TOSHIBA

UM-TS03***-E025

PROGRAMMABLE CONTROLLER
PROSEC T-SERIES

HANDY PROGRAMMER
HP911
OPERATION MANUAL

Contents

Toshiba Corporation

Important Information

Misuse of this equipment can result in property damage or human injury. Because controlled system applications vary widely, you should satisfy yourself as to the acceptability of this equipment for your intended purpose.

In no event will Toshiba Corporation be responsible or liable for either indirect or consequential damage or injury that may result from the use of this equipment.

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Important Precautions

Keep the following important precautions in using HP911.

1. Do not use or install your HP911 in the following locations:
   -Where the ambient temperature drops below 0°C or exceeds 40°C;
   -Where the relative humidity drops below 20% or exceeds 90%;
   -Where there is condensation due to sudden temperature changes;
   -Where there are shocks and vibrations that exceed the tolerance;
   -Where there are corrosive or inflammable gases;
   -Where there are dust, machining debris or other particles;
   -Where there is direct sunlight.

2. Do not apply force to the connection cable between the PLC and the HP 911.

3. For safety reason, provide the maximum possible distance between the connection cable and high-voltage cable or high-power panels.

4. Do not apply strong shock to the LCD screen.

5. Do not disassemble the HP 911 because there are hazardous voltage parts inside.

6. If any failure occurs with your HP 911, contact Toshiba for repair. Toshiba is not responsible for the unauthorized repair.

7. Disposing of your HP 911 should abide by the applicable environmental regulations.

Before readeing this manual

Preface

This manual explains the functions and operating procedures of the Handy Programmer HP911 for the T-series programmable controllers.
Sections 1 through 5 explain the overview and functions. Section 6 and after explain the detailed key operations in each operation mode.

This manual consists of:

1. Overview
Explains the outline of the HP911. Also, precautions and features are covered.

2. Names and Functions
Introduces the external features and explains the screen and the operation keys.

3. Basic operating procedure
Explains the basic procedure of how to enter a program into the PLC.

4. Mode and Function
Outlines the operation modes of the HP911.

5. Key Entry Common Rules
Explains the common rules in key operations.

6. System Information Mode
Explains the functions and key operations in the system information mode.

7. Program Monitor Mode
Describes how to monitor the PLC execution status and the functions in the program monitor mode.

8. Program Editing
Explains the key operations of how to write or modify a program.

9. Data Monitor Mode
Explains the data monitoring functions and how to set data.

10. Control Commands
Describes the functions and the key operations of each control command.

Appendix
Lists the specifications, error messages, guidance messages, and the protection levels for each function related to the passwords.

Related manuals

The HP911 is a programming tool for the T-series programmable controllers. Before reading this manual, read the following related manuals for understanding of your programmable controller's functions.

T3 User's Manual-Hardware
T3 User's Manual-Functions
T2 User's Manual
T-series Instruction Set

Note and caution symbols

Users of this manual should pay special attention to information preceded by the following symbols.

Calls the reader's attention to information considered important for full understandings of programming procedures and/or operation of the equipment.

Calls the reader's attention to conditions or practices that could damage the equipment or render it temporarily inoperative.

Terminology

ASCII	American Standard Code for Information Interchange
CPU	Central Processing Unit
EEPROM	Electrically Erasable Programmable Read Only Memory
I/O	Input/Output
LCD	Liquid Crystal Display
ms	millisecond
PLC	Programmable Controller
RAM	Random Access Memory
ROM	Read Only Memory
μs	microsecond
Vac	ac voltage
Vdc	dc voltage

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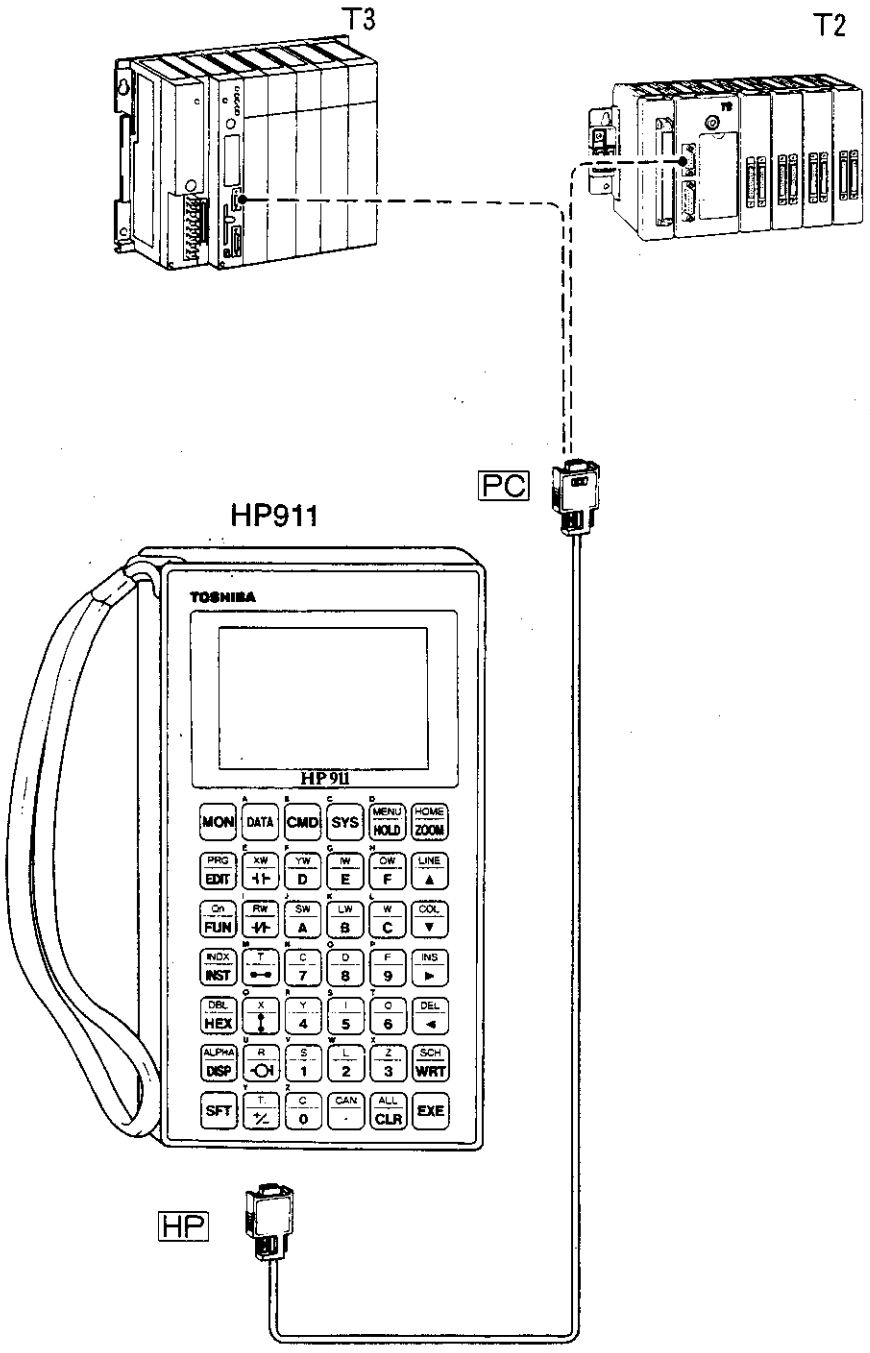
1.1 Introducing the HP911

Toshiba's HP is a hand-held programming tool for the T3 and T2 programmable controllers.
Because the HP allows you to enter programs with a ladder diagram, adding and/or deleting programs will be very easy. The HP will display a program in 5 lines x 12 columns on the display.
Its monitoring function and force function (forcible input/output) will help you debug and maintain programs.



1.2 HP911 Features

The HP has the following features:

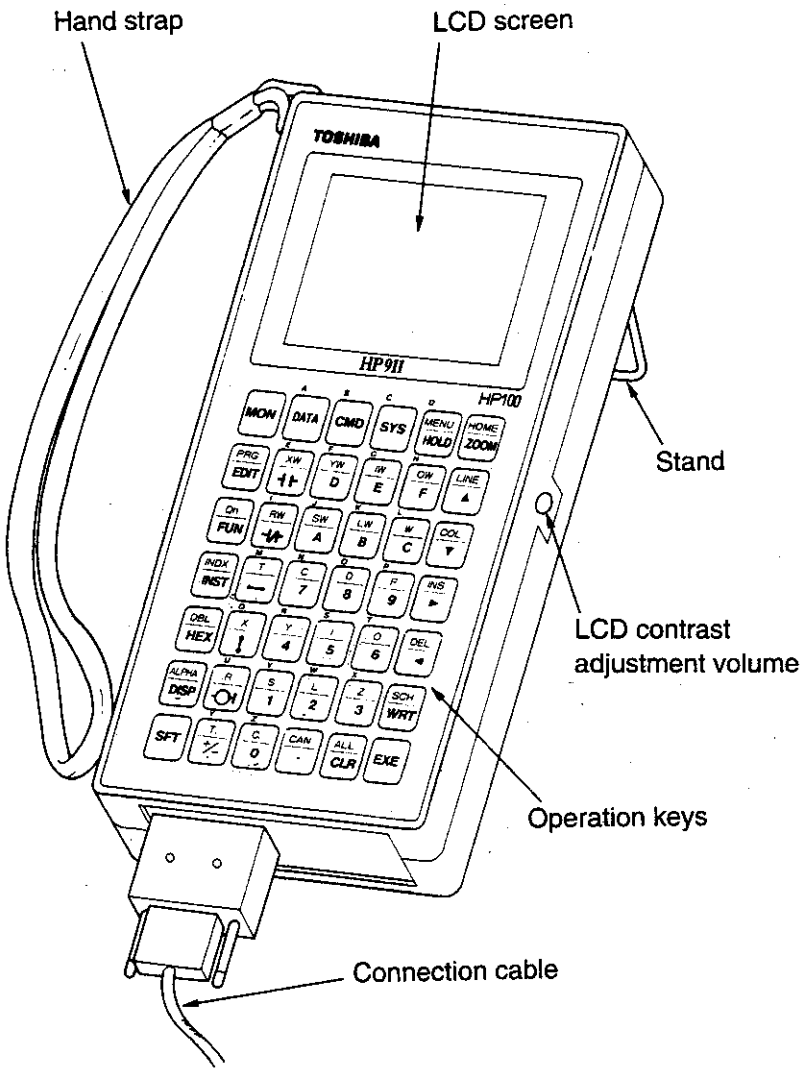
- A program can be entered and monitored in ladder diagram. In the normal mode, 5 lines by 12 columns of ladder diagram will be displayed. In the zoom display mode, because a detailed device/register can be displayed, you can easily confirm the program you entered.
- Because the HP has an EEPROM inside, you can save a program in the HP. This is useful for program loading/saving in factory site.
- The HP supports the Debug mode functions, so you can debug your program efficiently.
- The HP will allow you to check the external wiring easily by means of its data monitor/set and force functions.
- The HP can control RUN/HALT state of the PLC.
- You can set key entry buzzer to ON/OFF.
- The HP can be connected with a T2 or T3 directly or via a network (TOSLINE-S20).

1.3 Functional limitations

The HP dose not support the following functions.

- Offline programming is not supported. The HP works only with connecting to the PLC.
- Programming in SFC is not possible. Also, the SFC program stored in the PLC cannot be monitored/modified.
- The sampling trace, the status latch and the bit pattern check functions are not supported.
- The comment function is not supported. Even if the tags for registers/devices have been stored in the PLC, the tags cannot be displayed on the HP screen.

2.1 External features



2. 2 PLC connection

Use the 2-meter connection cable supplied as accessory to connect the HP to the PLC. The "PC" labeled connector should be connected to the PLC.

NOTE

(1) The cable is compatible with the cable for the T-PDS (TCJ905＊CS).
(2) Securely tighten the connector fixing screws.

2.3 LCD screen

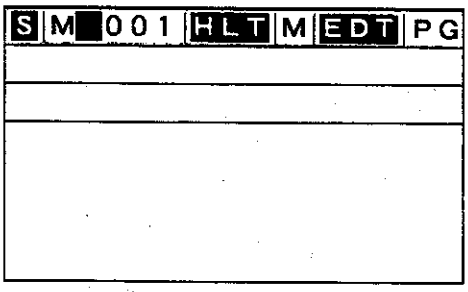
PLC operation status:
[RUN] : RUN
[HLT] : HALT
[ERR] : Error down
[HLD] : HOLD
[D-R] : D-RUN
[D-H] : D-HALT
[D-S] : D-STOP
[S-R] : S-RUN
[S-H] : S-HALT
[S-S] : S-STOP

HP operation mode:
[M]: Monitor mode
[D]: Data monitor mode
[S]: System information mode

Program type/block number
M: Main program
S: Sub program
C: Timer interrupt
I : I/O interrupt
P: Subroutine

Command display:
Displaying the command accepted
[CMD], [EDT], [PRG] etc

Key shift display:
Blank: No shift
[S] : Shift
[A] : Alphabetic entry mode



PLC alarm display:
Blank : Normal
[BT]: Abnormal battery (blinking)
[TS]: TOSLINE-S20 error (blinking)
[TF]: TOSLINE-F10 error (blinking)
[CL]: Computer link error (blinking)
[SC] : Scan execution delay (blinking)
[DG] :Diagnostic instruction executed (blinking)
[DL] : Download executing (blinking)
[PT]: Write protect state
[PG] :Write enable state
Display priority at simultaneous occurrence:BT>TS>TF>CL>SC >DG>DL>PT>PG

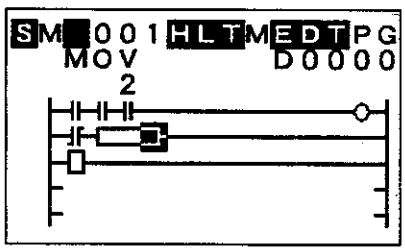
Key data buffer area:
Displays the data entered with keys.
Also, it will display the instruction on the cursor.

Message display area
Will display the operator key operation guide and confirm messages.

Program display area
Will display the rung number on the cursor.

Program display area
Will display the program in ladder diagram (5 lines x 12 columns) and others.

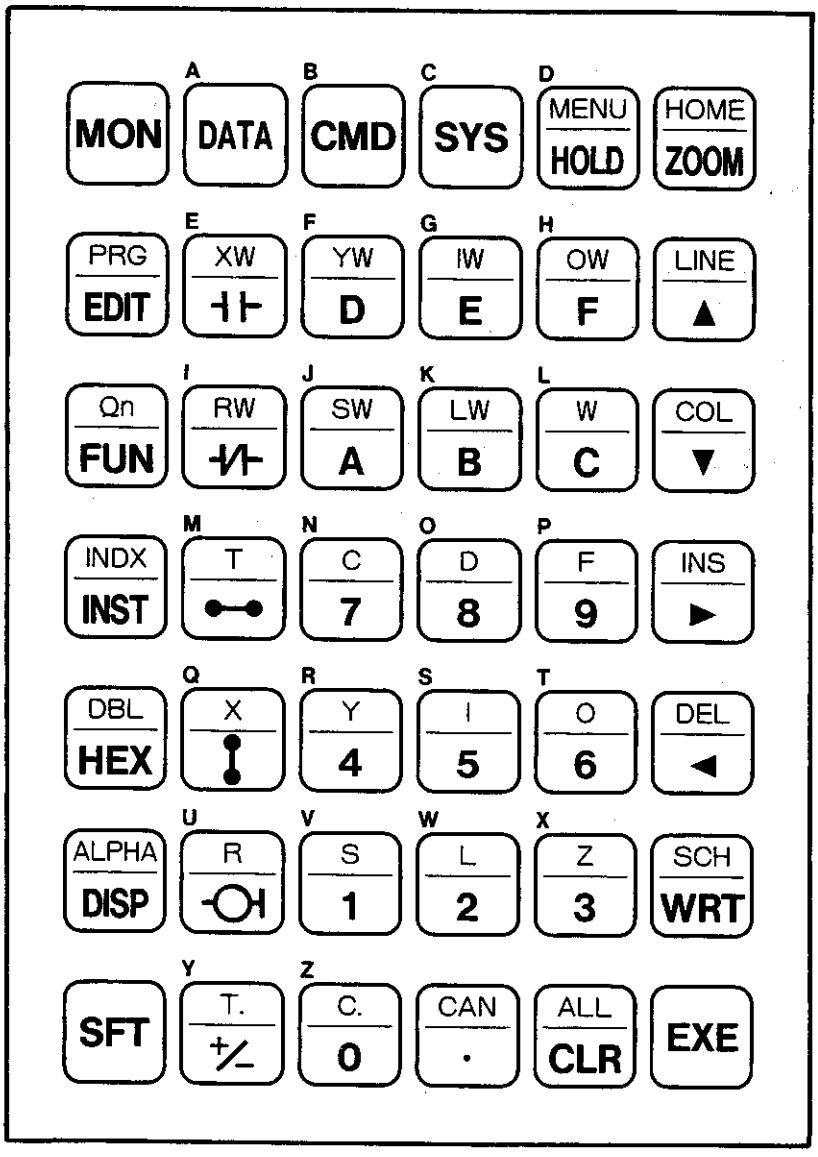
Actual screen example



2.4 Operation keys

The HP has 42 keys to operate. Pressing the [SFT] key will change into the shift mode. To select the function on the upper keycap, press the [SFT] key and then the key you want to enter. The shift mode will be set and released by each key entry.

To enter an alphabetic key, press the [ALPHA] key to change into the alphabetic mode. To enter lower-case letters in this mode, press the [SFT] key and then an alphabetic key you want to enter. The shift mode will be valid and released by each key entry. However, the alphabetic mode will remain valid until you press the [ALPHA] key again.
The keyboard layout is as follows:



2. Names and Functions

Each of the key functions is as follows:
(The upper keycap function of the key can be selected by pressing the shift key first)

Shift key

key	Name	Function
[SFT]	Shift	Selects the upper keycap function of a key or a lower-case letter.

Alphabet/Numeric switch key

key	Name	Function
[ALPHA]	Alphabetic switch	Selects or releases the alphabetic mode.
[DISP]	Data display format	Used to select the data display format.

HP control keys

key	Name	Function
[DATA]	Data monitor	Selects the data monitor mode
[MON]	Monitor	Selects the program monitor mode.
[SYS]	System information	Selects the system information mode.
[CMD]	Command	Used to select the control commands.
[PRG]	Program	Used to store the program or data edited on the HP into the PLC.
[EDIT]	Edit	Used to edit the program or system information.
[HOME]	Home	Sets the cursor to the home position.
[ZOOM]	Zoom	Zooms to display a part of a program. Each pressing of the key will change over between the normal display mode and the zoom display mode.
[MENU]	Menu	Used to select various functions in each mode
[HOLD]	Display hold	Holds the data monitor screen.

Instruction/operand keys

key	Name	Function
[XW]	External input register	Specifies the external input register (XW).
[-||-]	NO contact	Specifies the NO contact instruction .
[RW]	Auxiliary register	Specifies the auxiliary register (RW)
[-|/|-]	NC contact	Specifies the NC contact instruction.
[T]	Timer register	Specifies the timer register (T).
[—]	Horizontal connection	Connects line horizontally.
[X]	External input device	Specifies the external input device (X).
[|]	Vertical connection	Connects line vertically.
[R]	Auxiliary relay device	Specifies the auxiliary relay device (R).
[-o-]	Coil	Specifies the coil instruction.
[Qn]	Digit designation	Used for the digit designation.
[FUN]	Function instruction	Used to select the function instructions.
[INDX]	Index	Used for the index modification.
[INST]	Basic instruction	Used to select the basic instructions.

Numeric/operand keys

key	Name	Function
[C.]	Counter device	Specifies the counter device (C.).
[0]	0	Numeric value 0
[S]	Special device	Specifies the special device (S).
[1]	1	Numeric value 1
[L]	Link relay	Specifies the link relay (L).
[2]	2	Numeric value 2

key	Name	Function
[Z]	Link device	Specifies the link device (Z).
[3]	3	Numeric value 3
[Y]	External output device	Specifies the external output device (Y).
[4]	4	Numeric value 4
[I]	Direct input device	Specifies the direct input device (I).
[5]	5	Numeric value 5
[O]	Direct output device	Specifies the direct output device (O).
[6]	6	Numeric value 6
[C]	Counter register	Specifies the counter register (C)
[7]	7	Numeric value 7
[D]	Data register	Specifies the data register (D).
[8]	8	Numeric value 8
[F]	File register	Specifies the file register (F).
[9]	9	Numeric value 9
[SW]	Special register	Specifies the special register (SW).
[A]	A	Numeric value A
[LW]	Link relay register	Specifies the link relay register (LW).
[B]	B	Numeric value B
[W]	Link register	Specifies the link register (W).
[C]	C	Numeric value C
[YW]	External output register	Specifies the external output register (YW).
[D]	D	Numeric value D
[IW]	Direct input register	Specifies the direct input register (IW).
[E]	E	Numeric value E

key	Name	Function
[OW]	Direct output register	Specifies the direct output register (OW).
[F]	F	Numeric value F
[CAN]	Cancel	Cancels the command entered and returns the HP to the preceding state.
[.]	Period	Used to enter a floating point data.
[T.]	Timer device	Specifies the timer device (T.).
[+/-]	Minus	Changes over the sign between minus and plus.
[DBL]	Double	Changes over between single-length and double-length displays.
[HEX]	Hex	Changes over between decimal and hexadecimal displays.

Execution keys

key	Name	Function
[ALL]	All clear	Clears the display in program editing.
[CLR]	Clear	Clears key entry data.
[SCH]	Search	Searches an instruction or operand.
[WRT]	Write	Executes writing programs and data.
[EXE]	Execution	Used for final execution of each operetion.

Cursor keys

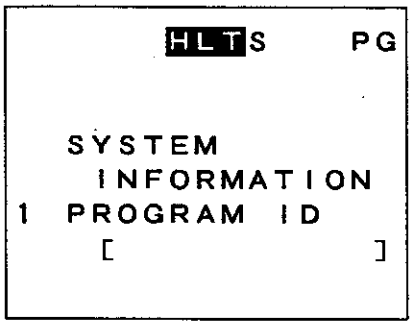
key	Name	Function
[LINE]	Line	Inserts/deletes a line during program editing.
[↑]	Up-arrow	Moves up the cursor.
[COL]	Column	Inserts/deletes a column during program editing.
[↓]	Down-arrow	Moves down the cursor.
[DEL]	Delete	Deletes a line, column or rung during program editing.
[←]	Left-arrow	Moves the cursor to left.
[INS]	Insert	Inserts a line, column or rung during program edit.
[→]	Right-arrow	Moves the cursor to right.

NOTE : The cursor keys (arrow keys) have the auto repeat function.

This section outlines the basic operating procedure, with a simple example.

Preparation

1. Connect your HP with the PLC via the dedicated connection cable.
2. Set the operation control switch on the front of the PLC to HALT.
3. Turn ON the power to the PLC. (Confirm that the FAULT LED is not lit.)
4. The following system information screen will appear on the HP.



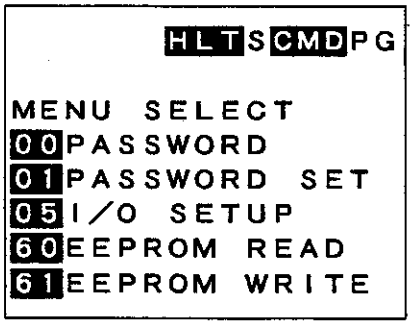
NOTE

(1) Tune the contrast adjustment volume on the right side of the HP if the display is not clear.
(2) The connection cable with the PLC can be removed/connected while power is ON.

CLEAR MEMORY

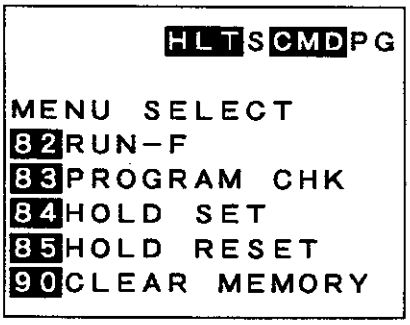
Before entering a new program, you must clear the PLC memory.
Press the [CMD] key to display the control command menu.

[CMD]



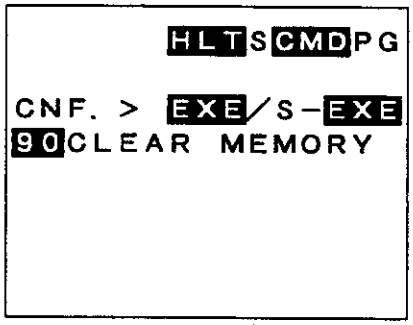
Your HP prompts you to enter a command number. Press the cursor keys to scroll the command menu.

[↓][↓]
(The cursor keys are for changing over menu displays and are not needed for selecting a command.)



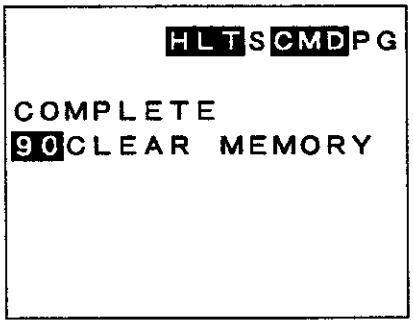
Key in the command number for the CLEAR MEMORY command (90), then press the [EXE] key.

[9] [0] [EXE]



The HP prompts you to confirm the CLEAR MEMORY command. If the command is correct, press the [EXE] key again. If you notice that you entered the wrong number, press the [CAN] key to cancel the wrong command number.

[EXE]

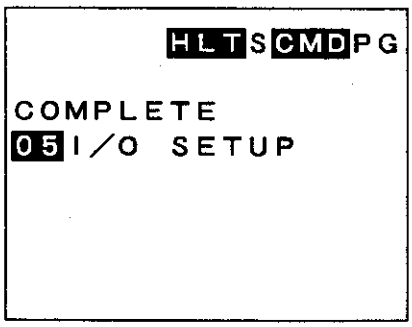


When "COMPLETE" is displayed, the operation has ended normally.

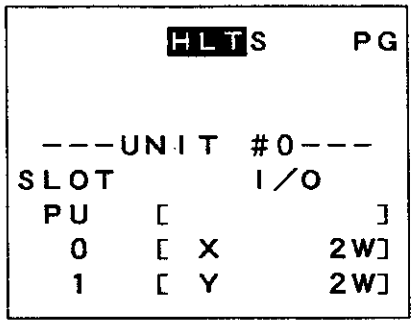
I/O allocation

Next, you must carry out the I/O allocation. When all the I/O modules have been mounted on the PLC, the automatic I/O allocation command (command 5 I/O SETUP) can be used. Enter keys in the same manner as you entered in the CLEAR MEMORY command operation.

[CMD][5][EXE][EXE]



Press the [SYS] and [2] keys to confirm the I/O allocation states on the system information display.



[SYS][2]

Pressing the [↓] and [↑] keys will scroll slots.

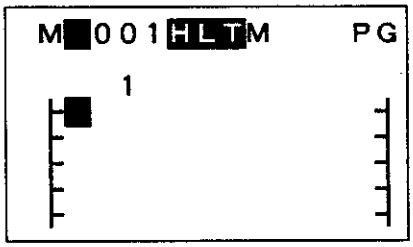
Pressing the [→] and [←] keys will scroll units.

The above operation will make you enter programs on the PLC.
The actual procedure of entering program will be explained below.

NOTE The CLEAR MEMORY and I/O SETUP operations are necessary only before you enter a first program. Do not execute this operation to modify the program already stored in the PLC.

Programming The following is the procedure to display the screen for entering a program.

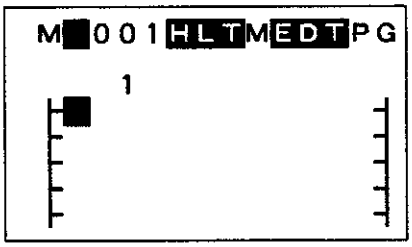
Select the main program.
[SFT][MON][1][EXE]



Select Block No. 1.
[MON][1][EXE]

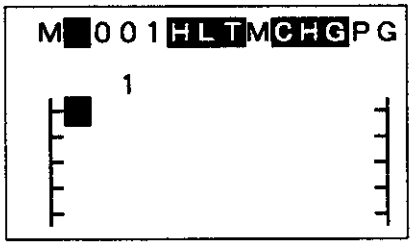
Select Rung No. 1.
[1][EXE]

Specify the edit mode for programs.
[EDIT]



Appearing "EDT" will mean the mode has changed into the edit mode.
Next, press the [EXE] key to edit the rung on the cursor key.

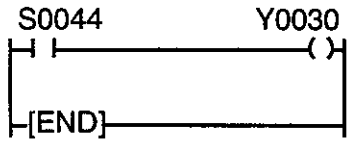
[EXE]



The display will prompt you to enter a program.

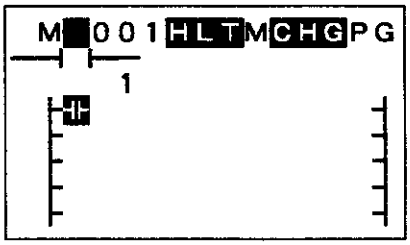
3. Basic Operating Procedure

To test the operation, enter the following sample program.

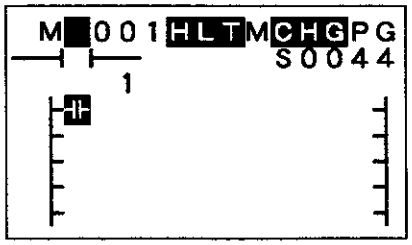


S0044 is a special device which comes ON every 1 second.

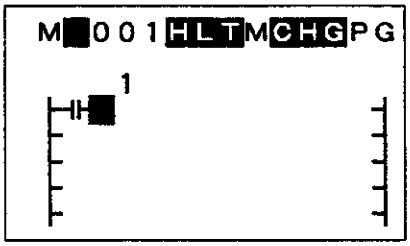
Enter the NO contact.
[⊣⊢]



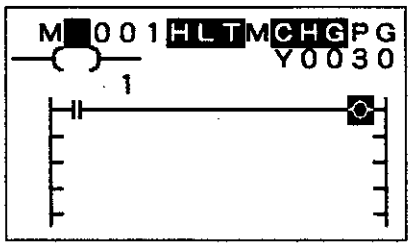
Enter the device S0044.
[SFT] [S] [4] [4]



Register the entry on the cursor position.
[WRT] or [EXE]

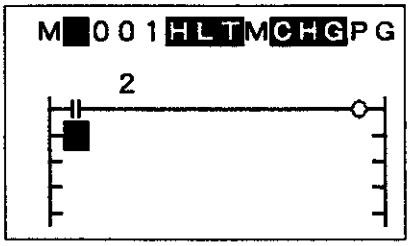


Enter coil Y0030.
[-○-] [SFT] [Y] [3] [0]



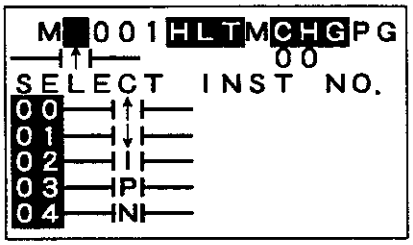
NOTE When the coil symbol is entered, the cursor will move to the right end column and a horizontal line will be linked automatically.

Register the coil instruction on the cursor position.
[WRT] or [EXE]

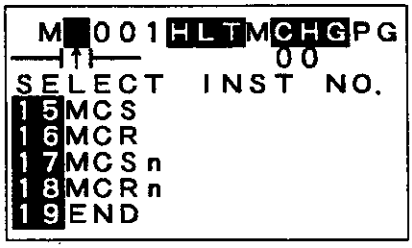


Enter the END instruction. The END is selected from the basic instructions.

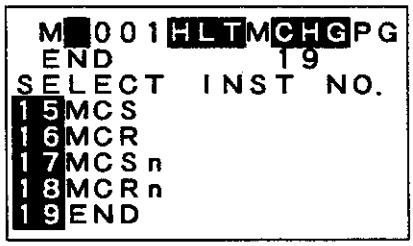
Display the basic instructions by pressing the INST key.
[INST]



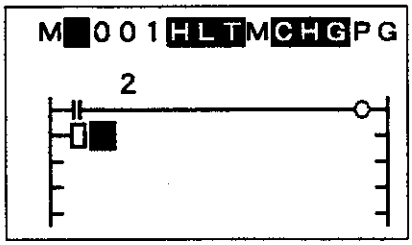
Confirm the number for the instruction.
[↓][↓][↓]: Change over menu displays



Select the END instruction.
[1][9]

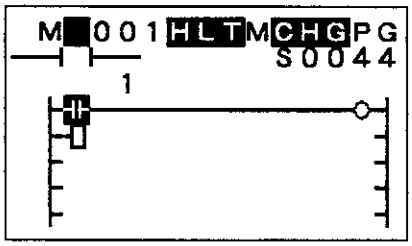


Register the instruction on the cursor position.
[EXE][EXE]



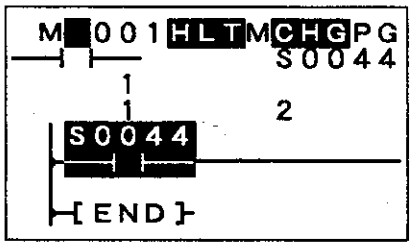
Now, entering a program has completed. Confirm with the zoom display that the program has been entered correctly before storing into the PLC.

Move the cursor onto the top of the rung.
[↑][←]



Change over to the zoom display.
[ZOOM]

Re-pressing the [ZOOM] key will return the display to the normal display (preceding display).

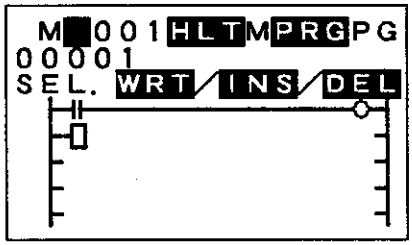


From this state, move the cursor to confirm the program.

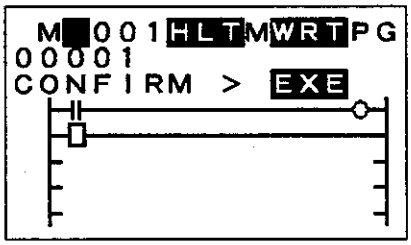
NOTE Each time when you press the [ZOOM] key, the display will change over between the zoom and normal displays. A program can also be entered in the zoom display.

Writing into the PLC A program edited on the HP can be written and stored into the PLC memory, as follows.

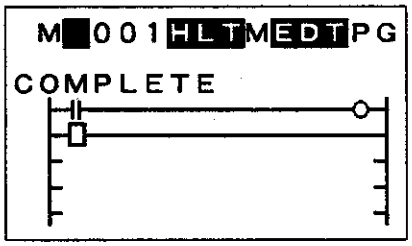
[SFT] [PRG]



[WRT]



[EXE]

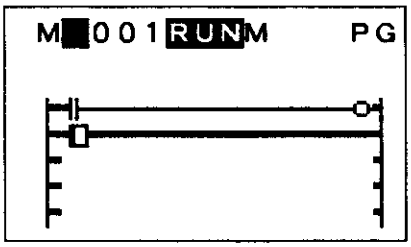


When the program is written normally into the PLC, "COMPLETE" will appear on the display. If any abnormality is found in the program, the cursor will move to the position and blink. After correcting the program, write the program into the PLC again.

Monitoring the execution state After completing the program writing into the PLC, try to monitor the executing state of the program by setting the PLC to RUN mode. The PLC mode displayed on the HP screen will change from HLT to RUN .

Set the HP to the program monitoring state.
[MON][EXE][EXE]

(For the case no cursor is displayed)



NOTE When EDT appears on the display, press the [SFT] and [CAN] keys. Also, to delete the cursor, press the [SFT] and [HOME] keys.

The execution state will be displayed by a power flow (hot line) .

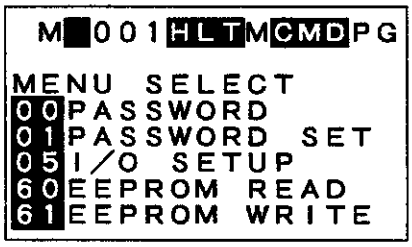
When S0044 is ON:

When S0044 is OFF:

Program saving (PC -> HP)

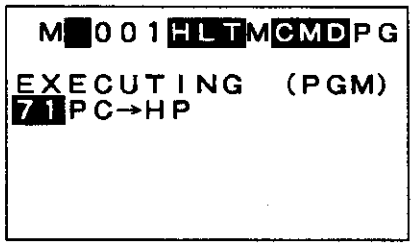
The program and register data stored in the PLC can be stored in the built-in EEPROM of the HP. The procedure is as follows:

Specify the control command.
[CMD]

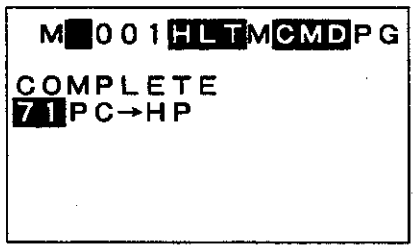


Select the PC -> HP transfer to execute.
[7][1][EXE][EXE]

During the execution, "EXECUTING" will appear on the display.



When the transfer is normally completed, "COMPLETE" will appear on the display.



After the transfer is completed, compare the program of the HP with that of the PLC in the following key operation:
[CMD] [7] [2] [EXE] [EXE]

"COMPLETE" will appear on the display when both programs match completely.

Program transferred to the HP from the PLC can also be transferred to other PLCs.

NOTE

(1) Do not disconnect the connection cable between the HP and the PLC until "COMPLETE" appears on the display.
(2) Storing program in the EEPROM of the HP should be temporal. When you want to store the program for a long time, use the IC memory card or a disk (by T-PDS).

Ending Set the operation control switch of the PLC to HALT and turn off power.

