

FAPT LADDER-III

OPERATOR'S MANUAL

- No part of this manual may be reproduced in any form.
- All specifications and designs are subject to change without notice.

The export of this product is subject to the authorization of the government of the country from where the product is exported.

In this manual we have tried as much as possible to describe all the various matters.
However, we cannot describe all the matters which must not be done, or which cannot be done, because there are so many possibilities.
Therefore, matters which are not especially described as possible in this manual should be regarded as "impossible".

SAFETY PRECAUTIONS

This manual includes safety precautions for protecting the user and preventing damage to the machine. Precautions are classified into Warnings and Cautions according to their bearing on safety. Also, supplementary information is described as Notes. Read the Warnings, Cautions, and Notes thoroughly before attempting to use the machine.

 **WARNING**

Applied when there is a danger of the user being injured or when there is a danger of both the user being injured and the equipment being damaged if the approved procedure is not observed.

 **CAUTION**

Applied when there is a danger of the equipment being damaged, if the approved procedure is not observed.

NOTE

Notes is used to indicate supplementary information other than Warnings and Cautions.

- Read this manual carefully, and store it in a safe place.

GENERAL WARNINGS AND CAUTIONS

The following warnings and note describe precautions on handling CNCs, which must be observed to ensure safety when using machines equipped with a CNC.

WARNING

- 1 Before operating the machine, thoroughly check the entered data. Operating the machine with incorrectly specified data may result in the machine behaving unexpectedly, possibly causing damage to the workpiece and/or machine itself, or injury to the user.
- 2 The parameters for the CNC and PMC are factory-set. Usually, there is no need to change them. When, however, there is no alternative other than to change a parameter, ensure that you fully Failure to set a parameter correctly may result in the machine behaving unexpectedly, possibly causing damage to the workpiece and/or machine itself, or injury to the user.

NOTE

Command programs, parameters, and variables are stored in nonvolatile memory in the CNC. Generally, the contents of memory are not lost by a power on/off operation. However, the contents of memory may be erased by mistake, or important data in nonvolatile memory may have to be erased upon recovering from a failure.

To enable the restoration of data as soon as possible if such a situation arises, always make a backup of the data in advance.

WARNINGS AND NOTES RELATING TO FAPT LADDER-III

Warnings and notes relating to FAPT LADDER-III appear in this manual. Before using the software, read this manual thoroughly and take time to read the Warnings, Cautions, and Notes in this manual carefully.

In addition, "READ THE FOLLOWING:" which appears in the next section, summarizes the note to be kept in mind when FAPT LADDER-III is used, which is not described in the chapters in this manual. Before using this software, also read this part.

READ THE FOLLOWING:...

The following summarizes the points that the user should keep in mind when using FAPT LADDER-III. Before using FAPT LADDER-III, read the following:

**CAUTION**

In this manual we have tried as much as possible to describe all the various matters.

However, we cannot describe all the matters which must not be done, or which cannot be done, because there are so many possibilities.

Therefore, matters which are not especially described as possible in this manual should be regarded as "impossible"

PREFACE

Thank you for purchasing FANUC FAPT LADDER-III
(Specification : A08B-9210-J505).

FAPT LADDER-III is a programming system for developing sequence programs for FANUC PMCs.

This software runs under the Microsoft® Windows® environment. This manual does not cover common basic Windows operations. If you are a beginner to Windows, read the Windows manual first to learn the basic Windows operations.

This manual describes the programming system-specific items including the methods of installing, starting, and using this software. For details on how to create sequence programs for FANUC PMCs and how to operate PMCs, refer to the following manuals:

"FANUC PMC MODEL PA1/PA3/SA1/SA2/SA3/SA5/SB/SB2/SB3/SB4/SB5/SB6/SB7/SC/SC3/SC4/NB/NB2/NB6 Ladder Language Programming Manual" B-61863E

Read this manual thoroughly to ensure the correct use of FAPT LADDER-III.

NOTE

This software you purchased can be used on a single computer. When using this software on more than one computer, you must be licensed to use as many copies of this software as the number of the computers being used, even if you are not running this software on multiple computers at the same time. You may make one copy of this software for backup or archiving purposes.

Copyright to this software is reserved by FANUC. You must not transfer, lend, sell, distribute, lease, or rent this software to a third party.

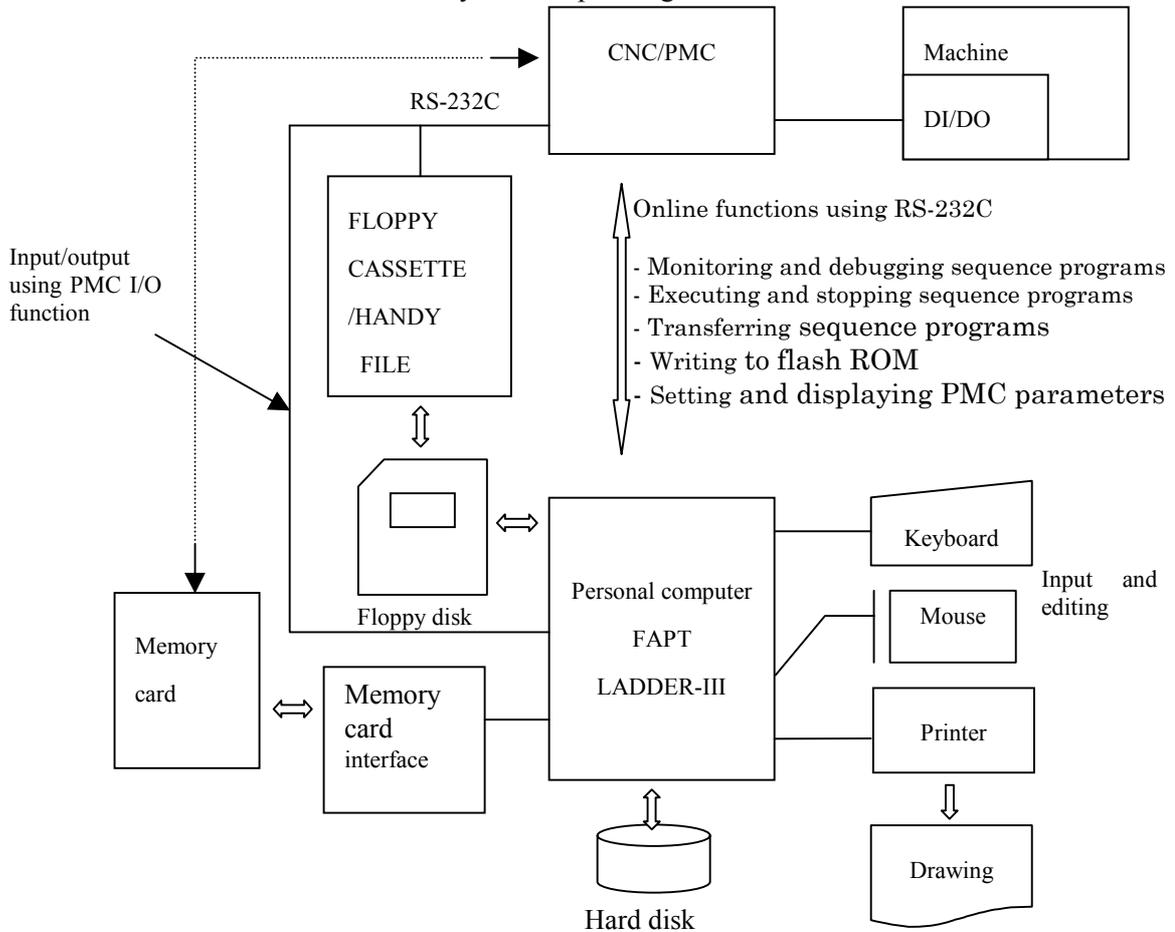
Microsoft and Windows are registered trademarks of Microsoft Corporation in the United States of America.

FEATURES OF FAPT LADDER-III

This software has the following features:

Features

This software provides a Windows-based environment for developing sequence programs for FANUC PMCs, therefore providing the user with easy-to-use operating environment.



Outline Diagram

NOTE

- 1 The specifications of the online functions using the RS-232C interface vary depending on the PMC model being used. With some PMC models, these functions are not available. For details on the functions, refer to the relevant PMC programming manual.
- 2 Multiple FAPT LADDER-III programs can be started at the same time. Multiple FAPT LADDER-III programs cannot be connected to one PMC at the same time. For one PC, FAPT LADDER-III can be connected to a maximum of four PMCs when using RS-232-C, while it can be connected to a maximum of 10 PMCs when using Ethernet.
- 3 For Ethernet, I/O operations that use [HOST] of the PMC I/O function cannot be performed.

- Main functions
 - Inputting, displaying, editing, and outputting sequence programs
 - Monitoring and debugging sequence programs (Displaying the signal status, alarms, and PMC status, and ladder diagram online monitoring)
 - Setting and displaying PMC parameters
 - Executing and stopping sequence programs
 - Transfer to and from the PMC (RAM)
 - Writing to flash ROM
 - Printing sequence programs
- Supported PMC models
PMC-NB/NB2/NB6/PA3//SA1/SA3/SA5/SB3/SB4/SB5/SB6/SB7/SC3/SC4
- PMC models and supported functions
The following table lists the available functions for each PMC model:

PMC model	Function					
	Step sequence program	Online function	Offline function	I/O device		
				PMC	Handy File	Memory card
PMC-SA1	B	C	A	A	A	C
PMC-SA3	B	C	A	A	A	C
PMC-SA5	B	C	A	A	A	C
PMC-SB3	B	C	A	A	A	C
PMC-SB4	B	C	A	A	A	A
PMC-SB4(STEP SEQ)	A	C	A	A	A	A
PMC-SB5	B	C	A	A	A	A
PMC-SB6	B	C	A	A	A	A
PMC-SB6(STEP SEQ)	A	C	A	A	A	A
PMC-SB7	B	C	A	B	A	A
PMC-SC3	B	C	A	A	A	C
PMC-SC4	B	C	A	A	A	A
PMC-SC4(STEP SEQ)	A	C	A	A	A	A
PMC-PA3	B	C	A	A	A	A
PMC-NB	B	C	A	A	A	A
PMC-NB2	B	C	A	A	A	A
PMC-NB2(STEP SEQ)	A	C	A	A	A	A
PMC-NB6	B	C	A	C	C	A

A : Available B: Not available

C : Available under certain conditions (The supported functions vary depending on the CNC and PMC series and edition. Refer to the PMC programming manual.)

CHECKING THE PACKAGE CONTENTS

The package contains the following:

- Floppy disks
FANUC FAPT LADDER-III (A08B-9210-J505)

NOTE

You must read the release note (READMEJ.TXT) on the first floppy disk of the product package. The release note provides detailed information on the package and information not included in the operator's manual.

ORGANIZATION OF THIS MANUAL

This manual is organized as follows:

SAFETY PRECAUTIONS

Describes general precautions that must be observed to ensure the safe use of this software.

PREFACE

Briefly describes the main features of this software. Also describes how to use this manual and other information to understand the use of this software.

1. SETUP

Describes the software operating environment and explains how to set up this software to ready it for use.

2. BASICS

Describes the basic items that the user should understand before using this software.

3. CREATING AND EDITING SEQUENCE PROGRAMS

Describes how to create and edit sequence programs.

4. PRINTING SEQUENCE PROGRAMS

Describes how to print sequence programs.

5. COMPILATION AND DECOMPILATION

Describes how to compile and decompile programs and also describes ladder program protection by password.

6. MNEMONIC EDITING

Describes conversion to mnemonic files and the mnemonic file format.

7. INPUT/OUTPUT

Describes input/output of sequence programs (loading sequence programs from the PMC and storing them into the PMC).

8. EXECUTING AND STOPPING SEQUENCE PROGRAMS

Describes how to execute and stop sequence programs.

9. DIAGNOSIS

Describes the online diagnosis functions including ladder monitoring, signal tracing, and signal analysis.

10. CONVERTING SEQUENCE PROGRAMS

Describes how to convert DOS sequence programs to Windows sequence programs.

11. ERROR MESSAGES

Describes the error messages displayed by this software.

APPENDIX

Provides information that is to be read as necessary.

NOTATION CONVENTIONS IN THIS MANUAL

This manual uses the following notation and conventions:

- Menus, commands, and screens

Notation example	Explanation
[File] menu	Menu names appear in brackets ([]).
[Setting...]	Command names appear in brackets ([]).
[Program List] screen	As the name of a screen, the title displayed on the title bar of the screen appears in brackets ([]).
<OK> button	Command buttons on the screen appear in angle brackets (< >).

- Keys and their operation

Notation example	Explanation
[Enter] key	Key names are indicated in brackets ([]).
[Ctrl]+[Tab] key	When two or more keys are held down at the same time by pressing them sequentially, the keys are connected using “+”, as shown on the left.
Direction keys	The [→], [←], [↑], and [↓] keys are collectively called direction keys.

- Mouse operations

Example of notation	Explanation
Click	To press and then immediately release a mouse button.
Double-click	To click a mouse button twice in rapid succession.
Drag	To move the mouse while holding down a mouse button, and then releasing the button at a desired position.

- Folders

Directories and folders are collectively referred to as folders.

- PMC models

In this manual, the PMC models are abbreviated as follows:

PMC Model Abbreviations

Abbreviation	PMC model
PMC-S series	
- PMC-SA1	FANUC PMC-MODEL SA1
- PMC-SA3	FANUC PMC-MODEL SA3
- PMC-SA5	FANUC PMC-MODEL SA5
- PMC-SB3	FANUC PMC-MODEL SB3
- PMC-SB4	FANUC PMC-MODEL SB4
- PMC-SB5	FANUC PMC-MODEL SB5
- PMC-SB6	FANUC PMC-MODEL SB6
- PMC-SB7	FANUC PMC-MODEL SB7
- PMC-SC3	FANUC PMC-MODEL SC3
- PMC-SC4	FANUC PMC-MODEL SC4
PMC-PA3	FANUC PMC-MODEL PA3
PMC-QC	FANUC PMC-MODEL QC
PMC-NB	FANUC PMC-MODEL NB
PMC-NB2	FANUC PMC-MODEL NB2
PMC-NB6	FANUC PMC-MODEL NB6

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1

SETUP

This chapter describes the operating environment of FAPT LADDER-III. This chapter also describes how to set up FAPT LADDER-III to make software ready for use.

1.1 OPERATING ENVIRONMENT

The operating environment required for this software is as follows:

- Computer
PC/AT-compatible computer running Windows 95, 98, Me, NT4.0, or 2000 (English/Japanese system)
- CPU
Pentium 133 MHz or better
- Memory
For Windows 95 and Windows 98
- 16MB or more (32MB or more recommended)

For Windows NT 4.0
- 24M or more (32MB or more recommended)

For Windows Me or 2000
- 32MB or more (64MB or more recommended)
- Hard disk
20MB of free space required (at installation)
100MB of free space required (at execution)

NOTE

- 1 Time required for ladder diagram editing and processing of symbols and net comments is affected by the free spaces of memory and the hard disk. When handling a source program including many ladders, symbols, comments, or net comments or editing ladder diagrams on multiple screens, allocate much more free spaces as far as possible.
- 2 We recommend that FAPT LADDER-III be run under Windows 95, Windows 98, Windows Me, Windows NT 4.0, or Windows 2000.

1.2 **INSTALLATION AND UNINSTALLATION**

This section describes how to install or uninstall this software.

1.2.1 **Installation**

Procedure

- 1 Preparation prior to installation
 - 1-1 Before installation, see Section 1.1, "OPERATING ENVIRONMENT" to check the environment of the computer being used.
- 2 Starting the installer
 - 2-1 If any programs are running, terminate them.
 - 2-2 Set the disk (A08B-9210-J505) in the floppy disk drive.
 - 2-3 Click [Start Menu] - [Run]. Type the following in the Open field, and then click <OK>

A (floppy disk drive name):¥SETUP.EXE

3 Starting setup and confirming the license agreement

- 3-1 FAPT LADDER-III setup starts, displaying the [Choose Setup Language] screen. Select Japanese or English, and then click the <OK> button.



Fig. 1.2.1 (a)

- 3-2 The [Welcome] screen appears.



Fig. 1.2.1 (b)

- 3-3 Click the <Next> button. Then, the [Software License Agreement] screen appears.

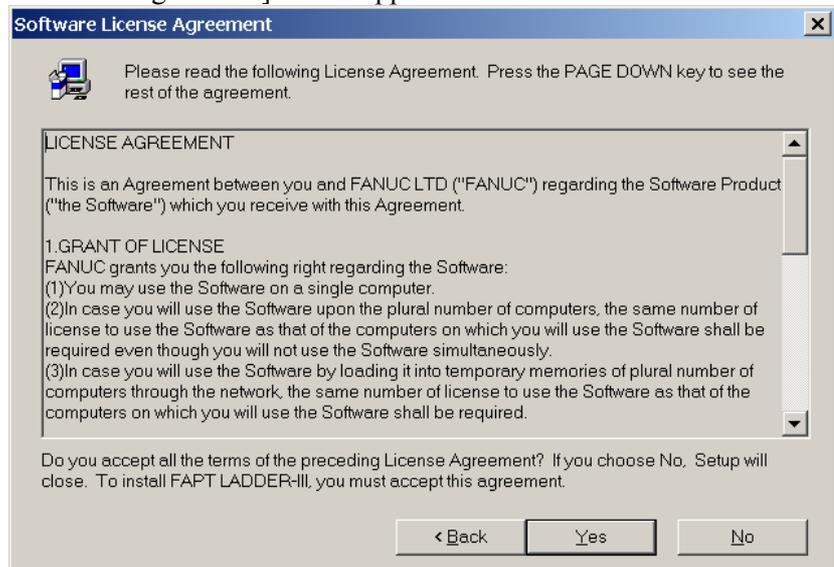
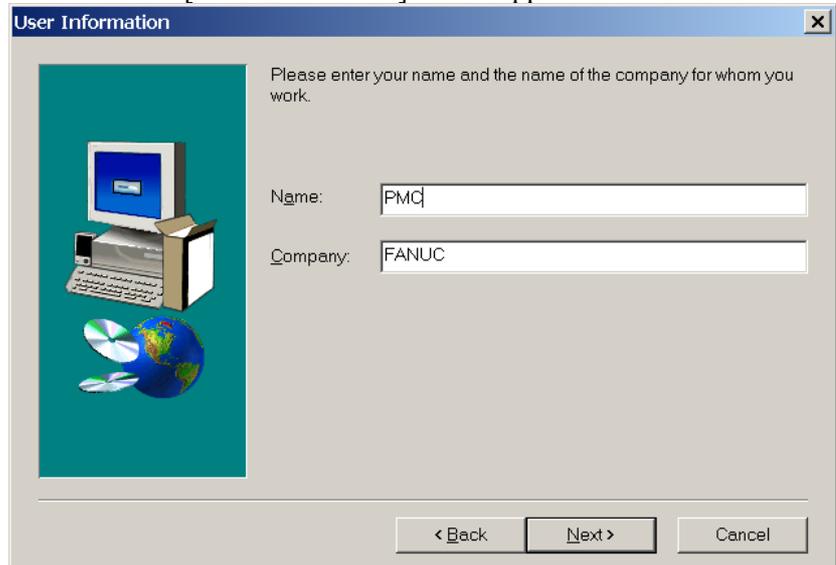


Fig. 1.2.1 (c)

- 3-4 When you agree to the terms of the license agreement, and wish to continue installation, click the <Yes> button. Clicking the <No> button stops installation.

4 Entering user information

4-1 The [User Information] screen appears.



User Information

Please enter your name and the name of the company for whom you work.

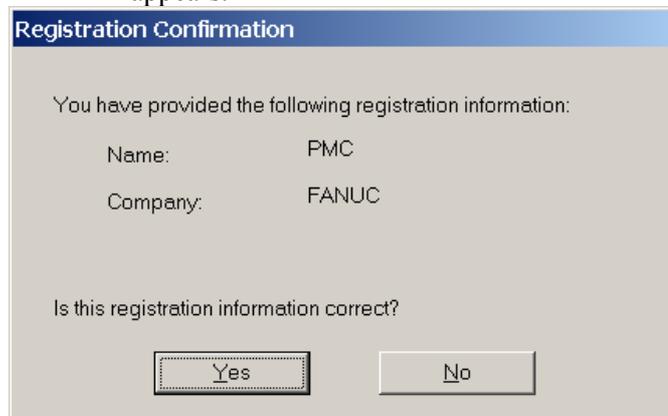
Name: PMC

Company: FANUC

< Back Next > Cancel

Fig. 1.2.1 (d)

4-2 Enter [Name] and [Company], and then click the <Next> button. Then, the [Registration Confirmation] screen appears.



Registration Confirmation

You have provided the following registration information:

Name: PMC

Company: FANUC

Is this registration information correct?

Yes No

Fig. 1.2.1 (e)

4-3 Check that the registration information is correct. To continue the installation, click the <Yes> button. Clicking the <No> button returns you to the [User Information] screen.

5 Selecting the installation destination and program folder

5-1 The [Choose Destination Location] screen appears.



Fig. 1.2.1 (f)

5-2 By default, the program is installed in C:\Program Files\FANUC PMC Programmer\FAPT LADDER-3. To change the installation destination, click the [Browse] button, and then select the installation destination.

5-3 Click the <Next> button.

5-4 The [Select Program Folder] screen appears.

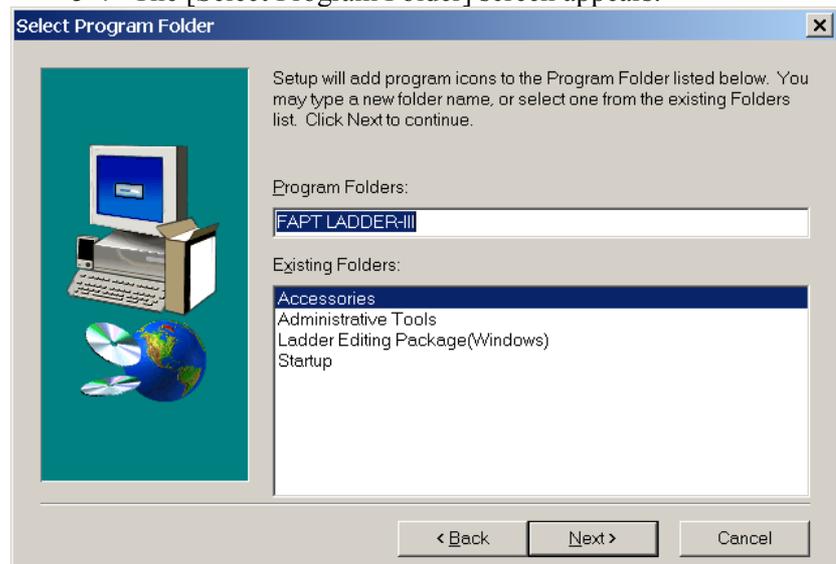


Fig. 1.2.1 (g)

5-5 Select the program folder in which you want to install the program or create a folder. Then, click the <Next> button.

6 Starting file copy operation and ending the installation

6-1 The [Start Copying Files] screen appears.

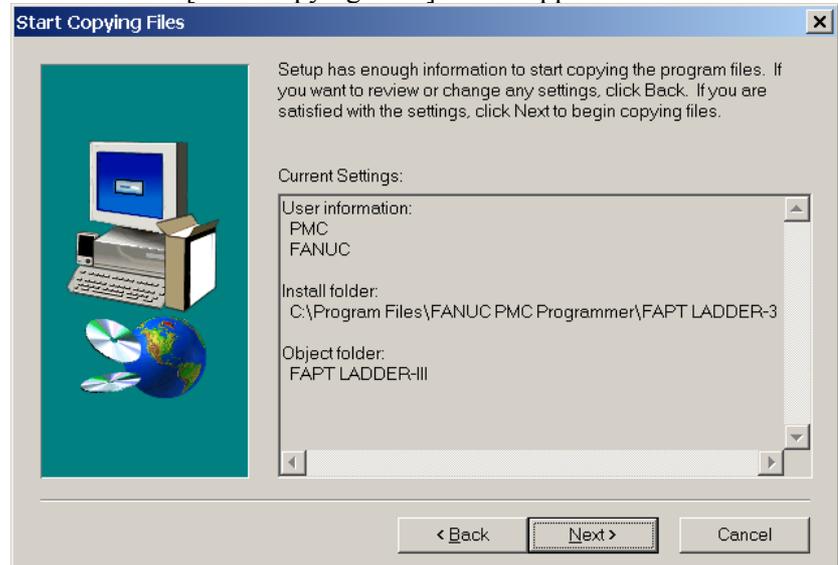


Fig. 1.2.1 (h)

6-2 Information for starting the program file copy operation is displayed. To change the information, click the <Back> button. Check that the displayed information is correct, and then click <Next>. Then, file copy operation starts.

6-3 As the file copy operation terminates, the [Information] screen appears.

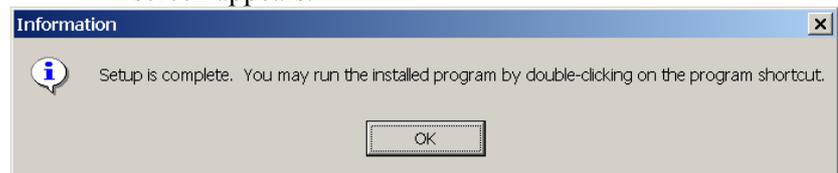


Fig. 1.2.1 (i)

6-4 Clicking [OK] terminates installation.

1.2.2 Uninstallation

Procedure

- 1 Terminating FAPT LADDER-III
 - 1-1 FAPT LADDER-III cannot be uninstalled while it is running. Terminate FAPT LADDER-III, and then uninstall it.
- 2 Starting the uninstaller
 - 2-1 Click [Start Menu] - [Settings] - [Control Panel].
 - 2-2 On the [Control Panel] screen, click [Add/Remove Programs].
 - 2-3 The [Add/Remove Programs Properties] screen appears.

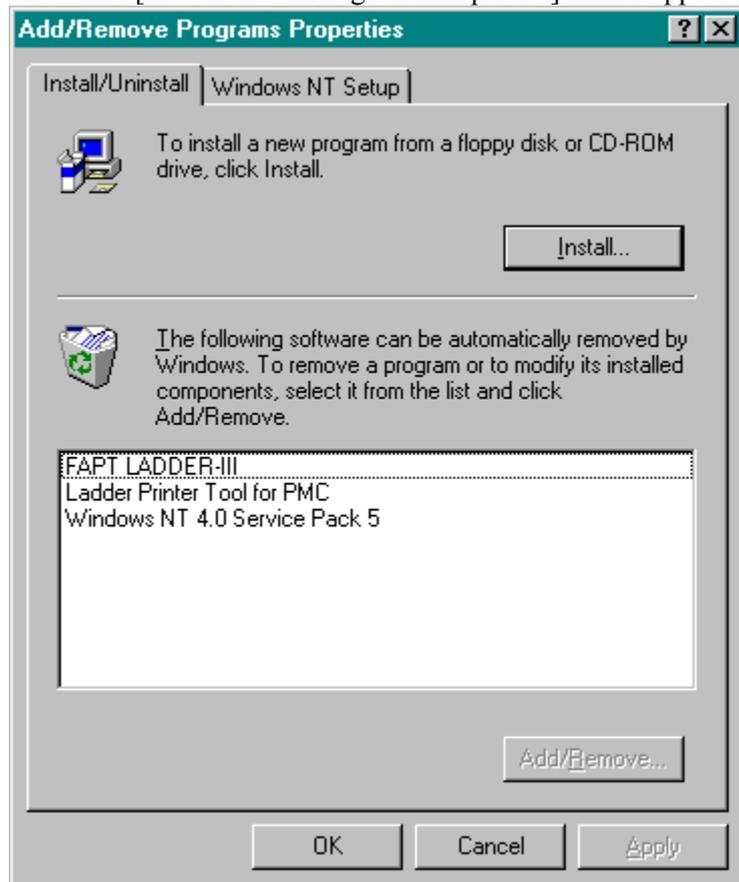


Fig. 1.2.2 (a)

- 2-4 Select FAPT LADDER-III, and then click <Add/Remove>.

3 Confirming uninstallation

3-1 A dialog box appears, asking whether you really want to uninstall the program. Select <Yes>.



Fig. 1.2.2 (b)

4 Executing uninstallation

The installed files, folders, and start menu items are deleted, and the original system settings are restored.

Uninstallation then ends.

The uninstaller sometimes cannot uninstall all the files and folders of FAPT LADDER-III, such that some files or folders may remain after uninstallation. Should this occur, restart the system, and then delete the remaining files/folders by using My Computer or Explorer.

2

BASICS

This chapter describes the basic items the user should understand before using FAPT LADDER-III.

2.1 START AND END

This section describes how to start and end FAPT LADDER-III.

2.1.1 Starting FAPT LADDER-III

To start this software, use the following procedure:

Procedure

- 1 Click the [Start] button.
- 2 From the [Start] menu, select [Program].
- 3 From the [Program] menu, select the [FAPT LADDER-III] folder.
- 4 From the [FAPT LADDER-III] folder, select FAPT LADDER-III.

2.1.2 Starting FAPT LADDER-III (Online Connection)

By specifying the following argument in the executable file of FAPT LADDER-III, you can automatically connect FAPT LADDER-III to a specified port.

- For an RS-232-C port
Fladder.exe/COM=<COM-port-number>
Example) Fladder.exe/COM=1
- For an Ethernet port
Fladder.exe/H=<host-name>:<port-name>
Example) Fladder.exe/H=190.0.55.55:8193

2.1.3 Terminating FAPT LADDER-III

To terminate this software, use the following procedure:

On the [File] menu, click [E~~x~~it]. Alternatively, click  (<Close> button) in the upper right corner of the parent window.

2.2 WINDOW NAMES AND FUNCTIONS

This section describes the names and functions of the windows displayed by this software.

As shown in the figure below, child windows are displayed within the parent window. These are required for operations such as the creation of sequence programs for the FANUC PMC.

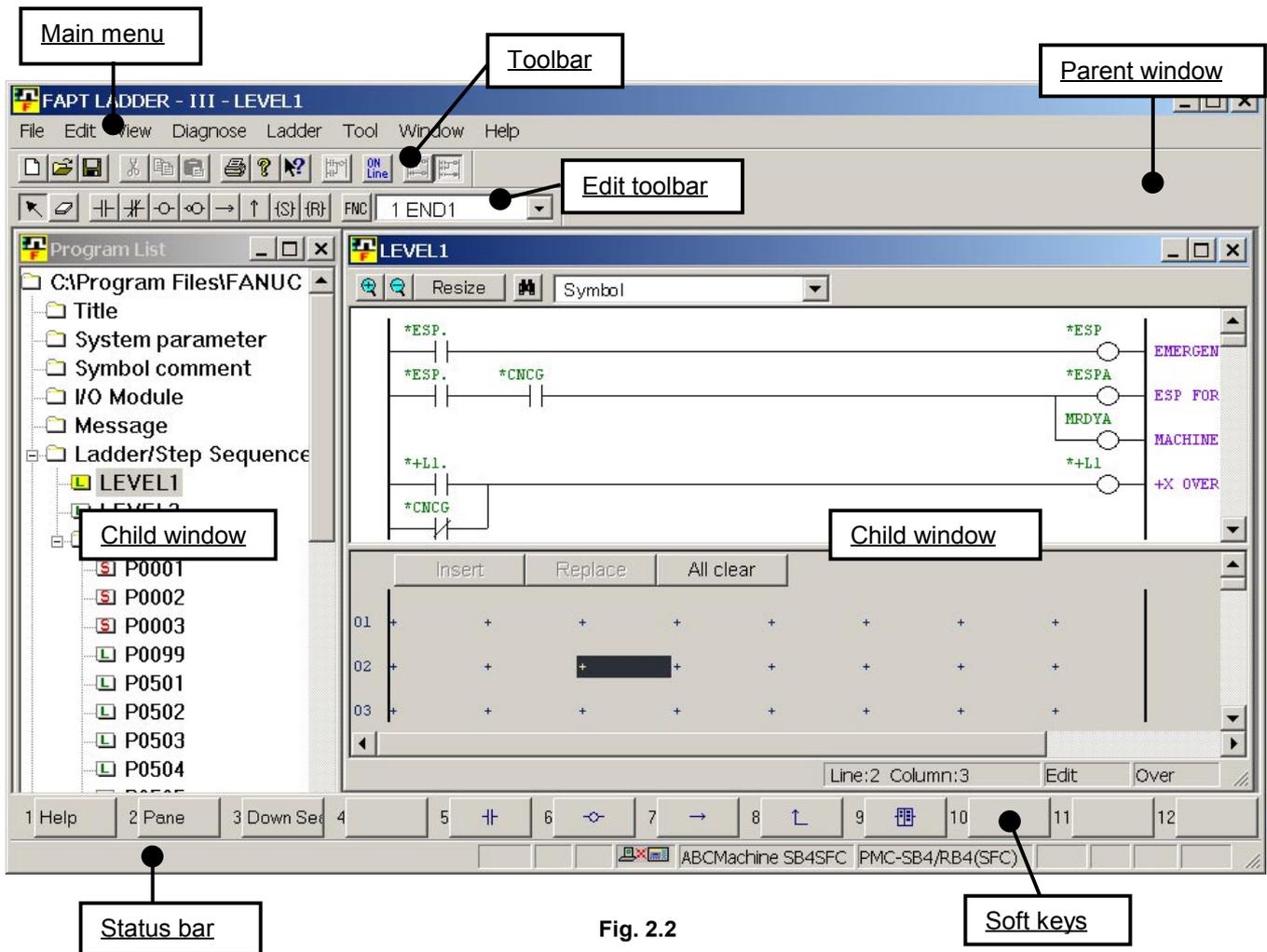


Fig. 2.2

- Parent window
 - The main window of this software.
 - Multiple child windows can be displayed within the parent window.
- Child window
 - Child windows are displayed within the parent window.
 - Child windows are used for displaying and editing FANUC PMC sequence programs.

2.2.1 Main menu

Each main menu has submenus, as listed below.

Table 2.2

Main menu	Submenu	Reference chapter, section, or subsection
File	New Program Open Program Close Program Save Save As Import Export Print Preview Exit	3.2 CREATING NEW PROGRAMS 3.3 OPENING EXISTING PROGRAMS 3.13 CLOSING PROGRAMS 3.11 SAVING PROGRAMS 3.12 SAVING PROGRAMS WITH NAMES 3.14 IMPORTING PROGRAMS 3.15 EXPORTING PROGRAMS 4 PRINTING SEQUENCE PROGRAMS 4 PRINTING SEQUENCE PROGRAMS 2.1.2 Terminating FAPT LADDER-III
Edit	Undo Cut Copy Paste Select All Add Data Delete Delete All Find Replace Jump	3.5 EDITING LADDER DIAGRAMS 3.7 EDITING SYMBOLS AND COMMENTS 3.9 EDITING I/O MODULE ASSIGNMENT 3.9 EDITING I/O MODULE ASSIGNMENT
View	ToolBar Status Bar Softkey Edit ToolBar Program List Grid Line	3.5 EDITING LADDER DIAGRAMS 3.5 EDITING LADDER DIAGRAMS

Table 2.2 (Continued)

Main menu	Submenu	Reference chapter, section, or subsection
Diagnose	Signal Status	9.2 SIGNAL STATUS
	PMC Parameter	9.3 PMC PARAMETERS
	Timer	9.3.2 Timers
	Counter	9.3.3 Counters
	Keep Relay	9.3.4 Keep Relays
	Data Table	9.3.5 Data Table
	Set Up	9.3.6 Setting PMC Parameters
	PMC Alarm Status	9.4 PMC ALARM STATUS
	PMC Status	9.5 PMC STATUS
Signal Trace	9.6 SIGNAL TRACING	
Signal Analysis	9.7 SIGNAL ANALYSIS	
Ladder	Online/Offline	3.5 EDITING LADDER DIAGRAMS
	Monitor/Editor	3.5 EDITING LADDER DIAGRAMS
Tool	Mnemonic Convert	8.1 CONVERTING SOURCE PROGRAMS TO MNEMONIC FILES
	Source Program Convert	8.2 CONVERTING MNEMONIC FILES TO SOURCE PROGRAMS
	Data Conversion	10 CONVERTING SEQUENCE PROGRAMS
	Data File→LAD File	10.1 CONVERSION FROM DOS FAPT LADDER-II
	Data File←LAD File	10.2 CONVERSION TO DOS FAPT LADDER-II
	Compile	5.1 COMPILATION
	Decompile	5.2 DECOMPILATION
	Communication	
	Device Select	
	Load from PMC	7.1, 7.2 LOADING SEQUENCE PROGRAMS FROM PMC
	Store to PMC	7.3, 7.4 STORING SEQUENCE PROGRAMS IN PMC
	Clear PMC Memory	9.8 CLEARING PMC AREAS
	I/O Link Restart	9.9 ACTIVATING THE I/O LINK
	Backup	7.5 WRITING SEQUENCE PROGRAMS INTO F-ROM
Program Run/Stop Option	8 RUNNING AND STOPPING SEQUENCE PROGRAMS	
Window	Cascade	
	Tile	
	Arrange Icons	
Help	Topic	
	Help	
	About version information	

2.2.2 Toolbar

The toolbar contains a set of buttons used for file operations and editing.



Fig. 2.2.2

- <1> New Program
Creates a new program.
- <2> Open Program
Opens an existing program
- <3> Save
Saves a program.
- <4> Cut
Removes a selected portion.
- <5> Copy
Copies a selected portion.
- <6> Paste
Pastes a cut or copied portion.
- <7> Print
Prints a program.
- <8> About version information
Displays version information.
- <9> Context-sensitive help
Displays the help text for the portion specified with the mouse.
- <10> Run/stop program
Runs or stop a Ladder program.
- <11> Online/Offline
Switches the system between online and offline modes.
- <12>, <13> Ladder monitor, Online editing
Switches the system between ladder monitor and online editing.
- <14> Signal trigger stop
Runs the signal trigger stop function.

2.2.3 Edit Toolbar

The edit tool bar contains a set of buttons used for editing ladder diagrams. You can input contacts and coils by using the edit tool bar. See Section 3.5, "EDITING LADDER DIAGRAMS" for details.

2.2.4 Soft Keys

To perform operations with the currently selected child window, you can select the displayed soft keys either by using the mouse or by pressing keys. You can change the display size of soft keys using [Softkey] in the [View] menu.



Fig. 2.2.4

2.2.5 Status Bar

The status bar provides information such as a sequence program name and PMC model name.

2.3 DISPLAYING VERSION INFORMATION

This section describes how to display the version information of this software for purposes of, for example, maintenance.

Procedure

Select [Help] - [About version information...].

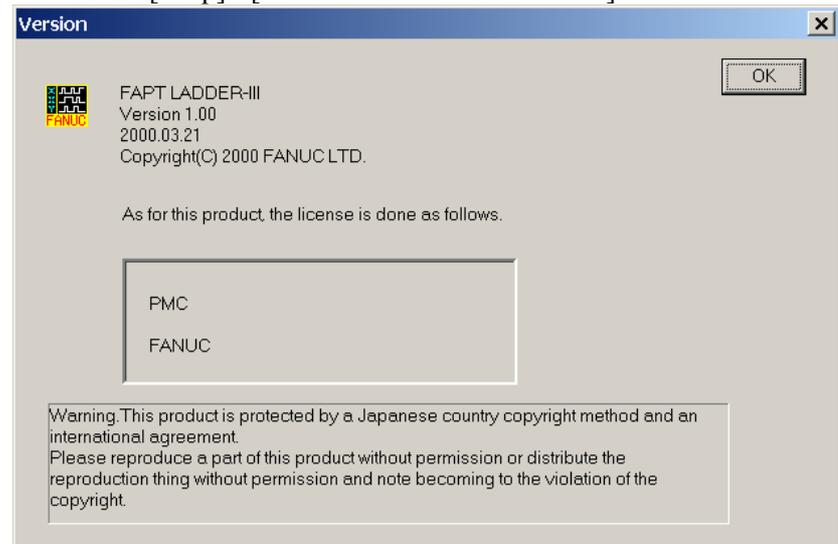


Fig. 2.3

3

CREATING AND EDITING SEQUENCE PROGRAMS

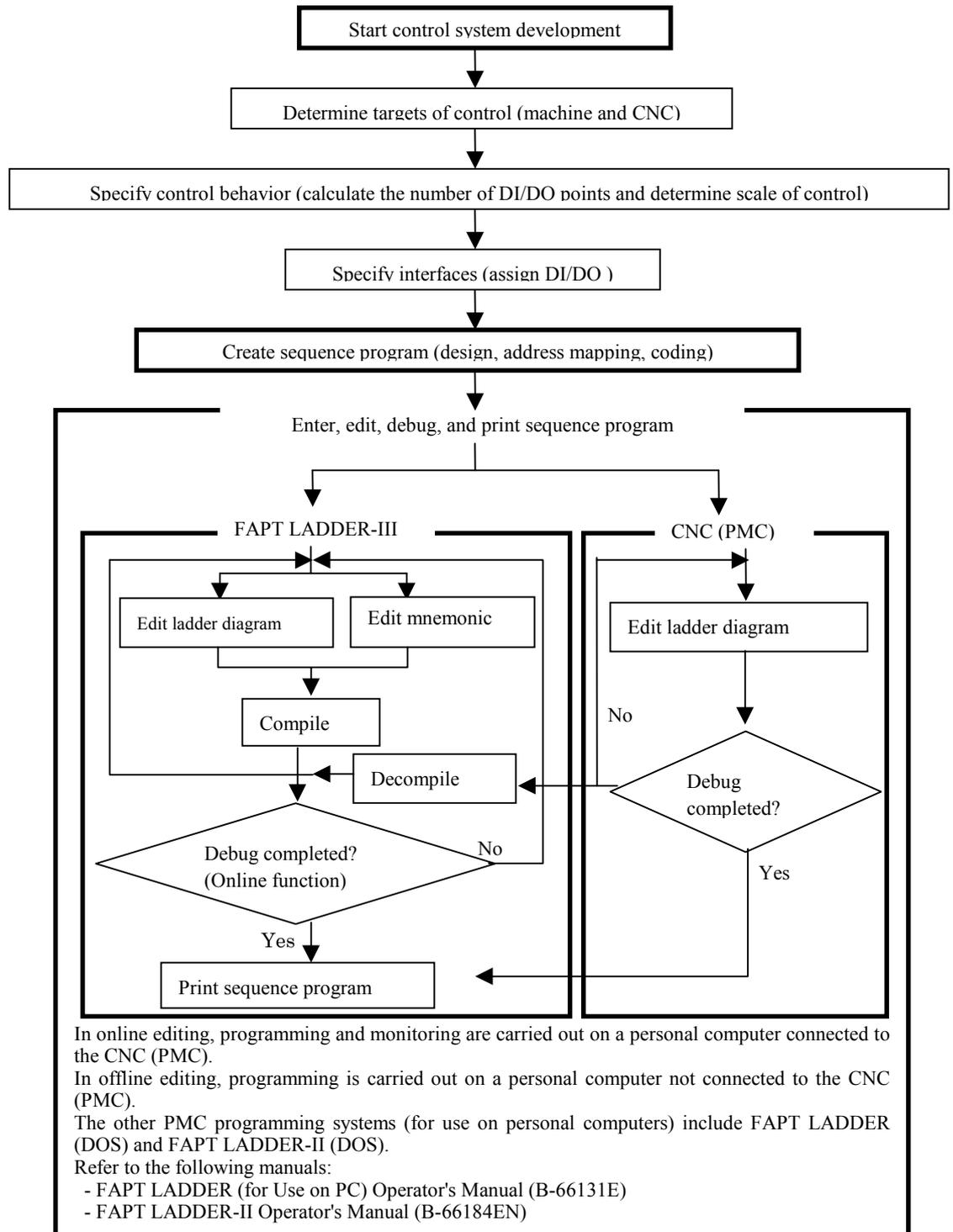
This chapter describes how to create and edit sequence programs. A sequence program consists of a title, system parameters, symbols, comments, I/O modules, messages, and ladder/step sequences.

3.1 SEQUENCE PROGRAMS

This section describes sequence programs.

3.1.1 Procedure for Creating Sequence Programs

The following flowchart illustrates the procedure for creating a sequence program.

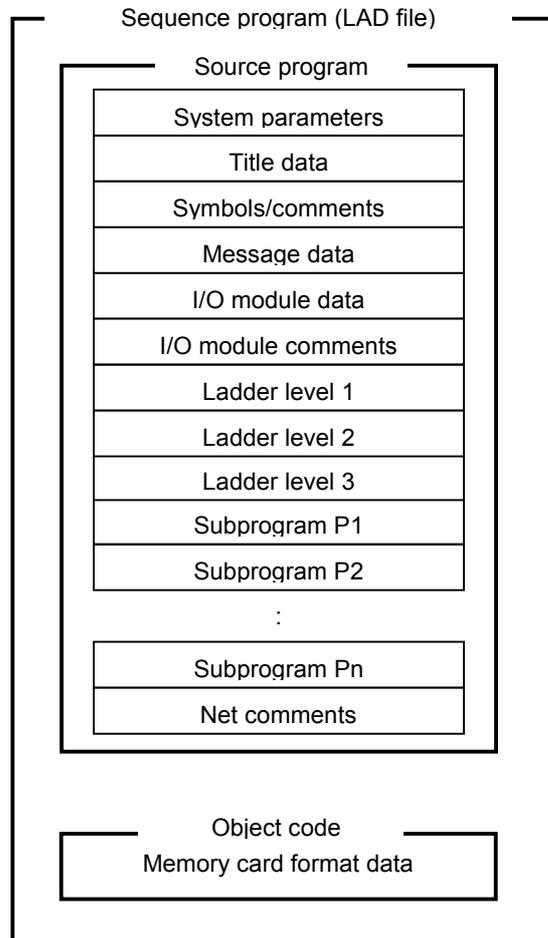


- Sequence programs

A sequence program consists of the data listed below.

- Title data
- System parameters
- Symbols/comments
- Message data
- I/O module data
- I/O module comments
- Ladder level 1
- Ladder level 2
- Ladder level 3
- Ladder subprograms
- Step sequence subprograms
- Net comments
- Memory card format data

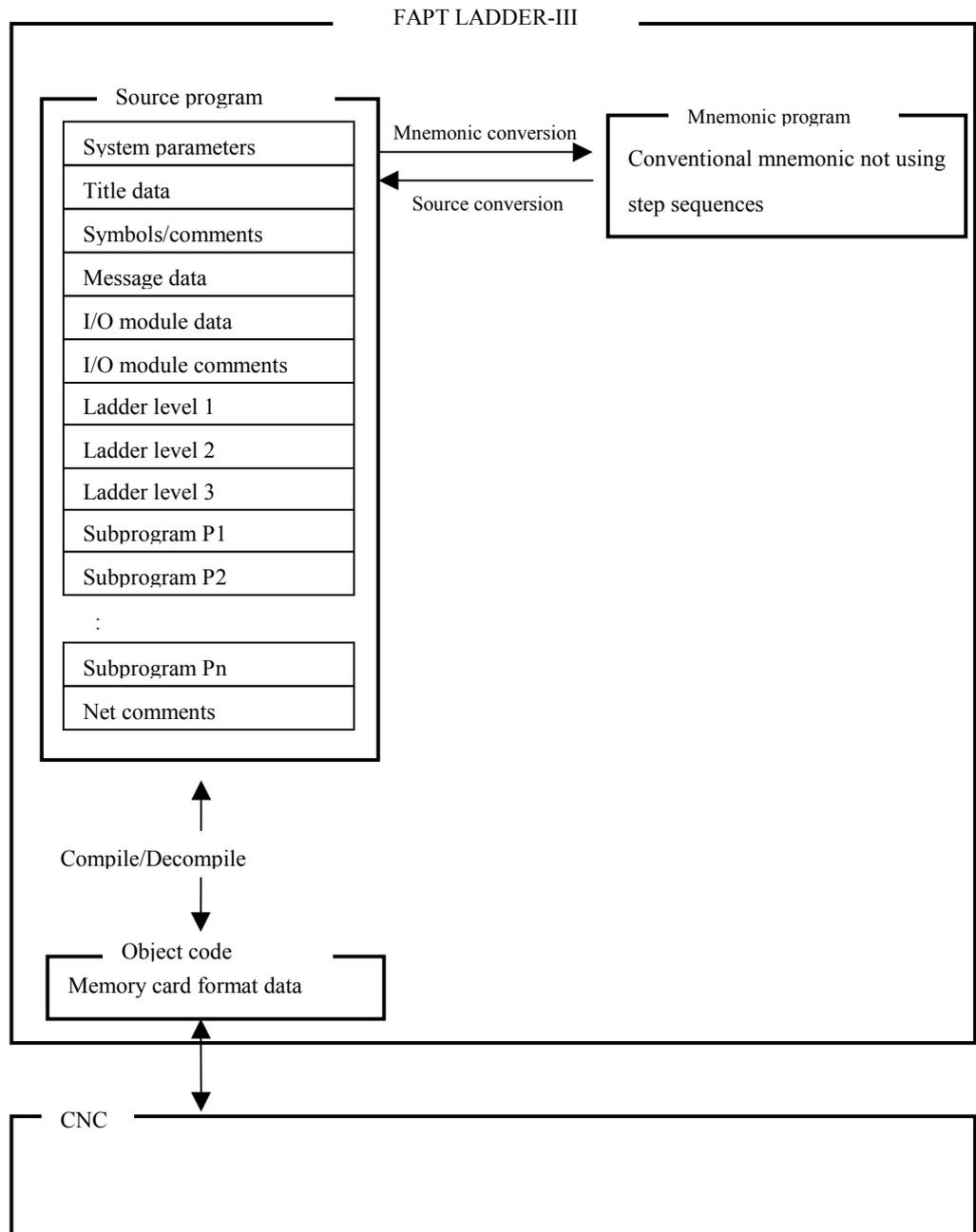
In FAPT LADDER-III, a file with extension .LAD (hereafter called a LAD file) holds all sequence program data.



NOTE

- 1 In FAPT LADDER-III, a sequence program to be printed or edited offline is called a source program.
- 2 An I/O module comment is one given to a module address in the I/O unit. See Section 3.9, "Editing I/O Module Assignment," for details.

• Data flow



3.1.2 PMC Programming Method

The ladder method is one of the most extensively used methods for programming PMC-based sequence control. Because this method was originally based on control circuits in relay panels, it was initially easy for sequence control engineers to understand. As the number of PMC functions has increased, however, sequence programs have become large and complicated. To cope with this situation, we have introduced step sequence programming.

- What is the step sequence method?

The step sequence method is a sequence control programming method that is based on a programmable controller. This method is intended to represent a flow of control directly using a flowchart. With this method, an individual control module is described using the conventional ladder method. Therefore, the step sequence method allows the user to visually describe the entire process flow. So, it is suitable for total process control.

See "Introduction--Features of FAPT LADDER-III and its Functions Classified by PMC Model," for details on the models that can use step sequences.

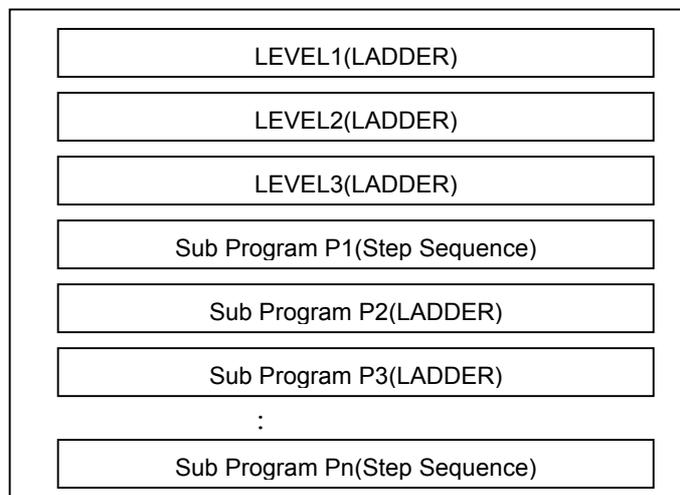
- Sequence configuration

Ladder programs can take any one of the following five configurations.

- Ladder level 1
- Ladder level 2
- Ladder level 3
- Ladder subprogram
- Step sequence subprogram

NOTE

Ladder level 3 is omissible.



3.1.4 Selecting Devices

If using loader control functions, display and use the PMC on either the CNC main unit or the loader by switching between them with the dialog box for selecting [Current Device].

Procedure

1. If the loader has been installed, the following dialog box automatically appears at the start of communication.

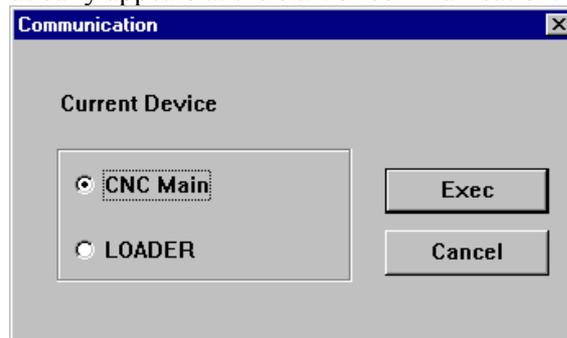


Fig. 3.1.4

2. Select the device you want to connect using the [↑] and [↓] keys.
3. Click the <Exec> button.

3.2 CREATING NEW PROGRAMS

This section describes how to create a sequence program (LAD file).

3.2.1 Procedure

- 1 Select [File] - [New Program].
The [New Program] screen appears.

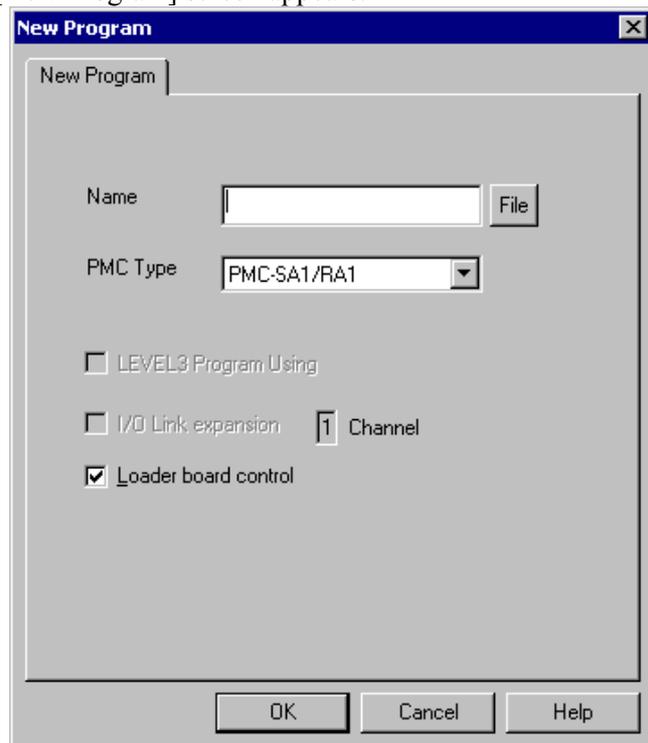


Fig. 3.2.1

- 1-1 Set the necessary data.

Name

Enter the name of a program file you want to create.
Use the extension .LAD. You can omit it, however.

PMC Type

Select a PMC model.

LEVEL3 Program Using

Select this item if you want to enable ladder level 3.

I/O Link expansion

Check this check box to enable the I/O Link expansion function after selecting a model that allows multiple channels to be set.

Checking this box displays "2 channels."

When the I/O Link expansion function is enabled, the input/output signals increase from the input signals (X0.0 to X127.7) and output signals (Y0.0 to Y127.7) increase to the input signals (X0.0 to X127.7, X200.0 to X327.7) and output signals (Y0.0 to Y127.7, Y200.0 to Y327.7).

Loader board control

Check this box to create Ladder programs for loader control functions.

NOTE

- 1 The models that allow multiple channels to be set are PMC-SB6 and PMC-SB6 (SFC). When using other models, you cannot check the check box for I/O Link expansion.
 - 2 When PMC-QC is used, 2 channels are used even if you do not check the check box for I/O Link expansion.
 - 3 Ladder programs for loader board control functions can be created on PMC-SA1 only.
- 2 To create a program, click the <OK> button.
The [Program List] screen appears.
To quit, click the <Cancel> button.

3.3 OPENING EXISTING PROGRAMS

This section describes how to open an existing sequence program (LAD file).

3.3.1 Procedure

- 1 Select [File] - [Open Program].
The [Open] screen appears.

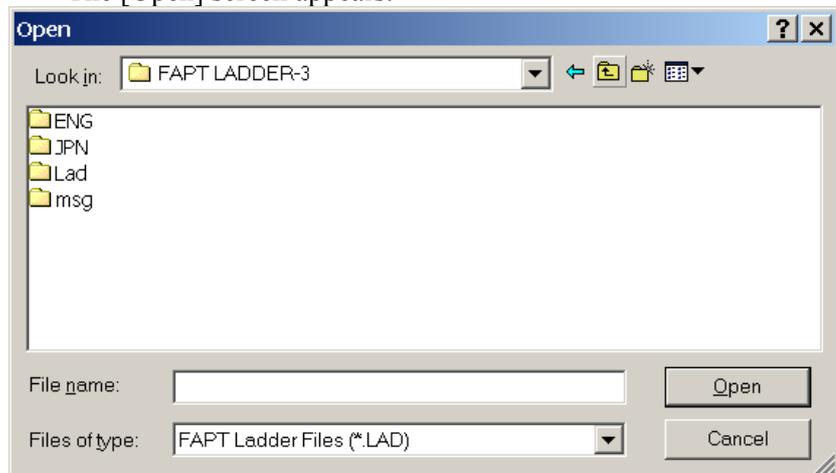


Fig. 3.3.1

- 1-1 Set the necessary data.
File name
Enter the name of the existing program file you want to open. Use the extension .LAD. You can omit it, however.
- 2 To open the program, click the <Open> button.
The [Program List] screen appears.
To quit, click the <Cancel> button.

3.3.2 Opening Programs Opened by Another User

This subsection describes access by multiple users to the same file on the network.

- 1 If a user attempts to open a program that is already opened by another user, the [File is opened...] screen appears.

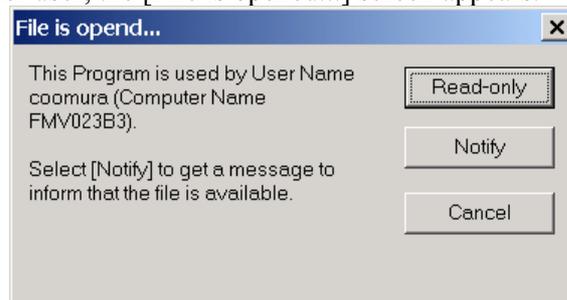


Fig. 3.3.2(a)

<Read-only> button

This button opens a file with the read-only attribute. (See Subsection 3.3.3, "Opening Programs with the Read-only Attribute.")

An opened file cannot be overwritten. An opened file can be saved only by assigning a new name to it.

If an attempt is made to save an opened file by specifying the same name, the following error message appears:



Fig. 3.3.2(b)

<Notify> button

When the first user closes the file, this button displays a notification message.

<Cancel> button

This button cancels an attempt to open a file.

- 2 Clicking the <Notify> button displays the [File is opened... - Waiting...] screen.

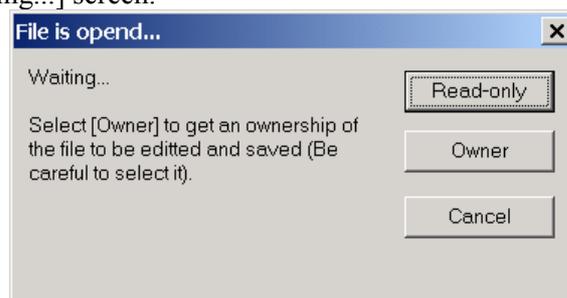


Fig. 3.3.2(c)

<Read-only> button

This button is the same as described in Item 1 above.

<Owner> button

This button opens a file with a privilege. If this button is selected, the first user cannot overwrite the file, but can save the file only by assigning a new name to it.

Be careful when selecting this button. For example, contact the other user(s) using the program.

<Cancel> button

This button is the same as described in Item 1 above.

- 3 If the first user closes the file when another user has clicked the <Notify> button and the [File is opened... - Waiting...] screen is displayed, the following message appears:

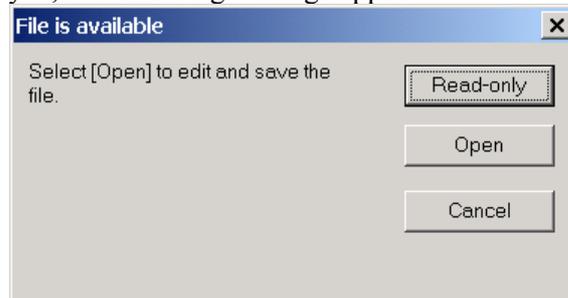


Fig. 3.3.2(d)

<Read-only> button

This button is the same as described in Item 1 above.

<Open> button

This button is the same as the normal button for opening a program.

<Cancel> button

This button is the same as described in Item 1 above.

3.3.3 Opening Programs with the Read-only Attribute

When a program with the read-only attribute is opened, a character string (for read-only indication) is added after the file name in the status bar. Such a file cannot be overwritten, but can be saved only by assigning a new name.

If an attempt is made to save such a file by assigning the same name, the following error message appears:



Fig. 3.3.3

3.4 EDITING TITLES

This section describes how to enter a title for a program created by the machine tool builder.

NOTE

Titles can be displayed and edited only when the current programmer mode (offline/online) is offline. To change the programmer mode to offline, select [Ladder] - [Online/Offline].

3.4.1 Procedure

- 1 Double-click the <Title> item in the [Program List] screen. The [Edit Title] screen appears.

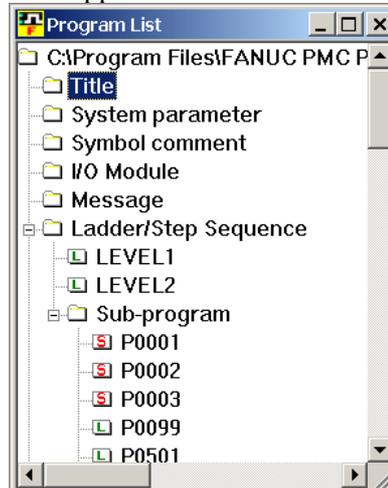


Fig. 3.4.1 (a)

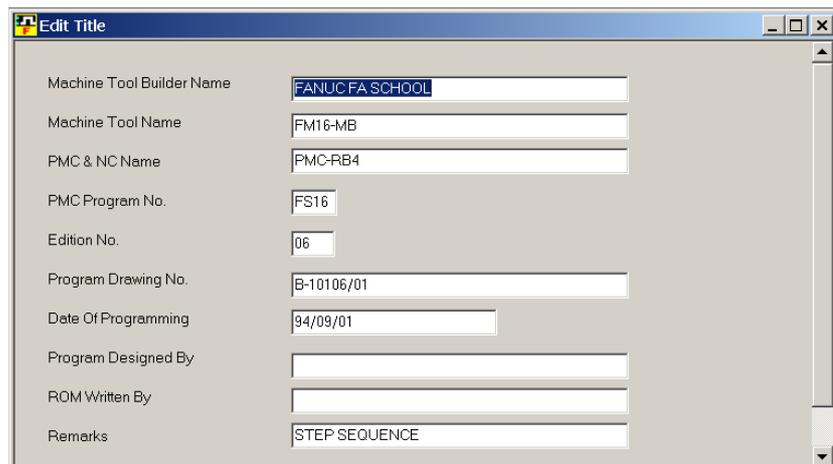
The screenshot shows a window titled "Edit Title" with a form containing several input fields. The fields and their values are: "Machine Tool Builder Name" (FANUCFA SCHOOL), "Machine Tool Name" (FM16-MB), "PMC & NC Name" (PMC-RB4), "PMC Program No." (FS16), "Edition No." (06), "Program Drawing No." (B-10106/01), "Date Of Programming" (94/09/01), "Program Designed By" (empty), "ROM Written By" (empty), and "Remarks" (STEP SEQUENCE).

Fig. 3.4.1 (b)

- 1-1 Set the necessary data. The maximum number of characters that can be entered is as listed below:

Table 3.4.1

Data	Maximum number of characters that can be entered
Machine builder name	32
Machine name	32
CNC/PMC model	32
Program number	4
Edition	2
Program part number	32
Date of creation	16
Creator	32
ROM writer	32
Comment	32

- 1 To close the [Edit Title] screen, click the <Close> button.



<Close> button

This operation has nothing to do with saving data entered on the [Edit Title] screen.

See Section 3.11, "Saving Programs," for an explanation about how to save data entered on the [Edit Title] screen.

See Section 3.12, "Closing Programs," for an explanation about how to close the sequence program without saving the data entered on the [Edit Title] screen."

3.5 EDITING LADDER DIAGRAMS

This section describes how to edit ladder diagrams.

Two different methods can be used to edit ladder diagrams. The first method is offline editing, in which a personal computer for editing ladder diagrams is used standalone, that is, without being connected to the CNC (PMC). The second method is online editing, in which a personal computer for editing ladder diagrams is connected to the CNC (PMC).

- Preparing for offline editing

Procedure

1. Check the current programmer mode (offline or online) on the status bar.

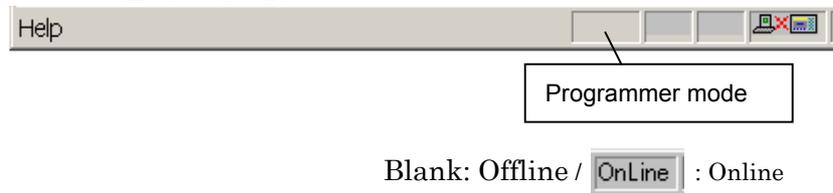


Fig. 3.5 (a)

2. If the current programmer mode is online, select [Ladder] - [Online/Offline] to change the current programmer mode to offline.

- Preparing for online editing.

Procedure

1. Connect the personal computer to the NC (PMC) with a data transfer cable.
(See Appendix A for an explanation about the data transfer cable.)
2. Check the current programmer mode (offline or online).
3. If the current programmer mode is offline, select [Ladder] - [Online/Offline] to change the programmer mode to online. Then, select [Ladder] - [Monitor/Editor] to change the ladder mode (monitor or edit) to edit.

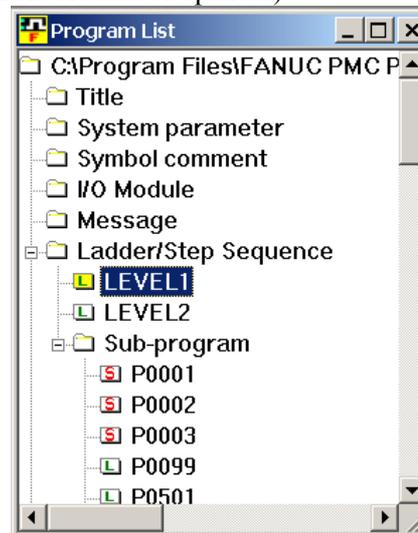
NOTE

- 1 If a ladder program to be edited online does not match one in the PMC, it is impossible to change the ladder mode to edit. Before trying to match the ladder to be edited to that in the PMC, store or load the ladder program to be edited.
- 2 A level 3 program can be added by right-clicking the [Program List] screen and then clicking [Add LEVEL3]. Level 3 programs can be added only when the current programmer mode is offline.

- Method of displaying the ladder diagram editing screen

Procedure

1. Select [View] - [Program List]. The [Program List] screen appears. (Usually, this screen appears automatically when a LAD file is created or opened.)



 Ladder program

 Step sequence program

Fig. 3.5 (b)

3.CREATING AND EDITING SEQUENCE PROGRAMS

2. On the [Program List] screen, double-click the ladder program you want to edit. Alternatively, select the ladder program and press the [Enter] or [F10] key.

