

MACHINE CONTROLLER MX200/MX100/MX50/MX30/MX20

User's Manual

Personal Computer Loader Operation Manual

Thank you for purchasing the Personal Computer Loader for Machine Controller MX200/MX100/MX50/MX30/MX20.

This manual contains information for ensuring correct use of the Personal Computer Loader. It also provides necessary information for installation, maintenance, and trouble-shooting.

This manual should be read by those who design and maintain devices that use the Personal Computer Loader.

Be sure to keep this manual nearby for handy reference.

Yamatake Corporation

RESTRICTIONS ON USE

When using this product in applications that require particular safety or when using this product in important facilities, pay attention to the safety of the overall system and equipment. For example, install fail-safe mechanisms, carry out redundancy checks and periodic inspections, and adopt other appropriate safety measures as required.

REQUEST

Make sure that this Instruction Manual is handed over to the user before the product is used.

Copying or duplicating this Instruction Manual in part or in whole is forbidden. The information and specifications in this Instruction Manual are subject to change without notice.

Considerable effort has been made to ensure that this Instruction Manual is free from inaccuracies and omissions.

If you should find any inaccuracies or omissions, please contact Yamatake Corporation.

In no event is Yamatake Corporation liable to anyone for any indirect, special or consequential damages as a result of using this product.

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Other company names and product names are registered trademarks or trademarks of their respective companies.



Unpacking

Check the following when removing the Personal Computer Loader from its package.

1. Check the model No. to make sure that you have received the product that you ordered.
2. Check the Personal Computer Loader for any apparent physical damage.
3. Check the contents of the package against the Package List to make sure that all accessories are included in the package.

After unpacking, handle the Personal Computer Loader and its accessories taking care to prevent damage or loss of parts.

If an inconsistency is found or the package contents are not in order, immediately contact your dealer.

Name	Model No.	Qt'y	Remarks
Personal Computer Loader 	MX200SW01	1	CD-ROM Both Windows version and MS-DOS version are included
User's Manual Personal Computer Loader Operation Maual 	CP-UM-1602E	1	This manual

On Use of Windows version Personal Computer Loaders

The Windows version Personal Computer Loaders have the same operation easiness and comfortableness that have been conventionally incorporated into the MS-DOS version.

The manipulability realizes the easy ladder program inputs by adopting friendly function key input of the MS-DOS. Furthermore, the new Windows version is based on the idea of not making the users feel uncomfortable comparing to the MS-DOS version Personal Computer Loaders.

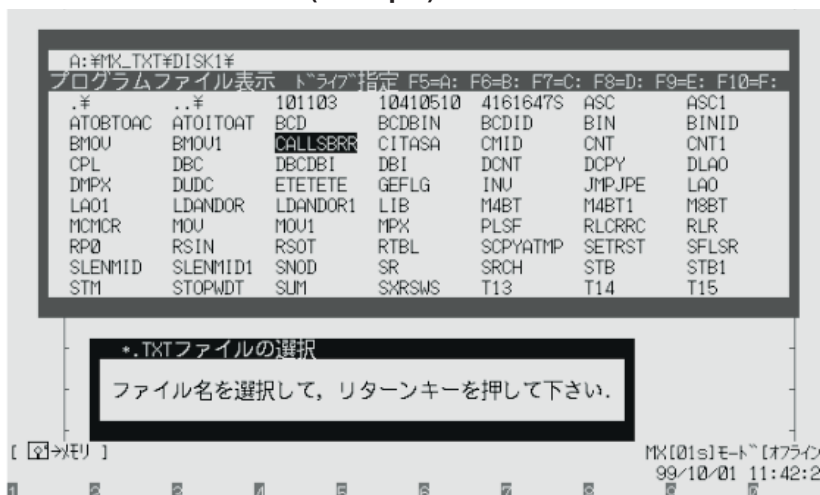
■ Titles of special Module User's Manuals

For the manipulation of Personal Computer Loaders for special modules, please refer to separate instruction manuals for detail.

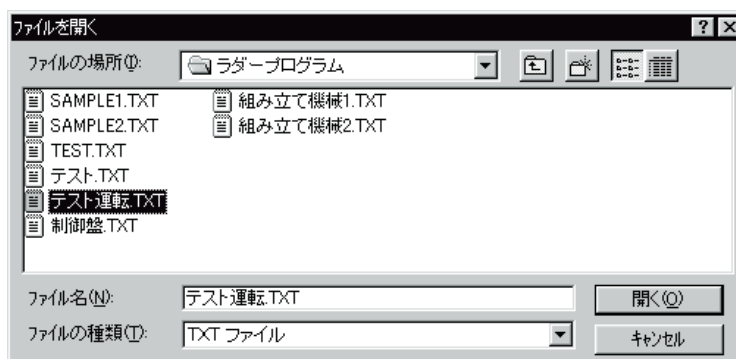
- CP-UM-1314E MACHINE CONTROLLER MX100 High Speed Conter Module
- CP-UM-1315E MACHINE CONTROLLER MX100 Analog Input ModuleI
- CP-UM-1316E MACHINE CONTROLLER MX100 Analog Output ModuleI
- CP-UM-1397E MACHINE CONTROLLER MX100 Serial Communication Module

The screen display examples shown in the special Module Manuals are of MS-DOS version with the similarity with the Windows version except some portions. The key manipulation is the same. Those portions not being similar each other between the Windows version and the MS-DOS version are the screens of file operation. For file operation, please follow the standard Windows operation procedures.

● MS-DOS version Screen (Example)

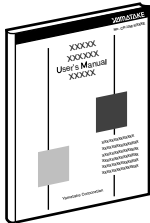


● Windows version Screen (Example)



The Role of This Manual

In all, 7 manuals have been prepared for the MX200/MX100/MX50/MX30/MX20. Read the manual according to your specific requirements. The following lists all the manuals that accompany the MX200/MX100/MX50/MX30/MX20 and gives a brief outline of the manual. If you do not have the required manual, contact Yamatake Corporation or your dealer.

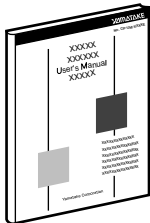


MX200 Specifications & Installation Manual

Manual No.CP-UM-1604E

This manual is required reading for first-time users of the Machine Controller MX200, those who design hardware for integrating the MX200 into operator control panels, and those who carry out maintenance. It outlines the hardware configuration, product features and the other products used in combination with the MX200.

It also describes how to install and wire the MX200 for integrating into instruments, method of operation, maintenance and inspection, troubleshooting, and hardware specifications.

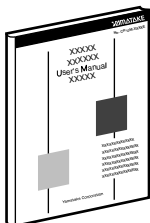


MX100 Specifications & Installation Manual

Manual No.CP-UM-1257E

This manual is required reading for first-time users of the Machine Controller MX100, those who design hardware for integrating the MX100 into operator control panels, and those who carry out maintenance. It outlines the hardware configuration, product features and the other products used in combination with the MX100.

It also describes how to install and wire the MX100 for integrating into instruments, method of operation, maintenance and inspection, troubleshooting, and hardware specifications.

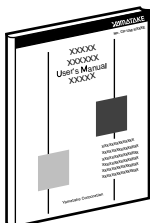


MX50

Manual No.CP-UM-1654E

This manual is required reading for first-time users of the Machine Controller MX50, those who design hardware for integrating the MX50 into operator control panels, and those who carry out maintenance.

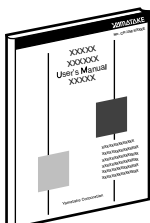
This manual describes how to install and wire the MX50 into a device, maintenance and inspection, troubleshooting and hardware specifications.



MX30

Manual No.CP-UM-1423E

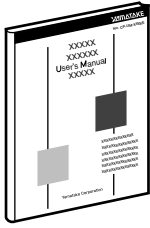
This manual is required reading for first-time users of the Machine Controller MX30, those who design hardware for integrating the MX30 into operator control panels, and those who carry out maintenance.



Basic Programming

Manual No.CP-UM-1562E

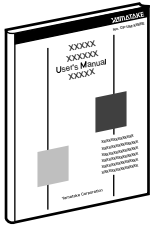
This manual describes the basic knowledge required for programming the MX series, the internal structure of MX200/MX100/MX50/MX30/MX20 registers and memory, and basic programming procedures.



Programming Instruction words

Manual No.CP-UM-1563E

This manual is required reading for programmers who write programs for the MX200/MX100/MX50/MX30/MX20 of machine controllers. It gives detailed explanations of each instruction word and so can be used for reference.



Personal Computer Loader Operation

Manual No.CP-UM-1602E

This manual.

This manual is required reading for those who write programs for the MX200/MX100/MX50/MX30/MX20 of machine controllers.

This manual comes with a loader software package supplied on CD-ROM. The loader software package supports the MX200, MX100, MX50, MX30 and MX20, and runs on personal computer.

This manual describes how to create an "execution system disk" and how to operate the personal computer loader.

Organization of This User's Manuals

This manual is organized as follows.

Chapter 1. General

This chapter gives an outline of the system, the features of the personal computer loader and information that should you should know before using the software.

Chapter 2. Setup

This chapter describes how to set up the personal computer loader.

Chapter 3. Basic Operations

This chapter describes the basic operating procedures, modes and menus of the personal computer loader.

Chapter 4. Operating Instructions

This chapter describes the initial settings of the loader and how to create, monitor and debug programs.

Chapter 5. Utilities

This chapter describes how to print programs created with the loader and how to edit labels and block comments.

Chapter 6. Troubleshooting

This chapter provides procedures for handling problems.

Appendix

First-time users of the personal computer loader should read at least the following chapters before they start using the software.

Chapter 2. Setup

Chapter 3. Basic Operations

Read these chapters before starting up the software, then follow the instructions given in **Chapter 4. Operating Instructions**.

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Conventions Used in This Manual

The following conventions are used in this manual.

 **NOTE** Notes indicate items that the user should pay attention to when handling the MX200/MX100/MX50/MX30/MX20.

 **Reference** : Reference indicate useful information that the user might benefit by knowing.

: Circled numbers indicate steps in a sequence or indicate corresponding parts in an explanation.

[F1] key : Indicates keys on the keyboard.
 [Enter] key, [↑] key

[PRINT] screen → COMPAR[F4] → BEGIN[F1]
 : Press [F4] key at PRINT screen and is shown to press down next [F1] key.

[NO PROMPT] : Indicates Messages, menus and shows the name of Screens.
 [F3:DATA TABLE PRINT]
 [Start-up menu] screen

Chapter 1. General

1 - 1 General

The MX series personal computer loader is a software package that runs on a regular personal computer and operates as a programming loader for the MX series of machine controllers.

This loader can be used with the **MX200**, **MX100**, **MX50**, **MX30** and **MX20** machine controllers.

1 - 2 Features

- **User-friendly operation**

Since most software operations are performed with the function keys or the numeric keys, there is no need to learn hard-to-remember key chords. Operation is easy from the start.

Special functions provided by the operation keys are indicated on the display.

MX200/MX50/MX30

- **CBL network supported**

A loader connected to an **MX200/MX50/MX30** can operate any other **MX200/MX50/MX30** on the CBL (Controller Based Link) network.

- **Easy communication setup**

Communication setup, normally a complex procedure, has been greatly simplified using the loader.

- **Label programming**

Programming can be performed using signal names (labels) without having to assign addresses to device numbers.

- **Real-time debugger for efficient program development**

Inserting breakpoints in a program makes it possible to suspend execution when preset conditions are met (Break Pt Setting) and to unconditionally execute each instruction of the program independently (step run). Both functions allow a programmer to stop program execution and examine intermediate operation results.

These real-time debugging tools are ideal for analyzing programs with many application instructions.

- **Support for command functions**

MX series monitor screens, data input, program uploading and downloading, RUN, STOP and other control screens can be handled as 10 display screens.

These functions make it possible to use the personal computer loader as part of the MX controller.

- **Program comments**

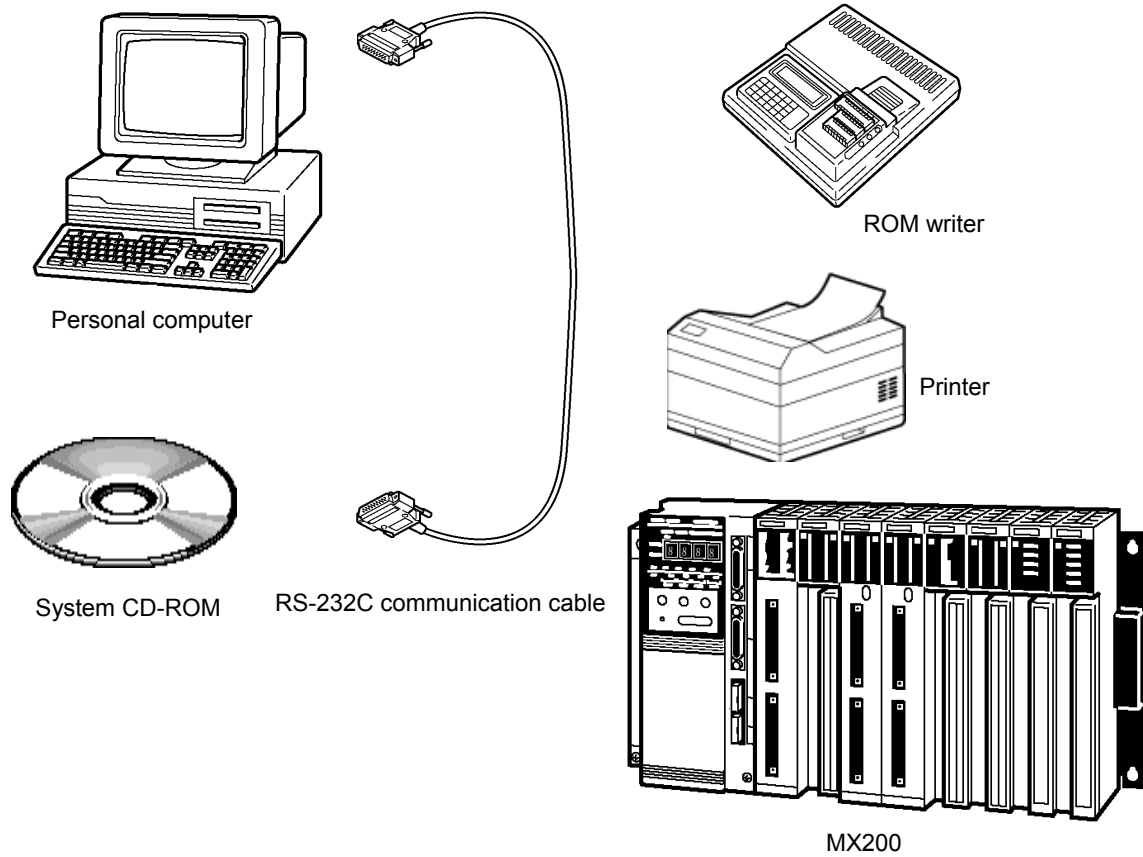
Comments can be attached to circuit blocks (up to 70 characters) or to circuit devices (up to 20 characters) within programs to simplify future program maintenance and documentation.

-
- **Program merge**
Two program files can be merged to form a new program, allowing existing program resources to be used efficiently.
 - **Powerful search function**
Programs can be searched for desired instruction words and devices.
 - **Signal ON/OFF timing can be determined from the timing trace display**
The status data of up to 8 selectable signals can be sampled and displayed on the timing trace display. An optional contact or the ON/OFF transition of a coil can be used as a trigger. The ON/OFF timing is displayed as a time trace (chart), therefore signal changes can be observed easily.
 - **20-point multipoint monitor**
Max. 20 words such as contacts, coils, timers, counters, registers, etc. can be monitored on the screen at one time. The program can be displayed on the screen concurrently allowing running conditions to be monitored.
 - **The active element condition of ladder circuits can be checked**
On/off conditions of contacts, coils, timers and counters of the current program being displayed on the screen are indicated by emphasizing or de-emphasizing the ladder circuit symbols. This simplifies the debugging of ladder sequence programs.
 - **Timer and counter settings can be changed while the MX series is running**
Since changed set points are updated retroactively in a program (source codes), the program can run with the updated set points after such a change.
 - **RUN time programming**
The program can be changed while it is running.
 - **SET/RESET force function**
Contacts, coils, timers, counters and registers within the MX series can be forced ON or OFF from the personal computer loader.
 - **Hardcopy print-out**
MX series programs can be printed as ladder diagrams or mnemonic codes with comments.
 - **General-purpose ROM writer support**
MX series programs can be written into a PROM when a general-purpose ROM writer is used in conjunction with the loader package.

1 - 3 System Configuration

■ 1:1 system configuration

The figure below shows an example of an **MX200** system configuration. This basic configuration comprises a processor module (with built-in power supply), I/O modules and special function modules. The MX series processor module is connected to a personal computer via an RS-232C communication cable.



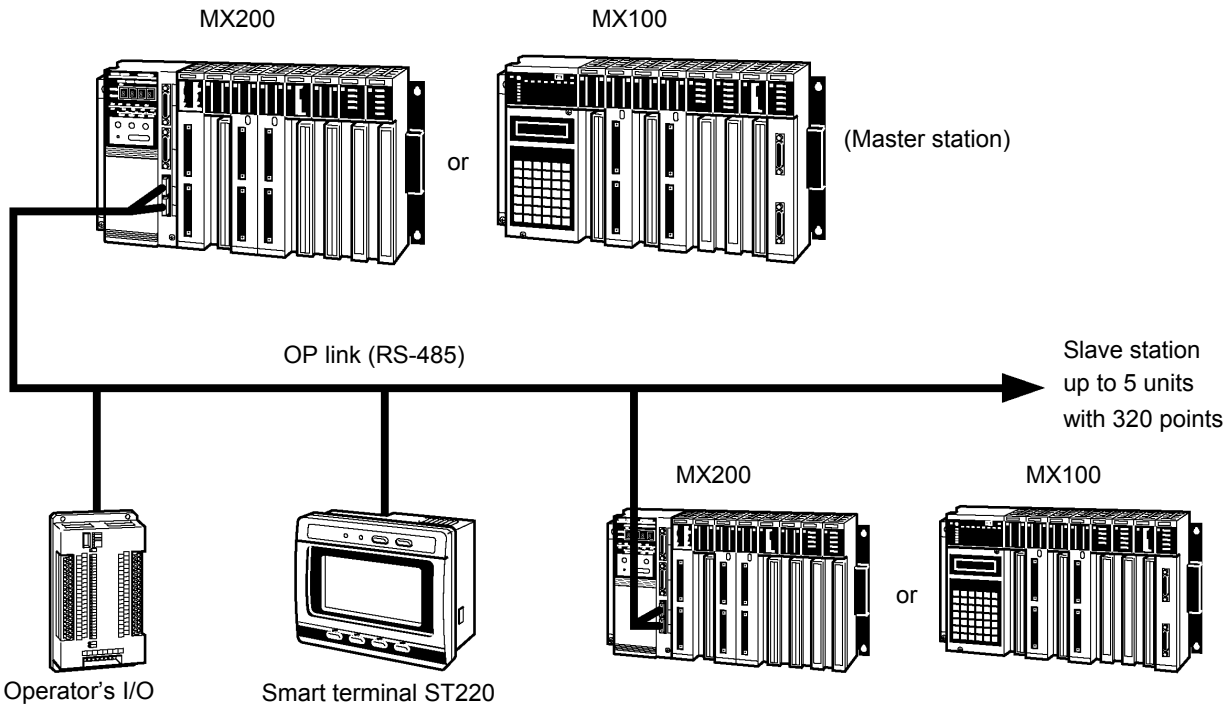
[Figure 1-1 1:1 system configuration]

MX200/MX100/MX50

 Reference

- A data link that does not require a program can be set up by connecting an **MX200** or **MX100** master station to slave units such as operator's I/O terminals, smart terminals (display terminals) or an **MX100** via an OP link.
- An OP link (OPerational communication link) is mainly used to transfer operation data between units.

As shown below, the **MX100** uses this OP link to set up an inter-processor link (data link) between **MX200** and **MX100** devices. However, the OP link is a low-speed network that cannot be used for high-speed applications.



MX200/MX50/MX30

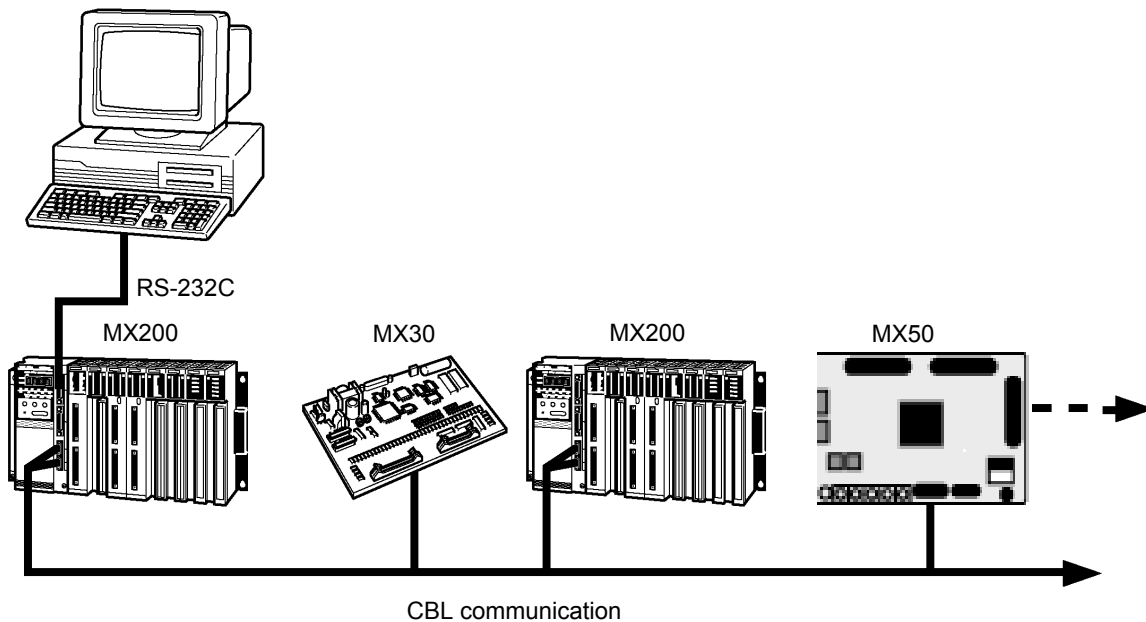
■ 1:N system configuration

This system comprises one personal computer and several machine controller programs and monitors.

!NOTE

Machine controllers have to be connected to a CBL network.

However, station number settings and other changes cannot be performed on a CBL network. Use the LOAD connector to connect machine controllers to personal computers rather than the ASCII connector as the monitor function cannot be performed on a CBL network.



MX200/MX50/MX30

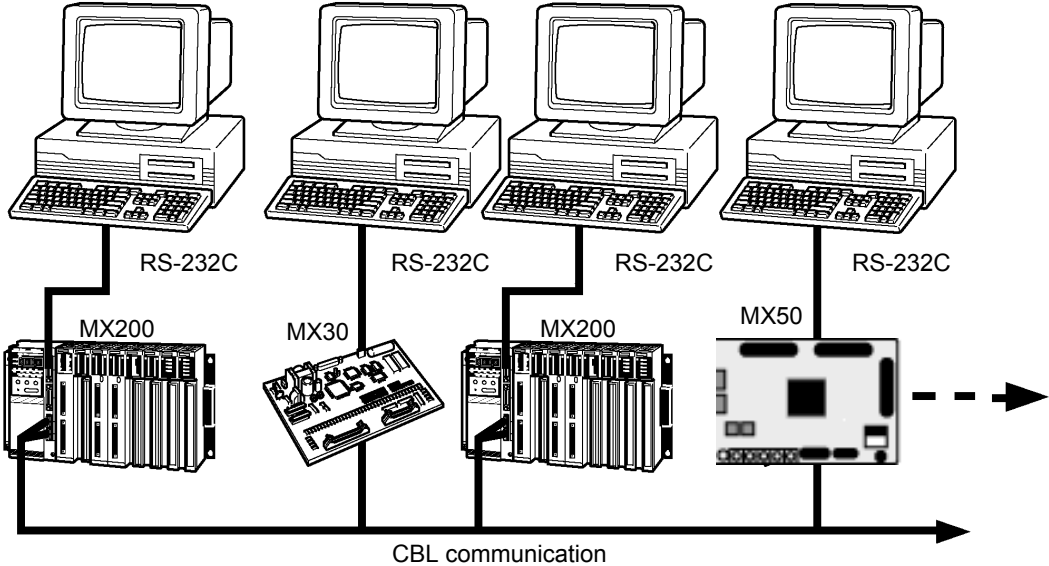
■ N:N system configuration

This system allows transactions between several personal computers and machine controllers.

!NOTE

When several loaders are connected on-line to one machine controller, there are a number of constraints.

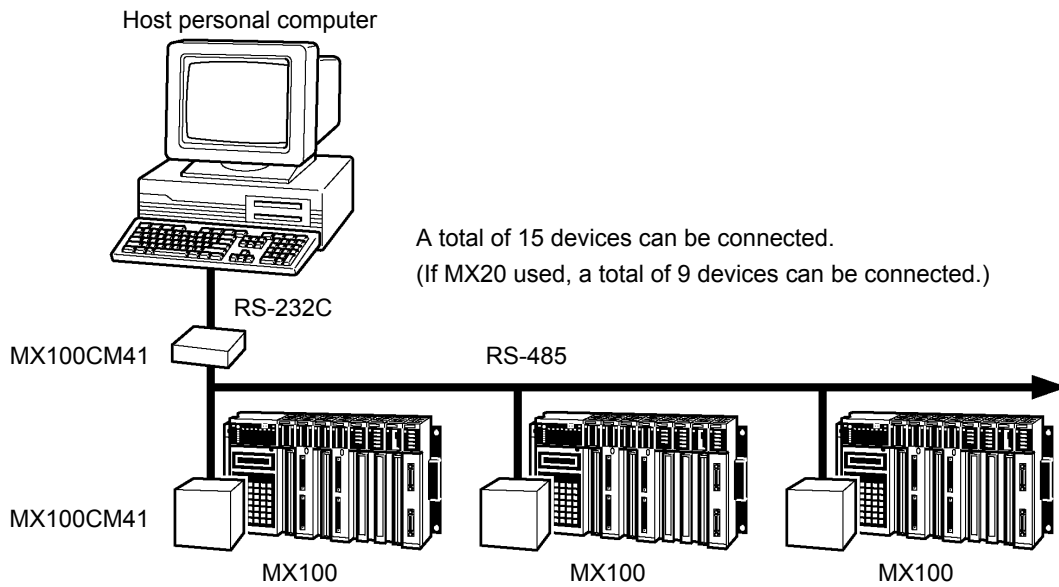
The LOAD connector should be used to connect machine controllers to personal computers rather than the ASCII connector as the monitor function cannot be performed on a CBL network.



MX100/MX20

■ 1:N on-line system

This system consists of loader software run on a personal computer which makes it possible to read and write **MX100** data/**MX20** data (I/O data, errors and alarms). The personal computer is connected to the processor module via the RS-232C port.



Chapter 2. Setup

2 - 1 Hardware and Operating system Requirements

■ Hardware requirements

IBM PC AT Series computer of 100% compatible, complete with:

CPU	Pentium processor 133MHz or better class machine is recommended
memory	32MB minimum of RAM, and 64MB is recommended
hard disk	10MB minimum of hard disk
display	800×600 resolution screen or greater (640×480 is not supported)
serial port	COM1 required for ONLINE mode
CD-ROM drive	required for installation
printer	parallel port or network printer required for the MX series utility

■ Operating system requirements

Microsoft Windows 95 or Microsoft Windows 98

2 - 2 Installation

■ To install the MX Loader

- ① Close all Windows applications before running the MX Loader's setup program.
- ② Insert the MX Loader CD-ROM
- ③ Installation program will start automatically. If the program does not start automatically:
 - i. Click the Windows **Start** button
 - ii. Click **Run**
 - iii. Click **Browse**
 - iv. Locate the local CD-ROM drive that contains the MX Loader CD-ROM
 - v. Double-click the **setup.exe** file
 - vi. Click **OK**.

Chapter 3. Basic Operations

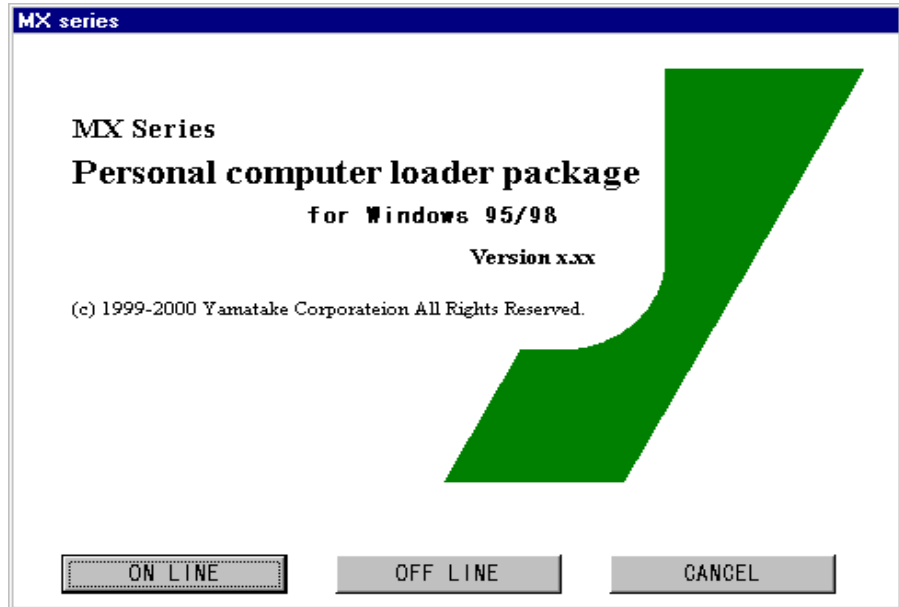
3 - 1 Key Operations

■ Startup procedures

Use the following procedure for starting the loader package on the hard disk.

- ① Turn on the power to the personal computer.
- ② Select MX Series Personal computer loader package from start menu.

■ On-line and off-line startup

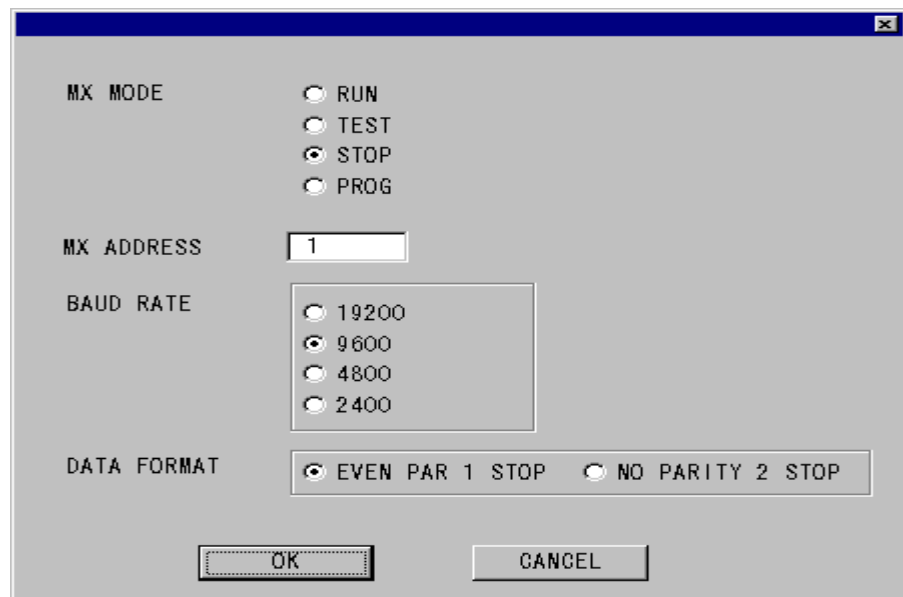


[Start-up menu] screen

Use the [←] or [→] key to select the menu and press the [Enter] key to open it.

Reference

In on-line mode the personal computer loader is connected to the MX series while it is not connected to the MX series in off-line mode.



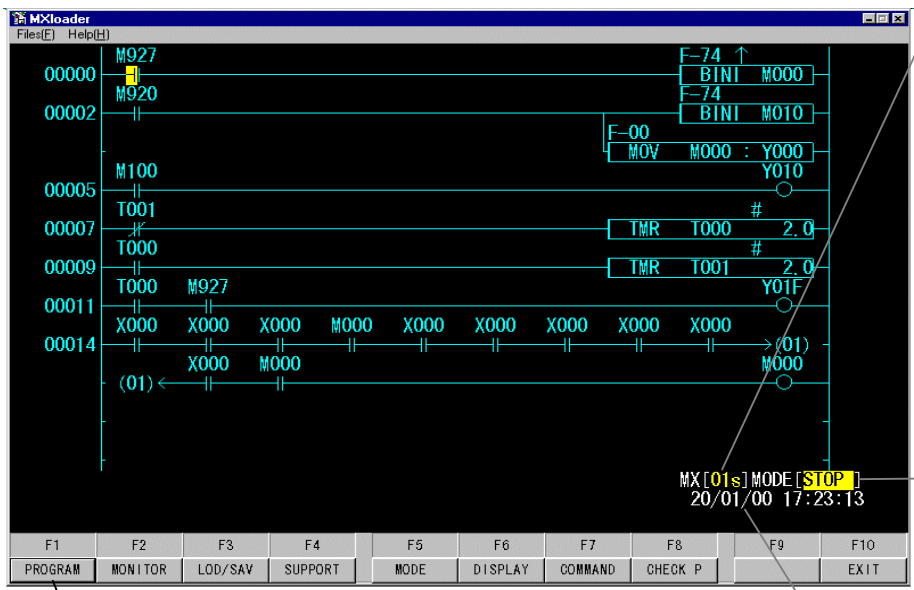
[On-line selection menu] screen

Check the station connected and connection parameters, then press the [Enter] key.

Changes can be made with the [↑], [↓], [←] and [→] keys.

!NOTE

An automatic check of the Baud rate is performed only for 19200 bps and 9600 bps. Thus if the Baud rate is set to 4800/2400 bps, the unit cannot automatically be connected on-line. In the latter case, the Baud rate and address settings have to be made manually.



Connected station
 When the personal computer loader is connected to a CBL network, the station is displayed in reverse video (yellow).

Mode

The displayed menu bar indicates the functions of the [F1] to [F10] keys in the menu.

Date and file name display
 Press [SUPPORT] → [ENVIRN] to switch between date and file name display.

[Basic] screen

The [Basic] screen (see above) is the screen shown when all menus have been closed by pressing the [Esc] key.

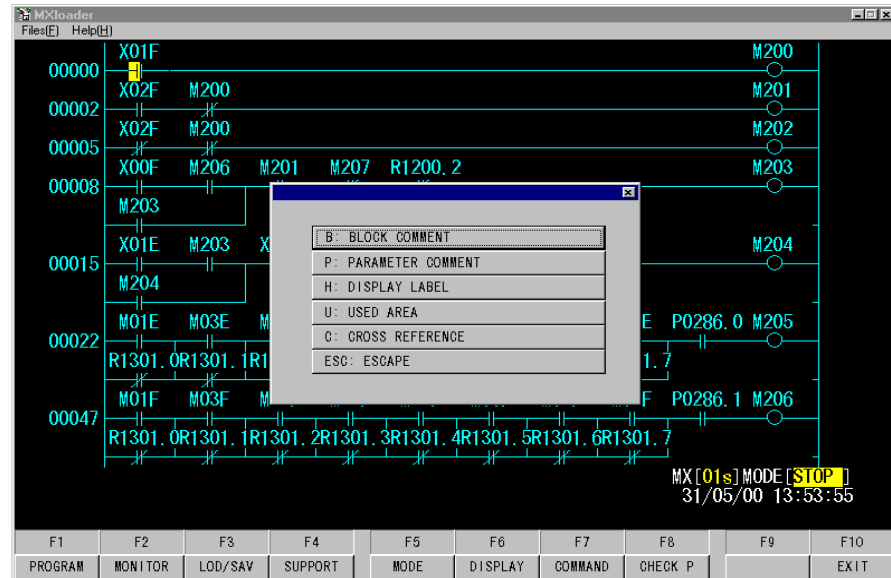
■ Basic Key Operations

The basic key operations are as follows. Other detailed key operations are described in the Chapter 4. Operating Instructions (page 4-1).

- Returning to the previous screen:
 [Esc] key
- Item selection:
 [↑], [↓], [→], [←], ([Y] [N]) key
- Setting a selected item:
 [Enter] key
- Changing modes and connected stations:
 [Home] key
- Deleting selected item:
 [Back space], [Delete] key
- Inserting:
 [Insert] key

■ Display functions

[Ctrl] key



B: BLOCK COMMENT

Comment can be put on each step number.

P: PARAMETER COMMENT

Comment can be put on each parameter.

H: DISPLAY LABEL

Label are displayed if specified.

U: USED AREA

Used area by ladder programs and mnemonic circuits are displayed.

C: CROSS REFERENCE



Cross reference of the devices and step numbers are displayed.

ESC: ESCAPE

Other detailed key operations are described in **4-3 Control key Functions (page 4-39)**.

■ List of special key functions

The keys listed below are provided with special functions. The location of the keys depends on the computer used.

Keys	Functions
Escape key [Esc]	Terminates current task and returns to the previous menu. This key is also used to delete menus and go between menus.
Enter key [Enter]	Selects the desired item. It is mainly used when starting up the personal computer loader and in program and transfer menus.
Home key [Home]	Calls MX modes (RUN, TEST, STOP and PROG), MX address and Baud rate setup screens. This key is used in 1:N on-line connection.
Slash key 	Searches for circuits. It can be used for searches of priority numbers in any menu in the circuit screen. It can also be used to find the start of a circuit.
Back Space key [Back Space]	Deletes file names, program names, numerics and other entries. It is also used for deleting device numbers to enter labels during programming.
Tab key [Tab]	Moves the cursor between contact and coil (OUT) instruction locations and device numbers each time this key is pressed.
Page Up/Page Down key 	Scrolls up or down the displayed screen or a displayed block comment.
Insert/Delete key [Insert] [Delete]	In mnemonic programming, the [Insert] key is used to insert lines during ladder programming, while the [Delete] key is used to delete instructions. In mnemonic programming, the [Insert] key is used in conjunction with the [Enter] key to insert the NOP instruction while the [Delete] key is used with the [Enter] key to delete instructions. The [Delete] key is also used to cancel numeric values.
Control key [Ctrl]	Selects block parameter comments, label/device display, areas to be used and cross references in the circuit screen.

3 - 2 Modes

■ Switching operating modes

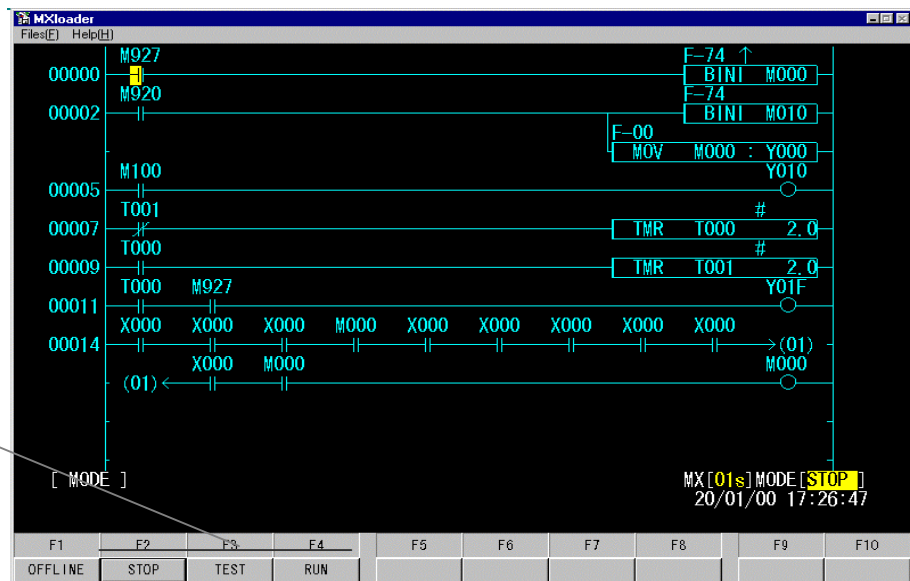
Following are descriptions of two procedures for switching operation modes on the MX series.

- Using the function keys

On-line

MODE [F5] → STOP [F2], TEST [F3], RUN [F4]

The selected mode is shown in reverse video.



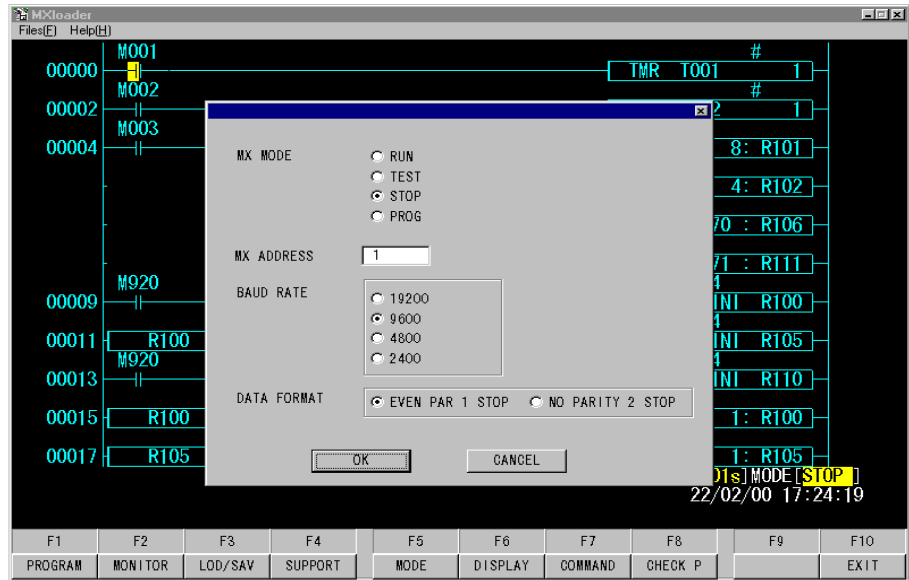
!NOTE

Do not go from the TEST to the RUN mode or from the RUN to the TEST mode directly. First, go to the STOP mode and then to the desired mode.

- [Home] key operation

On-line

[Home]→MX MODE [↑], [↓]→[Enter]



!NOTE

An MX controller connected to the CBL network can be selected in this screen.

■ Switching from off-line to on-line

Following describes how to switch the personal computer loader from the off-line to on-line mode.

The message displayed when the MX controller is switched to on-line mode depends on the operating mode (STOP, TEST or RUN) of the controller.

Off-line→On-line

MODE [F5]→ONLINE [F1]→[Enter]

If this address does not have to be changed, press the [Enter] key.

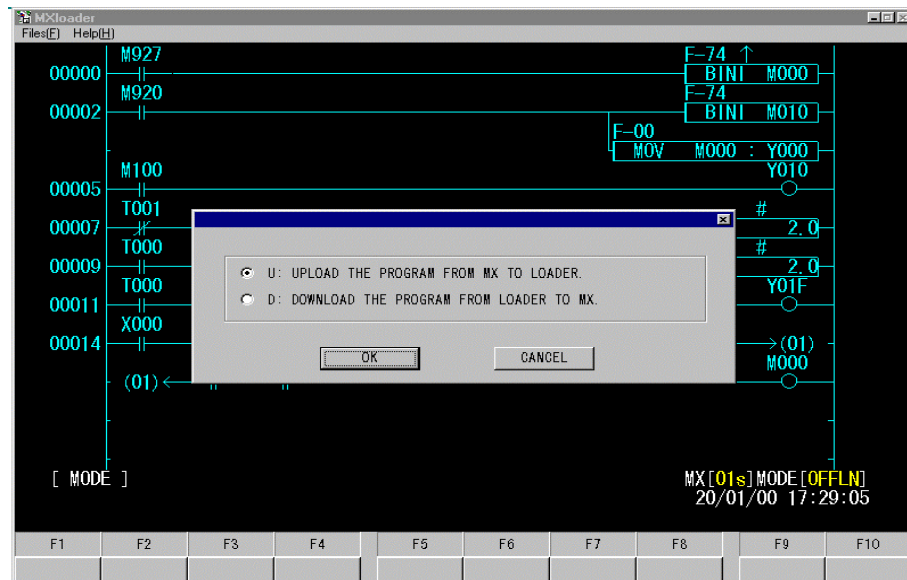
THIS MX : ADDRESS xxx CONNECTED

! NOTES

- If a check of the connected station indicates that the address is incorrect, press the [Enter]→[Enter]→SUPPORT [F4]→ENVIRN [F1]→ change the relevant MX address using the number keys.
- The relevant MX address [7F] is identical to address 127 of the local MX.

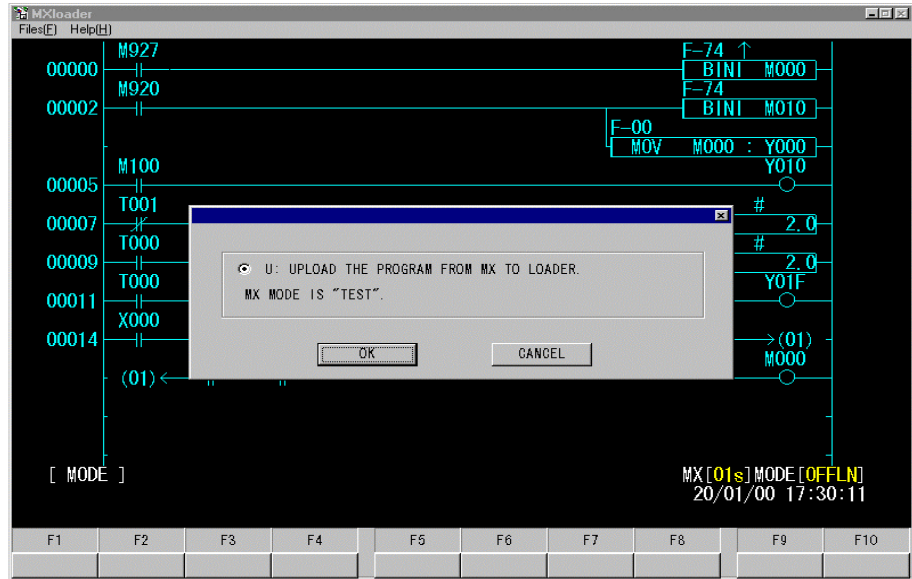
● When the processor STOP

→Select UPLOAD [U] or DOWNLOAD [D].



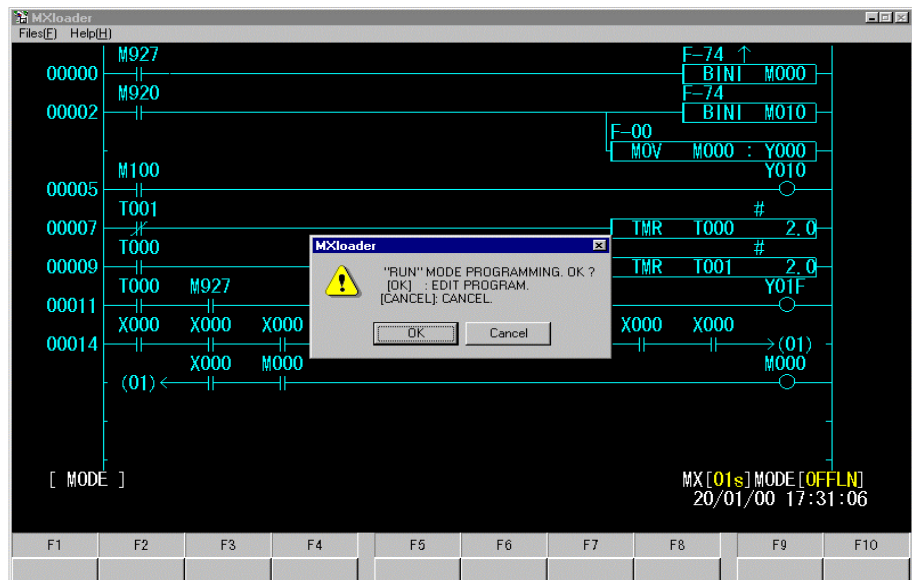
- During processor TEST

→Select UPLOAD [U].



- When the processor is in RUN mode

→Select UPLOAD [U] or DOWNLOAD [D].
Press→[OK] if DOWNLOAD is selected.

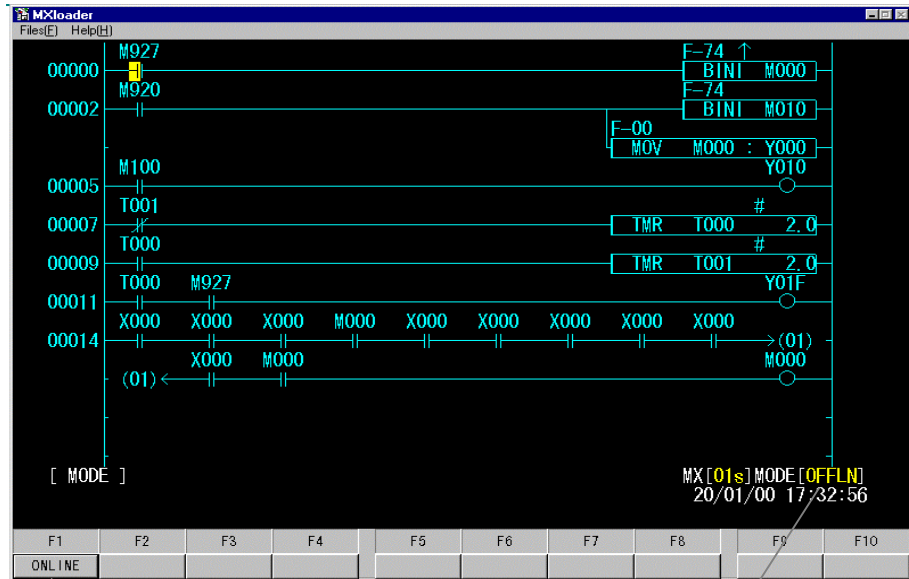


■ Switching from on-line to off-line

Procedure for switching the personal computer loader from the on-line to off-line mode.

On-line

MODE [F5] → OFFLINE [F1]



Function key display is switched to ONLINE.

Mode display changes to OFFLN.

■ Exclusive control

● Access and exclusive control from several stations

Several loaders can be connected on-line to one **MX200/MX50** controller as long as none of the loaders change the ladder program or the data tables of the **MX200/MX50** and they are used within the constraints of the communication buffer of the **MX200/MX50**.

!NOTES

The following conditions have to be handled with care.

- When a loader goes from STOP mode to PROGRAM mode
All other loaders are notified of the mode change. If the mode is subsequently changed from PROGRAM mode to any other mode, the message is automatically canceled. The MX controller can be set to off-line mode by pressing the [Esc] key.
- When one of the loaders goes from the RUN mode to PROGRAM mode
The color of the ladders displayed on the other loaders changes from blue to red. Program editing, active element indication and the test function of the monitor will not operate after this (a message is displayed to this effect).
- Transferring a program from the MX200/MX50 to floppy disk
Registration of exclusive control is performed on the loader that is to perform the transfer to prevent other loaders from modifying the program. After this a check is made to see if the control data of the ladder program matches that of the MX200/MX50. A transfer cannot be made if the two data sets do not match. When the data sets match, the program is transferred. to disk and exclusive control is cleared.

● Exclusive control

The **MX200/MX50** supports communication commands for exclusive control. When the screen transitions listed below are performed, the loader issues an exclusive control registration command to the **MX200/MX50** which is cleared when the end of the screen is reached.

PROGRAM [F1]
 MONITOR [F2]→TRACE [F3] menu
 MONITOR [F2]→FORCE [F5] menu
 MONITOR [F2]→Mod T/C [F7] menu
 MONITOR [F2]→TEST [F8] menu

Exclusive control authorities are independent operations that do not affect other functions. For example, a forced operation can be performed on one loader while another loader is executing a test, but two different loaders cannot use the test function simultaneously.

When the end of the screen is reached, only the relevant exclusive control authority is cleared. However, the communication command of the **MX200** does not clear the relevant exclusive control authority. As a result, all exclusive control authorities have to be cleared from the loader, after which the registered authorities are re-registered.

All exclusive authorities are cleared under the following conditions:

- ① When an MX mode is changed from another node. (In this case the message, [**MX Mode has been changed**] is displayed.)
- ② When communications between the loader and the MX series do not have continued for more than 25 seconds or longer.
- ③ When the processor is exited with EXIT [**F10**].
- ④ When a change ONLINE< – >OFFLINE is made.

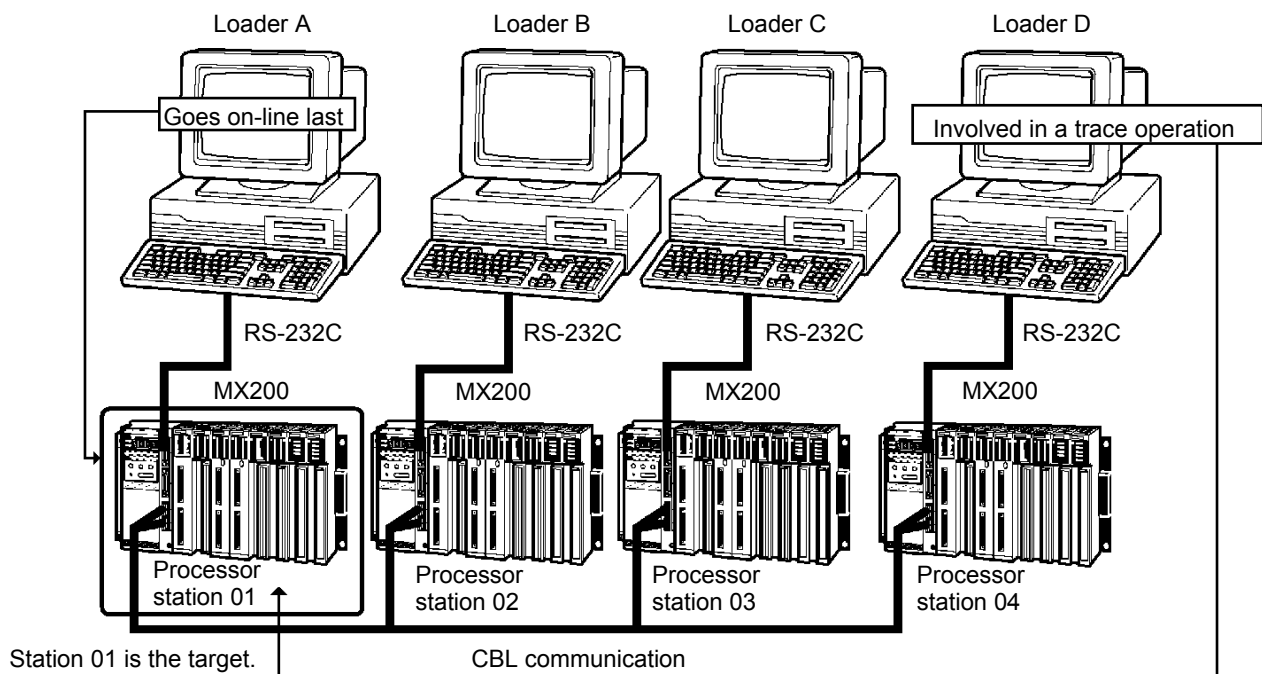
Exclusive control is not cleared by the processor under the following condition:

● Exclusive control error display

An exclusive control error occurs when a loader attempts to access an on-line station that is already being accessed by another loader.

Example:

When loader A goes on-line to station 1 when loader D is performing a trace operation with station 1, an error occurs.



Program: [other node address: 00]
 TEST function: [other node address: 00]
 FORCE function: [other node address: 00]
 TRACE: [other node address: 04]

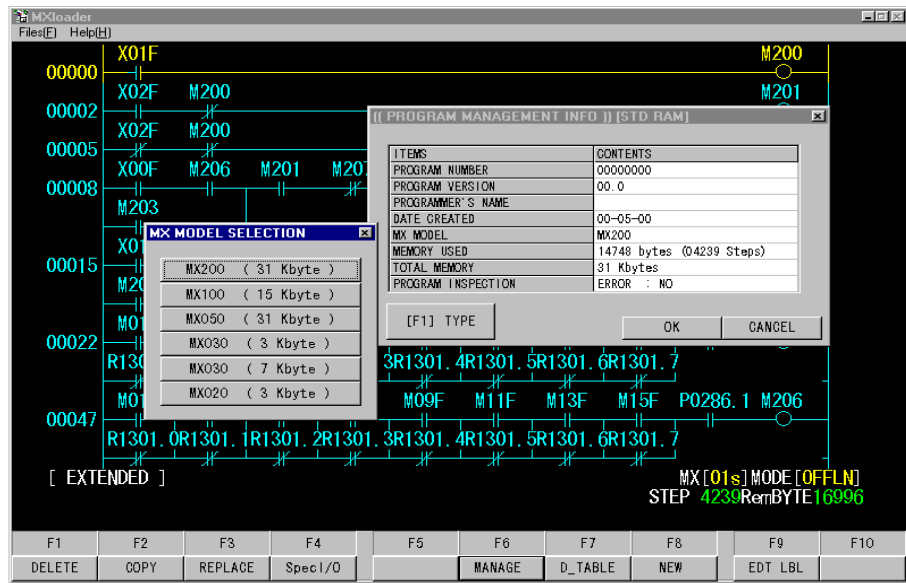
3 - 3 Selecting MX Series Model

The personal computer loader can be used with any of the MX series model (MX200, MX100, MX50, MX30 and MX20) as long as the program written off-line specifies which model it is to be used for.