NOTE When the PLC is set to initial load execution, the program and data in the EEPROM or the IC memory card will be transferred automatically onto the RAM (where program is written) when the power to the PLC is turned ON. Therefore, when you set the PLC to initial load execution, write the program and data into the EEPROM or an IC memory card by the following key operation before turning OFF the power. Writing program into an IC memory card, if it is fixed in the PLC, will be executed. If no IC memory card is fixed in the PLC, program will be written into the PLC's built-in EEPROM.
[CMD][6][1][EXE][EXE]

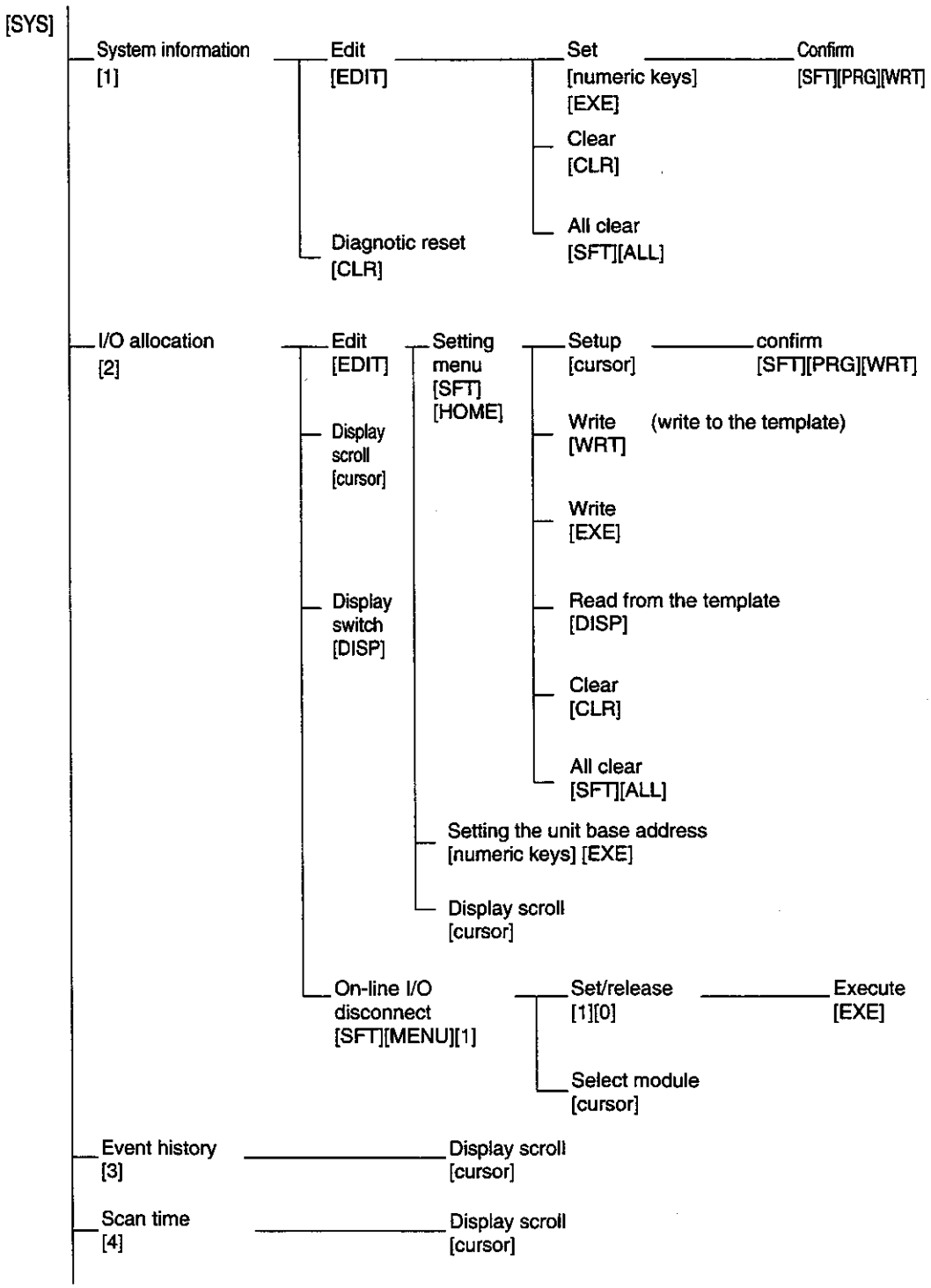
The HP has the following four modes. By pressing a desired mode key, the HP will change to the specified mode.

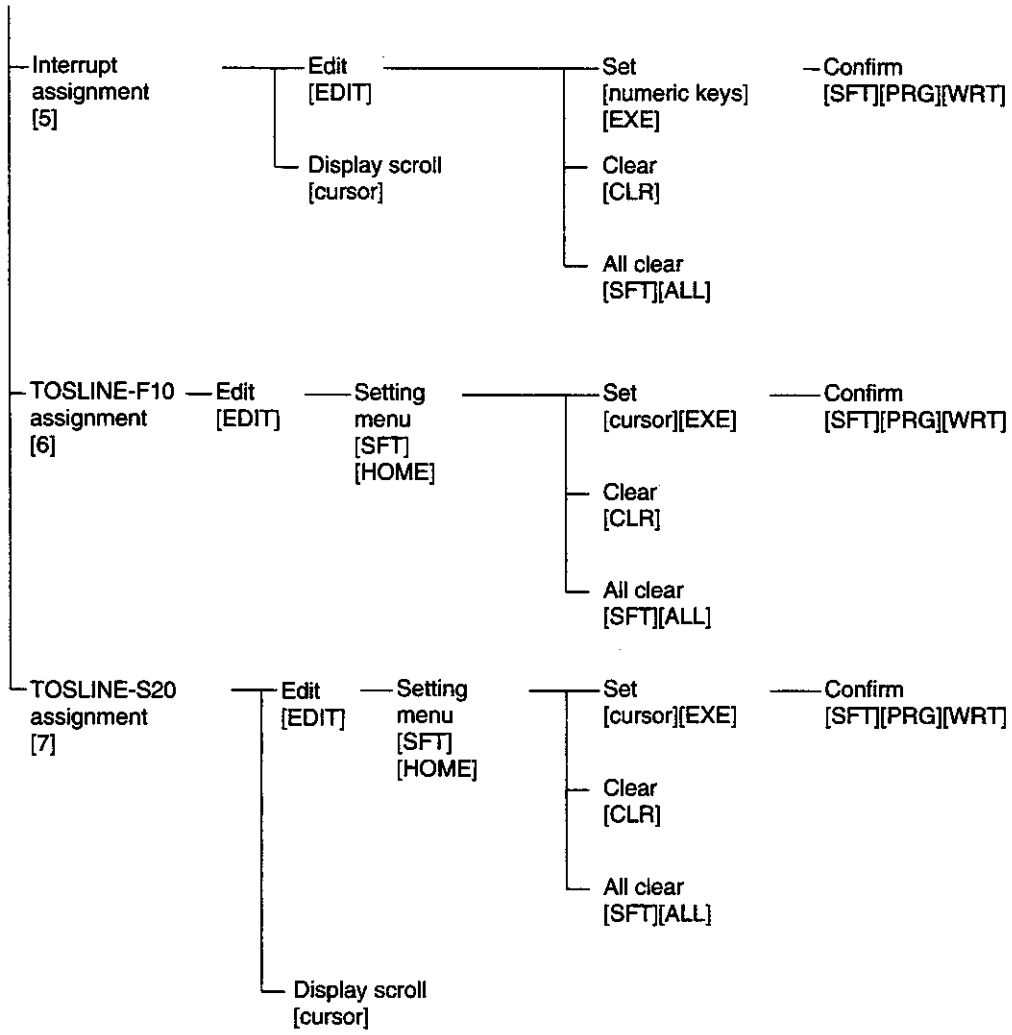
- System information mode
- Program monitor mode
- Data monitor mode
- Control command mode

The functions and key operations of the modes are as follows:

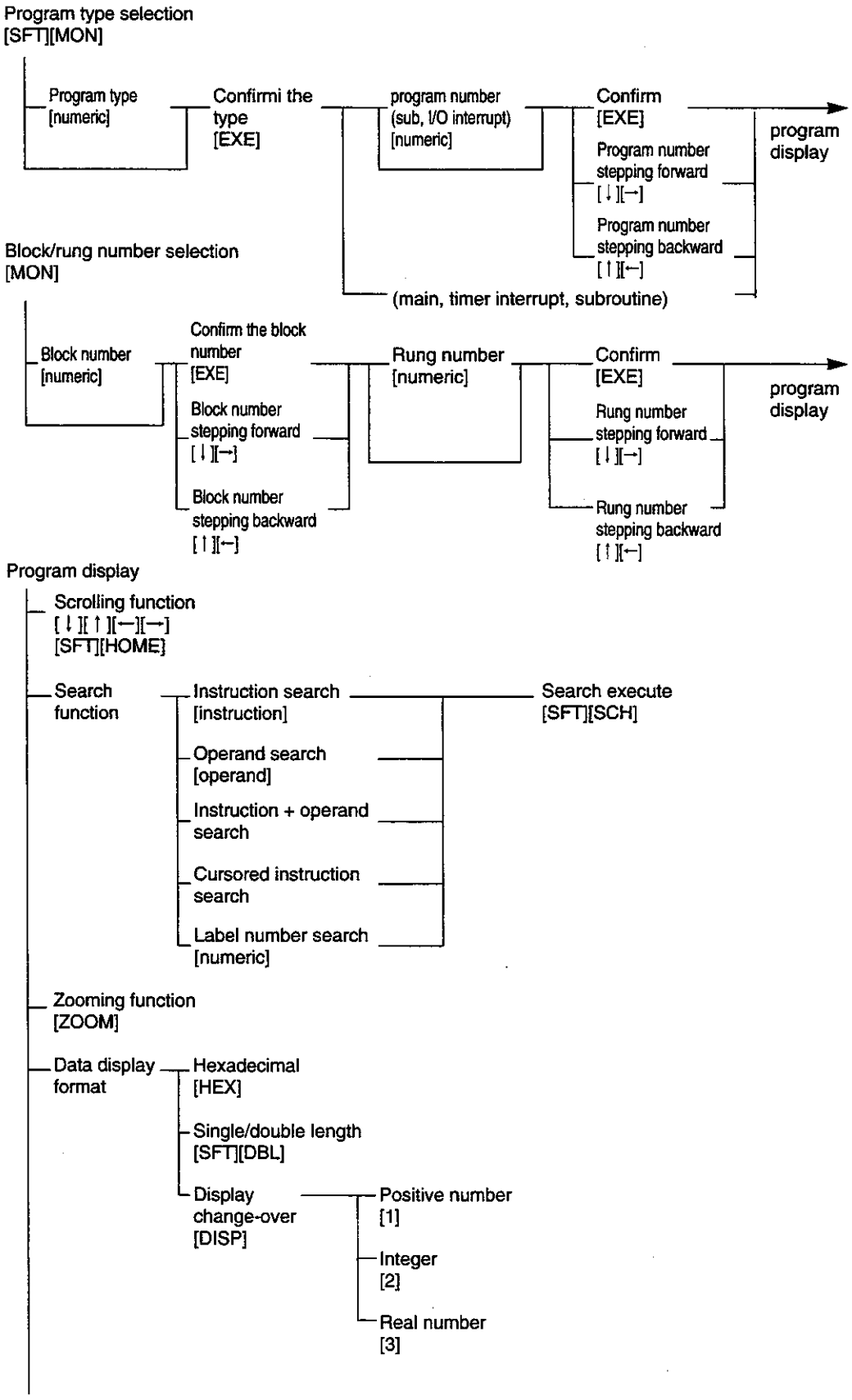
4.1 System Information mode

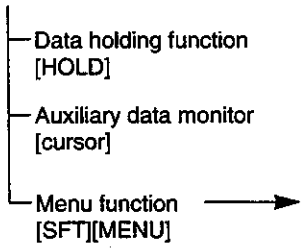
System information

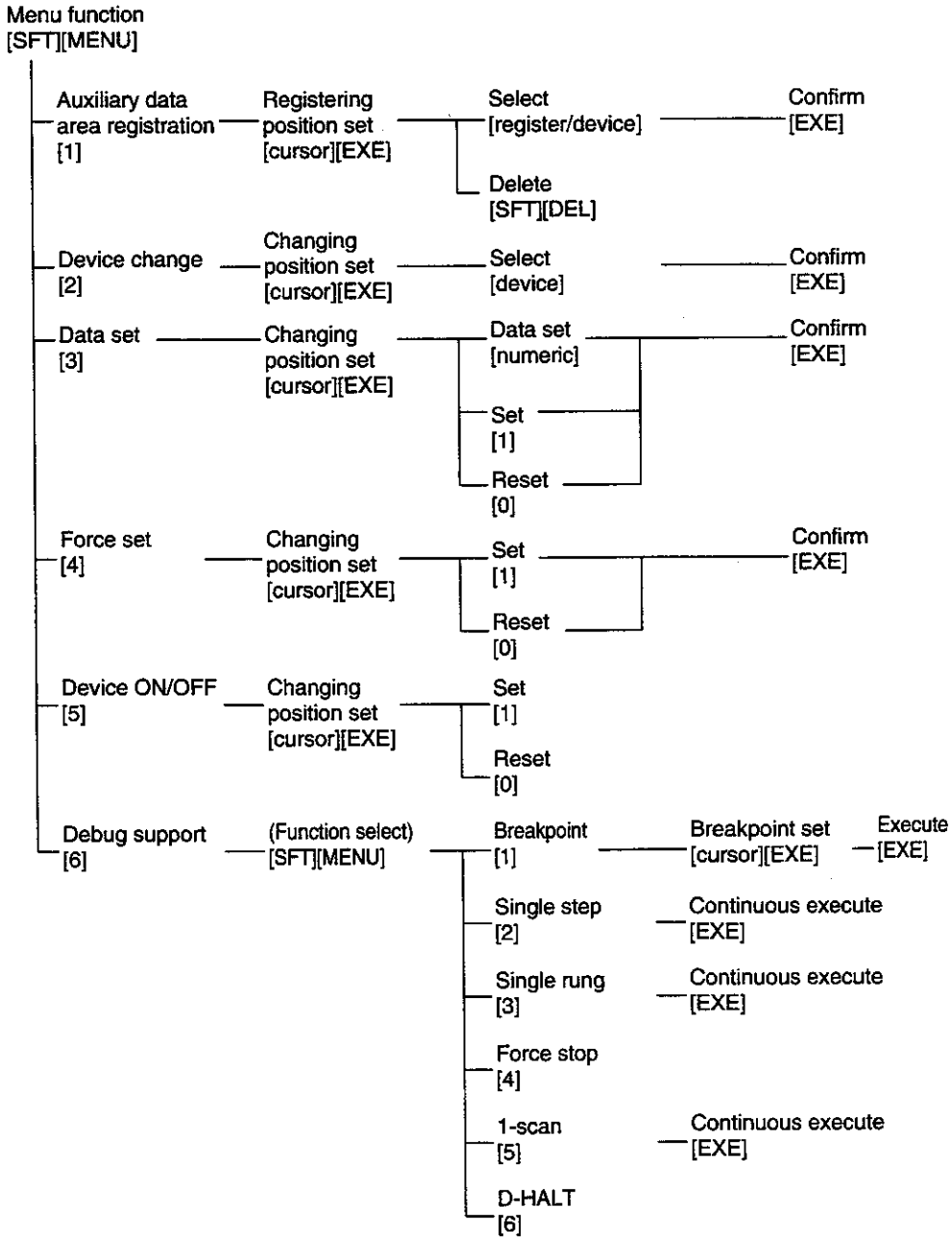


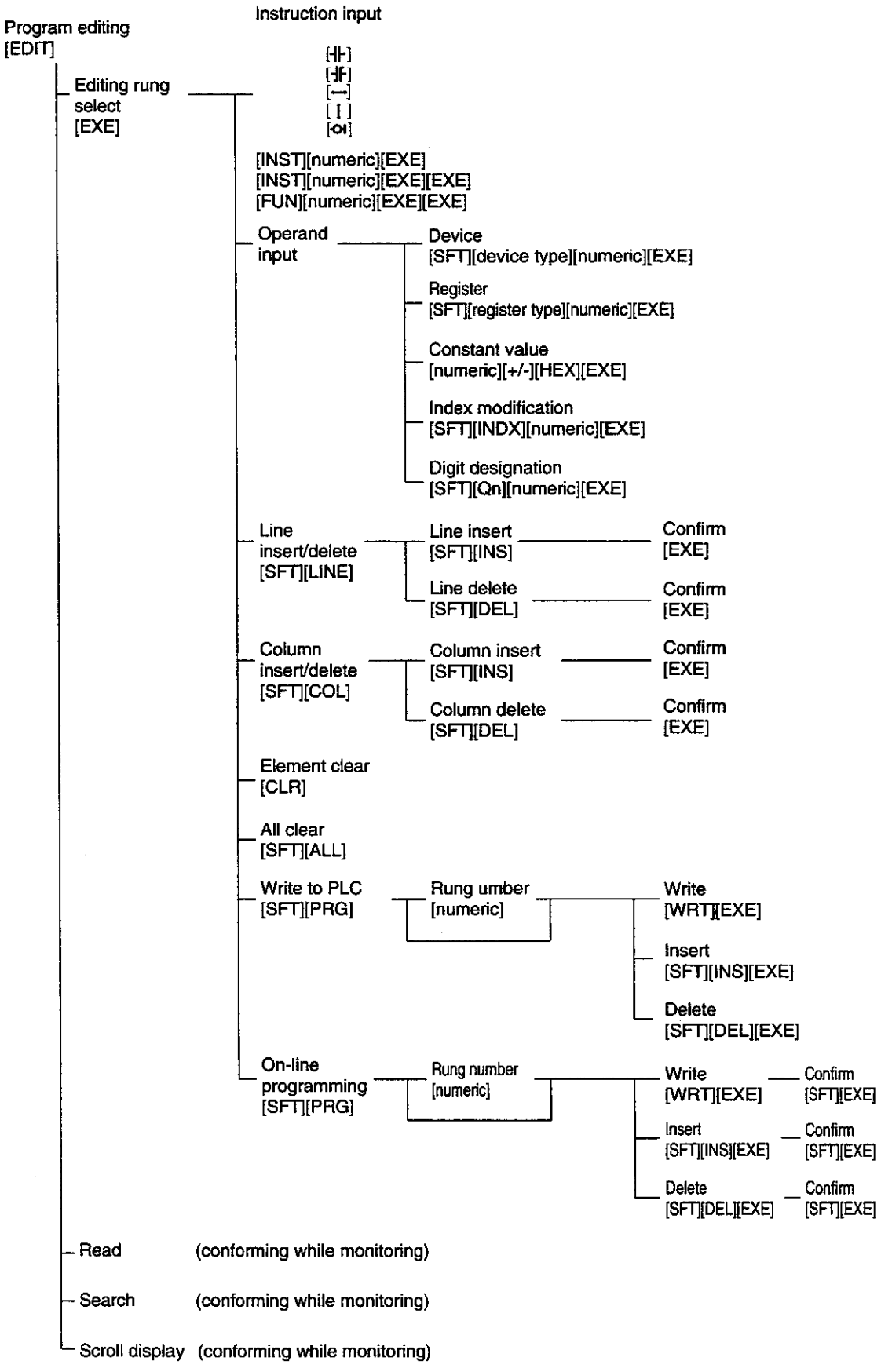

Interrupt assignment [5]
Edit [EDIT]
Display scroll [cursor]
Set [numeric keys] [EXE]
Clear [CLR]
All clear [SFT][ALL]
Confirm [SFT][PRG][WRT]
TOSLINE-F10 assignment [6]
Edit [EDIT]
Setting menu [SFT] [HOME]
Set [cursor][EXE]
Clear [CLR]
All clear [SFT][ALL]
Confirm [SFT][PRG][WRT]
TOSLINE-S20 assignment [7]
Edit [EDIT]
Setting menu [SFT] [HOME]
Display scroll [cursor]
Set [cursor][EXE]
Clear [CLR]
All clear [SFT][ALL]
Confirm [SFT][PRG][WRT]

4.2 Program Monitor Mode

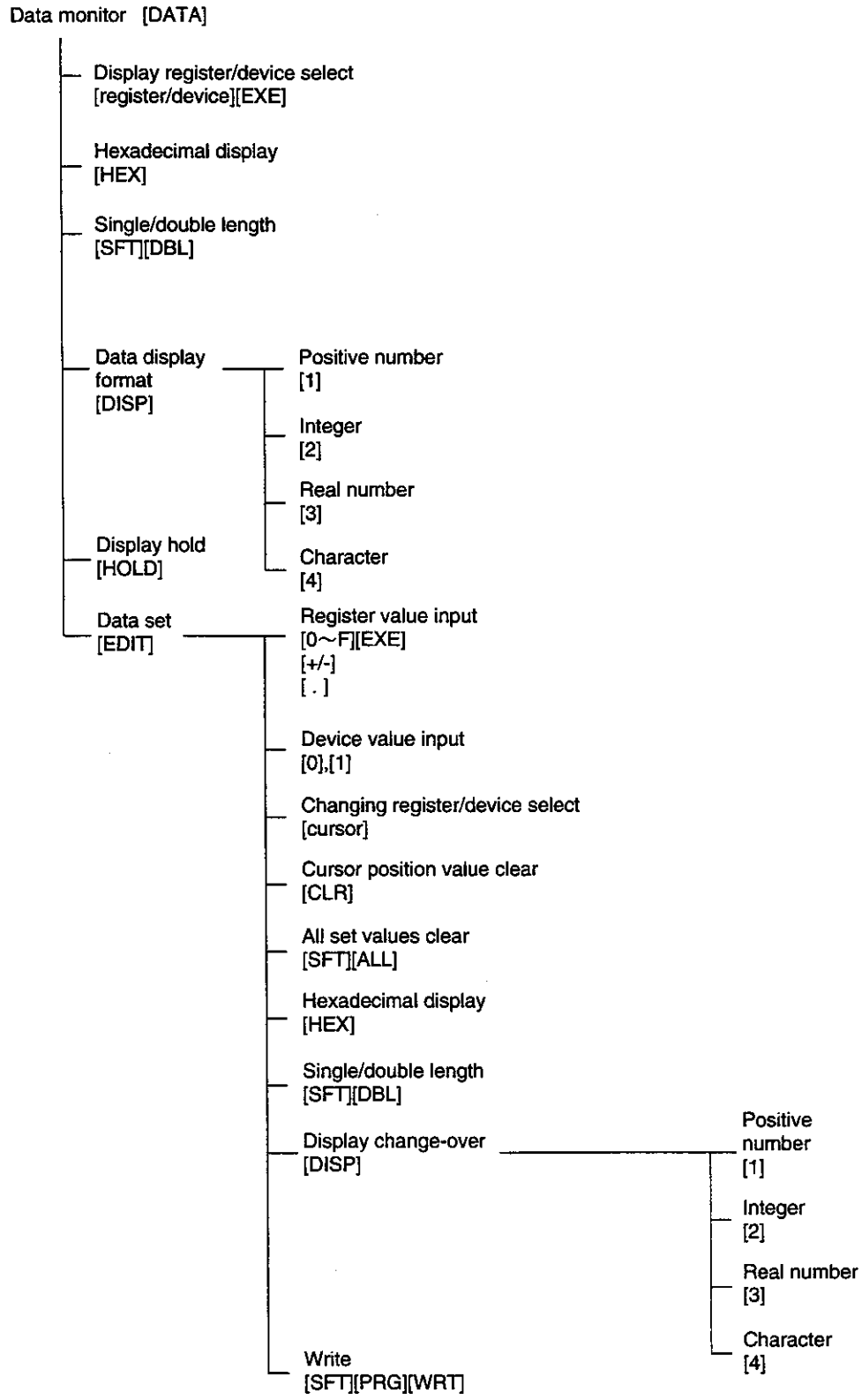



Data holding function
[HOLD]
Auxiliary data monitor
[cursor]
Menu function
[SFT][MENU]


Menu function
[SFT][MENU]
Auxiliary data area registration [1]
Registering position set [cursor][EXE]
Select [register/device]
Confirm [EXE]
Delete [SFT][DEL]
Device change [2]
Changing position set [cursor][EXE]
Select [device]
Confirm [EXE]
Data set [3]
Changing position set [cursor][EXE]
Data set [numeric]
Confirm [EXE]
Set [1]
Reset [0]
Force set [4]
Changing position set [cursor][EXE]
Set [1]
Confirm [EXE]
Reset [0]
Device ON/OFF [5]
Changing position set [cursor][EXE]
Set [1]
Reset [0]
Debug support [6]
(Function select) [SFT][MENU]
Breakpoint [1]
Breakpoint set [cursor][EXE]
Execute [EXE]
Single step [2]
Continuous execute [EXE]
Single rung [3]
Continuous execute [EXE]
Force stop [4]
1-scan [5]
Continuous execute [EXE]
D-HALT [6]


Program editing
[EDIT]
Editing rung select [EXE]
Instruction input
[HI-]
[-|F]
[—]
[|]
[OI]
[INST][numeric][EXE]
[INST][numeric][EXE][EXE]
[FUN][numeric][EXE][EXE]
Operand input
Device
[SFT][device type][numeric][EXE]
Register
[SFT][register type][numeric][EXE]
Constant value
[numeric][+/-][HEX][EXE]
Index modification
[SFT][INDX][numeric][EXE]
Digit designation
[SFT][Qn][numeric][EXE]
Line insert/delete [SFT][LINE]
Line insert [SFT][INS]
Confirm [EXE]
Line delete [SFT][DEL]
Confirm [EXE]
Column insert/delete [SFT][COL]
Column insert [SFT][INS]
Confirm [EXE]
Column delete [SFT][DEL]
Confirm [EXE]
Element clear [CLR]
All clear [SFT][ALL]
Write to PLC [SFT][PRG]
Rung umber [numeric]
Write [WRT][EXE]
Insert [SFT][INS][EXE]
Delete [SFT][DEL][EXE]
On-line programming [SFT][PRG]
Rung number [numeric]
Write [WRT][EXE]
Confirm [SFT][EXE]
Insert [SFT][INS][EXE]
Confirm [SFT][EXE]
Delete [SFT][DEL][EXE]
Confirm [SFT][EXE]
Read (conforming while monitoring)
Search (conforming while monitoring)
Scroll display (conforming while monitoring)

4.3 Data Monitor Mode



4.4 Control Commands

PLC control command
[CMD]

- Password [0][EXE] — Password input(change protect level) [alphanumeric][EXE]
- Password set [1][EXE] — Password input [EDIT][alphanumeric][SFT][PRG][WRT]
- Automatic I/O allocation [5][EXE][EXE]
- IC card/EEPROM read(EEPROM→RAM) [6][0][EXE][EXE]
- IC card/EEPROM write(RAM→EEPROM) [6][1][EXE][EXE]
- Program load(HP→PLC) [7][0][EXE][EXE][EXE]
- Program save(PLC→HP) [7][1][EXE][EXE]
- Program compare(HP↔PLC) [7][2][EXE][EXE]
- HALT [8][0][EXE][EXE]
- RUN [8][1][EXE][EXE]
- Force RUN [8][2][EXE][EXE]
- Program check [8][3][EXE]
  - Duplicate-coil check [0][EXE][EXE]
  - No duplicate-coil check [1][EXE][EXE]
- Hold [8][4][EXE][EXE]
- Hold reset [8][5][EXE][EXE]
- Clear memory [9][0][EXE][EXE]
- Clear force [9][1][EXE][EXE]
- Clear event history [9][2][EXE][EXE]
- Error reset [9][3][EXE][EXE]
- Buzzer ON/OFF [9][5][EXE][EXE]
- PLC connection type [9][6][EXE] — Set [EDIT]
  - Direct connection [1] [SFT][PRG][WRT]
  - Network connection [2] [numeric][EXE] [cursor] [SFT][PRG][WRT]

5. Key Entry Common Rules

Numerals input

Keep the rules below when entering a monitor blok number,command number,data set number, function number,and other numeric values.

1. Only valid-digit figures will appear when you input numeric values.
2. The upper digits figures will be set to 0 if numeric values input does not meet the valid digits.
3. The last valid digit will be accepted when entering numeric values exceeds the valid digits.

Example: Block number input [valid: 3 digits]
when you enter the [1], [2], [3], [4] keys, numeric values "234" will be valid.

Device/register input

Follow the rules below to input devices/registers.

1. When the type of device/register (X, Y, XW, YW, etc.) is input, the numeric part will be cleared to 0.
2. Only valid digit figures will appear in entering a device/register number.
3. The upper digits will be set to 0 when numeric value input falls short of the valid digits.
4. The last digit will be accepted if entering numeric values exceeds the valid digits.

Example:	Key input	Display
[SFT]	[X]	"X0000"
	[4]	"X0004"
[SFT]	[Z]	"Z0000"
	[1]	"Z0001"
	[2]	"Z0012"
	[3]	"Z0123"
	[4]	"Z1234"
	[5]	"Z2345"

key entry sound

When you press keys, the sound will be as follows:

1. In normal key inputting: a short beep (approx. 100 ms)
2. In alarming: a short beep follwed by a longer beep (approx. 250 ms)
   Alarming represents one of the following states:
   - When an incorrect key is pressed.
   - When an abnormal data is entered.
   - When a transmission error between the HP and a PLC occurs.
   - When an unacceptable command is entered to the PLC.
   - When an operation having a significant effect on PLC operation (on-line write, etc.) is entered.

The buzzer can be used to ON/OFF with a control command.
[CMD] [9] [5] [EXE] [EXE]

Alphabetic key input

Alphabets can be used when you enter a program ID, system comment, and password.

Example:		
	[SFT] [ALPHA]	: Alphabetic mode
	[A]~[Z]	: Uppercase alphabet input
	[SFT] [A]~[SFT] [Z]	: Lowercase alphabet input
	[SFT] [ALPHA]	: Alphabetic mode released

The [SFT] key status in entering lowercased characters will be released by each key input.

Restrictions The following characters can be entered with key operation.

- Figures: 0 to 9
- Uppercase alphabets: A to Z
- Lowercase alphabets: a to z
- - (minus)
- . (period)
- (space)

The following characters cannot be entered.

- Special symbols (!, ", #, etc.)
- Control codes (00H to 1FH)

The following characters can be displayed.

- Figures: 0 to 9
- Uppercase alphabets: A to Z
- Lowercase alphabets: a to z
- Space
- Special symbols (! " # $ % ' ( ) * + , - . / : ; < = > ? @ [¥] ^ _ ~)

The following characters cannot be displayed.

-Special symbols (~, {|})

If a character code which cannot be displayed is found, the illegal code "?" will be displayed. Note that the data containing an illegal code cannot be written by HP.

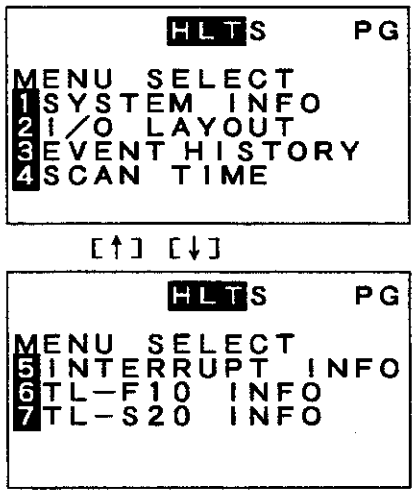
6. System Information Mode

The system information menu has two screens. A desired function can be selected from the menu (1 to 7).

[SYS] key System information menu display

Select a function of the system information by entering a numeric key.

[1] Displaying/registering system information
[2] Displaying/registering I/O allocation information
[3] Displaying event history
[4] Displaying the scan time
[5] Displaying/registering interrupt assignment information
[6] Displaying /registering TOSLINE-F10 assignment information
[7] Displaying/registering TOSLINE-S20 assignment information



Enter a [numeric] key to execute.

6.1 System Information

6.1.1 Displaying system information

This function is selected when you enter [SYS] and [1] or at POWER ON. Use the cursor key to scroll up/down through the 12 screens.

1 PROGRAM ID
You can make a program name up to 10 alphanumeric characters.

[↓]

2 SYSTEM COMMENT
Can be used for registering/displaying up to 30 alphanumeric characters.

[↓]

3 CAPACITY
Will display the memory capacity of the PLC being connected.

4 STEPS USED
Will display the total number of instruction steps used in the program.

[↓]

5 PC TYPE (PLC type)
Will display the type of the PLC being connected.

6 PC OS (PLC OS version)
Will display the operating software version of the PLC being connected.

7 HP (HP OS version)
Will display the operating software version of the HP.

[↓]

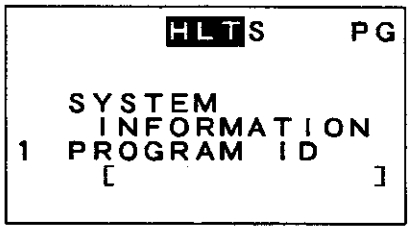
8 ERROR STATUS
Will display the most recent information on the error history.

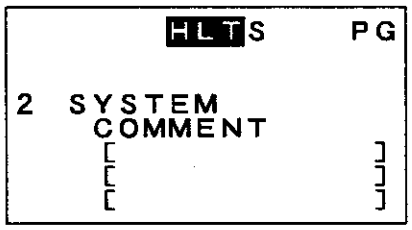
[↓]

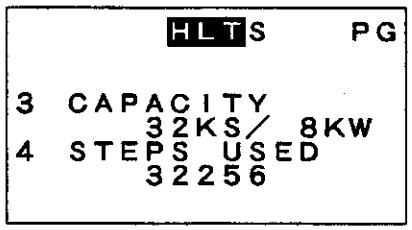
9 DIAGNOSTIC (diagnostic information)
Will display the error number and the accompanying message when the diagnostic instruction (DIAG) has been executed in the PLC.
(Up to 16 diagnostic errors can be registered in the list, and the first one is displayed.)
By pressing the [CLR] key, the first one is deleted and the second one is displayed, if any.

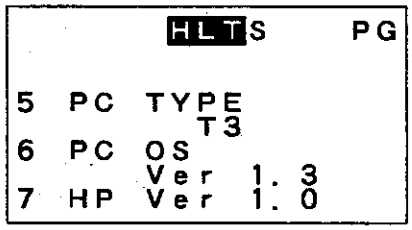
※Will be valid only when the right display is being displayed.

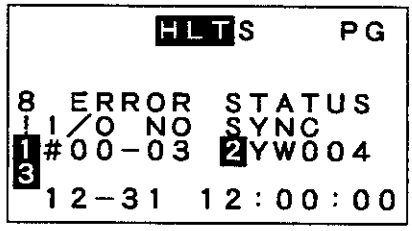
※Cannot be executed during editing.

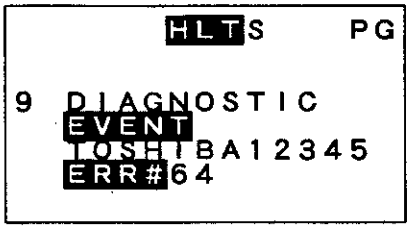








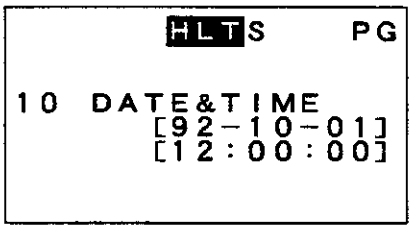




6. System Information Mode

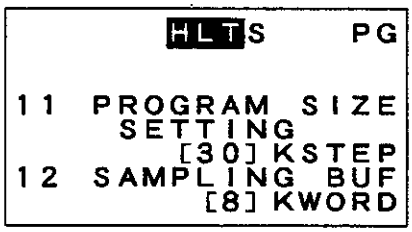
[↓]

10 DATE&TIME
Will display the current date and time managed in the PLC.



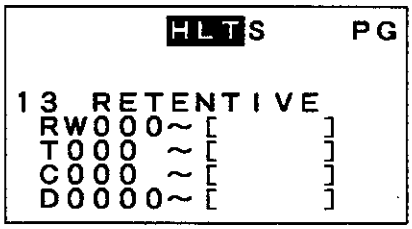
[↓]

11 PROGRAM SIZE SETTING
12 SAMPLING BUF (sampling buffer size)



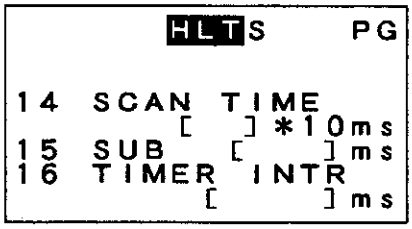
[↓]

13 RETENTIVE (retentive memory area)



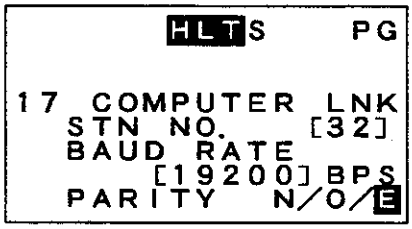
[↓]

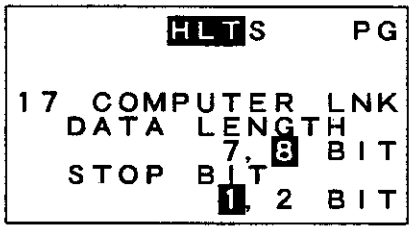
14 SCAN TIME (constant scan time setting)
15 SUB (sub-program execution time)
16 TIMER INTR (timer interrupt interval)



[↓]

17 COMPUTER LINK (computer link parameters)
STN NO. (station No. 1 to 32)
BAUD RATE (300, 600, 1200, 2400, 4800, 9600, or 19200 bps)
PARITY (non, odd, or even)



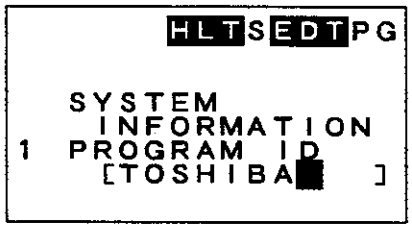


[↓]

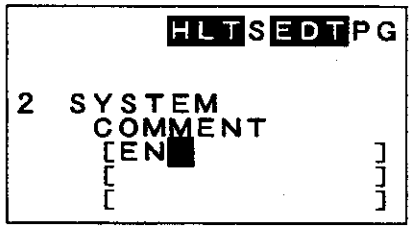
DATE LENGTH (7 or 8 bits)
STOP BIT (1 or 2 bits)

6.1.2 Setting system information

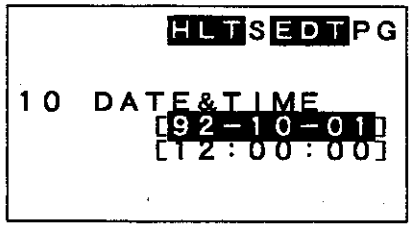
Set the HP to the edit mode by pressing [EDIT] key.
The cursor will appear on the top of the program ID column, prompting you to set.
Example: [TOSHIBA■]
Set with alphanumeric keys.
Enter [CLR] for a blank.
Enter [EXE] to complete the program ID.