- Summary of the ladder diagram editing screen

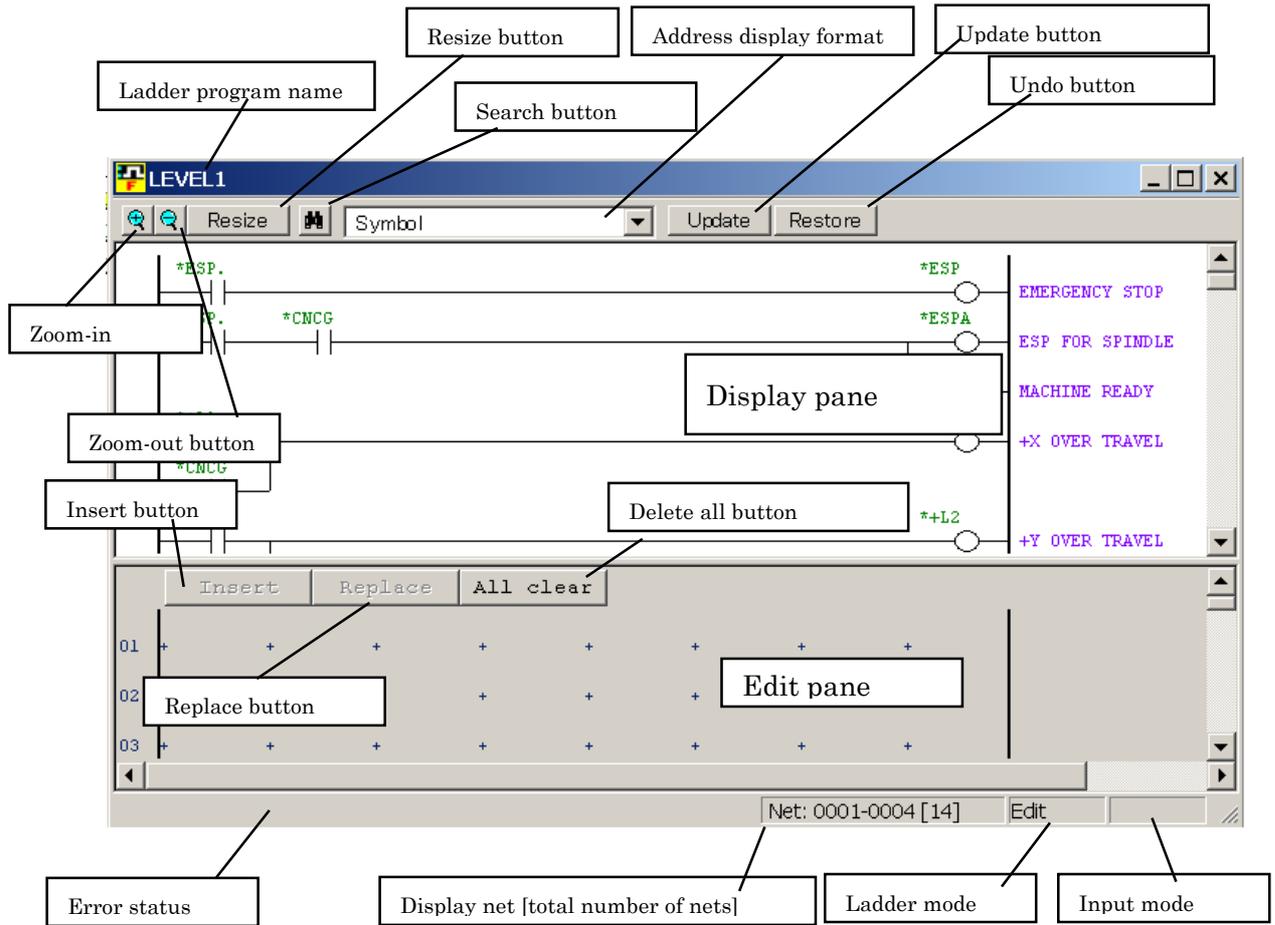


Fig. 3.5 (c)

Display pane

Ladder program is displayed here.

Edit pane

Ladder program is edited here. When the ladder program in this pane is inserted or overwrote to the display pane, the ladder program in the display pane is changed

Insert button

Inserts ladders in the ladder program (display pane) to the edit pane.

Replace button

Replaces ladders in the ladder program (display pane) with those in the edit pane.

Erase all button

Erases all ladders from the edit pane.

Update button(for online editing only)

Updates the ladders in the PMC with the those in the display pane.

Undo button(for online editing only)

Returns the ladders in the display pane to the state existing the last time the [Restore] button was pressed. (This operation nullifies all the changes you made after the latest update.

Zoom-in button

Magnifies ladder diagrams.

Zoom-out button

Reduces (shrinks) ladder diagrams.

Resize button

Make the size of a ladder diagram display match the window size.

Search button

Searches the display or edit pane for an address or symbol.

Address display format

Specifies the display format for ladders on the display or edit pane.

Error status

Displays information about errors.

Display net [total number of nets]

On the display pane, displays the range of displayed net numbers and the total number of nets. On the edit pane, displays the current cursor position.

Ladder mode

Display the current ladder mode (monitor or edit). To change the ladder mode, select [Ladder] - [Monitor/Editor].

Input mode

To change the input mode, press the [Insert] key.

- Soft keys

The following shows the soft keys that can be used with the edit pane.

- When the Shift key is not pressed



Fig. 3.5 (d)

- When the Shift key is pressed

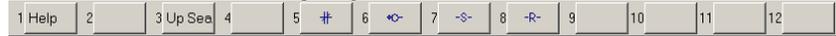


Fig. 3.5 (e)

NOTE
To display soft keys, select [View] - [Softkey].

- Edit tool bar



Fig. 3.5 (f)

The edit tool bar contains buttons for entering relays and coils, using the mouse. When you click a button on the edit tool bar and move the mouse pointer to the edit pane, the mouse pointer changes its shape to the relay or coil corresponding to the clicked button. Under this condition, left-clicking causes the relay or coil to be entered in the current mouse pointer position. Right-clicking resumes the usual mouse pointer shape.

NOTE

- 1 To display the edit tool bar, select [View] - [Edit ToolBar].
- 2 The edit tool bar can be detached from the window to which it belongs and moved to any position on the screen by clicking between its buttons and dragging.

- Shortcut keys

Table 3.5

Shortcut key	Function
[F2]	Switch panes (display/edit pane)
[F3]	Search next (downward)
[Shift] + [F3]	Search next (upward)
[F5]	 or edit
[Shift] + [F5]	
[F6]	
[Shift] + [F6]	
[F7]	— (horizontal line)
[F8]	(vertical line)
[F9]	Function instruction
[Shift] + [F7]	—[S]—
[Shift] + [F8]	—[R]—
[Ctrl] + [Enter]	Insert line
[Ctrl] + [E]	Insert element
[Del]	Clear element
[Ctrl] + [A]	Edit – Select All
[Ctrl] + [C]	Edit - Copy
[Ctrl] + [F]	Edit - Search
[Ctrl] + [G]	Edit - Jump to specified net number
[Ctrl] + [V]	Edit - Paste
[Ctrl] + [X]	Edit - Cut
[Ctrl] + [Z]	Undo
[Home]	Display left end
[End]	Display right end
[Ctrl] + [Home]	Jump to beginning
[Ctrl] + [End]	Jump to end
[Ctrl] + [↑]	Jump to previous net
[Ctrl] + [↓]	Jump to next net
[Ctrl] + [PageUp]	Jump to next page
[Ctrl] + [PageDown]	Jump to previous page

3.5.1 Changing Ladder Programs

This subsection describes how to modify ladder programs.

NOTE

- 1 To modify a ladder program, copy ladders from the display pane to the edit pane. Then, change them on the display pane and substitute the ladders on the display pane with those modified on the edit pane.
- 2 If there is a ladder error in the ladders on the edit pane, it is impossible to select the <Insert> and <Replace> buttons.
- 3 Double-clicking a ladder on the display pane causes the ladders in the same net as the clicked ladder to be copied to the edit pane.

Procedure

1. On the display pane, position the cursor to the ladder you want to modify, using the cursor control keys.

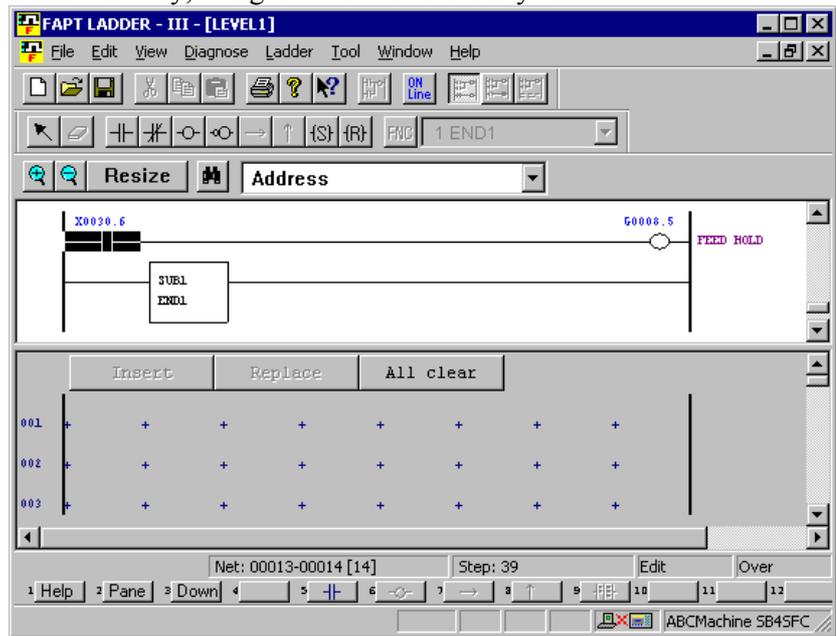


Fig. 3.5.1 (a)

2. Press the [Enter] key. (Alternatively, double-click the ladder you want to modify.)

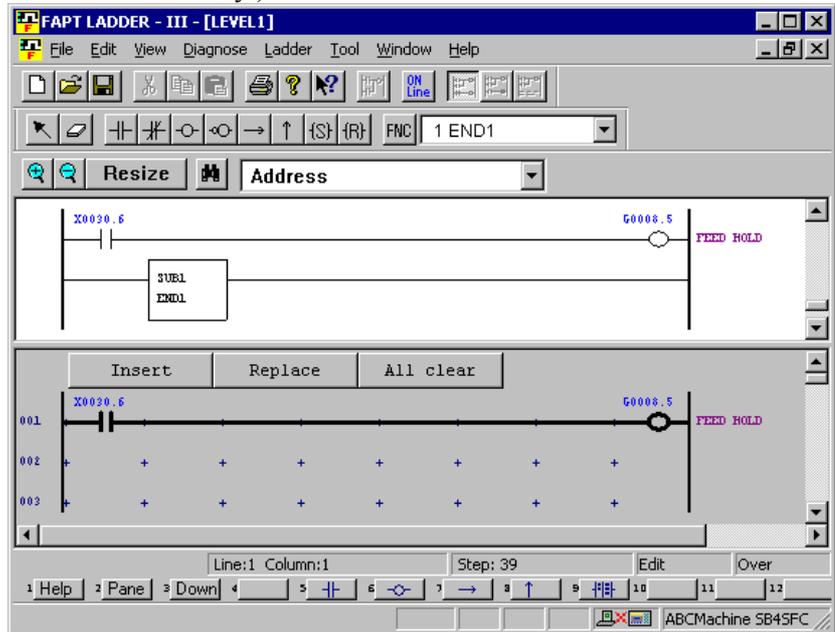


Fig. 3.5.1 (b)

3. Modify the ladder on the edit pane.
For an explanation of how to operate ladders on the edit pane, see the subsections listed below:

Table 3.5.1

Operation	Subsection
Entering basic instructions	3.5.3 "Entering Basic Instructions"
Entering horizontal lines	3.5.5 "Entering Horizontal Lines"
Entering and deleting vertical lines	3.5.6 "Entering and Deleting Vertical Lines"
Entering function instructions	3.5.4 "Entering Function Instructions"

3. CREATING AND EDITING SEQUENCE PROGRAMS

- After you finished modifying ladders, click the <Replace> button.

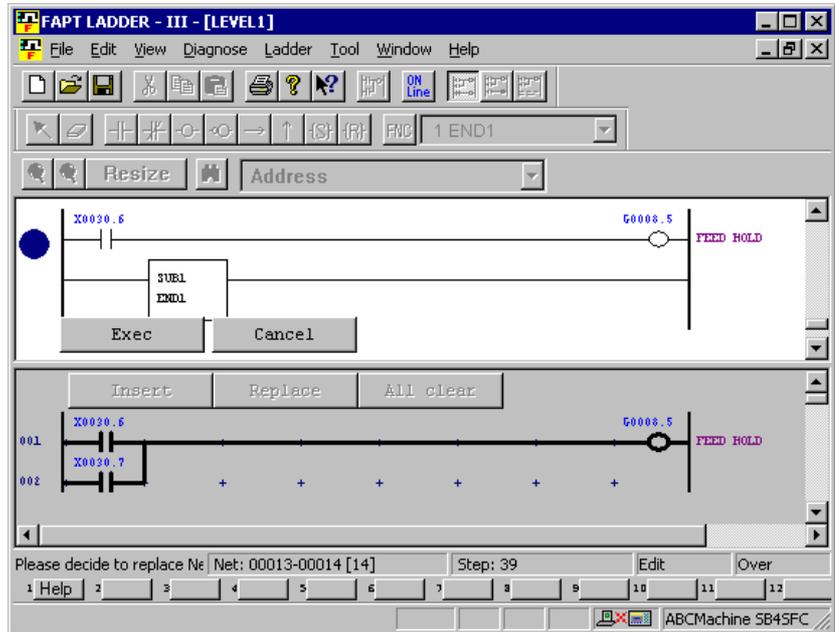


Fig. 3.5.1 (c)

- Select the replacement position, using the [↓] key or [↑] key, and then click the <Exec> button

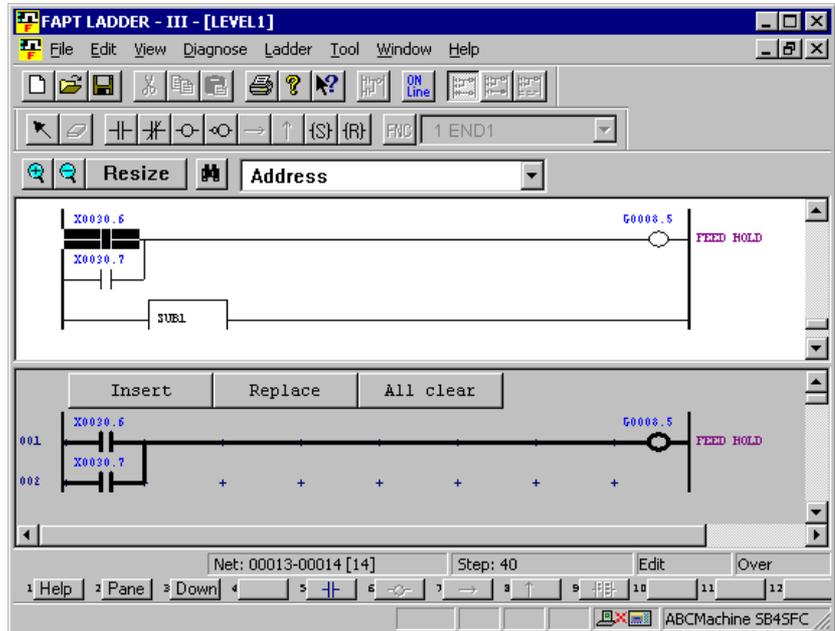


Fig. 3.5.1 (d)

3.5.2 Inserting Ladders from the Edit Pane into a Ladder Program

This subsection describes how to insert ladders from the edit pane into a ladder program (on the display pane).

NOTE

- 1 If there is a ladder error in a ladder in the edit pane, it is impossible to select the <Insert> and <Replace> buttons.
- 2 Double-clicking a ladder in the display pane causes the ladders in the same net as the clicked ladder to be copied to the edit pane.

Procedure

1. In the edit pane, create the ladders you want to insert into a ladder program.
For an explanation about how to operate the ladders on the edit pane, see the subsections listed below:

Table 3.5.2

Operation	Subsection
Entering basic instructions	3.5.3 "Entering Basic Instructions"
Entering horizontal lines	3.5.5 "Entering Horizontal Lines"
Entering and deleting vertical lines	3.5.6 "Entering and Deleting Vertical Lines"
Entering function instructions	3.5.4 "Entering Function Instructions"

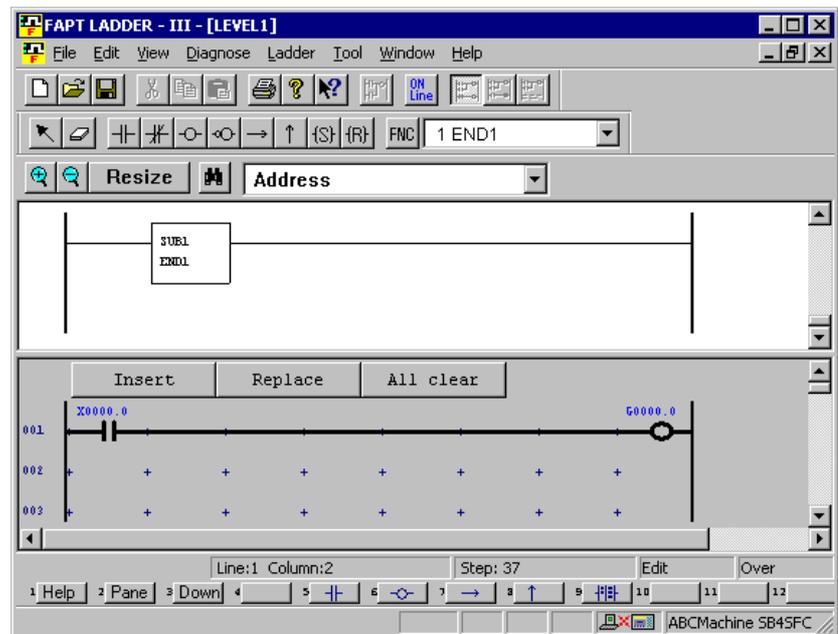


Fig. 3.5.2 (a)

2. Click the <Insert> button.

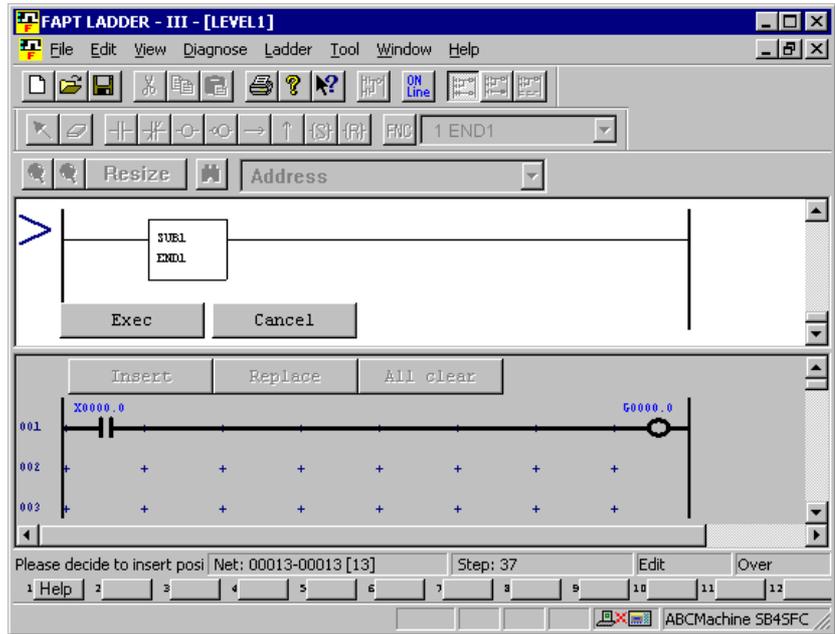


Fig. 3.5.2 (b)

3. Select the insertion position, using the [↓] key or [↑] key, and then click the <Exec> button.

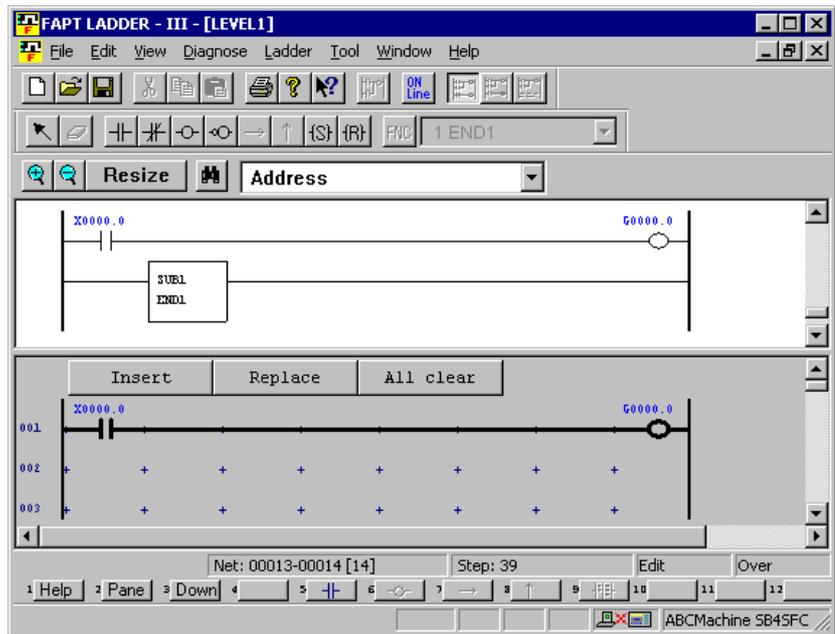


Fig. 3.5.2 (c)

3.5.3 Entering Basic Instructions

1. This subsection describes how to enter basic instructions (relays and coils) in the edit pane.

Procedure

- 1-1 Position the cursor to the point where you want to enter a basic instruction, using the cursor control keys. (Alternatively, click the point.)

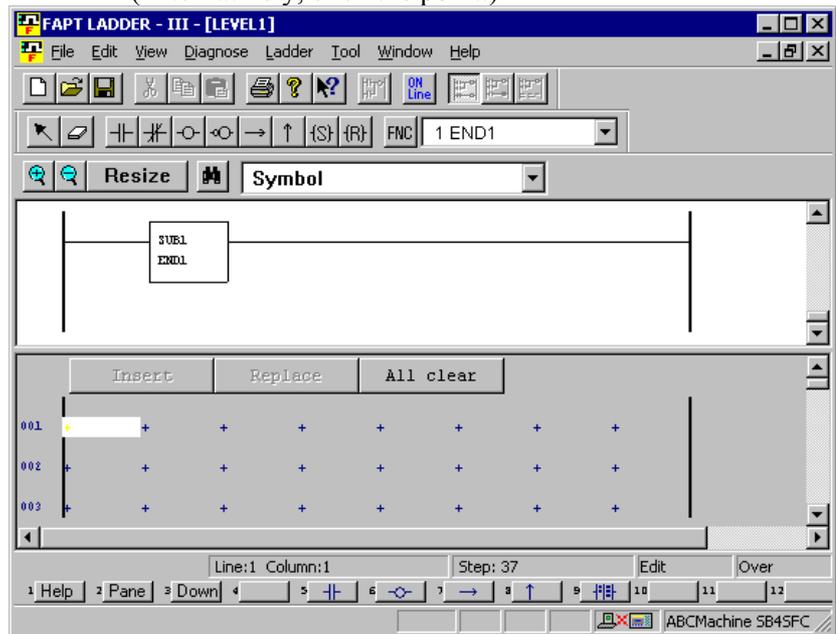


Fig. 3.5.3 (a)

- 1-2 Press the key that corresponds to the basic instruction you want to enter.

Table 3.5.3

Key	Basic instruction
[F5]	
[Shift] + [F5]	
[F6]	
[Shift] + [F6]	
[Shift] + [F7]	
[Shift] + [F8]	

3.CREATING AND EDITING SEQUENCE PROGRAMS

- 1-3 Position the cursor to the basic instruction you entered, using the cursor control keys, and then press the [Enter] key. (Alternatively, double-click the basic instruction.)

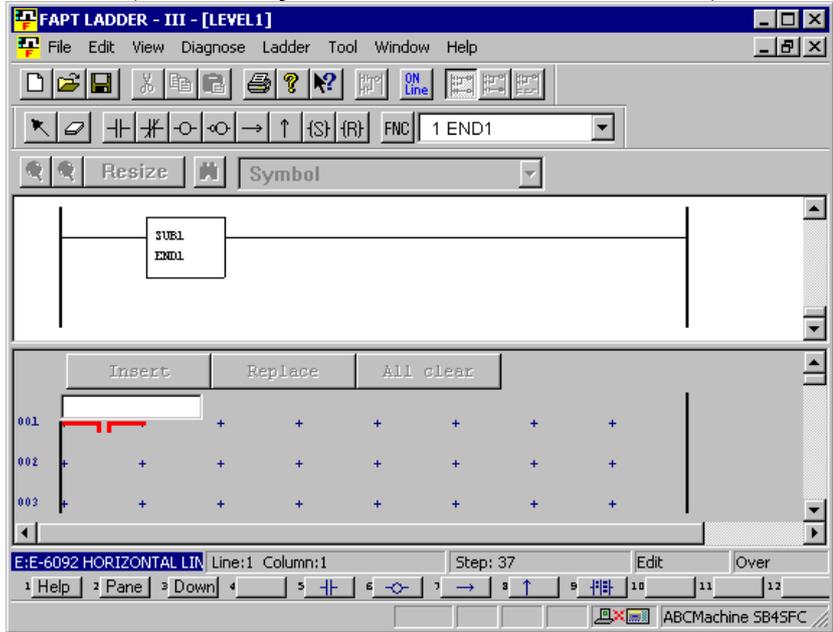


Fig. 3.5.3 (b)

- 1-4 Enter an address or symbol, and then press the [Enter] key.

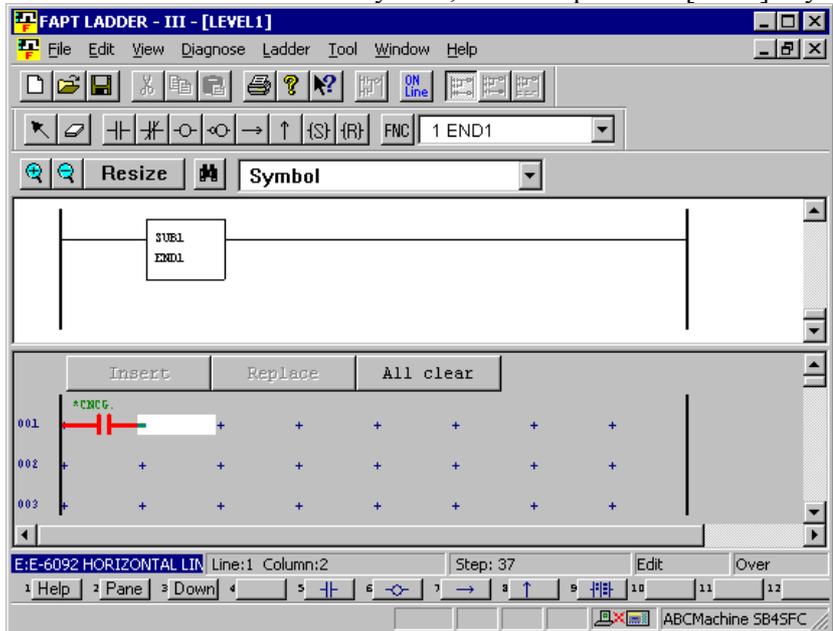


Fig. 3.5.3 (c)

2. After entering an address or symbol, you can enter basic instructions using function keys.

Procedure

- 2-1 Position the cursor to the point where you want to enter a basic instruction, using the cursor control keys. (Alternatively, click the point.)

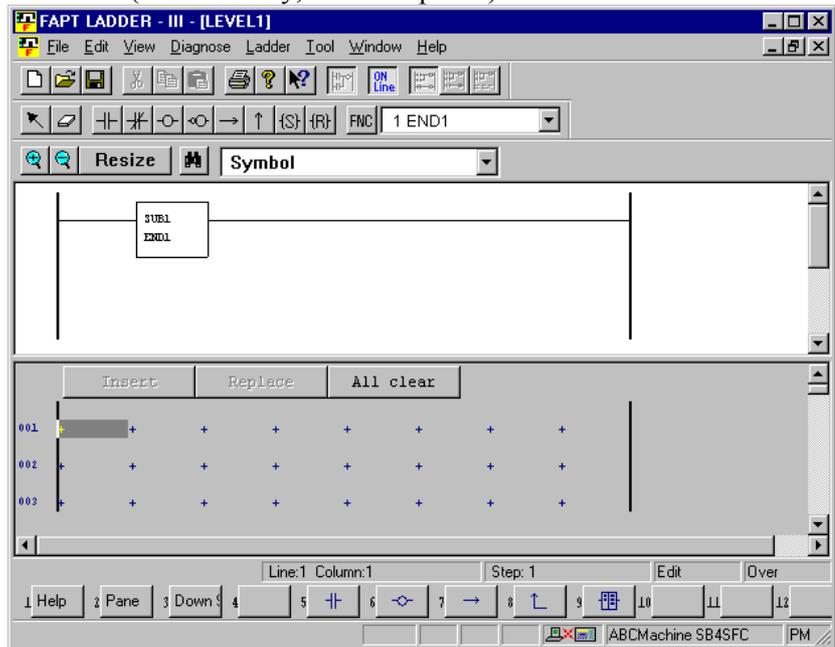


Fig. 3.5.3 (d)

- 2-2 Enter an address or symbol.

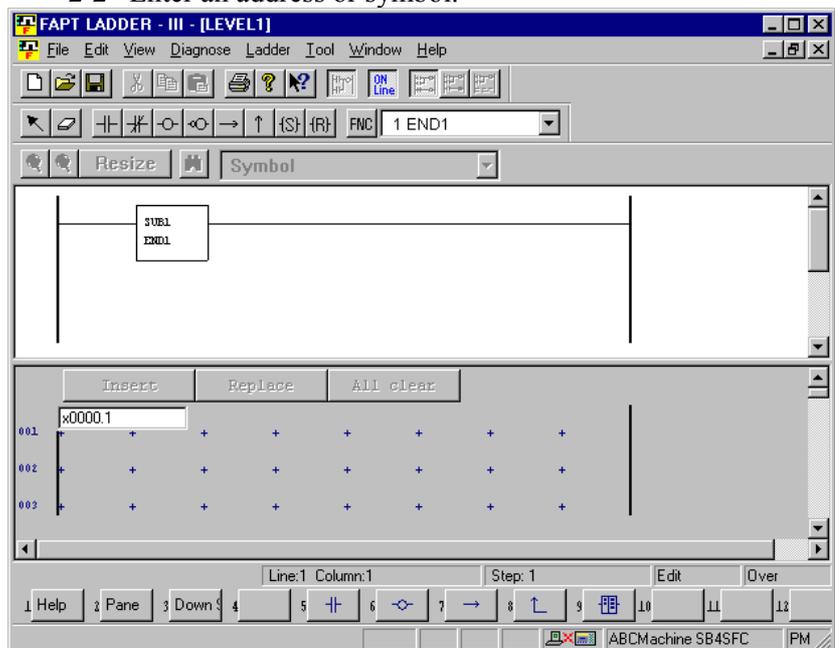


Fig. 3.5.3 (e)

2-3 Press the key that corresponds to the basic instruction you want to enter. (See Table 3.5.3.)

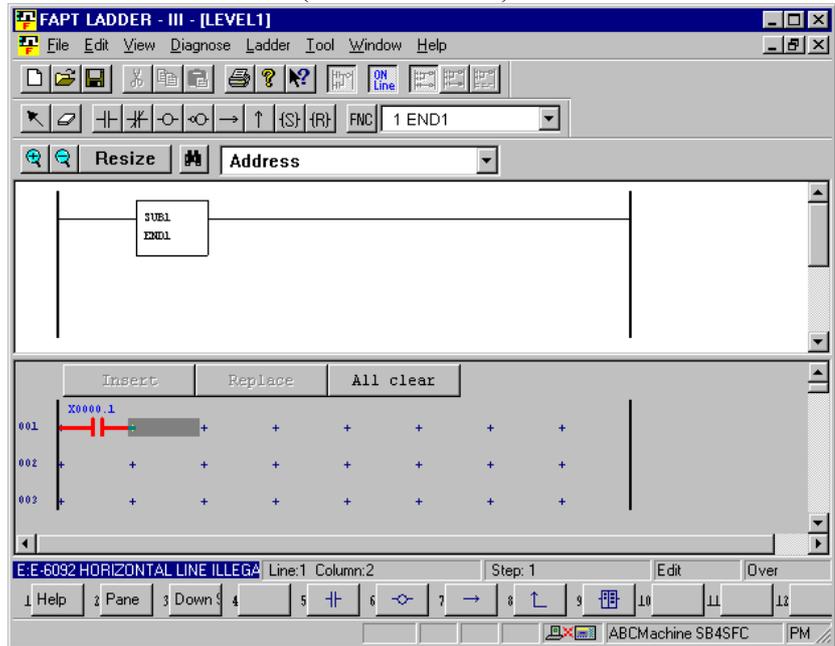


Fig. 3.5.3 (f)

3.5.4 Entering Function Instructions

1. This subsection describes how to enter function instructions in the edit pane.

Procedure

- 1-1 Position the cursor to the point where you want to enter a function instruction, using the cursor control keys. (Alternatively, click the point.)

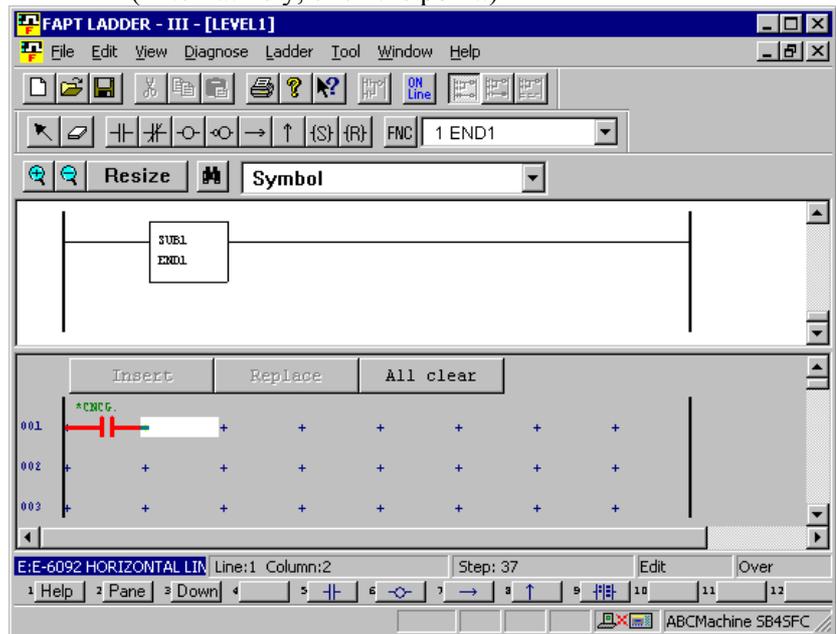


Fig. 3.5.4 (a)

- 1-2 Press the [F9] key to display the [Select function] dialog box.

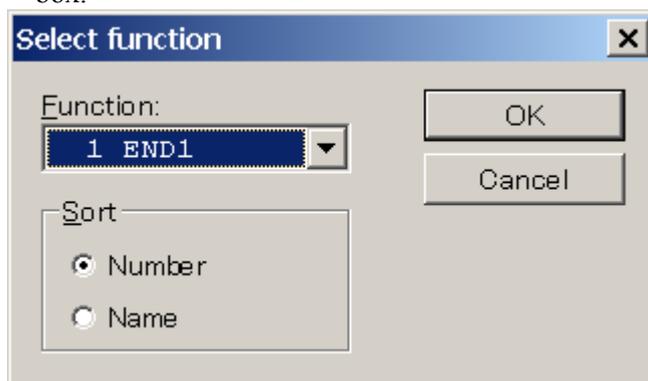


Fig. 3.5.4 (b)

3.CREATING AND EDITING SEQUENCE PROGRAMS

1-3 Select the function instruction you want to enter, and then press the <OK> button.

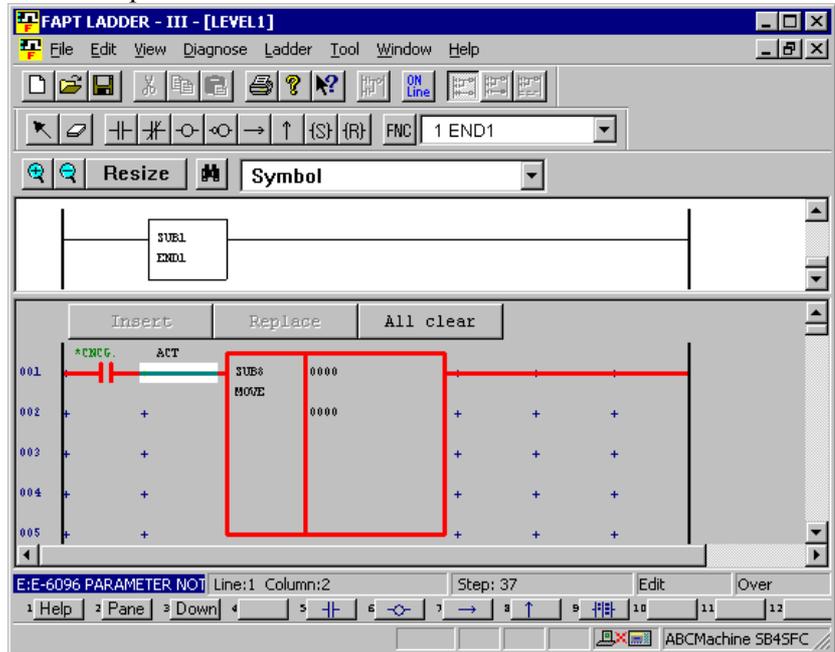


Fig. 3.5.4 (c)

1-4 Enter the parameters for the instruction you entered.

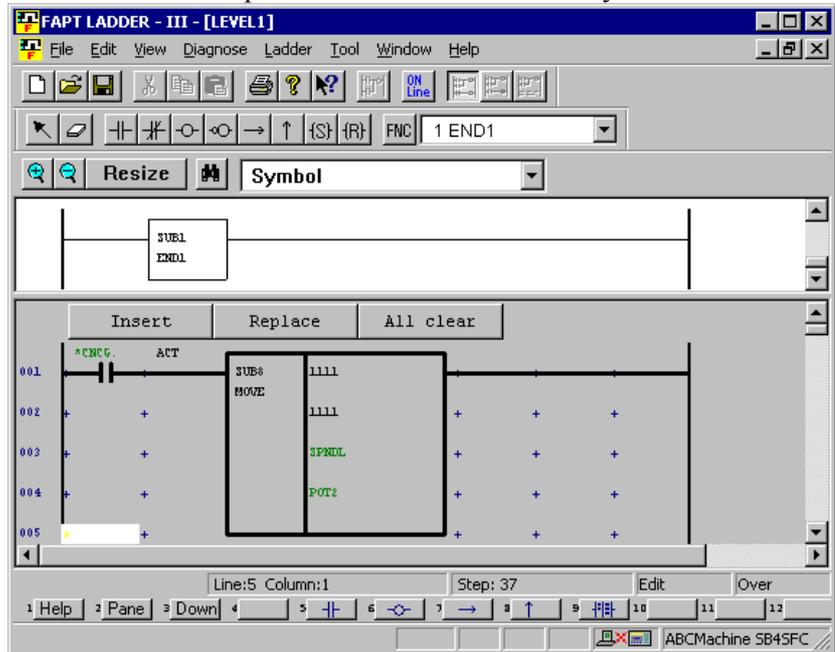


Fig. 3.5.4 (d)

- 2 After entering a function instruction number or name, you can enter a function instruction using the [F9] key.

Procedure

- 2-1 Position the cursor to the point where you want to enter a function instruction, using the cursor control keys. (Alternatively, click the point.)

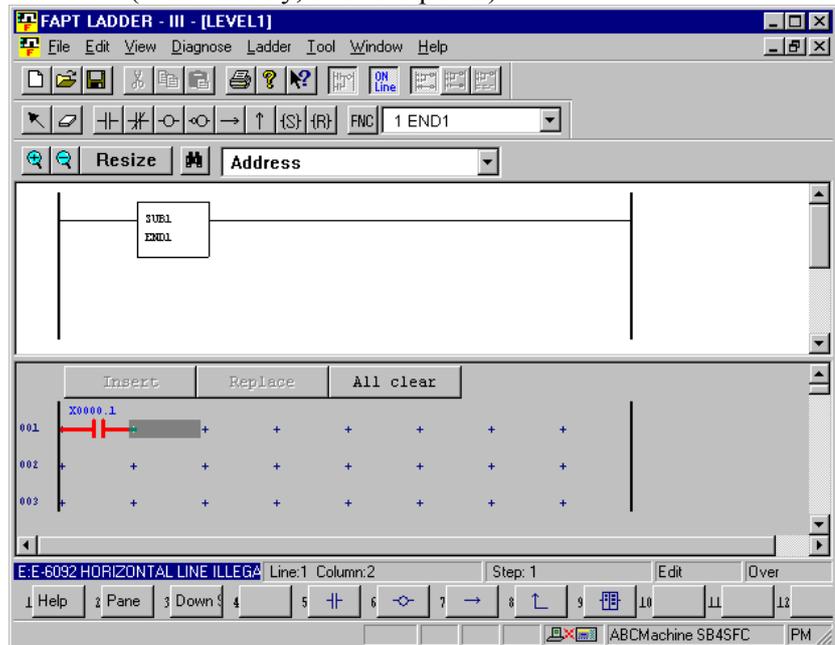


Fig. 3.5.4 (e)

- 2-2 Enter a function instruction number or name.

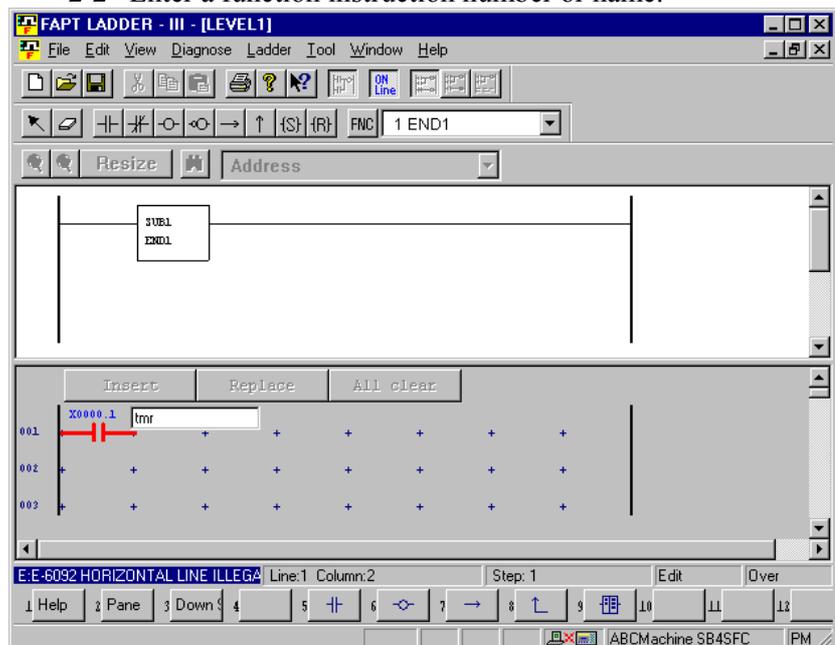


Fig. 3.5.4 (f)

2-3 Press the [F9] key.

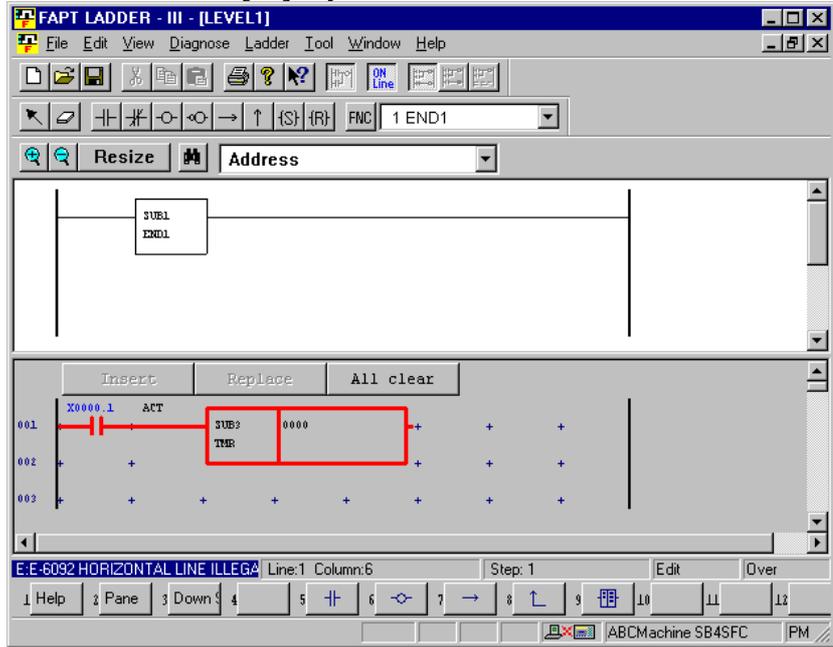


Fig. 3.5.4 (g)

3.5.5 Entering Horizontal Lines

This subsection describes how to enter horizontal lines in the edit pane.

Procedure

1. Position the cursor to the point where you want to enter a horizontal line. (Alternatively, click the point.)

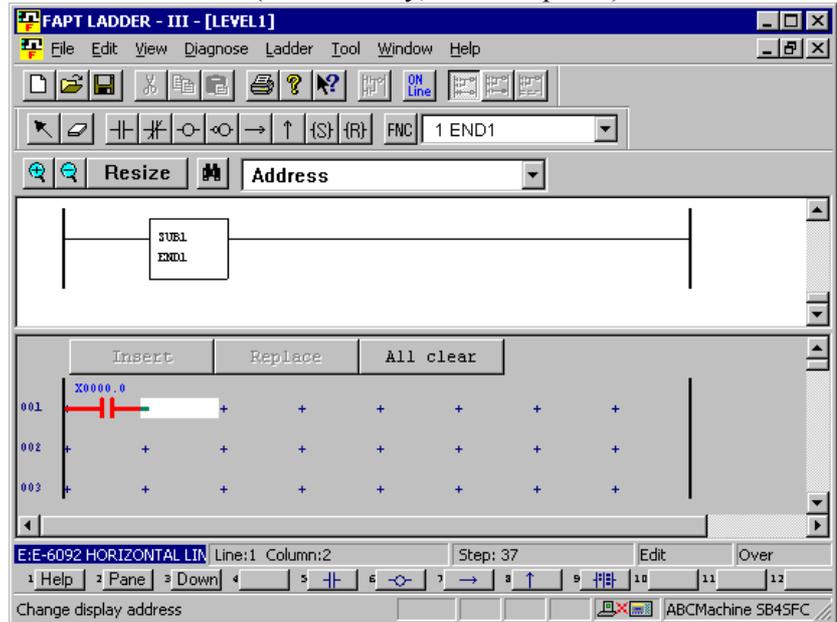


Fig. 3.5.5 (a)

2. Press the [F7] key.

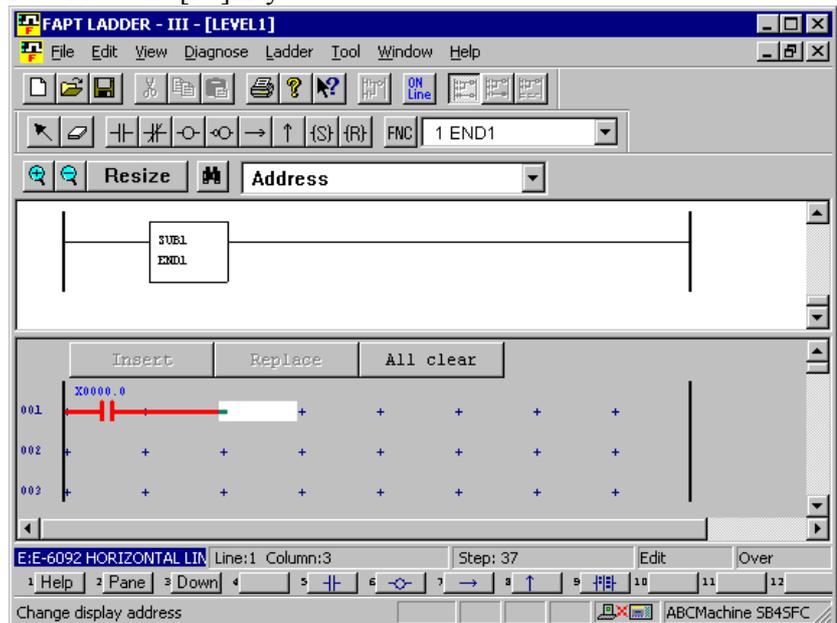


Fig. 3.5.5 (b)

3.5.6 Entering and Deleting Vertical Lines

This subsection describes how to enter and delete vertical lines in the edit pane.

Procedure

1. Position the cursor to the point where you want to enter a vertical line, using the cursor control keys.(Alternatively,click the point.)

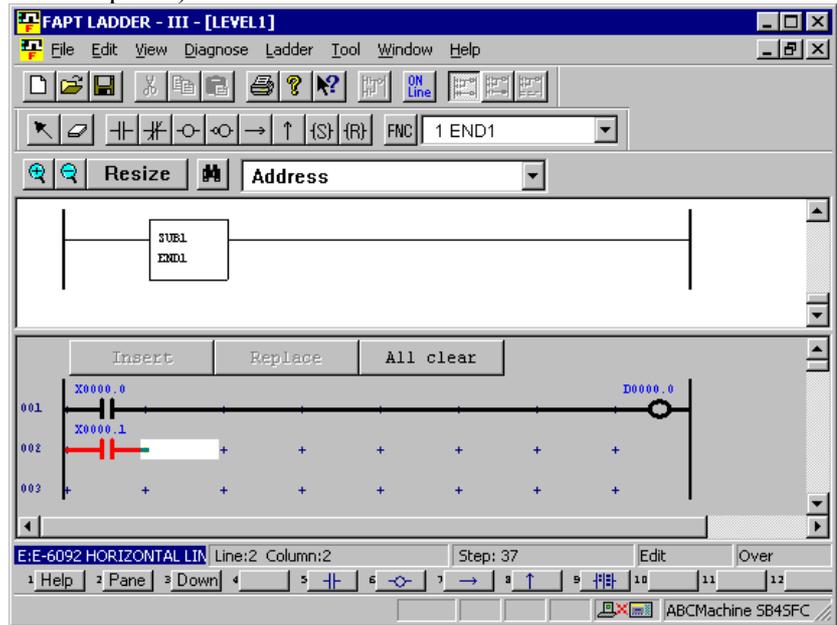


Fig. 3.5.6 (a)

2. Press the [F8] key, and then press the [↑] or [↓] key. The vertical line is entered. (To delete the vertical line, hold down the [Shift] key and then press the [↑] or [↓] key.)

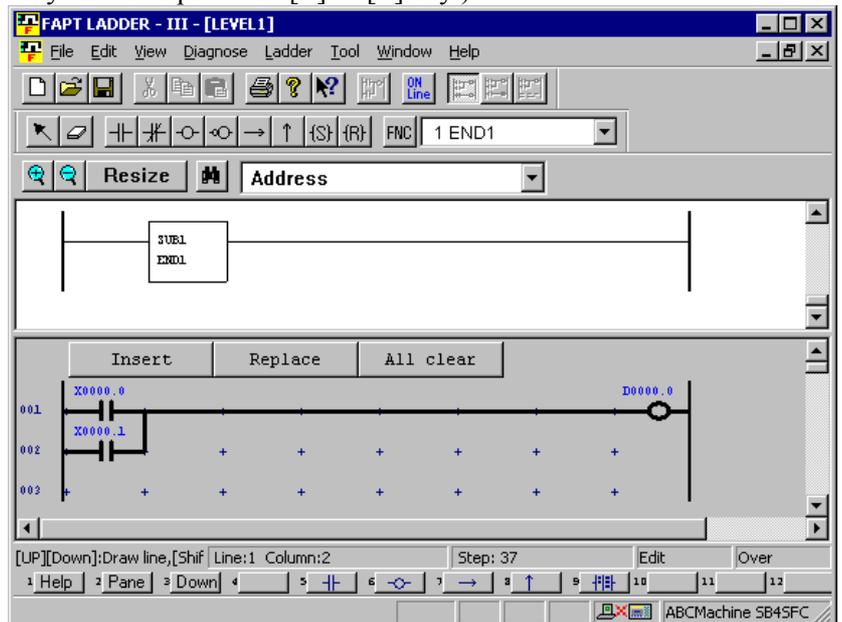


Fig. 3.5.6 (b)

3.5.7 Adding Ladder Subprograms

This subsection describes how to add ladder subprograms.

Procedure

1. Right-click on the program list screen, and then click [Add sub-program F9].

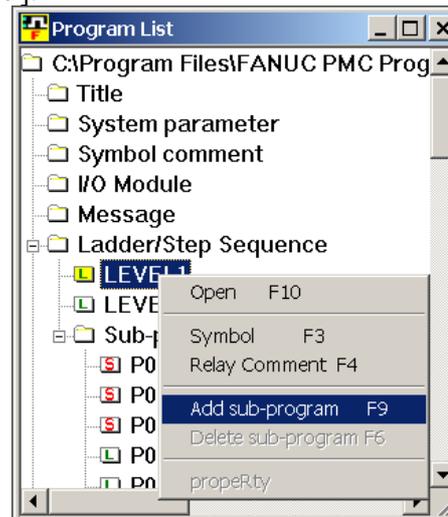


Fig. 3.5.7 (a)

2. The [Add sub-program] dialog box appears.

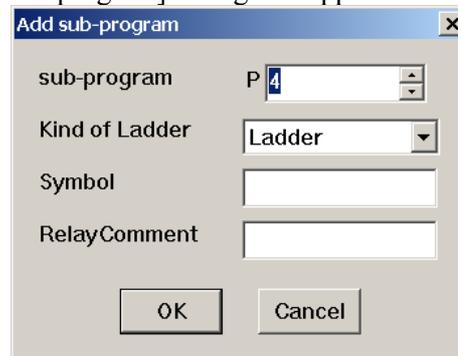


Fig. 3.5.7 (b)

3. Enter [sub-program].
4. Select [Ladder] from [Kind of Ladder].
5. Enter [Symbol] and [RelayComment], and then click the <OK> button.
6. The subprogram is added, and the screen for the added ladder program appears.

3.5.8 Deleting Ladder Subprograms

This subsection describes how to delete subprograms.

Procedure

1. On the program list screen, position the pointer to the subprogram you want to delete and right-click. Then, click [Delete sub-program F6].

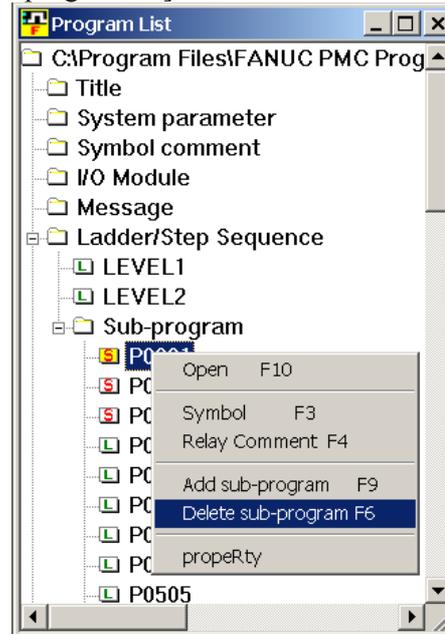


Fig. 3.5.8 (a)

2. The following dialog box appears. To delete the subprogram, click <Yes>.

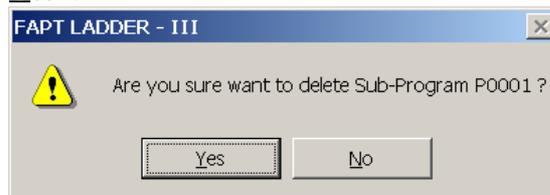


Fig. 3.5.8 (b)

3.5.9 Editing Net Comments

This subsection describes how to edit net comments.

Procedure for adding net comments

Procedure

1. In the display pane, position the mouse pointer to the point where you want to add a net comment, and then right-click.

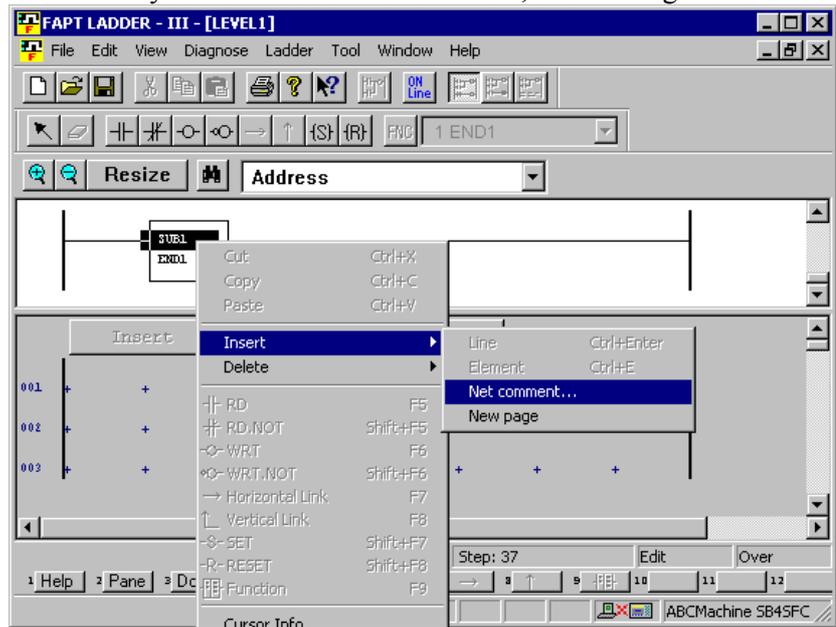


Fig. 3.5.9 (a)

2. Select [Insert] - [Net comment] , and then enter a net comment.

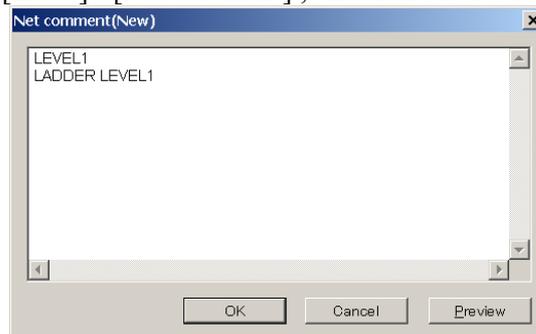


Fig. 3.5.9 (b)

To check the number of characters in the entered net comment, press the <Preview> button.
The preview screen appears.

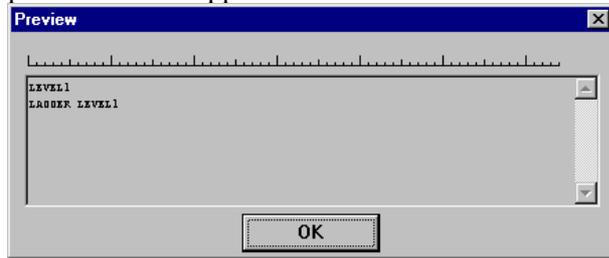


Fig. 3.5.9 (c)

3. After you finish entering the net comment, press the <OK> button.

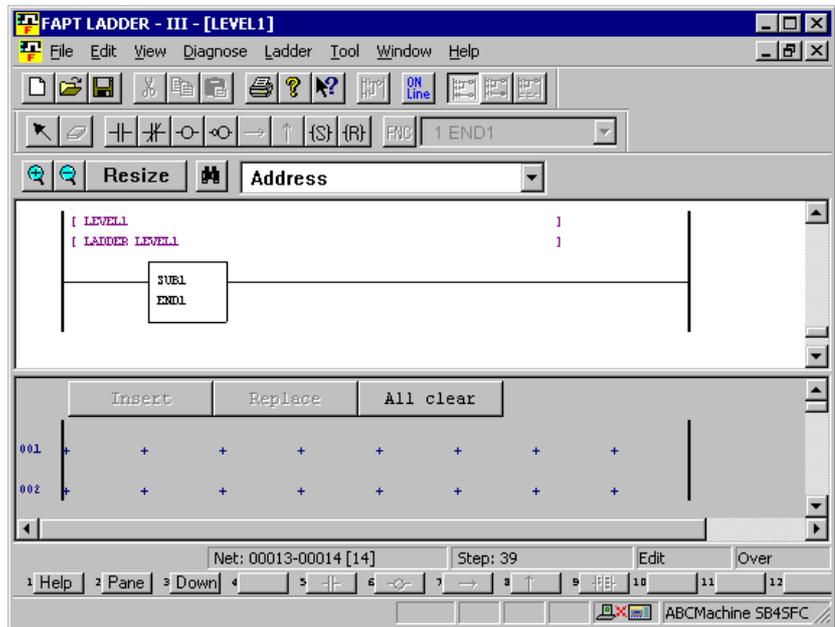


Fig. 3.5.9 (d)

• Procedure for editing net comments

Procedure

1. In the display pane, double-click the net comment you want to modify.

The [Net comment] screen appears.



Fig. 3.5.9 (e)

2. Edit the character strings for the net comment. After you finish editing, press the <OK> button. The net comment in the display pane is updated.

3.5.10 Deleting Net Comments

This subsection describes how to delete net comments.

Procedure

1. In the display pane, position the mouse pointer to the net comment you want to delete, and then right-click.

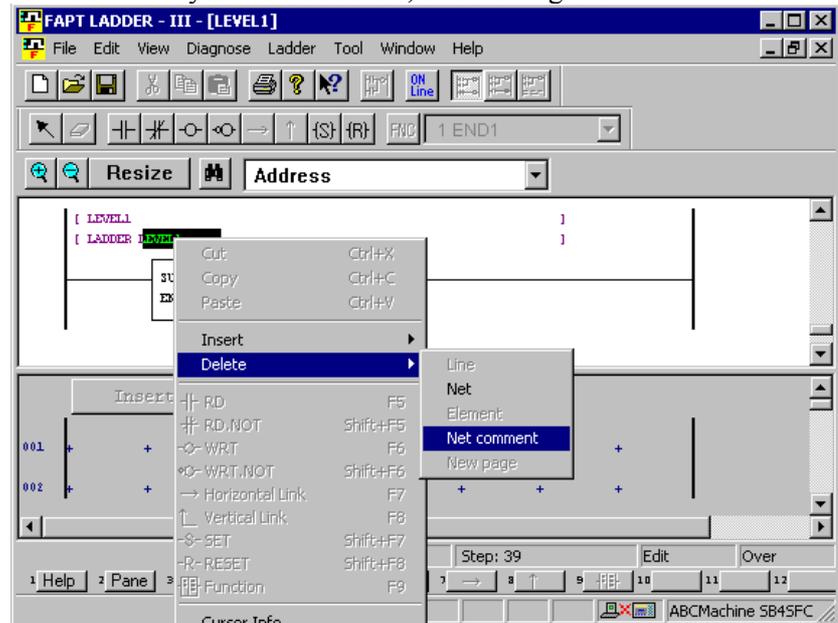


Fig. 3.5.10 (a)

2. Select [Delete] - [Net comment].
3. The following dialog box appears. To delete the net comment, select <OK>.

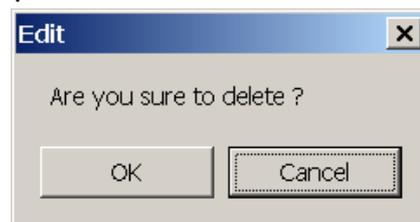


Fig. 3.5.10 (b)

3.5.11 Adding Page Breaks

This subsection describes how to add page breaks.

Procedure

1. In the display pane, position the mouse pointer to the point where you want to add a page break, and then right-click.

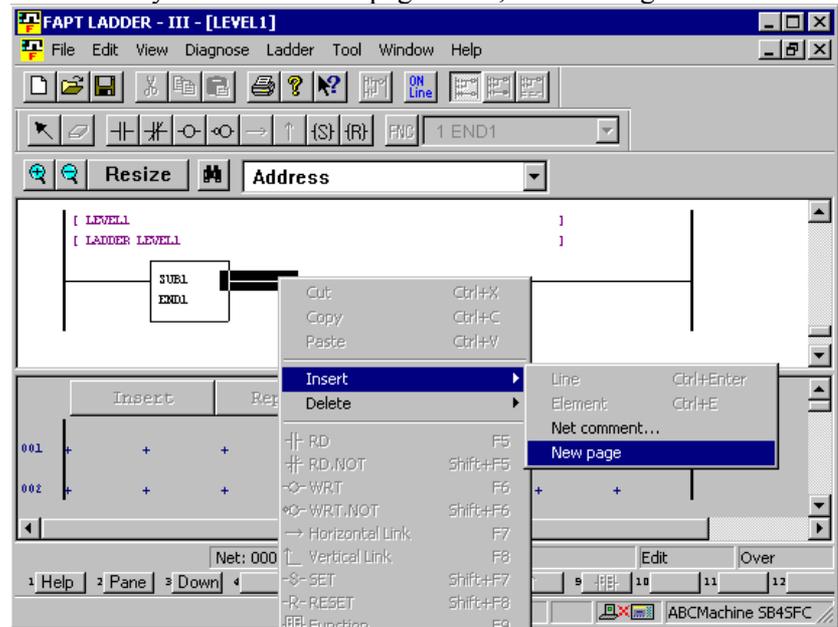


Fig. 3.5.11

2. Select [Insert] - [New page]. The page break is added.

3.5.12 Deleting Page Breaks

This subsection describes how to delete page breaks.

Procedure

1. In the display pane, position the mouse pointer to the page break you want to delete, and then right-click.

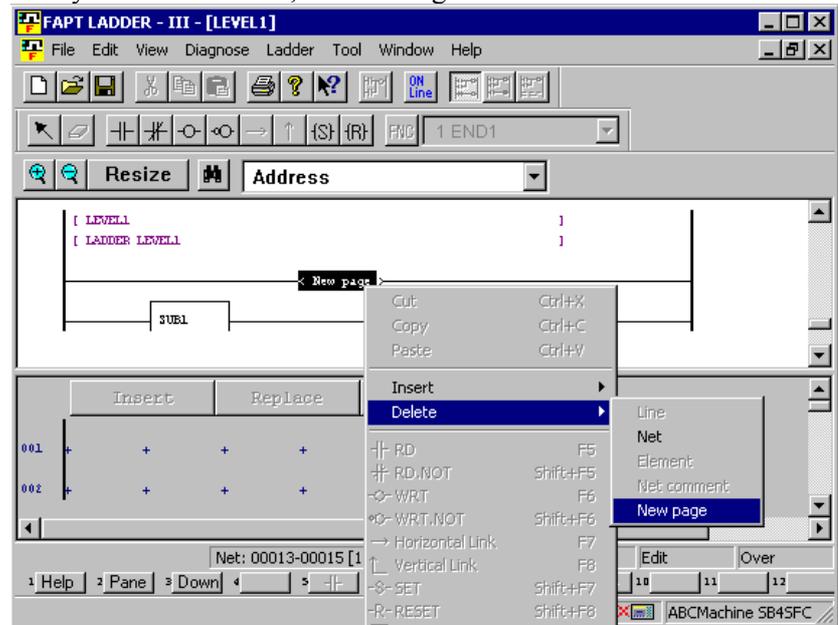


Fig. 3.5.12 (a)

2. Select [Delete] - [New page].
3. The following dialog box appears. To delete, select <OK>.



Fig. 3.5.12 (b)

3.5.14 Search

This subsection describes the ladder program search function.