■ Selecting model

Off-line

PROGRAM [F1] · Other.. [F10] · EXTD FN [F9] · MANAGE [F6]
 →PROGRAM [F1]→TYPE [F1]
 →Select using arrow keys [↑], [↓]→[Enter]



MX SERIES MODEL SELECTION	Description
MX200 (31Kbyte)	Adapted for MX200
MX100 (15Kbyte)	Adapted for MX100
MX050 (31Kbyte)	Adapted for MX50
MX030 (3Kbyte)	Adapted for MX30 with 3Kbyte of memory
MX030 (7Kbyte)	Adapted for MX30 with 7Kbyte of memory
MX020 (3Kbyte)	Adapted for MX20 with 3Kbyte of memory

!NOTE

A created program cannot be adapted to another model if it contains model dependent instructions.

3 - 4 Menu List

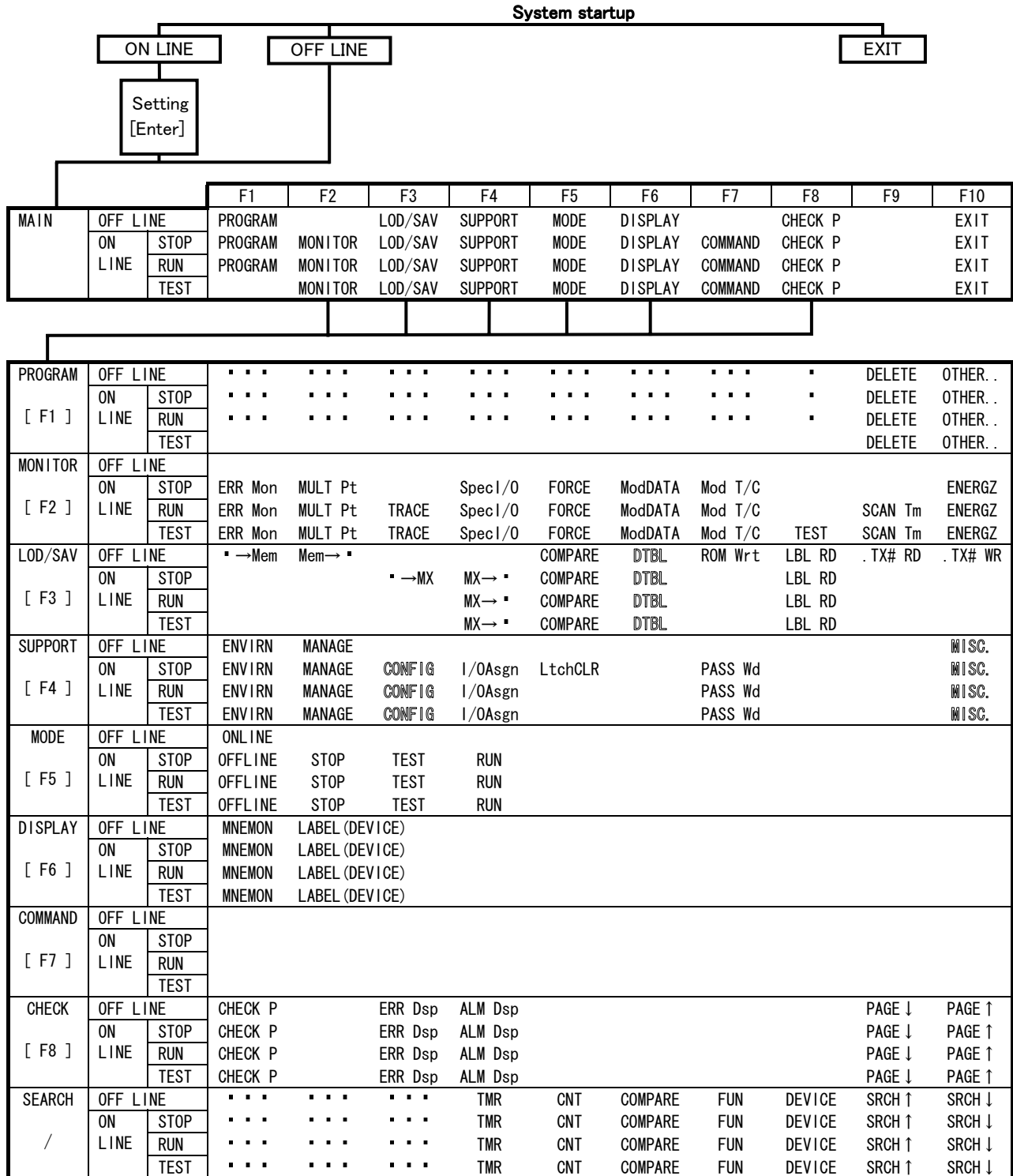
■ Main menu functions

Menus displayed in the basic screen in off-line and on-line mode are called main menus. Function keys [F1] to [F10] keys are assigned to the main menus. Menus other than the main menus are referred to as pop-up windows.

Main menus	Functions
Use Program [F1] or Display [F6] to select ladder or mnemonic programming.	Creates or edits ladder or mnemonic programs. Use the EXTEND FN [F9] key to do the following: <ul style="list-style-type: none"> •Editing and other management of deleting, copying and replacing circuit blocks and special I/Os. •Writing data tables. •Preparing for program updates (memory clear).
Monitor [F2] (available in on-line mode only)	Monitors on-line operating status of MX controller. The following functions can be selected in the pop-up windows: <ul style="list-style-type: none"> •Special I/Os can be set, tested or monitored in TEST mode. •The time chart of any device can be monitored, but not registered. •Instruction contacts can be forced (up to 8 words) or canceled. •Timer and counter settings can be monitored or changed. •Breakpoints can be inserted as required to facilitate debugging. •Scan times can be set to be displayed or not displayed. •The active element indicator display can be selected.
LOD/SAV [F3]	Loads created user programs in an MX controller and saves them to disk. <ul style="list-style-type: none"> •Loads data tables in a personal computer and saves them to disk. In off-line mode, this function is used to transfer data to a PROM writer and to read and write label programs (.TX#). •Writes labels to a personal computer. •It compares user programs transferred to an MX controller and programs stored in the memory of a personal computer. Data items that differ are shown in reverse video on a blue background.
Support [F4]	Displays management data and I/O data (includes OP. I/O data) environment of the user program. <ul style="list-style-type: none"> •Sets environmental conditions such as addresses of a target device and the default directory, transfer conditions, communication conditions and clock settings. •Transfers and edits special register data. •Sets passwords. •Writes to EEPROM in selected menu and sets program transfers in the selection menu. •Displays user program data.

Main menus	Functions
MODE [F5]	Switches between on-line and off-line modes and processor operating modes. (Note: Processor operating modes can be selected only in on-line mode.)
DISPLAY [F6]	Selects ladder or mnemonic display in the circuit screen when programs are not written or checked. Also selects label or device display.
Command [F7]	Selects and executes commands and creates and edits files.
CHECK [F8]	Checks user programs for syntax errors. (User programs with a program error cannot be transferred to the MX. series.)
EXIT [F10]	Exits user program.

■ Main menus and pop-up windows



❗NOTE

The hatched rectangle indicates a · memory card for MX100, MX30 and MX20, and · DTBL for MX200 and MX50.
 Outline characters (for example DTBL) cannot be displayed when using the MX100, MX30 and MX20.

NOTE

Modes are selected with the [Home] key.

•When mnemonic is selected with the DISPLAY [F6] key in the main menu, the content of the main menu is as displayed below.

1. When PROGRAM [F1] is pressed in the main menu, the following mnemonics are displayed.

		F1	F2	F3	F4	F5	F6	F7	F8	F9	F10
PROGRAM [F1]	OFF LINE	LD	LD NOT	AND	AND NOT	OR	OR NOT	OUT	ANB	ORB	OTHER..
	ON	LD	LD NOT	AND	AND NOT	OR	OR NOT	OUT	ANB	ORB	OTHER..
	LINE	LD	LD NOT	AND	AND NOT	OR	OR NOT	OUT	ANB	ORB	OTHER..
	STOP										
	RUN										
	TEST										

2. When MONITOR [F2] is pressed in the main menu, the following mnemonics are displayed.

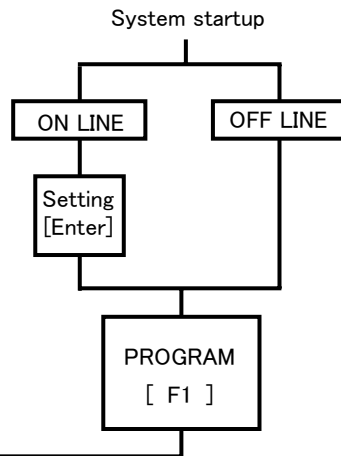
(The active element is not emphasized.)

MONITOR [F2]	OFF LINE										
	ON	ERR Mon	MULT Pt		Spec I/O	FORCE	ModDATA	Mod T/C			
	LINE	ERR Mon	MULT Pt	TRACE	Spec I/O	FORCE	ModDATA	Mod T/C		SCAN Tm	
	STOP										
	RUN										
	TEST	ERR Mon	MULT Pt	TRACE	Spec I/O	FORCE	ModDATA	Mod T/C	TEST	SCAN Tm	

3. When DISPLAY [F6] is pressed in the main menu, the following mnemonics are displayed.

DISPLAY [F6]	OFF LINE	LADDER	LABEL (DEVICE)
	ON	LADDER	LABEL (DEVICE)
	LINE	LADDER	LABEL (DEVICE)
	STOP		
	RUN	LADDER	LABEL (DEVICE)
	TEST	LADDER	LABEL (DEVICE)

■ Pop-up windows and expanded function menus for writing programs



		F1	F2	F3	F4	F5	F6	F7	F8	F9	F10	
In ladder mode												
OTHER. .	OFF LINE	CNT	CNT	▪ Cmp	▪ Cmp	FUN	OpenCOL	OpenROW	Ln WRAP	EXTD FN	OTHER. .	
[F10]	ON LINE	STOP	CNT	CNT	▪ Cmp	▪ Cmp	FUN	OpenCOL	OpenROW	Ln WRAP	EXTD FN	OTHER. .
		RUN	CNT	CNT	▪ Cmp	▪ Cmp	FUN	OpenCOL	OpenROW	Ln WRAP	EXTD FN	OTHER. .
	TEST											
	OTHER. .	OFF LINE	DELETE	COPY	REPLACE	Spec I/O		MANAGE	D_TABLE	NEW	EDT LBL	
↓ [F10] EXTD FN [F9]	ON LINE	STOP			Spec I/O		MANAGE	D_TABLE	NEW			
		RUN					MANAGE	D_TABLE	NEW			
	TEST											

•When mnemonic is selected with the DISPLAY [F6] key in the main menu, the content of the main menu is as displayed below.

In mnemonic mode												
OTHER. .	OFF LINE	CNT	CNT	LD_Cmp	AND_Cmp	OR_Cmp	FUN	INSERT	DELETE	EXTD FN	OTHER. .	
[F10]	ON LINE	STOP	CNT	CNT	LD_Cmp	AND_Cmp	OR_Cmp	FUN	INSERT	DELETE	EXTD FN	OTHER. .
		RUN	CNT	CNT	LD_Cmp	AND_Cmp	OR_Cmp	FUN	INSERT	DELETE	EXTD FN	OTHER. .
	TEST											
	OTHER. .	OFF LINE	DELETE	COPY	REPLACE	Spec I/O		MANAGE	D_TABLE	NEW		
↓ [F10] EXTD FN [F9]	ON LINE	STOP			Spec I/O		MANAGE	D_TABLE	NEW			
		RUN					MANAGE	D_TABLE	NEW			
	TEST											

■ List of application instructions

When the [F10] (others) key is pressed when a program is generated, a pop-up window appears (see ■ Pop-up windows and expanded function menus for writing programs (page 3-18)). Press the FUN [F5] key in this pop-up window to select an application instruction and key in the function number or use the screen menu to select it. The table below shows function numbers of application instructions and gives a list of menu choices.

	F1	F2	F3	F4	F5	F6	F7	F8	F9	F10
1 MOVE FUN00 to 08	MOV(↑) [00]	BMOV(↑) [01]	XCH(↑) [02]	M4BT(↑) [03]	M8BT(↑) [04]	DMPX(↑) [05]	MPX(↑) [06]	DCPY(↑) [07]	STB(↑) [08]	
2 BCD FUN10 to 19	BCD+(↑) [10]	BCD-(↑) [11]	BCD*(↑) [12]	BCD/(↑) [13]	BCDI(↑) [14]	BCDD(↑) [15]	DBC+(↑) [16]	DBC-(↑) [17]	DBC*(↑) [18]	DBC/(↑) [19]
3 SemiAdv FUN20 to 28	PLS↑ [20]	PLF↓ [21]	INV [22]	SET(↑) [23]	RST(↑) [24]	STM [25]	UDC [26]	DCNT [27]	DUDC [28]	
4 BRANCH FUN30 to 36	MC [30]	MCR [31]	JMP(↑) [32]	JPE [33]	LPS [34]	LRD [35]	LPP [36]			
5 BRANCH FUN40 to 44	END [40]	RBP [41]	CALL(↑) [42]	SBR [43]	RET [44]					
6 CONVERT FUN50 to 59	→BCD(↑) [50]	→BIN(↑) [51]	CLP(↑) [52]	4→16(↑) [53]	16→4(↑) [54]	7SEG(↑) [55]	TCMP(↑) [56]	→DBC(↑) [57]	DBI(↑) [58]	ASC(↑) [59]
7 Shft Fn FUN60 to 66	SR [60]	SF1(↑) [61]	SFR(↑) [62]	RLC(↑) [63]	RRC(↑) [64]	RL(↑) [65]	RR(↑) [66]			
8 BIN FUN70 to 79	BIN+(↑) [70]	BIN-(↑) [71]	BIN*(↑) [72]	BIN/(↑) [73]	BINI(↑) [74]	BIND(↑) [75]	DBI+(↑) [76]	DBI-(↑) [77]	DBI*(↑) [78]	DBI/(↑) [79]
9 LOGICAL FUN80 to 83	WAND(↑) [80]	WOR(↑) [81]	WXOR(↑) [82]	WXNR(↑) [83]						
0 SPECIAL FUN90 to 99	WTCS(↑) [90]	RTCS(↑) [91]	WTCA(↑) [92]	RTCA(↑) [93]	STOP [94]	WDT [95]	ISS(↑) [96]	IOS(↑) [97]	DTBL [98]	RTBL(↑) [99]
Use the Space bar to select.	LIB(↑) [180]									
	SNOD(↑) SXRS(↑) SXWS(↑) [120] [121] [122]									
	SCPY(↑) SCAT(↑) SCMT(↑) SNCP(↑) SLEN(↑) SMID(↑) ATOI(↑) ITOA(↑) ITSA(↑) [130] [131] [132] [133] [134] [135] [136] [137] [138]									
	ATOB(↑) BTOA(↑) CBTA(↑) SRCH(↑) CMID(↑) CITA(↑) CISA(↑) [140] [141] [142] [144] [145] [147] [148]									
	GFLG(↑) EFLG(↑) [150] [151]									
(Displayed only in mnemonic mode)	SUM(↑) [160]									
	WTBL(↑) RSIN(↑) RSOT(↑) WSOT(↑) [110] [115] [116] [117]									
	RLD RLDN RAND RADN ROR RORN ROUT [100] [101] [102] [103] [104] [105] [108]									

!NOTES

- FUN 34 to 36 are displayed in mnemonic mode.
- DTBL is displayed when an MX100, MX30 or MX20 is used.
- Special numbers of 100 and beyond are displayed only on the MX200 and MX50 (displayed when selected with the space bar).
- The SET and RST instructions are not displayed on the MX100 and MX30.

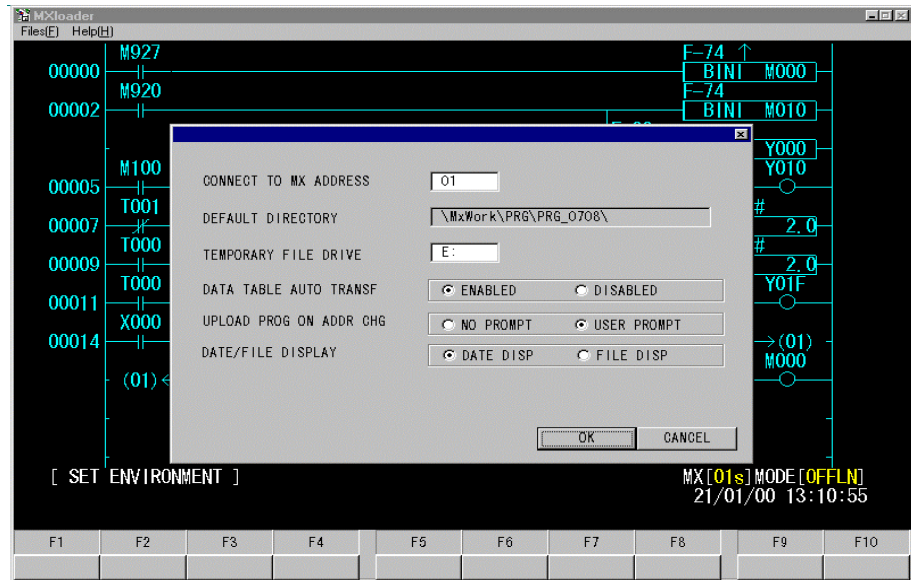
Chapter 4. Operating Instructions

4 - 1 Setup Operations

■ Environment settings

The following describes the file environment and specifications of station connections of the personal computer loader.

SUPPORT [F4]→ENVIRN [F1]



● CONNECT TO MX ADDRESS

Enter the processor address of a personal computer loader in a CBL network system in this field. This setting is made automatically when the loader is in on-line mode.

The range of possible settings is 1 to 63. Enter 127 when the CBL network is not supported.

● DEFAULT DIRECTORY

This field contains the name of the path of the file most recently set by the loader. It cannot be changed.

ⓘ NOTE

- When the default directory has not been correctly set, the message, [Please check Disk Drive] is displayed.
- If this happens, it may impossible to correctly write a transferred label file.

● DATA TABLE AUTO TRANSF.

The **MX200** saves data tables and programs as separate files. This field is normally set to [**ENABLED**] when a loader is used. However, read and write operations, especially of large data tables, take longer time when the loader is brought on-line with the processor module or when the program is written to floppy disk.

When a data table is not to be changed in creating or debugging a program, enter [**DISABLED**] in this field and the loader can be brought on-line with the processor module in a shorter time. Also, in this case the data table can be transferred using the LOD/SAV [**F3**] and DTBL [**F6**] keys. When no data table can be found at startup, the edit of the program is automatically written by the processor.

NOTE

In off-line mode the last data table in the loader is displayed and edited so a file is not automatically read at this time.

The following is a description of operations when [**ENABLED**] is entered.

- When the loader is set from off-line to on-line mode and upload is selected, the content of the MX data table is uploaded from the MX series to memory.
- When the loader is set from off-line to on-line mode and download is selected, the content of the MX data table in memory during off-line mode is downloaded to the MX series.
- When floppy disk→MX is selected with the LOD/SAV [**F3**] key in on-line mode, a data table file that has the extension “.TBL” and the same name as the ladder program is read and downloaded to the MX series. If such a file is not found, the download is not performed.
- When MX→floppy disk is selected with the LOD/SAV [**F3**] key in on-line mode and the number of MX data tables is not 0, the MX data table is saved in a file that has the extension “.TBL” and the same name as the ladder program. When the number is 0, a data table file is not created.
- When the MX address is changed with the [**Home**] key in on-line mode, the ladder program and the data table are uploaded from the MX series only under the following conditions:
[**NO PROMPT**] or [**USER PROMPT**] has to be entered in the [**UPLOAD PROG ON ADDR CHG**] field with the ENVIRN key and [**Y**] be entered at the prompt.
- When the MX address is changed with the SUPPORT [**F4**]→ENVIRN [**F1**] keys in on-line mode, the upload is performed according to the same conditions as set out in the previous item.

- When Mem→floppy disk is selected with the LOD/SAV [F3] key in off-line mode and the data table number (data table management information) is not 0, a data table that has the same name as the ladder program and a “.TBL” extension is created (a file with the same name is overwritten) and written to disk. If the data table number is 0, no process is performed.
- When floppy disk→Mem is selected with the LOD/SAV [F3] key in off-line mode, a data table file that has the same name as the ladder program and the extension “.TBL” is read to memory. If such a file is not found, no process is performed.

● **UPLOAD PROG ON ADDR CHG**

When [NO PROMPT] is entered in this field or the MX node address is changed, the ladder program is automatically uploaded from the MX series. When [USER PROMPT] is entered in this field, the system asks whether an upload is to be performed or not.

❗NOTES

- When an upload is not performed, the ladders in the processor and the personal computer loader do not match and the ladder on the loader is displayed in red.
- Since the [USER PROMPT] setting is illegal on the MX30, all entries are handled as a [NO PROMPT] setting.

● **DATE/FILE DISPLAY**

When [DATE DISP] is entered in this field, the date is displayed in the lower right corner of the screen. When [FILE DISP] is selected, the names of ladder program files read from floppy disk are displayed in reverse video (black characters on a white background) in the lower right corner of the screen where the date is otherwise displayed.

❗NOTE

When no file has been selected, no data is displayed.

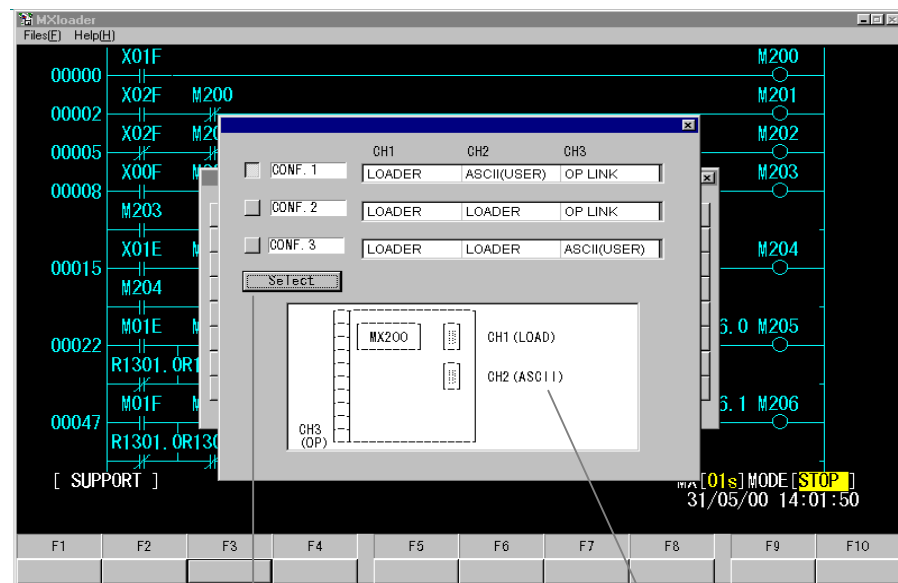
MX200/MX50

■ Setting the channel (CH) function (loader, ASCII and OP link)

This function is used for setting processor communication channels (loader, ASCII and OP link).

Select a configuration from CONF.1 to CONF.3 as shown in the figure below.

SUPPORT [F4]→CONFIG [F3]→
COMMUNICATIONS CONFIG. MODIFY/DISPLAY [F1]



Select CONFIG..

The location of each channel is displayed.

NOTE

Three settings can be made:

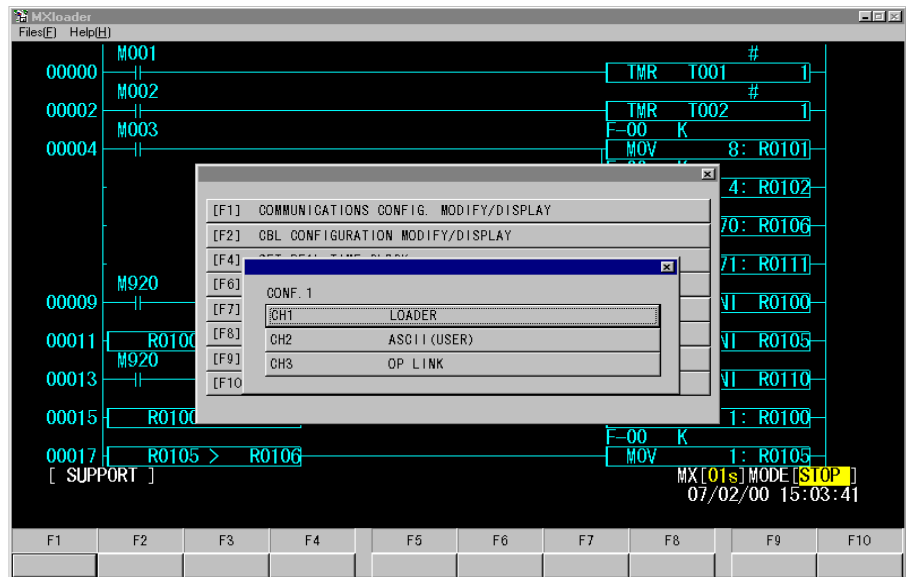
CH.1: Dedicated loader setting (RS-232C)

CH.2: RS-232C/RS-485

CH.3: RS-485

Setting the channel (CH) function (loader, ASCII and OP link)

[↑], [↓]→[Enter]



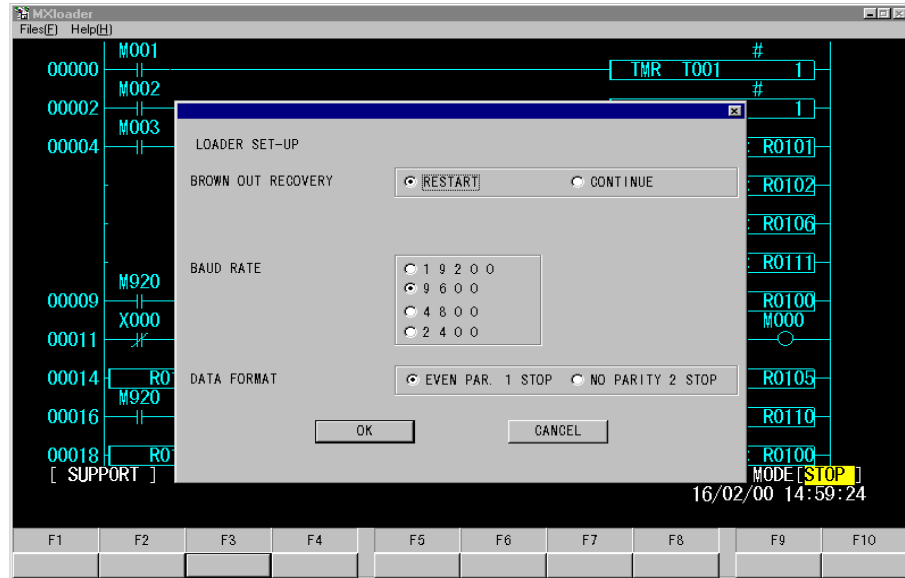
[Channel selection] screen

《The following example assumes that CONF.1 is set》

● CH.1, LOADER setting

This function is used for setting communication and brown out recovery settings.

→Select CONF.1→Select CH.1



- BROWN OUT RECOVERY : Selects process executed when a momentary AC power outage is detected.
- BAUD RATE : Sets speed of transmission and reception of communication.
- DATA FORMAT : Sets PARITY and STOP BIT.

NOTE

Some personal computers cannot communicate at 19200bps.

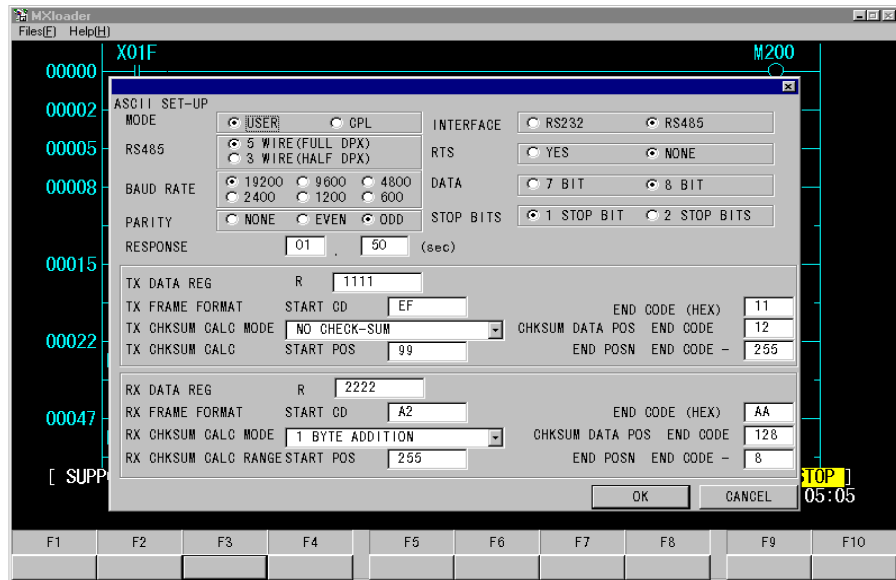
When the Baud rate of the MX controller is set to 19200bps and it is connected to a personal computer that cannot communicate at that speed, change the setting as follows:

Turn off the MX series and hold down the Δ button while powering up it again.

● CH.2, ASCII (USER) setting

This function is used for setting ASCII communication.

→Select CH.2



!NOTES

- When [CPL] is selected in the [ASCII SET-UP] screen, the frame definition screen is exited.
- When the loader is connected via the ASCII connector (CH2) and CH2 is set to ASCII (CPL), a communication time-out will occur. Set CH2 to LOADER in the MX controller setup procedure.
- A loader connected via the ASCII connector cannot access other stations via CBL.

● CH.3, OP LINK setting

This function is used for setting MODE, ADDRESS and BAUD RATE of OP LINK communication.

→Select CH.3



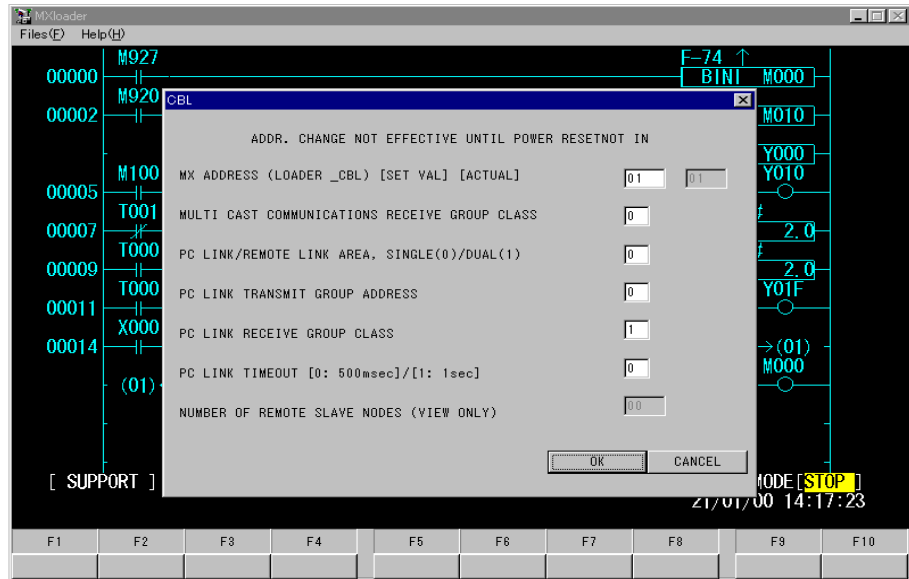
- MASTER MX series settings
 - Set the [OP LINK MODE] to [MASTER].
 - An [OP LINK ADDRESS] need not be entered.
 - Enter the same [BAUD RATE] for the master and the slaves.
 - Enter the same [DATA FORMAT] for the master and the slaves.
- SLAVE MX series settings
 - Set the [OP LINK MODE] to [SLAVE].
 - Enter an [OP LINK ADDRESS] from 1 to 15 for the slaves and make sure that no slave is assigned the same address as that of another slave.
 - Enter the same [BAUD RATE] as the master.
 - Enter the same [DATA FORMAT] as the master.

MX200/MX50/MX30

■ CBL setting

This function is used for setting CBL which is required for CBL communication.

SUPPORT [F4]→CONFIG [F3]→
CBL CONFIGURATION MODIFY/DISPLAY [F2]



● MX ADDRESS (LOADER_CBL) [SET VAL] [ACTUAL]

Enter the CBL address in this field.

● MULTI CAST COMMUNICATIONS RECEIVE GROUP CLASS

Enter one of the reception groups listed in the table below.

Table of MULTI CAST COMMUNICATIONS RECEIVE GROUP CLASS (R951) settings

Group/Setting	0	1	2	3	4	5	6	7
MULTI CAST COMMUNICATIONS RECEIVE Group 1	—	Reception	—	Reception	—	Reception	—	Reception
MULTI CAST COMMUNICATIONS RECEIVE Group 2	—	—	Reception	Reception	—	—	Reception	Reception
MULTI CAST COMMUNICATIONS RECEIVE Group 3	—	—	—	—	Reception	Reception	Reception	Reception

● PC LINK/REMOTE LINK AREA, SINGLE (0)/DUAL (1)

Select (0) 50 words (single) or (1) 100 words (dual) for [PC LINK/REMOTE LINK AREA].

● PC LINK TRANSMIT GROUP ADDRESS

Enter one of the following:

- 1 = transmission to group 1
- 2 = transmission to group 2
- 3 = transmission to group 3

● PC LINK RECEIVE GROUP CLASS

Enter one of the reception groups listed in the table below.

Table of PC LINK RECEIVE GROUP CLASS (R954) settings

Group/Setting		0	1	2	3	4	5	6	7
PC Link	Group 1	—	Reception	—	Reception	—	Reception	—	Reception
PC Link	Group 2	—	—	Reception	Reception	—	—	Reception	Reception
PC Link	Group 3	—	—	—	—	Reception	Reception	Reception	Reception

● PC LINK TIMEOUT [0: 500msec]/[1: 1sec]

Enter the time after which an idle condition is to be handled as a PC link error.

!NOTES

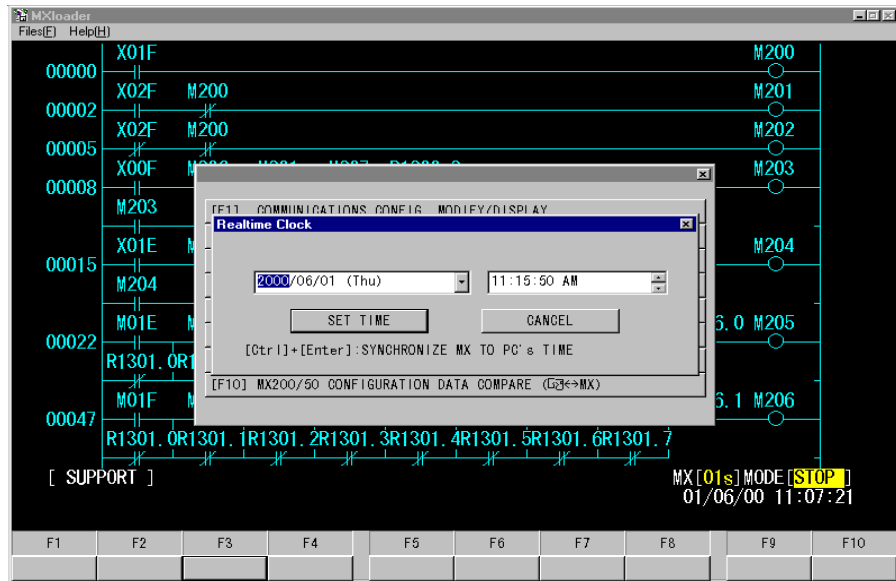
- When CBL communication is not required, enter 7F in the [MX ADDRESS (LOADER_CBL)] field.
- If it is not possible to bring a loader on-line with a controller, it may be because an incorrect station number has been set. Note that station numbers cannot be changed in off-line mode using the [Home] key. Use the SUPPORT [F4] and ENVIRN [F1] keys to set the correct number.

MX200/MX50

■ SET REAL-TIME-CLOCK

SET REAL-TIME-CLOCK makes it possible to set the clock built into the MX200.

SUPPORT[F4]→CONFIG[F3]→SET REAL-TIME-CLOCK[F4]

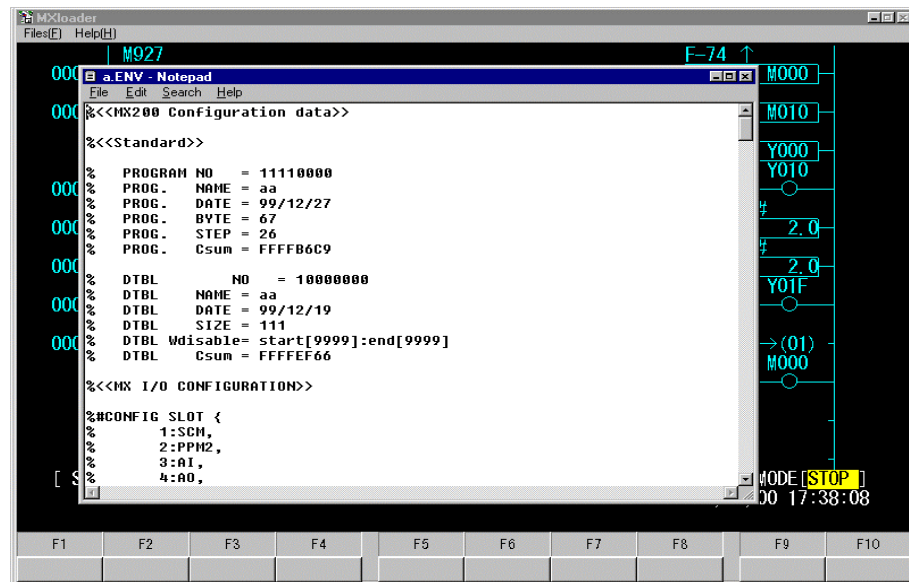


Use the [↑], [↓], [←], [→] and [Tab] keys to select year, month, days of the week and hours to set each item.

Use the [Ctrl] and [Enter] keys set the MX200 to the same time as the personal computer.

MX200/MX50**■ MX200/50 CONFIGURATION DATA EDIT**

MX200/50 CONFIGURATION DATA EDIT makes it possible to edit saved MX200/MX50 configuration data in a file. (Configuration data is an area that can be stored by the processor.)



SUPPORT [F4]→CONFIG [F3]→
MX200/50 CONFIGURATION DATA EDIT [F6]

This function makes it possible to edit saved configuration data for the MX200/MX50 as text data without the need to operate directly on data in the loader. To make the new configuration data valid, press the [Esc] key, enter [Y] when the system prompts you, [Save changed file?], then execute MX200/50 CONFIGURATION DATA LOAD [F9].

● MX200/50 CONFIGURATION DATA EDIT

This function is used for editing configuration data that has been converted to file data.

● MX200/50 CONFIGURATION DATA SAVE (MX → ▫)

This function converts configuration data to file data and writes it to disk. The following area is used to store the data:

L000 to L490
R903 to R994
P3800 to P3999

● MX200/50 CONFIGURATION DATA (incl. R_P) SAVE (MX → ▫)

The configuration data and all R and P areas are saved to the following areas:

L000 to L490
R000 to R499, R1000 to R4999, R903 to R994
P0000 to P3999

MX200/50 CONFIGURATION DATA SAVE, LOAD and COMPARE

● **MX200/50 CONFIGURATION DATA LOAD (◻ → MX)**

This function transfers the configuration data file to the MX controller.

● **MX200/50 CONFIGURATION DATA COMPARE (◻ ↔ MX)**

This function compares data in the MX200/MX50 with the file data. In a comparison involving configuration data only, clock, timer, alarm, error and other data are not compared.

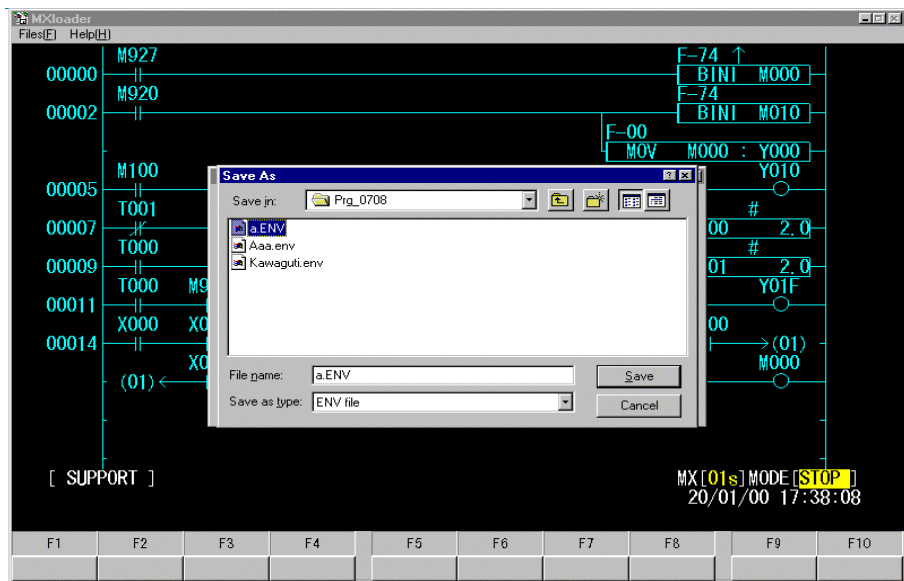
!NOTE

When a PC link setting or RUN is executed after saving the entire area, a compare error may occur.

■ **MX200/50 CONFIGURATION DATA SAVE, LOAD and COMPARE**

This function is used to save and load both MX200/MX50 configuration data and compare data.

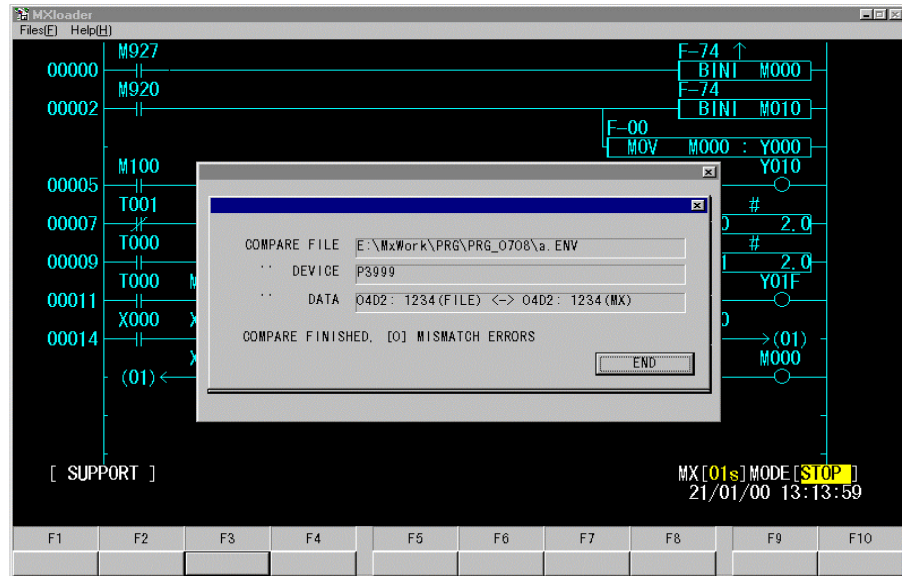
SUPPORT [F4]→CONFIG [F3]→
MX200/50 CONFIGURATION DATA.. [F7] to [F10]



[FILE SELECTION] screen

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MX200/50 CONFIGURATION DATA SAVE, LOAD and COMPARE



[COMPARE FILE] screen

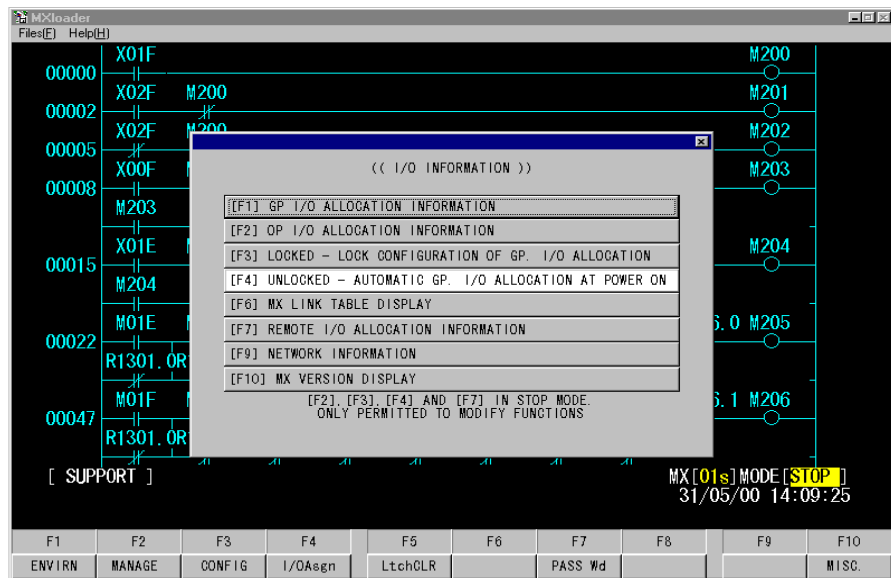
■ GP I/O, OP I/O allocation (I/O INFORMATION screen)

GP I/O and OP I/O allocation (I/O INFORMATION screen) allocate each module, OP I/O (operator's I/O) and device tables in the [I/O INFORMATION] screen. When the I/O allocation is fixed, an error or alarm is generated if the I/O connected at startup differs from the fixed I/O.

The SUPPORT [F4] key in the main menu is used to display I/OAsgn which shows and fixes the numbers of the slots where GP I/O (I/O modules mounted in the MX controller and special function modules), operator's I/O (MX100 MP01) connected to an OP link, smart terminals (ST100DL05, ST220CL05W) and MX100 are installed, their station numbers and I/O contact device numbers.

● [Menu] screen

SUPPORT [F4]→I/OAsgn [F4]→



[Menu] screen

[F1] GP I/O ALLOCATION INFORMATION:

Reads the information only.

[F2] OP I/O ALLOCATION INFORMATION:

Registers and corrects OP I/O allocation.

[F3] LOCKED-LOCK CONFIGURATION OF GP. I/O ALLOCAITON:

Registers and fixes GP I/O allocation.

[F4] UNLOCKED-AUTOMATIC GP. I/O ALLOCATION AT POWER ON:

Performs an automatic allocation of GP. I/O at power on.

[F6] MX LINK TABLE DISPLAY:

Displays connected CBL station.

[F7] REMOTE I/O ALLOCATION INFORMATION:

Displays and allocates REMOTE I/O connections.

[F9] NETWORK INFORMATION:

Displays network information of current CBL POWER ON communication.

[F10] MX VERSION DISPLAY:

Displays version of currently installed ROM.

● [GP I/O ALLOCATION INFORMATION] screen

This screen displays GP I/O allocation information. Input X and output Y are the currently installed and allocated I/O points. Entry X and entry Y are fixed allocated information. When input X and entry X, and output Y and entry Y do not match, an I/O compare error occurs. (Use LOCKED-LOCK CONFIGURATION OF GP. I/O ALLOCAITON [F3] or UNLOCKED-AUTOMATIC GP. I/O ALLOCATION AT POWER ON [F4] to change the entry (registration) then power up and power down.) The device allocation numbers are also displayed.

→GP I/O ALLOCATION INFORMATION [F1]

((GP I/O INFORMATION))

SLOT	INPUT X	OUTPUT Y	ENTRY X	ENTRY Y	DEVICE No. X	DEVICE No. Y
1	R80	R32	R80	R32	R500 → R504	R600 → R601
2	R96	R96	R96	R96	R505 → R510	R602 → R607
3	R48	R48	R48	R48	R511 → R513	R608 → R610
4	R64	R64	R64	R64	R514 → R517	R611 → R614
5	R32	R32	R32	R32	R518 → R519	R615 → R616
6		32		32	X000 → X01F	
7			64			X000 → X03F
8						

MX [01s] MODE [STOP]
01/06/00 11:07:21

[GP I/O]

F1 F2 F3 F4 F5 F6 F7 F8 F9 F10
ENVIRN MANAGE CONFIG I/Oasgn LtchCLR PASS Wd MISC.

NOTE

GP I/O are I/O modules or special function modules installed in the MX controller itself.

GP I/O differs OP I/O.

● Locking GP I/O allocation

Press the LOCKED-LOCK CONFIGURATION OF GP. I/O ALLOCAITON [F3] key to lock allocated GP I/Os. This causes the current GP I/O to be registered.

The LOCKED-LOCK CONFIGURATION OF GP. I/O ALLOCAITON [F3] key is available only in the MX STOP mode. Use the GP I/O ALLOCATION INFORMATION [F1] to check the content of the registration. Once locked, the [F3] key is displayed in reverse video on a white background.

→LOCKED-LOCK CONFIGURATION OF GP. I/O ALLOCAITON [F3]

● Automatic GP I/O allocation at power on

GP I/O are automatically allocated when the MX controller is powered up or when the Reset switch is pressed.

When UNLOCKED-AUTOMATIC GP. I/O ALLOCATION AT POWER ON [F4] is pressed, the locked allocation is unlocked and I/Os are allocated when the MX controller is powered up or reset. The UNLOCKED-AUTOMATIC GP. I/O ALLOCATION AT POWER ON [F4] key is available only in the MX STOP mode.

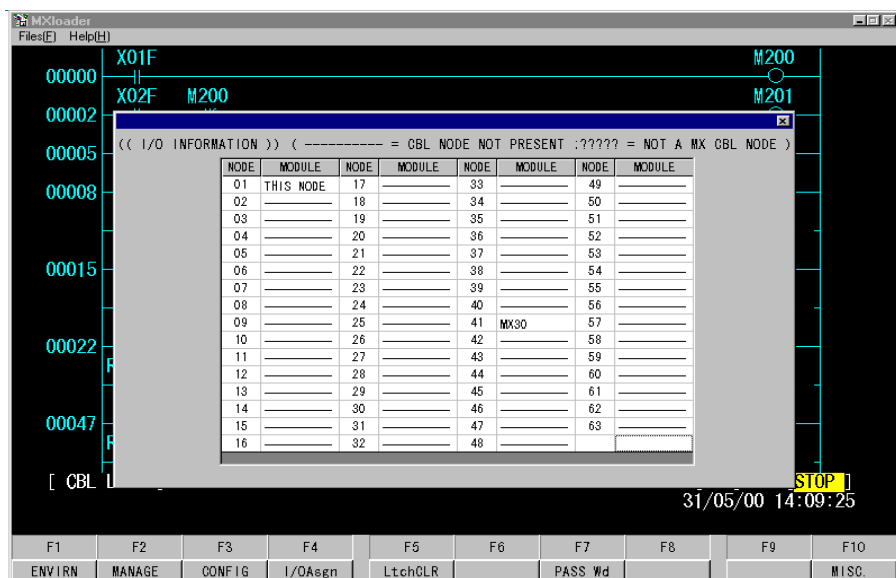
Once unlocked, the [F4] key is displayed in reverse video on a white background.

→UNLOCKED-AUTOMATIC GP. I/O ALLOCATION AT POWER ON [F4]

● MX LINK TABLE DISPLAY

This function displays station numbers and names of connected modules.

→MX LINK TABLE DISPLAY [F6]

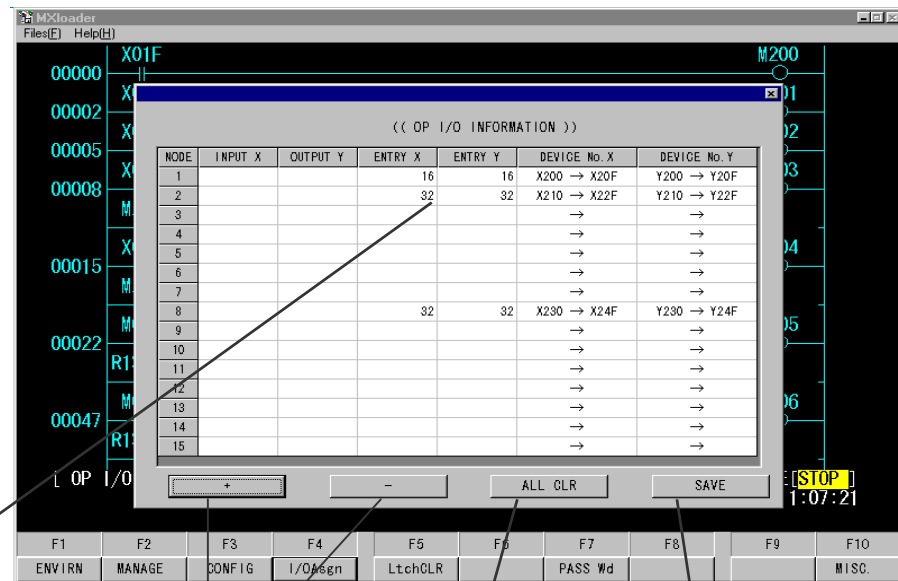


● Allocation and registration information provided by OP I/O INFORMATION

This function displays information concerning the allocation of input X and output Y connected to the MX OP link.

I/O allocations are made in the ENTRY X and ENTRY Y columns and are registered with the [SAVE] key.

→OP I/O ALLOCATION INFORMATION [F2]



Use the → key to move the cursor.

The + key adds 16 points.

The – key subtracts 16 points.

Use ALL CLR to clear everything.

Press the SAVE key to end when all settings have been made.

NOTE

When the X and Y I/O of a station with a registered number do not match the registered X and Y I/O, an OP I/O compare error occurs.

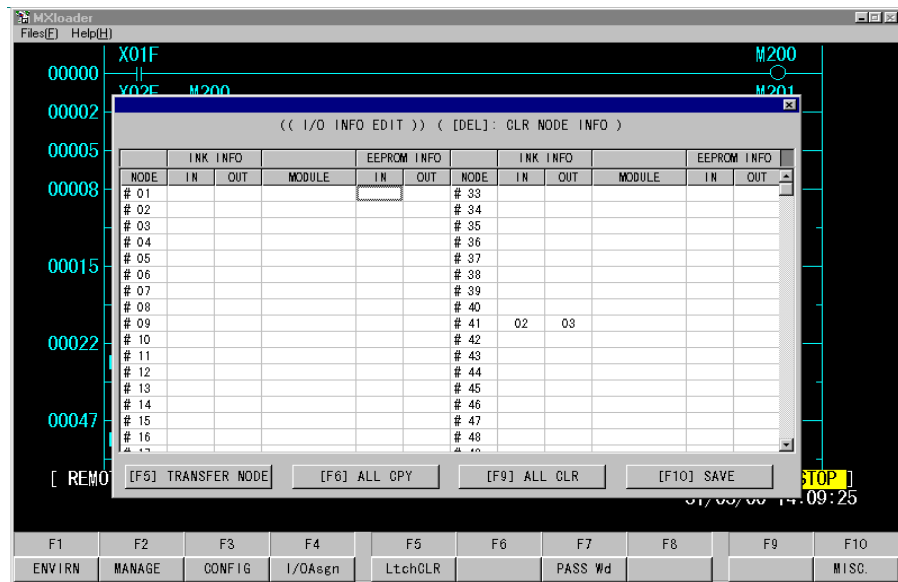
However, an OP I/O module whose station number is not registered is not displayed or checked even if it is connected.

When the controller is shipped, entry X and entry Y of OP I/O are not registered, so no data is displayed even when an OP I/O module is connected. (Only a station number with registered X or Y I/O is displayed.)

● Allocating and Registering REMOTE I/O Data

This function is used to display and register information of remote I/O modules currently connected to CBL.

