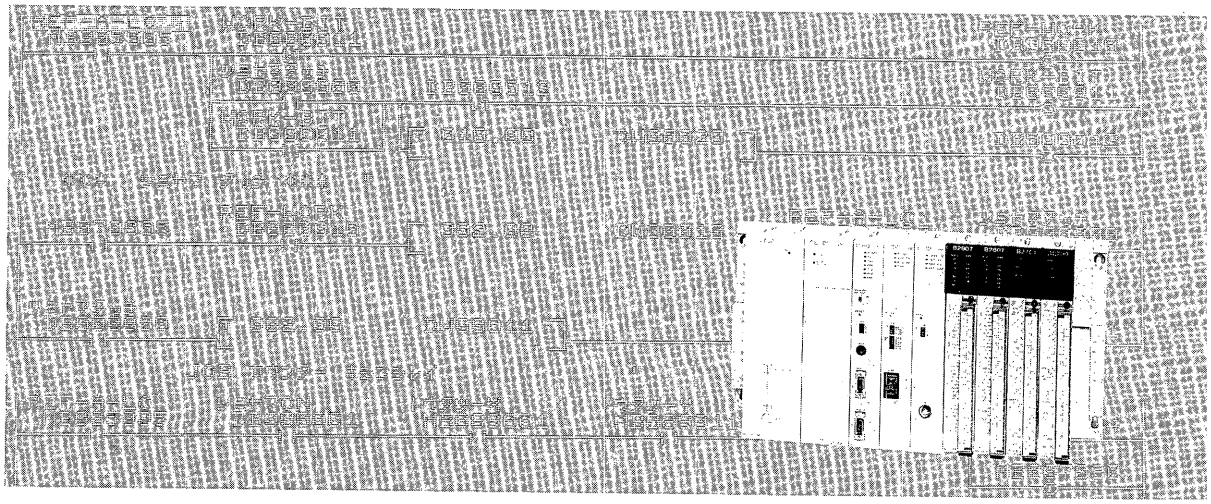
Control Pack CP-3300

SYSTEM CONTROLLER

PROGRAMMING PANEL OPERATOR'S MANUAL

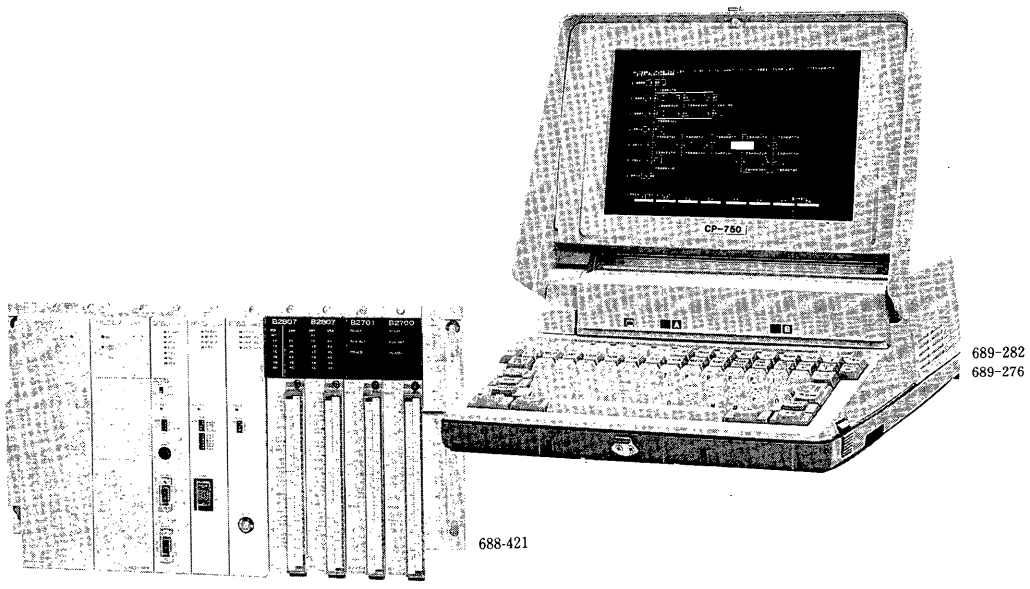


YASKAWA

This operator's manual explains the main functions of the Programming Panel (PP), which is a peripheral device of the System Controller CP-3300 (hereinafter referred to as CP-3300).

This manual is organized as follows:

(1) Sections 1 and 2 explain the programming panel hardware such as programming panel construction, keyboard key layout and connection with the CP-3300 mainframe.
(2) Sections 3 and 4 explain the method for starting the programming panel, and outline the functions.
(3) Section 5 and beyond explain in detail individual screens of the programming panel. The tables given at the end of the manual present lists of messages displayed in each screen.



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Keys shown in this manual

[Fx] (××××) : The function key [Fx] has a function (××××) displayed on a screen.

: Key entries shown in the dotted box can be omitted.

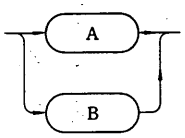
: The command key inside the frame must be depressed repeatedly until desired command is displayed in the function key area of a screen.

Symbols shown in keying operation procedure

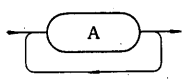
: Indicates successive keying operations and function key operations. Characters enclosed by the frame represent a key name, or a series of operations.

: Indicates that the contents within the frame are represented elsewhere.

: Indicates input of one character.



: Indicates that operation of A or B is performed.



: Indicates that operation of A is repeated.

1. PROGRAMMING PANEL CONFIGURATION

This section explains the hardware specifications of the programming panel, connection with the CP-3300, and the nomenclature of parts of the programming panel.

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1. PROGRAMMING PANEL CONFIGURATION

The CP-750, the programming panel of the CP-3300, is configured with the P150 programming panel as a basic component.

Tables 1.1 and 1.2 show the specifications of the P150.

Table 1.1 General Specifications

Item	Specifications	Disk insertion
Power supply	Single-phase 85 to 123 VAC/195 to 265 VAC (selectable) (47.5 to 63 Hz shared between 50 and 60 Hz)	Inserted
Power consumption	120VA	Inserted
Operating ambient temperature	+ 5 to + 40°C	Not inserted
Storage temperature	−20 to +60°C	Not inserted
Humidity	20 to 80% RH (non-condensing)	Inserted
Environment	There must be no combustible or corrosive gasses, or heavy dust.	Inserted
Grounding	Chassis grounding line must be grounded via a cable with the communication module.	Inserted
Dielectric Strength	1500 VAC, 1 minute	Not inserted
Insulation resistance	50 megohms or more in 500 VDC	Not inserted

Table 1.2 Performance Specifications

Item		Specifications
CPU		iAPX-186, 8MHz
ROM		16k bytes (for bootstrap and hardware diagnosis)
Display screen		Plasma display, orange color, size 144×230mm
Display capacity	Text display	ANK(*):25 lines×80 characters
	Character configuration	ANK(*):8 ×16 dots (25 lines displayed)
	Character attribute	Reversal, blinking, underline, non-display
	Graphic display	400 ×640 dots
Keyboard		94 keys, full keyboard type
Floppy disk drive		Two drives for 3.5" micro-floppy disk (double-side, double density) are incorporated
Serial interface		Conformity to RS-232C ×1, Conformity to RS-232C/422 ×1
Parallel interface		Conformity to Centronics specifications ×1
Composite video signal interface		For external CRT connection ×1
Calendar clock		Backup by battery
OS		MS-DOS Version 2.11
External dimension		121 (H) ×348 (W) ×435 (D) mm
Mass		Approx. 9 kg

* ANK : Generic name of alphanumeric characters, katakana, special characters and symbols

1.1 EXTERNAL VIEW OF PROGRAMMING PANEL

Fig. 2.1 shows the external view of the programming panel.

The programming panel contains a large and easy-to-see plasma display, a keyboard to input commands and data, and two units of 3.5-inch micro floppy disk drives. On the rear of the panel there are connectors for communications with the CP-3300, and for a printer, and other components.

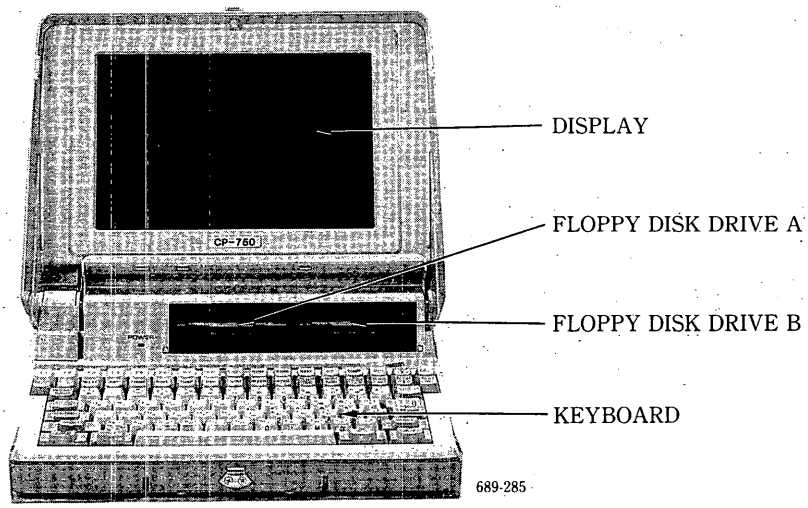
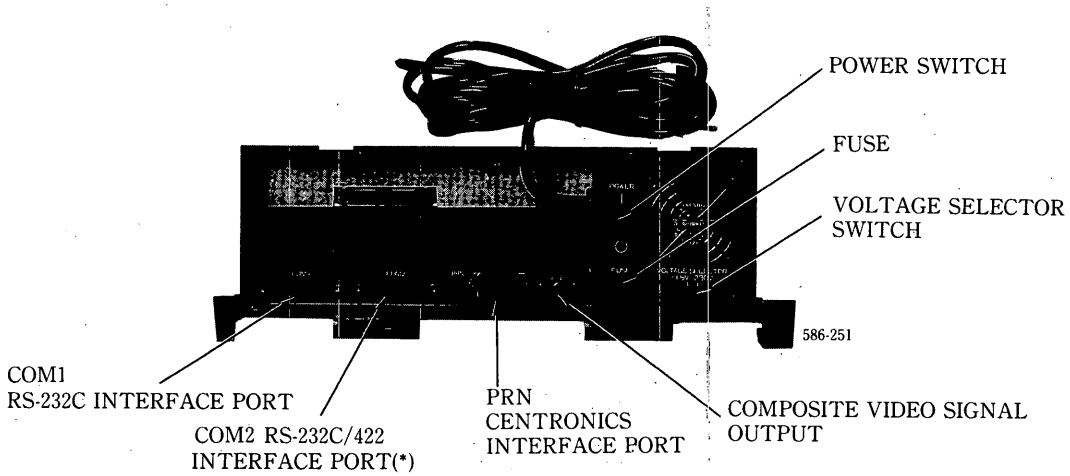


Fig. 1.1 External View of Programming Panel

1.2 REAR OF PANEL

Fig. 1.2 shows the rear of the panel.

Communication with the CP-3300 unit is enabled by connecting the RS-232C interface (COM1).



* NOT USED FOR THE CP-3300 PROGRAMMING PANEL

Fig. 1.2 Rear View of the Programming Panel

1.3 DISPLAY SECTION

As shown in Fig. 1.3, the programming panel displays by dividing the screen into four areas: the title, main display, auxiliary display, and function key.

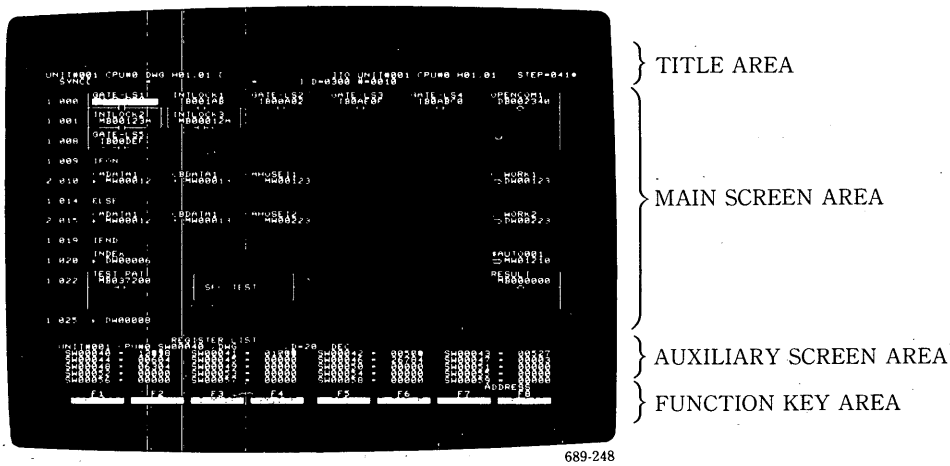


Fig. 1.3 Programming Panel Display

Title Area:
This area displays screen titles. The unit numbers and CPU numbers to be displayed are input. Messages are displayed when a screen is called up, and when operations such as program writing are performed.

Main Screen Area:
This area displays principal items such as programs and definition data. If the auxiliary display described below is not required, the auxiliary display area can also be incorporated with the main display.

Auxiliary Screen Area:
Register data are displayed in the auxiliary display area when the main area is displaying program data. REGLIST (register display), XREF (search for location where reference is made), and DISLIST (disabled coil list) are displayed in this area.

Function Key Area:
Specific meanings of the function keys [F1] to [F8] are displayed in this area.

1.4 CONNECTION WITH CP-3300 UNIT

Fig. 1.4 shows an example of connection between the CP-3300 unit and programming panel.

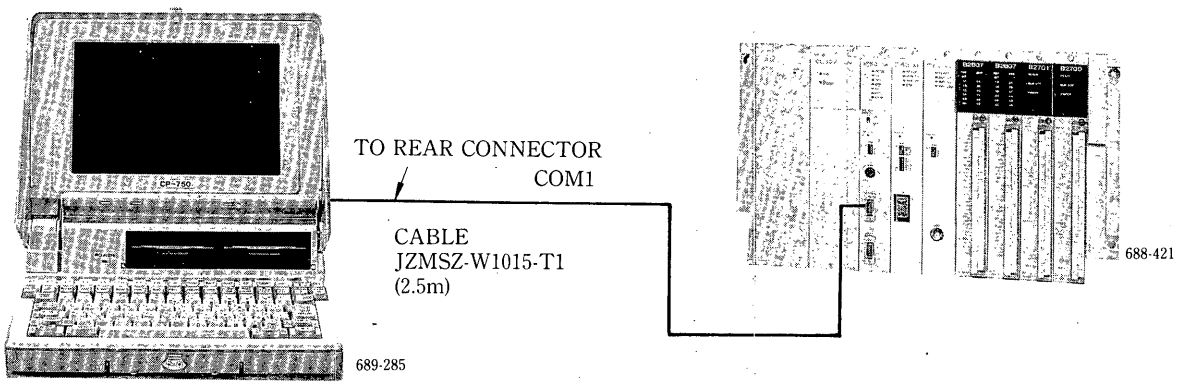


Fig. 1.4 Example of Connection with CP-3300 Unit

Generally, connection between the CP-3300 unit and the programming panel is made via the IOP module.

Communication between the CP-3300 and the programming panel can also be performed via the COMM module (if installed). If the RIOD module is installed, communication between the CP-3300 and the programming panel can be performed via any one of RIOR modules. In other words, the CP-3300 can connect up to three programming panels. However, the IOP and COMM modules permit the programming panel to be connected to only one port.

Note that connection of the programming panel to two ports may cause a malfunction.

2. KEYBOARD

This section explains the keyboard of the programming panel for each usage.

Users should be familiar with the meanings of individual keys to realize full use of the functions of the programming panel.

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2. KEYBOARD

2.1 KEYBOARD LAYOUT

Fig. 2.1 shows the keyboard layout.

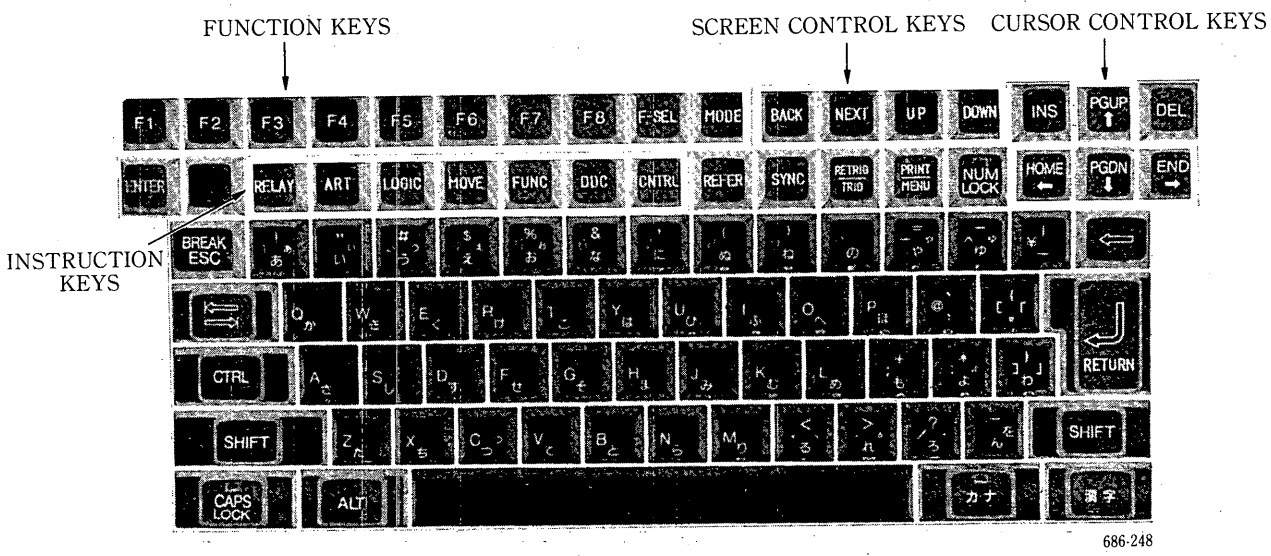

Fig. 2.1 Keyboard Layout

The roles of the keys are explained below.

(1) Function keys

[MODE] : Assigns different meanings to the [F1] to [F8] keys to change the display screen.

[F-SEL] : Allocates the functions specific to the screen being displayed to the F1 to F8 keys.

[F1] to [F8] : Operates in accordance with the meanings of the specific keys given by the [MODE] or [F-SEL] key, or by the instruction keys.

(2) Screen control keys

[BACK] : This key calls back and displays data displayed previously.

[NEXT] : This key traces back the original display moved backward by the [BACK] key. The [BACK] and [NEXT] keys memorize program display and register display screens, but other screens are not memorized.

[UP] : This key scrolls up the screen currently being displayed by one line.

[DOWN] : This key scrolls down the screen currently being displayed by one line.

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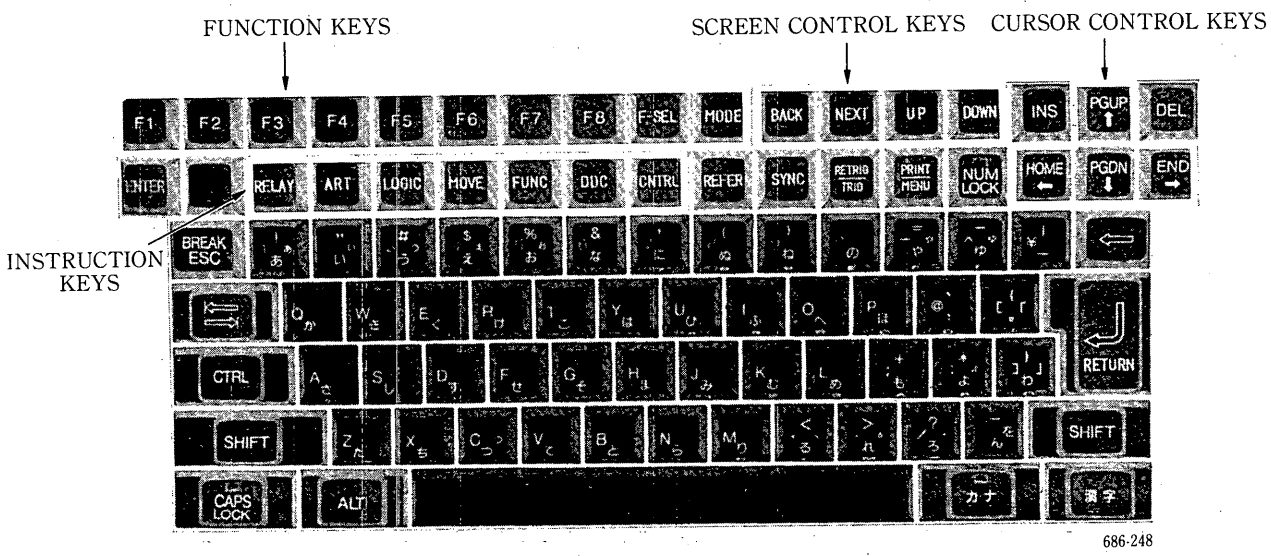

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[UP] : This key scrolls up the screen currently being displayed by one line.

[DOWN] : This key scrolls down the screen currently being displayed by one line.

PGUP ↑ : Depress SHIFT + PGUP ↑ (This mark "+" means herein after referred to depressing the SHIFT and PGUP ↑ simultaneously). This function updates the display per screen and shows screens that follow.

PGDN ↓ : SHIFT + PGDN ↓ The display is updated per screen, and the previous screen is displayed.

(3) Cursor control keys

HOME ←, END →, PGUP ↑, PGDN ↓ : The cursor moves vertically and horizontally.

SHIFT + HOME ← : The cursor moves to its original position on the screen.

ALT + HOME ← : When the auxiliary screen is displayed, the cursor moves from the main screen to the auxiliary screen, or from the auxiliary screen to the main screen. When the system constant screen, DWG/function map screen, or other screens are displayed, the cursor moves to the (UNIT #) position on the first line of the screens.

(4) Instruction keys

The keys provide specific meanings to function keys F1 to F8 when instruction are input during program display.

See Table 2.1 for the correspondence between the instruction and function keys.

(5) Other keys

REFER : This key is used for direct calling up of detailed drawings and expanded drawings referred to by SEE instruction during program display, and for direct calling up of user functions from a drawing referring to them.

SYNC : This key is used to set synchronous conditions for displaying current values during program display.

RETRIG / TRIG : This key is used to direct the CPU to manually stop and start data trace.

PRINT / MENU : Operate SHIFT and PRINT / MENU . When a printer is connected, a program list of DWG numbers and function names currently called is printed.

CTRL + P : A hard copy of the screen currently being displayed is produced.

[CTRL] + [A] : The number of lines displayed is changed during program display. Normally, the number of program display lines is 14 lines per screen when a program is being displayed, howerer, depressing [CTRL] + [A] changes the number of lines per screen to 7 lines. Depressing [CTRL] + [A] again restores 14 lines per screen to the dispiay. When the auxiliary screen is being displayed, the operation [CTRL] + [A] is disregarded. In the display mode of seven lines per screen, the auxiliary screen cannot be displayed.

[PRINT / MENU] : This key is used to return control from a particular screen to the basic menu screen of the programming panel.

[ENTER] : This key is used to write a program and constant data to a selected unit number, CPU number, or floppy disk.

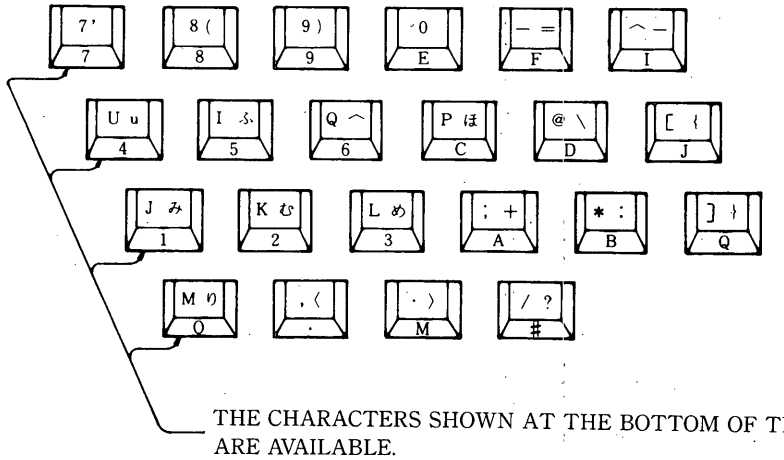
[BREAK / ESC] : This key is used to cancel input data (instructions, and numeric values, etc.)

[⇦] : This key deletes one input character.

[↵ RETURN] : This key terminates the keying.

The position in which data are entered from the keyboard is always indicated by the cursor. The cursor is reversely displayed. Therefore, to input some keys, move the cursor to the desired position with the cursor control keys and input the keys, then terminate the operation with the [↵ RETURN] key.

NUM LOCK : This key can, when depressed, be locked to use the keys shown below as numeric keys and only register type keys.



For example, depressing M key with NUM LOCK key depressed causes the digit 0 to be displayed on the screen.

2.2 KEY INPUT

(1) Input of alphanumeric characters and symbols
Digits, alphabetical letters, and symbols are entered. These keys are used to enter numeric data, symbol names, and definition data names.

Unlock [KANA] key when entering these keys.

Depressing [CAPS LOCK] (capital lock key) locks it and causes all letters subsequently entered to be displayed in uppercase.

Holding down a key for about 0.5 seconds permits the key to be automatically entered repeatedly. This is called auto repeat function.

2.3 INSTRUCTION KEYS AND FUNCTION KEYS

The instruction keys provide specific meanings to the function keys for instruction key operation during creation of user programs. Table 2.1 shows the relationship between instruction keys and function keys.

If the display of a desired meaning is not made when a instruction key is operated, depress the same instruction key again.

Table 2.1 Command Keys and Function Keys

Function key / Instruction key	F1	F2	F3	F4	F5	F6	F7	F8
RELAY	⊣⊢	-/-	↧	↥	_↥	ONDLY	-∫-	—○⊣
	⊣⊢	-/-	↧	↥	_↥	OFFDLY	-⌇-	—○⊣
ART	⊢	+	−	×	÷	MOD	[ ]	⇒
	⊢	++	−−	INC	DEC	REM	[ ]	⇒
	⊢	PARITY	INV	COM	BIN	BCD	[ ]	⇒
LOGIC	⊢	∧	∨	⊕			[ ]	⇒
	⊢	<	≦	=	≠	≧	>	⇒
CNTRL	WHILE	ON	OFF	IFON	IFOFF	ELSE	FOR	END
	SEE	START	FIN	FOUT	IN	OUT	[ ]	FSTART
		COMMENT						END
FUNC	⊢	ABS	SQRT	SIN	COS	TAN	[ ]	⇒
	⊢	LN	LOG	ASIN	ACOS	ATAN	EXP	⇒
	SFC	ABOX	SBOX		ISET-213	COUNTER	TRACE	FINFOUT
	*	*	*	*	*	*	*	*
DDC	⊢	DZ-A	DZ-B	LIMIT	FGN	LAG	[ ]	⇒
	⊢	PI	PD	PID	LLAG	IFGN	LAU	SLAU
	⊢						[ ]	⇒
MOVE	MOVW	MOVB	XCHG	ROTL	ROTR		[ ]	

Note : The asterisk (*) indicates that user-defined function name can be registered. For details, see Par. 5.3.8, "USER FUNCTION DEFINITION SCREEN."

3. POWER ON AND FLOPPY DISK OPERATION

This section explains the method for starting the programming panel and floppy disk operation.

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3. POWER ON AND FLOPPY DISK OPERATION

3.1 POWER ON

Power to the programming panel is turned on as follows:

(1) Turn on the power switch on the rear of the panel. When power is turned on, the programming panel performs self diagnosis and displays the start initialization screen as shown in Fig. 3.1.

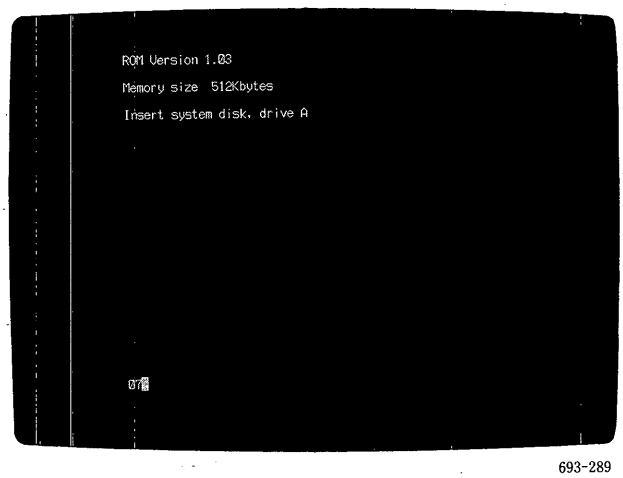

Fig. 3.1 Start Initialization Display

(2) Correctly insert the programming panel system floppy disk (S/N: 87780-0600X) to the drive A of the programming panel.

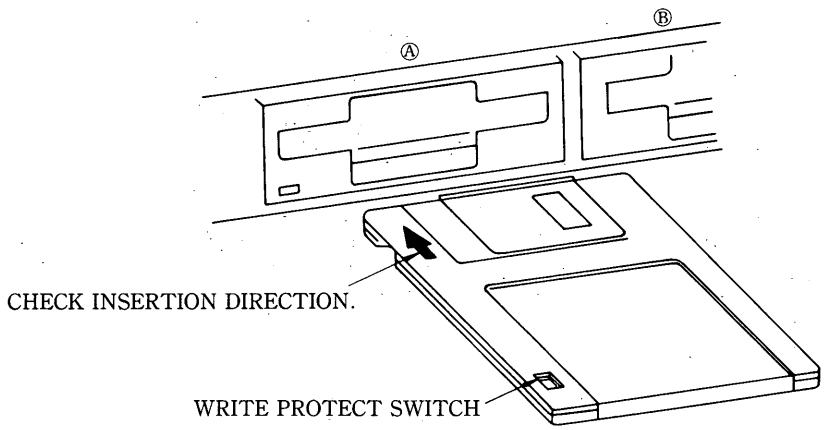

Fig. 3.2 Insertion of Floppy Disk

(3) After inserting a floppy disk, the programming panel reads the system program. In approximately 25 seconds, the screen for selecting the model of the printer to be connected to the programming panel is displayed. Two models of printers —— PC-PR201 series [NEC] and FP-850 [EPSON] printers —— can be connected to the programming panel. PC- PR201 series printers are standard.

Depress the [RETURN] key if the connected printer belongs to PC-PR201 series printers, or the [N] key if it is FP-850. After the version of the programming panel is displayed, the programming panel basic menu screen shown in Fig. 3.3 is displayed.

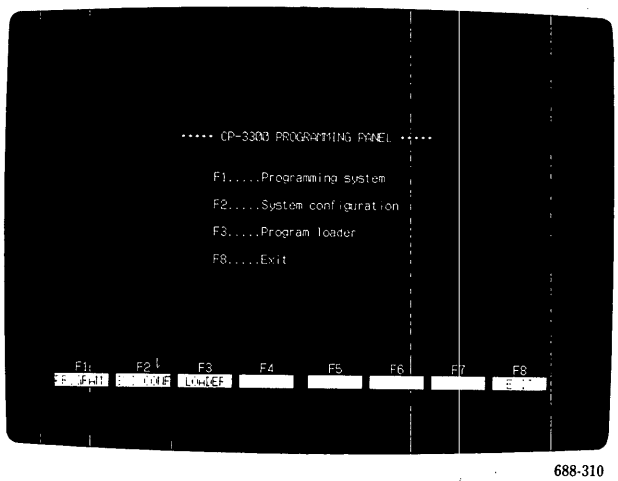

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Fig. 3.3 Programming Panel Basic Menu

Notes:

(1) The system does not operate unless the correct floppy disk is inserted.

(2) Insert or remove the floppy disk after checking that the disk drive operation indicator lamp is not lit.

3.2 FLOPPY DISK OPERATION

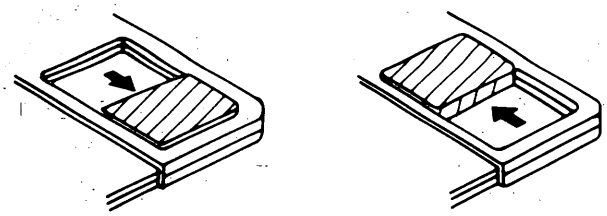
Observe to the following precautions when handling floppy disks.

(1) Insert or remove the floppy disk after checking that the disk drive operation indicator lamp is not lit. The programs and data may be destroyed if a floppy disk is inserted or removed while the operation indicator lamp is lit.

(2) Do not place the floppy disk near any magnetized device (e. g. a magnet, motor, transformer, etc.).

(3) Store disks in disk storage cases avoiding direct sunlight or heat.

(4) To prevent important programs being deleted, set a write protect switch to write disable position Ⓐ.



Ⓐ Write Disable Ⓑ Write Enable

Fig. 3.4 Write Protect Switch

4. PROGRAMMING PANEL FUNCTION SELECTION

This section outlines the functions of the programming panel, the programming system, data definition, and program loader for each display screen.

Individual functions are explained in section 6 and beyond.

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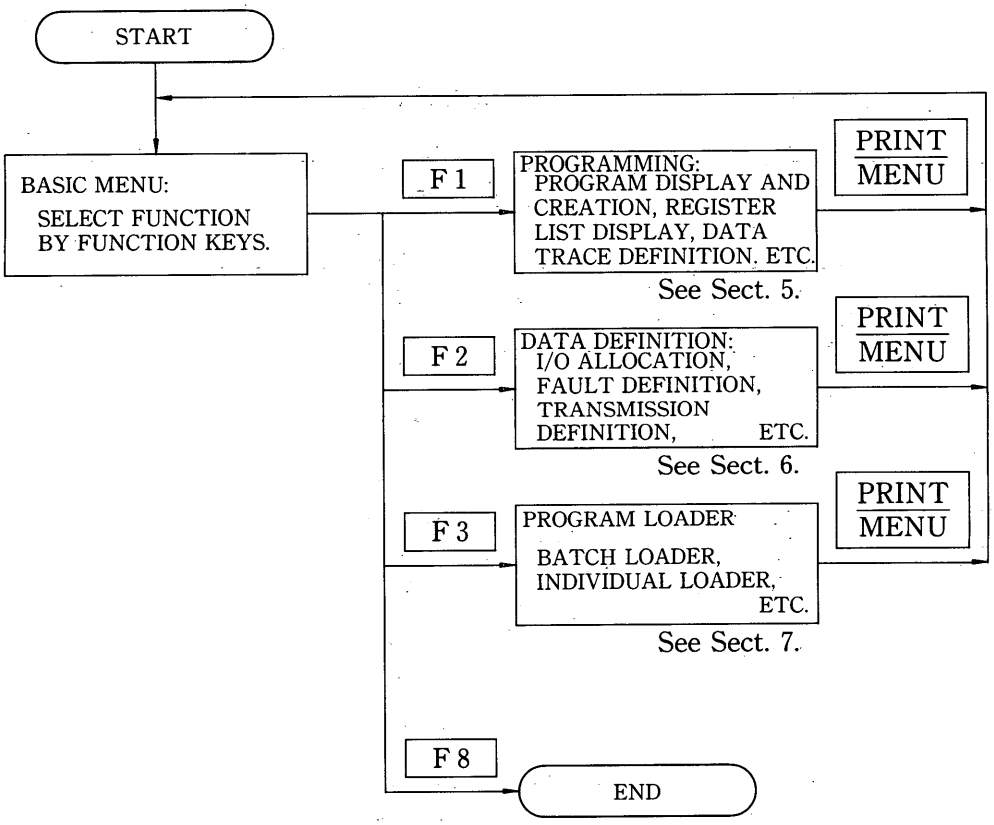
4. PROGRAMMING PANEL FUNCTION SELECTION

After turning on power to the programming panel, the programming panel basic menu as shown in Fig. 3.3 is displayed. Select the programming panel functions from this basic menu screen.



4.1 PROGRAMMING PANEL FUNCTIONS

(1) Programming

The CP-3300 programming system is selected by operating the [F1] key on the basic menu screen.

The programming system includes the creation and/or alteration of CP-3300 user programs, monitoring of user program execution status, and system tuning function.

Table 4.1 Functions of Programming System

Function key indication	Outline of function
SYSTEM	Sets CP -3300 processing scan time and displays processing time. Describes user program revision history and comments.
PROG MAP	Displays the use status of DWG and functions. Disables DWG and functions.
PROGRAM	Creates and/or alters CP-3300 user programs, and displays user program execution status at the same time as program display.
REG LIST	Displays registers. Up to eight different register ranges can be displayed on the main screen.
I/O TRACE	Displays data traced by different types of motor control units connected via CP-213 transmission.
TRACE	Makes data trace definitions in group unit (up to two groups) and displays traced data with numeric values or graphs.
DIS LEST	Searches for the location in which a disabled coil is used, displays DWG numbers and relay numbers.
CROSS	Searches for the locations where relay numbers and register numbers are referenced and used, and displays DWG numbers, step numbers, and instructions used.

(2) Data definition

The functions on CP-3300 data definition are selected by operating the F2 key on the basic menu screen. The data definition includes the functions on system configuration such as CP-3300 system I/O allocation and communication ports.

Table 4.2 Data Definition Functions

Function key indication	Outline of function
I/O MAP	Allocates CP-3300 process I/O. (Allocations of LOCAL, REMOTE, CP-213IF, and FA BUS II are included.)
I/O CONST	Sets and displays data necessary for different types of motor control units connected via CP-213 transmission.
TRANSDEF	Sets transmission parameters of serial transmission modules by the IOP or COMM.
FAULT	Defines and traces fault data.

(3) Program loader

The program loader functions are selected by operating the F3 key on the basic menu screen.

Table 4.3 outlines the program loader functions.

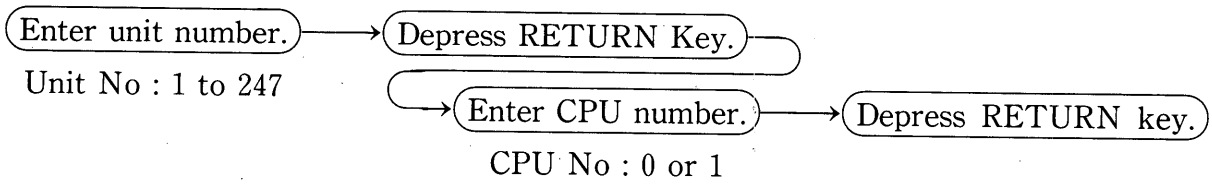
Table 4.3 Program Loader Functions

Funciton key indication	Outline of function
ALL	All user programs and data definitions of specified unit and CPU No. are subject to the loader.
INDIVID	Specified user program and data definition of specified unit and CPU No. are subject to the loader.

4.2 SETTING OF UNIT NUMBER AND CPU NUMBER

To display user programs and register lists, it is necessary to set the CPU number to be displayed.

The setting of a CPU number begins with input of a unit number and proceeds as follows:



(i) Unit numbers from 1 to 247 indicate the CP-3300, and a unit number A or B indicates a floppy disk.

(ii) A CPU number is specified as 0 or 1. A unit number and a CPU number are usually displayed on the first line of a screen.

In explanation in Section 5 and beyond, input of UNIT number and CPU number will be shown as (UNIT # CPU #).

5. PROGRAMMING SYSTEM

This section explains in detail the following major functions of the programming panel, including user program creation and editing, and monitoring of operating state, etc.

(1) System definition
(2) DWG and function program map display
(3) Program display and creation
(4) Register list display
(5) Trace back display
(6) Reference destination search and coil disable list

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5. PROGRAMMING SYSTEM

The programming functions such as CP-3300 system user program display and register list display are selected by operating the F1 key on the basic menu screen, and the programming system initial screen in Fig. 5.1 (a) is displayed.

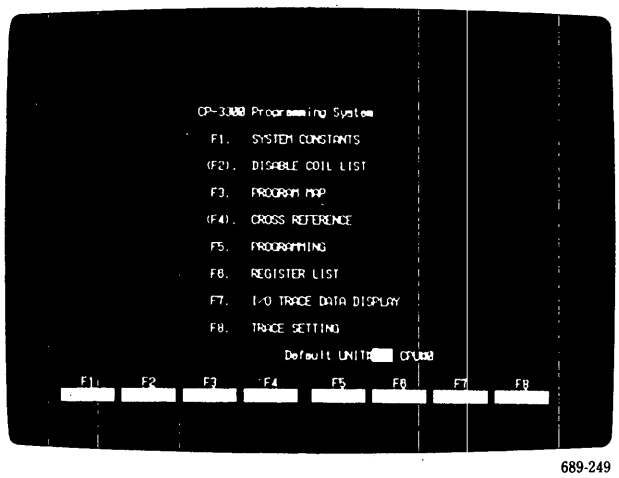


Fig. 5.1 (a) Programming System Initial Screen

When the programming system initial screen is displayed, the cursor lights in:

Default UNIT # [001] : CPU # 0

The unit number and CPU number entered here determine the unit and CPU numbers used by the programming panel in all subsequent operations. As a result, for data updating by the same unit number and CPU number, they may be omitted in subsequent screens if they are specified in the initial screen. Of course, different unit and CPU numbers can be specified in individual screens.

The unit number and CPU number have the initial values of 1 and 0, respectively. If the unit number and CPU number to be used have the initial values, you have only to operate the function keys to transfer to any desired screen.

The programming system initial screen is displayed with the function key section displayed as follows:

SYSTEM		PROG MAP		PROGRAM	REG LIST	IO TRACE	TRACE

Fig. 5.1 (b)

Operating the [MODE] key causes the function key section to be displayed as shown in Fig. 5.1 (c). Operate the [MODE] key depending on the screen displayed.

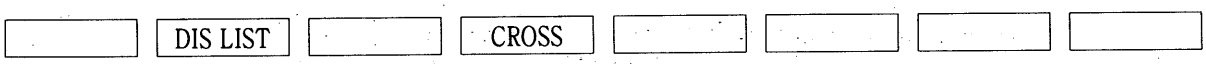


Fig. 5.1 (c)

5.1 SYSTEM CONSTANTS

You can set the scanning time of high-speed and low-speed drawings and display the current execution time (execution processing time) of individual processing drawings.

The creation date and revision history of user programs, and other information can also be entered.

5.1.1 Calling of System Constant Screen and Data Setting

Call the system constant screen according to the following procedure:

a. Screen selection key [MODE]

b. Function key [F1] (SYSTEM)

The parentheses enclose characters is displayed in the function key section.

The system constant screen is displayed. Each scan time can be set even if the CP-3300 is online. Next, enter the setting value of high-speed scan time in ms in the range of 3 to 300 ms. To set the high-speed scan time in Fig. 5.2 to 5 ms, move the cursor to the position of setting a high-speed scan time.

c. Enter numeric key [5] and [RETURN]. The [RETURN] key determines the input. Be sure to depress the [RETURN] after entering a setting value. If a numeric value is entered mistakenly, the entry can be canceled with the [BREAK ESC] key at any time before the [RETURN] is depressed.

Entering [RETURN] key moves the cursor to the position of the maximum value of high-speed scan time.

d. The following operation can reset the maximum value of high-speed scan time:

Numeric key [0]

[RETURN]

e. Next, enter the setting value of low-speed scan time in ms in the range of 3 to 300 ms. To set the low-speed scan time in Fig. 5.2 to 100 ms, enter numeric keys [1], [0], and [0], and [RETURN] in this order.

f. Next, reset the maximum value of low-speed scan time. Enter a numeric key [0] and [RETURN].

g. Next, enter a comment.