Procedure

1. Choose [Search] from the [Edit] menu.

The [Search] screen appears.

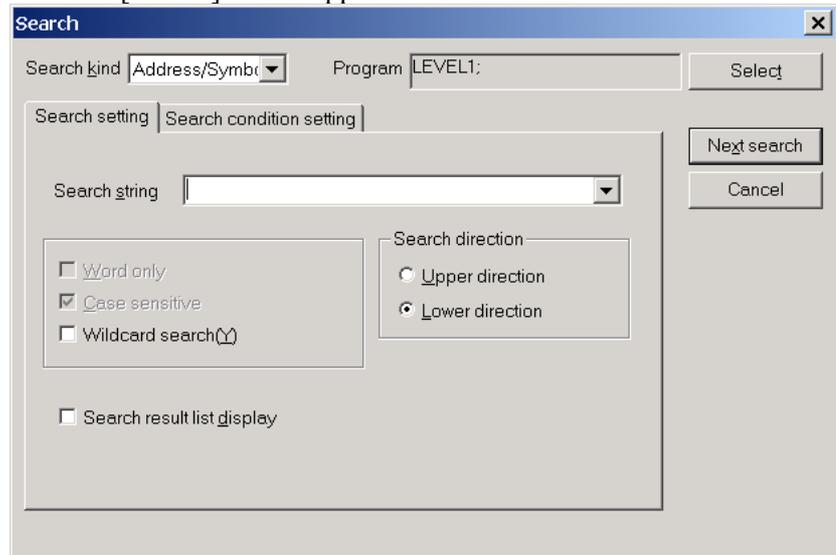


Fig. 3.5.14(a)

- 1-1 **Search kind**

Select Address/Symbol or Functional instruction.

- 1-2 **Program**

Click the <Select> button to open the [Program select dialog] screen, then select a search target program.

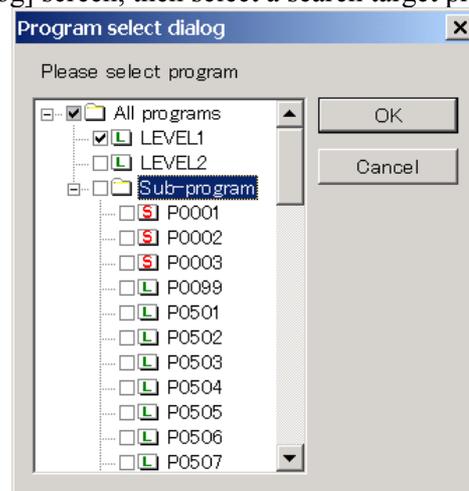


Fig. 3.5.14(b)

2. Select the [Search condition setting] tab.
The screen corresponding to a selected search kind is displayed.

- When Address/Symbol is selected

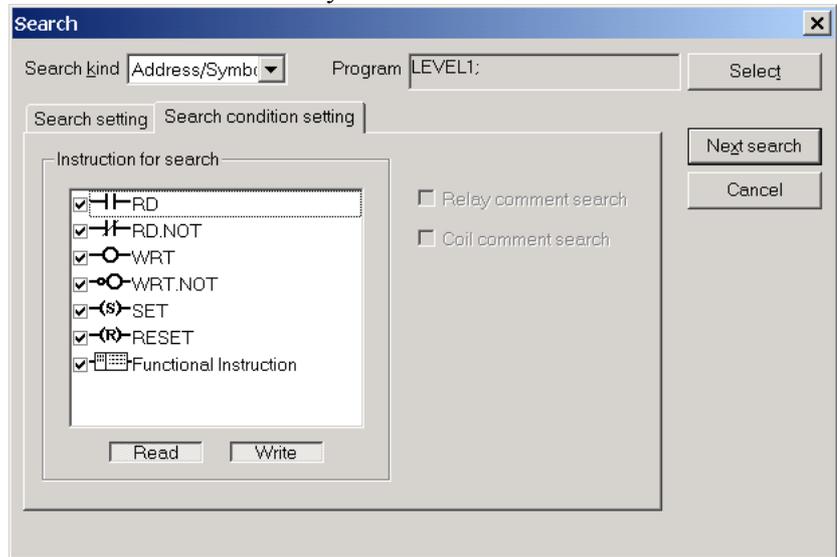


Fig. 3.5.14(c)

2-1 Instruction for search

Check search target instructions.

- When Functional instruction is selected

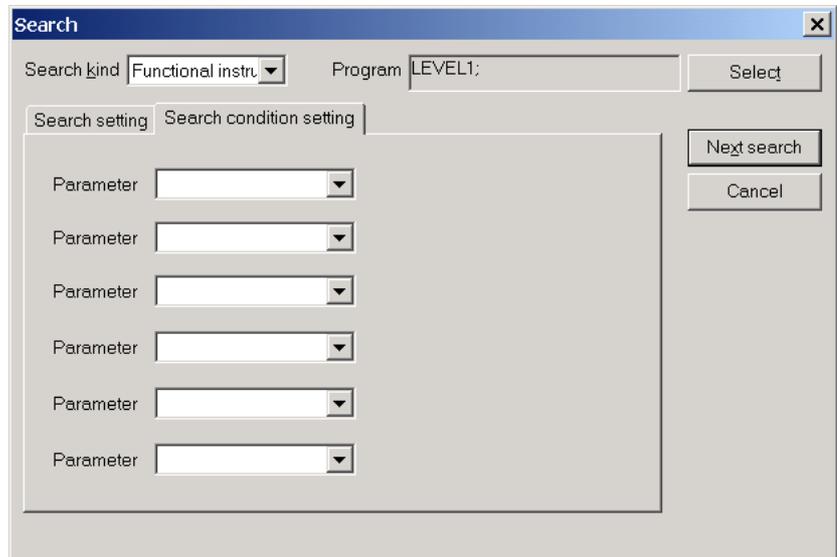


Fig. 3.5.14(d)

2-2 Parameter

Enter parameters as search conditions according to Functional instruction selected in Search kind.

3. Select the [Search setting] tab.

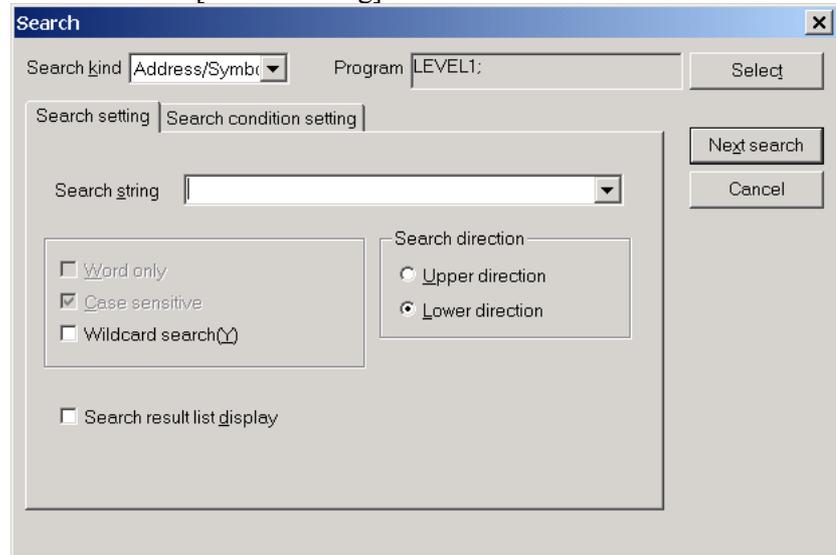


Fig. 3.5.14(e)

3-1 Search string

Enter a character string to be searched for.

In a character string to be found, two types of wildcards can be used: a question mark (?) and an asterisk (*). A wildcard substitutes for one or multiple characters.

A question mark (?) is used to represent one character. This wildcard can be used more than once to represent characters.

An asterisk (*) represents zero or more characters.

Multiple addresses can be specified by delimiting them from each other by a comma (,) or semicolon (;). (Example: Y0.0;X0.0)

3-2 Wildcard search

Check this check box if a specified character string to be found includes wildcards.

3-3 Search direction

Select Upper direction or Lower direction as the direction of search.

3-4 Search result list display

Check this check box to display the search results on the [Search result list (call)] screen in a batch.

The [Search result list (call)] screen displays program numbers, net numbers, ladder diagrams, and coil comments.

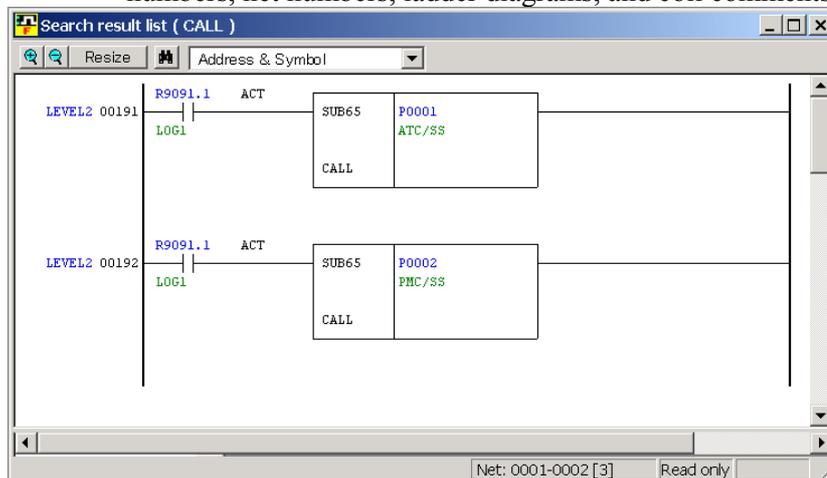


Fig. 3.5.14(f)

4. Execute search operation.

If Search result list display is checked, click the <Exec> button.
In other cases, click the <Next search> button.

3.5.15 Collective Display

Collective display is a function with which nets extracted under multiple search conditions can be monitored (in the online mode) and displayed in one window.

3.5.15.1 Setting collective display extraction conditions

Procedure

1. Double-click the <Collective Display> item on the [Program List] screen. The [Collective Display] screen appears. For buttons and input items, see the next page and later.

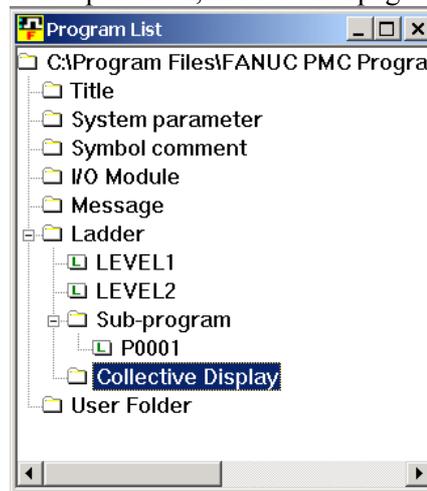


Fig. 3.5.15.1(a)

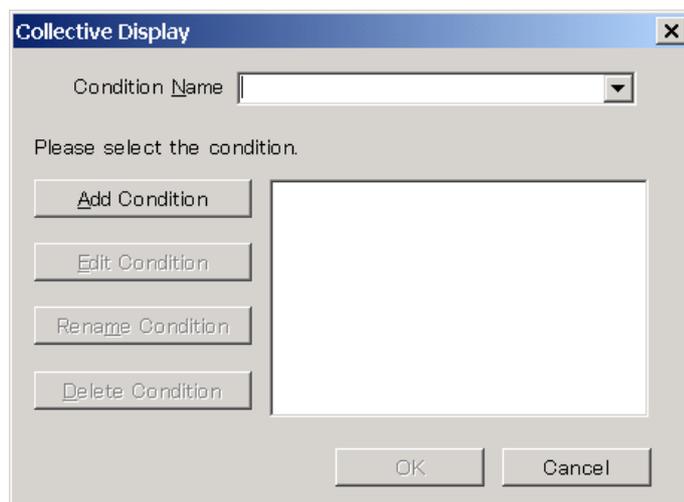


Fig. 3.5.15.1(b)

2. Click the <Add Condition> button. The [Search] screen appears.

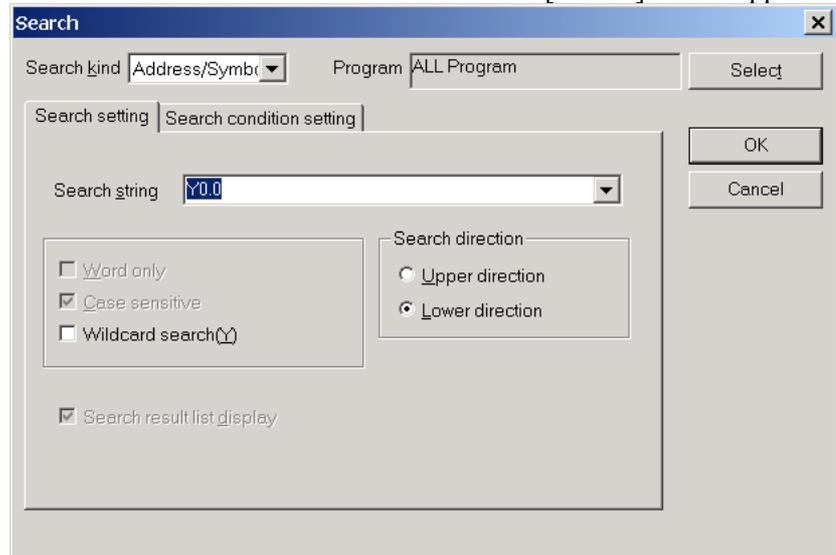


Fig. 3.5.15.1(c)

- 2-1 After setting search conditions, click the <OK> button.
For each setting item, see Subsection 3.5.13, "Search."

3. The [Setting of search condition-name] screen appears.



Fig. 3.5.15.1(d)

- 3-1 A character string that consists of the words "Search of" added to the start of a character string set in Search string on the [Search] screen is displayed. (Example: Search of Y0.0)
A set character string can be modified.
A set character string is displayed as a search condition name in the search condition list on the [Search Monitor] screen.
- 3-2 After setting a desired character string, click the <OK> button.

4. The [Collective Display] screen updated appears.

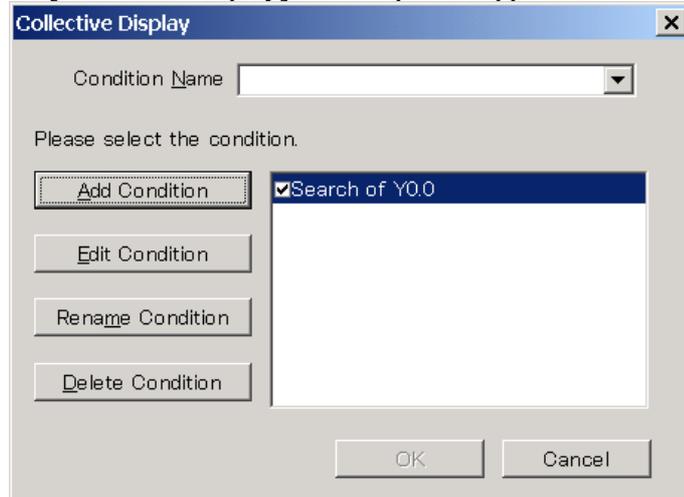


Fig. 3.5.15.1(e)

5. Repeat steps 2 through 4 to add search conditions.

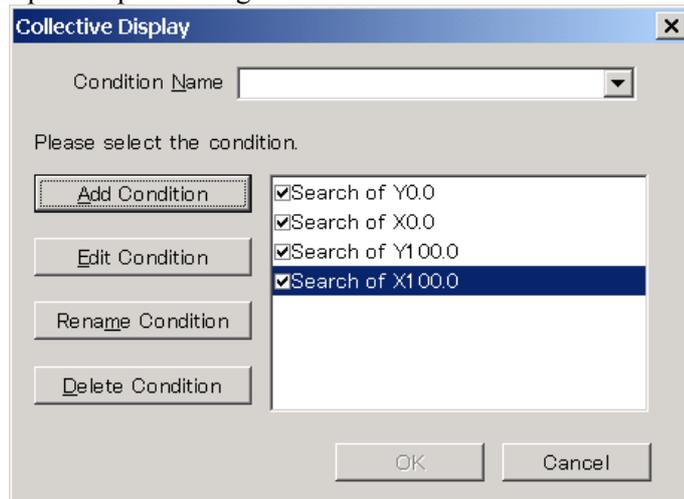


Fig. 3.5.15.1(f)

5-1 **<Edit Condition> button**

This button is used to edit the search condition where the cursor is placed.

5-2 **<Rename Condition> button**

This button is used to rename the search condition where the cursor is placed.

5-3 **<Deletion Condition> button**

This button is used to delete the search condition where the cursor is placed.

6. Check the check boxes of search conditions to be enabled, then set a desired collective display condition name in Condition Name.

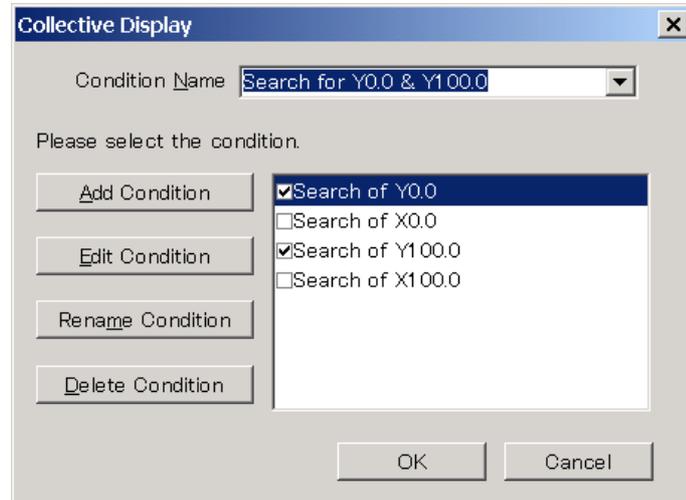


Fig. 3.5.15.1(g)

- 6-1 Click the <OK> button.

Extracted nets are collectively displayed on the screen.

The same information can also be monitored in the online mode.

An extraction condition is added to the <Collective Display> item on the [Program List] screen.

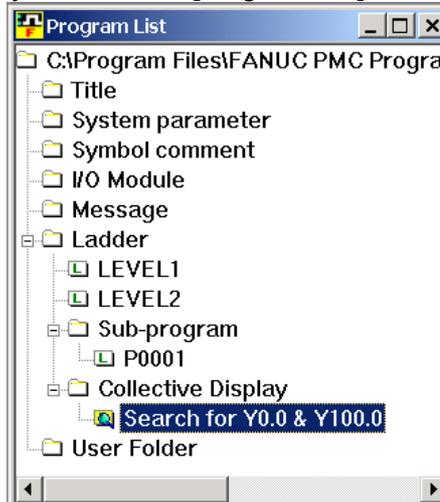


Fig. 3.5.15.1(h)

3.5.15.2 Executing collective display

Procedure

- 1 On the [Program List] screen, move the mouse pointer to the extraction condition used for collective display execution, then click the right mouse button.

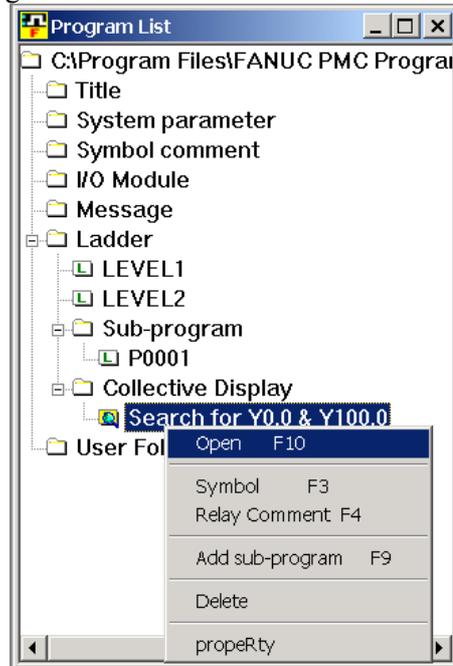


Fig. 3.5.15.2(a)

- 2 Choose [Open]. Then, the extracted nets are collectively displayed on the screen. The same information can also be monitored in the online mode.

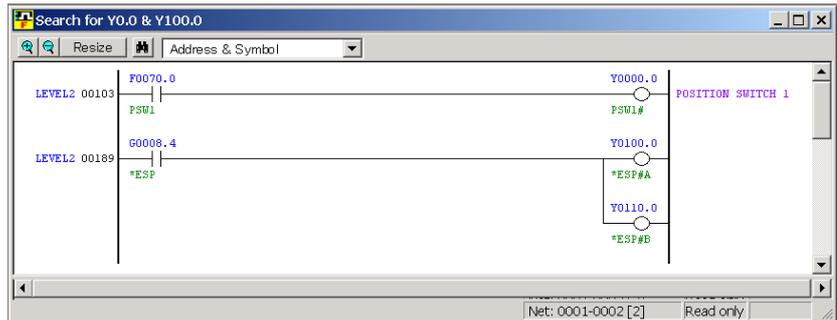


Fig. 3.5.15.2(b)

3.5.15.3 Modifying collective display extraction conditions

Procedure

1. On the [Program List] screen, move the mouse pointer to an extraction condition to be modified, then click the right mouse button.

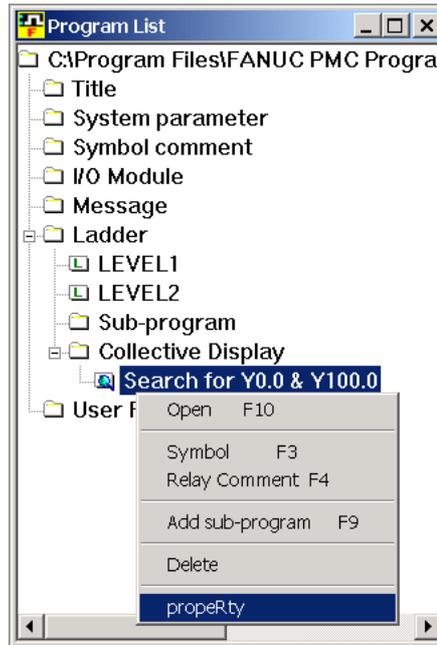


Fig. 3.5.15.3

2. Choose [propeRty]. Then, the [Collective Display] screen appears.
For extraction condition setting, see Subsection 3.5.15.1, "Setting collective display extraction conditions."

3.5.15.4 Deleting collective display extraction conditions

Procedure

1. On the [Program List] screen, move the mouse pointer to an extraction condition to be deleted, then click the right mouse button.

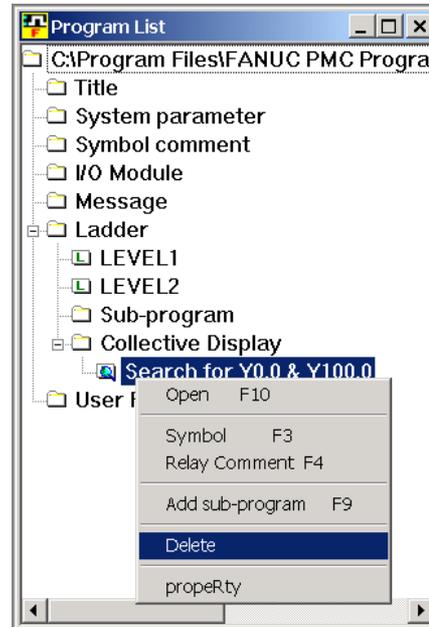


Fig. 3.5.15.4(a)

2. Choose [Delete]. Then, a message for checking whether the selected condition may be deleted appears. Click the <Yes> button to execute deletion. Click the <No> button to cancel deletion.

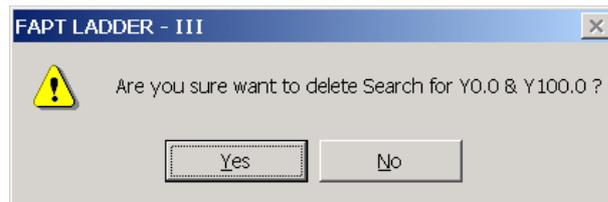


Fig. 3.5.15.4(b)

3.5.16 Setting the Number of Contacts and Coils per Row

On a ladder display screen (monitor, editing, or collective display), the number of contacts and coils displayed per row can be specified.

Procedure

1. From the [Tool] menu, choose [Options], then double-click [Display].

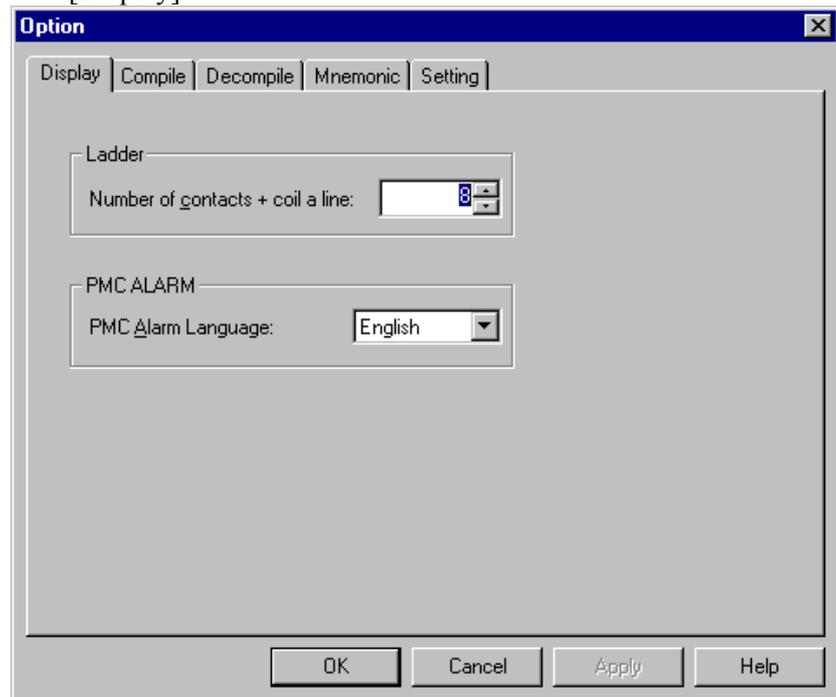


Fig. 3.5.16

2. Move the cursor to [Number of contacts + coil a line], then set the desired number of contacts and coils per row. (A value from 8 to 20 (columns) can be set.)
3. Click the <OK> button. The set number of contacts and coils is applied to display.

NOTE

- 1 If the number of contacts and coils per row is changed, a ladder diagram in the edit pane and clipboard is deleted, and reediting is disabled.
- 2 A net that has more relays or coils than the set number of contacts and coils is displayed as a continuation net as conventionally done.

3.5.17 Changing Signal Addresses and Function Instruction Parameters in the Display Pane

This subsection describes how to change signals addresses and function instruction parameters in the display pane.

Procedure

1. Position the cursor to the signal address or function instruction parameter you want to change.
2. Press and hold down the [Shift] key and press the [Enter] key, and the address or parameter will enter the change-enabled state. (You can also key in directly after positioning the cursor.)

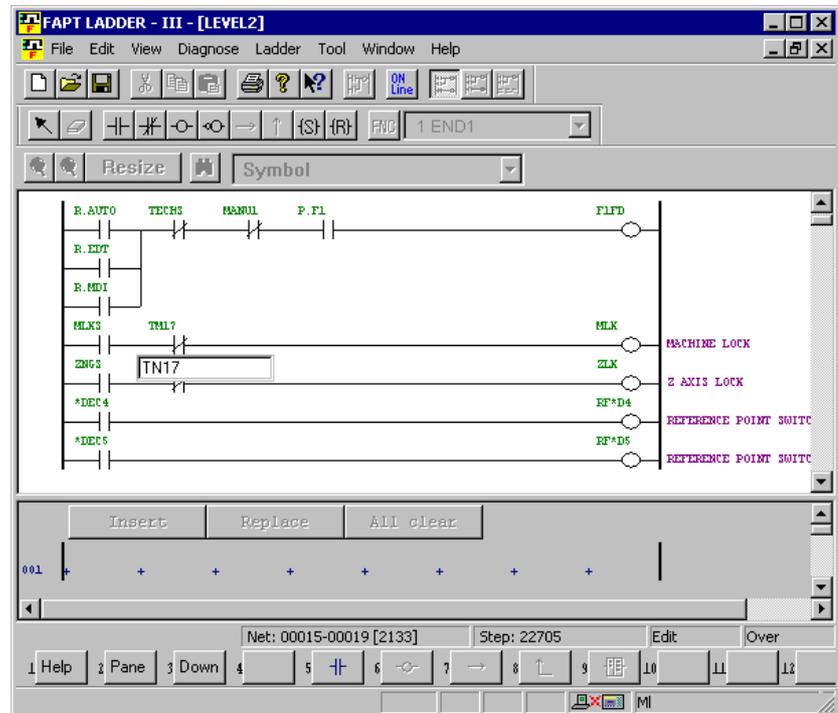


Fig. 3.5.17

3. Change the signal address or function instruction parameter, and press the [Enter] key.

NOTE

- 1 You can also enter a symbol as a signal address.
- 2 You cannot change function instruction numbers or the first parameters of the function instructions ADDB, AND, COMPB, DIVB, EOR, MULB, OR, and SUBB.

3.5.18 Changing Contacts and Coils in the Display Pane

This subsection describes how to change contacts and coils in the display pane.

1. Position the cursor to the contact or coil you want to change.

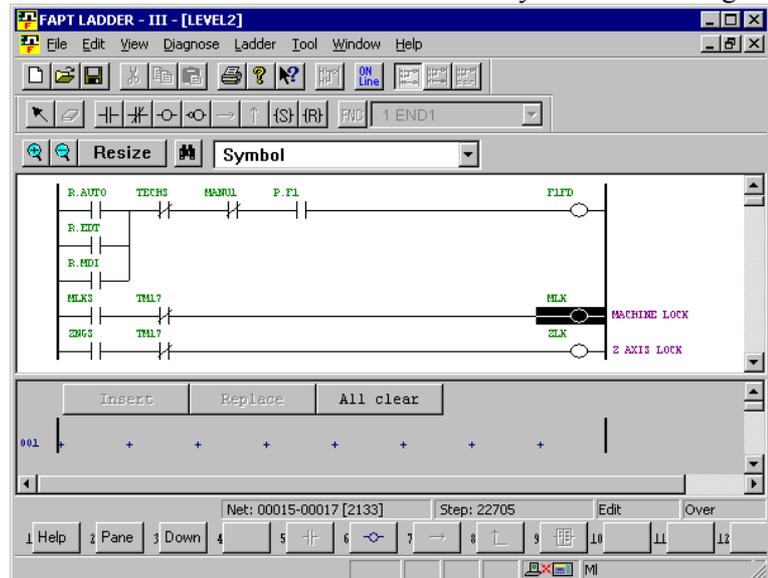


Fig. 3.5.18 (a)

2. Click the soft key that corresponds to the contact or coil you want to change.
(You can also change the contact or coil to the one selected with the edit toolbar.)

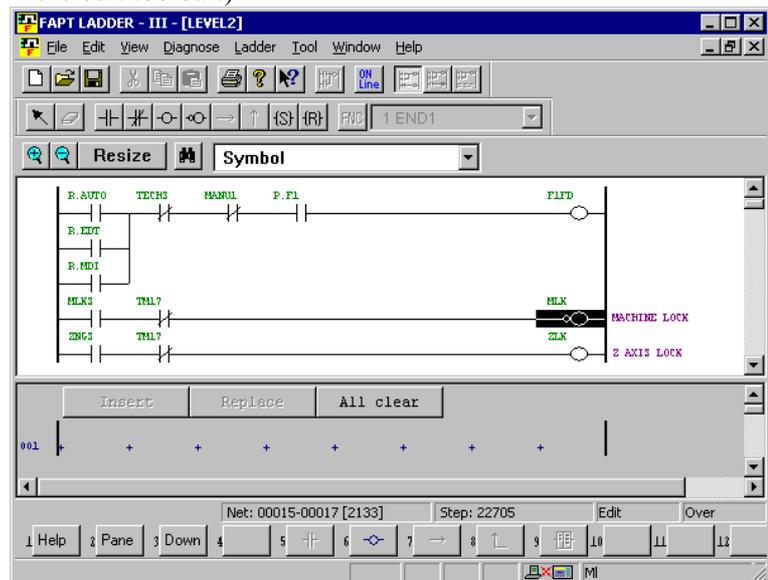


Fig. 3.5.18 (b)

NOTE

You cannot insert or delete contacts/coils. Nor can you enter horizontal/vertical lines.

3.6 EDITING STEP SEQUENCES

This section describes how to edit step sequence programs.

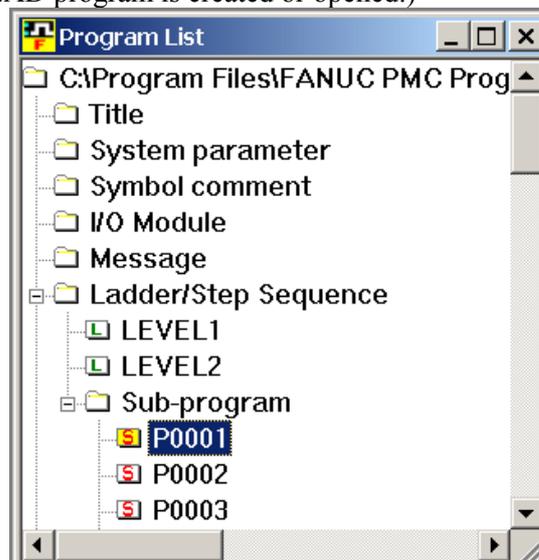
NOTE

Step sequence programs can be displayed and edited only when the current programmer mode (offline/online) is offline. To change the programmer mode to offline, select [Ladder] - [Online/Offline].

- How to display the step sequence edit screen

Procedure

1. Select [View] - [Program List]. The [Program List] screen appears. (Usually, this screen appears automatically when a LAD program is created or opened.)



 Ladder program

 Step sequence program

Fig. 3.6 (a)

2. On the [Program List] screen, double-click the step sequence program you want to edit. Alternatively, select the step sequence program, and then press the [Enter] or [F10] key.

- Summary of step sequence program edit screen

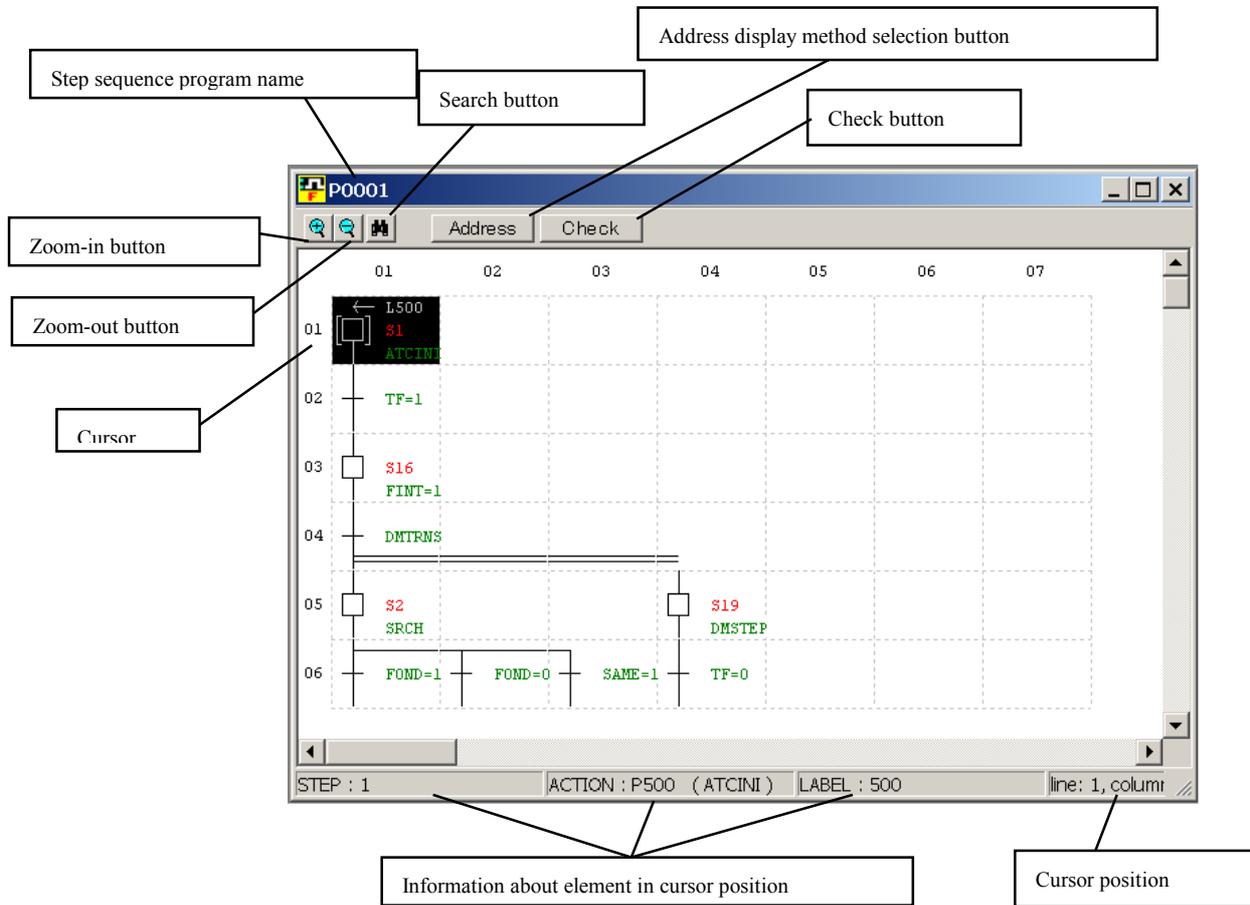


Fig. 3.6 (b)

Zoom-out button

Reduces the step ladder screen display.

Zoom-in button

Magnifies the step ladder screen display.

Search button

Searches for a step number and action.

Address display method selection button

Switches between address and symbol displays.

Check button

Check program syntax.

Information about element in the cursor position

Displays a step number, action (subprogram), and label number.

Cursor position

Displays the row and column of the current cursor position.

NOTE
The step sequence program edit screen consists of 32 horizontal elements by 64 vertical lines.

• Soft keys

- When the Shift key is not pressed (the cursor is on the "processing step line")



Fig. 3.6 (c)

- When the Shift key is pressed (the cursor is on the "processing step line")



Fig. 3.6 (d)

- When the Shift key is not pressed (the cursor is on the "condition specification TR")



Fig. 3.6 (e)

- When the Shift key is pressed (the cursor is on the "condition specification TR")



Fig. 3.6 (f)

NOTE
To display soft keys, select [View] - [Softkey].

- Context menu

Right-clicking the step sequence program edit screen displays this menu.

Cut	Ctrl+X
Copy	Ctrl+C
Paste	Ctrl+V
Delete	
Insert line	
Insert column	
Select line	
Select column	
<input type="checkbox"/> Step	F5
<input checked="" type="checkbox"/> Initial step	F6
<input type="checkbox"/> Block step	F7
Vertical line	F8
→ Jump	Shift+F5
← Label	Shift+F6
⊥ End	Shift+F7
List	
Zoom	Shift+F9
Check	F9
P500 Property	

Fig. 3.6 (g)

- Shortcut keys

Table 3.6

Shortcut key	Function
[F3]	Search (downward)
[Shift] + [F3]	Search (upward)
[F5]	Enter step program (step line) Enter transition (transition line)
[Shift] + [F5]	Enter label jump
[F6]	Enter initial step program (step line) Enter beginning of selective branch (transition line)
[Shift] + [F6]	Enter jump-to label (step line) Enter end of selective branch (transition line)
[F7]	Enter block step program (step line) Enter beginning of parallel branches (transition line)
[Shift] + [F7]	Enter end of block step (step line) Enter end of parallel branch (transition line)
[F8]	Enter continuation line
[F9]	Check syntax
[Shift] + [F9]	Zoom
[Del]	Clear element
[Ctrl] + [C]	Edit - Copy
[Ctrl] + [F]	Edit - Search
[Ctrl] + [G]	Edit - Jump to specified position
[Ctrl] + [V]	Edit - Paste
[Ctrl] + [X]	Edit - Cut
[Home]	Display left end
[End]	Display right end
[Ctrl] + [Home]	Jump to beginning
[Ctrl] + [End]	Jump to end

3.6.1 Step Sequence Configuration

A step sequence program consists of the following elements:

- Step

A step is a unit of processing in a program.



- A step number [Sn] necessary to control execution and a subprogram [Pm] that describes actual processing are defined for a step.
- Each step is always assigned with a step number. A duplicate step number cannot be used in a program.
- A step can be in any one of three logical states: running, stopping, and stopped. The running state is also called an active state. The stopping and stopped states are collectively referred to as inactive states.

Table 3.6.1

State		Processing	Sn.0
Active	Running	The step is active. The corresponding action program (subprogram) is running.	1
	Stopping	The step is shifting from running to stopped. The corresponding action program (subprogram) is executed only once. After this it is stopped.	0
Inactive	Stopped	The step is inactive. The corresponding action program (subprogram) is not running.	0

NOTE

The state of a specified step can be read through a contact; it cannot be written, however.

Sn.0 (where n represents a step number, which can take a value from 1 to 1000)

Step numbers are used in a program so that transition between steps can be controlled in detail.

Using step numbers makes it possible for any subprogram to detect the state of any step. However, the use of step numbers adversely affects program transportability and ease of understanding. Do not use step numbers excessively.

• Initial step

An initial step is a step that automatically becomes active when the program starts running. Except for this point, the initial step behaves in the same manner as ordinary steps. Control can be passed from a usual step to the initial step again. In this case, the initial step behaves in exactly the same manner as an ordinary step.



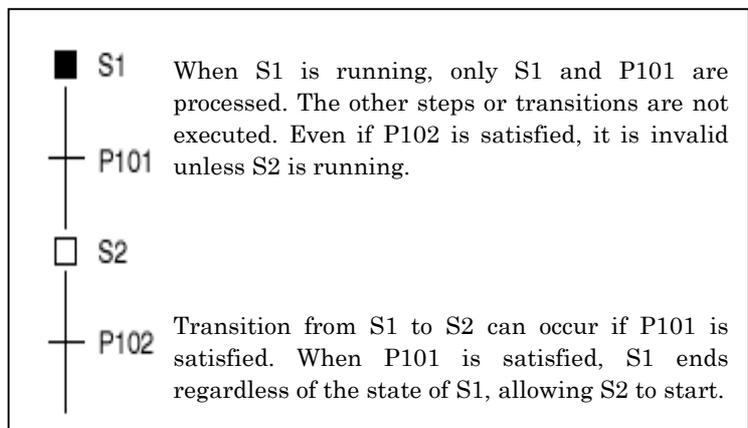
- A step number [Sn] necessary to control the execution and a subprogram [Pm] that describes the actual processing are defined for an initial step.
- All initial steps become active when no other step is running.
- Each block must have at least one initial step. It can have any number of initial steps.
- If a block has no initial step, it is not executed even if called.
- Each initial step is always assigned a step number. A duplicate step number cannot be used in a program.
- If there are initial steps in the middle of parallel branching, there must be at least one initial step in each flow.

• Transition

A transition represents a condition under which transition occurs from one step to another.



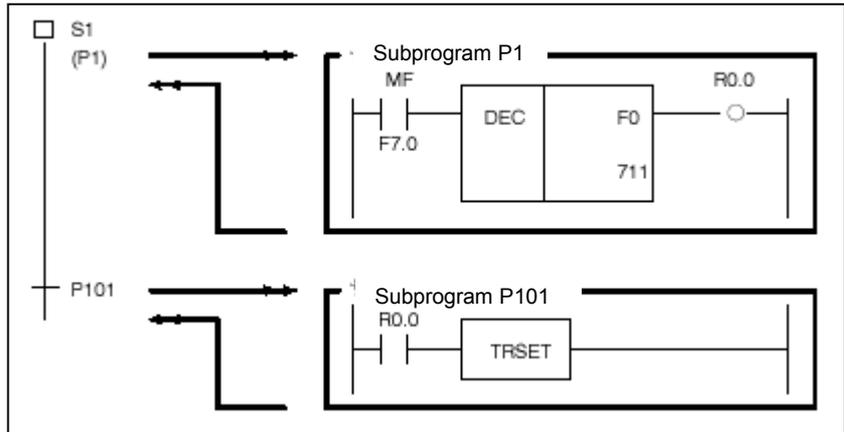
- There must be only one transition between steps.
- The transition of processing from one step to another is carried out as described below:



- When a signal becomes on in a transition, its state is held even after state transition occurs. So, if you do not want to maintain the state, you must turn off the signal, using another subprogram.

[Example of setting transition conditions]

In this example, after an M7 code is decoded using the DEC function instruction, control is passed to the next step.



NOTE

The TRSET function instruction is intended to describe that a transition condition is satisfied. It is used in a subprogram that is called from the transition.

- Beginning of selective branch

A branch occurs from one step to two or more steps, passing control to a step below a transition where the condition is satisfied.



- A transition is placed below a branch.
- A step leading to the first transition where the transition condition is satisfied becomes active.
- If transition conditions for more than one step are satisfied simultaneously, transition occurs to the leftmost step.
- A branch can occur to up to 16 flows.

- End of selective branches

Two or more flows that branched out gather back into one flow.



- The number of branching flows must match that of the gathering flows.

- Beginning of parallel branch

A branch occurs from one step to two or more steps, which become active simultaneously.



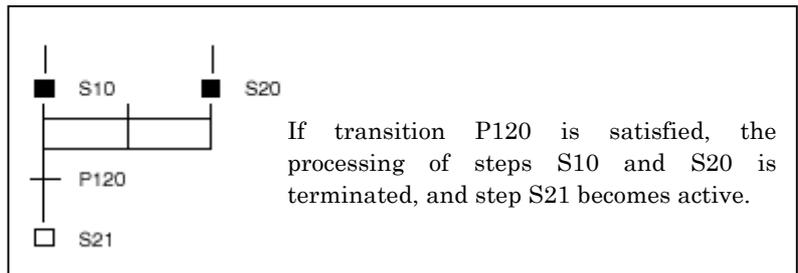
- A transition is placed above a branch.
- After branching, all steps become active simultaneously and are executed.
- A branch can occur to up to 16 flows.

- End of parallel branch

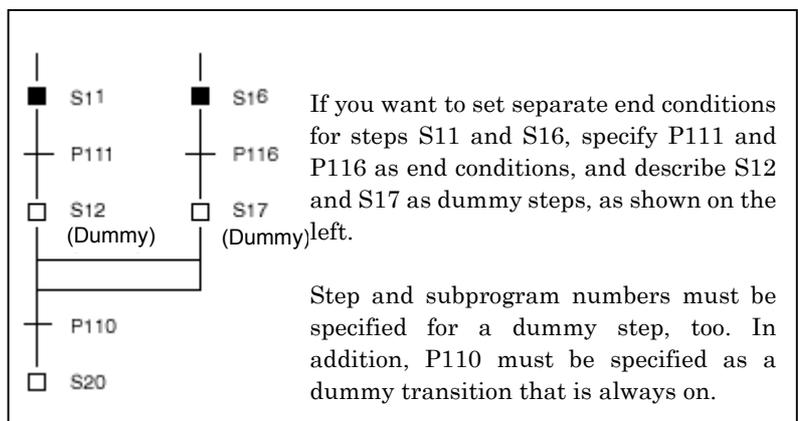
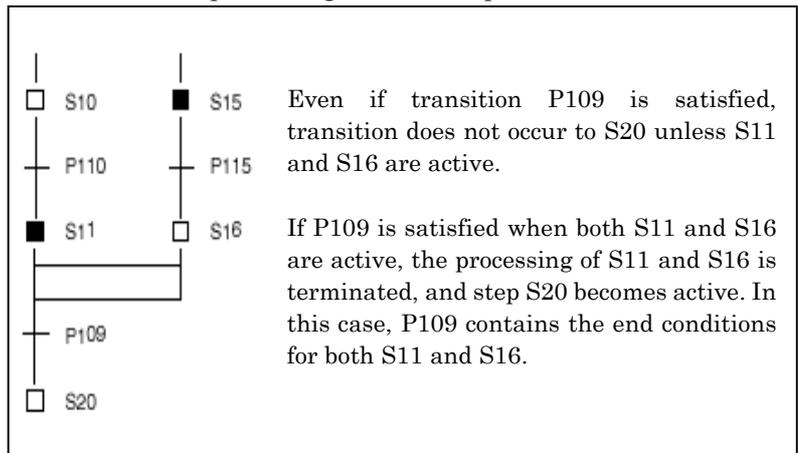
Two or more flows that branched out gather into one flow.



- How parallel flows gather again is explained below.



- How wait processing occurs is explained below.



• Jump

A jump is processed in conjunction with a transition to control the execution of steps.



- A jump-to label [Ln] is specified.
- The step at a jump destination becomes active.
- The jump destination must be within the same program.
- It is impossible to jump from outside to inside a parallel branch and vice versa.
- It is impossible to jump from one parallel branch flow to another.

• Label

A label represents a jump destination.



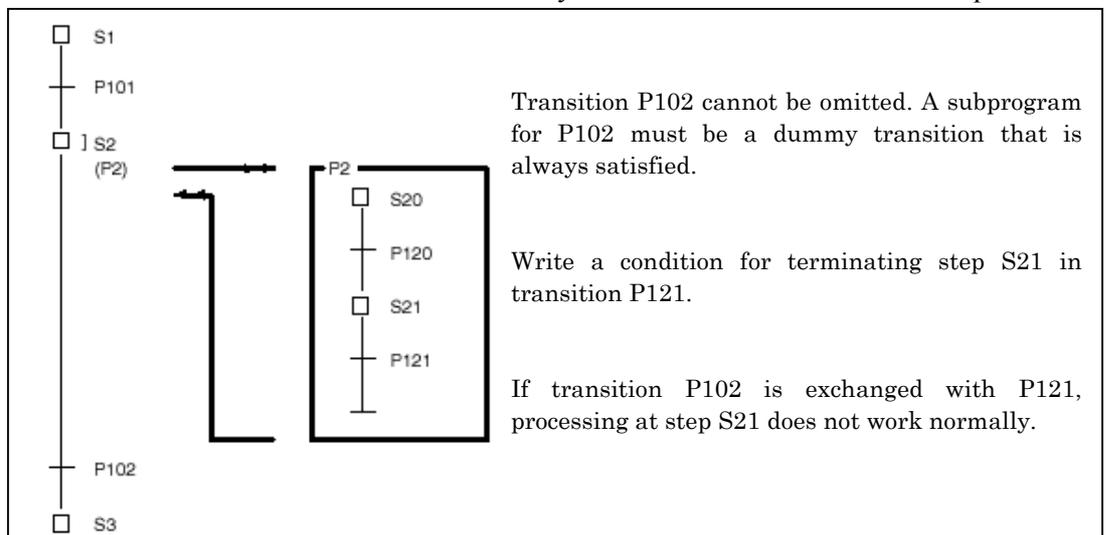
- A jump-to label [Ln] is defined.

• Block step

The block step is a step for representing a subprogram described with step sequences.



- A step number [Sn] necessary to control execution and a subprogram [Pm] that describes actual processing are defined for a block step.
- A step number must be assigned to a step.
- Duplicate step numbers cannot be used in a program.
- There must always be a transition below a block step.



- Initial block step

The initial block step is an initial step in a block.



- A step number [Sn] necessary to control execution and a subprogram [Pm] that describes actual processing are defined for an initial block step.
- The function and representation of the initial block step are the same as for the initial step.

- End block step

The end block step represents the end of the steps in a block.

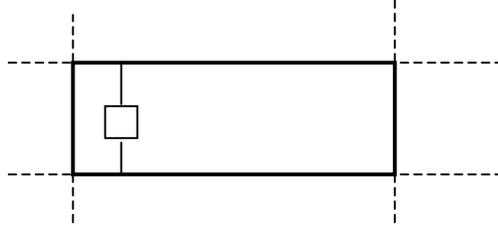


- An end block step is created to end block step processing.
- Each block must have at least one end block step. It can have any number of end block steps.

3.6.2 Entering Steps

Procedure

1. Position the cursor to the point where you want to enter a step.
2. Press the [F5] key.



3. The [Action] dialog box appears. Enter the necessary items. (An idle step number is used automatically.)

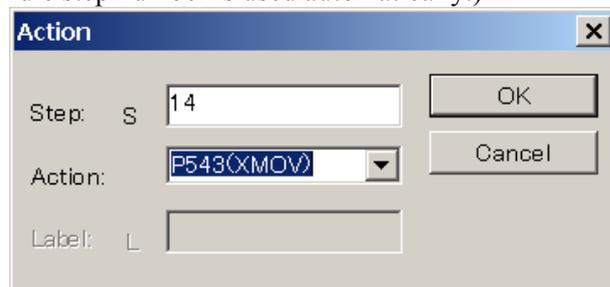
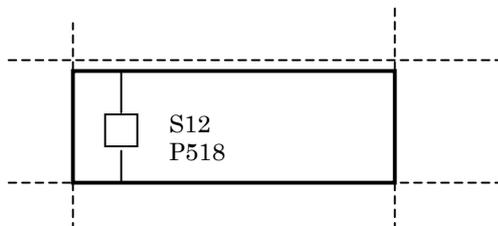


Fig. 3.6.2

4. After you finish entering the items, press the <OK> button.



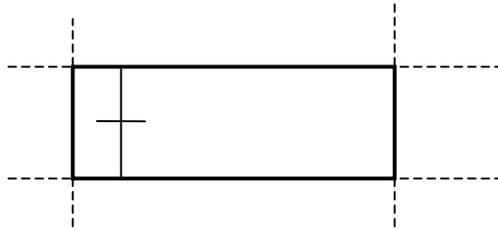
NOTE

To change a step number, action, or label, position the cursor to the desired element, and then press the [Enter] key. Alternatively, double-click the element. The [Action] dialog box appears.

3.6.3 Entering Transitions

Procedure

1. Position the cursor to the point where you want to enter a transition.
2. Press the [F5] key.



3. The [Action] dialog box appears. Enter the desired action.

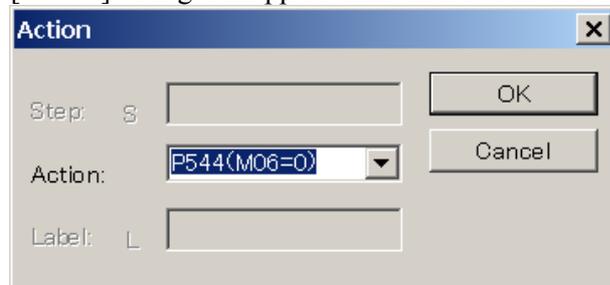
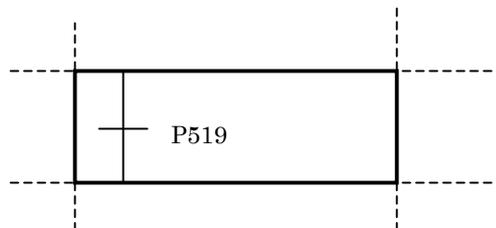


Fig. 3.6.3

4. After you finish entering the action (subprogram), press the <OK> button.



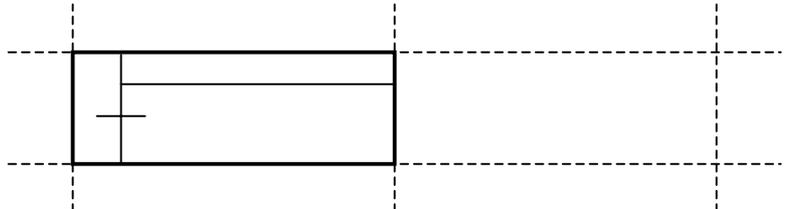
NOTE

To modify an action, position the cursor to the relevant element, and then press the [Enter] key. Or, double-click the element. The [Action] dialog box appears.

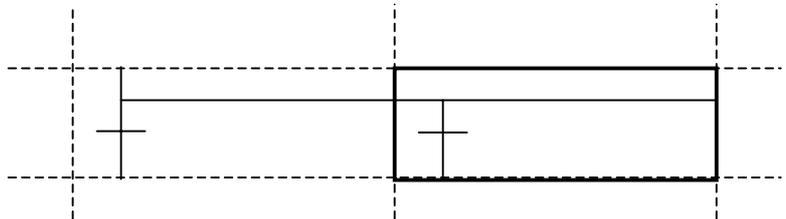
3.6.4 Beginning of Selective Branch

Procedure

1. Position the cursor to the point where you want to enter the beginning of a selective branch.



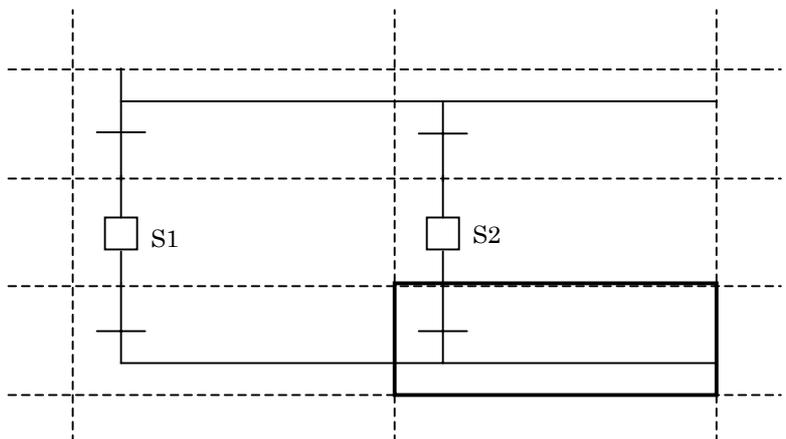
2. Press the [F6] key.



3.6.5 End of Selective Branch

Procedure

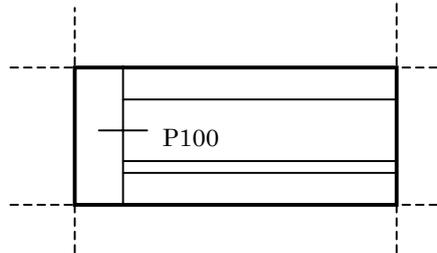
1. Position the cursor to the point where you want to enter an end of selective branch.
2. Hold down the [Shift] key, and then press the [F5] key.



3.6.6 Beginning of Parallel Branch

Procedure

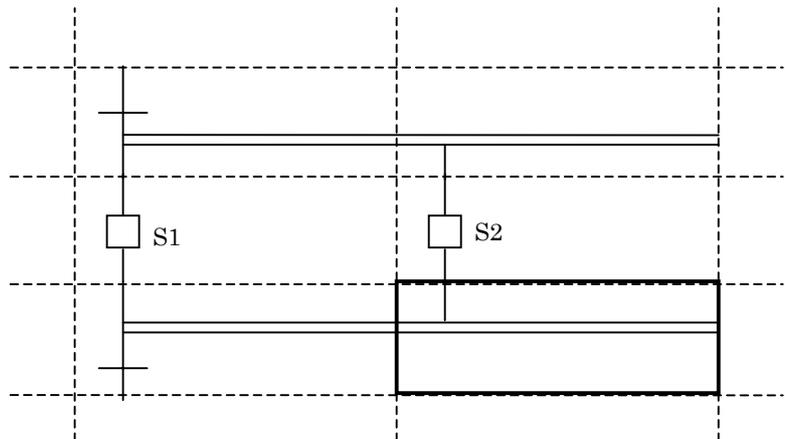
1. Position the cursor to the point (transition line) where you want to enter the beginning of parallel branch.
2. Press the [F7] key.



3.6.7 End of Parallel Branch

Procedure

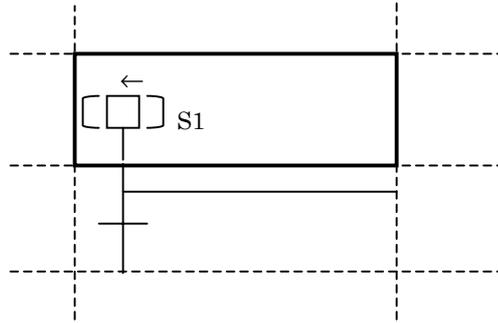
1. Position the cursor to the point where you want to enter the end of a parallel branch.
2. Hold down the [Shift] key, and then press the [F6] key.



3.6.8 Specifying Jump-to Label

Procedure

1. Position the cursor to the point (step line) where you want to enter a jump-to label (a label to which a jump is to be made).
2. Hold down the [Shift] key, and then press the [F6] key.



3. The [Action] dialog box appears. Enter the label name.

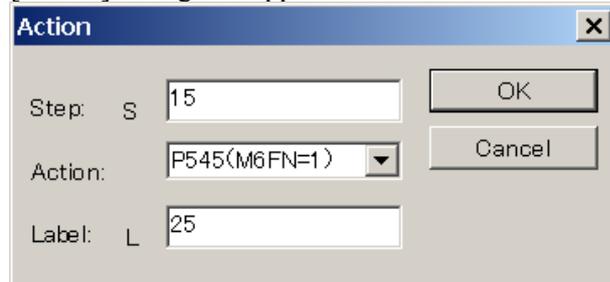
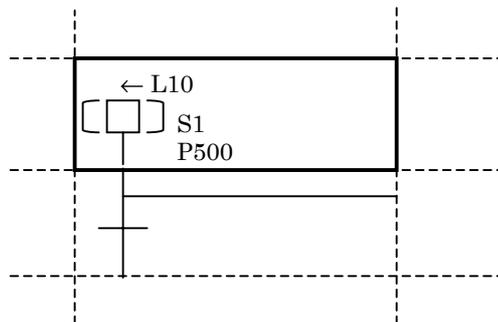


Fig. 3.6.8

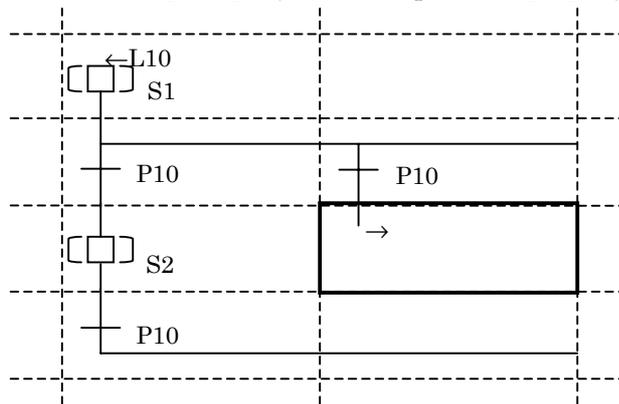
4. After you finish entering the label name, press the <OK> button.



3.6.9 Specifying Label Jump

Procedure

1. Position the cursor to the point (step line) where you want to enter a label jump.
2. Hold down the [Shift] key, and then press the [F5] key.



3. The [Action] dialog box appears. Enter the label.

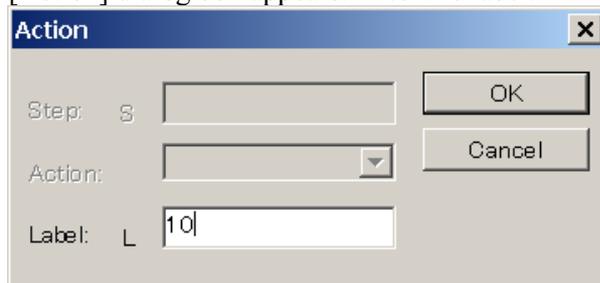
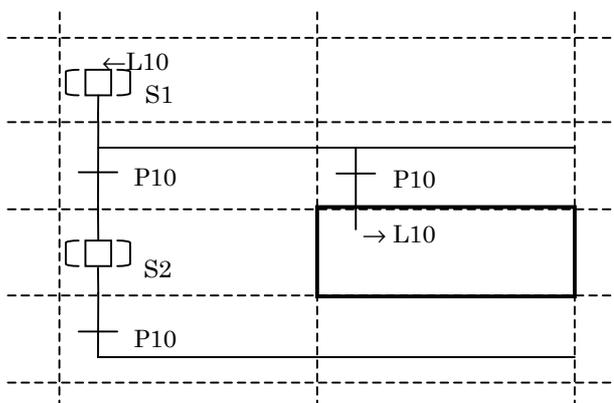


Fig. 3.6.9

4. After you finish entering the label, press the <OK> button.



3.6.10 Checking Syntax

Procedure

1. Press the [F9] key.

- If no error is found, the following dialog box appears.



Fig. 3.6.10 (a)

- If an error is found, the following dialog box appears.

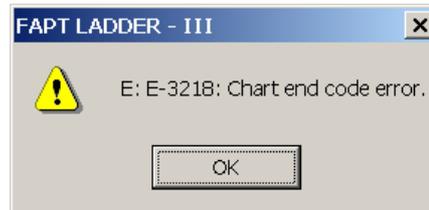


Fig. 3.6.10 (b)

3.6.11 Adding Step Sequence Subprograms

This subsection describes how to add step sequence subprograms.

Procedure

1. Right-click the program list screen, and then click [Add sub-program F9].

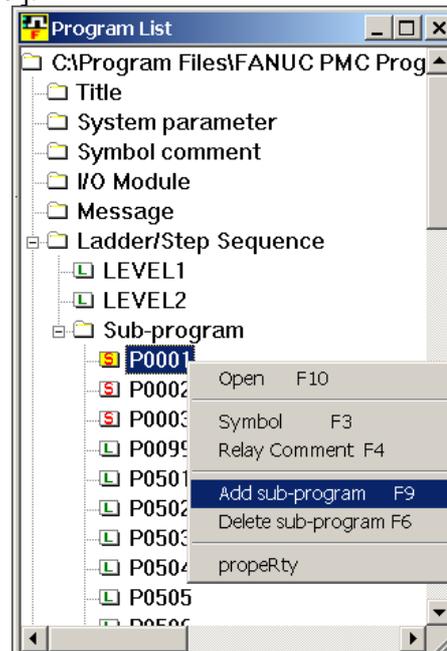


Fig. 3.6.11 (a)

2. The [Add sub-program] dialog box appears.

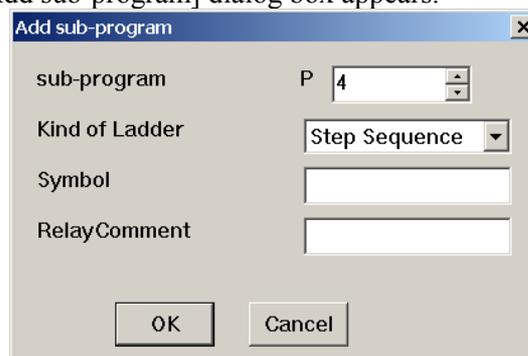


Fig. 3.6.11 (b)

3. Enter [sub-program].
4. Select [Step Sequence] from [Kind of Ladder].
5. Enter [Symbol] and [RelayComment], and then click the <OK> button.
6. The step sequence subprogram is added, and the screen for the added subprogram appears.

3.6.12 Deleting Step Sequence Subprograms

This subsection describes how to delete step sequence subprograms.

Procedure

1. Position the pointer to the step sequence subprogram that you want to delete from the program list screen, and then right-click. Then, click [Delete sub-program F6].

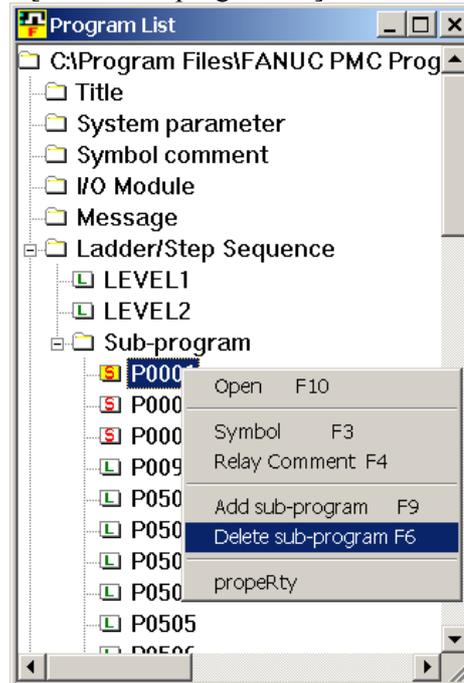


Fig. 3.6.12 (a)

2. The following dialog box appears. To delete, click <Yes>.

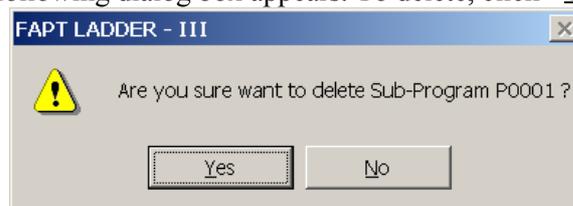


Fig. 3.6.12 (b)

3.6.13 Search

This subsection describes the step sequence program search function.