→REMOTE I/O ALLOCATION INFORMATION [F7]



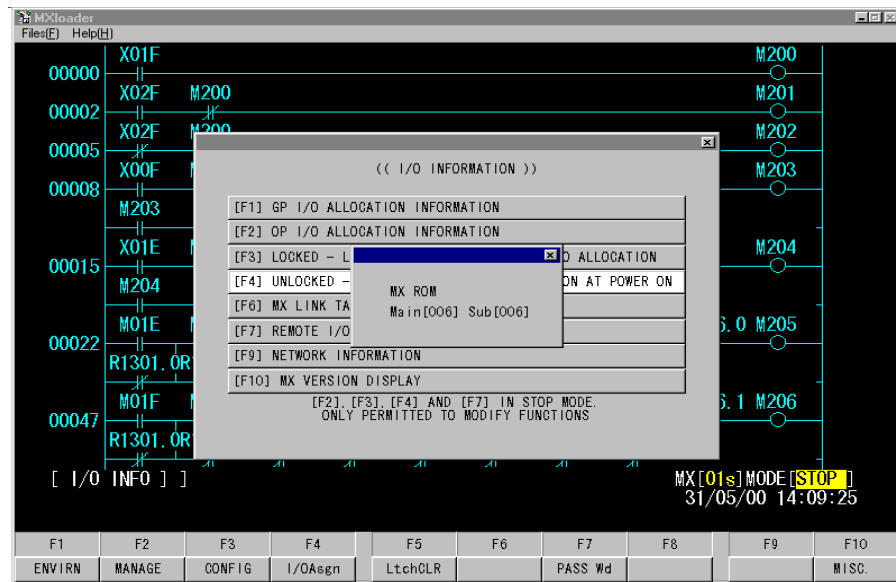
Procedure for registering I/O data:

- The [Enter] key is used to copy the connection information at the cursor to EEPROM.
- The [F6] key is used to copy all connection information to EEPROM.
- The [F9] key is used to delete EEPROM data.
- The [F10] key is used to write data to EEPROM.
- Press the [Delete] key to delete EEPROM data at the cursor.
- Use the SAVE [F10] function when all settings have been made.

● MX VERSION

This function is used to view the version of currently installed ROM of connected machine controller.

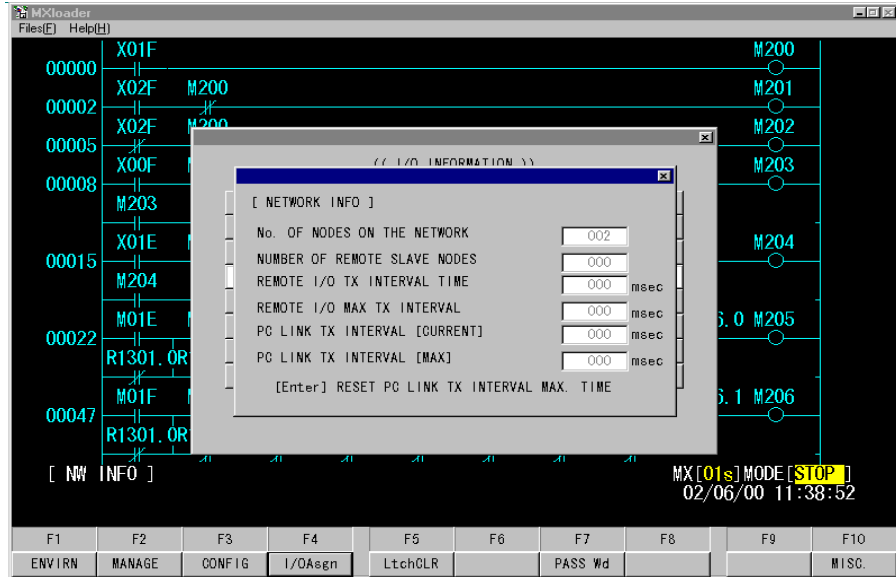
→MX VERSION DISPLAY [F10]



● NETWORK INFORMATION

This function displays CBL communication information.

→NETWORK INFORMATION [F9]



No. OF NODES ON THE NETWORK:

Indicates the number of modules connected to (allocated addresses) the current CBL network.

NUMBER OF REMOTE SLAVE NODES:

Indicates the number of modules registered as SLAVE nodes.

REMOTE I/O TX INTERVAL TIME:

Indicates the TX INTERVAL that the processor automatically sets for REMOTE I/O.

REMOTE I/O MAX TX INTERVAL:

Indicates the maximum TX INTERVAL for a REMOTE I/O.

PC LINK TX INTERVAL [CURRENT]:

Indicates the TX INTERVAL of a PC LINK.

PC LINK TX INTERVAL [MAX]:

Indicates the maximum TX INTERVAL of a PC LINK.

The maximum values can be reset by pressing the [Enter] key.

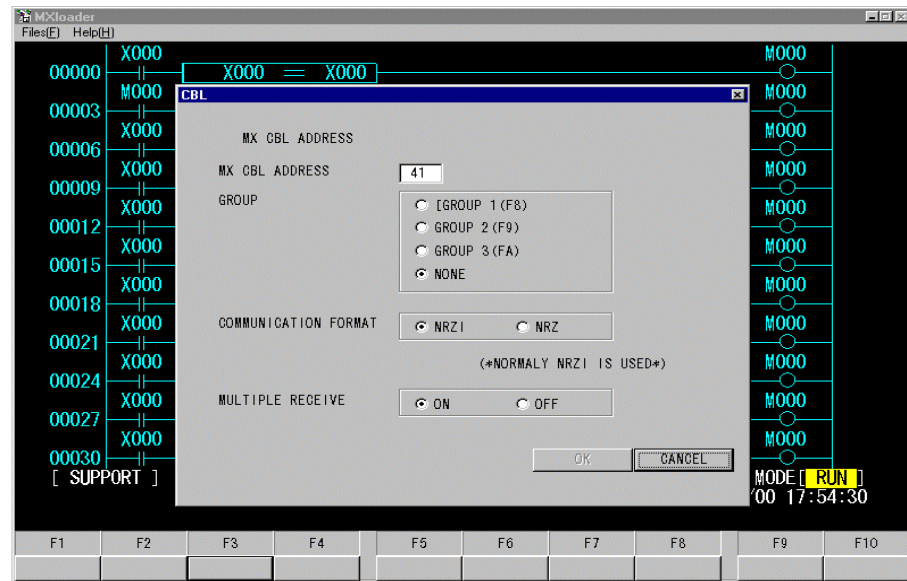
!NOTES

- [PC LINK TX INTERVAL [MAX]] is the value used at power on. Consequently, when the processor goes from STOP to another mode, the value may momentarily be a large value. To check the maximum value, reset the maximum value when operating modes are changed.
- Resetting the maximum value may also reset errors and alarms.

■ MX30 local station address setting

This function sets the local station address when the personal computer loader is connected to an **MX30** controller.

SUPPORT [F4] · CONFIG [F3] ·
THIS NODE'S ADDRESS MODIFY/DISPLAY [F1]



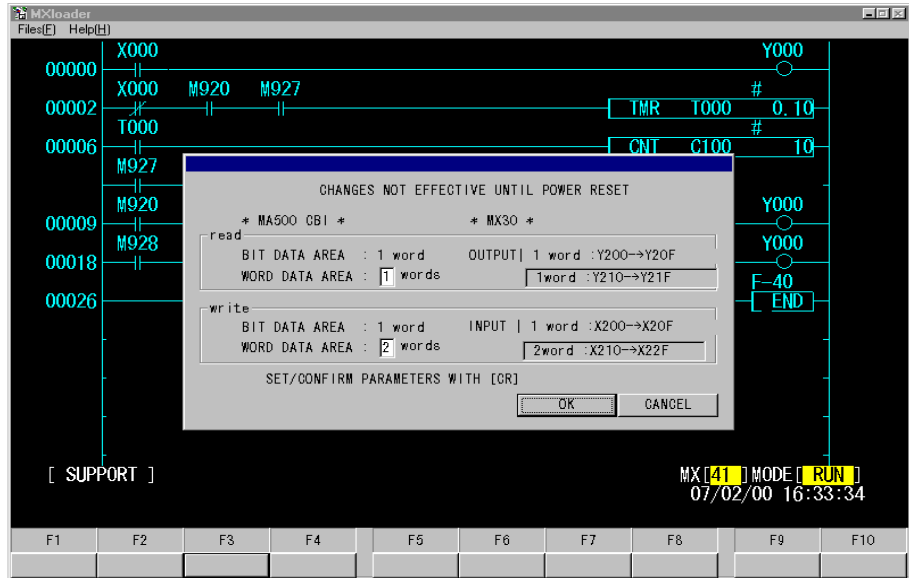
Content of special register R909 in the **MX30**:

- MX CBL ADDRESS** : Enter the CBL address (a value from 0 to 63) in this field.
- GROUP** : Enter the name of the CBL reception group in this field.
- COMMUNICATION FORMAT** : Enter [**NRZI**], the normally used value, in this field.
- MULTIPLE RECEIVE** : When [**ON**] is entered in this field, two or more write commands can be received during 1 scan in CBL communication. And, when a data transfer command is received, it is directly written as reception data in an interrupt process.
(When the above process is executed, the simultaneity of the data is lost and there is no overflow.)

■ MX30 remote I/O assignment

This function allocates remote I/O during CBL communications between an MA500 master station and an MX30 slave station.

SUPPORT [F4]→CONFIG [F3]→
 MA500: CBI←→MX30 REMOTE I/O CONFIGURATION [F2]



Use the cursor keys to set the values, then press the [Enter] key to enter them.

4 - 2 Writing Programs

The MX series personal computer loader allows you to write programs efficiently. Circuits, basic instructions and application instructions can all be entered with the function keys. Application instructions are selected by pressing the FUN [F5] key and entering a numeric value (the function number). The function number is indicated as [F - 00] in the instruction display.

To start programming, set the MX series to STOP mode to disconnect the personal computer loader and the MX controller (i.e. take them off-line).

A program consists of both ladder and mnemonic circuits. Editing functions such as copy, delete, replace, management information, data table and NEW are provided.

The search function (the [/] key) is always available during programming to allow quick location of step numbers and other items. The comment function (the [Ctrl] key) is used to check used area and create programs that are easy to read. Use the CHECK P [F8] key to check a completed program for syntax errors.

The following lists precautions that should be observed during programming.

● Conversion errors

An error is generated during program conversion under the following conditions:

- One circuit block is larger than 2 screens [(9 contacts plus 1 coil) × 22 lines]
- Incomplete circuit connection
- The circuit contains a short-circuit
- The circuit contains unnecessary bends
- The circuit violates the line wrap connection restriction

● Program error

When one of the following errors occurs, an error message is displayed during mnemonic and ladder programming and the conversion of the program is terminated.

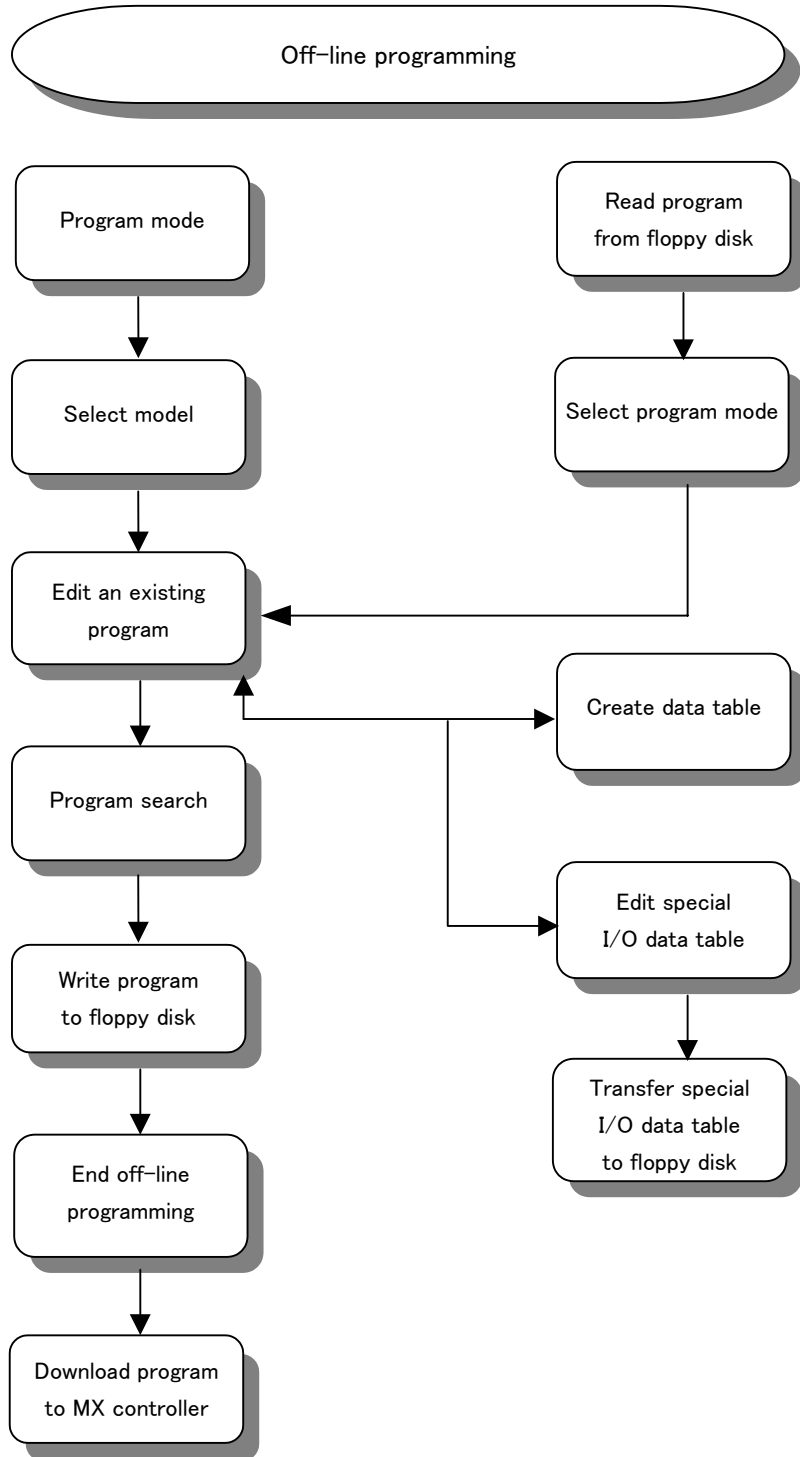
- Parameter error.....Illegal parameter
- Outside device area.....The value of the device is outside the set range
- Constant “#” error.....Incorrect constant “#” value
- Constant “K” error.....Incorrect constant “K” value
- Parameter same area error...The same area has not been specified
- Parameter out of range.....A device value exceeds the set range
- Program size overflow.....The created program exceeds maximum program size

● Other ladder program constraints

- The line wrap function cannot be used with multi-point instructions (for example, the bidirectional shift instruction FUN60)
- The line wrap function cannot be used with multi-outputs (when output instruction is linked with OR).
- An application instruction cannot be used if it overshoots the circuit ends due to its length.

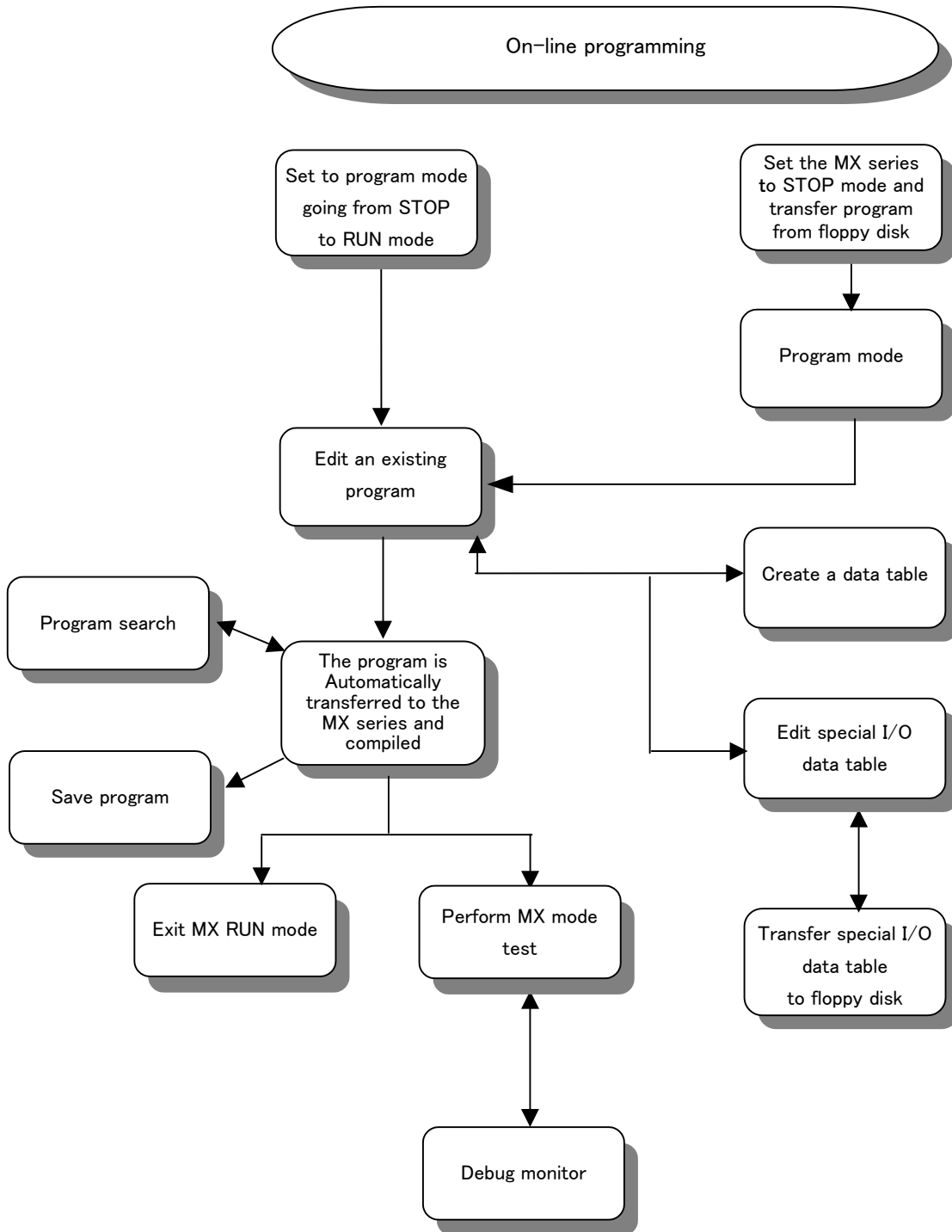
● Off-line programming

The flow chart below shows how programs are created on the personal computer loader when it is not connected to the MX controller.



● On-line programming

The flow chart below shows how programs are created on the personal computer loader when it is connected to the MX controller.



■ Deleting programs

This function is used to delete all programs.

PROGRAM [F1]→OTHER [F10]→EXTD FN [F9]→NEW [F8]

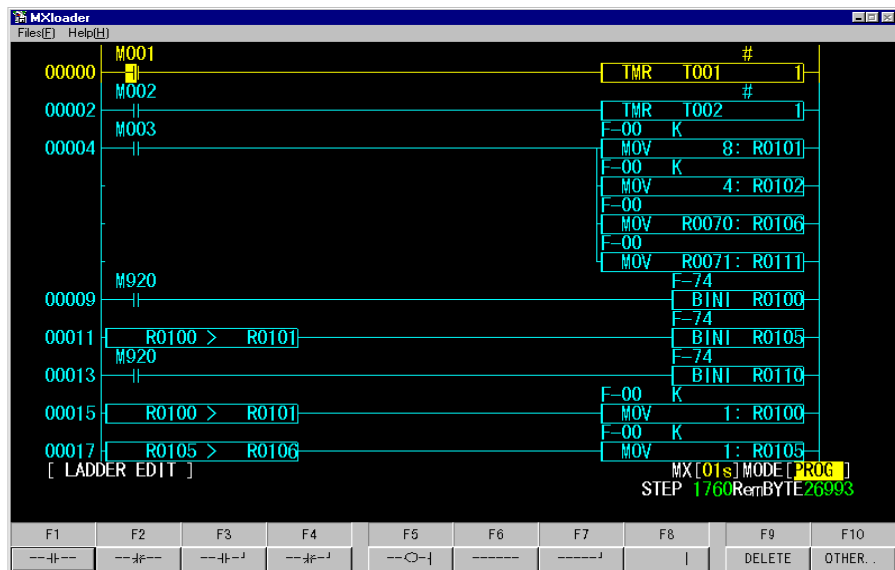
❗NOTE

- NEW can be executed in the RUN mode, but no programs written to the MX controller are deleted.
- When the [Esc] key is pressed after editing a program in RUN mode and [Yes] is entered after the prompt following a successful program check, the program is compiled and written back to the MX controller.

■ Deleting instructions

This function is used to delete circuits in a program.

PROGRAM [F1]→DELETE [F9] or [Delete]

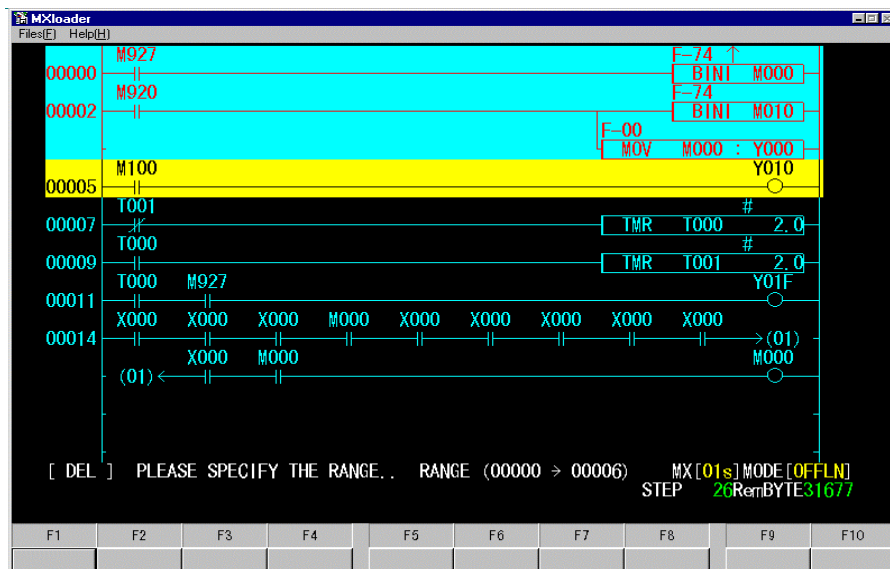


Off-line

■ Deleting lines

This function is used to delete lines from the program.

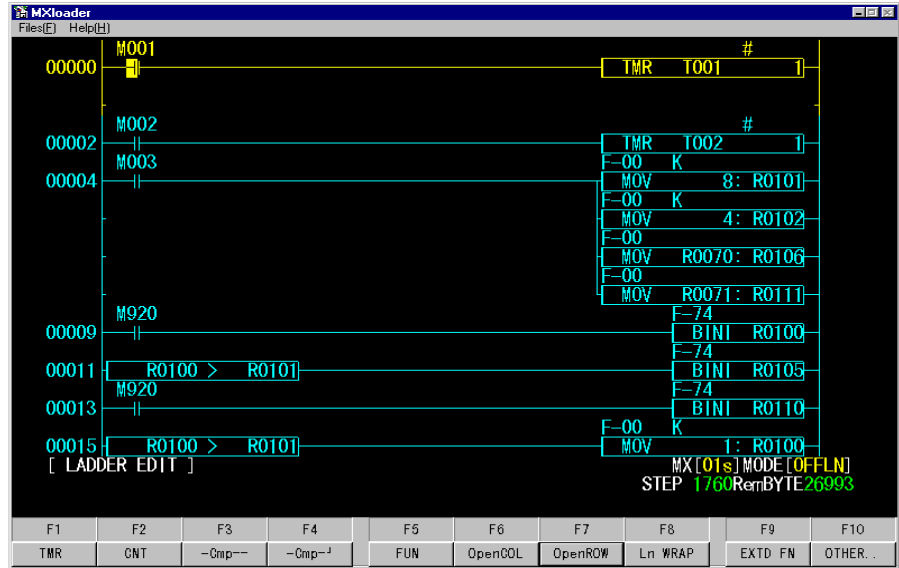
PROGRAM [F1]→OTHER.. [F10]→EXTD FN [F9]→DELETE [F1]→
Set Range [↓]→[Enter]



■ Opening lines

This function is used for inserting lines in existing ladder circuits.

PROGRAM [F1]→OTHER.. [F10]→OpenROW [F7] or [Insert]



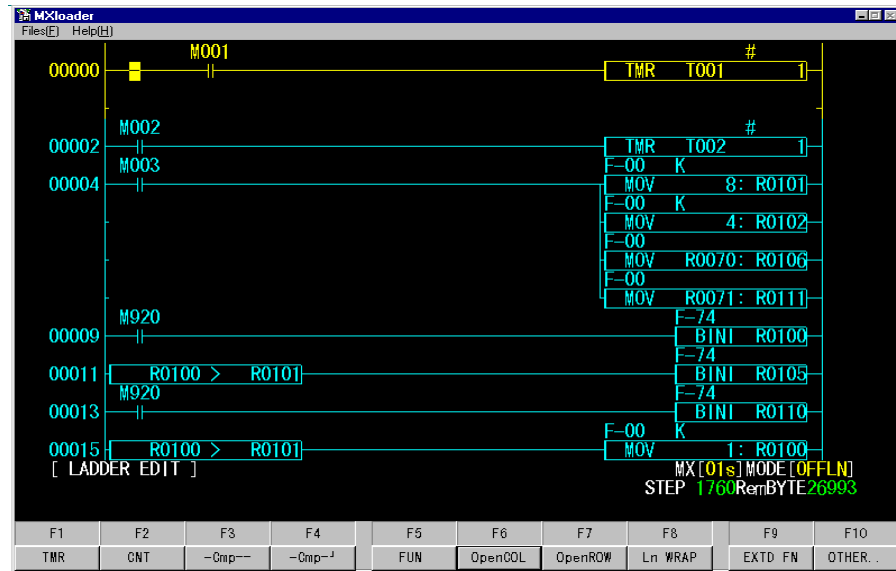
!NOTE

The new line is inserted at the cursor position. Since the first line cannot be turned into the second line, copy the first line before deleting it.

■ Opening columns (for inserting instructions)

This function is used to insert instructions in existing ladder circuits.

PROGRAM [F1]→OTHER.. [F10]→OpenCOL [F6]



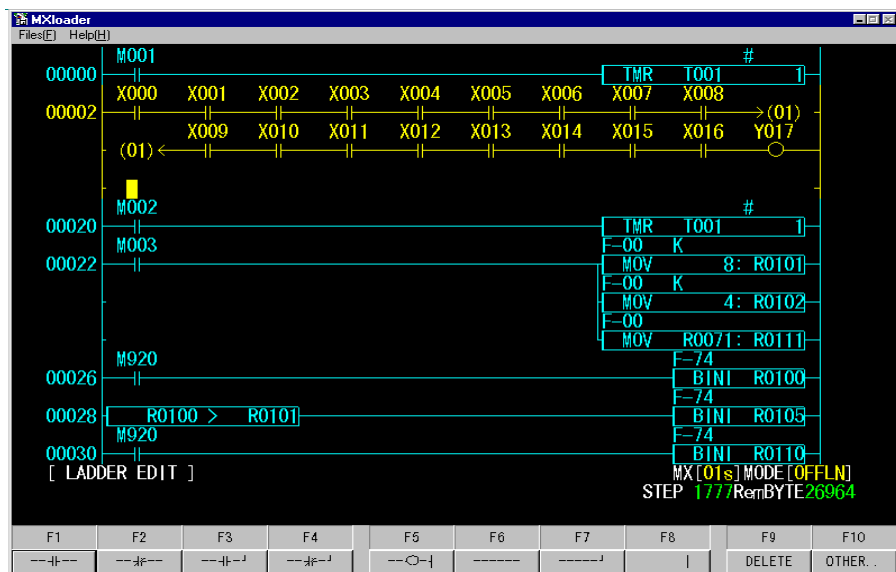
!NOTE

The OpenCOL function inserts data before the cursor position.

Looping

When the number of contact instructions exceeds 9 contacts per line, the program has to be line wrapped. A total of 20 (01 to 20) line wrap symbols (2 screens) can be used to allow a total of 177 contact connections. The symbol (01) is used to indicate the beginning of a line and (01) to indicate the end of a line.

PROGRAM [F1]→OTHER.. [F10]→Ln WRAP [F8]→Number entry→
[Enter]→OpenROW [F7]→[Enter]→Ln WRAP [F8]→Number entry→
[Enter]



NOTE

The range of line wrap numbers is 1 to 99.

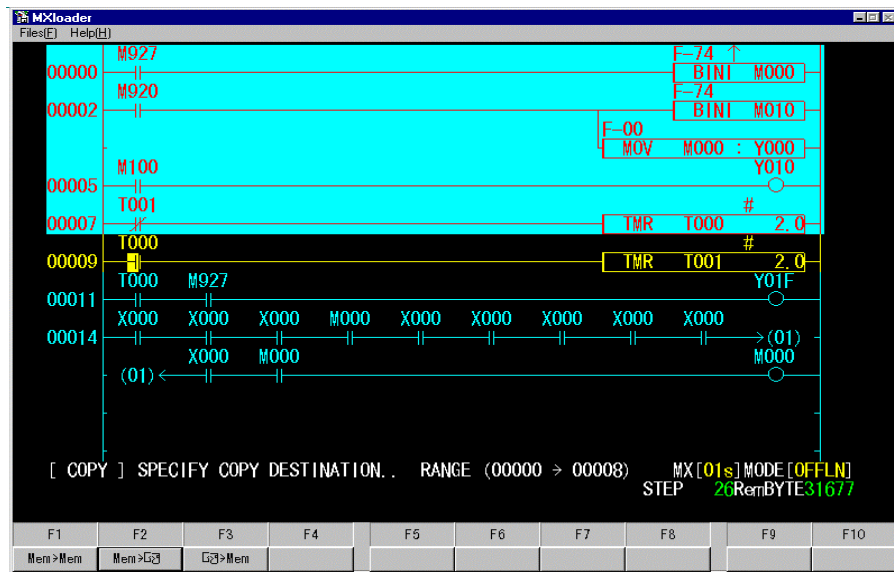
Off-line

■ Copying memory data

This function copies memory data to move blocks of program items to other places in the program.

PROGRAM [F1]→OTHER.[F10]→EXTD FN [F9]→COPY [F2]→
 Specify range [↓]→[Enter]→Copy destination [↑], [↓]→
 Mem · Mem [F1]

《The copied data is inserted before the cursor position.》

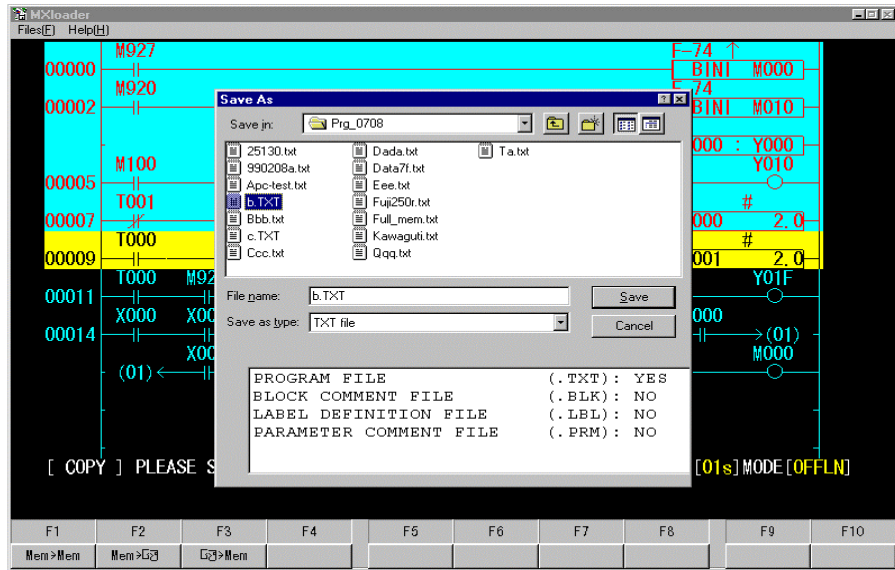


Off-line

■ Copying to floppy disk

This function is used to copy a range of data items to a floppy disk. (The program is not deleted.)

→Specify range [↓]→Mem . [F2]→Select file or new file

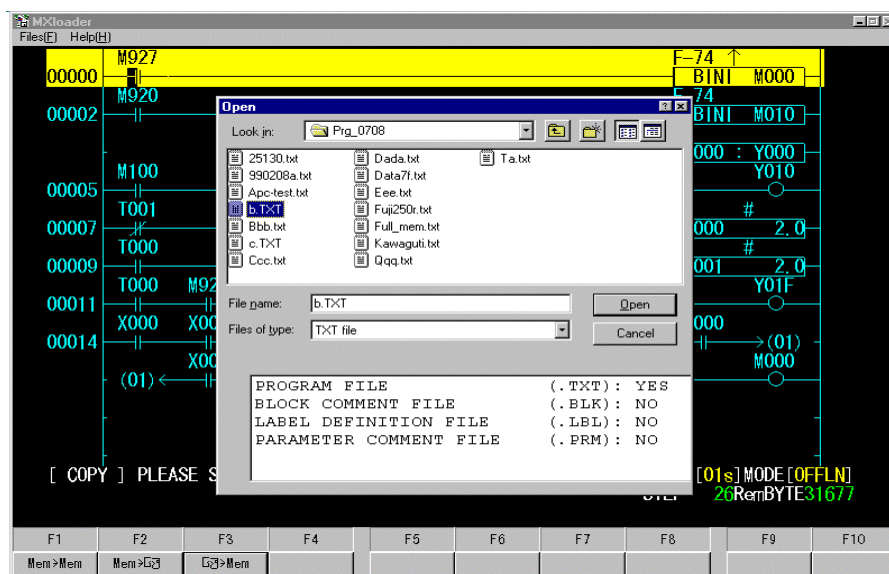


■ Copying from floppy disk

This function makes it possible to copy file data on a floppy disk to the personal computer loader program. (A range of data can be selected but no data is replaced.)

PROGRAM [F1]→OTHER.. [F10]→EXTD FN [F9]→
 Move cursor to insertion point using [↑] and [↓] keys→
 COPY [F2]→
 Mem [F3]→Select file

《The data is inserted in front of the cursor.》

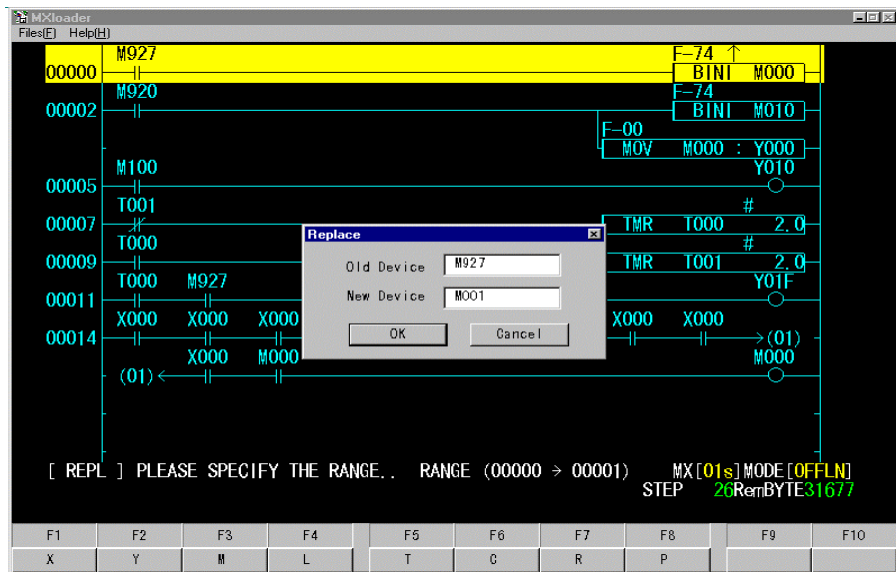


Off-line

■ Replacing

This function is used to replace device numbers.

PROGRAM [F1]→OTHER.. [F10]→EXTD FN [F9]→REPLACE [F3]→
Specify range [↓]→[Enter]→Specify old device→[Tab]
Specify new device→[Enter]→Confirm execution [OK]



!NOTE

Programs created on the MX100 may not be able to correctly perform data replacements on some devices. Should this happen, use the following procedure to convert the program to an MX200 program.

1. Install an MX200 controller.
2. Download the program to the processor module.
3. Upload the program again.
4. Save the program to a file.

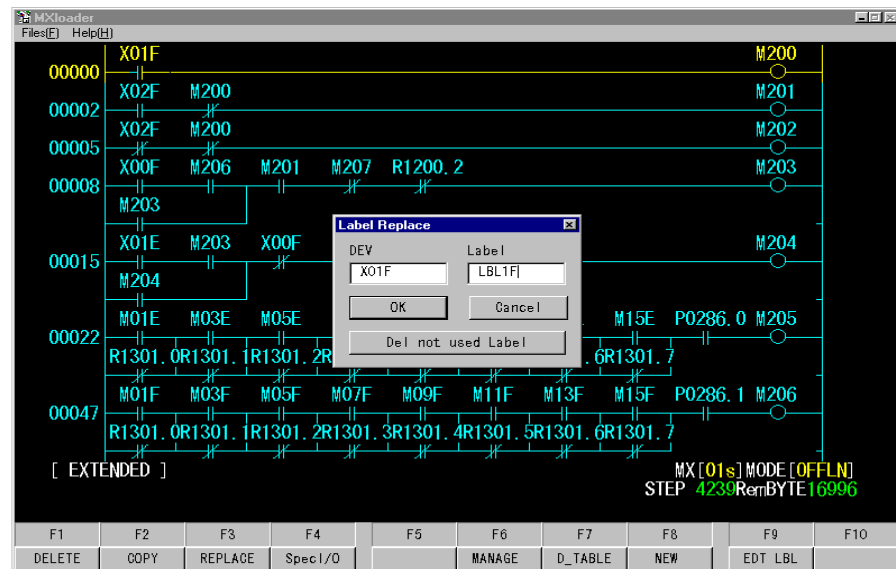
The above procedure ensures that program device numbers are correctly replaced.

MX200/MX50**Off-line**

■ Replacing labels

This function is used to replace programs created with device numbers with labels.

PROGRAM [F1]→OTHER.. [F10]→EXTD FN [F9]→EDT LBL [F9]→
 Enter the device name to be changed→[Tab]→
 Enter the label name→Confirm [OK]→Confirm execution [Y]


NOTE

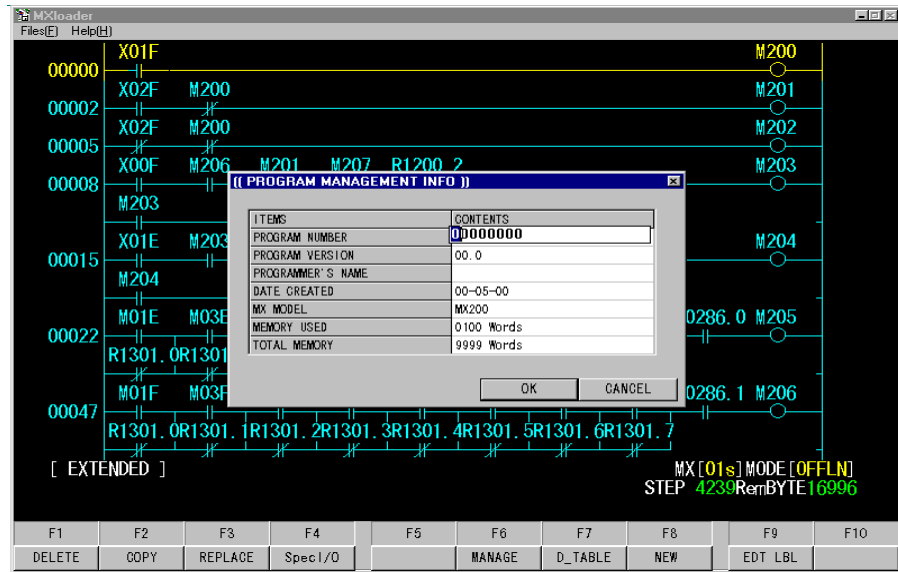
When a label replacement is made, the display must be changed to label display, otherwise it will not be possible to view the replacement. Use the [Ctrl] key to display labels.

MX200/MX50

■ **Creating data tables**

Data tables are created to allocate system memory.

PROGRAM [F1]→OTHER.. [F10]→EXTD FN [F9]→MANAGE [F6]→
 DATA TABLE [F2]



Use the [↑], [↓], [←] and [→] keys to move between items and enter numerics.

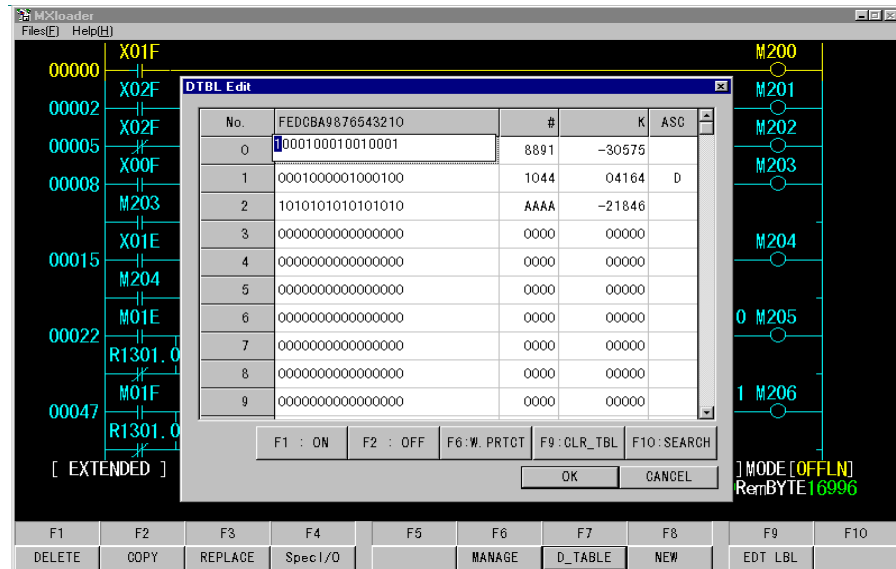
!NOTES

- MX100/MX30/MX20:
 - Use application instruction FUN98 (data table setting) to create data tables.
 - A data table can hold up to 6000 words.
 - A data table can be created only when there is a table setting instruction in the program.
- MX200/MX50:
 - A table setting instruction is not placed in the program.
 - A data table cannot be set when a program is in RUN mode.

■ Editing data tables

This function is used to edit data tables.

PROGRAM [F1]→OTHER.. [F10]→EXTD FN [F9]→D TABLE [F7]



Use the [←] and [→] keys to select #, K or ASCII.

Use the [Page Up] and [Page Down] keys to scroll the screen and the [Back Space] key to delete data.

- Hexadecimals (0 to F) are entered in column #.
- Decimals (0 to 9) are entered in column K.
- ASCII characters are entered in the ASCII column.

Use the [←] and [→] keys to select items.

To enter numbers greater than 15, use the [↑], [↓] keys or the SEARCH [F10] key.

When the cursor is on any of bits 0 to 9, set [F1] key to ON (1 on the screen) or [F2] key to OFF (0 on the screen).

The CLR_TBL [F9] function sets data in areas other than write-protected areas to 0.

The most convenient way of editing data tables in special modules is to use Spec I/O [F4].

!NOTES

- Data tables cannot be edited when a program is in the RUN mode.
- In the RUN mode the data table edit screen is not displayed in real-time. (If a data table write operation occurs in the data table editing screen, press the [Esc] key and return to the data table editing screen.)

MX200

● Write-protecting data tables

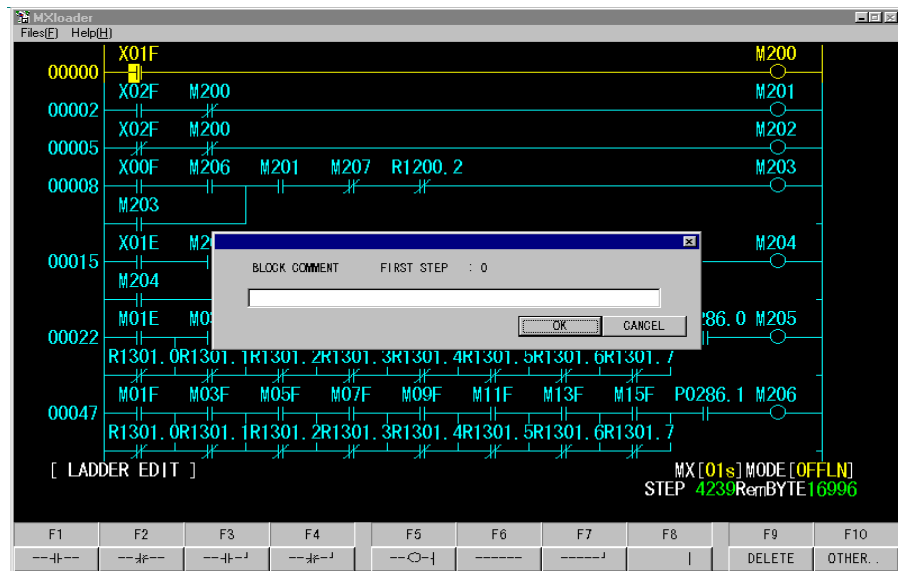
Data tables can be write-protected using the W.PRTCT [F6] key from the personal computer loader or the program.

4 - 3 Control Key Functions

■ BLOCK COMMENT

This function allows you to enter a comment of up to 70 characters for a step number.

PROGRAM [F1]→[Ctrl]→BLOCK COMMENT [B]

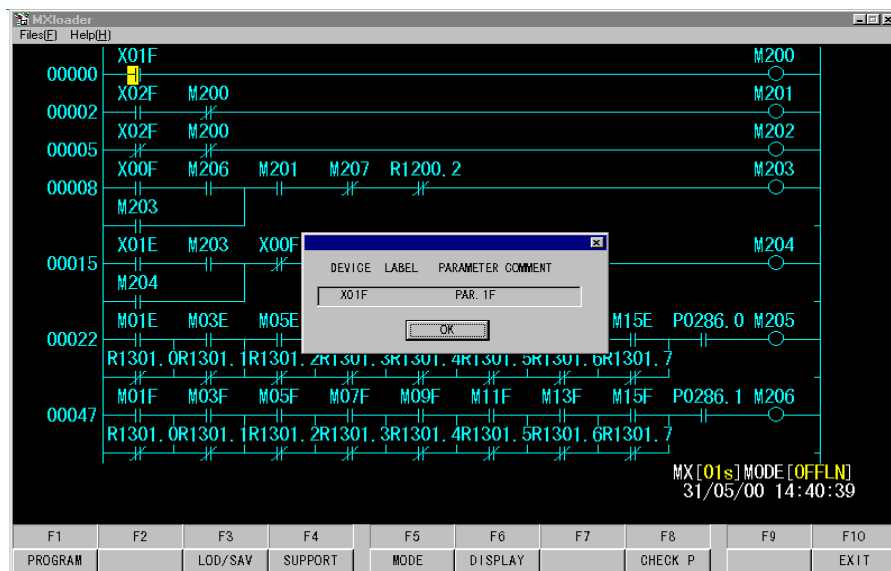


The PROGRAM [F1] key is not required when block comments are to be viewed only. When a block comment is ended with, [↑] or [↓] keys and not the [Esc] key, additions can be made to the comment by pressing the [Ctrl] (Read/Write) key. Block comments are scrolled with the [Page Up] and [Page Down] keys.

■ PARAMETER COMMENT

This function allows you to enter a comment for a device name consisting of up to 16 characters. Parameter comments are written with a special utility.

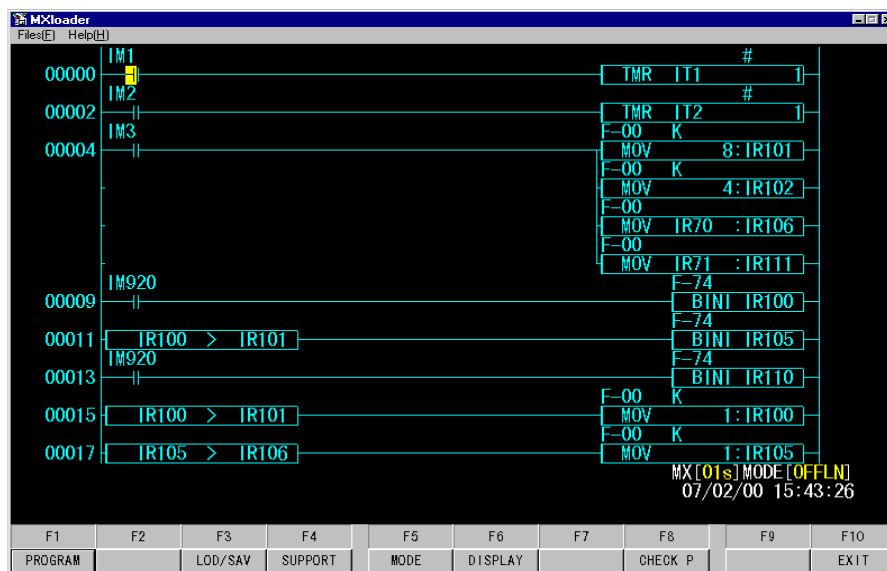
[Ctrl]→PARAMETER COMMENT [P]



■ **DISPLAY LABEL (device no.)**

This function allows you to display labels when labels have been set.

[Ctrl]→DISPLAY LABEL [H]



Procedure for returning to DISPLAY DEVICE No.

[Ctrl]→DISPLAY DEVICE No. [H]

NOTE

Five characters in comments added to the register area (Rxxxx and Pxxxx) are displayed. Thus any characters exceeding the five character limit are not displayed.

Example: Entered label : ABCDEF

Displayed label : ABCDE.0

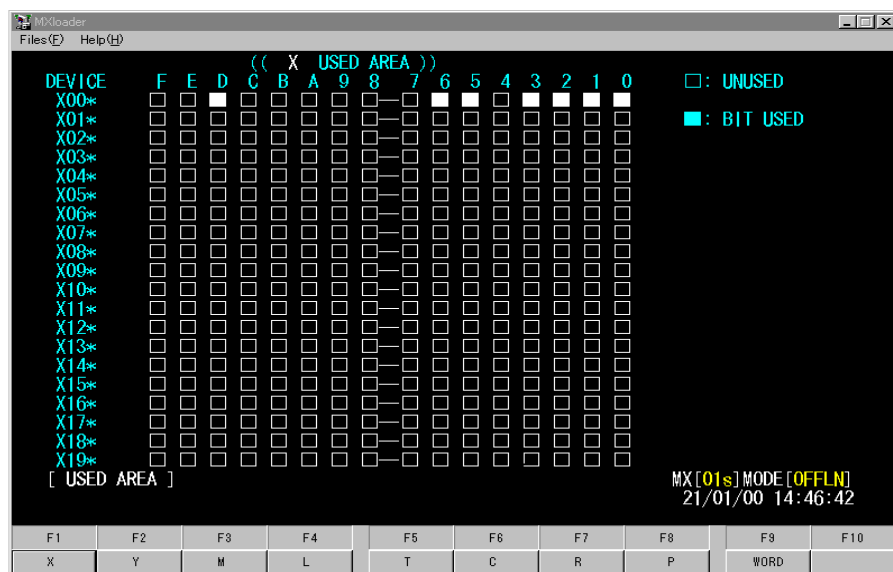
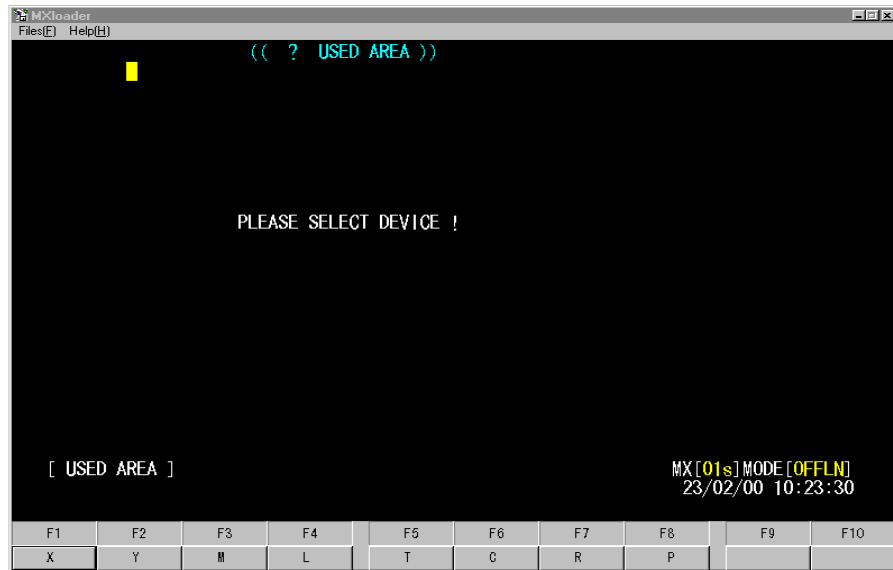
■ USED AREA

This function is used to display the area used by the ladder and mnemonic circuits.

It is displayed in words or bits.

Programs in ladder or mnemonic notation can be displayed.

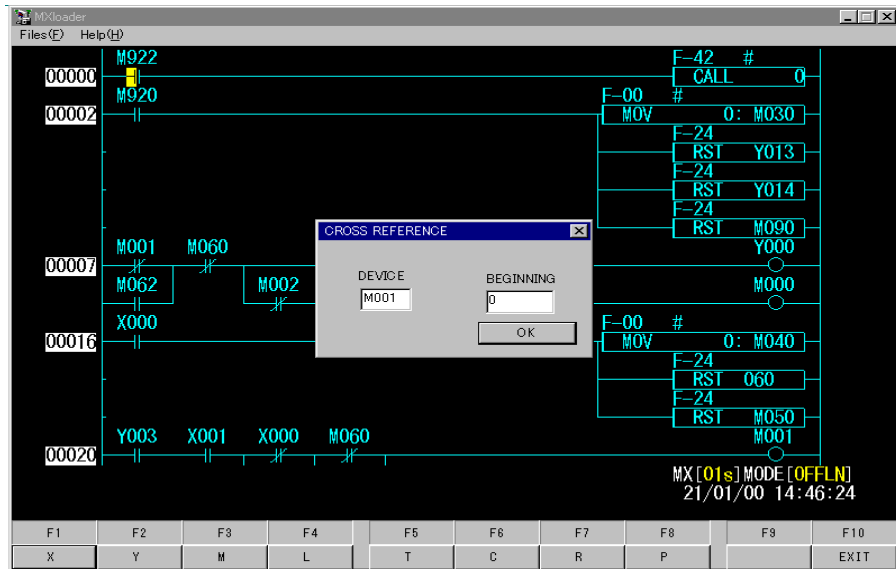
[Ctrl]→USED AREA [U]→Select DEVICE (X to P)



■ CROSS REFERENCE

This function shows the step number of a device. When the displayed step number is selected, the corresponding number is displayed.

[Ctrl]→CROSS REFERENCE [C]→Enter the DEVICE no.→[Enter]

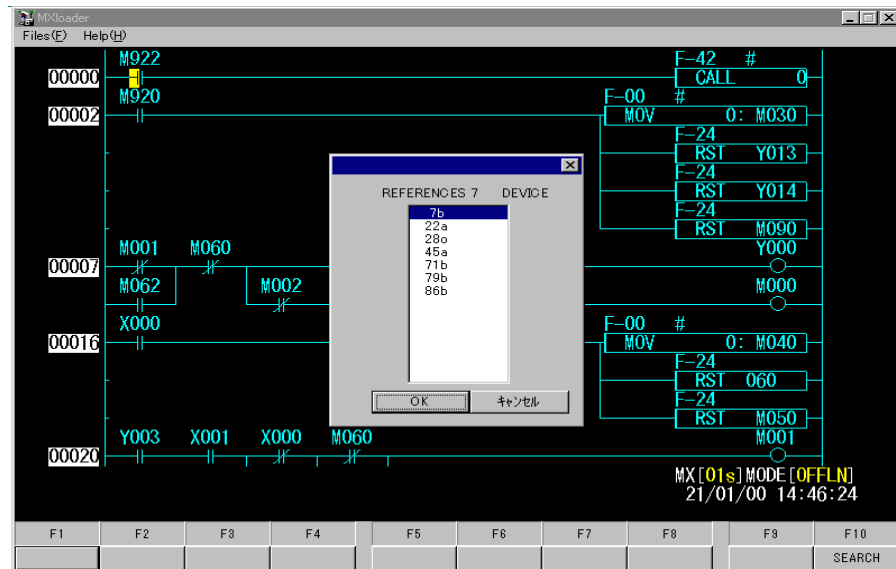


This screen allows you to enter the beginning step number. The symbols after the step number indicate the following:

- a: Contact a
- b: Contact b
- o: Output
- w: Application instruction

Enter the displayed cross reference number.

