently displayed line.</td>
</tr>
<tr>
<td>Insert</td>
<td>Inserts the currently edited ladder diagram information to</td>
</tr>
<tr>
<td></td>
<td>the next line of the currently displayed line.</td>
</tr>
<tr>
<td>Clear Current Rung</td>
<td>Clears the ladder diagram information of the currently</td>
</tr>
<tr>
<td></td>
<td>displayed line.</td>
</tr>
<tr>
<td>Header Information</td>
<td>Displays the header information of the ladder program in</td>
</tr>
<tr>
<td></td>
<td>operation.</td>
</tr>
<tr>
<td>Alarms and Messages</td>
<td>Displays the message information of the ladder program in</td>
</tr>
<tr>
<td></td>
<td>operation.</td>
</tr>
<tr>
<td>Relay Labels and Rung Comments</td>
<td>Displays the relay name list.</td>
</tr>
<tr>
<td>Register Labels</td>
<td>Displays the register name list.</td>
</tr>
<tr>
<td>Find Input Relays, Registers or</td>
<td></td>
</tr>
<tr>
<td>Constants</td>
<td>—</td>
</tr>
<tr>
<td>Specify Parameter</td>
<td>Searches for relay Nos., register Nos. or set constants.</td>
</tr>
</tbody>
</table>
### Table 4 Description of Menu