Procedure

- 1 Choose [Find] from the [Edit] menu.
The [Find] screen appears.

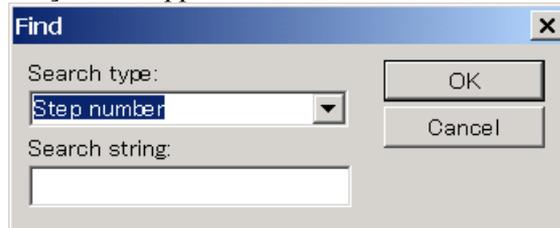


Fig. 3.6.13

- 1-1 **Search type**
Select Step number, Label number, or Symbol/address.
- 1-2 **Search string**
Enter a character string to be searched for.
No wildcard can be used.
- 2 Execute search operation.
For downward search operation, click the <OK> button. For upward search operation, click the <OK> button while holding down the [Shift] key.

3.7 EDITING SYMBOLS AND COMMENTS

This section describes how to edit symbols and comments.

NOTE
 Symbols and comments can be displayed and edited only when the current programmer mode (offline/online) is offline. To change the programmer mode to offline, select [Ladder] - [Online/Offline].

3.7.1 Symbol and Comment Data

Names and comments can be assigned to the input signals and internal relays used in sequence programs. These names and comments are generically referred to as symbol and comment data.

Table 3.7.1 (a)

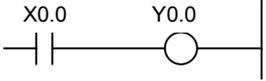
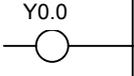
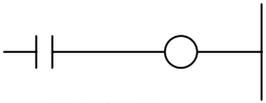
	Definition	Display
Symbol	Character string assigned to a contact or coil (on a one-to-one basis) and used in place of a PMC address	INPUT 
Relay comment	Character string assigned to a contact or coil to describe the contents at a PMC address	 RELAY X COMMENT COIL Y COMMENT
Coil comment (conventional comment)	Character string assigned to a coil to describe it	 HERE IS COIL COMMENT
Net comment	Assigned to an arbitrary position between nets to describe the program	 (* HERE IS NET *) (* COMMENT *)

Table 3.7.1 (b)

	Symbol	Relay comment	Coil comment
Usable characters	ASCII characters (except lowercase letters)	ASCII characters Kana and Kanji Half-size kana	ASCII characters Kana and kanji Half-size kana
Maximum number of characters	16 bytes	16 bytes	30 bytes
Maximum number of units that can be registered	20,000	20,000	20,000
Duplicate definition	Not allowed	Allowed	Allowed

Table 3.7.1 (c)

	Net comment
Usable characters	ASCII characters, kana, kanji, half-size kana
Number of usable steps	2 steps/net comment
Maximum number of characters	64 bytes/line or 4095 bytes/net comment
Maximum number of lines	100 lines/net comment
Maximum number of units that can be registered	Approx. 20,000

NOTE

The maximum number of characters or lines,
whichever is reached first, functions as a limit.

3.7.2 Procedure

- 1 Double-click the <Symbol comment> item on the [Program List] screen. The [SYMBOL/COMMENT] screen appears.

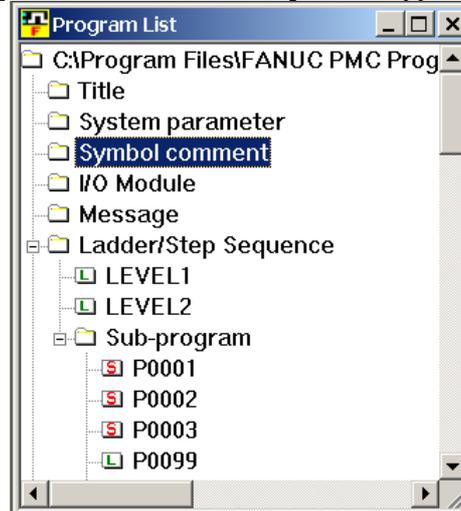


Fig. 3.7.2 (a)

The screenshot shows a window titled 'Symbol Comment Editing' with a table of symbol comments. The table has five columns: No., Address, Symbol, RelayComment, and CoilComment. The data is as follows:

No.	Address	Symbol	RelayComment	CoilComment
*1	X0000.0	*IT1.		INTERLOCK 1ST
*2	X0000.1	*IT2.		INTERLOCK 2ND
*3	X0000.2	*IT3.		INTERLOCK 3RD
*4	X0000.3	*IT.		INTERLOCK
*5	X0000.4	SYNC4.		SYNCRONIZE 4TH
*6	X0000.5	TSKP.		TOOL SKIP
*7	X0000.6	TRST.		TOOL RESET
*8	X0000.7	*CNCG.		CNC GENERAL
*9	X0001.0	EAX1.		PMC AXIS 1ST
*10	X0001.1	EAX2.		PMC AXIS 2ND

The status bar at the bottom indicates 'SYMBOL 915 / 915 COIL COMMENT 6765 / 6765'.

Fig. 3.7.2 (b)

NOTE

When you check [Ignore too long strings of the symbol], the number of symbols that can be registered and the size of coil comments vary because the symbols that exceed the limit are assumed to be absent.

- 1 Click the <Add New Data> button on the toolbar.



< Add New Data> button

The [New Data] screen appears.

A dialog box titled 'New Data' with a close button (X) in the top right corner. It contains four input fields labeled 'Address', 'Symbol', 'RelayComment', and 'CoilComment'. At the bottom right, there are two buttons: 'OK' and 'Cancel'.

Fig. 3.7.2 (c)

- 2-1 Set the necessary data.

Address

Symbol

Relay Comment

Coi Comment

- 2-2 To register the entered data, click the <OK> button.



< Add New Data> button

To quit without registering, click the <Cancel> button.

- 3 To close the [SYMBOL/COMMENT] screen, click the <Close> button.



<Close> button

This operation has nothing to do with whether to save the data entered on the [New Data] screen for [SYMBOL/COMMENT].

See Section 3.11, "Saving Programs," for an explanation about how to save data entered on the [New Data] screen for [SYMBOL/COMMENT].

See Section 3.12, "Closing Programs," for an explanation about how to close the sequence program without saving data entered on the [New Data] screen for [SYMBOL/COMMENT].

3.7.3 Toolbar



Fig. 3.7.3

- <1> <Add New Data> button
The [New Data] screen appears.
- <2> <Search> button
The [Search] screen appears.

3.7.4 Context Menu

Right-click the [SYMBOL/COMMENT] screen. The following context menu appears.

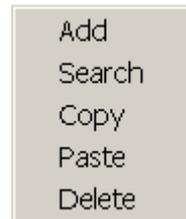


Fig. 3.7.4

3.8 EDITING MESSAGES

Using the DISPB (SUB 41) function instruction enables the display of any message on the CRT/MDI screen of the CNC. This section describes how to create messages.

NOTE

Messages can be displayed and edited only when the current programmer mode (offline/online) is offline. To change the programmer mode to offline, select [Ladder] - [Online/Offline].

3.8.1 Procedure

- 1 Double-click the <Message> item on the [Program List] screen. The [Message Editing] Screen appears.

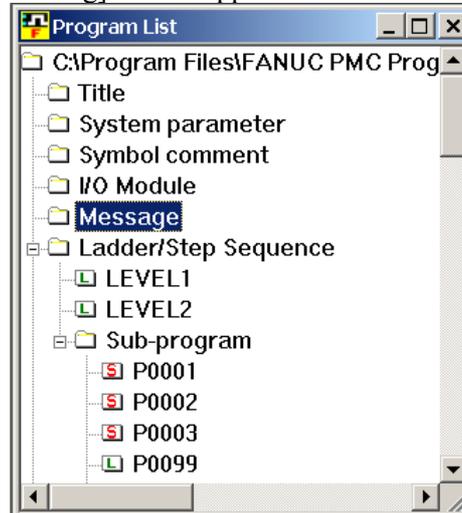


Fig. 3.8.1 (a)

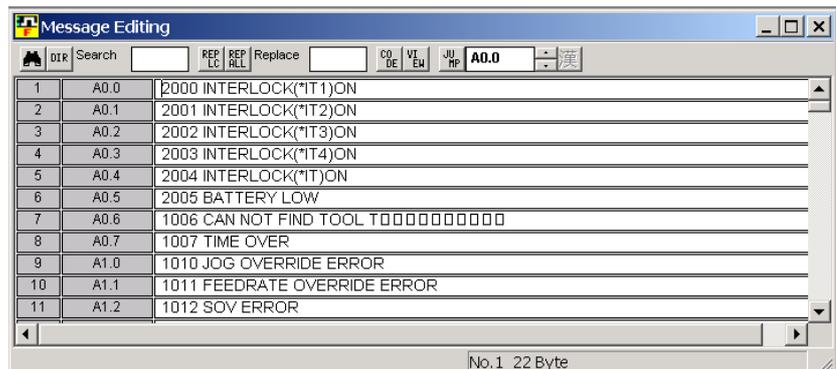


Fig. 3.8.1 (b)

- 1-1 Enter a message.
- 2 To close the [Message Editing] screen, click the <Close> button.



<Close> button

This operation has nothing to do with whether to save the data entered on the [Message Editing] screen.

See Section 3.11, "Saving Programs," for explanations about how to save data entered on the [Message Editing] screen.

See Section 3.12, "Closing Programs," for an explanation about how to close the sequence program without saving the data entered on the [Message Editing] screen.

3.8.2 Models and Quantity of Usable Characters

The types of characters usable in message text vary depending on the CNC/PMC model. See the following table for details.

Table 3.8.2

CNC	PMC	Characters that can be entered		
		JIS level-1/-2 kanji set	Half-size kana	Alphanumeric characters
FANUC Series 16	PMC-SB3/SB4/SB5/SB6/SB7 PMC-SC3/SC4	B	A	A
FANUC Series 18	PMC-SA1/SA3 PMC-SB3/SB4/SB5/SB6/SB7 PMC-SC3/SC4	B	A	A
FANUC Series 21	PMC-SA1/ SA5 PMC-SB6	B	A	A
FANUC Power Mate	PMC-PA3 PMC-SB5/SB6	B	A	A
FANUC Series 15	PMC-NB/NB2/NB6	B	A	A

A: Usable

B: Some kanji characters cannot be displayed. FAPT LADDER-III cannot check whether they can be displayed.

C: With FAPT LADDER-III, these characters cannot be entered.

NOTE

- 1 Lowercase letters (a to z) are converted to uppercase (A to Z) when entered.
- 2 Up to 65,535 characters can be used in messages in total.
Specifically, the number of characters in messages are counted starting at message No. 1, when the message edit function ends. Only the first 65,535 characters are accepted. Others are deleted.

3.8.3 Memory Addresses Required to Display Messages

The following table summarizes the range of addresses that can be specified in each PMC and the quantity of messages that can be held.

Table 3.8.3

Address range	Message quantity	PMC
A0.0 to A24.7	200	PMC-PA3 PMC-SA1/SA3/SA5 PMC-SB3/SB5 PMC-SC3 PMC-NB
A0.0 to A124.7	1000	PMC-SB4/SB6 PMC-SC4 PMC-NB2/NB6
A0.0 to A249.7	2000	PMC-SB7

3.8.4 Entering Special Characters

3.8.4.1 New line character

To enter a new line character, press the [Enter] key. On the screen, a dot "•" is used to represent a new line character. On the code input mode screen, enter "@" followed by "0A." Using the view function enables you to confirm whether the displayed message is actually continued on the next line.

See Subsection 3.8.5, "Toolbar," for an explanation of the code input mode and view function.

3.8.4.2 Numeric data

In code input mode, a message is entered using the following numeric data format.

[Ibid,____]

Letter I prefixes the "bid" information.

b: The number of bytes (1, 2, or 4) is specified.

i: The number of digits in the integer part (0 to 8) is specified.

d: The number of digits in the decimal part (0 to 8) is specified.

____: Address where numeric data is stored.

Example: [I232,D300]

Usually, as many dots "•" as the number of digits in the character string (from [to]) representing numeric data are displayed on the input mode screen. Example: ••••••••••

With the view function, as many number signs (#) as the number of specified digits are displayed in bold.

Example: ###.##

See Subsection 3.1.1, "Toolbar," for explanations about the code input mode and view function.

3.8.5 Tool Bar



Fig. 3.8.5

- <1> Search button
Searches for a character string.
- <2> Search direction button
Specifies the direction (upward or downward) in which a search is to be made.
- <3> Find what edit box
Lets you specify what to find.
- <4> Replace button
Replaces the occurrences of a specified character string one by one.
- <5> Replace all button
Replaces all the occurrences of a specified character string.
- <6> Replace with edit box
Lets you specify a character string for substituting an occurrence of a specified character.
- <7> Code input mode button
Lets you specify message data in code format. Enter a message, using numeric code (JIS).
Example: 2100 日本語表示
2100 @02467C4B5C386C493D4C2801@
- <8> View button
Lets you confirm that the message character string is in such a format that it is continued on a new line.
It is possible to specify the number of characters to be displayed per line (32 to 80 characters).
- <9> Jump button
Causes a jump to a specified address (A0.0 to A24.7/A124.7).
- <10> Jump address character string edit box
Lets you specify a character string as a jump address.
- <11> Jump address value up/down button
Increases or decreases the jump address value.
- <12> Invalid kanji character check button
Searches for kanji characters not displayable on the NC downward starting at the cursor position. (When search operation reaches the end, search operation resumes from the beginning.)
This button is enabled only with those PMC models that have a VGA indicator.

3.8.6 Status Bar



Fig. 3.8.6

<1> The status bar displays the number of bytes in a message on the current line (that line with a caret).

3.8.7 Shortcut keys

Table 3.8.7

Shortcut key	Corresponding function
[F3]	Search
[Shift]+[F3]	Search direction
[F4]	Replace
[Shift]+[F4]	Replace all
[F5]	Code input mode
[F7]	View
[F9]	Invalid kanji character check
[Ctrl]+[G]	Jump
[Ctrl]+[Z]	Edit - Undo
[Ctrl]+[X]	Edit - Cut
[Ctrl]+[C]	Edit - Copy
[Ctrl]+[V]	Edit - Paste
[Ctrl]+[Home]	Move to the first display line
[Ctrl]+[End]	Move to the last display line
[Home]	Move to beginning of line
[End]	Move to end of line
[PageUp]	Move up 10 lines
[PageDown]	Move down 10 lines
[↑]	Move up one line
[↓]	Move down one line

3.9 EDITING I/O MODULE ASSIGNMENT

This section describes how to set and delete an address for each module in an I/O unit.

NOTE

I/O module assignment can be displayed and edited only when the current programmer mode (offline/online) is offline. To change the programmer mode to offline, select [Ladder] - [Online/Offline].

3.9.1 Procedure

- 1 Double-click the <I/O Module> item on the [Program List] screen.
The [Edit I/O Module] screen appears.

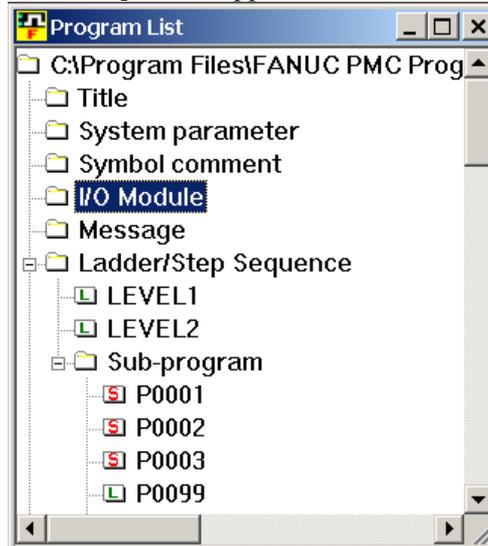


Fig. 3.9.1 (a)

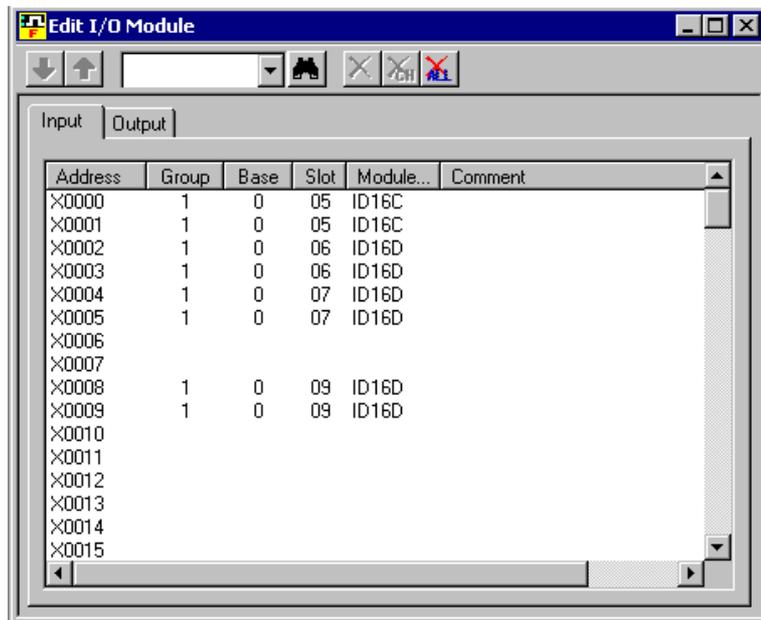


Fig. 3.9.1 (b)

1-1 Double-click the line that you want to edit. The [Module] screen appears.

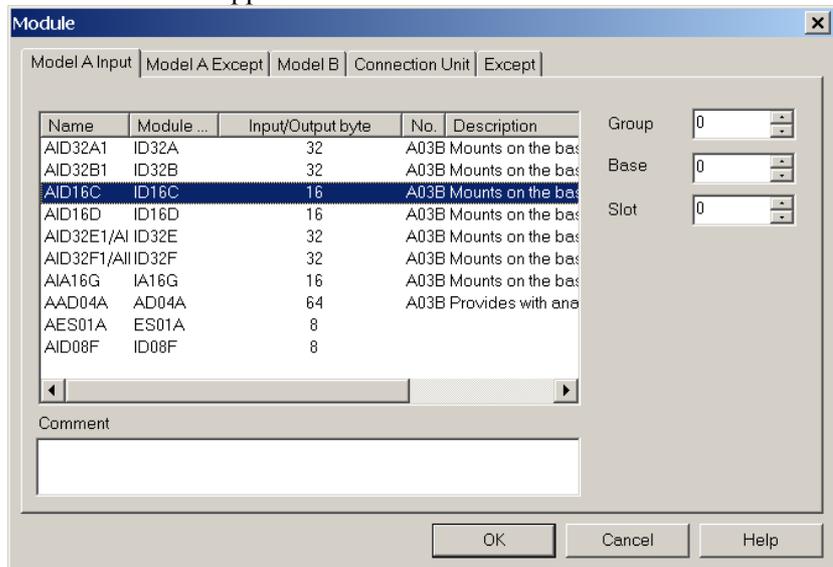


Fig. 3.9.1 (c)

1-2 Select a module name from those that can be specified. Set the following data.

Group

Base

Slot

Comment

NOTE

I/O Unit MODEL-B assignment is carried out as follows:

[GROUP]: To be set with a group number within a configuration.

[BASE]: To always be set to 0.

[SLOT]: To be set to a unit number for the I/O Unit-B. To be set with 0, however, when information '##' about power-on/-off is assigned.

To assert the data you entered, click the <OK> button.



<OK> button

To ignore the data, click the <Cancel> button.
The [Edit I/O Module] screen appears.

- 2 To close the [Edit I/O Module] screen, click the <Close> button.



<Close> button

This operation has nothing to do with whether to save the data entered on the [Module] screen.

See Section 3.11, "Saving Programs," for an explanation about how to save data entered on the [Module] screen.

See Section 3.12, "Closing Programs," for an explanation about how to close the sequence program without saving the data entered on the [Module] screen.

3.9.2 Tool bar



Fig. 3.9.2

- <1> Next channel
- <2> Previous channel
- <3> Search
- <4> Delete
- <5> Delete channel
- <6> Delete all

3.9.3 Shortcut Keys

Table 3.9.3

Shortcut key	Corresponding function
[Ctrl]+[F]	Search

3.10 EDITING SYSTEM PARAMETERS

This section describes how to edit system parameters.

NOTE

System parameters can be displayed and edited only when the current programmer mode (offline/online) is offline. To change the programmer mode to offline, select [Ladder] - [Online/Offline].

3.10.1 Procedure

- 1 Double-click the <System parameter> item on the [Program List] screen. The [Edit System Parameter] screen appears.

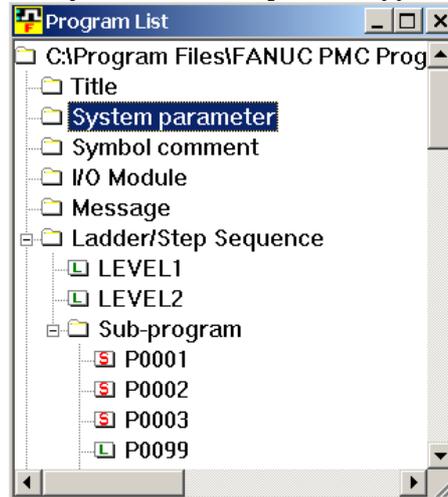


Fig. 3.10.1 (a)

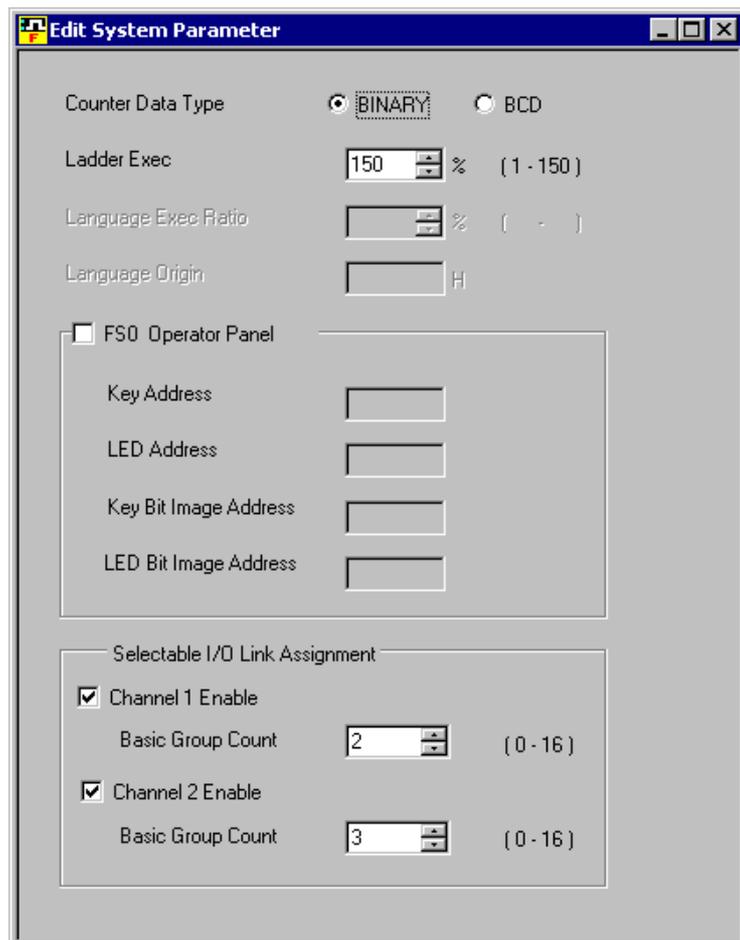


Fig. 3.10.1 (b)

1-1 Set the necessary data.

Counter Data Type

Initial value: BINARY

Set the format of the counter value to be used in the CTR function instruction as binary or BCD.

Ladder Exec

(Valid only with the PMC-SC3/SC4, PMC-QC, PMC-NB/NB2, and PMC-SB7)

Initial value: 100

Setting: 1 to 150

Set an increment for the processing time for ladder levels 1 and 2. Setting this parameter reduces the ladder scan time, thus quickening ladder processing.

The ladder execution time takes the value described below out of 8 ms.

If 100% is specified, the processing time for levels 1 and 2 is 5 ms.

If 150% is specified, the processing time for levels 1 and 2 is 7.5 ms.

Note that increasing the ladder execution time decreases the processing time in "PMC Screen Display Time", "Language Program Processing Time", and "Ladder Level 3".

Language Exec Ratio

(Valid only with the PMC-SC3/SC4, PMC-QC, and PMC-NB/NB2)

Initial value: 50

Setting: 0 to 99

This parameter sets a ratio for dividing the processing time in "PMC Screen Display Time", "Language Program Processing Time", and "Ladder Level 3", because the language program and the PMC screen display have the same priority.

Setting this parameter makes it possible to run the language program cyclically, even when the PMC screen display is active.

Language Origin

(Valid only with the PMC-SC3/SC4, PMC-QC, and PMC-NB/NB2)

Initial value: 000000

Setting: Address within the language program storage area

Set the start address of the link control statement data in the language program.

Specify 000000H if no language program is included.

FS0 Operator Panel

Initial value: No FS0 machine operator's panel (check off)

Specify whether the FS0 machine operator's panel is available. If you select this item, specify the actual DI/DO address connected to the machine operator's panel, the address of a KEY image transferred from the operator's panel, and the address of an LED image to be transferred to the operator's panel.

Key Address

Setting range: X0 to X127 and X1000 to X1019

Set the PMC address corresponding to the start address of the external DI that is connected.

LED Address

Setting range: Y0 to Y127 and Y1000 to Y1014

Set the PMC address corresponding to the start address of the external DO that is connected.

Key Bit Image Address

Set the PMC address corresponding to the start address of KEY image to be referenced by a user program.

Usually, specify an arbitrary internal relay area.

LED Bit Image Address

Set the PMC address corresponding to the start address of LED image to be referenced by a user program.

Usually, specify an arbitrary internal relay area.

Channel 1 Enable

Specify whether to enable or disable the selectable I/O link assignment function for channel 1. If checking this box, specify Basic Group Count.

Channel 2 Enable

Specify whether to enable or disable the selectable I/O link assignment function for channel 2. If checking this box, specify Basic Group Count.

Basic Group Count

This parameter is used to divide I/O link assignment data into a basic group section and a parameter selection group. Set the number of basic groups. The valid number is 0 to 16.

- 2 To close the [Edit System Parameter] screen, click the <Close> button.



<Close> button

This operation has nothing to do with whether to save the data entered on the [Edit System Parameter] screen.

See Section 3.11, "Saving Programs," for an explanation about how to save the data entered on the [Edit System Parameter] screen.

See Section 3.12, "Closing Programs," for an explanation about how to close a sequence program without saving the data entered on the [Edit System Parameter] screen.

NOTE

- 1 For details on the I/O link assignment data selection function, refer to the FANUC PMC MODEL PA1/PA3/SA1/SA2/SA3/SA5/SB/SB2/SB3/SB4/SB5/SB6/SB7/SC/SC3/SC4/NB/NB2/NB6 Ladder Language Programming Manual (B-61863E).
- 2 When channel 1 and channel 2 are not checked, the screen for setting the I/O link assignment data selection function, which is shown in Subsection 9.3.6, "Setting PMC Setting Parameters," does not appear.
- 3 To enable the I/O link assignment selection function, set the setting parameters (K910 to K930) correctly according to the I/O devices that are actually connected.

3.11 SAVING PROGRAMS

This section describes how to save new data to a sequence program (LAD file).

3.11.1 Procedure

- 1 Select [File] - [Save].
If the program has been updated, the [Program Update] screen appears.

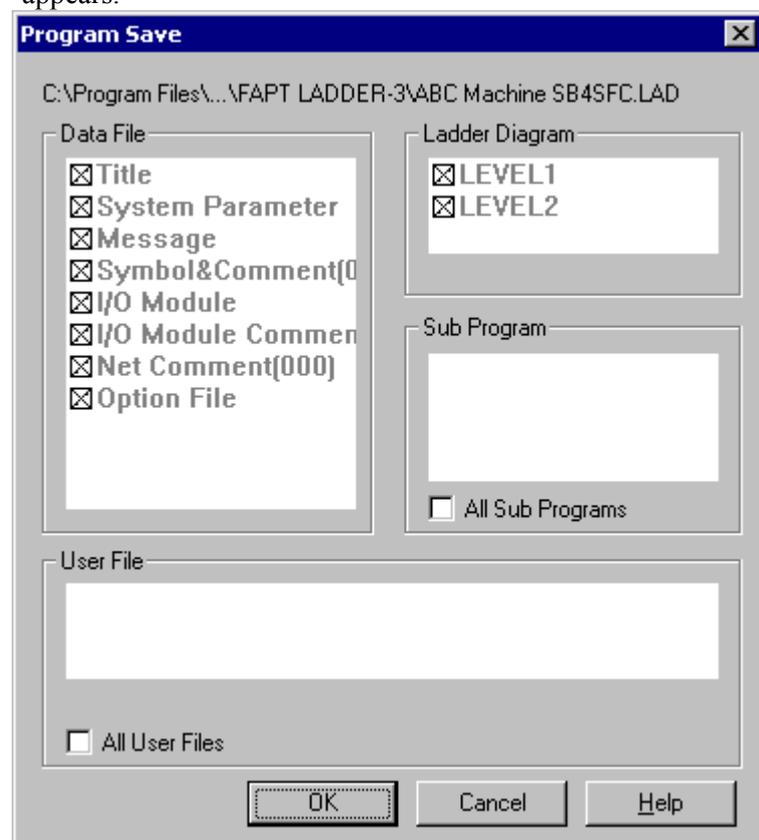


Fig. 3.11.1

- 1-1 Select the type of data that you want to update.
- 1-2 To save the program, click the <OK> button.
To quit without saving, click the <Cancel> button.

3.12 SAVING PROGRAMS WITH NAMES

This section describes how to name and save a sequence program (LAD file).

3.12.1 Procedure

- 1 Select [File] - [Save As].
The [Save As] screen appears.

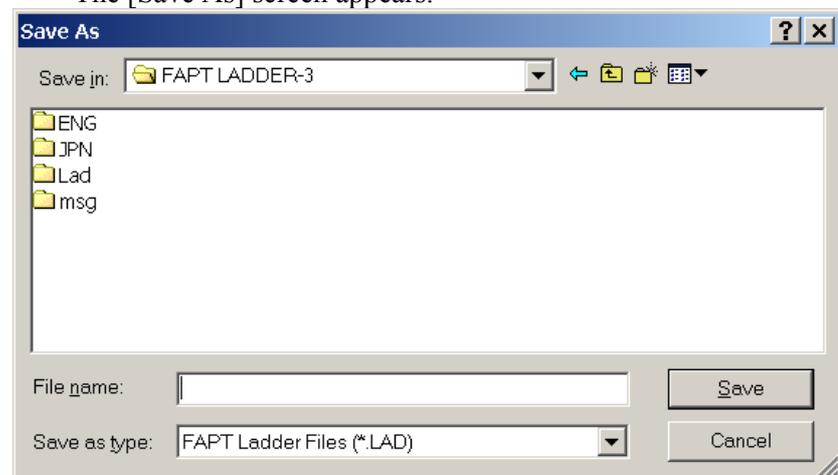


Fig. 3.12.1

- 1-1 Enter the file name you want to use.
- 1-2 To save the program, click the <OK> button.
To quit saving, click the <Cancel> button.

3.13 CLOSING PROGRAMS

This section describes how to close a sequence program (LAD file).

3.13.1 Procedure

- 1 Select [File] - [Close Program].

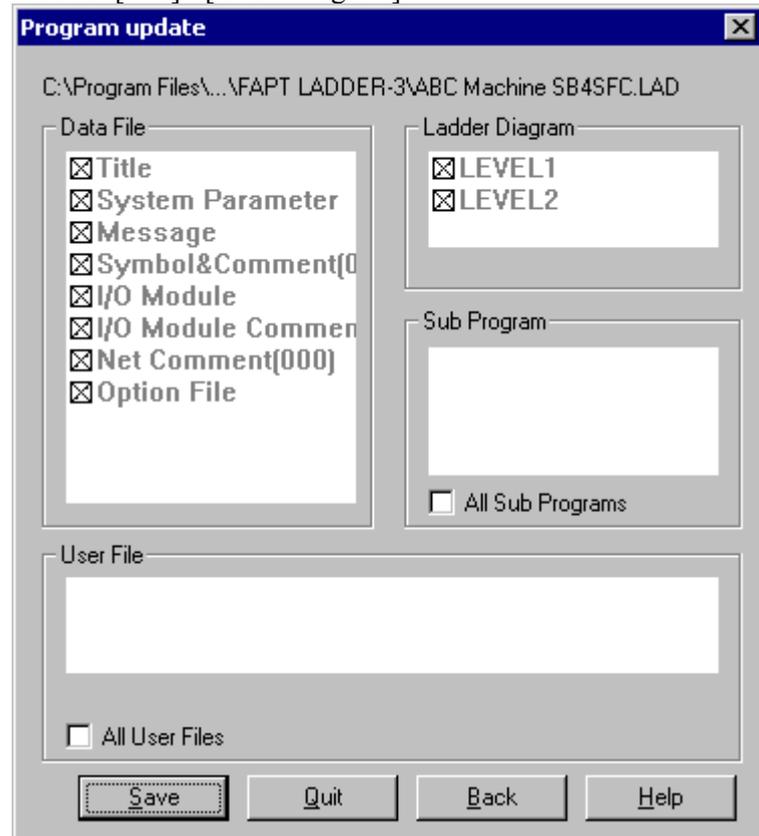


Fig. 3.13.1

- 2 The [Program Update] screen appears.
 - 2-1 Select the types of data that you want to update.
 - 2-2 To save the program, click the <Save> button. To quit saving, click the <Quit> button. To return to Program edit, click the <Back> button.

3.14 IMPORTING PROGRAMS

This section describes how to import (copy in overwrite mode) data files, ladder diagrams, and subprograms from a LAD program to another sequence program that is currently open. It also explains how to import (convert and copy in overwrite mode) files on a memory card, ROM, or Handy file format to a currently open sequence program file in memory card format.

3.14.1 Procedure

- 1 Select [File] - [Open Program] to open the program to which you want to import.
- 2 Select [File] - [Import].
The [Import/Export -- Select import file type] screen appears.

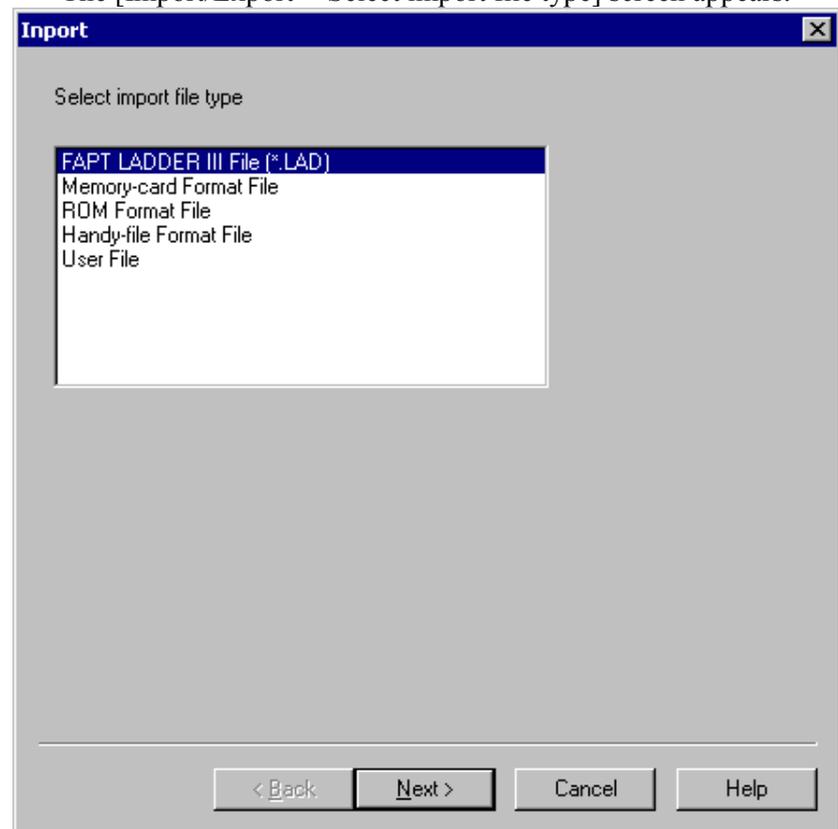


Fig. 3.14.1 (a)

2-1 Select the files you want to import.

FAPT LADDER-III File (*.LAD)

A data file is imported from a sequence program (LAD file) for the same PMC model.

Memory-card Format File

A memory card format file is imported. It is written over a memory card file (MCARD) for the currently open sequence program.

ROM Format File

A ROM format file is imported. It is written over a memory card file (MCARD) for the currently open sequence program.

Handy-file Format File

A Handy file format file is imported. It is written over a memory card file (MCARD) for the currently open sequence program.

User File

An arbitrary user file is imported to the user file folder (MyFladder) for the currently open sequence program. See Subsection 3.1.3, "Work Folders and Online Program Files," for an explanation about the user file folder.

3 Click the <Next> button.

The [Import/Export -- Specify import file name] screen appears.

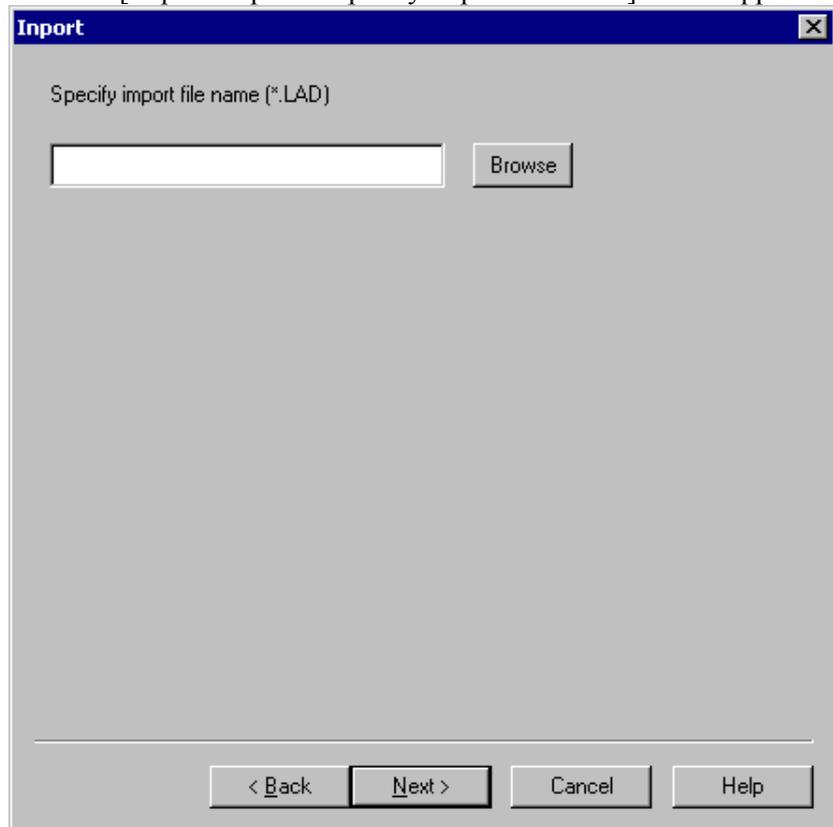


Fig. 3.14.1 (b)

3-1 Specify the file you want to import.

3.CREATING AND EDITING SEQUENCE PROGRAMS

- ◆ If the FAPT LADDER-III file (*.LAD) is selected as an import-from file in step 2, above
- 4 Click the <Next> button.
The [Import/Export --Select Data File, Ladder Diagram, Subprogram, and/or User File] screen appears.

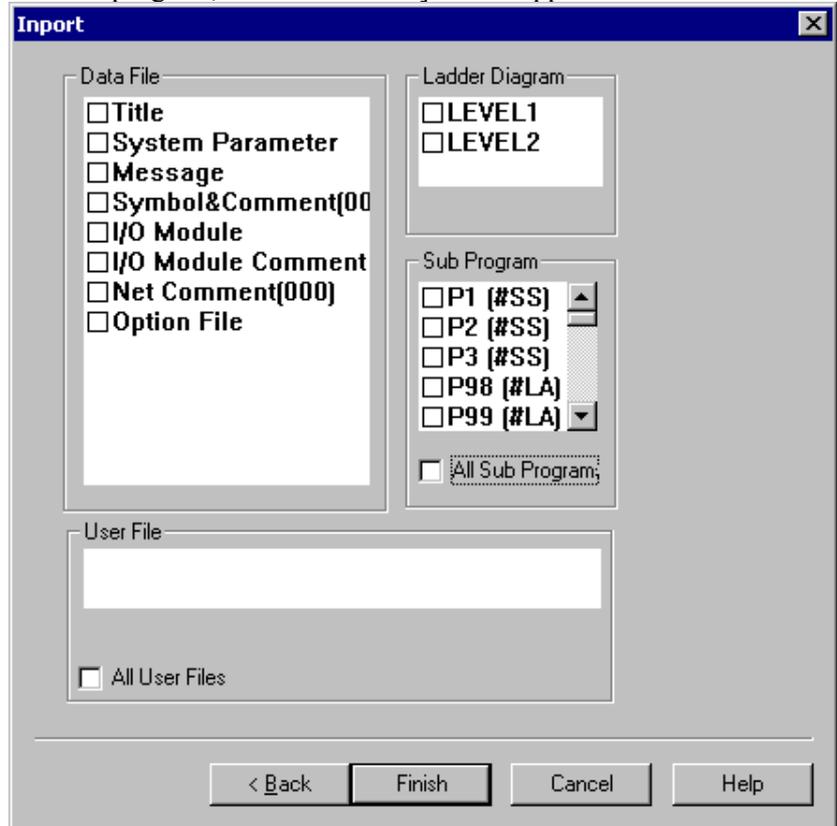


Fig. 3.14.1 (c)

4-1 Select the types of files you want to import.

- 5 Click the <Finish> button.
The message "Edit folder data file will be replaced/Added, Are you sore?" appears.

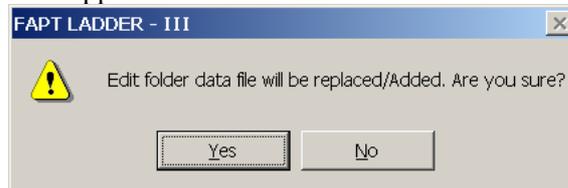


Fig. 3.14.1 (d)

To import, click the <Yes> button.

To return to the [Import/Export -- Select Data File, Ladder Diagram, Subprogram, and/or User File] screen without continuing, click the <No> button.

- 6 To quit importing, click the <Cancel> button on the [Import/Export File--Select Data File, Ladder Diagram, Subprogram, and/or User File] screen.

- ◆ If the memory format file, ROM format file, and/or Handy file format files are selected as the types of files you want to import in step 2, above
- 4 Click the <Finish> button.
The message “Succeed Change Data” appears.



Fig. 3.14.1 (e)

Click the <OK> button.
The message “Decompile” appears.

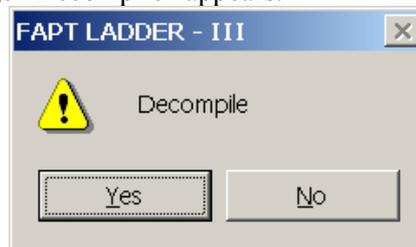


Fig. 3.14.1 (f)

If you do not want to decompile, click the <No> button.
To decompile, click the <Yes> button. The [Decompile] screen appears.

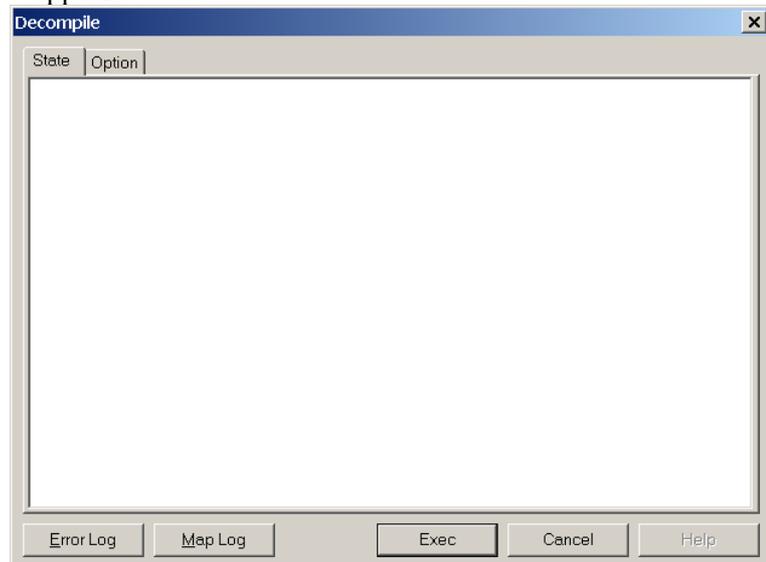


Fig. 3.14.1 (g)

- ◆ If a user file is selected as the type of file you want to import in step 2, above
- 4 Click the <Finish> button.

3.15 EXPORTING PROGRAMS

This section describes how to export (copy in overwrite mode) data files, ladder diagrams, and subprograms from the currently open sequence program to another LAD program. It also explains how to export (convert and copy in overwrite mode) the currently open sequence program memory card format file to files on a memory card, in ROM, and/or Handy file format.

3.15.1 Procedure

- 1 Select [File] - [Open Program] to open the program from which you want to perform export.
- 2 Select [File] - [Export].
The [Import/Export --Select export file type] screen appears.

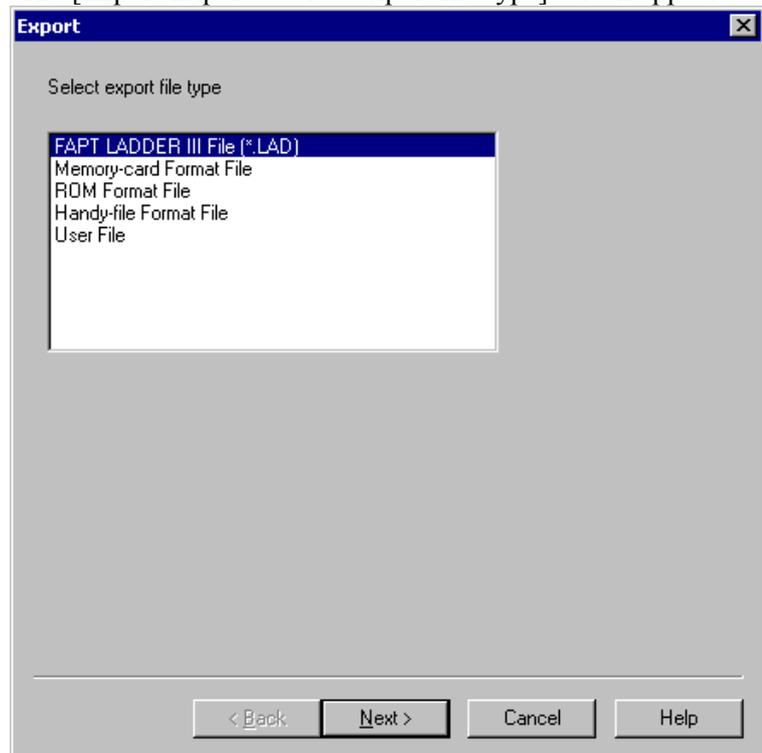


Fig. 3.15.1 (a)

- 2-1 Select the types of files you want to export.

FAPT LADDER-III File (*.LAD)

A data file is exported to a sequence program (LAD file) for the same PMC.

Memory-card Format File

A memory card file (MCARD) is exported from the currently open sequence program to a file in memory card format.

ROM Format File

A memory card file (MCARD) is exported from the currently open sequence program to a file in ROM format.

Handy-file Format File

A memory card file (MCARD) is exported from the currently open sequence program to a file in Handy file format.

User File

A user file is exported from the user file folder (MyFladder) for the currently open sequence program. See Subsection 3.1.3, "Work Folders and Online Program Files," for explanations about the user file folder.

- 3 Click the <Next> button.

The [Import/Export -- Specify export file name] screen appears.

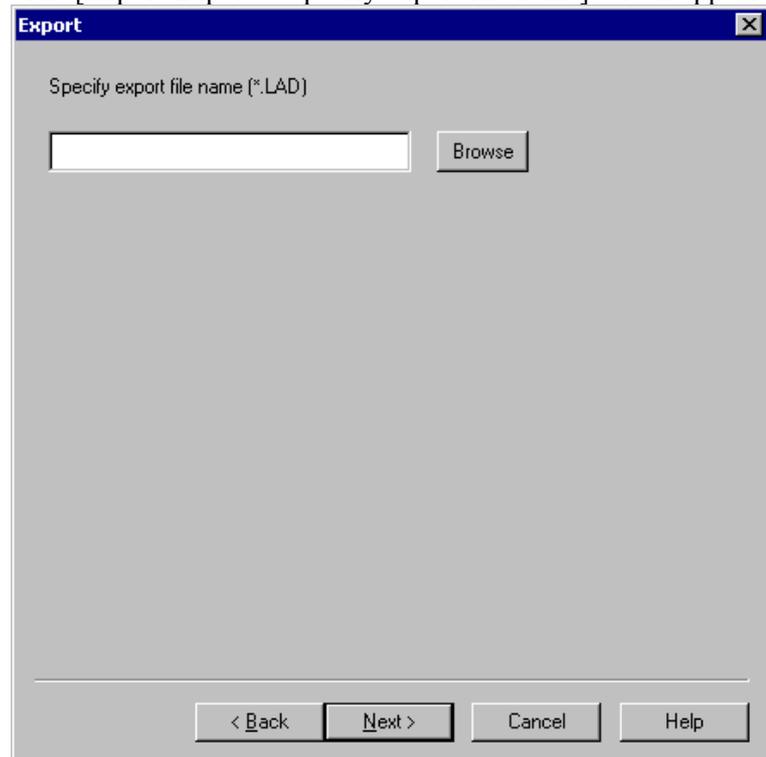


Fig. 3.15.1 (b)

- 3-1 Specify an export-to file.

If the type of a file to be exported is a user file, specify the export-to folder.

- ◆ If the FAPT LADDER-III file (*.LAD) is selected as a file to be exported file in step 2, above
- 4 Click the <Next> button.
The [Import/Export -- Select Data File, Ladder Diagram, Subprogram, and/or User File] screen appears.

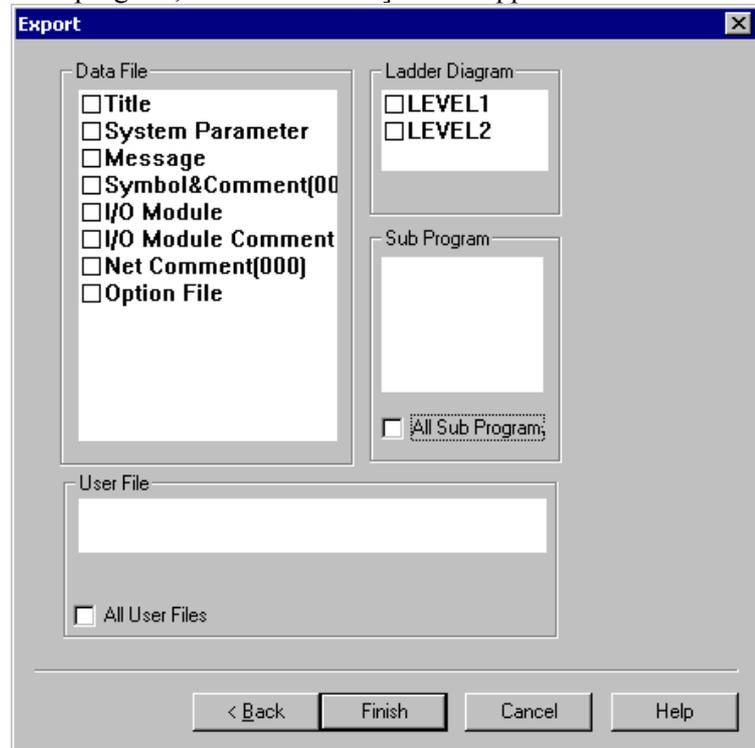


Fig. 3.15.1 (c)

- 4-1 Select the files you want to export.
- 5 Click the <Finish> button.
The message "Export file data will be replaced/Added, Are you sore?" appears.



Fig. 3.15.1 (d)

To export, click the <Yes> button.

To return to the [Import/Export -- Select Data File, Ladder Diagram, Subprogram, and/or User File] screen without continuing, click the <No> button.

- 6 To quit exporting, click the <Cancel> button on the [Import/Export -- Select Data File, Ladder Diagram, Subprogram, and/or User File] screen.

- ◆ If a memory format file, ROM format file, or Handy file format file is selected as the type of file to be exported in step 2, above
- 4 Click the <Finish> button.
The message “Succeed Change Data” appears.



Fig. 3.15.1 (e)

Click the <OK> button.

- ◆ If a user file is selected as the type of file to be exported in step 2, above
- 4 Click the <Finish> button.
The [Import/Export -- Select Data File, Ladder Diagram, Subprogram, and/or User File] screen appears.

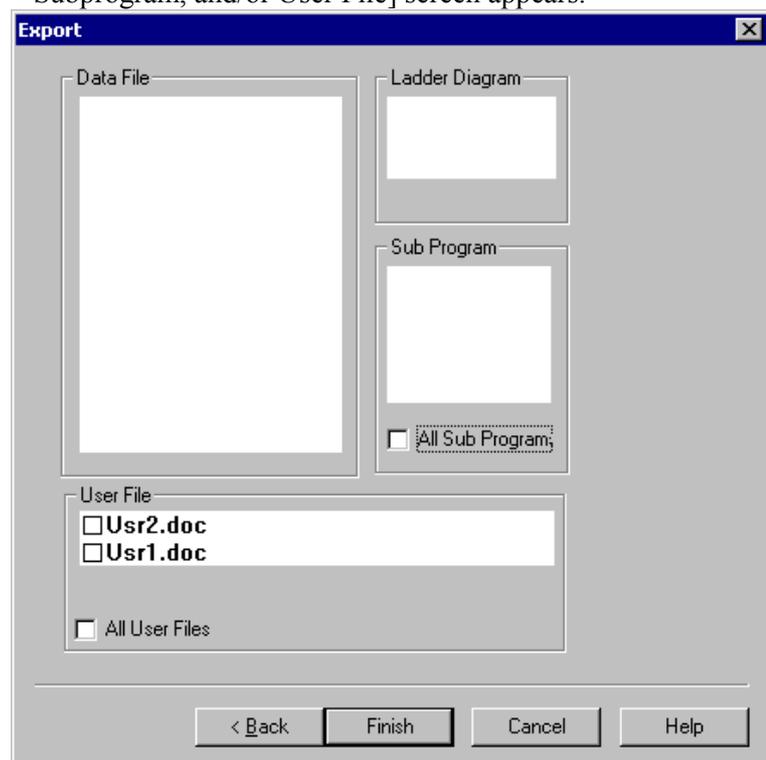


Fig. 3.15.1 (f)

4-1 Select the user files you want to export.

- 5 Click the <Finish> button.
The message "Export file data will be replaced/Added, Are you sure?" appears.

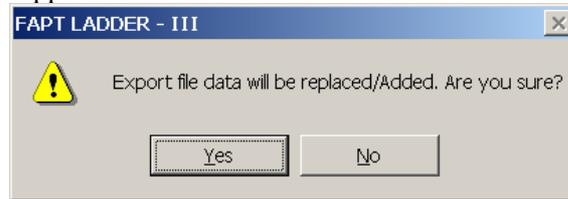


Fig. 3.15.1 (g)

To export, click the <Yes> button.
To quit exporting, click the <No> button.

3.16 OPENING MOST RECENTLY USED PROGRAMS

This section describes how to open the most recently used programs (up to four).

Procedure

1. Display the [File] menu.

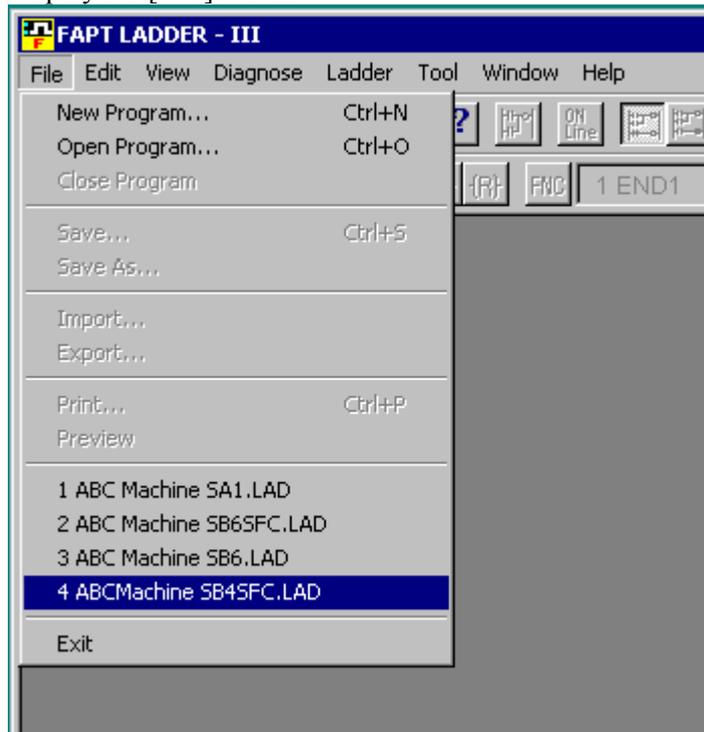


Fig. 3.16

2. Up to four most recently used programs are displayed above [Exit].
3. Select the program you want to display/edit.

4

PRINTING SEQUENCE PROGRAMS

This chapter describes how to print a sequence program, which consists of a title, system parameters, symbols, comments, I/O modules, messages, ladders and step sequences.

4.1 PRINTING TITLES

This section describes how to print title data.

4.1.1 Procedure

- 1 Select [File] - [Print]. The [Print] screen appears.

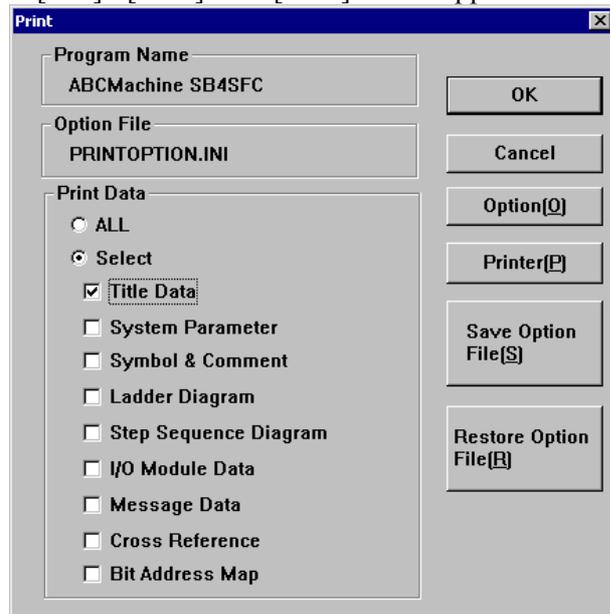


Fig. 4.1.1 (a)

- 1-1 Select Title Data from Print Data.

1-2 Click the <Option> button. The [Option] screen appears.

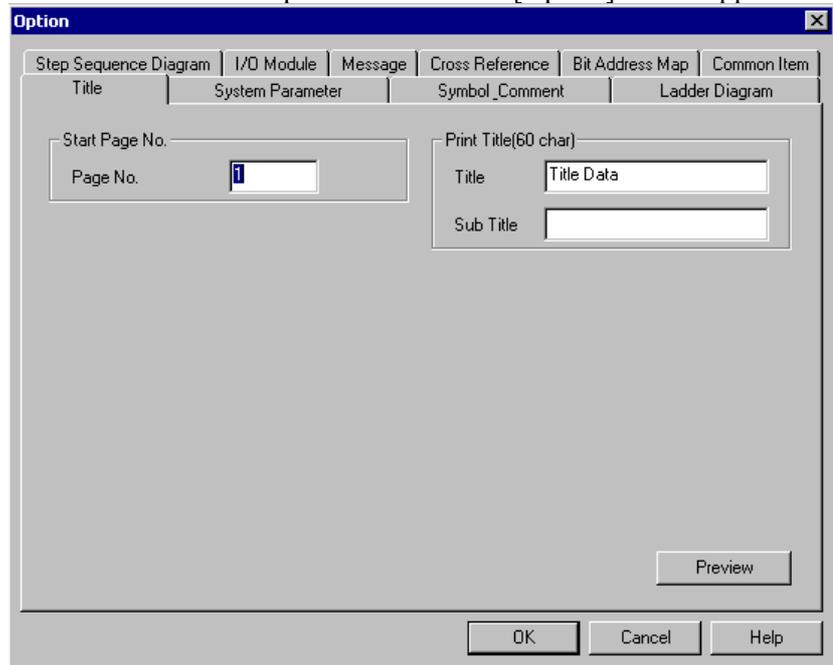


Fig. 4.1.1 (b)

- 2 Set the following print options on the Title tab.
 - Page No.**
Specify a start page number for title printing (the Initially value is 1).
 - Title**
Specify a title to be printed (the Initially value is "Title Data").
 - Sub Title**
Specify a subtitle to be printed (the Initially value is blank).
- 3 To preview title printing, click the <Preview> button.
- 4 To set up the print options, click the <OK> button.
To cancel the setup of the print options, click the <Cancel> button.
The [Print] screen appears again.
- 5 To print, click the <OK> button.
To quit without printing, click the <Cancel> button.

4.2 PRINTING LADDER DIAGRAMS

This section describes how to print ladder diagrams.

4.2.1 Procedure

- 1 Select [File] - [Print]. The [Print] screen appears.

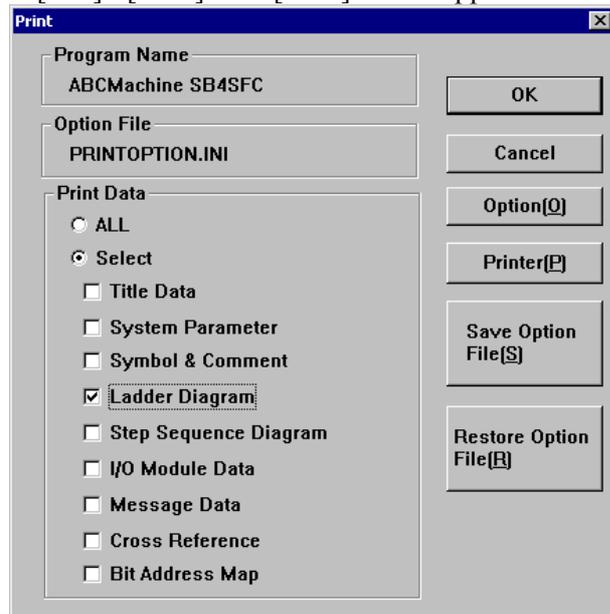


Fig. 4.2.1 (a)

- 1-1 Select Ladder Diagram from **Print Data**.

1-2 Click the <Option> button. The [Option] screen appears.

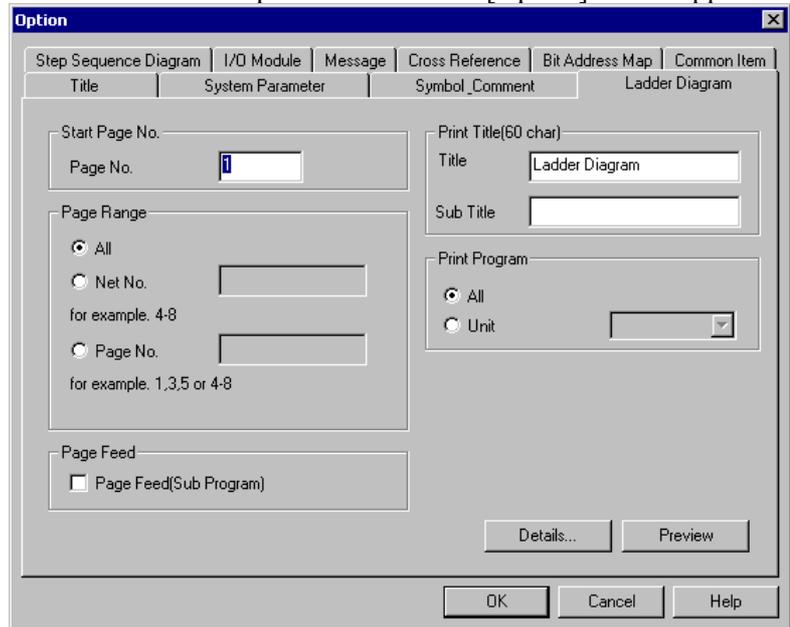


Fig. 4.2.1 (b)

2 Set up the following print options on the Ladder Diagram tab.

Page No.

Specify a start page number for ladder diagram printing (the Initially value is 1).

Title

Specify a title for ladder diagram printing (the Initially value is "Ladder Diagram").

Sub Title

Specify a subtitle for ladder diagram printing (the Initially value is blank).

Print Range

Specify the range of ladder diagrams to be printed (the Initially value is <All>).

All: All ladder diagrams will be printed.

Net No.: The ladder diagrams in the specified nets will be printed.

Page No.: The ladder diagrams on the specified pages will be printed.

Print Program

Specify the ladder programs you want to print (the Initially value is <All>).

All: All programs (including subprograms) will be printed.

Unit: Enter the name of the subprogram you want to print, or select it from the combo box.

Page Feed (Sub Program) (Initially not selected.)

- 3 To preview ladder diagram printing, click the <Preview> button.
- 4 To specify ladder diagram printing in detail, click the <Details> button.

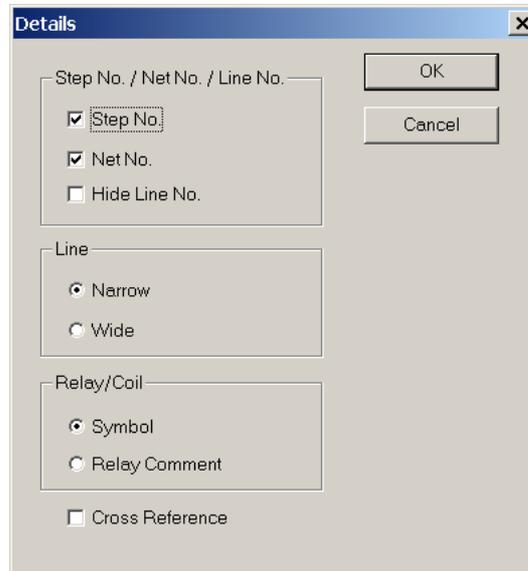


Fig. 4.2.1 (c)

Step No. (Initially selected.)

Net No. (Initially selected.)

Hide Line No. (Initially not selected.)

Line Spacing

Specify line spacing for nets (the Initially value is <Narrow>).

Relay/Coil

Specify the data to be printed at a contact (the Initially value is <Symbol>).

Symbol: Symbol data for contacts will be printed.

Relay Comment: Data for relay comments will be printed.

Cross Reference (Initially not selected.)

- 5 To set up the print options, click the <OK> button.
To cancel the setup of the print options, click the <Cancel> button.
The [Print] screen appears again.
- 6 To print, click the <OK> button.
To quit without printing, click the <Cancel> button.