Select step no. → [Enter]



4 - 4 Search Functions

■ Step number search

This function moves the cursor to the desired step number.

[/] → Enter step number → Select direction of search using [↑] or [↓]

■ Instruction search

This function moves the cursor to the desired instruction.

(1) Basic instructions

[/] → Select basic instruction → Select device → Enter device number → Select direction of search using [↑] or [↓]

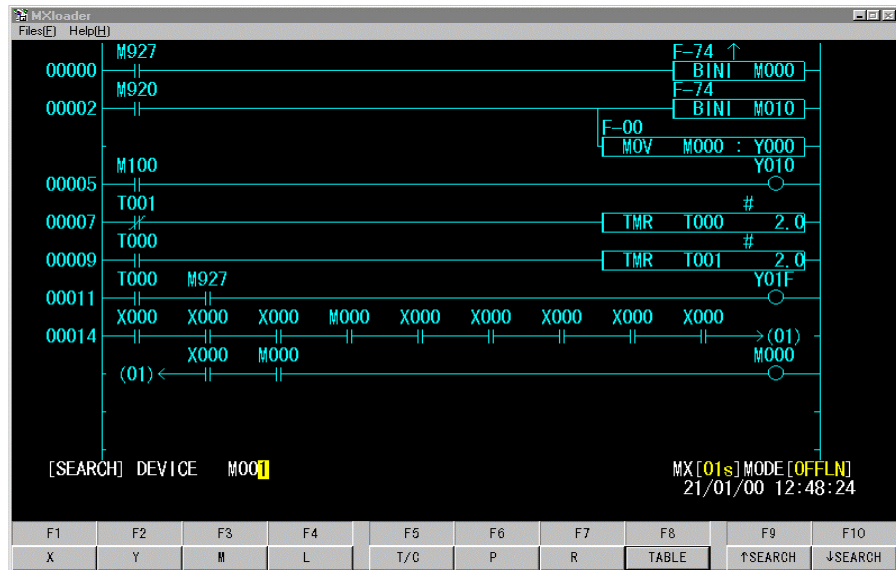
(2) Application instruction

[/] → FUN [F7] → Select type of instruction → Select instruction → Select direction of search using [↑] or [↓]

■ Device number search

This function moves the cursor to the desired device number.

[/] → DEVICE [F8] → Enter name of device → Enter device number → Select direction of search using [↑] or [↓]



[Search] screen

■ First line search

This function moves the cursor to the first line of the program.

[/] → [Insert]

■ Last line search

This function moves the cursor to the last line of the program.

[/] → [Delete]

■ Search again

The Search Again function repeats a previous search.

[/] → [/] (forward search)
 [Shift] + [/] (backward search)

!NOTES

- The Search Again function is available only when the program is displayed in the ladder screen.
- Make the following entry to search for a function number:
 [/] → FUN [F7] → Enter function number → [Enter] →
Device name → [↑] SEARCH [F9], [↓] SEARCH [F10]
 |
 Use the [P] key on the keyboard to enter a P device.

4 - 5 File Operations

The LOD/SAV [F3] key in the main menu has the following functions:

- Transfers and saves program files in MX controllers, memory (personal computer memory), memory card and PROM.
- Reads label files.
- Compares programs transferred to an MX controller with program in memory.

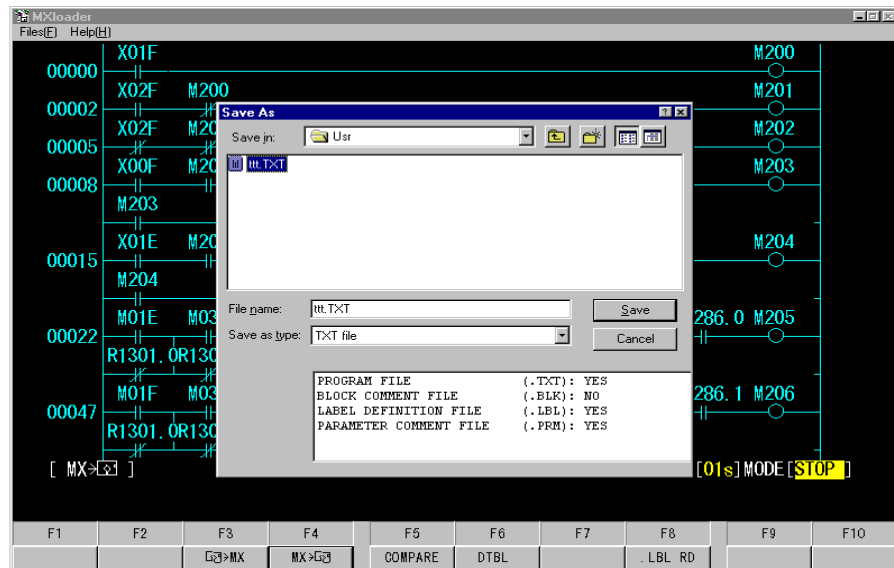
The content of the pop-up windows is given in the following table.

Pop-up windows	Descriptions
▪ →MX	Transfers program from disk to MX controller.
MX→ ▪	Transfers programs from MX controller and saves them to disk.
COMPARE	Compares program on disk with program in memory (personal computer memory). If a mismatch is found, it is indicated in reverse video (against a blue background) and the number of mismatches are also indicated.
▪ →Mem	Transfers programs from disk to memory (personal computer).
Mem→ ▪	Transfers programs from memory and saves them to disk.
memory card	Reads (transfers) programs in an MX100, MX30 or MX20 memory card to memory, writes (saves) programs from memory to a memory card, or deletes programs in a memory card.
ROM Wrt	Writes (saves) programs from memory to a 16Kbyte PROM (27128 or the equivalent) or a 32Kbyte PROM (27256 or the equivalent). Writes (saves) programs from memory to a 64Kbyte PROM (27C512 or the equivalent) or a 128Kbyte PROM (27C101 or the equivalent) on an MX200 controller.
.LBL RD	Used when the label file differs from the program file name.
.TX # RD	Reads programs written in label format from floppy disk.
.TX# WR	Writes programs written in label format to floppy disk.

■ Program save

This function is used to save the displayed program to floppy disk. Enter as shown below.

LOD/SAV [F3] → MX . □ [F4]



[FILE SELECTION] screen

● File types

Programs consist of the file types listed below. When files are read or written, OK or NONE appears in the top right corner of the screen.

- Program files
- Block comment files
- Label definition files
- Parameter comment files

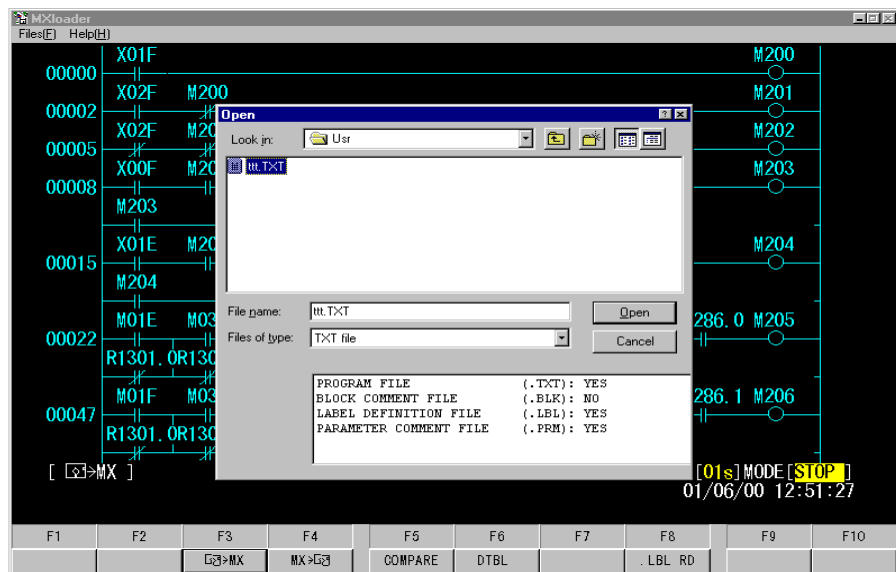
The above files can all be verified using the MS-DOS DIR command.

See Appendix ■ Label programs (page A-2) for further information regarding file types.

■ Program read

This function transfers programs from floppy disk to the on-line memory of the MX200 controller. Enter as shown below.

LOD/SAV [F3] → . MX [F3]



[FILE SELECTION] screen

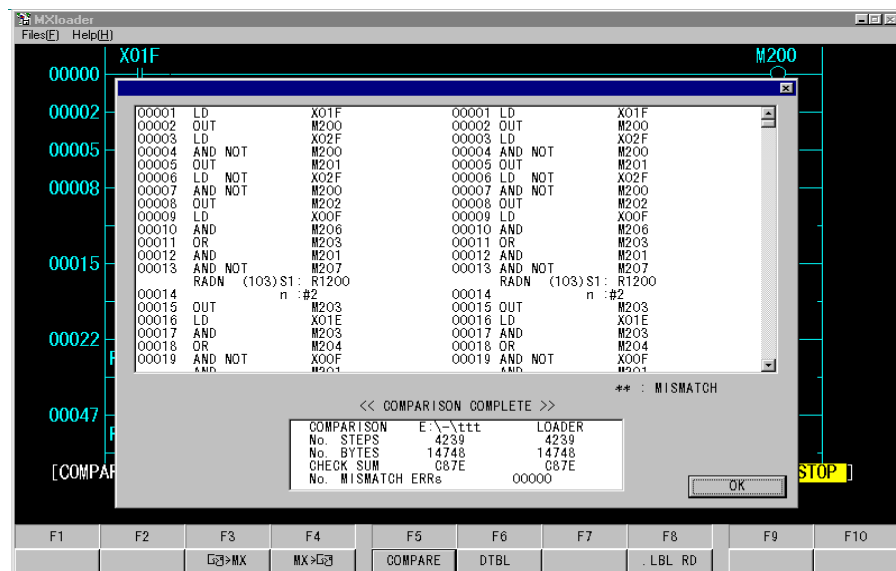
!NOTE

In on-line mode, programs can be read from a floppy disk to the personal computer memory or MX200 in on-line mode only in the STOP mode.

■ Program compare

This function compares the program on a floppy disk with the program loaded in memory.

LOD/SAV [F3] → COMPARE [F5]



[Screen displayed after completed comparison]

! NOTE

- When an MX program file in a manual comparison is rewritten with the content of the file it is being compared to, a comparison of those two files will generate a checksum result of [???]. Should this happen, press CHECK P [F8] and then CHECK [F1] in the next screen that appears.

■ Converting programs between MX100/MX30/MX20 ↔ MX200/MX50

Converting MX100, MX30 and MX20 programs to MX200/MX50 programs MX100, MX30 and MX20 programs can be converted to MX200/MX50 programs with the following procedure.

- ①Read in the program off-line.
- ②Change the machine selection to MX200.

PROGRAM [F1] · OTHER.. [F10] · EXTD FN [F9] · MANAGE [F6] ·
Machine model
PROGRAM [F1] · Select [·] (MX200) · [Enter]

- ③Since the device still has a 3-digit number, the comparison and replacement procedures in the MX200 loader will not function properly if the program is written to disk at this stage.
Therefore, change the number of the device to a 4-digit number.

!NOTE

Save the original program as the procedure described above overwrites the processor program.

MODE [F5]→ONLINE [F1]→[Enter] ·
(transfers the program from the loader to the MX controller) [D]→
OFFLINE [F1]→ONLINE [F1] · [Enter] ·
(Uploads the program from the MX to the loader) [U]

- ④This procedure replaces the original number with a 4-digit number in the MX200.
Update the file or create a new file.

● Converting an MX200 program without a data table to an MX100/MX30/MX20 program

MX200 programs without a data table can be converted to MX100/MX30/MX20 programs with the procedure described in, [Converting MX100, MX30 and MX20 programs to MX200 programs] above.

● Converting MX200 programs with data tables to MX100/MX30/MX20 programs

This function is used to convert MX200 programs with data tables to MX100, MX30 and MX20 programs.

!NOTE

These conversions are not possible if the program contains MX200 dependent instructions. If it does, convert such instructions to instructions that the MX100, MX30 and MX20 can handle.

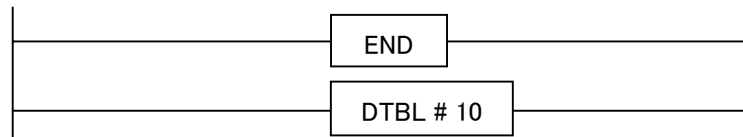
- ①Delete the program off-line.

PROGRAM [F1] · OTHER.. [F10] · EXTD FN [F9] · NEW [F8] · [Y]

- ② Change the MX series model name from **MX200** to **MX100**, **MX30** or **MX20** using the following procedure.

PROGRAM [F1] → OTHER.. [F10] → EXTD FN [F9] → MANAGE [F6] →
PROGRAM [F1] → TYPE [F1] → Select MX100 or MX30 → [Enter]

- ③ Create the following program.
The data table is adjusted to the number of **MX200** data tables that are ported.



- ④ Change the name of the model from **MX100/MX30/MX20** to **MX200**.
⑤ The **MX200** program data table is read from the file.

LOD/SAV [F3] · DTBL [F6] · DATA TABLE LOAD (■ .) [F1] ·
Select file name [Enter] · [Enter]

- ⑥ Copy the **MX200** program data table to the start of the program.

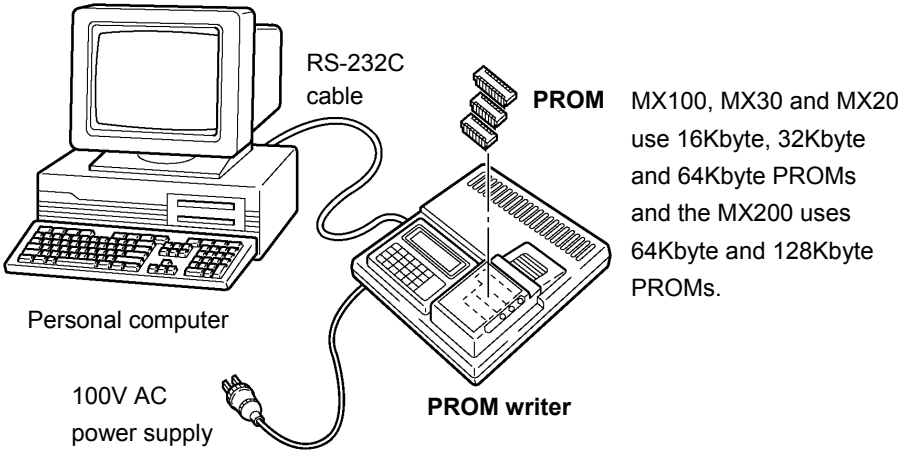
PROGRAM [F1]

Place the cursor at the beginning of the program in the program creating screen.

- ⑦ Then change the name of the model from **MX200** to **MX100**, **MX30** or **MX20**.

→ OTHER.. [F10] → EXTD FN [F9] → COPY [F2] → ■ . Mem [F3] →
Select a file → [Enter]

■ Writing data to a PROM writer



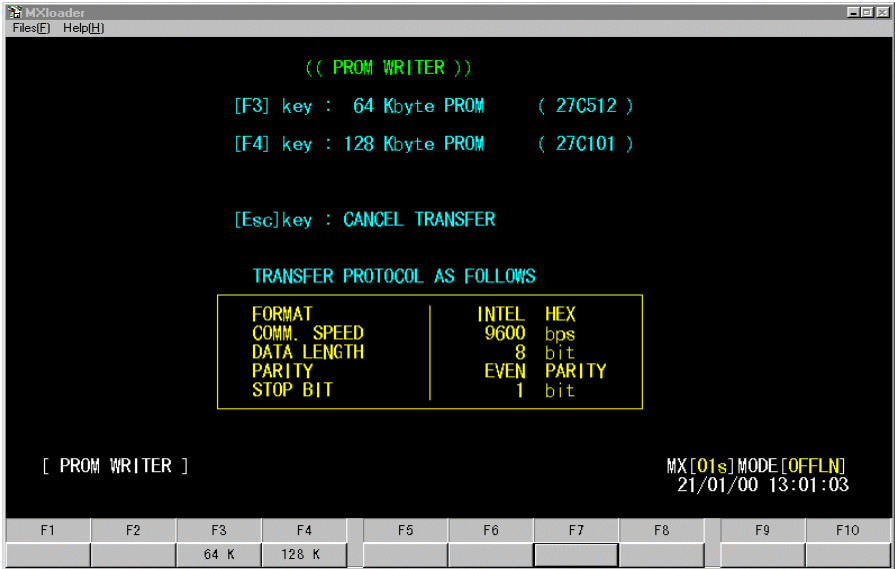
See Appendix ■ Recommended PROM writers (page A-1) for information on what PROM writer to purchase.

《Procedure》

- ① Power up the PROM writer and clear the memory.
- ② Define the serial communication input format to be used for the PROM writer.
- ③ Transfer the program from the personal computer loader.

Off-line

LOD/SAV [F3]→ROM Wrt [F7]→
 Select type of PROM using key [F3] or [F4]→
 Check program management information [Enter]



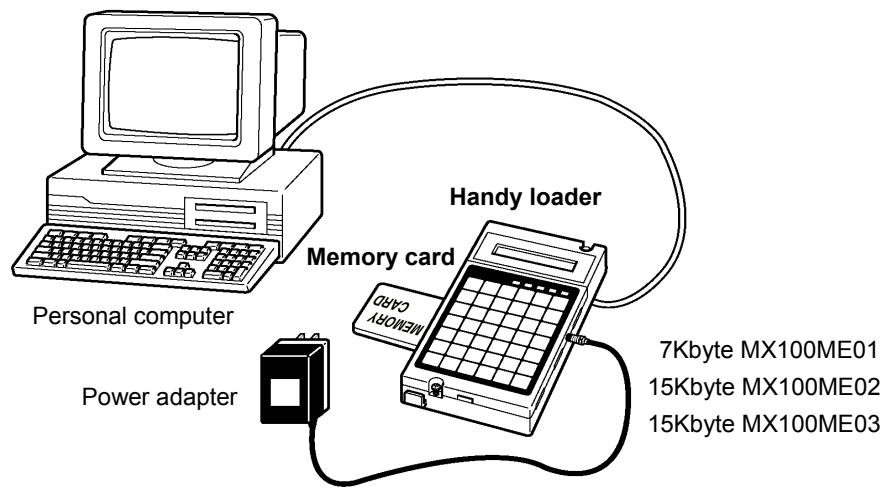
MX100

MX30/MX20

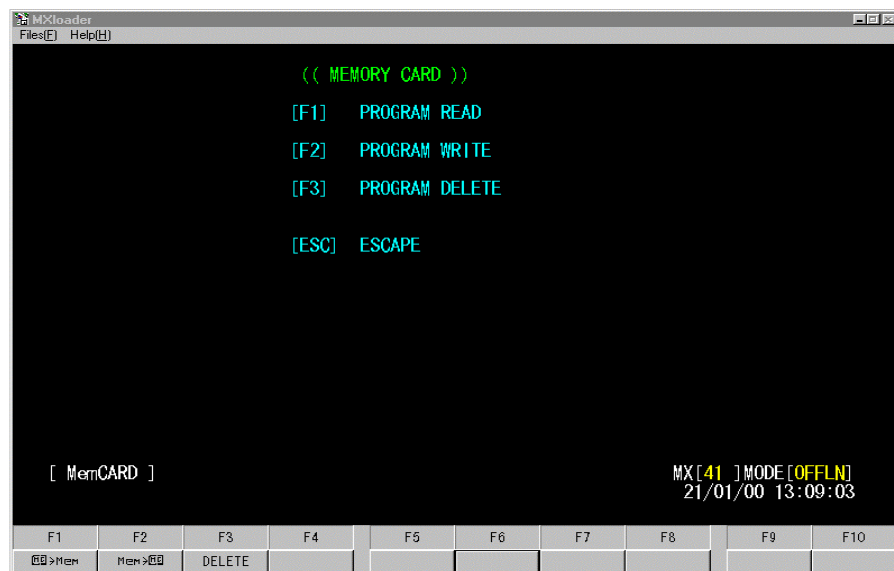
Off-line

■ Reading, writing and deleting memory card programs

A memory card is used to transfer programs between the card and a personal computer.



LOD/SAV [F3] → DTBL [F6]



Use the [F1] to [F3] keys to operate the card.

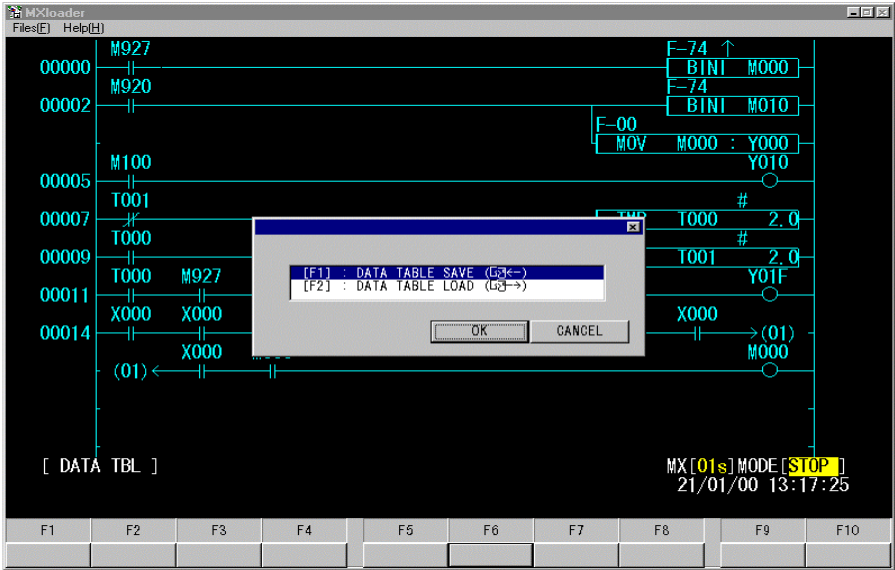
■ Reading and writing data tables

This function is used to read and write data tables to or from floppy disks.

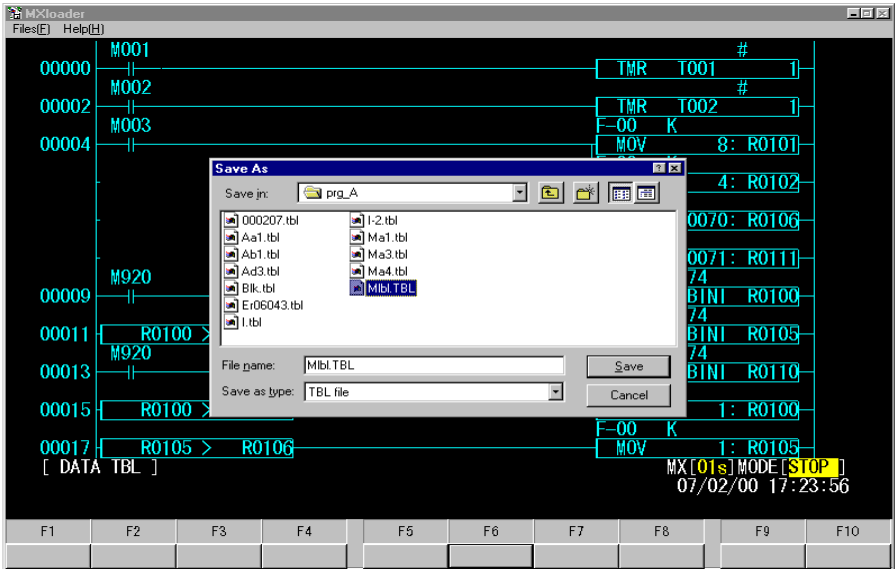
!NOTE

The write protected areas in the MX controller are ignored.

LOD/SAV [F3]→DTBL [F6]→
DATA TABLE SAVE [F1], DATA TABLE LOAD [F2]



[Read and write selection] screen



[File selection] screen

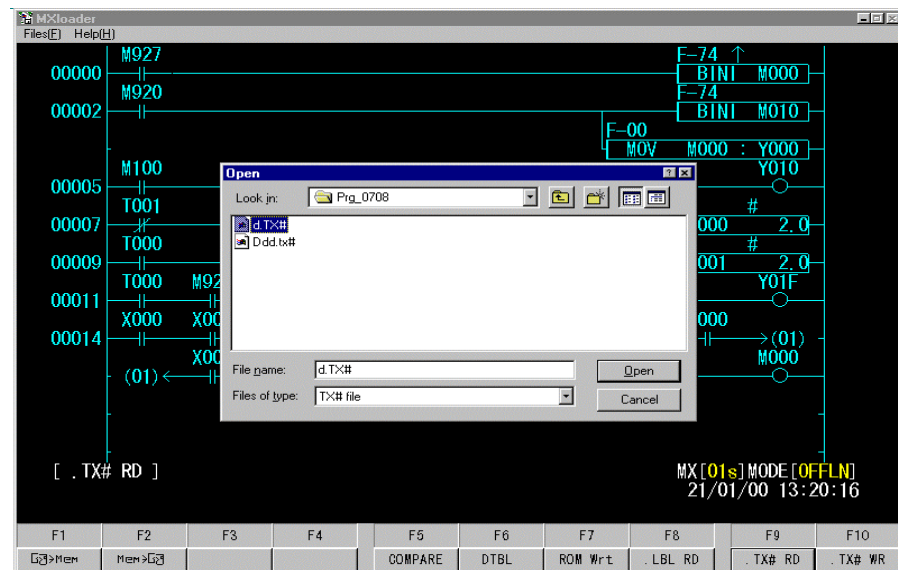
■ Reading and writing label program formats

This function converts the device names in a created program to the corresponding comment names and places the resulting data in a new file.

See Appendix ■ Label programs (page A-2) for details.

Off-line

LOD/SAV [F3] → .TX# RD [F9] or .TX# WR [F10]

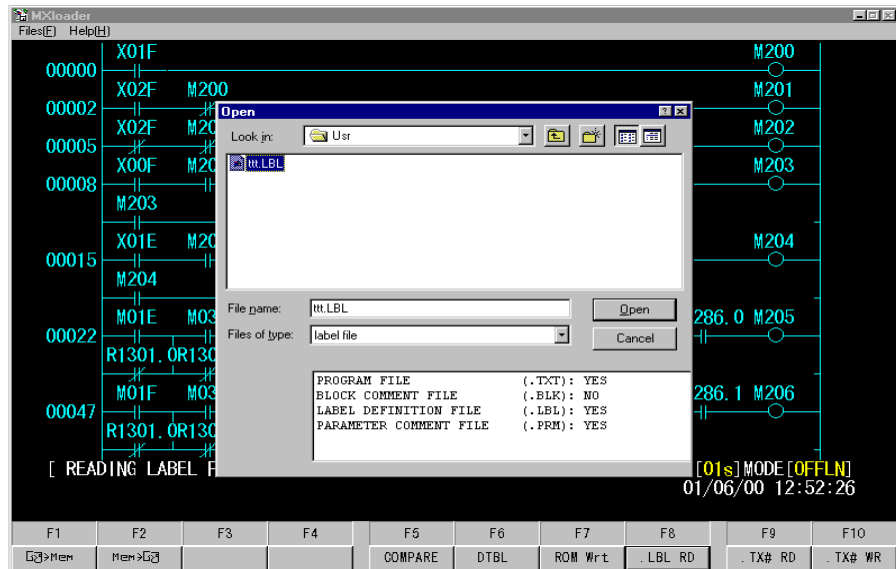


See Appendix ■ Label programs (page A-2) for information on .TX#.

■ Reading label files

This function is used to read label files created with a utility. When the program file and the label file have the same name, they are both read in the program read process. In such a case, the labels need not be read.

LOD/SAV [F3] → .LBL RD [F8]



4 - 6 Monitor and Debugging Operations

The main menu MONITOR [F2] monitors MX series operating conditions in on-line STOP, TEST and RUN modes. Thus no monitoring is performed in off-line mode. The functions of the monitor are listed below.

1. **Error monitor** (ERR Mon):
Indicates when an error or an alarm has occurred and the slot which the device where the error occurred is connected to.
2. **Multi-point monitor** (MULT Pt):
Indicates the operating condition for each device in up to 20 words (20 lines per screen). It can monitor forcing, data modify, changes to settings, tests, scan time and active element indicator conditions.
3. **Trace** (TRACE):
Samples and performs trace displays for up to 8 devices under specified conditions.
4. **Special I/O** (Spec I/O):
Checks initialization and tests special I/O (high-speed counters and analog I/O).
5. **Force** (FORCE):
Forces specified devices to go on or off.
6. **Data modify** (ModDATA):
Changes data in word units for specified devices.
7. **Changes to settings** (Mod T/C):
Changes the timer and counter settings in RUN or TEST mode.
8. **Test** (TEST):
Debugs up to 16 breakpoints set according to specified conditions and debugs each step (min) of a total of 300 steps (which can be set as two ranges). (This function is available in test mode.)
9. **Scan time** (SCAN Tm):
Indicates the scan time of the program on the screen.
10. **ENERGE** (ENERGE):
Indicates the continuity status of circuits using yellow lines and a variety of symbols.

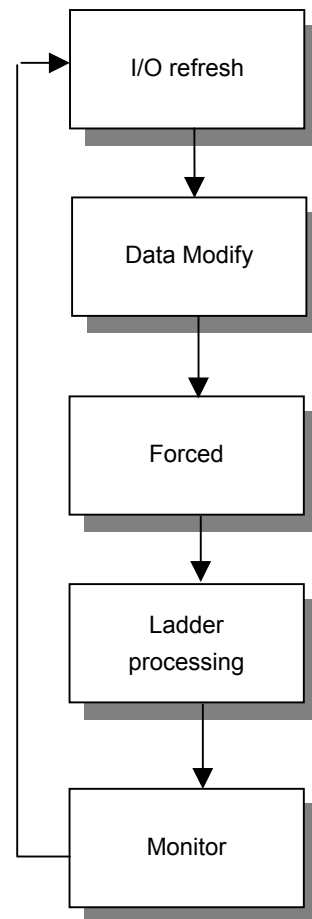
NOTE

Special I/O (Spec I/O) can be used only when a special I/O module is installed.

The table below shows changes in data, forcing and timer/counter values.

Function	Item changed	Unit changed	Mode	Timing of change	Range of hold	Remarks
ModDATA	All devices	Word	RUN TEST STOP	Changes before execution of user program	Valid for one scan only	
	Timer/Counter	Timer/Counter ①Set value ②Current value ③Output				
FORCE	Forced setting and resetting of bit units	Bit device	RUN TEST STOP	Changes before execution of user program	<ul style="list-style-type: none"> • Rewritten by internal program rewrite or I/O refresh, but is again set or reset by forced set/reset. • Not valid when modes are switched or when the power supply is reset. 	
	Forced setting and resetting of table	All devices				
Mod T/C	Timer/Counter	Set timer/Counter value	RUN TEST STOP	Specified changes are made after compilation	<ul style="list-style-type: none"> • Held when the source program is changed (this process is not affected by mode changes or power resets). 	

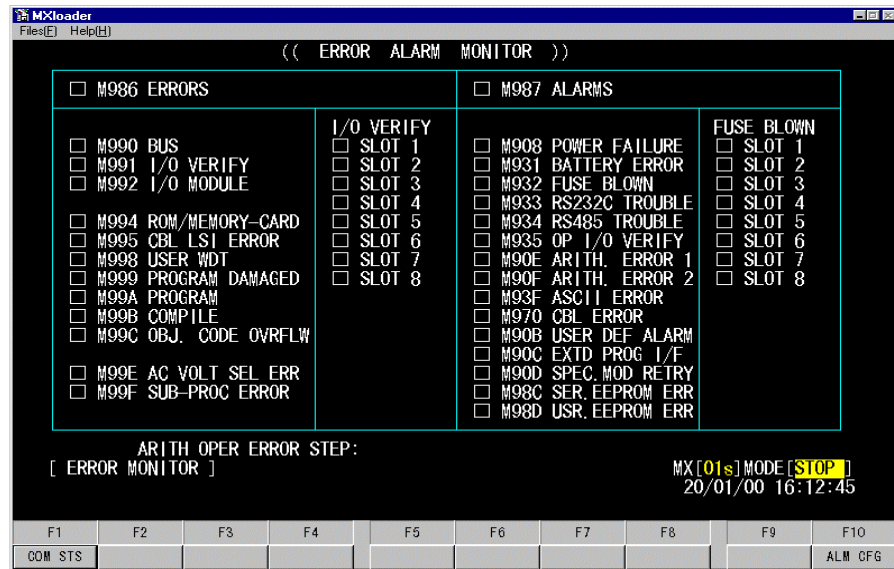
MX series processing flow



■ Error alarm monitor and monitor display

This function displays the MX series error alarm.

MONITOR [F2] → ERR Mon [F1]



[ERROR ALARM MONITOR] screen

The above screen shows errors and alarms. The square LED (□) to the left of the item where an error has occurred lights red. It lights yellow when an alarm has occurred but remains off during normal operation. When an operation error has occurred, the number of the step where the error occurred is indicated. Similarly, the square LEDs to the left of slot numbers light red to indicate an error and yellow to indicate an alarm.

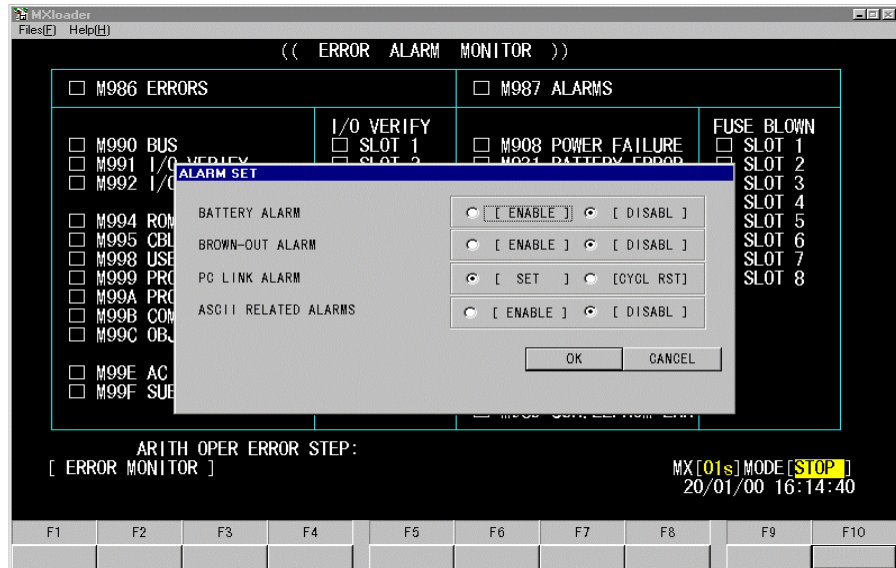
See **Chapter 6. Troubleshooting (page 6-1)** for procedures for clearing errors and alarms. The LEDs (□) go off when the error or alarm is cleared.

MX200/MX50

■ Alarm setting

The alarm setting determines whether a generated alarm is enabled or disabled.

MONITOR [F2]→ERR Mon [F1]→ALM CFG [F10]

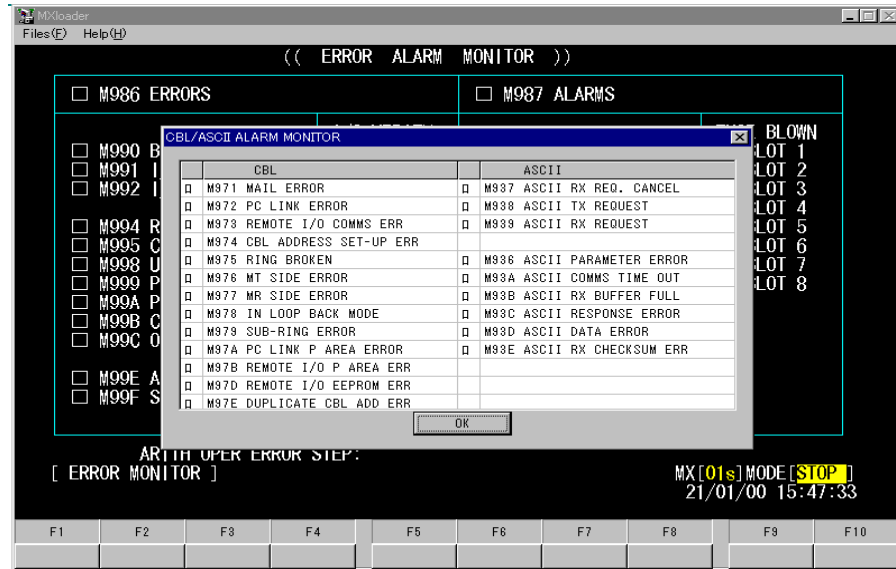


- **BATTERY ALARM: [ENABLE]/[DISABL]**
When a battery failure occurs, [ENABLE] sets the battery failure alarm bit (N931) to ON, while the [DISABL] turns it OFF.
- **BROWN-OUT ALARM: [ENABLE]/[DISABL]**
When a momentary AC power supply outage occurs, [ENABLE] sets the brown out alarm bit (M908) to ON, while the [DISABL] turns it OFF.
- **PC LINK ALARM: [SET]/[CYCL RST]**
When a failure occurs in a processor link communication, [SET] sets the PC link alarm bit (M973) to ON. A [CYCL RST] setting sets the PC link alarm bit (M973) to ON for a predetermined period of time after which it turns it OFF. Since the clear operation is asynchronous and occurs every 5 seconds, the ON time is the period of one scan plus 5 seconds.
- **ASCII RELATED ALARMS: [ENABLE]/[DISABL]**
When an error occurs in an ASCII communication, [ENABLE] sets the ASCII RELATED ALARM bits (M936, M93A to M93F) to ON, while the [DISABL] turns it OFF.

■ Communication alarm monitor (CBL/ASCII ALARM MONITOR)

The [CBL/ASCII ALARM MONITOR] screen indicates errors and alarms that occur during CBL and ASCII communications.

MONITOR [F2]→ERR Mon [F1]→COM STS [F1]

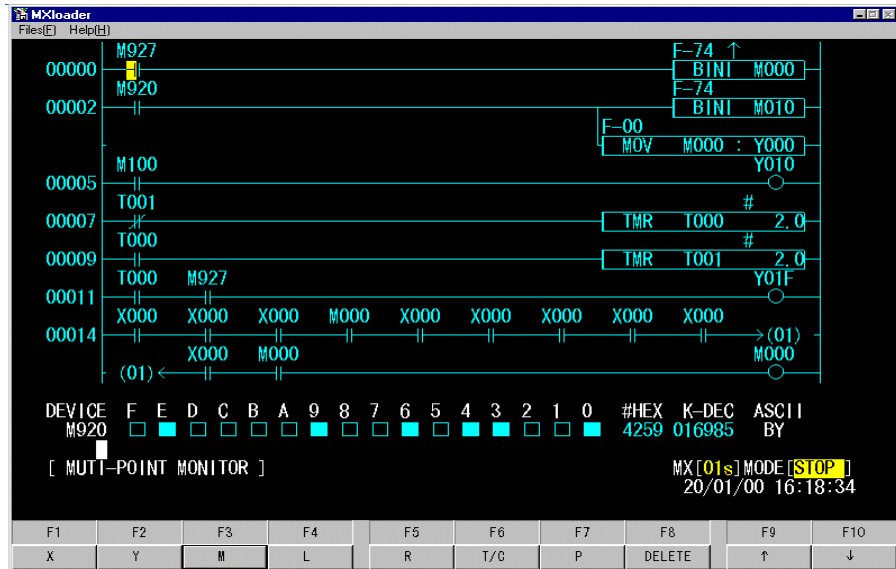


[CBL/ASCII ALARM MONITOR] screen

■ Multi-point monitor (MULT Pt)

This function displays the MX multi-point monitor.

MONITOR [F2]→MULT Pt [F2]→Select a device→
Enter a number→[Enter]



MULT Pt displays forcing, data modify, set value, tests, scan times and active element conditions. It can display up to 20 lines at one time. The square LEDs to the left of the items go ON when a bit is , otherwise the LEDs are OFF . Move the [F9] or [F10] keys to the item that is to be changed or deleted. Then make the required changes starting from the device name. To delete an item, press the DELETE [F8] key.

!NOTE

When an out-of-range setting has been made, the square LEDs do not go on.

■ Trace (TRACE)

This function traces the operating status in the MX TEST and RUN operating modes.

MONITOR [F2] → TRACE [F3]



[Pop-up window] screen

The trace function can be used to trace up to 512 times (128 forward and 384 backward). The sampling time is one minute from the scan time. A total of 8 points can be assigned to each device.

- [F1] UNIT : Sets the sampling time.
- [F2] TRIGGER : Selects trigger conditions.
- [F3] DEVICE : Sets up to 8 points per device.
- [F5] START : Starts sampling of trigger conditions.
- [F6] STOP : Stops sampling of trigger conditions.
- [F8] prevPG : Checks forward direction of the time chart (in direction of position -59 direction).
- [F9] nextPG : Checks the backward direction of the time chart (in direction of position 314).

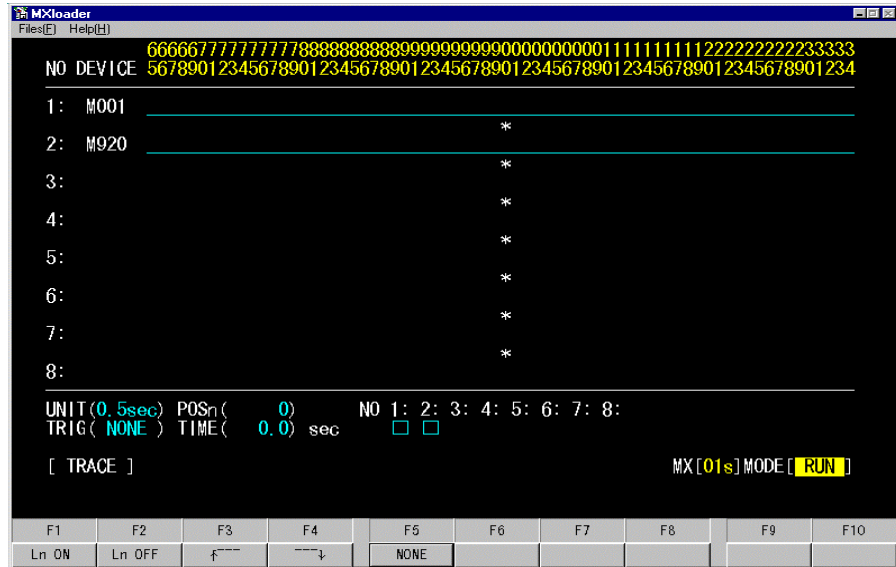
! NOTE

Normal sampling is not provided when the sampling time is set outside the scan time period. (Normal sampling may then be impossible as the personal computer performs sampling and trigger settings outside the scan time period.)

● Condition settings

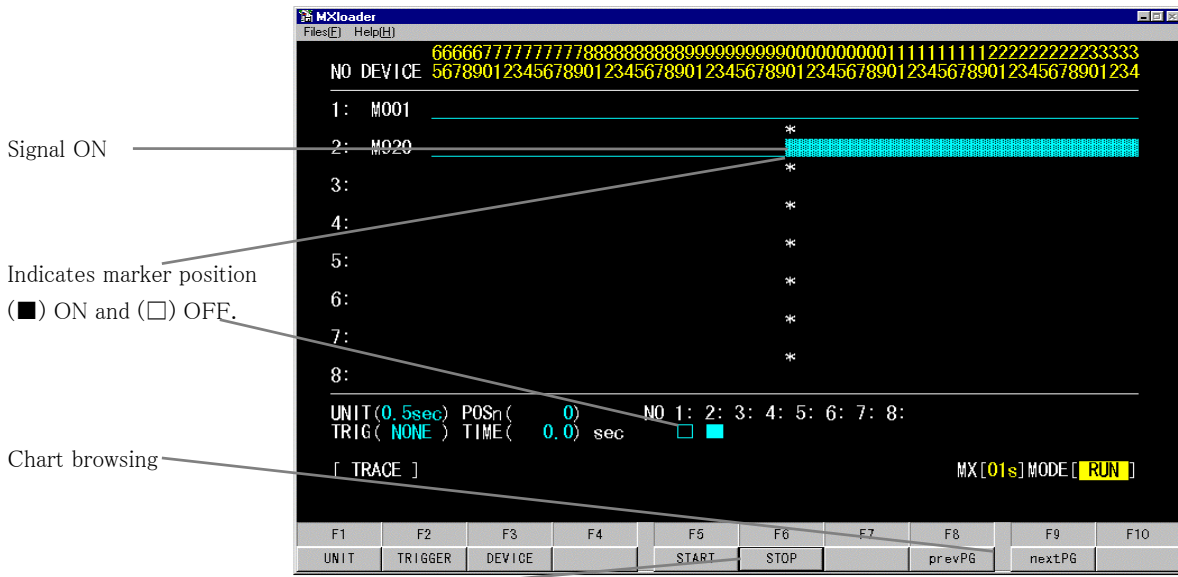
The time entered in UNIT applies to No. 1 to No. 8 setting conditions for the No. 1 device.

A bit device is used to set the sampling conditions. When a word device is to be used as the trigger, cause the program to send the sampling conditions to the bit device.



[Condition trigger setting] screen

- [F1] Ln ON : Starts sampling when the device entered in No. 1 is ON.
- [F2] Ln OFF : Starts sampling when the device entered in No. 1 is OFF.
- [F3] ▣ : Starts sampling when the device entered in No. 1 goes from OFF to ON.
- [F4] ▣ : Starts sampling when the device entered in No. 1 goes from ON to OFF.
- [F5] NONE : Starts sampling when the START [F5] is pressed.



Signal ON

Indicates marker position
(■) ON and (□) OFF.

Chart browsing

Sampling Start/Stop

[Sampling] screen

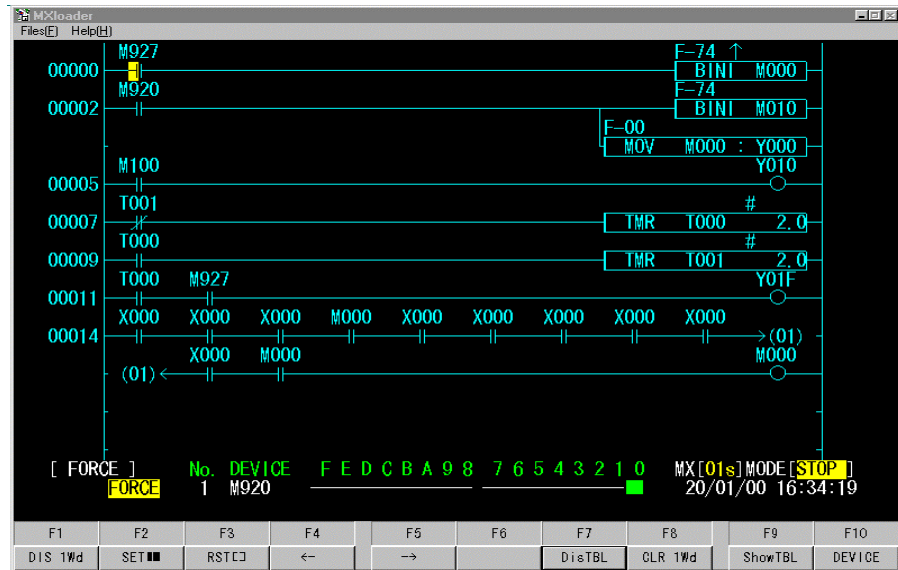
NOTE

When a trigger condition is met between the start of a time chart and before the 128th point, data items at positions before 0 may be corrupted.

■ Force

This function forcibly sets MX devices to ON or OFF.

MONITOR [F2] · FORCE [F5] · DEVICE [F10] ·
 Device name X to T/C [F1] to [F6] · Enter number of device ·
 DATA [F8] · Forcibly sets bit (DIS 1Wd: ·) [F1] to [F5] ·
 Enb TBL [F7]



[Screen displayed during force]

- [F1] DIS 1Wd : Cancels a forced setting. The symbol (←) cannot be used for this.
- [F2] SET ■ : Sets FORCE to ON.
- [F3] RST □ : Sets FORCE to OFF.
- [F4] ← : Changes device numbers in ascending order to F.
- [F5] → : Changes device numbers in descending order to O.
- [F7] Enb TBL : Starts the forced condition that has been set.
- [F8] CLR 1Wd : Clears displayed devices.
- [F9] Show TBL: Displays all 8 word as a list.
- [F10] DEVICE : Sets the next device.

● Force table display (ShowTBL)

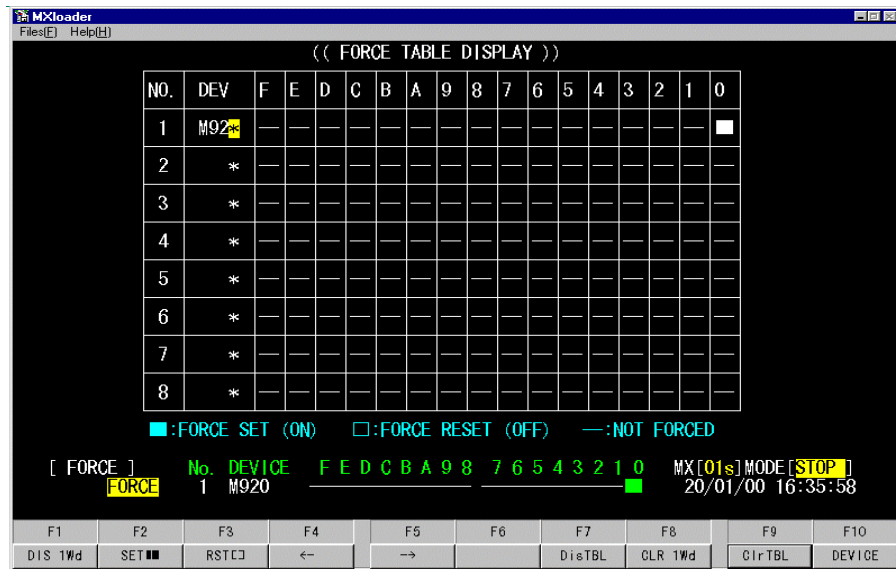
This function shows DisTBL/EndTBL of 8-word devices. The set devices are displayed in reverse video (yellow). Forced set or reset devices are also displayed at the bottom of the list.

ClrTBL [F9] clears all the settings.

The DisTBL [F7] and EnbTBL [F7] (forced clear) functions are selected with the same function key [F7] key which alternates between the two functions.

!NOTE

When the MX series is in forced mode, and the personal computer loader is started up, the values of the force table values are uploaded and replaces the force table in the personal computer loader.

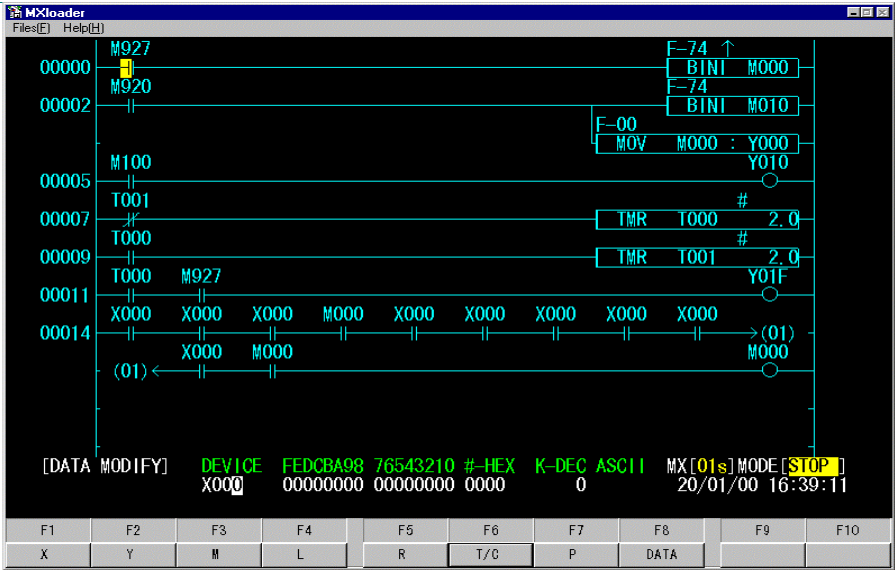


[FORCE TABLE DISPLAY] screen

■ Data modify (ModDATA)

Data of the specified device of MX are modified in word unit.

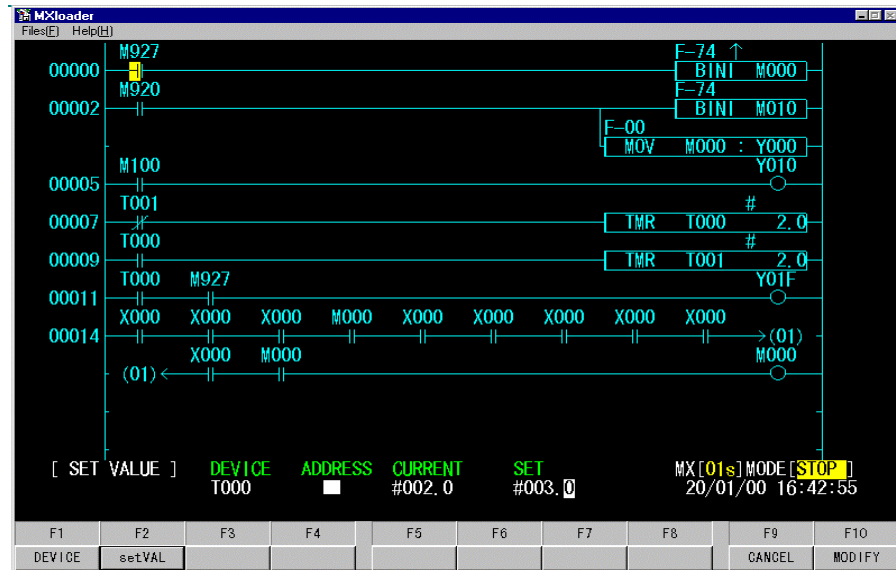
- MONITOR [F2] · ModDATA [F6] ·
- Select a device (X to P) [F1] to [F7] keys ·
- Enter device number · DATA [F8] ·
- Select bits, hexadecimals, decimals or ASCII using (· , ·) [F6], [F7] keys ·
- Set the value (bits are set to ON using [F1] and to OFF using the [F2] key)
- MODIFY [F10]



■ Set value change

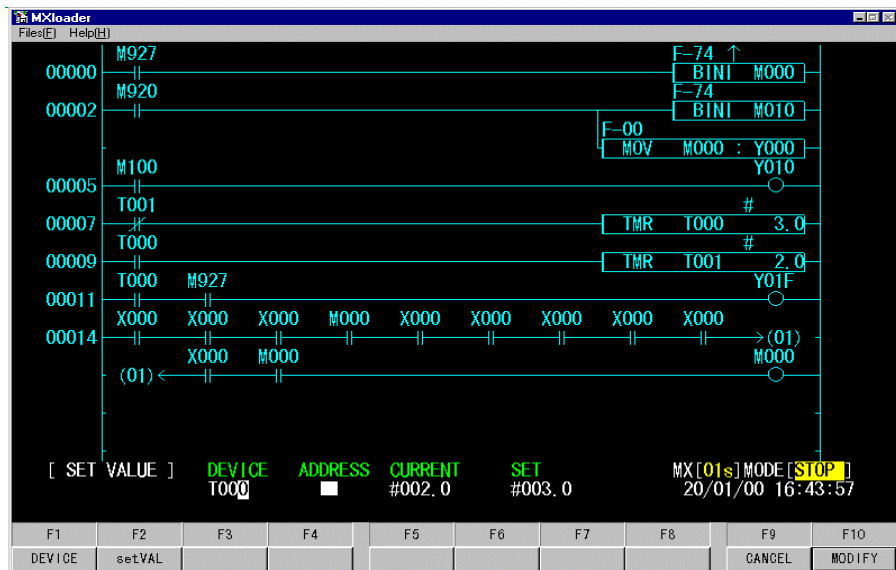
Settings of T/C can be modified. The new values are stored in the user program so they are retentive. Settings can be made on-line in the STOP, TEST or RUN mode.

MONITOR [F2]→Mod T/C [F7]→Enter the number of the device→
SetVAL [F2]→Enter new value→MODIFY [F10]



[Screen displayed before changes are made]

The cursor is displayed against a white background below the set value. Timer T or counter C is displayed depending on the device number. The symbol “■” indicates that a contact is on and symbol “□” indicates that it is off.