<table>
<thead>
<tr>
<th>Backward</th>
<th>Searches for set values in the direction of the smaller line No..</th>
</tr>
</thead>
<tbody>
<tr>
<td>Forward</td>
<td>Searches for set values in the direction of the greater line Nos..</td>
</tr>
<tr>
<td>Find Output Relays</td>
<td>Searches for relay Nos. used in the OUT terminal.</td>
</tr>
<tr>
<td>Go to Rung</td>
<td>Searches for the specified line and jumps there.</td>
</tr>
<tr>
<td>Go to First Rung</td>
<td>Moves to the first line.</td>
</tr>
<tr>
<td>Go to Last Rung</td>
<td>Moves to the last line.</td>
</tr>
<tr>
<td>View</td>
<td>—</td>
</tr>
<tr>
<td>Main Toolbar</td>
<td>Switches between display/non-display of the tool bar.</td>
</tr>
<tr>
<td>Navigation Toolbar</td>
<td>Switches between display/non-display of the search jump bar.</td>
</tr>
<tr>
<td>Instruction Toolbar</td>
<td>Switches between display/non-display of the parts selection bar.</td>
</tr>
<tr>
<td>Edit Toolbar</td>
<td>Switches between display/non-display of the parts control bar.</td>
</tr>
<tr>
<td>Status Bar</td>
<td>Switches between display/non-display of the status bar.</td>
</tr>
<tr>
<td>Relay Labels</td>
<td>Selects whether the relay short name is to be overlapped with the ladder diagram in the display.</td>
</tr>
<tr>
<td>Output Relay User Table</td>
<td>Selects whether the line No. using each relay No. on the ladder diagram for the OUT terminal is to be overlapped with the parts in the display.</td>
</tr>
<tr>
<td>Tools</td>
<td>—</td>
</tr>
<tr>
<td>Check the Ladder</td>
<td>Compiles the currently displayed ladder program. Compiling checks for mistakes in the edited ladder program (such as overlapped relay Nos., measurement of processing time).</td>
</tr>
<tr>
<td>Edit Instructions</td>
<td>—</td>
</tr>
<tr>
<td>Delete Instruction</td>
<td>Changes the edit mode to the deletion mode.</td>
</tr>
<tr>
<td>Edit Entire Row</td>
<td>—</td>
</tr>
<tr>
<td>Insert Row</td>
<td>Changes the edit mode to the line insertion mode.</td>
</tr>
<tr>
<td>Function</td>
<td>Description</td>
</tr>
<tr>
<td>-----------------------</td>
<td>---------------------------------------------------------------</td>
</tr>
<tr>
<td>Delete Row</td>
<td>Changes the edit mode to the line deletion mode.</td>
</tr>
<tr>
<td>Edit Entire Column</td>
<td>—</td>
</tr>
<tr>
<td>Insert Column</td>
<td>Changes the edit mode to the row insertion mode.</td>
</tr>
<tr>
<td>Delete Column</td>
<td>Changes the edit mode to the row deletion mode.</td>
</tr>
<tr>
<td>Edit Instruction</td>
<td>Changes the edit mode to the set value input mode.</td>
</tr>
<tr>
<td>Parameters</td>
<td></td>
</tr>
<tr>
<td>Edit Labels and</td>
<td>Changes the edit mode to the name input mode.</td>
</tr>
<tr>
<td>Comments</td>
<td></td>
</tr>
<tr>
<td>Quit the Editing</td>
<td>Clears the edit mode.</td>
</tr>
<tr>
<td>Functions</td>
<td></td>
</tr>
<tr>
<td>Add Instructions</td>
<td>—</td>
</tr>
<tr>
<td>STR</td>
<td>Changes to the set mode of STR parts.</td>
</tr>
<tr>
<td>STR-NOT</td>
<td>Changes to the setting mode of STR-NOT parts.</td>
</tr>
<tr>
<td>GRP</td>
<td>Changes to the setting mode of GRP parts.</td>
</tr>
<tr>
<td>TMR</td>
<td>Changes to the setting mode of TMR parts.</td>
</tr>
<tr>
<td>CNT</td>
<td>Changes to the setting mode of CNT parts.</td>
</tr>
<tr>
<td>OUT</td>
<td>Changes to the setting mode of OUT parts.</td>
</tr>
<tr>
<td>ADD</td>
<td>Changes to the setting mode of ADD parts.</td>
</tr>
<tr>
<td>SUB</td>
<td>Changes to the setting mode of SUB parts.</td>
</tr>
<tr>
<td>MUL</td>
<td>Changes to the setting mode of MUL parts.</td>
</tr>
<tr>
<td>DIV</td>
<td>Changes to the setting mode of DIV parts.</td>
</tr>
<tr>
<td>MOD</td>
<td>Changing to the setting mode of MOD parts.</td>
</tr>
<tr>
<td>BIN</td>
<td>Changes to the setting mode of BIN parts.</td>
</tr>
<tr>
<td>Table 4 Description of Menu</td>
<td></td>
</tr>
<tr>
<td>-----------------------------</td>
<td></td>
</tr>
<tr>
<td><strong>BCD</strong></td>
<td>Changes to the setting mode of BCD parts.</td>
</tr>
<tr>
<td><strong>MOV</strong></td>
<td>Changes to the setting mode of MOV parts.</td>
</tr>
<tr>
<td><strong>WAND</strong></td>
<td>Changes to the setting mode of WAND parts.</td>
</tr>
<tr>
<td><strong>WOR</strong></td>
<td>Changes to the setting mode of WOR parts.</td>
</tr>
<tr>
<td><strong>WXOR</strong></td>
<td>Changes to the setting mode of WXOR parts.</td>
</tr>
<tr>
<td><strong>WNOT</strong></td>
<td>Changes to the setting mode of WNOT parts.</td>
</tr>
<tr>
<td><strong>SHL</strong></td>
<td>Changes to the setting mode of SHL parts.</td>
</tr>
<tr>
<td><strong>SHR</strong></td>
<td>Changes to the setting mode of SHR parts.</td>
</tr>
<tr>
<td><strong>ROL</strong></td>
<td>Changes to the setting mode of ROL parts.</td>
</tr>
<tr>
<td><strong>ROR</strong></td>
<td>Changes to the setting mode of ROR parts.</td>
</tr>
<tr>
<td><strong>PLS</strong></td>
<td>Changes to the setting mode of PLS parts.</td>
</tr>
<tr>
<td><strong>PLF</strong></td>
<td>Changes to the setting mode of PLF parts.</td>
</tr>
<tr>
<td><strong>Instruction User Table</strong></td>
<td>Displays the list of lines which uses specified set values (relay Nos., register Nos., constants).</td>
</tr>
<tr>
<td><strong>Relay Use Table</strong></td>
<td>Displays the relay No. use state matrix.</td>
</tr>
<tr>
<td><strong>Register Use Table</strong></td>
<td>Displays the register No. use state matrix.</td>
</tr>
<tr>
<td><strong>Display Mnemonic</strong></td>
<td>Displays the Mnemonic.</td>
</tr>
<tr>
<td><strong>Option</strong></td>
<td>—</td>
</tr>
<tr>
<td><strong>Access Control</strong></td>
<td>—</td>
</tr>
<tr>
<td><strong>Enter Password</strong></td>
<td>Displays the “password input” display. Needed to edit in the system section.</td>
</tr>
<tr>
<td><strong>User Manager</strong></td>
<td>Displays the “user manager” dialog box.</td>
</tr>
<tr>
<td><strong>Current Ladder Section</strong></td>
<td>—</td>
</tr>
</tbody>
</table>
### Table 4 Description of Menu