4.3 PRINTING STEP SEQUENCES

This section describes how to print step sequences.

4.3.1 Procedure

- 1 Select [File] - [Print]. The [Print] screen appears.

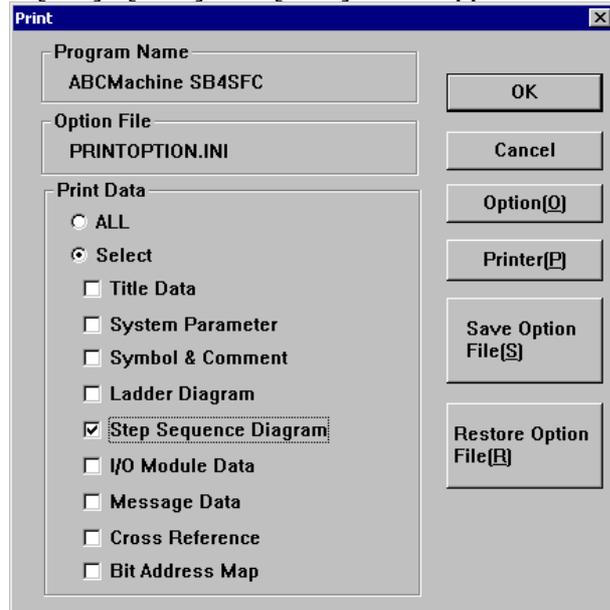


Fig. 4.3.1 (a)

- 1-1 Select Step Sequence Diagram from [Print Data].
If the PMC model does not support step sequences, or if there is no step sequence, this item is not displayed.

- 1-2 Click the <Option> button. The [Option] screen appears.

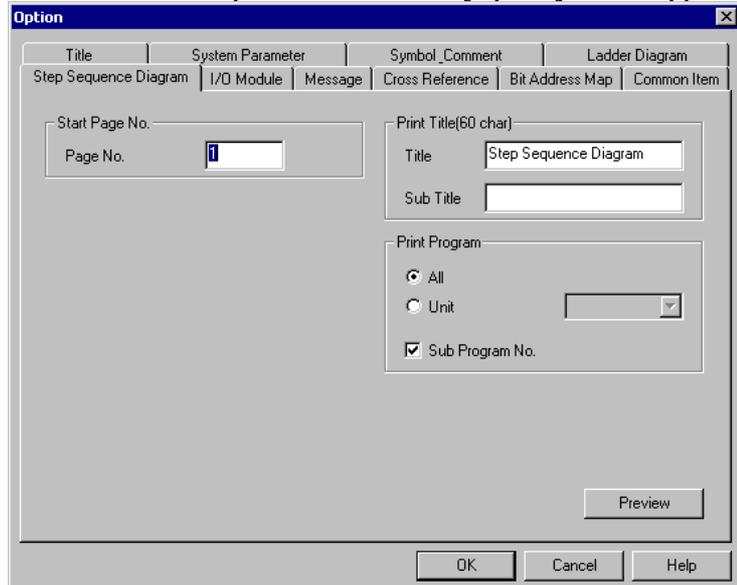


Fig. 4.3.1 (b)

- 2 Set up the following print options on the Step Sequence Diagram tab.

Page No.

Specify a start page number for step sequence printing (the Initially value is 1).

Title

Specify a title for step sequence printing (the Initially value is "Step Sequence Diagram").

Sub Title

Specify a subtitle for step sequence printing (the Initially value is blank).

Print Program

Specify the step sequence programs you want to print (the Initially value is <All>).

All: All programs (including subprograms) will be printed.

Unit: Enter the name of the subprogram you want to print, or select it from the combo box.

Sub Program No. (Initially selected.)

- 3 To preview step sequence program printing, click the <Preview> button.
- 4 To set up the print options, click the <OK> button.
To cancel the setup of the print options, click the <Cancel> button.
The [Print] screen appears again.
- 5 To print, click the <OK> button.
To quit without printing, click the <Cancel> button.

4.4 PRINTING SYMBOLS AND COMMENTS

This section describes how to print symbols and comments.

4.4.1 Procedure

- 1 Select [File] - [Print]. The [Print] screen appears.

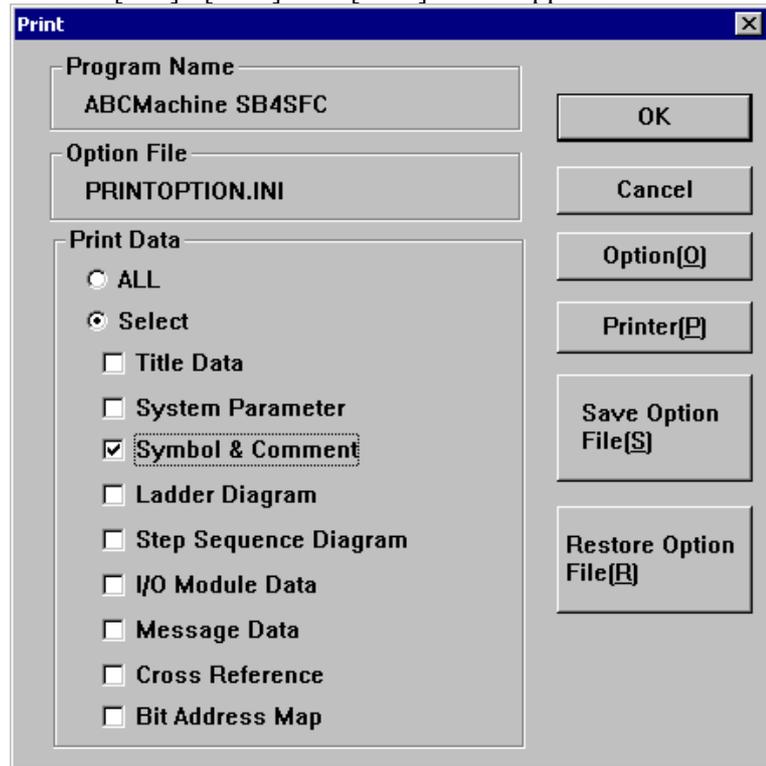


Fig. 4.4.1 (a)

- 1-1 Select Symbol & Comment from **Print Data**.

1-2 Click the <Option> button. The [Option] screen appears.

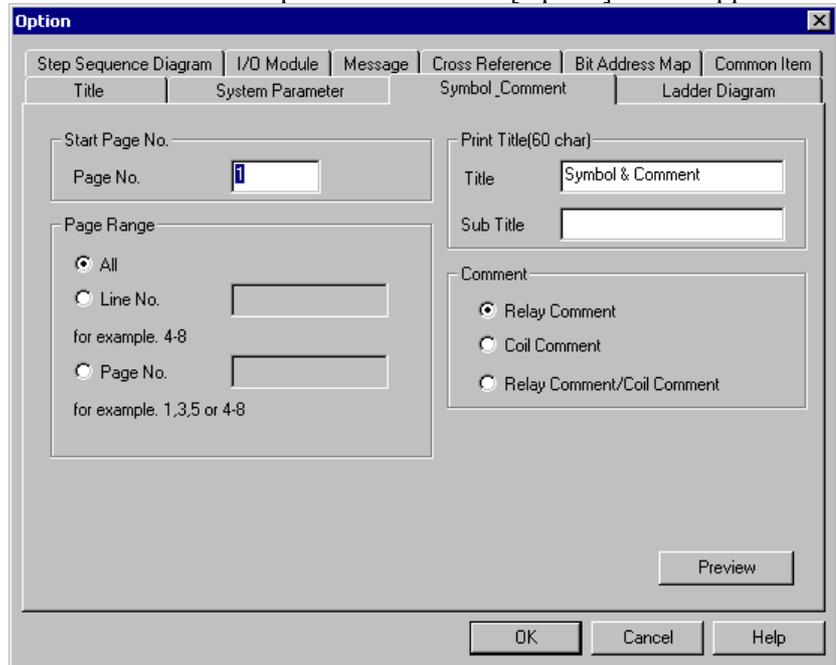


Fig. 4.4.1 (b)

2 Set up the following print options on the Symbol tab.

Page No.

Specify a start page number for symbol printing (the Initially value is 1).

Title

Specify a title for symbol printing (the Initially value is "Symbol & Comment").

Sub Title

Specify a subtitle for symbol printing (the Initially value is blank).

Print Range

Specify the range of symbols to be printed (the Initially value is <All>).

All: All the symbols will be printed.

Line No.:The symbols on the specified lines will be printed.

Page No.:The symbols on the specified pages will be printed.

Comment

Specify the type of comment you want to print (the Initially value is <Relay Comment>).

Relay Comment: A relay comment will be printed.

Coil Comment: A coil comment will be printed.

Relay Comment/Coil Comment: Relay and coil comments will be printed.

- 3 To preview symbol printing, click the <Preview> button.
- 4 To set up the print options, click the <OK> button.
To cancel the setup of the print options, click the <Cancel> button.
The [Print] screen appears again.
- 5 To print, click the <OK> button.
To quit without printing, click the <Cancel> button.

4.5 PRINTING MESSAGES

This section describes how to print messages.

4.5.1 Procedure

- 1 Select [File] - [Print]. The [Print] screen appears.

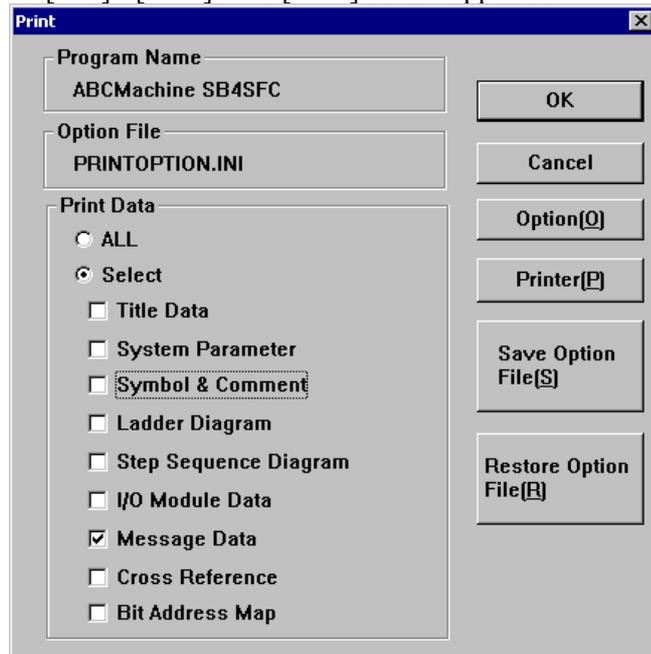


Fig. 4.5.1 (a)

- 1-1 Select Message Data from [Print Data].

- 1-2 Click the <Option> button. The [Option] screen appears.

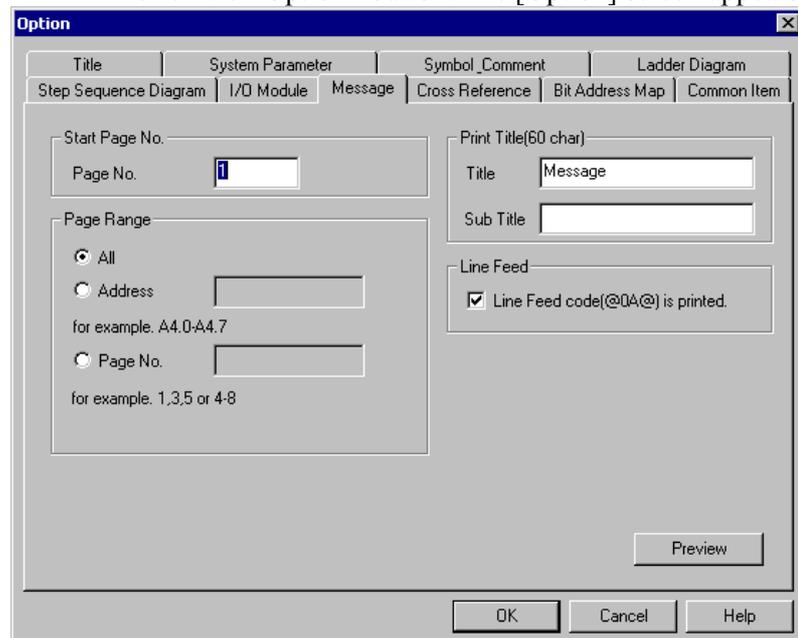


Fig. 4.5.1 (b)

- 2 Set up the following print options on the Message tab.

Page No.

Specify a start page number for message printing (the Initially value is 1).

Title

Specify a title for message printing (the Initially value is "Message").

Sub Title

Specify a subtitle for message printing (the Initially value is blank).

Print Range

Specify the range of messages to be printed (the Initially value is <All>).

All: All the messages will be printed.

Address: The messages in the specified address range will be printed.

Page No.: The messages on the specified pages will be printed.

Line Feed code(@0A@) is printed. (the Initially value is on).

When this option is not selected (off), message data is printed with the code (@0A@) replaced with a carriage return.

- 3 To preview message printing, click the <Preview> button.
- 4 To set up the print options, click the <OK> button.
To cancel the setup of the print options, click the <Cancel> button.
The [Print] screen appears again.
- 5 To print, click the <OK> button.
To quit without printing, click the <Cancel> button.

4.6 PRINTING I/O MODULE ASSIGNMENT

This section describes how to print I/O module assignments.

4.6.1 Procedure

- 1 Select [File] - [Print]. The [Print] screen appears.

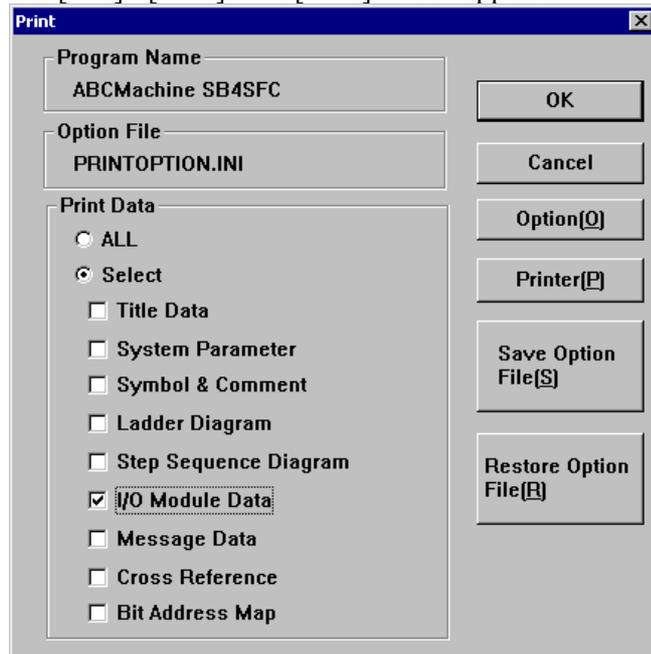


Fig. 4.6.1 (a)

- 1-1 Select I/O Module Data from **Print Data**.

- 1-2 Click the <Option> button. The [Option] screen appears.

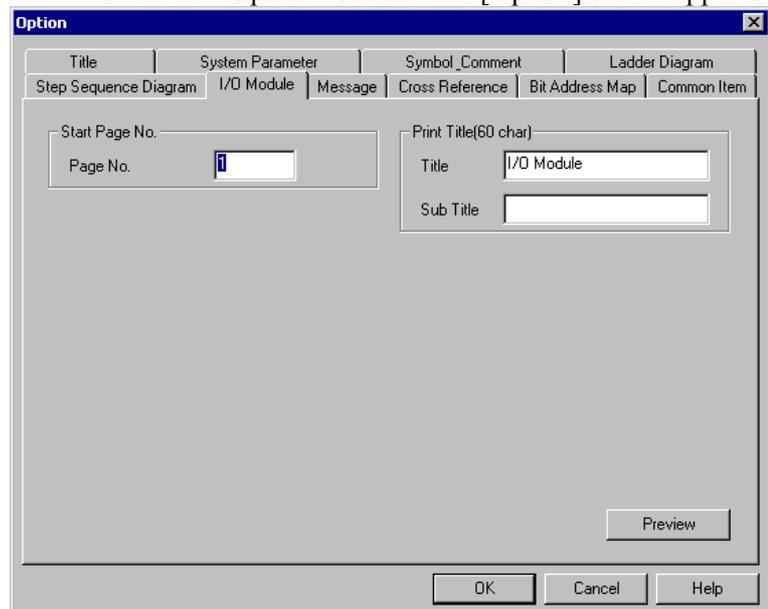


Fig. 4.6.1 (b)

- 2 Set up the following print options on the I/O Module tab.
 - Page No.**
Specify a start page number for I/O module printing (the Initially value is 1).

 - Title**
Specify a title for I/O module printing (the Initially value is "I/O Module").

 - Sub Title**
Specify a subtitle for I/O module printing (the Initially value is blank).

 - 1 Channel** (Initially selected.)
(This item is to be set if the PMC model is PMC-QC.)

 - 2 Channel** (Initially selected.)
(This item is to be set if the PMC model is PMC-QC.)
- 3 To preview I/O module printing, click the <Preview> button.
- 4 To set up the print options, click the <OK> button.
To cancel the setup of the print options, click the <Cancel> button.
The [Print] screen appears again.
- 5 To print, click the <OK> button.
To quit without printing, click the <Cancel> button.

4.7 PRINTING SYSTEM PARAMETERS

This section describes how to print system parameters.

4.7.1 Procedure

- 1 Select [File] - [Print]. The [Print] screen appears.

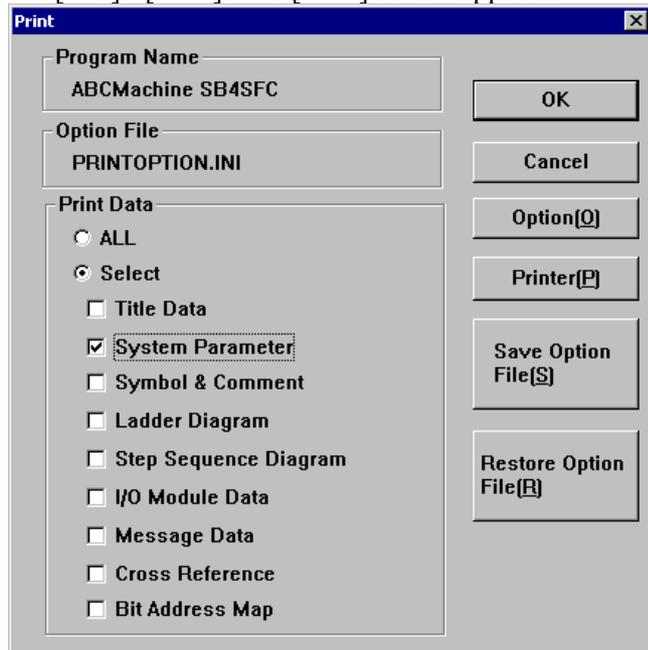


Fig. 4.7.1 (a)

- 1-1 Select System Parameter from **Print Data**.

- 1-2 Click the <Option> button. The [Option] screen appears.

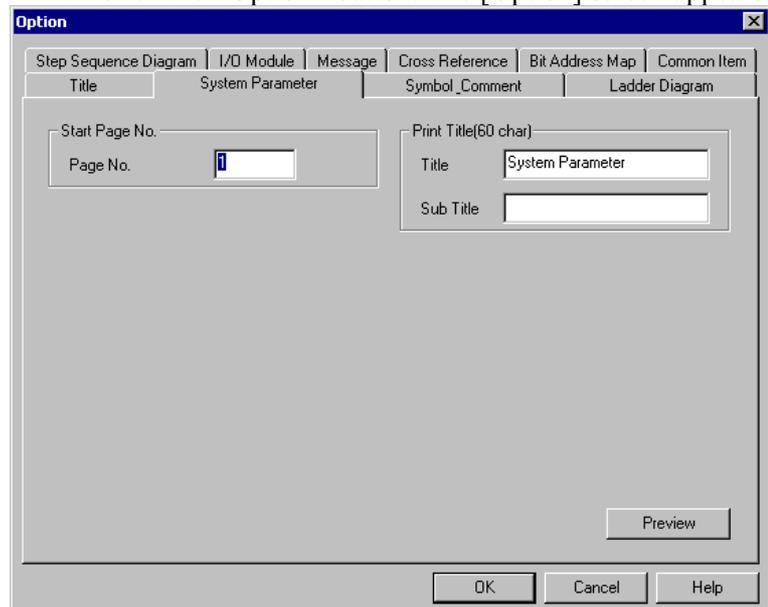


Fig. 4.7.1 (b)

- 2 Set up the following print options on the System Parameter tab.
 - Page No.**
Specify a start page number for system parameter printing (the Initially value is 1).
 - Title**
Specify a title for system parameter printing (the Initially value is "System Parameter").
 - Sub Title**
Specify a subtitle for system parameter printing (the Initially value is blank).
- 3 To preview system parameter printing, click the <Preview> button.
- 4 To set up the print options, click the <OK> button.
To cancel the setup of the print options, click the <Cancel> button.
The [Print] screen appears again.
- 5 To print, click the <OK> button.
To quit without printing, click the <Cancel> button.

4.8 PRINTING CROSS-REFERENCES

This section describes how to print cross-references.

4.8.1 Procedure

- 1 Select [File] - [Print]. The [Print] screen appears.

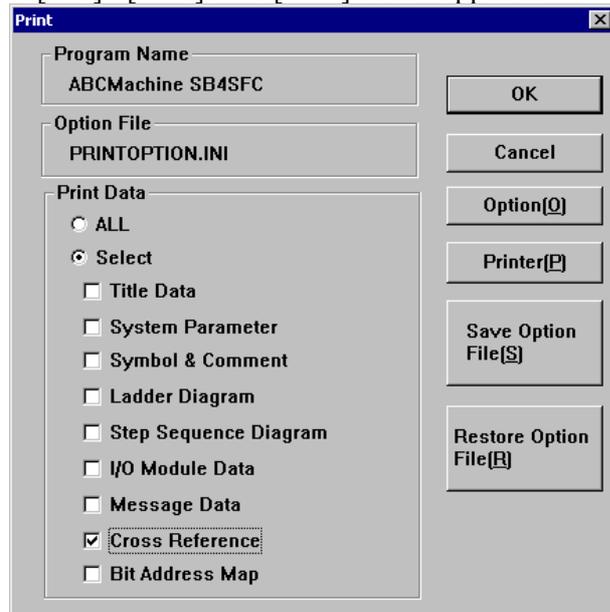


Fig. 4.8.1 (a)

- 1-1 Select Cross Reference from **Print Data**.

- 1-2 Click the <Option> button. The [Option] screen appears.

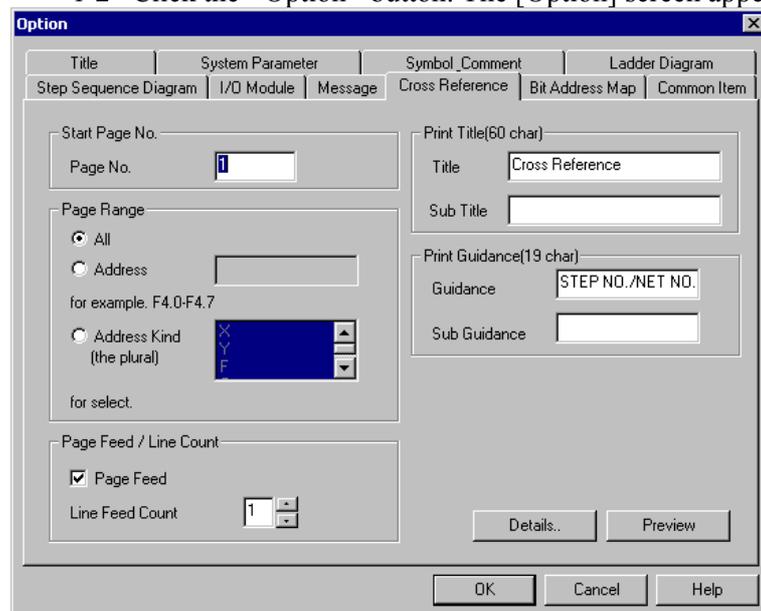


Fig. 4.8.1 (b)

- 1 Set up the following print options on the Cross Reference tab.

Page No.

Specify a start page number for cross-reference printing (the Initially value is 1).

Title

Specify a title for cross-reference printing (the Initially value is "Cross Reference").

Sub Title

Specify a subtitle for cross-reference printing (the Initially value is blank).

Print Range

Specify the range of cross-references to be printed (the Initially value is <All>).

All: All the cross-references will be printed.

Address: The cross-references in the specified address range will be printed.

Address Kind: Cross-references at addresses of the specified type will be printed (multiple address types can be selected).

Guidance

Specify the type of output format guidance (the Initially value is "STEP NO./NET NO.").

Sub Guidance

Specify the type of output format subguidance (the Initially value is blank).

Page Feed (Initially selected.)**Line Feed Count**

Specify the number (0 to 9) of blank lines to be placed between addresses (the Initially value is 1).

- 3 To preview cross-reference printing, click the <Preview> button.

- 4 To specify cross-reference printing in detail, click the <Details> button.

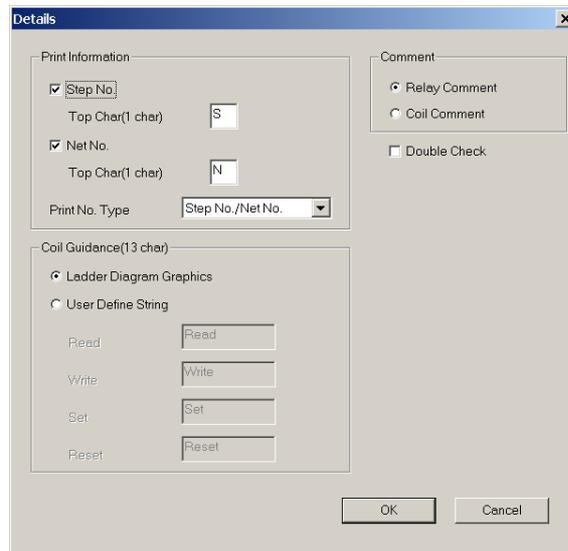


Fig. 4.8.1 (c)

Step No. (Initially selected.)

Net No. (Initially selected.)

Print No. Type (The Initially value is "Step No. /Net No. ".)

Comment

Specify the type of comment you want to print (the Initially value is <Relay Comment>).

Double Check (Initially not selected.)

Specify whether to check for duplicate coil writing and duplicate use of the coil write function instruction.

Coil Guidance

(The Initially value is <Ladder Diagram Graphics>.)

Ladder Diagram Graphics

The same graphics as those for ladder diagram printing will be used.

User Define String

User-defined character strings will be used for printing. User-defined character strings can be set up for the following four items (up to 13 characters for each).

Read: Specify a character string for displaying read references. (The Initially value is "Read.")

Write: Specify a character string for displaying write references. (The Initially value is "Write.")

Set: Specify a character string for displaying set references. (The Initially value is "Set.")

Reset: Specify a character string for displaying reset references. (The Initially value is "Reset.")

- 5 To set up the print options, click the <OK> button.
To cancel the setup of the print options, click the <Cancel> button.
The [Print] screen appears again.
- 6 To print, click the <OK> button.
To quit without printing, click the <Cancel> button.

4.9 PRINTING BIT ADDRESS MAPS

This section describes how to print bit address maps.

4.9.1 Procedure

- 1 Select [File] - [Print]. The [Print] screen appears.

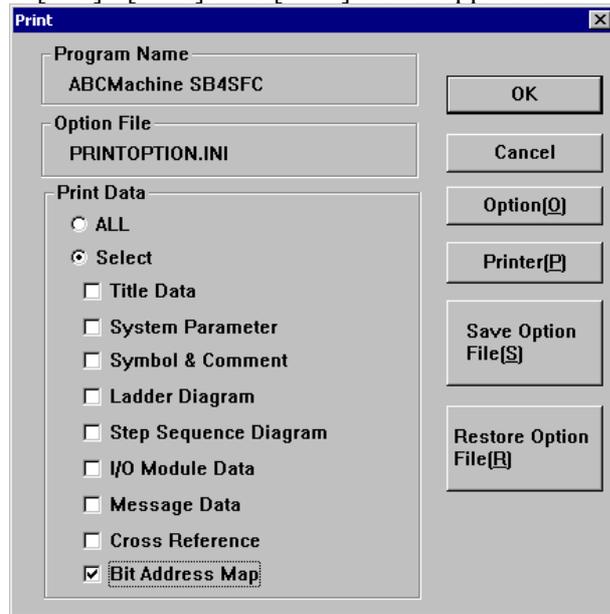


Fig. 4.9.1 (a)

- 1-1 Select Bit Address Map from Print Data.

- 1-2 Click the <Option> button. The [Option] screen appears.

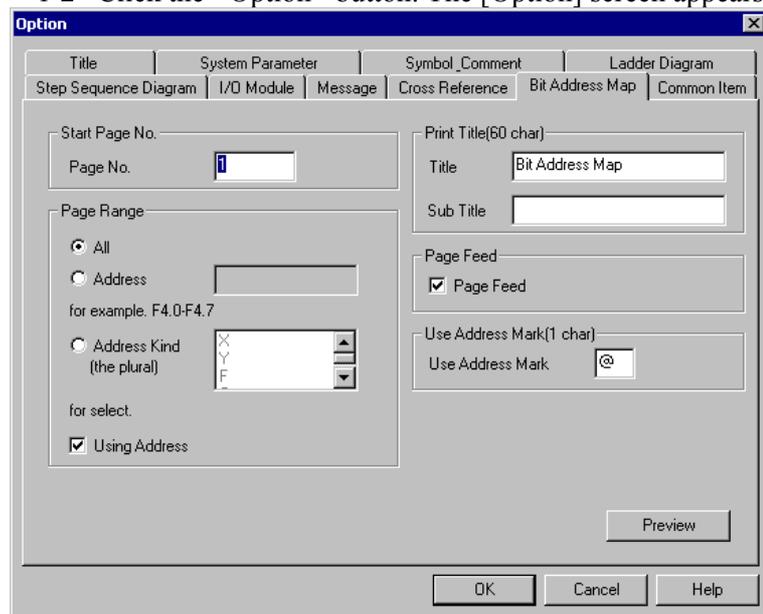


Fig. 4.9.1 (b)

- 2 Set up the following print options on the Bit Address Map tab.
 - Page No.**
Specify a start page number for bit address map printing (the Initially value is 1).
 - Title**
Specify a title for bit address map printing (the Initially value is "Bit Address Map").
 - Sub Title**
Specify a subtitle for bit address map printing (the Initially value is blank).
 - Print Range**
Specify the range of bit address maps to be printed (the Initially value is <All>).
All: All bit address maps will be printed.
Address: The bit map addresses in the specified address range will be printed.
Address Kind: Bit map addresses at addresses of the specified type will be printed (multiple address types can be selected).
 - Using Address** (Initially selected.)
 - Page Feed** (Initially selected.)
 - Use Address** (The Initially value is "@").
Any symbol (one character) can be specified as the address symbol to be used.
- 3 To preview bit address map printing, click the <Preview> button.
- 4 To set up the print options, click the <OK> button.
To cancel the setup of the print options, click the <Cancel> button.
The [Print] screen appears again.
- 5 To print, click the <OK> button.
To quit without printing, click the <Cancel> button.

4.10 SETTING UP COMMON OPTIONS

This section describes how to set up options common to all print items.

4.10.1 Procedure

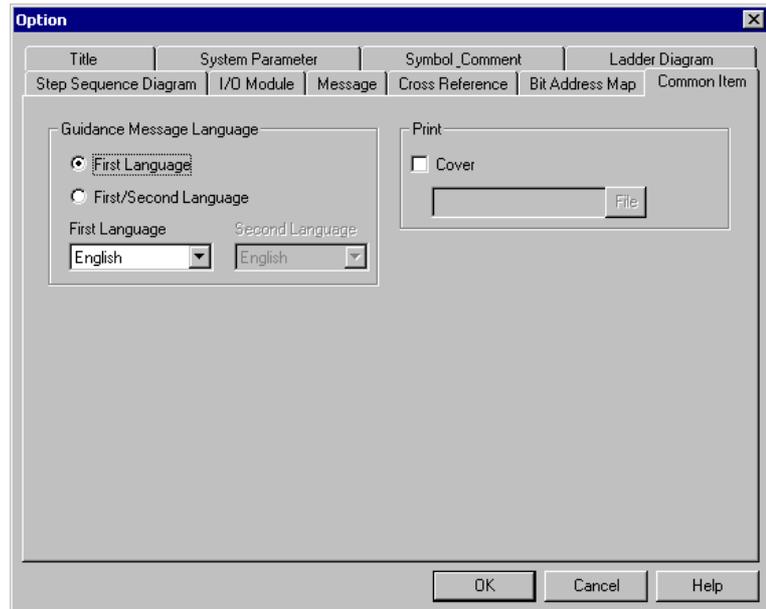


Fig. 4.10.1 (a)

- 1 Set up the following common options.
 - Guidance Message Language**
Specify the language for guidance messages used when titles and system parameters are printed.
(The Initially value is <First Language>.)
 - First Language**
Specify a title for bit address map printing (the Initially value is <English>).
 - Second Language**
This item can be specified if <First/Second Language> is selected for Guidance Message Language (the Initially value is <English>).
 - Cover** (Initially not selected.)
If this item is selected (the check mark is on), a meta file can be specified for the cover.
- 2 To set up the print options, click the <OK> button.
To cancel the setup of the print options, click the <Cancel> button.
The [Print] screen appears again.

4.11 SAVING AND READING OPTION FILE

This section describes how to save the print options you set up to a file and how to read them from the file when printing.

4.11.1 Procedure

- 1 Select [File] - [Print]. The [Print] screen appears.

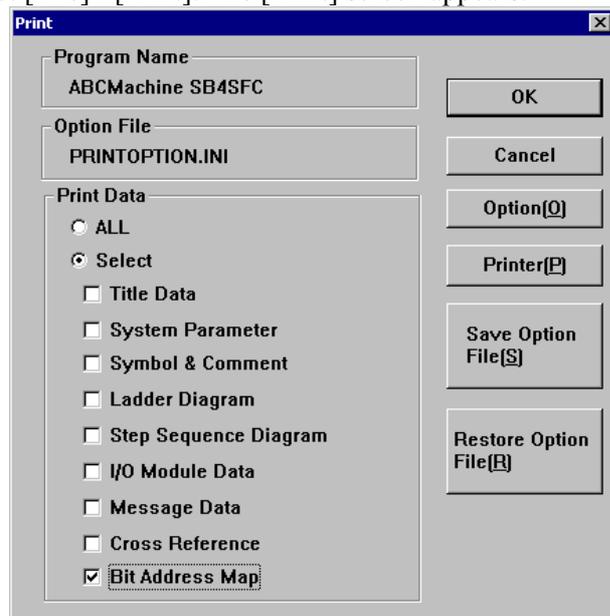


Fig. 4.11.1 (a)

- 2 To save the options to a file, click the <Save Option File> button.

2-1 The [Save As] screen appears.

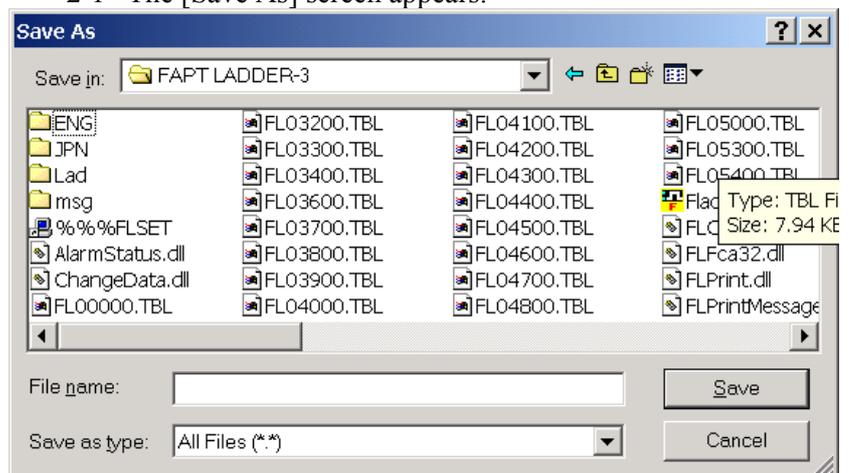


Fig. 4.11.1 (b)

2-2 Specify a File name.

2-3 Click the <Save> button.

- 3 To read options from a file, click the <Restore Option File> button.

3-1 The [Open] screen appears.

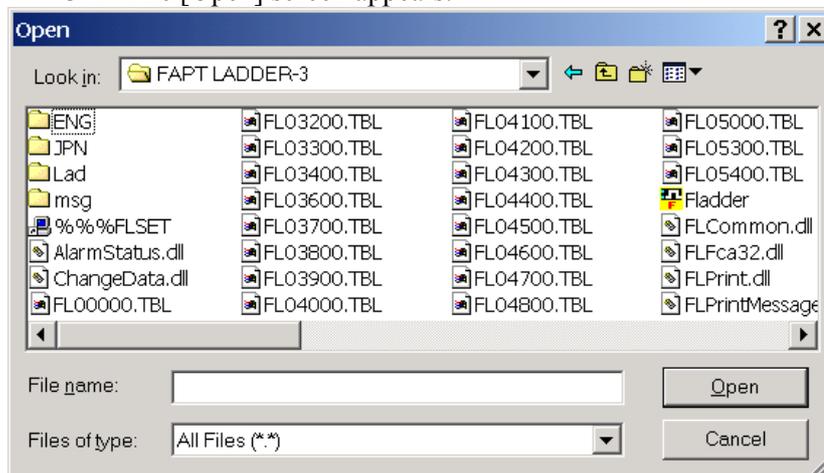


Fig. 4.11.1 (c)

3-1 Specify a File name.

3-2 Click the <Open> button.

4.12 SETTING UP PRINTER

This section describes how to set up a printer.

4.12.1 Procedure

- 1 Select [File] - [Print]. The [Print] screen appears.

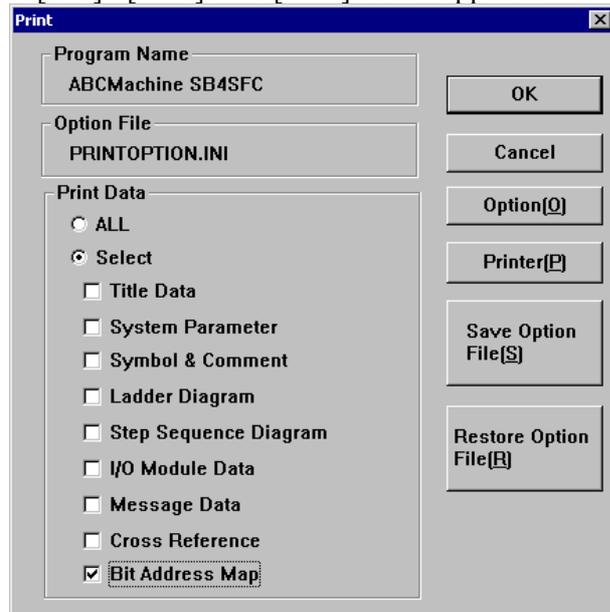


Fig. 4.12.1 (a)

- 2 Click the <Printer> button.

2-1 The [Printer] screen appears.

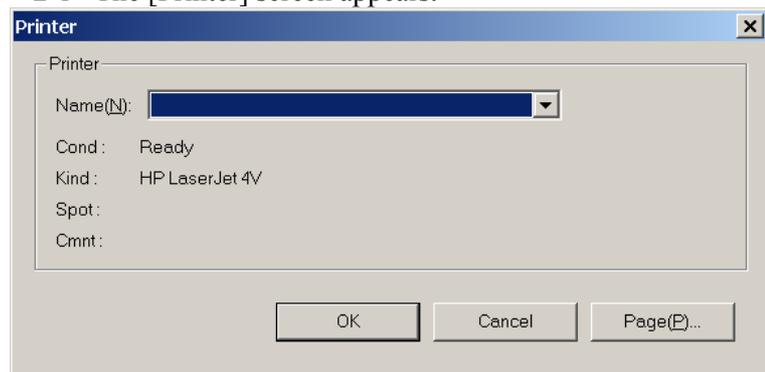


Fig. 4.12.1 (b)

- 2-2 Specify a printer name in Name.
If more than one printer has been installed in your system, one can be selected from the drop-down list box.
- 2-3 To set the displayed printer, click the <OK> button.
To cancel the setup of the printer, click the <Cancel> button.

4.12.2 Setting up Pages

- 1 On the [Printer] screen, click the Page button.
- 2 Set the items on each tab.

2-1 [Line Count] tab

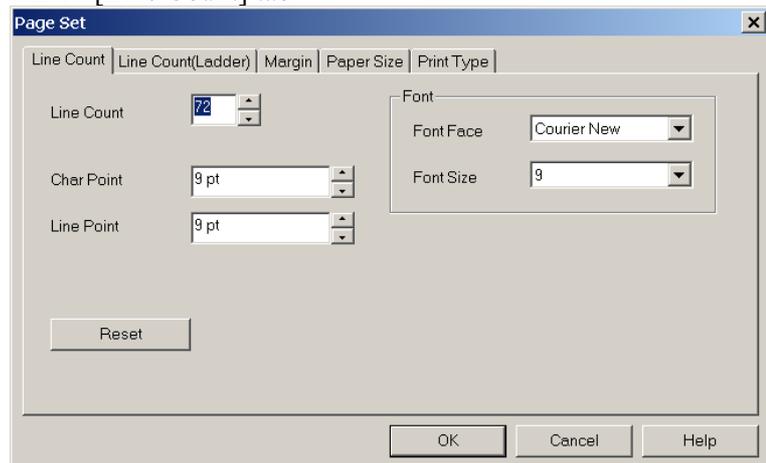


Fig. 4.12.2 (a)

Line Count

Specify the maximum number of lines that can be printed on one page. A value can be entered directly. It can also be selected by clicking the up/down arrows. (The Initially value is 72.)

Char Point

Specify the character spacing, in points. A value can be entered directly. It can also be selected by clicking the up/down arrows. The font size may be adjusted automatically according to the specified character spacing.

(The Initially value is 9.)

Line Point

Specify the line spacing, in points. A value can be entered directly. It can also be selected by clicking the up/down arrows. The number of lines and the font size may be adjusted automatically according to the specified line spacing.

(The Initially value is 9.)

Font Face

Specify the font you want to use.

(The Initially value is <Courier New>.)

Font Size

Specify the font size you want to use. The number of lines, character spacing, and line spacing may be adjusted automatically according to the specified font size.

(The Initially value is 9.)

<Reset> button

This button clears the settings of all the items on the [Line Count] tab to the respective Initially values.

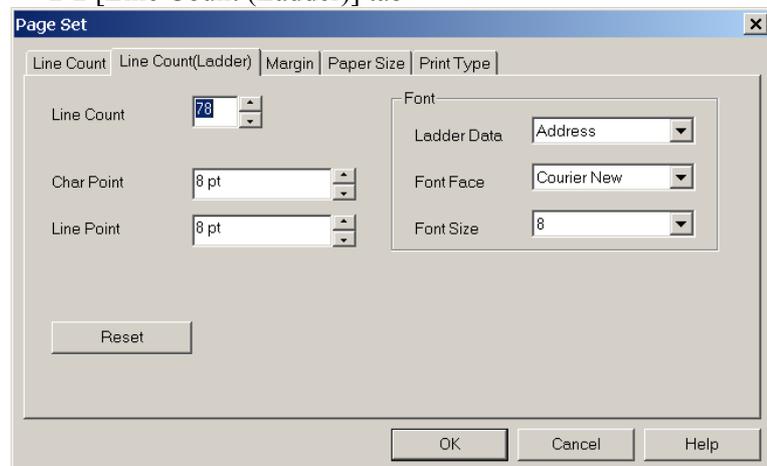
2-2 [Line Count (Ladder)] tab

Fig. 4.12.2 (b)

Line Count

Specify the maximum number of lines that can be printed on one page. A value can be entered directly. It can also be selected by clicking the up/down arrows. The line spacing and font size may be adjusted automatically according to the specified number of lines.

(The Initially value is 78.)

Char Point

Specify the character spacing, in points. A value can be entered directly. It can also be selected by clicking the up/down arrows. The font size may be adjusted automatically according to the specified character spacing.

(The Initially value is 8.)

Line Point

Specify the line spacing, in points. A value can be entered directly. It can also be selected by clicking the up/down arrows. The number of lines and the font size may be adjusted automatically according to the specified line spacing.

(The Initially value is 8.)

Ladder Data

Specify the ladder data for which you want to specify a font.

Font Face

Specify the name of the font you want to use for an item specified in Ladder Data.

(The Initially value is <Courier New>.)

Font Size

Specify the font size you want to use for an item specified in Ladder Data. The number of lines, character spacing, and line spacing may be adjusted automatically according to the specified font size.

(The Initially value is 8.)

<Reset> button

This button clears the settings for all the items on the [Line Count (Ladder)] tab to the respective Initially values.

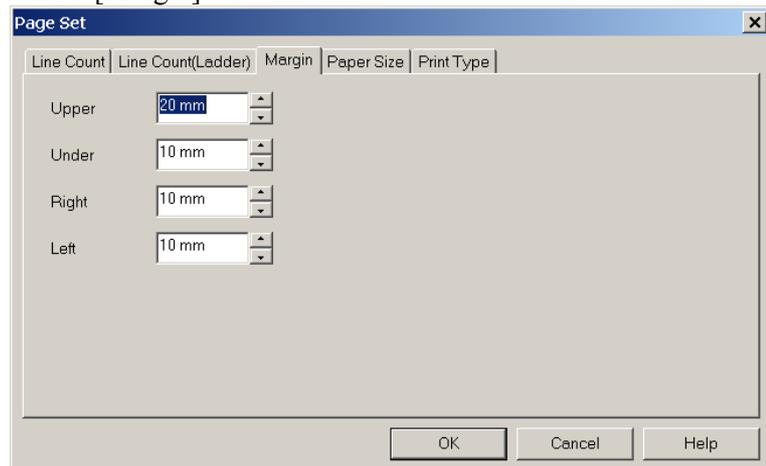
2-3 [Margin] tab

Fig. 4.12.2 (c)

Upper

Specify the top margin for each page. A value can be entered directly. It can also be selected by clicking the up/down arrows. The entered value is assumed to be in mm.

(The Initially value is 20.)

Under

Specify the bottom margin for each page. A value can be entered directly. It can also be selected by clicking the up/down arrows. The entered value is assumed to be in mm.

(The Initially value is 10.)

Right

Specify the right margin for each page. A value can be entered directly. It can also be selected by clicking the up/down arrows. The entered value is assumed to be in mm.

(The Initially value is 10.)

Left

Specify the left margin for each page. A value can be entered directly. It can also be selected by clicking the up/down arrows. The entered value is assumed to be in mm.

(The Initially value is 10.)

2-4 [Paper Size] tab

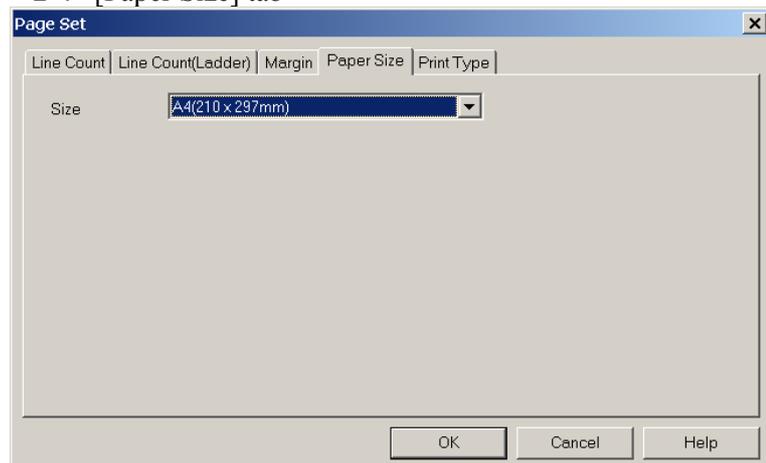


Fig. 4.12.2 (d)

Size

Specify the size of the form you want to use.

(The Initially value is <A4>.)

2-5 [Print Type] tab

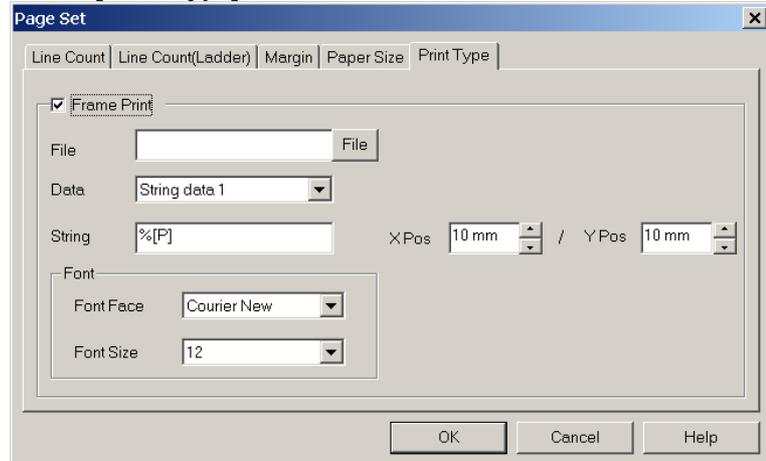


Fig. 4.12.2 (e)

Frame Print

Specify whether to print a frame. The following items can be set up only when this item is selected.

File

Specify the meta file you want to use for frame printing. The <File> button lets you select a file name.

Data

Specify the data for which you want to set up a character string, coordinate values, and font.

String

Specify a character string set up in Data as print data. Data can be specified in the following data formats.

%[T]: Title data will be printed.

%[S]: Subtitle data will be printed.

%[P]: A program name will be printed.

%[N]: Page numbers will be printed.

(Initially values)

Character definition 1: %[P]

Character definition 2: %[T]

Character definition 3: %[N]

Character definition 4: %[S]

Character definition 5: Unavailable

X Pos

Specify the print start position (X-coordinate) for a character string set up in Data. A value can be entered directly. It can also be selected by clicking the up/down arrows. The entered value is assumed to be in mm.

(Initially values)

Character string definition 1: 10

Character string definition 2: 75

Character string definition 3: 180

Character string definition 4: 75

Character string definition 5: 0

Y Pos

Specify the print start position (Y-coordinate) for a character string set up in Data. A value can be entered directly. It can also be selected by clicking the up/down arrows. The entered value is assumed to be in mm.

(Initially values)

Character string definition 1: 10

Character string definition 2: 10

Character string definition 3: 10

Character string definition 4: 15

Character string definition 5: 0

Font Face

Specify the name of the font you want to use to print the data set up in Data.

(The Initially value is <Courier New>.)

Font Size

Specify the font size you want to use to print the data set up in Data.

(The Initially value is 12.)

- 2-6 To use the entered page settings, click the <OK> button.
To cancel the page settings, click the <Cancel> button.

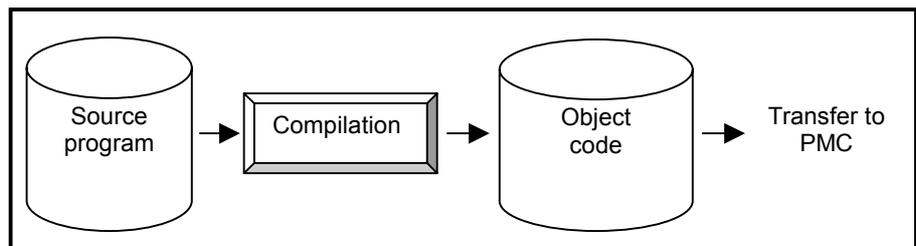
5

COMPILED AND DECOMPILED

This chapter describes how to compile and decompile source programs, as well as automatic compilation and automatic decompilation. The chapter also describes how to protect a ladder program using a password.

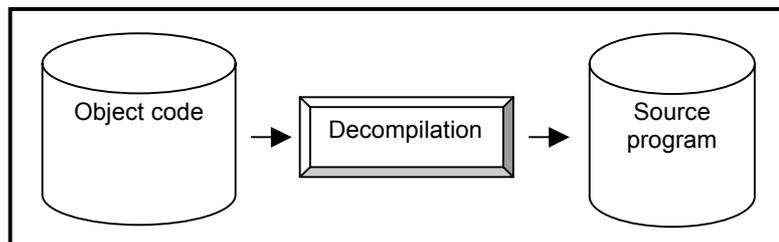
- **Compilation**

Compilation involves converting an edited source program to object code that can be executed by the PMC. Unless source programs are compiled, online functions cannot be used and the source programs cannot be transferred to RAM of the PMC.



- **Decompilation**

Decompilation involves converting object code to a source program. Data items uploaded from the PMC, and data items read from ROM and a memory card become object code. Since object code can neither be edited nor printed offline, you must decompile object code.

**NOTE**

To decompile an object code with a password, enter the password first.

5.1 COMPILATION

This section describes how to compile source programs.

Procedure

- 1 Select [Tool] - [Compile]. The [Compile] dialog appears.

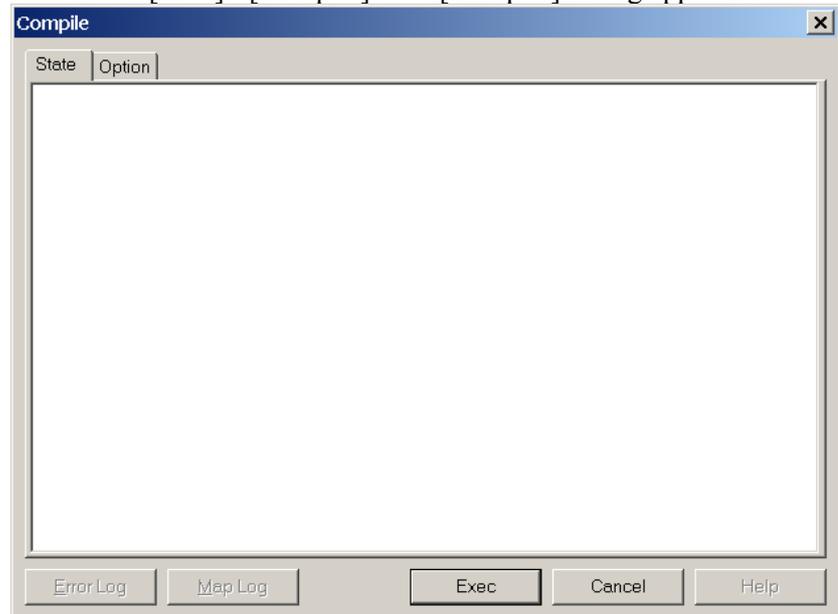


Fig. 5.1 (a)

- 2 Click the [Option] tab to set the compile options.

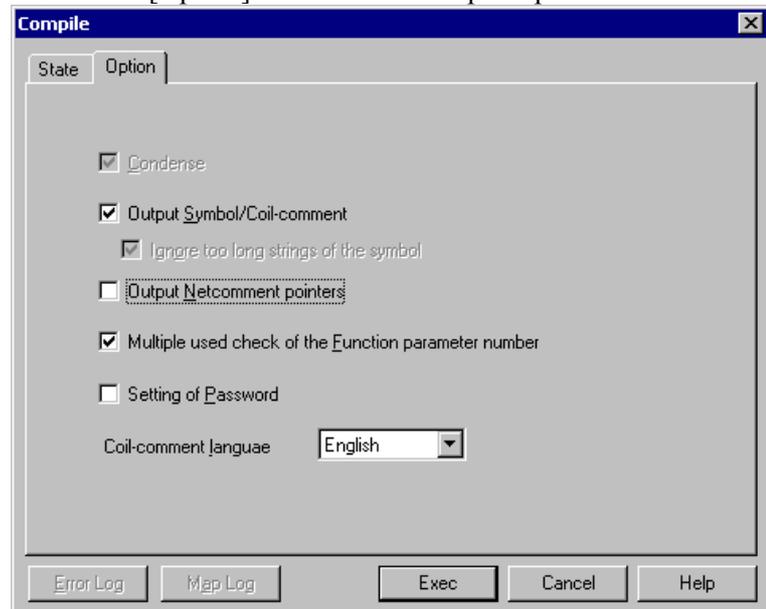


Fig. 5.1 (b)

The details of the options are listed below.

Table 5.1

Option	Explanation
Compile in the Condensation mode	When a ladder that has the same number of steps is compiled, the object code is decreased.
The Symbol/Coilcomment has been output	A symbol (six bytes or less) that can be displayed on a CRT/MDI, and an accompanying coil comment are output to an object code.
Ignore too long strings of the symbol	Any symbol that exceeds six characters in length is replaced by a space code of six characters and output to an object code together with a coil comment. When checking is disabled, any symbol comment that exceeds six characters in length is assumed to be erroneous and is not compiled, together with a coil comment. (Conventional specification)
Output Netcomment pointers	A net comment pointer is output to an object code.
Multiple used check of the Function parameter number	Functions TMR, TMRB, CTR, DIFU, and DIFD are checked if they are duplicated. If any, a warning is displayed.
Setting of Password	A password is added to an object code. Enter a password at the start of execution.
Coil-comment language	Specify the format in which to output a coil comment to an object file when compiling a source program. English: Japanese coil comments are replaced by spaces and output to an object file. (Conventional specification) Japanese: Japanese coil comments are converted directly and output to an object file.

- 3 To start compilation, click the <Exec> button. When [Setting of Password] in the compile option is checked, the [Password(Compile)] dialog appears. Enter a password, then click the <OK> button.
(For details of passwords, see Section 7.4, "Protecting Ladder Programs by Passwords.")

The screenshot shows a dialog box titled "Password(Compile)". It has a standard Windows-style title bar with a close button (X) in the top right corner. The dialog is divided into two main sections, each enclosed in a rounded rectangular frame. The first section is titled "Setting for display permission" and has a checked checkbox to its left. Below this title are two text input fields: "Password:" and "Confirm Password:". The second section is titled "Setting for display and edit permission" and also has a checked checkbox to its left. It also contains two text input fields: "Password:" and "Confirm Password:". At the bottom right of the dialog, there are two buttons: "OK" and "Cancel".

Fig. 5.1 (c)

- 4 While data is being compiled, the progress of the processing appears on the screen. When completed, the number of errors and warnings appears.

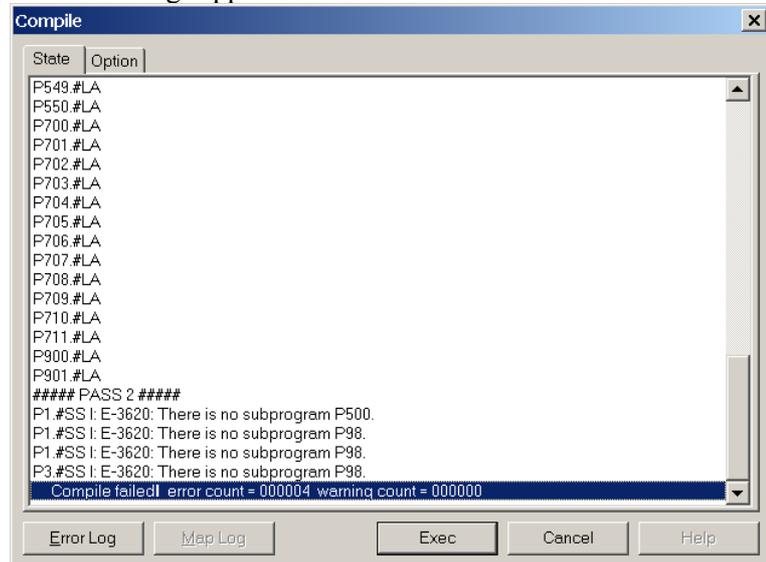


Fig. 5.1 (d)

NOTE

1 Condense mode

Condense mode has the following advantages.

- Reduced compilation time.
- Reduced transfer time from a personal computer to the PMC.
- The mode requires little ROM space.

On the other hand, the following restrictions must be observed:

- When data is edited by an integrated edit function, and if a ladder or symbol is added, overlapping with the C language area might occur. Pay careful attention to this point.

2 Net comment pointer

The net comment contains string information only in a source program. The compiled object code does not include the net comment information. Therefore, the setting to output the "net comment pointer" (position information of a net comment) as a function NOP to object code was developed. This position information enables the net comment to be restored at decompilation after a ladder is modified by online editing.

3 PMC-SB7

On PMC-SB7, the "Condense" and "Ignore too long strings of the symbol" options are enabled unconditionally.

5.2 DECOMPILED

This section describes how to decompile object code.

Procedure

- 1 Select [Tool] - [Decompile]. The [Decompile] dialog appears.

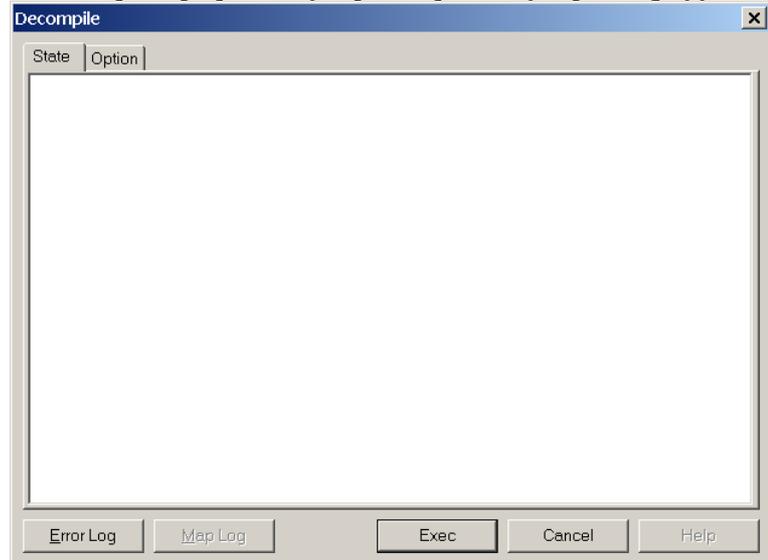


Fig. 5.2 (a)

- 2 Click the [Option] tab to set the decompile options.

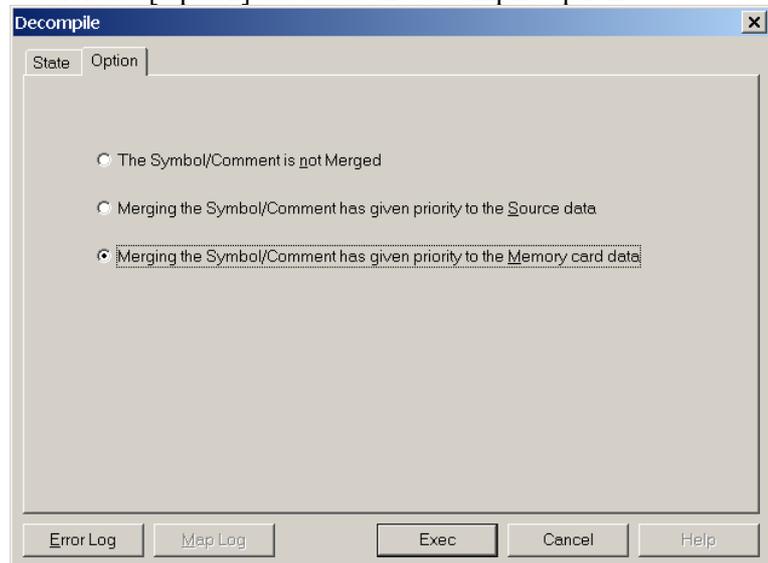


Fig. 5.2 (b)

Details of the options are listed below.

Table 5.2

Option	Explanation
The Symbol/ Comment is <u>n</u> ot Merge	No symbol/comment data is decompiled. The definition of the source is directly used.
Merging the Symbol/ Comment has given priority to the <u>S</u> ource data	The symbols of the source program and object code are merged only for a symbol and comment. If the same symbol and comment exist, the definition of the source program is used.
Merging the Symbol/ Comment has given priority to the <u>M</u> emory card data	The symbols of the source program and object code are merged only for a symbol and comment. If the same symbol and comment exist, the definition of the source program is used.

- 3 To start decompilation, click the <Exec> button. When object code with a password is to be decompiled, the [Password(Decompile)] dialog appears. Enter a password to permit display or to permit display and editing, and then click the <OK> button.

(For details on passwords, see "Protecting Ladder Programs by Passwords.")

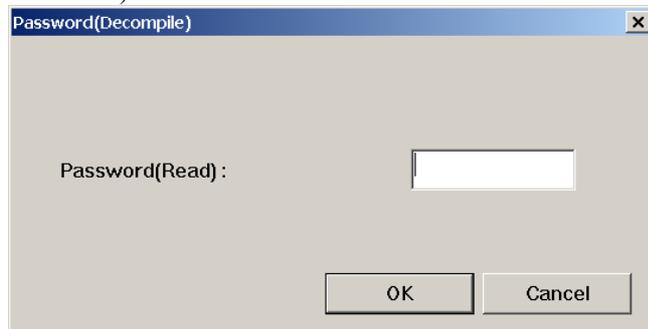


Fig. 5.2 (c)

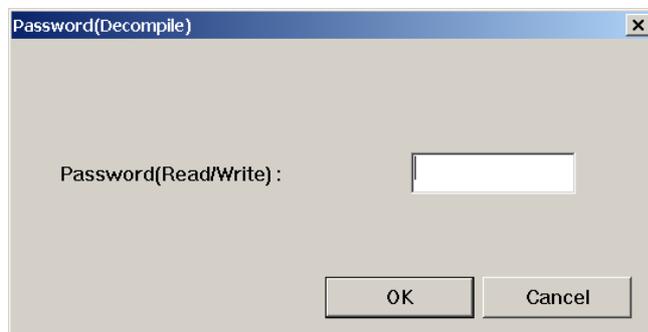


Fig. 5.2 (d)

- 4 Once decompilation is complete, the number of errors and warnings appears.

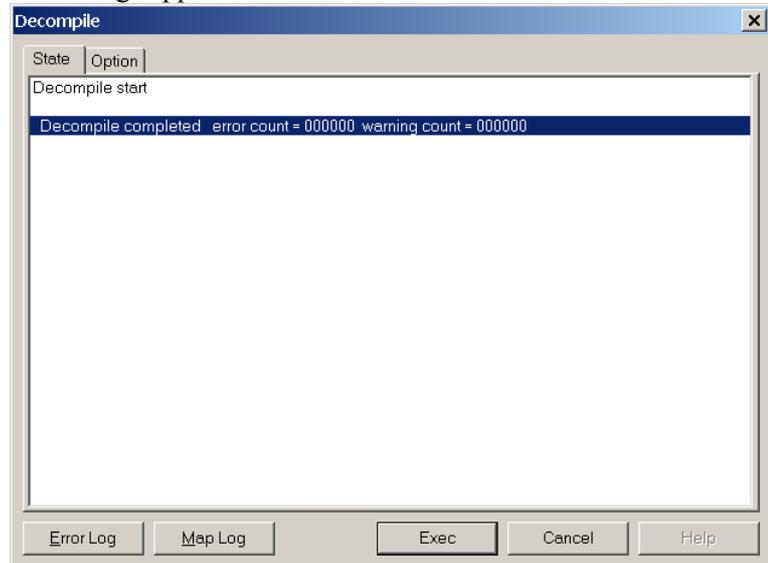


Fig. 5.2 (e)

NOTE

Password

The password to be entered differs depending on the type of the password added to an object code.

- To permit display → Enter the password to permit display
- To permit display and editing → Enter a password to permit display and editing
- Both → Enter a password to permit display and editing

5.3 AUTOMATIC COMPILED AND DECOMPILED

This section describes automatic compilation and decompilation.

The automatic compilation or decompilation processing is performed when the mode is switched between offline and online so that a source program in a sequence program (LAD file) is consistent with the object code (memory card-formatted data).

- Execution condition of automatic compilation

Select [Ladder] - [Online/Offline]. When the mode is switched from offline to online, a source program is compiled automatically under one of the following conditions.