[Screen displayed after changes are made]

■ Test (TEST) (inserting breakpoints)

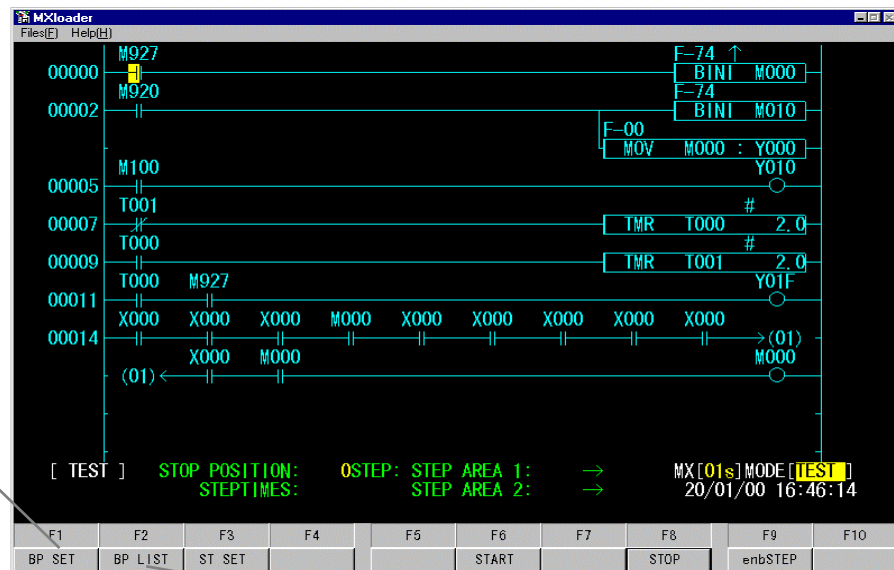
The MX200/MX50 provides the following two test debugging procedures in the test mode.

- Breakpoint : Stops (breaks) the program at a point where a preset condition is met.
- Step point : Executes a program step by step or several steps at a time (max. 300 steps) in groups (areas) of up to 300 steps.

MONITOR [F2]→TEST [F8]→

Move the cursor to the location where a breakpoint is to be set.

While viewing a circuit, points 0 to 15 can be set by selecting BP SET [F1].



Press BP LIST [F2] when points 0 to 15 are to be viewed as a list.

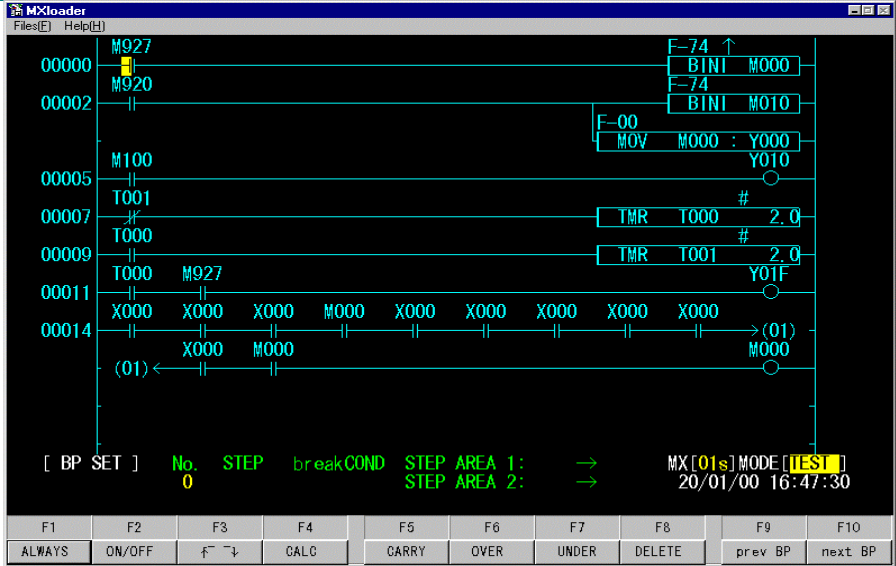
[BP (breakpoint) and ST (step point) pop-up window] screen

!NOTES

- The breakpoint or step point where the program stops is the location right before the set instruction.
- If a special module is selected in test mode during a break, the program will not run correctly causing the [Special Fn Module Data Exchange Error] message to be displayed. (This is because data cannot be properly exchanged with a special module during a break.) To select a special module, do as follows. First, go to the STOP mode, then return to the TEST mode to select the special module.

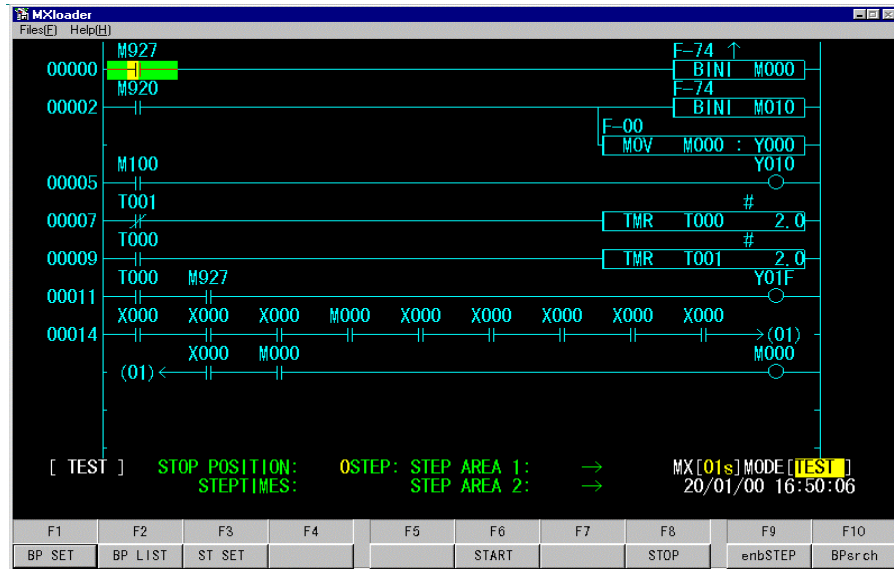
《Setting a breakpoint》

→Move the cursor to a breakpoint→
 Enter conditions using keys [F1] to [F7]



[Break condition set] screen

- Breakpoint conditions are set as described below.
- [F1] ALWAYS : The program always stops at this point.
 - [F2] ON/OFF : A line ON causes the program to stop when the previous line logic is ON.
 A line OFF causes the program to stop when the previous line logic is OFF.
 The [F2] key alternates as line ON and line OFF.
 - [F3] ■ ■ : Causes the program to stop when the previous line logic goes from OFF [→] ON or from ON [→] OFF.
 - [F4] CALC : Stops the program when an operation error occurs.
 - [F5] CARRY : Stops the program when the carry flag is on.
 - [F6] OVER : Stops the program when an overflow occurs.
 - [F7] UNDER : Stops the program when an underflow occurs.
 - [F8] DELETE : Clears step numbers and break conditions. Use the prev BP [F9] and the next BP [F10] keys to check previous settings or numbers.

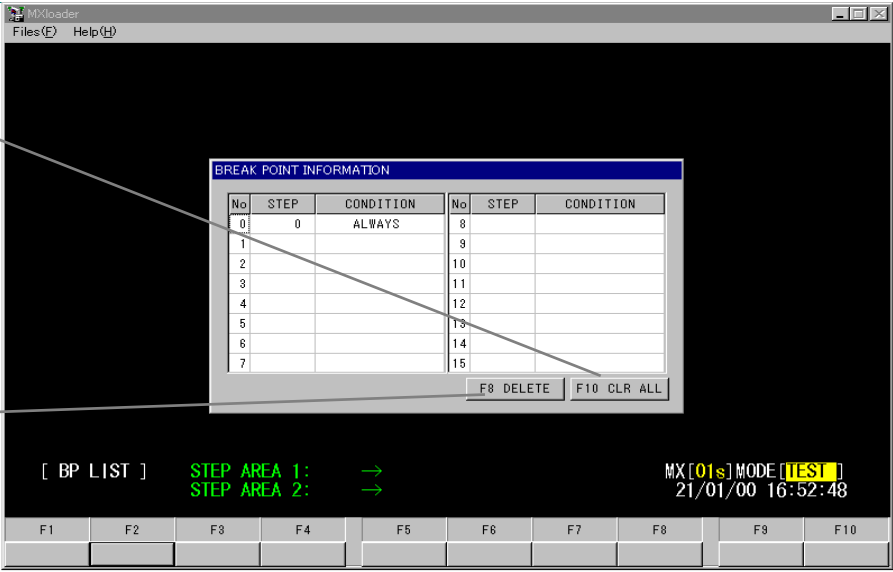


The STOP POSITION field displays the breakpoint step numbers. Each press of the BP srch [F10] key causes the cursor to move the breakpoint by one point, which also changes the step numbers in the STOP POSITION field.

- [F6] START : Moves the cursor to the first step number where a break condition is met when a breakpoint is set from step 0.
- [F7] CONT.. : Moves the cursor from the next breakpoint to the step where a break occurred.
- [F8] STOP : Returns the program to the start at which point the program is stopped.
- [F2] BP LIST : This key is also used to view the entire breakpoint list and to cancel settings.

This function clears all breakpoints.

This function clears the item at the cursor.



[BREAK POINT INFORMATION] screen

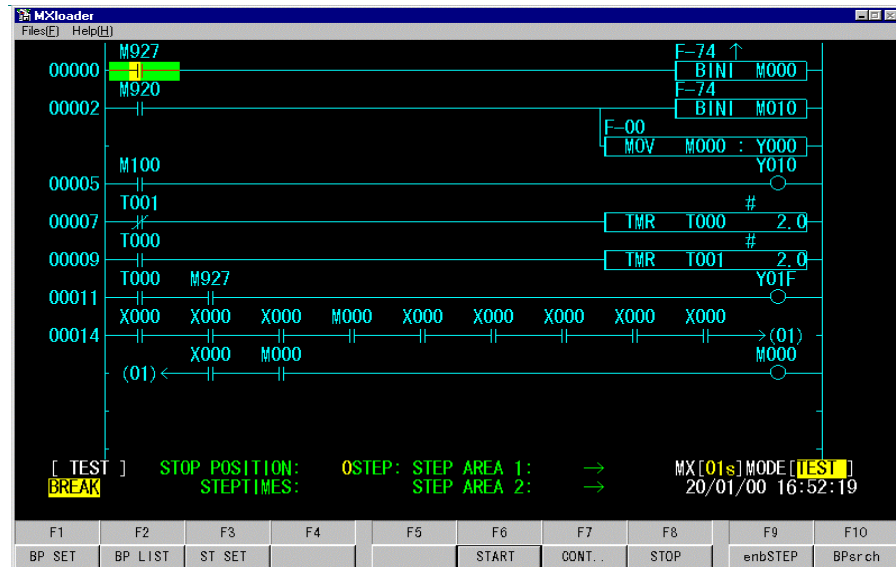
NOTE

Breakpoint and step point values are cleared when processing goes to a mode other than the TEST mode or when the MX200 is powered down.

《Debugging》

START [F6] → 《Execution → break》 →

Use the monitor to set the breakpoint contact → Continue debugging



[Screen displayed during break]

! NOTE

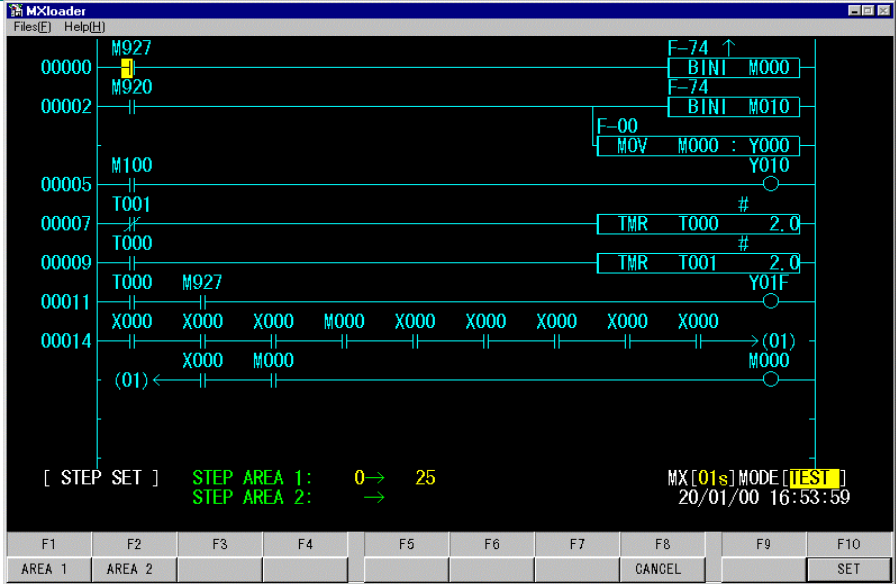
When a program is stopped at a breakpoint due to output or an instruction, the program stops before the output or instruction is executed.

When a program stops at a breakpoint or step point, the MX200 output condition is set to the I/O condition just before a scan.

A wide variety of debugging functions is provided. Contacts can be viewed using a monitor and register values can be verified while the breakpoints are set. The execution conditions can be changed with the data modify function to allow you to test several processing scenarios up to a breakpoint.

《Setting set points》

ST SET [F3] · AREA 1 [F1], AREA 2 [F2] ·
 Move the cursor to the first position of the step point · SET [F10]



The SET [F10] key is used to automatically allocate 300 steps from the position where the key is pressed. This setting can be cleared with the CANCEL [F8] key.

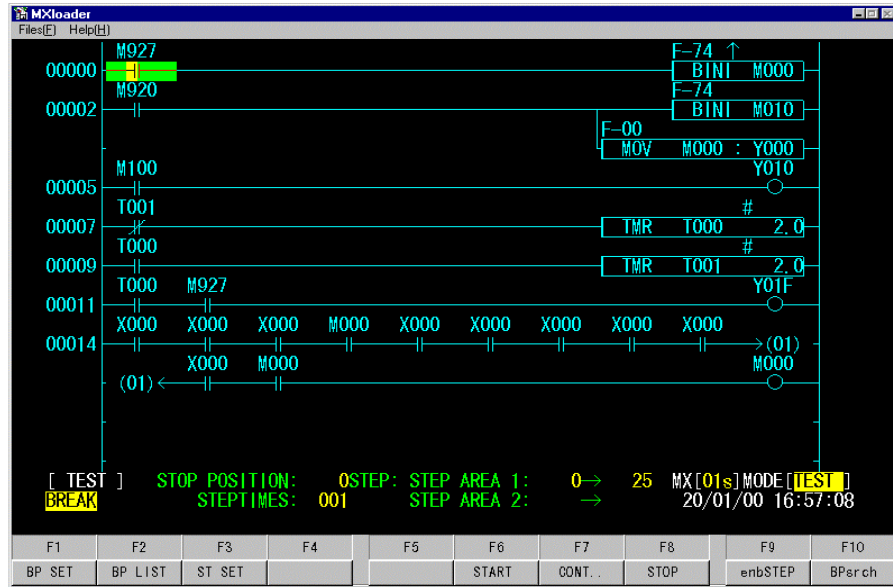
NOTE

When this key is pressed and the cursor is not at the position of the instruction, the first step number in the block where the cursor is located becomes the first step.

《Step point execution》

Breakpoint→step range setting

START [F6]→Break stop→enbSTEP [F9]→Enter the number of steps→
 Each time the CONT.. [F7] key is pressed,
 the set number of steps is executed.

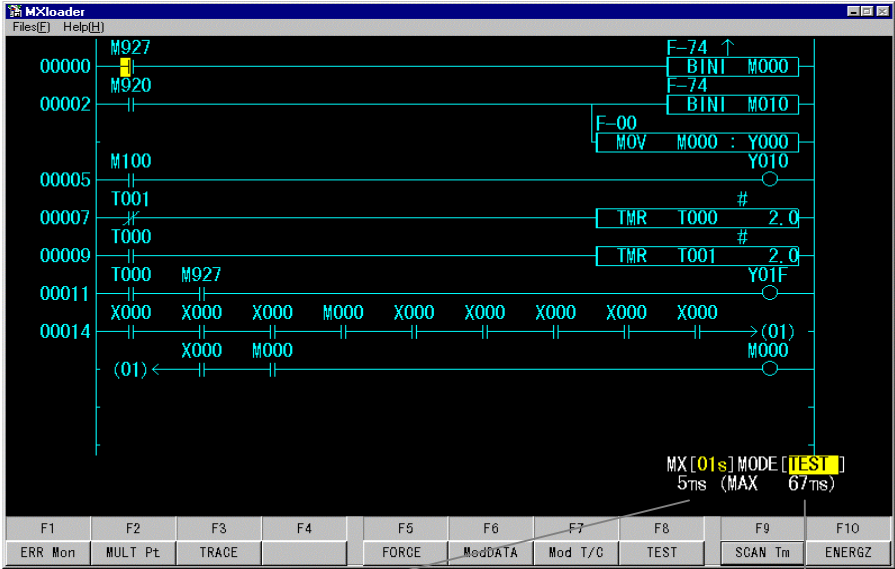


When step points but no breakpoints are set, the program always stops at the beginning of the step range after which step-by-step operation is possible.

■ Scan time (SCAN Tm)

This function displays the scan time in the TEST and RUN modes.

MONITOR [F2]→SCAN Tm [F9]



Latest scan time

Maximum scan time

NOTE

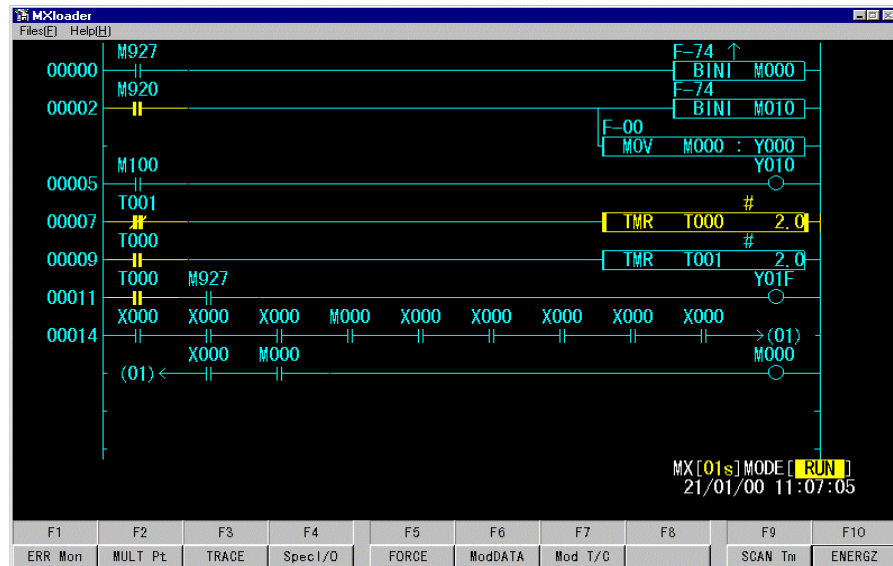
The maximum scan time value includes compilation and is therefore longer than normal scan time.

■ Active element indicator (ENERGZ)

This function shows an active element indicator in the STOP, TEST and RUN modes.

MONITOR [F2]→ENERGZ [F10]

Items that are being executed are indicated by the active element indicator.



The screen is displayed in reverse video when the active element indicator is on.

The following instructions can display the active element indicator.
(LD, AND, OR, NOT, LDNOT, ANDNOT, ORNOT, OUT)

Compare instructions

TMR (Timer) , CNT (Counter)

PLS ↑ (FUN20), PLF ↑ (FUN21)

SET (FUN23), RST (FUN24)

STM (FUN25), UDC (FUN26)

DCNT (FUN27), DUDC (FUN28)

MCR (FUN31), JPE (FUN33)

END (FUN40), RBP (FUN41)

SBR (FUN43), RET (FUN44)

4 - 7 Command Functions

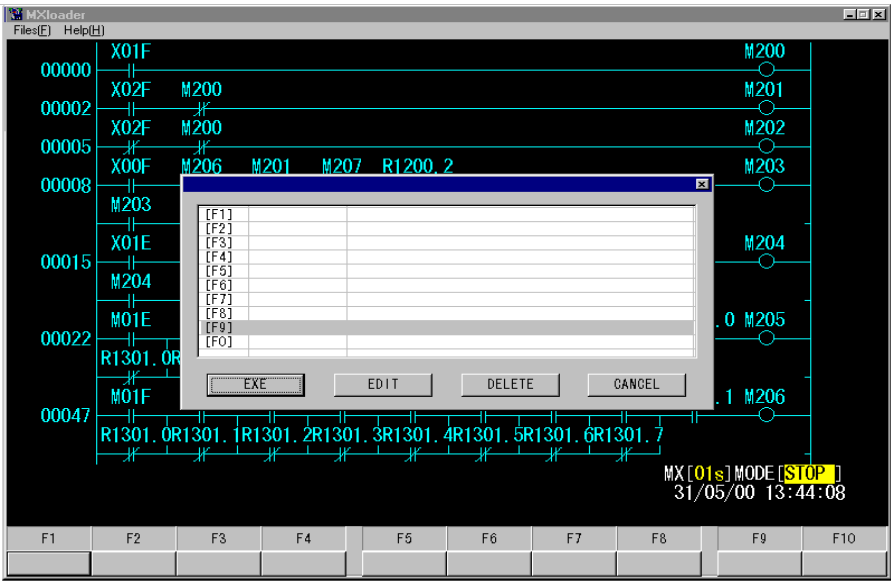
■ Command functions

- 1. The command functions allow you to easily perform STOP/RUN operations for a number of MX controllers connected to the same CBL network.
- 2. They allow the user to easily create monitor screens.

● Program creation

COMMAND [F7]→

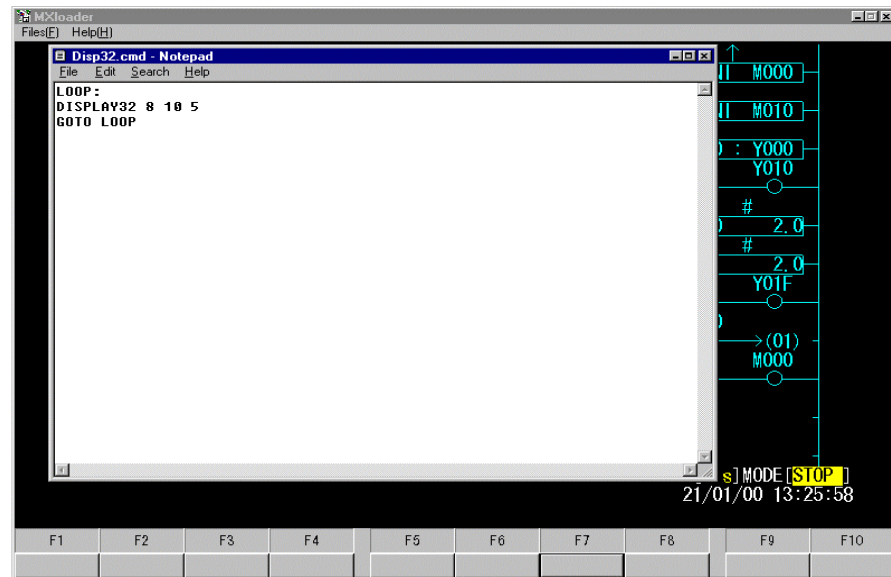
The screen below appears when the COMMAND [F7] function key in the main menu is pressed.



[Command menu selection] screen

The currently selected command ([F1], [F2], [F3], [F4], [F5], [F6], [F7], [F8], [F9] or [F10]) is on the line displayed in reverse video (yellow). Use the [↑] and [↓] keys to change selection.

→EDIT



[Program creation] screen

● Command file description

The command file is described as follows.

- (1) The line that starts with “%” is a comment line that is not executed.
- (2) Each line starts with a command or a label. (However, any number of blank spaces can be entered at the beginning.)
- (3) Each line has only one command.
- (4) Both lower and upper case characters are interchangeable in commands.
- (5) A name at the beginning of a line followed by a colon (:) is a label.

● Command types

- (1) **RUN** Sets the MX controller to RUN mode.
- (2) **STOP** Sets the MX controller to STOP mode.
- (3) **DOWNLOAD** Downloads a program from a floppy disk to the MX controller.
- (4) **UPLOAD** Uploads a program from the MX controller to a floppy disk.
- (5) **DISPLAY** Displays character strings and data on the CRT.
- (6) **GOTO** Moves execution to the specified label.
- (7) **DISPLAY32** Displays all devices on the CRT
- (8) **WAIT** Sets the MX controller to wait mode.
- (9) **SET** Writes (or changes) data to devices.

Commands (1) to (4) and (7) specify MX controller node addresses and must be written in the format period (.) followed by the number of the node address.

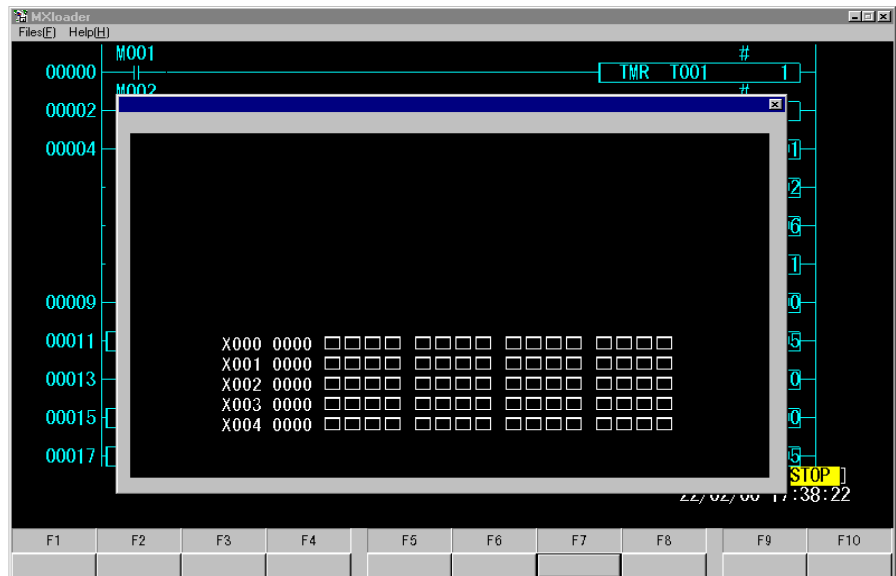
Example: Run. 1 is translated to % node address 1 in the MX controller RUN mode.

NOTE

The MX100 loader does not support the DISPLAY32 and DISPLAY data modify function.

- Executing command functions

COMMAND [F7]→Select using the [↓] and [↑] keys→Execute→[Enter]



[Screen displayed when DISPLAY32 is executed]

■ Detailed description of commands

● RUN

- Function:** Sets the MX controller mode to the RUN mode.
- Format:** **RUN. node address** (node address is 1 to 63, as are all subsequent commands)
- Note:** When the command has been executed, a check is made to see whether the MX controller was actually set to the STOP mode or not, if not, an error is generated.

● STOP

- Function:** Sets the MX controller mode to the STOP mode.
- Format:** **STOP. node address**
- Note:** When the command has been executed, a check is made to see whether the MX controller was actually set to the STOP mode or not, if not, an error is generated.

● DOWNLOAD

- Function:** Transfers a program from a floppy disk to an MX controller.
- Format:** **DOWNLOAD. node address "file name"**
- Example:** The following shows the format for downloading a ladder program file with the name **TEST.TXT** to an MX controller at node address 2.
DOWNLOAD.2"A:TEST"
- Reference:** The extension of a file name (**.TXT**) is not given. Nor need the drives or directories be given. When they are not given, the default drive and the startup directory of the loader are assumed. Only the following two types of files are downloaded:
- .TXT ladder program files
.LBL label files

!NOTE

When this command is executed, the original ladder program in the loader is overwritten by the downloaded ladder program.

● UPLOAD

- Function:** Transfers programs from an MX controller to a floppy disk.
- Format:** **UPLOAD. node address "file name"**
- Example:** The following shows the format for uploading a ladder program file with the name **TEST.TXT** to an MX controller with node address 2.
UPLOAD.2"A:TEST"
- Reference:** The extension of a file name (**.TXT**) is not given. Nor need the drives or directories be given. When they are not given, the default drive and the startup directory of the loader are assumed. Only the following type of files is downloaded:
- .TXT ladder program files

!NOTE

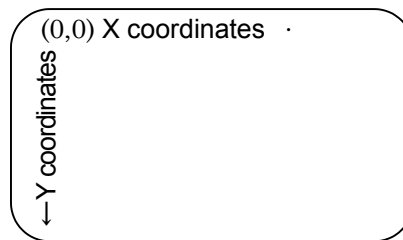
When this command is executed, the original ladder program in the loader is overwritten by the uploaded ladder program.

● DISPLAY

Function: Displays data or character strings on the CRT.

Description: **DISPLAY x coordinate y coordinate [[option] "character string"]**
DISPLAY x coordinate y coordinate [[option] display device]

Operation: Displays in the specified coordinates.



Character strings are displayed as they are.

When a device is specified, the value of the device is displayed. Depending on the options, display color, reverse video and blink specifications can be made.

Optional specifications are valid until new optional specifications are made.

Character strings and devices can be specified on the same line.

Devices are specified by a period (.) followed by the node address.

Example: **X000.12**

Options: The following options are provided.

(1) Color specifications

/C[W|R|G|B|Y|M|S][B][R]

W:White R:Red G:Green B:Blue Y:Yellow M:Purple S:Sky blue

B:Blinks

R:Reverse video

Example: Alarm messages are shown in red in reverse video and the display flashes.

DISPLAY 10 20 /CRBR "ALARM"

(2) Format specifications

/F[H|D|B|C]

H:Hexadecimals D:Decimals

B:Bit 0/1

C:Bit

Example: Value **X000** of an MX device at node address 1 is displayed in hexadecimals as follows:

DISPLAY 10 20 /FH X000.1

(3) Changing data

/QH

When this option is added, the value of the device can be changed through key entries. (The values entered are hexadecimal) The following key entries can be made.

[Enter] key: Start or end of data change entry mode

[↑] and **[↓]** keys: Selects the device whose data is to be changed

Numeric keys (**0** to **9**, **A** to **F**): Used for entering data

The name of a device where changes are made and entered values are displayed in the top left frame of the window.

The value for the device to be changed in the display area appears in reverse video.

Example: The following is a complex example:

Display 10 20 /CY "X000" /CW /FH X000.1 /CG /FD X000.1

Result shown:

```
.....
X000  0012  +18
.....
Yellow White Green
```

DISPLAY 10 20 "X000" /FH /QH X000.1

Example showing data modification entry display mode:

```
X000 [0012]
.....
X000 0012
.....
```

● GOTO

Function: Hands over control to specified label.

Description: **GOTO** label

Example: By submitting control to a **LOOP** label, it is possible to repeatedly execute and monitor infinite loops.

LOOP:

DISPLAY 10 20 X000.1

GOTO LOOP

However, when the **[Esc]** key is pressed, execution is interrupted and command file execution is terminated.

Reference: As in the above example, **GOTO** can be used to show the monitor display.

● DISPLAY32

Function: Displays all device monitors.

Description: **DISPLAY32 x Coordinates y coordinates Line number**

Operation: Displays the number of lines in the specified coordinates.

The following display formats are used:

- Device name, device value (hexadecimals), device value (bit display)
- Device name, device value (hexadecimals)

When 33 or more lines are specified, 100 is subtracted from the actual number of lines to be displayed which are not shown in bit display.

The initial value of display devices is **X000**. The following keys are used for changing device values.

- **[Page Up]** key: Moves the cursor from the currently displayed device to the next device.
- **[Page Down]** key: Moves the cursor from the currently displayed device to the previous device.
- **X/Y/M/L/R/P** key entries: Displays respective device.
- When the **X/Y/R/P** keys are pressed with the **[Shift]** key, **X200/Y200/R1000/P3800** are displayed.

Example: **DISPLAY 32 10 5 10**

Displayed result:

```

.....
X000 1234□□□■... □■□□
X010 8000■□□□... □□□□
.....
X090 0001□□□□... □□□■
[Shift]+[R] key entry
.....
R1000 1234□□□■... □■□□
R1001 8000■□□□... □□□□
.....
R1009 0001□□□□... □□□■
[Page Up] key entry
.....
R1010 1234□□□■... □■□□
R1011 8000■□□□... □□□□
.....
R1019 0001□□□□... □□□■
DISPLAY 32 10 5 10

```

Displayed result:

```

.....
X000 1234
X010 8000
.....
X090 0001

```

- WAIT

Function: Time wait

Description: **WAIT time in seconds**

Operation: Operation is halted for the specified time period (seconds) after which the following commands are executed.

Example:

```

STOP.1      %
WAIT5       Goes to % STOP mode for 5 seconds
                after which the RUN mode is started
RUN.1      %
  
```

- SET

Function: Changes device data.

Description: **SET device name [.node address] = [#] specification**

Operation: The value of the specified device is specified. (this function is identical to data modification.)

When no node address is given: Local node MX device

When node address is specified: Changes the MX device with the specified node address.

Values without a '#' are decimals and values with a '#' are hexadecimal.

Example:

```

SET R0000=1234    %decimals 1234
SET R0001=#1234  %hexadecimals 1234h
SET R0100.2=#5678 Changes value R0100 of the MX
                    device at %node address 2
  
```

- Other information

Since a specified command and function key allocation is stored in a file (**MX100.FIL/MX200.FIL**), there is no need to allocate the commands when the loader restarted again.

4 - 8 Other Functions

■ Passwords

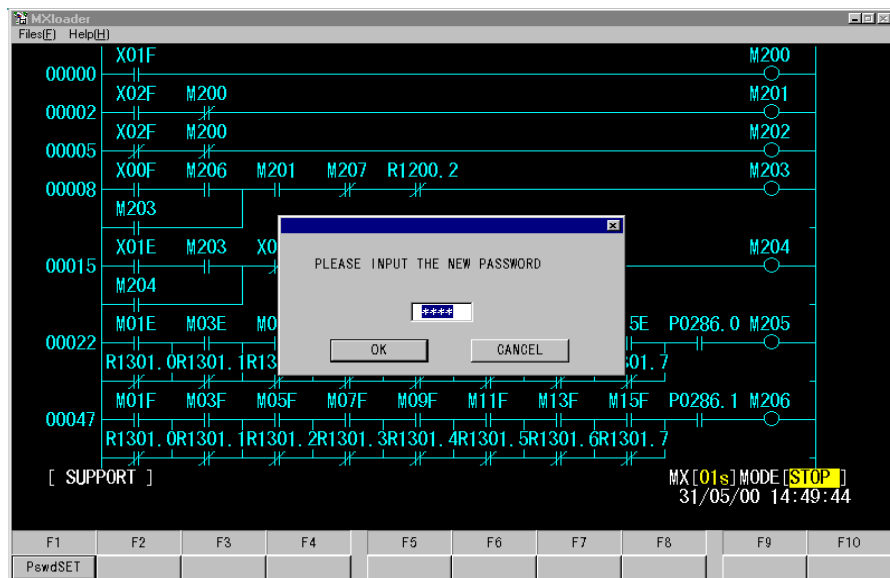
Passwords are used to prevent programs from being overwritten. When a password is registered, the system will request the password in the following situations.

1. When a download is specified when going from off-line mode to on-line mode.
2. In on-line mode, when PROGRAM [F1] (main menu) is selected to write to the program.
3. When a direct write operation is attempted from a disk to an MX controller.
4. When an attempt is made to change the timer or counter values.

Once a password has been given, there is no need to give it until you go off-line again. When no password is registered, a default password of [0000] is used. (A registered password persists even when the controller is turned off and will be requested in the above situations until a password of [0000] is set.)

On-line

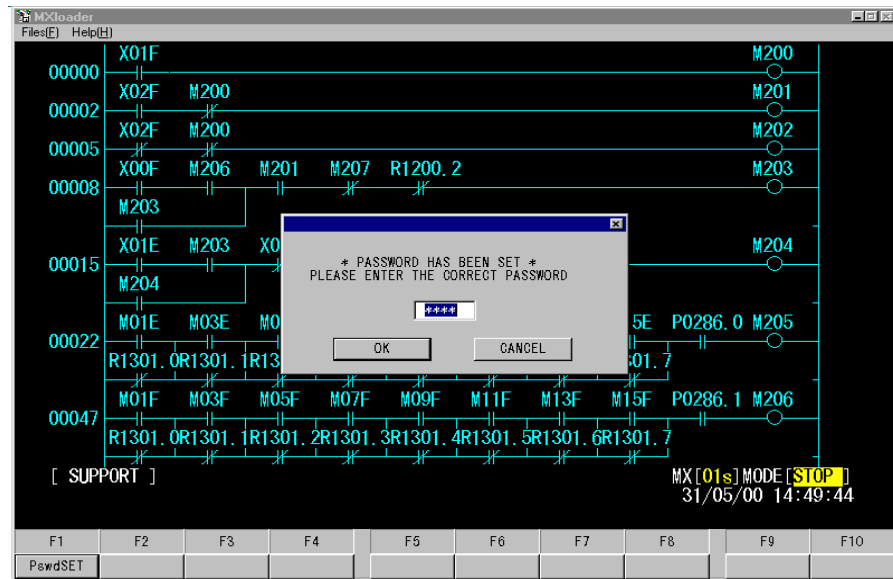
SUPPORT [F4]→PASS WD [F7]→PswdSET [F1]→Enter a password→
[Enter]



[Password setting] screen

! NOTE

A password in the MX100 controller can be cleared by holding down the LATCHCLEAR key on the lower left front panel of the controller while pressing the RESET key. The buzzer sounds to announce that the password has been cleared. Remember that this operation also clears all other settings.



[Password request] screen

!NOTE

A [@@@@] password that will accept any entry can be set.

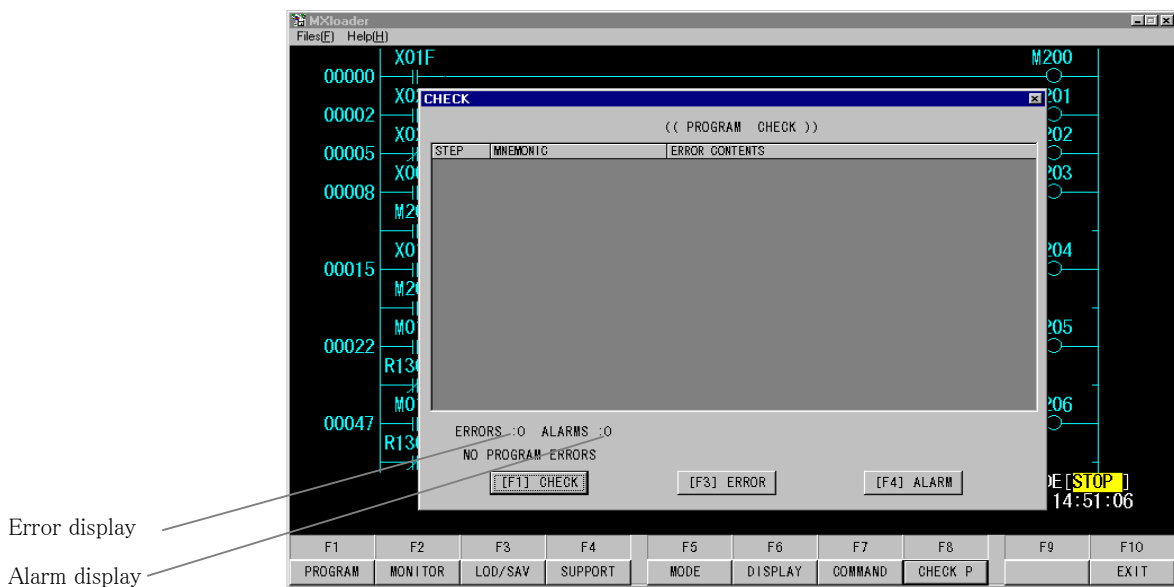
■ Program check

This function checks the syntax of the program and displays detected error or alarm conditions on the screen. As a program with an error (an alarm is not a problem) cannot be downloaded to the MX controller, all new programs must be examined with this function.

!NOTE

Although programs that have not been checked can be saved, they should be checked before being saved.

CHECK P [F8]→CHECK [F1]



When an error or alarm is found in a program, use step numbers and instruction words (mnemonic notation) to display them. Refer to Chapter 6. Troubleshooting (page 6-1) for procedures to remove errors and alarms.

!NOTES

- Alarm conditions in a program will not prevent it from being downloaded or run.
- A program with more than 100 alarms or errors cannot be displayed.
- The following errors are not generated on the MX200/MX50 controller.
 - DTBL instruction errors
 - Errors resulting from the absence of CALLs in response to an SBR instruction
 - A missing END instruction does not result in an error.

MX200

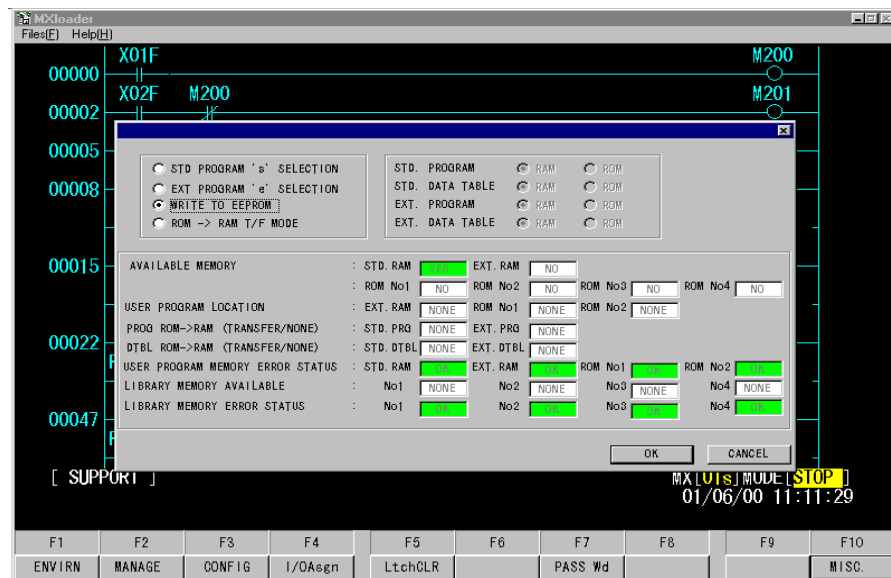
■ EEPROM write

This function is used to write ladder programs to an EEPROM.

!NOTE

An EPROM (an erasable PROM) may be damaged if it is exposed to an EEPROM write operation.

SUPPORT [F4]→MISC. [F10]→WRITE TO EEPROM→Verification [Y]



[Selection menu] screen

The selection menu is shown at the top of the screen, while the lower menu shows available memory in the processor module. The latter menu shows how the programs have been uploaded when the system was powered up.

<Menu description>

● STD PROGRAM 's' SELECTION

The current version allows selection of standard programs only.

● EXT PROGRAM 'e' SELECTION

The current version of the program does not allow selection of extended programs.

An attempt to load such a program will result in the following message:

[Extended Program Function is not yet supported]

MX200

■ ROM→RAM transfer settings (ROM→RAM T/F MODE)

When a program is to be transferred ROM→RAM, you have to specify which portion of the program is to be loaded in RAM at power up.

Select SUPPORT [F4]→MISC. [F10]→ROM→RAM T/F MODE

	STD. RPOGRAM	:	[RAM] / [ROM]
	STD. DATA TABLE	:	[RAM] / [ROM]
·	EXT. RPOGRAM	:	[RAM] / [ROM]
·	EXT. DATA TABLE	:	[RAM] / [ROM]

When [RAM] is selected, programs and data tables are not loaded at startup.
When [ROM] is selected, programs and data tables are loaded at startup.

!NOTES

- When standard data tables are in [ROM], a program write to these data tables will cause ROM data to be overwritten when the system is started up.
- The current version of the program does not support extended programs.
- The ★ symbol indicates settings that are not valid with the MX200 CP01 controller.

<Description of status displays>

● AVAILABLE MEMORY

This function indicates the amount of available memory in special register R980. It indicates the presence of ROM No.1 to No.4 [YES/NO].

!NOTE

ROM availability is expressed in this way in the MX200 controller because ROM is managed in 64Kbyte units in the program structure.

For example, 512Kbyte of ROM is indicated as follows:

ROM No1 [YES], ROM No2 [NO], ROM No3 [NO], ROM No4 [NO]

And, 1Mbit ROM is indicated as follows:

ROM No1 [YES], ROM No2 [YES], ROM No3 [NO], ROM No4 [NO]

And, 2Mbit ROM is indicated as follows:

ROM No1 [YES], ROM No2 [YES], ROM No3 [YES], ROM No4 [YES]

● **USER PROGRAM LOCATION**

This function shows the contents of special register R981.

● **PROG ROM→RAM (TRANSFER/NONE): DTBL ROM→RAM (TRANSFER/NONE)**

This function shows the content of entries made in the [ROM→RAM T/F MODE] menu.

● **USER PROGRAM MEMORY ERROR STATUS**

This function shows the content of special register R982. The following conditions will result in an error.

- When a checksum error is found in the user program
- When a syntax error is found in the user program
- When a compile error is found in the user program
- When the compiled object code of the user program exceeds available RAM size

● **LIBRARY MEMORY AVAILABLE**

This function shows the content of special register R983. It shows ROM allocated to storing libraries in the installed memory devices.

● **LIBRARY MEMORY ERROR STATUS**

This function shows the content of special register R984. It shows which memory modules have generated a checksum error.

Chapter 5. Utilities

5 - 1 Outline

Four major utilities are provided with the program.

- Program file print (.TXT)

This function prints programs in ladder or mnemonic notation. There is also a PRINT HEADER _FOOTER utility for printing program management data, titles (text headers, footers, etc.). The following lists the available print functions.

- PROGRAM TEXT PRINT (Ladder)
- PROGRAM TEXT PRINT (Mnemonic)
- DATA TABLE PRINT
- DEVICE/LABEL COMPARISON LIST PRINT
- DEVICES-USED LIST PRINT
- CROSS-REFERENCE TABLE PRINT
- BLOCK COMMENT TABLE PRINT

(Descriptions of these functions are given below.)

- Program file print (.TX#)

This function prints programs (.TX#) created with the loader. Refer to the sections describing loader functions for information on .TX# files. The following print functions are available.

- PROGRAM TEXT PRINT (Ladder)
- PROGRAM TEXT PRINT (Mnemonic)
- CROSS-REFERENCE TABLE PRINT

(These functions operate in much the same way as the PROGRAM FILE PRINT (.TXT) print does.)

- Label/comment file edit

This function is used to create new labels and comments, and to search for them.

- Special module configuration print

This function is used to print the parameters of special MX controller modules. The following modules are supported.

MX100CT61	HSCM (high-speed counter module)
MX100GT53/56	AI (analog input)
MX100PT52	AO (analog output)
MX100NC11/NC12	PPM (positioning module)
MX100CM61	SCM (serial communication module)

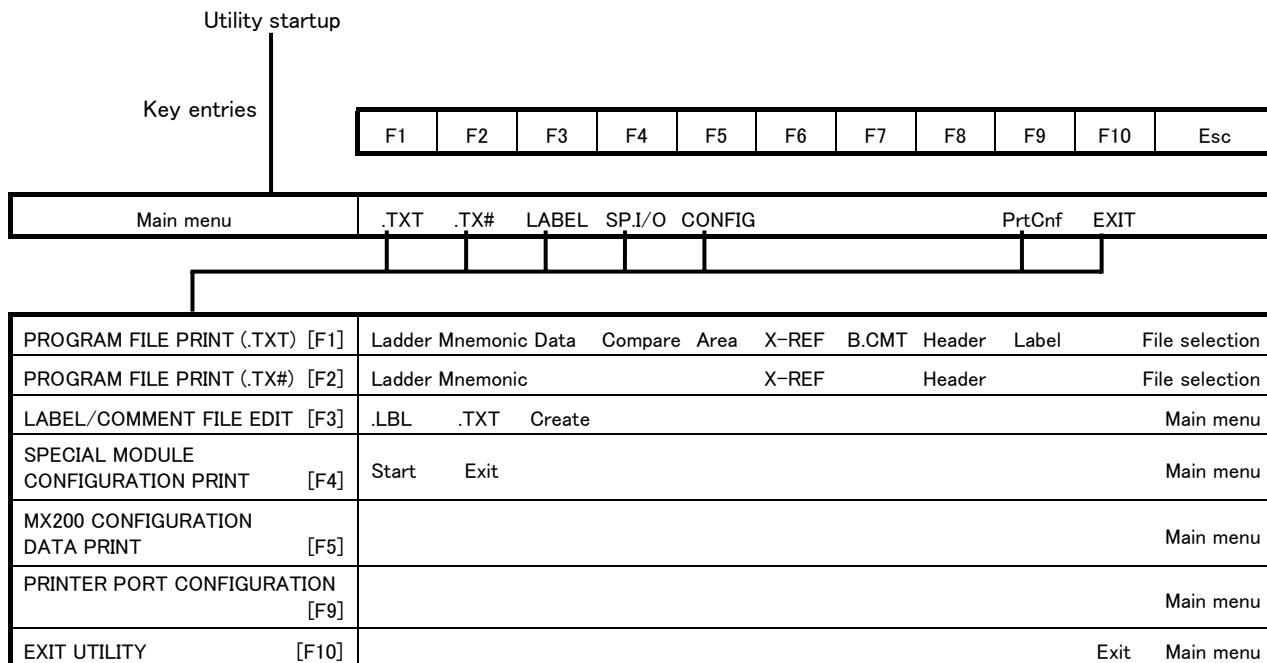
5 - 2 Starting up MX Series Utilities

After starting up MX, MX Utilities can be started by selecting UTILITY in the file menu.



5 - 3 Menu List

The figure below shows the structure of main menus and pop-up windows.

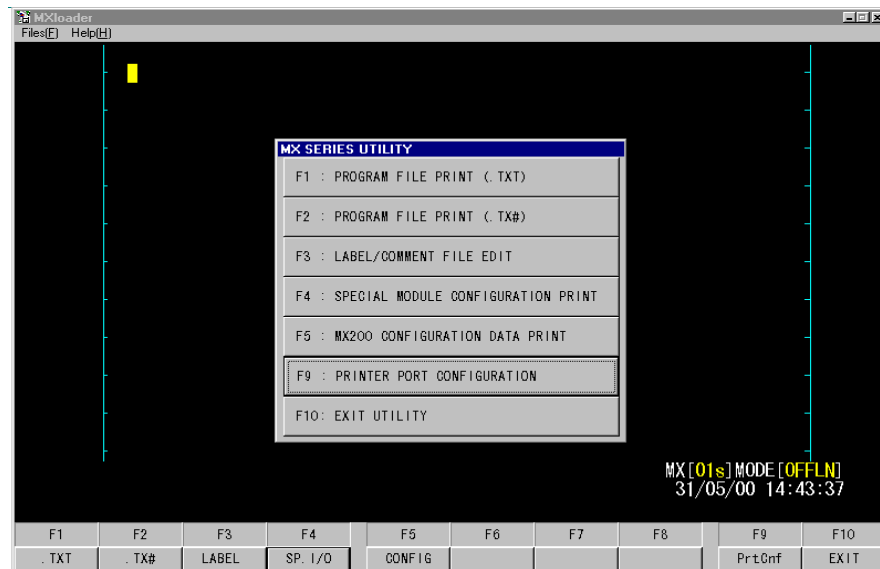


5 - 4 Preparing for Printing

■ Printer settings

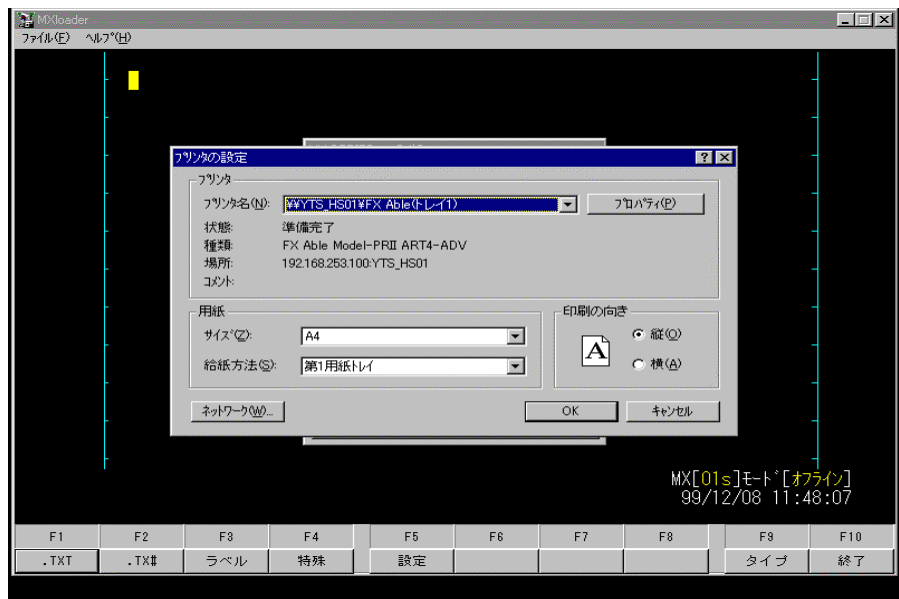
Use the following procedure to select printer type before starting to print.

PrtCnf [F9]→



[MX SERIES UTILITY] screen

- ① Press the [F9] key in the [MX SERIES UTILITY] screen. (Or use the [↑] and [↓] keys to select [F9: PRINTER PORT CONFIGURATION] and press the [Enter] key.)



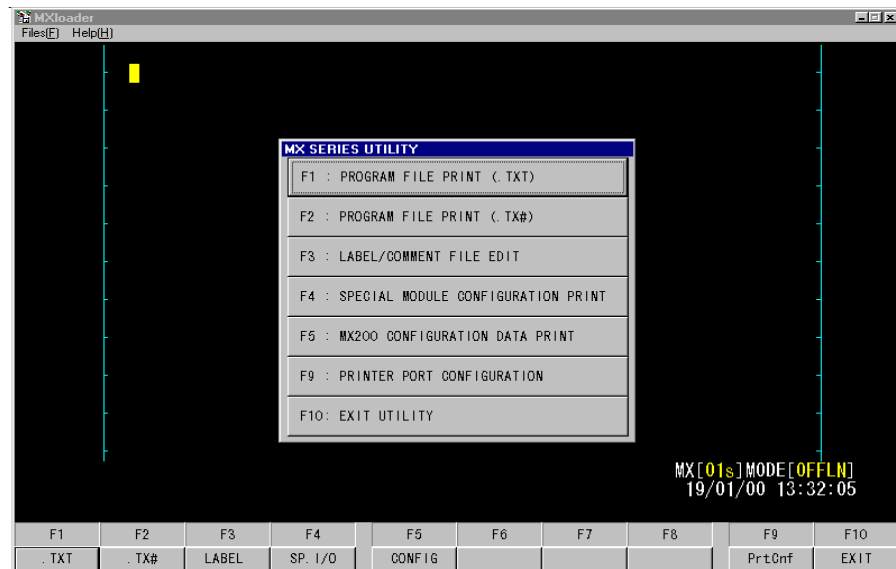
[PRINTER PORT CONFIGURATION] screen

- ② Setup printer.

■ Selecting print files (Printing a .TXT file)

Use the following procedure to create print files (program files, data table files, etc.).

.TXT [F1]→Select the file



[MX SERIES UTILITY] screen

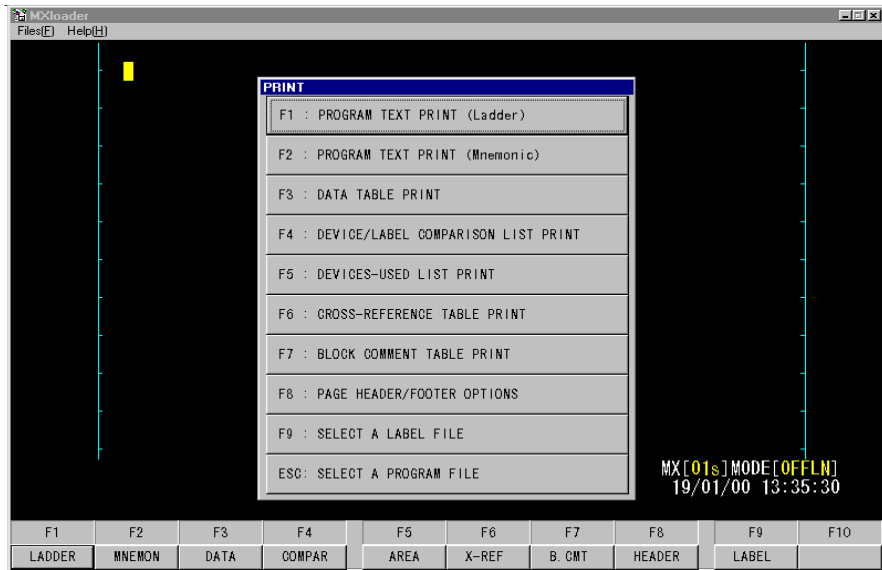
- ① Press the [F1] key in the [MX SERIES UTILITY] screen. (Or use the [↑] and [↓] keys to select [F1: PROGRAM FILE PRINT (.TXT)] and press the [Enter] key.)

Selecting print files (Printing a .TXT file)



[FILE SELECTION] screen

② Select the file.