Depressing [RETURN] moves the cursor to the creation date field.

h. To enter the date in Fig. 5.2, enter numeric keys [9], [0], [-], [0], [1], [-], [0], and [5], and [RETURN].

i. The setting values are written to the CP-3300 by the [ENTER] key.

Processing scan setting values, reset maximum values, and comments can be written at the same time to the CP-3300 by the ENTER key. The CP-3300 operates with the values before alteration until the writing is performed by the [ENTER] key.

If the writing is performed successfully by the [ENTER] key, "Completed" is displayed in the message area. Any message other than "Completed" indicates an error in the writing. Refer to Table A4 in APPENDIX to remove the error, and perform writing again.

Useful Key Operation

The cursor can be moved to the unit number (UNIT #) field on the first line of the screen by [ALT] + [HOME ←] keys.

To change the unit number and CPU number, operate [ALT] + [HOME ←] keys, then enter a unit number and a CPU number.

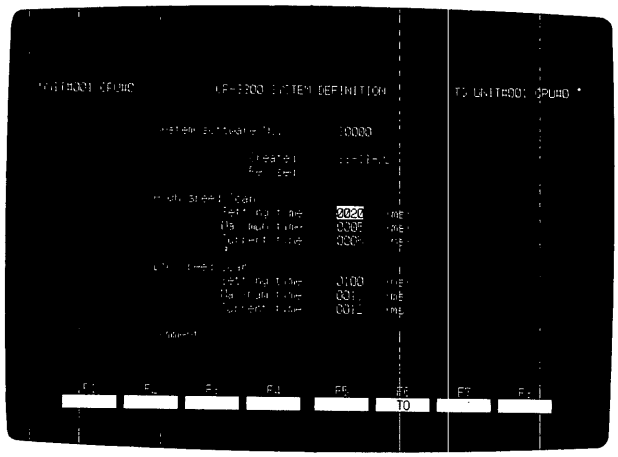


Fig. 5.2 System Constant Screen

5.2 DWG/FUNCTION MAP

The DWG/function map, displays the use status of each processing drawing (startup, interrupt, high-speed, low-speed, and batches), and user functions, and disables or enables drawings and user functions.

5.2.1 Calling up DWG/Function Map Display

Call up the DWG/function map display according to the following procedure:

a. Screen selection key [MODE]

b. Function key [F3] (PROG MAP)

Fig. 5.3 shows the DWG/function map call up screen.

When the DWG/function map display is called up, the function key display section is displayed as follows:

[ACT] [INT] [HIGH] [LOW] [BATCH] [FUNC] [DISABLE] [ENABLE]

These function keys are used to determine the type of map to be displayed, and disable drawings and user functions and free the disabled state.

Table 5.2 explains the function keys.

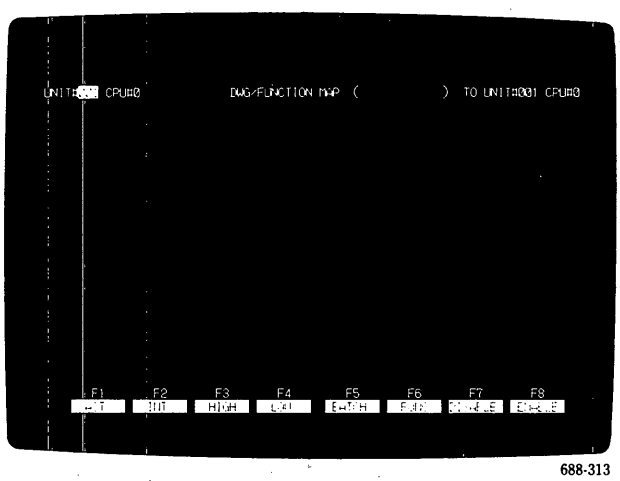
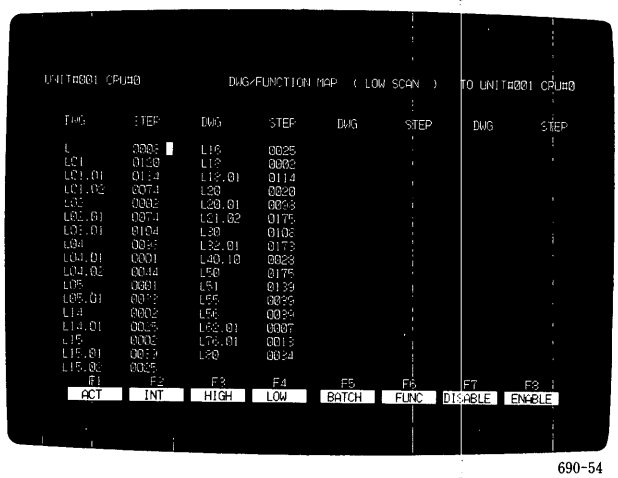


Fig. 5.3 DWG/Function Map Call Up Screen

For DWG function map display of low-speed scan with both unit number and CPU number set to 1, perform the following operation:

When UNIT # has not been set to 1 in the DWG/function map call screen in Fig. 5.3, enter numeric keys [0] [0] [1] RETURN (determination of UNIT #) and [0] [RETURN] (determination of CPU #), then depress the function key [F4] (LOW).

A DWG map of low-speed scan is displayed as shown in Fig. 5.4.

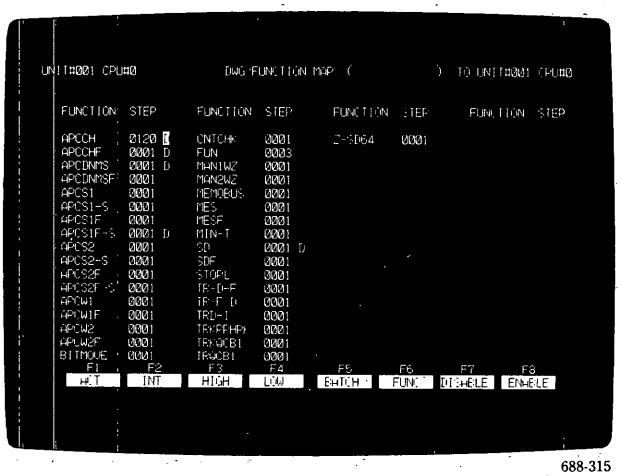


690-54

Fig. 5.4 Example of DWG/Function Map Display

Without changing the unit number and CPU number currently being displayed, other processing drawing or user function map is displayed by selecting the type of desired drawing with the function keys.

For example, to display a user function map without changing UNIT# 1 and CPU# 0 in Fig. 5.4, operate function key [F1] (FUNC), and the user function map in Fig. 5.5 will be displayed.



688-315

Fig. 5.5 Example of User Function Map

STEP of 0000 in the DWG/function map display indicates that the relevant drawings or functions are not created yet which are referred to by SEE instruction or user function reference instructions from upper-level drawings (basic drawing, detailed drawings or drawings in which the functions are referred to, in the case of user functions).

Useful Key Operation

The cursor can be moved to the unit number (UNIT#) position on the first line of the screen by [ALT] + [HOME ←] keys.

To change the unit number and CPU number, operate [ALT] + [HOME ←] keys, then enter a unit number and a CPU number and select a desired drawing by the function keys.

5.2.2 Disabling DWG/Functions

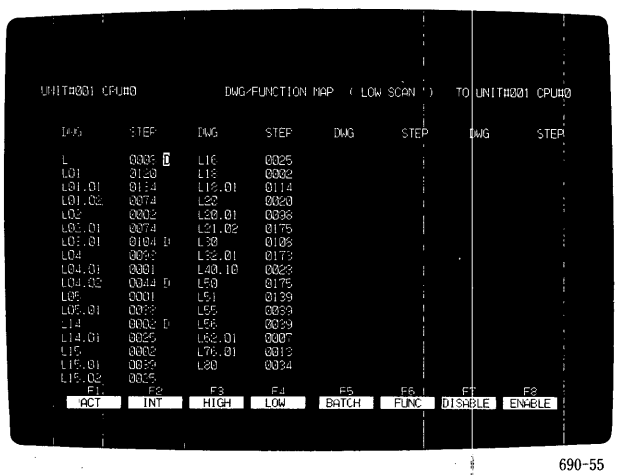
Disabled drawings or functions are not executed. That is, when a SEE instruction or function reference referring to the drawings is encountered, actual reference is bypassed and controls go to the next step. Drawings and functions are disabled and freed from the disabled state, as explained below.

Using Fig. 5.4 as an example, DWG L is disabled.

a. Move the cursor to the L position with the cursor control keys.

b. Operate the function key [F7] (DISABLE); "D" is displayed within the cursor, as shown in Fig. 5.6.

c. Operate [RETURN] key. When [RETURN] is depressed, write is made to the unit number and CPU number (UNIT# 1 and CPU# 1 in the example in Fig. 5.6) subject to DWG L04 disable specification, and if the writing is performed successfully, "Completed" is displayed.



690-55

Fig. 5.6 Example of DWG Disable

Table 5. 2 Function Keys in DWG/Function Map Display

Key	Function key display	Explanation
F1	ACT	Selects DWG map display of startup processing drawing.
F2	INT	Selects DWG map display of interrupt processing drawing.
F3	HIGH	Selects DWG map display of high-speed scan drawing.
F4	LOW	Selects DWG map display of low-speed scan drawing.
F5	BATCH	Selects DWG map display of batch prosessing drawing.
F6	FUNC	Selects user function map display.
F7	DISABLE	Disables DWG and function in cursor position.
F8	ENABLE	Frees DWG and function in cursor position from the dissabled state.

Note : The meanings of function keys are provided by the F-SEL key.

5.3 DWG/FUNCTION PROGRAM DISPLAY

This section explains the display and creation of user programs (drawings, functions), which are basic elements of the CP-3300 system. For the operation of each instruction appearing in the explanation, refer to "Control Pack CP-3300 Designer's Manual" (SIE-C873-20.2).

5.3.1 Calling up DWG/Function Program Display

Call up the DWG/function display screen according to the following procedure:

a. Screen selection key [MODE]

b. Function key [F3] (PROGRAM)

Fig. 5.7 shows the screen after executing the above procedures.

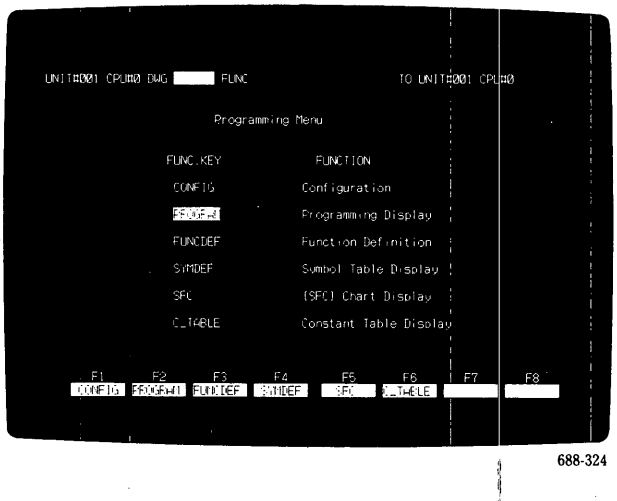


Fig. 5.7 DWG/Function Program Display Selection Screen

When the DWG/function program display is made, if unit number specification is CPU (1-247) until key entry is accepted after the program display menu screen in Fig. 5.7 is displayed, several seconds may be required in the following cases, since the user function definition data file is read from the CPU of the specified unit number:

(i) The first time that the DWG/function program is called up after the programming system is selected from the programming panel basic menu in Fig. 3.3 with the F1 key

(ii) When the DWG/function program is called up after a user function definition is added or created and written to the CPU of specified unit number

(iii) When the DWG/function program is called up after a user function program is created or altered, and written to a specified unit number

(iv) When a unit number is specified, this time is different from a unit number previously specified

When one programming panel is used in more than one CP-3300 system, if the programming panel is connected one-to-one with each CP-3300 to create and/or alter CP-3300 user programs, assign different unit numbers to the individual CP-3300s.

If the same unit number is assigned to different CP- 3300s, the programming panel reads the function definition data file from the CP-3300 of a specified unit number only once during DWG/function program display. Therefore, if function definitions are different among the CP-3300s, the functions used in programs may not be displayed.

If this state occurs erroneously, make the program display again from a floppy disk (specify unit number A or B), alter the unit number again, and read the function definition data file from the CPU.

5.3.2 Types of program displays

The call up screen in Fig. 5.7 is used to select the DWG/function program display and is shifted to a specified DWG/function program display screen with the function keys. Table 5.3 shows the meanings of program displays.

Table 5. 3 Meanings of Program Displays

Key	Function key display	Meaning	DWG	Function
F1	CONFIG	Displays DWG / function program configurations (# register size, etc.)	○	○
F2	RROGRAM	Displays DWG/function programs.	○	○
F3	FUNCDEF	Defines and refers to user functions.	○	○
F4	SYMDEF	Defines and alters symbols, and automatically numbers symbols.	○	○
F5	SFC	Displays SFC charts, and displays and creates action box and output bit charts.	○	–
F6	C-TABLE	Creates and dicplays constant tables (# register) specific to DWG.	○	–

When the DWG/function program display is called up, the PROGRAM position of FUNC.KEY is reversely displayed. The programming panel shifts to the program display screen by operating [RETURN] key after a DWG number or function name is entered.

To select the screen to be displayed from the program display selection screen in Fig. 5.7

a. Operate the function keys directly.

b. Move the cursor to the desired item within FUNC.KEY with the [↑] and [↓] keys.

These operations cause a shift to a specified display screen after a DWG number or function name is entered.

On the program display selection screen, to alter the unit number and CPU number to be displayed, use the cursor control key [←].

Fig. 5.8 shows the keying operation procedure from the calling up of the DWG/function program display to a specified program display screen.

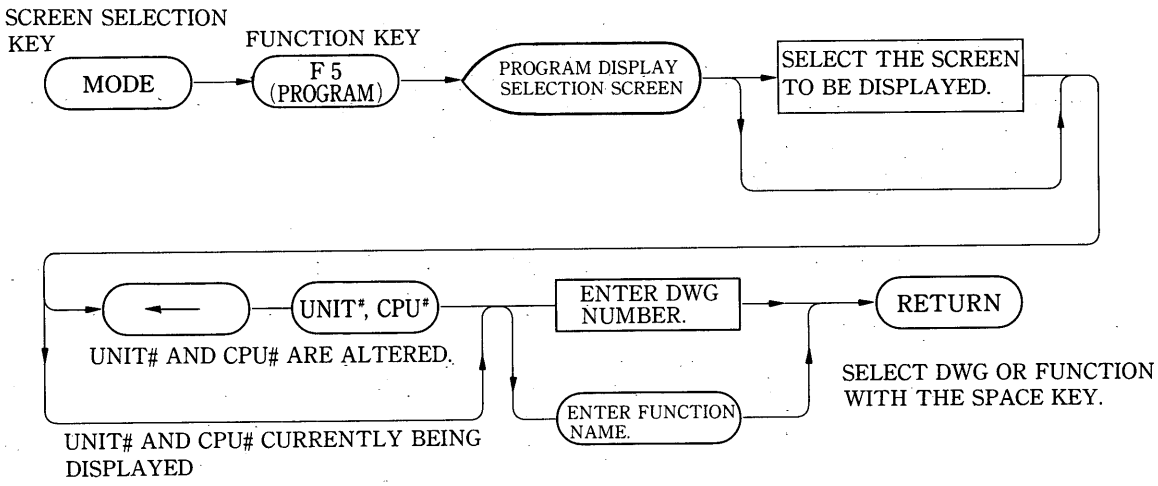


Fig. 5.8 Keying Operation Procedure (2-1)

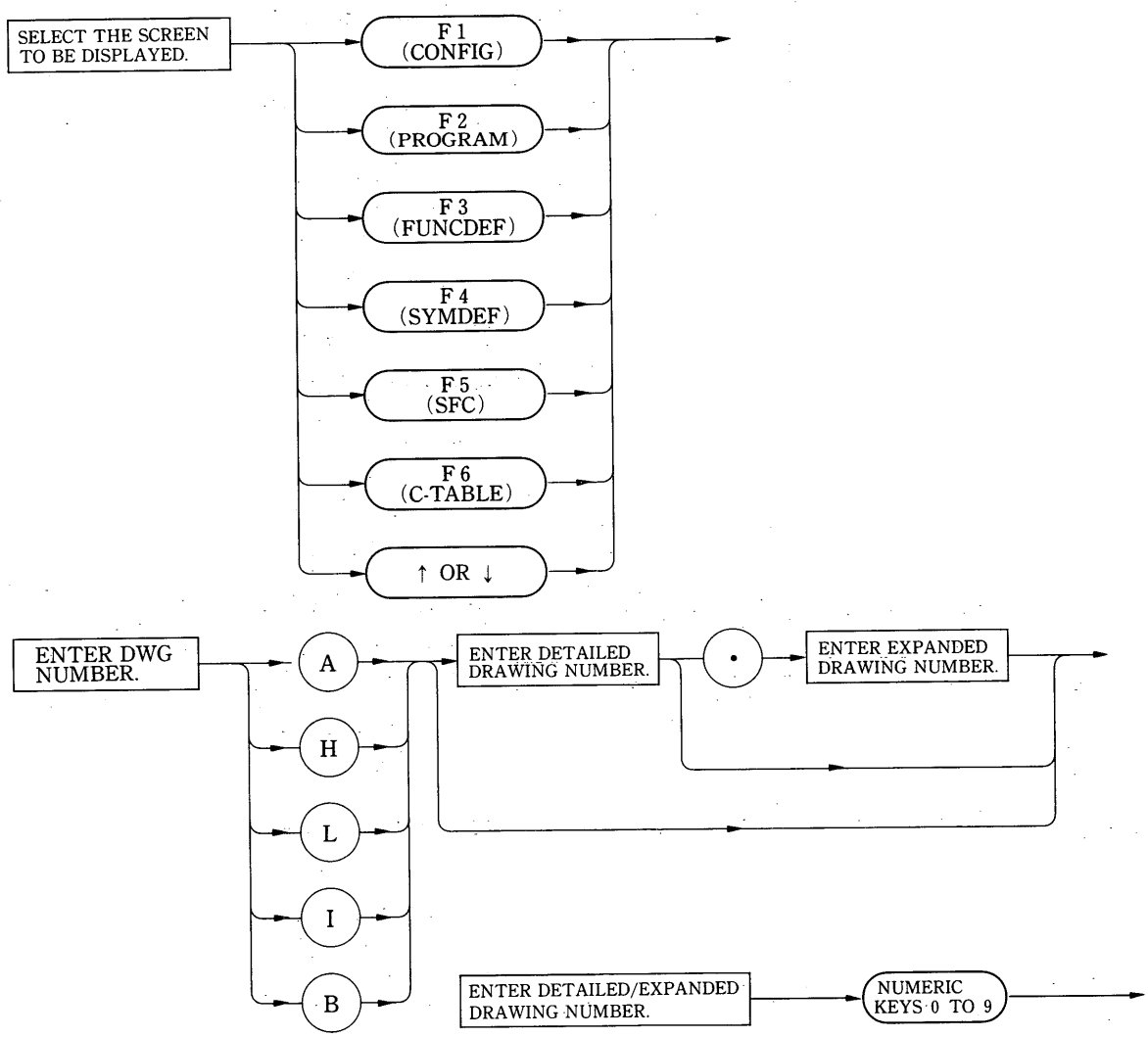


Fig. 5.8 Keying Operation Procedure (2-2)

Using Fig. 5.7 as an example of the screen for calling up the DWG/function program display, an example of keying operations for obtaining the program display in Fig. 5.9 (b) is shown below.

a. Screen selection key [MODE]

b. Function key [F5] (PROGRAM) : Fig. 5.7 is displayed.

c. Cursor control key [HOME ←] : The cursor lights in the UNIT # position.

d. Alphanumeric key [B] [RETURN] : The floppy drive B side is selected.

e. Alphanumeric symbol key [H] [0] [1] [RETURN]

Indicates that H01 of high-speed processing drawing is displayed.

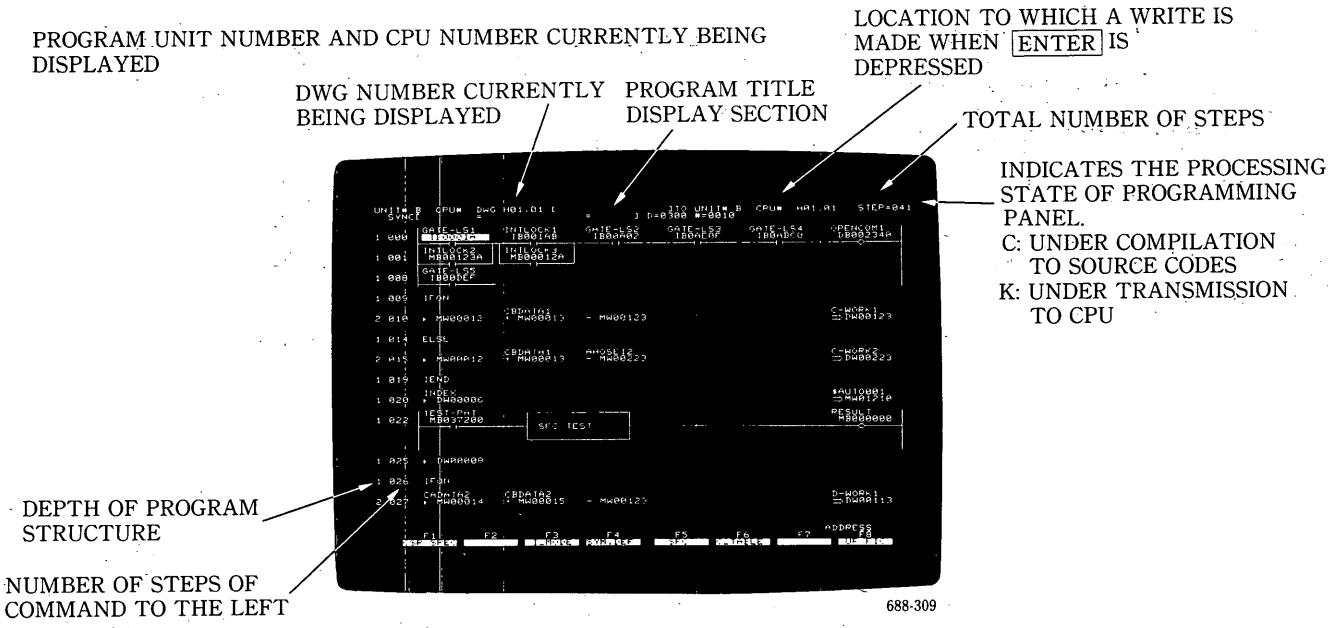


Fig. 5.9 (a) Explanation of Program Display

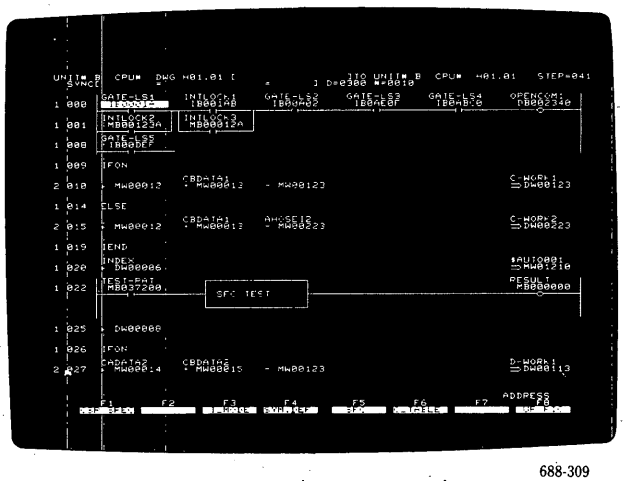


Fig. 5.9 (b) Example of Program Display

5.3.3 DWG/Function Program Configuration Screen

Select CONFIG from the DWG/function program display call up screen in Fig. 5.7 with [F1] (CONFIG) key or [PGUP ↑] and [PGDN ↓] keys, then enter a DWG number or function name, and the DWG/function program configuration screen in Fig. 5.10 will be displayed.

The following items can be specified on the DWG program configuration screen (see Fig. 5.10):

- D register size
- # register size
- SFC output bit width
- DWG title

Function titles can be specified on the function program configuration screen (see Fig. 5.10).

The items specified on the program configuration screen have the following meanings:

(1) D register size
Specify the range of D register that can be used in the user program currently called up. If this item is not specified, the programming panel sets 32 as the initial value. The values of D register that can be used in user programs are:
Integer type DW00000 to DW00031
Real type DF00000 to DF00030
Bit type DB000000 to DB00031F
When exceeded these values are used, be sure to specify D register size.

(2) # register size
When the user program currently called up uses a constant table, specify the size of the # register.

register size is assigned 0 as the initial value by the programming panel. # register cannot be referred to during program creation without specifying its size.

Specification of D register and # register size results merely in allocation of area. When they are referred to by subscript register during program execution, user programs must be designed so that a specified area is not exceeded.

(3) SFC output bit width
When SFC functions are used for programming, the output bit width for steps of each SFC can be specified up to 64 bits in 16-bit increments.

When an output bit width is 0, the operation of SFC functions is not adversely affected, except that the SFC output bit time chart described later is not displayed.

(4) Program title
A title of up to 20 characters can be assigned to user programs and user-defined functions. A title entered here is displayed in the title display section when the program display is made.

These items must be specified on the program configuration screen before a user program is created newly. The items (1) to (4) can be altered at any time during program creation.

When the program configuration screen is displayed, depress F8 (UP PIC) key to return from the program display (Fig. 5.9) to the program display selection screen (Fig. 5.7).

5.3.4 Creating DWG/Function Programs

This section explains the creation of a user program when no user program is written at all.

Before creating a program, determine the register sizes explained in Par. 5.3.3. For creation of a user-defined function program, define the I/O of the function on the user function definition screen described later. This section explains an example of the creation of DWG L01.

[Example of program creation]
Intended unit number and CPU number: UNIT# =1, CPU# =0
Drawing to be created: L01
Number of DWG internal variables (D): 128
Number of DWG internal variables (#): 32
SFC output bit width: 16
Perform keying operations as follows:

a. Screen selection key [MODE]

b. Function key [F5] (PROGRAM) : The DWG/function program selection screen (Fig. 5.7) is displayed.

c. Function key [F1] (CONFIG) or [↑] : The CONFIG is displayed in reverse color.

If UNIT#1 and CPU#0 are selected, the next ⓓ and ⓔ operations can be omitted.

d. [←] : The cursor moves to the UNIT# position.

e. Numeric key [1] [RETURN] : UNIT#1 is entered.

Numeric key [0] [RETURN] : CPU#0 is entered.

f. [L] [0] [1] [RETURN] : The program configuration screen (Fig. 5.10) is displayed.

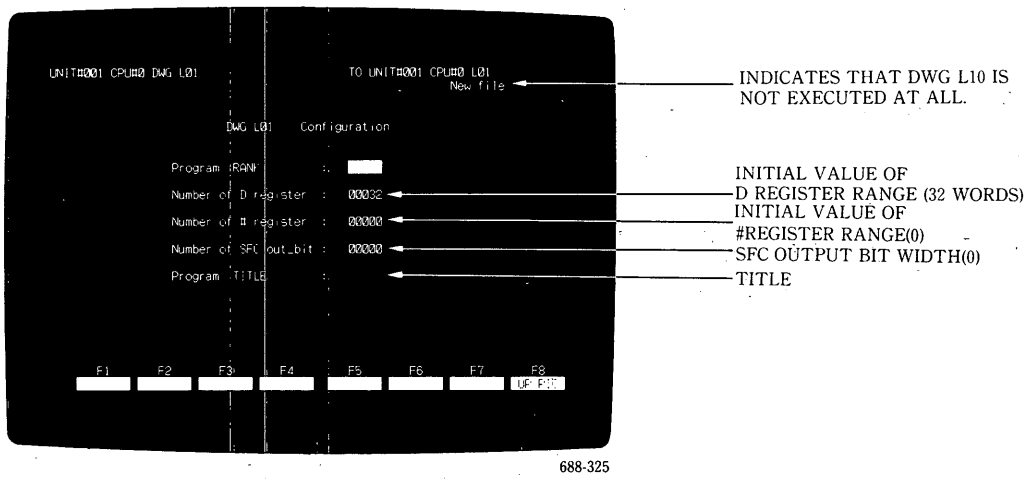


Fig. 5.10 Program Configuration Screen

g. Move the cursor to the # register range setting position by using [↓] key.

h. [1] [2] [8] [RETURN] : Setting of D register number

i. [0] [3] [2] [RETURN] : Setting of # register range

[0] [1] [6] [RETURN] : Setting of SFC output bit width

As a result of the above operations, the program configuration screen (Fig. 5.11) is displayed.

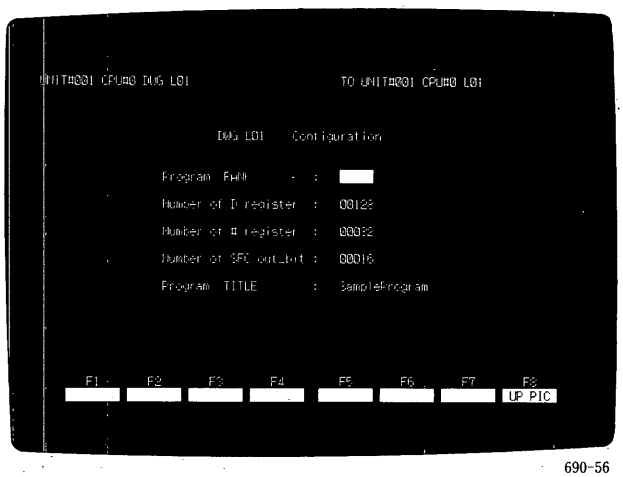


Fig. 5.11 Program Configuration Screen (After Setting)

j. Function key [F8] (UP PIC) : The screen display returns to the program display selection screen.

k. Function key [F2] (PROGRAM) or [↓] : The PROGRAM is displayed in reverse color.

l. [RETURN] : Fig. 5.12 is displayed.

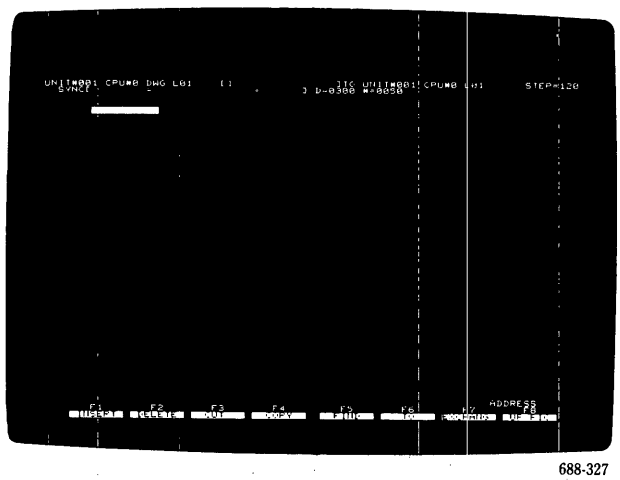


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Fig. 5.12 Program Display (When No Program Is Created)

In this way, preparations for creating new user programs are completed. If alteration to the initial values of register ranges is not required, the program display in Fig. 5.12 can be made by the keying operations d to f for creating DWG/function program in Par. 5.3.4.

When the program display screen appears the function key display section is displayed as shown below.

(a)

CSR SPEC		I-MODE	SYM. DEF	SFC	C-TABLE		UP PIC

Depress [F-SEL] key.

(b)

INSERT	DELETE	CUT	COPY	FIND	TO	EXCHANGE	UP PIC

Depress [F-SEL] key once more.

(c)

DIS. ON	DIS. OFF	ENABLE			HOLD	ER TRACE	UP PIC

Depressing the F-SEL key again causes the display of (a) to appear in the function key display section. Table 5.4 explains the meaning of the function key display section in (a). The function key display sections in (b) is explained in par. 5.3.5 and (c) is explained in pars. 5.3.12 and 5.3.13.

Table 5. 4 Meanings of Function Key Display Section

Key	Function key display	Meaning
F1	CSR SPEC	Moves the cursor to any position.
F2		Free
F3	I-MODE	Switches operand input specification among (1) ADDRESS (direct input of relay number and register number), (2) SYMBOL (symbol input), and (3) SYMADR (symbol input → address direct input).
F4	SYM. DEF	Displays the symbol definition screen.
F5	SFC	Makes SFC programming display.
F6	C-TABLE	Displays definition table.
F7		Free
F8	UP PIC	Returns to the program display selection screen.

(1) Entering relay number, register number, and symbol

Before proceeding to program creation, this paragraph explains the display configuration of one element of each command, which consists of three lines, as shown in Fig. 5.13.

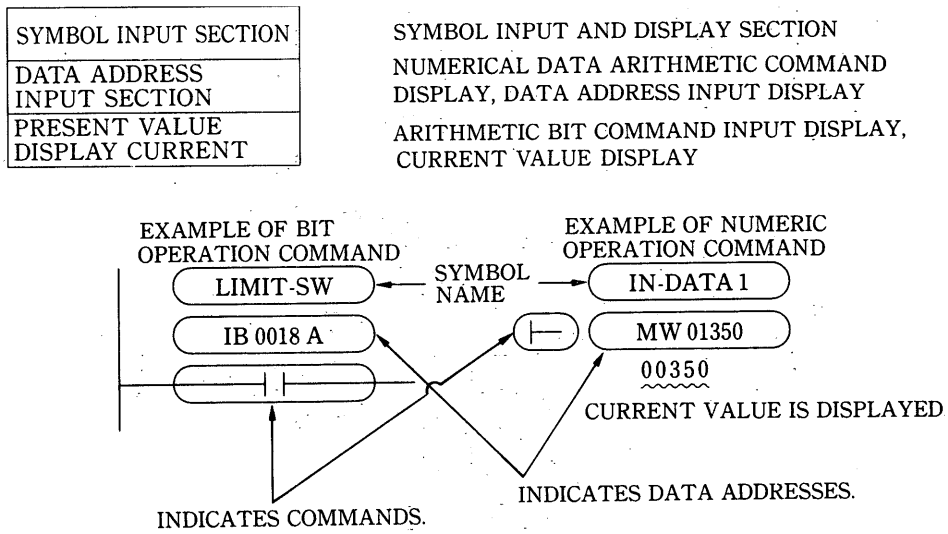


Fig. 5.13

The [F3] (I-MODE) key in Table 5.4 selects whether operands of individual commands are entered by data addresses (relay number, register number) or symbol names. When the program display is called from the MODE screen selection key, data address input is assumed initially.

This mode is identified by ADDRESS displayed on the lower right portion of the screen. In this input mode, the cursor always moves to the data address input field in Fig. 5.13.

Operating the function key [F3] (I-MODE) causes SYMBOL to be displayed at the lower right portion of the screen and the cursor moves to the symbol input field in Fig. 5.13. All subsequent inputs are treated as symbol names.

Operating function key [F3] (I-MODE) again causes SYMADR to be displayed at the lower right portion of the screen and the cursor moves to the symbol input field in Fig. 5.13. Input made here is treated as a symbol name. Operating the [RETURN] key causes the cursor to move to the data address input field, permitting definition of the data address of the symbol name entered previously.

(2) Handling of symbol names

CP-3300 user programs can be created using symbols.

Symbol names have the following limitations:

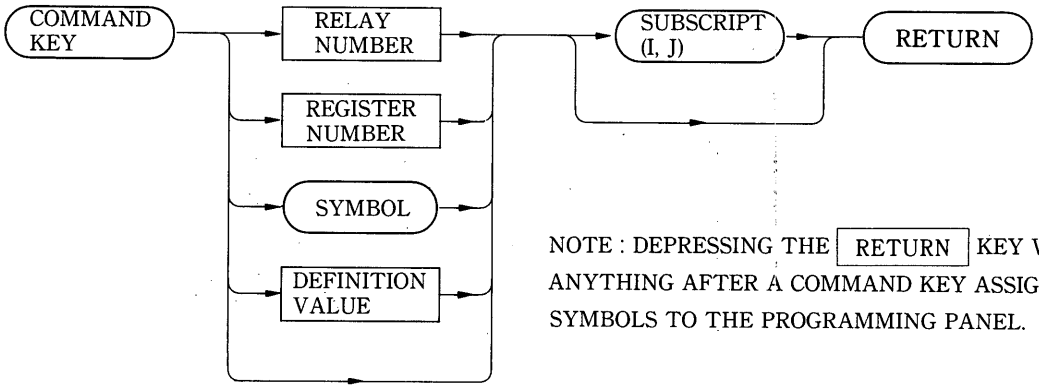
- A symbol name must be eight characters or less.
- A symbol name must be a string of alphanumeric characters beginning with an alphabetic character (A to Z) or a symbol.

Some symbols are automatically assigned by the programming panel. These are called automatic symbols. Automatic symbols assigned by the programming panel have the following format:
$AUTOXXX (XXX is a numeric value beginning with 001)

A write to the CPU cannot be performed when automatic symbols remain on the screen. In this case, before writing to the CPU, number the automatic symbols on the symbol definition screen by the user, or perform automatic numbering for them on the symbol definition screen.

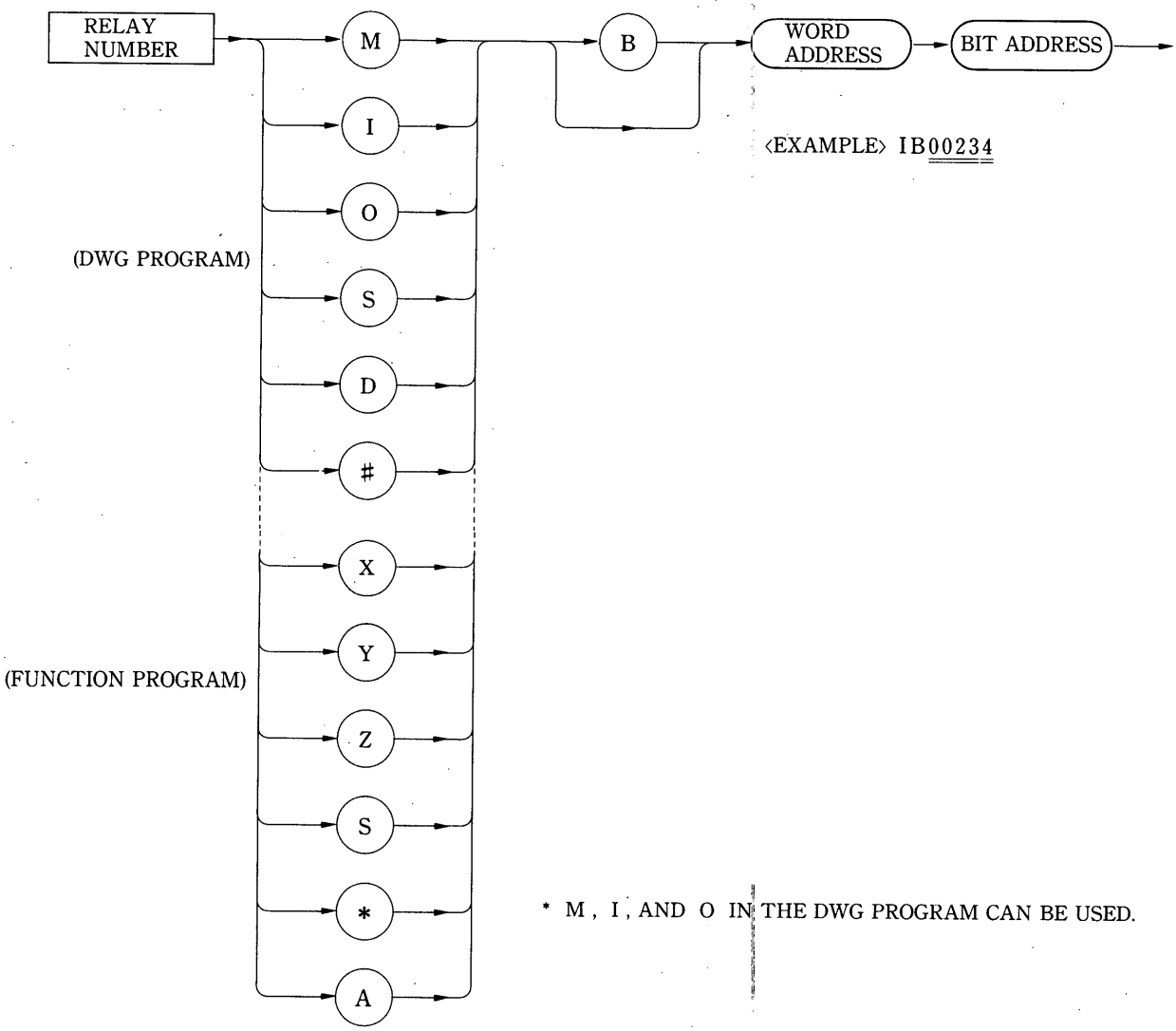
(3) Creating DWG/function programs

Fig 5.14 shows keying operation during program creation.



NOTE : DEPRESSING THE RETURN KEY WITHOUT ENTERING ANYTHING AFTER A COMMAND KEY ASSIGNS AUTOMATIC SYMBOLS TO THE PROGRAMMING PANEL.

Fig. 5.14 (a)



<EXAMPLE> IB00234

* M , I , AND O IN THE DWG PROGRAM CAN BE USED.

NOTE: WHEN I OR O IS SPECIFIED, ENTER A WORD ADDRESS WITH FOUR HEXADECIMAL DIGITS; WHEN OTHER THAN THE ABOVE IS SPECIFIED, ENTER A WORD ADDRESS WITH FIVE DECIMAL DIGITS, AND ENTER A BIT ADDRESS WITH HEXADECIMAL DIGITS.