<table>
<thead>
<tr>
<th>Section</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>User Section</strong></td>
<td>Changes a ladder to be edited into a ladder in the user section.</td>
</tr>
<tr>
<td><strong>System Section</strong></td>
<td>Changes a ladder to be edited into a ladder in the system section. Only users at the manager level can edit the ladders in the system section.</td>
</tr>
<tr>
<td><strong>Color Scheme</strong></td>
<td>Sets the graphic color displayed in the “ladder editing” display.</td>
</tr>
<tr>
<td><strong>Font</strong></td>
<td>—</td>
</tr>
<tr>
<td><strong>Edit Window</strong></td>
<td>Sets the character font displayed in the “ladder editing” display.</td>
</tr>
<tr>
<td><strong>Preview Windows</strong></td>
<td>Sets the character font displayed in the “ladder preview” display.</td>
</tr>
<tr>
<td><strong>Auto Save Current Rung</strong></td>
<td>Detects modification to the ladder diagram when moving to another line during editing, and selects whether the message to verify modification is to be displayed or not.</td>
</tr>
<tr>
<td><strong>Ask Before Saving</strong></td>
<td>With [Verify at Editing] above OFF, detects modification to the ladder diagram when moving to another line, and overwrites and updates the current line automatically.</td>
</tr>
<tr>
<td><strong>Overwrite Current Rung</strong></td>
<td>With [Verify at Editing] above OFF, detects modification to the ladder diagram when moving to another line, and inserts the current line automatically to the line to be jumped.</td>
</tr>
<tr>
<td><strong>Insert New Rung</strong></td>
<td>Display File Management Dialog.</td>
</tr>
<tr>
<td><strong>Window</strong></td>
<td>—</td>
</tr>
<tr>
<td><strong>Cascade</strong></td>
<td>Overlaps windows.</td>
</tr>
<tr>
<td><strong>Tile</strong></td>
<td>Displays windows side by side.</td>
</tr>
<tr>
<td><strong>Arrange Icons</strong></td>
<td>Arranges icons of iconized window.</td>
</tr>
<tr>
<td><strong>HELP</strong></td>
<td>—</td>
</tr>
<tr>
<td><strong>Help Topics</strong></td>
<td>Displays the contents of HELP.</td>
</tr>
<tr>
<td><strong>Search Keyword</strong></td>
<td>Displays the “keyword search” dialog box of HELP.</td>
</tr>
<tr>
<td><strong>Using Help</strong></td>
<td>Displays how to use HELP.</td>
</tr>
<tr>
<td><strong>About Ladder Editor</strong></td>
<td>Displays the version information.</td>
</tr>
</tbody>
</table>
## A.1 Description of Tool Bars