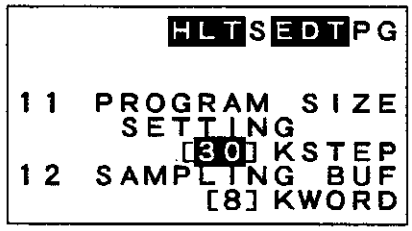
Setting the system comment
Use alphanumeric keys to enter.
Use the [↓] and [↑] keys, and enter [EXE] to complete the system comment.



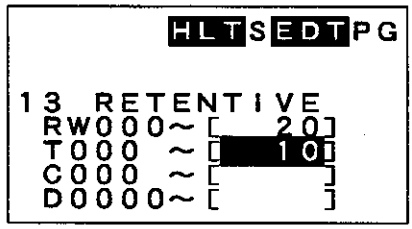
Setting the DATE&TIME
Use numeric keys to enter the date and time. (year → month → day)
(hour→ minute → second)
Use the [↓] and [↑] keys, and enter [EXE] to complete.



Setting a program size
Use numeric keys, and enter [EXE] to complete.
Setting a sampling buffer size
Use numeric keys, and enter [EXE] to complete.

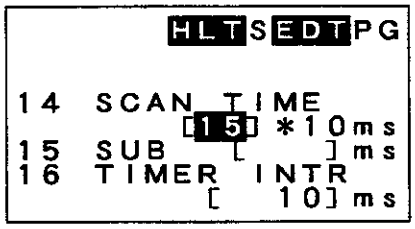


Setting a retentive memory area
Use numeric keys and enter [EXE] to complete.



6. System Information Mode

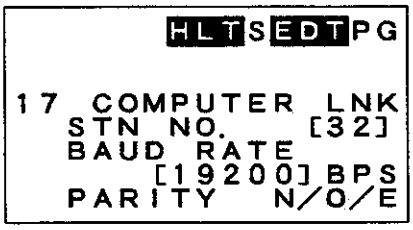
Setting the constant scan time
(10～200ms)
Use numeric keys, and enter [EXE] to complete.
Setting the sub-program execution time
(1～100ms) (T3 only)
Use numeric keys, and enter [EXE] to complete.
Setting the timer interrupt interval
(2～1000ms for T3, 5～1000ms for T2)
Use numeric keys, and enter [EXE] to complete.



Setting the computer link parameters

Station No.: (1 to 32) Use numeric keys, and [EXE].

Baud rate: Use [→] and [←] keys, and [EXE].



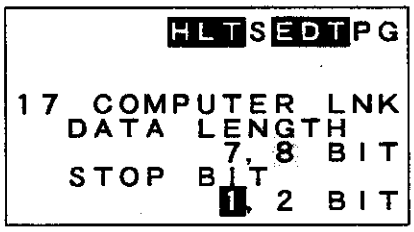
> 300←600←1200←2400←4800←9600←19200 <

Parity: Use the [→] and [←] keys to select.
The set item will be blinked in reverse during setting.
The setting will appear in reverse when confirmed.

Example: N / O / E

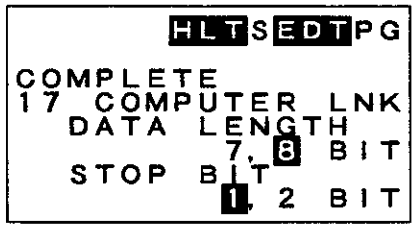
Data length: Use the [→] and [←] keys to select.
The set item will be blinked in reverse during setting.
The setting will appear in reverse when confirmed.

Stop bit: Use the [→] and [←] keys to select.
The set item will be in reverse blink during setting.
The setting will appear in reverse when confirmed



When you complete the above settings on the HP, write them into the PLC.

Press the [SFT], [PRG], and [WRT] keys to execute writing into the PLC.
When the writing has completed normally, "COMPLETE" will appear on the display.

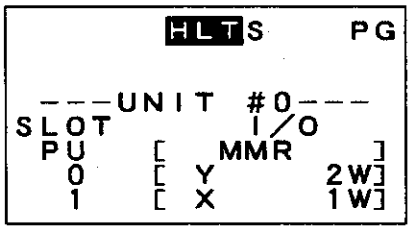


6.2 I/O allocation Information

This mode will set/display the I/O allocation information.

6.2.1 Displaying I/O allocation information

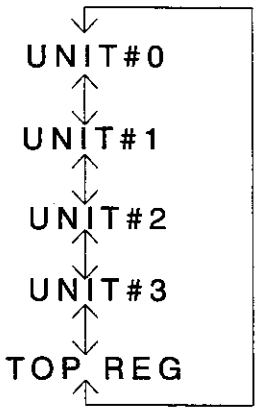
Press [SYS] and [2] to display the I/O allocation information.



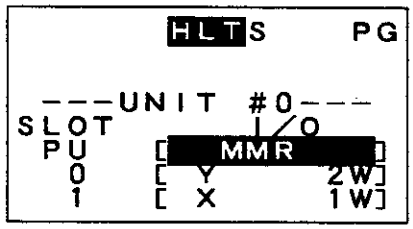
Use cursor kays to display the desired unit/slot

Cursor control
[↑][↓]: Press to scroll up/down the slot.
[→][←]: Press to move to another slot in units.

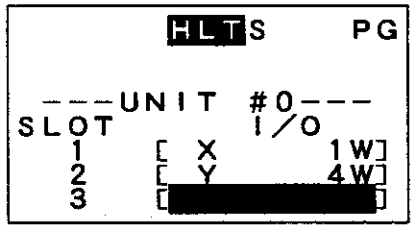
screen configuration



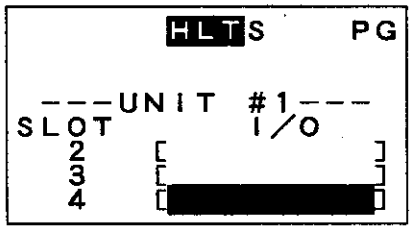
[↓]



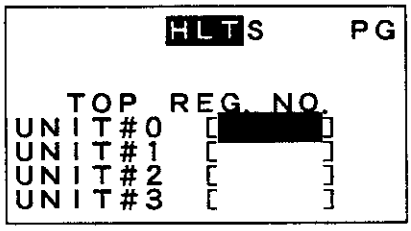
[↓][↓][↓][↓]



[→]
Moves to the next unit.

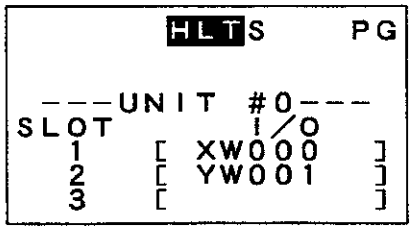


Display for unit base address setting screen.
[→][→][→]



Display change-over function
Will display the register assigned to the module.

Alternate
- Press the [DISP] key to display the register.
- Press the [DISP] key to display the module type.



6.2.2 Specifying on-line I/O disconnection

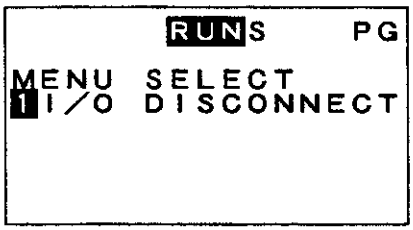
For the T3, specified I/O modules (discrete I/O only) can be removed and re-mounted during program execution. (not possible for the T2)

How to specify connect/disconnect:

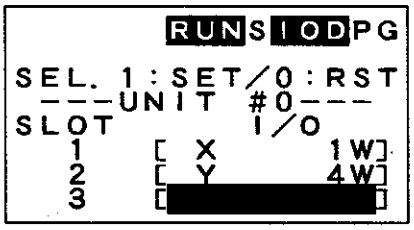
This is valid only during the display of I/O allocation information.

[SFT][MENU]

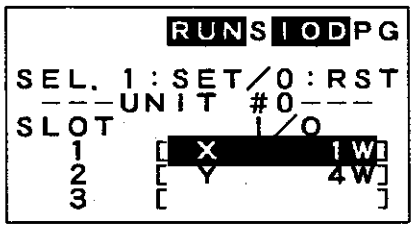
[1]



IOD will appear on the display prompting you to select the module.



Move the cursor to the slot of the module you want to specify the on-line I/O disconnection.

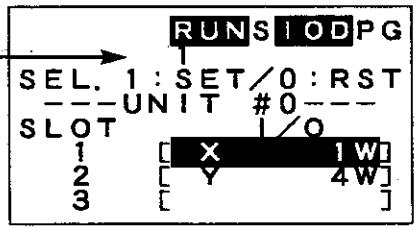


Specify/release this function.

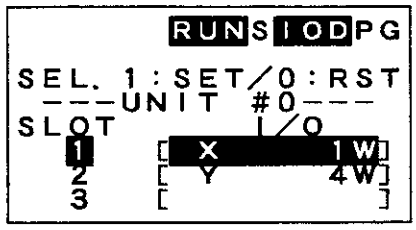
[1]: To specify

[0]: To release

Enter [EXE] to execute.



When the specified module is disconnected from the PLC operation,the slot number will appear in reverse.



Accessing to the module of the slot in reverse display is in temporal halt, so you can remove/re-mount the module without turning off power.

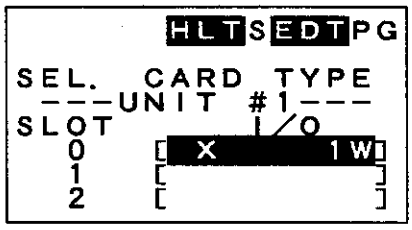
Press the [SFT] and [CAN] Keys to exit from this function.

CAUTION When a module is disconnected by this function, the I/O signal status of the module remains unchanged.
Pay special attention to safety when using this function.

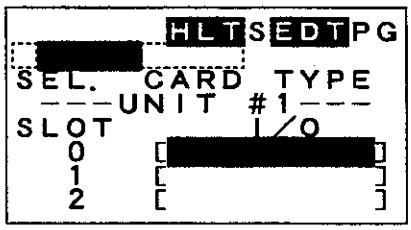
6.2.3 Setting I/O allocation information

Set to the edit mode by pressing the [EDIT] key.

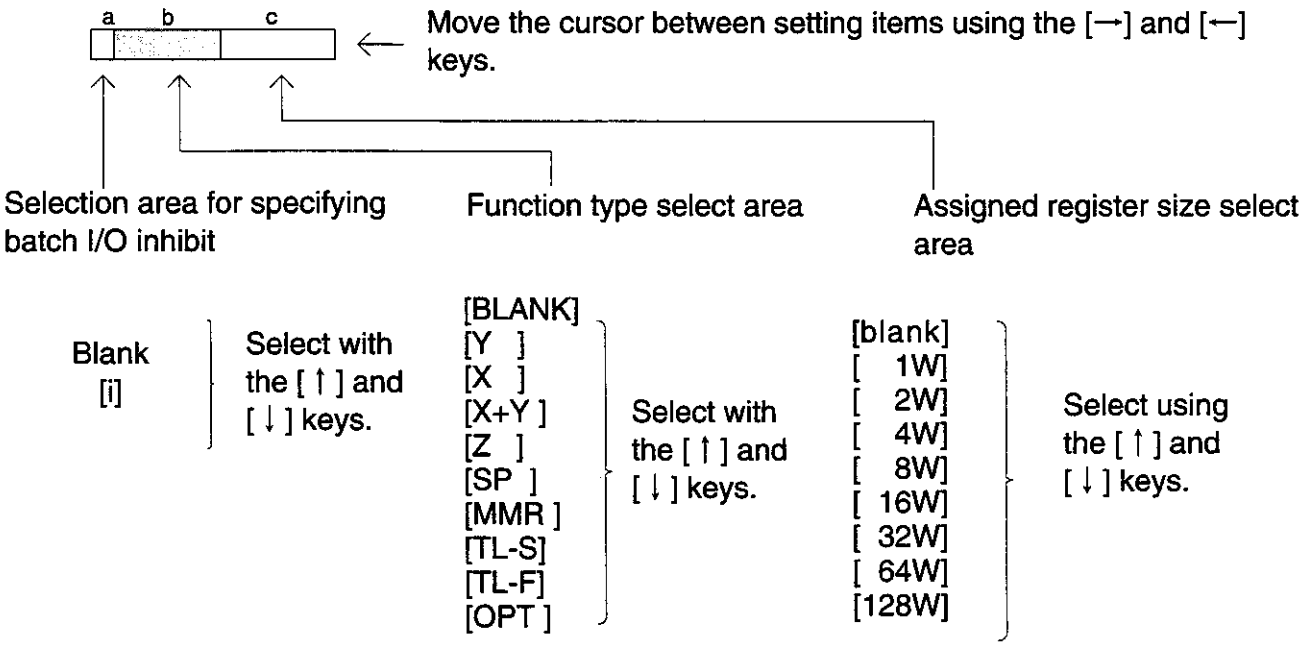
Move the cursor to a desired slot.



Enter [SFT] and [HOME] to set the module type setting mode.
In this mode, the type select menu will appear on the second line of the display, prompting you to select the type with [arrow] keys.



Configuration of the type select menu



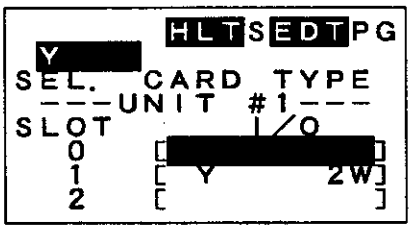
Selection example: Selecting a module (card) type

a	b	c
i	X	2W
	MMR	
i	X+Y	8W

6. System Information Mode

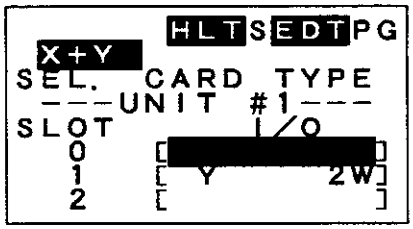
Operation example (iX+Y 4W)

Press the [SFT] and [HOME] key to display the function select menu.

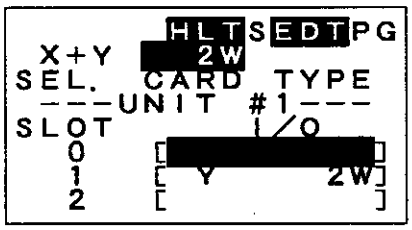


[↓]: "Y"

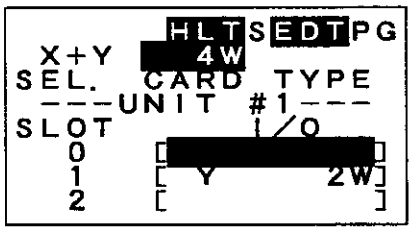
[↓]: "X"
[↓]: "X+Y"



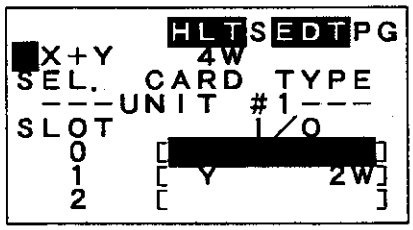
[→]: Move to the register size select area for setting.
In this case, because the card type is "X + Y", selecting a card size will be limited to other than 1W (2W to 128W).



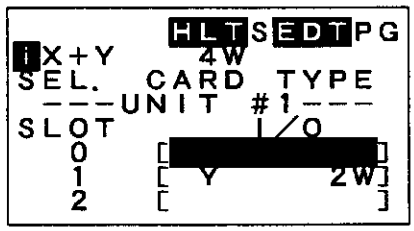
[↓]: Select a card size ("4W").



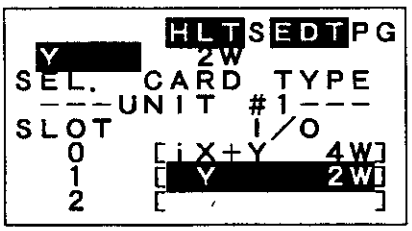
[→]: Move to the batch I/O inhibit select area for setting.



[↓]: Specify the batch I/O inhibit ("i").



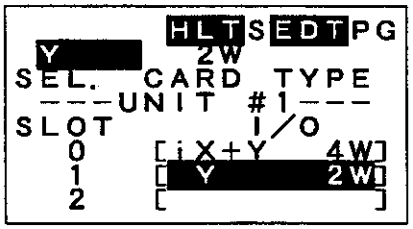
Register the selected type to the slot.
[WRT]: Store into the template.
or
[EXE]: Register but not store into the template .
The cursor on the slot will move onto the next slot, and the type select menu will be displayed accordingly.



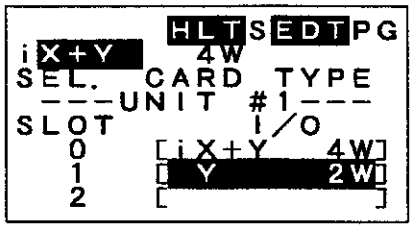
Template function

This function is useful to allocate the same module type to other slots.
Example: For allocating "i X + Y 4W" to slots 0, 1, and 3.

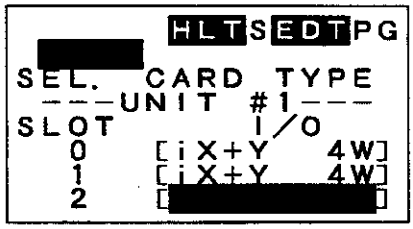
Allocate " iX + Y 4W" to slot 0.
Press the [WRT] key to register.



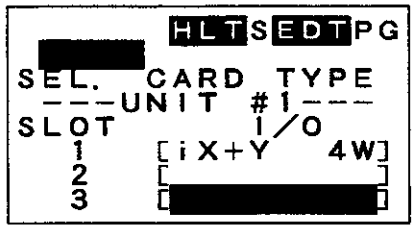
Press the [DISP] key.
The card type previously registered into the template will appear.



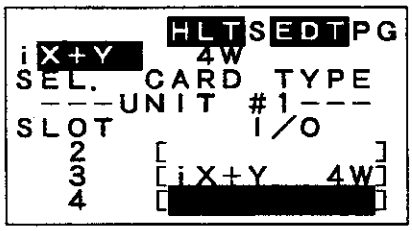
Enter [EXE] to register.



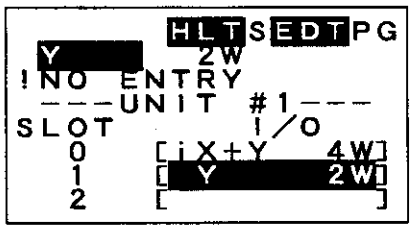
For not registering in slot 2, enter [EXE].
(cursor stepping forward only)



To register in slot 3, enter the following keys.
[DISP]
[EXE]



The "!NO ENTRY" (unregistered) error message will appear when you press [DISP] in case a type has not been stored with the [WRT] key.



NOTE

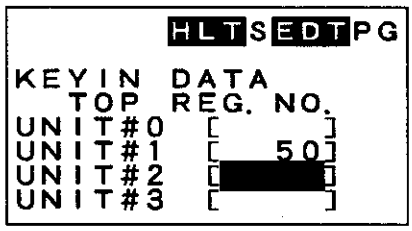
(1) The contents of the template will remain during edit mode. (however, the [DISP] key is valid only in the module type setting mode.)
(2) The contents of the template will be updated when the [WRT] key is pressed next time.

6. System Information Mode

Unit base address

Setting the unit base address :

When you press the [→] key some times, the unit base address setling screen will appear. You can set the base address (top register number) for each unit. If you are going to set a register number of UNIT#1 to 50, move the cursor to UNIT#1, and enter [5][0][EXE].



Write into PLC

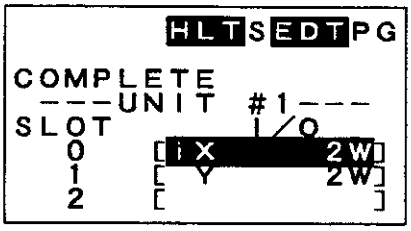
Writing I/O allocation information:

After you complete the setting of I/O allocation information, the information must be written into the PLC by the following key operation.

[SFT][PRG][WRT]

Writing can also be executed while the type select menu is being displayed.

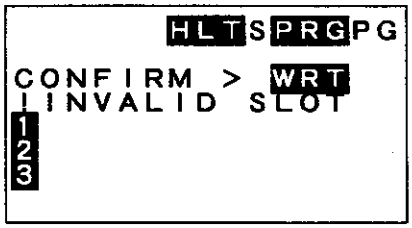
When you complete the above operation, "COMPLETE" will appear on the display.



NOTE

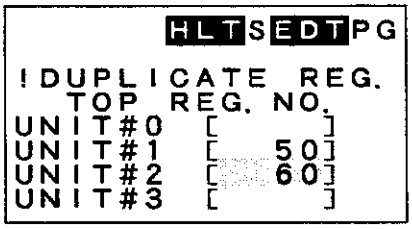
(1) For the PU slot, Blank or MMR is valid.

(2) Slots 8, 9, and 10 of the T2 cannot be used. If you enter [SFT] [PRG] [WRT], "INVALID SLOT" will appear on the display. Enter [SFT] [CAN] then check again.



If registers are duplicated by setting the unit base address, "DUPLICATE REG." will appear on the display when [SFT][PRG] are entered.

Enter [SFT][CAN] to cancel error state, then change the setting.



6.3 Event History

This function will display the error history stored in the PLC.

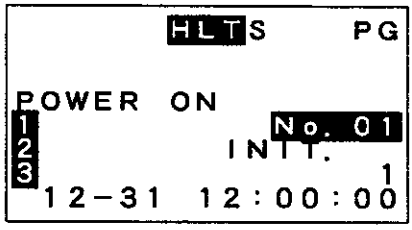
The error mesage, time, and operating mode when the error occurred will be displayed.

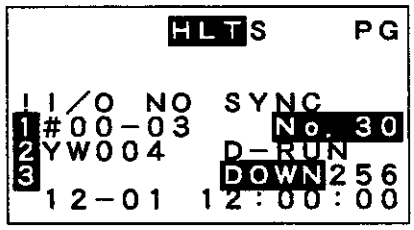
The event history consists of 30 screens.

The 30 most recent events are stored in the PLC and displayed on the HP screen.

To display the event history table, enter keys as follows:

[SYS] [3]
Cursor keys for scrolling

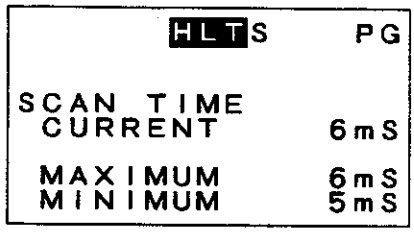




6.4 Scan Time

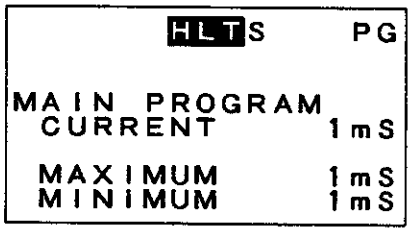
This function monitors the scan time during program execution.
The current value, maximum value, and minimum value are displayed.

[SYS][4]: Displays scan time.
Press the [↑] [→] [↓] [←] keys to scroll and display the time for each program type.

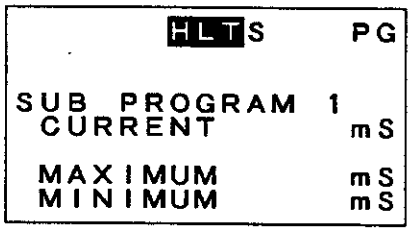


6. System Information Mode

[↓] or [→]: Main program execution time

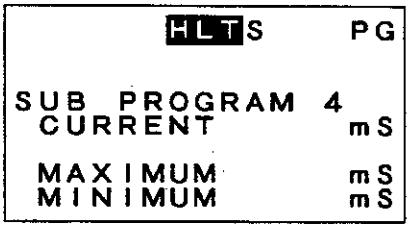


[↓] or [→]: Subprogram 1 execution time

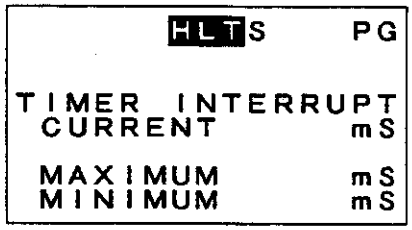


[↓] or [→]: Subprogram stepping forward

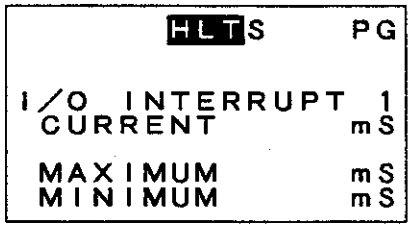
•
•
•



[↓] or [→]: Timer interrupt program execution time

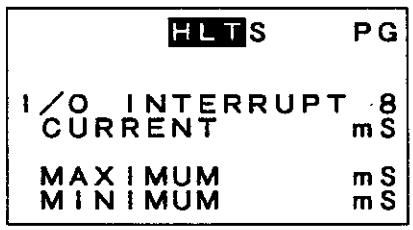


[↓] or [→]: I/O interrupt program 1 execution time



[↓] or [→]: I/O interrupt program stepping forward

•
•
•



6.5 Interrupt Assignment Information

This function is used to change the assignment between the I/O interrupt program and the module which has the interrupt function.

6.5.1 Displaying interrupt assignment information

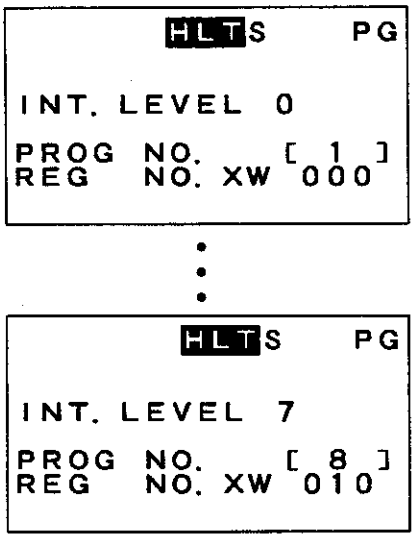
This function will display the interrupt assignment information .

[SYS] [5]

INT. LEVEL: (interrupt level) 0 to 7
PROG. NO. (interrupt program number)
REG NO. (input register)

The input register allocated to the interrupt module is displeyed as REG NO. automatically.

Scroll using the cursor keys.



6.5.2 Setting interrupt assignment information

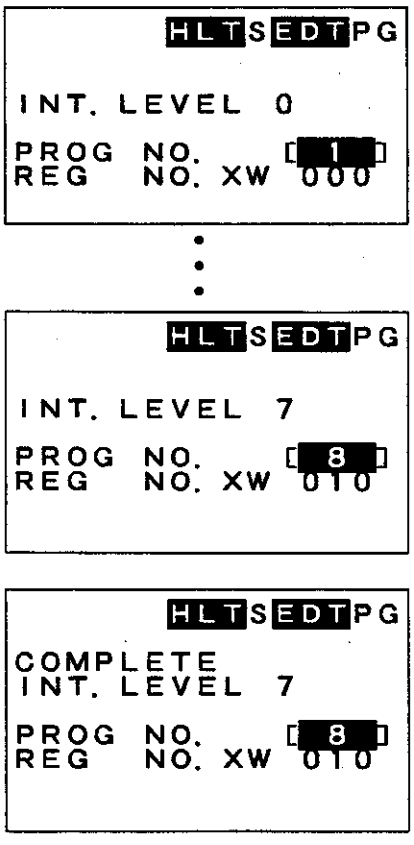
Up to 8 I/O interrupt programs can be registered. (No.1 to No.8)

Press [EDIT] key to enter the edit mode.

Use cursor keys to display the desired level screen, and enter the desired interrupt program number using a [numeric] key.

Set an interrupt program number by entering [EXE] or [WRT].
Press the [CLR] key to delete the content on the cursor.
Press the [SFT][ALL] keys to delete the entire content on the display.

Enter the following keys to register into the PLC.
[SFT] [PRG] [WRT]
When the operation has completed normally, "COMPLETE" will appear on the display.



NOTE This function is invalid for the T2.

6. System Information Mode

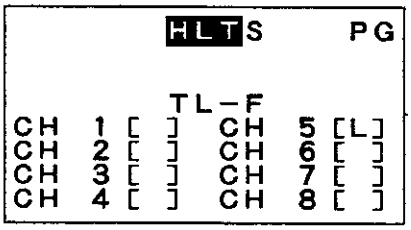
6.6 TOSLINE-F10 Assignment Information

This function is used to set/monitor the TOSLINE-F10 assignment information.

6.6.1 Displaying TOSLINE-F10 assignment information

Press the [SYS] [6] keys.

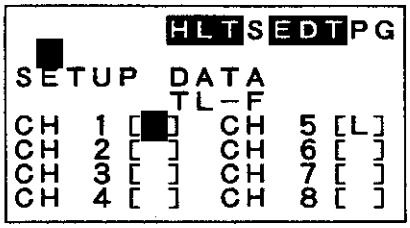
Display example:
[blank]: Not specified
[L] : LINK specified



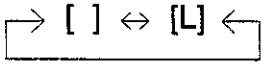
6.6.2 Setting TOSLINE-F10 assignment information

This will set the the TOSLINE-F10 assignment.

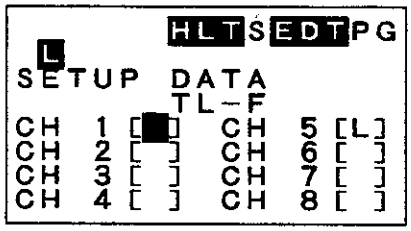
[EDIT]: Enters the edit mode.
[cursor]: Moves the cursor to the channel.
[SFT][HOME]: Enters to selection mode.
The selection menu will appear on the second line of the display.



[→] [←]keys: Press to select "blank" and LINK setting.

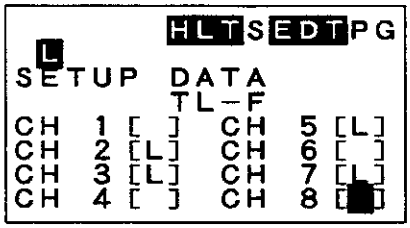


[EXE] or [WRT]: Enters to register and step forward the cursor.
Scroll up/down the cursor without registering, using the [↑] and [↓] keys.

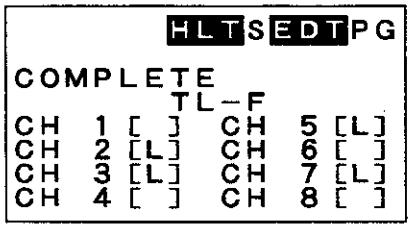


[L] will appear on the channel you specified LINK.

Using the [CLR] key, delete the content on the cursor.
Using the [SFT] [ALL] keys, delete the entire information.



Write the setting to the PLC.
[SFT] [PRG] [WRT]
When the writing has completed normally, "COMPLETE" will appear on the display.



6.7 TOSLINE-S20 Assignment Information

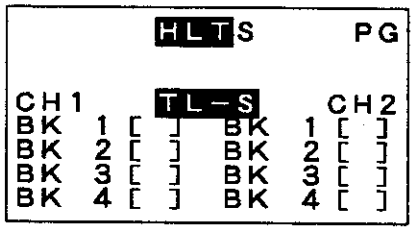
This function is used to set/monitor the TOSLINE-S20 assignment information.

6.7.1 Displaying TOSLINE-S20 assignment information

Press the [SYS] [7] keys.

Display example:

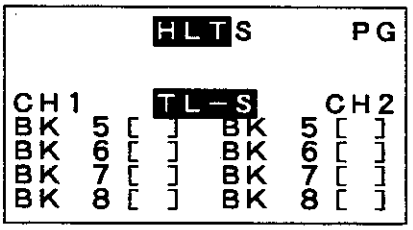
[blank]: Not specified
[L]: LINK specified
[G]: GLOBAL specified



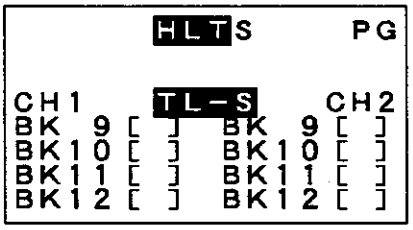
[↓]

Scroll the display using the [↑] and [↓] keys.
CH 1 BLK1～BLK16
CH 2 BLK1～BLK16

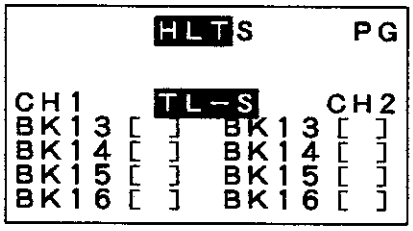
(4 screens configuration)



[↓]



[↓]

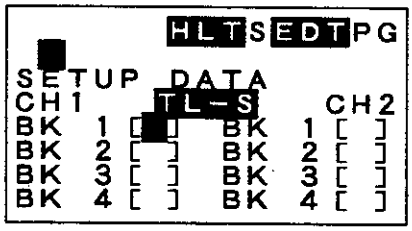


[↓]
Top display

6.7.2 Setting TOSLINE-S20 assignment information

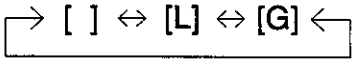
The assignment for the TOSLINE-S20 will be set as follows:

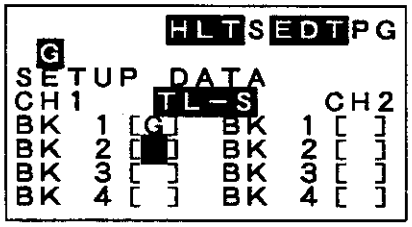
[EDIT]: Enters the edit mode.
[cursor] keys: Move the cursor onto a block/channel that you are going to use.
[↓][↑] CH1 BK1 ⟷ BK16
CH2 BK1 ⟷ BK16
[→][←] CH1 BK1 ⟷ CH2 BK1
[SFT] [HOME]: Enters to selection mode.



The selection menu will appear on the second line of the display.

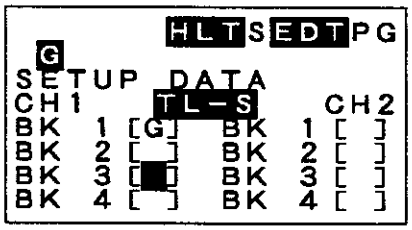
[→] [←] keys: Select "blank", LINK, or GLOBAL.



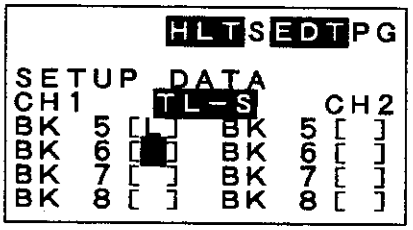


[EXE] or [WRT]: Enters to register and step forward the cursor.

[↑] [↓] keys: Press to scroll up/down the cursor without registering.

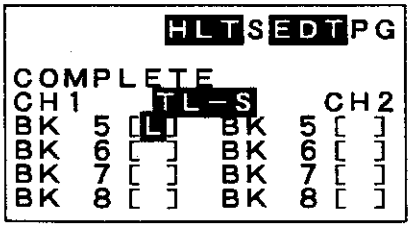


[L]or[G] will appear on the block specified.



Using the [CLR] key, delete the content on the cursor.
Using the [SFT][ALL] keys, delete the entire information.

Write the setting to the PLC.
[SFT][PRG][WRT]
When the writing has completed normally, "COMPLETE" will appear on the display.

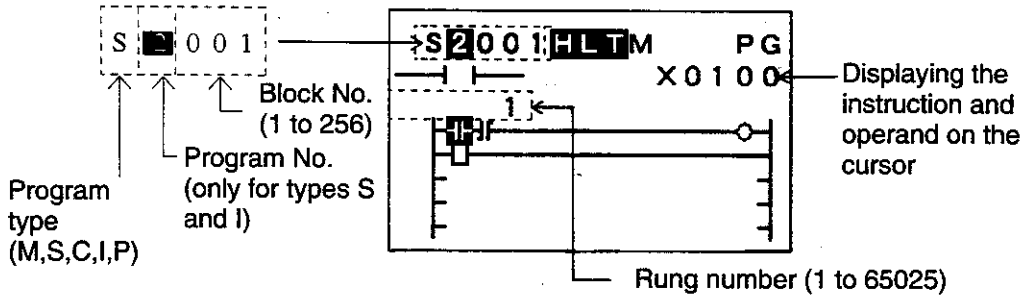


7.1 General Rules

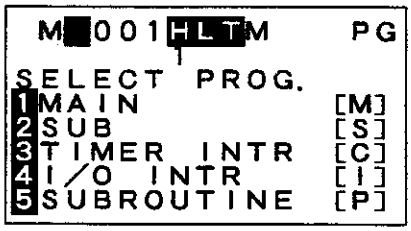
The program monitor mode will display the program stored in the PLC on the HP display.
When the PLC is in RUN mode (during program execution), the execution status will also appear on the display.

There are two ways to display a program:

1. Program type selection : [SFT] [MON] → examples 1 and 2
2. Block and rung selection : [MON] → example 3



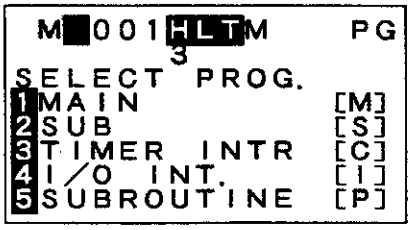
Basic operation example 1:



[SFT] [MON]: Display the program type menu.