Fig. 5.14 (b)

DWG/FUNCTION PROGRAM DISPLAY

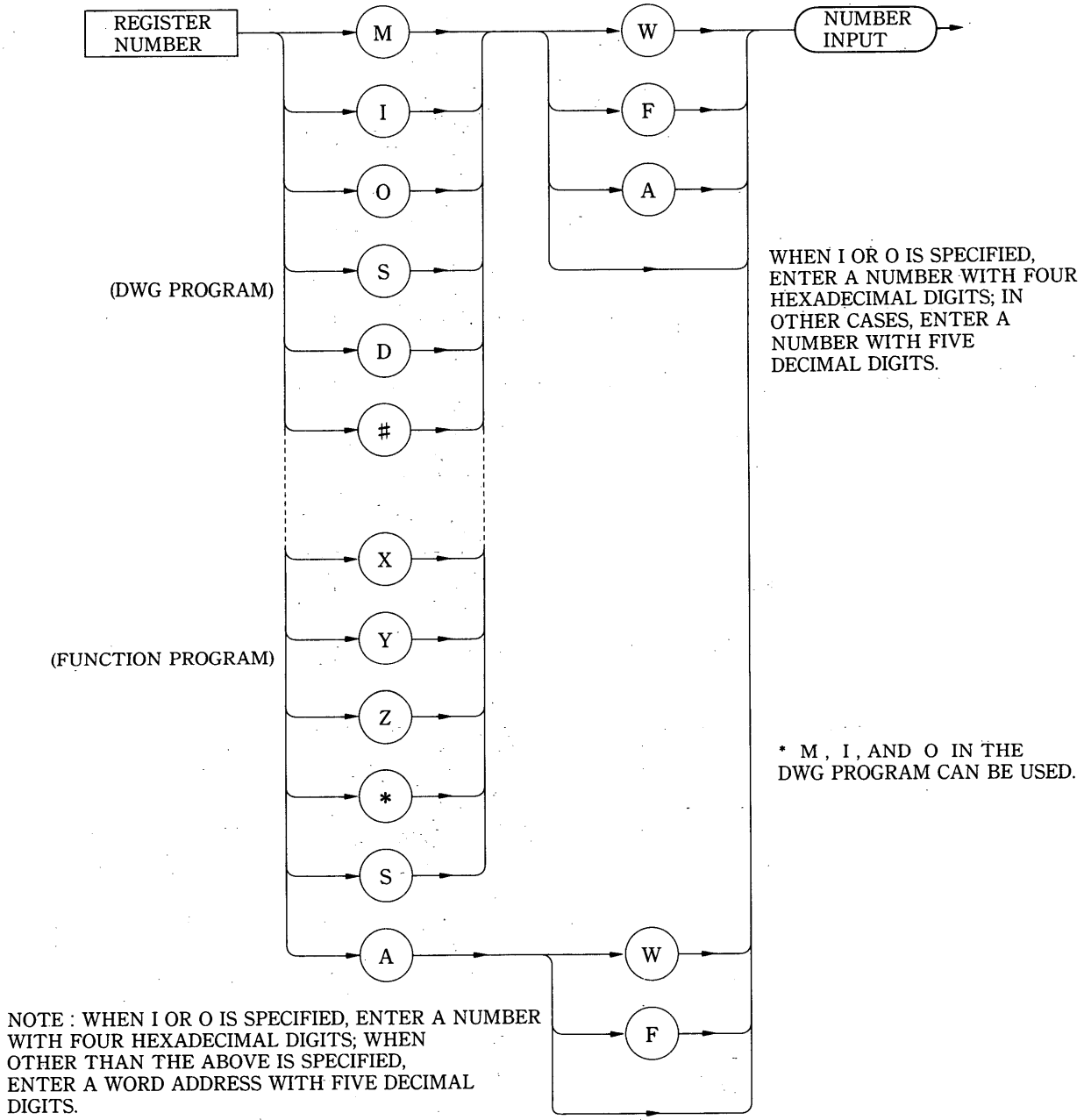


Fig. 5.14 (c)

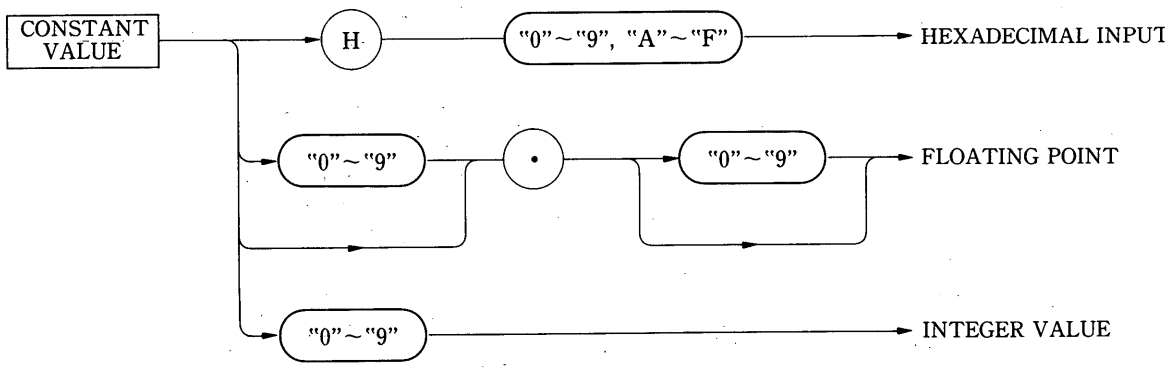


Fig. 5.14 (d)

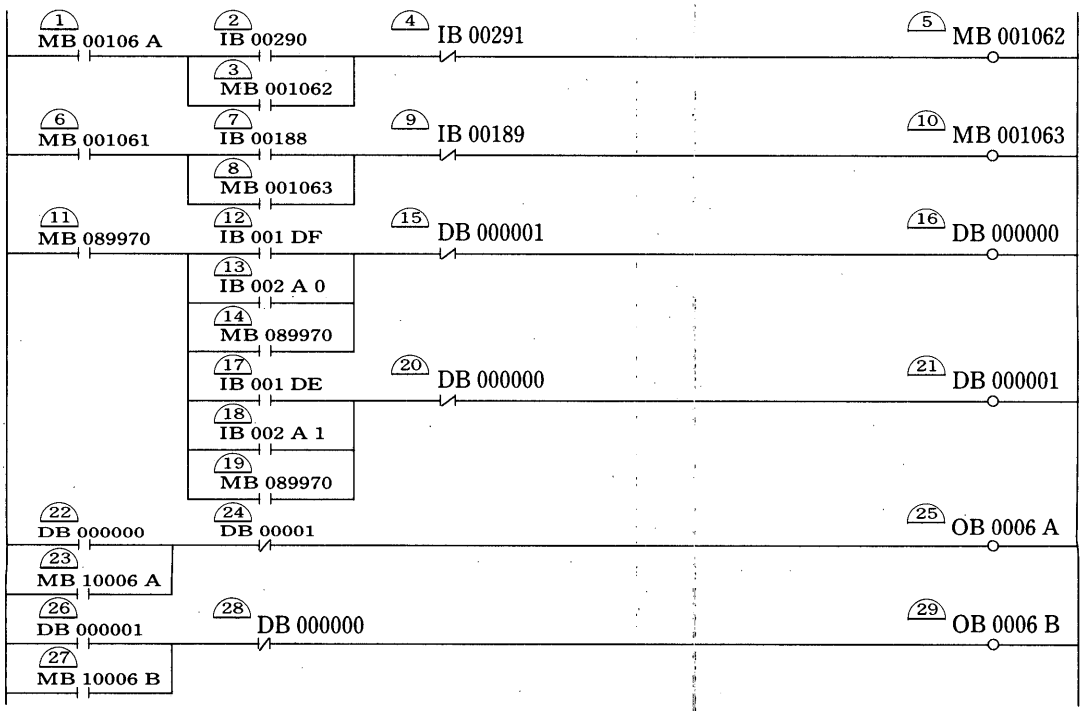
(a) Creating relay circuit

A relay circuit is created in a given order.

The order is indicated from the programming panel by the fact that each time the RETURN is depressed, the cursor moves to the next command input position.

Users need not be aware of the position of commands. Fig. 5.15 shows an example of a relay circuit and Fig. 5.16 shows the keying operation procedure for creation.

See Table 2.1 for the command keys shown in the keying operation procedure described later.



NOTE: ⌒ : SHOWS THE CURSOR MOVING SEQUENCE.

Fig. 5.15 Example of Relay Circuit

Relay circuit programs are created in units of contacts or coils. Enter contacts or coils, with branch connection at both sides, and their relay numbers, then depress RETURN key to advance to the next processing. The branch connection and relay number may be entered in any order.

INPUT ORDER	COMMAND KEY	FUNCTION KEY	ALPHANUMERIC KEY	
1	RELAY	⊣⊢	M B 0 1 0 6 A	RETURN
2		⊣⊢ ↓ ↓	I B 0 2 9 0	RETURN
3		⊣⊢ □	M B 0 1 0 6 2	RETURN
4		□	I B 0 2 9 1	RETURN
5		⊣○⊢	M B 0 1 0 6 2	RETURN
6		⊣⊢	M B 0 1 0 6 1	RETURN
7		⊣⊢ ↓ ↓	I B 0 1 8 8	RETURN
8		⊣⊢ ⌐	M B 0 1 0 6 3	RETURN
9		⊣/⊢	I B 0 1 8 9	RETURN
10		⊣○⊢	M B 0 1 0 6 3	RETURN
11		⊣⊢	M B 0 8 9 9 7 0	RETURN
12		⊣⊢ ↓ ↓	I B 0 1 D F	RETURN
13		⊣⊢ ↓ ↓ ⌐	I B 0 2 A 0	RETURN
14		⊣⊢ ↓ ⌐	M B 0 8 9 9 7 0	RETURN
15		⊣/⊢	D B 0 0 1	RETURN
16		⊣○⊢	D B 0 0 0	RETURN
17		⊣⊢ ↓ ↓	I B 0 1 D E	RETURN
18		⊣⊢ ↓ ↓ ⌐	I B 0 2 A 1	RETURN
19		⊣⊢ ⌐	M B 0 8 9 9 7 0	RETURN
20		⊣/⊢	D B 0 0 0	RETURN
21		⊣○⊢	D B 0 0 1	RETURN
22		⊣⊢ ↓	D B 0 0 0	RETURN
23		⊣⊢ ⌐	M B 1 0 0 0 6 A	RETURN
24		⊣/⊢	D B 1 0 0 0 6 A	RETURN
25		⊣○⊢	O B 0 0 6 A	RETURN
26		⊣⊢ ↓	D B 0 0 1	RETURN
27		⊣⊢ ⌐	M B 1 0 0 0 6 B	RETURN
28		⊣/⊢	D B 0 0 0	RETURN
29		⊣○⊢	O B 0 0 6 B	RETURN

NOTE : THE INPUT OPERATION INDICATED BY [ ] MAY BE OMITTED.

Fig. 5.16 Keying Operation Procedure

For incorrect keying

(1) To delete one character entered immediately before, use the [⇦] key.

(2) Cancel input by the [ESC] key.

The above keying operations can be performed at any time before the [RETURN] key is depressed.

The cursor is moved to the next command input position by the [RETURN] key. Cursor movement is controlled in conjunction with the branch [⊤], parallel connection point [⊤], and parallel connection [⊥].

The meanings of [⊤], [⊤], and [⊥], and cursor movement are explained below.

The branch [⊤], parallel connection point [⊤], and parallel connection [⊥] reserve the assigned functions when the keys are depressed, and nullify the functions when depressed once more.

Branch [⊤]

Cursor movement is independent whether the branch is specified or not. The branch is assigned to the left side of a contact or coil command, and later, the left end of a parallel circuit is connected to it. However, when a contact is connected to the power supply line, the programming panel automatically adds the branch. Depress this key when the circuit diagram has the form as shown in Fig. 5.17.

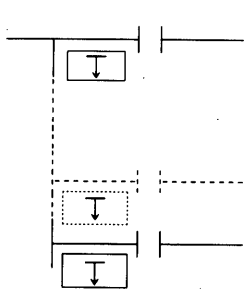


Fig. 5.17 Branch

Parallel connection point [⊤]

When the [RETURN] key is depressed, the cursor moves to the subsequent of the point at which the connection of the left end of the parallel circuit has been reserved with the key. (Fig. 5.18)

This key is to be depressed when the circuit diagram is in the form shown in Fig. 5.19. In other words, this is a point to which the right end of a parallel circuit is later connected.

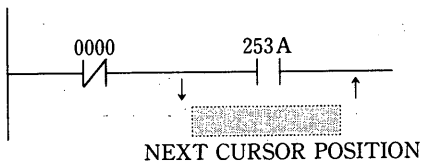


Fig. 5.18 Parallel Connection Point and Cursor Position

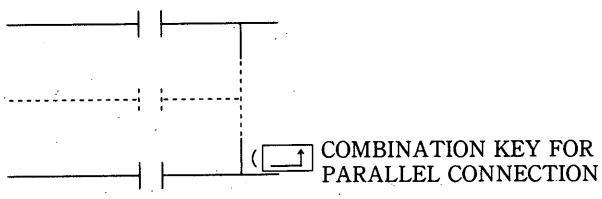


Fig. 5.19 Parallel Connection Point

Parallel connection [⊥]

The cursor moves differently depending on whether the parallel connection [⊥] is used in combination with the parallel connection point [⊤]. When only the parallel connection [⊥] is specified, the cursor moves to the right end of the parallel connection point [⊤] that has been reserved, when the [RETURN] key is depressed. (Fig. 5.20)

The parallel connection is to be depressed when the circuit diagram is in the form shown in Fig. 5.21. In other words, the right end of the circuit having been created is connected to the parallel connection point that has been reserved.

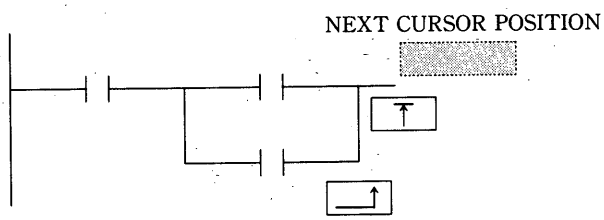


Fig. 5.20 Parallel Connection and Cursor Position

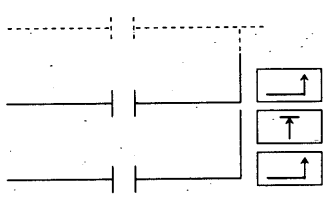


Fig. 5.21 Parallel Connection

Series connection

When the parallel connection point [↑] and parallel connection [↑] indicating the connection of the right side of a contact are not specified, the next contact is connected in series and the cursor moves to the right of the current command position.

A series connection is performed independently from the branch [↓], and the number of contacts is unlimited. Fig. 5.22 shows an example of direct connection. When a series connection exceeds one line, ( ) is displayed on the screen and represents loopback.

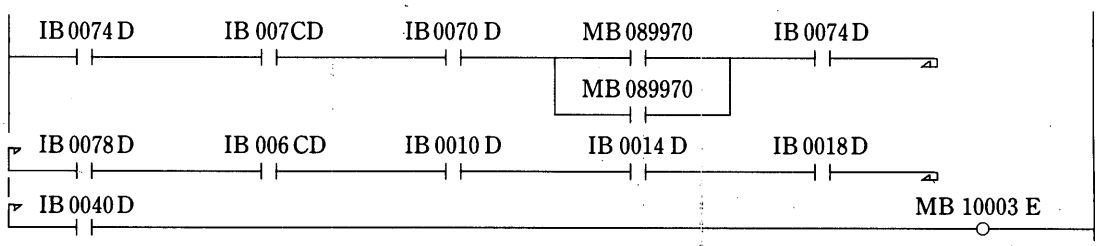


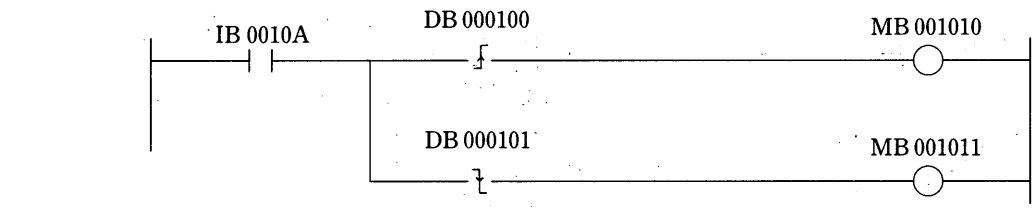
Fig. 5.22 Series Connection

[—○—] Coil

After a coil command, the cursor moves in the same way as after a command by the [↑] key. That is, it moves to the connection point of the left end of the subsequent circuit reserved previously by the [↓] key. Where no connection point has been reserved by the [↓] key, a new circuit connected to the power supply line is started.

(b) Pulse generation circuit

Pulse generation circuits can be programmed in exactly the same way as contact connection of a Relay Circuit previously described. A pulse generation is created as follows:



KEYING SEQUENCE	COMMAND KEY	FUNCTION KEY	ALPHANUMERIC KEY	
1	RELAY	⊣⊢	I B 0 1 0 A	RETURN
2		-∫- ⊤	D B 0 1 0 0	RETURN
3		-○⊣	M B 0 1 0 1 0	RETURN
4	RELAY	-⌇-	D B 0 1 0 1	RETURN
5		-○⊣	M B 0 1 0 1 1	RETURN

Fig. 5.23 Example of Pulse Generation Circuit Keying

(c) Timer circuit

When programming timer elements, the following three points should be specified:

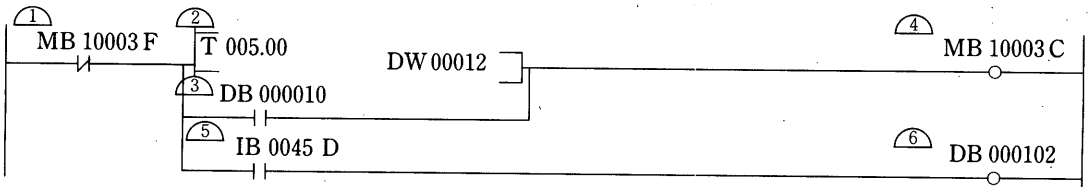
- Branch, parallel connection point, parallel connection
- Time limit or time limit register
- Timing register

Fig. 5.24 shows a circuit containing timer elements, and an example of keying sequence for programming the circuit.

Cautions for programming the timer commands are as follows :

(i) To specify a time limit value (in unit of 10ms) with a constant, for example, 2.50 seconds, enter as follows : Numeric keys 0 2 . 5 0

(ii) The specification of a branch [⊤↓], parallel connection point [⊤↑], and parallel connection [⌐↑] is effective when the cursor is located at the time limit value or the timing register.



KEYING SEQUENCE	COMMAND KEY	FUNCTION KEY	ALPHANUMERIC KEY	
1	RELAY	⊣⊢	M B 1 0 0 0 3 F	RETURN
2		ONDLY T T	0 5 . 0	RETURN
			D W 0 1 2	RETURN
3		⊣⊢ T ⊣	D B 0 1 0	RETURN
4		⊣○⊢	M B 1 0 0 0 3 C	RETURN
5		⊣⊢	I B 0 4 5 D	RETURN
6		⊣○⊢	D B 0 1 0 2	RETURN

Fig. 5.24 Timer Circuit and Keying Operation

(d) Arithmetic and comparison COMMANDS

In the case of numerical data and logic arithmetic operations and comparision commands, the cursor moves to the right by depressing the [RETURN] key. However, after [⇨] command or because of the limit display of the right, it moves to the left end of the next line.

To explain program creation, keying operations for an example using commands contained in command keys [ART] [LOGIC] are explained.

```
├─ MW00231  +  MW00119−00010                    ⇒ DW00012
├─ MW00223  ×  000010÷000200                    ⇒ DW00014
 INC          DW00010
├─ 00001                                        ⇒ DW00016
```

KEYING SEQUENCE	COMMAND KEY	FUNCTION KEY	ALPHANUMERIC KEY	
1	ART	⊢	M W 0 2 3 1	RETURN
2		+	M W 0 1 1 9	RETURN
3		−	0 1 1	RETURN
4		⇒	D W 0 1 2	RETURN
5		⊢	M W 0 2 2 3	RETURN
6		×	0 1	RETURN
7		÷	0 2 0	RETURN
8		⇒	D W 0 1 4	RETURN
9	ART	INC	D W 0 1 0	RETURN
10	ART	⊢	0 1	RETURN
11		⇒	D W 0 1 6	RETURN

Fig. 5.25 Numeric Value Operation Circuit and Keying Procedure (1)

```
├─ DW00012  BIN                                 ⇒ DW00013
```

KEYING SEQUENCE	COMMAND KEY	FUNCTION KEY	ALPHANUMERIC KEY	
1	| ART |	⊢	D W 0 1 2	RETURN
	| ART |	BIN		RETURN
		⇒	D W 0 1 3	RETURN

\| | signifies that the command key inside the frame must be depressed repeatedly until the desired command is dispiayed in the function key area.

Fig. 5.26 Numeric Value Operation Circuit and Keying Procedure (2)

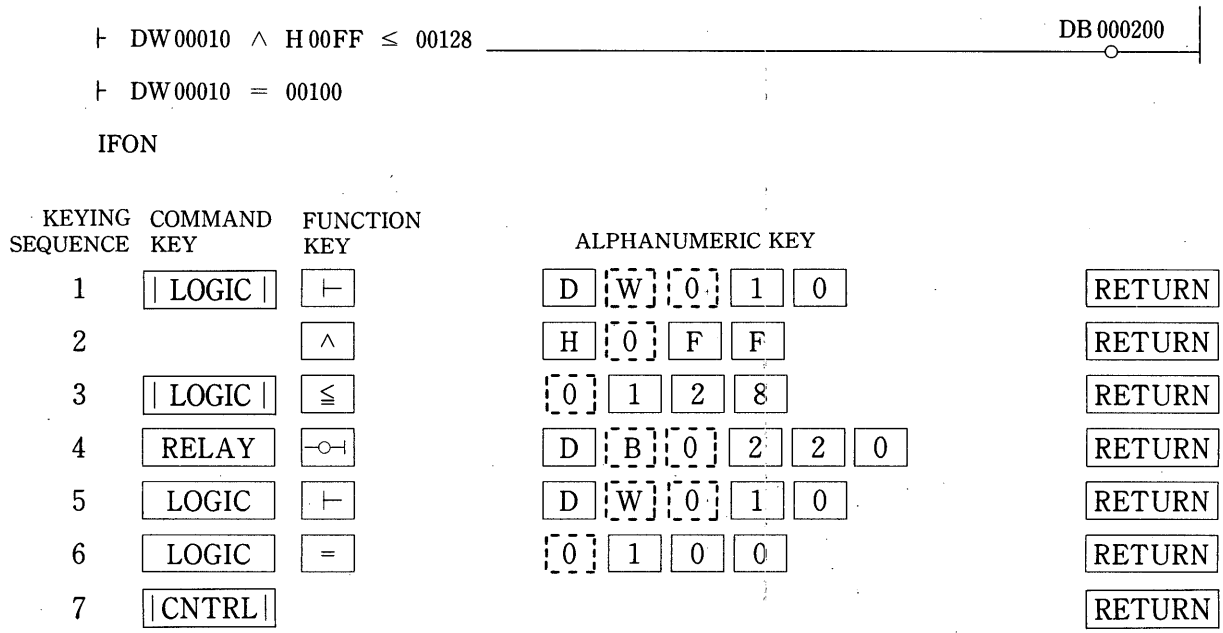


Fig. 5.27 Logical Circuit Comparison Commands and Keying Procedure

(e) Conditional Commands

No special conditional commands are provided.

Use the [ ] key to show that the command being created is a conditional command.

Examples of conditional commands and keying procedures are shown below.

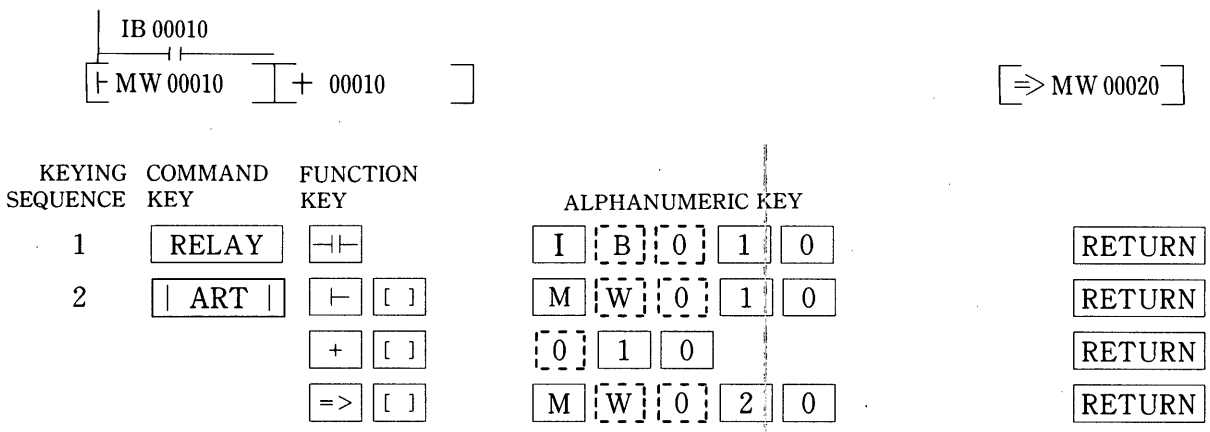


Fig. 5.28 Keying Procedure for Creating Conditional Commands

(f) Referring to user-defined functions

This paragraph explains the keying procedure for referring to user-defined functions in DWG programs or user-defined function programs.

To refer to functions in DWG and function programs, I/Os of the functions must be defined beforehand on the user function definition screen explained in Par. 5.3.8.

Fig. 5.29 shows the definition of functions to be referred to.

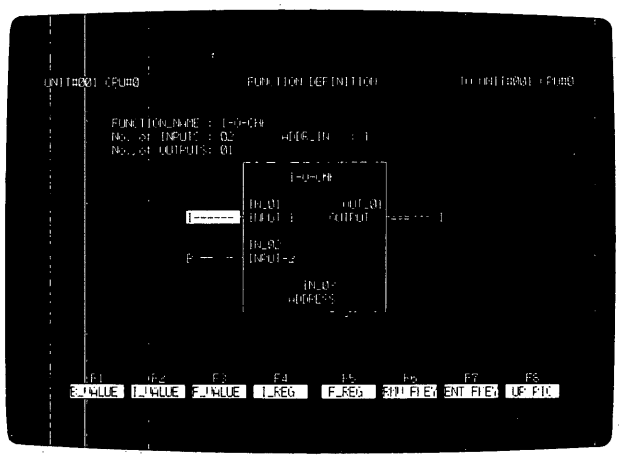


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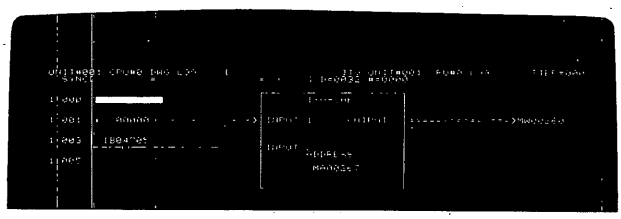
Fig. 5.29 Definition of Function Name I-0-CHK



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KEYING SEQUENCE	COMMAND KEY	FUNCTION KEY	ALPHANUMERIC KEY	
1	| CNTRL |	FSTART	I — O — C H K	RETURN
	ART	⊢	[0] 0	RETURN
	CNTRL	FIN		RETURN
	RELAY	⊣⊢	I [B] [0] [0] 7 0 5	RETURN
	CNTRL	FIN		RETURN
		FIN	M [A] [0] 2 6 7	RETURN
		FOUT	M [W] [0] 2 6 0	RETURN

Fig. 5.30 Keying Procedure for Referring to User Functions

(g) MOVW and XCHG commands

These commands require more than two operand. The programming panel, when these commands are entered, feeds lines and lights the cursor in the first operand position.

Fig. 5.31 shows keying procedures, using the MOVW command as an example.

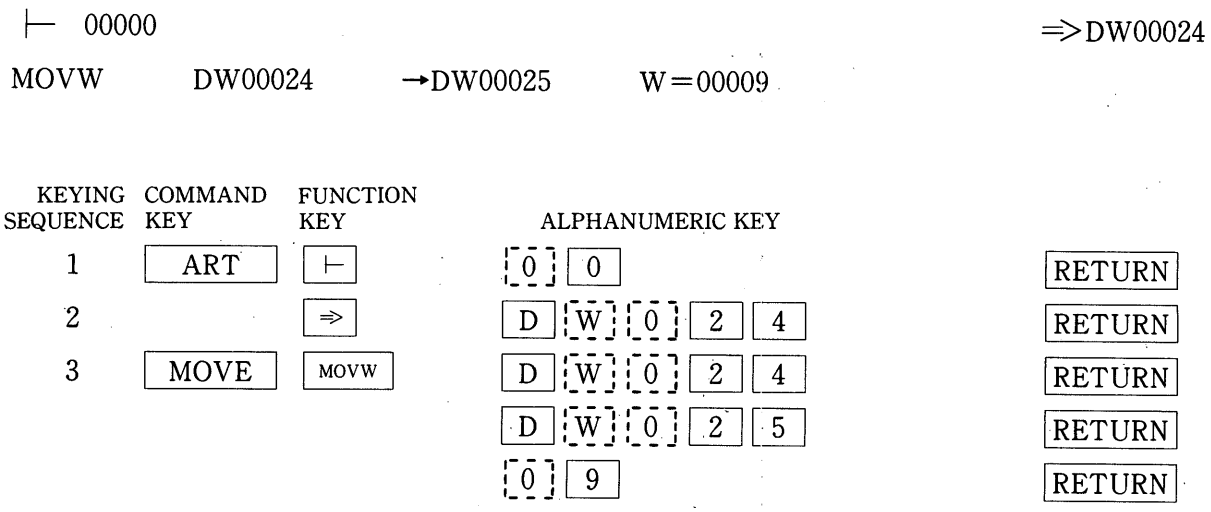

Fig. 5.31 Keying Procedure for Creating MOVW Command

(h) SEE and START commands

When a SEE command is entered, the type of the basic drawing of the drawing currently being created is displayed within the cursor. Enter the number of detailed/expanded drawing to be referred to with the SEE command. When a START command is entered, "B" is displayed within the cursor. Enter the number of batch drawing.

(i) Program creation by symbol

An example of program input by symbols is shown below. In this example, symbol names "GATE-LS1", "INTLOCK1", and "OPENCOMM" are defined on the symbol definition screen (for details, see Par. 5.3.7, "Symbol Definition Screen" described later). (Fig. 5.32)

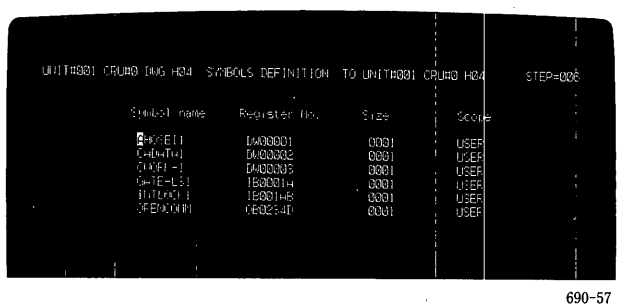

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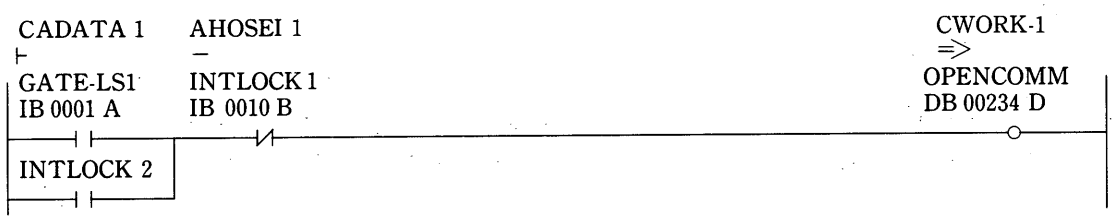
Fig. 5.32 Example of Symbol Definition



Before entering symbols, perform the following keying operation.

| F-SEL | FUNCTION KEY: I-MODE

Select symbol mode as operand input mode. Check that SYMBOL is displayed in the lower right portion of the screen.

KEYING SEQUENCE	COMMAND KEY	FUNCTION KEY	ALPHANUMERIC KEY	
1	ART	⊢	C A D A T A 1	RETURN
2		−	A H O S E I 1	RETURN
3		⇒	C W O R K — 1	RETURN

Fig. 5.33 Example of Symbol Input (2-1)

KEYING SEQUENCE	COMMAND KEY	FUNCTION KEY	ALPHANUMERIC KEY	
4	RELAY	⊣⊢ ⊤	G A T E — L S 1	RETURN

After the RETURN key is depressed, the programming panel searches the symbol definition table for symbol name "GATE-LS1" and displays data address "IB0001A" under the entered symbol name.

5	⊣⊢ ⌟	I N T L O C K 2	RETURN
6	⊣∕⊢	I N T L O C K 1	RETURN
7	⊣○⊢	O P E N C O M M	RETURN

Likewise, in the keying sequence (6) and (7), after the RETURN key is depressed, the programming panel searches the symbol definition table for symbol names "INTLOCK1" and "OPENCOMM" and displays data addresses "0010B" and "DB00234D", respectively.

Fig. 5.33 Example of Symbol Input (2-2)

(j) END command

IF, WHILE, and FOR syntaxes, and DWG/function programs end with an END command. As the END commands for ending the syntaxes, IEND, WEND, and FEND are used depending on the syntaxes. The END command for ending DWG/function programs is DEND.

(k) Creating comments

Comments can be placed anywhere in user programs and user-defined programs. Comments can be written with alphanumeric characters.

Comments are created as follows:

a. Command key

With the [CTRL] key depressed, assigns the meaning of a comment to the function key display section F2.

b. Function key

Depress the [F2] (COMMENT) key. The screen display goes into " ▒▒ " and the system waits for a comment to be entered.

c. Entering comment

Enter a comment with alphanumeric characters.

d. Terminating comment input

To terminate comment input, depress the function key [F2] (COMMENT) again. (If COMMENT is not displayed, perform the operation of a.)

At the end of comment input, the cursor moves to the start position of the entered comment. Then, to enter a command, move the cursor to the input position.

5.3.5 Changing DWG/Function Programs

To change the contents of an existing DWG/function program, the procedure is slightly different from the procedure of making a new program. Program changes in the broad sense include program addition and deletions, and duplication of similar programs; changes in the narrow sense include changes in relay numbers, register numbers, symbol names, and commands.

(1) Changes in the narrow sense

This paragraph explains changes in relay numbers, register numbers, and commands. Minor changes do not require assignment of the meanings to the function keys as described above.

(a) Changing only relay number

Move the cursor to the intended command, enter a new relay number, and depress the RETURN key.

(b) Changing between A contact and B contact

Move the cursor to the intended contact command, operate a new contact command key, and depress the RETURN key.

(c) Changing both contact type and relay number

Move the cursor to the intended contact command, and

- Enter a new contact command key.
- Enter a new relay number and depress the RETURN key.

(d) Numerical operand

Move the cursor to the intended location, enter a new operand, and depress the RETURN key.

Numerical operands are as follows :

As long as they are not prohibited by the meaning, they can be interchanged.

- Decimal and hexadecimal integer constants and real constants
- DWG common registers such as M, S, I, and O, and subscripted ones
- DWG dependent registers such as D and #, and subscripted ones
- Function dedicated registers such as X, Y, Z, and subscripted ones
- Index registers (I, J)

(2) Changes in the broad sense

To change programs, assign the following meanings to the function keys [F1] to [F8] with the [F-SEL] key:

INSERT	DELETE	CUT	COPY	FIND	TO	EXCHANGE	UP PIC

Fig. 5.34

This paragraph explains major program changes, such as program insertion, deletion, and duplication.

Precautions for the cursor position

With normal commands (sequence commands, arithmetic operations, etc.), one command is represented as one screen element, while with SEE, MOVW, and comment commands, one command is represented as two or more screen elements.

Therefore, when the cursor moves, the command representation within the cursor may blink.

In a SEE command, for example, when the cursor moves to the position where "SEE" is displayed, the character string of "SEE" blinks.

When the command representation within the cursor thus blinks, the cursor position is incorrect. Move the cursor to an appropriate position (a drawing number display position, in the case of SEE command, for example).

(a) Deleting Programs

This paragraph explains the method for deleting relay circuits, operation commands, and other program elements from programs.

Program deletion is accomplished in two ways, as explained below. In either way, the command portion to be deleted is reversely displayed and "DEL" is displayed at the lower right portion of the screen.

When the [DELETE] key is depressed mistakenly in either of the two ways, the invalid operation can be freed by [SHIFT] + [DELETE] keys.

(i) For deletion of one command

Move the cursor to the command element to be deleted, and perform the following operation:

- Operate the [F-SEL] key to output the display in Fig. 5.34 to the function key display section.
- Depress the [DELETE] function key twice successively.

(ii) For deletion of more than one command

More than one command can be deleted by using repeatedly the method of deletion of one command described above. The following method is more useful:

a. Move the cursor to the first of the instructions to be deleted.

b. Depress the [DELETE] function key. (Setting of deletion start point) The command portion in the cursor position is reversely displayed.

c. Move the cursor to the last of the instructions to be deleted. All the instructions between the two points are reversely displayed.

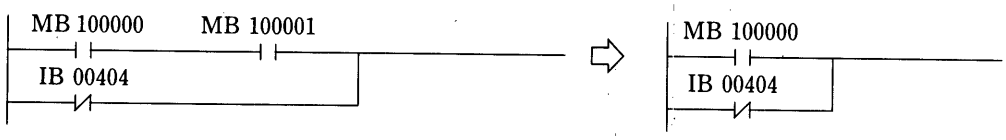
d. Depressing the [DELETE] function key again causes deletion from the deletion start points.

(iii) For deletion of relay circuits (one command)

Move the cursor to the command element (contact, coil, pulse generation element, and timer element) to be deleted, and depress the DELETE key twice.

After deletion, the following processing is performed depending on the circuit connection:

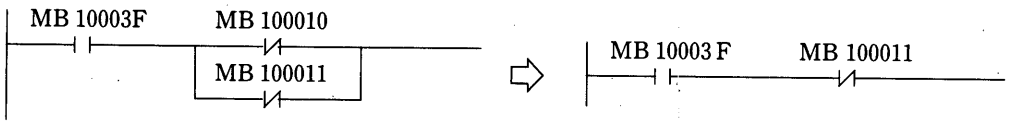
- The circuit connected in series with the deleted element is closed.



(a) Deleting A contact of relay number MB100001 (b) After deleting

Fig. 5.35 Partial Deletion of Series Circuit

- When the command element to be deleted is connected in parallel with another element, the circuit is opened after the element is deleted.



(a) Deleting B contact of relay number MB100010 (b) After deleting

Fig. 5.36 Partial Deletion of Parallel Circuit

(iv) For deletion of special circuits (more than one command)

Select a power connection command as the start command to be deleted, and a coil command as the end command to be deleted.

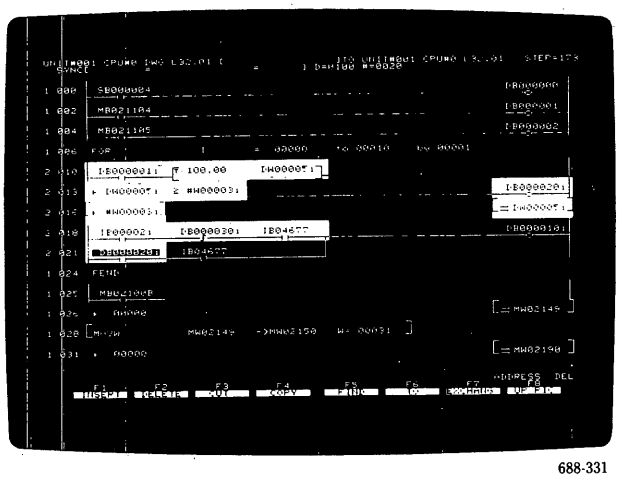


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Fig. 5.37 Deleting Complicated Circuit

Operate as follows:

1 Move the cursor to the relay number DB000001i position.

2 Depress the DELETE function key. (Deletion start point)

3 Move the cursor to the relay number DB000010i position.

4 Depress the DELETE function key again.

The portion reversely displayed in Fig. 5.37 is deleted.

(v) Deleting other commands

With the same operation as for relay circuits, one command and a specified program area can be deleted.

(b) Adding Programs

This paragraph explains the method for adding relay circuits, operation commands, and other program elements to programs. Program addition is performed by the following operations:

1 Move the cursor to the command next to the location where addition is to be made. In the case of a relay circuit, the term "the next command" denotes "the next command to which the cursor moves" described in Creation of Relay Circuit.

2 Operate the F-SEL key to output the display of Fig. 5.34 to the function key display section.

3 Depressing the INSERT function key causes "INS" to be displayed in the lower right portion of the screen and the program after the cursor to disappear from the screen.

Programs can be added by the same operation as for new creation of programs, with the exception of the following points:

(1) By depressing the RETURN key without entering a new command, the first command of the latter portion of the program to be added to is displayed in the cursor.

(2) If the [RETURN] key is depressed further in this state, the next program addition position moves to after that command.

4 To terminate program addition, output again the display of Fig. 5.34 to the function key display section with the [F-SEL] key and depress the [INSERT] function key. "INS" displayed in the lower right portion of the screen goes out, and the program having been removed from the screen is returned to the screen for display.

[Example]

Add relay number DB000010 in parallel to NO (Normally Open) contact of relay number DB000001 of step 013.

1 Move the cursor to NO contact of relay number DB000001 of step 013, and depress the [F-SEL] key to output the display of Fig. 5.34 to the function key display section.

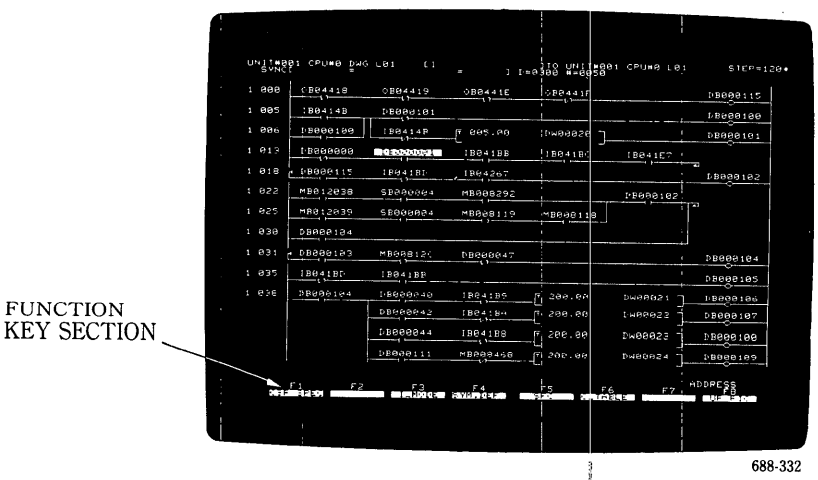

Fig. 5.38 (a)

2 Depress the [INSERT] function key. The program after NO contact of relay number DB000001 of step 013 disappears and "INS" is displayed in the lower right portion of the screen.