- When a source program (such as a title or ladder) is changed
- When a source program is imported
- When a source program is not compiled after a sequence program is created
- When the time stamp of memory card-formatted data is older than that of any data in a source program (when data is converted)

- Execution condition of automatic decompilation

Select [Ladder] - [Online/Offline]. When the mode is switched from online to offline, object code is decompiled automatically under one of the following conditions.

- When memory card-formatted data is loaded from the PMC
- When a memory card-formatted file is imported
- When a Handy File-formatted file is imported
- When a ROM-formatted file is imported
- When online editing is executed
- When the time stamp of any data in a source program is older than that of memory card-formatted data (when data is converted)

NOTE

Setting options for automatic compilation or decompilation

(1) Compile option

- Select [Tool] - [Option].
- Click the [Compile] tab for setting.

(2) Decompile option

- Select [Tool] - [Option].
- Click the [Decompile] tab for setting.

5.4 PROTECTING LADDER PROGRAMS BY PASSWORDS

This section describes the protection of a ladder program.

Adding a password to an object code prevents a ladder program from being displayed or edited on a CRT or MDI.

- How to create object code with a password
 - 1 Select [Tool] - [Compile].
 - 2 Click the [Option] tab, then select [Setting of Password].
 - 3 Click the <Exec> button.
 - 4 When the [Password(Compile)] dialog appears, enter a password.

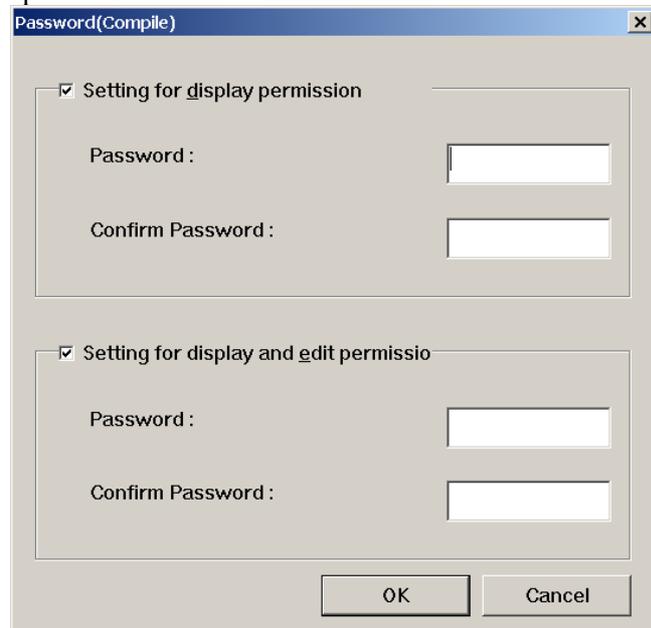


Fig. 5.4 (a)

- 5 Click the <OK> button. Then, object code with the entered password is created.

NOTE

Entering a password

- 1 A password must consist of no more than eight alphanumeric characters.
- 2 Passwords are not case-sensitive. (A lower-case letter is regarded as an upper-case letter.)
- 3 A space, kana character, kanji character, and special character (for example, *, #, and @) cannot be used.
- 4 There are combinations of characters, which cannot be used in some rare cases. (An error message appears.) In this case, enter another string.

5.4.1 Partial Protect Functions

This subsection describes the partial protect function.

Using a special password to permit display and editing enables the subprogram area to be divided into a protection area and non-protection area, as well as enabling a ladder program to be partially protected. An object code with a special password is created in the same way as an object code with a normal password, except for using the special password to permit display and editing.

- Special password

A special password begins with #.

(Except for its beginning with #, a special password is no different from a normal password.)

Example of a special password: #FANUC

- Protection area and non-protection area

A subprogram number identifies the protection area and non-protection area.

Main program	LEVEL1	Protection area
	LEVEL2	Protection area
	LEVEL3	Protection area
Subprogram	P1 to P1499 P1500	Protection area
	to P2000	Non-protection area

- Applied model

PMC-SB4(STEP)/SC4(STEP)/SB6(STEP)/
SB6(STEP,IO-2)/SB7/NB2(STEP)

NOTE

Object code with a special password can be decompiled without entering a password. In this case, only a subprogram in the non-protection area (P1500 or later) can be displayed, edited, and printed. When compiled, [Setting of Password] in the compile option is ignored and an object code is created by using a special password added to the object code. This enables only the non-protection area to be changed while a ladder program created by a machine manufacturer is protected.

6

MNEMONIC EDITING

This chapter describes how to convert a source program to a mnemonic file, and vice versa, as well as the mnemonic file format.

6.1 CONVERTING SOURCE PROGRAMS TO MNEMONIC FILES

This section describes the procedure for converting a source program to a mnemonic file that can be edited with a text editor.

Procedure

- 1 Select [Tool] - [Mnemonic Convrt]. Then, the [Mnemonic – Mnemonic Conversion] dialog appears.

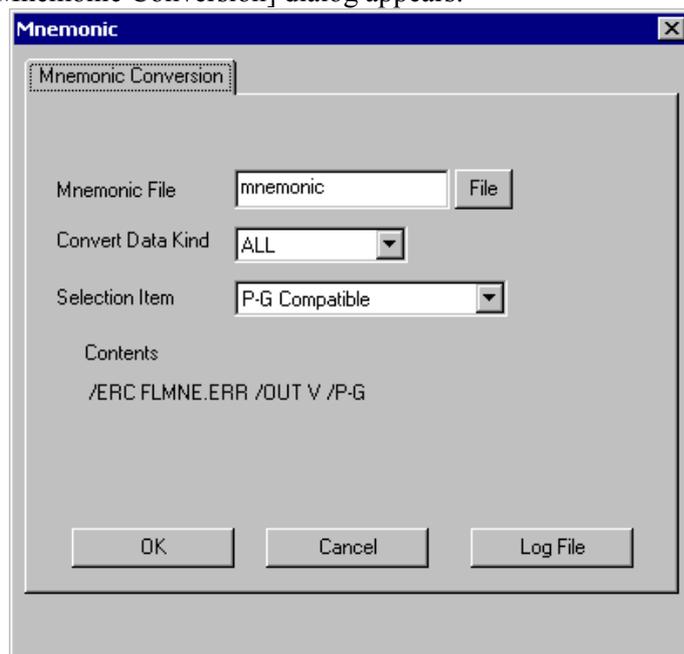


Fig. 6.1

- 2 Enter a mnemonic file name in [Mnemonic File].
- 3 Select [Convert Data Kind]. The following items can be selected:

Table 6.1 (a)

ALL	Converts all source programs.
System Parameter	Converts only system parameters.
Title	Converts only titles.
Symbol&Comment	Converts only symbols and comments.
Ladder	Converts only ladder programs.
I/O Module	Converts only I/O modules.
Message	Converts only messages.

- 4 Select [Selection Item]. The following items can be selected:

Table 6.1 (b)

P-G Compatible	<ul style="list-style-type: none"> - Converts data to data in the format output by P-G. - Converts Japanese messages to code-formatted data.
Full Options	<ul style="list-style-type: none"> - Converts comments in which kanji characters are included in the comment data. - Converts data in which the symbol and comment for an address as well as the function name of a function are used as comments. - Converts data that has an instruction part, operand part, and comment part. - Converts Japanese messages to Japanese-formatted data.
Label/Subprogram	<ul style="list-style-type: none"> - Converts data with the jump addresses (labels) of functions (JMPB, JMPC, CALL, SP commands) used in a subprogram highlighted. However, the step number of mnemonic data after conversion is different from the other settings. (The function part used in a subprogram is different.) - Converts Japanese messages to Japanese-formatted data.

- 5 To convert a source program to a mnemonic file, click the <OK> button. Once the conversion is completed, the conversion results appear.
(To see the last converted results, click the <Log File> button.)

NOTE

For conversion to a mnemonic program, a step sequence subprogram is not converted.

6.2 CONVERTING MNEMONIC FILES TO SOURCE PROGRAMS

This section describes the procedure for converting a mnemonic file edited by a text editor to a source program in accordance with a certain format.

Procedure

- 1 Select [Tool] - [Source Program Convert]. Then, the [Mnemonic – Source Program Conversion] dialog appears.

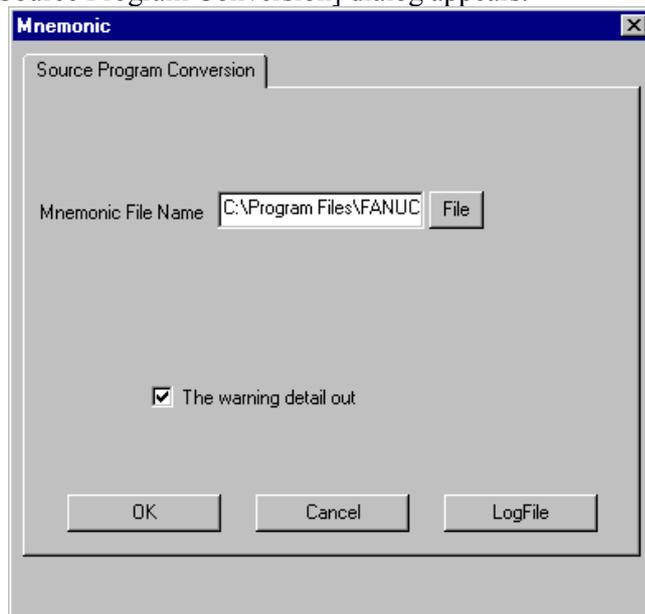


Fig. 6.2

- 2 Enter a mnemonic file name in [Mnemonic File Name].
- 3 When checking is enabled, a warning is output to a log file when it occurs during conversion of a symbol & comment mnemonic file to a source program. (Conventional specification)
When checking is disabled, the warnings and the number of occurrences are output to a log file at the end of conversion of a symbol & comment mnemonic file to a source program.
Target warning numbers: K:W-4131, K:W-4133, K:W-4139
- 3 To convert a mnemonic file to a source program, click the <OK> button.
Once the conversion is complete, the conversion results appear. (To see the most recently converted results, click the <Log File> button.)

NOTE

- 1 For conversion to a source program, the source program of the currently open sequence program is changed but is not stored, however.
- 2 For a coil comment, created in A or B format, that contains single-byte lowercase alphabetic characters, the lowercase characters are replaced with uppercase characters when a mnemonic file is converted to a source program.

6.3 MNEMONIC FILE FORMAT

This section describes the mnemonic file format.

- Identification code

For a mnemonic file, data is defined using one of four types of identification code, beginning with %.

Table 6.3 (a)

Identification code	Meaning
%@A	Start of ALL-format data
%@E	End of ALL-format data
%@0 to %@5	Start of each single-format data %@0: System parameter %@1: Title %@2: Symbol and comment (FORMAT-A/B) %@2-C: Symbol and comment (FORMAT-C) %@3 Ladder %@4: Message %@5: I/O module
Only %	End of each single-format data

- Line feed code

LF (0AH) is used as the line feed code.

CR (0DH) is ignored.

- Delimiter

Table 6.3 (b)

;(Semicolon)	This is used in ladder data. - This is used in the ladder data part to delimit ladder data and a comment statement. Data after ";" is regarded as being a comment statement. Consequently, when a mnemonic file is converted to a source program, data after ";" is not converted but deleted.
:(Colon)	This is used in ladder data and I/O module data. - This is used in a ladder data part to delimit net numbers and ladder data. Data before ":" is regarded as being net numbers. - This is used in the I/O module data part to delimit channel numbers and I/O module data. Data before ":" is regarded as being channel numbers.

- Control character

In a mnemonic file, a dollar sign ("\$\$") is used as the control character.

When a dollar sign is used in a string, describe "\$\$."

(1) Symbol and comment data

- Specifying address and symbol

Describe an address and symbol on the same line. At the beginning of a line, describe an address, use a half-size space or tab as a delimiter, and then describe a symbol.

R0200.0 UNIT-3-POWER

Address Symbol

Half-size space or tab

- Specifying a relay comment and coil comment

Describe a relay comment and coil comment after the specification of an address described in (1). A string enclosed in the first single quotation marks "" after "\$1" is a relay comment. A string enclosed in the second single quotation marks is a coil comment.

\$1 'KEEPPOWERON' 'KEEPPOWERON'

Relay comment Coil comment

Half-size space or tab

Half-size space or tab

Mark that represents comment data (always '\$1')

When you do not use a relay comment, describe a pair of single quotation marks for the relay comment part.

\$1 ' 'INITIALIZE OF SEQUENCE'

NOTE

When you use a single quotation mark "" in a string of a relay comment or coil comment, describe a dollar sign plus a single quotation mark "\$" + "'."

(2) Ladder data

- Starting and ending a net comment

Describe a net comment with "(*" "*)" in a ladder mnemonic.

Table 6.3 (c)

Description	Meaning
(*	Start of a net comment
*)	End of a net comment

- Specifying the position of a form feed character (printing a ladder diagram)

To specify the position of a form feed character to print a ladder diagram, describe "\$P" in a net comment.

Table 6.3 (d)

Description	Meaning
\$P or #p	Specification of position of form feed character (printing ladder diagram)

6.4 MNEMONIC FILE SAMPLE

This section provides examples of mnemonic files for the single format and All format.

6.4.1 Single Format

This section shows a sample file for each single-format data.

6.4.1.1 Parameter

%@0	
2 BCD	→ Counter data type
3 NO	→ Presence or absence of operator panel
4 PMC-RC4	→ PMC type
5 000000	→ Head address of language program link control statement data
6 50	→ Time ratio to execute language program
7 100	→ Ladder execution time
%	

Counter data type
 BINARY or BCD

Presence or absence of operator panel
 No operator panel: NO
 Operator panel: YES X0000 Y0000 R0000 R0010

KEY address

KEY image address

LED address

LED image address

PMC type

Table 6.4.1.1

PMC model	Setting data (half-size string)
PMC-SA1	PMC-RA1
PMC-SA3	PMC-RA3
PMC-SA5	PMC-RA5
PMC-SB3	PMC-RB3
PMC-SB4	PMC-RB4
PMC-SB4 (STEP SEQ)	PMC-RB4 (STEP SEQ)
PMC-SB5	PMC-RB5
PMC-SB6	PMC-RB6
PMC-SB6 (STEP SEQ)	PMC-RB6 (STEP SEQ)
PMC-SB6 (IO-2)	PMC-RB6 (IO-2)
PMC-SB6 (STEP, IO-2)	PMC-RB6 (STEP, IO-2)
PMC-SB7	PMC-RB7
PMC-SC3	PMC-RC3
PMC-SC4	PMC-RC4
PMC-SC4 (STEP SEQ)	PMC-RC4 (STEP SEQ)
PMC-NB	PMC-NB
PMC-NB2	PMC-NB2
PMC-NB6	PMC-NB6
PMC-PA3	PMC-PA3
PMC-QC	PMC-QC

Head address of language program link control statement data
0, or 800000 to 8FFFFFF (hex)

Time ratio to execute language program
1 to 99 (%)

Ladder execution time
100 (fixed at 100%)

I/O link assignment selection function (channel 1)
Used: USE
Not used: UNUSE

Number of basic I/O link groups (channel 1)
0 to 16

I/O link assignment selection function (channel 2)
Used: USE
Not used: UNUSE

Number of basic I/O link groups (channel 2)
0 to 16

The parameters for each model are described below.

(1) For PMC-PA3/SA3/SA5/SB4/SB5/SB6

%@0		
2 BINARY	2. Counter data type	(BINARY or BCD)
3 NO	3. Presence or absence of operator panel	(Presence: YES, Absence: NO)
4 PMC-RB5	4. PMC type	(PMC-PA3/PMC-RA3/PMC-RA5/PMC-RB4/PMC-RB5/PMC-RB6)
%		

(2) For PMC-SB3/NB6

%@0		
2 BINARY	2. Counter data type	(BINARY or BCD)
3 NO	3. Presence or absence of operator panel	(Presence: YES, Absence: NO)
4 PMC-NB6	4. PMC type	(PMC-RB3/PMC-NB6)
7 100	7. Ladder execution time	(fixed at 100%)
%		

(3) For PMC-SC3/SC4

%@0		
2 BINARY	2. Counter data type	(BINARY or BCD)
3 NO	3. Presence or absence of operator panel	(Presence: YES, Absence: NO)
4 PMC-RC3	4. PMC type	(PMC-RC3/PMC-RC4)
5 000000	5. Head address of language program link control statement data	(0 or 800000 to 8FFFFFF(hex))
6 50	6. Time ratio to execute language program	(1 to 99%)
7 100	7. Ladder execution time	(fixed at 100%)
%		

(4) For PMC-NB/NB2

%@0		
2 BINARY	2. Counter data type	(BINARY or BCD)
3 NO	3. Presence or absence of operator panel	(Presence: YES, Absence: NO)
4 PMC-NB	4. PMC type	(PMC-NB/PMC-NB2)
5 000000	5. Head address of language program link control statement data	(0 or 200000 to 2FFFFFF(hex))
6 50	6. Time ratio to execute language program	(1 to 99%)
7 100	7. Ladder execution time	(fixed at 100%)
%		

(5) For PMC-SB7

%@0		
2 BINARY	2. Counter data type	(BINARY or BCD)
3 NO	3. Presence or absence of operator panel	(Presence: YES, Absence: NO)
4 PMC-SB7	4. PMC type	(PMC-SB7)
7 150	7. Ladder execution time	
11 UNUSE	11. I/O link assignment selection function	(Used: USE, Not used: UNUSE) (channel 1)
12 0	12. Number of basic I/O link groups	(0 to 16) (channel 1)
13 UNUSE	13. I/O link assignment selection function	(Used: USE, Not used: UNUSE) (channel 2)
14 0	14. Number of basic I/O link groups	(0 to 16) (channel 2)
%		

6.4.2 Title

```
%@1
01 MACHINE TOOL BUILDER NAME
02 MACHINE TOOL NAME
03 CNC & PMC NAME
04 PMC PROGRAM NO.
05 EDITION NO.
06 PROGRAM DRAWING NO.
07 DATE OF PROGRAMMING
08 PROGRAM DESIGNED BY
09 ROM WRITTEN BY
10 REMARKS
%
```

6.4.2.1 Symbol and comment

```
%@2-C
R0200.0 UNIT-3-POWER
$1 'KEEP POWER ON' 'KEEP UNIT-3 POWER ON'
R0200.1 UNIT-2-ACT
$1 '$POWER$$' 'KEEP UNIT-4 $$POWER$' ON'
R0300.0
$1 'KEEP POWER ON' 'KEEP UNIT-4 POWER ON'
P0008 OPEN-FRONT
$1 'OPEN FRONT COVER
L0100 INITIALIZE
$1 " 'INITIALIZE OF SEQUENCE
%
```

6.4.2.2 Ladder

- P-G compatible and Japanese comment

```

%@3
RD X0.4
OR Y80.6
WRT D300.1
SUB 1
RD.NOT X3.0
SUB 40
2
8191
D300
SUB 2
%
```

- Full option

```

%@3
N00001:  SUB   71      ; SP
          P1          ; (SUBPR1 ) "SUB PROG. NO.01"
          ; [SUB PROGRAM DATA NO.01]
N00002:  RD    X0.0    ; (XADRS1 ) "JUMPB LABEL L001"
          SUB    68      ; JMPB
          L100        ; (LABEL1 )
          ; [LABEL L00001]
N00003:  RD    X0.1    ; (XADRS2 ) "JMPC LABEL L001"
          SUB    73      ; JMPC
          L100        ; (LABEL1 )
          ; [LABEL L00001]
N00004:  SUB    69      ; LBL
          L100        ; (LABEL1 )
          ; [LABEL L00001]
N00005:  SUB    72      ; SPE
N00006:  SUB    71      ; SP
          P2          ; (SP1000 ) "SUB PROGRAM NO.1"
N00007  RD    R0.0    ; (RADRS00)
          DEC    D0     ; (DADRS04)
          2
          WRT    D0.0
N00008:  SUB    72      ; SPE
N00009:  SUB    64      ; END
%
```

- Label and subprogram

```

%@3
SUBPR1  SP      SUBPR1 ; <P1 > "SUB PROG. NO.01"
                                ; [SUB PROGRAM DATA NO.01]
                                ; <X0.0 > "JUMPB LABEL L001"
                                ; <L100 >
                                ; [LABEL L00001]
                                ; <X0.1 > "JUMPB LABEL L002"
                                ; <L100 > [LABEL L00001]
                                ; <L100 >
                                ; [LABEL L00001]
                                ; [LABEL L00001]
L00001  LBL
                                ; <L100 >
                                ; [LABEL L00001]
                                ; [LABEL L00001]
SP1000  SP      ; <P2 > "SUB PROG. NO.01"
                                ; <R0.0 >
RD      RADR00 ; <R0.0 >
DEC     DADR04 ; <D0 >
                                2
                                WRT D0.0
                                SPE
                                END
%
```

6.4.2.3 Message

```

%@4
A00.0 2100020 ACT DOOR NOT CLOSE
A00.1 2101022 SPINDLE SPEED ARRIVAL SIGNAL NOT ON
A00.2 2100020 EDTOK KEY SWITCH ON
%
```

6.4.2.4 I/O module

```

%@5
X000 1 0 1 ID64A
Y008 1 0 4 OD64B
%
```

6.4.3 ALL format

```

%@A
%@0
2 BINARY
3 NO
4 PMC-RB4
%
%@1
01 MACHINE TOOL BUILDER NAME
:
:
10 REMARKS
%
%@2-C
R0200.0 UNIT-3-POWER
$1 'KEEP POWER ON' 'KEEP UNIT-3 POWER ON'
R0200.1 UNIT-2-ACT
$1 '$POWER$$' 'KEEP UNIT-4 $POWER$' ON'
R0300.0
$1 'KEEP POWER ON' 'KEEP UNIT-4 POWER ON'
P0008 OPEN-FRONT
$1 'OPEN FRONT COVER
L0100 INITIALIZE
$1 '' 'INITIALIZE OF SEQUENCE
%
%@3
RD R1001.0
OR R120.3
AND R1000.2
WRT Y2000.4
(*
Describe a net comment at this position.
Any characters that can be entered from a PC are available.
*)
RD R1001.0
AND R1000.2
WRT Y23.4
(* $p *) ← Specification of the position of a form feed character (printing a
ladder diagram)

RD R101.0
OR R123.4
AND R100.2
WRT Y200.4
%
%@4
A00.0 2100020 ACT DOOR NOT CLOSE
A00.1 2101022 SPINDLE SPEED ARRIVAL SIGNAL NOT ON
%
%@5
X000 1 0 1 ID16C
Y008 1 0 4 OD32A
%
%@E

```

7

INPUT/OUTPUT

This chapter describes how to load and store programs.

NOTE

- 1 When input or output (loading data from the PMC or storing data to the PMC) is performed during NC operation, the speed at which data (such as positions) is displayed on an NC screen may fall. This does not, however, affect NC operation. It is recommended that input or output be performed while the NC is not being operated.
- 2 While a screen created by the C executor is displayed, the communication speed falls. It is recommended that, after moving to another screen such as the position display screen, input or output (loading data from the PMC or storing data to the PMC) be performed.

7.1 SETTING UP COMMUNICATION

Program editing and input/output operations in online mode can be performed via an Ethernet port. The following explains how to set up connection via an Ethernet port.

7.1.1 Procedure

1. Select [Tool] - [Communication...].

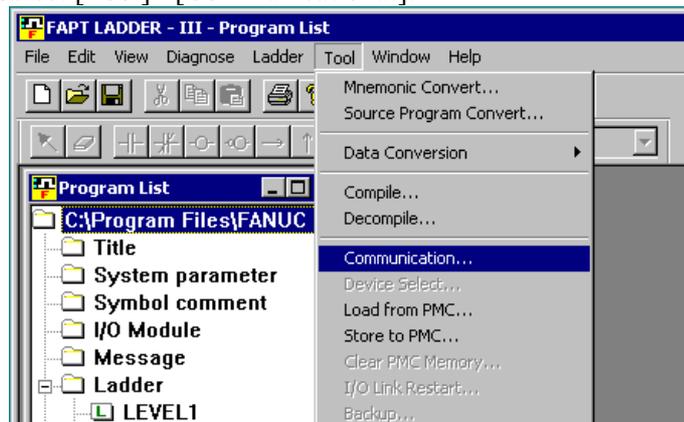


Fig. 7.1.1 (a)

2. Select [Network Address] and click the <Add host> button. Click the <Advanced> button to display the "Host Setting Dialog" box.

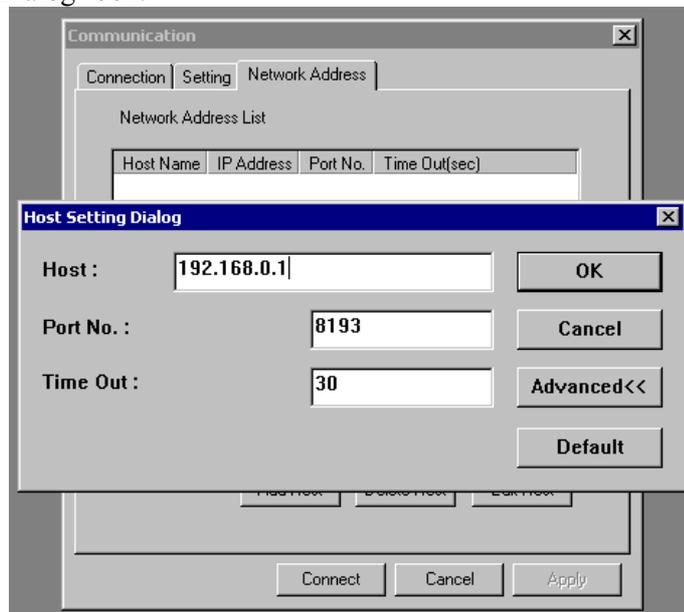


Fig. 7.1.1 (b)

Host

Specify a host name (for example, "CNC1") or an IP address (for example, "190.168.0.1").

Port No.

Specify the port number of the Ethernet function of the CNC to be connected.

Time Out

Specify the time out applied to the transmission/reception of PMC data, in seconds.

3. Select [Setting] and add a network address to "Use device".

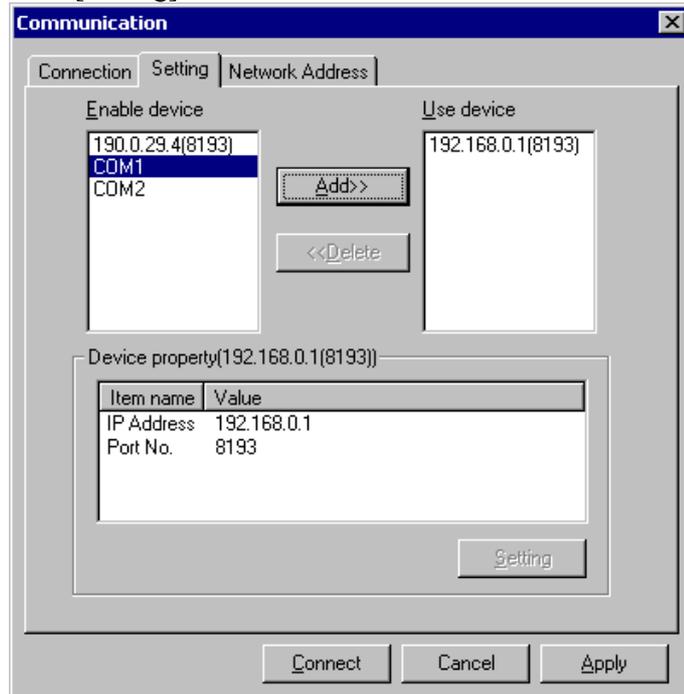


Fig. 7.1.1 (c)

4. Click the <Connect> button to start communication.

NOTE

If the PMC is displaying one of the following screens, you cannot communicate with the PMC. Use the online function after the PMC switches to another screen.

[PMCLAD], [I/O], [EDIT], [SYSPRM], [TRACE],
[ANALYS], [USRDN], [DBGLAD], [GDT],
[USRMEM]

7.2 LOADING SEQUENCE PROGRAMS FROM THE PMC (DURING DISCONNECTION WITH THE PMC)

7.2.1 Procedure

- 1 Select [File] - [Open Program] to open the program into which data is to be loaded.
- 2 Select [Tool] - [Load from PMC].
The [Program transfer wizard Selection of transferred method] screen appears.

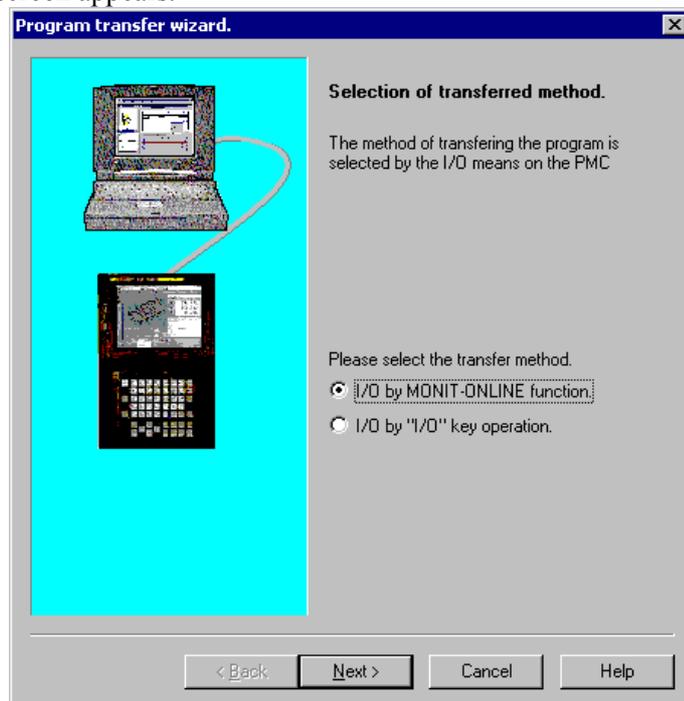


Fig. 7.2.1(a)

- 2-1 Select a transfer method.
 - <I/O by MONIT-ONLINE function>
A communication function by an online monitor is used.
 - <I/O by "I/O" key operation>
Input or output is performed by the HOST operation of an I/O function.

NOTE

On PMC-SB7, this screen does not appear. On PMC-SB7, only <I/O by MONIT-ONLINE function> is available.

◆ <I/O by MONIT-ONLINE function>

- 3 Select <I/O by MONIT-ONLINE function>, and then click the <Next> button. The following message appears.

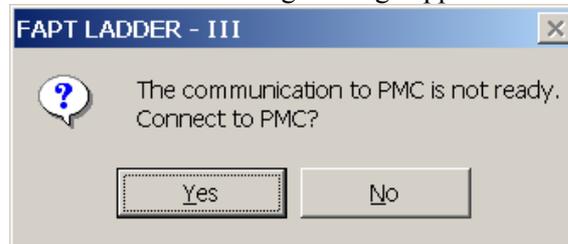


Fig. 7.2.1(b)

- 4 To display the [Communication] screen to start access to the PMC, click the <Yes> button.

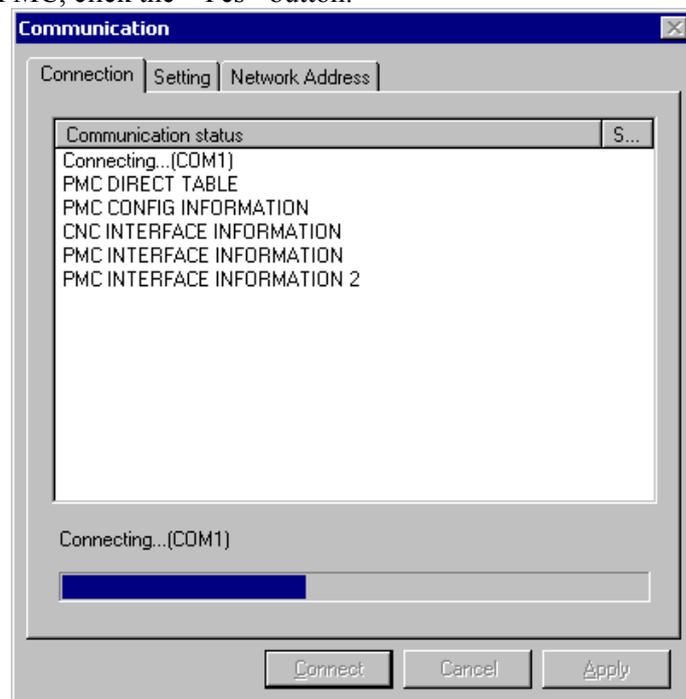


Fig. 7.2.1(c)

- 5 When there is a loader, the [Communication Current Device] screen appears. Select either CNC Main or LOADER, and then click the <Exec> button.



Fig. 7.2.1(d)

- 6 The [Program transfer wizard Selection of loading/store] screen appears. Click the <Next> button.



Fig. 7.2.1(e)

- 7 The [Program transfer wizard Selection of program] screen appears.

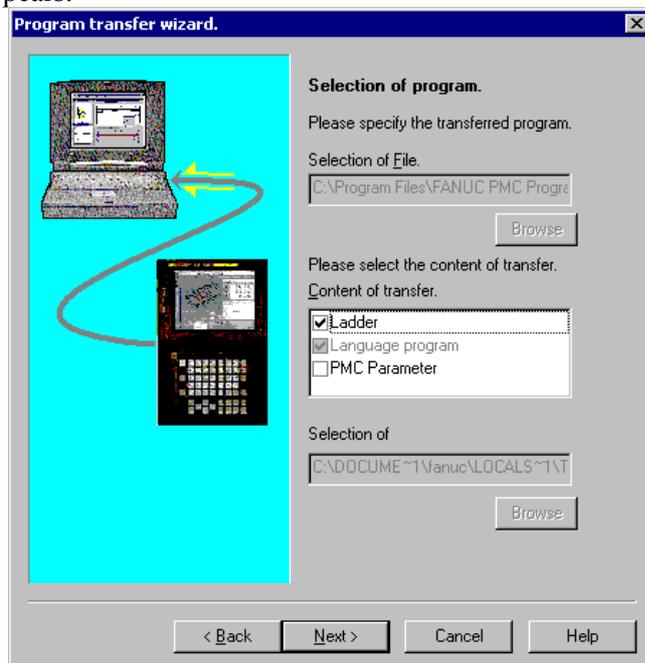


Fig. 7.2.1(f)

- 8 For the remainder of the procedure, see Section 7.3, "Loading Sequence Programs from the PMC (During Connection with the PMC)."

◆ <I/O by “I/O” key operation>

- 3 Select <I/O by “I/O” key operation>, and then click the <Next> button. The [Program transfer wizard Selection of loading/store] screen appears.



Fig. 7.2.1(g)

- 4 Click the <Next> button. The [Program transfer wizard Selection of program] screen appears.

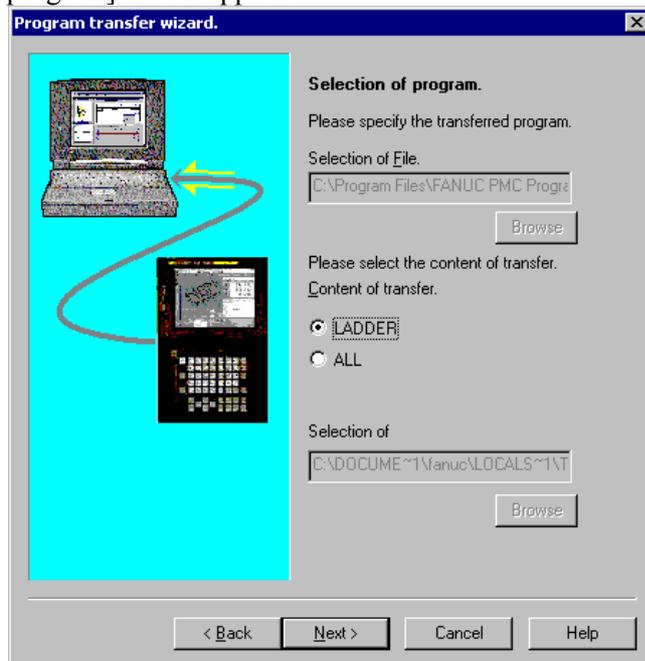


Fig. 7.2.1(h)

- 5 Select LADDER or ALL, and then click the <Next> button.

- 6 The [Program transfer wizard Setting of communication] screen appears.
Set a communication protocol, and then click the <Next> button.

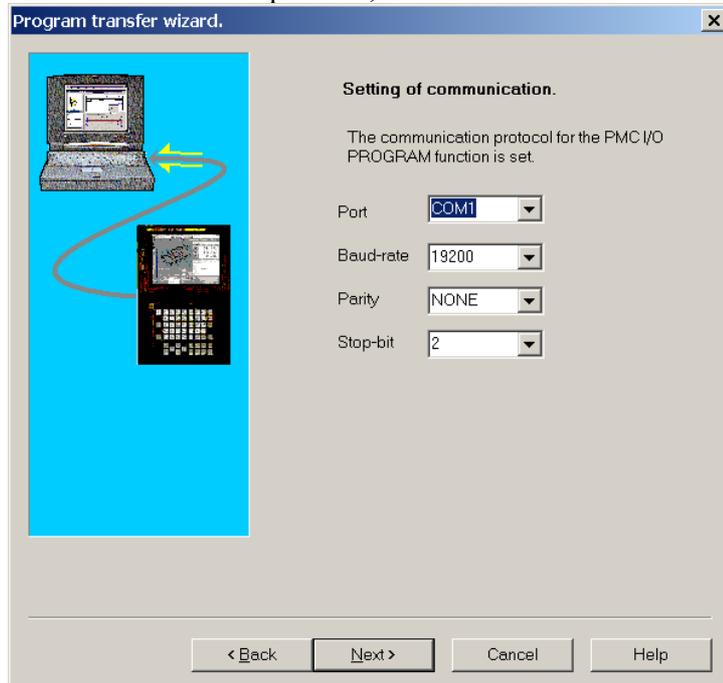


Fig. 7.2.1(i)

- 7 The [Program transfer wizard Confirmation of processing] screen appears.

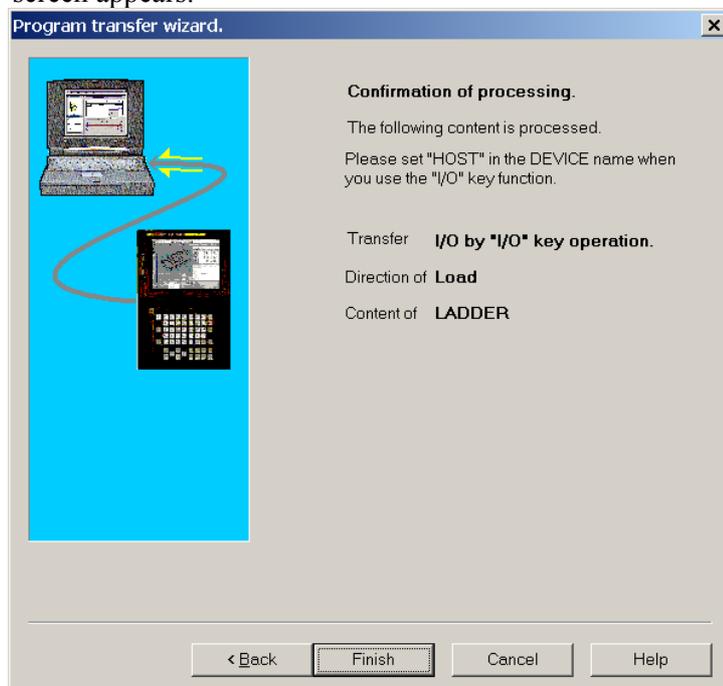


Fig. 7.2.1(j)

- 3 Click the <Finish> button. Then, the [Execution of I/O transfer] screen appears.

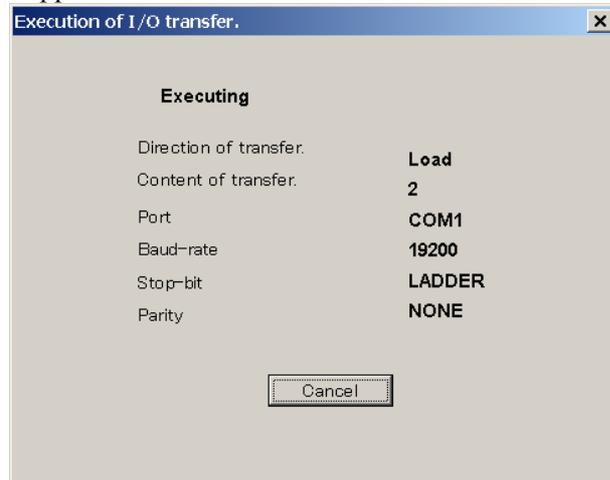


Fig. 7.2.1(k)

NOTE

Set CHANNEL, DEVICE, FUNCTION, and DATA KIND on the PMC I/O PROGRAM screen of the PMC in advance. Set HOST for DEVICE. For details of the settings, refer to the FANUC PMC Ladder Language Programming Manual (B-61863E). Press soft key <EXEC> of the NC to place the NC in standby.

- 9 Once I/O transfer is complete, the following message appears.



Fig. 7.2.1(l)

7.3 LOADING SEQUENCE PROGRAMS FROM THE PMC (DURING CONNECTION WITH THE PMC)

7.3.1 Procedure

- 1 Select [File] - [Open Program] to open the program into which data is loaded.
- 2 Select [Tool] - [Load from PMC].
The [Program transfer wizard Selection of program] screen appears.

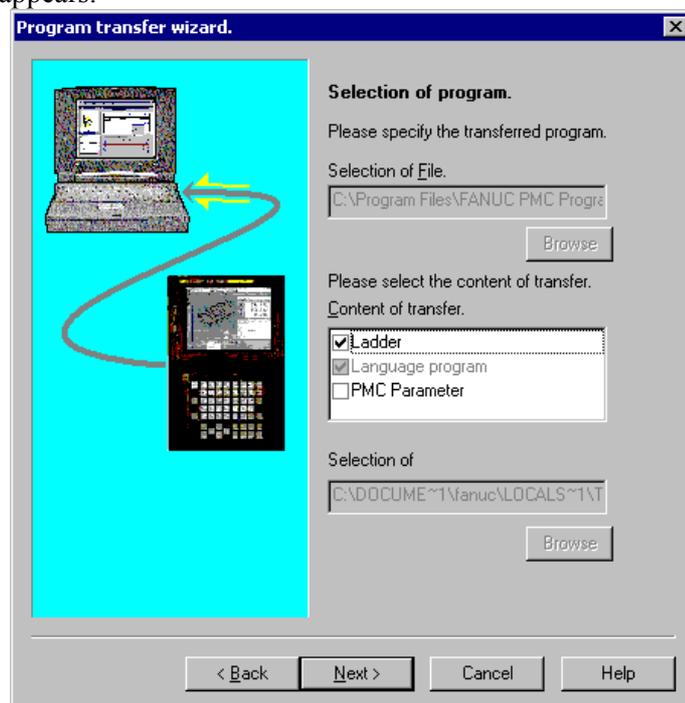


Fig. 7.3.1(a)

NOTE

When connection is not established, the [Communication] screen appears. Then, establish connection.

2-1 Set data.

Content of transfer

As transfer information, a selection can be made from Ladder, Language program, and PMC Parameter. When transferring PMC parameters, enter a transfer destination file name in [Selection of]. The initial setting specifies that PMC parameters are transferred to PMC_PRM.PRM in a user file folder.

For a user file folder, see Subsection 3.1.3, "Work Folders and Online Program Files."

A PMC parameter file once transferred to a user file

folder can be restored by using the export function.
For the export function, see Section 3.15,
"EXPORTING PROGRAMS."

NOTE

Only PMC-SC3/SC4 allow loading and storing of language programs. Those types of PMCs to which a C board is attached do not allow loading and storing of language programs.

2-2 Click the <Next> button. The [Program transfer wizard Confirmation of processing] screen appears.

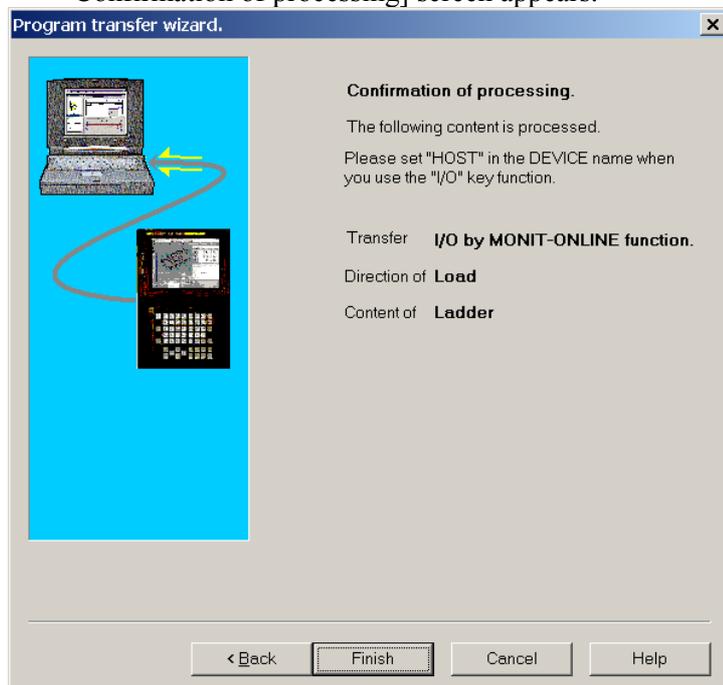


Fig. 7.3.1(b)

2-3 Check the setting items. Click the <Finish> button. Then, the [Transfer monitor] screen appears, and then the program is transferred.

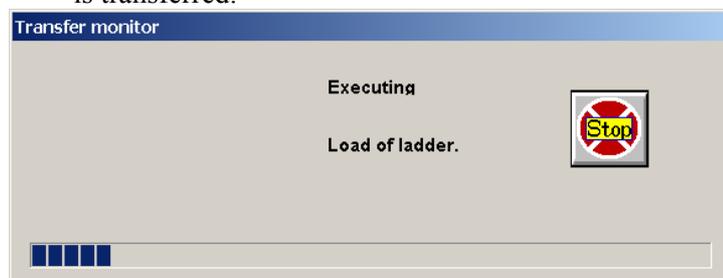


Fig. 7.3.1(c)

7.4 STORING SEQUENCE PROGRAMS IN THE PMC (DURING CONNECTION WITH THE PMC)

7.4.1 Procedure

- 1 Select [File] - [Open Program] to open the program to be stored.
- 2 Select [Tool] - [Store to PMC].
The [Program transfer wizard Selection of transferred method] screen appears.

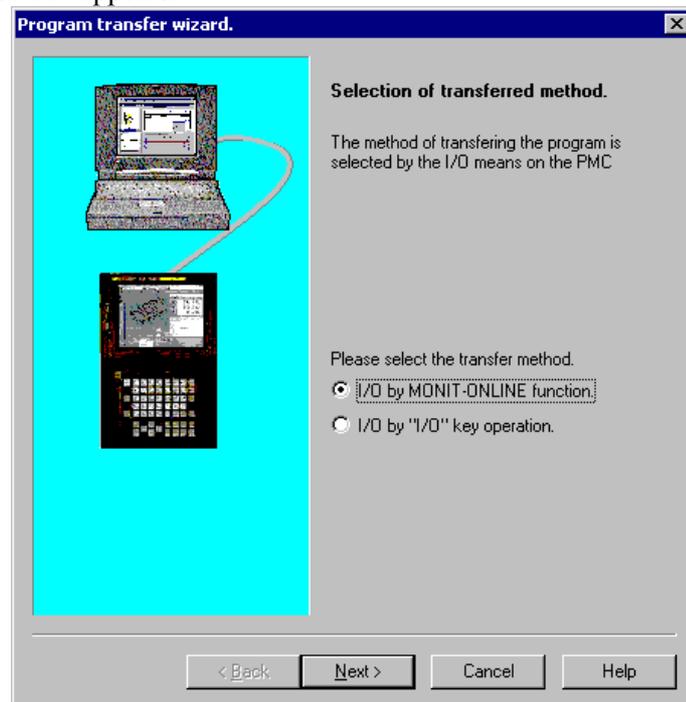


Fig. 7.4.1(a)

- 2-1 Selection of transferred method.
 - <I/O by MONIT-ONLINE function>
A communication function by an online monitor is used.
 - <I/O by "I/O" key operation>
An input or output is performed by the HOST operation of an I/O function.

◆ <I/O by MONIT-ONLINE function>

- 3 Select <I/O by MONIT-ONLINE function>, and then click the <Next> button. The following message appears.

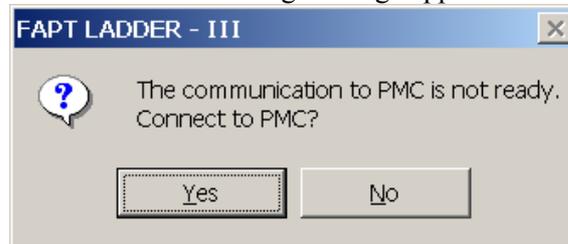


Fig. 7.4.1(b)

- 4 Click the <Yes> button. The [Communication] screen appears, after which access to the PMC is started.

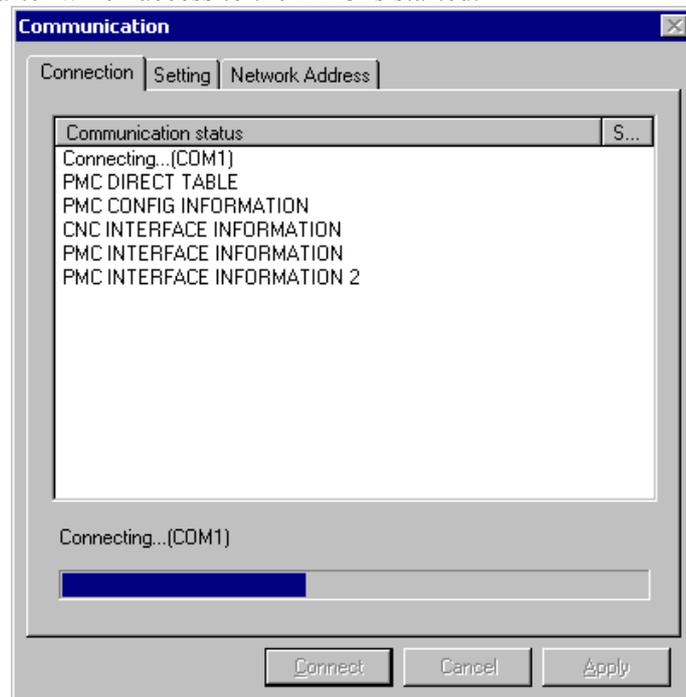


Fig. 7.4.1(c)

- 5 When there is a loader, the [Communication Current Device] screen appears. Select CNC Main or LOADER, and then click the <Exec> button.



Fig. 7.4.1(d)

- 6 The [Program transfer wizard Selection of loading/store] screen appears. Click the <Next> button.

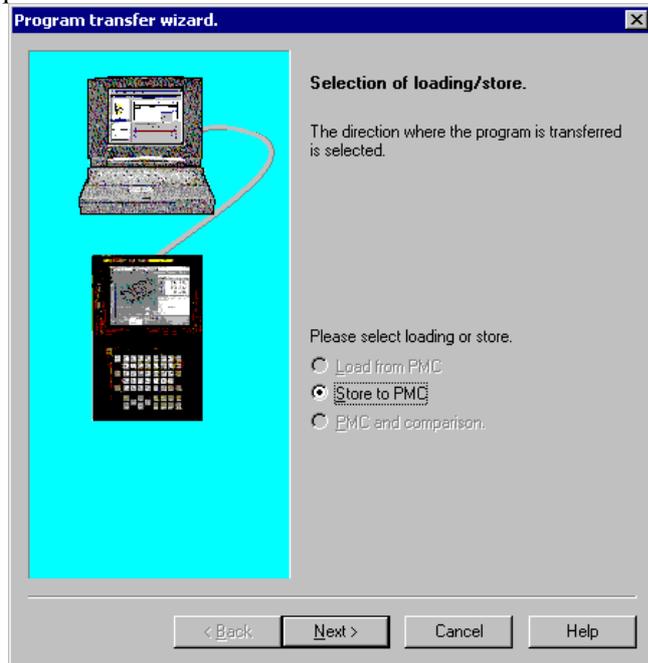


Fig. 7.4.1(e)

- 7 The [Program transfer wizard Selection of program] screen appears.

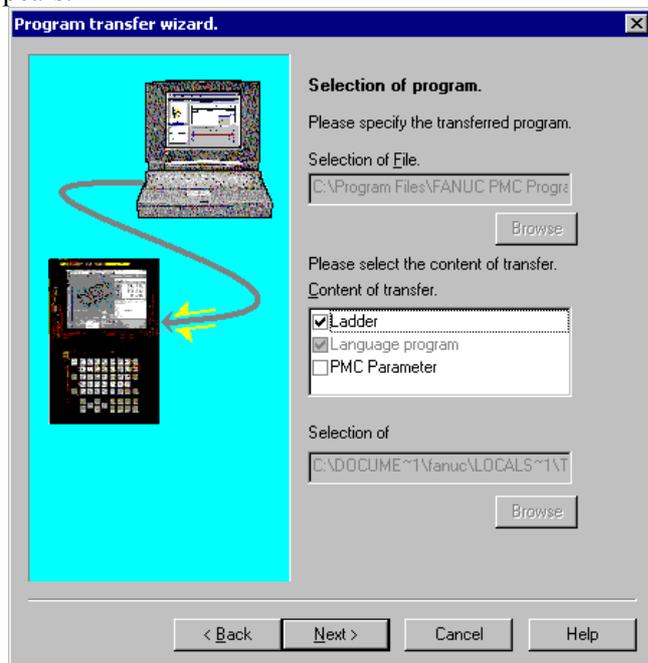


Fig. 7.4.1(f)

- 8 For the remainder of the procedure, see Section 7.5, "Storing Sequence Programs in the PMC (During Connection with the PMC)."

◆ <I/O by “I/O” key operation>

- 3 Select <I/O by “I/O” key operation>, and then click the <Next> button. The [Program transfer wizard Selection of loading/store] screen appears.



Fig. 7.4.1(g)

- 4 Click the <Next> button. The [Program transfer wizard Selection of program] screen appears.



Fig. 7.4.1(h)

- 5 Select LADDER or ALL, then click the <Next> button.

- 6 The [Program transfer wizard Setting of communication] screen appears.
Set a communication protocol, and then click the <Next> button.

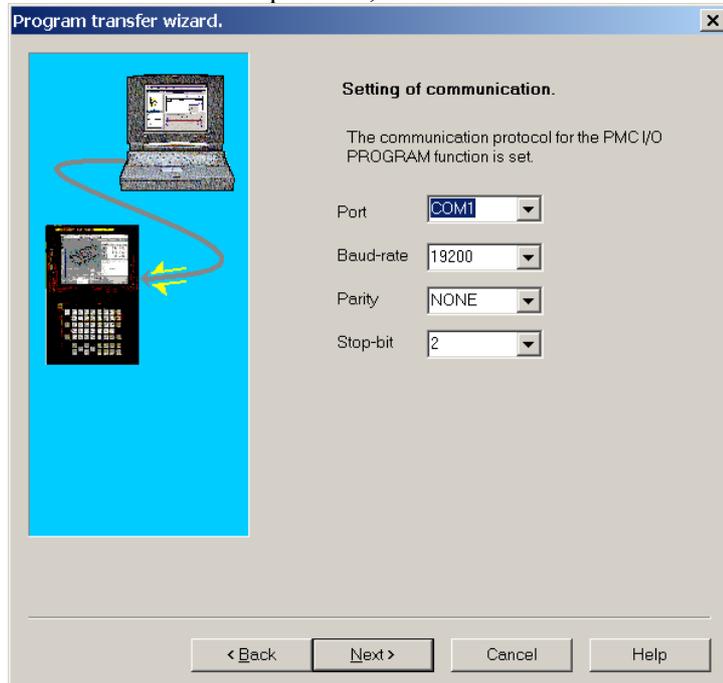


Fig. 7.4.1(i)

- 7 The [Program transfer wizard Confirmation of processing] screen appears.

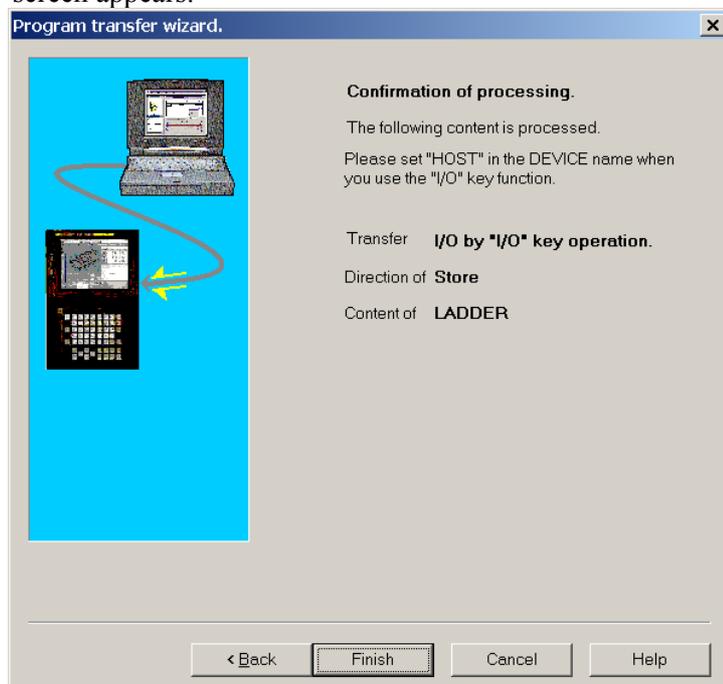


Fig. 7.4.1(j)

- Click the <Finish> button. The [Execution of I/O transfer] screen appears.

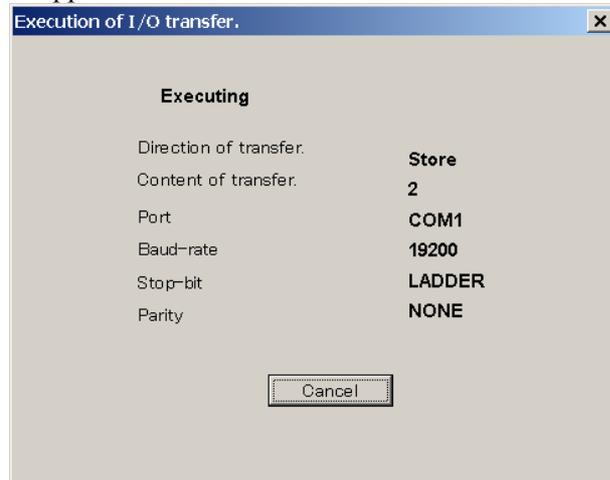


Fig. 7.4.1(k)

NOTE

Set CHANNEL, DEVICE, FUNCTION, and DATA KIND on the PMC I/O PROGRAM screen of the PMC in advance. Set HOST for DEVICE. For details of these settings, refer to the FANUC PMC Ladder Language Programming Manual (B-61863E). Press soft key <EXEC> of the NC to place the NC in the standby status.

- Once I/O transfer is complete, the following message appears.



Fig. 7.4.1(l)

7.5 STORING SEQUENCE PROGRAMS IN THE PMC (DURING CONNECTION WITH THE PMC)

7.5.1 Procedure

- 1 Select [File] - [Open Program] to open the program to be stored.
- 2 Select [Tool] - [Store to PMC]
The [Program transfer wizard Selection of program] screen appears.

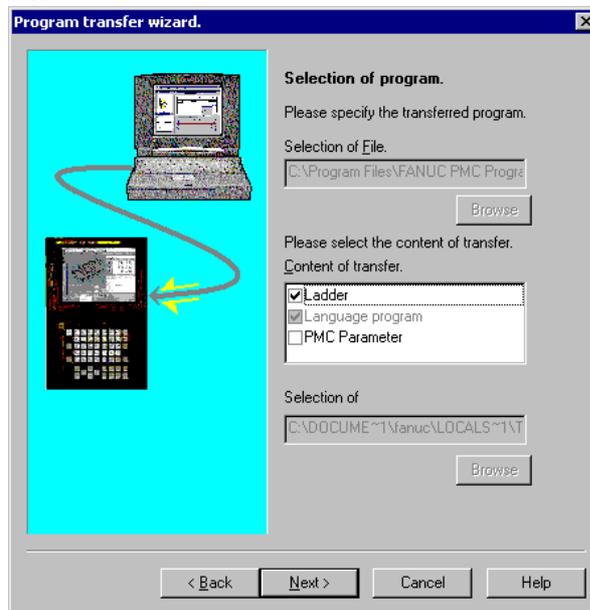


Fig. 7.5.1(a)

NOTE

When connection is not established, the [Communication] screen appears. Then establish connection.

2-1 Set data.

Content of transfer

As transfer information, a selection can be made from Ladders, Language program, and PMC Parameter.

When transferring PMC parameters, enter a transfer source file name in [Selection of]. The initial setting specifies that PMC_PRM.PRM in a user file folder is transferred.

For a user file folder, see Subsection 3.1.3, "Work Folders and Online Program Files."

An existing PMC parameter file can be stored in a user file folder by using the import function.

For the import function, see Section 3.14, "IMPORTING PROGRAMS."

- 2-2 Click the <Next> button. The [Program transfer wizard Confirmation of processing] screen appears.

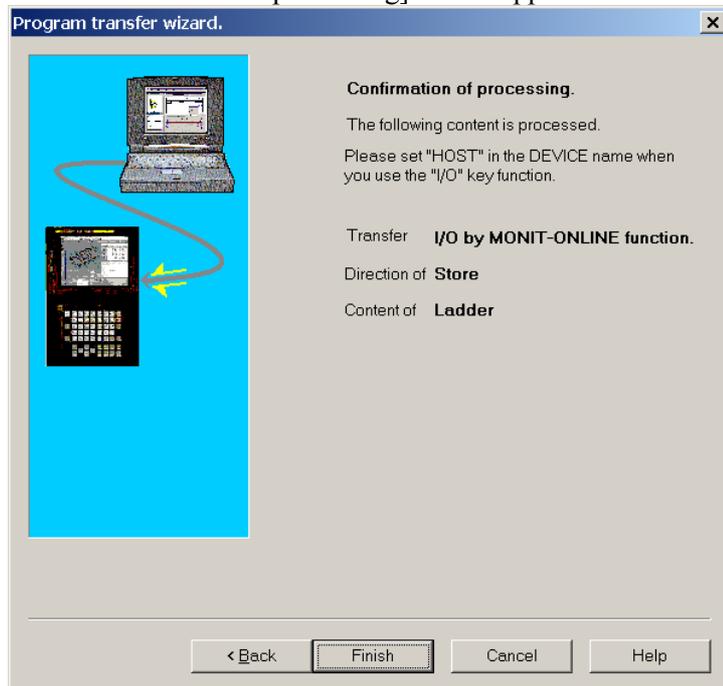


Fig. 7.5.1(b)

- 2-3 Check the setting items. Click the <Finish> button. Then, the [Transfer monitor] screen appears, and then the program is transferred.

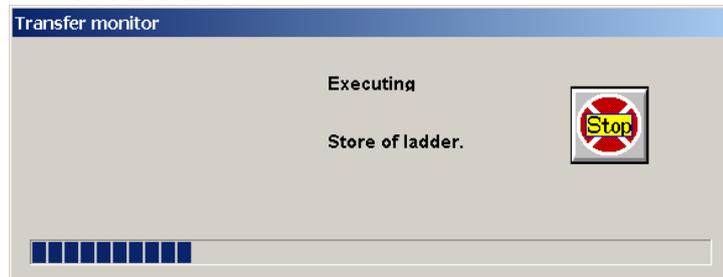


Fig. 7.5.1(c)

NOTE

- 1 During ladder editing in online mode, no program can be stored in the PMC. Store programs in the PMC while a ladder is being monitored.
- 2 After storing a program in the PMC, if the CNC is powered down without backing up the program, the editing results are lost. When you want to store a program in the CNC, execute [Backup].

7.6 WRITING SEQUENCE PROGRAMS INTO F-ROM

This section describes how to back up a program edited in online mode or a program stored in the PMC to F-ROM of the CNC.

7.6.1 Procedure

- 1 Select [Tool] - [Backup].
The [Backup of program] screen appears.

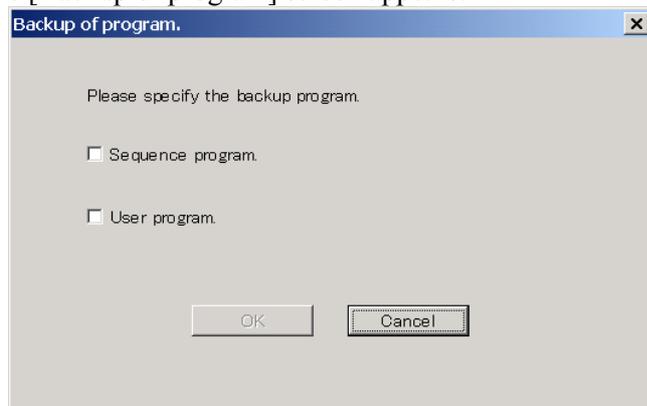


Fig. 7.6.1

- 2 Choose the check boxes of the programs you want to back up.
When the C board is not mounted, you cannot choose "User C program."
- 3 To back up a program, click the <OK> button.
When backup is completed successfully, the [Backup of the program ended] message appears.
To cancel the backup of a program, click the <Cancel> button.

NOTE

- 1 Since the Power Mate-D (PMC-PA3) stores programs in S-RAM, the operation described above is not needed.
- 2 For other than the Power Mate-D (PMC-PA3), if the CNC is powered down without first backing up the programs, the edited programs and stored programs are lost. Back up the programs, before powering down the CNC.

7.7 COMPARING WITH PMC

You can compare programs with the I/O function, HOST operation.

7.7.1 Menu Bar

Select [Tool] - [Load from PMC...] or [Store to PMC...], and the transfer direction selection dialog box of the "Program transfer wizard" will appear.

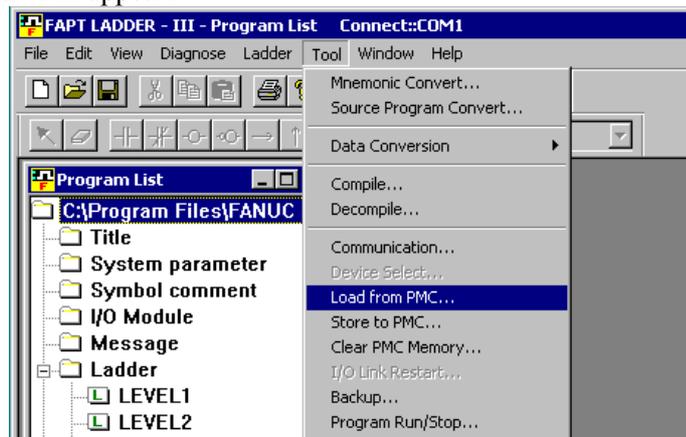


Fig. 7.7.1

NOTE

You can compare programs including language programs on each model of PMC-SC3, SC4, NB, and NB2.

7.7.2 Program Transfer Wizard

This wizard displays a group of dialog boxes for performing a series of setup operations necessary for program comparison operations. At the prompts on the dialog pages, set the necessary items.

7.7.2.1 Selecting a transfer method

To perform program comparison operations, select "I/O by "I/O" key operation" as a transfer method.