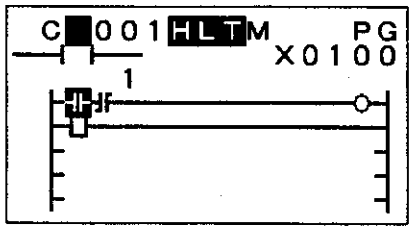
On the first line of the screen, last time's program monitoring type or the initial value (main program) will appear. (blinking during setting)

1 Main program ·····M
2 Subprogram ·····S
3 Timer interrupt program ·····C
4 I/O interrupt program ·····I
5 Subroutine ·····P



Select a program type by numeric keys. (1 to 5)
[3]

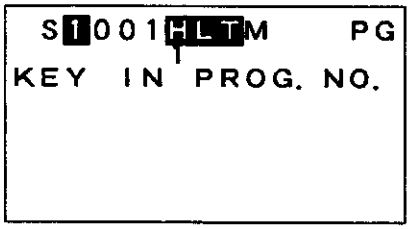
[EXE]: Enter to execute.
The timer interrupt program will appear on the display.



Basic operation example 2:

If a subprogram or an I/O interrupt program is selected (for the case when the type is "S" or "I"), a program number must be set.

[SFT] [MON] [2] [EXE]: Select the subprogram.



Program No. will be blinked.

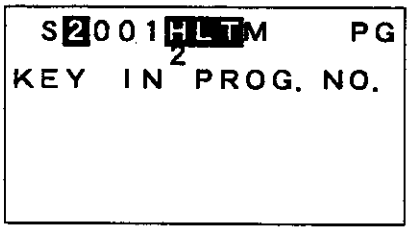
Specify a program number as follows:

[numeric]: Select the program number.

[EXE]: Confirm

or

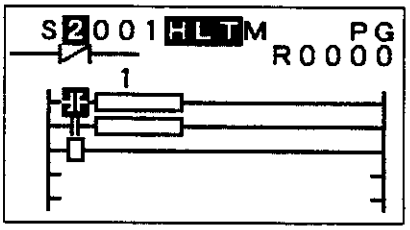
[cursor] keys: Press to step forward/backward a program number.



For displaying program No. 2:

[2][EXE], or [↓], or [→]

Subprogram 2 will appear on the display.
And block 1, rung 1 is automatically selected.



Basic operation example 3:

A monitoring example of rung 300 of block 123 is shown below.

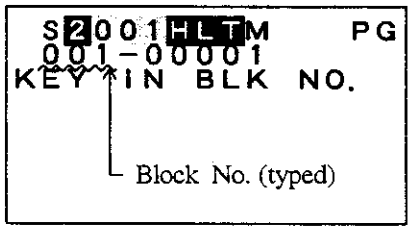
[MON]: Set the monitoring mode.

[numeric]: Block No.

[EXE]: Confirm.

or

[cursor] keys: Use to step forward/backward Block No.



For specifying block 123:

[MON] [1] [2] [3] [EXE]

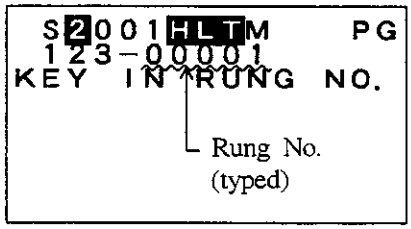
Continue to set a rung No. as follows:

[numeric]: Enter to set a rung No.

[EXE]: Enter to confirm.

or

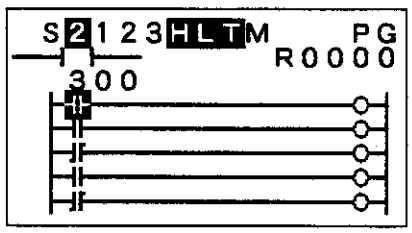
[cursor] keys: Use to step forward/backward rung No.



For specifying rung 300:

[3][0] [0] [EXE]

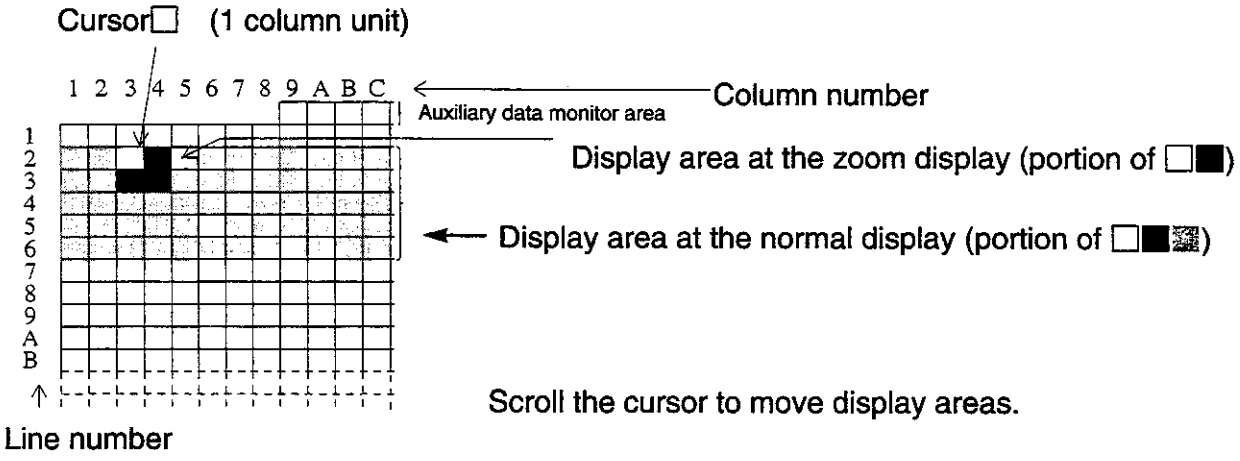
Rung 300 of block 123 will be displayed and the cursor will appear on the home position.



If there is no program on the specified rung, the next to the program existing rung will be selected.

7.2 Zoom Function

In the program monitor mode, you can change the display between the normal display and the zoom. However, if you change the display mode during a subsequent operation, such as search, menu function, etc., the operation prior to that point will be canceled.

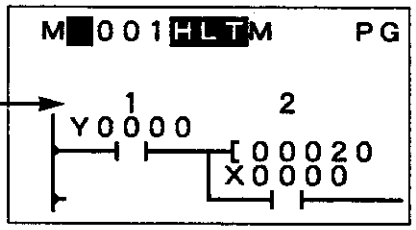


The [ZOOM] key will change over the normal display and the zoom display.

Enter [ZOOM] to show a zoomed display.

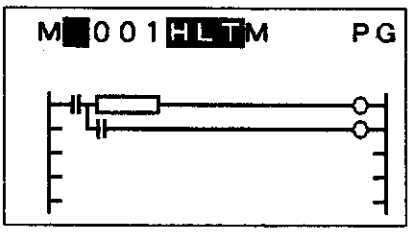
Column number

2 columns by 2 lines



Enter [ZOOM] to set the normal display.

12 columns by 5 lines

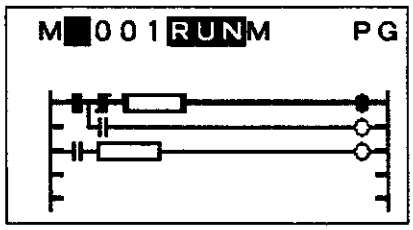


7.3 Program execution monitor

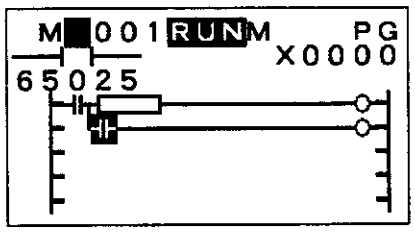
When the PLC is in RUN mode, the execution status will appear in power flow (hot-line state).

In program on-line monitoring, the program execution status will appear based on the data when the instruction is executed, not based on the data after the scanning. Therefore, you can debug a program efficiently.

Display example:
Monitor a progrom in the procedure explained in Section 7.1.



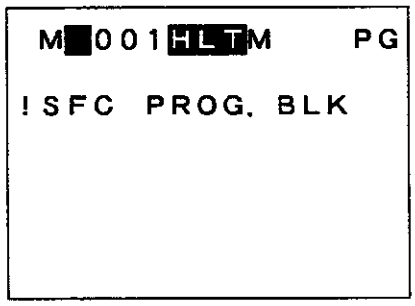
Scrolling and displaying
Use the [cursor] keys to scroll.



Use the [SFT][HOME] keys to move the cursor to the top of the display screen.

NOTE

(1) Monitoring execution status ranges from the program top to the END instruction.
(2) In the normal display mode, vertical connect lines cannot appear in power flow display.
(3) The HP cannot display SFC programs, nor can a new ladder program be created in an SFC block.



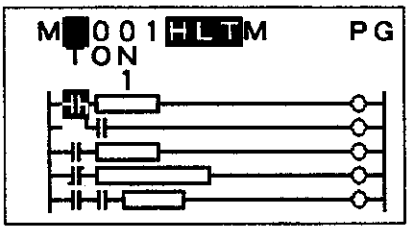
7.4 Search Function

This function will specify and search an instruction, operand, combination of an instruction and operand, or a label number.
Search will be executed in the following rules.

1. A program will be searched after the cursor position.
2. When an object is searched, the cursor will be positioned at the object and the rung will appear on the display. (CONTINUE〉 SCH)
3. Press the [SCH] key to continue searching in the remaining program.
4. When search has reached at the end of the program, "SEARCH END" will appear. If you press the [SRH] key again, search will re-start at the top of the program.

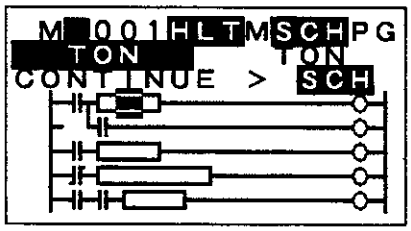
7.4.1 Instruction search

This function will be used to search by specifying an instruction.



Select an instruction.
[INST] [8] [EXE] (example: TON)

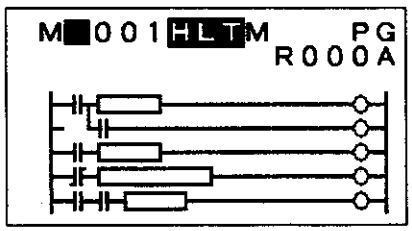
[SFT] [SCH] (search execution)
The object to be searched will be displayed in the buffer area.



"EXECUTING" will appear during search.

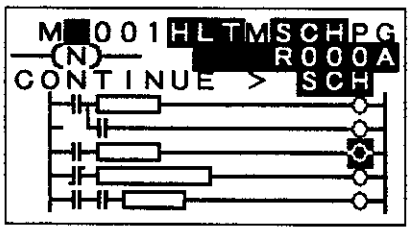
7.4.2 Operand search

This function will be used to search by specifying an operand (device/register).



Specify an operand.
[SFT][R][A] (example: device R000A)

[SFT][SCH] (search execution)



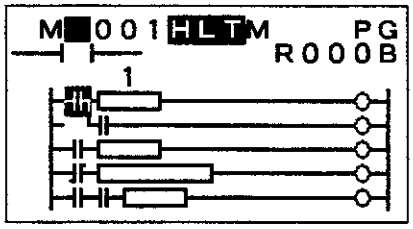
The object to be searched will be displayed in the data buffer.

'EXECUTING" will appear during search.

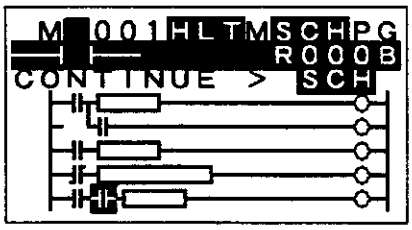
7.4.3 Instruction with operand search

This function will search a combination of an instruction and an operand.

Specify an instruction and an operand.
[⊣⊢] [SFT] [R] [B]
(example: NO contact R000B)



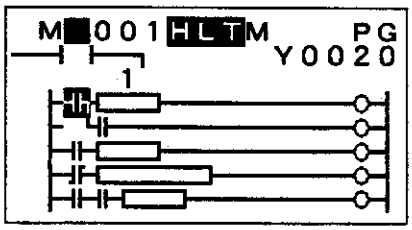
[SFT] [SCH] (search execution)



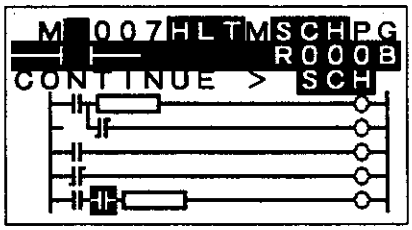
7.4.4 Search using cursor

This function will search an object to be searched by specifying with the cursor.

Move the cursor onto the object to be searched.



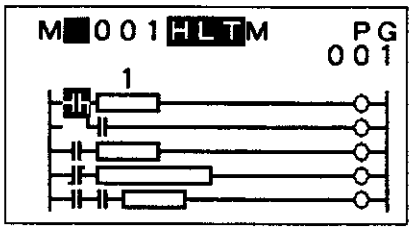
[SFT] [SCH] (search execution)



7.4.5 Label number search

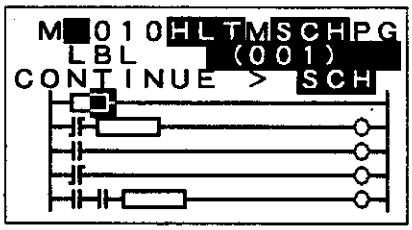
This function will search the specified label number.

Specify a label number with the [numeric] keys.



[1] (example: LBL 1)

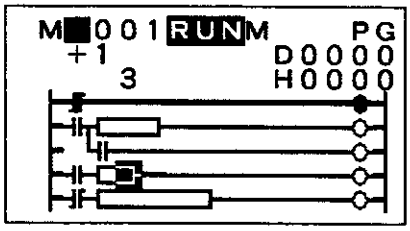
[SFT] [SCH] (search execution)



7.5 Data format changing

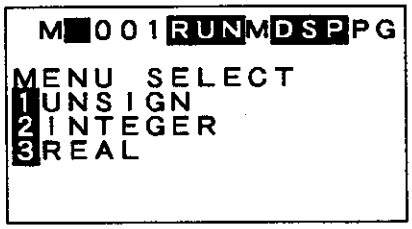
This function will change over register data of the program being displayed to a hexadecimal, positive number, integer, or real number.

[HEX]: Change to hexadecimal format.

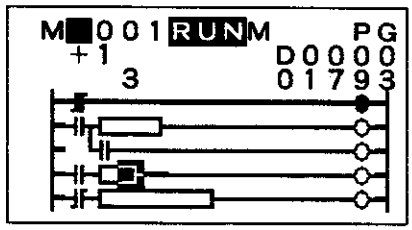


Select a desired display from the menu.
[DISP]: Enter to change over displays.
[1] to [3]: Select one of the number.

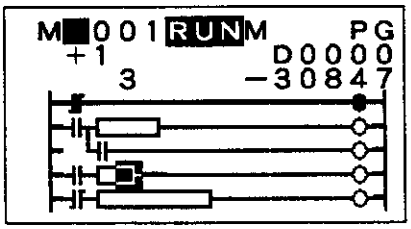
1 UNSIGN (Positive number)
2 INTEGER
3 REAL (Real number)



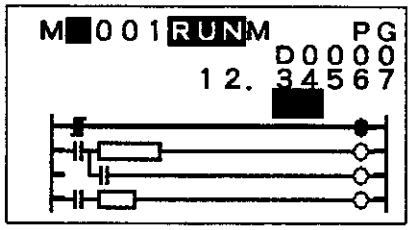
[DISP] [1]: Display as positive number.



[DISP] [2]: Display as integer.



[DISP] [3]: Display as real number.



NOTE

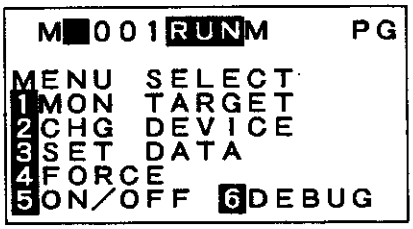
(1) Changing over to a real number will be possible at the auxiliary data monitor area (double-length is specified).
(2) The T2 cannot deal with real numbers.
(3) Character data can be displayed in the data monitor mode only.

7.6 Screen hold Function

This function will hold the last on-line trace status. This function is useful for monitoring the program part which is executed intermittently. Use the [HOLD] key to set/release the hold state. (alternately)

7.7 Menu Function

This mode will support the functions below. You can select a function from the menu to execute.



[SFT][MENU] : Enter to display the function menu.

1 Auxiliary data monitor
2 Device change
3 Setting data
4 Force function
5 Device ON/OFF
6 Debug support

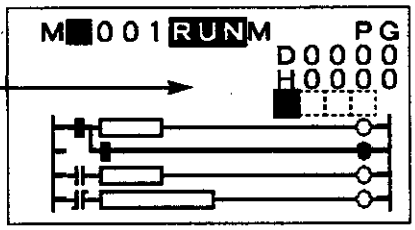
Select one by pressing one of the [1] to [6] keys.

7.7.1 Auxiliary data monitor

This function will register up to 4 devices or registers in the auxiliary data monitor area to monitor their ON/OFF states and current values.
(When the cursor moves to this area, the display will appear on the screen.)

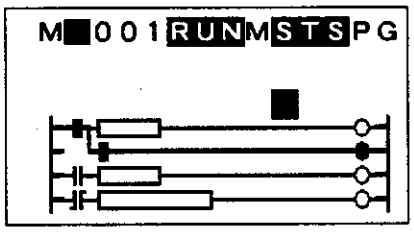
Rung number will not appear while auxiliary data is being display or registered.

Auxiliary data monitor area → Up to 4 devices or registers can be registered.



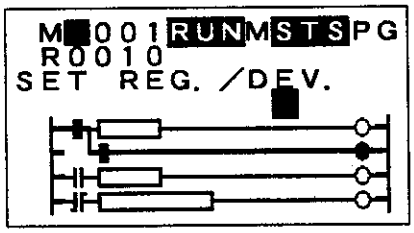
How to register:

[SFT] [MENU] [1]: Select "MON TARGET".
(If the cursor is out of the auxiliary data monitor area, the cursor will move to the extreme left of the auxiliary data monitor area.)



Specify the registration position.

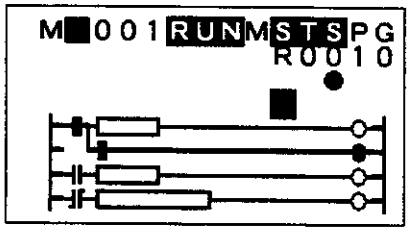
[cursor]: Use to select position to be registered.
[EXE]: Confirm the position to be registered.



Specify a device/register.

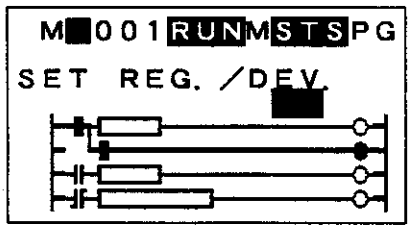
[SFT] [R][1] [0]
(example: R0010)

[EXE] : Registration



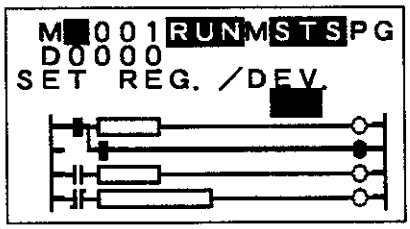
The ON/OFF statuses of the device registered will appear on the display.
(●:ON ○:OFF)
For registers, their current value will appear. (Hexadecimal values can be displayed when [HEX] is entered.)

For displaying in double-length:

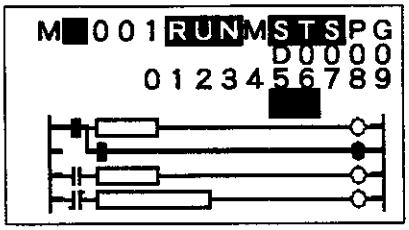


[SFT] [MENU] [1]: Select auxiliary data monitor.
[cursor] [EXE]: Select a position to be registered
[SFT] [DBL]: Specify double-length
In the auxiliary data monitor area, 2 columns will be secured.
If the cursor remains at the extreme-right of the auxiliary data monitor area, "!DOUBLE LENGTH" will appear, prompting you not to register.

Enter a register number.
[SFT] [D][0] (example: D0001 · D0000)



[EXE] : Registration



The current value in double-length will appear.

For releasing registration:
Move the cursor to the auxiliary data monitor area you want to release the registration.

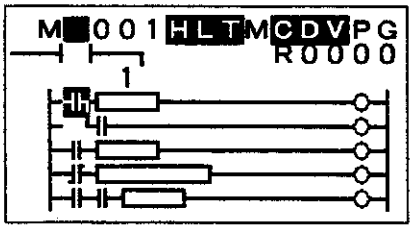
[SFT] [MENU] [1] : Select auxiliary data monitor
[EXE] : Select the area to be released
[SFT] [DEL] : Release

Enter [SFT][CAN] to exit from this function.

NOTE The registration of devices/registers will be cleared when the power supply of the PLC is turned OFF or when the cable between the HP and the PLC is disconnected.

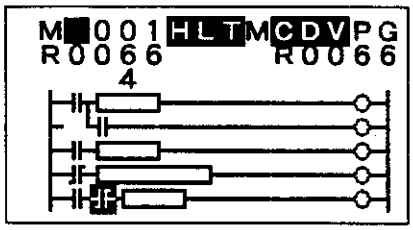
7.7.2 Change device

This function will be used for changing devices (operand) of a contact/coil.

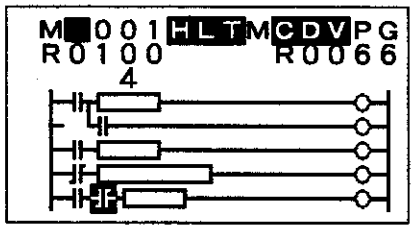


Select this function as follows :
[SFT] [MENU] [2]: Select "CHG DEVICE".

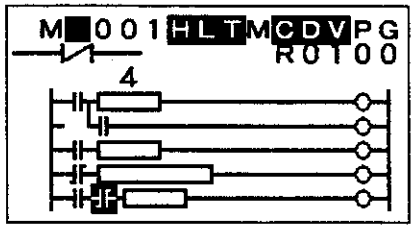
Move the cursor onto a device to be changed in the program, and press
[EXE]



Set a new device.
[SFT] [R] [1] [0] [0] (example: R0100)

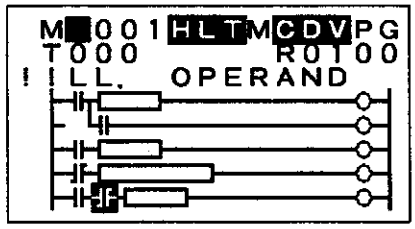


Write the setting to the PLC.
[EXE]



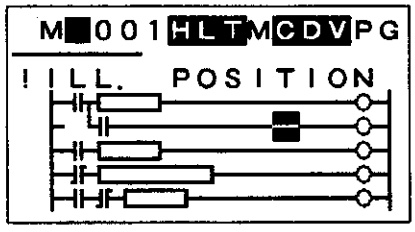
If you are going to change another device, move the cursor onto the target device, and change it in the same procedure explained above.

When [SFT] [CAN] are entered, you can exit from this function.



When an illegal device is entered, the "!ILL OPERAND" message will appear. In this case, set the correct device to change.

The object to be changed is contacts and coils only. Registers cannot be changed . Therefore, if an object other than contacts or coils is specified for change, "!ILL POSITION" will appear. In this case, set the correct position.



CAUTION

(1) This function will change a device for a contact/coil specified by one by one. Therefore, this function will not replace the specified device to another in the whole program.

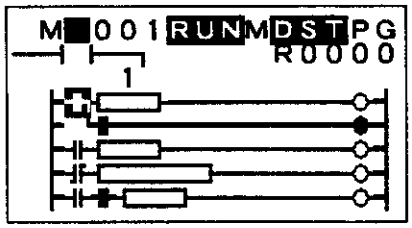
(2) A device can be changed during program execution. However, you must pay attention on the operation status.

7.7.3 Setting data

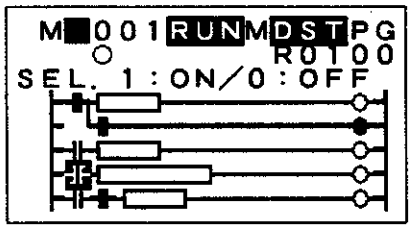
This function will change the current value of a register/device in the program being displayed or in the auxiliary data monitor area.

The setting data function – (1) setting ON/OFF of a device, (2) setting data of a register, and (3) changing the constant data will be explained below.

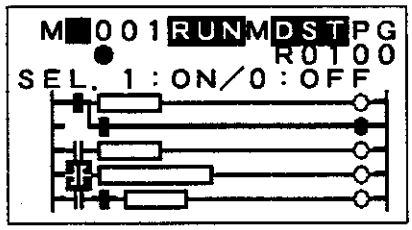
How to set date:
Select "SET DATA" as follows:
[SFT] [MENU] [3]



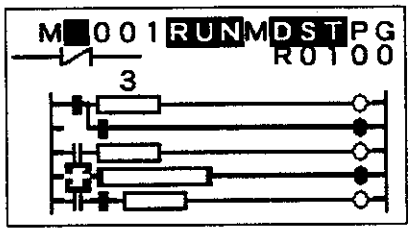
(1) Setting ON/OFF of a device
Move the cursor onto a target device.
[EXE]: Confirm the device to be set.



Set ON/OFF of the device.
[1] (to set to ON) ●
[0] (to set to OFF) ○
(will appear on the second line at left)



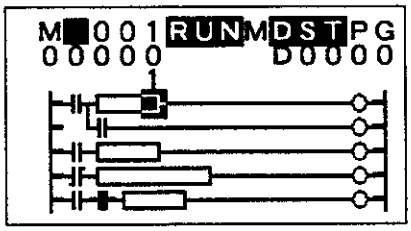
Write the setting into the PLC.
[EXE]



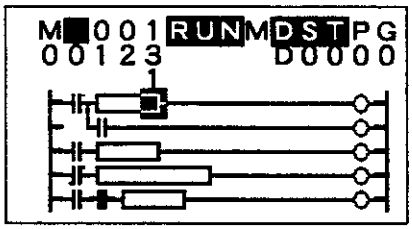
Enter [SFT][CAN] to exit from this function.

NOTE ON/OFF of a device can be set while the PLC is in RUN mode. However, the execution result of the running program has higher priority than the device setting. (For the case of external input devices, their input status has higher priority.) Therefore, using this function in combination with the force function to be explained later will be effective.

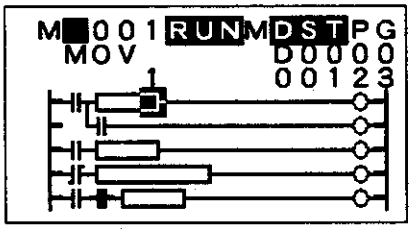
(2) Changing the data of a register
Move the cursor onto the register to be changed.
[EXE]: Specify the register to be changed.



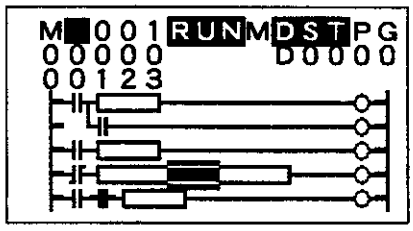
Set a numeric value to the register.
[1][2][3]
(Enter [HEX] for the a hexadecimal value.)
(Enter [DISP] for the integer or positive numbers desired.)



Write the setting into the PLC.
[EXE]

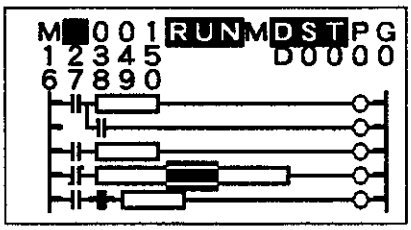


For double-length data and real numbers:
Select an operand specified in double-length.
[EXE]: Specify the register to be changed.



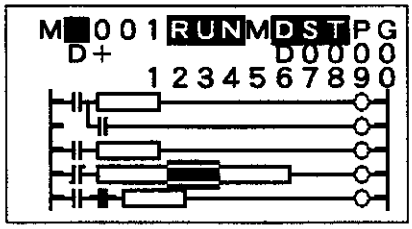
Set a numeric value to the double-length register.

[1] [2] [3] [4] [5]
[6] [7] [8] [9] [0]



Write the setting into the PLC.
[EXE]

Enter [SFT][CAN] to exit from this function.



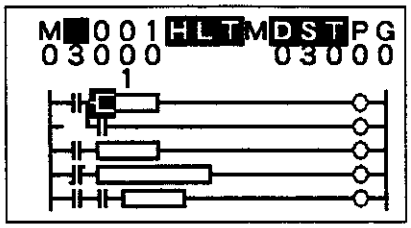
NOTE

(1) The rung number will not appear when a double-length operond or a real number is set.
(2) The data of a register can be changed while the PLC is in RUN mode. The execution result of the running program has higher priority than the data setting.

(3) Changing the constant data

Move the cursor onto the constant operand to be changed.

[EXE]: Specify the position to be changed.

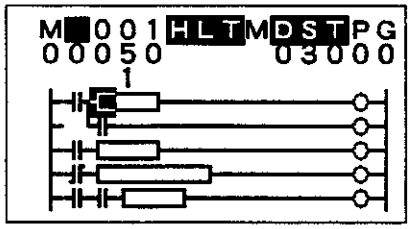


Set a numeric value.

[5] [0]

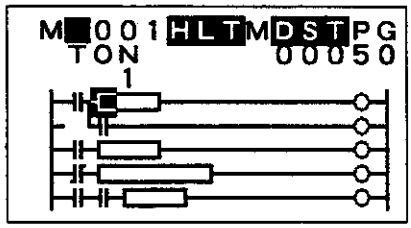
(Enter [HEX] for the hexadecimal value .)

(Enter [DISP] for the integer or positive number.)



Write the setting into the PLC.

[EXE]



Enter [SFT][CAN] to exit from this function.

7.7.4 Force function

This function will maintain the current status of a device specified regardless of the external input status and program execution status.

This function enables you to debug programs and system check efficiently.

There are two types of force functions to be specified.

1) Coil force
   Will maintain the coil device status regardless of program execution result.

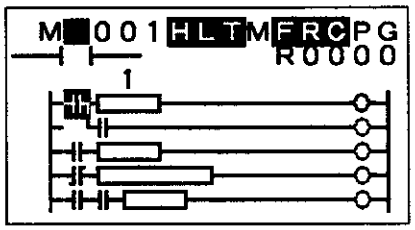
2) Input device force
   Will force to maintain the input device status regardless of the external input status.

NOTE

(1) The force function will maintain the current status of a device. Therefore, in order to set a device's ON/OFF to a desired status, use this function in combination with the setting data function.
(2) The force status and the content (ON/OFF status of a device) will be retained even after the power supply of the PLC has been turned ON again.
(3) The force function as the register can be specified by specifying all 16 devices to force.
(4) In order to release all forces specified simultaneously, execute the clear force designation command (CMD 91). Clearing the forces specified is recommended before the actual operation.

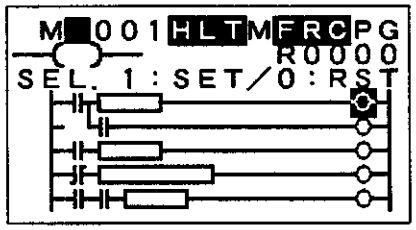
How to set force

Select the force function.
[SFT] [MENU] [4]

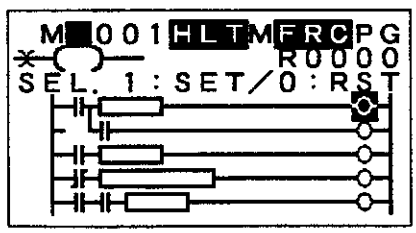


(1) Coil force

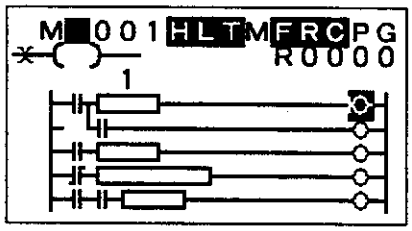
Move the cursor onto the coil instruction which specifies the force, and enter [EXE].



Select the force status.
[1] (Setting force) —|/|—
[0] (Releasing force) —| |—
(displayed on the upper-left)

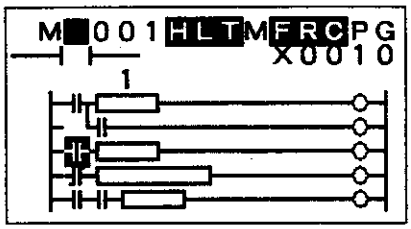


Execute.
[EXE]



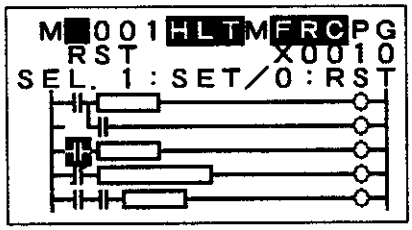
By moving the cursor onto another coil instruction or input device, you can continue to set/release the force function.

Enter [SFT][CAN], to exit from this function.

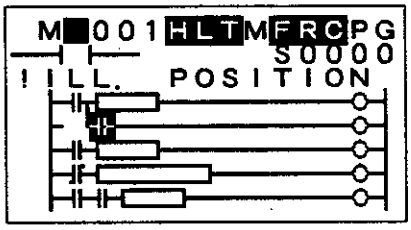


(2) Input device force

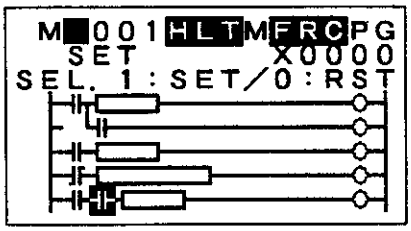
Move the cursor onto the device that you will specify the force function, and enter [EXE].



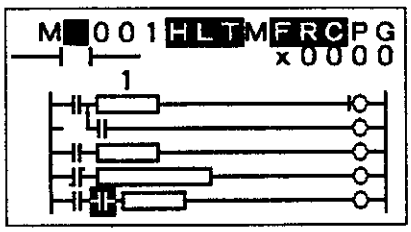
When you are going to specify other than X, Z, and L, the "!ILL. POSITION" (illegal position) message will appear.



Select the force status.
[1] (setting force)
[0] (releasing force)

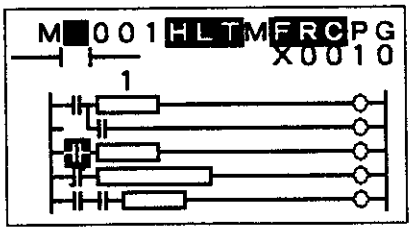


Execute.
[EXE]: When the force function is set, the device symbol will change to lowercase.



By moving the cursor onto another coil instruction or input device, you can continue to set/release the force function.

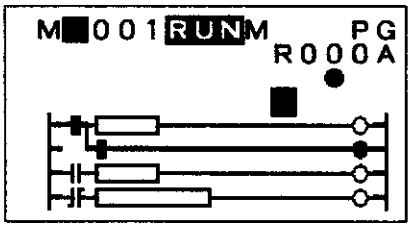
Enter [SFT][CAN] to exit from this function.



7.7.5 Device ON/OFF

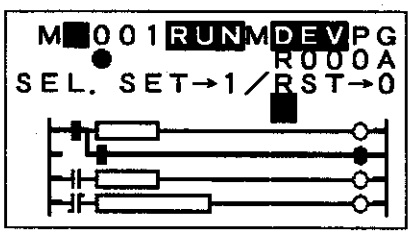
This function will set ON/OFF of a device with one-key action.
The function is valid only for the devices registered in the auxiliary data monitor area.

How to set the function:



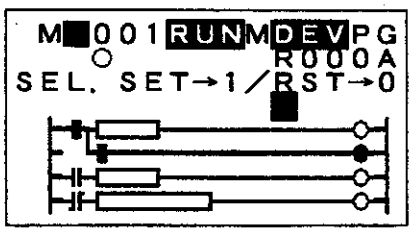
(First, register the target devices in the auxiliary data monitor area.)

Select the device ON/OFF function.
[SFT][MENU][5]



Move the cursor onto the device to be set.
[EXE]

Enter "SET" or "RESET".
[1] : Set device to ON.
[0] : Reset device to OFF.

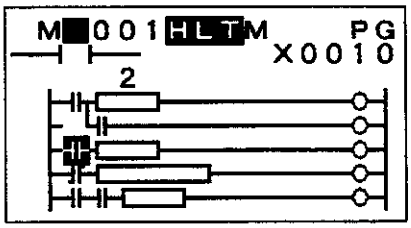


Enter [SFT][CAN] to select another device.

To exit from this function, enter [SFT][CAN].

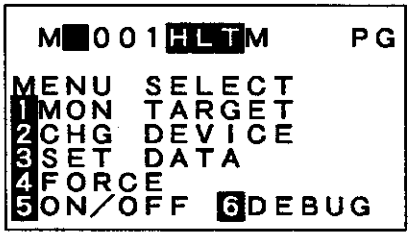
7.7.6 Debug support function

This function is useful for program debugging. In this menu, single step, single rung and 1-scan start/stop, and breakpoint setting are possible.



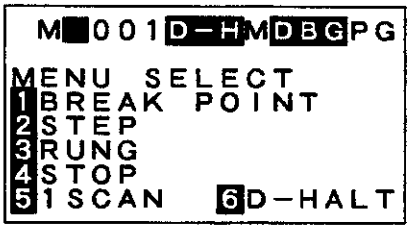
Set the PLC to the HALT mode. If the operation mode switch of the PLC is set to HALT, set the switch to RUN before you set the PLC to HALT using the HP command (CMD 80).

Activate the debug support function.
[SFT] [MENU] [6]



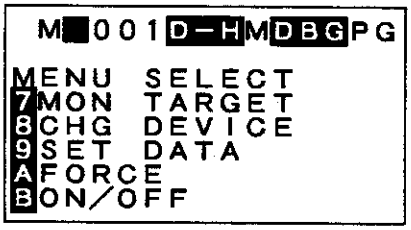
The PLC's operation status display will change to "D-H" indicating the debug HALT mode.

Enter [SFT][MENU] to display the debug support function menu display.



Change over displays using the [↑] [↓] or [→] [←] keys.

For the functions 7 to B, see Subsections 7.7.1 to 7.7.5.



To exit from the debug support function, press [SFT][CAN].