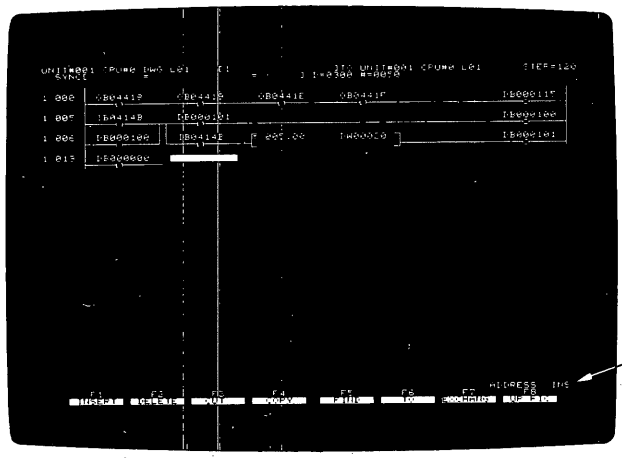

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Fig. 5.38 (b)

3 Depress the [RETURN] key. NO contact of relay number DB00001 is displayed in the cursor position.

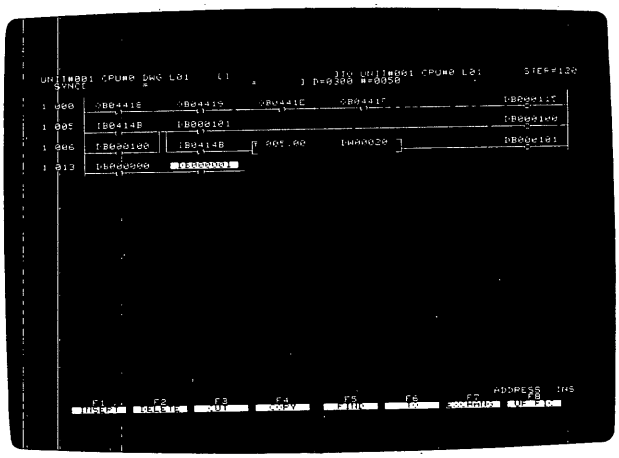

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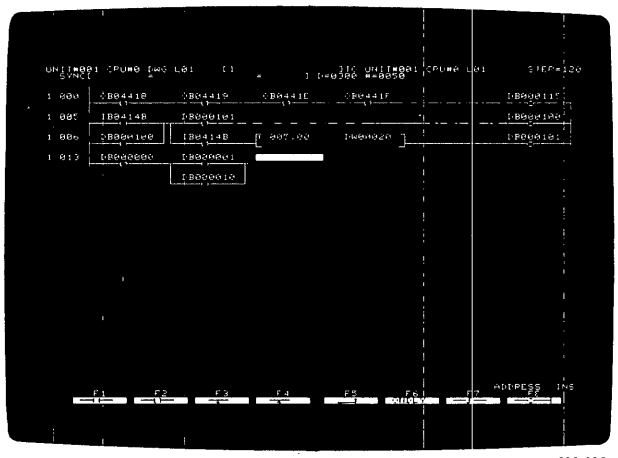
Fig. 5.38 (c)

Create a parallel circuit according to the procedure explained in "Creation of Relay Circuit".

4 Operate [↓] [↑] keys in NO contact of relay number DB000001 and depress the [RETURN] key.

5 Key in [⊣⊢] [⊥] and depress [D] [B] [0] [1] [0] and [RETURN] keys.

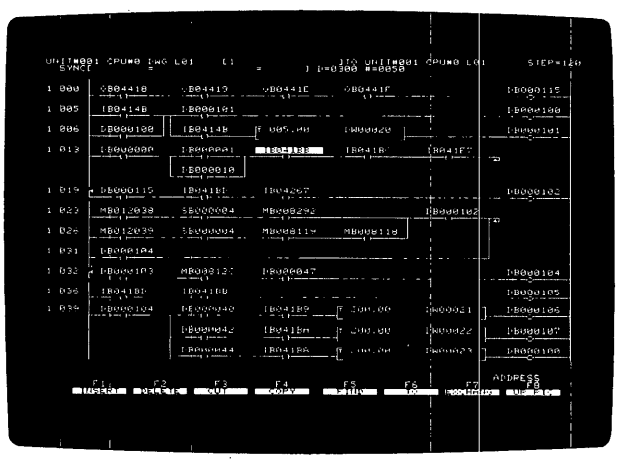


688-335

Fig. 5.38 (d)

6 Depress the F-SEL key to output the display of Fig. 5.34 to the function key display section.

Depressing the INSERT function key displays the program having been removed from the screen, turns off the INS indicator in the lower right portion of the screen, and terminates program addition.



688-336

Fig. 5.38 (e)

(c) Copying Programs

The program edit function is used to edit similar programs and move programs partially.

Example

In Fig. 5.39, Move the section between the FOR command of step 006 and the FEND command of step 022 to before NO contact (relay number SB000004) of step 000.

1 Move the cursor to the FOR command (I=position) of step 006 in Fig. 5.39.

2 Output the display of Fig. 5.34 to the function key display section by the F-SEL key.

3 Depress the CUT function key. "CUT" is displayed in the lower right portion of the screen and the command in the cursor position is reversely displayed.

4 Move the cursor to the FEND command of step 022 and depress the CUT function key again. The screen is in the same state as it is during deletion of more than one program.

5 Move the cursor to the NO contact command (relay number SB000004) of step 000.

6 Depress the COPY function key. As in Fig. 5.40, the program cut out according to the above procedure is copied to before the NO contact command of relay number SB000004.

If the CUT key is depressed mistakenly, the program cutout function can be canceled by SHIFT + CUT keys.

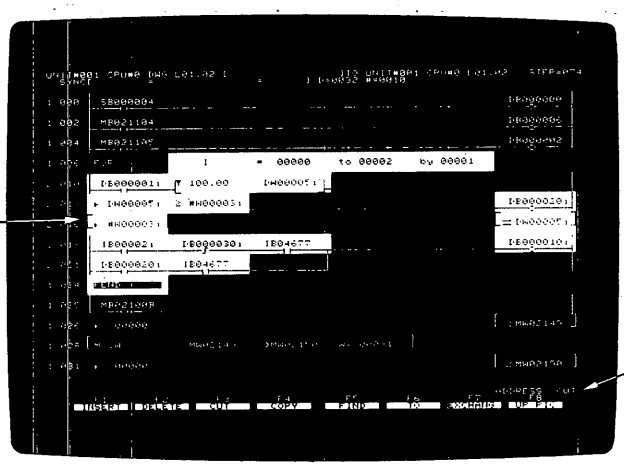


Fig. 5.39 Program Cutout

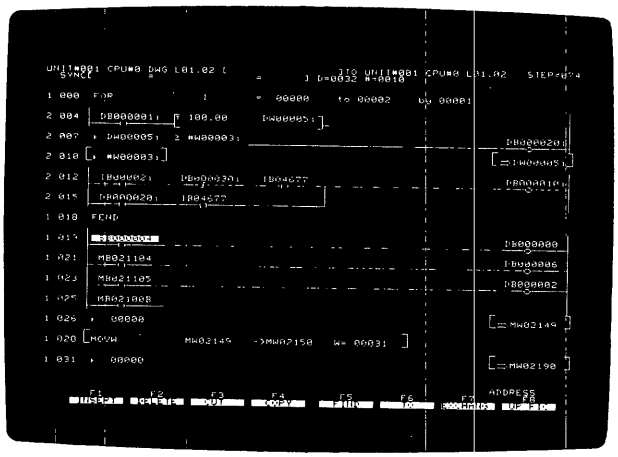


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Fig. 5.40 Display after Program Copy

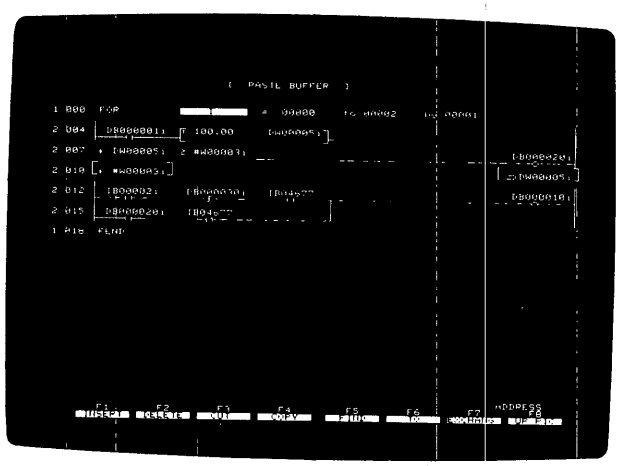
A program cut out by the CUT function key can be displayed on the screen for minor changes of relay numbers and register numbers, and for editing such as major program addition and deletions and programs can be copied to the current drawing and other drawings called up.

To display a program cut off on the screen,

7 Output the display of Fig. 5.34 to the function key display section by the F-SEL key.

8 Depress the EXCHANGE function key.

Fig. 5.41 shows an example of displaying the program cut out in Fig. 5.39 on the screen by the EXCHANGE key.



688-339

Fig. 5.41 Program Display Cut Off

A program cut off by the [CUT] key is retained until the next [CUT] key (retained even if DWG numbers and function names displayed are changed).

(d) Searching for relay numbers, register numbers, and symbols

The search function searches DWG/function programs currently being displayed on the screen for relay numbers, register numbers, and symbol names.

Output the display of Fig. 5.34 to the function key display section by the [F-SEL] key and use the [FIND] key.

1 Move the cursor to the relay number, register number, or symbol name to be searched for.

2 Depressing the [FIND] function key starts a search. If the relay number, register number, or symbol name is found, update the screen and move the cursor to the step number position where it is found.

3 Depressing the [FIND] key further proceeds to the next search.

(e) Replacing relay numbers, register numbers, and symbols.

Deressing the [FIND] key and [SHIFT] key simultaneously searches for a relay number, register number, or symbol name, and replaces them by a relay number, register number, or symbol name newly entered.

Use the replacement function according to the following procedure:

1 Move the cursor to the relay number, register number, or symbol to be replaced.

2 Depress [SHIFT] + [FIND] keys (assume that the display of Fig. 5.34 is output to the function key display section).

3 Enter a relay number, register number, or symbol name to be replaced.

4 Depress the [RETURN] key.

Example

Replace register number DW00002 of step 093 to MW00005.

1 Move the cursor to the command position of step 093.

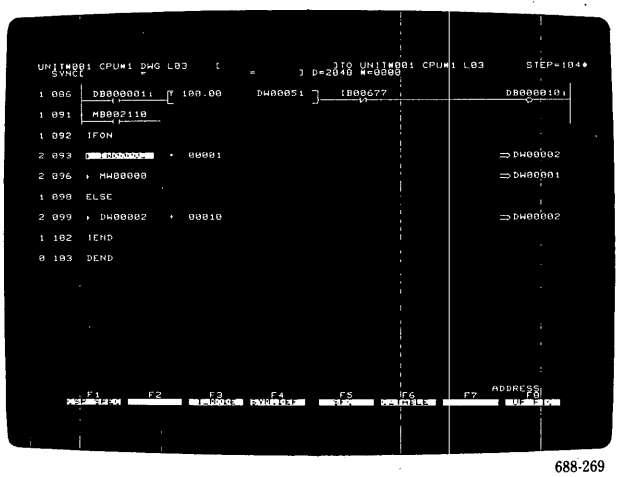


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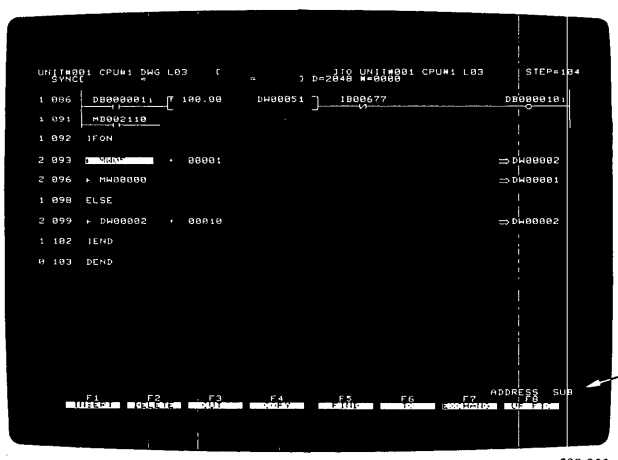
Fig. 5.42 (a) Replacement Function

2 Operate SHIFT + FIND keys. "SUB" indicating replacement mode is displayed in the lower right portion of the screen.

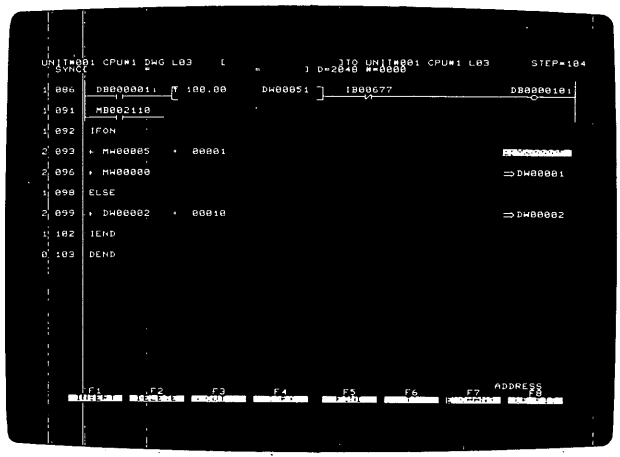
3 Enter the register number to replace. M W 0 5



688-266

Fig. 5.42 (b)

4 Depress the RETURN key. Replace register number DW00002 of step 093 by MW00005, and search further for DW00002 and replace register number of step 5 by MW00005.



688-270

Fig. 5.42 (c)

5 Depressing [SHIFT] + [FIND] and [RETURN] keys causes register number DW00002 of step 099 to be searched for and replaced by MW00005.

By repeating this operation, replacement is performed within the DWG/function program currently being displayed.

(f) Specifying DWG/function program write destination

The write destination specification function is useful for program copy between DWGs or between functions, and for creation of DWG/function programs performing similar processing.

Output the display of Fig. 5.34 to the function key display section by the [F-SEL] key. Depressing the [TO] function key moves the cursor to the following position on the first line of the screen.

To UNIT # [CURSOR] : CPU #

Specify the destination to which the program currently being displayed (including the program configuration table described previously, the system definition, SFC flow related information, and constant table that are described later) is written by the [ENTER] key.

If no write destination is specified, the caller of the program currently being displayed is shown.

Program writing by the write destination specification exerts no influence on the programs calling up the program.

Note:
When the program currently being displayed use SEE and START commands, a write to other drawing numbers may not be performed. Check the drawing numbers referred to by the SEE and START commands.

5.3.6 Updating Screen

The screen currently being displayed is updated by the following methods:

(i) Scroll the display screen up or down one line by the [UP ↑] and [DOWN ↓] keys.

(ii) Update the display screen per screen by [SHIFT] + [PGUP ↑], and [SHIFT] + [PGDN ↓] keys.

(iii) Make screen display in a specified position by the [CSR SPEC] key.
The method (iii) is explained below.

1 Output the following display to the function key display section by the [F-SEL] key.

CSR SPEC		I-MODE	SYM, DEF	SFC	C-TABLE		UP PIC

2 Depressing the [CSR SPEC] function key moves the cursor to the step number display field on the current line.
3 Enter the step number to be displayed on the line containing the cursor. If the entered step number is larger than the total step number of the program currently being displayed, the last command position of the program is displayed.

5.3.7 Symbol Definition Screen

The symbol definition screen is used to define symbols used in DWG/function programs. The symbol definition screen can be called by one of the following two operations:

(i) When the symbol definition screen is selected from the DWG/function program display call screen of Fig. 5.7 by the [SYM. DEF] function key

(ii) When the following display is output to the function key display section by the [F-SEL] key during DWG/function program display, and screen selection is made by the [SYM. DEF] function key

CSR SPEC		I-MODE	SYM. DEF	SFC	C-TABLE		UP PIC

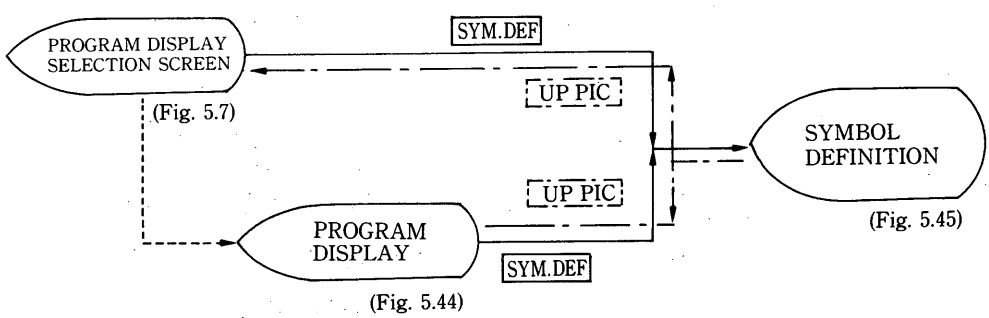
Fig. 5.43

When the symbol definition screen is called up, the function key display section changes to the following display and the functions of the symbol definition screen are allocated to the function keys [F1] to [F8.]

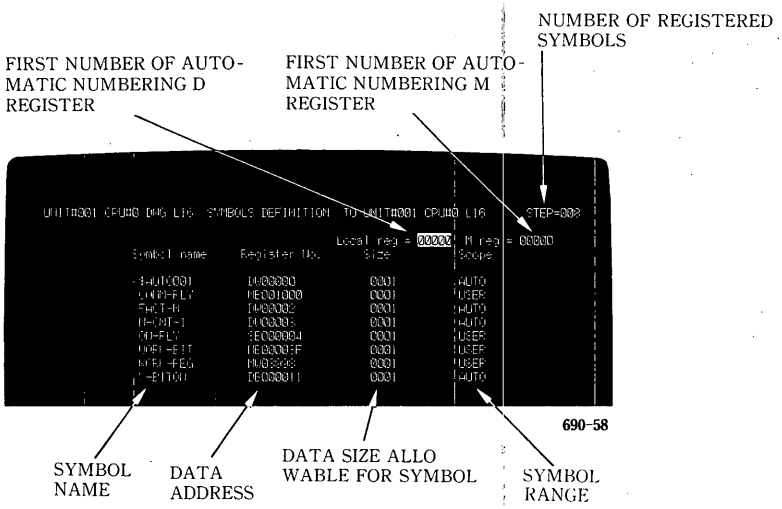
INSERT	DELETE			SORT	AUTO NO.	LINK	UP PIC

The [UP PIC] key allocated to the [F8] key functions differently, depending on the route through which the symbol definition screen was called.

When the symbol definition screen is called up by the method (i) described above, depressing the [UP PIC] key returns control to the program display call screen of Fig. 5.7, and when it is called by the method (ii), depressing the [UP PIC] key returns control to the DWG/function program display call screen.



• Explanation of the symbol definition screen



5

When the program display of Fig. 5.44 is made, output the display of Fig. 5.43 to the function key display section by depressing the F-SEL key and depress the SYM.DEF key, and the symbol definition screen of Fig. 5.45 will be displayed.

If a data address is defined as in symbol name ON-RLY in Fig. 5.44 or Fig. 5.45,

(i) SYM-ADR is selected as input mode during program creation and ON-RLY is defined as SB000004, or

(ii) The symbol definition screen is called before program creation and ON-RLY is defined as SB000004.

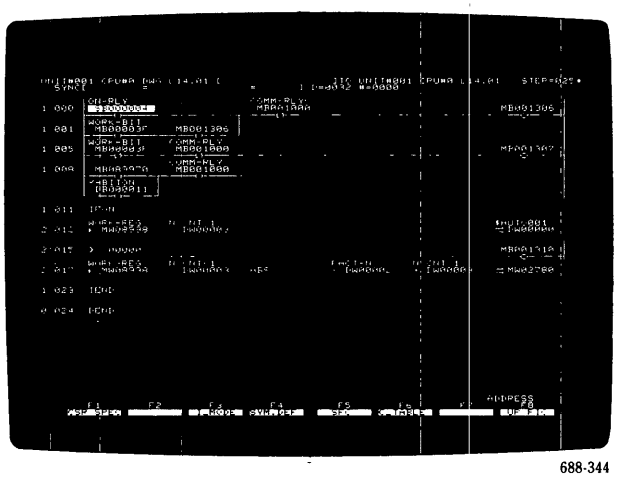


Fig. 5.44 Example of Program Using Symbols

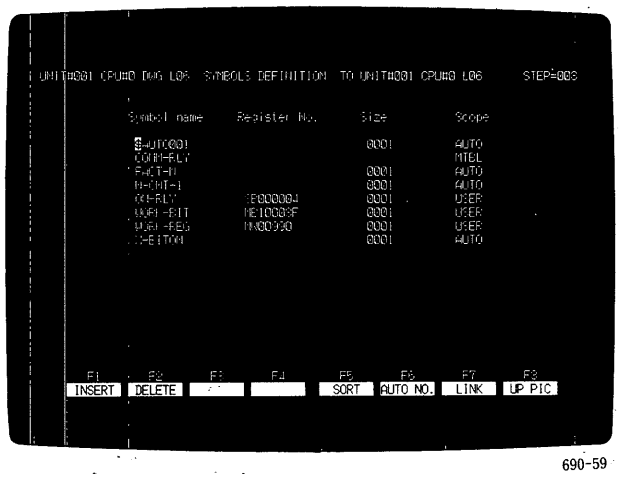


Fig. 5.45 Symbol Definition Screen

Symbol name $AUTO001 in Fig. 5.45 is a symbol assigned automatically by the programming panel, as explained in Par. 5.3.4.2 (i).

(1) Automatic numbering of symbols

Symbols having symbol range of AUTO in the symbol definition are automatically numbered (data address assignment function). Depressing the [AUTO NO], function key causes the screen of Fig. 5.46 to be displayed to specify the start address of registers for automatic numbering. Registers subject to automatic numbering are D register and M register. When M register is to be subject to automatic numbering, on the symbol definition screen

(i) Enter a symbol name.

(ii) In the data address input field, specify definitely the type of data for which the symbol is used, that is, bit type (used in a relay circuit), integer type, or real type (used in an arithmetic circuit).

[Example]

If symbol name W-LIMIT is used in a relay circuit and it is allocated in M register area,

1 Enter a symbol name as [W] [-] [L] [I] [M] [I] [T] [RETURN]

2 Specify data type as [W] [-] [RETURN]

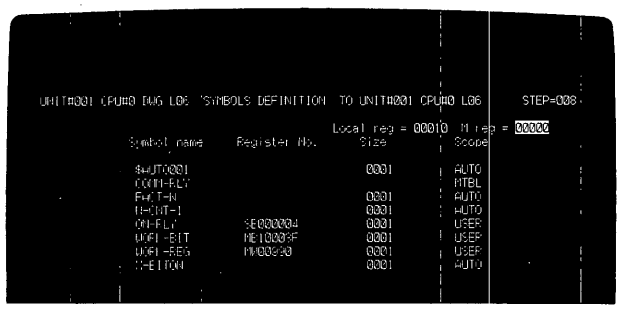


Fig. 5.46 Automatic Numbering of Symbols

Specify the start address of D register in "Local reg=" in Fig. 5.46. In this example, an automatic numbering area begins in the 10th D register. Depressing the RETURN key causes symbols specified "AUTO" to automatically be numbered.

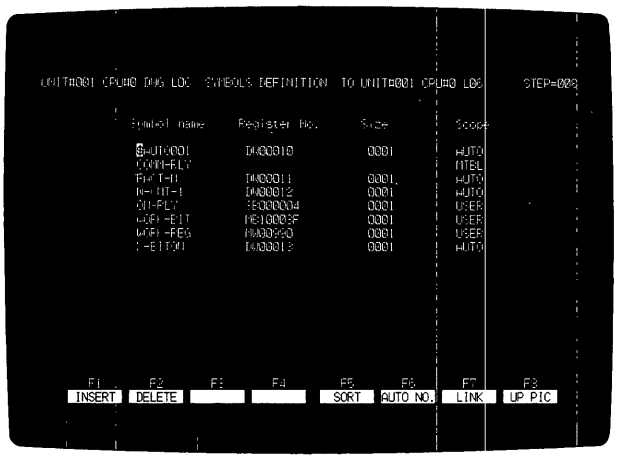


Fig. 5.47 Display after Automatic Numbering

(2) High-level link of symbols

Symbols are usually specific to the DWG/function program. Symbol name WORK-BIT in Fig. 5.47 is referred to as data address MB10003F within the L05 program. Therefore, WORK-BIT can be defined in a different data address within another program.

High-order link of symbol refers to the fact that definition is made so that an identical data address is referred to with an identical symbol name through a drawing in scanning (e.g., slow scanning). Specification of high-order link of symbol and link method are explained below.

The example of Fig. 5.45 is used for explanation. Enter the following on the symbol definition screen:

(i) Symbol name [C] [O] [M] [M] [-] [R] [L] [Y] [RETURN]

(ii) Symbol range [M] [T] [B] [L] [RETURN]

Next, to specify a link method, depress the [LINK] function key. If the current DWG program is a detailed drawing, the symbol definition of the basic drawing is checked and data addresses are determined. Symbols to be linked in the basic drawing must be defined.

If the program currently being displayed is an expanded drawing, symbols to be linked must be defined in the basic drawing or detailed drawing. The symbol link function cannot be used in the basic, detailed or function programs.

Fig. 5.48 shows an example of the screen after execution of high-order link, and Fig. 5.49 shows an example of program display after all symbols are defined.

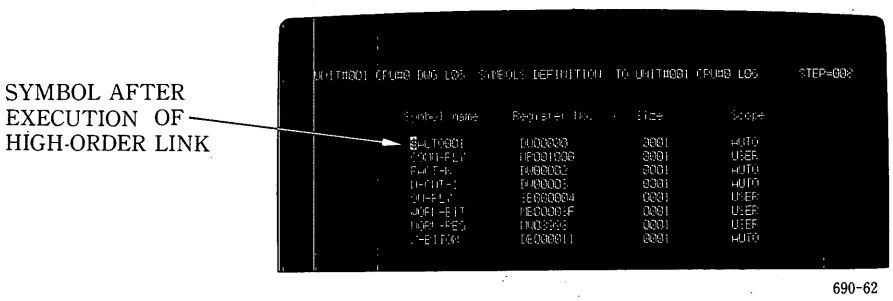


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Fig. 5.48 Screen after High-order Link

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Fig. 5.49 Program Display after Symbol Definition

(3) Deleting symbols

Symbols cannot be deleted on the program display screen. When a symbol name is changed on the program display screen, the old symbol name is not deleted and remains in the symbol table. Unnecessary symbols must be deleted on the symbol definition screen by the [DELETE] function key.

(4) Sorting symbols

Symbols can be sorted alphabetically on the symbol definition screen. Sorting can be performed by depressing the [SORT] function key.

5.3.8 User Function Definition Display

User function definition refers to the definition of I/O of function programs created by users. When a function program is newly created, the I/O of the function to be created must be defined on the function definition screen.

The function definition screen is displayed when:

(i) The [FUNCDEF] function key is depressed on the DWG/function program display call up screen in Fig. 5.7.

(ii) The function program display was attempted on the DWG/function program display call up screen in Fig. 5.7, but the function program is not created.

Fig. 5.50 shows an example of calling up the function definition screen in (i) above.

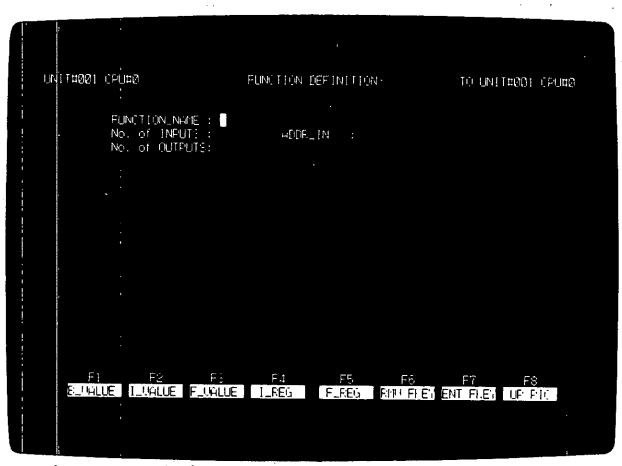


Fig. 5.50 Calling Up Function Definition

When the function definition screen is called up, the function key display section is displayed as shown below.

[B-VALUE] [I-VALUE] [F-VALUE] [I-REG] [F-REG] [RMV FKEY] [ENT FKEY] [UP PIC]

These function keys are explained below.

[B-VALUE] Specifies that the data type of function I/O is bit type.

[I-VALUE] Specifies that the data type of function I/O is integer type.

[I-REG] Specifies that the data type of function I/O is the contents of integer-type register.

[RMV FKEY] Deletes the user function name registered in the command key FUNC field in Table 2.1 by the [ENT FKEY] function key.

[ENT FKEY] Registers a defined user function name in the command key FUNK field in Table 2.1. User function names can be allocated to command keys by this function.

During program change or creation, user-defined functions can be referred to by depressing this command key instead of the command (FSTART) to refer to user-defined functions.

[Example]

Create a function definition shown in Fig. 5.50.

1 Assume that "FUNCTION"-NAME" is DA-OUT.

"FUNCTION NAME": [D] [A] [-] [O] [U] [T] [RETURN]

Next, the cursor moves to the position of "No. of INPUTS".

2 Specify the number of inputs of the function.

"No. of INPUTS": [0] [3] [RETURN]

Next, the cursor moves to the position of "ADDR-IN".

3 Specify whether the function has input passed as data address.

"ADDR-IN": [1] [RETURN]

Next, the cursor moves to the position of "No. of OUTPUTS".

4 Specify the number of outputs of the function.

"NO. of OUTPUTS": [0] [2] [RETURN]

In this way, the function definition pattern of Fig. 5.51 is displayed. The portion enclosed by " " in the explanation indicates a character string displayed on the screen.

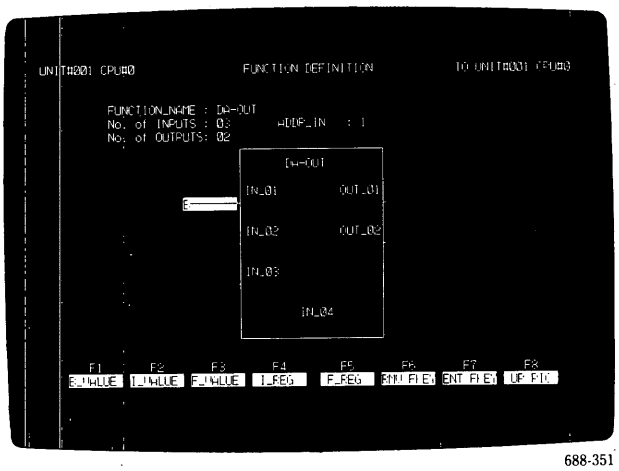
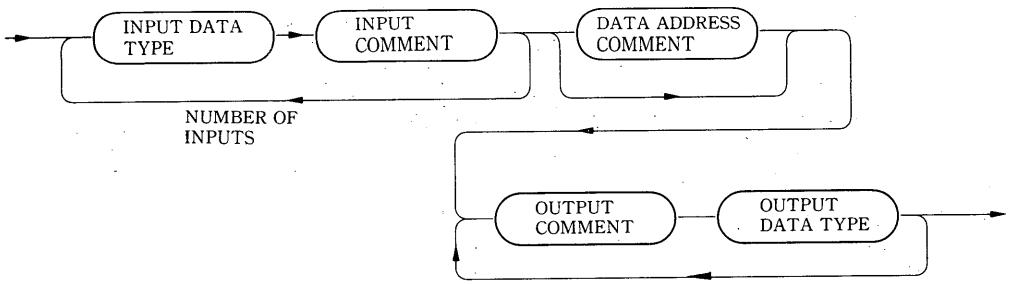


Fig. 5.51 Example of Function Definition

5 Next, define the data type of I/O of the function. Define the data type of I/O according to the following keying procedure:



When the following I/O data types are given, an example of the keying operation for defining function I/O is shown below.

Input 1: Bit type
Input 2: Value of integer type
Output 1: Register of integer type

	FUNCTION KEY	ALPHANUMERIC KEY	
DEFINITION OF INPUT 1	B-VALUE		RETURN
COMMENT OF INPUT 1		E X E C U T E	RETURN

*I/O COMMENT DOES NOT AFFECT FANCTION OPERATION. EXPRESSES MEANING OF INPUTS AND OUTPUTS.

DEFINITION OF INPUT 2	I-VALUE		RETURN
COMMENT OF INPUT 2		I — D A T A	RETURN
DEFINITION OF INPUT 3	F-VALUE		RETURN
COMMENT OF INPUT 3		F — D A T A	RETURN
COMMENT OF DATA ADDRESS PART		P T R — B A S E	RETURN
COMMENT OF OUTPUT 1		I — R E G — A	RETURN
DEFINITION OF OUTPUT 1	I-REG		RETURN
COMMENT OF INPUT 2		F — R E G — A	RETURN
DEFINITION OF OUTPUT 2	F-REG		RETURN

BY OPERATING THE KEYS IN THIS ORDER, THE FUNCTION DEFINITION CREATED IN FIG. 5.52 IS CREATED.

6 Depress the ENTER key. When function definition has been created, be sure to perform a write before leaving the function definition screen.

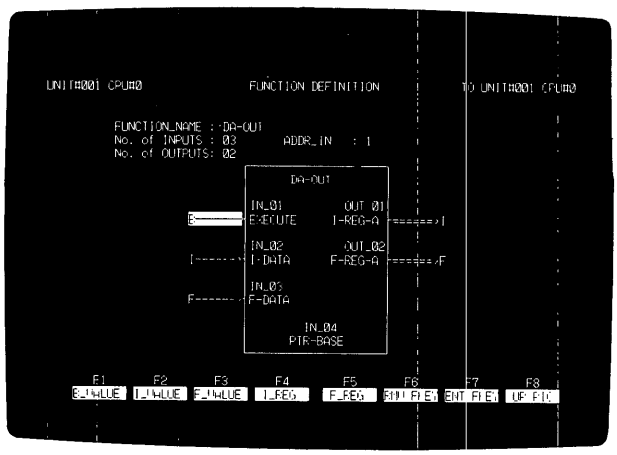


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Fig. 5.52 Function Definition

Up to 16 inputs and outputs can be specified each.

5.3.9 SFC Programming

SFC programming is performed primarily on the SFC flowchart screen. The SFC flowchart screen can be called up by one of the following two operations:

(i) When the SFC flowchart screen is selected from the DWG/function program display call up screen of Fig. 5.7 by the [SFC] function key

(ii) When the display of Fig. 5.43 is output to the function key display section by the [F-SEL] key during DWG program display, and screen selection is made by the [SFC] function key

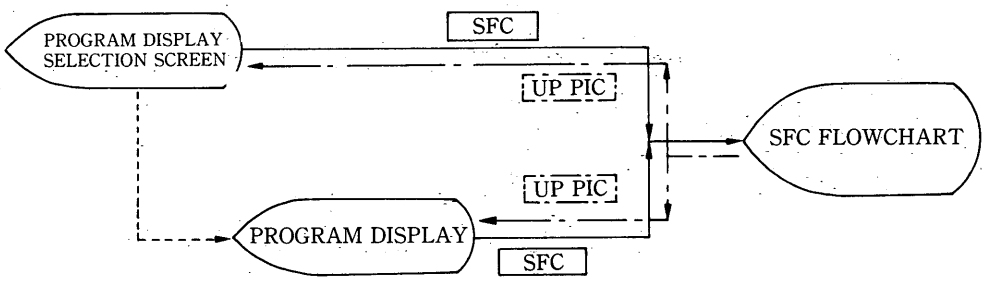
When the SFC flowchart screen is called up, the function key display section changes to the following display.

INSERT	DELETE	UNDO	REG.SET	T-CHART	ACT BOX		UP PIC

Fig. 5.53

The [UP PIC] key allocated to the [F3] key functions differently, depending on the route through which the SFC flowchart was called up.

When the SFC flowchart is called up by method (i) described above, depressing the [UP PIC] key returns control to the DWG/function program display call up screen of Fig. 5.7, and when it is called up by method (ii), depressing the [UP PIC] key returns control to the DWG program display screen.



(1) Creating SFC flowchart

SFC flowchart is created in units of steps and transition conditions.

When the SFC flowchart screen is displayed, depressing the command key causes the function key display section to be displayed as follows:

[≒] [≠] [TIMER] [STEP] [⊢→] [←⊢] [↵] [END]

• Step

Depress the [STEP] function key and input a step name, then depress the [RETURN] key.

A step name is a string of not more than five alphanumeric characters beginning with "A" to "Z".

• Transition conditions

Enter transition conditions with the functions keys [≒], [≠], or [TIMER], specify NO contact conditions and NC contact conditions with relay numbers, and counting values as timer conditions with integer values or register numbers, then depress the [RETURN] key. The transition conditions can also be specified with symbols.

As the counting values as timer conditions, up to 655.35 seconds can be specified in multiples of 10 ms.

• Branch

There are two types of branches: normal branch and parallel concurrent processing branch. They are represented respectively, as shown in Fig. 5.54 (a).

Specify branch points with the function key [⊢→]. and junction points with the function key [←⊢]. Branch points and junction points of normal branch must be specified when the cursor is in transition condition position, and concurrent processing branch must be specified when the cursor is in the position of step BOX.

Using Fig. 5.54 (a) as an example, the keying procedure for normal branch and junction, and the start and end of parallel concurrent processing is shown below.

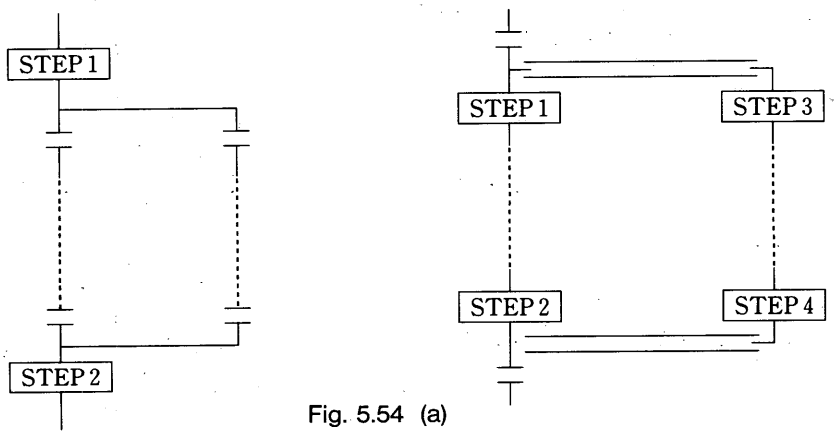


Fig. 5.54 (a)

Fig. 5.54 (b) shows the keying procedure for creating the SFC flowchart.

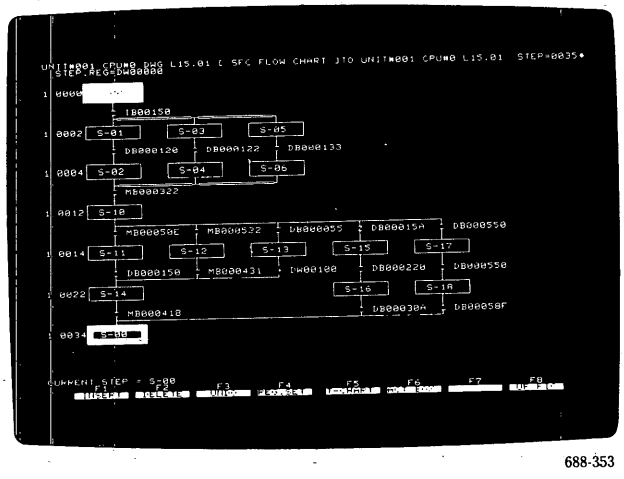


Fig. 5.54 (b) SFC Flowchart

	INPUT SEQUENCE	COMMAND KEY	FUNCTION KEY	ALPHANUMERIC KEY
ENTER NORMAL BRANCH(a)	1	RELAY	STEP	S T E P 1 RETURN
	2	RELAY	⇌ ⊢	M B 0 1 A RETURN
ENTER TO JUNCTION(b)	1	RELAY	⇌ ⊢	M B 0 1 B RETURN
	2	RELAY	STEP	S T E P 1 RETURN
ENTER START OF PARALLEL CONCURRENT PROCESSING(c)	1	RELAY	⇌	M B 0 2 0 RETURN
	2	RELAY	STEP ⊢	S T E P 2 RETURN
ENTER END OF PARALLEL CORCURRENT PROCESSING(d)	1	RELAY	STEP ⊢	S T E P 2 RETURN
	2	RELAY	⇌	M B 0 2 1 RETURN

INPUT SEQUENCE	COMMAND KEY	FUNCTION KEY	ALPHANUMERIC KEY
1	RELAY	STEP	S — 0 0 RETURN
2		⇌	I B 0 1 5 0 RETURN
3		STEP ⊢	S — 0 1 RETURN
4		⇌	D B 0 1 2 0 RETURN
5		STEP ⊢	S — 0 2 RETURN
6		STEP ⊢	S — 0 3 RETURN
7		⇌	D B 0 1 2 2 RETURN
8		STEP ⊢ ↵	S — 0 4 RETURN
9		STEP	S — 0 5 RETURN
10		⇌	D B 0 1 3 3 RETURN
11		STEP ↵	S — 0 6 RETURN
12		⇌	M B 0 3 2 2 RETURN
13		SETP	S — 1 0 RETURN
14		⇌ ⊢	M B 0 5 0 E RETURN
15		STEP	S — 1 1 RETURN
16		⇌ ⊢	D B 0 1 5 0 RETURN
17		⇌ ⊢	M B 0 5 2 2 RETURN
18		STEP	S — 1 2 RETURN
19		⇌ ⊢ ↵	M B 0 4 3 1 RETURN
20		⇌ ⊢	D B 0 5 5 RETURN
21		STEP	S — 1 3 RETURN
22		TIMER ↵	D W 0 1 0 0 RETURN

INPUT SEQUENCE	COMMAND KEY	FUNCTION KEY	ALPHANUMERIC KEY	
23		STEP	S — 1 4	RETURN
24		⇌ ⊢	M B 0 4 1 8	RETURN
25		≠ ⊢	S — 0 3 3	RETURN
26		STEP	D B 0 1 5 A	RETURN
27		⇌	S — 1 5	RETURN
28		STEP	D B 0 2 2 0	RETURN
			S — 1 6	
29	RELAY	⇌ ⊢ ↵	D B 0 3 0 A	RETURN
30		⇌	D B 0 5 5 0	RETURN
31		STEP	S — 1 7	RETURN
32		⇌	D B 0 5 5 1	RETURN
33		STEP	S — 1 8	RETURN
34		⇌ ↵	D B 0 5 8 F	RETURN
35		END	S — 0 0	RETURN

Fig. 5.55 SFC Program Keying Procedure

(2) Adding and deleting SFC flowchart

Output the display of Fig. 5.53 to the function key display section by the F-SEL key.

Add an SFC flowchart by the INSERT function key, and delete it by the DELETE function key.

An SFC flowchart is newly added before the current cursor position, as in the addition of DWG/function programs.

For deletion of SFC flowchart, the deletion range differs depending on the conditions of transition of cursor position from step BOX. The deletion range is reversely displayed.

(3) SFC action box

SFC action box refers to the processing in individual step BOX programmed in an SFC flowchart. The program is represented as:

ABOX Step symbol 1

Processing program in that step (applies also to free programs)

SBOX Step symbol 2

A program of action boxes also ends with an END command.

The ABOX command specifies that the step repeat processing until the conditions for transition to the next step are satisfied.

The SBOX command specifies that the step performs processing only once on the arrival of transition, and subsequently performs no processing until the transition conditions are satisfied.

To call the SFC action box display screen, output the display of Fig. 5.53 to the function key display section on the SFC flowchart display screen by the F-SEL key. Depressing the ACT BOX function key causes the SFC action boxes to be displayed.

```
ABOX        S−000
 ⊢ 00000              =>MW00100
                      =>MW00101
SBOX        S−001
```


The keying sequence using this example is shown below.

INPUT SEQUENCE	COMMAND KEY	FUNCTION KEY	ALPHANUMERIC KEY	
1	FUNC	ABOX	S — 0 0 0	RETURN
2	LOGIC	⊢	0	RETURN
3		=>	M W 0 1 0 0	RETURN
4		=>	M W 0 1 0 1	RETURN
5	FUNC	SBOX	S — 0 0 1	RETURN

(4) SFC output bit time chart

The SFC output bit time chart is a screen for specifying ON or OFF of output data in a given SFC step. The output data specified in the output bit time chart, when SFC is executed, is output to D register (DW00004 to DW00007) of the DWG program currently called up.