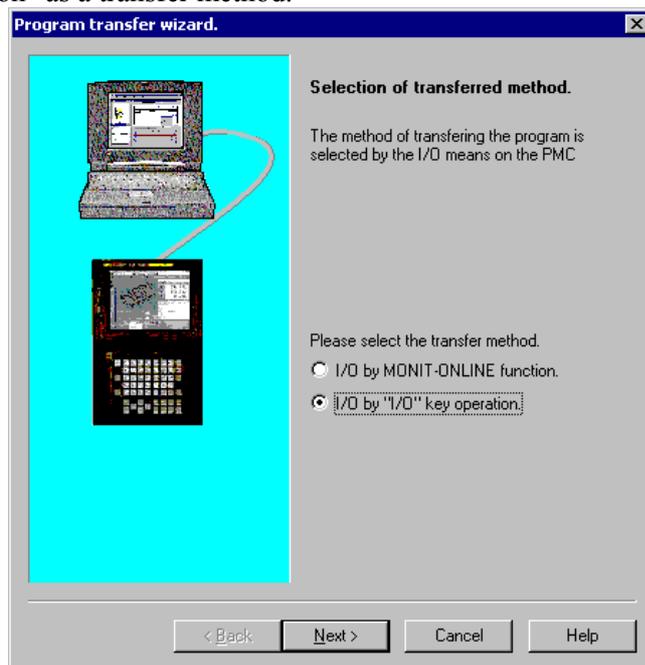


Fig. 7.7.2.1

7.7.2.2 Selecting a transfer direction

The transfer direction selection dialog box appears. To use the compare function, select "PMC and comparison" and click the <Next> button.

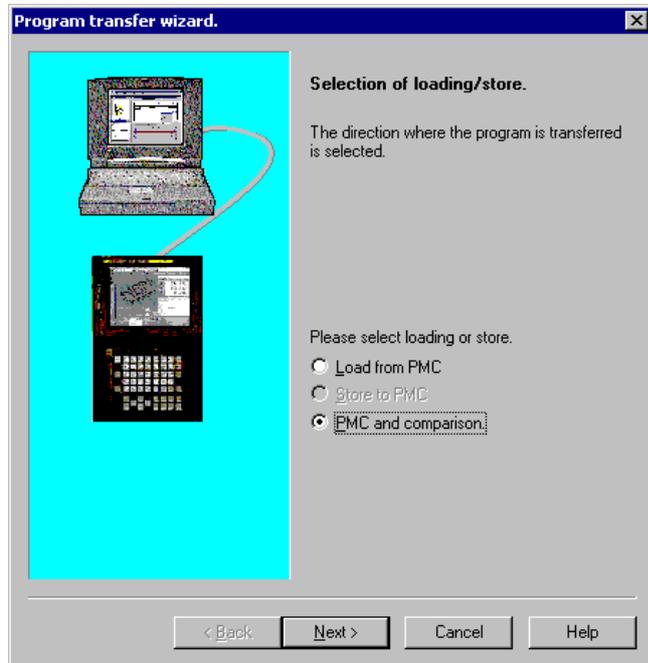


Fig. 7.7.2.2

On the subsequent pages of the wizard, follow the instructions indicated.

8

EXECUTING AND STOPPING SEQUENCE PROGRAMS

This chapter describes how to execute and stop sequence programs.



WARNING

Special care is needed when you execute or stop a program.

If a program is used inappropriately, the machine may operate in an unexpected manner.

It is recommended that you not use this machine while a person is near the machine.

- How to check the execution or stop status

Check the execution or stop status on the status bar.



Execution/stop status

Undisplay: When disconnected



: Stop status



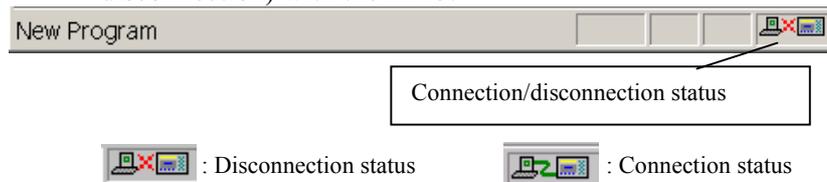
: Execution status

Fig. 8(a)

- Preparation prior to accessing the PMC

Procedure

- 1 Connect a personal computer to the NC (PMC) with a cable.
(For the specification of the required cable, see Appendix 1.)
- 2 Check the communications status (connection or disconnection) with the PMC.

**Fig. 8(b)**

- 3 In the disconnection status, select [Tool]-[Communication].
The [Communication] screen appears.
- 4 Click the <Connect> button to establish a connection.

8.1 EXECUTING SEQUENCE PROGRAMS

This section describes the procedure for executing a sequence program.

Procedure

- 1 Select [Tool] - [Program Run/Stop].

For no language program:



Fig. 8.1(a)

For a language program:

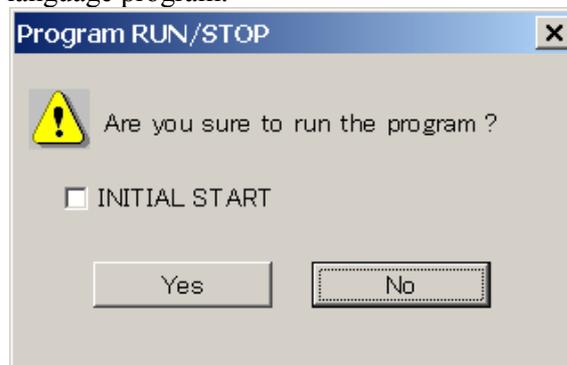


Fig. 8.1(b)

Yes

A sequence program is to be executed.

No

The dialog box is closed without executing a sequence program.

INITIAL START

Selected: A language program is to be executed from the beginning.

Unselected: A language program is to be executed from the last-terminated position.

8.2 STOPPING SEQUENCE PROGRAMS

This section describes the procedure for stopping sequence programs.

Procedure

- 1 Select [Tool] - [Program Run/Stop].



Fig. 8.2

Yes

A sequence program is to be stopped.

No

The dialog box is to be closed without stopping the sequence program.

NOTE

When the PMC-MDI screen is displayed by a language program on the NC, no program can be stopped. To stop the program, select another screen on the NC.

9

DIAGNOSIS

This chapter describes the online diagnosis functions including ladder monitoring, display and modification of the PMC status and PMC parameters, signal tracing, and signal analysis.

9.1 LADDER MONITORING



CAUTION

- 1 The online monitor function for step sequence programs is not supported.
- 2 If the system being used is not supported by the connected PMC, the online functions sometimes cannot be used. Use a system with a supported edition.

9.1.1 Procedure

- 1 Select [File] - [Open Program] to open the program you want to monitor.
- 2 When the system is in offline mode, select [Ladder] - [Online/Offline] to set online mode.
When the <On-Line/Off-Line Change> button is in the up state, the system is in offline mode. When the button is in the down state, the system is in online mode.



<On-Line/Off-Line Change button>

- 3 Select [Ladder] - [Monitor/Editor] to switch between the [Monitor] screen and [Edit] screen.
On the [Monitor] screen, the <Ladder Monitor> button is in the down state.
On the [Edit] screen, the <Online Editor> button is in the down state.

9.1.2 [Monitor] Screen

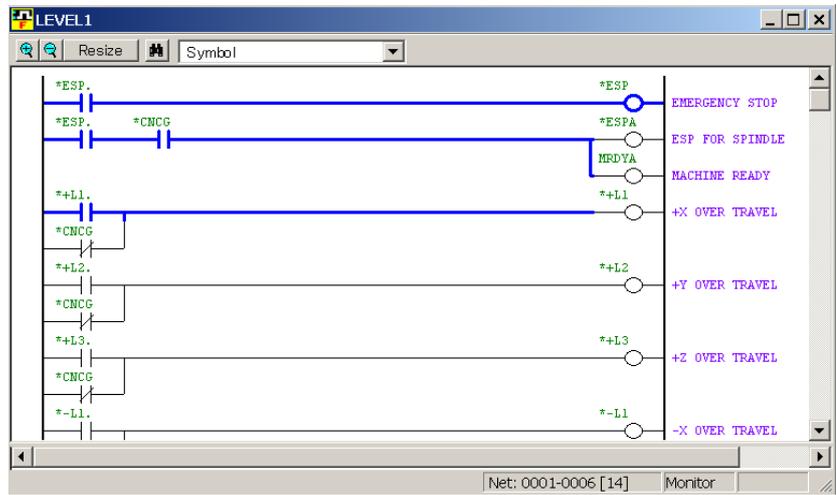


Fig. 9.1.2

The screen is scrolled by using the direction keys, page keys, and scroll bars.

The signal ON and OFF states are expressed by the line thickness.

ON : **_____**
 OFF :

9.1.3 [Edit] Screen

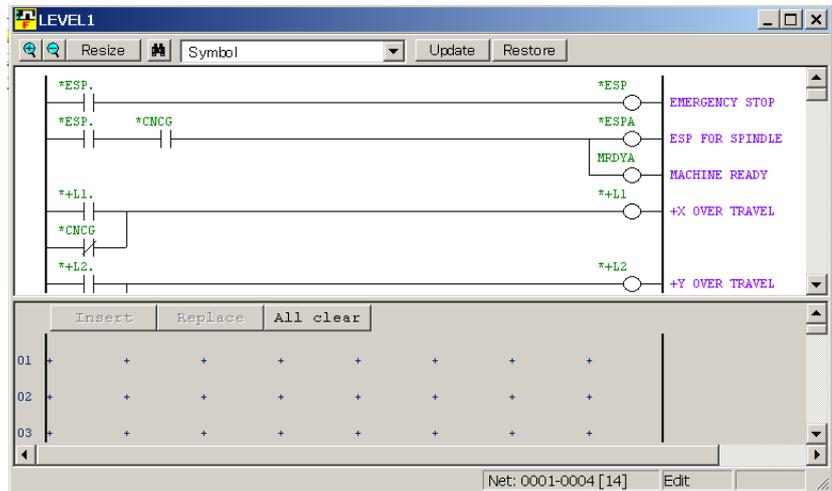


Fig. 9.1.3(a)

The <Update> button on the toolbar writes the edited ladder program to the PMC.

The <Restore> button restores the ladder program to its original state that existed before editing.



Fig. 9.1.3(b)

⚠ CAUTION

- 1 Executing the update function alters the ladder program on the PMC.
Before executing the update function, carefully check whether it is safe to alter the ladder program.
- 2 Except for the Power Mate-D (PMC-PA3), powering off the CNC without backing up the program clears the program changes.
Before powering off the CNC, click the <Update> button on the toolbar and then back up the program.
- 3 To reflect the results of editing a ladder program in online mode in the source program in the sequence program (LAD file), switch to offline mode to automatically execute decompilation. or execute decompilation manually.

For other edit operations, see Section 3.5, "EDITING LADDER DIAGRAMS."

9.1.4 Signal Trigger Stop Function

9.1.4.1 Procedure

- 1 Choose [Open Program] from the [File] menu to open a program to be monitored.
- 2 If the offline mode is set, choose [Online/Offline] from the [Ladder] menu to set the online mode.
The offline mode is set when the <Online/Offline Switch> button is up. The online mode is set when the button is down.



<<Online/Offline Switch> button>

- 3 Choose [Ladder Mode - Signal Trigger] from the [Ladder] menu. The <Signal Trigger> button is held down, and the [Signal Trigger] screen appears. At the bottom of the screen, Trigger Mode, Check Point, Address, Count, and Time are displayed. (See Subsection 9.1.4.4, "[Trigger Parameter] screen.")

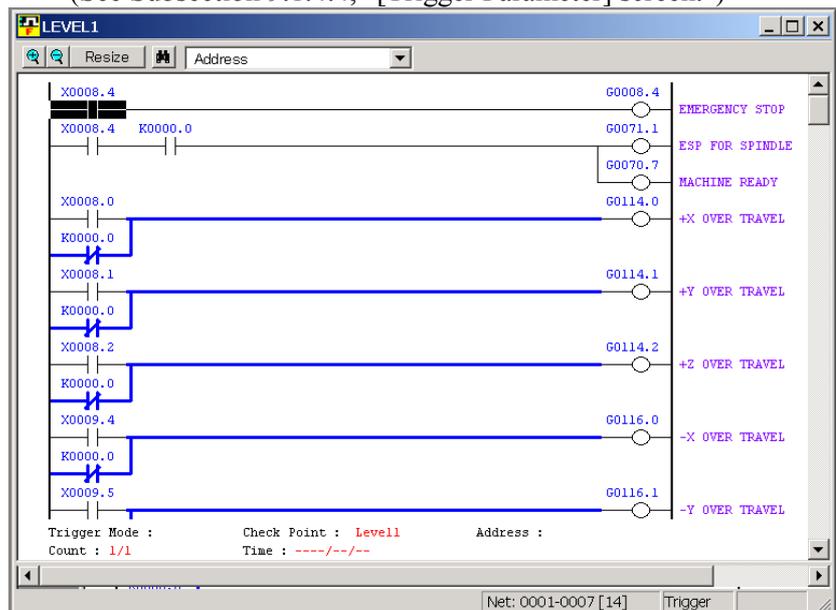


Fig. 9.1.4.1

9.1.4.2 Executing the signal trigger stop function

- 1 Choose [Signal Trigger - Start] from the [Ladder] menu.
The [Signal Trigger Stop Function] execution screen appears.
During execution, the status bar of the main frame displays an icon indicating that the signal trigger stop function is being executed.

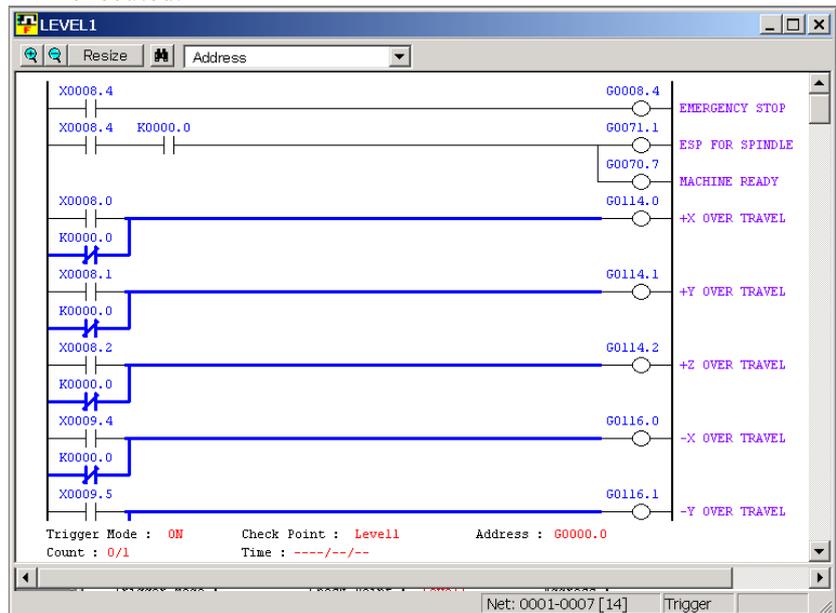


Fig. 9.1.4.2



<Icon for indicating that the signal trigger stop function is being executed>

9.1.4.3 Terminating the signal trigger stop function

- 1 When the signal trigger stop condition is satisfied, the [Signal Trigger] screen appears, and sample data is collected.



Fig. 9.1.4.3(a)

- 2 The [Signal Trigger Stop Function] termination screen appears. Trigger stop time on the NC side is displayed.

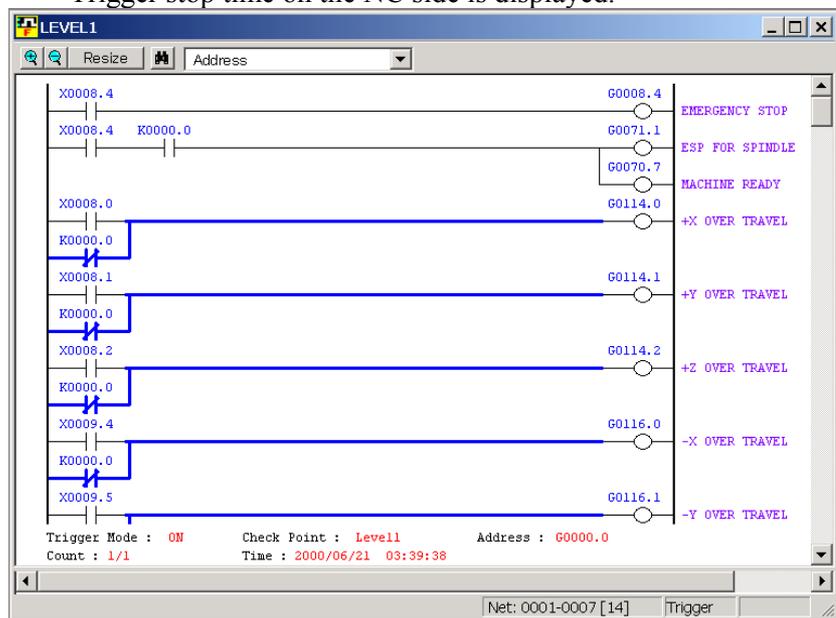


Fig. 9.1.4.3(b)

9.1.4.4 [Trigger Parameter] screen

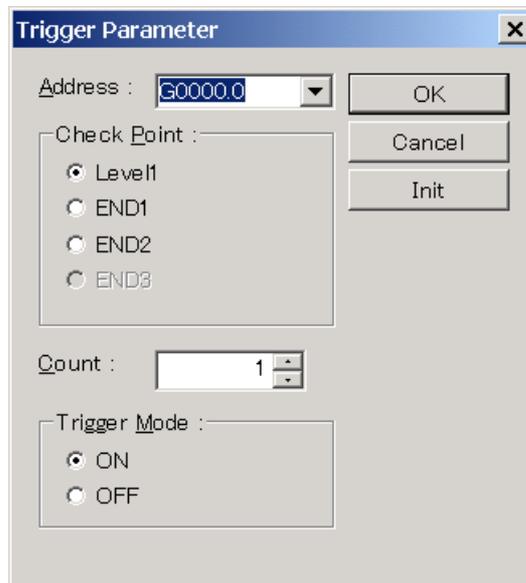


Fig. 9.1.4.4

Address

Set a trigger address. (Symbol input is possible.)

Check Point

Select a trigger check point.

Make a selection from Level1 (start of LEVEL1), END1 (after END1 instruction execution), END2 (after END2 instruction execution), and END3 (after END3 instruction execution, selectable with a model that can use LEVEL3).

Count

Set a trigger count (1 to 65535).

Trigger Mode

ON: Stops triggering on the rising edge of a specified address signal.

OFF: Stops triggering on the falling edge of a specified address signal.

<Init> button

This button initializes the parameters as follows:

Address: Blank

Check Point: LEVEL1

Count: 1

Trigger Mode: Disabled

9.1.4.5 Context menu

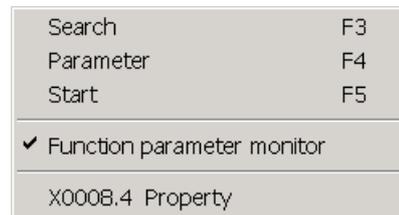


Fig. 9.1.4.5

9.1.4.6 Shortcut key list

Table 9.1.4.6

Shortcut key	Corresponding function
[F3]	Search
[F4]	Parameter setting
[F5]	Execution

9.2 SIGNAL STATUS

The PMC signal status can be displayed and changed in real-time.

WARNING
 Special care must be taken when the signal status or PMC parameters are changed. If the change function is not used appropriately, the machine operation may be unpredictable. When there are people near the machine, this function should not be used.

CAUTION
 The statuses of some signals cannot be changed. The status of such a signal is not changed when a sequence program, the CNC, the MMC, or an external I/O unit such as the I/O-Link is repeatedly writing data into the address of the signal. (The CNC repeatedly writes data to address F, the MMC repeatedly writes data to address M, and the external I/O unit repeatedly writes data to address X.)

9.2.1 Procedure

- 1 Select [Diagnose] - [Signal Status]. The [Signal Status] screen appears.

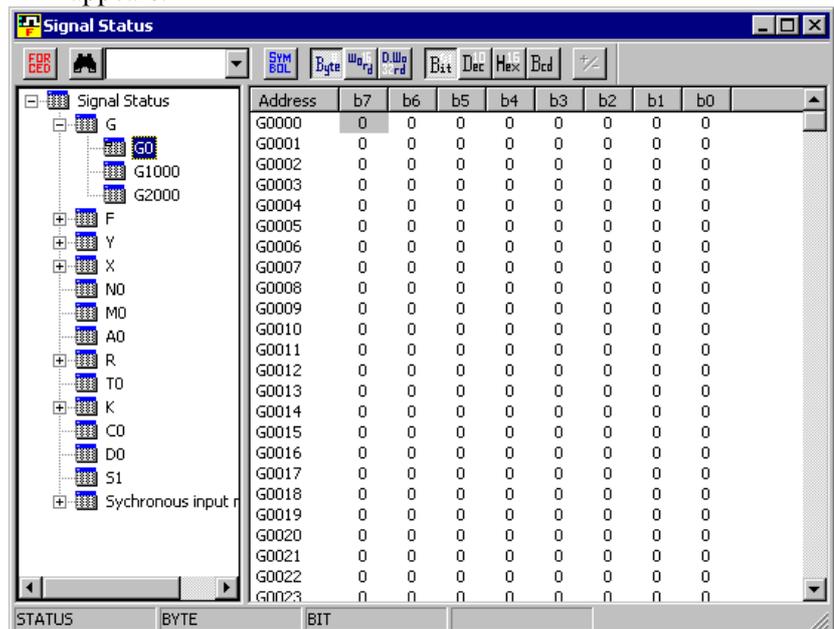


Fig. 9.2.1

9.2.2 Toolbar



Fig. 9.2.2

- <1> Switches between the status screen and forced I/O screen.
- <2> Search button
- <3> Combo box for inputting the character string for which a search is to be made
- <4> Symbol indication (off ↔ on)
- <5> Display format: Byte
- <6> Display format: Word
- <7> Display format: Double word
- <8> Display type: Binary
- <9> Display type: Decimal
- <10> Display type: Hexadecimal
- <11> Display type: BCD
- <12> Sign indication (off ↔ on)
(Valid only when decimal notation is set as the display type.)

9.2.3 Status Bar



Fig. 9.2.3

- <1> Selection mode
[Status] or [Force] is indicated.
- <2> Display format
[Byte], [Word], or [Dword] is indicated.
- <3> Display type
[Bit], [Decimal], [Hex], or [Bcd] is indicated.

9.2.4 Context Menu

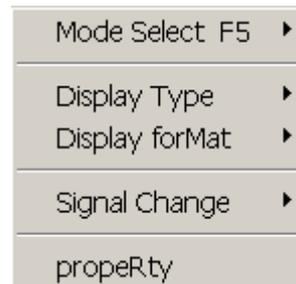


Fig. 9.2.4

9.2.5 Shortcut Keys

Table 9.2.5

Shortcut key	Corresponding function
[F2]	Turns on a signal. (Forced I/O)
[F3]	Turns off a signal. (Forced I/O)
[F4]	Symbol indication (off↔on)
[F5]	Switches between the status screen and forced I/O screen.
[Ctrl]+[F]	Search

9.3 PMC PARAMETERS

PMC parameters (timers, counters, keep relays, and data table) are displayed.

⚠ WARNING
 Special care must be taken when the signal status or PMC parameters are changed. If the change function is not used appropriately, the machine operation may be unpredictable.
 When there are people near the machine, this function should not be used.

⚠ CAUTION
 When PMC parameters should not be changed, the parameters may be protected.
 Refer to the relevant programming manual for the PMC being used.

9.3.1 Procedure

- 1 Select [Diagnose] - [PMC Parameter].
- 2 Display the pull-down menu, and then select [Timer], [Counter], [Keep Relay], [Data Table], or [Set Up].

9.3.2 Timer

The contents of the timer address locations (T) used with the TMR instruction can be displayed and modified.

No.	Address	Data	No.	Address	Data	No.	Address	Data	No.	Address
1	T00	96	17	T32	8	33	T64	8	49	T96
2	T02	960	18	T34	0	34	T66	0	50	T98
3	T04	0	19	T36	8	35	T68	8	51	T100
4	T06	0	20	T38	0	36	T70	0	52	T102
5	T08	0	21	T40	8	37	T72	8	53	T104
6	T10	0	22	T42	0	38	T74	0	54	T106
7	T12	0	23	T44	8	39	T76	8	55	T108
8	T14	0	24	T46	0	40	T78	0	56	T110
9	T16	16	25	T48	8	41	T80	8	57	T112
10	T18	0	26	T50	0	42	T82	0	58	T114
11	T20	16	27	T52	8	43	T84	8	59	T116
12	T22	0	28	T54	0	44	T86	0	60	T118
13	T24	8	29	T56	8	45	T88	8	61	T120
14	T26	0	30	T58	0	46	T90	0	62	T122
15	T28	8	31	T60	8	47	T92	8	63	T124
16	T30	0	32	T62	0	48	T94	0	64	T126

MINIMUM TIME : 48 MAXIMUM TIME : 1572816

Fig. 9.3.2

9.3.2.1 Toolbar



Fig. 9.3.2.1

- <1> Symbol indication (off↔on)
- <2> Search
- <3> Combo box for inputting the character string for which a search is to be made
- <4> Units of the displayed timer value (msec, sec, min)

9.3.2.2 Status bar



Fig. 9.3.2.2

- <1> Minimum setting time for the timer selected with the cursor
- <2> Maximum setting time for the timer selected with the cursor

9.3.2.3 Context menu



Fig. 9.3.2.3

9.3.2.4 Shortcut keys

Table 9.3.2.4

Shortcut key	Corresponding function
[F4]	Symbol indication (off↔on)
[Ctrl]+[F]	Search

9.3.3 Counter

The contents of the counter address locations (C) used with the CTR instruction can be displayed and modified.

No.	Address	PRESET	CURRENT	No.	Address	PRESET	CURRENT	No.	Address	PR
1	C000	555	5555	18	C068	0	0	35	C136	
2	C004	0	0	19	C072	4444	4444	36	C140	
3	C008	1	1	20	C076	888	888	37	C144	
4	C012	0	0	21	C080	0	0	38	C148	
5	C016	1	1	22	C084	1	1	39	C152	
6	C020	0	0	23	C088	0	0	40	C156	
7	C024	1	1	24	C092	1	1	41	C160	
8	C028	0	0	25	C096	0	0	42	C164	
9	C032	1	1	26	C100	1	1	43	C168	
10	C036	0	0	27	C104	0	0	44	C172	
11	C040	1	1	28	C108	1	1	45	C176	
12	C044	0	0	29	C112	0	0	46	C180	
13	C048	1	1	30	C116	1	1	47	C184	
14	C052	0	0	31	C120	0	0	48	C188	
15	C056	1	1	32	C124	1	1	49	C192	
16	C060	0	0	33	C128	0	0	50	C196	
17	C064	1	1	34	C132	1	1			

Fig. 9.3.3

9.3.3.1 Toolbar



<1> <2> <3>

Fig. 9.3.3.1

<1> Symbol indication (off ↔ on)

<2> Search

<3> Combo box for inputting the character string to be searched for

9.3.3.2 Context menu



Fig. 9.3.3.2

9.3.3.3 Shortcut keys

Table 9.3.3.3

Shortcut key	Corresponding function
[F4]	Symbol indication (off↔on)
[Ctrl]+[F]	Search

9.3.4 Keep Relay

The contents of the keep relays (K) can be displayed and modified.

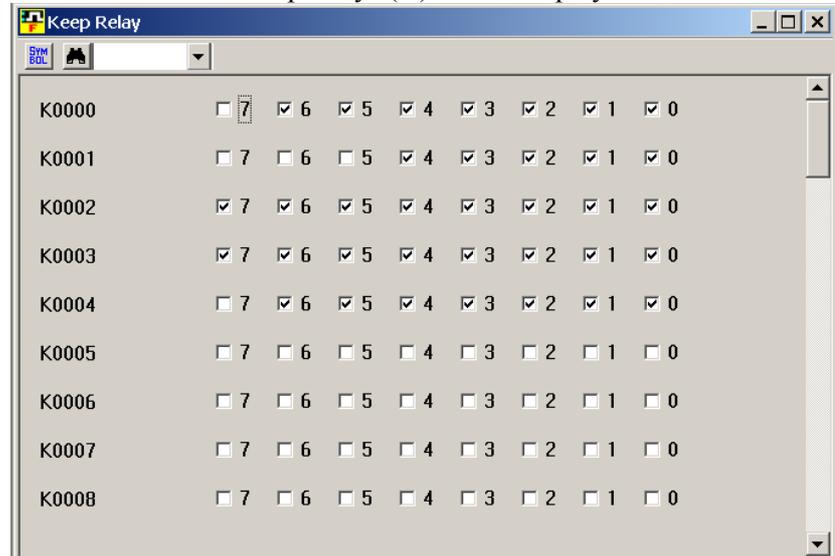


Fig. 9.3.4

9.3.4.1 Toolbar



<1> <2> <3>

Fig. 9.3.4.1

<1> Symbol indication (off ↔ on)

<2> Search

<3> Combo box for inputting the character string for which a search is to be made

9.3.4.2 Context menu

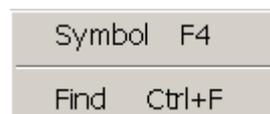


Fig. 9.3.4.2

9.3.4.3 Shortcut keys

Table 9.3.4.3

Shortcut key	Corresponding function
[F4]	Symbol indication (off↔on)
[Ctrl]+[F]	Search

9.3.4.4 Data for PMC control software

Because some keep relays are used by the PMC control software, sequence programs cannot use the data in these keep relays.

This subsection describes only the signals relating to online function operations. For detailed information and other signals, refer to the "PMC Ladder Language Programming Manual" (B-61863E).

The bits marked * are used by the PMC control software and are not related to the online function operations.

K17 or K900

#7	#6	#5	#4	#3	#2	#1	#0
DTBLDSP	*	*	MEMINP	*	*	PRGRAM	LADMASK

Bit	Value	Meaning
#7	1	Does not display the PMC parameter data table control screen.
#4	0	Does not allow you to change the signal status.
#1	0	Does not allow you to use the online edit function and I/O function.
#0	0	Does not display the ladder monitor screen.

K19 or K902

#7	#6	#5	#4	#3	#2	#1	#0
*	*	*	*	*	*	*	FROM-WRT

Bit	Value	Meaning
#0	1	Displays a dialog box for writing to F-ROM at the end of online editing.

9.3.5 Data Table

The contents of the data table (D) can be displayed and modified.

The screenshot shows a software window titled "DATA TABLE". On the left is a tree view with "DATA TABLE" expanded to show "GROUP1" and "GROUP2". The main area contains a table with 9 columns: NO., ADDRESS, DATA, NO., ADDRESS, DATA, NO., ADDRESS, DATA. The table lists 30 entries. Below the table, there are fields for "GROUP1", "D0 - D99", "100", "BYTE", and "DECIMAL".

NO.	ADDRESS	DATA	NO.	ADDRESS	DATA	NO.	ADDRESS	DATA
1	D0000	0	11	D0010	0	21	D0020	49
2	D0001	100	12	D0011	0	22	D0021	54
3	D0002	111	13	D0012	0	23	D0022	32
4	D0003	63	14	D0013	0	24	D0023	77
5	D0004	0	15	D0014	100	25	D0024	66
6	D0005	0	16	D0015	0	26	D0025	48
7	D0006	0	17	D0016	0	27	D0026	70
8	D0007	0	18	D0017	0	28	D0027	50
9	D0008	0	19	D0018	0	29	D0028	48
10	D0009	0	20	D0019	0	30	D0029	48

Fig. 9.3.5

9.3.5.1 Toolbar



Fig. 9.3.5.1

- <1> Symbol indication (off ↔ on)
- <2> Search
- <3> Combo box for inputting the character string for which a search is to be made
- <4> Display format: Byte
- <5> Display format: Word
- <6> Display format: Double word
- <7> Display type: Decimal
- <8> Display type: Hexadecimal
- <9> Display type: BCD
- <10> Sign indication (off ↔ on)
- <11> Write protection

9.3.5.2 Status bar

GROUP1	D0 - D99	100	BYTE	DECIMAL
<1>	<2>	<3>	<4>	<5>

Fig. 9.3.5.2

- <1> Group name
- <2> Data area range
- <3> Number of data items
- <4> Display format
[Byte], [Word], or [Dword] is indicated.
- <5> Display type
[Bit], [Decimal], [Hex], or [Bcd] is indicated.

9.3.5.3 Shortcut keys

Table 9.3.5.3

Shortcut keys	Corresponding function
[F4]	Symbol indication (off↔on)
[Ctrl]+[F]	Search

9.3.5.4 Input data range

Table 9.3.5.4

	Byte	Word	Double word
Decimal	-128 to 127	-32,768 to 32,767	-2,147,483,648 to 2,147,483,647
Hexa- decimal	0 to FF	0 to FFFF	0 to FFFFFFFF
BCD	0 to 99	0 to 9,999	0 to 99,999,999

9.3.5.5 Context menu



Fig. 9.3.5.5

9.3.6 Setting PMC Setting Parameters

PMC setting parameters can be made valid or invalid.

9.3.6.1 Programmer protect function



CAUTION

The subsequent subsections contain information important to the developer of the application systems to be controlled by the PMC. If the design of an application system is inappropriate, security problems are more likely to occur. Use great caution when operating the functions described in the subsequent subsections and designing application systems using these functions.

The PMC provides a variety of editing, diagnosis, and debugging functions to support sequence program development and debugging. These functions, which may disable the safety mechanism provided by sequence programs, are assumed to be used only by those operators who are familiar with the operation of sequence programs and that of the PMC. These functions must be protected with appropriate settings or sequence programs from being inadvertently operated by regular operators after the machine has been shipped to the field. If any of these functions are to be used for the maintenance and adjustment of the machine in the field, the machine developer is required to make sure that the machine is placed in a safe state before the means for enabling these functions are incorporated and that operators observe the techniques for ensuring safety.

The parameters described in the subsequent subsections are designed so that the system designer can set the conditions necessary for preventing erroneous operations such as those that "stop the Ladder program inadvertently" and that "change the settings of sequence programs and various functions" and for operating PMC programmer functions safely and so that such conditions are controllable with sequence programs.

The programmer protect function can be set with the appropriate setting parameter or keep relay data for PMC management software (PMC-SB7: K900 to 919, PMC-SA1: K17 to 19).

9.3.6.2 Procedure

- 1 Check the setting parameters you want to make valid.

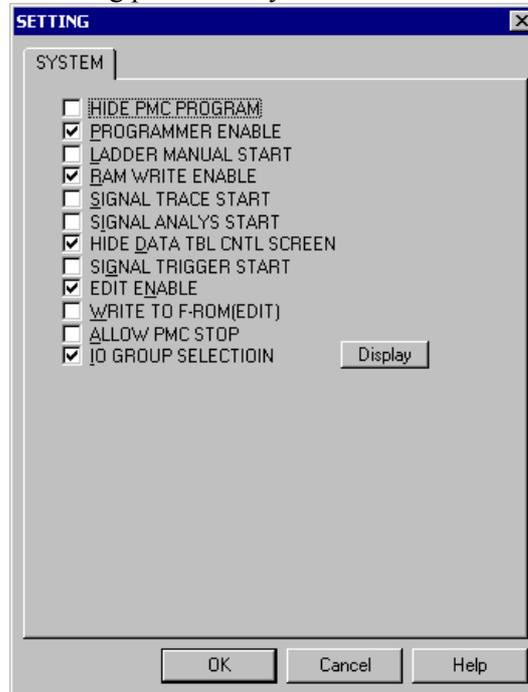


Fig. 9.3.6.2

- 2 To save the changes, click the <OK> buttons.
To cancel the changes, click the <Cancel> button.

9.3.6.3 Setting items

- HIDE PMC PROGRAM (PMC-SB7: K900.0, PMC-SA1: K17.0)
 Not checked : Displays sequence programs.
 Checked : Hides sequence programs.
- PROGRAMMER ENABLE (PMC-SB7: K900.1, PMC-SA1: K17.1)
 Not checked : Disables built-in programmer functions.
 Checked : Enables built-in programmer functions.
- LADDER MANUAL START (PMC-SB7: K900.2, PMC-SA1: K17.2)
 Not checked : After the power is turned on, sequence programs will be automatically executed.
 Checked : Sequence programs will be executed with the sequence program execution soft key.
- RAM WRITE ENABLE (PMC-SB7: K900.4, PMC-SA1: K17.4)
 Not checked : Disables the forcing and overwrite functions.
 Checked : Enables the forcing and overwrite functions.
- SIGNAL TRACE START (PMC-SB6: K900.5)
 Not checked : The signal trace function starts tracing with the trace execution button.
 Checked : The signal trace function automatically starts tracing after the power is turned on.
- SIGNAL ANALYSIS START (PMC-SB6: K900.6)
 Not checked : The signal waveform display function starts sampling with the execution button.
 Checked : The signal waveform display function automatically starts sampling after the power is turned on.
- HIDE DATA TBL CNTL SCREEN (PMC-SB7: K900.7, PMC-SA1: K17.7)
 Not checked : Displays the PMC parameter data table control screen.
 Checked : Hides the PMC parameter data table control screen.
- SIGNAL TRIGGER START (PMC-SB7: K901.2, PMC-SA1: K18.8)
 Not checked : The trigger stop function does not automatically start when the power is turned on.
 Checked : The trigger stop function automatically starts when the power is turned on.

- EDIT ENABLE (PMC-SB7: K901.6, PMC-SA1: K18.6)
Not checked : Disables sequence program editing.
Checked : Enables sequence program editing.
- WRITE TO F-ROM[EDIT] (PMC-SB7: K902.0, PMC-SA1: K19.0)
Not checked : After a Ladder program is edited, the changes will be automatically written to F-ROM.
Checked : After a Ladder program is edited, the changes will not be automatically written to F-ROM.
- ALLOW PMC STOP (PMC-SB7: K902.2, PMC-SA1: K19.2)
Not checked : Disables the sequence program execution/stopping operations.
Checked : Enables the sequence program execution/stopping operations.
- IO GROUP SELECTION (PMC-SB7: K906.1)
Not checked : Hides the I/O link group selection screen.
Checked : Displays the I/O link group selection screen.

 CAUTION

The [Display] button can be used if the following conditions are satisfied:

- The selectable I/O link assignment screen on the system parameter screen is enabled.
- IO GROUP SELECTION (K906.1=1) is checked and PROGRAMMABLE ENABLE is also checked.

9.3.6.4 Warning message

When you click the [Display] button to call the setting parameter screen of the selectable I/O link assignment function, the following warning screen appears first to warn you against the modification of parameters.

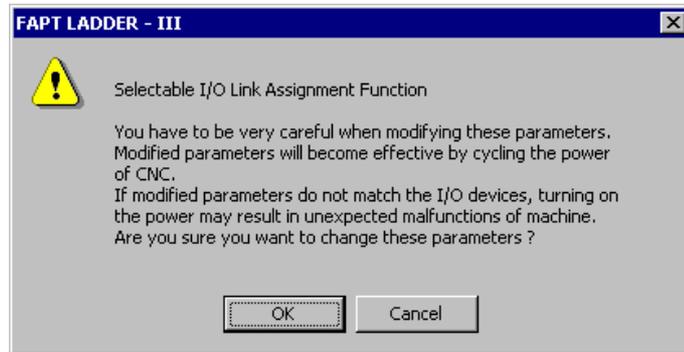


Fig. 9.3.6.4

OK

Displays the selectable I/O link assignment function.

Cancel

Returns you to the SETTING screen for PMC setting parameters.



WARNING

If you modify these parameters inadvertently, The I/O device configuration may not match the I/O assignment data, possibly causing the machine to perform an unexpected operation after the power is turned on. These parameters are assumed to be modified only by those operators who are familiar with the operation of sequence programs and that of the PMC. This setting screen must be protected with the programmer protect function so that the settings on the screen are not inadvertently changed by regular operators after the machine has been shipped to the field.

9.3.6.5 Setting screen of the selectable I/O link assignment function

On this setting screen, set the unique group of I/O devices to be connected to each machine.

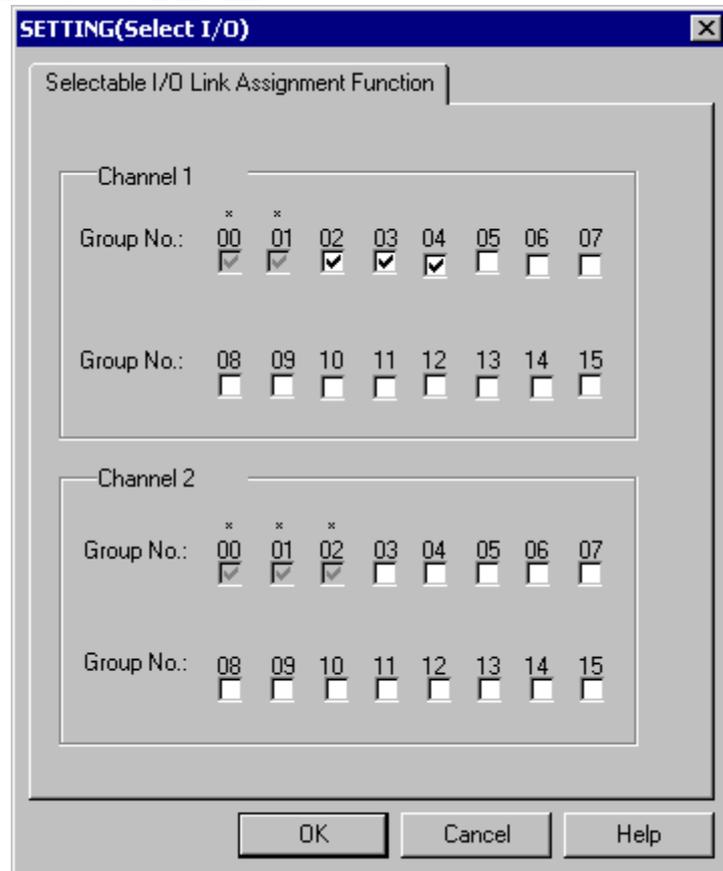


Fig. 9.3.6.5

Channel 1

Select the group to which the I/O link assignment data for channel 1 is to be made valid.

Checked : The assignment data is valid.

Not checked : The assignment data is invalid.

Channel 2

Select the group to which the I/O link assignment data for channel 2 is to be made valid.

Checked : The assignment data is valid.

Not checked : The assignment data is invalid.

NOTE

- 1 The basic groups that have been specified for each "Basic Group Count" on the system parameter screen will have their numbers displayed gray with an asterisk mark (*) shown above them. These groups are noneligible for this settings.
- 2 Channels for which the "selectable I/O link assignment function" is disabled on the system parameter screen are displayed gray. These channels are noneligible for this setting.
- 3 When you click the [OK] button, the warning message shown in Subjection 9.3.6.3 reappears. To reflect the settings to the keep relays, click the [OK] button below the warning message.

9.4 PMC ALARM STATUS

PMC alarm messages are displayed.

9.4.1 Procedure

1. Select [Diagnose] - [PMC Alarm Status].
The [PMC Alarm Status] screen appears.



Fig. 9.4.1

For details on PMC alarm messages, refer to the ladder language programming manual.

9.4.2 Switching the Language in Which PMC Alarm Messages Are Displayed

You can switch the language in which PMC alarm messages are displayed.

1. Select [Tool] - [Options].
2. Select a language from "PMC alarm language".



Fig.9.4.2

9.5 PMC STATUS

The PMC program status is displayed.

9.5.1 Procedure

- 1 Select [Diagnose] - [PMC Status].
The [[PMC Status] screen appears.

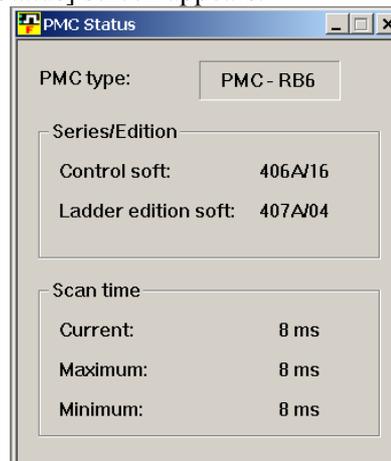


Fig. 9.5.1

9.5.2 Display Items

- PMC type
Model of the connected PMC
- Series and edition: Control software
Series and edition of the PMC
- Series and edition: Ladder edit software (option board)
Series and edition of the ladder edit card or option card
- Scan time: Current
Current scan time
- Scan time: Maximum
Maximum scan time
- Scan time: Minimum
Minimum scan time

9.6 SIGNAL TRACING

Changes in arbitrary signals are displayed on the screen. Signals are traced one or two bytes at a time. For one-byte tracing, two addresses can be traced at the same time. Up to 512 items can be displayed for one-byte tracing. For two-byte tracing, up to 256 items can be displayed.

9.6.1 Procedure

- 1 Select [Diagnose] - [Signal Trace].
The [Signal Trace] screen appears.

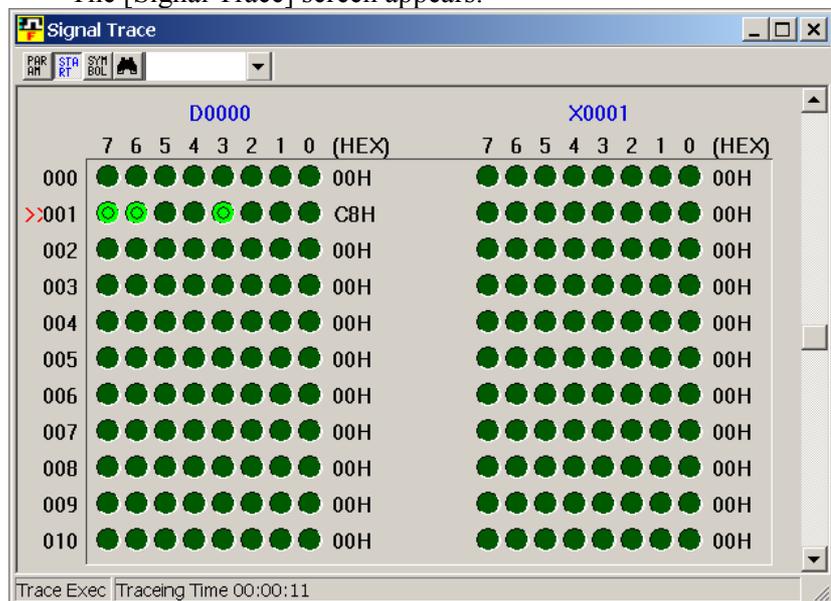


Fig. 9.6.1

- 2 Click the <Parameter> button.
The [Signal Trace Parameter] screen appears.



<Parameter button>

- 3 Set data on the [Signal Trace Parameter] screen.
See Subsection 9.6.6, "[Signal Trace Parameter] Screen."
- 4 Click the <Start/Stop> button. The <Start/Stop> button enters the down state, and signal tracing starts.



<Start/Stop button>

- 5 To terminate tracing, click the <Start/Stop> button again. The <Start/Stop> button then enters the up state, and signal tracing terminates.

- Signal status indication

-  The signal is off.
-  The signal is on.

- Mask bit name indication

The numbers of the bits to be detected are indicated with bold characters.

The numbers of the bits not to be detected are indicated with grayed characters.

Example: When the signals on bits 4 to 7 are detected, and

bits 0 to 3 are masked

R9028

7 6 5 4 3 2 1 0

9.6.2 Toolbar

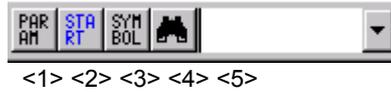


Fig. 9.6.2

- <1> Parameter
- <2> Start and stop of tracing
- <3> Symbol indication
- <4> Number search
- <5> Combo box for inputting the character string for number search

9.6.3 Status Bar



Fig. 9.6.3

- <1> Status
[Tracing Exec] or [Trace Stop] is displayed.
- <2> Elapsed time

9.6.4 Context Menu

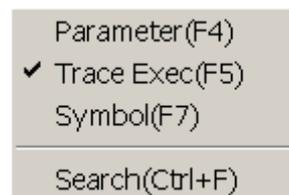


Fig. 9.6.4

9.6.5 Shortcut Keys

Table 9.6.5

Shortcut key	Corresponding function
[F3]	Number search
[F4]	Displays the [Parameter] screen.
[F5]	Starts and stops tracing.
[Ctrl]+[F]	Number search
[Ctrl]+[Home]	Displays data from the beginning.
[Ctrl]+[End]	Displays data from the end.

9.6.6 [Signal Trace Parameter] Screen

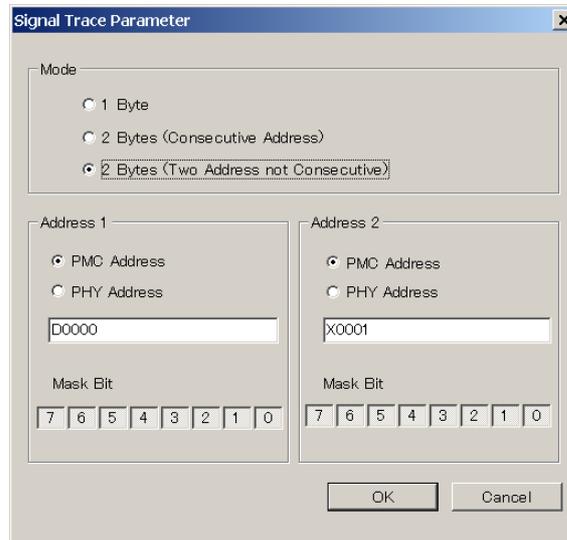


Fig. 9.6.6

Mode

Signal data length (in bytes)

Address Type

PMC address or physical address

Address

Address for signal tracing of a specified address type

Mask Bit

Specify the bits of the signals that need not be traced.
(The buttons of the signals to be traced are in the down state.)

The parameter settings become valid when the execution of signal tracing is selected.

NOTE

- 1 While the signal analysis function is being used, the signal trace function cannot be used.
- 2 During online monitoring, the PMC signal trace screen cannot be displayed.

⚠ CAUTION

When the address type is physical address, starting tracing with an illegal memory address specified may result in a system error. To specify a valid physical address, the user needs to be familiar with PMC programming in C. Refer to the "C Programming Manual" (B-61863E-1), and specify a valid memory address.

9.6.7 Automatic Trace Function at Power-On

If trace parameters are set, and [Signal Trace Start] is selected on the [Set Up] screen for PMC parameters, tracing will start automatically when the power to the CNC is turned on.

9.7 SIGNAL ANALYSIS

The ladder signal status is sampled and displayed along with the time axis. Trigger conditions can also be set.

9.7.1 Procedure

- 1 Select [Diagnose] - [Signal Analysis].
The [Signal Analysis] screen appears.

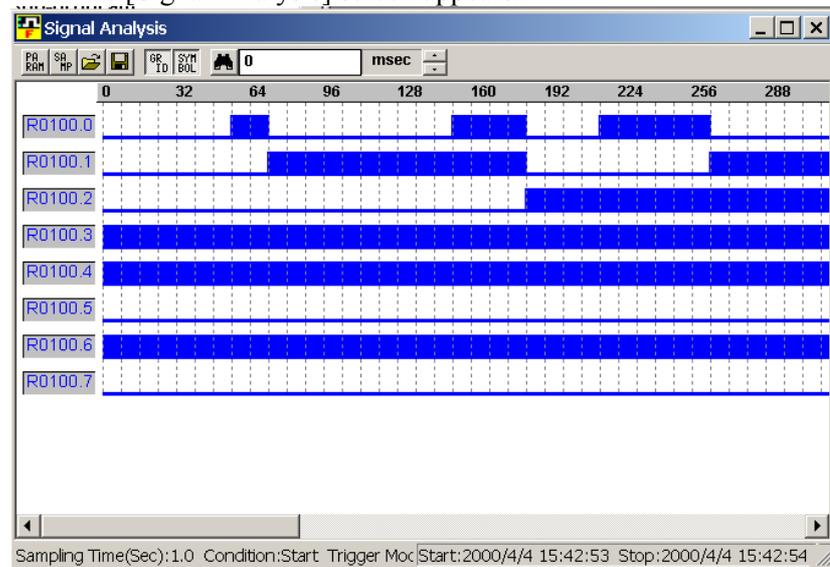


Fig. 9.7.1

- 2 Click the <Parameter> button.
The [Signal Analysis Parameter] screen appears.



<Parameter button>
- 3 Set data on the [Signal Analysis Parameters] screen.
See Subsection 9.7.6, [Signal Analysis Parameter] screen.
- 4 Click the <Sampling> button. The <Sampling> button then enters the down state, and sampling starts.



<Sampling button>
- 5 To terminate sampling, click the <Sampling> button again. The button enters the up state, and sampling terminates.
 - Maximum number of signals sampled simultaneously: 16
 - Sampling interval: 8 or 4 msec
 - Maximum sampling period:
 - 10 sec (when the sampling interval is set to 8 msec)
 - 5 sec (when the sampling interval is set to 4 msec)

9.7.2 Toolbar



Fig. 9.7.2

<1> Parameter

<2> Start and stop of sampling

NOTE

- 1 While the signal analysis function is being executed, the signal trace function cannot be used. If the <Sampling> button is clicked during signal tracing, a message box appears, indicating "Signal Trace function is running."
- 2 When the automatic signal read function is executed at power-on, the displayed button is in the down state, which indicates that sampling is in progress.

<3> Open File

Reads a signal analysis data file, and then displays waveforms. The extension of signal analysis data files is SAN.

<4> Save As

Saves signal analysis data in a file with a file name specified (extension: SAN).

<5> Grid line on/off

Specifies whether to display grid lines.

When no grid line is displayed, the button is in the up state; when grid lines are displayed, the button is in the down state.

The color and line style of grid lines are set from the context menu which is displayed by right-clicking a displayed grid line.

<6> Symbol on/off

Sets the display format of the trigger and sampling addresses.

When the symbol format is selected, the button is in the down state; when the address format is selected, the button is in the up state.

<7> Search

Moves through the signal analysis area with a specified search time.

<8> Text box for inputting the character string for which a search is to be made

Specifies the search time.

<9> Search character string increase/decrease button

Increases or decreases the search time in grid setting time units.

9.7.3 Status Bar



Fig. 9.7.3

<1> to <6> are displayed when sampling terminates. During sampling, [Executing] is indicated.

<1> Sampling time

<2> Condition

<3> Trigger mode

<4> Trigger address

<5> Sampling start time

<6> Sampling end time

<7> The current mouse position is indicated as the time (msec) on the signal analysis display.

9.7.4 Context Menu

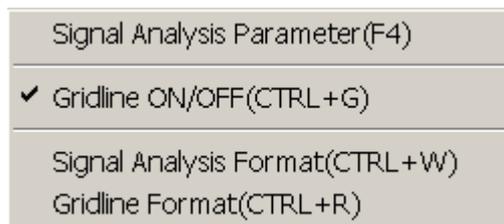


Fig. 9.7.4

9.7.5 Shortcut Keys

Table 9.7.5

Shortcut key	Corresponding function
[F3]	Sampling time search
[F4]	Displays the [Parameters] screen.
[F5]	Starts and stops sampling.
[Ctrl]+[Shift]+[O]	Opens an existing signal analysis file.
[Ctrl]+[Shift]+[A]	Saves data with a name.
[Ctrl]+[G]	Displays/does not display grid lines.
[Ctrl]+[R]	Sets the grid line format.
[Ctrl]+[W]	Sets the signal waveform format.
[Ctrl]+[Home]	Scrolls to the beginning of the signal analysis display.
[Ctrl]+[End]	Scrolls to the end of the signal analysis display.
PageUp	Scrolls the signal analysis display up by 1/2 page.
PageDown	Scrolls the signal analysis display down by 1/2 page.
[↑]	Scrolls the signal analysis display up by one line.
[↓]	Scrolls the signal analysis display down by one line.
[→]	Scrolls to the right by one sampling interval (8 or 4 msec).
[←]	Scrolls to the left by one sampling interval (8 or 4 msec).
[Home]	Scrolls to the beginning of the line.
[End]	Scrolls to the end of the line.

9.7.6 [Signal Analysis Parameter] Screen

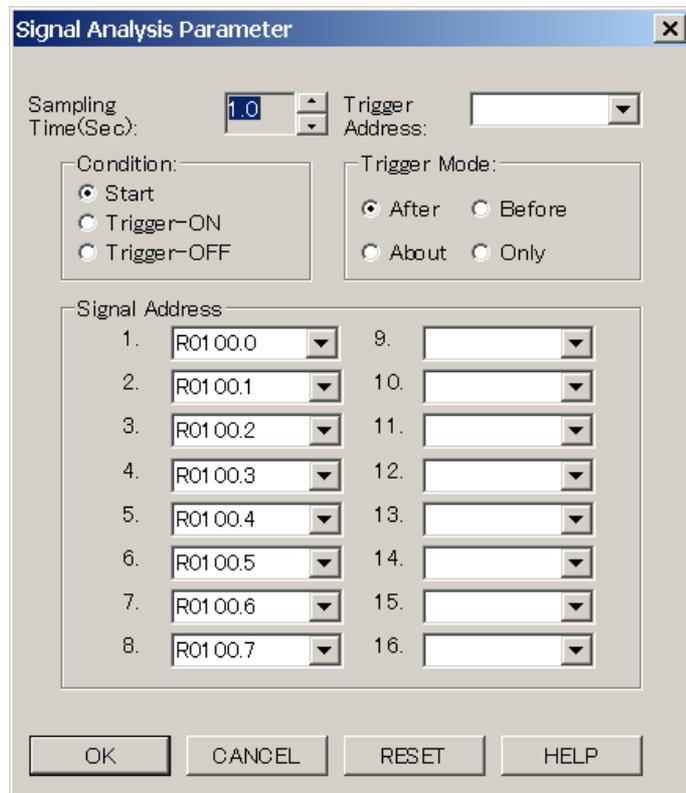


Fig. 9.7.6

Sampling Time

Set the maximum sampling time.

When the sampling interval is 8 msec, set one to 10 sec (in 0.1-sec increments).

When the sampling interval is 4 msec, set one to five sec (in 0.1-sec increments).

Trigger Address

Set the trigger bit address at which sampling starts, with a PMC address or symbol.

Condition

Condition for starting sampling

Start: Sampling start button on the toolbar

Trigger-ON: Sampling start button + rising edge at the trigger address

Trigger-OFF: Sampling start button + falling edge at the trigger address

NOTE

When Trigger-ON or Trigger-OFF is selected with no trigger address set, a message box appears, indicating "No Trigger Address."

Trigger Mode

There is a buffer for holding data sampled for up to 10 seconds when the signal status is read at 8-msec intervals. (When the signal status is read at 4-ms intervals, the buffer can hold data sampled over five seconds.)

In trigger mode, the read start and end points are specified.

After: The signal status after the trigger address meets the trigger condition is read until the sampling time elapses.

About: The signal status around the time at which the trigger address satisfies the trigger condition is read within the sampling time.

Before: The signal status from when the <Sampling> button on the tool bar is pressed until the trigger address satisfies the trigger condition is read for up to the sampling time.

Only: The signal status when the trigger address satisfies the trigger condition is read.

NOTE

When About or Before is selected with the condition set to Start, a message box appears, indicating "[About]/[Before] is illegal on [Start] selected."

Signal Address

Set up to 16 sampling addresses with PMC addresses or symbols.

To reset the settings to the default values, click the <RESET> button.

Table 9.7.6

Default	
Sampling Time	10 sec
Trigger Address	Not set
Condition	Start
Trigger Mode	After
Signal Address	Not set

Once the settings are complete (the <OK> button is pressed), the trigger address and diagnosis address setting information is stored in the Windows registry on the disk. When the dialog box is next opened, the registry is read, and the previously made settings are restored in the list of the combo box.

9.7.7 [Signal Analysis Format] Screen

When [Signal Analysis Format] is selected from the context menu, the [Signal Analysis Format] screen appears.

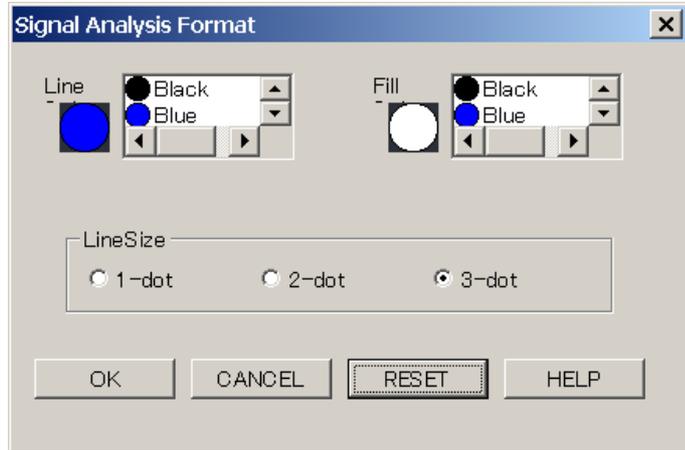


Fig. 9.7.7

Line Color

Fill Color

Choose from the following 16 colors:
 Black, blue, light blue, light green, pink, red, yellow, white, dark blue, peacock blue, green, purple, dark red, dark yellow, 50% gray, 25% gray

Line Size

1 dot, 2 dots, or 3 dots

To reset the settings to the defaults, click the <RESET> button.

Table 9.7.7

Default	
Line Color	Blue
Fill Color	White
Line Size	3 dots

9.7.8 [Gridline Format] Screen

When [Gridline Format] is selected from the context menu, the [Gridline Format] screen appears.

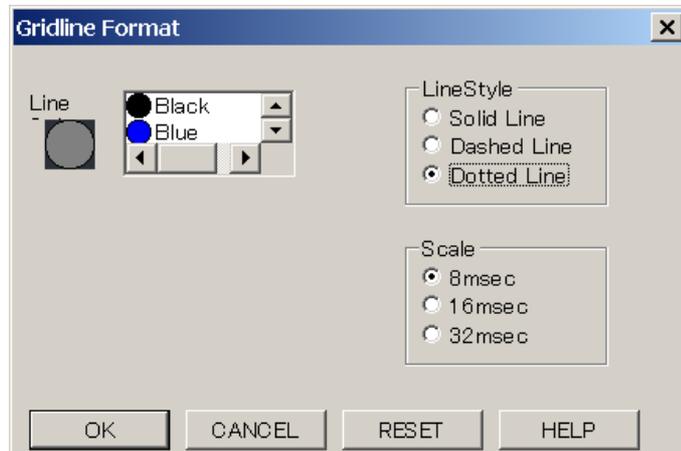


Fig. 9.7.8

Line Color

Choose from the following 16 colors:
Black, blue, light blue, light green, pink, red, yellow, white, dark blue, peacock blue, green, purple, dark red, dark yellow, 50% gray, 25% gray

Line Style

Solid line, dotted line, or broken line

Scale

When the sampling interval is 8 msec:

8 msec, 16 msec, or 32 msec

When the sampling interval is 4 msec:

4 msec, 8 msec, or 16 msec

When the trigger mode is ONLY:

1 time, 2 times or 4 times

To reset the settings to the defaults, click the <RESET> button.

Table 9.7.8

Default	
Line Color	50% gray
Line Style	Solid line
Scale	32 msec (16 msec, 4 times)

9.7.9 Automatic Signal Sampling Function at Power-On

If sampling parameters are set, then [Signal Analysis Start] is checked on the [Set Up] screen for PMC parameters, sampling will start automatically when the power to the CNC is turned on.

9.8 CLEARING PMC AREAS

Addresses G, Y, N, A, R, and S can be cleared.

9.8.1 Procedure

- 1 Select [Tool] - [Clear PMC Memory].
The [Clear PMC memory] screen appears.

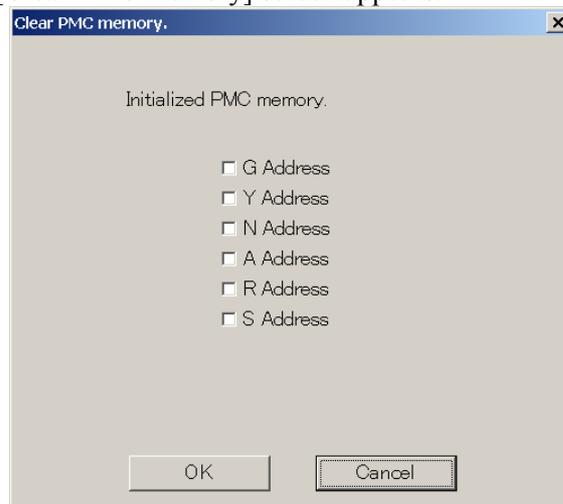


Fig. 9.8.1

- 2 To clear the PMC area, click the <OK> button.
To cancel the clear operation, click the <Cancel> button.



WARNING

When PMC areas are cleared, special care must be taken.

Clearing a PMC area may cause unpredictable machine operation. When there are people near the machine, this function should not be used.



CAUTION

On PMC-SB7, E Address is added below Initialized PMC memory.

9.9 ACTIVATING THE I/O LINK

9.9.1 Procedure

- 1 Select the [Tool] - [I/O Link Restart].
The [I/O Link Restart] screen appears.



Fig. 9.9.1

- 2 To activate the I/O Link, click the <OK> button.
To cancel the activation of the I/O Link, click the <Cancel> button.



WARNING

When the I/O Link is activated, special care must be taken.

Setting I/O module data may cause unpredictable machine operation. When there are people near the machine, this function should not be used.

10

CONVERTING SEQUENCE PROGRAMS

This chapter describes how to convert DOS-version FAPT LADDER-II and FAPT LADDER-III sequence programs.

10.1 CONVERTING FROM DOS-VERSION FAPT LADDER-II

This section describes how to convert DOS-version sequence programs to the Windows version.

10.1.1 Procedure

- 1 Select [Tool] – [Data Conversion.]
- 2 On the pull-down menu, select [Data File → LAD File]. The [Conversion into LAD Format File] screen appears.

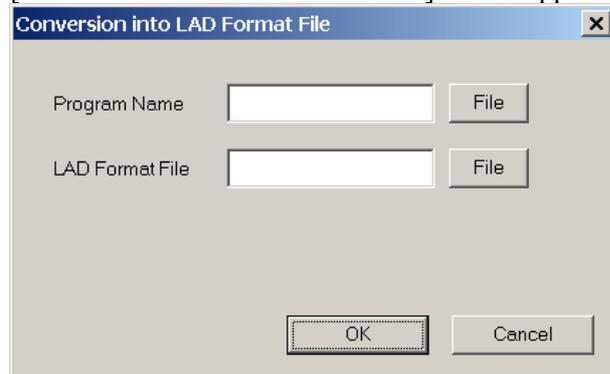


Fig. 10.1.1

- 2-1 **Input the required data.**
 - Program Name**
Enter the name (folder name) of the DOS-version sequence program you want to convert.
 - LAD Format File**
Enter the name of the Windows-version sequence program you want to create by the conversion. Use the extension .LAD. You can omit the extension, however.
- 3 To convert, click the <OK> button.
To abandon the conversion, click the <Cancel> button.

If an LAD file opened by another user is specified, the following error messages are displayed, and data conversion is terminated:

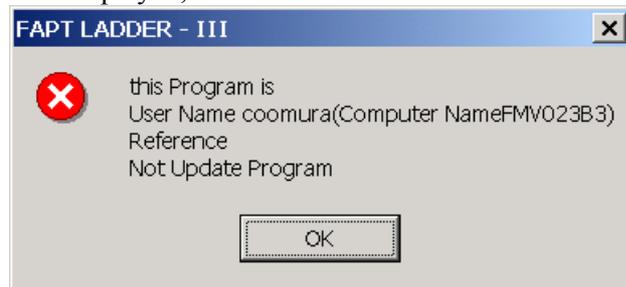


Fig. 10.1.1(b)



Fig. 10.1.1(c)

If an LAD file that has the read-only attribute is specified, the following error messages are displayed, and data conversion is terminated:



Fig. 10.1.1(d)



Fig. 10.1.1(e)

10.2 CONVERTING TO DOS-VERSION FAPT LADDER-II

This section describes how to convert Windows-version sequence programs to the DOS version.

10.2.1 Procedure

- 1 Select [Tool] – [Data Conversion.]
- 2 On the pull-down menu, select [Data File ← LAD File].
The [Conversion into Program Data File] screen appears.