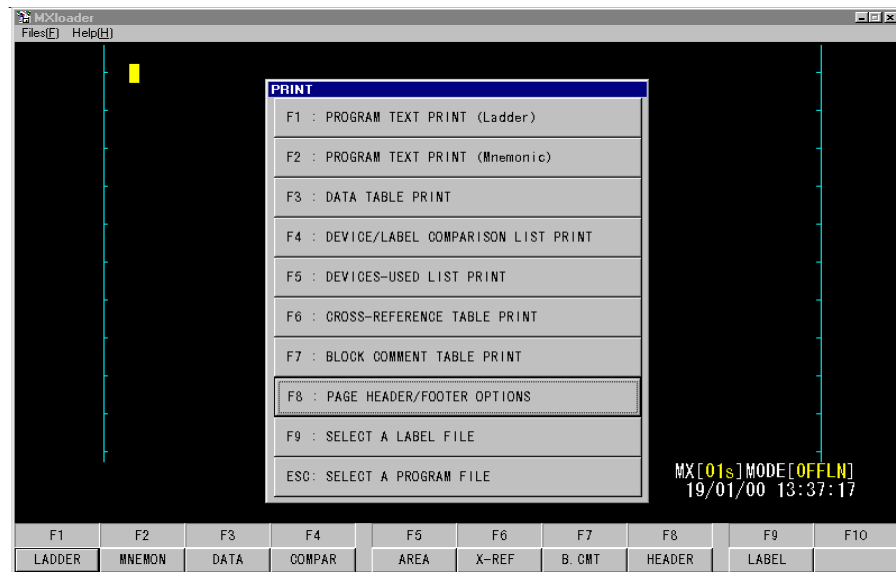


[PRINT] screen

■ Setting print format

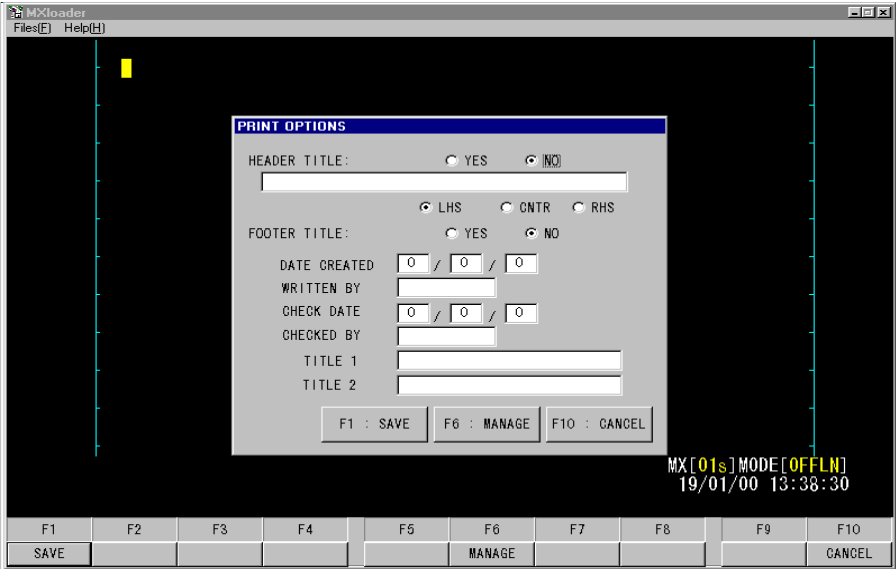
When [YES] was selected in the [PRINT HEADER FOOTER] field, follow the procedures given below in printing program text. If [NO] was entered in this field, continue to the paragraph **■Checking management information (page 5-11)**.

[PRINT] Screen→HEADER [F8]



[PRINT] screen

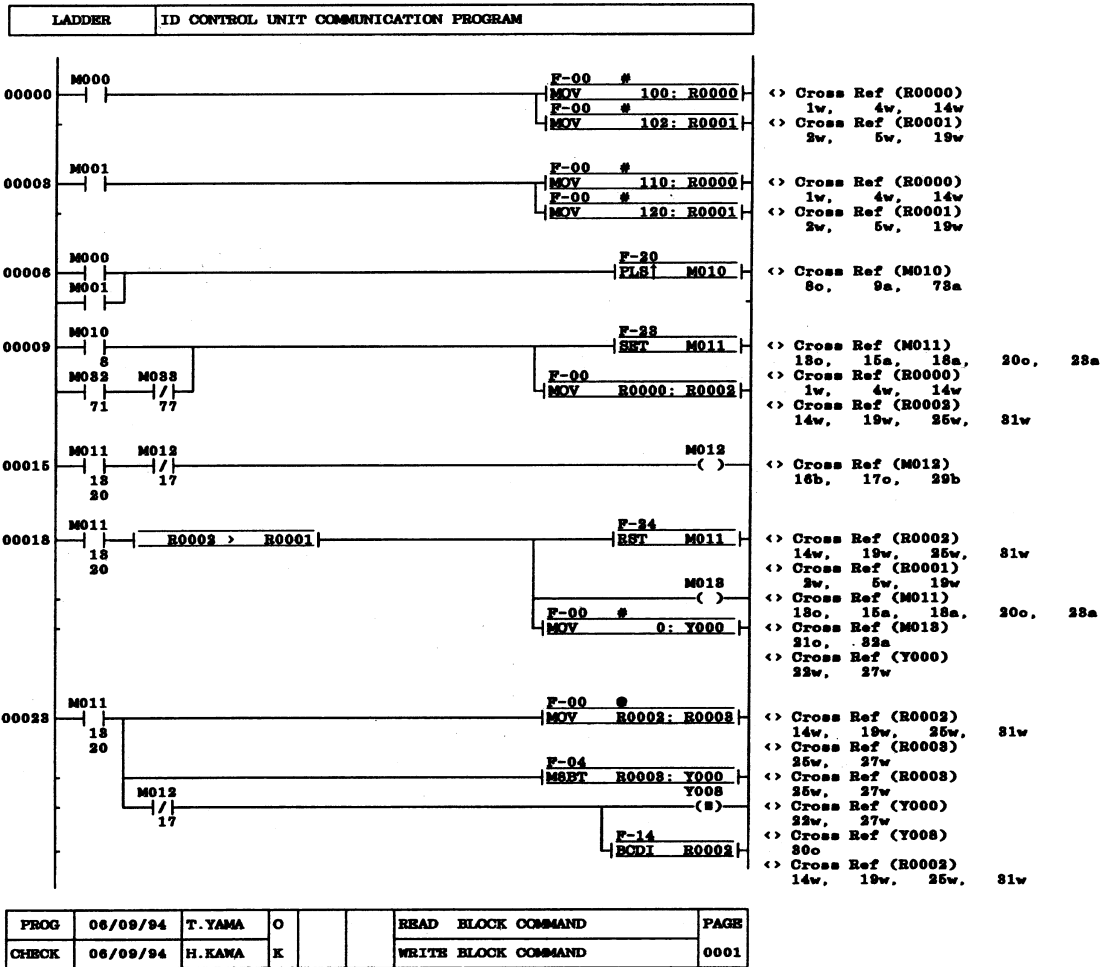
- ① The [PRINT] screen is now displayed. Press the [F8] key. (Or use the [↑] and [↓] keys to select [F8: PAGE HEADER/FOOTER OPTIONS] and press the [Enter] key.) If the [PRINT] screen is not displayed, continue to press the [Esc] key to return to the [MX SERIES UTILITY] screen and follow the instructions given in the paragraph **■Selecting print files (Printing a .TXT file) (page 5-6)**.



[PAGE HEADER/FOOTER OPTIONS] screen

- ② When the format settings are completed, press the SAVE [F1] key. Or press the CANCEL [F10] key in which case entries made in the TITLE, WRITTEN BY and CHECKED BY fields are cleared. When SAVE [F1] key is selected, all entries made are stored until they are modified or deleted with the CANCEL [F10] key. Check current settings before printing.

<Print example>



■ Checking management information

Management information for both program print and data table print operations can be checked. Continue to Section 5-5 Printing Program (.TXT) (page 5-14) or Section 5-6 Printing Program (.TX#) (page 5-35) when you do not need this information.

Management information comprises [PROGRAM MANAGEMENT INFO] and [DATA TABLE MANAGEMENT INFO].

The [PROGRAM MANAGEMENT INFO] screen provides the following information about the program that has been selected for printing.

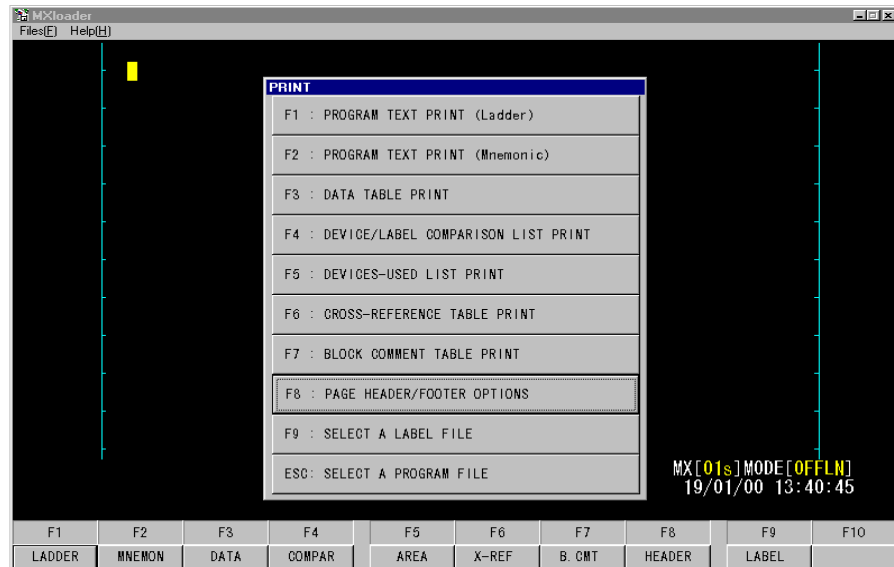
Items	Contents
PROGRAM NUMBER	00000001
PROGRAM VERSION	00.1
PROGRAMMER'S NAME	PROGRAMMERS NAME
DATE CREATED	October 1, 1999
MX MODEL	MX200
MEMORY USED	00360bytes (00074 Step)
TOTAL MEMORY	31Kbytes
PROGRAM INSPECTION	Error :No

The [DATA TABLE MANAGEMENT INFO] screen contains the following information about the data table that has been selected for printing.

Items	Contents
PROGRAM NUMBER	00000001
PROGRAM VERSION	00.1
PROGRAMMER'S NAME	PROGRAMMERS NAME
DATE CREATED	October 1, 1999
MX MODEL	MX 200
MEMORY USED	0100 Word
TOTAL MEMORY	1000 Word

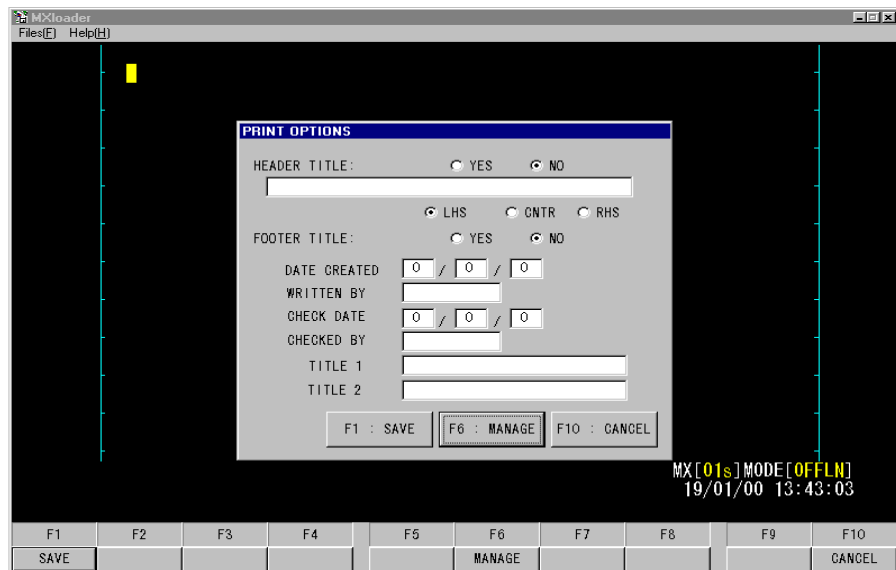
Follow the procedures given as follows to obtain management information. However, if you selected PRINT HEADER&FOOTER, go to step ② (page 5-13).

[PRINT] Screen · HEADER [F8] ·
MANAGE [F6] · PROGRAM [F1] or DATA TABLE [F2]



[PRINT] screen

- Now the [PRINT] screen appears. Press the [F8] key. (Or use the [↑] and [↓] keys to select [F8: PAGE HEADER/FOOTER OPTIONS] and press the [Enter] key.) If the [PRINT] screen is not displayed, continue to press the [Esc] key to return to the [MX SERIES UTILITY] screen and follow the instructions given in the paragraph ■ Selecting print files (Printing a .TXT file) (page 5-6).



[PRINT OPTIONS] screen

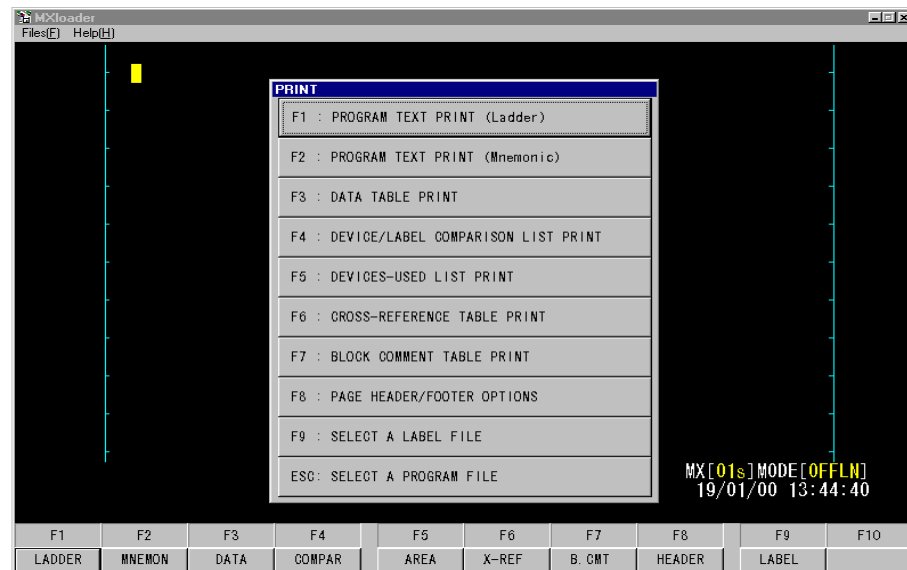
- ② Now the [PRINT OPTIONS] screen appears. Press the MANAGE [F6] key.
- ③ The [MANAGEMENT INFO] screen appears. Select the PROGRAM [F1] /DATA TABLE [F2] and press the [Enter] key to display the [MANAGEMENT INFO] screen.
- ④ Press the [Esc] key to return to the [PRINT OPTIONS] screen.

5 - 5 Printing Program (.TXT)

■ Printing ladder programs

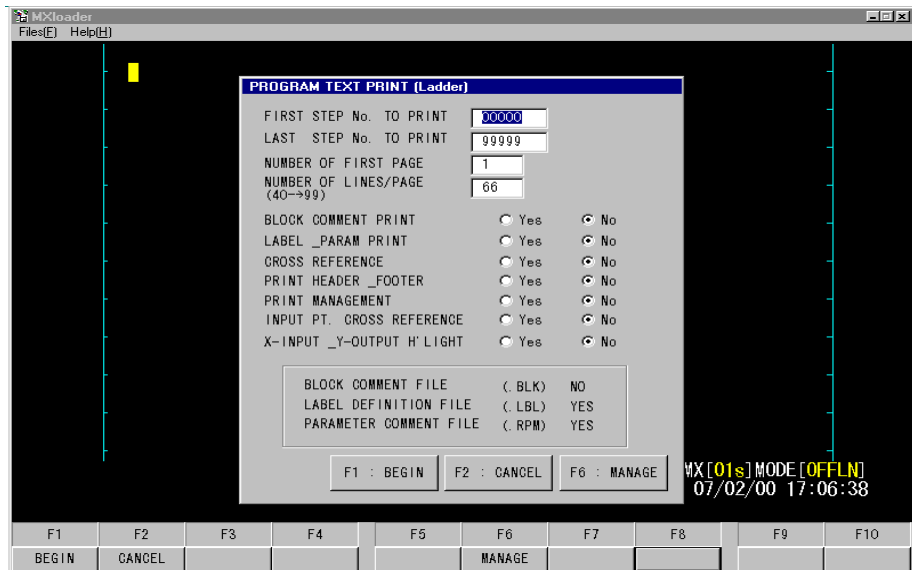
The PROGRAM TEXT PRINT (Ladder) function prints ladder programs (sequence programs) created with the MX loader. Follow the instructions given below to execute PROGRAM TEXT PRINT (Ladder).

[PRINT] Screen → LADDER [F1] → BEGIN [F1]



[PRINT] screen

- ① Now the [PRINT] screen appears. Press the [F1] key. (Or use the [↑] and [↓] keys to select [F1: PROGRAM TEXT PRINT (Ladder)] and press the [Enter] key.) If the [PRINT] screen is not displayed, continue to press the [Esc] key to return to the [MX SERIES UTILITY] screen and follow the instructions given in the paragraph **■ Selecting print files (Printing a .TXT file)** (page 5-6).



[PROGRAM TEXT PRINT (Ladder)] screen

- ② Now the [PROGRAM TEXT PRINT (Ladder)] screen appears.
- ③ Select the item to be modified or written
- ④ Use the numeric keys to make numeric entries and the [←] and [→] keys to make the desired selection [Yes/No].
- ⑤ Start printing by pressing the BEGIN [F1] key and stop it by pressing CANCEL [F2] or CONT. [F3].
- ⑥ When printing is completed, the [PRINT] screen reappears.

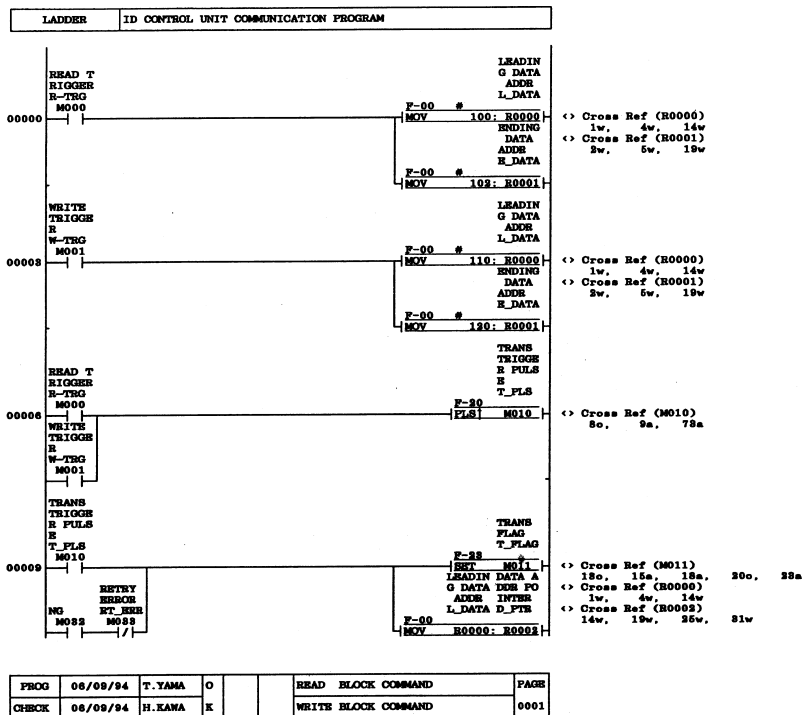
● Detailed print settings

FIRST STEP No. TO PRINT	
LAST STEP No. TO PRINT	Determines the first and last step to print.
NUMBER OF FIRST PAGE	Sets the initial value of the page number to be printed in the top right corner of the page.
NUMBER OF LINES/PAGE	Determines the number of lines to print per page.
BLOCK COMMENT PRINT	Determines whether the block comment at the top of each block is to be printed or not (select [Yes] or [No])
LABEL & PARAM PRINT	Determines whether labels and parameters of each device are to be printed or not (select [Yes] or [No])
CROSS REFERENCE PRINT	Determines whether the cross reference of each output device is to be printed or not (select [Yes] or [No])
PRINT HEADER & FOOTER	Determines whether the header and footer formats are to be printed or not (select [Yes] or [No]).
PRINT MANAGEMENT INFO.	Determines whether the print management info. is to be printed at the start of the program or not (select [Yes] or [No])
INPUT PT. CROSS REFERENCE	Determines whether step numbers used as contacts or coils are to be printed or not (select [Yes] or [No])
X-INPUT & Y-OUTPUT H'LIGHT	Determines whether X contacts and Y coils are to be highlighted (bold) in printing (select [Yes] or [No])

! NOTES

- Enter a number lower than 73 in the [NUMBER OF LINES/PAGE] field when continuous forms are used.
- When [Yes] is entered in the [PRINT MANAGEMENT INFO.] field and you want to check the content of the management information, press the MANAGE [F6] key.

<Print example>

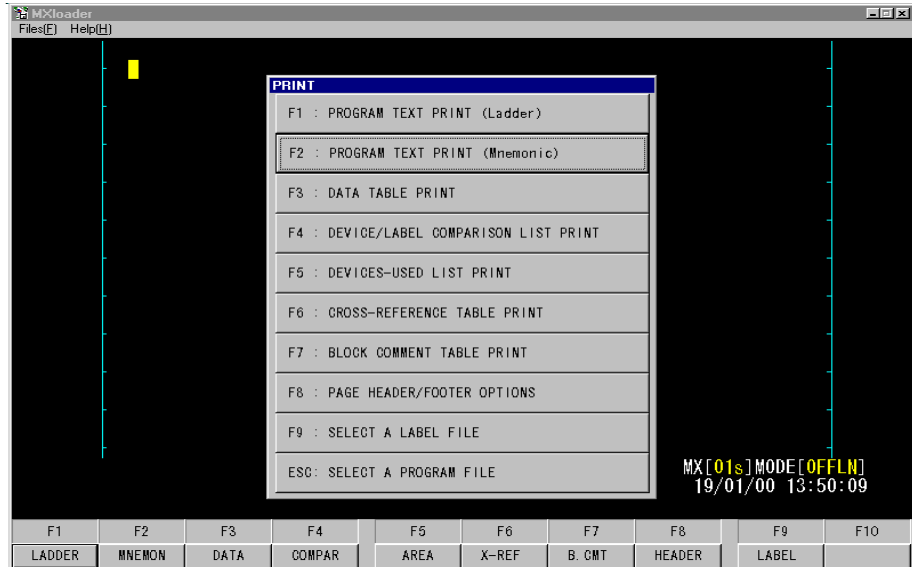


[Ladder program]

■ Program text print (mnemonic)

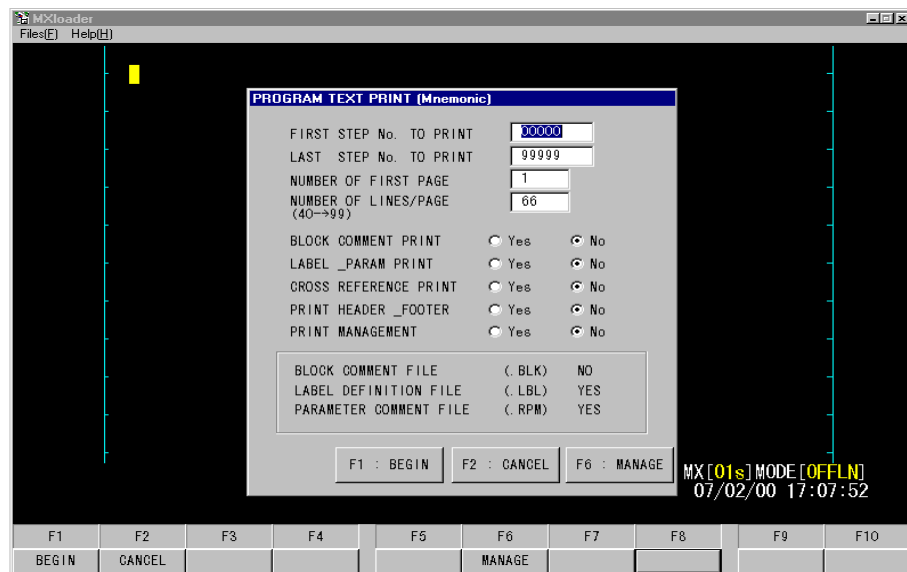
The PROGRAM TEXT PRINT (Mnemonic) function prints ladder programs (sequence programs) created with the MX loader. Follow the instructions given below to execute PROGRAM TEXT PRINT (Mnemonic).

[PRINT] Screen → MNEMON [F2] → BEGIN [F1]



[PRINT] screen

- ① Now the [PRINT] screen appears. Press the [F2] key. (Or use the [↑] and [↓] keys to select [F2: PROGRAM TEXT PRINT (Mnemonic)] and press the [Enter] key.) If the [PRINT] screen is not displayed, continue to press the [Esc] key to return to the [MX SERIES UTILITY] screen and follow the instructions given in the paragraph ■ Selecting print files (Printing a .TXT file) (page 5-6).



[PROGRAM TEXT PRINT (Mnemonic)] screen

- ② Now the [PROGRAM TEXT PRINT (Mnemonic)] screen appears.
- ③ Select the item to be modified or written
- ④ Use the numeric keys to make numeric entries and the [←] and [→] keys to make the desired selection [Yes/No].
- ⑤ Start printing by pressing the BEGIN [F1] key and stop it by pressing CANCEL [F2] or CONT. [F3].
- ⑥ When printing is completed, the [PRINT] screen reappears.

● Detailed print settings

FIRST STEP No. TO PRINT	
LAST STEP No. TO PRINT	Determines the first and last step to print.
NUMBER OF FIRST PAGE	Sets the initial value of the page number to be printed in the top right corner of the page.
NUMBER OF LINES/PAGE	Determines the number of lines to print per page.
BLOCK COMMENT PRINT	Determines whether the block comment at the top of each block is to be printed or not (select [Yes] or [No])
LABEL & PARAM PRINT	Determines whether labels and parameters of each device are to be printed or not (select [Yes] or [No])
CROSS REFERENCE PRINT	Determines whether the cross reference of each output device is to be printed or not(select [Yes] or [No])
PRINT HEADER & FOOTER	Determines whether the header and footer formats are to be printed or not (select [Yes] or [No]).
PRINT MANAGEMENT INFO.	Determines whether the print management info. is to be printed at the start of the program or not (select [Yes] or [No])

!NOTES

- Enter a number lower than 73 in the [NUMBER OF LINES/PAGE] field when continuous forms are used.
- When [Yes] is entered in the [PRINT MANAGEMENT INFO.] field and you want to check the content of the management information, press the MANAGE [F6] key.

<Print example>

MNEMONIC	ID	CONTROL UNIT	COMMUNICATION PROGRAM		
00000	LD	M000	R-TRG	READ TRIGGER	<> Cross Ref (R0000)
00001	MOV	(00) S : # 100	L_DATA	LEADING DATA ADDR	1w, 4w, 14w <> Cross Ref (R0001)
		D : R0000	E_DATA	ENDING DATA ADDR	2w, 5w, 19w
00002	MOV	(00) S : # 102			
		D : R0001			
00003	LD	M001	W-TRG	WRITES TRIGGER	<> Cross Ref (R0000)
00004	MOV	(00) S : # 110	L_DATA	LEADING DATA ADDR	1w, 4w, 14w <> Cross Ref (R0001)
		D : R0000	E_DATA	ENDING DATA ADDR	2w, 5w, 19w
00005	MOV	(00) S : # 120			
		D : R0001			
00006	LD	M000	R-TRG	READ TRIGGER	<> Cross Ref (M010)
00007	OR	M001	W-TRG	WRITES TRIGGER	8o, 9a, 78a
00008	PLS	(20) M010	T_FLG	TRANS TRIGGER PULSE	
00009	LD	M010	T_FLG	TRANS TRIGGER PULSE	<> Cross Ref (M011)
00010	LD	M082	NG		18o, 15a, 18a, 20o, 28a
00011	AND NOT	M088	RT_ERR	RETRY ERROR	<> Cross Ref (R0000)
00012	ORB				1w, 4w, 14w
00013	SET	(28) M011	T_FLAG	TRANS FLAG	<> Cross Ref (R0002)
00014	MOV	(00) S : R0000	L_DATA	LEADING DATA ADDR	14w, 19w, 25w, 31w
		D : R0002	D_PTR	DATA ADDR POINTER	
00015	LD	M011	T_FLAG	TRANS FLAG	<> Cross Ref (M012)
00016	AND NOT	M012	W_FLG	WRITE STB PULSE	16b, 17o, 29b
00017	OUT	M012	W_FLG	WRITE STB PULSE	
00018	LD	M011	T_FLAG	TRANS FLAG	<> Cross Ref (R0002)
00019	AND	S1 : R0002	D_PTR	DATA ADDR POINTER	14w, 19w, 25w, 31w
		S2 : R0001	E_DATA	ENDING DATA ADDR	<> Cross Ref (R0001)
00020	RST	(24) M011	T_FLAG	TRANS FLAG	2w, 5w, 19w
00021	OUT	M012	T_END	TRANS COMPLETION	<> Cross Ref (M011)
00022	MOV	(00) S : # 0	OUT_S	DATA OUTPUT SBIT	18o, 15a, 18a, 20o, 28a <> Cross Ref (M012)
		D : Y000			21o, 32a <> Cross Ref (Y000)
					22w, 27w
00023	LD	M011	T_FLAG	TRANS FLAG	<> Cross Ref (R0002)
00024	LPS	(24)	D_PTR	DATA ADDR POINTER	14w, 19w, 25w, 31w
00025	MOV	(00) S : R0002	T_DATA	TRANS DATA	<> Cross Ref (R0002)
		D : R0003			25w, 27w <> Cross Ref (R0002)
00026	LED	(25)	T_DATA	TRANS DATA	25w, 27w <> Cross Ref (Y000)
00027	MBST	(04) S : R0002	OUT_S	DATA OUTPUT SBIT	<> Cross Ref (Y000)
		D : Y000			22w, 27w <> Cross Ref (Y000)
00028	LPP	(28)	W_FLG	WRITE STB PULSE	8o <> Cross Ref (Y000)
00029	AND NOT	M012	W_STB	WRITE STB PULSE	8o
00030	OUT	Y000	D_PTR	DATA ADDR POINTER	<> Cross Ref (R0002)
00031	BCDI	(14) D : R0002			14w, 19w, 25w, 31w

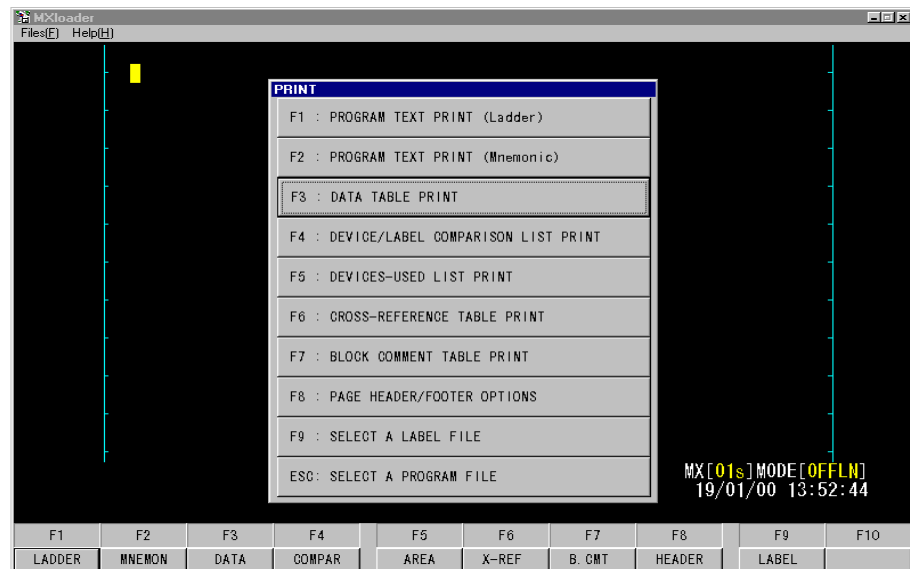
PROG	06/09/94	T.YAMA	O		READ BLOCK COMMAND	PAGE
CHECK	06/09/94	H.KAWA	K		WRITE BLOCK COMMAND	0001

[Mnemonic program]

■ Data table print

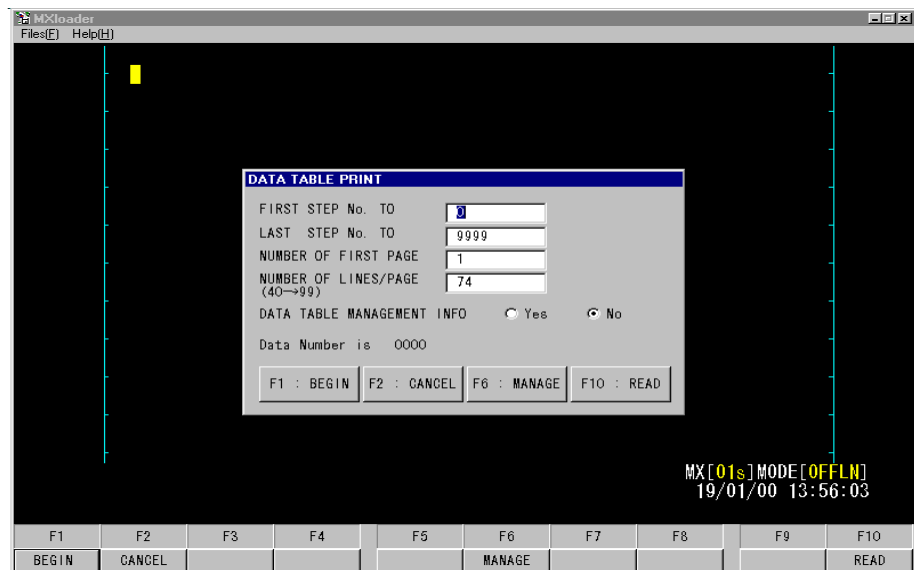
The DATA TABLE PRINT function prints data tables created with the MX loader. Follow the instructions given below to execute DATA TABLE PRINT.

[PRINT] Screen → DATA [F3] → BEGIN [F1]



[PRINT] screen

- ① Now the [PRINT] screen appears. Press the [F3] key. (Or use the [↑] and [↓] keys to select [F3: DATA TABLE PRINT] and press the [Enter] key.) If the [PRINT] screen is not displayed, continue to press the [Esc] key to return to the [MX SERIES UTILITY] screen and follow the instructions given in the paragraph **■ Selecting print files (Printing a .TXT file) (page 5-6)**.



[DATA TABLE PRINT] screen

- ② Now the [DATA TABLE PRINT] screen appears.
- ③ Select the item to be modified or written
- ④ Use the numeric keys to make numeric entries and the [←] and [→] keys to make the desired selection [Yes/No].
- ⑤ Start printing by pressing the BEGIN [F1] key and stop it by pressing CANCEL [F2] or CONT. [F3].
- ⑥ When printing is completed, the [PRINT] screen reappears.

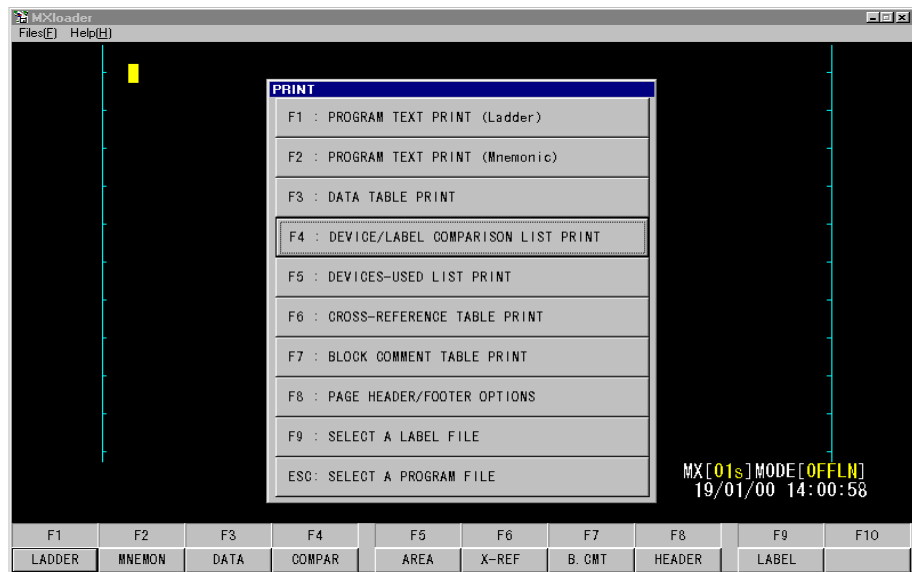
Reference

A data table is a table created in a user program which contains setting values and other information.

■ Device/label comparison list print

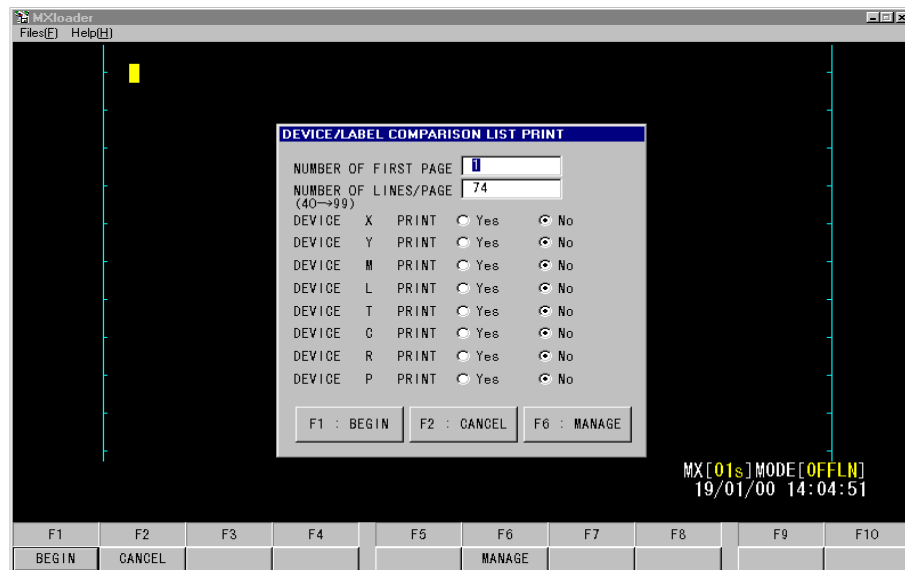
The DEVICE/LABEL COMPARISON LIST PRINT function prints the device, label and comment for each device (X, Y, M, L, T, C, R and P) used in a program. Labels and comments can be edited and modified using the label edit function. Follow the instructions given below to execute DEVICE/LABEL COMPARISON LIST PRINT.

[PRINT] Screen→COMPAR [F4]→BEGIN [F1]



[PRINT] screen

- ① Now the [PRINT] screen appears. Press the [F4] key. (Or use the [↑] and [↓] keys to select [F4: DEVICE/LABEL COMPARISON LIST PRINT] and press the [Enter] key.) If the [PRINT] screen is not displayed, continue to press the [Esc] key to return to the [MX SERIES UTILITY] screen and follow the instructions given in the paragraph ■ Selecting print files (Printing a .TXT file) (page 5-6).



[DEVICE/LABEL COMPARISON LIST PRINT] screen

- ② Now the [DEVICE/LABEL COMPARISON LIST PRINT] screen appears.
If there are no labels in the current program, the message, [NO LABELS] is displayed. Press any key to return to the [PRINT] screen. Then use the LABEL [F9] key to set labels.
- ③ Select the item to be modified or written
- ④ Use the numeric keys to make numeric entries and the [←] and [→] keys to make the desired selection [Yes/No].
- ⑤ Start printing by pressing the BEGIN [F1] key and stop it by pressing CANCEL [F2] or CONT. [F3].
- ⑥ When printing is completed, the [PRINT] screen reappears.

● Detailed print settings

NUMBER OF FIRST PAGE	Sets the initial value of the page number to be printed in the top right corner of the page.
NUMBER OF LINES/PAGE	Determines the number of lines to print per page.
DEVICE X PRINT	Determines whether device X is to be printed or not (select [Yes] or [No]).
DEVICE Y PRINT	Determines whether device Y is to be printed or not (select [Yes] or [No]).
DEVICE M PRINT	Determines whether device M is to be printed or not (select [Yes] or [No]).
DEVICE L PRINT	Determines whether device L is to be printed or not (select [Yes] or [No]).
DEVICE T PRINT	Determines whether device T is to be printed or not (select [Yes] or [No]).
DEVICE C PRINT	Determines whether device C is to be printed or not (select [Yes] or [No]).
DEVICE R PRINT	Determines whether device R is to be printed or not (select [Yes] or [No]).
DEVICE P PRINT	Determines whether device P is to be printed or not (select [Yes] or [No]).

!NOTES

- Enter a number lower than 73 in the [NUMBER OF LINES/PAGE] field when continuous forms are used
- When you want to check the content of management information, press the MANAGE [F6] key.

<Print example>

FILE NAME:[TEST4] 06/09/94 PAGE NO.[0001]
 ((LABEL/DEVICE DATA))

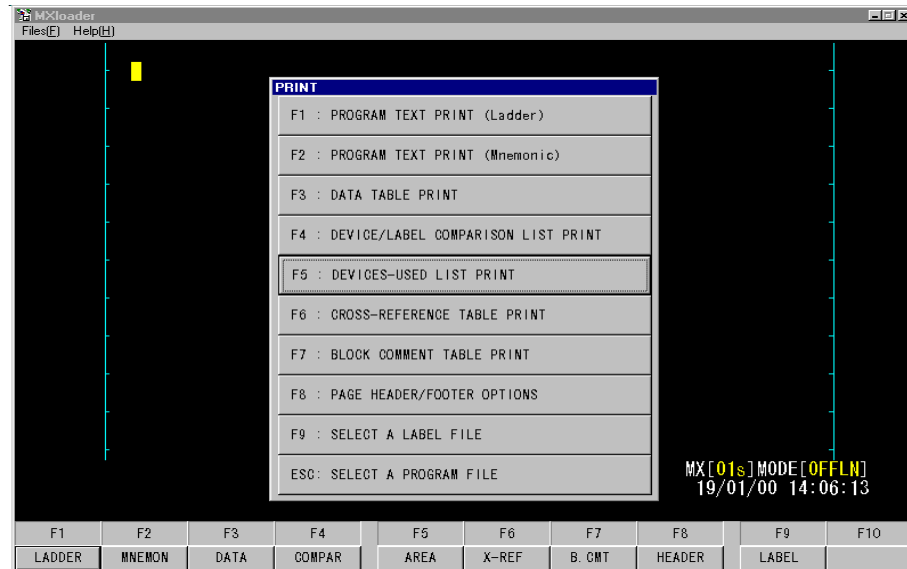
DEVICE	LABEL	COMMENT
X000	START	START SWITCH
X001	STA01	STATION NO.01
X002	STA02	STATION NO.02
X003	STA03	STATION NO.03
X004	AUTO	AUTO RUN MODE
X005	MAN	MANUAL RUN MODE
X006	L_OVER	LOW OVER
X007	H_OVER	HIGH OVER
X008	INT01	INTERRUPTION 01
X009	INT02	INTERRUPTION 02
X00A	LS00	LIMIT SWITCH 01
X00B	LS01	LIMIT SWITCH 02
X00C	PHOT01	PHOTO SWITCH 01
X00D	PHOT02	PHOTO SWITCH 02
X00E	TMP_AL	TEMP ALARM
X00F	STOP	STOP SWITCH

[Device/label comparison list]

■ Devices-used list print

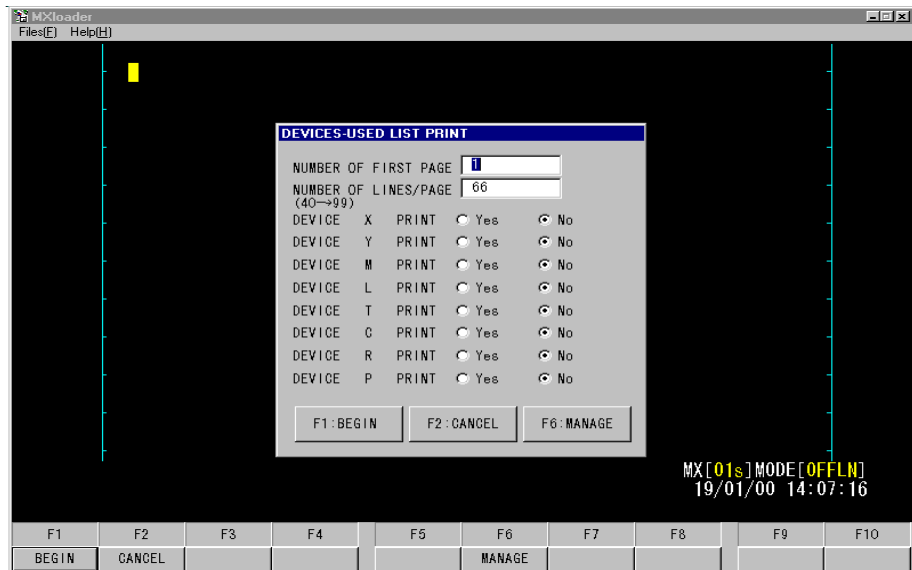
The DEVICES-USED LIST PRINT function prints the devices used by sequence programs created with the MX loader. Follow the instructions given below to execute DEVICES-USED LIST PRINT.

[PRINT] Screen → AREA [F5] → BEGIN [F1]



[PRINT] screen

- ① Now the [PRINT] screen appears. Press the [F5] key. (Or use the [↑] and [↓] keys to select [F5: DEVICES-USED LIST PRINT] and press the [Enter] key.) If the [PRINT] screen is not displayed, continue to press the [Esc] key to return to the [MX SERIES UTILITY] screen and follow the instructions given in the paragraph **■ Selecting print files (Printing a .TXT file) (page 5-6)**.



[DEVICES USED LIST PRINT] screen

- ② Now the [DEVICES USED LIST PRINT] screen appears.
- ③ Select the item to be modified or written
- ④ Use the numeric keys to make numeric entries and the [←] and [→] keys to make the desired selection [Yes/No].
- ⑤ Start printing by pressing the BEGIN [F1] key and stop it by pressing CANCEL [F2] or CONT. [F3].
- ⑥ When printing is completed, the [PRINT] screen reappears.

● Detailed description of devices-used list print

This function prints data in devices X, Y, M and L in bit or word format. The following data is printed

	Bit format	Word format
X	<input type="checkbox"/> : Not used <input checked="" type="checkbox"/> : Bits used	<input type="checkbox"/> : Not used W : Word used
Y	<input type="checkbox"/> : Not used I : Input O : Output IO : I/O D : Double coil ID : Double coil and input	<input type="checkbox"/> : Not used WI : Input WO : Output IO : I/O
M,L	<input type="checkbox"/> : Not used <input checked="" type="checkbox"/> : Bits used I : Input O : Output IO : I/O D : Double coil ID : Double coil and input	<input type="checkbox"/> : Not used WI : Input WO : Output IO : I/O
T	<input type="checkbox"/> : Not used <input checked="" type="checkbox"/> : Timer used	
C	<input type="checkbox"/> : Not used <input checked="" type="checkbox"/> : Counter used	
R,P		<input type="checkbox"/> : Not used WI : Input WO : Output IO : I/O

● Detailed print example

NUMBER OF FIRST PAGE	Sets the initial value of the page number to be printed in the top right corner of the page.
NUMBER OF LINES/PAGE	Determines the number of lines to print per page.
DEVICE X PRINT	Determines whether device X is to be printed or not (select [Yes] or [No]).
DEVICE Y PRINT	Determines whether device Y is to be printed or not (select [Yes] or [No]).
DEVICE M PRINT	Determines whether device M is to be printed or not (select [Yes] or [No]).
DEVICE L PRINT	Determines whether device L is to be printed or not (select [Yes] or [No]).
DEVICE T PRINT	Determines whether device T is to be printed or not (select [Yes] or [No]).
DEVICE C PRINT	Determines whether device C is to be printed or not (select [Yes] or [No]).
DEVICE R PRINT	Determines whether device R is to be printed or not (select [Yes] or [No]).
DEVICE P PRINT	Determines whether device P is to be printed or not (select [Yes] or [No]).

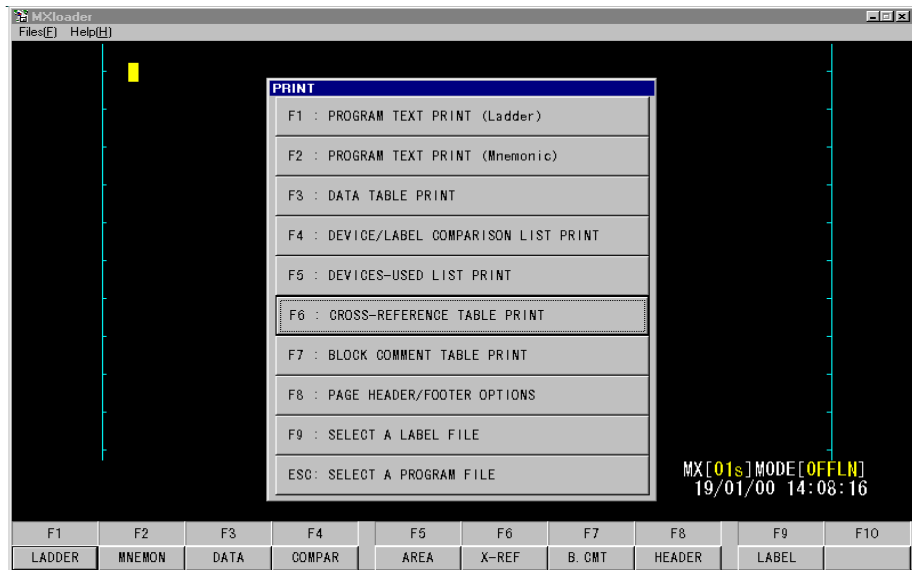
NOTES

- Enter a number lower than 73 in the [NUMBER OF LINES/PAGE] field when continuous forms are used.
- When you want to check the content of management information, press the MANAGE [F6] key.
- The R and P areas use bits but display words.

■ Cross-reference table print

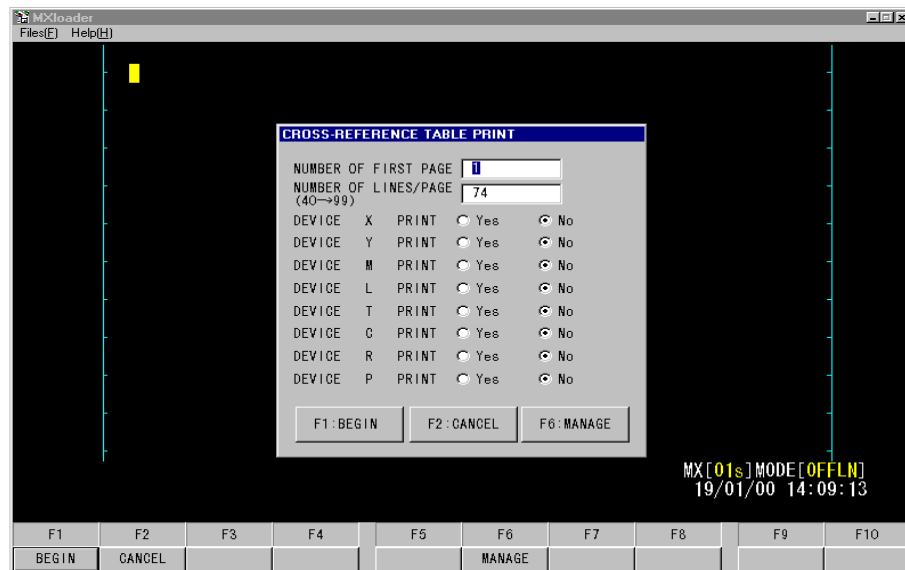
The CROSS-REFERENCE TABLE PRINT function prints lists of device labels, parameters, step numbers and information on how they are used in the sequence programs. Follow the instructions given below to execute CROSS-REFERENCE TABLE PRINT.

[PRINT] Screen→X-REF [F6]→BEGIN [F1]



[PRINT] screen

- ① Now the [PRINT] screen appears. Press the [F6] key. (Or use the [↑] and [↓] keys to select [F6: CROSS-REFERENCE TABLE PRINT] and press the [Enter] key.) If the [PRINT] screen is not displayed, continue to press the [Esc] key to return to the [MX SERIES UTILITY] screen and follow the instructions given in the paragraph ■ Selecting print files (Printing a .TXT file) (page 5-6).



[CROSS REFERENCE TABLE PRINT] screen

- ② Now the [CROSS REFERENCE TABLE PRINT] screen appears.
- ③ Select the item to be modified or written
- ④ Use the numeric keys to make numeric entries and the [←] and [→] keys to make the desired selection [Yes/No].
- ⑤ Start printing by pressing the BEGIN [F1] key and stop it by pressing CANCEL [F2] or CONT. [F3].
- ⑥ When printing is completed, the [PRINT] screen reappears.

● Detailed print example

NUMBER OF FIRST PAGE	Sets the initial value of the page number to be printed in the top right corner of the page.
NUMBER OF LINES/PAGE	Determines the number of lines to print per page.
DEVICE X PRINT	Determines whether device X is to be printed or not (select [Yes] or [No]).
DEVICE Y PRINT	Determines whether device Y is to be printed or not (select [Yes] or [No]).
DEVICE M PRINT	Determines whether device M is to be printed or not (select [Yes] or [No]).
DEVICE L PRINT	Determines whether device L is to be printed or not (select [Yes] or [No]).
DEVICE T PRINT	Determines whether device T is to be printed or not (select [Yes] or [No]).
DEVICE C PRINT	Determines whether device C is to be printed or not (select [Yes] or [No]).
DEVICE R PRINT	Determines whether device R is to be printed or not (select [Yes] or [No]).
DEVICE P PRINT	Determines whether device P is to be printed or not (select [Yes] or [No]).

!NOTES

- Enter a number lower than 73 in the [NUMBER OF LINES/PAGE] field when continuous forms are used.
- When you want to check the content of management information, press the MANAGE [F6] key.
- The alphabetic characters in the [X-REF STEP No.] column have the following meaning:
a: Contact a b: Contact b o: Output w: Application instruction
The R and P devices are bit devices and application instructions and are therefore indicated by w.