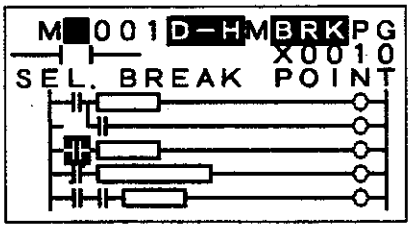
NOTE While the PLC's operation mode switch is being set to RUN and the PLC mode is being set to HALT, the PLC's operation mode can be set to the debug HALT mode.
The ZOOM key will be invalid while the debug support function is active. So, change over display modes before you select the debug support function.

7.7.6.1 Breakpoint setting

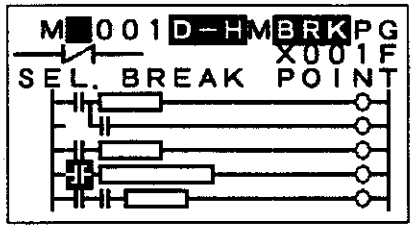
This function will set a breakpoint in a program and execute the program from the current stopping point until the breakpoint is fetched.

When you set a breakpoint, the number of breakpoint execution times "1" and the number of scan times "0" will be set in the HP.

How to set the function:
Select the breakpoint function.
[SFT][MENU][1] (BREAK POINT)

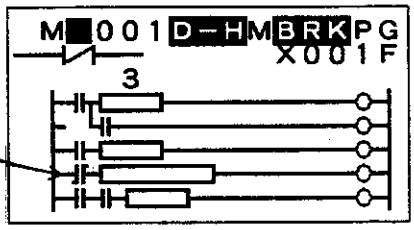


Select the instruction for the breakpoint using the cursor key.
[↓]



Set the breakpoint.
[EXE]

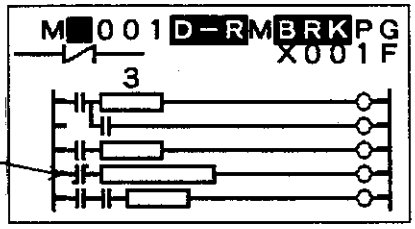
The set position is blinked.



[SFT][CAN] : Release the breakpoint.

Execute the program.
[EXE]

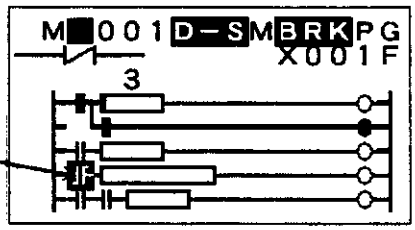
Blinking during execution



When execution is started, the PLC operation mode display will change from "D-H" to "D-R" indicating the PLC is in Debug-RUN mode.

Program execution is stopped at the breakpoint.

Normal cursor



When the program execution is stopped by fetching the breakpoint instruction, the PLC operation mode display will change from "D-R" to "D-S" indicating the PLC is in Debug-Stop mode.

7.7.6.2 Single step execution

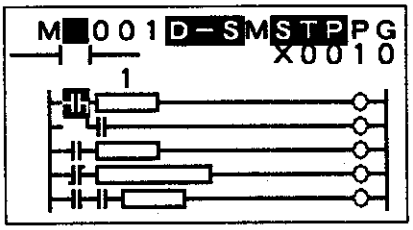
This function will start and stop in each inslruction.

At the initial start or after 1-scan execution, the single step execution will start from the top of the program.

After stopping by the breakpoint or single rung execution, it will start from the stopping point.

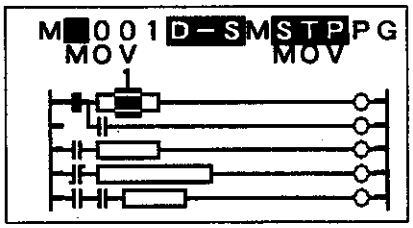
How to set the function

Select the single step execution as follows:
[SFT][MENU][2] (STEP)



The instruction last stopped is executed, and stopped at the next instruction.

To continue the single step execution ;
[EXE]



7.7.6.3 Single rung execution

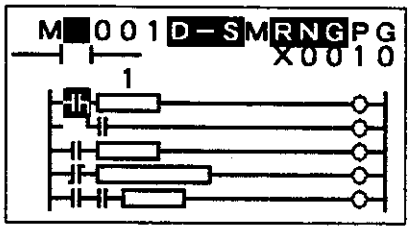
This function will start and stop in each rung.

At the initial start or after 1-scan execution, the single rung execution will start from the top of the program.

After stopping by the breakpoint or single step execution, it will start from the stopping point.

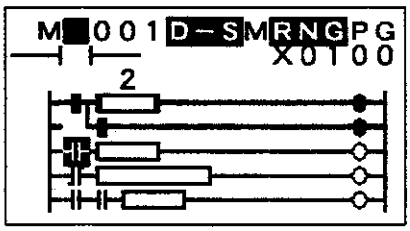
How to set the function

Select the single rung execution as follows:
[SFT] [MENU] [3] (RUNG)



The instructions on the rung are executed, and stopped at the first instruction on the next rung.

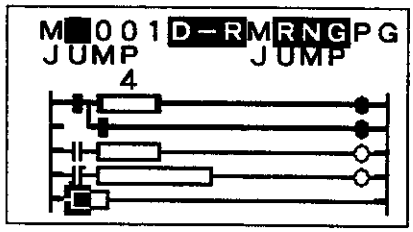
To continue the single rung execution ;
[EXE]



7.7.6.4 Force stop

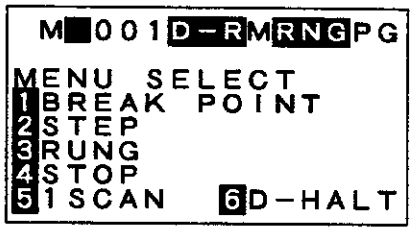
You can use this command to manually stop the running program (D-STOP) after you specified single rung execution or breakpoint execution.

Example: In the case of the screen right, the execution is not stopped in the single rung execution.

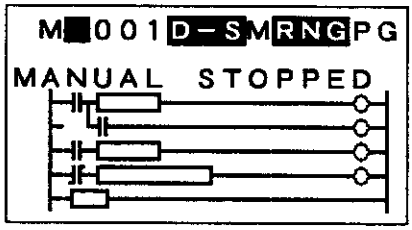


How to set force stop

Select the force stop function as follows:
[SFT] [MENU] [4] (STOP)



This function will stop the program execution at the bottom of scan. If you continue the single step execution, it will start from the top of the program.



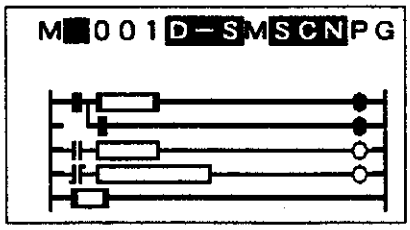
7.7.6.5 1-scan execution

This function will start and stop in each scan.

Breakpoint execution cannot be done together with this function.

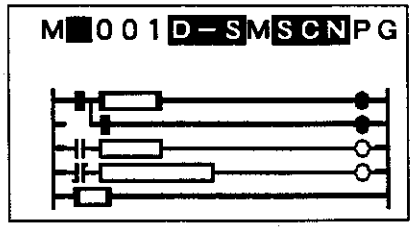
How to set the function

Select 1-scan execution as follows:
[SFT] [MENU] [5] (1SCAN)

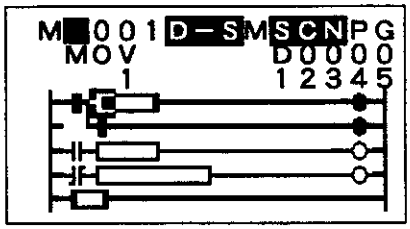


After executing the END instruction, execution will stop.

To continue the 1-scan executions ;
[EXE]



You can check the register data by moving the cursor.



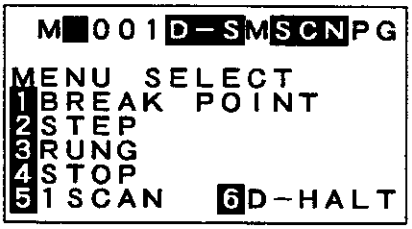
7.7.6.6 D-HALT transition

This function changes the PLC operation mode to Debug-HALT (D-HALT).

Use this function when you want to select the 1-scan execution after execution of the breakpoint setting, and vice versa.

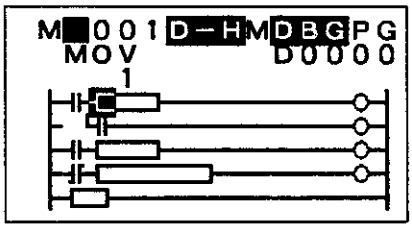
How to set the function:

Select the D-HALT transition as follows:
[SFT] [MENU] [6] (D-HALT)



The setting will transit into debug HALT.

PLC operation mode display will change from D-S to D-H.



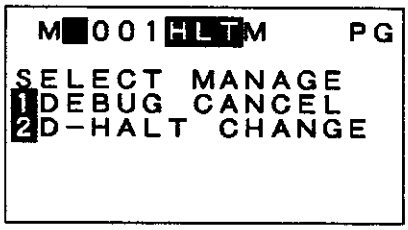
7.7.6.7 In case of debug mode error

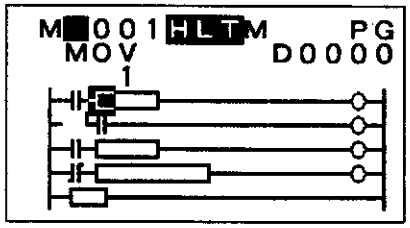
The debug support function is usable only when the PLC is in Debug mode. However, the PLC's operation mode may change to other modes by one of the following causes after you have selected the debug support function.

Cause 1: The operation mode switch of the PLC was changed.
2: The hold device was set to ON.
3: An error occurred.

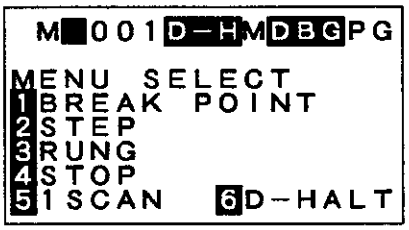
In the above cases, the debug support function will be disabled afterwards. When a key is pressed, the following menu will appear. Select the following procedure.

How to operate:
To exit from the debug support function ;
[1] (DEBUG CANCEL)





To return to the Debug-HALT mode ;
[2] (D-HALT CHANGE)



NOTE If the PLC cannot be changed to the debug HALT mode, the above selection [2] will become mode error.

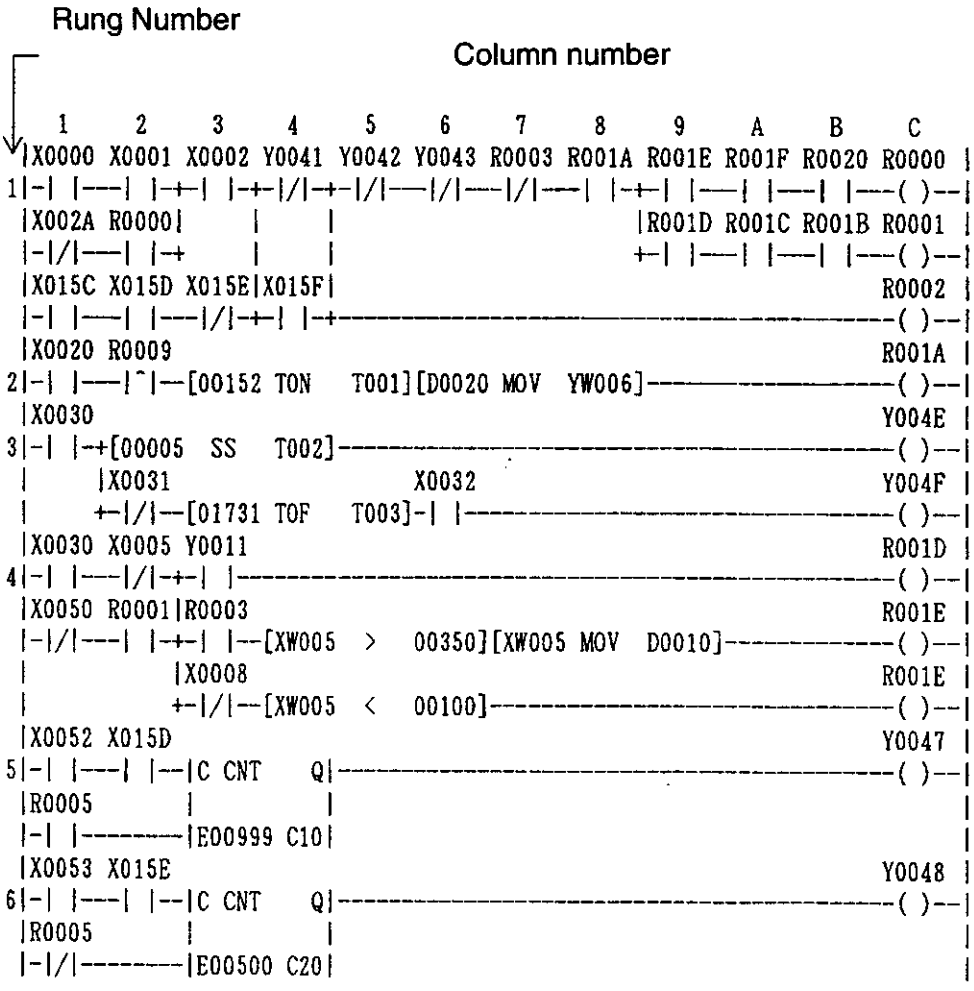
8.1 Programming rules

Program editing is a mode for creating and editing programs.
The following are the rules you have to keep in programming.

1. Programming is made in units of a rung.
   Block numbers range from 001 to 256, and rung numbers range from 1 to 65025 per block. Enter a program sequentially from rung 1 in the desired block of each program type (below).

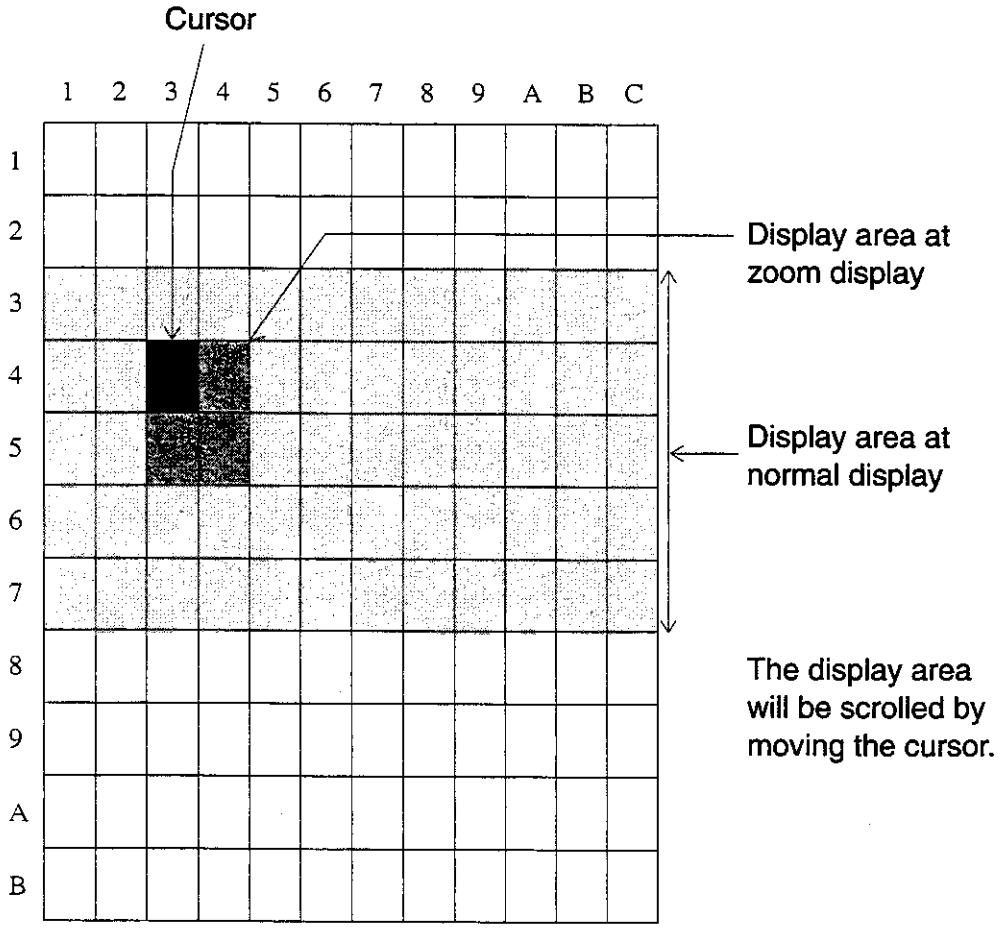
   Program type:
   - Main program
   - Subprograms 1 to 4
   - Timer interrupt
   - I/O interrupts 1 to 8
   - Subroutine

2. The maximum size of a rung is 12 columns x 11 lines.
3. The total number of steps per rung must be 132 steps or less.

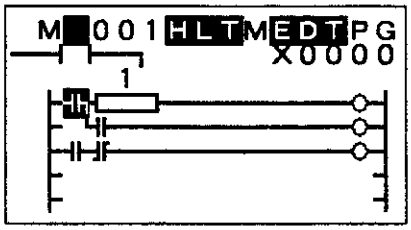


4. Either of the normal display or the zoom display can be used in programming. The normal display has 12 columns x 5 lines for display window, while the zoom display has 2 columns x 2 lines for display window.

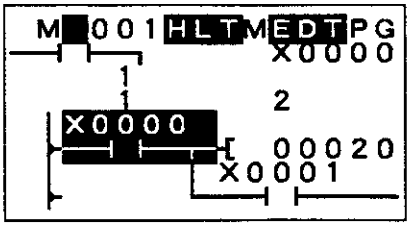
   The following illustration shows the editing space and the display window of each display mode.



[Example of an edit screen in the normal display]



[Example of an edit screen in the zoom display]

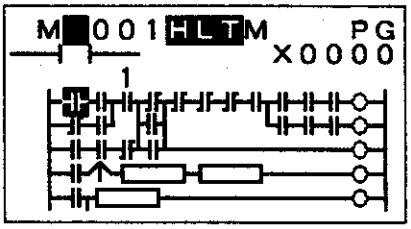


NOTE This manual explains programming using examples of the normal displays.

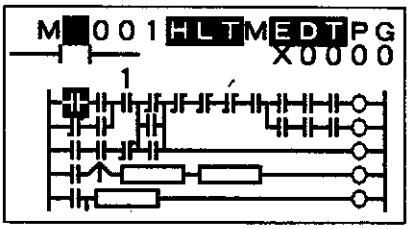
8.2 Writing a program

First, monitor a rung that you want to enter or edit, then press the [EDIT] key to change to the edit mode.

Select the program monitor mode.
[SFT] [MON]
(program type) [EXE]
[MON] (block No.) [EXE]
(rung No.) [EXE]

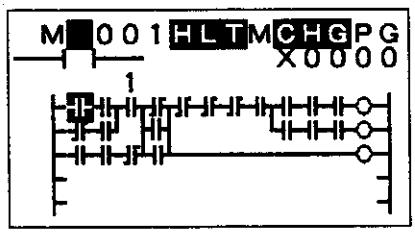


Change to the edit mode.
[EDIT]



" EDT " will appear on the display, indicating the edit mode. In this mode, read, search, write, and scroll display can be executed. (For details, see Chapter 7.) Next, move the cursor onto a rung to be edited, and press [EXE]. If no program exists at the cursor position, the entering will become a new creation or addition of a rung. The cursor can move up to the rung next to the program existing rung.

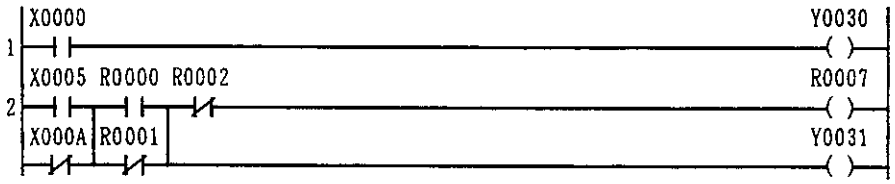
Select an edit rung.
[EXE]



NOTE If an operation error occurs in entering a program, the cursor keys will be disabled. Press the [CAN] key to release the error to restart programming.

8.2.1 Writing contacts and coils

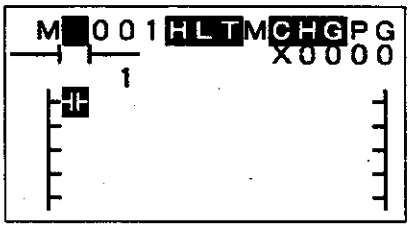
The following program is an example of how to write a program.



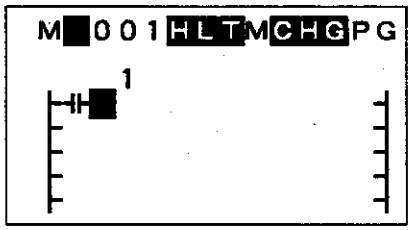
Imagine you are making a program by pasting an instruction on the cursor position. Enter instructions in the following order.

[instruction symbol] [device type] [device number] ([vertical line]) [EXE] or [WRT]

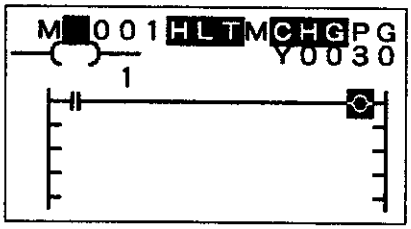
Write NO contact of X0000.
[⊣⊢][SFT][X]
(For the device No. 0, no device number is needed to enter.)



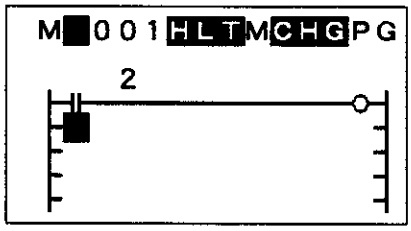
Register on the cursor position.
[EXE] or [WRT]



Write coil Y0030.
[⊸] [SFT] [Y] [3] [0]
(When the coil symbol is entered, it will be linked to the right power rail automatically.)

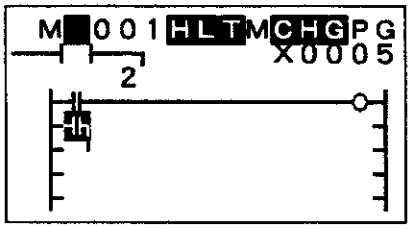


Register on the cursor position.
[EXE] or [WRT]



Write NO contact (with vertical line) of X0005.

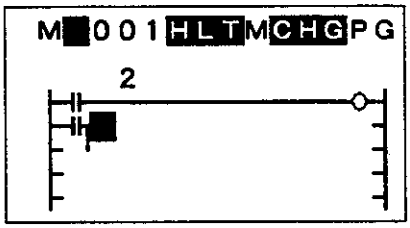
[⊣⊢] [SFT] [X] [5] [|]



NOTE The vertical line is connected down to right from the cursor position. Every time when you enter the vertical line key, the vertical link will be displayed/deleted.

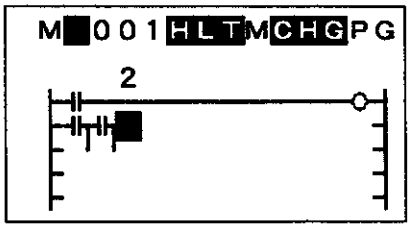
Register the contact on the cursor position.

[EXE] or [WRT]

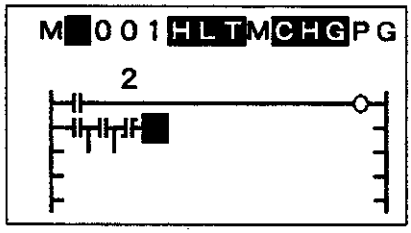


Write the following instructions in the same manner.

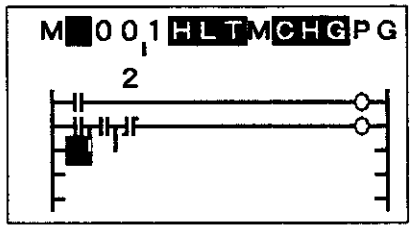
[⊣⊢] [SFT] [R] [|] [EXE]



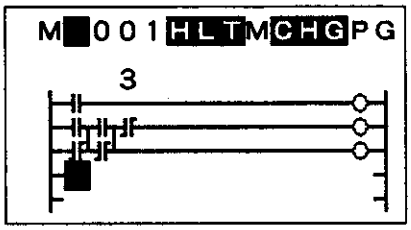
[⊣/⊢] [SFT] [R] [2] [EXE]



[○|] [SFT] [R] [7] [EXE]



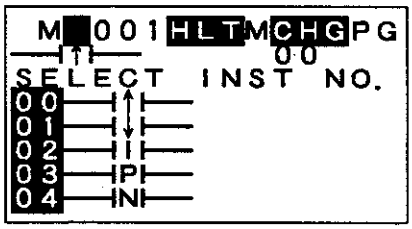
[⊣/⊢] [SFT] [X] [A] [EXE]
[⊣/⊢] [SFT] [R] [1] [EXE]
[○|] [SFT] [Y] [3] [1] [EXE]



8.2.2 Writing basic instructions

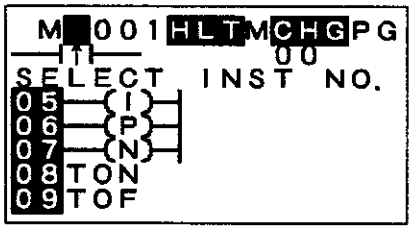
Basic instructions will be entered by selecting from the basic instruction menu.

Display basic instruction menu.
[INST]

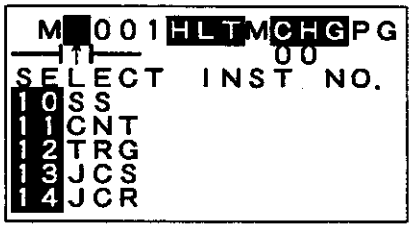


The display will change to the basic instruction menu.
You can scroll the menu display using the cursor key. After confirming the instruction number, enter the number. (You can also enter a number without displaying the instruction.)

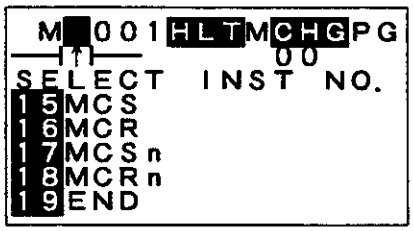
[↓]



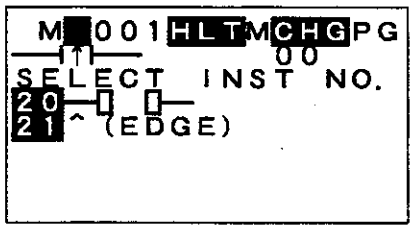
[↓]



[↓]



[↓]

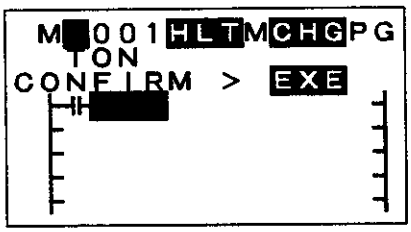


- The instruction which uses one element will be written in the ladder diagram when you press the instruction number key.
- If an instruction which uses two or more elements is selected, the ladder diagram area to be used will appear when you enter the instruction number key, waiting for confirm key to be pressed. When you enter the confirm key, the instruction will be written in the ladder diagram.
- The "^" (EDGE) is used to modify a function instruction to edge execution type.

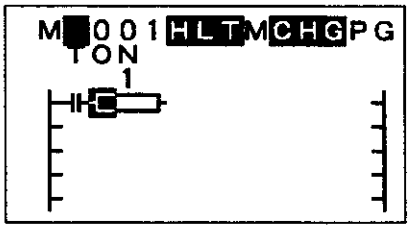
8.2.2.1 Writing timer instructions

There are three types of timer instructions, ON-delay timer (TON), OFF-delay timer (TOF), and single-shot (SS).
Unlike writing contact/coil instructions, a timer instruction will be written after the instruction area is secured.

Select the ON-delay timer instruction.
[INST] [8] [EXE]

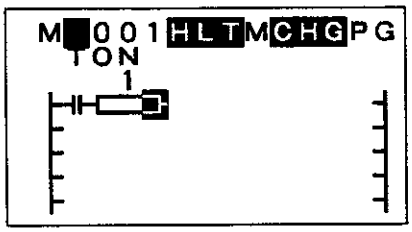


The cursor will secure the instruction area, and wait for the confirm key to be pressed. Press the confirm key.
[EXE]



At this time, the instruction will be secured.
The cursor will move onto the position where a preset value is to be set.

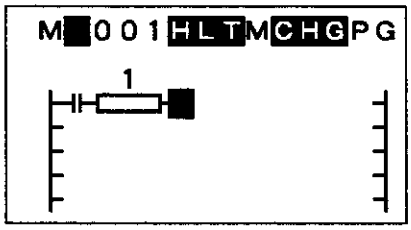
Enter preset value 10.
[1] [0] [EXE] or [WRT]



NOTE A constant or register can be specified for the preset value.

When a preset value is entered, the cursor will move onto the timer register input position.

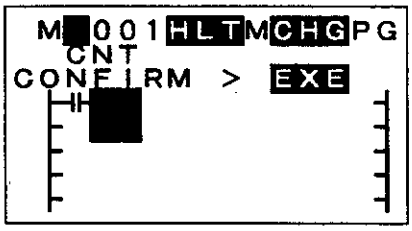
Enter timer register T005.
[SFT] [T] [5] [EXE]
or
[WRT]



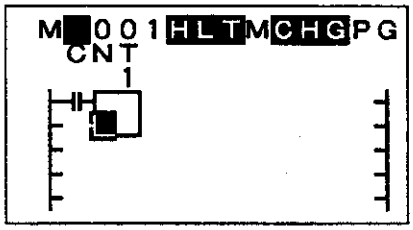
8.2.2.2 Writing counter instruction

The counter instruction has two inputs (count and enable). Writing counter instruction is the same as writing timer instructions, except for the two inputs.

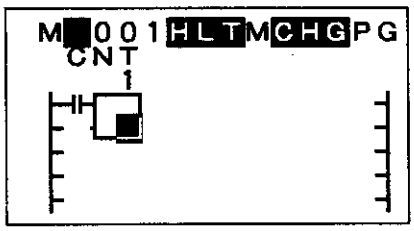
Select a counter instruction.
[INST][1] [1] [EXE]



The cursor will secure an instruction area, and wait for the confirm key to be pressed. Press the confirm key.
[EXE]

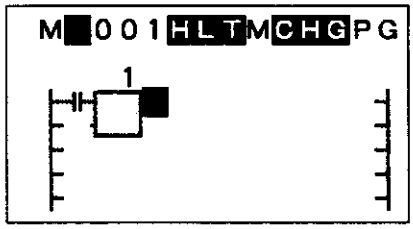


The cursor will move onto a position where a preset value is to be set. Enter the preset value 5.
[5] [EXE] or [WRT]



NOTE A constant or register can be specified for the preset value.

Enter counter register C001.
[SFT][C][1] [EXE]
or
[WRT]



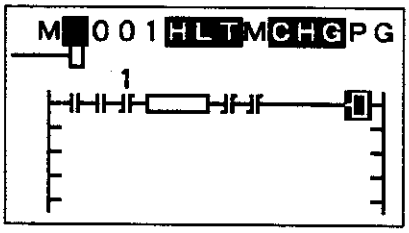
Writing the counter instruction has completed. Move the cursor to write the enable input (contact).

8.2.2.3 Writing line connectors

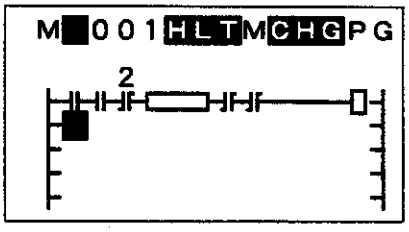
The size of the editing space is 12 columns x 11 lines. The line connector function enables to write rungs that have more than 12 columns.

When the line connector is entered on the first column, it will become the inlet (⊡-), and when it is entered on the second column and after, it will become the outlet (-⊡).

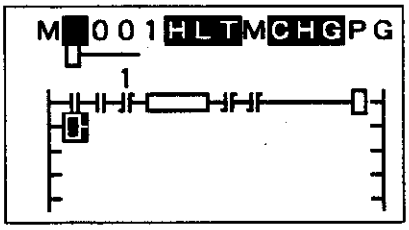
[INST][2][0][EXE] (line connector outlet)



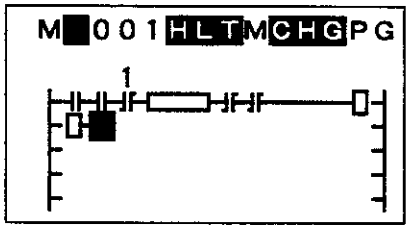
[EXE] (write)



[INST][2][0][EXE] (line connector inlet)



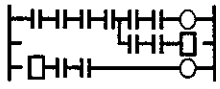
[EXE] (write)



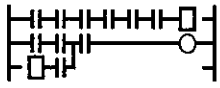
NOTE

The following rungs will become errors.
(1) If the rung of the outlet is connected to the right power rail.
(2) If the inlet is not located on the next line of the outlet.
(3) If the outlet and inlet do not correspond one to one.

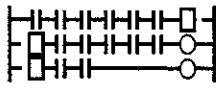
(1)



(2)



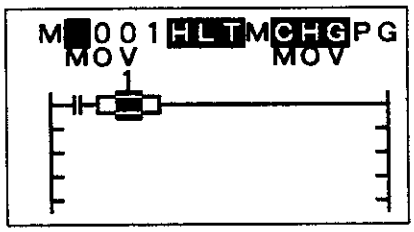
(3)



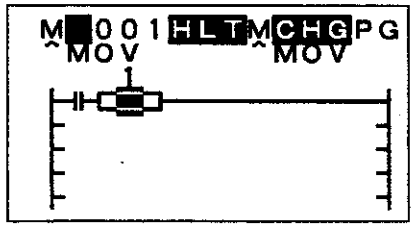
8.2.2.4 Writing an edge execution modifier

When the edge execution modifier is added to a function instruction, the instruction will be changed to edge execution type. That is, the instruction will be executed once when the input is changed from OFF to ON.

Move the cursor onto the function instruction position to specify edge execution.



[INST] [2] [1] [EXE]
(specifying edge execution)

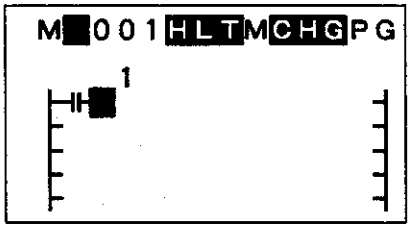


The edge modifier mark "^" will appear in front of the instruction symbol.

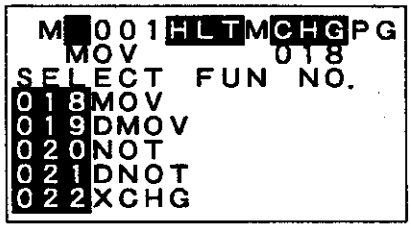
8.2.3 Writing function instructions

There are two types of function instructions. One is a single-input instruction (horizontal box instruction) and the other type is a multi-input instruction (vertical box instruction).
Basically, the single-input instruction and the multi-input instruction can be written in the similar way as the timer instruction and the counter instruction, respectively.

Move the cursor to the function instruction writing position.

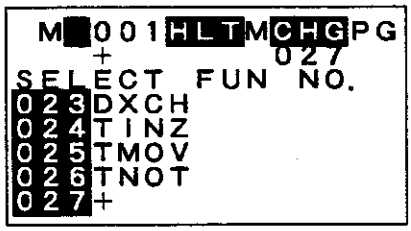


Select function instruction.
[FUN]

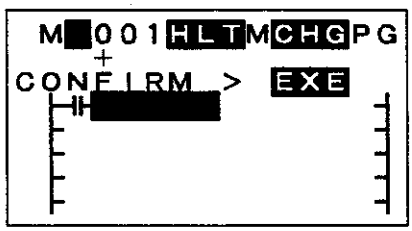


The screen will change to the menu display of function instructions. Scroll the menu display using the cursor to confirm a desired function number. (Without displaying the instruction, you can enter a function number.)

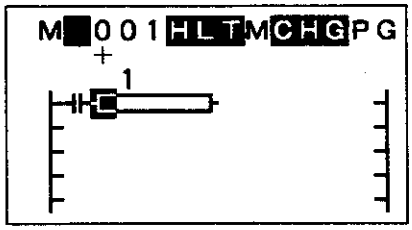
[↓] (step forward the function menu)
[2] [7]
(example of FUN 27 addition)



Specify FUN 27.
[EXE]

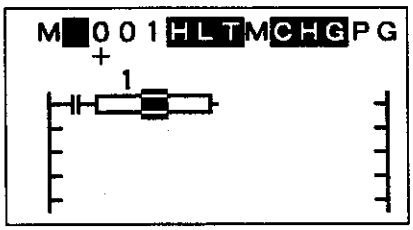


The cursor will secure an instruction area, and wait for the confirm key to be pressed. Press the key.
[EXE]

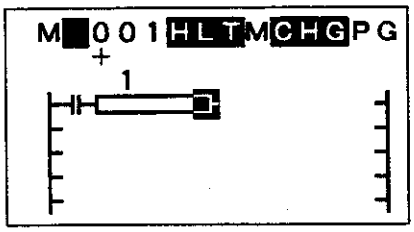


The cursor will move onto the first operand position, and prompt you to enter an operand.

Enter the first operand (augend).
[SFT][D][1][0]
[EXE] or [WRT]
(example of register D0010)

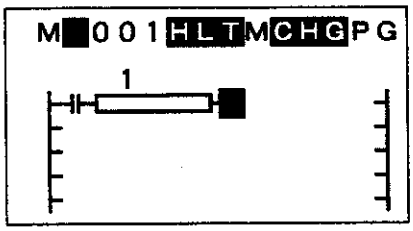


Enter the second operand (addend).
[1] [EXE] or [WRT]
(example of a numeric value 1)



NOTE Depending on the function instruction type, an available operand is different. See separate Instruction Set manual.