The output bit width must be set beforehand in 16-bit increments on the DWG/function program configuration screen explained in Par. 5.3.3.

To call up the SFC output bit time chart screen, output the display of Fig. 5.53 to the function key display section on the SFC flowchart display screen by the F-SEL key.

Depressing the T-CHART function key causes the SFC output bit time chart of Fig. 5.56 to be displayed.

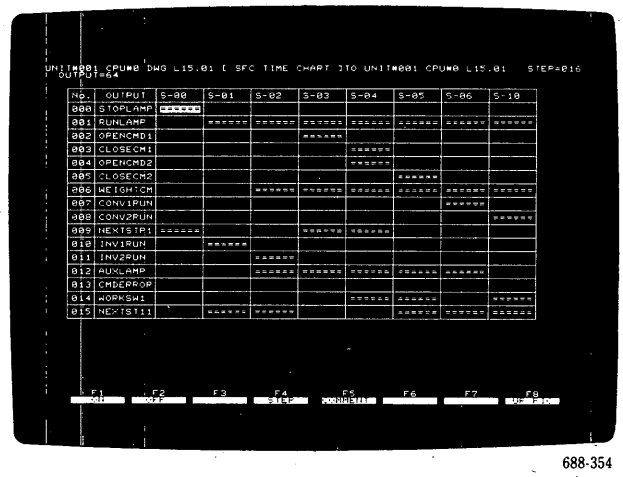
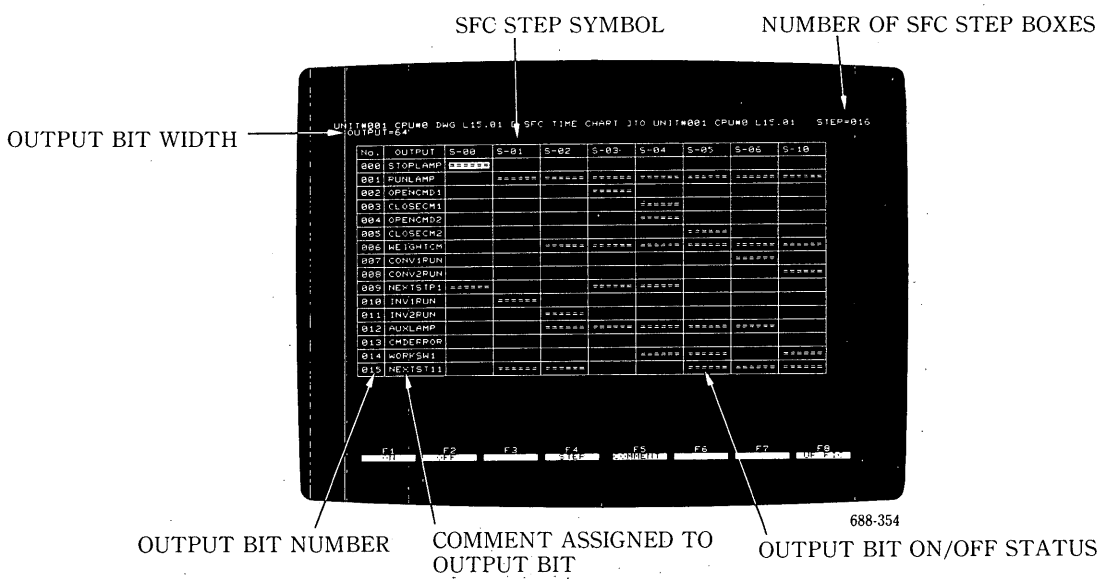


Fig. 5.56 SFC Output Bit Time Chart

When the SFC output bit time chart is called up, the functions of the SFC output bit time chart are allocated to the function keys in the function key display section.

ON	OFF		STEP	COMMENT			UP PIC.

The following explains the SFC output bit time chart screen and the meanings of the function keys.



Following output bit numbers can be displayed by [SHIFT] + [PGUP ↑] keys. The relationship between output bit numbers and registers is as shown below.

OUTPUT BIT NO.	D REGISTER
0 ~15	DW00004
16~31	DW00005
32~47	DW00006
48~63	DW00007

Explanation of function keys

[ON] : Turns on the output bit in the intended SFC step position.

[OFF] : Turns off the output bit in the intended SFC step position.

Move the cursor to the output bit number of an intended SFC step position and depress the [ON] or [OFF] function key.

Turning on the output bit number causes "====" to be displayed, and turning it off causes no display.

[STEP] : Enters the SFC step symbol to be displayed.

Operating this key moves the cursor to the SFC step symbol display position. Entering the SFC step symbol to be displayed causes the screen to be updated and the SFC output bit time chart to be displayed beginning with the entered SFC step symbol.

[COMMENT] : Enters a comment assigned to an output bit. Depressing this key moves the cursor to the output bit comment display position.

A comment can be entered with up to eight alphanumeric characters. To return to the output bit ON/OFF specification area, operate [SHIFT] + [HOME ←] keys.

5.3.10 Setting DWG Constants

The DWG specific constant table can be called up by one of the following two operations:

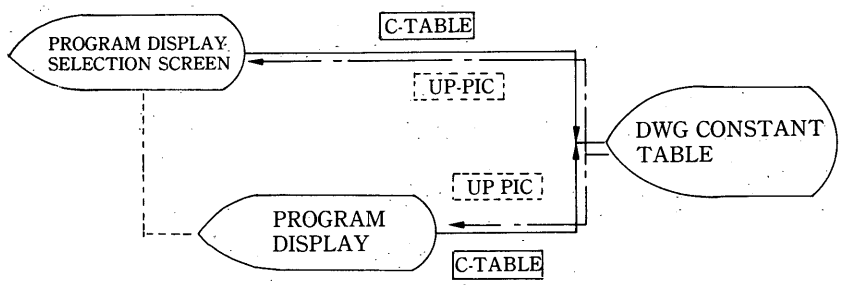
(i) When the SFC flowchart screen is selected from the DWG/function program display call up screen of Fig. 5.7 by the C-TABLE function key

(ii) When the display of Fig. 5.43 is output to the function key display section by the F-SEL key during DWG program display, and screen selection is made by the C-TABLE function key

When the DWG constant table is called up, the following are allocated to the function keys:

DEC	HEX	FLOAT	BINARY				UP PIC

The UP PIC key allocated to the F8 key functions differently, depending on the route through which the DWG constant table was called up. When the DWG constant table is called up by method (i) described above, depressing the UP PIC key returns control to the DWG/function program display call up screen of Fig. 5.7, and when it is called up by method (ii), depressing the UP PIC key returns control to the DWG program display screen.



The DEC, HEX, FLOAT, and BINARY determine the radix of display data of DWG constant table.

5.3.11 Writing Programs

User programs are created and edited by the method explained in Par, 5.3.4 and following sections. Program creation and editing are performed when user programs are being created or edited. When a user program is being created or edited, the user program within the CP-3300 or the floppy disk is maintained as it was when read by the programming panel, until a write is made.

Created or edited user programs are written by the [ENTER] key. The following program data is written by the [ENTER] key:

(i) Program configuration data

(ii) User program

(iii) Symbol definition

(iv) Constant table

(v) SFC flowchart, output time chart, action BOX

When user-defined functions are written, function definition data is written instead of (iv) and (v) above.

Normally, the [ENTER] key causes an intended program to be written in the location from which the program was read, but by the write destination specification explained in (f) of (2) in Par. 5.3.5, created or edited user programs can be written to a specified destination. If the writing is performed successfully, "Completed" is displayed in the message display area. If the writing is performed erroneously, remove the failure by seeing Table A3, and perform write operation again.

The CP-3300 programming panel permits the copying of user programs between floppy disks by specifing a write destination. However, for the copying of user programs (particularly copying of user-defind function programs) between floppy disk, use both the floppy disk drives A and B. Copying in only either of them may erase user-defind functions

Copy user-defind functions between floppy disks according to the follwind procedure:

(1) Insert the floppy disk to be read into the floppy disk drive A.

(2) Insert the floppy disk to be written into the floppy disk drive B.

(3) Make the program display in the floppy disk drive A. (The user program is read with UNIT # as A, as explained in Section 5.3.1.)

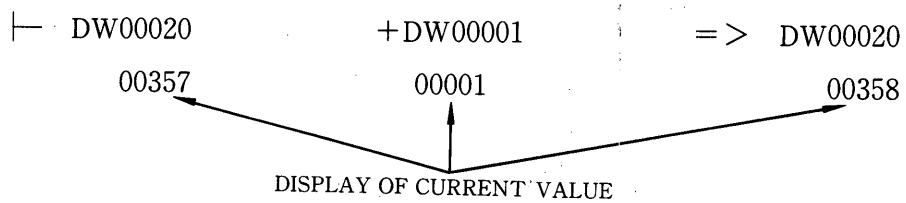
(4) In the write destination specification in Section 5.3.5, specify a write destination as the floppy disk drive B.

(5) Write the user program to the floppy disk drive B by the [ENTER] key.

In the above procedure, the read source may be the B drive and the write destination may be the A drive.

5.3.12 Displaying Current Values of DWG/Function Programs

If a displayed DWG/function program is the CP-3300 CPU and the CPU is operating, the conduction status of contacts and the values of word operands are displayed as current values at the same time as program display.



(1) Current value display

The current value display is constantly updated and kept up-to-date, as long as the conditions are satisfied.

Current value display is made as follows:

Contact: The open/close status of contacts is displayed on a circuit diagram. Close contacts are displayed more boldly than open contacts.

Coil: The energization/deenergaization status of coils is displayed on a circuit diagram. Energized coils are displayed more boldly than deenergaized coils.

Word operand: The values of operands that are subjected to arithmetic operations are displayed under calculation formulas.

(2) Limitations on current value display

Some limitations can be placed on current value display. Use the synchronous specification key [SYNC] and the program reference key [REFER.]

[SYNC] key: When the command displayed at the upper left corner is executed, a specified register number, the values of subscripts I and J, or the ON/OFF status of specified relay numbers are displayed as current values.

Depressing the synchronous specification key [SYNC] moves the cursor to the "SYNC [ ] " position of title display section. Enter the conditions for current value display. Up to two current value display conditions can be specified.

Example

Perform current value display when the value of register number MW00035 is 1 and index register I is 10, enter the following :

1 Synchronous specification key [S Y N C] [RETURN]

2 Alphanumeric key [M] [W] [0] [3] [5] [RETURN]

3 Numeric key [1] [RETURN]

4 Alphabetic key [I] [RETURN]

5 Numeric key [1] [0] [RETURN]

The condition specification is not made when other program display is made on the screen. To cancel condition specification once made, move the cursor to the condition specification field and depress [BREAK] [RETURN] The conditions for current value display are checked when the command at the upper left corner of the screen is executed.

When two current value display conditions are specified, current value data are collected when AND condition of the conditions is satisfied.

[REFER] key: When the cursor is in a SEE command or user function name, the use of this key calls up the DWG program or function program. Current values are displayed when execution is performed at the location where the program currently being displayed is referred to by a SEE command or function reference is made.

Normally, as in Fig. 5.57, when a program is referred to from two points, a mere display of L01 program causes the values at reference from (a) to be displayed as current values.

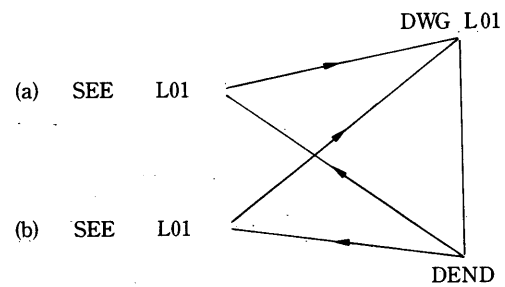


Fig. 5.57

In such a case, in Fig. 5.57, when the cursor is moved to SEE L01 of (b) and the [REFER] key is depressed, although the DWG L01 program is made, the values at reference from (b) are displayed as current values. The values at reference from (a) are not displayed.

5.3.13 Disabling Coil Command

In a relay circuit, coils can be freed from the energized or deenergized state determined by circuit logic, and can be fixed in either an energized or deenergized state as desired. This fixed coil state is referred to as disabled state.

Output the following display to the function key display section by the F-SEL key.

DIS. ON	DIS. OFF	ENBLE			HOLD	ER. TRACE	UP PIC

Fig. 5.58

Move the cursor to the coil command to be disabled, and depress the DIS.ON or DIS.OFF key. When the DIS.ON key is depressed, the elements are locked in the energized state, and when the DIS.OFF key is depressed, they are locked in the deenergized state.

The disabled state is shown in an equivalent circuit as in Fig. 5.59.

To bring the disabled elements to the normal state, move the cursor to the coil to be cleared, and depress the ENABLE key.

When the cursor is moved to a contact and disable specification is made, if the coil of the relay number of the contact is within the program currently being displayed, the coil is disabled. If there are two or more coils, the coil immediately preceding the contact is disabled.

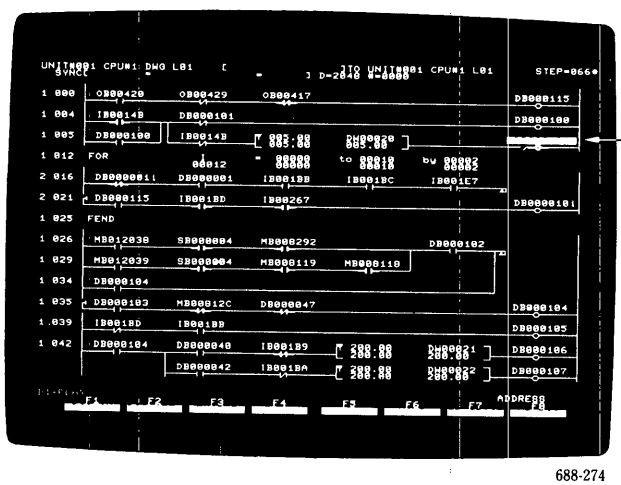


Fig. 5.59

5.3.14 Other Functions

(1) Error trace function

When writing is performed by the [ENTER] key after program creation or change, if "PP:COMPOSE ERROR #XXX" is displayed in the message display section, output the display of Fig. 5.58 to the function key display section by the [F-SEL] key, and depress the [ER.TRACE] function key, and the write error trace screen will be displayed.

(2) Stopping current value display

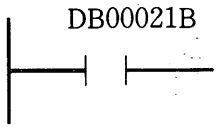
If the [HOLD] function key in Fig. 5.58 is depressed, the command in the current cursor position is executed once, and current value display is stopped.

Depressing the [HOLD] key once more resumes current value display.

(3) Program keying by blind touch method

As explained in Par. 5.3.4, DWG/function programs are entered using command keys and the function keys associated with individual commands. In addition to the keying from the function keys, the CP-3300 programming panel permits DWG/function programs to be created by entering reserved keys from the full keyboard on the programming panel. However, some functions such as command rewriting cannot be used.

The figure below shows an example of program keying by blind touch.



IFON

⊢ MW01001 +MW00100 =>MW00200 i

IEND

EXAMPLE OF KEYING

(1)] [RETURN

NO CONTACT COMMAND

(2) D B 0 0 0 2 1 B RETURN

RELAY NO.

(3) I F O N RETURN

IFON COMMAND

(4) ; RETURN

INTEGER REGISTRATION COMMAND

(5) M W 0 1 0 0 1 RETURN

REGISTER NO.

(6) + RETURN

ADDITION COMMAND

(7) M W 0 0 1 0 0 RETURN

REGISTER NO.

(8) : = RETURN

STORAGE COMMAND

(9) M W 0 0 2 0 0 I RETURN

REGISTER NO.

(10) E N D RETURN

IF END COMMAND

The keys (keying character string) reserved for program keying by the blind touch method are shown in Table A6 in APPENDIX.

5.4 REGISTER DISPLAY

With the register display function, the contents of M, I, O, S, and D registers can be displayed and changed. The registers are displayed using the auxiliary screen display area when a program is already displayed on the main screen.

If the register display function is called up when other than programs are displayed on the main screen, the registers are displayed in the main screen display area.

Registers can be displayed on split screens. Different registers can be displayed on the main screen that is split into up to eight subscreens, and the auxiliary screen that is split into two subscreens.

Perform the following operations to call up the register display function:

(1) Screen selection key [MODE]

(2) Function key [F6] (REG.LIST)

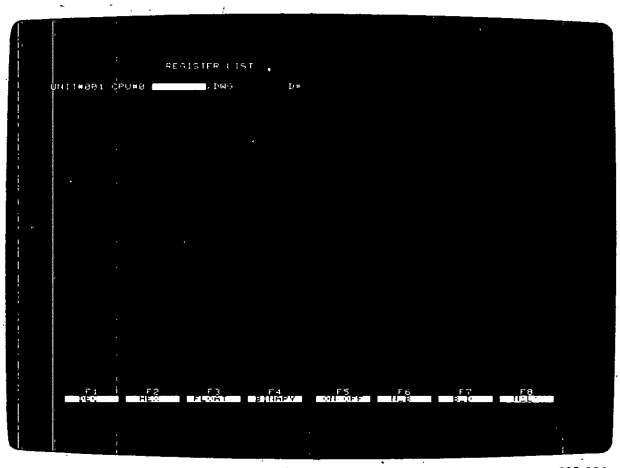


Fig. 5.60 Register Display Calling

The cursor lights in the register number input position when the register display screen is called up. The display line is called "input line".

UNIT # and CPU # have as initial values the values that were selected previously on another screen. To display registers of another UNIT # and CPU #, enter UNIT # and CPU # with the cursor movement key [←], and enter register numbers.

The register display screen is called up with the function key display section displayed as follows:

DEC	HEX	FLOAT	BINARY	ON/OFF	N-B	B-D	N-L

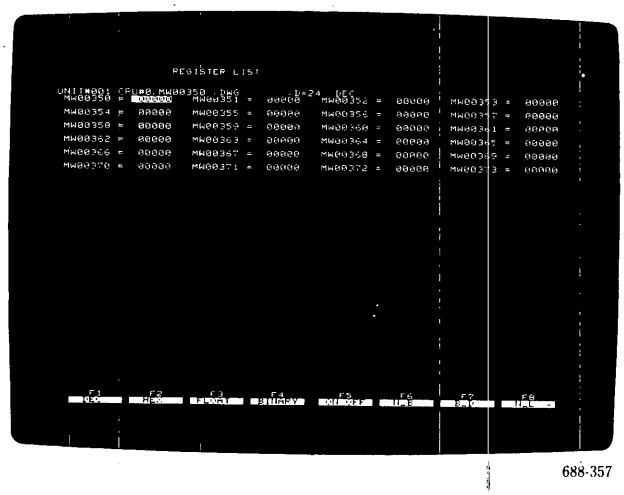
DEC , HEX , FLOAT , and BINARY specify the radix of data to be displayed. If a relay number is specified in the register number input field, data is displayed as On or OFF. The ON/OFF function key sets bit data display to ON or OFF. (The numeric key "1" indicates ON and "0" indicates OFF.)

N-B , B-D , and N-L are function keys for controlling split display. The key operations for the register display of Fig. 5.61 are shown below.

(1) Enter a register number. M W 3 5 0 RETURN

(2) Enter the number of data. 2 4 RETURN

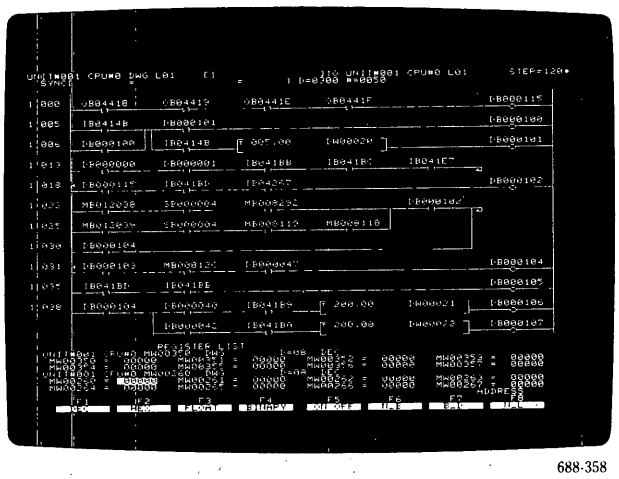
If the data number is omitted, 8 is assumed.



688-357

Fig. 5.61

Fig. 5.62 shows an example of register display when a program is displayed on the main screen.



688-358

Fig. 5.62 Register Display on Auxiliary Screen

To move the cursor from the main screen to the auxiliary screen, and from the auxiliary screen to the main screen, use [ALT] + [HOME] keys.

Changing register contents

(1) Move the cursor to the intended register position with cursor control keys.

(2) Enter new contents using numeric keys ("A" to "F" are used when display radix is HEX).

Negative decimal integers and real numbers can be set. A negative number must be preceded by the [-] key.

(3) Depress the [RETURN] key.

Register contents are actually updated when the [RETURN] key is depressed.

5.4.1 Register Split Display

This section explains the function keys used for split display of registers.

[N-L] : This key moves the cursor to the register number input position on the input line on which registers are currently being displayed. Data can also be displayed by entering newly a register number.

Depressing the [N-L] key once more without entering a register number sets the "input line" indication next to the area where registers are currently being displayed. Enter a new register number. If the number of data displayed in each split display is eight, eight split register can be displayed on the main screen.

Assume that the cursor is in the data position of MW00350.

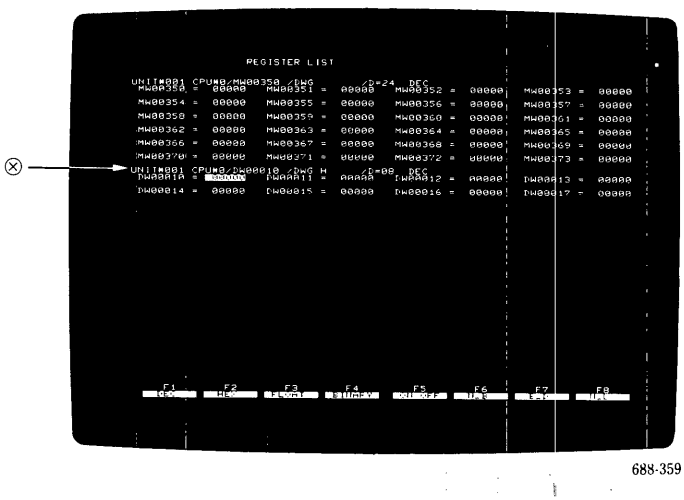


Fig. 5.63

(1) Function keys [N-L] [N-L] (depress twice)

The cursor moves to the register number input position of the line indicated by Ⓧ.

(2) Enter a register number. [D] [W] [1] [0] [RETURN]

The cursor moves to after /DWG. Enter the DWG whose D register is to be displayed.

[H] [RETURN]

(3) Enter the number of data. Since standard value is eight, in this example, a display is made only by entering [RETURN]

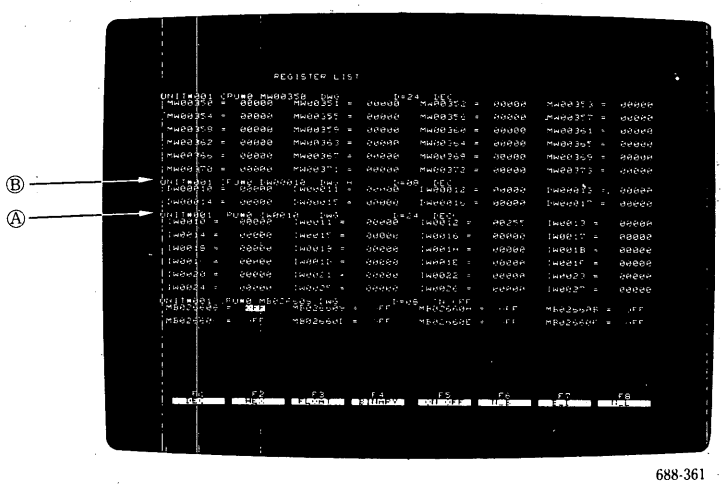
[N-B] : When register display is split, the cursor is moved to the data display position of the first register in the next display area.

[B-D] : This key is used to erase the register display area in which the cursor is currently placed, and expand the first preceding register display area. For example, to expand the register indicated by B for display purposes in the register split display of Fig. 5.64, perform the following:

(1) Move the cursor to the start of A display area with the [N-B] function key.

(2) Erase A display area with the [B-D] function key.

(3) Depress the [N-L] function key four times. (The cursor moves to the "input line" of B .)



688-361

Fig. 5.64

(4) By increasing the data number (D= specification) of display area B , the register display area of B area can be expanded.

Fig. 5.65

5.5 DISPLAYING DISABLED COILS

The locations where disabled coils are used are searched to display DWG numbers and relay numbers. These are displayed using the auxiliary screen display area when a program is already displayed on the main screen.

When other than a program is displayed on the main screen, disabled coils are displayed in the main screen display area.

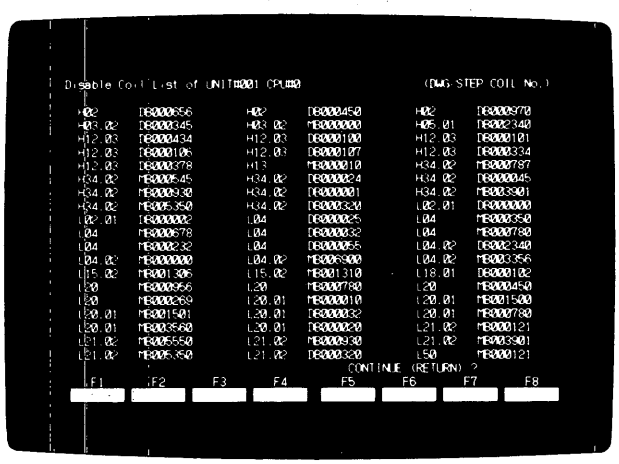
Perform the following operations to display disabled coils:

(1) Screen selection key [MODE] (When the function key display is not as shown in Fig. 5.1 (c), depress the [MODE] key again.)

(2) Function key [F2] (DIS LIST)

Fig. 5.66 shows an example of disable coil list display on the main screen.

When the disable coil list display does not fit on one screen, "CONTINUE (RETURN)" is displayed in the lower right portion of the screen. Depressing the [RETURN] key causes the remaining disabled coils to be displayed. If the remaining display is not required, depress any key other than the [RETURN] key.



689-254

Fig. 5.66 Disable Coil List Display

5.6 REFERENCE SEARCH

The locations where the same relay numbers and register numbers are used are searched. The operation procedure is different depending on whether the program display is made or not.

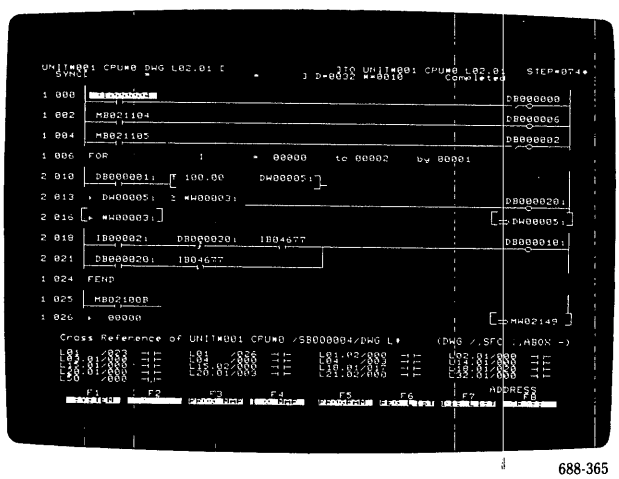
When the program display is made on the main screen

(1) Move the cursor to the relay number and register number to be searched.

(2) Depress the [MODE] screen selection key to output the display of Fig. 5.1 (c) to the function key display section.

(3) Depress the [CROSS] function key.

Fig. 5.67 shows an example of reference search display. All processing drawings subordinate to the basic drawing of the program currently being displayed are searched.



688-365

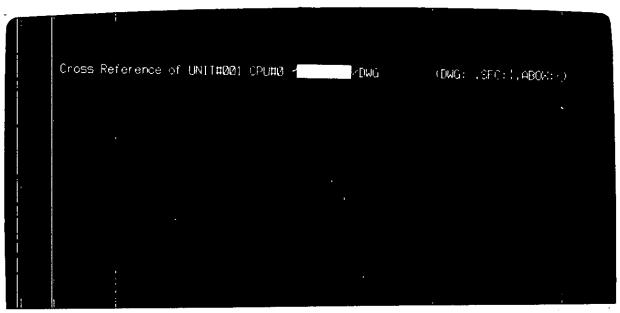
Fig. 5.67

Perform the following operations to output the reference search display to the main screen:

(1) Display a screen other than a program display.

(2) Depress the [MODE] screen selection key to output the display of Fig. 5.1 (c) to the function key display section.

(3) Depressing the [CROSS] function key causes the display of Fig. 5.68 to be output.



688-366

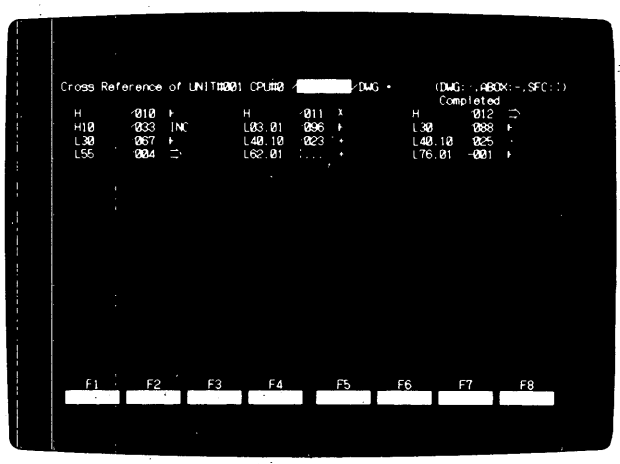
Fig. 5.68

(4) Enter the relay number and register number to be searched, and a search range. For example, to search all processing drawings for register number MW00000, perform the following operations:

- Register number [M] [W] [0] [0] [RETURN]
- Search range [*] [RETURN]

Entering the [*] key in the /DWG position causes all processing drawing to be searched. The following specification is also possible.

To search for the above register that is used in slow scanning, enter [L] [*].



689-255

Fig. 5.69

When the reference search display does not fit on the main screen and auxiliary screen, "CONTINE (RETURN)?" is displayed in the lower right portion of the screen, and if the remaining display is not required, depress any key other than the RETURN key. Depressing the RETURN key causes the remaining display to be output.

5.7 I/O DEVICE TRACE DATA DISPLAY

I/O devices (VS-676, VS-686TY, CP-813DMC, etc) connected to the CP-213 line (FA bus) sample eight signals every cycle in each device and keep data for 64 cycles (For details, refer to the operation manual of the appropriate devices.)

Perform the following operations to call the I/O device trace data to the display screen:

(1) Screen selection key [MODE]
(2) Function key [F7] (IO TRACE)

Fig. 5.70 shows the initial screen of trace data display.

Enter the line number and station number of the device subject to trace data display. To display trace data of the device with a line number of 0 and a station number of 09, perform the following operation:

[0] [RETURN] (Input of line number)

[9] [RETURN] (Input of station number)

The numeric display of the trace data will appear.

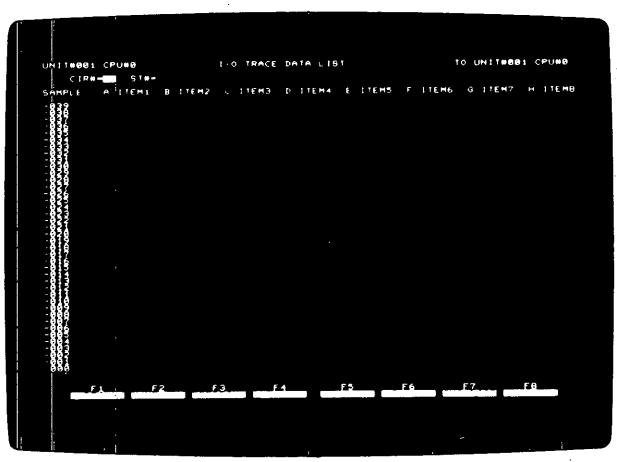
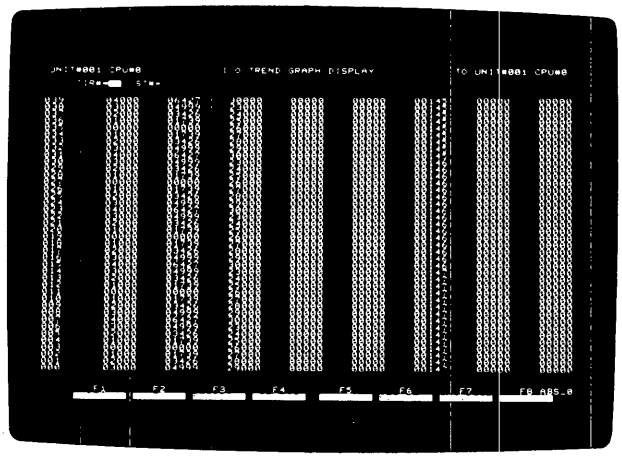


Fig. 5.70 Initial State of Trace Data Display

5.7.1 Numeric Display of Trace Data

Numeric display of data traced by I/O devices will make quantitative analysis for symptoms easier.



687-342
689-256

Fig. 5.71 Trace Data Numeric Display

The function keys for the numeric display of trace data are:

DEC	HEX					CHG. DISP	

The DEC and HEX keys are used to display the data item at the current cursor position in decimal and hexadecimal, respectively.

The meanings of data items ITEM1, ITEM2, and so forth depend on the I/O devices. For the meanings of the data items, refer to the operation manual of the appropriate I/O devices.

5.7.2 Graphic Display of Trace Data

The data in the display fields of data items A to D in the trace data numeric display described in Par. 5.7.1 can be displayed graphically in time series.

Operations for selection between numeric display and graph display screens are as follows:

Numeric data display screen ⟷ Graph display

Function key [CHG.DISP]

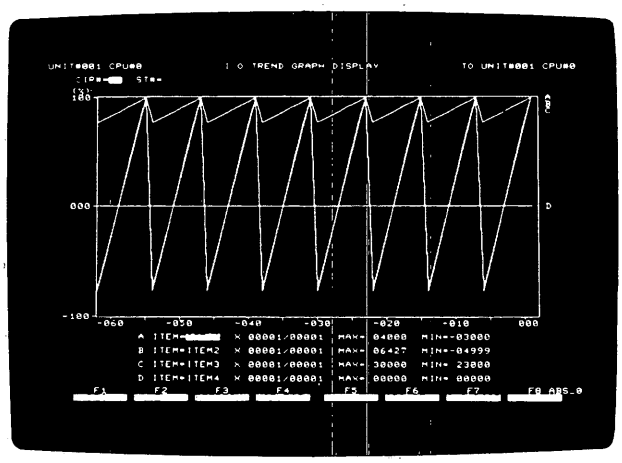
In a graphic display, 64 Samples are displayed per screen.

Two graphic display methods are available. One is the normalized display method (Fig. 5.72) in which the maximum value of the absolute value of traced data is set to 100%. The other is the method (Fig. 5.72) in which the maximum value of traced data is set to 100% and the minimum value is set to -100%.

When the graphic display screen is displayed, the function keys appear as follows:

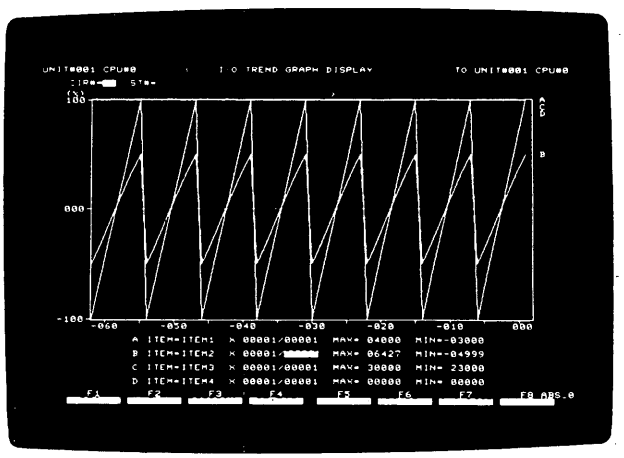
DEC	HEX		SELECT		ABS/REL	CHG. DISP	

The [SELECT] function key is used to select the data items to be displayed graphically. [ABS/REL] is used to select the graph display methods explained above.



687-333
689-257

Fig. 5.72



687-334
689-257

Fig. 5.73

The amplitude of data displayed graphically can be set freely to clarify the mutual relationship between two items.

To halve the amplitude of data item B in Fig. 5.73, perform the following operations:

(1) Move the cursor to the X [ ] position of item B.

(2) [1] [⇦ RETURN]

(3) [2] [⇦ RETURN]

5.8 DATA TRACE DEFINITION

The CP-3300 has the data trace function. The CP-3300 defines data (register contents and relay ON/OFF) to be traced on the data trace definition screen.

The CP-3300 performs tracing in group units and can define up to two groups.

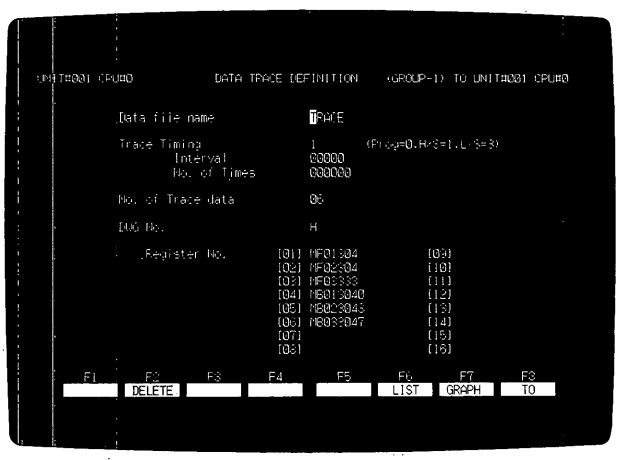
5.8.1 Calling up the Data Trace Definition Screen

To call up the data trace definition screen, perform the following operations:

(1) Screen selection key [MODE]

(2) Function key [F8] (TRACE)

Fig. 5.74 shows an example of data trace definition screen.



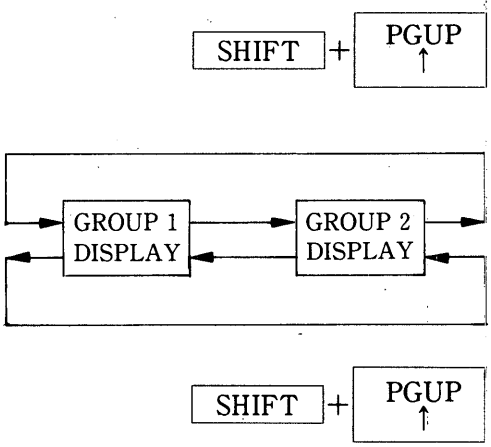
690-64

Fig. 5.74 Trace Data Definition Screen

The data trace definition screen is called up with the function key display section displayed as follows:

[ ] [DELETE] [ ] [ ] [ ] [LIST] [GRAPH] [TO]

A data group is called up as follows:



The meanings of the function keys are:

[DELETE] : Deletes the data definition of the group currently being displayed. Actual deletion is made when the [ENTER] key is depressed.

[LIST] : shifts the trace data of the group currently being displayed, with numeric values, or ON or OFF.

[GRAPH] : Shifts the data trace of the group currently being displayed to the trend graph display screen.

Fig. 5.75 explains the data trace definition screen.

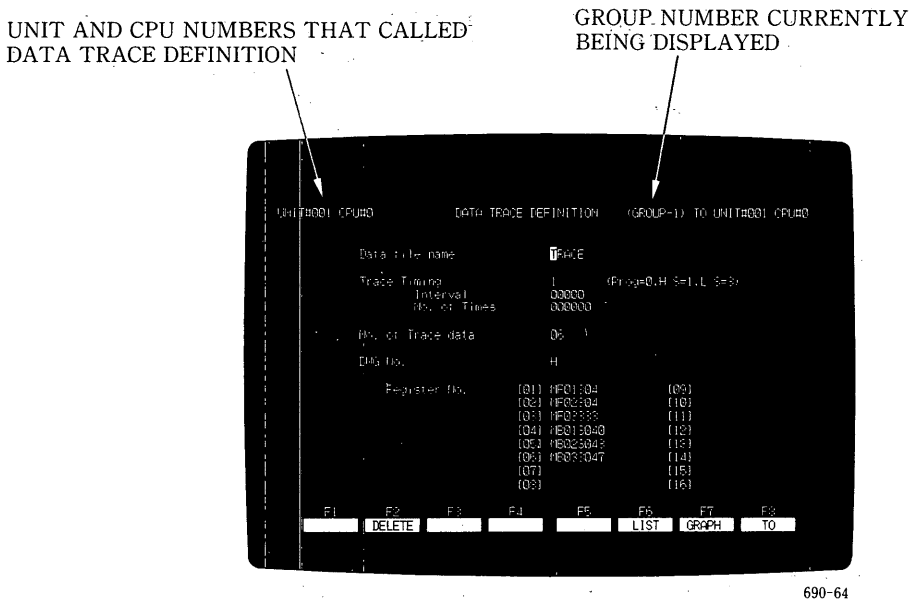


Fig. 5.75 Explains The Data Trace Definition Screen

• Explanation of data trace definition screen

(i) Data file name:

Enter a name assigned to a group number with eight characters or less. This exerts no influence on data tracing.

(ii) Trace timing:

Controls data tracing. "0" controls data tracing within user programs, using the system standard function TRACE. "1" or "3" performs data tracing during fast or slow scanning at the cycle specified in (iii).

(iii) Interval:

When "1" or "3" is specified as trace timing of (ii), it sets the interval for each scan. When "0" is specified, tracing is performed each time the scan specified in (ii) is

performed.

(iv) Number of traces:

Specify the number of traces. When 0 is specified, data tracing is performed continuously until a trigger signal is issued from the programming panel.

(v) Number of trace data:

Specify the number of data to be traced. Up 16 data can be set.

(vi) DWG number:

When D register is specified in (vii) below, specify the DWG number to which it belongs.

(vii) Data variable specification:

Enter the register number and relay number to be traced.

When writing is performed by the ENTER key after the data trace definition, the CPU starts tracing.

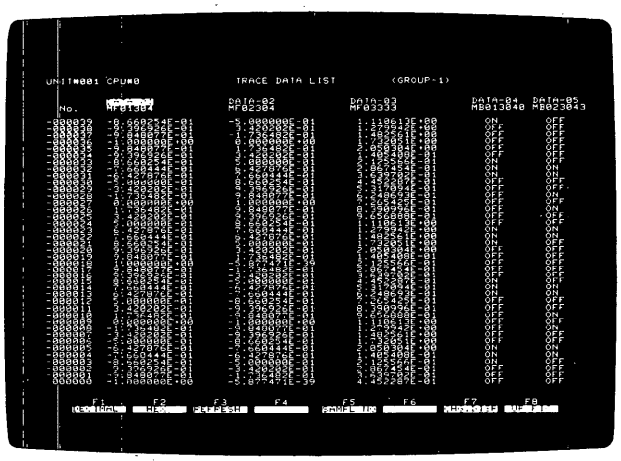
5.8.2 Numeric Display of Trace Data

To call the trace data numeric display screen, perform the following operations:

(1) Depress the [LIST] function key on the data trace definition screen.