### Table 5 Main Tool Bar

<table>
<thead>
<tr>
<th>Button</th>
<th>Function</th>
<th>Selection</th>
</tr>
</thead>
<tbody>
<tr>
<td>![File]</td>
<td>Creates a new ladder program file in default.</td>
<td>[File] - [New]</td>
</tr>
<tr>
<td>![File]</td>
<td>Opens an existing ladder program.</td>
<td>[File] - [Open]</td>
</tr>
<tr>
<td>![File]</td>
<td>Overwrites and saves a ladder program in which compiling after editing is completed successfully. To save a ladder program that is being edited and cannot be compiled, select [File] - [Save As Rough Draft].</td>
<td>[File] - [Save]</td>
</tr>
<tr>
<td>![Edit]</td>
<td>Deletes the ladder diagram information of the selected line.</td>
<td>[Edit] - [Cut Rung]</td>
</tr>
<tr>
<td>![Edit]</td>
<td>Copies the ladder diagram information of the selected line.</td>
<td>[Edit] - [Copy Rung]</td>
</tr>
<tr>
<td>![Edit]</td>
<td>Pastes the contents of [Cut Rung] or [Copy Rung] on the selected line. The ladder information that existed before pasting disappears.</td>
<td>[Edit] - [Paste Rung]</td>
</tr>
<tr>
<td>![Edit]</td>
<td>Inserts the contents of [Cut Rung] or [Copy Rung] into the selected line. All the lines after the selected line are moved backward.</td>
<td>[Edit] - [Insert Cut\Copied Rung]</td>
</tr>
<tr>
<td>![Edit]</td>
<td>Returns the edited contents to the previous state.</td>
<td>[Edit] - [Undo]</td>
</tr>
<tr>
<td>![Edit]</td>
<td>Retries the operation that was returned to by [Return].</td>
<td>[Edit] - [Redo]</td>
</tr>
<tr>
<td>![Edit]</td>
<td>Inserts a new line after the selected line.</td>
<td>[Edit] - [Insert new Rung]</td>
</tr>
<tr>
<td>![Edit]</td>
<td>Overwrites and updates the currently edited ladder diagram information for the currently displayed line.</td>
<td>[Edit] - [Save Current Rung] – [Overwrite]</td>
</tr>
<tr>
<td>![Edit]</td>
<td>Inserts the currently edited ladder diagram information to the next line of the currently displayed line.</td>
<td>[Edit] - [Save Current Rung] – [Insert]</td>
</tr>
<tr>
<td>![Tool]</td>
<td>Compiles the currently displayed ladder program. Compiling checks for mistakes in the edited ladder program (such as overlapped relay Nos., measurement of processing time).</td>
<td>[Tool] - [Check the Ladder]</td>
</tr>
<tr>
<td>![Tool]</td>
<td>Displays the list of lines which uses specified set values (relay Nos., register Nos., constants).</td>
<td>[Tool] - [Instruction Use Table]</td>
</tr>
</tbody>
</table>
### Table 5  Main Tool Bar

<table>
<thead>
<tr>
<th>Button</th>
<th>Function</th>
<th>Selection</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="icon1.png" alt="Icon" /></td>
<td>Displays the header information of the ladder program in operation.</td>
<td>[Edit] - [Header Information]</td>
</tr>
<tr>
<td><img src="icon2.png" alt="Icon" /></td>
<td>Displays the message information of the ladder program in operation.</td>
<td>[Edit] - [Alarms and Messages]</td>
</tr>
<tr>
<td><img src="icon3.png" alt="Icon" /></td>
<td>Changes a ladder to be edited into a ladder in the system section. Only users at the manager level can edit the ladders in the system section.</td>
<td>[Option] - [Current Ladder Section] - [System Section]</td>
</tr>
<tr>
<td><img src="icon4.png" alt="Icon" /></td>
<td>Changes a ladder to be edited into a ladder in the user section.</td>
<td>[Option] - [Current Ladder Section] - [User Section]</td>
</tr>
<tr>
<td><img src="icon5.png" alt="Icon" /></td>
<td>Displays the contents of HELP.</td>
<td>[Help] - [Help Topics]</td>
</tr>
</tbody>
</table>

### Table 6  Parts Control Tool Bar

<table>
<thead>
<tr>
<th>Button</th>
<th>Function</th>
<th>Selection</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="icon6.png" alt="Icon" /></td>
<td>Changes the edit mode to the deletion mode.</td>
<td>[Tools] · [Edit Instructions] · [Delete Instructions]</td>
</tr>
<tr>
<td><img src="icon7.png" alt="Icon" /></td>
<td>Changes the edit mode to the line insertion mode.</td>
<td>[Tools] · [Edit Instructions] · [Insert Row]</td>
</tr>
<tr>
<td><img src="icon8.png" alt="Icon" /></td>
<td>Changes the edit mode to the line deletion mode.</td>
<td>[Tools] · [Edit Instructions] · [Delete Row]</td>
</tr>
<tr>
<td><img src="icon9.png" alt="Icon" /></td>
<td>Changes the edit mode to the row insertion mode.</td>
<td>[Tools] · [Edit Instructions] · [Insert Column]</td>
</tr>
<tr>
<td><img src="icon10.png" alt="Icon" /></td>
<td>Changes the edit mode to the row deletion mode.</td>
<td>[Tools] · [Edit Instructions] · [Delete Column]</td>
</tr>
</tbody>
</table>
### Table 6  Parts Control Tool Bar