Enter the third operand (sum destination).
[SFT] [D] [1] [1]
[EXE] or [WRT]
(example of D0011)



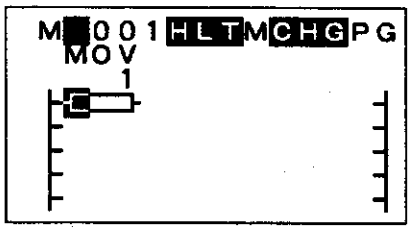
Writing the function instruction has completed.

NOTE Coil instruction is not always needed on the output side of the function instruction.

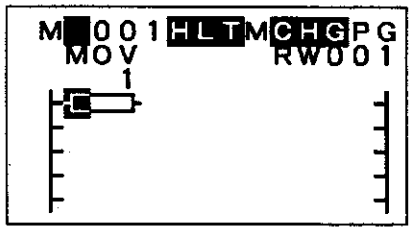
8.2.4 Entering an operand with index modification

The index modification is used for indirect addressing.

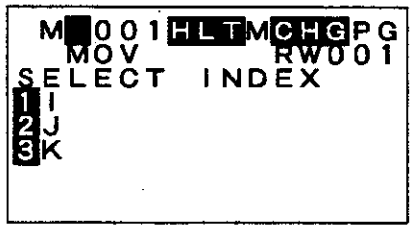
Move the cursor onto the operand position where you are going to specify the index modification.



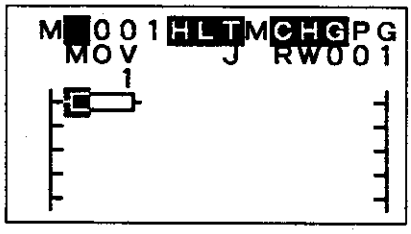
[SFT][RW][1]
(operand input)



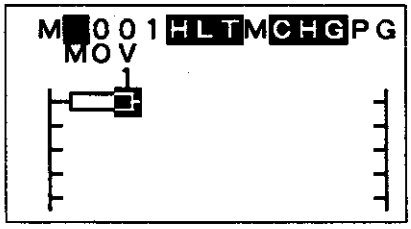
[SFT][INDX]
(specify index modification)



[2]
(select "J")



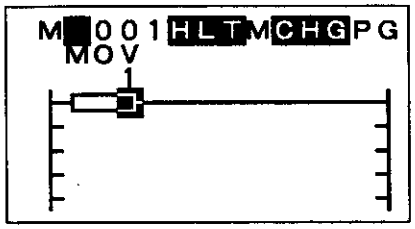
[EXE] (confirm)



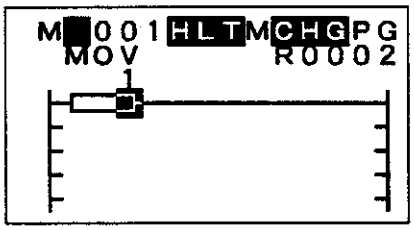
8.2.5 Entering an operand with digit designation

The digit designation is used to manipulate the specified digits starting with a device.

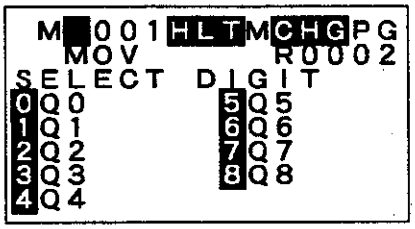
Move the cursor onto the operand position where you are going to specify digit designation.



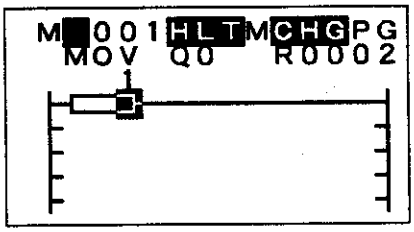
[SFT] [R][2]
(operand input)



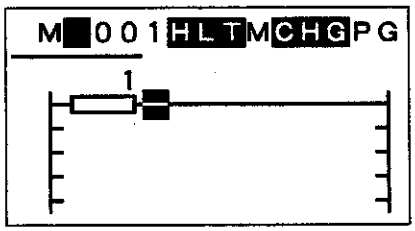
[SFT] [Qn]
(specify digit designation)



[0]
(specify Q0)



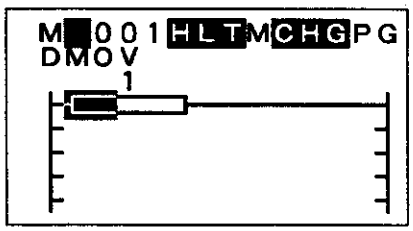
[EXE] (confirm)



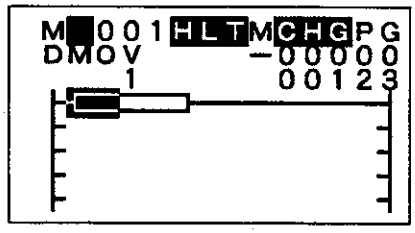
8.2.6 Entering a double-length constant operand

When the cursor is moved onto a double-length operand, the 2-column length cursor will appear.

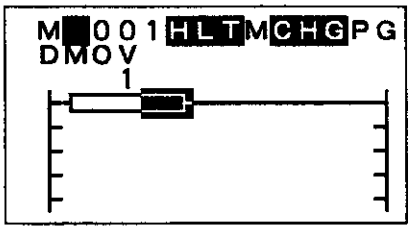
Move the cursor onto a double-length operand position.



[+/-] [1] [2] [3]
(Enter constant value -123.)



A constant value entered will appear on the second and third lines at the extreme right, with 5 digits on each line.
[EXE] (confirm)



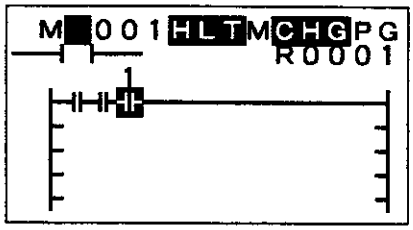
8.3 Modifying a program

This section explains how to modify a part of a rung already written. First, display the rung to be modified and press [EDIT] key to enter the edit mode. Using the [EXE] key, select the rung to be modified.

8.3.1 Changing an instruction

The method for modifying contact and coil instructions differs slightly from the method for modifying timer, counter, and function instructions.

(1) Changing a contact or coil instruction

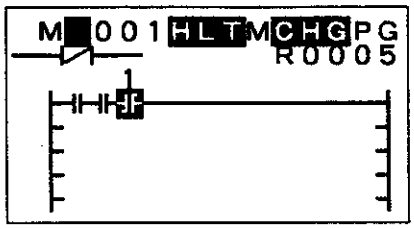


To change a contact instruction or coil instruction, move the cursor onto the position of an instruction to be changed and overwrite a new instruction.

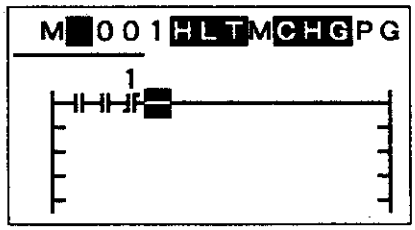
Move the cursor onto the position of an instruction.

Overwrite a new instruction on the cursor position. (The NO contact of R0001 will be changed to the NC contact of R0005.)

[-|/|-] [SFT] [R][5]
(NC contact of R0005)



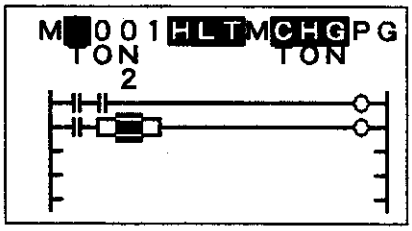
[EXE] (specify overwrite)



(2) Changing a timer, counter, or function instruction

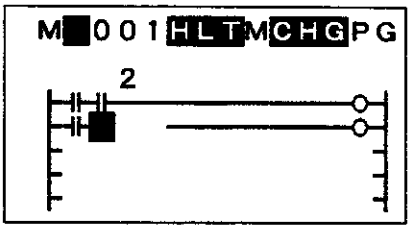
To change a timer, counter or function instruction, move the cursor onto the position of an instruction to be changed, delete the instruction on the position using the [CLR] key, and write a new instruction.

Move the cursor onto the position of an instruction to be changed.

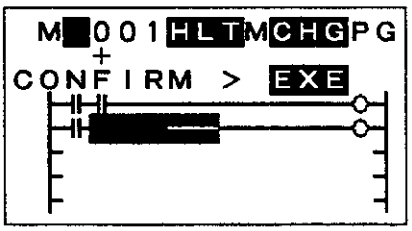


NOTE At this time, place the cursor on the position of an instruction symbol; two of which will appear in the data buffer area on the display (TON position in the above example).

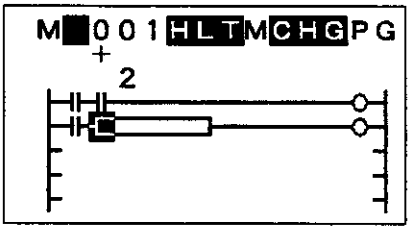
Delete the instruction on the cursor position using the [CLR] key.
[CLR] (delete)



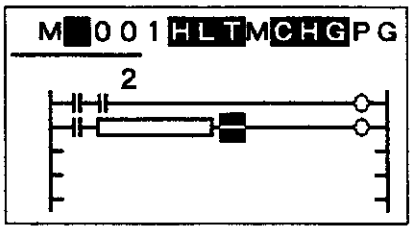
Write a new instruction.
[FUN][2][7][EXE]
(change to the FUN27 addition)



[EXE] (confirm)

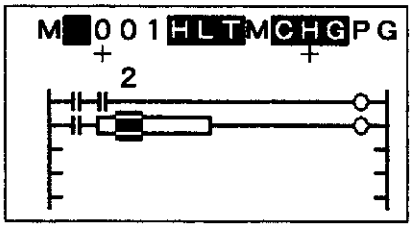


[SFT] [D] [1] [0] [EXE]
[1] [EXE]
[SFT] [D] [1] [0] [EXE]
(write the operands)



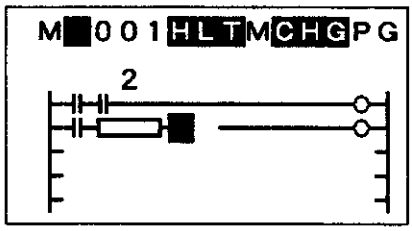
NOTE If the horizontal link line breaks off after changing a instruction, press the horizontal link key [—] to connect the line.
(For the case, a 5-column instruction is deleted and a 3-column instruction is written.)

Move the cursor onto the instruction symbol position.

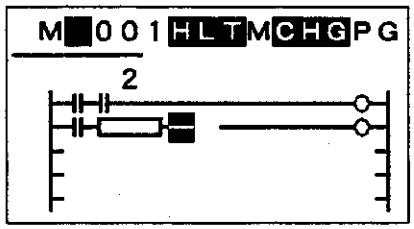


Clear the 5-element instruction (+) and enter a 3-element instruction (TON).

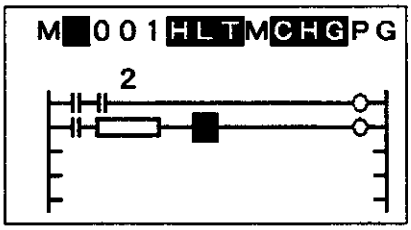
[CLR] (delete)
[INST][8][EXE][EXE]
[1][0][EXE]
[SFT][T][5][EXE]



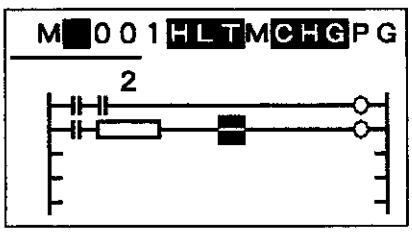
Press the horizontal line key.
[—]



Register it on the cursor position.
[EXE]



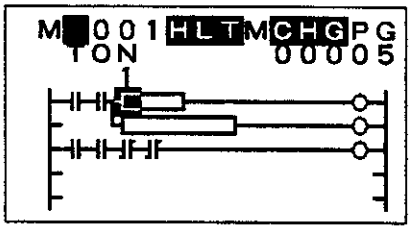
The cursor will move to right.
[—] [EXE]



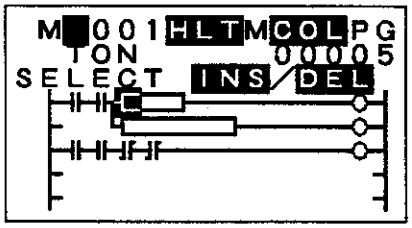
8.3.2 Inserting a column

To insert an instruction, first insert one column space and write the instruction as follows:

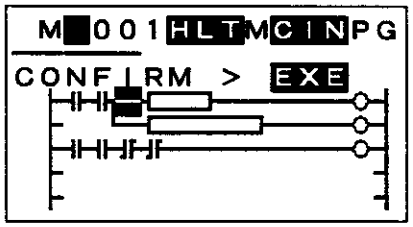
Move the cursor onto the position of a column to be inserted.



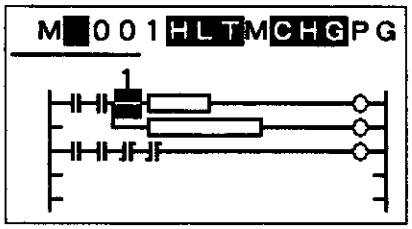
[SFT][COL] (specify column edit)



[SFT][INS] (specify insert)



[EXE] (confirm)



NOTE

(1) If a contact instruction or a vertical link line is positioned on the 11th column, or if the cursor is positioned on the 12th column, column insert is not possible.

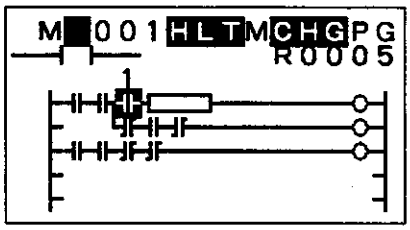
(2) If the result after inserting a column exceeds 12 columns, column insert is not possible.

(3) If a part of a box-type instruction lies on the cursor column (on the same rung), a new column will be inserted right after the box-type instruction.

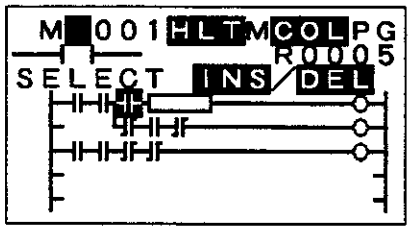
8.3.3 Deleting a column

This function will delete a column on a rung.

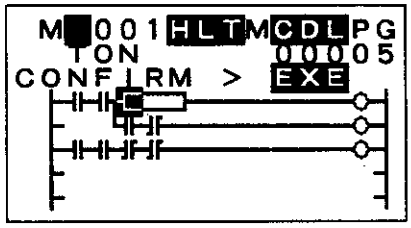
Move the cursor onto a column you want to delete.



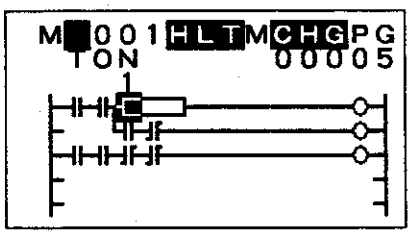
[SFT] [COL] (specify column edit)



[SFT] [DEL] (specify delete)



[EXE] (confirm)



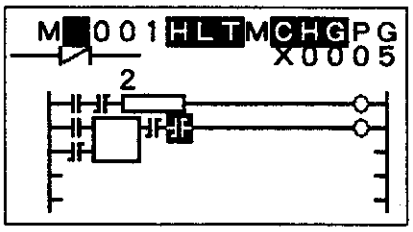
NOTE

(1) If the cursor column is at the top (left end) of a box-type instruction, the entire box-type instruction will be deleted.
(2) If the cursor column is halfway over a box-type instruction, the instruction after (right of) the box-type instruction will be deleted.

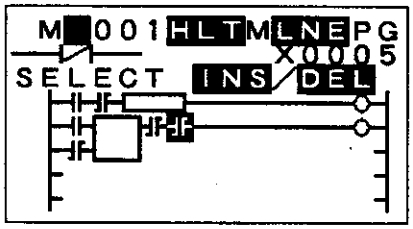
8.3.4 Inserting a line

This function will insert one line space in a rung.

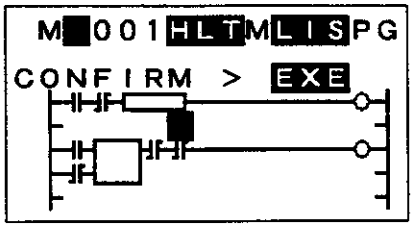
Move the cursor onto a line to be inserted.
(A new line will be inserted before the line specified.)



[SFT] [LINE] (specify line edit)

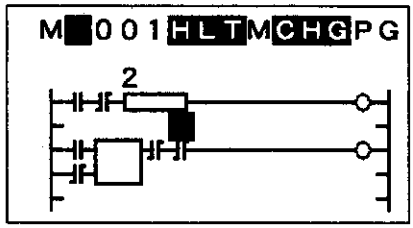


[SFT] [INS] (specify insert)



A line space will appear.

[EXE] (confirm)



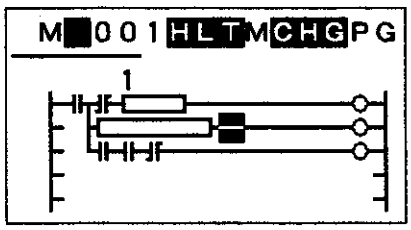
NOTE

(1) If the rung consists of a 11 lines program, or if the cursor is positioned on the 11th line, a new line cannot be inserted.
(2) If the cursor line is halfway over a vertical box-instruction, a new line cannot be inserted.

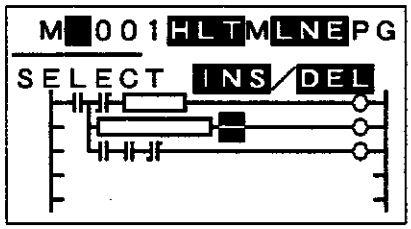
8.3.5 Deleting a line

This function will delete a line in a rung. The following lines will be shifted up.

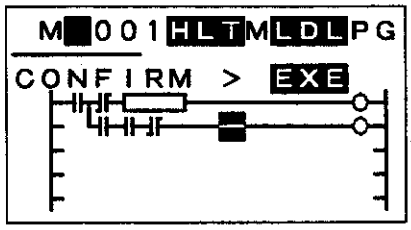
Move the cursor onto a line you want to delete.



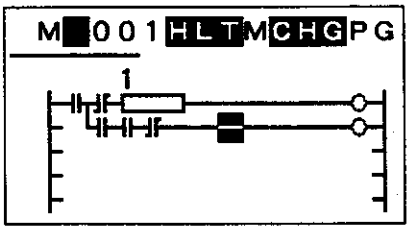
[SFT][LINE] (specify line edit)



[SFT][DEL] (specify delete)



[EXE] (confirm)



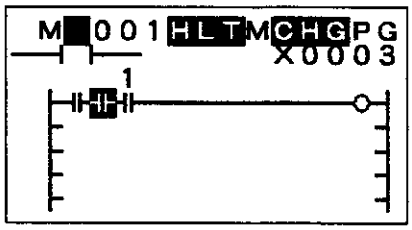
NOTE

(1) If a vertical line is on the line to be deleted, the vertical line will also be deleted together. If the vertical connection does not change after the line is deleted, the vertical line will remain.
(2) If the first line of a vertical box-type instruction is on the cursor line, the entire vertical box-type instruction will be deleted.
(3) If the halfway line of vertical box-type instruction is on the cursor line, the line cannot be deleted.

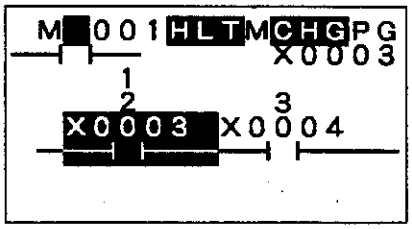
Zoom Display Mode

Up to this page, program editing (write and modification) is explained using the normal mode. The zoom display mode can be used for program editing, too. Changing of the normal/zoom display modes is always available even during editing. The following explains on the zoom display mode.

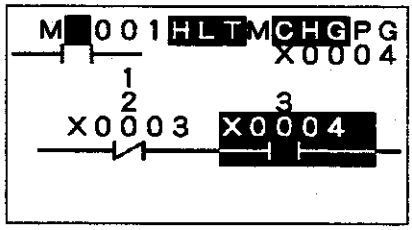
(editing in the normal display mode)



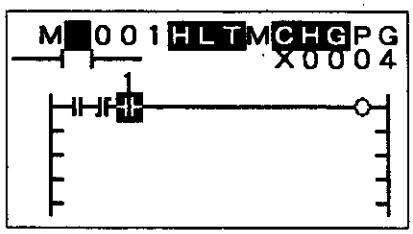
[ZOOM] (select zoom display)
(A column number will appear on the display in the zoom display mode.)



[-|/|-][EXE]
(example of instruction change in the zoom display mode)



[ZOOM] (select normal display)



Using the zoom display, you can easily confirm the program.

NOTE

If you change over between the normal and zoom display modes during one of the following operations, the operation before you change the mode will be canceled.

(1) While you are selecting a basic instruction/ function instruction (excluding the contact and coil instructions).
(2) While you are entering an operand.
(3) While you are inserting/deleting a column/line or operation to the PLC.

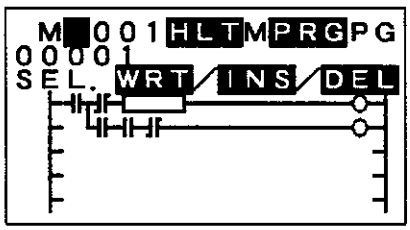
8.4 Writing into the PLC's memory

The program editing explained before deals with the HP only. It does not bring any change on the memory of the PLC. Therefore, you need to write the program edited on the HP into the PLC's memory.

8.4.1 Writing/replacing a rung

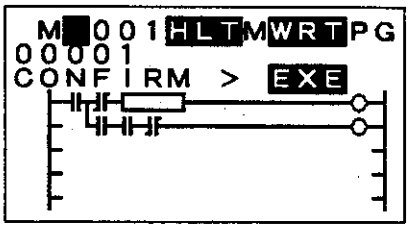
This function will write a program edited on the HP onto a specified rung in the same block of the PLC. If the rung already exists in the PLC, the content will be replaced by the content of the program transferred from the HP.

[SFT][PRG]
(specify operation for PLC memory)



"WRT / INS / DEL" will appear and prompt you to enter any of these keys. Select to enter [WRT].

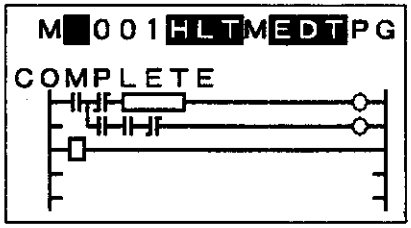
[numeric] (rung number) See Note below.
[WRT] (specify write)



The HP will compile the program edited, and prompt you to confirm writing into the PLC. If an error occurs in compiling the program, the error content will appear on the display.

NOTE Before pressing the [WRT] key, you can specify the rung number to be replaced.
Without a rung number specified, the HP will automatically specify the rung number specified when you selected a rung to be edited.

[EXE] (confirm)



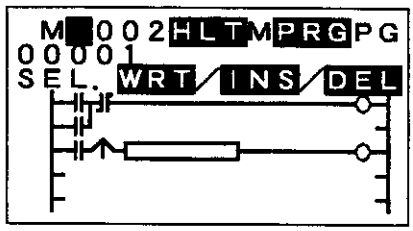
When the program has been written into the PLC, "COMPLETE" will appear on the display. And the following rungs will appear on the display.

NOTE When you specify a rung number, the range of numbers available will be up to the next number of the rung where the last program exists. In other words, you cannot write a program onto a skipped-number rung. Also, if you select a rung number already exists, the program will be overwritten onto the rung.

8.4.2 Inserting a rung

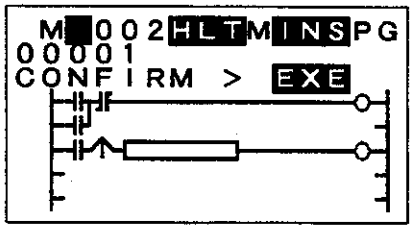
This function will insert a program edited on the HP before the specified rung of the same block. The following rungs will be shifted down by the number of rungs inserted.

[SFT][PRG] (specify operation for PLC memory)



" SEL. WRT / INS / DEL " will appear on the display, and prompt you to select any of these keys. Press the [INS] key.

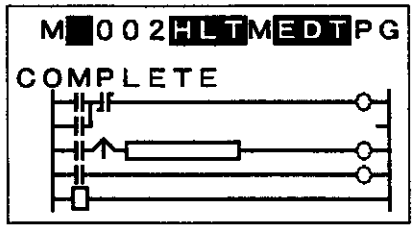
[numeric] (rung number) See Note below.
[SFT][INS] (instruct insert)



Like writing a rung, the HP will compile the program, and prompt you to press the confirm key.

NOTE Before pressing the [INS] key, you can specify the rung number to be inserted. Without a number specified, the HP will automatically specify the rung number specified when you selected a rung to be edited. In rung insertion, new rungs will be inserted before the rung specified.

[EXE] (confirm)



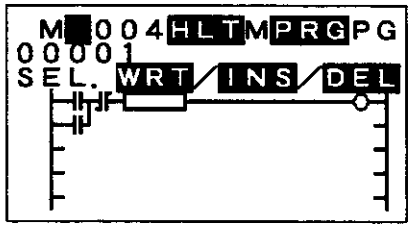
When the insertion has completed normally, "COMPLETE" will appear on the display.

NOTE When you specify a rung number, the range of numbers available will be up to the next number of the rung where the last program exits.

8.4.3 Deleting a rung

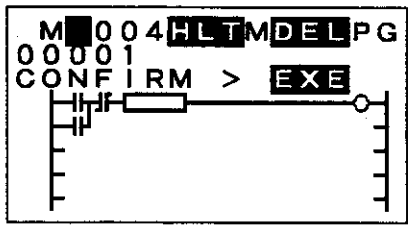
This function will delete a specified rung in the same block. The following rungs will be shifted up.

[SFT][PRG]
(specify operation for PLC memory)



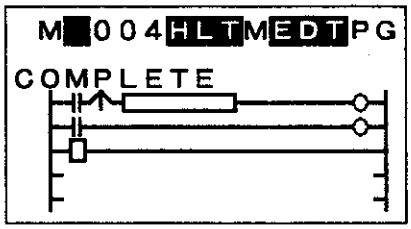
" SEL . WRT / INS / DEL " will appear on the display, and prompt you to press of these keys. Press the delete key.

[numeric] (rung number) See Note below
[SFT][DEL] (instruct delete)



NOTE Before pressing the delete key, you can specify the rung number to be deleted. Without a number specified, the HP will automatically specify the rung number specified when you selected a rung to be edited.

[EXE] (confirm)

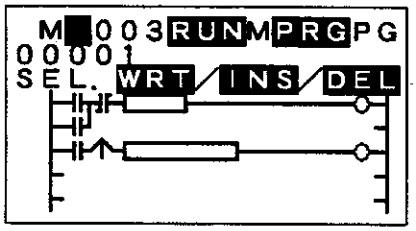


When deleting the rung has completed normally, "COMPLETE" will appear on the display.

8.4.4 On-line program changes

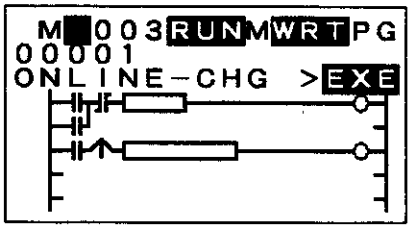
The write function explained in Subsections 8.4.1 through 8.4.3 is available only when the PLC is in HALT mode. The on-line program changes function will, however, allow you to edit (write, insert, delete) a rung when the PLC is in RUN mode. The detailed procedure for on-line program changes is as follows:

[SFT][PRG] (specify operation for PLC memory)



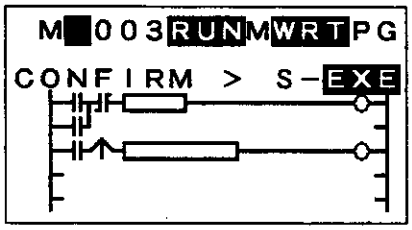
" SEL . WRT / INS / DEL " will appear on the display, and prompt you to press any of these keys.

[WRT]
(example of on-line rung writing)



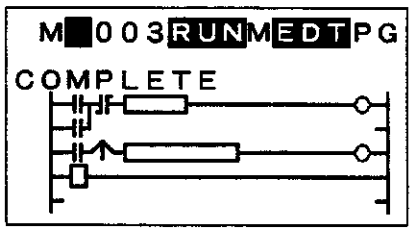
The HP will display on-line program modification, and prompt you to press the confirm key.

[EXE] (confirm)



If the [EXE] key is pressed, the buzzer will sound, and prompt you to press the confirm key again.

[SFT][EXE] (write into the PLC)



NOTE On-line program changes is not available if the execution has resulted in:

(1) the change of the number of program control instructions (END, MCS, MCR, JCS, JCR, IRET, RET, SUBR, CALL, LBL, JUMP, FOR, NEXT).
(2) the change of the execution sequence of program control instructions.
(3) the change of the operand of a program control instruction (subroutine number, label number, number of loop times, MCS/MCR number)

CAUTION This function will change a program while the PLC is in RUN mode. Therefore, Be sure that the machines and systems controlled by the PLC are not in danger.

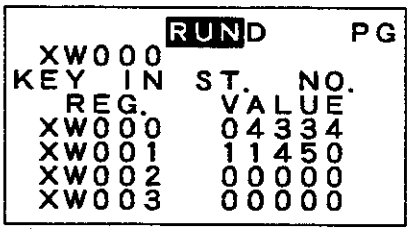
9. Data Monitor Mode

9.1 Displaying registers/devices in a block

The data monitoring function will collectively monitor the data of registers/devices. The HP will display the current values of 4 consecutive registers, or display the ON/OFF states of 32 consecutive devices.

Select the data monitor mode.

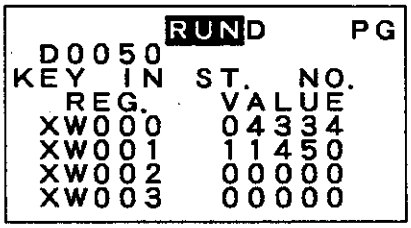
[DATA] (data monitor)



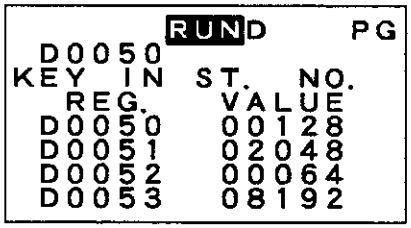
Register

The current values of addressees from 000 to 003 of external input/output registers (XW/YW) will appear on the display. Press a register/device key you want to monitor.

[SFT][D][5][0]
(example of data register D0050)



[EXE] (confirm)



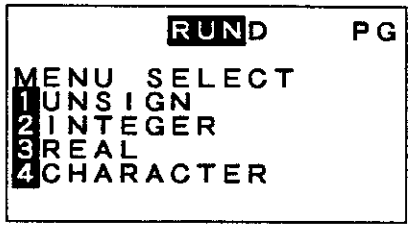
The 4 registers starting with the specified register will appear. By pressing the cursor ([↑] and [↓]) keys, you can scroll the monitor display within the same register type.

NOTE

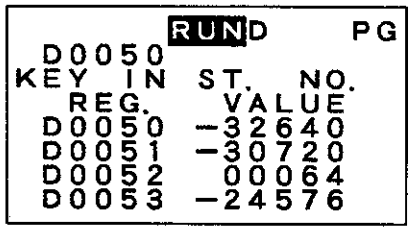
You can display the current value in hexadecimal notation by pressing the [HEX] key, or in single-/double-length notation by pressing the [DBL] key, or in positive number/integer/real number/character by pressing the [DISP] key and numeric keys [1] to [4]. Also, you can hold the display by pressing the [HOLD] key.

Below is an example of changing over integer displays.

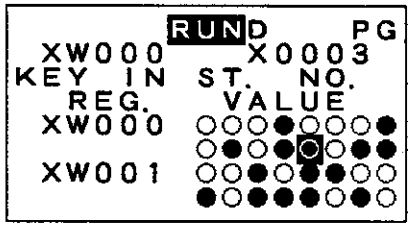
[[DISP] (select display format)



[2] (select integer)



Device Press a device key you want to monitor.
[SFT] [X] [3] [EXE]
(example of device X0003)



The HP will display the register containing the device specified and the next register in device display form (bit display).
(●:ON ○:OFF)

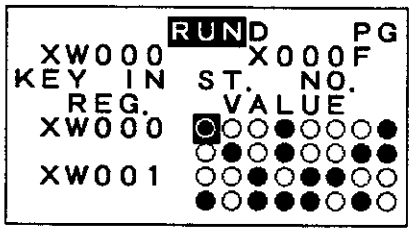
The device number on the cursor position will appear on the screen (X0003 for the above example).
By pressing the cursor (up, down, left, right) keys, you can confirm devices.
When the cursor is moving out of the display range, the display will be scrolled.

NOTE The arrengement of the device display is as follows:

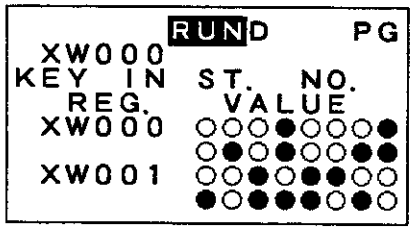
	F	E	D	C	B	A	9	8
XW000	7	6	5	4	3	2	1	0

The registers available for displaying devices are as follows:
XW,YW,RW,W,LW,SW

[SFT] [HOME]
(move the cursor to upper left)

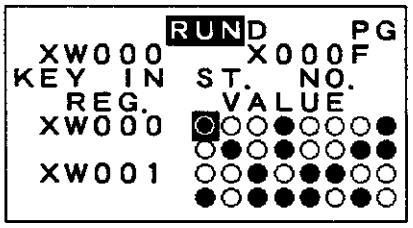


[SFT] [HOME]
(cursor OFF)



By using the [HOME] key, you can move the cursor to home position (upper left) or set the cursor display to ON/OFF.

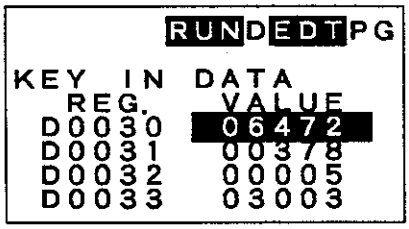
[SFT] [HOME]
(cursor ON)



9.2 Data setting function

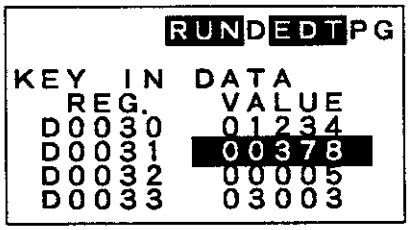
This function will allow you to set data to registers/devices (even while the PLC is in RUN mode). The procedure is as follows:

[EDIT] (edit mode)



EDT will appear on the display indicating the data edit mode. Enter a numeric value to a register.

[1][2][3][4][EXE]
(example of numeric value 1234)

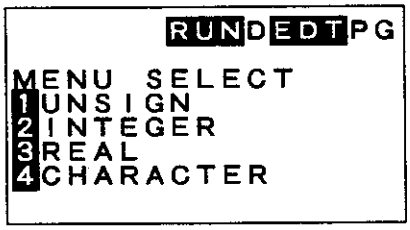


The cursor will move onto the next register position. Data for 4 consecutive registers can be set.

NOTE Data in hexadecimal notation can be set by pressing the [HEX] key. Also, data in double-length notation can be set by pressing the [DBL] key. Likewise, data in positive number/integer/real number/character can be set by pressing either of the [1] to [4] keys after pressing the [DISP] key.

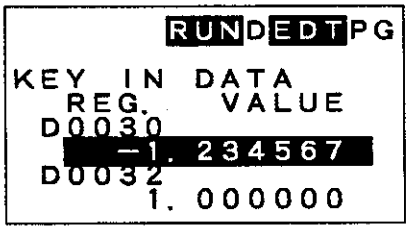
The following is an example for setting a real number.

[DISP] (select display format)



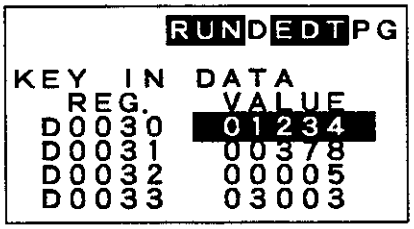
[3] (select a real number)

The real number data will appear on the display.



Next, write the data set into the PLC.

[SFT] [PRG] [WRT] (write into the PLC)



NOTE The data setting function is available while the PLC is in RUN mode. However, the result of program execution has higher priority.

The setting range and display range of real numbers are as follows:

setting range:

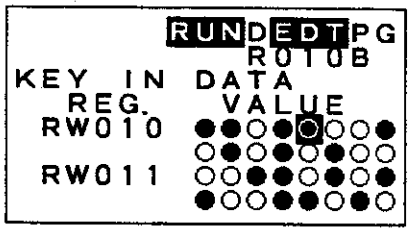
9999999
⋮
0.0000001
0
-0.0000001
⋮
-9999999

Display range:

3.4028×10^{38}
⋮
1.1754×10^{-37}
0
-1.1754×10^{-37}
⋮
-3.4028×10^{38}

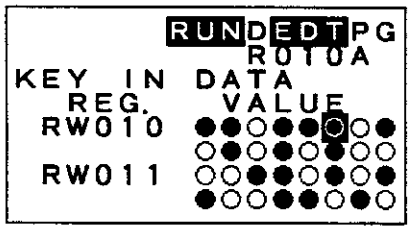
Next is an example of setting ON/OFF of a device.
After displaying a device you want to set, press the edit key.

[EDIT] (edit mode)



EDT will appear on the display, indicating the data edit mode. Move the cursor onto a device you want to set ON/OFF, and press either of the [0] or [1] keys.