<Print example>

FILE NAME:[WAMTEST.TXT] PROGRAM NO.[00000000] 06/09/94 PAGE NO.[0001]
((CROSS REFERENCE TABLE))

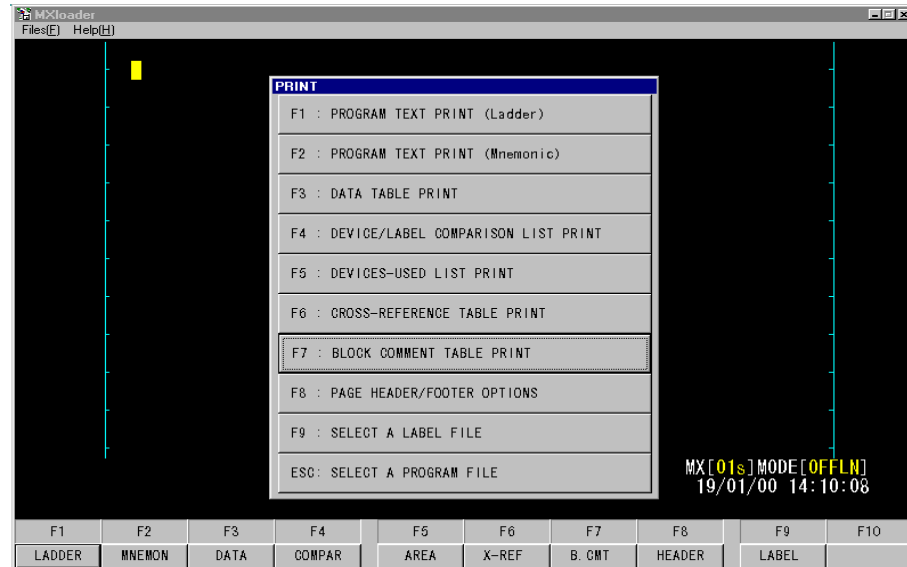
DEVICE	LABEL	PARAMETER COMMENT	X-REF STEP No.
M000	R-TRG	READ TRIGGER	0a, 6a
M001	W-TRG	WRITE TRIGGER	3a, 7a
M010	T_PLS	TRANS TRIGGER PULSE	8o, 9a, 73a
M011	T_FLAG	TRANS FLAG	13o, 15a, 18a, 20o, 23a
M012	W_PLS	WRITE STB PULSE	16b, 17o, 29b
M018	T_END	TRANS COMPLETION	21o, 32a
M014	TM_CHK	TIME_OUT CHECK	33a, 37o, 38a
M015	TM_OUT	TIME_OUT	35b, 41o
M020	RCV_ST	RECEIVE START	43o, 44a, 52a
M021	RCV_FG	RECEIVE FLAG	47a, 53o, 54a, 56o, 57a 60a, 63a
M022	R_PLS	READ STB PULSE	48b, 58b, 59o, 61a
M030	RCV_OK	RECEIVE OK	64o, 65a
M031	OK	DATA OK	68o, 70b
M032	NG	DATA NG	10a, 71o, 72a
M033	RT_ERR	RETRY ERROR	11b, 74a, 77o
M920	CONST		78a

[Cross reference table list]

■ Block comment table print

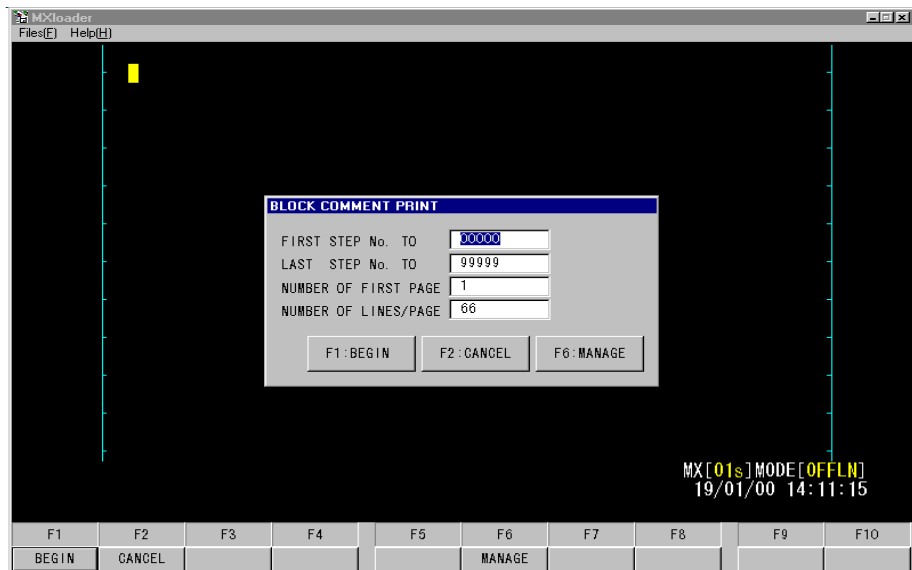
The BLOCK COMMENT TABLE PRINT function prints the comments (circuit names, etc.) in each circuit block. Follow the instructions given below to execute BLOCK COMMENT TABLE PRINT.

[PRINT] Screen → B.CMT [F7] → BEGIN [F1]



[PRINT] screen

- ① Now the [PRINT] screen appears. Press the [F7] key. (Or use the [↑] and [↓] keys to select [F7: BLOCK COMMENT TABLE PRINT] and press the [Enter] key.) If the [PRINT] screen is not displayed, continue to press the [Esc] key to return to the [MX SERIES UTILITY] screen and follow the instructions given in the paragraph **■ Selecting print files (Printing a .TXT file)** (page 5-6).



[BLOCK COMMENT TABLE PRINT] screen

- ② Now the [BLOCK COMMENT TABLE PRINT] screen appears.
- ③ Select the item to be modified or written.
- ④ Enter the numeric keys.
- ⑤ Start printing by pressing the BEGIN [F1] key and stop it by pressing CANCEL [F2] or CONT. [F3].
- ⑥ When printing is completed, the [PRINT] screen reappears.

● Detailed print settings

FIRST STEP No. TO PRINT	
LAST STEP No. TO PRINT	Determines the first and last step to print.
NUMBER OF FIRST PAGE	Sets the initial value of the page number to be printed in the top right corner of the page.
NUMBER OF LINES/PAGE	Determines the number of lines to print per page.

!NOTES

- Enter a number lower than 73 in the [NUMBER OF LINES/PAGE] field when continuous forms are used.
- When you want to check the content of management information, press the MANAGE [F6] key.

<Print example>

FILE NAME:[WAMTEST.TXT] PROGRAM NO.[00000000] 06/09/94 PAGE NO.[0001]
 ((BLOCK COMMENT TABLE))

Step	Block Comment
00000	READ COMMAND DATA AREA SET
00008	WRITE COMMAND DATA AREA SET
00006	COMMAND TRIGGER
00009	COMMUNICATION FLAG SET/LEADING ADDR SET
00015	WRITE STB PULSE
00018	COMMUNICATION COMPLETION/COMMUNICATION FLAG RESET
00028	TRANSMISSION DATA SET/READ_STB ON
00032	TIME_OUT CHECK
00038	TIME_OUT 3sec
00040	TIME_OUT ON
00042	RECEIVE START
00044	RECEIVE DATA LEADING ADDR SET/DATA AREA CLEAR
00047	DATA GET (1Byte)
00052	RECEIVE FLAG SET
00054	RECEIVE COMPLETION
00057	READ COMMAND STB PULSE

[Block comment table list]

5 - 6 Printing Program (.TX#)

■ Selecting file to print

Like the PROGRAM FILE PRINT (.TXT), this function is used to print files.

.TX# [F2] · Enter the file name or Select the file · [Enter]

Refer to the paragraph **■Selecting print files (Printing a .TXT file) (page 5-6)** for details.

The following print operations are performed in the same way as printing a .TXT file.

■ Printing ladder program

[PRINT] Screen→LADDER [F1]→BEGIN [F1]

■ Printing mnemonic file

[PRINT] Screen→MNEMON [F2]→BEGIN [F1]

■ Printing cross-reference file

[PRINT] Screen→X-REF [F6]→BEGIN [F1]

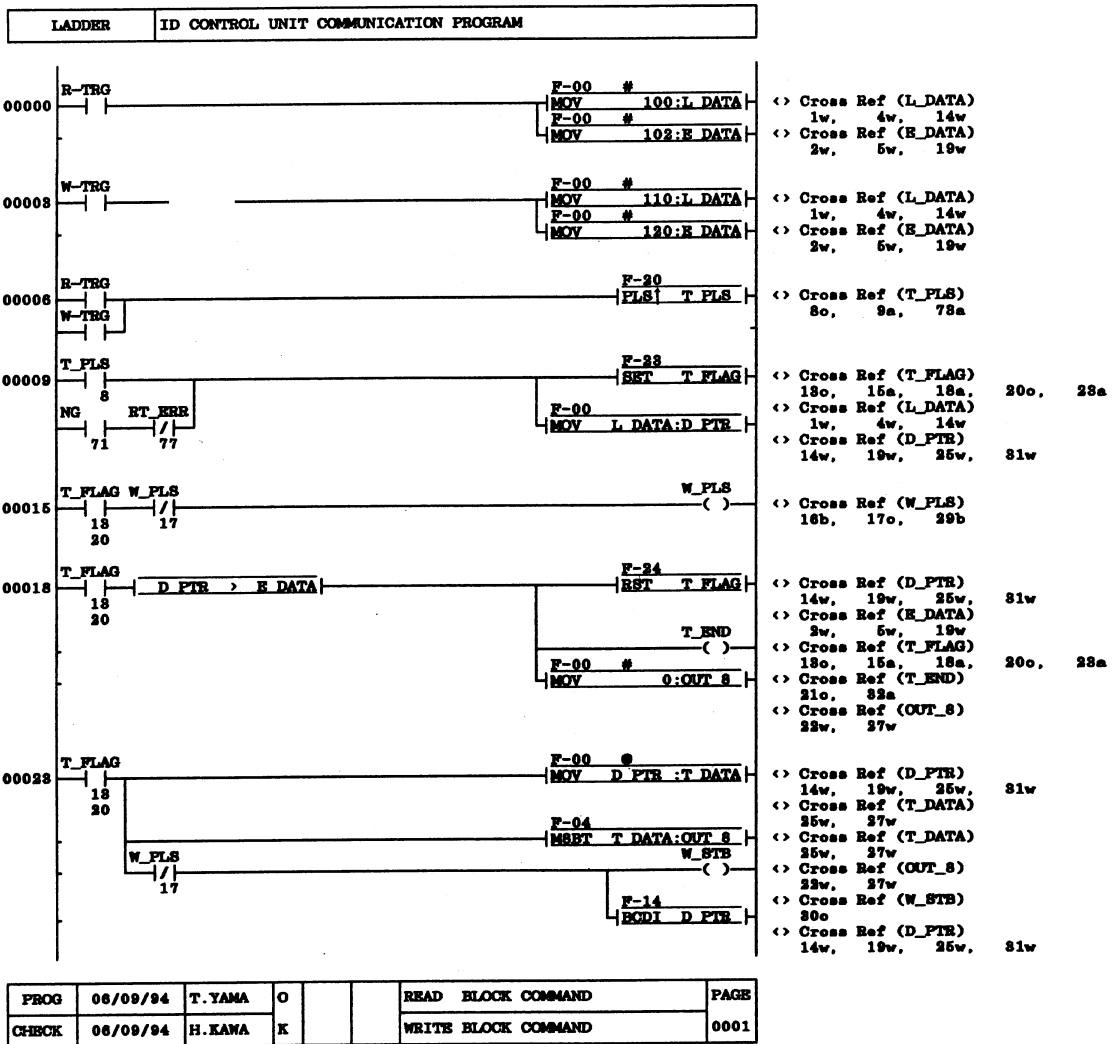
When printing is completed, the [PRINT] screen reappears.

Reference

.TX# files are files that are not related to label/comment



<Print example>



[Ladder program]

5 - 7 Editing Label/Parameter Comments

Programs written using devices (X000, Y000, etc.) are often hard to check. Labels are used to make such programs easier to comprehend.

Label comments, 6 character comments, and parameter comments, 20 character comments, are used for describing devices and programs. However, only up to five character label comments are allowed in register areas Rxxxx and Pxxxx. Thus comments containing 6 characters in those areas are ignored in ladder view.

To use labels and comments, a label file (.LBL) and a parameter file (.PRM) are required. Special editing techniques are required for editing labels and comments.

NOTE

The device areas in the MX200/MX50 controller differ from those in the MX100/MX30/MX20. Use the CONVRT [F9]→MX MODEL SELECTION [F9] to select a suitable label file type.

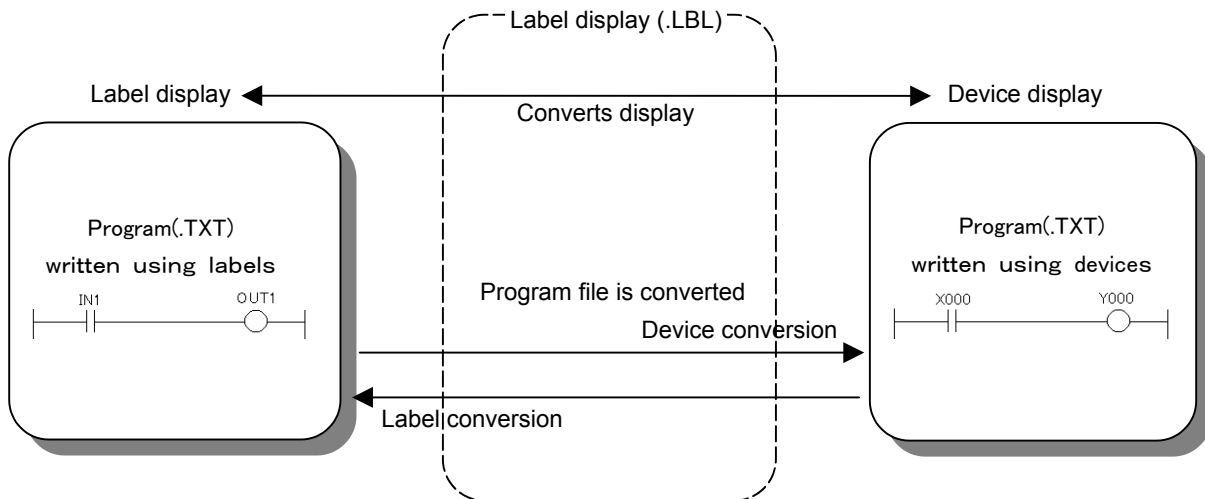
Label files

A label file is a type of converter utility. It displays MX loader programs written using devices into label display and turns programs written using labels into a device display.

(However, it does not overwrite the original file.)

There is an MX series utility that replaces labels in .TXT files with device numbers and replaces device numbers in .TXT files with labels. This utility converts program files (.TXT) to a label or device file.

The MX loader can automatically read label files if the label file and the program file (.TXT) has the same name.



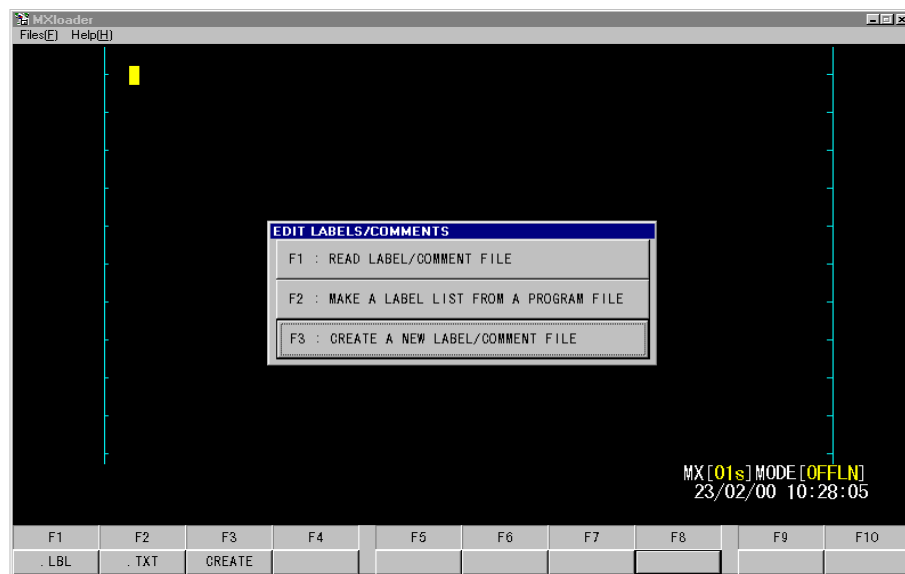
■ Adding labels to files

(Creating a new label file)

Use the following procedure to create new label files.

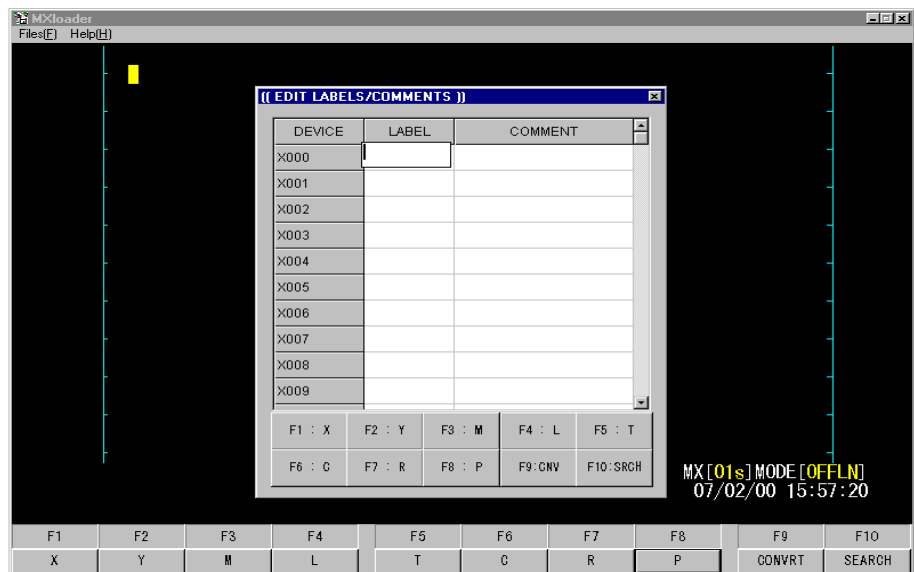
[MX SERIES UTILITY] Screen → LABEL [F3] → CREATE [F3]

- ① Press the LABEL [F3] key in the [MX SERIES UTILITY] screen. (Or use the [↑] and [↓] keys to select [F3: LABEL/COMMENT FILE EDIT] and press the [Enter] key.)



[EDIT LABELS/COMMENTS] screen

- ② The above is the [EDIT LABELS/COMMENTS] screen. Press the CREATE [F3] key. (Or use the [↑] and [↓] keys to select [F3: CREATE A NEW LABEL/COMMENT FILE] and press the [Enter] key.)



- ③ This is newly created [**EDIT LABELS/COMMENTS**] screen. Labels are entered in alphanumerics. Select devices using the [**F1**] to [**F8**] keys. Use the [**→**] key to move the cursor to the comment.

Reference

Use the [**↑**], [**↓**], [**←**] and [**→**] keys to edit files and the [**Enter**] key to go to the next line.

The **SEARCH** [**F10**] key allows you search for devices or labels. Use the [**Page Up**] and [**Page Down**] keys for scrolling.

● Changing .TXT file labels

- ① When editing has been completed, the program file (.TXT) has to undergo label conversion. Press the CONVERT [F9] key and the REPLACE DEVICE No.s IN .TXT WITH LABELS [F3]. When no conversion is required, go to the next paragraph ●Exiting EDIT LABELS/COMMENTS (page 5-41).



[*.TXT FILE SELECTION] screen

- ② The [*.TXT FILE SELECTION] screen is now displayed. Select or enter the name of the program (.TXT) that is to undergo label conversion.

● Exiting EDIT LABELS/COMMENTS

- ① Press the [Esc] key to exit EDIT LABELS/COMMENTS.



[*.LBL FILE SELECTION] screen

- ② The [*.LBL FILE SELECTION] screen now appears.

!NOTE

When a program file (.TXT) has undergone label conversion or the label and parameter comments have been changed or edited, the file must be saved.

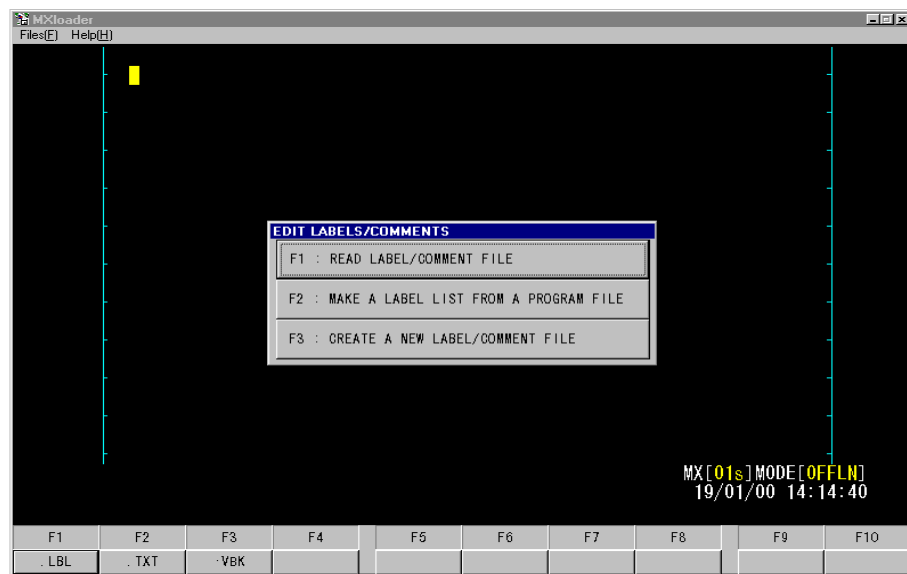
■ Re-editing files with labels

(Editing label files)

Use the following procedure to edit label files.

[MX SERIES UTILITY] Screen → LABEL [F3] → .LBL [F1]

- ① Press the LABEL [F3] key in the [MX SERIES UTILITY] screen. (Or use the [↑] and [↓] keys to select [F3: LABEL/COMMENT FILE EDIT] and press the [Enter] key.)



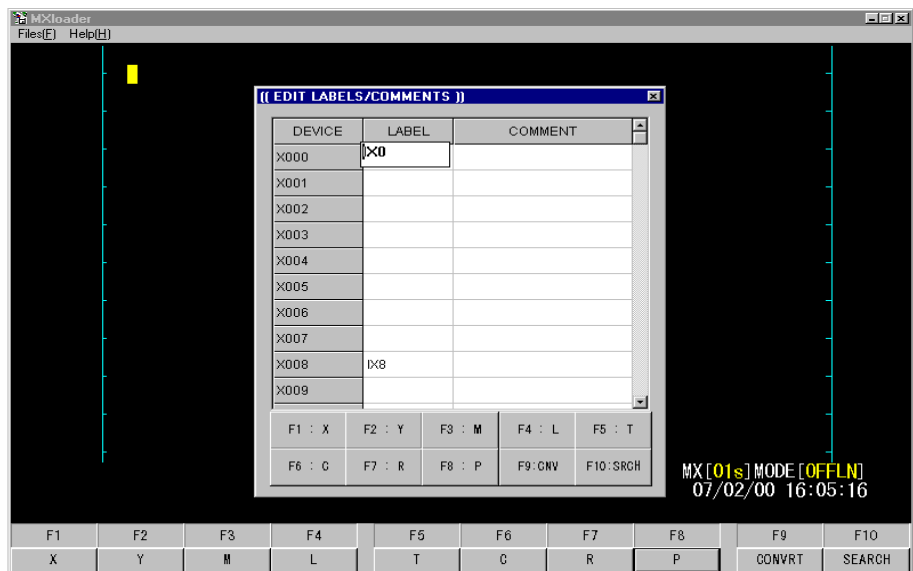
[EDIT LABELS/COMMENTS] screen

- ② Press the .LBL [F1] key. (Or use the [↑] and [↓] keys to select [F1: READ LABEL/COMMENT FILE] and press the [Enter] key.)



[*.LBL FILE SELECTION] screen

- ③ The [*.LBL FILE SELECTION] screen now appears. Select or enter the name of the file (. LBL) to be re-edited.



[EDIT LABELS/COMMENTS] screen

- ④ This is the [EDIT LABELS/COMMENTS] screen. Labels are entered in alphanumeric. Select devices using the [F1] to [F8] keys. Use the [→] key to move the cursor to the comment.

Reference

Use the [↑], [↓], [←] and [→] keys to edit labels and comments and the [Enter] key to go to the next line. The SEARCH [F10] key allows you search for devices or labels. Use the [Page Up] and [Page Down] keys for scrolling.

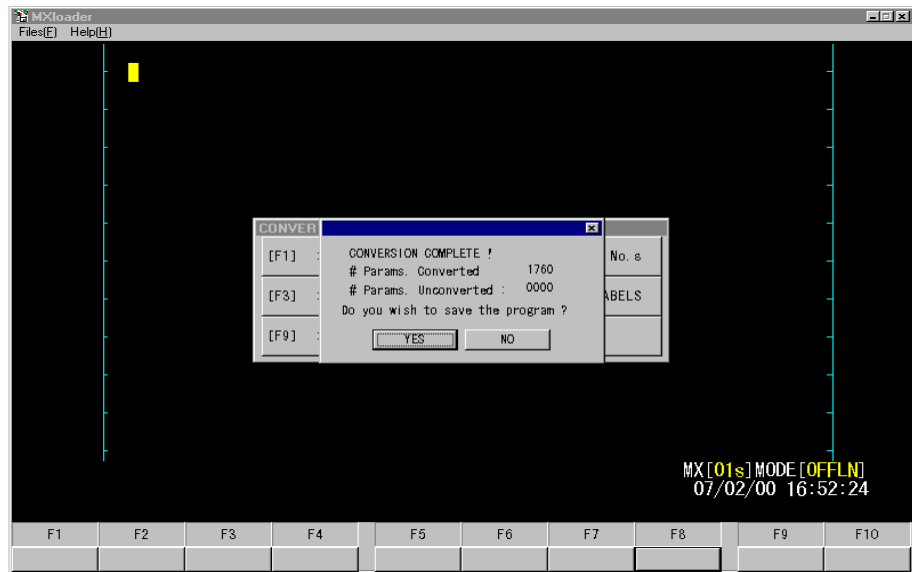
● Changing .TXT file labels

- ① When editing has been completed, the program file (.TXT) has to undergo label conversion. Press the CONVRT [F9] key and the REPLACE DEVICE No.s IN .TXT WITH LABELS [F3]. When no conversion is required, go to the paragraph ●Exiting EDIT LABELS/COMMENTS (page 5-46).



[*.TXT FILE SELECTION] screen

- ② The [*.TXT FILE SELECTION] screen is now displayed. Select or enter the name of the program (.TXT) that is to undergo label conversion.



- ③ When the conversion is completed, the number of parameters that were converted and those that were not converted are displayed. The system now asks whether the program (.TXT) is to be saved or not, select [Yes or No]. If you want to convert the program to a label program, save it as this will convert it to a label program.

● Exiting EDIT LABELS/COMMENTS

- ① Press the [Esc] key to exit EDIT LABELS/COMMENTS.



[*.LBL FILE SELECTION] screen

- ② The [*.LBL FILE SELECTION] screen now appears. Select or enter the name of the label file (. LBL) to be saved and press the [Enter] key. When you do not want to save the file, press the [Esc] key second time and the [Y] key to exit.

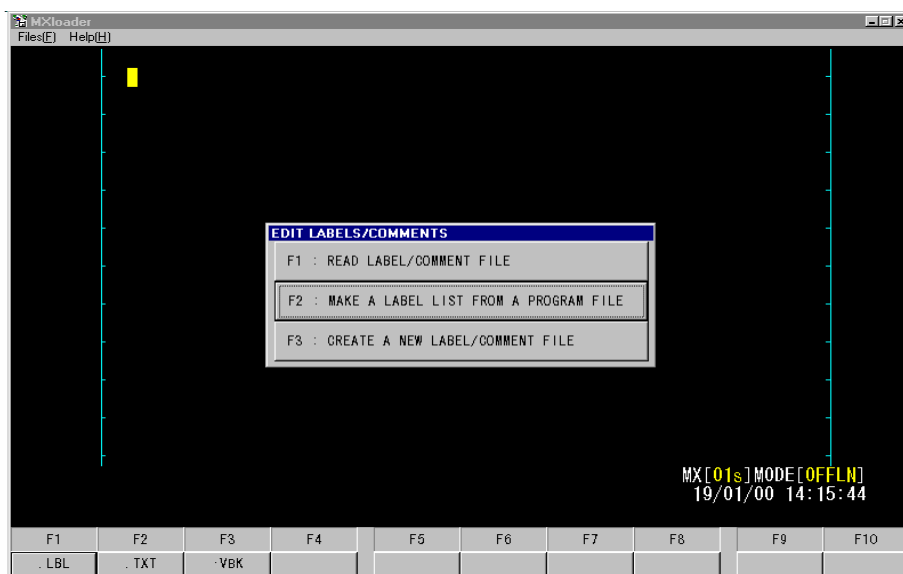
■ Inserting device numbers in programs created with labels

(Setting device numbers in .TXT files)

Use the following procedure to set device numbers.

[MX SERIES UTILITY] Screen → LABEL [F3] → .TXT [F2]

- ① Press the LABEL [F3] key in the [MX SERIES UTILITY] screen. (Or use the [↑] and [↓] keys to select [F3: LABEL/COMMENT FILE EDIT] and press the [Enter] key.)



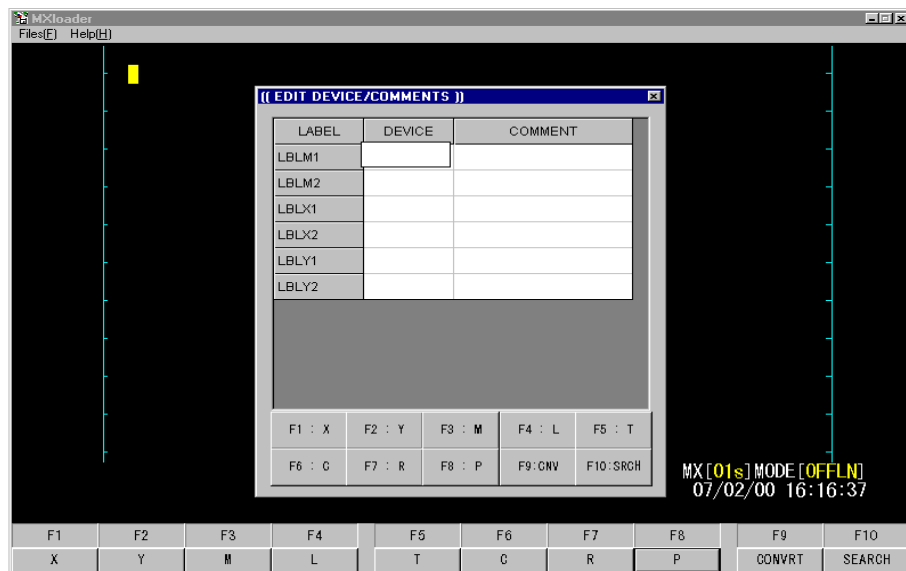
[EDIT LABELS/COMMENTS] screen

- ② Press the .TXT [F2] key. (Or use the [↑] and [↓] keys to select [F2: MAKE A LABEL LIST FROM A PROGRAM FILE] and press the [Enter] key.)



[*.TXT FILE SELECTION] screen

③ This is the [*.TXT FILE SELECTION] screen. Select or enter the name of the program whose devices are to be edited.



[EDIT DEVICE/COMMENTS] screen

④ This is the [EDIT DEVICE/COMMENTS] screen. Select devices using the [F1] to [F8] keys. Use the [→] key to move the cursor to the comment.

Reference

Use the [↑], [↓], [←] and [→] keys to edit devices and comments and the [Enter] key to go to the next line. The SEARCH [F10] key allows you search for devices or labels. Use the [Page Up] and [Page Down] keys for scrolling.

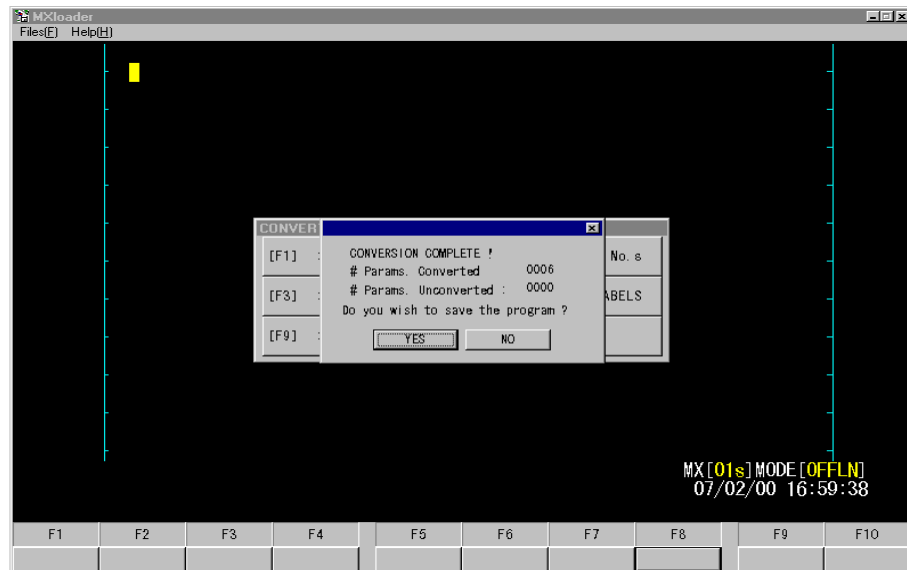
● Changing .TXT file devices

- ① When editing has been completed, the program file (.TXT) has to undergo label conversion. Press the CONVRT [F9] key and the REPLACE LABELS IN .TXT WITH DEVICE No.s [F1]. When no conversion is required, go to the next paragraph, ●Exiting EDIT DEVICE/COMMENTS (page 5-51).



[*.TXT FILE SELECTION] screen

- ② The [*.TXT FILE SELECTION] screen is now displayed. Select or enter the name of the program (.TXT) that is to undergo label conversion.



- ③ When the conversion is completed, the number of parameters that were converted and those that were not converted are displayed. The system now asks whether the program (.TXT) is to be saved or not, select [Yes or No]. If you want to convert the program to a device program, save it as this will convert it to a device program.

● Exiting EDIT DEVICE/COMMENTS

- ① Press the [Esc] key to exit EDIT DEVICE/COMMENTS.



[*.LBL FILE SELECTION] screen

- ② The [*.LBL FILE SELECTION] screen now appears. Select or enter the name of the label file (. LBL) to be saved and press the [Enter] key. When you do not want to save the file, press the [Esc] key second time and the [Y] key to exit.

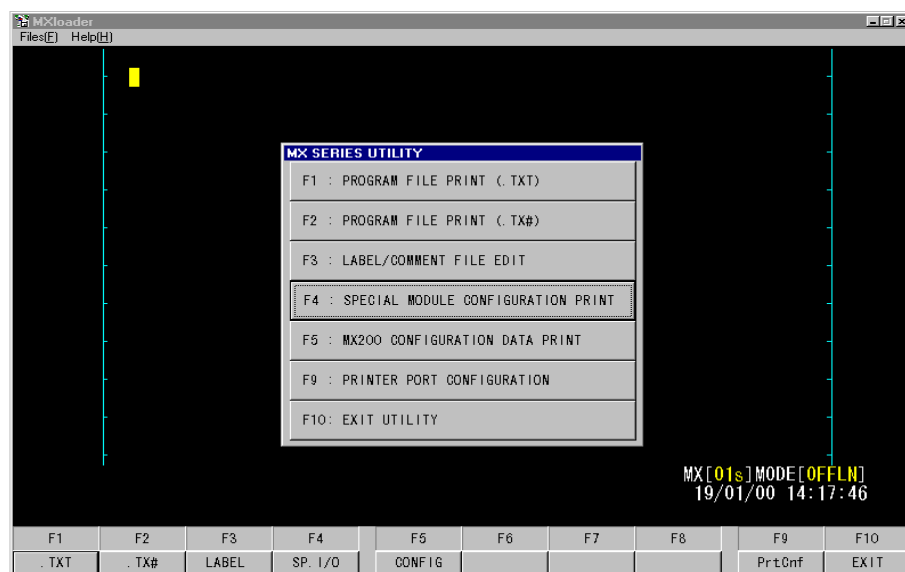
5 - 8 Printing Special Module Parameters

The MX series of special modules contain the parameters they need for operation.

These parameters can be stored in a file (. DTL) by the MX loader in which case they can be printed. The special module parameters are printed according to the following procedure.

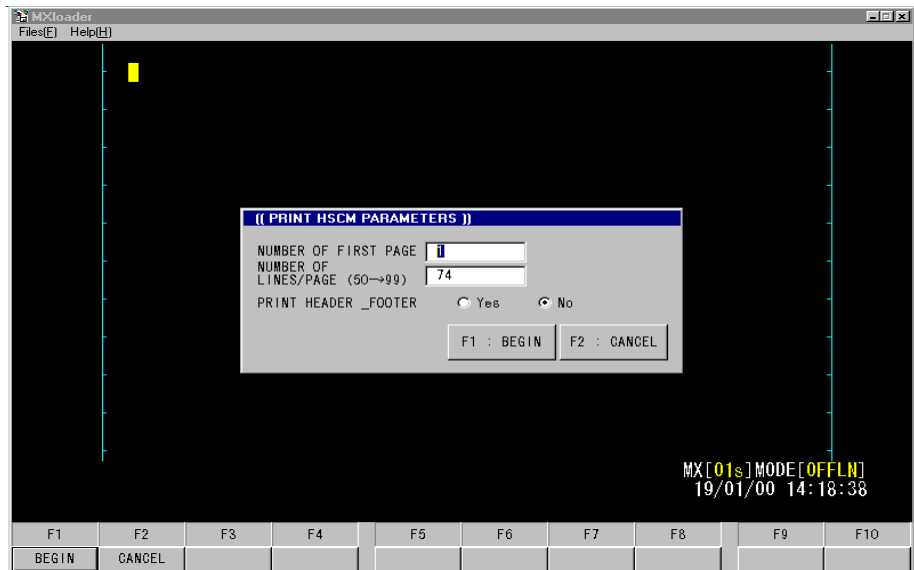
[MX SERIES UTILITY] Screen · SP.I/O [F4] ·
Enter the file name or Select the file

- ① Press the [F4] key in the [MX SERIES UTILITY] screen. (Or use the [↑] and [↓] keys to select [F4: SPECIAL MODULE CONFIGURATION PRINT] and press the [Enter] key.)



[MX SERIES UTILITY] screen

- ② Select the parameter file to be printed.



[SPECIAL MODULE CONFIGURATION PRINT] screen

- ③ This is the [SPECIAL MODULE CONFIGURATION PRINT] screen. Use the [↑] and [↓] keys to select the item to be modified or written.
- ④ Use the numeric keys to make numeric entries and the [←] and [→] keys to make the desired selection [Yes/No].
- ⑤ Start printing by pressing the BEGIN [F1] key and stop it by pressing CANCEL [F2] or CONT. [F3].
- ⑥ When printing is completed, the [PRINT] screen reappears..

● Detailed print settings

NUMBER OF FIRST PAGE	Sets the initial value of the page number to be printed in the top right corner of the page.
NUMBER OF LINES/PAGE	Determines the number of lines to print per page.
PRINT HEADER & FOOTER	Determines whether the header and footer formats are to be printed or not (select [YES] or [NO]).

<Print example>

SPECIAL I/O	MX200 PULSE POSITIONING SYSTEM NO.1
-------------	-------------------------------------

MODULE TYPE : P P M

((SET VELOCITY))

ITEM	[PARAMETER#]	VALUE	VALUE x Pulse Rate
BEGIN/END VELOCITY	[00]	25	25.00 pulse/sec
MAXIMUM VELOCITY(x10)	[01]	20,000	200,000.00 pulse/sec
VELOCITY No.0	[08]	100	100.00 pulse/sec
VELOCITY No.1	[09]	2,000	2,000.00 pulse/sec
VELOCITY No.2	[10]	4,000	4,000.00 pulse/sec
VELOCITY No.3	[11]	12,000	12,000.00 pulse/sec
VELOCITY No.4 (x10)	[12]	2,000	20,000.00 pulse/sec
VELOCITY No.5 (x10)	[18]	10,000	100,000.00 pulse/sec
VELOCITY No.6 (x10)	[14]	12,000	120,000.00 pulse/sec
VELOCITY No.7 (x10)	[15]	20,000	200,000.00 pulse/sec
HOME RET LOW VELOCITY	[32]	400	400.00 pulse/sec
HOME RET HI VEL.(x10)	[38]	800	8,000.00 pulse/sec

((SET ACC/DECELERATION))

ITEM	ACCELERATION TIME	DECELERATION TIME
NUMBER0	0 msec[16]	0 msec[20]
NUMBER1	200 msec[17]	200 msec[21]
NUMBER2	400 msec[18]	400 msec[22]
NUMBER3	800 msec[19]	800 msec[23]
HOME RET	400 msec[24]	400 msec[25]

[Special module parameter print]

<Print example>

SPECIAL I/O	MX200 PULSE POSITIONING SYSTEM NO.1
-------------	-------------------------------------

MODULE TYPE : H S C M

((FUNCTION)) PARAMETER 00H : 0000

ITEM	CONTENTS
COUNT FORM	PHASE-DIFF INPUT (x1)
COUNT MODE 1	LINEAR COUNT
COUNT MODE 2	REGULAR COUNT
PRESET MODE	PZ DISABLE, IN1 DISABLE
RESET MODE	PZ DISABLE, IN1 DISABLE
LATCH MODE	PZ DISABLE, IN2 DISABLE
PZ POLARITY	ACTIVE HIGH
IN1 POLARITY	ACTIVE HIGH
IN2 POLARITY	ACTIVE HIGH
PHASE-DIFF INPUT	A PHASE

((OUTPUT MODE)) PARAMETER 01H : FFF1

ITEM	CONTENTS
OUTPUT MODE OF OUT.1	OffMode IN THE RANGE
OUTPUT MODE OF OUT.2	On Mode IN THE RANGE
OUTPUT MODE OF OUT.3	NORMALLY OFF OUTPUT
OUTPUT MODE OF OUT.4	NORMALLY OFF OUTPUT
OUTPUT MODE OF OUT.5	NORMALLY OFF OUTPUT
OUTPUT MODE OF OUT.6	NORMALLY OFF OUTPUT
OUTPUT MODE OF OUT.7	NORMALLY OFF OUTPUT
OUTPUT MODE OF OUT.8	NORMALLY OFF OUTPUT

[Special module parameter print]

Chapter 6. Troubleshooting

6 - 1 Troubleshooting Operations

■ Troubleshooting Operations

When the personal computer loader does not seem to operate normally, refer to the following table before calling your agent.

(1/3)

Operation problems	Problems and countermeasures
The personal computer loader does not install	<ul style="list-style-type: none"> • Not enough disk space. The installation of the loader requires more than 10MB disk free space.
The personal computer loader does not startup	<ul style="list-style-type: none"> • The installation is not completed. Reboot the computer and install the loader again.
The personal computer loader cannot be set to on-line status	<ul style="list-style-type: none"> • A Baud rate of 19200 bps was mistakenly set on a computer that does not support it. Hold down the Δ key on the MX controller while turning off and on the MX controller and the loader to set the ASCII communication format to the default value. • The personal computer loader cable is connected to the ASCII connector and an ASCII setting has been made. Press the SUPPORT [F4] key and the CONFIG [F3] key. When the COMMUNICATIONS CONFIG. MODIFY/DISPLAY [F1] screen appears, set the CH. 2 to the loader position (CONF.2 or CONF.3). • Incorrect MX address Change the address as follows: Press the SUPPORT [F4] key and the ENVIRN [F1] key to display the environment configuration screen. Enter the correct address in the MX Address: field. When the personal computer loader is set to off-line mode at startup, the MX address is automatically set to station 01. When the loader is connected to a CBL network, set the address of the MX controller. If not connected to a CBL network, set the address to 7F. • Incorrect Baud rate and data format The personal computer loader will automatically select the required data format for transfer rates of 19200 and 9600; for other transfer rates the format has to be set manually. Note that some computers do not support the 19200 bps rate. The personal computer loader communication cable was connected to the ASCII connector when an attempt was made to go on-line with another station via the CBL network. The personal computer loader cannot be set to on-line mode via the CBL network when it is connected with an ASCII connector. To go on-line, connect the communication cable from the personal computer loader to the LOAD connector. • The personal computer loader cannot be set to on-line mode when it has been switched to another model (MX100, MX30 or MX200) after booting. Reboot the personal computer loader. • The RS-232C cable is not correctly connected. Connect the communications cable (RS-232C cross-over cable) to the personal computer and the LOAD connector on the MX controller. • Defective cable Replace the cable.

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Operation problems	Problems and countermeasures
Station connections cannot be changed	<ul style="list-style-type: none"> It is not possible to change station connections with the [Home] key in off-line mode. Press the SUPPORT [F4] key and the ENVIRN [F1] key.
A time-out occurs when the REMOTE I/O ALLOCATION INFORMATION is opened.	<ul style="list-style-type: none"> This screen cannot be viewed on an MX controller that does not support CBL communication. Do not try to view this screen as a time-out will occur.
A password prevents program access	<ul style="list-style-type: none"> Passwords can be temporarily disabled by entering [@@@@] which is accepted as a substitute for any password. A password can also be cleared by performing a general reset of the MX controller, however, this will also cancel all other settings and initialize the program. The general reset function should be used with caution. Procedure for performing general reset: Hold down the DISP, [←], and [↑] keys while turning off the controller and then turning it back on again.
The Find Again function cannot be used	<ul style="list-style-type: none"> This function is not available in the mnemonic display.
Insertion cannot be made on the first line of the program	<ul style="list-style-type: none"> Since the insert function makes inserts after the cursor position and a blank line cannot be inserted, do as follows. Copy another line to the position of the first line, which is moved down to the position of the second line. Then overwrite the copied data on the first line with the data that is to be inserted.
The replace function does not operate properly	<ul style="list-style-type: none"> Programs created on the MX100/MX30/MX20 controllers use 3-digit register codes and cannot be used as they are on the MX200 controller. First download the program to the MX controller, then upload it again.
A DTBL instruction cannot be entered	<ul style="list-style-type: none"> A data table and a program are separate entities in the MX200. A data table is declared by making entries in the following order: PROGRAM [F1]→OTHER.. [F10]→EXTD.FN [F9]→MANAGE [F6]→DATA TABLE [F2]. Refer to the paragraph, ■Converting programs between MX100/MX30/MX20←→MX200/MX50 (page 4-51) in Chapter 4.
The personal computer loader responds extremely slowly	<ul style="list-style-type: none"> When a very slow scan time is set in the MX program, the personal computer loader will slow down too. When a program is written to EEPROM, program operation will slow down considerably.
It takes a long time to go on-line	<ul style="list-style-type: none"> A large program or a large data table takes a long time to upload and download. If you want to go on-line to monitor contacts, the process can be speeded up as follows: press the SUPPORT [F4]→ENVIRN [F1] key and enter [DISABLED] in the [DATA TABLE AUTO TRANSF] field. When you are entering another station via the CBL network and a ladder is not required, use the same screen to enter the [UPLOAD PROG ON ADDR CHG] at the [USER PROMPT] to speed up the process.
Normal sampling cannot be performed in the time chart	<ul style="list-style-type: none"> When the sampling time is set outside of the scan time, the computer loader reads data from the MX controller only irregularly and does not allow accurate time chart operation.

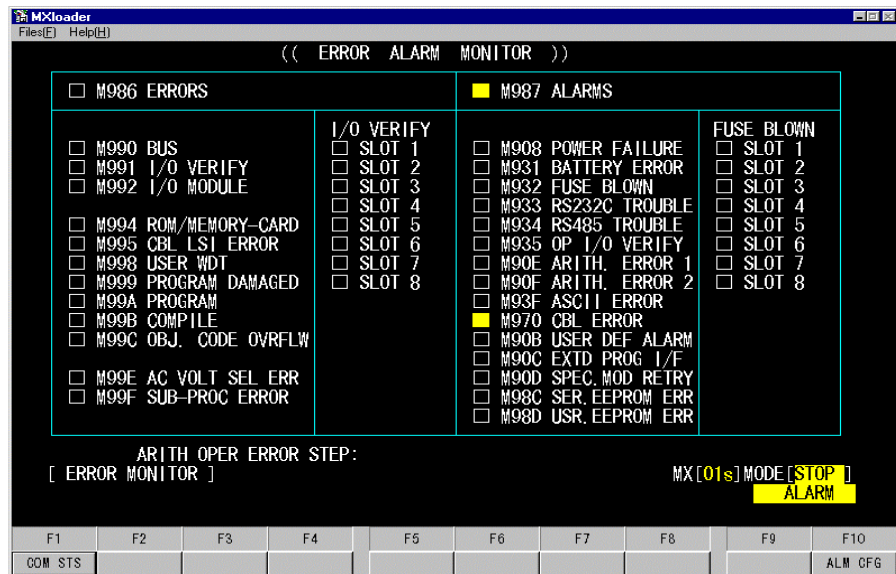
Operation problems	Problems and countermeasures
The maximum value of the scan time takes much longer to process than normal	<ul style="list-style-type: none"> • Since the scan time includes program compilation, scanning takes a long time when compilation is performed in RUN mode.
The program mode cannot be accessed	<ul style="list-style-type: none"> • When the mode switch terminal on the MX controller is set to STOP, disconnect any connections made to the mode switch terminal.
The data displayed differ from MX ladder data	<ul style="list-style-type: none"> • When several personal computer loaders are connected to one MX controller via the CBL network and one loader is performing program operations with the MX controller, the program displayed on the other personal computer loaders is not the current state of the program. The ladders on the other personal computer loaders not in programming mode are then displayed in red to indicate that this ladder differs from the actual ladder. The current state of the ladder can be viewed on the other computer loaders only when they upload the program after the personal computer loader leaves the program mode. The program is uploaded by taking the computer loader off-line and then back on-line or by connecting to another station and then going back to the original station.
Processing cannot be continued after responding to the prompt, [Line modified! Keep the changes? (Y/N)]	<ul style="list-style-type: none"> • In a normal program, [↓] is used for converting blocks. However, if the [Esc] key is pressed after conversion, the prompt, [Line modified! Keep the changes? (Y/N)] appears and [Y] key is selected, the message, [Ladder Rung not yet converted] is output. Do not press the [Esc] key at this point, but press the [↓] key, instead. Then, when [Y] key is selected in response to the prompt [Line modified! Keep the changes? (Y/N)], the program is converted and exited.
《Special Fn Module Data Exchange Error》	<ul style="list-style-type: none"> • When a Spec I/O was operated in the test mode, an error occurred and responses to key operations slowed down. This happened because the Spec I/O was operated when ladder program execution started (i.e. its status was changed to start mode via the monitor and test modes) causing a collision of ladder and Spec I/O operations. Go to the STOP mode, then return to the test mode and select the Spec I/O (it cannot be executed during STOP mode, execution or a break.)
A password has been set and the program cannot be rewritten	<ul style="list-style-type: none"> • When you have forgotten the password, enter [@@@@] to access the program.

6 - 2 Error Alarms and Diagnostic Functions

■ Error and alarm display

The user is notified of errors or alarms in the lower right corner of the screen. When this happens, open the ERR ALARM MONITOR using the procedure given below to check the nature of the error.

MONITOR [F2] → ERR Mon [F1]



- The above screen shows the [ERROR ALARM MONITOR]. The square LED (□) to the left of the item where an error has occurred lights red. It lights yellow when an alarm has occurred but remains off during normal operation.
- When an error occurs, all program operations are stopped. An alarm, except a momentary outage, does not stop program operation. (When a momentary outage occurs, a setting in special register R908 (bit 12) determines whether operation is to continue or a restart is to be made.)
- An I/O VERIFY (error) and a FUSE BLOWN (alarm) conditions causes the square LED (□) for the slot which houses the module with the condition to go yellow or red.
- When an operation error occurs, up to four step numbers are shown in the order the operation errors occurred.
When there are more than four errors, the data of the step numbers beyond the first four is not stored.
- System errors are not monitored on this screen, it can only display alarms output by the MX controller. (A system error often causes the program to stop operating.)
- Refer to ●Error (serious failure) display (page 6-8) for information on how to eliminate errors and alarms.

When an error or alarm has been cleared up, reset the controller and the LEDs (□) will return to their normal unlit state.

MX200/MX50

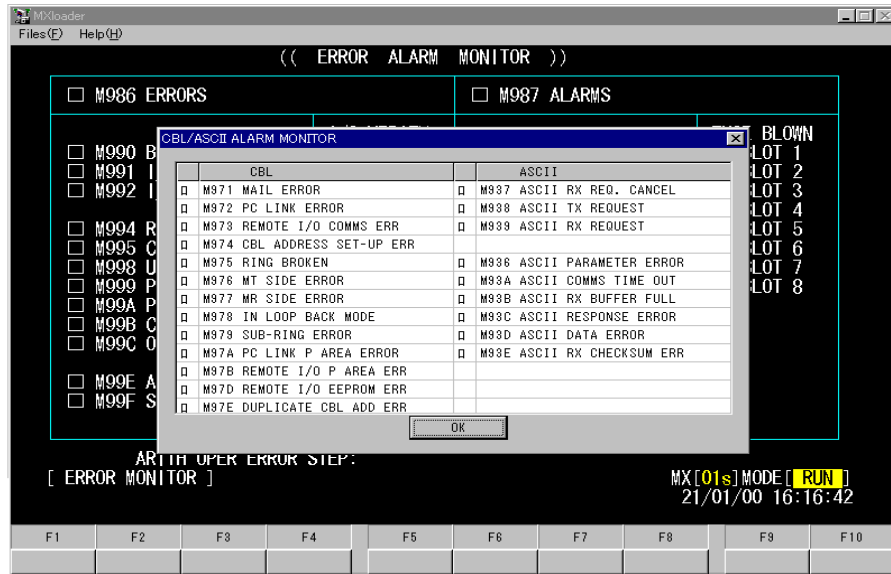
MX30

- Communication related alarms and errors (Communication status)

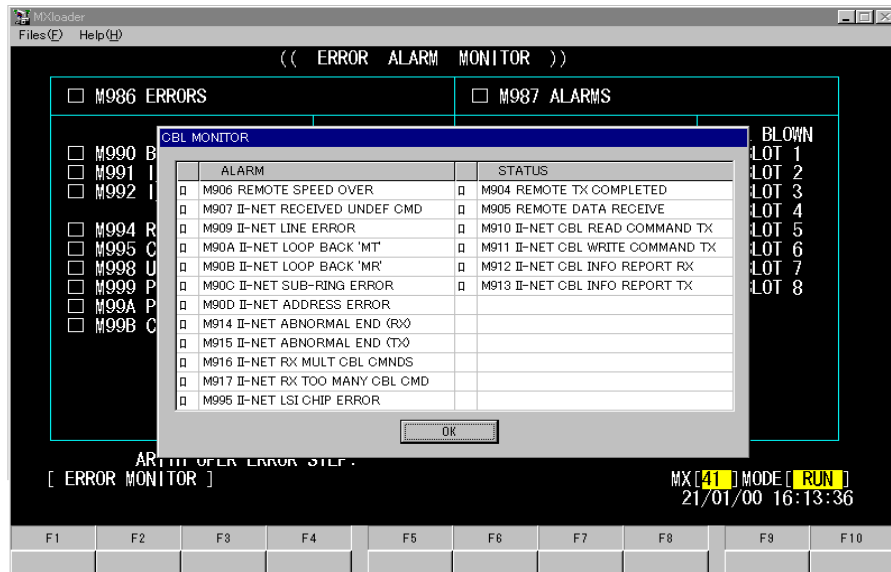
This function displays CBL and ASCII alarm and error conditions on the MX200, MX50 and MX30 controllers.

→COM STS [F1]

MX200/MX50



MX30



● **Additional description of countermeasures given on the following pages**

The countermeasures given from Error (serious failure) display are mainly for the **MX200** controller.

Thus the “**7-segment LED indication**” is a function only on the **MX200**, although LEDs are used to indicate some errors and alarm conditions on the **MX100** controller.

The **MX50/MX30/MX20** has only an ERR/ALM display and such conditions therefore have to be checked on the personal computer loader that is connected to it.

Most error and alarms are basically the same for all processors, but there is one difference between the **MX100**, the **MX30** and the **MX20**.

· **User ROM/memory card (M994)**

- The following memory card errors are indicated.
 - ①When a checksum error occurs on a memory card.
 - ②When the size of a program on the memory card is larger than internal memory.
 - ③When an incorrect ID is used in the memory card.
 - ④When there is a syntax error in a program stored on a memory card.

These conditions can be corrected as follows:

- Make sure that the memory card is properly connected to the memory card connector.
- Check whether a memory card has been correctly installed in a handy loader and that the handy loader has been properly connected to the processor module.
- Use the LOD/SAVE [**F3**] key in the main menu to set the Memory card [**F6**] key CM→memory (program read) [**F1**] to read, then check and revise the program.
- Replace the memory card with another card storing an error-free version of the program.

Eliminate the cause of the error before setting the Reset switch to ON to perform a reset operation.

MX100

● **I/O errors**

When slot #1 and then slot #2 is removed from an **MX100** with two slots mounted, an error is generated only for slot #2. (This is because the **MX100** controller can only retain one error condition.)

The same operation causes an error in both slot #1 and slot #2 on an **MX200**.

● Error (serious failure) display

When an error occurs in the MX200, programs are forced into STOP mode and the 7-segment LED indicator displays an error code. Follow the instructions given in the tables below to process them. Note that special relay areas can be monitored on a personal computer loader.

State of LEDs	7-segment LED indication	8-bit data indicator	Name	Mode change				Reset procedure
				RUN	TEST	STOP	PROG	
S-ERR LED on RUN/STOP LED off			System error	● Not possible	● Not possible	● Not possible	● Not possible	Eliminate the cause of the error. Then press the Reset switch or turn off the power and turn it back on again in the STOP mode, or power OFF→ON.
S-ERR LED flashes RUN/STOP LED off	<i>Er0</i> <i>1</i>	All bit LEDs are on.	I/O bus error	● Not possible	● Not possible	○ possible	○ possible	Eliminate the cause of the error. Then press the Reset switch or turn off the power and turn it back on again in the STOP mode, or power OFF→ON.
	<i>Er0</i> <i>2</i>	The bit (0 to 7) LEDs that correspond to the slot (1 to 8) where the error occurred goes on.	I/O compare error	● Not possible	● Not possible	○ possible	○ possible	Eliminate the cause of the error. Then press the Reset switch or turn off the power and turn it back on again in the STOP mode, or power OFF→ON.
	<i>Er0</i> <i>3</i>	The bit (0 to 7) LEDs that correspond to the slot (1 to 8) where the error occurred goes on.	I/O module error	● Not possible	● Not possible	○ possible	○ possible	Eliminate the cause of the error. Then press the Reset switch or turn off the power and turn it back on again in the STOP mode, or power OFF→ON.