<table>
<thead>
<tr>
<th>Button</th>
<th>Function</th>
<th>Selection</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image1" alt="Icon" /></td>
<td>Changes the edit mode to the set value input mode.</td>
<td>[Tools] · [Edit Instructions] · [Edit &amp; Instruction Parameters]</td>
</tr>
<tr>
<td><img src="image2" alt="Icon" /></td>
<td>Changes the edit mode to the name input mode.</td>
<td>[Tools] · [Edit Instructions] · [Edit Labels and Comments]</td>
</tr>
<tr>
<td><img src="image3" alt="Icon" /></td>
<td>Clears the “ladder diagram information” display of the currently displayed line.</td>
<td>[Edit] · [Clear Current Rung]</td>
</tr>
<tr>
<td><img src="image4" alt="Icon" /></td>
<td>Clears the edit mode.</td>
<td>[Tools] · [Edit Instructions] · [Quit the Editing Functions]</td>
</tr>
</tbody>
</table>

### Table 7  Search Jump Tool Bar

<table>
<thead>
<tr>
<th>Button</th>
<th>Function</th>
<th>Selection</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image5" alt="Icon" /></td>
<td>Searches for relay Nos. used in the OUT terminal.</td>
<td>[Edit] · [Find &amp; Output Relays]</td>
</tr>
<tr>
<td><img src="image6" alt="Icon" /></td>
<td>Searches for relay Nos., register Nos., or set constants.</td>
<td>[Edit] · [Find Input Relays, Registers or Constants] – [Specify Parameter]</td>
</tr>
<tr>
<td><img src="image7" alt="Icon" /></td>
<td>Searches for set values in the direction of the smaller line Nos..</td>
<td>[Edit] · [Find Input Relays, Registers or Constants] – [Backward]</td>
</tr>
<tr>
<td><img src="image8" alt="Icon" /></td>
<td>Searches for set values in the direction of the greater line Nos..</td>
<td>[Edit] · [Find Input Relays, Registers or Constants] – [Forward]</td>
</tr>
<tr>
<td><img src="image9" alt="Icon" /></td>
<td>Searches for the specified line and jumps there.</td>
<td>[Edit] · [Go to Rung]</td>
</tr>
<tr>
<td><img src="image10" alt="Icon" /></td>
<td>Moves to the first line.</td>
<td>[Edit] · [Go to First Rung]</td>
</tr>
<tr>
<td><img src="image11" alt="Icon" /></td>
<td>Moves to the last line.</td>
<td>[Edit] · [Go to Next Rung]</td>
</tr>
<tr>
<td><img src="image12" alt="Icon" /></td>
<td>Jumps backward in the jump history.</td>
<td></td>
</tr>
<tr>
<td><img src="image13" alt="Icon" /></td>
<td>Jumps forward in the jump history.</td>
<td></td>
</tr>
<tr>
<td>Button</td>
<td>Function</td>
<td>Selection</td>
</tr>
<tr>
<td>--------</td>
<td>----------</td>
<td>-----------</td>
</tr>
<tr>
<td></td>
<td>Changes to the setting mode of STR parts.</td>
<td>[Tools] · [Add Instructions] · [STR]</td>
</tr>
<tr>
<td></td>
<td>Changes to the setting mode of STR-NOT parts.</td>
<td>[Tools] · [Add Instructions] · [STR-NOT]</td>
</tr>
<tr>
<td></td>
<td>Changes to the setting mode of GRP parts.</td>
<td>[Tools] · [Add Instructions] · [GRP]</td>
</tr>
<tr>
<td></td>
<td>Changes to the setting mode of TMR parts.</td>
<td>[Tools] · [Add Instructions] · [TMR]</td>
</tr>
<tr>
<td></td>
<td>Changes to the setting mode of CNT parts.</td>
<td>[Tools] · [Add Instructions] · [CNT]</td>
</tr>
<tr>
<td></td>
<td>Changes to the setting mode of OUT parts.</td>
<td>[Tools] · [Add Instructions] · [OUT]</td>
</tr>
<tr>
<td></td>
<td>Changes to the setting mode of ADD parts.</td>
<td>[Tools] · [Add Instructions] · [ADD]</td>
</tr>
<tr>
<td></td>
<td>Changes to the setting mode of SUB parts.</td>
<td>[Tools] · [Add Instructions] · [SUB]</td>
</tr>
<tr>
<td></td>
<td>Changes to the setting mode of MUL parts.</td>
<td>[Tools] · [Add Instructions] · [MUL]</td>
</tr>
<tr>
<td></td>
<td>Changes to the setting mode of DIV parts.</td>
<td>[Tools] · [Add Instructions] · [DIV]</td>
</tr>
<tr>
<td></td>
<td>Changing to the setting mode of MOD parts.</td>
<td>[Tools] · [Add Instructions] · [MOD]</td>
</tr>
<tr>
<td></td>
<td>Changes to the setting mode of BIN parts.</td>
<td>[Tools] · [Add Instructions] · [BIN]</td>
</tr>
<tr>
<td></td>
<td>Changes to the setting mode of BCD parts.</td>
<td>[Tools] · [Add Instructions] · [BCD]</td>
</tr>
<tr>
<td></td>
<td>Changes to the setting mode of MOV parts.</td>
<td>[Tools] · [Add Instructions] · [MOV]</td>
</tr>
<tr>
<td></td>
<td>Changes to the setting mode of WAND parts.</td>
<td>[Tools] · [Add Instructions] · [WAND]</td>
</tr>
<tr>
<td></td>
<td>Changes to the setting mode of WOR parts.</td>
<td>[Tools] · [Add Instructions] · [WOR]</td>
</tr>
</tbody>
</table>
### Table 8  Ladder Parts Tool Bar