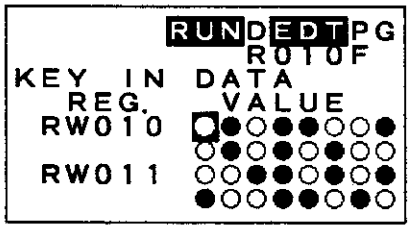
[0] (OFF)
[1] (ON)



Data for 2 consecutive registers can be set collectively.

Write the data into the PLC.

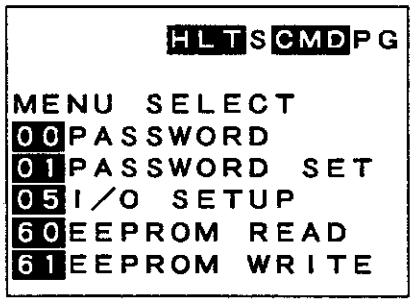
[SFT][PRG][WRT] (write into the PLC)



NOTE The data setting function is available even while the PLC is in RUN mode. However, the external input status and the result of program execution have higher priority.

10. Control Commands

Various control commands for the PLC are available by pressing the [CMD] key. When [CMD] is entered, the command menu will appear.

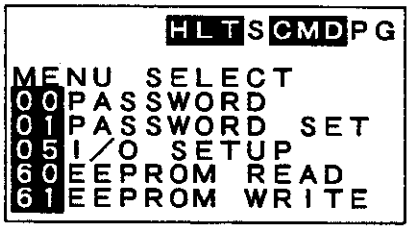


If you do not know the command number, scroll the menu display by using the cursor keys to confirm it.
Note that you can enter a command number without displaying the number in the menu display.

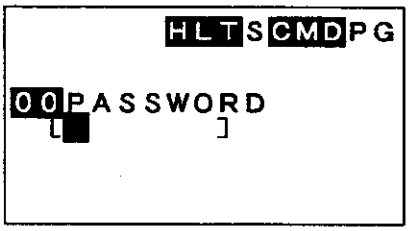
10.1 Entering the password

The command 0 (PASSWORD) function will allow you to enter the password to change the PCL's protection level.

Press the [CMD] key.
[CMD]



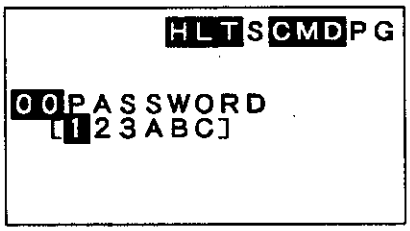
Enter command No. 0.
[0][EXE]



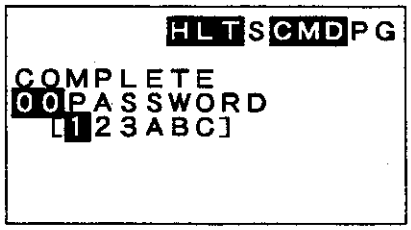
The cursor will appear onto the first columm of the password, and prompt you to enter the password registered by the command 1 (maximum 6 characters).

- Use the [0] to [F] numeric keys, [A] to [Z] alphabetic keys, and [a] to [z] lowercase alphabetic keys to enter the password.
- Use the [CLR] key to enter a blank.
- Use the [ALL] key to clear 6 alphanumeric characters.

(example of entering a password)



Execute the command.
[EXE]



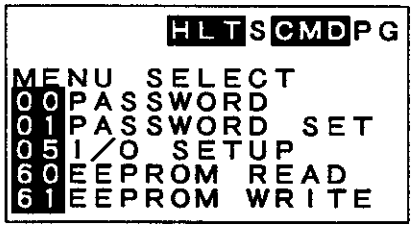
When the command is completed normally, "COMPLETE" will appear on the display, and the PLC's protection level will be changed according to the password entered.

When you release the control command after executing the PASSWORD command, the system information display will appear.

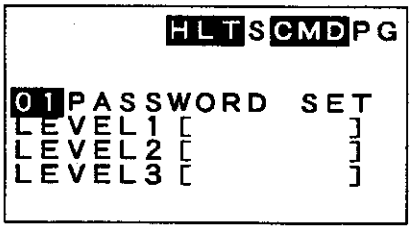
10.2 Setting passwords

The command 1 (PASSWORD SET) function will allow you to register the 3 levels of passwords.

Press the [CMD] key.
[CMD]

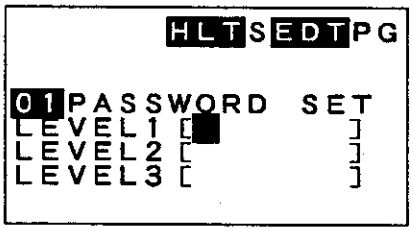


Enter command No. 1.
[1][EXE]

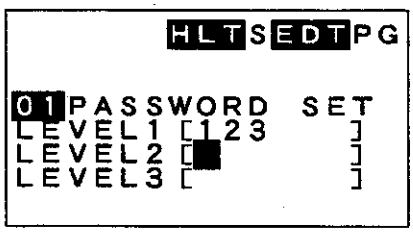


If passwords have already been registered, the content will appear. To change the passwords, set to the edit mode.

Change to the edit mode.
[EDIT]

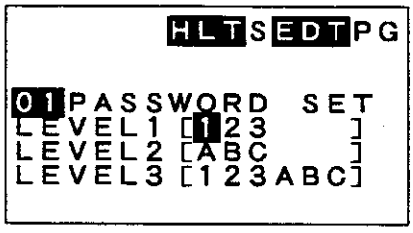


[1] [2] [3] [EXE]

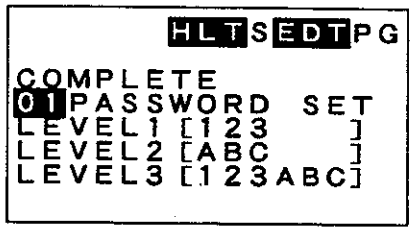


- Use the [0] to [F] numeric keys, [A] to [Z] alphabetic keys, and [a] to [z] lowercase alphabetic keys to enter the passwords.
- Press the [CLR] key to enter a blank.
- Enter [ALL] to clear 6 alphanumeric characters on the cursor position.

(example of setting passwords)



Write the passwords into the PLC.
[SFT][PRG][WRT]



When the command is completed normally, "COMPLETE" will appear on the display.

NOTE

This command is available when the PCL's protection level is in the lowest level (level 1). By entering the level 1 password by the command 0, the PLC's protection level can be changed to the Level 1.
The available HP functions corresponding to the PLC's protection levels are listed in Appendix E.

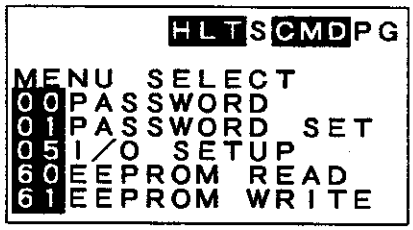
When the control command is released after the execution of the PASSWORD SET command, the system information display will appear.

10.3 Automatic I/O allocation

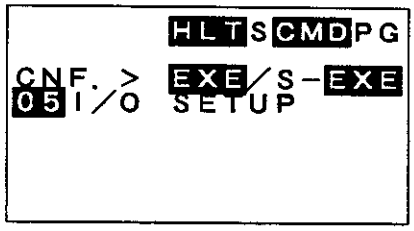
The command 5 (I/O SETUP) will allow you to perform the automatic I/O allocation. Besides this command, the manual I/O allocation is available in the system information mode. (see 6.2.3)

NOTE Refer to the PLC User's Manual for details of the I/O allocation.

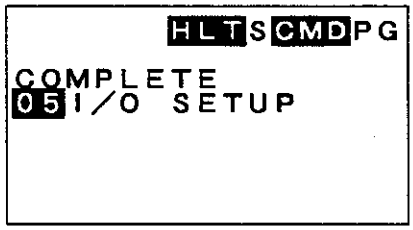
Specify the control command.
[CMD]



Enter command No. 5.
[5] [EXE]



Execute the command.
[EXE]



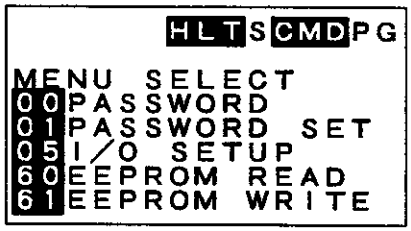
When the command is completed normally, "COMPLETE" will appear on the display. If an error occurs, the error message will appear. Check the error content. (See the list of error messages.)

NOTE The I/O SETUP command is valid only when the PLC is in HALT mode.

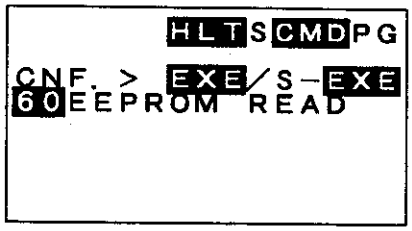
10.4 Program read (RAM←IC card/ EEPROM)

The command 60 (EEPROM READ) will instruct the PLC to read the program stored in the IC memory card or PLC's built-in EEPROM, and to store it into the PLC's RAM.

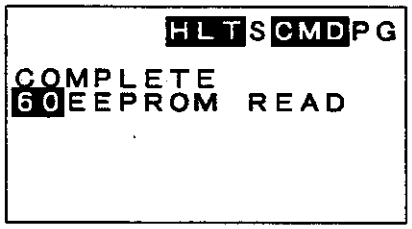
Specify the control command.
[CMD]



Enter command No. 60.
[6] [0] [EXE]



Execute the command.
[EXE]



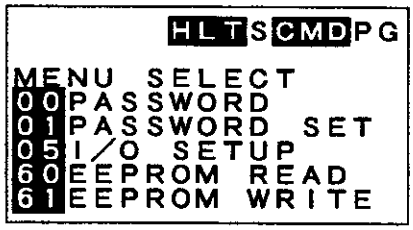
While reading, "EXECUTING" will appear on the display. When the operation is completed normally, "COMPLETE" will appear.

NOTE The EEPROM READ command is valid only when the PLC is in HALT mode.

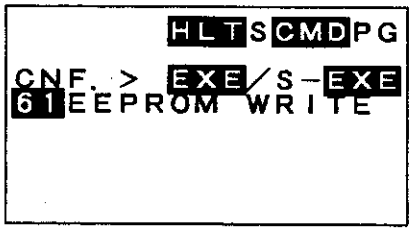
10.5 Program write (RAM→IC card/ EEPROM)

The command 61 (EEPROM WRITE) will instruct the PLC to write the program stored in the PLC's RAM into the IC memory card or PLC's built-in EEPROM.

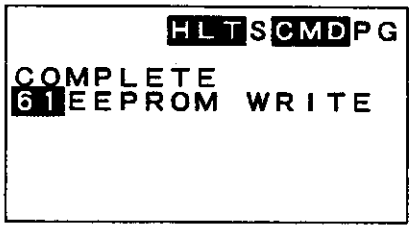
Specify the control command.
[CMD]



Enter command No. 61.
[6] [1] [EXE]



Execute the command.
[EXE]



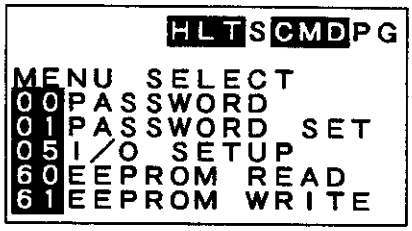
During writing, "EXECUTING" will appear on the display. When the operation is completed, "COMPLETE" will appear.

NOTE The EEPROM WRITE command is valid only when the PLC is in HALT mode.

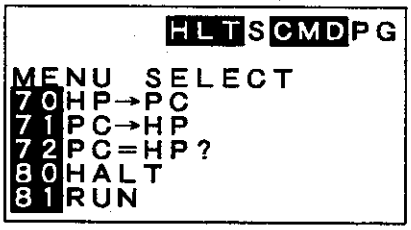
10.6 Program load (HP→PLC)

The command 70 (HP→PC) will transfer the program stored in the HP's built-in EEPROM to the PLC's RAM.

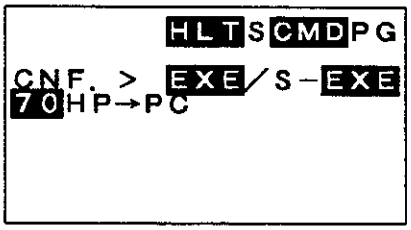
Specify the control command.
[CMD]



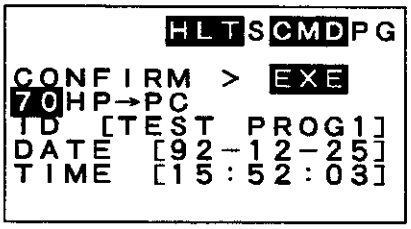
You can confirm the command number by stepping up/down the command menu using the cursor key.
[↓]



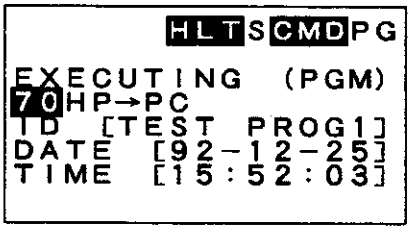
Enter command No. 70.
[7][0][EXE]

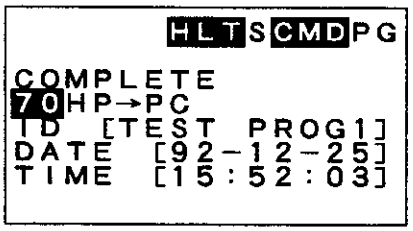


The program ID. of the program stored in the HP, and the saved date and time are displayed on the screen.



Execute the command.
[EXE]





During loading from the HP to the PLC, "EXECUTING" will appear on the display. When the operation is completed normally, "COMPLETE" will appear.

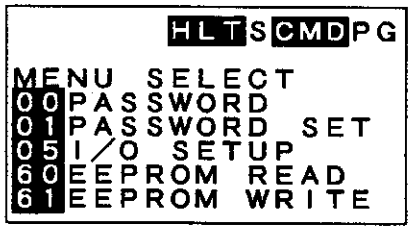
NOTE

- This command is valid only when the PLC is in HALT mode.
- Do not disconnect the connection cable during the operation.

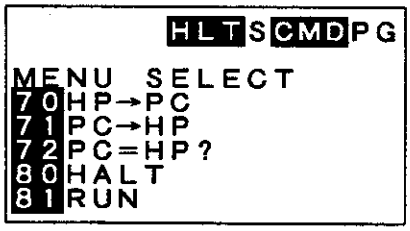
10.7 Program save (HP←PLC)

The command 71 (PC→HP) will read the program from the PLC and store into the HP's built-in EEPROM.

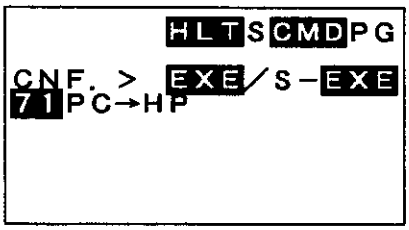
Specify the control command.
[CMD]



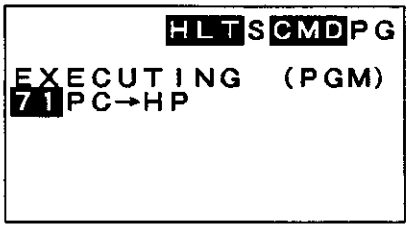
You can confirm the command number by stepping up/down the command menu using the cursor key.
[↓]

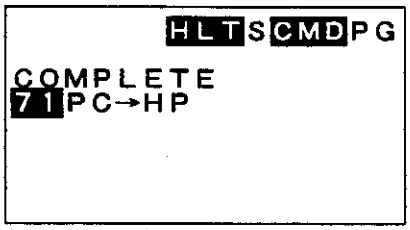


Enter command No. 71.
[7][1][EXE]



Execute the command.
[EXE]





During saving from the PLC into the HP, "EXECUTING" will appear on the display with the data type being read.

(PGM):	Program	(PRM):	Parameter	(RW):	RW register
(C) :	C register	(T) :	T register	(D) :	D register
(F) :	F register	(CMT):	Comment		

When the operation is completed normally, "COMPLETE" will appear on the display.

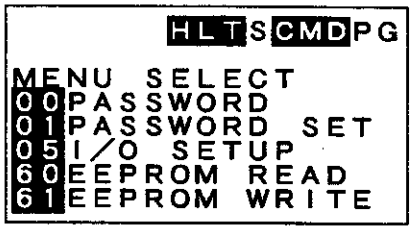
NOTE

- This command is available even while the PLC is in RUN mode.
- Use the HP's built-in EEPROM as temporary program storage. It is recommended to use disks for a long term master program storage.
- Do not disconnect the connection cable during the operation.

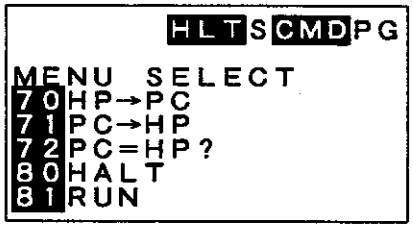
10.8 Program compare (HP⟷PLC)

The command 72 (PC=HP?) will compare the content of the HP's built-in EEPROM with those of the PLC.

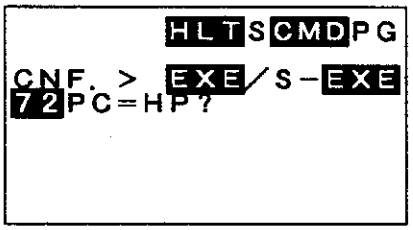
Specify the control command.
[CMD]



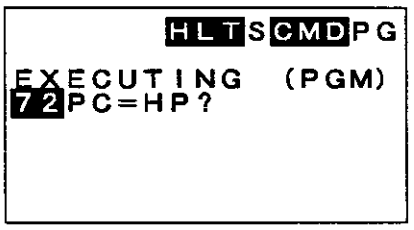
You can confirm the command number by stepping up/down the command menu using the cursor key.
[↓]

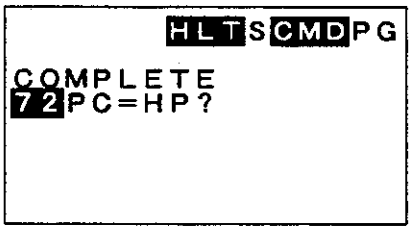


Enter command No. 72.
[7][2][EXE]



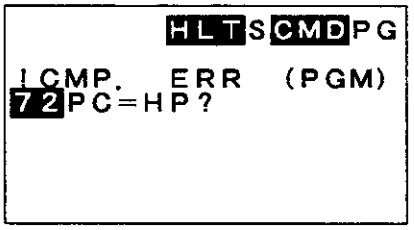
Execute the command.
[EXE]





During comparing, "EXECUTING" will appear on the display.
When the operation is completed normally, "COMPLETE" will appear. If any differences are found, "CMP. ERR" will appear, displaying the error type.

!CMP. ERR (PGM)	Program
!CMP. ERR (PRM)	Parameter
!CMP. ERR (RW)	RW regsiter
!CMP. ERR (C)	C regsiter
!CMP. ERR (T)	T register
!CMP. ERR (D)	D register
!CMP. ERR (F)	F register
!CMP. ERR (CMT)	Comment

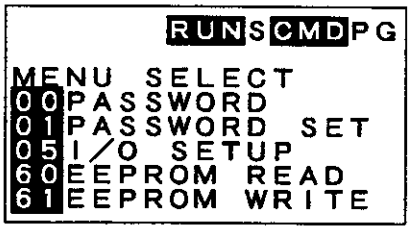


NOTE This command is valid even while the PLC is in RUN mode. If an error occurs, confirm the cable connection, execute the program loading/saving then execute the comparison again.

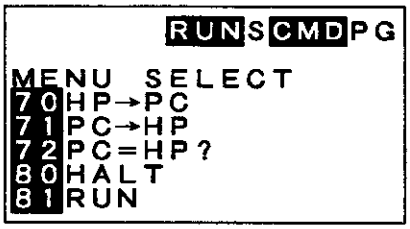
10.9 HALT

The command 80 (HALT) will instruct the PLC to stop the program execution while the PLC is in RUN mode.

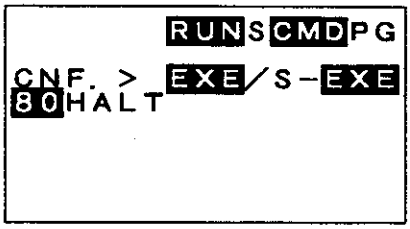
Specify the control command.
[CMD]



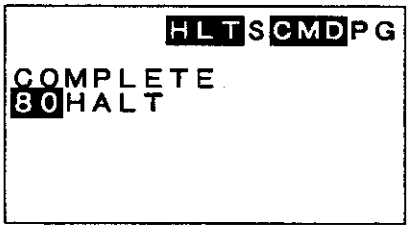
You can confirm the command number by stepping up/down the command menu using the cursor key.
[↓]



Enter command No. 80.
[8] [0] [EXE]



Execute the command.
[EXE]



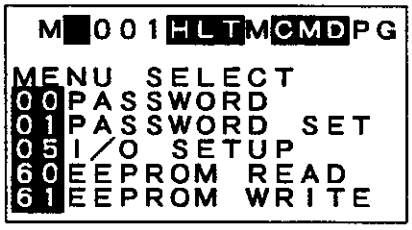
When the operation is completed normally, "COMPLETE" will appear on the display, and the PLC operation status display will change from RUN to HLT indicating the HALT mode.

10.10 RUN

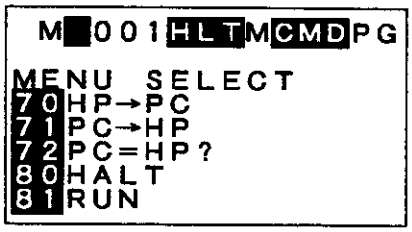
The command 81 (RUN) will instruct the PLC to start the program execution.

This command is valid only when the PLC's operation mode switch is set to RUN or P-RUN.

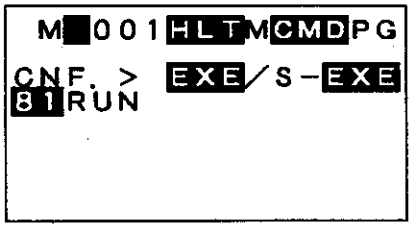
Specify the control command.
[CMD]



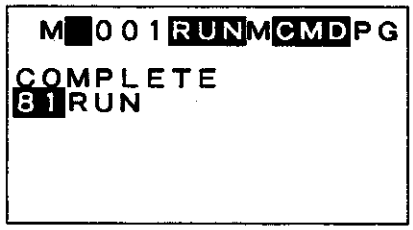
You can confirm the command number by stepping up/down the command menu using the cursor key.
[↓]



Enter command No. 81.
[8] [1] [EXE]



Execute the command.
[EXE]



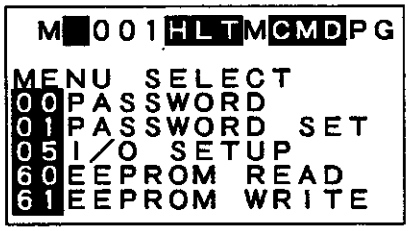
When the operation is completed normally, "COMPLETE" will appear on the display, and the PLC operation status will change from HLT to RUN, indicating the RUN mode.
If an error occurs in command execution, the error message will appear. In this case, check the error content. (See the list of error messages.)

10.11 RUN-F

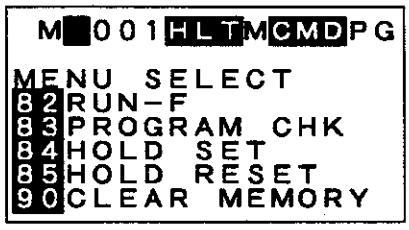
The command 82 (RUN-F) will instruct the PLC to start the program execution. Unlike command 81 (RUN), the RUN-F command will forcibly activate RUN even when all the I/O modules are not mounted. This command is useful when you debug a program without module installation.

NOTE This command will forcibly activate the PLC when no I/O module is installed. However, if the I/O allocation information and installation do not match, the PLC cannot be operated.

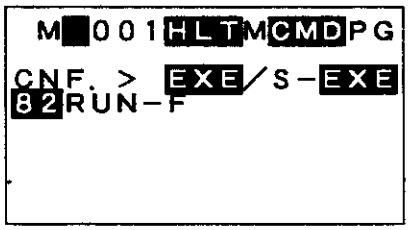
Specify the control command.
[CMD]



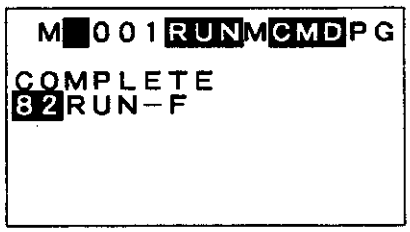
You can confirm the command number by stepping up/down the command menu by using the cursor.
[↓][↓]



Enter command No. 82.
[8][2][EXE]



Execute the command.
[EXE]

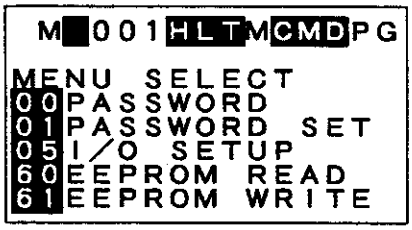


When the operation is completed normally, "COMPLETE" will appear on the display, and the PLC operation status will change from HLT to RUN, indicating the RUN mode.
If an error occurs in command execution, the error message will appear. Check the error content. (See the list of error messages.)

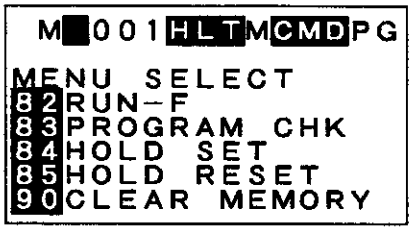
10.12 Program check

The command 83 (PROGRAM CHK) will instruct the PLC to check the program syntax. You can also specify duplicated coil check.

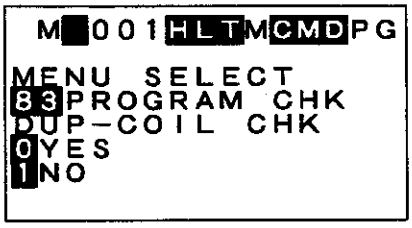
Specify the control command.
[CMD]



You can confirm the command number by stepping up/down the command menu using the cursor key.
[↓][↓]

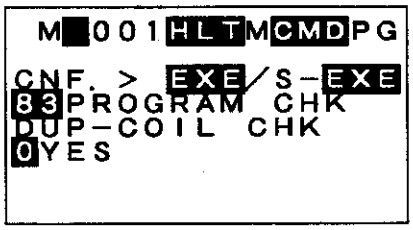


Enter command No. 83.
[8] [3] [EXE]



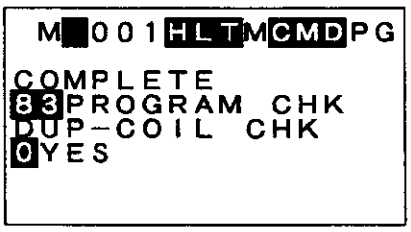
Select with or without duplicated coil check

[0][EXE](with duplicated coil check)
(0 is omissible)

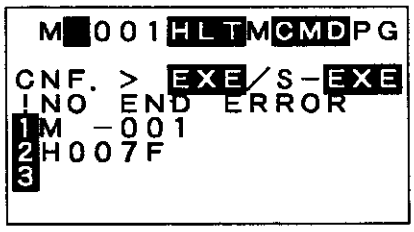


Execute the command.
[EXE]

When completed normally:



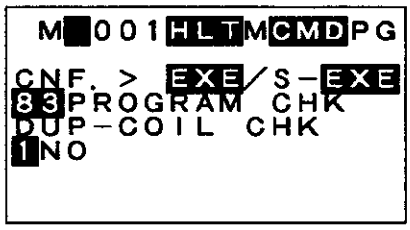
When an error occurred:



NOTE The duplicated coil check is carried out only for the external output device Y.

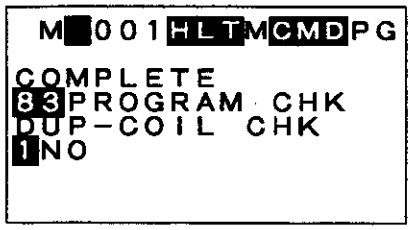
Specify program check without duplicated coil check.

[1][EXE](without duplicated coil check)



Execute the command.

[EXE]



When no error is found, "COMPLETE" will appear on the display. If an error is found, the error message will appear.

Example:

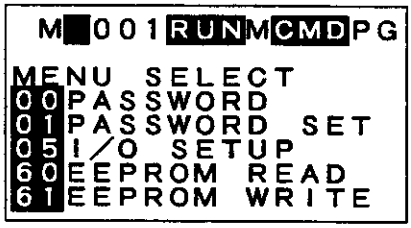
```
!NO END ERROR      ← No END instruction
 1 M-001           ← Block 1 of main program
 2 H007F           ← H007F, step address of the block
 3
```

NOTE This command is valid only when the PLC is in HALT mode.

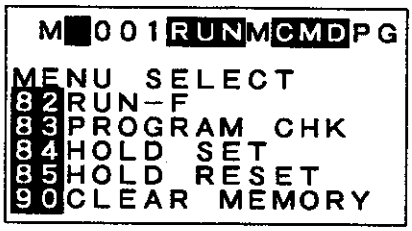
10.13 HOLD set

The command 84 (HOLD SET) will instruct the PLC to move into the HOLD mode. In the HOLD mode, the PLC stops program execution while maintaining the input/output status. This mode is useful for the external I/O signal (wiring) checking.

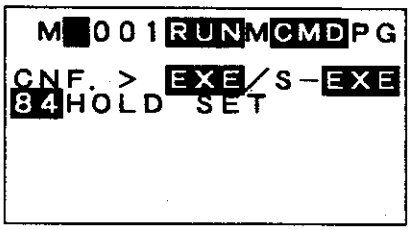
Specify the control command.
[CMD]



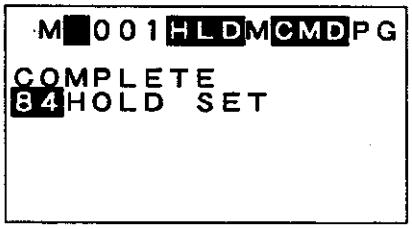
You can confirm the command number by stepping up/down the command menu using the cursor key.
[↓][↓]



Enter command No. 84.
[8] [4] [EXE]



Execute the command.
[EXE]

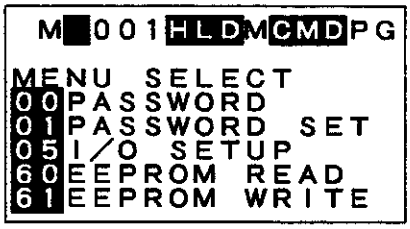


When the operation is completed normally, "COMPLETE" will appear on the display, and the PLC operation status will change from RUN to HLD, indicating the HOLD mode.

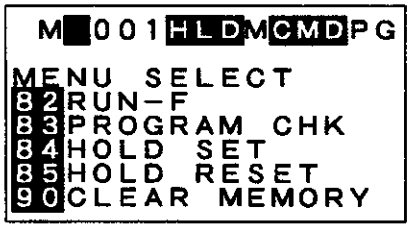
10.14 HOLD reset

The command 85 (HOLD RESET) will instruct the PLC to release the HOLD mode.

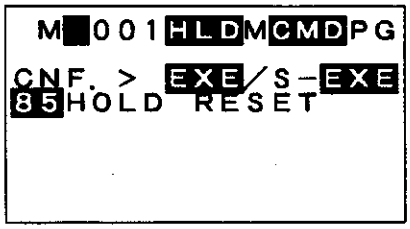
Specify the control command.
[CMD]



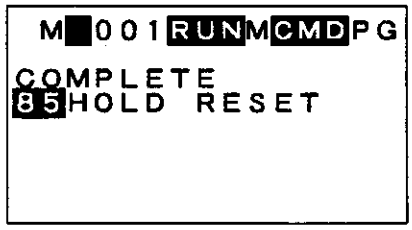
You can confirm the command number by stepping up/down the command menu using the cursor.
[↓][↓]



Enter command No. 85.
[8][5][EXE]



Execute the command.
[EXE]



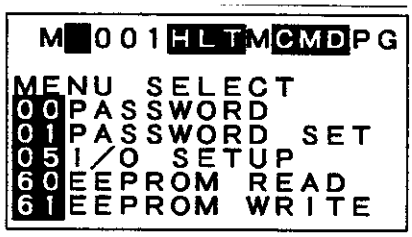
When the operation is completed normally, "COMPLETE" will appear on the display, and the PLC's operation status will change from HLD to RUN, indicating the RUN mode.

10.15 Clear memory

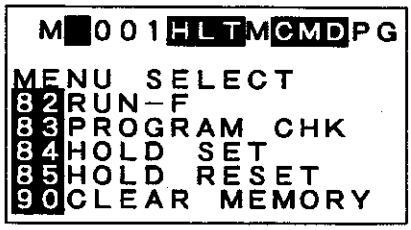
The command 90 (CLEAR MEMORY) will clear the PLC's memory (RAM). The data to be deleted are as follow:

-Program
-I/O allocation information
-Force designation
-Error history
-System information
-Device/register values

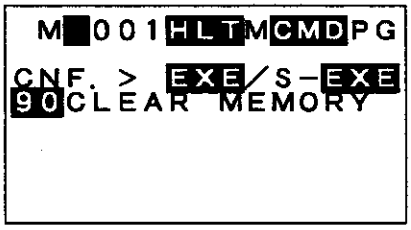
Specify the control command.
[CMD]



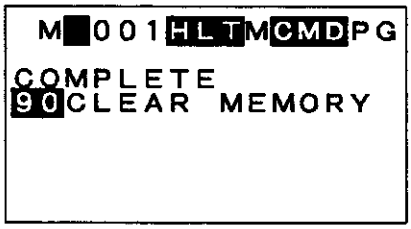
You can confirm the command number by stepping up/down the command menu using the cursor key.
[↓][↓]



Enter command No. 90.
[9] [0] [EXE]



Execute the command,
[EXE]



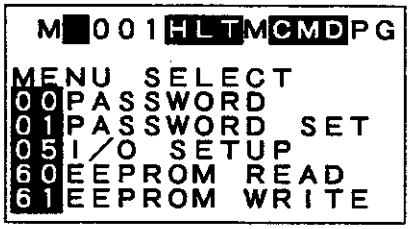
When the operation is completed normally, "COMPLETE" will appear on the display.

NOTE This command is valid only when the PLC is in HALT mode.

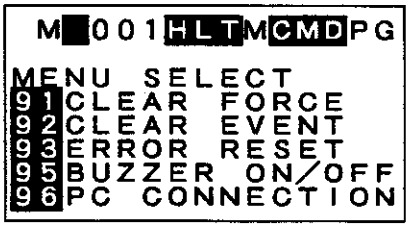
10.16 Clear force designation

The command 91 (CLEAR FORCE) will release all the force designation. This command is useful when you want to release all the force designation when debugging is completed.(For the force function, see Subsection 7.7.4.)

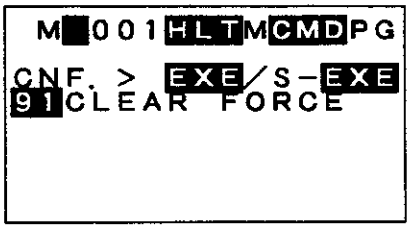
Specify the control command.
[CMD]



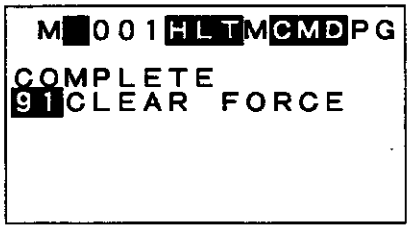
You can confirm the command number by stepping up/down the command menu using the cursor key.
[↓][↓][↓]



Enter command No. 91.
[9][1][EXE]



Execute the command.
[EXE]



When the operation is completed normally, "COMPLETE" will appear on the display.

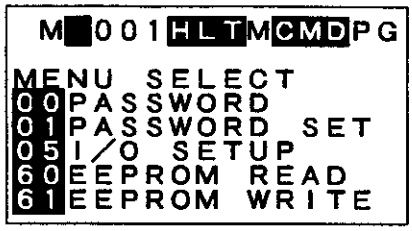
NOTE

(1) This command is available even when the PLC is in RUN mode.
(2) This CLEAR FORCE command is for releasing the force designation and not for changing the device status forced.

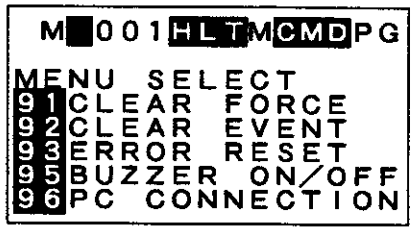
10.17 Clear evevt history

The command 92 (CLEAR EVENT) will clear event history information in the PLC.

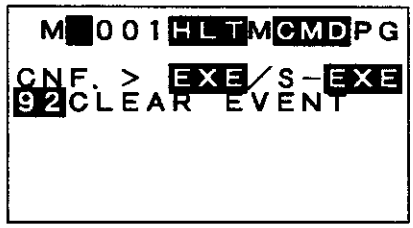
Specify the control command.
[CMD]



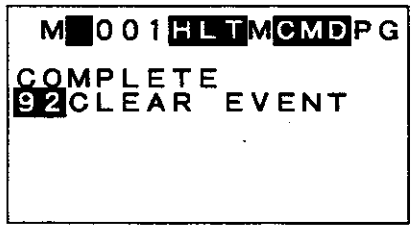
You can confirm the command number by stepping up/down the command menu using the cursor key.
[↓] [↓] [↓]



Enter command No. 92.
[9] [2] [EXE]



Execute the command.
[EXE]



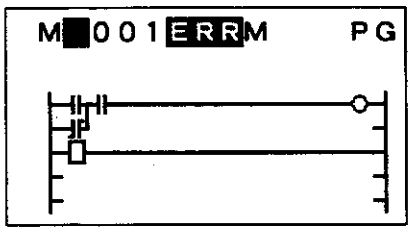
When the operation is completed normally, "COMPLETE" will appear on the display.