Mode change : Indicates which modes the loader can access when an error has occurred.

State of contacts when an error or alarm occurs

: Terminals ⑩-⑪ go off when an error occurs while terminals ⑫-⑬ go on when an alarm occurs.

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State of contacts when error or alarm occurs	Program state	Monitor	Special relay address	Diagnosis	Countermeasures
Terminals ⑩-⑪ off Terminals ⑫-⑬ on	Stops	Monitoring impossible	—	<ul style="list-style-type: none"> A system error (TRAP error, ROM error, RAM error or subprocessor error) has occurred. <p>TRAP error An error in a command causes the CPU to assume that it is an undefined command. The command is not executed.</p> <p>ROM error A checksum error has occurred in processor module ROM.</p> <p>RAM error A bit error has occurred in processor module RAM</p> <p>Subprocessor error A ROM or RAM error has occurred in a sub-CPU (I/O handling processor) in the processor module.</p>	<ul style="list-style-type: none"> Check if the processor module is correctly installed or not. Then press the Reset switch to start up again. Replace the processor module and start over.
Terminals ⑩-⑪ off	Stops	Monitor on the loader	M990	<ul style="list-style-type: none"> Since a failure has occurred in the bus line, normal access cannot be made to any I/O module. 	<ul style="list-style-type: none"> Check for damages and cracks on the base PCB. Check for poor contact caused by connection errors between base slots and processor module connectors.
Terminals ⑩-⑪ off	Stops	Monitor on the loader	M991	<ul style="list-style-type: none"> An unrecognizable I/O module was detected in comparison with I/O module installation conditions that are performed at power up and reset. <p>Note: Checks for I/O compare errors are performed not only during program execution but also in the STOP mode. When an I/O module is removed after powering down, its area will be assigned to the next I/O module thus changing the original I/O assignment.</p>	<ul style="list-style-type: none"> Make sure that the module is not loose or has been disconnected. Install it properly. Check I/O data to confirm that set (I/O assigned) I/O corresponds to the locations of actually inserted I/O modules.
Terminals ⑩-⑪ off	Stops	Monitor on the loader	M992	<ul style="list-style-type: none"> Some I/O modules are recognized as normal, others cannot be recognized and still others do not respond normally. Internal I/O module failure. 	<ul style="list-style-type: none"> Check for poor contact between the I/O module and the base connectors. Replace the I/O module.

State of LEDs	7-segment LED indication	8-bit data indicator	Name	Mode change				Reset procedure
				RUN	TEST	STOP	PROG	
—	—	—	Reserved	—	—	—	—	—
ERR/ ALM LED flashes RUN/ STOP LED off	<i>Er05</i>	TX and RX state of LOAD, ASCII, CBL and OPL communication are displayed.	User EPROM/EEPROM failure	● Not possible	● Not possible	○ possible	● Not possible	Eliminate the cause of the error. Then press the Reset switch or turn off the power and turn it back on again in the STOP mode, or power OFF→ON.
	<i>Er06</i>	TX and RX state of LOAD, ASCII, CBL and OPL communication are displayed.	Failure in LSI used for CBL communication	● Not possible	● Not possible	○ possible	○ possible	Eliminate the cause of the error. Then press the Reset switch or turn off the power and turn it back on again in the STOP mode, or power OFF→ON.
	<i>Er10</i>	TX and RX state of LOAD, ASCII, CBL and OPL communication are displayed.	User WDT error	● Not possible	● Not possible	○ possible	○ possible	Eliminate the cause of the error. Then press the Reset switch or turn off the power and turn it back on again in the STOP mode, or power OFF→ON.
	<i>Er11</i>	TX and RX state of LOAD, ASCII, CBL and OPL communication are displayed.	Program damage	● Not possible	● Not possible	○ possible	○ possible	Eliminate the cause of the error. Then press the Reset switch or turn off the power and turn it back on again in the STOP mode, or power OFF→ON.
	<i>Er12</i>	TX and RX state of LOAD, ASCII, CBL and OPL communication are displayed.	Program incomplete	● Not possible	● Not possible	○ possible	○ possible	Eliminate the cause of the error and go from the PROG mode to the STOP mode.

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State of contacts when error or alarm occurs	Program state	Monitor	Special relay address	Diagnosis	Countermeasures
—	—	—	M993	—	—
Terminals ⑩-⑪ off	Stops	Monitor on the loader.	M994	<ul style="list-style-type: none"> • This indicates that one of the following failures has occurred in EPROM/EEPROM. ① A checksum error occurred in EPROM/EEPROM. ② The size of the program in EPROM/EEPROM is larger than internal memory. ③ There is an incorrect ID in EPROM/EEPROM. ④ There is a syntax error in the program stored in EPROM/EEPROM. 	<ul style="list-style-type: none"> • Check if the EPROM/EEPROM unit has been properly installed in the processor module socket. • There is a syntax error in the program stored in EPROM/EEPROM. Check program content and revise. • Install a new EPROM/EEPROM with the correct program.
Terminals ⑩-⑪ off	Stops	Monitor on the loader.	M995	<ul style="list-style-type: none"> • Check turned up failure in LSI used for communication. 	<ul style="list-style-type: none"> • Replace processor module and start over.
Terminals ⑩-⑪ off	Stops	Monitor on the loader.	M998	<ul style="list-style-type: none"> • Indicates that the program took longer than the set scan time. The scan time value can be set using the WDT instruction (FUN95) within a range of 100ms to 2 seconds. The default value is 100ms. 	<ul style="list-style-type: none"> • Set a shorter scan time (set to 100ms at factory). • When the program cannot be changed, use the WDT instruction to correct the scan time setting (between 100ms to 2 seconds).
Terminals ⑩-⑪ off	Stops	Monitor on the loader.	M999	<ul style="list-style-type: none"> • A checksum failure occurred in a program stored in processor module internal memory. • The program has been damaged. • The Reset switch was pressed during execution of a WTBL instruction (does not happen when the power is turned off and turned back on again). 	<ul style="list-style-type: none"> • Check if all devices were correctly assembled and connected when the program was written. • Check if battery voltage is too low and if the devices have been correctly assembled. (If this is the case, the AL02 code is displayed and a battery failure is indicated.) • Upload the program to the processor module again. • Download the data tables again and correct the checksum data. • Replace the processor module.
Terminals ⑩-⑪ off	Stops	Monitor on the loader.	M99A	<ul style="list-style-type: none"> • There is a syntax error in the program. 	<ul style="list-style-type: none"> • Correct the syntax error and update the program to the processor module.

State of LEDs	7-segment LED indication	8-bit data indicator	Name	Mode change				Reset procedure
				RUN	TEST	STOP	PROG	
ERR/ ALM LED flashes RUN/ STOP LED off	<i>Er 1</i> <i>3</i>	TX and RX state of LOAD, ASCII, CBL and OPL communication are displayed.	Compile error	● Not possible	● Not possible	○ possible	○ possible	Eliminate the cause of the error. Then press the Reset switch or turn off the power and turn it back on again in the STOP mode, or power OFF→ON.
	<i>Er 1</i> <i>4</i>	TX and RX state of LOAD, ASCII, CBL and OPL communication are displayed.	Object code size exceeded.	● Not possible	● Not possible	○ possible	○ possible	Eliminate the cause of the error. Then press the Reset switch or turn off the power and turn it back on again in the STOP mode, or power OFF→ON.
	<i>Er 1</i> <i>5</i>	TX and RX state of LOAD, ASCII, CBL and OPL communication are displayed.	AC power supply setting failure	● Not possible	● Not possible	○ possible	○ possible	Eliminate the cause of the error. Then press the Reset switch or turn off the power and turn it back on again in the STOP mode, or power OFF→ON.

● Alarm (non-serious failures) display

When an alarm is generated in the MX200, program operation continues. (For some alarms, it is possible to specify whether the program should be continued or not.)When alarm is generated, the 7-segment LED indicator on the processor module displays an error code. Follow the instructions given in the tables below to process them. Note that special relay areas can be read or written to using a user program.

State of LEDs	7-segment LED indication	8-bit data indicator	Name	Mode change				Reset procedure
				RUN	TEST	STOP	PROG	
ERR/ ALM LED on RUN/ STOP LED on	<i>AL 0</i> <i>1</i>	TX and RX state of LOAD, ASCII, CBL and OPL communication are displayed.	Momentary power failure occurred	○ possible	○ possible	○ possible	○ possible	<ul style="list-style-type: none"> Eliminate the cause of the error. Then press the Reset switch or turn off the power and turn it back on again in the STOP mode, or power OFF→ON. Write to special relay M908.
	<i>AL 0</i> <i>2</i>	TX and RX state of LOAD, ASCII, CBL and OPL communication are displayed.	Battery failure	○ possible	○ possible	○ possible	○ possible	Eliminate the cause of the error.

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State of contacts when error or alarm occurs	Program state	Monitor	Special relay address	Diagnosis	Countermeasures
Terminals ⑩-⑪ off	Stops	Monitor on the loader.	M99B	• An error occurred in compiling or a program error occurred.	• Upload the program to the processor module again and restart.
Terminals ⑩-⑪ off	Stops	Monitor on the loader.	M99C	• The object code of the user program exceeds the capacity of the compile RAM.	• The program is too large. Reduce the size of the program (put basic instructions together and process them as application instructions for greater efficiency).
Terminals ⑩-⑪ off	Stops	Monitor on the loader.	M99E	• 200V AC setting (thus the 100/200V AC selector terminals ③-④ should be open), but 100V AC is being supplied.	• Close terminals ③-④ or supply 200V AC.

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State of contacts when error or alarm occurs	Program state	Monitor	Special relay address	Diagnosis	Countermeasures
Terminals ⑫-⑬ on	Continues or stops	Read special relays (writing also possible) or monitor on the loader.	M908	• There was a 20msec or longer power failure in the AC supply after which power returned. Note: When bit 12 in register R0908 for host communication settings is on (stop) and terminals 7 and 8 are off (RUN), the program stops and terminals ⑫-⑬ goes on. When bit 12 is off (continue), operation continues but terminals ⑫-⑬ go on. Bit 12 is set to off at the factory.	• Check power supply voltage and connections of each device. • Check if there was a power failure longer than 20 ms or voltage fluctuations. • Turn on the power and restart. • When a check for a momentary power failure is not necessary, set bit 12 in register R0903 to on.
Terminals ⑫-⑬ on	Continues	Monitor on the loader.	M931	• The battery should be replaced when the voltage drops below the specified value (2.5 ±0.2V DC). • This failure may temporarily “go away”, however, the battery should be replaced even when this alarm goes on for a short period. (The condition of the battery can be checked only when the power is on.)	• Replace the battery. • Check that the battery leads and connectors have been properly connected. • When a battery check is not necessary, set bit 13 in register R0903 to on.

State of LEDs	7-segment LED indication	8-bit data indicator	Name	Mode change				Reset procedure
				RUN	TEST	STOP	PROG	
ERR/ ALM LED on RUN/ STOP LED on	<i>AL0</i> <i>3</i>	The bit (0 to 7) LEDs that correspond to the slot (1 to 8) which caused the alarm go on.	Fuse blown	○ possible	○ possible	○ possible	○ possible	Eliminate the cause of the error. Then press the Reset switch or turn off the power and turn it back on again in the STOP mode, or power OFF→ON.
	<i>AL0</i> <i>8</i>	TX and RX state of LOAD, ASCII, CBL and OPL communication are displayed.	Invalid startup of extended program interface	○ possible	○ possible	○ possible	○ possible	Eliminate the cause of the error. Then press the Reset switch or turn off the power and turn it back on again in the STOP mode, or power OFF→ON.
	<i>AL0</i> <i>9</i>	TX and RX state of LOAD, ASCII, CBL and OPL communication are displayed.	Retry generated by special module	○ possible	○ possible	○ possible	○ possible	Normal operation resumed after retry.
	<i>AL1</i> <i>0</i>	TX and RX state of LOAD, ASCII, CBL and OPL communication are displayed.	Operation error 1	○ possible	○ possible	○ possible	○ possible	<ul style="list-style-type: none"> Eliminate the cause of the error. Write to special relay M90E.
	<i>AL1</i> <i>1</i>	TX and RX state of LOAD, ASCII, CBL and OPL communication are displayed.	Operation error 2	○ possible	○ possible	○ possible	○ possible	<ul style="list-style-type: none"> Eliminate the cause of the error. Then press the Reset switch or turn off the power and turn it back on again in the STOP mode, or power OFF→ON. Write to special relay M90F. Return to STOP→RUN mode.

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State of contacts when error or alarm occurs	Program state	Monitor	Special relay address	Diagnosis	Countermeasures
Terminals ⑫-⑬ on	Continues	Read special relays (writing also possible) or monitor on the loader.	M932	• A fuse has been blown in an I/O module.	<ul style="list-style-type: none"> • Check the bit LEDs on the processor module or the fuse alarm lamps to determine which module has a blown fuse. • Eliminate the overload or wire contact that caused the blown fuse before replacing it.
Terminals ⑫-⑬ on	Continues	Monitor on the loader.	M90C	• Communications that cannot be controlled by an extended program (CBL mail communication (M950 to M967), communication to one destination (no response), ASCII send and reception (M960 to M96F) (M937 to M939) is being run.	<ul style="list-style-type: none"> • The following contacts are operated by the extended program. Correct the program. M950 to M95F: CBL mail communication M960 to M967: Communication with one destination (no response) M937 to M939: ASCII send and reception
Terminals ⑫-⑬ on	Continues	Monitor on the loader.	M90D	• The ready time of the special module was exceeded.	<ul style="list-style-type: none"> • Check for failures in the special module.
Terminals ⑫-⑬ on	Continues	Read special relays (writing also possible) or monitor on the loader.	M90E	• An operation error occurred in the execution of an application instruction. Or the operation error was not cleared up.	<ul style="list-style-type: none"> • The instruction is used incorrectly. Check the operands of the instruction.
Terminals ⑫-⑬ on	Continues	Read special relays (writing also possible) or monitor on the loader.	M90F	• An operation error occurred in the execution of an application instruction. Or the operation error was not cleared up.	<ul style="list-style-type: none"> • The instruction is used incorrectly. Check the operands of the instruction.

State of LEDs	7-segment LED indication	8-bit data indicator	Name	Mode change				Reset procedure
				RUN	TEST	STOP	PROG	
ERR/ ALM LED on RUN/ STOP LED on	<i>AL1</i> <i>2</i>	TX and RX state of LOAD, ASCII, CBL and OPL communication are displayed.	EEPROM transmission failure in special register	○ possible	○ possible	○ possible	○ possible	Use loader to set special register again and update EEPROM.
	<i>AL1</i> <i>3</i>	TX and RX state of LOAD, ASCII, CBL and OPL communication are displayed.	Write error occurred in user EEPROM	○ possible	○ possible	○ possible	○ possible	Write to user EEPROM again.
	<i>AL2</i> <i>0</i>	TX and RX state of LOAD, ASCII, CBL and OPL communication are displayed.	Loader communication failure (RS-232C communication failure)	○ possible	○ possible	○ possible	○ possible	Eliminate the cause.
	<i>AL2</i> <i>1</i>	The bit (0 to 7) LEDs that correspond to the station numbers (1 to 7) where an OP link communication failure occurred go on.	OP I/O communication failure (RS-485 communication failure OP link stations 1 to 7)	○ possible	○ possible	○ possible	○ possible	Eliminate the cause.
	<i>AL2</i> <i>2</i>	The bit (0 to 7) LEDs that correspond to the station numbers (8 to 15) where an OP link communication failure occurred go on.	OP I/O communication failure (RS-485 communication failure OP link stations 8 to 15)	○ possible	○ possible	○ possible	○ possible	Eliminate the cause.

(3/7)

State of contacts when error or alarm occurs	Program state	Monitor	Special relay address	Diagnosis	Countermeasures
Terminals ⑫-⑬ on	Continues	Read special relays (writing also possible) or monitor on the loader.	M98C	<ul style="list-style-type: none"> • A reset was performed during a write to EEPROM and the data could not be properly written. • A checksum error occurred in EEPROM used for storing special register data. 	<ul style="list-style-type: none"> • Use loader to set special register again and update EEPROM. • Replace the processor module. (It is possible that the EEPROM has been written to too many times. Check if this is the case.)
Terminals ⑫-⑬ on	Continues	Monitor on the loader.	M98D	<ul style="list-style-type: none"> • Data could not be correctly written to a user EEPROM. • A checksum error occurred in user EEPROM. 	<ul style="list-style-type: none"> • Write the data to user EEPROM again. • Check if an EEPROM of the correct make and model is used.
Terminals ⑫-⑬ on	Continues	Read special relays (writing also possible) or monitor on the loader.	M933	<ul style="list-style-type: none"> • The loader, personal computer and the processor module cannot communicate. Check for broken cables and whether the power to the loader, personal computer or other devices has been turned off and if the communication settings are correct. 	<ul style="list-style-type: none"> • Check if the communication path connections between the PC loader and the processor module is correct and whether the devices have been properly assembled. • Check if the power to the devices has been turned off or if signal cables and other connections are exposed to induction noise.
Terminals ⑫-⑬ on	Continues	Read special relays (writing also possible) or monitor on the loader.	M934	<ul style="list-style-type: none"> • A communication error occurred during communication between the OP I/O (OP link station no. 1 to 7) and the processor module. A cable may have broken during communication or the power to the OP I/O may have been turned off during communication. 	<ul style="list-style-type: none"> • Check if the communication path connections between the OP I/O and the processor module was ruptured, or if there was noise, or whether the modules were correctly assembled. • Check if the OP I/O power supply was turned off or not.
Terminals ⑫-⑬ on	Continues	Read special relays (writing also possible) or monitor on the loader.	M934	<ul style="list-style-type: none"> • A communication error occurred during communication between the OP I/O (OP link station no. 8 to 15) and the processor module. A cable may have broken during communication or the power to the OP I/O may have been turned off during communication. 	<ul style="list-style-type: none"> • Check if the communication path connections between the OP I/O and the processor module was ruptured, or if there was noise, or whether the modules were correctly assembled. • Check if the OP I/O power supply was turned off or not.

State of LEDs	7-segment LED indication	8-bit data indicator	Name	Mode change				Reset procedure
				RUN	TEST	STOP	PROG	
ERR/ ALM LED on RUN/ STOP LED on	AL2 3	The bit (1 to 7) LEDs that correspond to the station numbers (1 to 7) where an OP I/O compare error occurred go on.	OP I/O compare error (OP link station nos. 1 to 7)	○ possible	○ possible	○ possible	○ possible	Eliminate the cause.
		The bit (0 to 7) LEDs that correspond to the station numbers (8 to 15) where an OP I/O compare error occurred go on.	OP I/O compare error (OP link station nos. 8 to 15)	○ possible	○ possible	○ possible	○ possible	Eliminate the cause.
	AL3 0	TX and RX state of LOAD, ASCII, CBL and OPL communication are displayed.	ASCII communication alarm (representative bits)	○ possible	○ possible	○ possible	○ possible	Eliminate the cause of the failure and go from STOP→RUN mode and STOP→TEST mode.

(4/7)

State of contacts when error or alarm occurs	Program state	Monitor	Special relay address	Diagnosis	Countermeasures
Terminals ⑫-⑬ on	Continues	Read special relays (writing also possible) or monitor on the loader.	M935	<ul style="list-style-type: none"> The registered OP I/O are not connected (the processor module cannot recognize it). 	<ul style="list-style-type: none"> Check if the power to the OP I/O has been turned off. Correct OP I/O setting.
Terminals ⑫-⑬ on	Continues	Read special relays (writing also possible) or monitor on the loader.	M935	<ul style="list-style-type: none"> The registered OP I/O are not connected (the processor module cannot recognize it). 	<ul style="list-style-type: none"> Check if the power to the OP I/O has been turned off. Correct OP I/O setting.
Terminals ⑫-⑬ on	Continues	Read special relays or monitor on the loader.	M93F	<ul style="list-style-type: none"> One of the following ASCII errors occurred: <ol style="list-style-type: none"> ① ASCII communication error time out (M93A) ② ASCII reception buffer (M93B) ③ ASCII response error (M93C) ④ ASCII reception data error (M93D) ⑤ ASCII reception checksum error (M93E) On when one of M93A to M93E is on. Off when all are off. 	<ul style="list-style-type: none"> Check ASCII communication and correct ASCII communication settings. The following are probable causes. <p>M93A: The connection to the other party is not correct and there is an error in the communication parameters.</p> <p>M93B: There is no termination code in the reception data (parameter setting mistake) or a lot of data was received at one time.</p> <p>M93C: The response code in a special mode was other than 00.</p> <p>M93D: The Baud rate parity and stop bit (communication parameters) settings were incorrectly set.</p> <p>M93E: The result of frame sum in the reception data is incorrect.</p> When an ASCII communication alarm check is not required, set bit 4 in the R0903 register to on.

State of LEDs	7-segment LED indication	8-bit data indicator	Name	Mode change				Reset procedure
				RUN	TEST	STOP	PROG	
ERR/ ALM LED on RUN/ STOP LED on	<i>AL3</i> <i>1</i>	TX and RX state of LOAD, ASCII, CBL and OPL communication are displayed.	ASCII Parameter error	○ possible	○ possible	○ possible	○ possible	Eliminate the cause of the failure and go from STOP→RUN mode and STOP→TEST mode.
	<i>AL6</i> <i>0</i>	TX and RX state of LOAD, ASCII, CBL and OPL communication are displayed.	CBL communication alarm (representative bit)	○ possible	○ possible	○ possible	○ possible	Eliminate the cause of the failure and go from STOP→RUN mode and STOP→TEST mode.
	<i>AL6</i> <i>1</i>	TX and RX state of LOAD, ASCII, CBL and OPL communication are displayed.	CBL communication mail link failure	○ possible	○ possible	○ possible	○ possible	Eliminate the cause of the failure and go from STOP→RUN mode and STOP→TEST mode.
	<i>AL6</i> <i>2</i>	TX and RX state of LOAD, ASCII, CBL and OPL communication are displayed.	CBL communication PC link failure	○ possible	○ possible	○ possible	○ possible	Eliminate the cause of the failure and go from STOP→RUN mode and STOP→TEST mode.

(5/7)

State of contacts when error or alarm occurs	Program state	Monitor	Special relay address	Diagnosis	Countermeasures
Terminals ⑫-⑬ on	Continues	Monitor on the loader.	M936	<ul style="list-style-type: none"> • ASCII transmission and reception parameter was attempted when the ASCII transmission and reception parameter was set to a nonexecutable value. 	<ul style="list-style-type: none"> • The ASCII transmission and reception parameters (R0941 to R0949) have either been set so that they exceed the register area or the sum location is incorrect. Correct the setting. • When an ASCII communication alarm check is not required, set bit 4 in the R0903 register to on.
Terminals ⑫-⑬ on	Continues	Read special relays or monitor on the loader.	M970	<ul style="list-style-type: none"> • Representative bits of CBL communication alarm (M971 to M97E). • On when one of M971 to M97E is on. Off when all are off. 	<ul style="list-style-type: none"> • Verify the main cause of the alarm (M971 to M97E) and process them as required.
Terminals ⑫-⑬ on	Continues	Read special relays or monitor on the loader.	M971	<ul style="list-style-type: none"> • Mail transmission was abnormally terminated. 	<ul style="list-style-type: none"> • Check the mail parameter (transmission destination address).
Terminals ⑫-⑬ on	Continues	Read special relays or monitor on the loader.	M972	<ul style="list-style-type: none"> • PC link data transmission was interrupted for 1 second (R0955 = 1) or 500ms (R0955 = 0) or longer. 	<ul style="list-style-type: none"> • Use the network information PC link failure station data (P0020 to P0023) to check station where failure has occurred to see if this station is conducting normal PC link transmission. <p>Note: If a PC link has been received at least once, the receiving station bit of the MX200 PC link receiving station configuration (P0016 to P0019) goes on. After this, PC link reception configuration can be cleared by turning the power off and then turning it back on again. Or set bit 0 in R0903 to on to clear the PC link reception station configuration every 5 seconds and the alarm is not latched.</p>

State of LEDs	7-segment LED indication	8-bit data indicator	Name	Mode change				Reset procedure
				RUN	TEST	STOP	PROG	
ERR/ ALM LED on RUN/ STOP LED on	<i>AL6</i> 3	TX and RX state of LOAD, ASCII, CBL and OPL communication are displayed.	CBL communication remote I/O error	<input type="radio"/> possible	<input type="radio"/> possible	<input type="radio"/> possible	<input type="radio"/> possible	Eliminate the cause.
		TX and RX state of LOAD, ASCII, CBL and OPL communication are displayed.	CBL communication address setting error	<input type="radio"/> possible	<input type="radio"/> possible	<input type="radio"/> possible	<input type="radio"/> possible	Eliminate the cause and set the Reset switch to on.
		TX and RX state of LOAD, ASCII, CBL and OPL communication are displayed. CBL and TX on RX off.	CBL communication line problem	<input type="radio"/> possible	<input type="radio"/> possible	<input type="radio"/> possible	<input type="radio"/> possible	Eliminate the cause.
		TX and RX state of LOAD, ASCII, CBL and OPL communication are displayed.	CBL communication loop back MT (transmission) failure	<input type="radio"/> possible	<input type="radio"/> possible	<input type="radio"/> possible	<input type="radio"/> possible	Eliminate the cause.
		TX and RX state of LOAD, ASCII, CBL and OPL communication are displayed.	CBL communication loop back MR (reception) failure	<input type="radio"/> possible	<input type="radio"/> possible	<input type="radio"/> possible	<input type="radio"/> possible	Eliminate the cause.
		TX and RX state of LOAD, ASCII, CBL and OPL communication are displayed.	CBL communication loop back occurred.	<input type="radio"/> possible	<input type="radio"/> possible	<input type="radio"/> possible	<input type="radio"/> possible	Eliminate the cause.

(6/7)

State of contacts when error or alarm occurs	Program state	Monitor	Special relay address	Diagnosis	Countermeasures
Terminals ⑫-⑬ on	Continues	Read special relays or monitor on the loader.	M973	<ul style="list-style-type: none"> Remote I/O does not operate normally due to a remote I/O allocation error or inability to establish a connection with the remote I/O. 	<ul style="list-style-type: none"> Check remote I/O allocation using the loader. When the configuration of remote slave stations data differs from current configuration (the number of units and addresses), reregister the configuration. <p>Check the state of connected remote slave stations (the number of units, addresses, etc.)</p>
Terminals ⑫-⑬ on	Continues	Read special relays or monitor on the loader.	M974	<ul style="list-style-type: none"> There is an error in the value of a set CBL address. 	<ul style="list-style-type: none"> The address is set to a value that is outside the allowable range (1 to 63). Correct address setting. <p>Note: Address 7FH is used to turn off CBL communication.</p>
Terminals ⑫-⑬ on	Continues	Read special relays or monitor on the loader.	M975	<ul style="list-style-type: none"> Communication cannot be made to both CBL stations. No connection has been made to CBL connector MT (transmission) and MR (reception). 	<ul style="list-style-type: none"> Check MT and MR cable connections and that the power to both stations is turned on.
Terminals ⑫-⑬ on	Continues	Read special relays or monitor on the loader.	M976	<ul style="list-style-type: none"> Loop back occurred in MT CBL connection. 	<ul style="list-style-type: none"> Check MT cable connection and that the power to the MT station is turned on.
Terminals ⑫-⑬ on	Continues	Read special relays or monitor on the loader.	M977	<ul style="list-style-type: none"> Loop back occurred in MR CBL connection. 	<ul style="list-style-type: none"> Check MR cable connection and that the power to the MR station is turned on.
Terminals ⑫-⑬ on	Continues	Read special relays or monitor on the loader.	M978	<ul style="list-style-type: none"> A loop back has occurred somewhere in a CBL network to which the MX200 Controller is connected. 	<ul style="list-style-type: none"> When an AL66 or AL67 code is displayed, check MT and MR cable connections and that the power to the MT station is turned on. When an AL66 or AL67 code is not displayed, check the network data loop back address (MT: P0006, MR: P0007) and check cable connections and the power supply of the station between them.

State of LEDs	7-segment LED indication	8-bit data indicator	Name	Mode change				Reset procedure
				RUN	TEST	STOP	PROG	
ERR/ ALM LED on RUN/ STOP LED on	<i>AL 6</i> <i>9</i>	TX and RX state of LOAD, ASCII, CBL and OPL communication are displayed.	CBL sublink failure	○ possible	○ possible	○ possible	○ possible	Eliminate the cause.
	<i>AL 7</i> <i>0</i>	TX and RX state of LOAD, ASCII, CBL and OPL communication are displayed. CBL and TX on. RX off.	PC link transmission and reception error	○ possible	○ possible	○ possible	○ possible	Eliminate the cause.
	<i>AL 7</i> <i>1</i>	TX and RX state of LOAD, ASCII, CBL and OPL communication are displayed.	Remote I/O transmission and reception error	○ possible	○ possible	○ possible	○ possible	
	<i>AL 7</i> <i>2</i>	TX and RX state of LOAD, ASCII, CBL and OPL communication are displayed.	Remote slave station data error	○ possible	○ possible	○ possible	○ possible	
	<i>AL 7</i> <i>3</i>	TX and RX state of LOAD, ASCII, CBL and OPL communication are displayed.	Duplicate address error	○ possible	○ possible	○ possible	○ possible	Eliminate the cause.

(7/7)

State of contacts when error or alarm occurs	Program state	Monitor	Special relay address	Diagnosis	Countermeasures
Terminals ⑫-⑬ on	Continues	Read special relays or monitor on the loader.	M979	<ul style="list-style-type: none"> During a non-loop back state a sublink failure occurred somewhere in a CBL network to which the MX200 is connected. 	<ul style="list-style-type: none"> Check the address bit of the station where a network data sublink error occurred. <p>Check the link starting from the local station connector and go toward MR. Check the sublink cable before the station where the data for the sublink failure first occurred.</p>
Terminals ⑫-⑬ on	Continues	Read special relays or monitor on the loader.	M97A	<ul style="list-style-type: none"> When reception of MX200 was in single mode, it received 100 word data transmission from the dual mode transmission side (the low-order 50 words are ignored). PC link data was received from a station with a number under 32 in dual mode. 	<ul style="list-style-type: none"> Set reception to dual mode or transmission to single mode. Set reception to single mode or transmission to dual mode.
Terminals ⑫-⑬ on	Continues	Read special relays or monitor on the loader.	M97B	<ul style="list-style-type: none"> Data exceeding 26 words was sent or received despite a single mode setting. Remote data was received from a station with an address less than 32 in dual mode. 	<ul style="list-style-type: none"> Set to twin mode (max. 50 words) when data transmissions or receptions of 26 words or more are to be performed. Set to single mode.
Terminals ⑫-⑬ on	Continues	Read special relays or monitor on the loader.	M97D	<ul style="list-style-type: none"> Error occurred in remote slave station data. 	<ul style="list-style-type: none"> Reregister remote slave station data using the loader or through key operation.
Terminals ⑫-⑬ on	Continues	Read special relays or monitor on the loader.	M97E	<ul style="list-style-type: none"> There is a station in the network with an address that is identical to that used by the MX200. 	<ul style="list-style-type: none"> Reset to make sure there are no duplicate addresses.

6 - 3 Error and Alarms Displayed when Writing Programs

■ Errors during program creation

Press the CHECK P [F8] in the main menu, then the CHECK [F1] and the ERROR [F3] keys to check an edited program for errors.

Since the error alarm monitor stops operation of any program that contains errors, new programs must be debugged until all program errors listed below have been removed.

Some errors are detected not only by the CHECK P [F8] function, but also when the program is edited. Alarms are not program errors and do not stop the operation of the program.

(1/3)

Error code	Description of error	Error diagnosis	Checked during edit
02	Parameter Error	Incorrect parameter value (device number, constant #, constant K)	Yes
03	Dev. Param. out of range	The value of the device number exceeds the defined area. Example : X000 to X09F → X100 X200 to X29F → X11F (positive) (negative)	Yes
04	Constant '#' Error	① The constant # value exceeds the specified number of digits. ② A decimal point is used (allowable only with the counter). ③ A to F, a to f are used with numerics.	Yes
05	Constant 'K' Error	① Characters other than “-”, “+” and “0 to 9” are used. ② A double length instruction exceeds the range $-2147483648 \leq \text{to} \leq 2147483647$. ③ K (not a double length instruction) exceeds the range $-32768 \leq \text{to} \leq 32767$.	Yes
06	Parameter Same Area Err.	Parameter values are not in the same area. ① D1 and D2 of DCPY (FUN07), SR (FUN60), SFL (FUN61), SFR (FUN62), RLC (FUN63), RRC (FUN64), RL (FUN65) and RR (FUN66) must be in the same area and D1 must be less than or equal to D2. • Y GP output (Y00 to Y090) and OP I/O output (Y200 to Y290) are in different areas as are R register (R00 to R499) and output register (R600 to R619). ② S1 and S2 of BMO V (01) must be in the same area and S1 must be less than or equal to S2. • X GP output (X00 to X090) and OP I/O input (X200 to X290) are in different areas as are Y GP input and OP I/O input. • R register (R00 to R499), input register (R500 to R519) and output register (R600 to R619) are in different areas. • Only the register (R000 to R499) can be used in indirect specification which is handled as register (R000 to R499). However, when an indirect specification is made of S1 or S2, no check is made that S1 is less than or equal to S2.	Yes
07	Parameter out of range	Parameter (device number, constant # and constant K) are out of range. ① A BMOV (FUN01) instruction is out of range. The number of words of a device specified by D is outside of the S2-S1+1 word range. Example : BMOV S1 : X000 \lceil 9-0+1=10 words (FUN01) S2 : X090 \lceil D : R498+9 > 499 (error) ② The STB (FUN08) area is exceeded. (n+1)/2+1 words (however, all decimals are rounded off) were added to a device specified by S which caused the range to be exceeded. Example : STB n : #11 → (11-1)/2+1=6 words (FUN08) S : X080 D : Y000 → 8+5=13 > 9 (error)	Yes

(2/3)

Error code	Description of error	Error diagnosis	Checked during edit
20	Undefined Inst.	An undefined instruction was found in the program.	
21	Ladder Rung Error	<p>The following errors occurred in a circuit block.</p> <p>① The total number of ANB and ORB plus 1 and LD, LDNOT, LD compare and DLD compare do not match.</p> <p>② The total number of LD, LDNOT, LD compare and DLD compare which must be less than or equal to 8, fail to meet this condition. An error was generated when the result of internal processing LD, LDNOT, LD compare and DLD compare plus 1 and the internal count of ANB, ORB minus 1 is more than 9 and less than 0.</p> <p>③ An ORB and ANB instruction follow an output instruction. Note: Output instructions: OUT, TMR, CNT and the following instructions: INV (FUN22) LPS (FUN34) LRD (FUN35) LPP (FUN36)</p> <p>④ JPE (FUN33) is followed by an output instruction. RBP (FUN41) SBR (FUN43) RET (FUN44) However, the following combinations are possible: MCR (FUN31), JPE (FUN33) RBP (FUN41), BSR (FUN43) RET (FUN44), END (FUN40)</p> <p>⑤ There is no LD instruction before an output instruction. However, the following combinations are possible: MCR (FUN31), JPE (FUN33) RBP (FUN41), BSR (FUN43) RET (FUN44), END (FUN40)</p>	—
22	CALL, SBR, RET Error	<p>① An SBR (FUN43) with the same number called by the CALL (FUN42) instruction cannot be found.</p> <p>② RET (FUN44) corresponding to SBR (FUN43) cannot be found.</p> <p>③ Between SBR (FUN43) and RET (FUN44) there is a CALL (FUN42) instruction with the same number.</p> <p>④ An SBR (FUN43) is not preceded by an RBP (FUN41) or RET (FUN44).</p>	—
23	MC, MCR Error	<p>① An MC (FUN30) instruction corresponding to MCR (FUN31) cannot be found.</p> <p>② An MCR (FUN31) instruction with a number lower than #n could not be found between an MC (FUN30) #n and END (FUN40).</p>	—
24	JMP, JPE Error	A JPE (FUN33) instruction corresponding to a JMP (FUN32) instruction cannot be found.	—
25	Mult Input Inst. Err	<p>① An error occurs because LD, LDNOT, LD compare and DLD compare instructions between an output instruction and a multi-input instruction (see note) do not correspond to the total number of ANB and ORB instructions.</p> <p>2 inputs: (total number of LD, LDNOT and other instructions) = 2 + (total number of ANB and ORB)</p> <p>3 inputs: (total number of LD, LDNOT and other instructions) = 3 + (total number of ANB and ORB)</p> <p>4 inputs: (total number of LD, LDNOT and other instructions) = 4 + (total number of ANB and ORB)</p> <p>Note: A multi-input instruction is used for entering counter and shift signals and other inputs outside of the execution conditions.</p> <p>2 inputs: CNT, STM (FUN25) 3 inputs: CDU (FUN26), DUDC (FUN28) 4 inputs: SR (FUN40)</p> <p>② An output instruction was entered after a multi-input instruction.</p>	·

(3/3)

Error code	Description of error	Error diagnosis	Checked during edit
26	STOP Inst. Error	There is no LD or LDNOT input instruction before a STOP instruction (FUN94).	—
27	LPS, LRD, LPP Error	① The block does not contain the same number of LPS (FUN34) instructions as LPP (FUN36) instructions. ② There is no output instruction before an LRD (FUN35) and an LPP (FUN36) instruction. ③ There are more than 32 LPS (FUN34) instructions in a block.	—
30	TMR, CNT Duplication	Duplicate numbers are used for a timer/counter instruction. Timer instruction: TMR, STM (FUN25) Counter instruction: CNT and UDC (FUN26), DCNT (FUN27), DUDC (FUN28) Note: DCNT (FUN27) and DUDC (FUN28) occupy specified devices and specified devices plus 1.	—
31	JPE Duplication	There are two or more JPE (FUN33) instructions with the same number.	—
32	SBR Duplication	There are two or more SBR (FUN43) instructions with the same number.	—
33	PULSE mod inst overflow	There are more than 2000 pulse modulation instructions. Instructions that can be pulse modulated: • PLS [↑] (FUN20) • PLF [↓] (FUN21) • STB (FUN08) • SR (FUN60) • Function instruction with a pulse option	—
34	DTBL inst Error (MX100, MX30)	The instruction before a DTBL (FUN98) is not an END instruction (FUN40). (An error will occur even if a NOP instruction is placed before.) The set value n (number of data items) does not meet the requirement that it should be 2n less than or equal to (total number of bytes)–(total number of bytes including basic instructions plus 2).	—
35	RTBL/WTBL inst Error (MX100/MX30)	① An RTBL instruction (FUN99) is used without a DTBL instruction (FUN98). ② DTBL (FUN98) error ③ When an S1 constant is used, the set value $n \geq S1+1$ condition of the DTBL instruction (FUN98) is not met. ④ When both S1 and S2 are constants, the set value $n \geq S1+S2$ condition of the DTBL instruction (FUN98) is not met.	—

● Alarms during program creation

Check the program using the CHECK P [F8] function in the main menu, then press the ALARM [F4] key to display the result.

This will not produce an error and although an alarm code might be displayed, the program will run.

Alarm code	Description of alarm	Error diagnosis	Checked During edit
40	Duplicate Coil	The same number Y, M and L is used in the following instructions: Output instruction (OUT), PLS [↑] (FUN20), PLF [↓] (FUN21), SET (FUN23) and RST (FUN24).	—
41	JMP missing/backwards	A JMP instruction (FUN32) for a JPE (FUN33) instruction is missing.	—
42	SBR missing CALL	A CALL instruction (FUN42) for an SBR (FUN43) instruction is missing.	—
43	Prog. missing END inst	There is no END instruction (FUN40) in the program.	—

● Other error messages

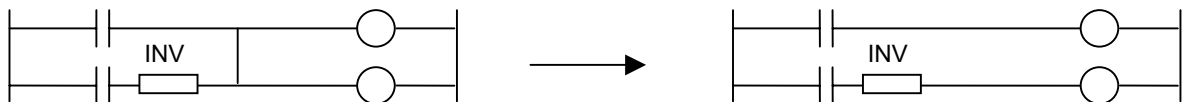
- “Undefined Inst.”

A bug was found in the program when going from off-line to on-line mode or when memory card data was loaded in memory.

- “Identification Header Mismatch”

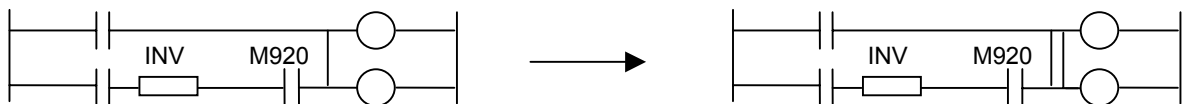
MX program data (used step numbers, bytes) does not match personal computer loader data when exiting edit.

<Symptom>

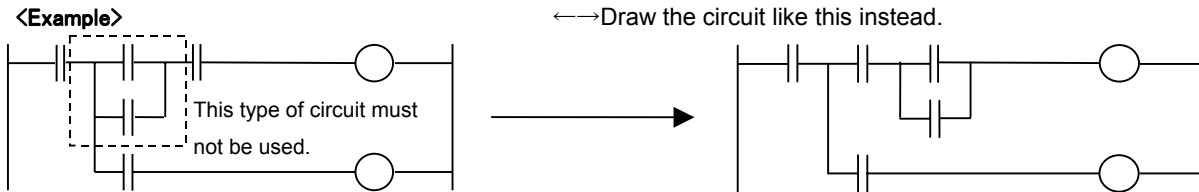


When a conversion is made, an INV block is displayed but since the instruction is missing the conversion failed.

<Countermeasure> Enter a dummy contact (M920) after INV.



A parallel circuit cannot be connected directly after an LPS instruction. For example, in a ladder program the circuit drawing on the left should be changed to that shown on the right.



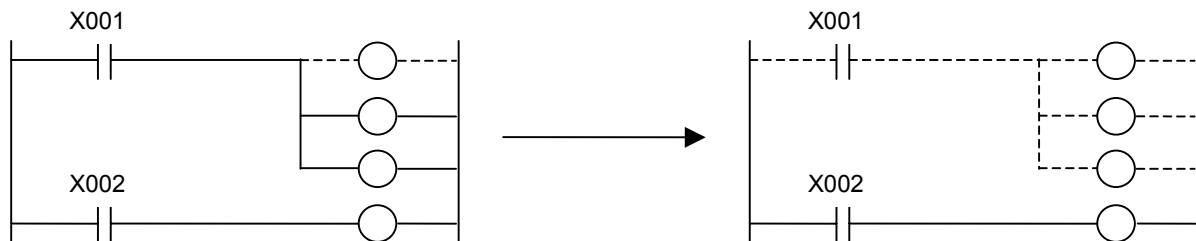
In mnemonic programming replace the entries on the left with those on the right.

```

Example: LPS (34)           LPS (34)
            LD X000 · AND X002
            OR X001 · LD X000
            ANB          · OR X001
            AND X002 · ANB
            OUT Y000 · OUT Y000
    
```

A program containing circuits like the one shown at left in the figure above will not operate normally when you go from mnemonic to ladder view.

When the first step [0000] in a ladder circuit is deleted using the [Delete] key so that the program starts from line 2, the first block will be deleted in conversion. To correct data, do not use the [Delete] key, but overwrite existing data.



Appendix

■ Recommended PROM writers

● PROM writers

- We recommend the following products from Aval Corporation:
 - PECKER 10 (PKW1000)
 - PECKER 11 (PKW1100)
 - (Use an FX-6 adapter with the PECKER 10 model)
- The AF-9704 from Ando Denki is also available.

■ Label programs

MX programs can be created and edited either using devices (X000, Y000 or R000) or labels (up to 6 character alphanumerics or character strings of special symbols).

The correspondence between devices and labels is managed as a label file. Programs can be made up of both devices and labels.

This paragraph provides the required procedures for creating devices and labels and describes the label support functions of the programming systems.

● Devices and labels

A device is a physical address of an I/O referenced in the execution of an MX program. A label is a variable or a logical device. In order to run a program made with labels on an MX controller, all labels have to be converted to actual devices. The correspondence between devices and labels is managed as a label file and handled independently of the program. As a result, revising a label file makes it possible to easily change the allocation of program devices.

● File types

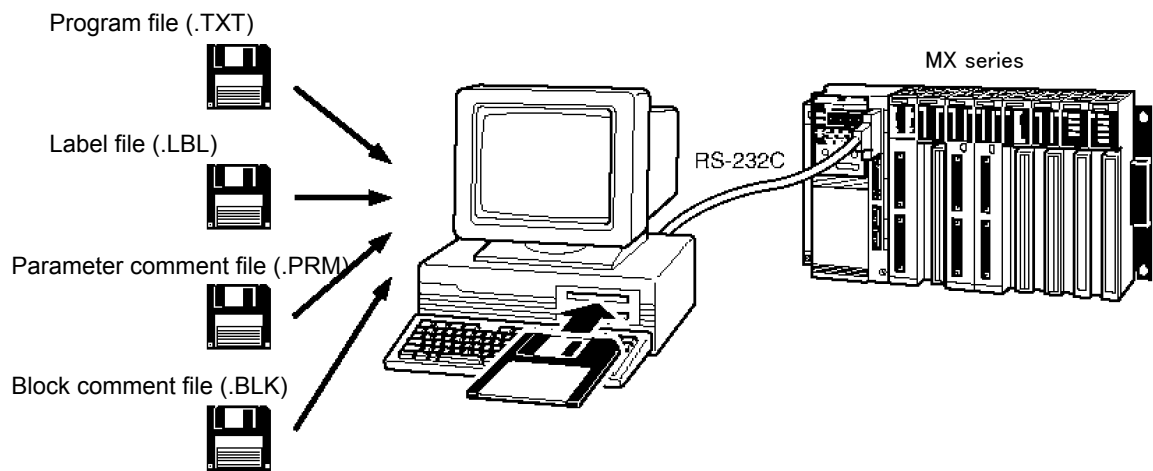
An MX program consists of the following file types.

File type	File extension	Description	File data format
Program file	.TXT	Ladder program	Binary data
Label file	.LBL	A binary data file managing the relationship between devices and labels	Binary data
Parameter comment file	.PRM	A comment of each label	Binary data
Block comment file	.BLK	A comment on each block in the program	Binary data
Program file	.TX#	Program not related to label and parameter comment file	Binary data

The program is managed as a unit of four files each with a unique extension (.TXT, .LBL, .PRM or .BLK).

For example, when a file name of SAMPLE file is specified in transferring files, all the files in the group of four will be transferred (if they can be found on the medium).

SAMPLE .TXT
SAMPLE .LBL
SAMPLE .PRM
SAMPLE .BLK



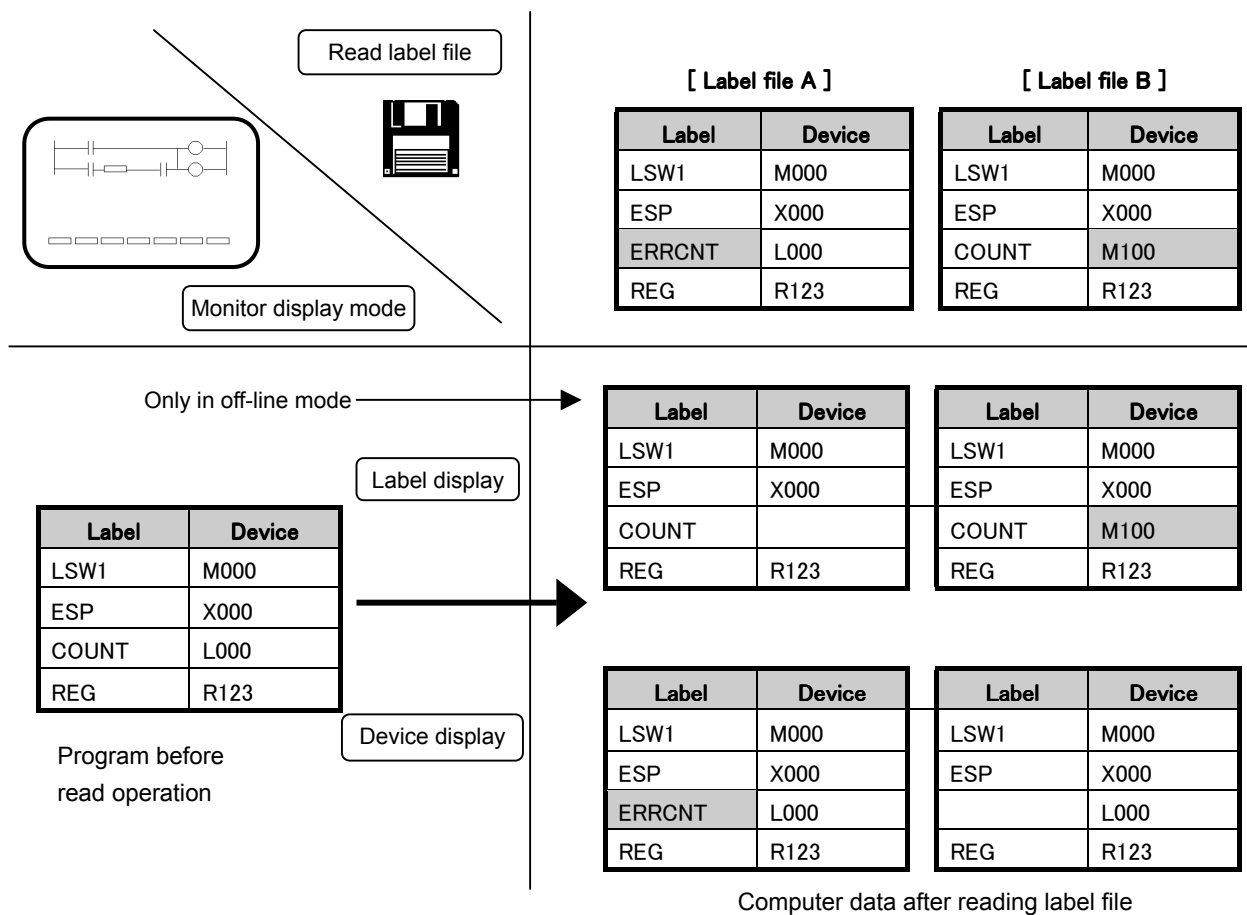
Similarly, when a file is written, the .TXT, .LBL and .BLK extension files are written as well. (The .PRM file is not written during editing.)

● Reading label files

The LOD/SAV [F3] and .LBL RD [F8] function is used to read a label file and convert devices to labels or vice versa.

!NOTES

- The current ladder display mode (device display or label display) determines whether the labels or devices are modified.
- When a label file is read and there is already a label program and the read label file has an entirely different label name or device name, it is added to an existing file.
- The following happens when labels and devices with the same name.



■ List of error and alarm messages

The following is a list of error and alarm messages that the Error Alarm Monitor displays.

The error message column shows the messages displayed while the notes column offers a brief description.

Error messages	Notes
Receive Buffer Full	
<< Communications Time-out >>	Indicates that communications could not be established with an MX controller.
Please check the Comms Params & Cable	
Illegal MX Mode	
DATA TABLE Area Overflow	
STEP No. Overflow	
PROGRAM SIZE Overflow	
The requested mode can only be accessed from STOP mode. Please select STOP mode then retry.	This message is displayed when a direct change from TEST to RUN modes is attempted.
Double Word LSB Error	
Invalid – Value outside Device range	Indicates that this is outside of the monitors device range.
This Timer/Counter is unused in Prog.	
Can't write program in STOP Mode	
Invalid File – Header Data Invalid	
Please assign the Device	
Confirm the CLEAR of SINGLE FORCE (Y/N)	
Confirm the CLEAR of ALL FORCE data (Y/N)	
Warning: Outputs can't be FORCED while the Program is stopped by a BREAK or STOP command in TEST Mode	
Confirm the CLEAR of ALL BREAK POINTS (Y/N)	
PRINTER : Invalid No. of Lines per Page	
Print CANCELLED due to Convert Error or Ladder Rung Overflow.	
Illegal Parameter Value	
Exceeded Maximum number of Forced Devices. Please Clear unnecessary Forces.	
Invalid Node Address entered (1 <= Valid Address <= 63)	
No data Table Present	
Changing to STOP Mode	
Changing to OFFLINE Mode	
Force Data Table contains invalid data and can't be read. * Clearing the Force Data Table.*	
Double Word MSB Error	
<< Special Fn Module Data Exchange Error >>	
<< Tmr/Cntr Error >> Modified Data could not found in the Ladder Program.	
<< !!! SYSTEM ERROR -(TXT_ABS)- !!! >>	Consult Yamatake

Error messages	Notes
CTRL keys not accepted when cursor on Param Locn.	
This MX does not support CBL	
Please check Disk Drive	
No Files with the required extension	
<< Communication Error >> Please check the RS-232 & Power connections of the HANDY LOADER	
<< Memory Card Error >>	
<< Memory Card Not Inserted >>	
<< Communicatin Time Out >> [ESC] : Offline Mode [HOME] : Display/Modify Comm. Params Other key : Retry Communication	
<< Program Data Transfer Error >> Data transfer CANCELLED due to Identification Header Mismatch	
<< Abnormal End >> Please retry Data Transfer Check the HANDY LOADER and the MEMORY CARD.	
Cancelled due to Ladder Rung Comment No. Error	
!!! MX Mode has been Changed !!!	
!!! MX Mode changed from PROG. !!! Loader changing to OFFLINE Mode	Indicates that the MX mode terminal changed modes.
<< Online Program Error >> Identification Header Mismatch, changing to OFFLINE mode.	
<< Latch Coil Clear >> [Y] : Clear Latch Coil Other key : Cancel	
Destination Table Number exceeds maximum Table Number	
Illegal File Identification	Indicates that the file extension does not correspond to file contents.
Entered value exceeds valid range	
Floppy/File Write Protected	
Maximum of 3750 steps can be copied	
Program size Overflow	
Parameter Error	
Dev. Param. out of range	
Constant '#' Error	
Constant 'K' Error	
Parameter Same Area Err.	
Parameter out of range	
Illegal Label Name	
Illegal Label Definition	
Line Wrap-Around Error	
Conversion Error	
Mult. Out Err (CALL/LIB)	
Insufficient Disk Space	

Error messages	Notes
<< Identification Header Mismatch >> Unable to perform ONLINE PROG editing due to PC and MX Identification Header Mismatch. Please enter OFFLINE Mode and re-UPLOAD the Program from The MX.	
COMMAND file too Large	Indicates that the file is approx. 6K too large.
Program DOWNLOAD ERROR	
Program UPLOAD ERROR	
PROGRAM and MX mismatch (model type)	
<< Identification Header Mismatch >> Ladder displayed and Ladder within the MX are NOT the same. Can not EXECUTE ladder program.	Indicates that for some reason the ladder in the MX contro does not match the ladder in the personal computer loader.
Undefined Inst.	
Ladder Rung Error	
CALL,SBR,RET Error	
MC , MCR Error	
JMP , JPE Error	
Mult Input Inst. Err	
STOP Inst. Error	
LPS,LRD,LPP Error	
TMR,CNT Duplication	
JPE Duplication	
SBR Duplication	
PULSE mod inst overflow	
DTBL inst Error	
RTBL/WTBL inst Error	
Duplicate Coil	
JMP missing/backwards	
SBR missing CALL	
Prog. missing END inst	
Prog. missing DTBL inst	
Entered value too big	
Can't open Column	
Can't open Row	
Item Not Found	
Program size mismatch between PC & MX	
Any key for OFFLINE Mode	
DTBL already exists in Program	
END inst must appear before DTBL	No END instruction can be found before a DTBL instructi
Program does not exist	
Can't Input instruction	
Can't Overwrite instruction	
File name was not entered	

Error messages	Notes
11:Conversion Error (Ladder)	
11:Conversion Error (Mnemonic)	
Program Compile Check Mismatch between PC & MX	
Ladder Rung exceeds 2 display windows	Indicates that ladder display has now been changed to mnemonic display.
Can not transfer Program due to Error	
Undefined Instruction exists	
Undefined Parameter exists	
Couldn't Delete DTBL inst	
Couldn't Copy DTBL inst	
No available Parameter space	
Ladder Rung not yet converted	
Line-Wrap is Prohibited here	
Couldn't replace DTBL inst	
DTBL exceeds available size	
Param. not yet read from Special Fn Module	
Set value is out of range	
<< Exclusive Access Error >> Another node's loader is executing this function. This node can NOT access the requested function.	Indicates that time chart/force and test functions cannot be executed simultaneously on two personal computer loader
Identification Header Error	
Download target MX type differs from the MX type in the Identification Header Can NOT download. <Please check MX type>	

Specifications are subject to change without notice.

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