(2) Depress the [CHG.DISP] function key on the trace data graph display screen.

Fig. 5.76 shows an example of the trace data numeric display screen.



688-377

Fig. 5.76 Trace Data Numeric Display

Data on the trace data numeric display screen is displayed according to the type (integer type, bit type) of data specified in the data variable specification of the data trace definition screen in Fig. 5.75.

The trace data numeric display screen is called up with the function key display section displayed as follows:

DECIMAL	HEX	REFRESH		SAMPL NO		CHG. DISP	UP PIC

The meanings of the function keys are explained below.

[DECIMAL] : Displays trace data of integer-type register in decimal.

[HEX] : Displays trace data of integer-type register in hexadecimal.

[REFRESH] : Issues a request again for trace data of the group currently being selectively displayed and makes an up-to-date trace data numeric display.

[SAMPL NO] : Enter the sample number in which the display is to begin. Depressing this function key moves the cursor to the sample number display position in the upper left portion of the screen, then enter the sample number to start display.

[CHG. DISP] : Used for selection between the numeric display screen and the graph display screen.

[UP PIC] : Returns to the data trace definition screen.

When the numeric display screen is called, "DATA NO EXIST" may be displayed in the message display area. This indicates that tracing of the group specified in the data trace definition is not started.

The numeric display screen is updated in the following two ways:

(1) Scroll the screen up or down by the [UP] and [DOWN] keys.

(2) Updating for each screen by [SHIFT] + [PGUP ↑], [SHIFT] + [PGDN ↓] (every 40 sample numbers)

Up to eight data can be displayed. Data that cannot be displayed by displayed by operating the [→] key.

The operator can direct the CPU to stop and start manually data tracing.

[RETRIG / TRIG] manually stops data tracing.

[Shift] + [RETRIG / TRIG] Starts manually data tracing.

5.8.3 Graphic Display

To call up the graph display screen of data trace, perform the following operations:

(1) Depress the [GRAPH] function key on the data trace definition screen.

(2) Depress the [CHG.DISP] function key on the trace data numeric display screen.

Fig. 5.77 shows an example of the trace data graphic display screen.

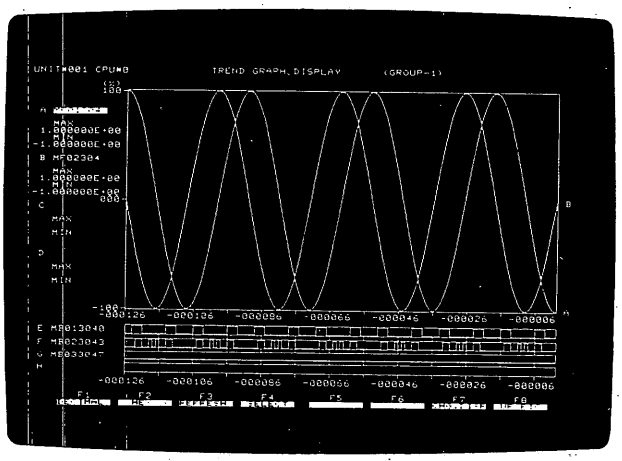


Fig. 5.77 Trace Data Graphic Display

The trace data graphic display screen is called up with the function key display section displayed as follows:

DECIMAL	HEX	REFRESH	SELECT			CHG. DISP	UP PIC

[SELECT] : Selects the data to be displayed graphically.

• Explanation of graphic display

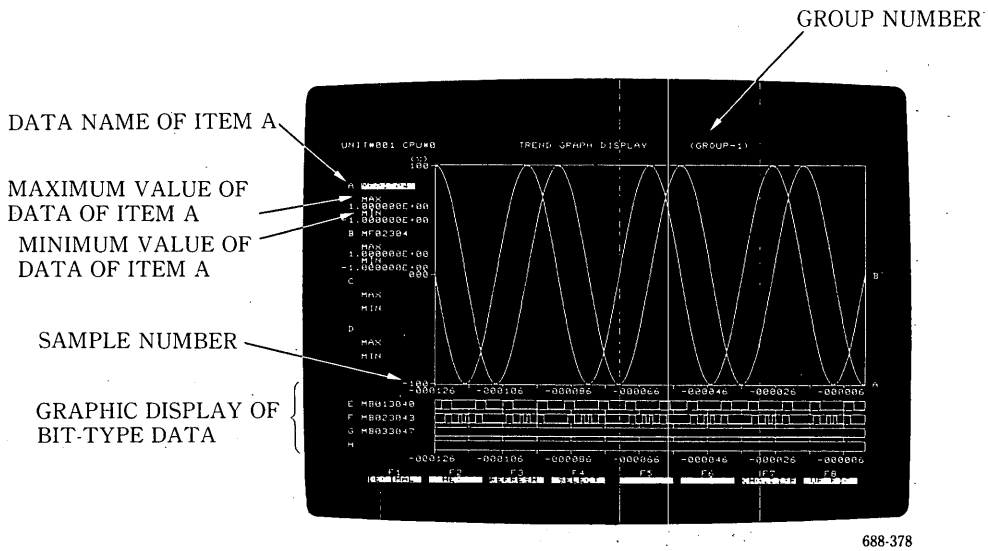


Fig. 5.78

Data specified with integer type or constant type in the data specification of data trace definition is displayed graphically in graph display items A to D, and data specified with bit type are displayed graphically in items E to H.

Data specified with integer type and constant type are displayed with the maximum value (absolute value) of traced data as 100%. Therefore, the amplitude of the display can be adjusted by changing the maximum and minimum values of each item.

The [HOME] and [END] keys scroll the screen horizontally.

The operator can manually direct the CPU to stop and start data tracing.

[RETRIG TRIG] manually stops data tracing.

[Shift] + [RETRIG TRIG] manually starts data tracing.

5.8.4 Back and Next Display of Display Screen

Depressing the screen control key [BACK] causes data previously displayed to be called back sequentially on the screen. Only register display and program display can be called back.

The [NEXT] key brings forward the screens which were called up to eight screens can be brought back by the [BACK] key.

Display screen is redisplayed by the [BACK] and [NEXT] keys when the screen selection key [MODE] calls another screen from a program display or register display, or the initial display screen of a program display or register display. Therefore, note that when a program display is updated with the DWG number and function name displayed in Fig. 5.7, the updated program display is not redisplayed.

If the [BACK] or [NEXT] key is used for redisplay when a program display is made on the main screen and a register display is made on the auxiliary screen, the register display on the auxiliary screen is suppressed.

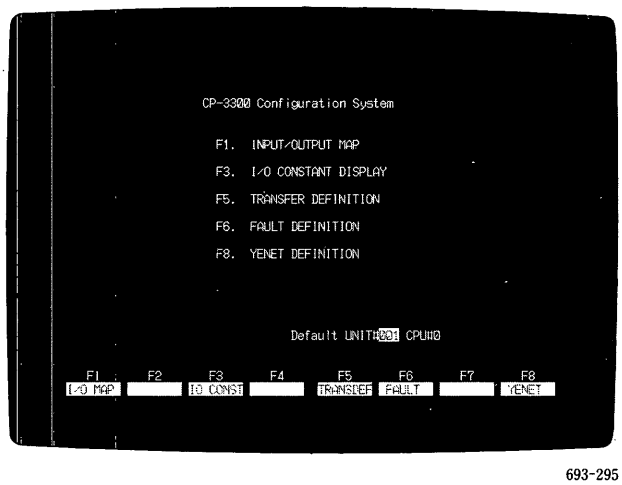
6. DATA DEFINITION

This section explains data definitions of the CP-3300 system configuration, such as I/O control module allocation, and the format for communication with host computers and other controllers.

CONTENTS

6. DATA DEFINITION

By operating the [F2] key on the basic menu screen, various types of data definitions such as fault data definition and trace data definition of the CP-3300 system are selected, and the data definition initial screen of Fig. 6.1 (a) is displayed.



693-295

Fig. 6.1 (a) Data Definition Initial Screen

On the data definition initial screen display, perform initial setting of unit number and CPU number, as explained in Section 5.

The data definition initial screen is displayed with the function key section as shown in Fig. 6.1 (b).

IO MAP		IO CONST		TRANSDEF	FAULT		

Fig. 6.1 (b)

6.1 DISPLAYING DRIVE DEVICE INITIAL CONSTANT DATA

As I/O devices connected to the CP-213 (FA bus) line, motor control devices such as the new vector control transistor inverter VS-676 and cassette-type transistor inverters VS-686TY and CP-813DMC can be connected.

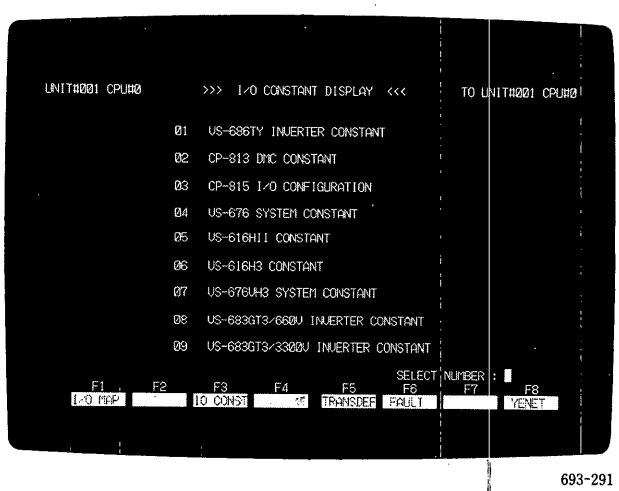
These motor control devices receive constants necessary for control from the CP-3300 via the CP-213 (FA bus). The initial constant data display screen displays and sets constants necessary for the motor control devices. The initial constant data screen can be displayed only when these constants are registered beforehand in the CP-213 IOMAP.

To call up the initial constant data display screen, perform the following operations:

(1) Screen selection key [MODE]

(2) Function key [F3] (IO CONST)

Fig. 6.2 shows the initial constant display call up screen.



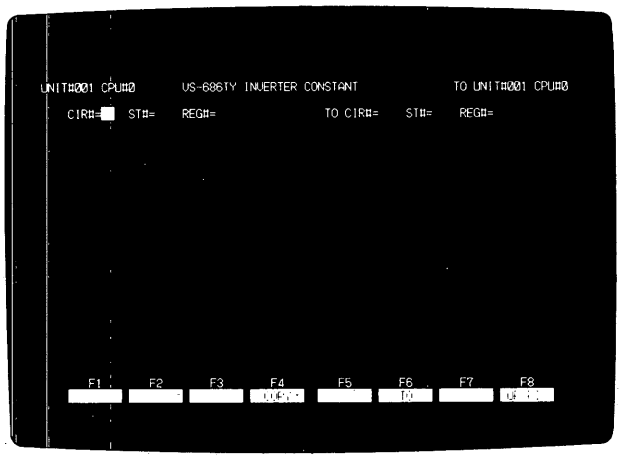
693-291

Fig. 6.2

Select the device to be displayed, using the numeric keys.

In Fig. 6.2, to display the initial setting constant data for the cassette-type inverter VS-686TY, for example,

perform keying [1] [RETURN], and the screen will be displayed as shown in Fig. 6.3.



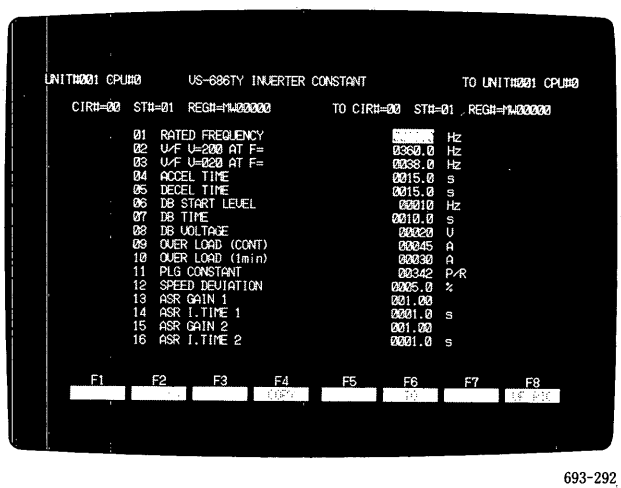
688-370

Fig. 6.3

On this screen, enter the line number of the cassette- type inverter VS-686TY of which initial constant data are to be displayed, and the station number within the line. For example, if the line number is "0" and the station number is "01", perform the following operations:

0 RETURN (input of line number)

1 RETURN (input of station number) and the initial constant data will be displayed, as shown in Fig. 6.4.



693-292

Fig. 6.4

6.1.1 Setting of Initial Constant Data

Set initial constant data of individual devices on the screen of Fig. 6.4.

Set initial constant data by the following operation. Initial constant data can be set even if the CP-3300 is ON-LINE.

(1) Move the cursor to a desired initial constant data item, or move the cursor with the [RETURN] key.

(2) Set initial data. For example, in Fig. 6.4, to set 04 ACCEL TIME to 15.0 sec, enter numeric keys [1] [5] [.] [0] ([ ] indicates omittable keying). The [RETURN] key is a key for determining the input.

If a numeric value is entered mistakenly, the input can be canceled with the [ESC] key at any time before the [RETURN] key is depressed.

(3) Repeat (1) and (2) to set the initial constant data of each item.

If the setting is completed, write to the CP-3300 module with the [RETURN] key. If the writing is performed successfully, "COMPLETED" is displayed. Any message other than "COMPLETED" indicates failure in the writing. Check the value of the setting data and the status of the writing device before re-writing.

6.1.2 Functions for Supporting Initial Data Setting

A great number of drive devices having identical characteristics, controlled by the CP-3300, may be connected. In this case, initial constant data currently being displayed can be written per station number allocated to each device.

Perform the following operations:

(1) Operate the [COPY] function key.

The cursor moves to the TO CIR# = [ ] position. Enter the line number to write to, and depress [RETURN]. Next, enter the station number of connected device, and depress [RETURN]

When the [RETURN] key is depressed, the initial constant data is written to the CP-3300 CP module.

Note: When a write device is specified, the device (station number, I/O name, etc.) must be allocated using the I/O allocation display screen explained in Par. 6.4.4 (1). For the initial constant setting values of a drive device, refer to the manual of the device before entering them. This programming panel does not check the upper and lower limits of setting values.

6.2 TRANSMISSION DEFINITION SCREEN

The CP-3300 can perform data transmission with host computers and peripheral devices via the communication module IOP and COMM module.

The transmission definition screen sets communication parameters of these communication modules

6.2.1 Calling up Transmission Definition Screen

To call up the transmission definition screen, perform the following operations:

(1) Screen selection key [MODE]

(2) Function key [F5] (TRANSDEF)

Fig. 6.5 shows an example of the transmission definition screen.

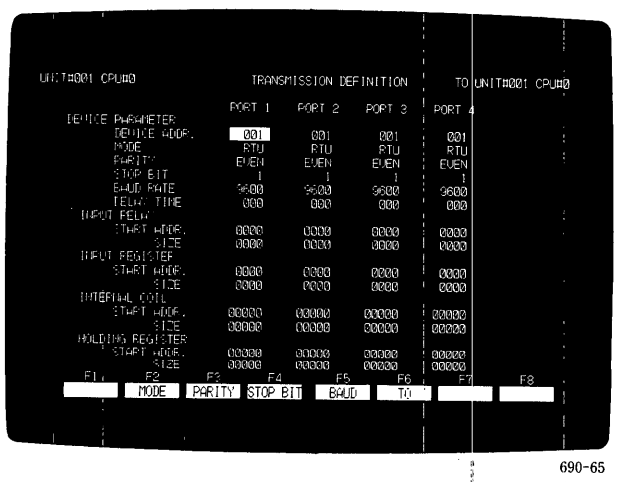


Fig. 6.5 Transmission Definition Screen

The transmission definition screen is called up with the function key display section displayed as follows:

	MODE	PARITY	STOP BIT	BAUD	TO		

Individual items being displayed are explained below.

MODE, PARITY, STOP BIT, and BAUD RATE are specified by the function keys, and other items are set by alphanumeric keys. For the MEMOBUS specifications, refer to "In-Factory Communication System Memobus" (SIE-C815-7.60).

The function keys are used to specify the items indicated by "DEVICE PARAMETER" of transmission parameters. Numerical keys are used to specify the other items.

The relationship between port numbers indicated on the transmission parameter setting screen, and communication modules is as shown below.

IOP module PORT1, PORT2
COMM module PORT3, PORT4

The IOP module is essential to the CP-3300 system configuration, but the installation of the COMM module may or may not be made, depending on the system When the COMM module is not installed, the PORT3 and PORT4 parameters are disregerded.

For the MEMOBUS specifications, refer to "In-Factory Communication System Memobus" (SIE-C815-7.60).

6.2.2 Specifying Transmission Parameter Items

The specification of transmission parameter items falls into two categories:

(i) Specifying communication port parameters

(ii) Specifying interface register with memobus messages

(1) Specifying communication parameters
Specify the items indicated by "DEVICE PARAMETER" on the transmission parameter setting screen.

Communication port parameters are specified to conform to transmission specifications with remote devices connected to the port. The CP-3300 has the initial values shown in Table 6.1.

Table 6. 1 Initial Values of Communication Parameters

Communication parameter	Initial value
DEVICE ADDR.	0 0 1
MODE	RTU
PARITY	EVEN
STOP BIT	1
BAUD RATE	9 6 0 0
DELAY TIME	0

(a) DEVICE ADDR.
Specify the slave address of memobus. Specify "DEVICE ADDR" in the range of 1 to 247.

When the programming panel is connected to the IOP or COMM module (the IOP and COMM modules permit connection of one programming panel each), the unit number afforded from the programming panel denotes the transmission parameter "DEVICE ADDR".

If "DEVICE ADDR." of the port to which the programming panel is currently connected is changed for writing, "TIME OVER" occurs (the specified data is ordinarily written, but the programming panel cannot accept a normal response because "DEVICE ADDR." is changed). Change the unit number and call up the transmission parameter setting screen again.

(b) Data format

(i) MODE

Specify communication mode. Operating the [F2] function key (MODE) causes RTU and ASCII to be displayed alternately. Perform setting to conform with the remote devices. The data length is eight bits in RTU mode and seven bits in ASCII mode.

(ii) PARITY

Specify whether parity check is to be performed or not. Operating the [F3] function key (PARITY) causes EVEN, ODD, and NONE to be displayed in this order. Perform setting to conform with the remote devices.

(iii) STOP BIT

Specify stop bit length. Operating the [F4] function key (STOP BIT) causes "1" and "2" to be displayed alternately. Perform setting to conform with the remote devices.

(iv) BAUD RATE

Specify transmission rate. Operating the [F5] function key (BAUD) causes transmission rates to be displayed. Transmission rate can be specified in the range of 150 to 19200 bauds. Perform setting to conform with the remote devices.

(v) DELAY TIME

By specifying a delay time, after the CP-3300 receives a transmission signal from a remote device, transmission of a response is delayed by the specified time. Ordinarily, "0" is sufficient.

(2) Specifying memobus interface register

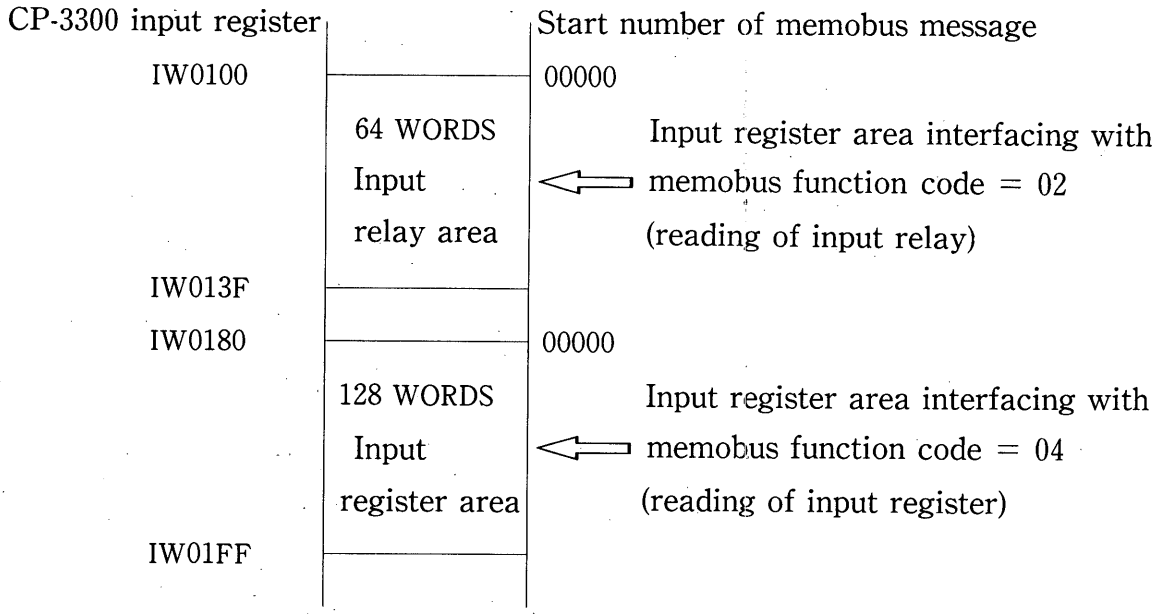
When the CP-3300 operates as a memobus slave, specify CP-3300 interface registers corresponding to individual memobus messages.

(i) INPUT RELAY and INPUT REGISTER

Allocate CP-3300 input register (IW) area for reading memobus messages to an input relay and an input register.

INPUT RELAY		
START ADDR.	0100	(Specify with hexadecimal.)
SIZE	0064	(Specify with decimal.)
INPUT REGISTER		
START ADDR.	0180	(Specify with hexadecimal.)
SIZE	0128	(Specify with decimal.)

When INPUT RELAY and INPUT REGISTER are specified as shown above, the relationship with memobus messages is as shown in the figure below.

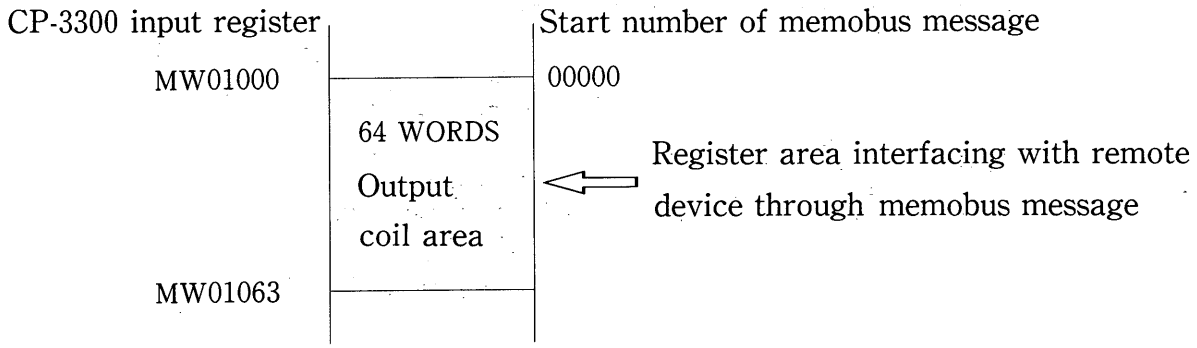


(ii) OUTPUT COIL

Allocate CP-3300 common register (MW) area for the coil status reading, single coil status change, and change of the status of more than one coil by memobus message.

OUTPUT COIL		
START ADDR.	01000	(Specify with decimal.)
SIZE	00064	(Specify with decimal.)

When OUTPUT COIL is specified as shown above, the relationship with memobus messages is as shown in the figure below.



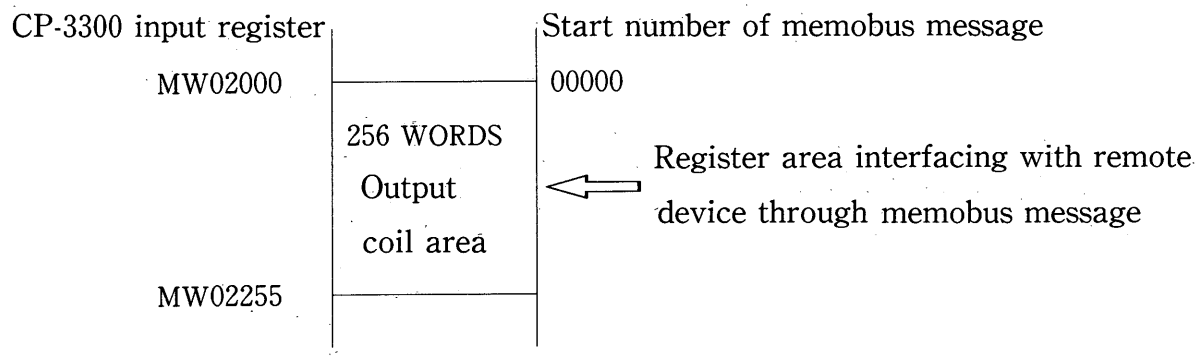
The 64-word area specified in SIZE is a writable area. When instructions to write to other than this area are received from a memobus message, a response is made with an error code. For read messages, normal response is returned independently from this area.

(iii) HOLDING REGISTER

Allocate CP-3300 common register (MW) area for the holding register contents reading, writing to more than one holding register, and writing to a single register by memobus message.

HOLDING REGISTER		
START ADDR.	02000	(Specify with decimal.)
SIZE	00256	(Specify with decimal.)

When HOLDING REGISTER is specified as shown above, the relationship with memobus messages is as shown in the figure below.



The 256-word area specified in SIZE is a writable area. When instructions to write to other than this area are received from a memobus message, a response is made with an error code. For read messages, normal response is returned independently from this area.

6.2.3 Writing Transmission Definition

After setting of transmission mode is completed, write to the CP module or floppy disk by the [ENTER] key. If the writing is performed successfully, "Completed" is displayed in the message display position. If a write error occurs, the contents are displayed. For error messages, see Table A4.

6.3 FAULT DEFINITION AND FAULT TRACE DISPLAY

The CP-3300 has the fault trace function. The fault definition screen defines fault detection relays, fault levels, and fault names for each fault definition number. The status of fault detection relays must be determined within user programs. Fault detection relays represent faults by deenergization.

The fault trace display consists of the following two screens:

(i) Fault occurrence display screen:
The names of persistent faults are displayed together with fault occurrence times. If a new fault occurs when this screen is called up, the name of the fault is displayed.

(ii) Fault trace display screen
Fault status is displayed. The names of current faults and previous faults already solved are displayed together with occurrence and recovery times.

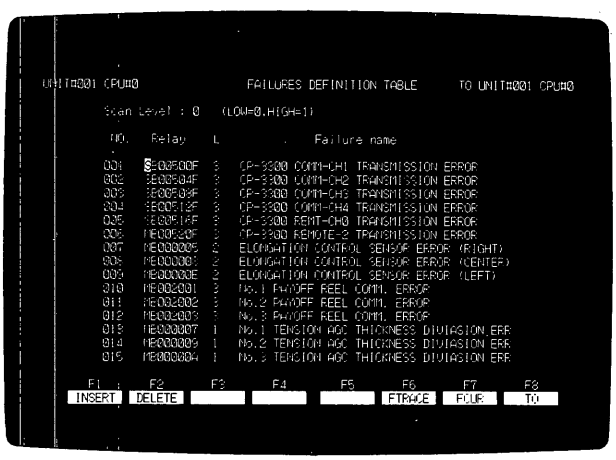
6.3.1 Calling up Fault Definition Screen

To call up the fault definition screen, perform the following operation:

(1) Screen selection key [MODE]

(2) Function key [F5] (FAULT)
Fig. 6.6 (a) shows an example of the fault definition screen.

The fault definition screen is called up with the function key display section displayed as shown in Fig. 6.4 (b).



690-66

Fig. 6.6 (a) Example of Fault Definition Screen

INSERT	DELETE				FTRACE	FCUR	TO

Fig. 6.6 (b)

The meanings of the functions keys are:

INSERT : Adds a fault item. When newly defining a fault item before a fault number in which the cursor is placed, depress the INSERT key.

DELETE : Deletes the fault definition of the fault number line in which the cursor is placed.

FTRACE : Shifts to the fault trace display screen.

FCUR : Shifts to the fault occurrence display screen.

6.3.2 Setting of Fault Definition Data

When the fault definition screen is called up, the cursor lights at the detection level input position. Specify a detection level.

For detection level of slow scan, enter the alphanumeric key 0 and depress the RETURN key. For detection level of fast scan, enter the alphanumeric key 1 and depress the RETURN key.

When a detection level is specified, the cursor lights in the input position of the fault detection relay of fault number 001.

Enter fault definition data according to the following procedure. Up to 31 fault detection relays can be defined in fast scan and slow scan, respectively.

(1) Entering fault detection relay
Relay numbers that can be used as detection relays cannot specify a DWG specific area in a DWG common data area.

(2) Entering fault level
Use the numeric keys 0 to 9 for the entry.

(3) Entering fault name

Enter the name of fault detected in fault detection relays

If a change in fault definition data occurs, the CP module resets all existing trace data and provides against the occurrence of fault in data newly defined.

6.3.3 Displaying Fault Trace

The fault trace display is called up from the fault definition screen or fault occurrence display screen by depressing the FTRACE function key.

The fault trace display shows fault occurrence time and recovery status.

A fault indicated by "*" in displayed recovery time still persists. Fig. 6.7 shows an example of fault trace display.

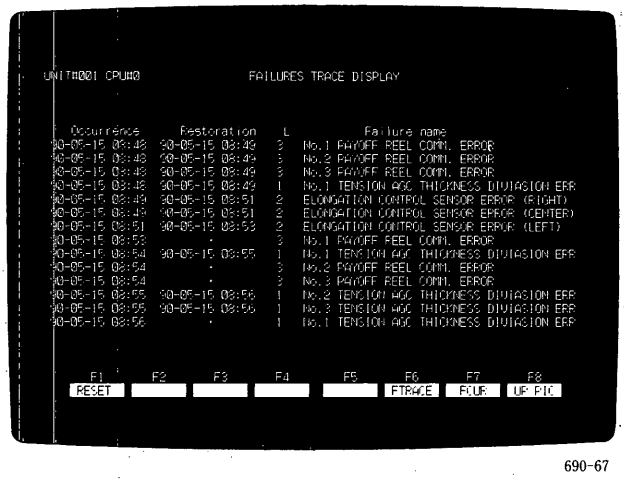


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Fig. 6.7 Example of Fault Trace Display

6.3.4 Fault Occurrence Display Screen

The fault occurrence display screen is called up from the fault definition screen or fault trace display screen by depressing the FCUR function key. Fig. 6.8 shows an example of the fault occurrence screen.

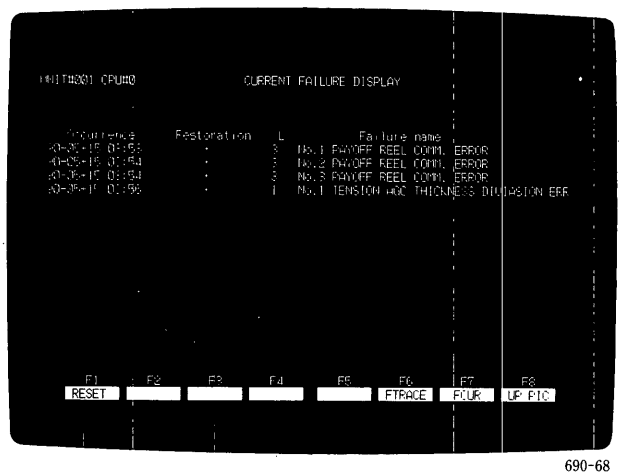


Fig. 6.8 Example of Fault Occurrence Display

6.4 I/O ALLOCATION

This section explains the allocation of CP-3300 process I/O data, and FA bus II input and output link data. Fig. 6.9 shows the correspondence between CP-3300 I/O registers and I/O control modules (local I/O module: IOP, remote I/O module: RIOD, and FA bus: 213IF).

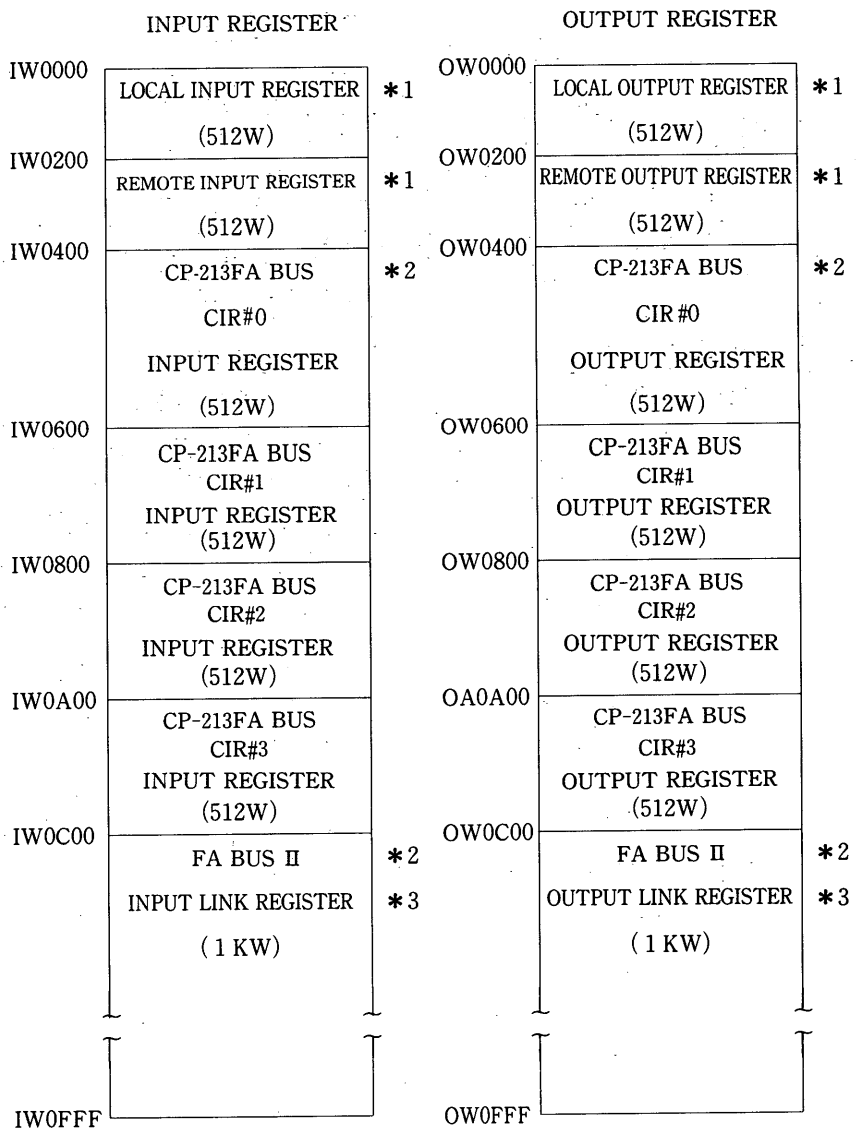


Fig. 6.9

*1 The discrete modules (B2601, B2603, etc.) are allocated as local or remote I/O devices in register units (minimum unit), that is, 16 discrete points.

*2 The last 16 words of each line of CP-213FA bus and FA bus II is for system area. Therefore, I/O allocation of CP-213IF and FA bus II, a system area cannot be allocated.

*3 I/O link data of FA bus II is divided into a discrete area and a register area, as shown in Fig. 6.10. The discrete I/O area can be allocated as register I/O, but they cannot overlap each other.

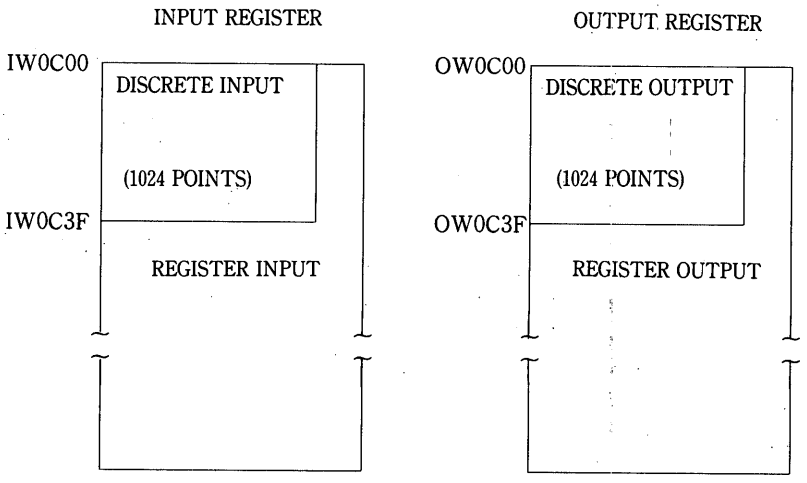
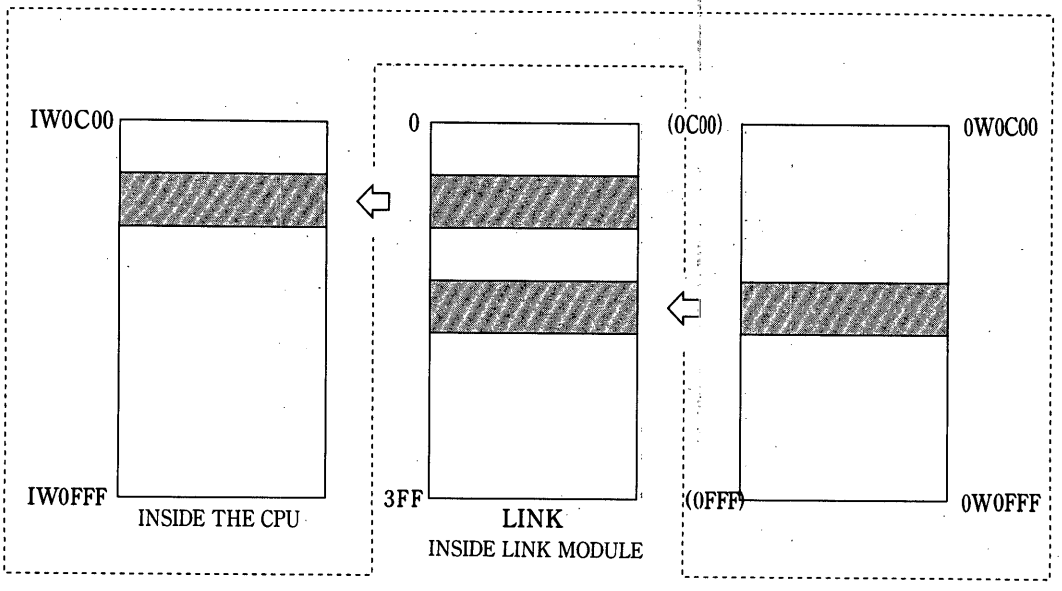


Fig. 6.10

For FA bus II I/O link data, the communication data area (memory area for sending and receiving I/O data to and from other controllers) within the PC-LINK module has a size of 1K words, including input and output areas.

Therefore, although CP-3300 internal I/O registers are allocated an area of 1K words each, care should be taken to ensure that output register numbers do not overlap during link map allocation.



6.4.1 Calling I/O Allocation Display

The I/O allocation menu is displayed by the following operations:

(1) Screen selection key [MODE]

(2) Function key [F1] (I/O MAP)

I/O allocation configuration and the operation for I/O allocation to communication modules are shown below.

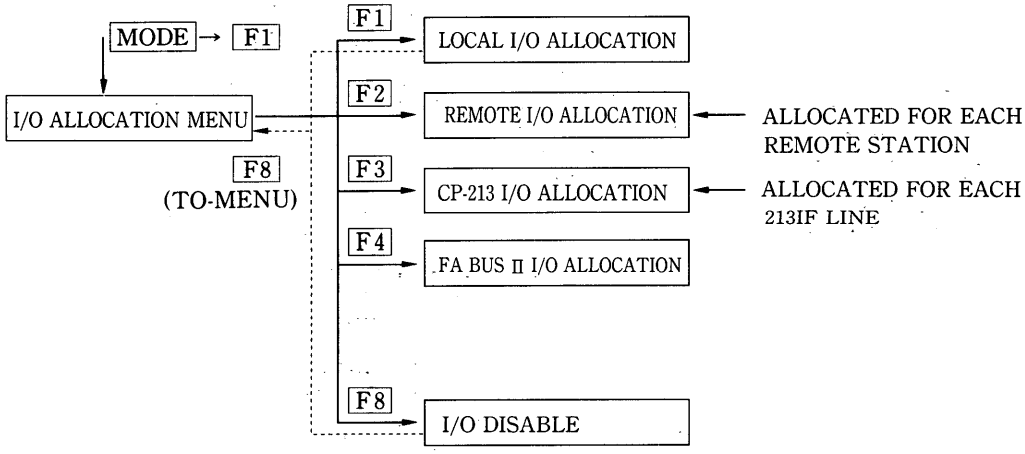


Fig. 6.11

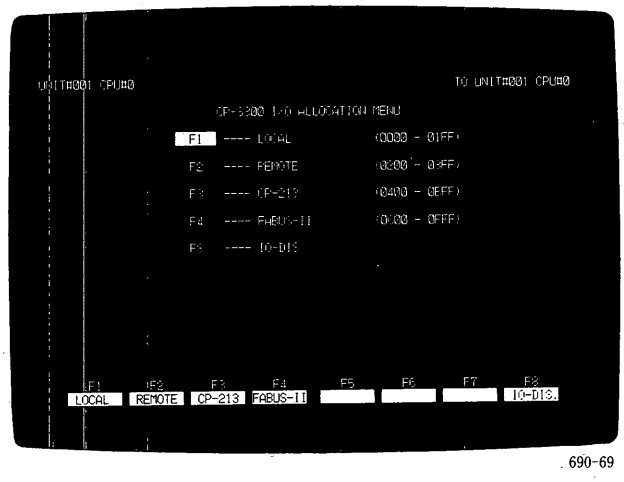


Fig. 6.12 I/O Allocation Menu Display Screen

6.4.2 Local I/O Allocation

The CP-3300 can perform I/O operations with I/O devices via the IOP module (JAMSC-IF60) installed in the CPU installation rack.

(1) Local I/O allocation display

The local I/O allocation screen is called up from the I/O allocation menu display screen of Fig. 6.12 by depressing the [F1] (LOCAL) key. Fig. 6.13 shows the local I/O allocation screen.

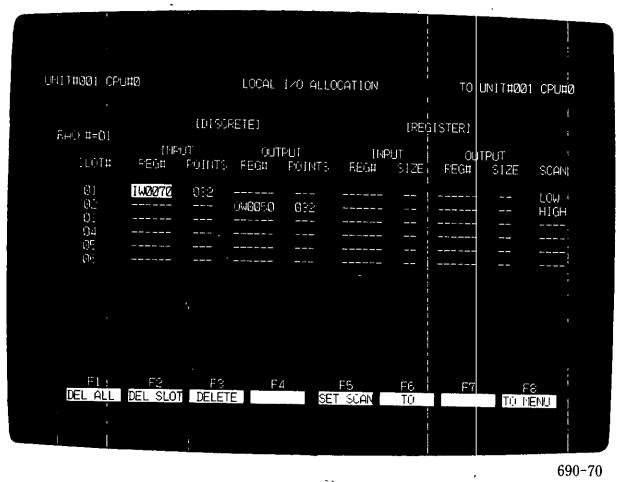


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Fig. 6.13 Local I/O Allocation Screen

The local I/O allocation screen is displayed with the function key display section displayed as follows:

[DEL ALL] [DEL SLOT] [DELETE] [ ] [SET SCAN] [TO] [ ] [TO MENU]

Fig. 6.14

RACK # and SLOT # displayed on the local I/O allocation screen are as shown in Fig. 6.15.