NOTE This command is valid only when the PLC is in HALT mode.

10.18 ERROR reset

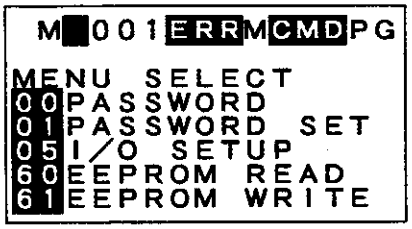
If an error occurs in the PLC, the program execution will be stopped and the PLC will enter the ERROR mode. In this state, writing operation to the PLC will be inhibited. The command 93 (ERROR RESET) will return the PLC from ERROR mode to HALT mode.

(when an error occurs)

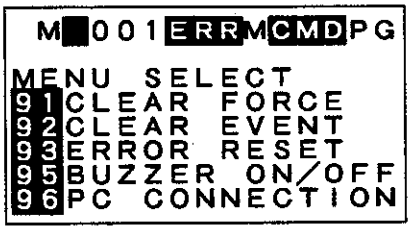


If an error occurs, ERR will appear on the HP's screen.

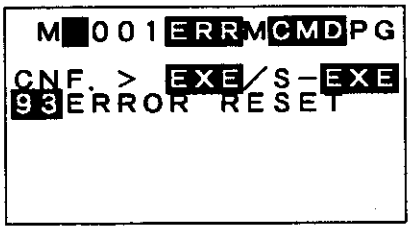
Specify the control command.
[CMD]



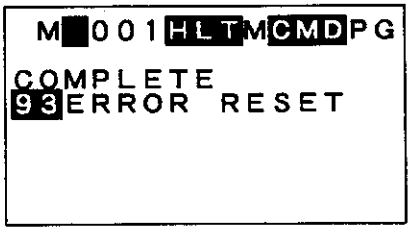
You can confirm the command number by stepping up/down the command menu using the cursor key.
[↓][↓][↓]



Enter command No. 93.
[9][3][EXE]



Execute the command.
[EXE]



When the operation is completed normally, "COMPLETE" will appear on the display, and the PLC operation status will change from ERR to HLT, indicating the HALT mode.

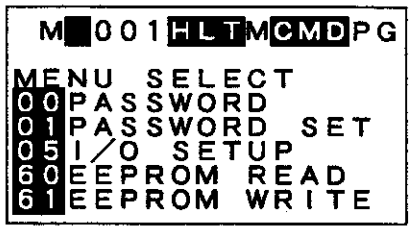
NOTE

(1) This command is available only in the ERROR mode.
(2) After executing this command, check the error information in the event history.

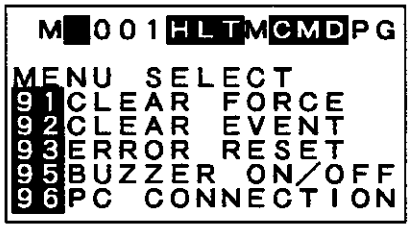
10.19 Buzzer ON/OFF

The command 95 (BUZZER ON/OFF) will set the HP's key entry buzzer to ON/OFF.

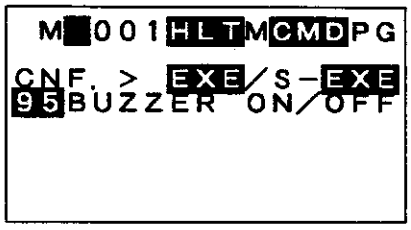
Specify the control command.
[CMD]



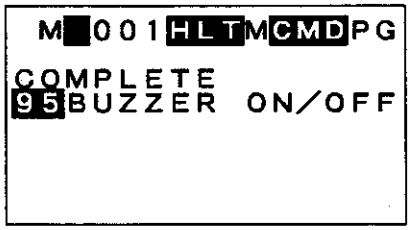
You can confirm the command number by stepping up/down the command menu using the cursor key.
[↓][↓][↓]



Enter command No. 95.
[9] [5] [EXE]



Execute the command.
[EXE]

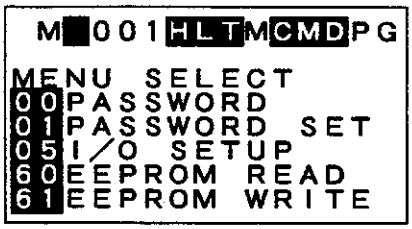


When the command has completed normally, "COMPLETE" will appear on the display. After this, no key entry buzzer will sound until you execute command 95 again or turning OFF/ON the power of the HP again.

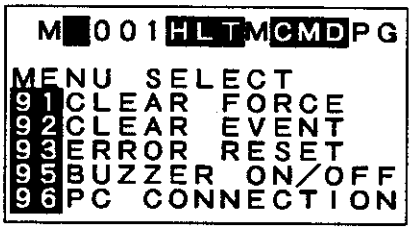
10.20 PLC connection

The command 96 (PC CONNECTION) is used to select the PLC connection method. Direct connection is set at power on.

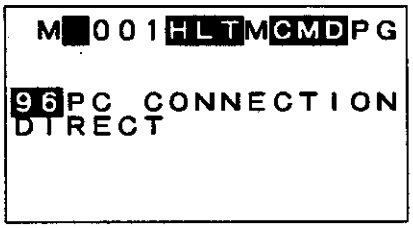
Specify the control command.
[CMD]



You can confirm the command number by stepping up/down the command menu using the cursor key.
[↓][↓][↓][↓]

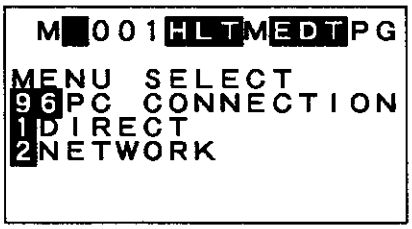


Enter command No. 96.
[9] [6] [EXE]



The current connection status will appear.
Enter into the edit mode to change the status.

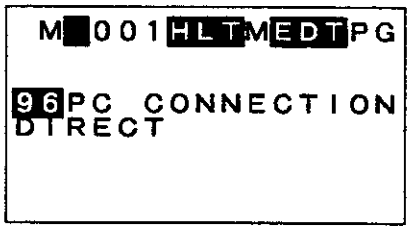
Set to the edit mode.
[EDIT]



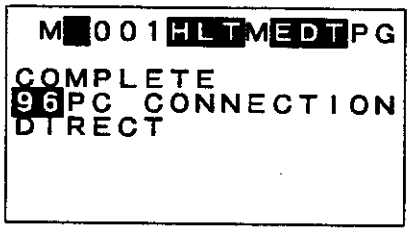
The connection method can be selected from either direct or network.
Direct : Connected through the programmer port on the PLC's CPU module.
Network : Connected through the TOSLINE-S20 by using the loader port on the TOSLINE-S20 station.

10.20.1 Direct connection

Select the direct connection.
[1]



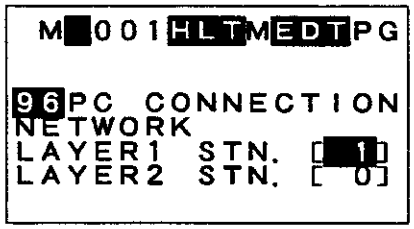
Confirm.
[SFT] [PRG] [WRT]



When the command has completed normally, "COMPLETE" will appear on the display. If the communication with the PLC cannot be established, "!COMM.TIMEOUT" will appear on the display.

10.20.2 Network connection

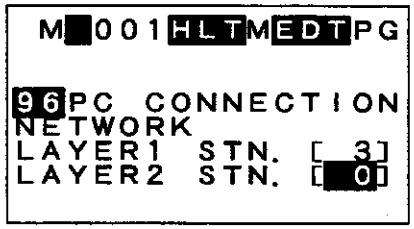
Select the network connection.
[2]



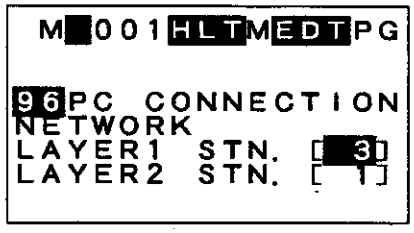
Enter the station number for the target PLC. If multi layer connection is not used, set 0 to the layer 2 station number. The range of setting available is as follows:

Layer 1 station number 1 to 64
Layer 2 station number 0 to 64

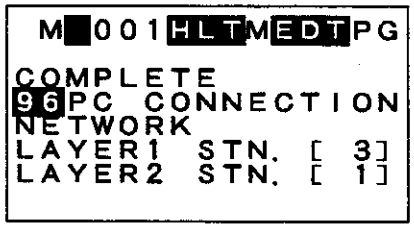
[3] [EXE]



[1] [EXE]



Confirm
[SFT] [PRG] [WRT]



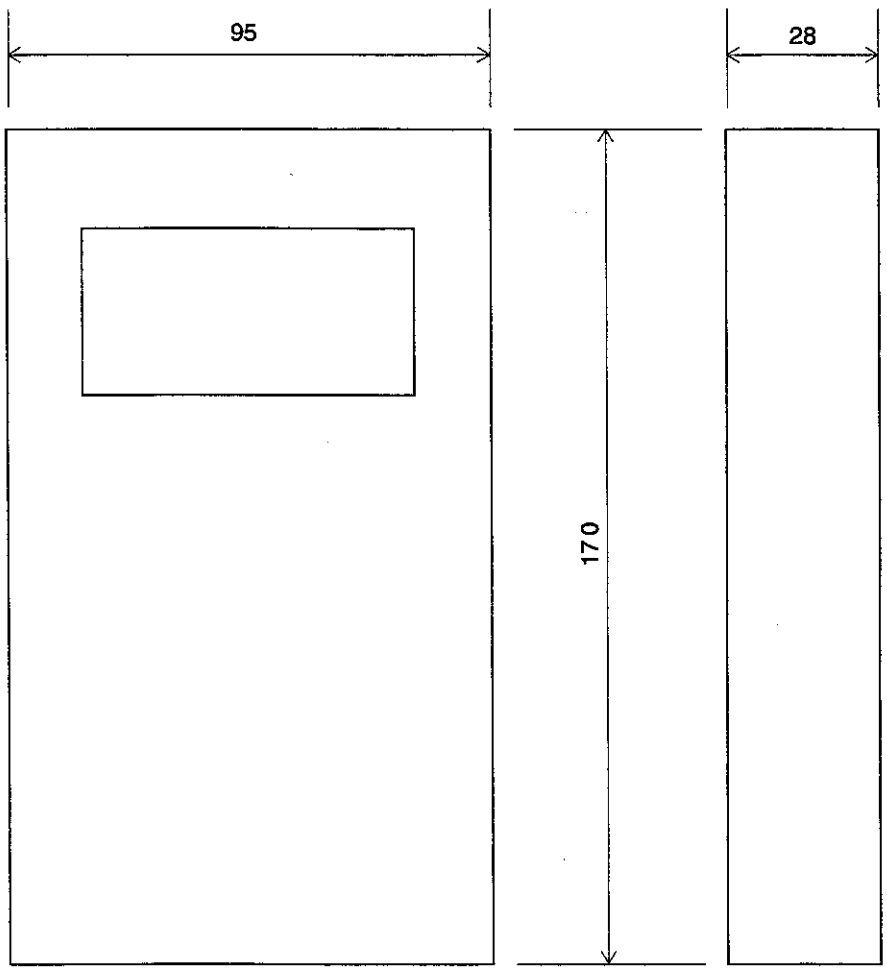
When the command has completed normally, "COMPLETE" will appear on the display. If the communication with the PLC cannot be established, "!COMM.TIMEOUT" will appear on the display.

NOTE When power to the HP is turned on, the PLC connection method will be initialized to the direct connection.

A Specifications

Item	Specification
Power supply	5 Vdc ± 5% (supplied from the T2/T3 or TOSLINE-S20)
Consumed current	0.4 A or less
Operating temperature	0℃ to 40℃
Storage temperature	−20℃ to 60℃
Ambient humidity	20 to 90%RH (no condensation)
Atmosphere	No inflammable gas nor corrosive gas
Display unit	120 x 64 dots LCD (EL back-light)
Keyboard	42 keys (6 x 7) Membrane keyboard with click action
PLC inter face	Serial interface (RS232C) 9600 bps (2m cable is attached)
Program storage	EEPROM 128 k bytes
Ladder diagram display	Normal display mode: 12 columns x 5 lines Zoom display mode: 2 columns x 2 lines
Buzzer	Key entry confirm (with ON/OFF control)
Weight	310 g (excluding the connection cable)

B External dimensions



[mm]

C List of error messages

1. Error in HP operation

Message	Meaning
!OUT OF RANGE	The value set is out of the range specified.
!ILL. POSITION	The current cursor position is illegal to execute the operation specified.
!TARGET NG	The target to be searched is set incorrectly.
!INVALID BLOCK	In programming, an instruction which cannot be used in the block specified has been programmed.
!ILLEGAL CMD	An illegal command key is pressed.
!INVALID DIGIT	The size of digit designation are out of the range available for the operand.
!ILLEGAL FUN NO	An illegal function instruction number is entered.
!I/P IMPOSSIBLE	The instruction specified cannot be entered onto the current cursor position.
!LIMIT OVER	The constant value set or register/device numbers are out of the range.
!I/O MISMATCH	The I/O allocation information and types of modules installed do not match.
!INVALID V-LINE	In program editing, the vertical line cannot be entered onto the current cursor position.
!DOUBLE LENGTH	A double-length operand is being specified in a single-length operand.
!INDEX/DIGIT	Data was set to an operand with index modification/digit designation.
!INVALID ENTRY	Entry does not match input conditions. Example: date and time
!CONSTANT SCN	The subprogram execution time cannot be set in the constant scan mode.
!COMBINATION	In editing the I/O allocation information, module type specified is incorrect.
!BAD LOCATION	On line I/O disconnection cannot be specified to the slot specified.

Message	Meaning
!DUPLICATE REG.	The base register of an I/O unit overlaps with the register assigned to the preceding I/O unit. Or, unit base address setting is incorrect.
!NO ENTRY	Necessary entry is not made.
!ILLEGAL CMD NO	The control command number entered is illegal.
!ILLEGAL KEY	The unacceptable key is pressed.
!ILLEGAL STN NO	The station number is out of the range.
!CMP. ERR (PGM)	In executing program comparison, an error occurred in the program .
!CMP. ERR (PRM)	In executing program comparison, an error occurred in the parameter .
!CMP. ERR (RW)	In executing program comparison, an error occurred in the RW register.
!CMP. ERR (C)	In executing program comparison, an error occurred in the C register.
!CMP. ERR (T)	In executing program comparison, an error occurred in the T register.
!CMP. ERR (D)	In executing program comparison, an error occurred in the D register.
!CMP. ERR (CMT)	In executing program comparison, an error occurred in the comment area.
!SFC PROG. BLK	The block specified is an SFC block and cannot be displayed.
!CMP. ERR (F)	In executing program comparison, an error occurred in the F register.
!HP EEPROM EMPT	The HP built-in EEPROM is empty. (No program is stored)
!HP EEPROM BCC	A BCC error in the HP built-in EEPROM.
!HP EEPROM WRT	Write error into the HP built-in EEPROM
!PC NO CMT AREA	No comment area is available for the PLC.

Message	Meaning
!ILL. INST NO.	An illegal basic instruction was entered.

2. Communication error

Message	Meaning
!COMM. TIMEOUT	Communication timeout
!RCV ADR ERROR	Received address is abnormal.
!RCV LEN ERROR	Received text length is abnormal.
!RCV CMD ERROR	Received command is abnormal.
!ETX/ETB ERROR	Received ETX/ETB is abnormal.
!RCV BCC ERROR	Received BCC is abnormal.
!PRTY/FRAM/BREK	A parity error/framing error/break signal is detected.
!SEND REQ ERROR	Send request error
!RCV CHK ERROR	Receive completion check request error

3. Program compiling and decompling errors

Message	Meaning
!ILL. OPERAND	Illegal operand specified
!NO OPERAND	No operand specified
!OPEN CIRCUIT	A connect line is bloken off.
!SHORT CIRCUIT	Short-circuit
!BACK CURRENT	Back current (Signal flow is from left to right.)
!CONTACT/PULSE	A contact instruction is connected with the right power rail.
!OPR LIMIT OVER	The constant specified for a register number is beyond the limit.
!MCS/JCS ERROR	An MCS/JCS instruction is not at the last of the rung.
!MCR/JCR/END	An MCR/JCR/END/RET instruction is not connected with the both power rails.
!LEFT-CONN. ERR.	In a vertical box type instruction, input connection is illegal.
!OVER 132 STEP	The number of steps of a rung exceeds 132 steps.
!LINE OVER	The rung has more than 11 lines to display on the screen.
!BRANCH STACK	Ladder connection is abnormal.
!ILLEGAL INST	An illegal instruction exists in the program.
!L-BUS CONN. ERR	The instruction cannot be connected with the left power rail.
!TURN UP SYMBOL	Combination of line connectors is illlegal.
!LBL/SUBR ERROR	Other instructions are programmed on the LBL or SUBR rung.
!NO PROGRAM	No rung exists in writing a program.
!BRANCH ERROR	Branch line error. FOR or NEXT is connected with a branch line.

Message	Meaning
!JOIN STACK	Ladder connection is abnormal.

4. HP hardware errors

Message	Meaning
!HP ROM BCC ERR	The HP's ROM is abnormal.
!HP RAM ERROR	The HP's RAM is abnormal.
!HP CPU ERROR	The HP's CPU is abnormal.
!HP LCD ERROR	The HP's LCD is abnormal.

5. PLC error response

Message	Meaning
!E-POWER FAIL	See "6. PLC error".
!EEPROM BCC ERR	See "6. PLC error".
!EEPROM WRT ERR 1 nnnn 2 Hnnnn 3 Hnnnn	An abnormality was detected in writing a user program onto the EEPROM. INF.1: Block No. (0 through 2047) !NF.2: Error data INF.3: Write data
!EEPROM WARNING 1 nnnnn 2 3	Writing onto the EEPROM has exceeded more than the useful life (100,000 times). After this, errors and abnormalities may occur in writing onto the EEPROM. INF.1: Number of times exceeding 100,000 times
!I/O BUS ERROR	See "6. PLC error".
!I/O MISMATCH	See "6. PLC error".
!I/O NO ANSWER	See "6. PLC error".
!I/O PARITY ERR	See "6. PLC error".
!I/O DUPLICATE	See "6. PLC error".
!I/O OVER	See "6. PLC error".
!PC COMM ERROR 1 2 3	Communication error was detected in PLC.
!COMM. BUSY 1 2 3	PLC cannot accept the command because of serving on other communication devices.
!FORMAT ERROR 1 2 3	When the PLC received commands from the programmer, invalid data was detected.
!NO END ERROR	See "6. PLC error".
!PAIR INST ERR	See "6. PLC error".
!OPERAND ERROR	See "6. PLC error".
!INVALID PROG.	See "6. PLC error".
!JUMP ERROR	See "6. PLC error".
!NO SUBR ENTRY	See "6. PLC error".
!NO RET ERROR	See "6. PLC error".
!SUBR NESTING	See "6. PLC error".
!LOOP NESTING	See "6. PLC error".

Message	Meaning
!SFC STEP ERROR	See "6. PLC error".
!SFC MACRO DUP.	See "6. PLC error".
!NO SFC MACRO	See "6. PLC error".
!DUP. COIL 1 nn-nn 2 nnnn 3	A duplicated coil was detected in program checking. INF. 1: Register type–bit position INF. 2: Register Number
!SFC LBL DUP.	See "6 PLC error".
!NO SFC LBL	See "6 PLC error".
!SFC PROG. DUP.	See "6 PLC error".
!SFC INVALID	See "6 PLC error".
!INVALID FUN	See "6 PLC error".
!PASSWORD PROT. 1 2 3	The command specified is not allowed to use in the current protection level.
!PASSWORD UNMAT 1 2 3	The password does not match.
!COMMENT FULL 1 2 3	The comment memory is full.
!ILLEGAL INST	See "6 PLC error".
!MEMORY FULL 1 2 3	The program memory is full.
!MODE ERROR 1 2 3	The current operation mode does not allow command from the programmer to be executed.
!I/O NO. ERROR 1 nn-nn 2 nnnnn 3	The register number requested by the programmer is out of the valid register range. INF. 1: Register type—bit position INF. 2: Register number
!MEMORY PROTECT 1 2 3	The writing operation is prohibited by P-RUN.
!LBL/SUBR DUP.	See "6 PLC error".
!CNTL INST 1 2 3	The program control instructions cannot be changed in on-line program changes.

Message	Meaning
!INVALID RUNG 1 nn-nnn 2 nnnnn 3	The specified rung number was abnormal. Or rung numbers in the same block are not consecutive in writing a program. INF. 1: Program type—block number INF. 2: Rung number
!PROGRAM LOADED 1 2 3	A program was transferred from the EEPROM or IC memory card to the RAM.
!INVALID PROG. 1 2 3	This PLC does not support the program type specified.
!INVALID CMD 1 2 3	This PLC does not support the function specified.
!INVALID SLOT 1 2 3	The specified slot is invalid in this PLC.
!NO PRG IN CARD 1 2 3	The content stored in the IC memory card is not a program.
!NO CARD EXIST 1 2 3	An IC memory card is not inserted.
!CARD WRT PROT. 1 2 3	The IC memory card is write-protected.
!CARD BCC ERROR	See "6. PLC error".
!CARD TYPE ERR.	See "6. PLC error".
!NO ENTRY ERR.	See "6. PLC error".
!NO BLK EXIST 1 2 3	Program block specified is not registered.
!CAPACITY UNMAT 1 2 3	A program size in the EEPROM of the HP is larger than the memory of the PLC.

6. PLC error (registered in the event history)

Message	Meaning
POWER ON 1 2 3	Power ON (not error)
POWER OFF 1 2 3	Power OFF (not error)
!E-POWER FAIL 1 2 3	The 5 Vdc power supply of the expansion unit is abnormal, or an expansion interface module is terminated abnormally.
!POWER INTR 1 2 3	An instantaneous power interruption was detected in use of the power interruption shut-down function.
!POWER INTR RES 1 2 3	Power recovery from the instantaneous power interruption is detected in use of the hot restart function.
!RAM CHECK ERR. 1 Hnnnn 2 Hnnnn 3 Hnnnn	An abnormality was detected in user data memory (RAM) read/write checking. INF. 1: Abnormal address (offset) INF. 2: Error data INF. 3: Test data
!PROG BCC ERROR 1 Hnnnn 2 3	An abnormality was detected in BCC of user program memory (RAM) . INF. 1: Abnormal BCC data .
!BATTERY FAIL 1 2 3	The battery voltage for RAM memory backup is low .
!EEPROM BCC ERR 1 Hnnnn 2 3	An abnormal BCC was detected in the user program in the EEPROM. INF. 1: Abnormal BCC data.
!SYS RAM ERROR 1 Hnnnn 2 Hnnnn 3 Hnnnn	An abnormality was detected in system RAM read/write check. INF. 1: Abnormal address (offset) INF. 2: Error data INF. 3: Test data
!SYS ROM ERROR 1 Hnnnn 2 3	An abnormality was detected in checking BCC of the system ROM. INF. 1: Abnormal BCC data.

Message	Meaning
!SYS LSI ERROR 1 nn 2 3	An abnormality was detected in checking the LSIs. INF. 1: Error code
!CALENDAR ERROR 1 2 3	An abnormal data was detected (no error down) in the built-in clock-calendar LSI.
!ILL SYS INTR 1 Hnnnn 2 Hnnnn 3	Illegal interrupt was detected in the CPU module (no error down). INF. 1: Address interrupted (segment) INF. 2: Address interrupted (offset)
!WD TIMER ERROR 1 nn 2 Hnnnn 3	Watchdog timer error. INF. 1: Abnormal address (segment) INF. 2: Abnormal address (offset)
!I/O BUS ERROR 1 nn 2 Hnnnn 3	An abnormality was detected in checking the I/O bus. INF. 1: Unit number INF. 2: Data
!I/O MISMATCH 1 #nn-nn 2 nnnnn 3	The I/O allocation information and the I/O installation do not match. INF. 1: Unit number—slot number INF. 2: Register number
!I/O NO ANSWER 1 #nn-nn 2 nnnnn 3	An I/O module is not installed in the allocated slot. INF. 1: Unit number—slot number INF. 2: Register number
!I/O PARITY ERR 1 #nn-nn 2 nnnnn 3	A parity error was detected in transferring data to/from an I/O module. INF. 1: Unit number—slot number INF. 2: Register number
!I/O ILL INTR 1 Hnnnn 2 3	Illegal I/O interrupt was detected (no error down). INF. 1: Unit number—slot number
!I/O DUPLICATE 1 #nn-nn 2 nnnnn 3	Duplicated I/O register assignment was detected. INF. 1: Unit number—slot number INF. 2: Register number
!I/O OVER 1 #nn-nn 2 nnnnn 3	I/O register assignment exceeded the address range. INF. 1: Unit number—slot number INF. 2: Register number
!LP FNC ERROR 1 nn 2 Hnnnn 3	An abnormality was detected in the language processor (LP). INF. 1: Error code INF. 2: Error data

Message	Meaning
!LP REG R/W ERR 1 nn 2 Hnnnn 3 Hnnnn	At initializing the language processor (LP), an abnormality occurred in read/write check. INF. 1: Port number INF. 2: Error data INF. 3: Test data
!LP TIMEOUT 1 2 3	The execution of the language processor (LP) does not end within a specified time.
!SCAN TIME OVER 1 nnnnms 2 3	Scan time exceeds 200 ms. INF. 1: Execution time
!NO END ERROR 1 nn-nnn 2 Hnnnn 3	In the main program or in a subprogram, END is not programmed, or IRET is not programmed in the interrupt program. INF. 1: Program type—block number INF. 2: Address in the block
!PAIR INST ERR 1 nn-nnn 2 Hnnnn 3	Combined use of the MCS/R or JCS/R instructions is abnormal. INF. 1: Program type—block number INF. 2: Address in the block
!OPERAND ERROR 1 nn-nnn 2 Hnnnn 3	The operand specified is abnormal. INF. 1: Program type—block number INF. 2: Address in the block
!INVALID PROG 1 nn-nnn 2 Hnnnn 3 nnn	Program management information is abnormal. INF. 1: Program type—block number
!JUMP ERROR 1 nn-nnn 2 Hnnnn 3 nnn	The LBL instruction corresponding to the JUMP instruction is not programmed within the same program type. Or the LBL instruction is positioned before the JUMP instruction (backward jump). INF. 1: Program type—block number INF. 2: Address in the block INF. 3: Jump label number
!NO SUBR ENTRY 1 nn-nnn 2 Hnnnn 3 nnn	The SUBR instruction specified by the CALL instruction is not programmed. INF. 1: program type—block number INF. 2: Subroutine number
!NO RET ERROR 1 nn-nnn 2 Hnnnn 3 nnn	The RET instruction is not programmed in a subroutine. INF. 1: Pogrom type—block number INF. 2: Address in the block INF. 3: Subroutine number

Message	Meaning
!SUBR NESTING 1 nn-nnn 2 Hnnnn 3 nnn	The number of nesting in a subroutine exceeds 6. INF. 1: Program type—block number INF. 2: Address in the block INF. 3: Subroutine number
!LOOP NESTING 1 nn-nnn 2 Hnnnn 3	The number of nesting of the FOR or NEXT loop exceeds 6. INF. 1: Program type—block number INF. 2: Address in the block
!SFC STEP ERROR 1 nn-nnn 2 nnnn 3	In an SFC program, a step number is duplicated in use, or the initial step number and the step number specified at the end step do not match. INF. 1: Program type—block number INF. 2: Step number
!SFC MACRO DUP. 1 nn-nnn 2 nnn 3	An SFC macro number is duplicated in use, or the same macro program is called by two or more points. INF. 1: Program number—block number INF. 2: Macro number
!NO SFC MACRO 1 nn-nnn 2 nnn 3	The SFC macro program specified by a macro step is not programmed. INF. 1: Program type—block number INF. 2: Macro number
!SFC LBL DUP. 1 nn-nnn 2 nnnn 3	An SFC label number is duplicated in use. INF. 1: program type—block number INF. 2: SFC label number
!NO SFC LBL 1 nn-nnn 2 nnnn 3	The SFC label specified by an SFC jump instruction is not programmed. INF. 1: Program type—block number INF. 2: SFC label number
!SFC PROG. DUP. 1 nn-nnn 2 nn 3	An SFC program number is duplicated in use. INF. 1: Program type—block number INF. 2: SFC program number
!SFC INVALID 1 nn-nnn 2 3	The initial step and end step, or macro entry and macro end do not correspond to each other. INF. 1: program type—block number
!INVALID FUN 1 nn-nnn 2 Hnnnn 3 nnn	An invalid instruction which is not supported by the PLC was detected. INF. 1: Program type—block number INF. 2: Address in the block INF. 3: FUN instruction number
!ILLEGAL INST 1 nn-nnn 2 Hnnnn 3	An illegal instruction was detected. INF. 1: Program type—block number INF. 2: Address in the block

Message	Meaning
!BOUNDARY ERROR 1 nn-nnn 2 Hnnnn 3 nnn	An index modified operand exceeds the range of register numbers (no error down). INF. 1: Program type—block number INF. 2: Address in the block INF. 3: FUN instruction number
!LBL/SUBR DUP. 1 nn-nnn 2 Hnnnn 3 nnn	An entry number of the LBL instruction, or the SUBR instruction is duplicated in use. INF. 1: Program type—block number INF. 2: Address in the block INF. 3: Entry number
!CARD BCC ERROR 1 2 3	A BCC error is detected in the IC memory card.
!CARD TYPE ERR. 1 2 3	The size of the program in the IC memory card is larger than the memory of the PLC.
!NO ENTRY ERR. 1 nnn	Expanded error INF. 1: Error number

D List of guidance messages

Message	Meaning
PRESS HOME KEY	To press the [HOME] key is requested.
SELECT PROG.	To select a program type is requested.
KEY IN PROG. NO.	To enter a program number is requested.
CONTINUE 〉 SCH	Confirms whether search be continued.
MENU SELECT	To select a function is requested.
SEL. 1 : ON/0 : OFF	To set device data is requested.
SEL. 1 : SET/0 : RST	To select force setting/releasing is requested.
SEL. BREAK POINT	Breakpoint setting is requested.
SELECT INST NO.	To select a basic instruction number is requested.
CONFIRM 〉 EXE	To enter [EXE] is requested after confirming.
SELECT FUN NO.	To select a function instruction number is requested.
SELECT INDEX	To select an index register is requested.
SELECT DIGIT	To specify the number of digits is requested.
SELECT INS / DEL	To select insert/delete is requested (in line/column edit)
SEL. WRT / INS / DEL	To select replace/insert/delete is requested (in program edit).
COMPLETE	The process has completed.
ONLINE-CHG 〉 EXE	To enter [EXE] is requested after confirming the on-line program changes.
CONFIRM 〉 S- EXE	To enter [SFT] [EXE] is requested after confirming. (at final confirmation of the on-line program changes)
KEY IN ST. NO.	To enter the starting register number is requested in the data monitor mode.
KEY IN DATA	In data monitoring and edit, to set the register date is requested.
CNF. 〉 EXE /S- EXE	To enter [EXE] or [SFT][EXE] is requested after confirmation.

Message	Meaning
EXECUTING (blinking)	Executing
SEL. CARD TYPE	To select a module type in I/O allocation information editing is requested.
SETUP DATA	To select an access type for the transmission module is requested.
SEL. SET → 1/RST → 0	To set ON/OFF of the device is requested. (Device ON/OFF)
KEY IN BLK NO.	To enter a block number is requested.
KEY RUNG NO.	To enter a rung number is requested.
MANUAL STOPPED	Manually stopped
TRACE NEXT RUNG	Traced data will be displayed on and after the next rung.
PROGRAM LOADED	A program was transferred from the EEPROM or the IC memory card to the RAM. Or, a program of PLC is loaded from other communication device.
CONFIRM 〉 WRT	To enter [WRT] is requested after confirming.
PC CONNECT	Communication between the HP and the PLC is established
SEARCH END	Search has reached to the end.
SET REG./DEV.	To enter a register/device at registering auxiliary data monitor is requested.
EXECUTING (PGM) (blinking)	Saving the program into HP.
EXECUTING (PRM) (blinking)	Saving the parameter into HP.
EXECUTING (RW) (blinking)	Saving the RW register into HP.
EXECUTING (C) (blinking)	Saving the C register into HP.
EXECUTING (T) (blinking)	Saving the T register into HP.
EXECUTING (D) (blinking)	Saving D register into HP.
EXECUTING (F) (blinking)	Saving the F register into HP.

Message	Meaning
EXECUTING (CMT) (blinking)	Saving the comment into HP.

E Protection levels for each function

How to read the list
The ○ in items indicates the available operation for the level.

Protection level: 3 2 1

SYS: System information

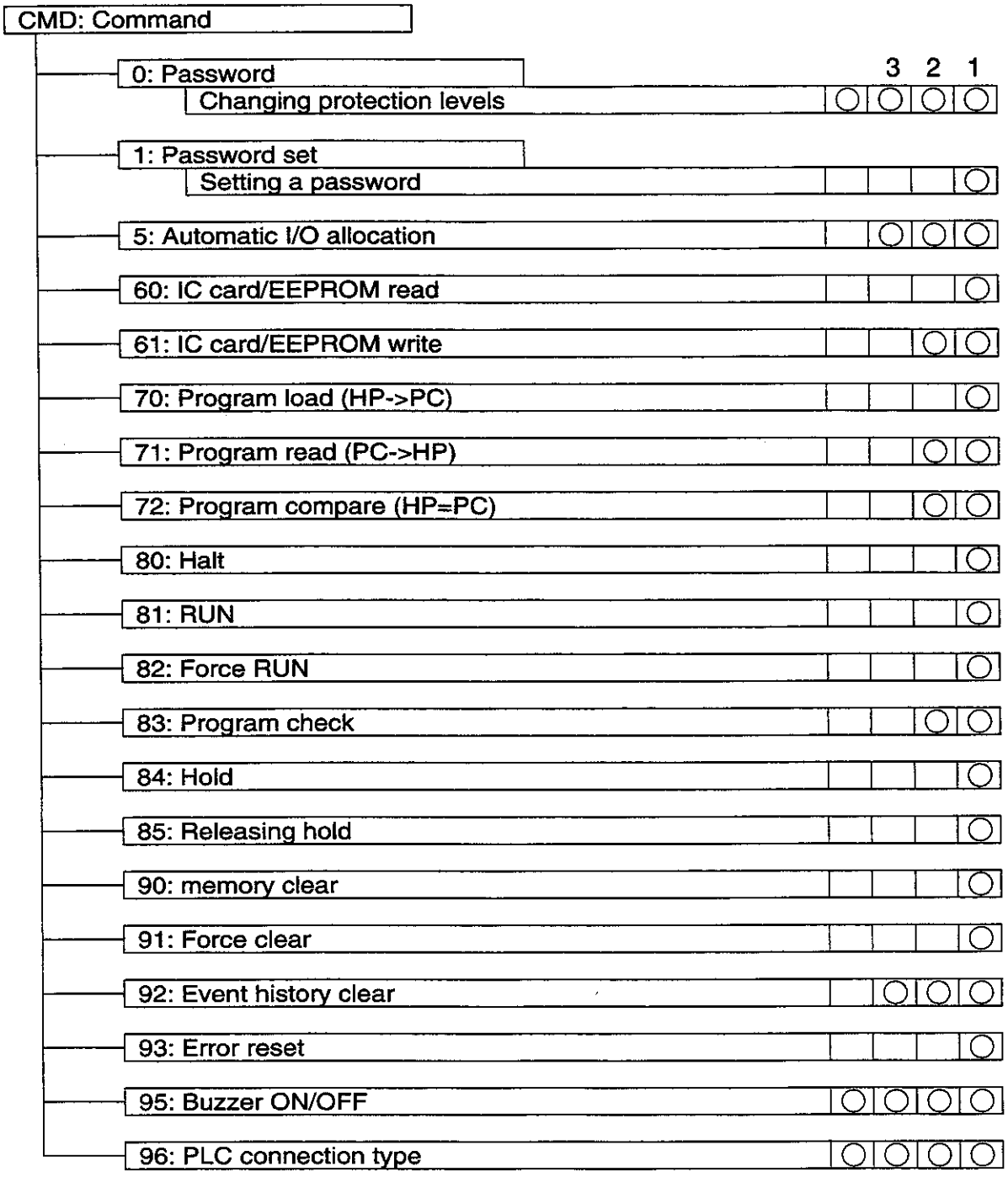
	3	2	1
1: System information			
Displaying system information	○	○	○	○
Setting system information		○	○	○
Diagnostic disply reset		○	○	○
2: I/O allocation information			
Displaying I/O allocation information	○	○	○	○
Setting I/O allocation information		○	○	○
3: Event history			
Displaying event history	○	○	○	○
4: Scan time			
Displaying scan time	○	○	○	○
5: Interrupt assignment information			
Displaying interrupt assignment information	○	○	○	○
Setting interrupt assignment information		○	○	○
6: TOSLINE-F10 assignment information			
Displaying TOSLINE-F10 assignment information	○	○	○	○
Setting TOSLINE-F10 assignment information		○	○	○
7: TOSLINE-S20 assignment information			
Displaying TOSLINE-S20 assignment information	○	○	○	○
Setting TOSLINE-S20 assignment information		○	○	○

(SFT)MON: Program monitor

Program display (normal/zoom)			○	○
Search			○	○
Program edit				○
Force setting				○
Device modification				○
Debug function				○

DATA: Data monitor monitor

Displaying the register/device data	○	○	○	○
Setting the data of a register/device		○	○	○


CMD: Command
0: Password
Changing protection levels
1: Password set
Setting a password
5: Automatic I/O allocation
60: IC card/EEPROM read
61: IC card/EEPROM write
70: Program load (HP->PC)
71: Program read (PC->HP)
72: Program compare (HP=PC)
80: Halt
81: RUN
82: Force RUN
83: Program check
84: Hold
85: Releasing hold
90: memory clear
91: Force clear
92: Event history clear
93: Error reset
95: Buzzer ON/OFF
96: PLC connection type
3 2 1

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