<p>| | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Changes to the setting mode of WXOR parts.</td>
<td>[Tools] · [Add Instructions] · [WXOR]</td>
</tr>
<tr>
<td></td>
<td>Changes to the setting mode of WNOT parts.</td>
<td>[Tools] · [Add Instructions] · [WNOT]</td>
</tr>
<tr>
<td></td>
<td>Changes to the setting mode of SHL parts.</td>
<td>[Tools] · [Add Instructions] · [SHL]</td>
</tr>
<tr>
<td></td>
<td>Changes to the setting mode of SHR parts.</td>
<td>[Tools] · [Add Instructions] · [SHR]</td>
</tr>
<tr>
<td></td>
<td>Changes to the setting mode of ROL parts.</td>
<td>[Tools] · [Add Instructions] · [ROL]</td>
</tr>
<tr>
<td></td>
<td>Changes to the setting mode of ROR parts.</td>
<td>[Tools] · [Add Instructions] · [ROR]</td>
</tr>
<tr>
<td></td>
<td>Changes to the setting mode of PLS parts.</td>
<td>[Tools] · [Add Instructions] · [PLS]</td>
</tr>
<tr>
<td></td>
<td>Changes to the setting mode of PLF parts.</td>
<td>[Tools] · [Add Instructions] · [PLF]</td>
</tr>
</tbody>
</table>

### A.1.1 Name File Format

The following shows the format of a name file.

```plaintext
//TYPE:ARCWELD : Ladder name
///11280 : Relay block No.
ssssssss,LLLLLLLL : Name of 11280
aaaaaaa,BBBBBBBB : Name of 11281
                      ↓ For eight items

Arcstart, arc off restart processing memory reset
Restart, restart processing reset
Inching, inching
Retract, retract : Name of 11287
///20010 : Next relay block No.
,External start
,
,Call master job
,Alarm/error reset
,
```


//REGISTER

M209=ssssssss,LLLLLLLLL
M210=Aconfirm relay sticking,
     arc confirm relay sticking
M211=Arc shortageR,
     arc shortage (robot side)
M212=Power failure, welder malfunction
M213=Retract request, wire retract request

[Relay Name:]
Short name: Within 8 characters
Long name: Within 60 characters

[Register Name:]
M000 = Short name, long name
Short name: Within 8 characters
Long name: Within 60 characters
“M” must be added to the first character in the name.
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