Assume that the number of the rack in which the CPU is installed is 01. In the rack number 01, up to six I/O modules can be installed when no communication module is installed. In rack numbers 02 to 05, up to nine I/O modules can be installed in each. Explanation of the function keys in the local I/O allocation display follows. The function key display section is automatically displayed as in Fig. 6.14 when the local I/O allocation display screen is called up. When the meanings of the function keys are changed by the [MODE] key, the display of Fig. 6.14 can be restored by depressing the [F-SEL] key.

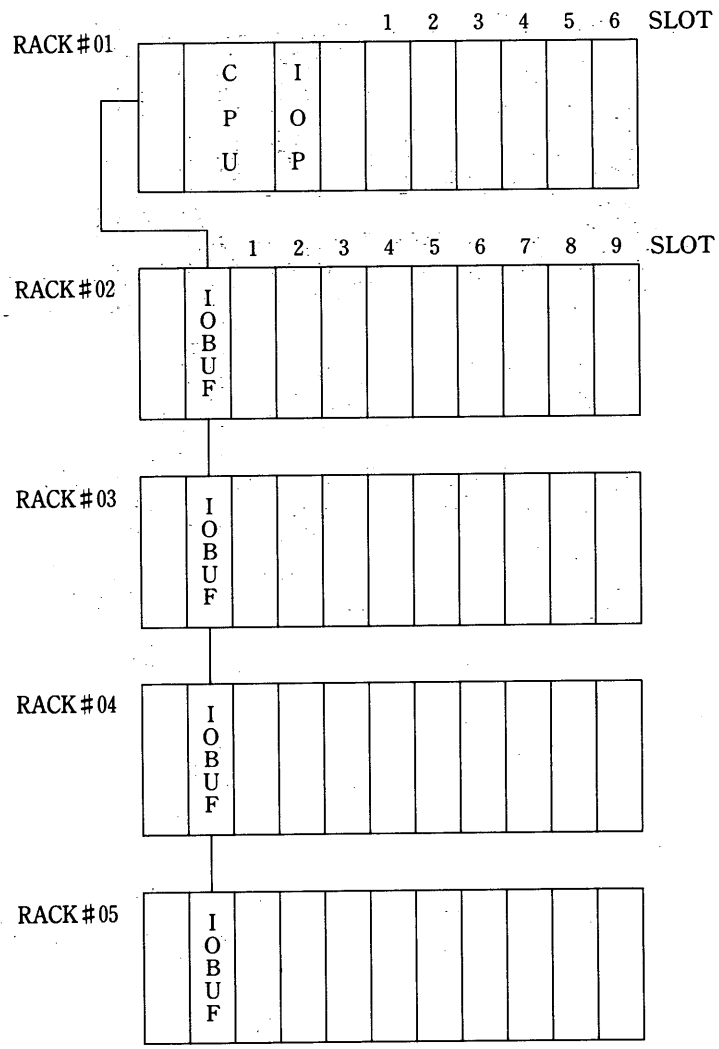

Fig. 6.15

F1 key (DEL.ALL):
Deletes all current local I/O allocations.
F2 key (DEL.SLOT):
Deletes the allocation of the slot in the cursor position.
F3 key (DELETE):
Deletes allocation data in the cursor position.
F5 key (SEL.SCAN):
Allocates the slot in the cursor position for I/O at fast scan or slow scan.
F6 key (TO):
Specifies the location to which I/O allocation information is written.
F8 key (TO MENU):
Returns to the I/O allocation menu screen.

(2) Creating and changing local I/O allocation
The method for creating local I/O allocation is explained using Fig. 6.16 as an example.

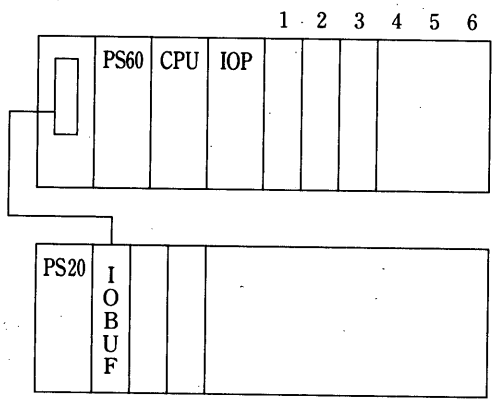

Fig. 6.16 (a)

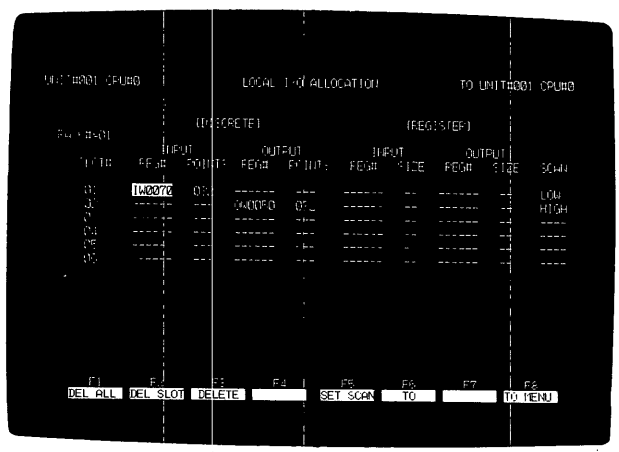

Fig. 6.16 (b)

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Display the local I/O allocation according to the procedure explained in (1), "Local I/O allocation display". If no local I/O is allocated, "New file" is displayed in the message display area. When the local I/O allocation screen is called, the I/O allocation of RACK#01 is displayed.

Allocate I/O modules installed in each SLOT of RACK#01 of Fig. 6.16.

(a) Allocating input modules installed in SLOT#01.
Make sure that the cursor lights in the REG# position of discrete input of SLOT#01. If the cursor lights in other position, move the cursor to the REG# position of discrete input of SLOT#1.

1 Specifying input register number and the number of data

Specify the location within the CP-3300 to which input data from the input module installed in SLOT#01 of RACK#01 is got. In this example, assume that input data is got in input register IW0070.

Enter alphanumeric keys [I] [W] [0] [0] [7] [0] and depress the [RETURN] key, and the cursor will move to the position of the next POINTS (number of input points).

Enter numeric keys [3] [2] and depress the [RETURN] key.

This means that 32 points (bits), or two words of data, are entered as the number of input data.

2 Specifying I/O processing level

When an input register number and the number of data have been specified (i), "LOW" is automatically displayed in the column of "SCAN" (represents the scan level of processing the input). This means that input data from the input module installed in SLOT#01 of RACK#01 are processed at slow scan.

For input processing at fast scan, move the cursor to the "SCAN" position, and enter the [F5] key, or enter [H] [I] [RETURN] from the keyboard. Depressing the [F5] key causes "LOW" or "HIGH" to be displayed alternately in "SCAN". (Entering [L] [O] [W] [RETURN] from the keyboard causes "LOW" to be displayed.)

(b) Allocating output module installed in SLOT#02

Move the cursor to the REG# position of discrete output of SLOT#02.

1 Specifying output register number and the number of data

Specify the register within the CP-3300 from which output data are written to the output module installed in SLOT#02 of RACK#01. In this example, assume that data of output register OW0050 are output.

Enter alphanumeric keys [O] [W] [0] [0] [5] [0] and depress the [RETURN], and the cursor will move to the position of the next POINTS (number of output points).

Enter numeric keys [3] [2] and depress the [RETURN] key. This means that 32 points (bits), or two words of data, are output as the number of output data.

2 Specifying I/O processing level

When an output register number and the number of data have been specified (i), "LOW" is automatically displayed in the column of "SCAN" (represents the scan level of processing the output). This means that data are output at slow scan cycle for the output module installed in SLOT#02 of RACK#01.

In this example, assume that data are output at fast scan cycle for an output module.

- Move the cursor to the "SCAN" position of SLOT#02.
- Operate the [F5] function key (SET SCAN) and the [RETURN] key. (Or enter [H] [I] [G] [H] [RETURN] from the keyboard.)

Next, proceed to allocation of RACK#02.

Depressing the [SHIFT] + [PGUP] keys causes the I/O allocation display screen of RACK#02 to be displayed.

Allocate each SLOT of RACK#02 by the method previously explained.

(3) Writing local I/O allocation data

If creation or change of local I/O allocation data is completed, perform write operation. Use the [ENTER] key for writing.

The write destination is usually the calling up source. In other words, if local I/O allocation is called up and the [ENTER] key is used, the writing is made to the CP-3300 CPU. However, if the write destination is changed by the [F6] (TO) key, the writing is made to the changed destination.

6.4.3 Remote I/O Allocation

The CP-3300 can perform I/O operations with I/O devices remotely installed, via the remote I/O communication module RIOD (JAMSC-IF62) installed in the CPU installation rack. This section explains the allocation of remotely installed I/O devices.

(1) Remote I/O allocation display

The remote I/O allocation screen is called up from the I/O allocation menu display screen of Fig. 6.12 by depressing the [F2] (REMOTE) key.

Fig. 6.17 shows the remote I/O allocation screen.

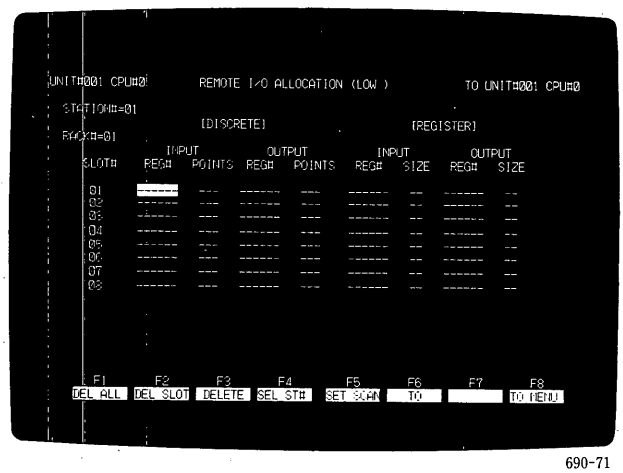

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Fig. 6.17 Remote I/O Allocation Screen

The remote I/O allocation screen is displayed with the function key display section displayed as follows:

DEL ALL	DEL SLOT	DELETE	SEL ST #	SET SCAN	TO		TO MENU

Fig. 6.18

The CP-3300 permits the connection of up to 31 remote I/O stations. Fig. 6.19 shows remote I/O device configuration.

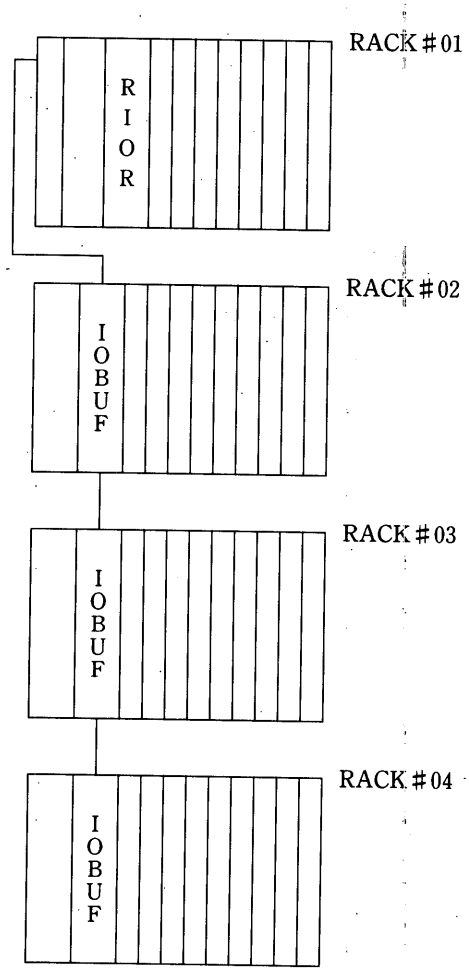


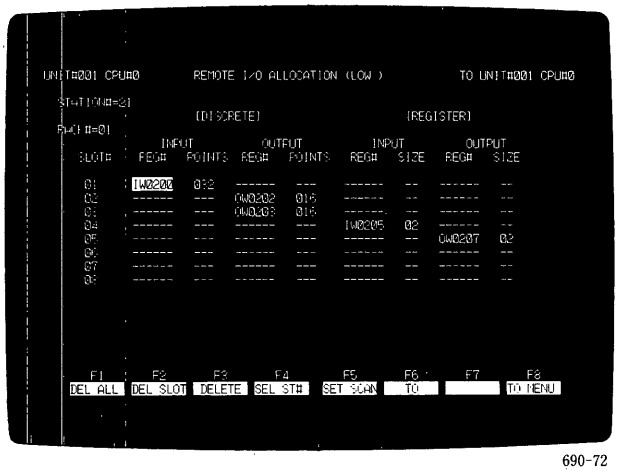
Fig. 6.19

• When the remote I/O allocation display is made, the cursor lights in the ST # = position.

• Enter the station number to make the remote I/O allocation display. Specify a remote I/O station by the remote I/O receiver RIOR (JAMSC-IF70).

• The range of station address is from 1 to 31.

Fig. 6.20 shows the remote I/O allocation display of station 21.



690-72

Fig. 6.20 Example of Remote I/O Allocation

When the remote I/O allocation display is made, the meanings of the functions keys are:

[F1] (DEL.ALL):

Deletes all I/O allocations of the station currently being displayed.

[F2] (DEL SLOT):

Deletes the I/O allocation of the slot in the current cursor position.

[F3] (DELETE):

Deletes I/O allocation data in the current cursor position.

[F4] (SEL ST#):

Moves the cursor to the ST# = [ ] and waits until a station number newly displayed is entered.

[F5] key (SET SCAN):

Specifies whether I/O processing of remote I/O station currently being displayed is performed at fast scan or slow scan. Note that I/O processing of remote I/O is performed for each remote I/O station.

[F6] key (TO):

Specifies the location to which remote I/O allocation information is written. The specified destination becomes effective when the [ENTER] key is depressed.

[F8] key (TO MENU):

Returns to the I/O allocation menu screen.

(2) Creating and changing remote I/O allocation data

Create and or change remote I/O allocation data according to the procedure explained in (1) of Par. 6.4.2. The creation or change of remote I/O allocation data is different from those of local I/O allocation in I/O processing level specification. Since remote I/O processing is performed for each remote I/O station, as explained previously, specify the I/O processing level of the remote I/O station that is currently creating or changing I/O allocation data. When specifying I/O processing level, since slow scan mode is automatically set when the remote I/O station allocation is called, perform the following operations to switch to fast scan mode:

① Depress the [F5] (SET SCAN) key. The cursor moves to the I/O processing scan level position of the title display section.

② Depress the [F5] (SET SCAN) key. The display within the cursor changes from "LOW" to "HIGH".

③ [RETURN]

I/O processing scan level is determined.

(3) Writing remote I/O allocation data

The remote I/O allocation data created by (2) above is written to the CPU or floppy disk when the [ENTER] key is depressed. (If the write destination is changed by the [F6] (TO) key, the remote I/O allocation information is written to the changed destination.) When the writing is performed successfully, the I/O allocation and processing scan level become effective.

6.4.4 CP-213 (FA Bus) I/O Allocation

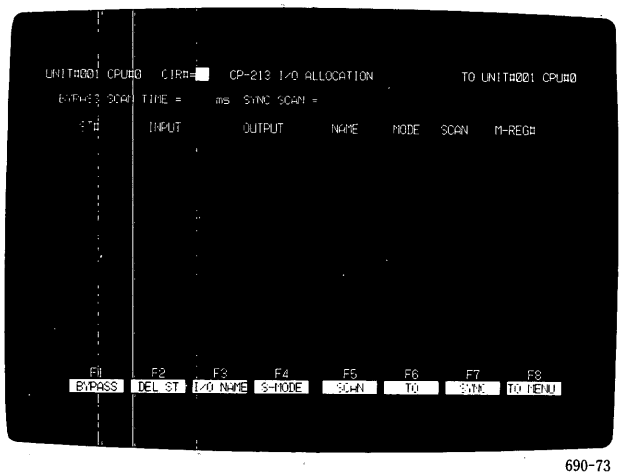
The CP-3300 can perform I/O operations with FDS devices via the 213IF module (JAMSC-IF63) installed in the CPU installation rack.

Up to four 213IF modules can be installed. This section explains allocation to FDS devices with which I/O operations are performed via the 213IF.

(1) CP-213 I/O allocation display

The CP-213 I/O allocation display can be called up from the I/O allocation menu display screen of Fig. 6.12 by depressing the [F3] (CP-213) key.

Fig. 6.21 shows the CP-213 I/O allocation initial display.



690-73

Fig. 6.21 CP-213 I/O Allocation Initial Display

When the CP-213 I/O allocation screen is displayed, the cursor lights in the CIR # = [ ] position on the first line of the screen. (A line number is set with dip switches CIR0 and CIR1 of the 213IF.) Input the line number of the module installed.

Fig. 6.22 shows the CP-213 I/O allocation display.

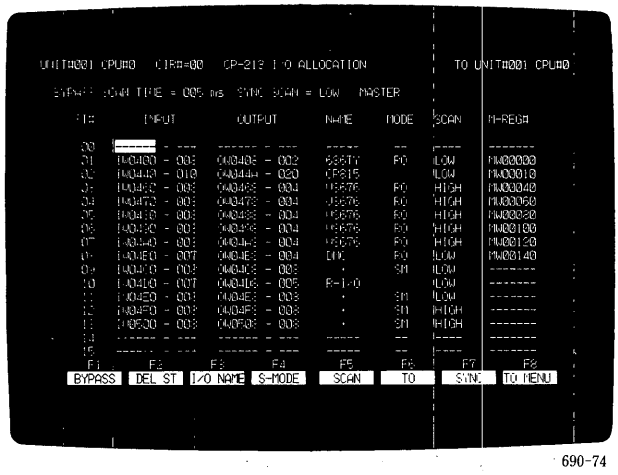


Fig. 6.22

(2) Explanation and setting of CP-213 I/O allocation display

The CP-213 I/O allocation screen is displayed with the function key display section displayed as shown in Fig. 6.23 (a). This section explains the display screen of Fig. 6. 23 (b) and the meanings of the function key display section.

BYPASS	DEL-ST	IO NAME	S-MODE	SCAN	TO	SYNC	TO MENU

Fig. 6.23 (a)

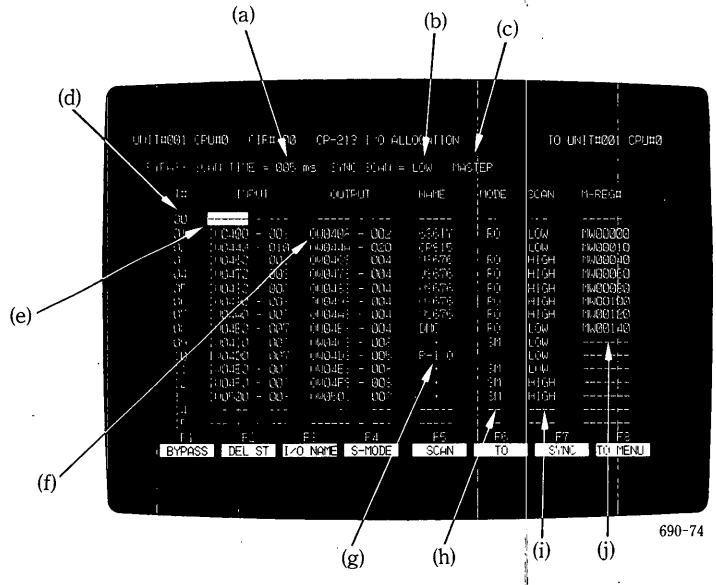


Fig. 6.23 (b)

(a) When a submaster exists on the CP-213 line, the cycle time for transferring master right to the submaster is set and displayed.

A master right transfer cycle time (BYPASS SCAN TIME) can be set by operating the [F1] (BYPASS) function key. Setting is performed in 5 ms units. (When a multiple of 5 ms is not set, the entered value is displayed, but the CP- 213 line operation uses the rounded-off value.)

A setting value of "0" does not cause transfer of the master right

This setting becomes effective when the CP-3300 operates as a master on the CP-213 line.

(b) CP-213 transmission cycle is set and displayed.

It is displayed to which of CP-3300 fast/slow scan the CP213 transmission cycle is conformed. When the CP-213 I/O allocation display is made, the synchronous scan is set to slow scan (LOW) mode. Use the [F7] key (SYNC) for setting. Depressing the [F7] key moves the cursor to the SYNC SCAN = [ ] position.

Synchronous scan setting is made in one of the following operations:

1 Depress the [F7] key. Depressing the [F7] key causes "LOW" (slow scan) or "HIGH" (fast scan) to be displayed alternately.

2 Enter [L] [O] [W], [H] [I] [G] [H] from the keyboard, and depress the [⇦ RETURN] key for determination.

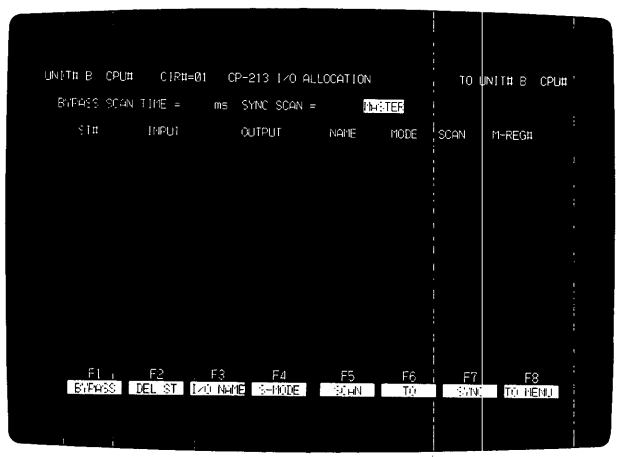
This setting is effective when the dip switch "SYNC" of the 213IF module is set to ON (left).

(c) It is displayed whether the CP-3300 is a master or a slave on the specified line. When the CP-3300 is operating as a slave, its own station address on the line is also displayed.

Master/slave setting is performed by the dip switch of the 213IF module. When the CP-213 I/O allocation is called from the CP-3300 CPU, the master/slave display is automatically made, but when it is called up from a floppy disk and the line allocation is first performed, it is necessary to specify whether it operates as a master or a slave on the line. When the CP-213 I/O allocation is called up from a floppy disk (the first time that allocation is created in the floppy disk), the display of Fig. 6.24 is made. On this screen, specify whether the CP-3300 is a master or a slave.

For allocation as a master, only depress the [RETURN] key, and for allocation as a slave, select SLAVE with the cursor movement keys [↑] or [↓], and depress the [RETURN] key. The cursor moves to the ST # = position. Enter the CP-3300 station number and depress the [RETURN] key.

These operations have to be performed only once when allocation is newly created in the floppy disk.



690-75

Fig. 6.24

(d) The station numbers within the selected line are displayed.

The station numbers must be in the range from 0 to 63. When the CP-213 I/O allocation display is made, 16 station numbers from 0 to 15 are displayed. The allocation screen of station number 16 and greater can be displayed by the [ROLL UP] key, or [SHIFT] + [PGUP]

Station number 0 is the typical number for broadcasting. Do not allocate this number if the broadcasting function is not used. Allocate FDS-series I/O devices in the range of station numbers 01 to 31.

(e) The first input register number (hexadecimal) and input data count (decimal) of the station displayed in (d).

(f) The first output register number (hexadecimal) and output data count (decimal) of the station displayed in (d).

Specify (e) and (f) in the range of I/O registers.

(g) The name of I/O device connected to the station number displayed in (d).

Select the name of input device by the function key [F3] (I/O NAME). CP-313M series devices (slave stations of CP313 MA MC/MD) and CP-3300 (slave devices) are identified by "*" attached to I/O device names.

(h) Mode of transmission between the CP-3300 and the station on CP-213 line is displayed. Specify transmission mode by the [F4] (S-MODE) function key.

Select a transmission mode from the following three modes:

1 No display: Input and output operations on data are performed between the CP-3300 and I/O devices.

2 RO: The CP-3300 only inputs data from I/O devices. Submaster devices usually output data to I/O devices.

3 SM: I/O devices connected can serve as submasters. Devices eligible for submasters are CP-313M-series devices and the CP-3300, as explained in (g). I/O operations are performed with the CP-3300 master device.

(i) I/O processing scan is displayed. Use the [F5] function key (SCAN) to specify processing scan.

(j) First M register number to store the initial constant data of I/O device connected to the CP-213 line is displayed.

Be sure to terminate the setting of each item with the [⇦ RETURN] key.

The [F2] function key (DEL ST) is used to delete allocation of the station in which the cursor currently lights.

(3) Writing CP-213 I/O allocation data

After creation or change of CP-213 I/O allocation data, write the data to the CPU or a floppy disk by the [⇦ ENTER] key.

Ordinarily, the writing is made to the location where the CP-213 I/O allocation was called up. When the write destination is changed using the [F6] function key (TO), the writing is made to the location indicated by "TO" at the upper right portion of the screen.

6.4.5 FA Bus II Link Data Allocation

The CP-3300 can exchange data with the CP-3300, CP-3500, CP-5500, or Memocon SC GL60S via the inter-PC link transmission FA bus II (CP-2500) by installing the LINK module (JAMSC-IF64) in the CPU installation rack.

(1) Configuration of FA bus II link data allocation screen

The FA bus II link data allocation screen is configured as shown in Fig. 6.25.

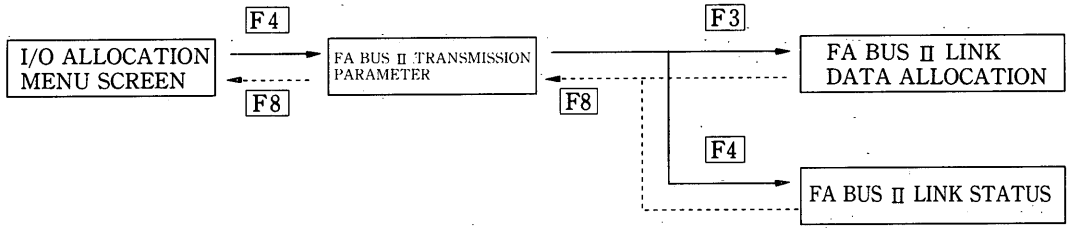


Fig. 6.25

In other words, with the FA bus II transmission parameter setting screen as a basic screen, the FA bus II link data allocation shifts to the link status display screen.

(2) Displaying the FA bus II transmission parameter setting screen

The FA bus II transmission parameter setting screen is called up from the I/O menu display screen of Fig. 6.12 by depressing the [F4] (FA bus II) key. Fig. 6.26 shows an example of the FA bus II transmission parameter setting screen.

The FA bus II transmission parameter setting screen is displayed with the function key display section displayed as shown below.

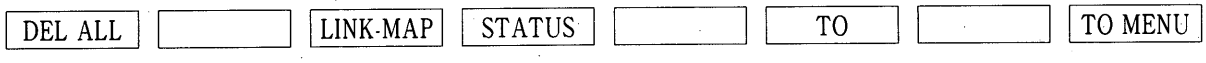


Fig. 6.26

For details of FA bus II transmission parameters, refer to "CP-2500 FA Bus II Design Handbook" (SIE-C872-5).

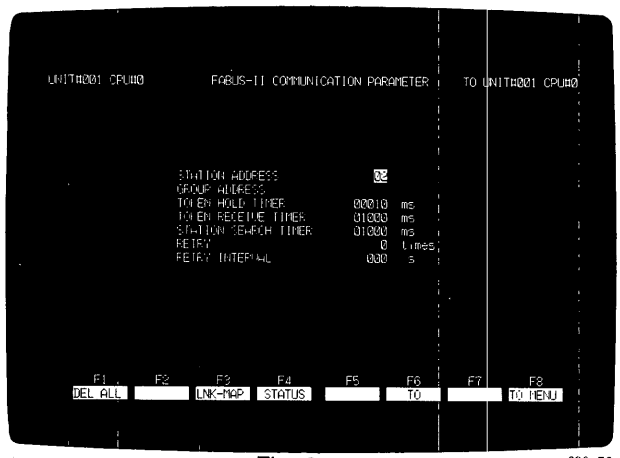


Fig. 6.27 690-76

(3) Specifying FA bus II transmission parameters

The first time that FA bus II transmission parameters are specified, when the FA bus II transmission parameter setting screen is displayed by the method explained in (2), "New file" is displayed in the message display area in the upper right portion of the screen, the entire entry field of each parameter is blank, and the cursor lights in the station address position.

In this state, specify the local station address within FA bus II. As the setting value of a local station address, enter the value set by the STATION ADDRESS setting switch at the front of the LINK module installed in the CPU installation rack. If the station address set by the LINK module is 02, enter numeric keys [0] [2], depress the [RETURN] key, and the standard values of individual parameters will be displayed. If the standard value of a particular parameter is desired, move the cursor to the parameter and enter the desired value.

For example, to set token monitoring time to 1.0 second, move the cursor to the "Token monitoring time" position, and enter numeric keys [1] [0] [0] [0] and depress the [RETURN] key. When it is necessary to change the station address of transmission parameter, note the following things:

(i) FA bus II link data must not be allocated to the station address previously specified.

(ii) FA bus II link data must not be allocated to the station address to be newly specified.

When these two points are not satisfied, enter the station address and depress the [RETURN] key, and a message "MAP ALLOCATED" will be displayed and the station address previously specified will be displayed again.

(4) Writing transmission parameters

If the setting of FA II transmission parameters is completed, write it to the CPU or a floppy disk by the [ENTER] key.

Unless the writing of transmission parameters is performed, you cannot proceed to the FA bus II link data allocation and the link status display screen. If the writing is performed with all transmission parameters deleted by the [F1] (DEL ALL) key, delete allocations of all station addresses in the FA bus II link data allocation before writing. If allocation remains in all station addresses, "Can't Delete" message is displayed.

(5) Displaying FA bus II link data allocation

The FA bus II link data allocation is called up from the FA bus II transmission setting display screen by depressing the [F3] (LINK-MAP) function key. However, as explained previously, it cannot be called up if the setting of FA bus II transmission parameters has not been performed (a write has not been made to the CPU or floppy disk). Fig. 6.29 shows the FA bus II link data allocation display. If the link data allocation display is called up, the function key display section displayed as shown in Fig. 6.28.

DEL ALL	DEL ST	DELETE		SCAN	TO	SYNC	UP-PIC

Fig. 6.28

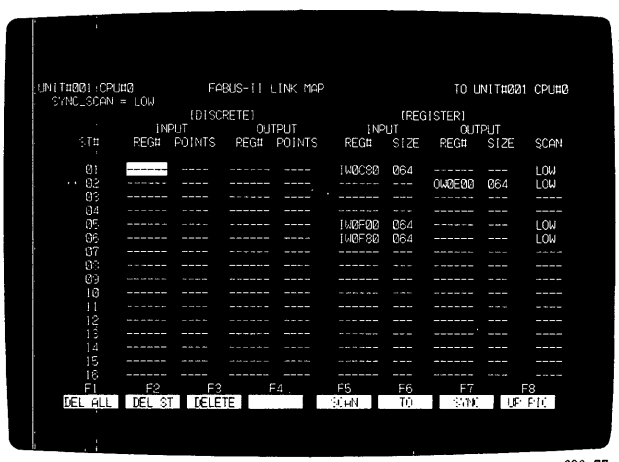


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Fig. 6.29 FA Bus II Link Data Allocation Screen

The meanings of individual function keys are:

[F1] (DEL. ALL):

Deletes all FA bus II link data currently allocated.

[F2] (DEL ST):

Deletes the link data allocation of the station in the current cursor position.

[F3] (DELETE):

Deletes the link data allocation (REG# and size) in the current cursor position.

[F5] (SCAN):

Sets the I/O processing scan of link data allocated to the station in the cursor position.

[F6] (TO):

Specifies the location to which FA bus II link data allocation is written by the [ENTER] key.

[F7] (SYNC):

Specifies the timing in which the LINK module and I/O data are updated.

[F8] (UP PIC):

Returns to the FA bus II transmission parameter setting screen.

(6) Creating FA bus II link data allocation

To allocate FA bus link data, I/O areas are allocated for each type (discrete, register) of link data.

A discrete area consists of 64 words (1024 points), that is, input area IW0C00 to IW0C3F, and output area OW0C00 to OW0C3F.

A register area consists of 1008 words, that is, input area IW0C00 to IW0FEF, and output area OW0C00 to OW0FEF.
(See Fig. 6.10.)

A local station address is indicated by "**" in ST# on the screen.

To allocate link data of a local station, output data are allocated to other stations, and a discrete output area and a register output area are allocated.

To allocate link data of other stations, input data are allocated to a local station, and a discrete input area and a register input area are allocated.

Operations for allocation of FA bus II link data of Fig. 6.30 are explained below. (Assume that the type of link data is register.)

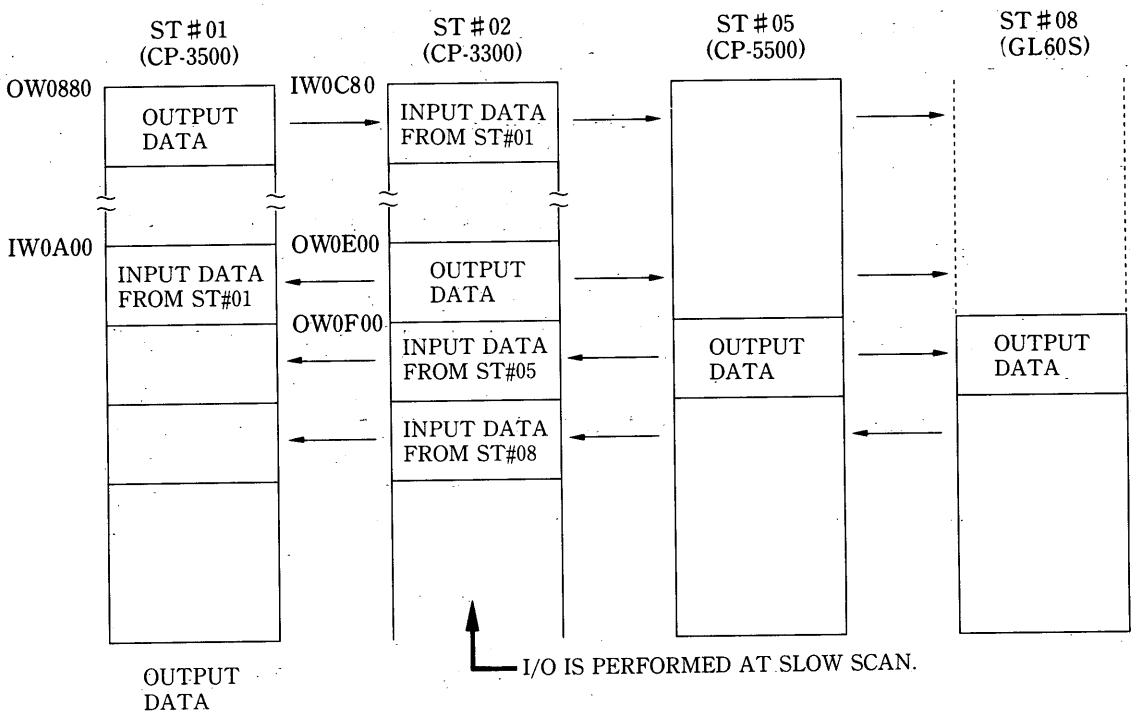


Fig. 6.30

When the FA bus II link data allocation display is called up, "＊＊" is placed in ST#02. (It indicates that the local station is 02.)

(a) An input from ST#01 is allocated.
Move the cursor to the register input (REG#) position of ST#01 and perform the following operations:

1 Alphanumeric keys [I] [W] [0] [C] [8] [0] [RETURN]

2 Numeric keys [6] [4] [RETURN]

(b) ST#02 (local station) output is allocated.
Move the cursor to the register output (REG#) position of ST#02 and perform the following operations:

1 Alphanumeric keys [0] [W] [0] [E] [0] [0] [RETURN]

2 Numeric keys [6] [4] [RETURN]

(c) Allocate inputs from ST#05 and ST#08 according to the procedure (a) above.

In this example, I/O processing is performed at slow scan. In the system that uses fast scan, operate the [F5] key (SCAN) in the SCAN field of each station for setting.

(7) Writing FA bus II link data allocation

If FA bus II link data allocation is completed, write the allocation data to the CPU or a floppy disk. The writing is ordinarily written to the calling up source, but if the write destination is changed by the [F6] (TO) key, the writing is made to the changed destination.

(8) FA bus II link status display

The FA bus II link status display screen is called up from the FA bus II transmission parameter setting screen by depressing the [F4] (STATU) key.

The FA bus II link status display provides the types of stations connected to the FA bus II, the status of received from other stations, the address of data received from other stations, and the data size.

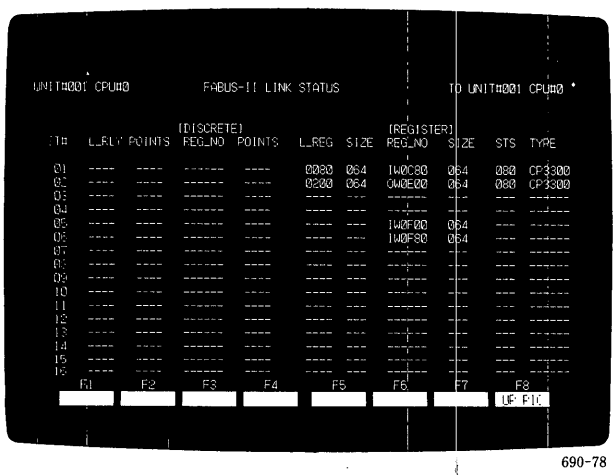


Fig. 6.31 FA Bus II Status Display

6.4.6 Disabling I/O Data

The I/O data disable setting screen is displayed by operating the [F8] (IO-DIS) key on the I/O allocation menu screen.

Disabling of I/O data means that input data from individual I/O devices allocated in the CP-3300 I/O allocation, and output data to the I/O devices are fixed.

On the I/O disable setting screen, Disabling in bit unit or Disabling in word unit can be specified for I/O of high-speed scan and low-speed scan.

Fig. 6.32 shows an example of the I/O data disable display screen.

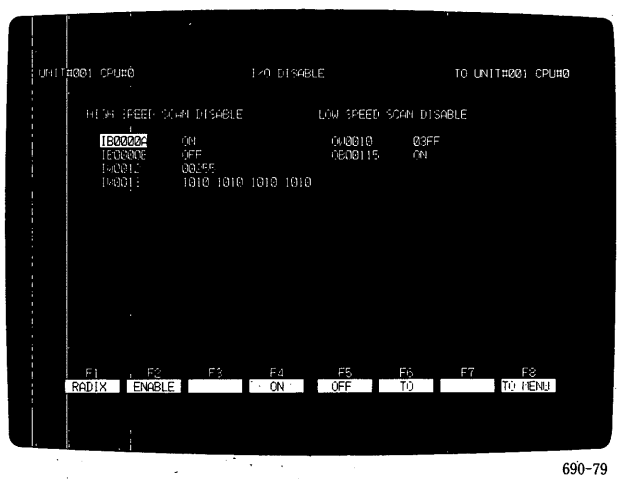


Fig. 6.32 I/O Data Disable Display

The I/O disable display screen is called up with the function key display section displayed as shown in Fig. 6.33.

RADIX	ENABLE		ON	OFF	TO		TO MENU

Fig. 6.33

The meanings of the function keys are:

F1 (RADIX): When I/O data are disabled in a word unit, changes the radix of setting value.

F2 (ENABLE): Frees disabling of I/O data.

F4 (ON): Disables data to ON in bit unit.

F5 (OFF): Disables data to OFF in bit unit.

F6 (TO): Specifies write destination.

F8 (TO MENU): Returns to the I/O allocation menu screen.

The procedure for disabling I/O data is explained using Fig. 6.32 as an example.

I/O data are disabled separately at fast scan and slow scan. In other words, I/O allocated to fast scan should be specified as fast scan I/O disable.

1 Move the cursor to the fast scan I/O disable position.

2 Alphanumeric keys: I B 0 0 A RETURN

IB0000A ENABLE is displayed.

3 Function key: F4 (ON) RETURN

4 Move the cursor to the slow scan I/O disable position.

5 Alphanumeric keys: 0 W 0 1 0 RETURN

OW0010 ENABLE is displayed.

6 Alphanumeric keys: 0 3 F F RETURN

As a result, IB000A is fixed to ON as input of fast scan, and OW0010 is fixed to 03FFH as output of slow scan.

Enter the I/O data disable information by the ENTER key.

6.5 YENET DEFINITION

Using YENET system allows you to perform message transmission among CP-3300, programmable controller Memocon-SC GL60, and other devices able to perform MEMOBUS transmissions.
To connect CP-3300 to the YENET system, mount a 3200IF module (model JAMSC-IF65V) in the CPU mounting rack.

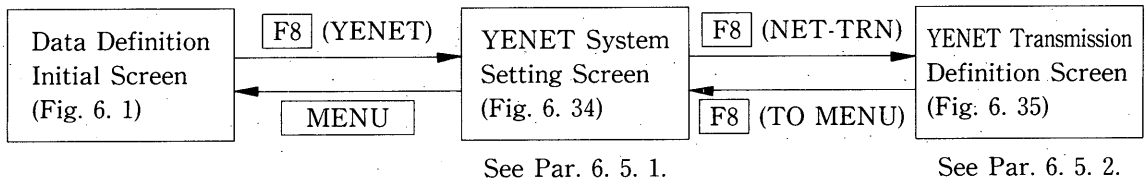
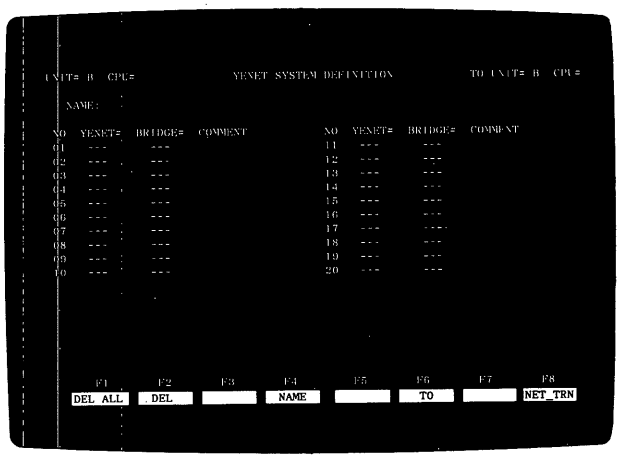


Fig. 6. 33 Configuration of YENET Definition Screen

6.5.1 YENET System Setting

(1) Calling up YENET system setting screen
Depress function key F8 (YENET) in the data definition initial screen (Fig. 6. 1).



Function keys :

DEL ALL	DEL		NAME		TO		NET-TRN

Fig. 6. 34 YENET System Setting Screen

Meaning of Function keys in Fig. 6. 34

Key	Function key	Meaning
F1	DEL ALL	Deletes all YENET system settings.
F2	DEL	Deletes the setting at the cursor position.
F4	NAME	Moves the cursor to the name setting position.
F6	TO	Specifies the location to which system setting is written. The specified destination becomes effective when ENTER key is depressed.
F8	NET-TRN	Calls up YENET transmission definition screen.