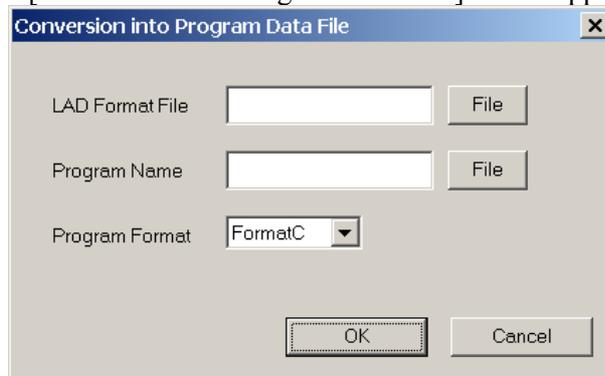


Fig. 10.2.1

- 2-1 Input the required data.

LAD Format File

Enter the name of the Windows-version sequence program you want to convert. Use the extension .LAD. You can omit the extension, however.

Program Name

Enter the name (folder name) of the DOS-version sequence program you want to create by the conversion.

Program Format

Select format A, B, or C.

- 3 To convert, click the <OK> button.
To abandon the conversion, click the <Cancel> button.

NOTE

For conversion to FAPT LADDER-II sequence programs, select FormatC for Program Format.

10.3 CONVERTING SEQUENCE PROGRAMS BETWEEN PMC MODELS

Converting a mnemonic file enables it to be used as a sequence program for another PMC model.

10.3.1 Conversion by Changing System Parameters

For the following PMC models, changing the system parameters in a mnemonic file enables a sequence program for another PMC to be edited. However, the format of the system parameters, the function instructions that can be used, and the range of addresses vary from one PMC model to another.

Table 10.3.1

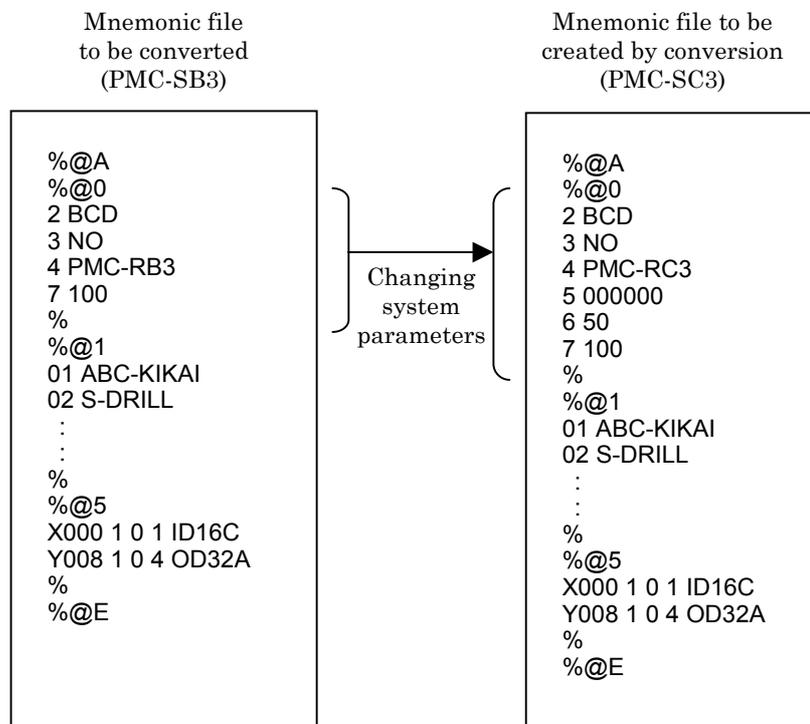
CNC model	PMC from which conversion is possible
FS16/18/20-B FS16/18/21-C FS16/18/21 <i>i</i> -A FS16/18/21 <i>i</i> -B	PMC - SA1 / SA3 / SA5 / SB3 / SB4 / SB5 / SB6 / SB7 SC3 / SC4
Power Mate-D/F/H Power Mate <i>i</i> -D/H	PMC - PA1 / PA3 / SB5 / SB6
FS15-B FS15 <i>i</i>	PMC - NB / NB2 / NB6

NOTE

It is impossible to convert step sequence data.

Example of conversion (PMC-SB3 → PMC-SC3)

1. On FAPT LADDER-III, set PMC-SB3 as the device, and convert the source program to be converted into a mnemonic file.
2. In the resulting mnemonic file, change the settings of system parameters to PMC-SC3, using a general-purpose text editor.
3. On FAPT LADDER-III, set PMC-SC3 as the device, and open a new source program.
4. Convert the mnemonic file modified in 2. into the source program opened in 3.
5. On the Edit System Parameter screen, return the values of system parameters to the previous ones.

**NOTE**

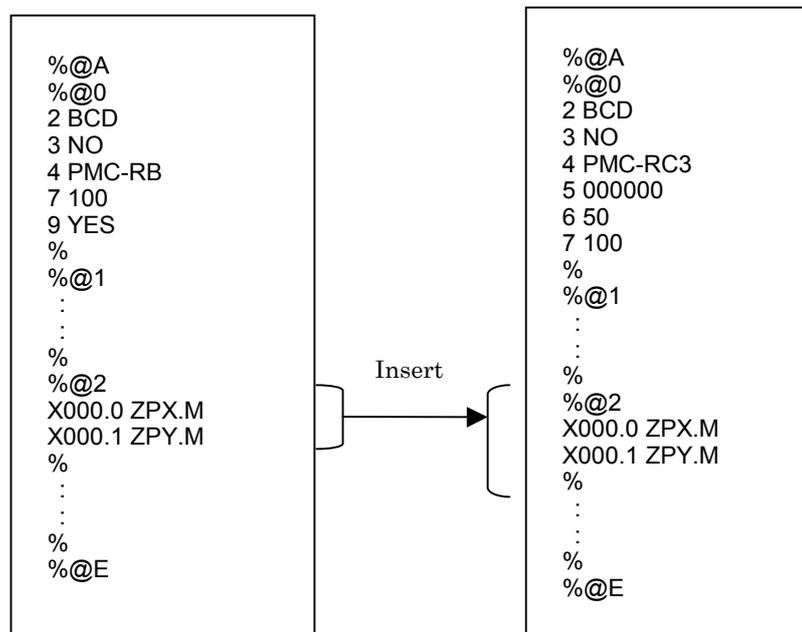
For an explanation of the setting items of the system parameter section of each model, see Subsection 6.4.1.1, "Parameter" in Section 6.4, "MNEMONIC FILE SAMPLE".

10.3.2 Using System Program Data for Another Program

The following method makes the data (title, symbols, comments, ladders, messages, and I/O module data) of a sequence program usable as data for another sequence program.

However, the range of addresses varies from one model to another. Refer to the applicable programming manual for each individual model for a detailed explanation about how to change the range of their addresses.

[Example: Making symbol and comment data for the PMC-SB usable for with PMC-SC3]



10.3.3 Converting Step Sequence Programs between Different Models

Usually, a mnemonic file is used for ladder program conversion between different models. For step sequence programs, however, a memory card format file is used for conversion.

Program conversion is possible between the following combinations of models.

"PMC-SB4 (STEP SEQ) → PMC-SC4 (STEP SEQ)"

"PMC-SB4 (STEP SEQ) → PMC-SB6 (STEP SEQ)"

Example of conversion (PMC-SB4 (STEP SEQ) → PMC-SB6 (STEP SEQ))

- 1 Compile a step sequence program for the PMC-SB4 (STEP SEQ) to create memory card format data.
- 2 Export memory card format data.
- 3 Create a new program.
(Set the model to "PMC-SB6 (STEP SEQ).")
- 4 Import the memory card format data that was exported in step 2, above.
- 5 Select [Tool] - [Decompile] to decompile the program.

This completes the conversion. When the step sequence program is loaded into FAPT LADDER-II, it can be used for the PMC-SB6 (STEP SEQ).

11

ERROR MESSAGES

This chapter describes the error messages that may be displayed by FAPT LADDER-III.

11.1 ERROR MESSAGE FORMAT

FAPT LADDER-III outputs error messages in the following format:
Function symbol:Classification-Four-digit-code Error message
character strings

11.1.1 Function Symbols

The function for which an error occurred is represented using one alphabetic character.

Function symbol	Function name	Function screen
A	File	Create new program Open program Update program Save Import Export Data conversion
B	Title editing	Edit title
C	I/O module editing	Edit I/O module
D	System parameter editing	Edit system parameter
E	Ladder/step sequence editing	Edit ladder Ladder monitor
F	Symbol/comment editing	Edit symbol/comment
G	Message editing	Edit message
H	Print	Print Print preview
I	Compile	Compile
J	Decompile	Decompile
K	Mnemonic editing	Mnemonic conversion Source program conversion
L	Input/output	Load from PMC Store in PMC Backup
N	Online	Signal status PMC parameter timer PMC parameter counter PMC parameter keep relay PMC parameter data table PMC parameter setting PMC alarm status PMC status Signal trace Signal analysis Run program Stop program Communication I/O Link start Clear PMC area

11.1.2 Message Classification

A message type is represented using one alphabetic character.

Classification	Type	Description	No.
F	Fatal error	State in which the system is operational, but cannot continue processing due to a reason such as there being an invalid user program	2xxx 5xxx
E	Error	State in which processing continues but with no results produced, or in which processing is stopped	3xxx 6xxx
W	Warning	State in which processing continues with results produced, but in which the results are unpredictable	4xxx 7xxx

11.2 ERROR MESSAGES

11.2.1 File

Error code	Message	Cause/action
A:F-2000	Insufficient memory	
A:F-2001	Insufficient disk space	
A:F-2004	This data can not be handled at this version of FAPT LADDER	
A:F-2005	Source program has wrong file	The source program includes an invalid file or does not include a necessary file. Check the file configuration of the source program.
A:F-2006	Not found **** file	
A:F-2007	Not found **** Source program	
A:F-2008	Cannot open **** file	
A:F-2009	Cannot close **** file	
A:F-2010	**** Source program broken	
A:E-3120	Enter program name	No source program is entered. Enter the name of the desired source program.
A:E-3121	The source program does not exist	
A:E-3122	PMC model file is not found	A source program for an unsupported model was entered. Check the models supported by this system. Some system files (****.TBL) are not found. Reinstall.
A:E-3124	Cannot create new program ****	An entered source program cannot be created. A source program cannot be created if a folder with the same name already exists. Enter another program name.
A:E-3125	Illegal path of source program name	A specified path is not found. Check the entered source program name.
A:E-3126	Source program type is different	In source program copy operation, a program of FORMAT-A/B was specified. FORMAT-A/B cannot be used with FAPT LADDER-III. Convert the program by using the data conversion function of the [Tool] menu.
A:E-3127	Mismatched password	
A:E-3128	**** file read error	The **** file cannot be read.
A:E-3130	**** file read error. Hit any key	The **** file cannot be read.
A:E-3131	**** file open error	The **** file cannot be opened.
A:E-3132	**** file close error	The **** file cannot be closed.
A:E-3133	insufficient disk error	A file cannot be output due to there being insufficient disk capacity. Terminate the system, and then the free up space on the disk.
A:E-3134	Invalid option initialized.(**** file was updated.	The option file was initialized because its data was destroyed.
A:E-3135	Program conversion error.(ROM -> Memory card) Hit any key	

Error code	Message	Cause/action
A:E-3136	Program conversion error.(Memory card -> ROM) Hit any key	
A:E-3137	Cannot create file ****	The **** file could not be created.
A:E-3138	Illegal source program name	
A:E-3139	Illegal **** source program name	
A:E-3140	Not found file	
A:E-3141	Not found **** PMC-OS file	
A:E-3143	Cannot open file	The **** file cannot be opened.
A:E-3144	Cannot close file	The **** file cannot be closed.
A:E-3145	File I/O error	A file access error occurred.
A:E-3146	**** file I/O error	
A:E-3147	Unknown PMC series	
A:E-3148	**** file write error. Hit any key.	The **** file cannot be written to.
A:E-6000	Illegal folder name	Specify an existing folder as the export destination for a user file.
A:E-6001	PMC type is different	When an LAD file is imported, the PMC model of the import source must match that of the open program.
A:E-6002	Export Ladder File is protected	Deselect the ladder file from export targets.
A:E-6003	Import Ladder File is protected	Deselect the ladder file from import targets.
A:E-6004	Export Sub program File is protected	Deselect the sub-program file from export targets.
A:E-6005	Import Sub program File is protected	Deselect the sub-program file from import targets.
A:E-6006	Fail to delete file	Check whether the file you attempt to delete is used with another system.
A:W-7000	Net comment can be selected when all data is selected	Select all the data files, ladder diagrams, and sub-programs to import a net comment.
A:W-7001	No timer available	Since the timer cannot be used, the status bar display cannot be updated. FAPT LADDER-III can be executed normally.

11.2.2 Title Editing

Error code	Message	Cause/action
B:E-3020	File read error. Hit any key	The title file (TITLE) of a source program cannot be read.
B:E-3021	File write error. Hit any Key	The title file (TITLE) or control file (CONTROL) of a source program cannot be written to.
B:E-3022	File I/O error. Hit any key	A file access error occurred.

11.2.3 I/O Module Editing

Error code	Message	Cause/action
C:E-3021	File read error. Hit any key	The I/O module file (IOMODULE) of a source program cannot be read.
C:E-3022	File write error. Hit any key	The I/O module file (IOMODULE) or control file (CONTROL) cannot be written to.
C:E-3023	Input data invalid	Check the input method.
C:E-3024	Appointed Group not exist	Check the input range.
C:E-3025	Appointed Base not exist	Check the input range.
C:E-3026	Appointed Slot not exist	Check the input range.
C:E-3027	Appointed ID Code not exist	The entered module does not exist. Check the usable modules.
C:E-3028	Input key not used	
C:E-3030	Address appoint illegal	This address does not allow the entered module to be used. Check if an output module is entered in address X, or if an input module is entered in address Y.
C:E-3032	The same group base and slot are already specified	A module is already set in the entered group, base, and slot. The same group, base, and slot cannot be set more than once. Specify a different group, base, or slot.
C:E-3033	Invalid Channel No. appoint	Check the usable channels.
C:E-3034	Invalid data except '0' is specified at the slot of * as I/O UNIT B	I/O Unit-B (power-on/off information) can be set in slot 0 only. Reenter by specifying slot 0.
C:E-6011	Not Module	
C:E-6021	Module Data Delete Error	
C:E-6031	Get Module Data Error	
C:E-6032	Set Module Data Error	
C:E-6041	Get Module Comment Data Error	
C:E-6042	Set Module Comment Data Error	
C:E-6043	Module Comment Data Delete Error	
C:E-6050	Channel Data Delete Error	
C:W-4020	The same group base and slot are already specified	A module is already set in the entered group, base, and slot. The same group, base, and slot are set more than once. Check whether this poses a problem.
C:W-4021	Invalid data except '0' is specified at the base of I/O UNIT B	The I/O Unit-B module can be set in base 0 only.
C:W-4022	Both I/O UNIT-A and UNIT-B are specified in the same group	I/O Unit-A and I/O Unit-B cannot be specified in the same group.
C:W-7023	Both I/O UNIT-B and CONNECTION UNIT are specified in the same group	

11.2.4 System Parameter Editing

Error code	Message	Cause/action
D:E-3020	File read error. Hit any key	The system parameter file (SYSPARAM) of a source program cannot be read.
D:E-3021	File write error. Hit any key	The system parameter file (SYSPARAM) or control file (CONTROL) of a source program cannot be written to.
D:E-3022	Invalid value	
D:E-3023	Input data invalid	
D:E-3024	Operater panel address error	When the use of the FS0 operator's panel is set, set the following addresses: Key input address, LED output address, key bit image address, LED bit image address

11.2.5 Ladder/Step Sequence Editing

Error code	Message	Cause/action
E:F-2100	Cannot read **** file	
E:F-2101	Cannot write **** file	
E:F-2102	Cannot seek **** file	
E:E-3200	Illegal source code	
E:E-3201	Buffer size over	
E:E-3202	Number of nest branch too big	
E:E-3203	Number of branch too big	
E:E-3204	Size of table buffer too big	
E:E-3205	Unconnected step sequence diagram	
E:E-3206	Selected branch error	
E:E-3207	Parallel branch error	
E:E-3208	Syntax error	
E:E-3209	Step line syntax error	
E:E-3210	Transition line syntax error	
E:E-3211	Cannot insert	
E:E-3212	Cannot make diagram	
E:E-3213	Horizontal line illegal	
E:E-3214	Jump forward check error	
E:E-3215	Check incomplete error	
E:E-3216	Chart sequence error	
E:E-3217	Chart start code error	
E:E-3218	Chart end code error	
E:E-3219	Jump close error	
E:E-3220	Horizontal line duplicate error	
E:E-3221	Branch unconnected error	
E:E-3222	Branch sequence error	
E:E-3223	Cannot copy diagrams	
E:E-3224	Cannot move diagrams	
E:E-3225	Illegal specified position	
E:E-3226	Strings not Found	
E:E-3227	Step Number Duplicate Error	
E:E-3228	Label Number Duplicate Error	
E:E-3229	Cannot delete temporary file	

Error code	Message	Cause/action
E:E-3230	Same sub-program name exists	
E:E-3231	Input invalid	
E:E-3232	Expected address	
E:E-3233	Too deep nesting of sub-program	
E:E-3234	Illegal file name	
E:E-3235	Sub-program already entried	
E:E-3236	Cannot delete program	
E:E-3237	Cannot change data	
E:E-6035	Program data error.	
E:E-6036	Program size error (OPTION).	The size of a sequence program exceeded the size specified by an option. Reduce the size of the sequence program.
E:E-6037	PMC type unmatched.	Convert the model with the offline function.
E:E-6041	The communication to PMC is not ready.	Start communication.
E:E-6042	An alarm occurs on PMC	An alarm was issued on the PMC, so processing cannot be continued. Reset the alarm on the PMC.
E:E-6044	Cannot create temporary file.	
E:E-6045	Ladder size over (PMC) Error status = ****	The size of a ladder being edited exceeded the writable size on the PMC. Reduce the size of the ladder being edited.
E:E-6046	The program is not corresponding(PMC). status=****	A program being edited does not match the program on the PMC. By loading, storing, or restoring a program, ensure a match with the program on the PMC.
E:E-6047	An alarm occurs on PMC Error status = ****	An alarm was issued on the PMC, so processing cannot be continued. Check if the ladder data being edited is correct.
E:E-6048	Ladder data error (PMC). Error status = ****	A program does not match the program on the PMC. By loading, storing, or restoring a program, ensure a match with the program on the PMC.
E:E-6051	OBJECT BUFFER OVER	The sequence program is excessively large. Reduce the amount of ladder data.
E:E-6053	1ST LEVEL EXECUTE TIME OVER	
E:E-6054	COM FUNCTION MISSING	The method of using function instruction COM (SUB9) is incorrect. Check that COM is paired with COME (SUB29) correctly.
E:E-6055	JUMP FUNCTION MISSING	The method of using function instruction JMP (SUB10) is incorrect. Check that JMP is paired with IMPE (SUB30) correctly.
E:E-6056	END FUNCTION MISSING	Function instructions END1, END2, END3, and END are incorrect. Check that the order of END1, END2, END3, and END is correct.
E:E-6057	PROGRAM NOTHING	
E:E-6058	LADDER BROKEN	A ladder is destroyed, so that it cannot be updated. Reenter the ladder.
E:E-6059	COIL NOTHING	
E:E-6060	CALL CALLU FUNCTION MISSING	Function instructions CALL and CALLU are incorrect. Create function instructions CALL and CALLU on the second level of a ladder or in a sub-program.
E:E-6061	COM FUNCTION MISSING (CALL SP)	Function instruction CALL or CALLU is found between function instructions COM (SUB9) and COME. CALL and CALLU cannot be created between COM and COME.

Error code	Message	Cause/action
E:E-6062	JMP FUNCTION MISSING (SP)	The method of using function instruction JMP (SUB10) in a sub-program is incorrect. Check that JMP is correctly paired with JMPE (SUB30).
E:E-6063	SUB PROGRAM MISSING	The method of using function instruction SP is incorrect. Check that SP is paired with SPEED correctly.
E:E-6064	SP NO. DUPLICATE	The same sub-program number already exists. Change the sub-program number.
E:E-6065	SUB PROGRAM NOTHING	Create a sub-program.
E:E-6066	END FUNCTION NOTHING	Add the END instruction.
E:E-6067	SP FUNCTION MISSING	
E:E-6068	LBL COUNT OVER	Reduce the number of labels.
E:E-6069	LBL NO. DUPLICATE	The same label number already exists. Change the label number.
E:E-6070	LBL FUNCTION NOTHING (JMPB)	Function instruction LBL specified by JMPB is not found. Add the LBL function instruction.
E:E-6071	COM FUNCTION MISSING (JMPB)	Function instruction JMPB is found between function instructions COM and COME. No jump can be made beyond COM and COME. Ensure that JMPB is not inserted between COM and COME. Alternatively, also create specified function instruction LBL between COM and COME.
E:E-6072	JMPB FUNCTION MISSING	The JMPB instruction allows a jump to be made to a sub-program only. Ensure that a jump is made to a point within a sub-program.
E:E-6073	LBL FUNCTION NOTHING (JMPC)	Function instruction LBL, specified by JMPC, is not found. Add function instruction LBL.
E:E-6074	COM FUNCTION MISSING (LBL)	Specified function instruction LBL is found between function instructions COM and COME. A jump cannot be made to a point between COM and COME. Ensure that LBL is not inserted between COM and COME. Alternatively, also create function instruction JMPC between COM and COME.
E:E-6075	JMPC FUNCTION MISSING	Function instruction JMPC is not specified in a sub-program. Create function instruction JMPC in a sub-program.
E:E-6076	LBL FUNCTION MISSING (JMPC)	Function instruction LBL, specified by function instruction JMPC, is not specified at the second level of a ladder. Create function instruction LBL at the second level of a ladder.
E:E-6080	LADDER ILLEGAL	A ladder is incorrect. Reenter the ladder.
E:E-6090	RELAY OR COIL FORBIT	An unnecessary relay or coil is set. Delete the relay or coil.
E:E-6092	HORIZONTAL LINE ILLEGAL	Connect the horizontal line of the net.
E:E-6093	FUNCTION LINE ILLEGAL	Connect the function instruction correctly.
E:E-6094	RELAY OR COIL NOTHING	A relay or coil is missing. Add a relay or coil.
E:E-6095	VERTICAL LINE ILLEGAL	Connect the vertical line of the net.
E:E-6096	PARAMETER NOTHING	The parameters of a function instruction are missing. Set the parameters.
E:E-6097	ADDRESS NOT DETECTED	Set an address.
E:E-6100	NET TOO LARGE	The net being edited has become larger than the edit buffer. Reduce the size of the net being edited.
E:E-6101	PLEASE COMPLETE NET	

Error code	Message	Cause/action
E:E-6102	LARGE NET APPEARED	Reduce the size of the net.
E:E-6111	ERROR NET FOUND	Modify the error net.
E:E-6115	PARA NO. RANGE ERR	
E:E-6150	Ladder diagram has not been modified.	The ladder diagram is not modified, but an attempt was made to update or restore it.
E:E-6152	Ladder data write error.	
E:E-6154	Temporary file load error.	
E:E-6155	Program read error. Not enough program memory.	Allocate conventional memory.
E:E-6156	Program read error. Error status = ****	
E:E-6160	The program is not corresponding	A selected program does not match the program in PMC memory. By specifying, loading, or by storing a correct program, ensure a match with the program in PMC memory.
E:E-6183	This function is protected.	The online edit/input/output function (sequence program load/store) is protected. Check the keep relay. Display of the data table control screen is protected. Check the keep relay.
E:E-6187	Write protect.	The signal status is write-protected. Check the keep relay.
E:E-6197	INPUT NET TOO LARGE	
E:E-6362	Ladder diagram on the PMC side is being edited now.	

11.2.6 Message Editing

Error code	Message	Cause/action
G:E-6000	Specify A address.	Specify an A address like A0.0.
G:E-6001	Illegal address data.	The characters you can use for addressing are the letter A, a period (.), and digits 0 to 9.
G:E-6002	Illegal range data.	The maximum allowed A address is exceeded.
G:W-7000	KANJI is not allowed	When the PMC model is PA3, full-size characters cannot be used.

11.2.7 Print

Error code	Message	Cause/action
H:F-2005	Source program has wrong file	
H:F-2008	Cannot open **** file	

11.2.8 Compile

Error code	Message	Cause/action
I:F-2100	Not enough disk space	
I:F-2101	Out of memory	
I:E-3100	**** read error	The source program could not be read.
I:E-3101	**** write error	The results of compilation could not be written.
I:E-3102	**** Source program name illegal.	An invalid source program name was specified.
I:E-3103	**** Source program not found.	The **** source program is not found.
I:E-3104	**** file not found	
I:E-3105	**** Source program format is different.	The format of the source program is FORMAT-A.
I:E-3106	**** file read error.	
I:E-3107	System parameter read error.	A source file containing system parameter data is missing.
I:E-3108	Title read error.	A source file containing title data is missing.
I:E-3109	I/O module read error.	A source file containing I/O module data is missing.
I:E-3110	Verification error	An entered password does not match the set password.
I:E-3111	This word can not be used as password. Try another word	Try another password.
I:E-3112	Only alphabetical and numerical characters are allowed	A password including other than alphanumeric characters was entered.
I:E-3200	There is an undefined instruction.	An instruction that cannot be handled with a selected type of program is included.
I:E-3201	There is no coil in the functional instruction which needs the coil.	For a function instruction that requires a coil, no coil is set.
I:E-3220	The **** parameter is out of range.	In a parameter of the **** instruction, a numeric value outside the specifiable range is specified.
I:E-3221	Program number is different from program name.	In a parameter of the sub-program start instruction SP, a program number that does not match the file name is specified.
I:E-3222	An illegal program number is specified for the **** instruction.	In a parameter of the **** instruction, a program number outside the specifiable range or an address other than a program number is specified.
I:E-3223	An illegal label number is specified for the **** instruction.	In a parameter of the **** instruction, a label number outside the specifiable range or an address other than a label number is specified.
I:E-3250	There is no LADDER program.	The contents of a ladder program are empty. The END1 or END2 instruction is required.
I:E-3251	The size of LADDER program is too large.	The size of a ladder program exceeds the maximum specifiable size of a selected type of program.
I:E-3252	LADDER program is broken.	An instruction is destroyed and unrecognizable.
I:E-3253	LADDER execution time at the 1st level is too large.	The execution of the first level of the main program takes an excessively long time, so that the ladder cannot be executed. Reduce the first level or increase the value of the system parameter by specifying a ladder execution time ratio.
I:E-3254	The number of division of LADDER exceeds 99.	The number of divisions of the second level of the main program exceeded the maximum allowable value (99), so that the ladder cannot be executed. Reduce the size of the second level or increase the value of the system parameter by specifying a ladder execution time ratio.

Error code	Message	Cause/action
I:E-3270	SP instruction can not be used in the main program.	SP is the sub-program start instruction. SP cannot be used with a main program.
I:E-3271	SPE instruction can not be used in the main program.	SPE is the sub-program end instruction. SPE cannot be used with a main program.
I:E-3272	JMPC instruction can not be used in the main program.	JMPC is an instruction for making a jump from a sub-program to the second level of the main program. JMPC cannot be used with a main program.
I:E-3273	CALL instruction can not be used excluding the 2nd level main program.	No sub-program can be called from a level other than the second level of the main program. So, the CALL instruction cannot be used.
I:E-3274	CALLU instruction can not be used excluding the 2nd level main program.	No sub-program can be called from a level other than the second level of the main program. So, the CALLU instruction cannot be used.
I:E-3290	There is no SP instruction at the top of the subprogram.	Start a sub-program with the SP instruction used to specify the start of a sub-program.
I:E-3291	There is no SPE instruction at the bottom of the subprogram.	End a sub-program with the SPE instruction used to specify the end of a sub-program.
I:E-3292	LADDER program exists beyond SPE instruction.	SPE is the sub-program end instruction. After SPE, no instruction can be specified.
I:E-3293	SP instruction is detected in the subprogram.	SP is the sub-program start instruction. SP cannot be specified in the middle of a sub-program.
I:E-3310	There is no END1 instruction.	At the end of the first level, the END1 instruction is missing.
I:E-3211	There is no END2 instruction.	At the end of the second level, the END2 instruction is missing.
I:E-3312	There is no END3 instruction.	At the end of the third level, the END3 instruction is missing.
I:E-3313	LADDER program exists beyond END1 instruction.	END1 is the end instruction for the first level. After END1, no instruction can be specified.
I:E-3314	LADDER program exists beyond END2 instruction.	END2 is the end instruction for the second level. After END2, no instruction can be specified.
I:E-3315	LADDER program exists beyond END3 instruction.	END3 is the end instruction for the third level. After END3, no instruction can be specified.
I:E-3316	LADDER program exists beyond END instruction.	END is the end instruction for all ladder programs. After END, no instruction can be specified.
I:E-3317	END1 instruction can not be used.	The END1 instruction is used at a level other than the first level.
I:E-3318	END2 instruction can not be used.	The END2 instruction is used at a level other than the second level.
I:E-3319	END3 instruction can not be used.	The END3 instruction is used at a level other than the third level.
I:E-3320	END instruction can not be used.	The END instruction is used at the first level.
I:E-3330	There is no COME instruction.	The COM instruction for starting a COM instruction control range is defined, but the COME instruction for ending the range is not defined.
I:E-3331	CALL instruction can not be used in the range controled COM instruction.	A sub-program cannot be called from within a COM instruction control range. So, the CALL instruction cannot be used.
I:E-3332	CALLU instruction can not be used in the range controled COM instruction.	A sub-program cannot be called from within a COM instruction control range. So, the CALLU instruction cannot be used.
I:E-3333	Another COM instruction can not be used in the range controled COM instruction.	In a COM instruction control range, the COM instruction for starting a control range is defined again.

Error code	Message	Cause/action
I:E-3334	COME instruction must be the pair with COM.	If a COM instruction control range is not started, the COME instruction for ending a control range cannot be used.
I:E-3335	COME instruction is detected though the case of the coil number specification.	If the end of a COM instruction control range is defined by specifying the number of coils, the COME instruction for ending a control range cannot be used.
I:E-3340	There is no JMPE instruction.	The JMP instruction for specifying a jump start position is defined, but the JMPE instruction for specifying a jump end position is not.
I:E-3341	Another JMP instruction can not be used in the range of JMP instruction.	Between a JMP instruction for specifying a jump start position and a JMPE instruction for specifying a jump end position, another JMP instruction is defined.
I:E-3342	JMPE instruction must be the pair with JMP.	If the JMP instruction for specifying a jump start position is not defined, the JMPE instruction for specifying a jump end position cannot be used.
I:E-3343	JMPE instruction is detected though the case of the coil number specification.	If a jump end position is defined by specifying the number of coils, the JMPE instruction for specifying a jump end position cannot be used.
I:E-3350	There is no label of ****.	The label **** for indicating the jump destination of a JMPB instruction cannot be found.
I:E-3351	The label of **** is used twice or more.	At the jump destination of the LBL instruction, the same label number **** is defined. Define a different label number.
I:E-3352	Too many labels.	The total number of LBL instruction jump destinations defined exceeded the maximum allocable value of a selected type of program. Reduce the number of jump destinations defined.
I:E-3353	The destination of JMPB instruction is beyond COM/COME instruction.	The JMPB instruction cannot be used to make a jump from within a COM instruction control range to an external point, or from a point outside a COM instruction control range to a point within the range. The JMPB instruction can only be used to make a jump from one position to another both within a COM instruction control range or outside a COM instruction control range.
I:E-3400	There is an undefined instruction.	A step sequence program includes an instruction that cannot be handled by a selected type of program, or a destroyed instruction.
I:E-3420	Program number is different from program name.	In a parameter of program start instruction SP, a program number that does not match the file name is specified.
I:E-3421	An illegal step number is specified for the **** instruction.	In the **** instruction, a step number outside the specifiable range or an address other than a step number is specified.
I:E-3422	An illegal program number is specified for the **** instruction.	In the **** instruction, a program number outside the specifiable range or an address other than a program number is specified.
I:E-3423	An illegal label number is specified for the **** instruction.	In the **** instruction, a label number outside the specifiable range or an address other than a label number is specified.
I:E-3440	There is no SP instruction at the top of the subprogram.	A sub-program must start with the SP instruction for specifying the start of a sub-program.

Error code	Message	Cause/action
I:E-3441	There is no SPE instruction at the bottom of the subprogram.	A sub-program must end with the SPE instruction for specifying the end of a sub-program.
I:E-3442	Step sequence program exists beyond SPE instruction.	SPE is the sub-program end instruction. After SPE, no instruction can be specified.
I:E-3443	SP instruction is detected in the subprogram.	SP is the sub-program start instruction. SP cannot be specified within a sub-program.
I:E-3460	The label **** is assigned for two or more step programs.	At a jump destination, the same label number **** is defined. Define a different label number.
I:E-3461	Too many labels.	The total number of jump destinations defined exceeded the maximum allowable value for step sequence editing. Reduce the number of jump destinations defined.
I:E-3462	DSTEP instruction without DLBL.	The label representing the jump destination of a DSTEP instruction cannot be found.
I:E-3480	The step number **** is assigned for two or more step programs.	For a different step, the same step number **** is used. Define a different step number.
I:E-3570	The size of the message data is too large.	The total number of message data characters exceeded the maximum allowable value of a selected type of program. Reduce the total number of characters.
I:E-3600	Data too large.(LADDER + step sequence)	The total size of the ladders and step sequences exceeded the maximum allowable value of a selected type of program. Reduce the size of the ladders/step sequences.
I:E-3601	Data too large.(message + symbol + comment + LADDER + step sequence)	The total size of the messages, symbols, comments, ladders, and step sequences exceeded the maximum allowable value of a selected type of program. Reduce the amount of data.
I:E-3620	There is no subprogram ****.	Because the sub-program file with number **** is not included in the selected program, the file cannot be called. Create a sub-program with number ****.
I:E-3640	LADDER/step sequence program exists beyond END instruction.	A sub-program exists, but the END instruction is specified at the end of level 2. The END instruction is specified at the end of a sub-program, but a sub-program with a greater program number exists.
I:E-3650	There is no label of ****.	Label **** representing the jump destination of the JMPC instruction cannot be found.
I:E-3651	The label of **** is used twice or more.	In the main program, the same label number **** is defined as the jump destination of the LBL instruction. Define a different label number.
I:E-3652	Too many labels.	The total number of LBL instruction jump destinations defined in the main program exceeded the maximum allowable value of a selected type of program. Reduce the number of jump destinations defined.
I:E-3653	The label of **** to refer exists in another level.	JMPC is the instruction for making a jump from a sub-program to the second level of the main program. Define the jump destination label **** at the second level.
I:E-3654	The label of **** exists in the range of the COM instruction.	The jump destination label **** of the JMPC instruction is specified within a COM instruction control range. Specify the label **** outside the control range.

Error code	Message	Cause/action
I:W-4100	The title data which could not be display on the CNC was replaced with space code.	Title data includes characters such as kana characters. Those characters are replaced with blank characters.
I:W-4101	Illegal OP.PANEL(PARAMETER). Proceed to compile using 'NO'	A system parameter is set to use the FS0 operator's panel, but addresses (such as a key input address and LED output address) are not set. Compilation is performed, assuming that the FS0 operator's panel is not used.
I:W-4102	Editing sub-program has not completed.	A sub-program is being edited. Complete the editing.
I:W-4103	Multiple sub-programs with same number exist.	A sub-program with the same number exists (for example, P1.#LA and P1.#SS). The ladder program is compiled first (P1.#LA, for example).
I:W-4104	The source-program is FORMAT-B. This parameter is ignored: SYMBOL/COMMENT	FORMAT-B outputs symbols/comments at all times.
I:W-4105	The source-program is FORMAT-B. This parameter is ignored: NET COMMENT	FORMAT-B data does not include a net comment. Setting this item has no effect.
I:W-4200	There is no LADDER program.	A ladder program is empty. The ladder program is not output to a memory card format file.
I:W-4201	LADDER execution time at the 1st level is too large.	Reduce the first level, or increase the value of the system parameter by specifying a ladder execution time ratio.
I:W-4202	The coil number specification of COM instruction is not allowed.	The end of a COM instruction control range cannot be defined using the number of coils. The specification of the number of coils is ignored, and the end of a COM instruction control range is determined based on the COME instruction.
I:W-4203	The coil number specification of JMP instruction is not allowed.	The end position of a jump cannot be defined using the number of coils. The specification of the number of coils is ignored, and the end position is determined based on the JMPE instruction.
I:W-4204	Unused NET COMMENT pointer found.	A ladder program includes a pointer to a lost net comment character string. The pointer is not output to a memory card format file.
I:W-4400	There is no step sequence program.	A step sequence program is empty. The step sequence program is not output to a memory card format file.
I:W-4500	The symbol data which could not be display on the CNC was replaced with space code.	Symbol data includes special characters that cannot be displayed by the CNC. Those characters only are replaced with blank characters.
I:W-4501	The comment data which could not be display on the CNC was replaced with space code.	Comment data includes special characters that cannot be displayed by the CNC. Those characters only are replaced with blank characters.
I:W-4502	Comment data size exceeds 64KB. Symbol/comment data is not converted to the Memory card format file.	The total number of comment data characters exceeded 65535. None of the symbols/comment data is output to a memory card format file.
I:W-4503	The character * in the comment may not be displayed on the CNC	The comment uses a character code not available to the CNC and, therefore, may not be displayed.
I:W-4504	Double-sized space character in comment was changed to two single-sized spaces.	The comments uses a double-byte space character, and the character is replaced by two single-byte space characters.
I:W-4505	Too long strings for symbol data	A symbol that exceeds the character length limit (six characters) is found, and is deleted. (The comment remains valid.)

Error code	Message	Cause/action
I:W-4570	The message data which could not be display on the CNC was replaced with space code.	Message data includes special characters that cannot be displayed by the CNC. Those characters only were replaced with blank characters.
I:W-4600	Unreferenced subprogram ****.	The **** sub-program is not called from any program, but is output to a memory card format file.
I:W-4601	\$ number * is duplicated.	

11.2.9 Decompile

Error code	Message	Cause/action
J:F-2100	Function code error DATA:***** SYSTEM:*****	There is a mismatch between the function codes in a memory card format file and the function codes of the system. DATA is for the file side, and DATA is for the system side. Install the correct system.
J:F-2101	PMC series is different from **** Memory card format file.	The type of memory card format file **** differs from the type of a selected program. Select a correct program.
J:F-2102	**** Memory card format file not found.	The specified memory card format file **** is not found. Prepare a file.
J:F-2103	Mismatched password.	Execution is rejected because the password is incorrect. Enter the correct password.
J:F-2104	**** Memory card format file read error.	The memory card format file **** could not be read. The file is invalid.
J:F-2105	**** source program write error.	The source program **** could not be written.
J:E-3100	There is an undefined instruction.	An instruction that cannot be handled by a selected type of program, or a destroyed instruction is included.
J:E-3101	There is no SPE instruction at the bottom of the subprogram.	A sub-program in a selected program does not end with the SPE instruction.
J:E-3200	The number of symbol data in source program exceeds the limit.	The number of symbol data items in a selected program exceeded the maximum allowable value defined with the system. Reduce the number of symbol data items.
J:E-3300	ID code (I/O module) error.(address ****)	The ID code defined at address **** in the I/O module data cannot be recognized correctly. Prepare a correct memory card format file.
J:W-4100	The size of LADDER program is too large.	The number of steps of a sub-program in a ladder program exceeded the maximum allowable value of a selected type of program, but the sub-program is output to the source program. Make corrections by ladder editing as required.
J:W-4101	**** unused NET COMMENT pointer found.	**** net comment pointers not corresponding to net comment character strings were detected. The net comment pointers are not output to the source program. Make corrections by ladder editing as required.
J:W-4102	**** unused NET COMMENT strings found.	**** net comment character strings not corresponding to net comment pointers were detected. The net comment character strings are deleted. Make corrections by ladder editing as required.
J:W-4103	**** duplicated NET COMMENT pointer found.	**** duplicate net comment pointers were detected. Character strings are copied so that the same net comment character string corresponds to the same net comment pointer.

Error code	Message	Cause/action
J:W-4104	The step number of **** is used twice or more.	The same step number **** is used for different steps. Make corrections by step sequence editing.
J:W-4105	Some sub-programs are protected. These sub-programs have not been decompiled.	
J:W-4200	The number of symbol data exceeds the limit.(address **** symbol ****)	During symbol data merge processing, the total number of data items at address ****/symbol **** exceeded the maximum allowable value defined with the system. Data beyond the symbol data is not output to the source program.
J:W-4201	**** symbol data at duplicated address found.	**** duplicate symbol data items defined for the same address were detected. Either source data or memory card data is valid according to the setting of the symbol merge option.
J:W-4202	Same symbol exists.(address **** symbol ****)	The symbol character string defined in the symbol data at address ****/symbol **** is already defined at another address. The symbol data is not output to the source program.
J:W-4203	Illegal symbol.(address **** symbol ****)	The symbol data at address ****/symbol **** is determined to be invalid by a symbol character string check based on the IEC standard. The symbol data is not output to the source program. If the check option in the %%%FLSET.CNF setting file is deselected, the symbol data is output to the source program.
J:W-4204	Symbol data address illegal.(symbol ****)	The address in the symbol data containing symbol **** cannot be recognized correctly. The symbol data is not output to the source program.
J:W-4300	Illegal operator panel (system parameter). Proceed to decompile using 'NO'.	The specification of an operator's panel in the system parameter data is invalid. Execution is continued, assuming that the specification of the operator's panel is invalid.
J:W-4301	This Memory card format file is not for expanded R/D address.	If the PMC version of PMC-RC is less than 3, R/D extended addresses are not supported. Change the PMC version by system parameter editing.
J:W-4800	**** Memory card format file illegal.	The header section of the memory card format file **** is invalid, but execution is continued.
J:W-4900	'OPTION' read failed.	The default setting was used. Settings in the option file of a selected program cannot be read. Prepare a file, or correct the settings. Execution is made possible by option resetting.
J:W-4901	'%%FLSET.CNF' read failed.	Symbol characters are not checked. Settings in the %%%FLSET.CNF file cannot be read. Prepare a file, or correct the settings. Execution is possible if symbol characters are not checked.

11.2.10 Mnemonic Conversion

Error code	Message	Cause/action
K:F-2000	Insufficient memory.	
K:F-2001	Insufficient disk space.	
K:F-2006	Not found **** file.	
K:F-2100	Not found * file.	
K:F-2101	Set-up file broken.	
K:F-2102	Illegal option(s).	
K:F-2103	Insufficient parameter(s).	System parameter /function instruction data is insufficient.
K:F-2104	Too many parameters.	Too many parameters are specified in a function instruction.
K:F-2105	Illegal Option-specified file.	
K:F-2106	Illegal Idcode.	
K:F-2107	Expected terminator.	
K:F-2108	PMC series is different from Source-program.	
K:F-2109	Expected Idcode.	
K:F-2110	Illegal parameter(s).	
K:F-2111	Create temporary file(s) in current directory.	
K:F-2112	Not specified environmental variable 'TMP'.	
K:F-2113	Illegal name of Set-up file.	
K:F-2114	Not found Set-up file.	
K:F-2115	Expected '/PC' option.	
K:F-2116	**** executable file not found.	
K:F-2117	Input data illegal.	
K:E-3100	**** file cannot execute.	
	The file cannot be executed.	
K:E-3101	The data of **** is broken.	
	* Symbol & Comment data broken.	
K:E-3102	Cannot be handle data type '%@2-C'.	When the format of %%%FLSET.CNF is FORMAT-A/B, the mnemonic of the extended symbol %@2-C was converted.
K:E-3103	Cannot convert files of the PMC series set up the system.	
	The model set with the system cannot be converted.	
K:E-3104	Cannot overwrite existing data.	
K:E-3105	Cannot specify bit address of parameter.	A bit address was specified in a byte address parameter of a function instruction.
K:E-3106	Cannot specify byte address on basic instruction.	A byte address was specified in a basic instruction.
K:E-3107	Cannot specify output module at input address.	An output module is specified at the input address of I/O module data.
K:E-3108	Cannot specify input module at output address.	An input module is specified at the output address of I/O module data.
K:E-3109	Cannot specify the address prohibited using as parameter.	A parameter prohibition address was specified in the address parameter of a function instruction.
K:E-3110	Cannot specify the bit address.	
K:E-3111	Cannot specify the byte address.	

Error code	Message	Cause/action
K:E-3112	Cannot specify the input address.	An output prohibition address was specified in the output address parameter of a function instruction.
K:E-3113	Cannot specify the input address with coil.	An output prohibition address was specified for a coil.
K:E-3114	Cannot specify the odd address.	An odd-numbered prohibition address was specified as an odd-numbered address.
K:E-3117	Expected a multiple of 2.	A system parameter includes a numeric value that is not a multiple of 2.
K:E-3118	Expected a multiple of 5.	A system parameter includes a numeric value that is not a multiple of 5.
K:E-3119	Expected address.	A basic instruction has no address.
K:E-3120	Expected function number.	
K:E-3121	Expected parameter(s).	A function instruction has no parameter.
K:E-3122	The identification code is not found in mnemonic file.	
K:E-3123	Illegal address.	An invalid address was specified as a symbol/comment data/message setting address.
K:E-3124	Illegal address in data table.	An invalid address was specified in the data table of a function instruction.
K:E-3125	Illegal address of parameter.	An invalid address was specified in the address parameter of a function instruction.
K:E-3126	Illegal character(s).	Invalid character data is contained in a system parameter, title data, symbol/comment data, or message data.
K:E-3127	Illegal Source-program name.	
	The specified source program name is illegal.	
K:E-3128	The specified mnemonic file name is illegal.	
	Illegal Mnemonic file name.	
K:E-3129	Illegal parameter number.	An invalid data number was specified in a system parameter.
	Illegal title number.	
K:E-3130	Illegal value of parameter.	An invalid data number was specified as a data identifier.
K:E-3131	Illegal value.	Invalid numeric data was specified in a system parameter.
K:E-3132	Illegal value in base data.	An invalid value was specified for the base data of I/O module data.
K:E-3133	Illegal value in group data.	An invalid value was specified for the group data of I/O module data.
K:E-3134	Illegal value in slot data.	An invalid value was specified for the slot data of I/O module data.
K:E-3135	Illegal value of parameter.	An invalid numeric value was specified in the data table of a function instruction.
K:E-3136	Include KANA or KANJI character(s).	
K:E-3137	Input mnemonic file name	
K:E-3138	Input the source program name.	

Error code	Message	Cause/action
K:E-3139	The conversion data type number is illegal.	
	The data type number is illegal	
	Invalid a number of convert data.	
K:E-3140	Invalid function's name.	An invalid function instruction name was specified.
K:E-3141	Invalid function number.	
K:E-3142	Invalid module name.	The module name of I/O module data is invalid.
K:E-3143	Return status from SPAWN is E2BIG(=7).	
K:E-3144	The model of the specified source program is illegal.	
	Invalid PMC series of specified Source-program.	
K:E-3145	Invalid qualifier.	An invalid character follows a system parameter, title data, symbol/comment data, ladder, or I/O module data.
K:E-3146	There is no option by which **** file is specified.	
	Lack of **** file	
K:E-3147	Message data too large.	
K:E-3148	Specified Mnemonic file is not found.	
	Mnemonic file not found.	
K:E-3149	Not enough parameter(s)	System parameter /function instruction parameters are insufficient.
K:E-3150	Not found base data.	The base data of I/O module data is missing.
K:E-3151	Not found group data.	The group data of I/O module data is missing.
K:E-3152	Not found module name.	The module name of I/O module data is missing.
K:E-3153	Not found slot data	The slot data of I/O module data is missing.
K:E-3154	Not found **** Process interface file.	
K:E-3155	Not found **** Source-program management file.	
K:E-3156	Not found **** SUB program file.	
K:E-3157	Out of address limits.	The address of mnemonic data/I/O module data was specified.
K:E-3158	Out of address limits in data table.	An address outside the specifiable range was specified in the data table of a function instruction.
K:E-3159	Out of address limits of address.	An address outside the specifiable range was specified as a message setting address.
K:E-3160	Out of address limits of parameter	An address outside the specifiable range was specified in a parameter of a function instruction.
K:E-3161	Out of parameter value.	A numeric value outside the specifiable range was specified in a parameter of a function instruction.
K:E-3162	Out of value.	A numeric value outside the specifiable range was specified in a system parameter.
K:E-3163	Out of value in base data.	A value outside the specifiable range was specified for the base data of I/O module data.
	Not found slot data.	
K:E-3164	Out of value in data table.	A numeric value outside the specifiable range was specified in the data table of a function instruction.
K:E-3165	Out of value in group data.	A value outside the specifiable range was specified for the group data of I/O module data.

Error code	Message	Cause/action
K:E-3166	Out of value in slot data.	A value outside the specifiable range was specified for the slot data of I/O module data.
K:E-3167	Please shorten file name.	
K:E-3168	Process error	
K:E-3172	Specified source program is not found.	
	Source-program not found.	
K:E-3173	Specified source program is not found.	
	The specified conversion data is not found.	
K:E-3174	Specify the value(Slot) except 0 at I/O UNIT-B *.	
K:E-3176	Symbol data count over.	
K:E-3177	Symbol data not found.	Comment data is set, but symbol data is not.
K:E-3178	Symbol or comment data not found.	Data containing a symbol or comment only was converted to an address.
K:E-3179	The same group base and slot are already specified.	In I/O module data, the same number is specified for group, base, and slot data.
K:E-3180	Too large of total comment data.	
K:E-3181	Too long strings.	The length of a system parameter, message data, or title data exceeded the maximum allowable value.
K:E-3187	Too many characters in 1 line.	The number of characters on one line of mnemonic data, a mnemonic, or I/O module data in a system parameter, message data, title data, or symbol/comment exceeded the maximum allowable value.
K:E-3188	Too many parameters.	Too many parameters are set for a function instruction.
K:E-3189	Total value of base and slot is over.	The total of the base and slot values of the I/O module data exceeded the default.
K:E-3190	Undefined instruction.	Data includes an undefined instruction.
K:E-3191	Unexpected address.	An address was specified where no address is required.
K:E-3192	Unexpected parameter(s).	Parameters were specified in a function instruction that requires no parameters.
K:E-3193	Unknown data number.	A nonexistent data number was specified as a system parameter/data identifier.
K:E-3194	Data entry error.	Symbol/comment data could not be registered.
K:E-3195	Include KANA or KANJI character(s) in symbol data.	Full-size characters cannot be used for symbol data.
K:E-3196	Include KANA or KANJI character(s).	
K:W-4100	Comment data not found.	Data consisting of symbols only was converted to an address.
K:W-4101	Data not found.	System parameters, message data, title data, symbols/comments, and I/O module data are not found.
K:W-4102	Deleted KANJI characters.	
K:W-4103	Expected control condition(s).	No control condition is set for a function instruction.
K:W-4104	Illegal characters are specified at ****.	Invalid data was specified in ****.
K:W-4105	Illegal OP.PANEL(PARAMETER). Proceed to convert with using 'NO'.	The system parameter OP.PANEL (parameter) is invalid. Conversion is performed assuming "NO."
K:W-4106	Illegal symbol.	The symbol data does not satisfy the standard (check level-1). (FORMAT-C)

Error code	Message	Cause/action
K:W-4108	Include KANA or KANJI character(s) in comment data.	Comment data including full-size characters was converted without selecting the full-size character conversion option (J option).
K:W-4109	Logical operated with unused register(s).	An operation was performed with a register not entered in the ladder data.
K:W-4110	Logical product remains in register(s).	A register was not output to ladder data.
K:W-4111	Message data include KANA OR KANJI characters at ****.	Message data **** includes full-size/half-size katakana characters.
K:W-4112	Not enough control condition(s).	Not all necessary control conditions are set for a function instruction.
K:W-4113	Not found data at **** address.	At address ****, no message is defined.
K:W-4114	Not found parameter numbered ****.	
	Not found title numbered \$.	
K:W-4116	Not found **** PMC-OS file..	
K:W-4117	Not used net comment pointer exist. \$	
K:W-4118	Output unused register(s).	
K:W-4119	Overwrote existing data.	
K:W-4120	Invalid qualifier.	An invalid character follows the end ID code (%) of each data item (system parameter, message data, title data, ladder, symbol/comment, and I/O module data).
K:W-4121	Registers overflow.	
K:W-4122	Some garbage data are found at end of ladder data.	Upon conversion to FORMAT-B, data that does not belong to the first to third levels or any sub-programs was found. This message is output when data is found after the last SPE instruction.
K:W-4123	Specify same group base and slot.	In the I/O module data, the same number is specified for group, base, and slot data.
K:W-4124	Specify same number(Group) at I/O UNIT-B as I/O UNIT-A.	
K:W-4125	Specify the value(Base) except 0 at I/O UNIT-B.	
K:W-4126	The following data of **** were deleted because of exceeding the limit.	
K:W-4127	Too many control conditions.	Too many control conditions are set for a function instruction.
K:W-4128	Unexpected coil(s).	Coils were specified for a function instruction that requires no coils.
K:W-4129	Unexpected control condition(s).	A basic instruction was specified for a function instruction that requires no control condition.
K:W-4130	Redefinition of address data.	A symbol definition is made at more than one location for the same address. If the start ID code of symbol data is %@2, no duplicate definition is allowed. The definition or definitions made later are ignored.
	Illegal net comment pointer. ****	
K:W-4131	Redefinition of symbol data.	The same symbol data was specified for different addresses. The symbol data defined later is replaced with blank characters.

Error code	Message	Cause/action
K:W-4132	Too long strings for symbol data.	FORMAT-A/B allows up to 6 characters. FORMAT-C allows up to 16 characters. Symbol data is replaced with blank characters.
K:W-4133	Too long strings for comment data.	A maximum of 30 characters can be specified. Comment data is replaced with blank characters.
K:W-4134	symbol data already exist.	For one address, a different symbol is specified at more than one location. (With FORMAT-C, the same symbol may be specified at more than one location.) The symbol data specified later is replaced with blank characters.
K:W-4135	relay comment data already exist.	For a relay comment at one address, a different character string is specified at more than one location. (With FORMAT-C, the same character string may be specified at more than one location.) The relay comment data specified later is replaced with blank characters.
K:W-4136	coil comment data already exist.	For a coil comment at one address, a different character string is specified at more than one location. (With FORMAT-C, the same character string may be specified at more than one location.) The coil comment data specified later is replaced with blank characters.
K:W-4137	comment title data already exist.	For a comment title at one address, a different character string is specified at more than one location. (With FORMAT-C, the same character string may be specified at more than one location.) The comment title data specified later is deleted.
K:W-4138	Too long strings for relay comment data.	The character string of a relay comment is longer than 16 characters. With FORMAT-C only, relay comment data is replaced with blank characters.
K:W-4139	Too long strings for coil comment data.	The character string of a coil comment is longer than 30 characters. With FORMAT-C only, coil comment data is replaced with blank characters.
K:W-4140	Too long strings for comment title data.	The character string of a comment title is longer than 30 characters. With FORMAT-C only, comment title data is replaced with blank characters.

11.2.11 Input/Output

Error code	Message	Cause/action
L:E-6000	I/O Error.	Recheck the setting of MONIT on the PMC.
L:E-6001	The system failed in making the thread	
L:E-6002	PMC parameter file read error	
L:E-6003	PMC parameter file write error	
L:E-6004	PMC parameter file write error Insufficient disk space	
L:E-6005	This file format is not PMC parameter file format	
L:E-6006	Can not load PMC parameter from PMC side(Not EDIT mode)	
L:E-6007	Can not store PMC parameter to PMC side(Not emergency stop nor PWE = 1)	

11.2.12 Online

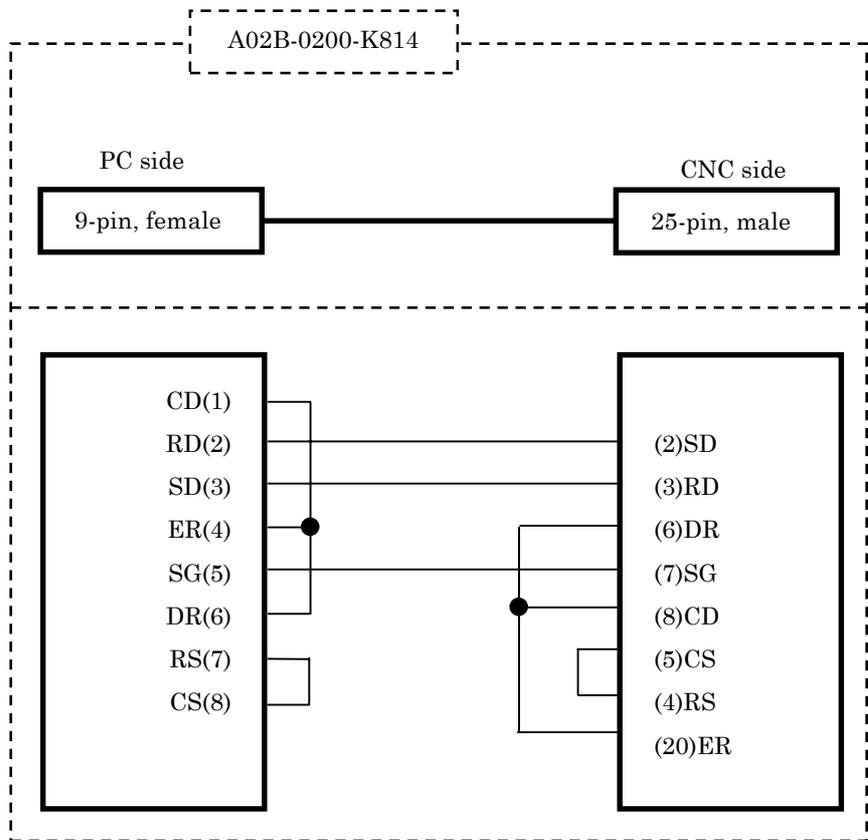
Error code	Message	Cause/action
N:E-3001	Flash ROM Write error	The F-ROM is abnormal. Replace the F-ROM. Contact your FANUC service center.
N:E-3002	Flash ROM Read error	
N:E-3003	Flash ROM Erase error	The F-ROM is abnormal. Replace the F-ROM. Contact your FANUC service center.
N:E-3004	Flash ROM Area error	
N:E-3005	Flash ROM Program nothing	
N:E-3006	Flash ROM Size error	A sequence program is larger than the F-ROM. Increase the size of the F-ROM. Try the CONDENCE function, which is an offline function.
N:E-3007	Flash ROM Not EMG stop	The CNC is not placed in the emergency stop state. Place the CNC in the emergency stop state.
N:E-3008	Flash ROM Program data error	A sequence program on the PMC is destroyed. Reenter the sequence program.
N:E-3009	Flash ROM Access request error	
N:E-3011	User C program error occurs on PMC.	
N:E-3012	Flash ROM Another used	
N:E-3013	Flash ROM Command error	
N:E-3014	Flash ROM No space	
N:E-3015	Flash ROM File error	
N:E-3016	Flash ROM File not match	
N:E-3017	Flash ROM Un-known F-ROM	
N:E-3018	Flash ROM I/O error	
N:E-3019	Flash ROM Undefine error code	
N:E-3300	Signal trigger unavailable	The user switched from online editing to the signal trigger stop function.
N:E-3302	Reject Signal trigger	The user switched to online editing during signal trigger execution.
N:E-3307	Cannot be changed Signal trigger is executing	The user attempted to modify parameter settings during signal trigger execution.
N:E-3390	Program is running	
N:E-3410	Function param is out of range	
N:E-6000	Signal Analysis function is not supported	The PMC is of a type that does not support the signal analysis function.
N:E-6001	Signal Trace function is running	During signal trace function execution, the signal analysis function cannot be executed.
N:E-6002	Address Error	A specified address is invalid.
N:E-6003	No Trigger Address	When the condition is <Trigger-ON> or <Trigger-OFF>, set a trigger address.
N:E-6004	[About]/[Before] is illegal on [Start] selected	When the condition is <Start>, <About> and <Before> cannot be selected as a trigger mode.
N:E-6005	No Signal Address	No sampling address is set.
N:E-6006	Sampling Time Error:	An invalid sampling time is set.
N:E-6041	The communication to PMC is not ready	The connection with the NC is disconnected.

APPENDIX

A

CABLE FOR DATA TRANSFER

When data is transferred from the personal computer (PC) to the CNC, the cable shown below is used.



B

CONVERSION USING A SIGNAL ADDRESS CONVERTER

Table B

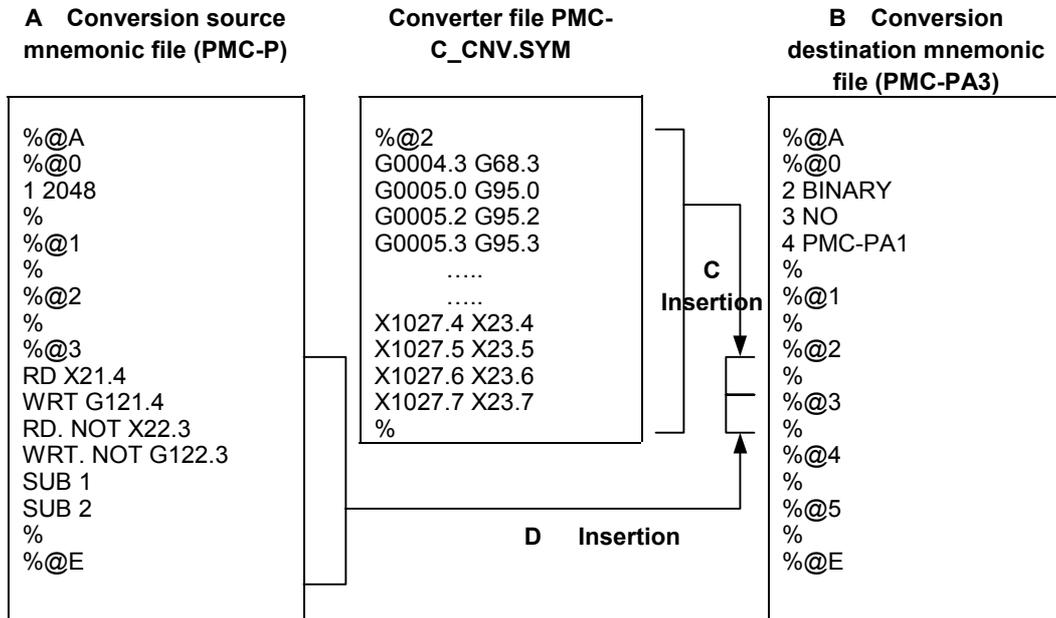
Converter file name	Applicable function	Reference document
FS0T_CNV.SYM	PMC-L/M/M(MMC) -> PMC-SA1/SA3/SB3/SC3/ SB4/SC4/SB5/SB6 (FS0-T) (FS16/18/20-T)	FANUC PMC-MODEL PA1/PA3/SA1/SA2/SA3/SB/ SB2/SB3/SB4/SC/SC3/SC4/NB Programming Manual (Ladder Language) B-61863E
FS0M_CNV.SYM	PMC-L/M/M(MMC) -> PMC-SA1/SA3/SB3/SC3/ SB4/SC4/SB5/SB6 (FS0-M) (FS16/18/20-M)	
PM-C_CNV.SYM	PMC-P -> PMC-PA3 (Power Mate-MODEL C) (Power Mate-MODEL D/F/H)	

The converter files are stored in the subdirectory ¥APPENDIX of the system floppy (Vol. 5).

Example of operation: PMC-P -> PMC-PA3

- <1> By using FAPT LADDER, convert a program of the PMC-P model (conversion source) to a mnemonic file. (A in the figure below)
- <2> By using FAPT LADDER-III, create a program of the PMC-PA3 model (conversion destination).
- <3> Convert the program of <2> to mnemonics. (B in the figure below)
- <4> Start a text editor commercially available, then open the mnemonic file (conversion destination) created in <3>.
- <5> Replace the symbol data of the mnemonic file (conversion destination) with the converter file. (C in the figure below)
- <6> Replace the ladder data of the mnemonic file (conversion destination) with the ladder data of the mnemonic file (conversion source) created in <1>. (D in the figure below)
- <7> Close the mnemonic file (conversion destination) on the text editor.
- <8> By using FAPT LADDER-III, convert the mnemonic file (conversion destination) of <7> to a source program (with the program created in <2> left open).
- <9> Delete all symbol comment data.

B. CONVERSION USING A SIGNAL ADDRESS CONVERTER

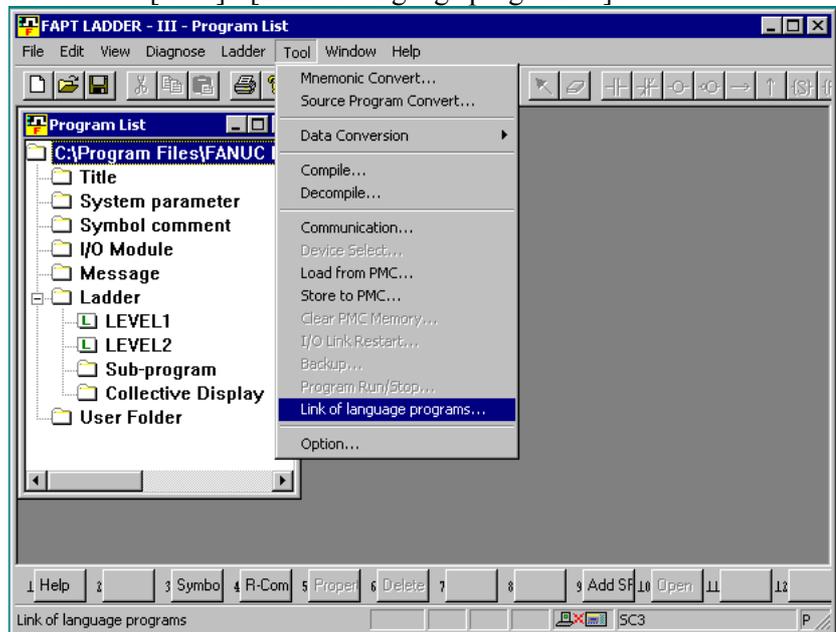


C

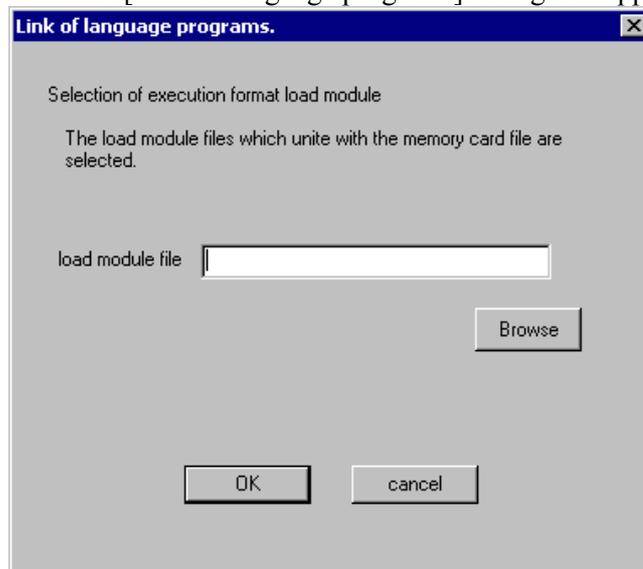
LANGUAGE PROGRAM LINK FUNCTION

This function is used to unite a load module created in C with a memory card file created on FAPT LADDER-III or loaded from the PMC.

1. Select [File] - [Open Program], and open the program with which you want to unite a load module.
2. Select [Tool] - [Link of language programs...].



3. The [Link of language programs] dialog box appears.



4. Select the load module file you want to unite.
5. Click the "OK" button to unite the load module with the program.

NOTE

- 1 If not using C functions, you need not unite programs.
- 2 This function is available to models PMC-SC3/SC4/SC4 (STEP SEQ.)/QC/NB/NB2.

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