(2) Setting in YENET system setting screen

・Name registration

Register own station name as follows :

1 Move the cursor to the "NAME:" position by depressing F4 (NAME) key.

2 Set the name (within 8 alphanumeric characters).

3200IF module responds the address set in the module when the station name is quetioned from other stations.

・Routine table registration

Register the node address of bridge (or gateway) connected in own network as follows :

1 After registering the name, the cursor moves to the routine table position.

2 Set the node address of bridge to connect with other networks.
Up to 20 addresses can be set for each of the following items.
YENET# : Set the network address to be transmitted.
(setting range : 1 to 126)
BRIDGE# : Set the bridge address for interfacing.
COMMENT : Set the comment (up to 16 characters).

3200IF module transmits the data through the bridge which is set according to this routine table from own network station to other network station.

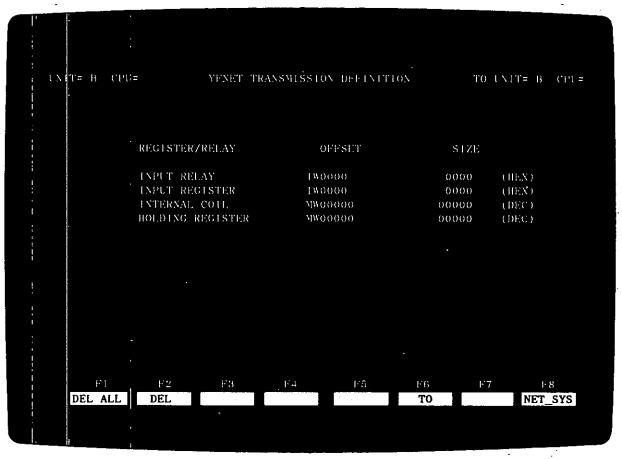
(3) Writing YENET system setting

Depress ENTER key to write the YENET system setting in the CPU or floppy disk.

6.5.2 YENET Transmission Definition

(1) Calling up YENET transmission definition screen

Depress function key [F8] (YENET) in the YENET system setting screen (Fig. 6. 34) to set the read-out/write-in range of register and relay in slave operation.



Function keys

[DEL ALL] [DEL] [ ] [ ] [ ] [TO] [ ] [NET-SYS]

Fig. 6. 35 YENET Transmission Difinition Screen

key	Function	Meaning
F1	[DEL ALL]	Deletes all YENET transmission definitions.
F2	[DEL]	Deletes the setting at the cursor position.
F6	[TO]	Specifies the location to which transmission definition is written. The specified destination becomes effective when [ENTER] key is depressed.
F8	[NET-SYS]	Calls up YENET system setting screen.

(2) Setting in YENET transmission definition

- Offset setting

  Set the word offset value of the register (or relay) corresponding with read-out/write-in request.

  Top address of the register becomes this setting offset value plus reference number requested from the master.

- Size setting

  Set the write-in range in units of words.

  The size "0" means a write-in disable.

- Object register

  For input relay/input register, CP-3300 input registers (IW) are objects. The offset and size are aet in hexadecimal notation.

  For internal coil/holding register, CP-3300 common registers (MW) are objects. The offset and size are set in decimal notation.

  For example, where offset is set to MW00100 and the size is set to 1000 in holding register, the write-in range becomes MW00100 to MW01099.

(3) Writing YENET transmission definition

Depress ENTER key to write the YENET transmission definition in the CPU or floppy disk.

7. PROGRAM LOADER

This section explains in detail the batched loader function and separate loader function of the programming panel.

CONTENTS PAGE

7. PROGRAM LOADER

The CP-3300 program loader is selected by operating the [F3] key on the basic menu screen, and the program loader initial screen of Fig. 7.1 (a) is displayed.

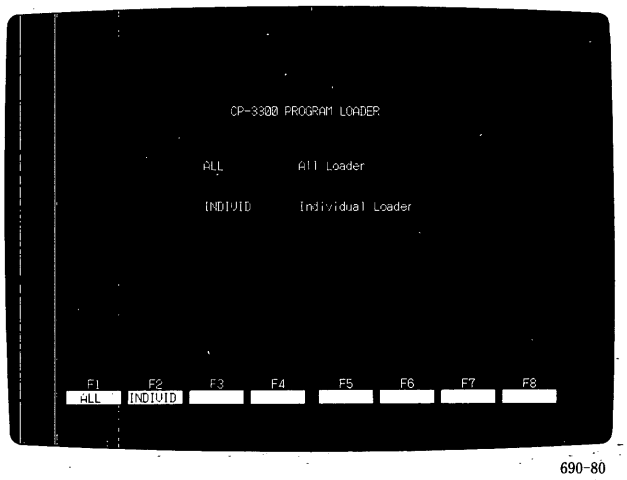


Fig. 7.1 (a) Program Loader Initial Screen

The program loader initial screen is displayed with the function key display section displayed as shown in Fig. 7.1 (b).

Fig. 7.1 (b) is displayed in the function key display section by operating the [F-SEL] key whenever program loader related operations are being performed.

ALL	INDIVID						

Fig. 7.1 (b)

7.1 FUNCTIONS OF PROGRAM LOADER

The program loader has the following three functions:

Load: User programs and definition data saved in a floppy disk are written to the CP-3300 specified by UNIT#.

Dump: User programs and definition data of CP-3300 specified by UNIT# are written to a floppy disk. The dump is performed even when the specified CP-3300 is in ON-LINE mode.

Comparison: User programs and definition data of CP-3300 specified by #UNIT are compared with the contents of the floppy disk.

7.2 PROGRAM BATCHED LOADER

The program batched loader is applicable to the contents of all user programs, definition data, and data memory.

The program batched loader is called up from the program loader initial screen by operating the F1 (ALL) key, and the batched loader of Fig. 7.2 is displayed.

The batched loader is called up with the function key display section displayed as follows.

CPU	TO	COMPARE	FLOPPY				

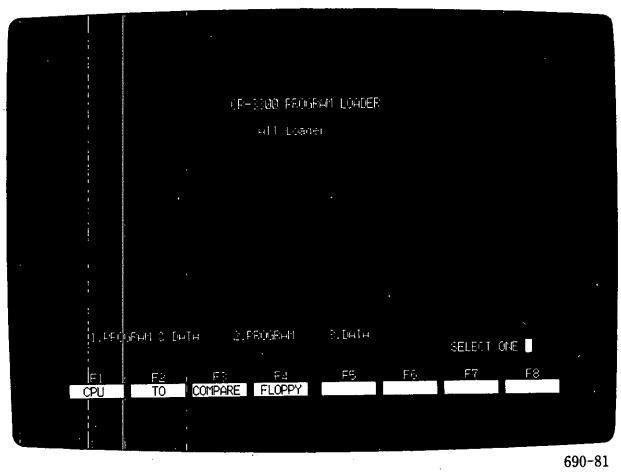


Fig. 7.2 Batched Loader

The keying operations for the batched loader are explained below.

〈Selecting an object of the loader〉

Before selecting the loader function, determine an object of the batched loader with numeric keys [1] to [3]. The objects of the loader are:

PROGRAM DATA: The contents of all user programs, all definition data, and M register contents of the CP-3300 are subject to the loader.
PROGRAM: The contents of all user programs and all definition data of the CP-3300 are subject to the loader.

DATA: The contents of M register are subject to the loader.

For example, to select PROGRAM DATA as an object of the loader, operate [1] [⇦ RETURN] keys, then select the loader functions explained later.

(1) Load

For the loading by the program batched loader function, the CP-3300 must be placed into offline status. To place the CP-3300 into offline status, move RUN of the dip switch in the front of the CPU to the OFF (right) position.

If batched loading is performed when the CP-3300 is online, "CPU ON-LINE" is displayed in the message area.

The procedure for loading is explained below.

1 Insert correctly the floppy disk containing CP-3300 user programs and definition data to the floppy disk B side.

2 For loading to a unit number of 1 and a CP number of 0, for example, perform keying operations in the following order:

(i) Function key [F4] (FLOPPY)
[F2] (TO)
[F1] (CPU)
— Indicates the load function.

(ii) Numeric key [1] [⇦ RETURN]
[0] [⇦ RETURN]
Select the CP-3300 to load to.
The screen of Fig. 7.3 is displayed.

If keying operations are performed mistakenly, depress the [ESC] key perform keying from the beginning.

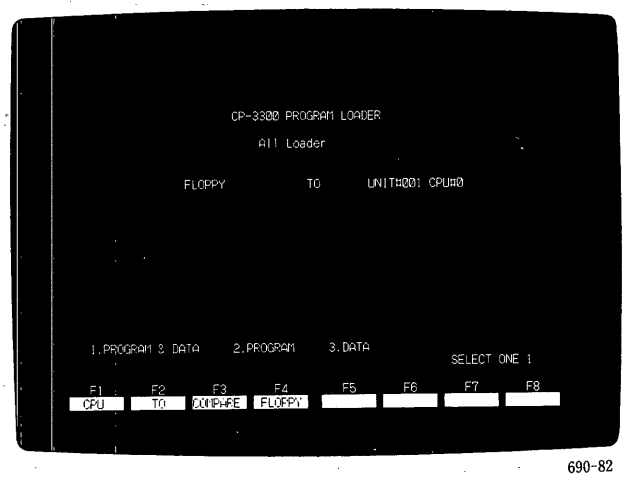


Fig. 7.3 Load

3 Depressing the [ENTER] key starts loading. If the loading is normally terminated, "Completed" is displayed. If an error occurs during the loading, the DWG number, function name, and definition data name in which the error occurs are displayed together with an error code. For error codes, see Table A4 in APPENDIX.

(2) Dump

The dump function stores the contents of CP-3300 user programs, definition data, and M register to a floppy disk. The CP-3300 performs the dump function even when it is in online status.

1 Set the write prohibit switch to the write enable position and insert correctly the floppy disk to the disk drive B.

2 To dump the contents of CP-3300 user programs, definition data, and M register in a unit number of 1 and a CP number of 0, for example, perform keying operations in the following order:

(i) Function key [F1] (CPU)

(ii) Numeric key [1] [RETURN]

[0] [RETURN]

(iii) Function key [F2] (TO)

(iv) [F4] (FLOPPY)

The screen of Fig. 7.4 is displayed.

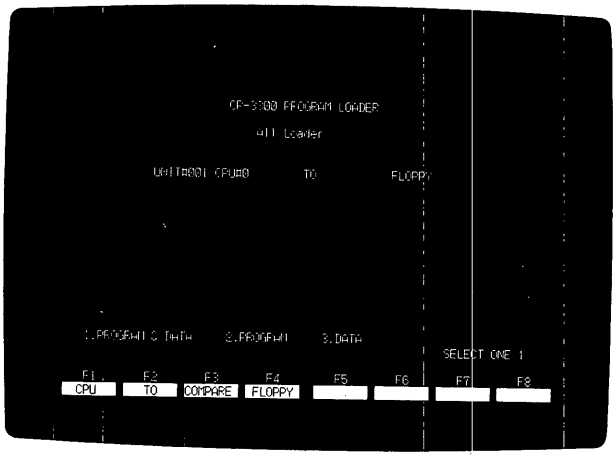


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Fig. 7.4 Dump

3 Depressing the [ENTER] key starts dumping. If the dumping is terminated normally, "Completed" is displayed. If an error occurs during the dumping, the DWG number, function name, and definition data name in which the error occurs are displayed together with an error code.

7

(3) Comparison

The comparison function compares the contents of CP-3300 user programs and definition data with the contents of the floppy disk. The comparison function does not conduct a comparison of M register contents. The comparision is performed even if CP-3300 is in online status.

1 Insert correctly the floppy disk stored the user program and definition data to be compared to the floppy disk drive B.

2 To compare the contents of CP-3300 user programs and definition data in a unit number of 1 and a CP number of 0 with the contents of the floppy disk, for example, perform keying operations in the following order:

(i) Function key [F1] (CPU)*

(ii) Numeric key [1] [RETURN]

[0] [RETURN]

(iii) Function key [F3] (COMPARE)

(iv) Function key [F4] (FLOPPY)*

*: The [F1] and [F4] function keys may be operated in any order.

The screen of Fig. 7.5 is displayed.

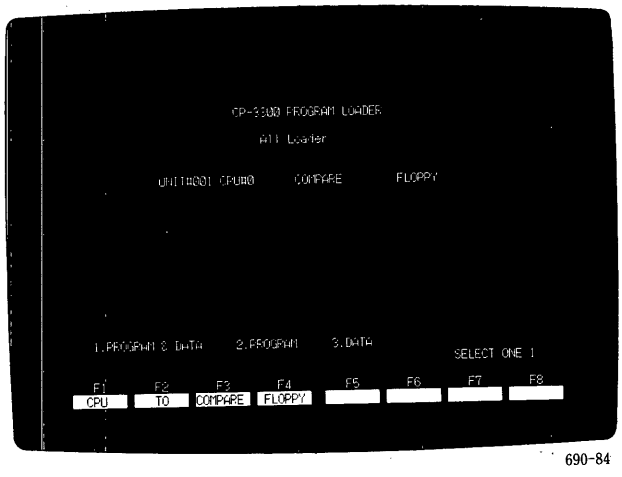

Fig. 7.5 Comparison

3 Depressing the [ENTER] key starts the comparison. If the comparing is terminated normally, "Completed" is displayed. If an error occurs during the comparing, the DWG number, function name, or definition data name in which the error is found are displayed together with the number of mismatches, or "?" is displayed.

"?" indicates that the data with the indicated name does not exist in either of the CP-3300 and the floppy disk.

7.3 PROGRAM SPECIFIC LOADER

Call up the program specific loader screen according to the following procedure:

(1) Depress the [F2] (INDIVID) function key on the program loader initial screen of Fig. 7.1 (a).

(2) If another loader screen is selected, output the display of Fig. 7.1 (b) to the function key display section by the [F-SEL] key, and depress the [F2] (INDIVID) key.

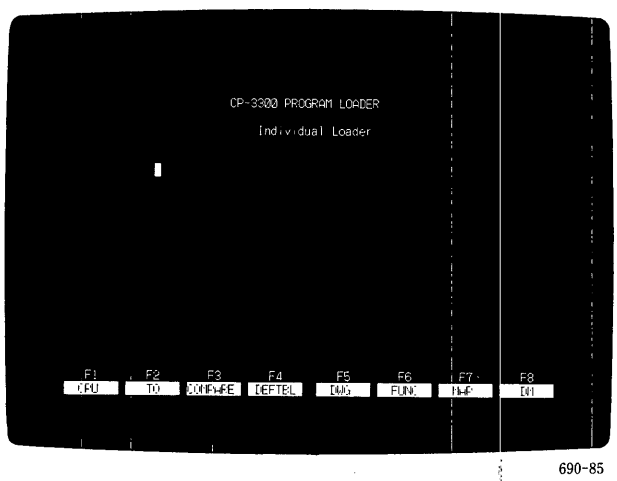

Fig. 7.6 Specific Loader

The specific loader screen is called up with the function display section displayed as follows.

CPU	TO	COMPARE	DEFTBL	DWG	FUNC	MAP	DM

The function keys are explained below.

[CPU] : Specifies the mainframe number and CP number subject to the specific loader.
[TO] : Specifies the load and dump functions.
[COMPARE] : Specifies the comparison function.
[DEFTBL] : Specifies definition data subject to the specific loader. Depressing this key causes the type of definition data to be displayed in the lower portion of the screen. Enter the definition data subject to the specific loader with a number.
[DWG] : Specifies a user DWG program as an object of the specific loader.
[FUNC] : Specifies a user function program as an object of the specific loader.

When the [DWG] and [FUNC] keys are depressed, the omission symbol "*" can be used for DWG numbers and function names.

[MAP] : Specifies I/O allocation related map data as an object of the specific loader. Depressing this key causes the type of map data to be displayed in the lower portion of the screen. Enter the map data subject to the specific loader with a number.
[DM] : Specifies M register as an object of the specific loader.

Keying operations for the specific loader are explained below using Fig. 7.7 as an example.

1 Function key [DEFTBL] : Specifies definition data within a floppy disk as an object of loading.

[5] [RETURN] : Selects all definition data.

2 Function [TO]

[1] [RETURN] : Enter 1 as a unit number.

[0] [RETURN] : Enter 0 as a CP number.

3 Write key [ENTER] : Starts loading.

When DWG programs and function programs are subject to the specific loader, the omission symbol "*" can be used for the DWG numbers and function names.

(Example 1) Specifying all DWG programs of fast scan

Enter [DWG] [H] [*] [RETURN].

(Example 2) Specifying all expanded drawings subordinate to detailed drawing number 01 of slow scan

Enter [DWG] [L] [0] [1] [*] [RETURN]

(Example 3) Specifying all function programs beginning with "A"

Enter [FUNC] [A] [*] [RETURN]

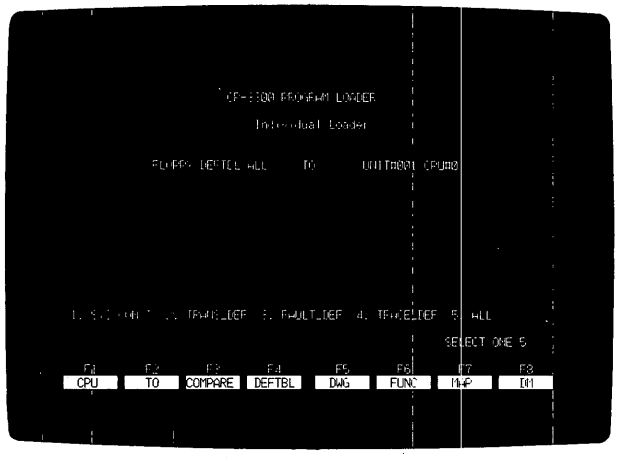
CP-1300 PROGRAM LOADER
Individual Loader
FLOPPY DEFTBL ALL TO UNITM001 CPUM2
1. ALL 2. TRANS_DEF 3. FAULT_DEF 4. TRAVEL_DEF 5. ALL
SELECT ONE 5
F1 CPU
F2 TO
F3 COMPARE
F4 DEFTBL
F5 DWG
F6 FUNC
F7 MAP
F8 DM

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Fig. 7.7

7.4 DEFINITION DATA NAMES DURING LOADER EXECUTION

During program loader execution, drawings (DWG/function) currently subject to the loader are displayed with the drawing numbers and function names, and definition data is displayed with symbols.

Table 7.1 shows the meanings of symbols of definition data.

Table 7.1 Definition Data Names

Symbol	Meaning
SYS -CONST	Scan setting value, comment, date, etc. specified on the system constant screen
TRANS -DEF	Data specified on the transmission definition screen
FAULT -DEF	Data specified on the fault definition screen
TRACE -DEF	Data specified on the data trace definition screen
LOCAL	Local I/O allocation data
REMOTE	Remote I/O allocation data
IOCONF-n	CP-213IF I/O allocation data ($0 \leqq n \leqq 3$. CP-2131F line number)
FABUS -II	FA bus II transmission parameter I/O allocaiton data
IO-DIS	I/O disable setting data

8. PRINTER

This section explains the models, connections, and operation of commercially available printers connectable to the programming panel.

CONTENTS PAGE

8. PRINTER

8.1 CONNECTION

Commercially available printers can be connected to the programming panel via the parallel port PRN at the back of the programming panel. Connectable printers are:

- PC-PR201 series (NEC)
- FP-850 (EPSON)

Select one of these printers on the printer selection display when the programming panel is activated. The programming panel supports PC-PR201 series as a standard printer.

As the cable between the printer and the programming panel, use the cable supplied with the printer.

8.2 OPERATION

The following are printed to a printer:

(i) Hard copy of display screen

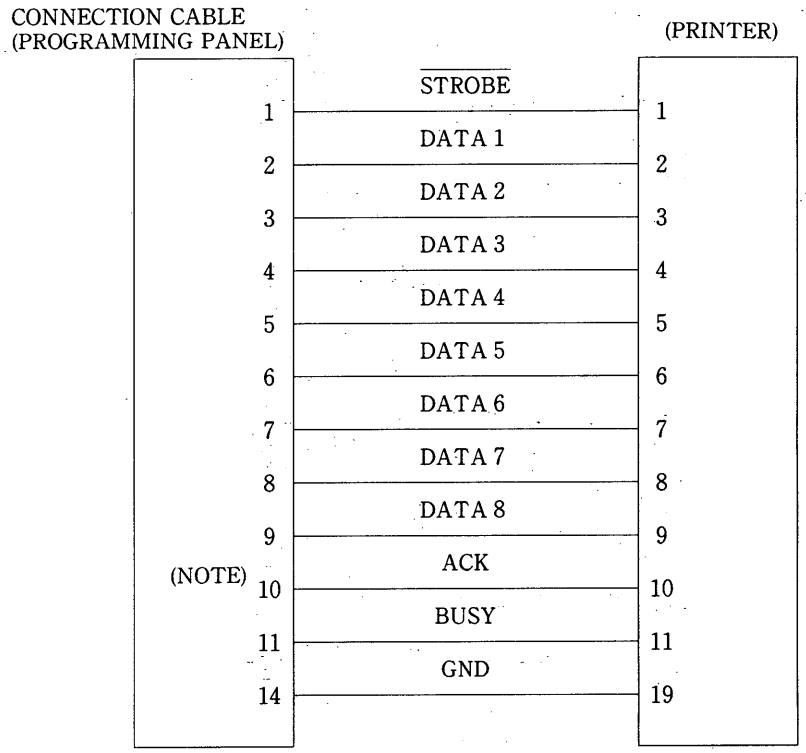
(ii) Program (DMG/function programs) listing

For printing to a printer, connect PRN at the back of the programming panel and the printer parallel interface connector, and perform the following operations:

1 Depress the [SEL] key of the printer, and confirm "READY" lamp is lit.

2 To obtain hard copy of display screen, depress [CTRL] + [P] keys. To print a listing of the DWG/function program currently being displayed, depress [SHIFT] + [PRINT MENU] keys.

Fig. 8.1 shows the connection between the programming panel and cable.



ADAPTABLE PLUG

NOTE : Pin 10 is enabled even in open state.

MANUFACTURER: DAIICH ELECTRIC CO., LTD.

MODEL : 57-30140

Fig. 8.1 Connection between Programming Panel and Cable

9. FLOPPY DISK INITIALIZATION METHOD

This section explains the method for initializing a floppy disk.

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9. FLOPPY DISK INITIALIZATION METHOD

The process of making an unprocessed floppy disk accessible to the system is called floppy disk initialization.

The procedure for initializing a floppy disk is explained below.

(1) Make sure that the system is in DOS mode. "A> " displayed on the screen indicates DOS mode. To return to DOS mode after the programming system is started, depress the [F8] key on the basic menu screen.

(2) Insert an unprocessed floppy disk to the drive B and perform the following operation:

A> FORMAT ␣ B: ␣ /V ↵

The underlined portion represents key entry. "␣" indicates one or more spaces and indicates [RETURN] key operation.

(3) The following screen is displayed:

```
Select media type.
  320kb type  → 1
  360kb type  → 2
  640kb type  → 3
  720kb type  → 4

4
```

Enter "4" to select 720kb type. The following display is made on the screen.

```
Insert new diskette for drive B:
and strike any key when ready
```

(Display 1)

If you are ready, depress any key.

Note:
Make sure that the floppy disk in drive B is not write prohibited.

```
All data in disk of drive B: are cleared.  Are you sure? (Y/N) y
```

(Display 2)

The above display is made, and if you consent to all data being be erased, enter [Y]. If [N] is entered when the floppy disk is inserted mistakenly, the initialization is canceled.

As soon as [Y] is entered, initialization of the floppy disk is started. The screen is displayed as follows:

```
formatting...  system transferred
```

If the initialization terminates and /V is specified in the last command, the following is displayed:

```
Volume label (11 chracters.  ENTER for none)?  N
```

(Display 3)

The setting of a volume label aids in showing the purpose of the use of the floppy disk. For example, the contents of the floppy disk will be identified by specifying a CP-3300 application system name, for example.

Finally, the capacity of the floppy disk is displayed, and the following is displayed:

```
Format another  [Y/N] ?  N
```

(Display 4)

When more than one floppy disk is to be formatted, enter [Y] key.

(4) Then, necessary data are written to the CP-3300 order floppy. Perform the following operation:

A> ODRCRY ↵

The following is displayed.

```
Insert new diskette for drive B:
and strike any key when ready
```

(Display 5)

If you are ready, depress any key.

This terminates the initialization of the CP-3300 order floppy disk.

Caution
Since access to a floppy disk not initialized for the CP-3300 as explained in (4) causes "PP-FILE-ACC error" (error code F200F), be sure to perform the initialization of (4).

Fig. 9.1 shows an initialization procedure flow.

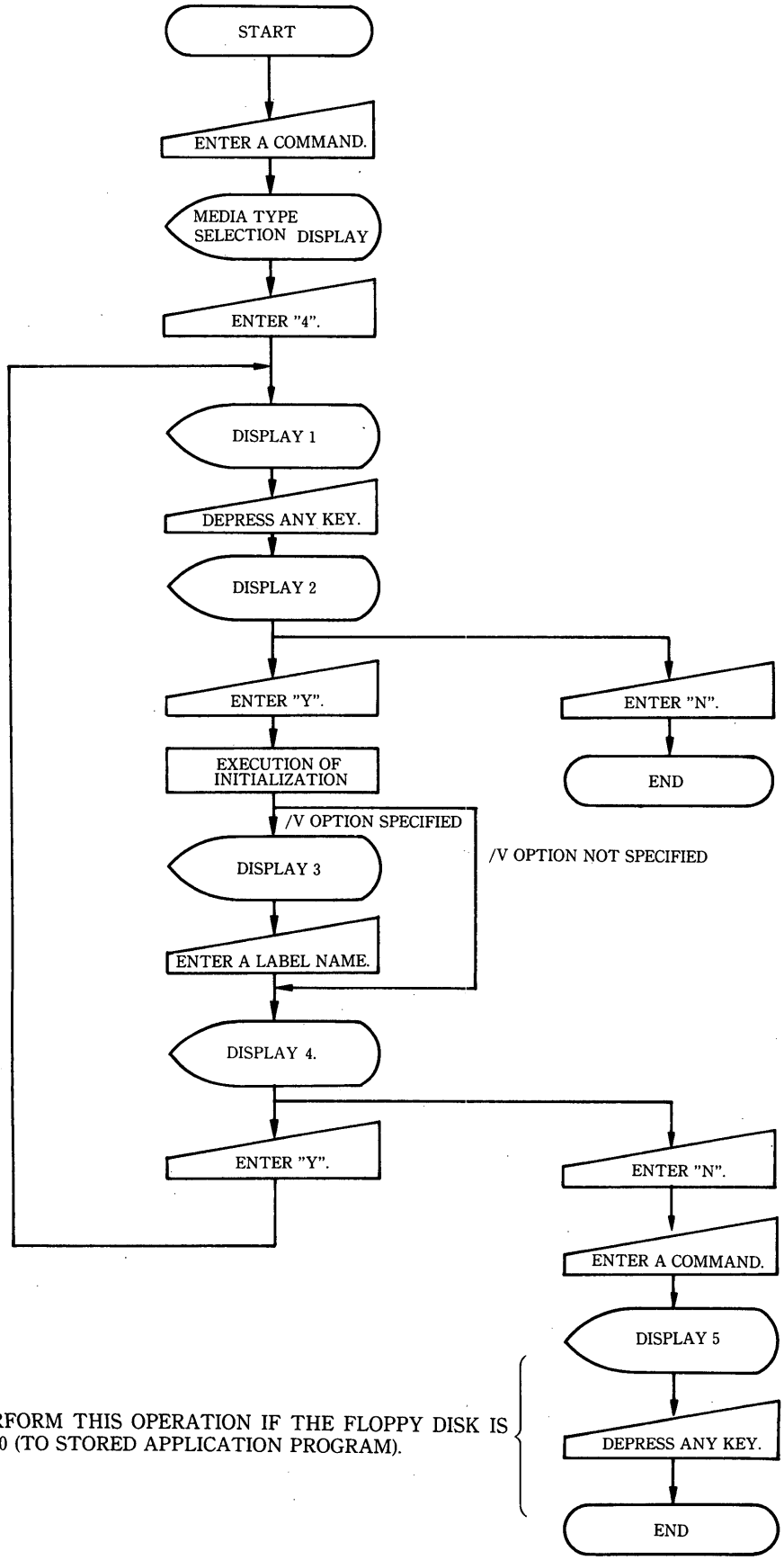
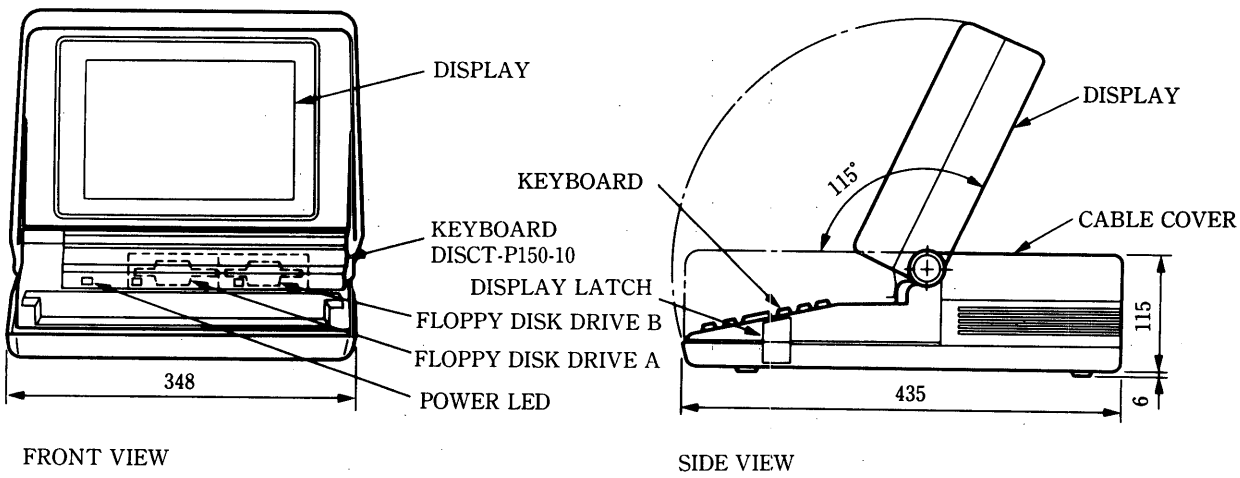


Fig. 9.1

10. EXTERNAL DIMENSIONS OF THE PROGRAMMING PANEL

This section provides the names of parts of the programming panel, and its external dimensions.



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APPENDIX

This chapter lists error messages displayed on individual screens, and commands necessary for creation of drawings.

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Table A1 Programming Panel Composing Error Messages

Error message	Status
PP COMPOSE error #001	A WHILE command for the ON/OFF command is missing.
PP COMPOSE error #002	An ON/OFF command for the WHILE command is missing.
PP COMPOSE error #003	An IFON/IFOFF command for the ELSE command is missing.
PP COMPOSE error #004	An IFON/IFOFF command or FOR command for the END command is missing.
PP COMPOSE error #005	Undefined command was detected.
PP COMPOSE error #006	Undefined command was detected.
PP COMPOSE error #007	Undefined command was detected. 1. Too many action box steps 2. The function drawing or expanded drawing contains a SEE command. Others
PP COMPOSE error #008	Invalid branch in ladder circuit or SFC flowchart
PP COMPOSE error #009	Invalid operand or register type
PP COMPOSE error #010	Invalid operand type
PP COMPOSE error #011	Improper subscript
PP COMPOSE error #012	1. Invalid drawing number of SEE or START command 2. Invalid bit number or register number
PP COMPOSE error #013	1. The symbol is not found in symbol specification. 2. The action box name is not found.
PP COMPOSE error #014	Function definition not registered
PP COMPOSE error #015	Invalid parameter
PP COMPOSE error #016	There are too many function I/Os.
PP COMPOSE error #017	The symbol is duplicated.
PP COMPOSE error #018	The symbol is undefined.
PP COMPOSE error #019	There are too few symbols.
PP COMPOSE error #020	The symbol cannot be allocated.
PP COMPOSE error #021	There are too many levels of nesting of WHILE, IFON/IFOFF, or FOR commands.
PP COMPOSE error #022	PP internal buffer overflow
PP COMPOSE error #023	Invalid PP internal conversion

Table A2 Correspondence between Programming Panel Composing

Error message	Error trace screen message
PP COMPOSE error #001	WHILE not found
PP COMPOSE error #002	ON/OFF not found
PP COMPOSE error #003	IFON/IFOFF not found
PP COMPOSE error #004	END not found
PP COMPOSE error #005	Opemode error
PP COMPOSE error #006	Opecode error
PP COMPOSE error #007	Illegal instruction
PP COMPOSE error #008	Branch error
PP COMPOSE error #009	Illegal address mode
PP COMPOSE error #010	Illegal operand type
PP COMPOSE error #011	Index error
PP COMPOSE error #012	Value error
PP COMPOSE error #013	Symbol not found
PP COMPOSE error #014	Function not defined
PP COMPOSE error #015	Parameter error
PP COMPOSE error #016	Function inputs/outputs over
PP COMPOSE error #017	Symbol more once defined
PP COMPOSE error #018	Symbol not defined
PP COMPOSE error #019	Symbol defined insufficiently
PP COMPOSE error #020	Symbol can not allocate
PP COMPOSE error #021	Nesting over
PP COMPOSE error #022	Buffer exceeded
PP COMPOSE error #023	Composer error

Table A3 Programming Panel Error Display Messages
(The asterisk (*) does not indicate an error.)

Screen type	Error message	Status
PROGRAM	FILE destroyed	Drawing destroyed during reading.
	BUFFER FULL	PP internal edit buffer is full during writing.
	FUNCTION NOT FOUND	Function definition is missing during functoin writing.
	Insufficient D-REG	SFC flowchart exists during DWG writing, and 1. 10 or more D registers are not set if no multi -token exists. 2. 30 or more D registers are not set if multi-token exists.
	Can't delete	Invalid flowchart structure during deleting of SFC flowchart
	FUNCTION FULL	The maximum number (8) of function definitions allocatable to FUNCTION key is exceeded.
	FUNCDEF BUFFER FULL	Too many function definitions are registered (when more than 108 are registered, too many I/Os are registered).
DWG/FUNC map	File not found	* The map of specified drawing type does not exist. (There is no drawing in specified drawing type.)
Register list	No symbol	The specified drawing contains no symbol definition.
I/O allocation Common-to all screens	Insufficient definition	Insufficient allocation (address, data count, etc.)
	Illegal number	Improper address value
	MAP overlap	Duplicate allocation
	Illegal source data	Data error (I/O mismatch, etc.)
	Buffer over	Too many allocations
FA bus II transmission parameter	MAP ALLOCATED	When station address is changed 1. I/O is allocated to the station currently specified. 2. I/O is allocated to the station newly specified.
	Can't Delete	FA bus II I/O allocation exists.
Trace definition	Any data is not defined	Insufficient setting (data count setting, etc.)
Data trace	DATA NOT EXIST	* Data are not collected.
Fault trace	NO FAILURE	* No fault occurs.
Specific loader	File not found	The specified file does not exist in the floppy disk.
	FUNCDEF BUFFER FULL	Too many function definitions are registered (when more than 108 are registered, too many I/Os are registered).
PROGRAM/SYSCONF Opening loader	Configuration not found	The CP-3300 system file $ CONFIG registering CP-3300 register size and other information do not exist in the data floppy disk.

Table A4 Error Messages at Programming Panel Transmission
(R : Only during reading, W : Only during writing)

Error message	Error code	Status
OBJ -SIZE over	0021H 0022H	Object size is exceeded.
General error #00	0040H	1. CPU memory initialization error during batched load 2. Invalid scan time value (other than 3 to 300 ms)(W) 3. LOCAL I/O(W): Parameter error 4. REMOTE I/O, CP -213IF, LINK I/O(W): Parameter error or no response from a module 5. DELATE request error except for drawing
I/O INIT-DATA set error(1) Trans Param set error(2)	0043H	(1) CP-213 initialization data set error (W) (2) FABUS II transmission parameter set error (W)
I/O TRACE error(1) LINK Status get error(2)	0044H	(1) CP-213 I/O trace error (R) (2) FABUS II status collection error (R)
Memory management error	004AH	CPU memory allocation error occurred during drawing writing.
CPU ON-LINE	004DH	The batched loader could not load DM because the CPU was online.
CPU undefined command	004FH	Undefined processing request was detected (CPU internal error).
Transfer error	0090H	Transmission error
Illegal command	0091H	Invalid PP processing request command
Illegal parameter	0092H	Invalid PP transmission data
Illegal file name	0093H	Drawing name error. The function drawing name is a system function (function drawing -W). Error (W) of drawing name called up by SEE, START, and FSTART, etc.
New file	0094H	The indicated file does not exist (R).
MEMORY PROTECT ON	0097H	CPU write disabled (W)
xxxxxx not mount	0098H	RIOD, 213IF, and LINK modules are not installed. (The module name is displayed in xxxxxx portion.)
Setting error	0099H	1. CP -213 master/slave mismatch (W) 2. The specified CP -213 is not allocated. (I/O trace screen -W)
Illegal device No.	009EH	Unit number error
Time over	009FH	PP response wait time was exceeded (communication disconnected).
Communication busy	00AOH	1. No fault trace data (no PP display) 2. Buffer for processing request to the CPU is full.
SRC memory Full	00B3H	MM60 memory full (drawing -W)
SRC memory allocate error	00B4H	MM60 memory allocation error (drawing -W)

Table A4 Error Messages at Programming Panel Transmission (Continued)

Error message	Error code	Status
Can't delete	00C0H	Drawing cannot be deleted (drawing subject to DELETE is called up from other drawing).
Can't data trace	00C1H	Data trace definition error
Can't Disable coil	00C2H	Too many disable coils (100 maximum)
PP RECV -BUF over	F100H	The data size received by PP is too large (R).
PP FILE -ACC error	F200H	Floppy file access error
FDD write protect	F300H	The floppy disk is write prohibited (W).
FDD not ready	F400H	The floppy disk is not set up.

Table A5 CPU Compile Error Messages

Error message	Error code	Status
Compile error #001	0001H	Undefined command code was detected.
Compile error #002	0002H	Invalid IF command structure
Compile error #003	0003H	Invalid WHILE command structure
Compile error #004	0004H	Invalid FOR command structure
Compile error #005	0005H	DEND is missing.
Compile error #006	0006H	Too many drawings are registered.
Compile error #007	0007H	AEND command is missing.
Compile error #008	0008H	Too many SFC flowchart steps
Compile error #009	0009H	Too many SFC out bit settings
Compile error #010	000AH	Invalid SFC action box structure
Compile error #011	000BH	Too many current value collection conditions
Compile error #012	000CH	Too many branches in SFC flowchart multi-token
Compile error #013	000DH	Invalid SFC flowchart
Compile error #014	000EH	Too many SFC flowchart box steps

Table A6 Programming Panel Drawing Creation Command Set

Command	Display	Keying	Remarks
SEE	SEE	SEE	SE is acceptable.
START	START	START	ST or more is acceptable.
FOR	FOR = to by	FOR	
WHILE	WHILE	WHILE	W or more is acceptable.
ON	ON	ON	
OFF	OFF	OFF	OF is acceptable
IFON	IFON	IFON	
IFOFF	IFOFF	IFOFF	IFOF is acceptable.
ELSE	ELSE	ELSE	EL or more is acceptable.
DEND/FEND/WEND/IEND	DEND/FEND/WEND/IEND	END	EN is acceptable.
IN	IN	IN	
OUT	OUT	OUT	OU is acceptable.
Function reference		FSTART	FS or more is acceptable.
Function input		FIN	
Function output		FOUT	FOU is acceptable.
NO contact	┤ ├	] [	
NC contact	┤/├	] / [	] / is acceptable.
ON pulse	┤↑├	] P [	] P is acceptable.
OFF pulse	┤↓├	] N [	] N is acceptable.
ON delay timer	┤[T]├	[ON]	[ON is acceptable.
OFF delay timer	┤[T]├	[OFF]	[OF or more is acceptable.
Coil	—○┤	( )	
SFC call	┤ SFC xxxxxxxx ├	SFC	SF is acceptable.
ABOX	ABOX nnn	ABOX	ABO is acceptable.
SBOX	SBOX nnn	SBOX	SB or more is acceptable.
Integer registration	├	;	
Real number	‖├	; ;	
Storage	=>	: =	: is acceptable.

Table A6 Programming Panel Drawing Creation Command Set (Continued)

Command	Display	Keying	Remarks
Addition	+	+	
Subtraction	−	−	
Extended addition	++	++	
Extended subtraction	−−	−−	
Multiplication	×	*	
Division	÷	/	
Increment	INC	INC	
Decrement	DEC	DEC	DE is acceptable.
Remainder -integer	MOD	MOD	
Remainder -real number	REM	REM	RE is acceptable.
Conjunction	∧	&	
Logical add	∨	¦	
Exclusive logical add	⊕	^	
Comparison 1	<	<	
Comparison 2	≦	<=	
Comparison 3	=	=	
Comparison 4	≠	<>	
Comparison 5	≧	>=	
Comparison 6	>	>	
Sign reversal	INV	INV	
Complement on one	COM	COM	
Absolute value	ABS	ABS	
BCD → BIN	BIN	BIN	BI is acceptable
BIN → BCD	BCD	BCD	BC is acceptable.
Parity	PARITY	PARITY	PA or more is acceptable.
Bit rotation L	ROTL	ROTL	
Bit rotation R	ROTR	ROTR	
Bit transfer	MOVB	MOVB	

Table A6 Programming Panel Drawing Creation Command Set (Continued)

Command	Display	Keying	Remarks
Word transfer	MOVW	MOVW	
Changed transfer	XCHG	XCHG	X or more is acceptable.
Synchronous transfer	SMOV	SMOV	SM or more is acceptable.
Square	SQRT	SQRT	SQ or more is acceptable.
Sine	SIN	SIN	SI is acceptable.
Cosine	COS	COS	
Tangent	TAN	TAN	TA is acceptable.
Inverse sine	ASIN	ASIN	ASI is acceptable.
Inverse cosine	ACOS	ACOS	AC or more is acceptable.
Inverse tangent	ATAN	ATAN	AT or more is acceptable.
Exponent	EXP	EXP	EX is acceptable.
Natural logarithm	LN	LN	
Common logarithm	LOG	LOG	LO is acceptable.
Dead zone A	DZA	DZA	
Dead zone B	DZB	DZB	
Upper and lower limits	LIMIT	LIMIT	LI or more is acceptable.
PI control	PI	PI	
PD control	PD	PD	
PID control	PID	PID	
Primary delay	LAG	LAG	
Phase lag	LLAG	LLAG	LL or more is acceptable.
Function generator	FGN	FGN	FG is acceptable.
Inverse function generator	IFGN	IFGN	IFG is acceptable.
Direct accelerator 1	LAU	LAU	
Direct accelerator 2	SLAU	SLAU	SL or more is acceptable.
Condition	[ ]	[ ]	

Control Pack CP-3300

SYSTEM CONTROLLER

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689-169.688-421

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