SIE-C815-14.3
DESCRIPTIVE
INFORMATION

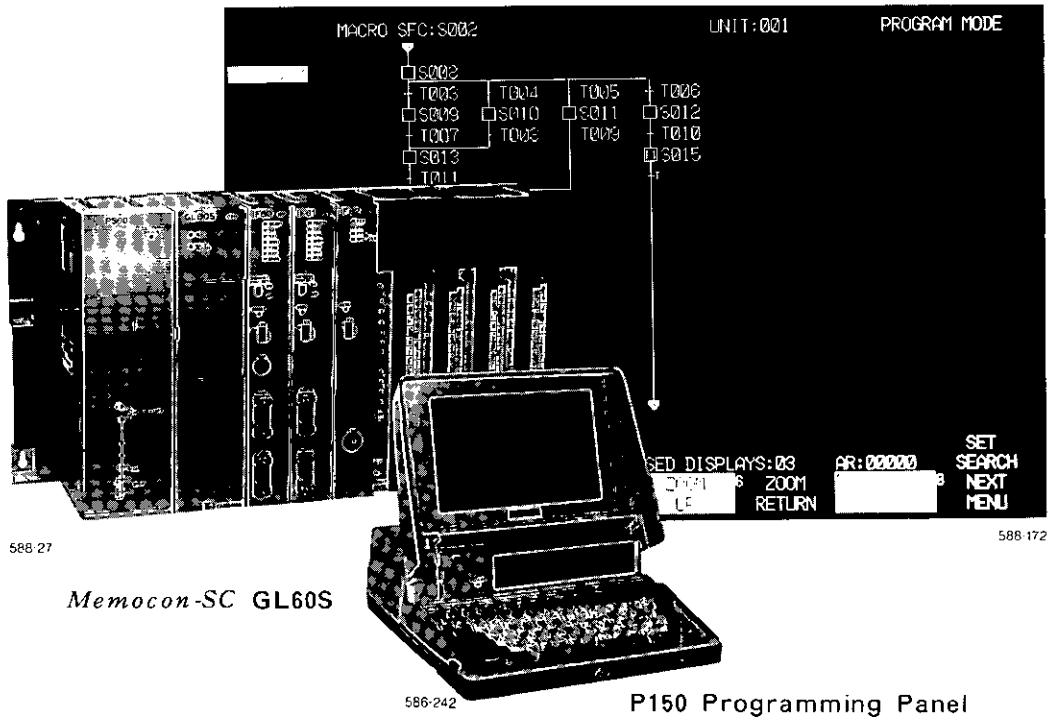
YASKAWA
ELECTRIC

PROGRAMMABLE CONTROLLER
Memocon™-SC GL60S
USER'S MANUAL-NO.3
P150 PROGRAMMING PANEL
SFC INFORMATION

This manual summarizes SFC (Sequential Function Chart) functions and operations of the Yaskawa P150 programming panel.

For additional information on *Memocon-SC* GL60 S (GL60 S), refer to the following manuals.

- *Memocon-SC* GL60S User's Manual-No.1
  Design and Maintenance (SIE-C815-14.1)
- *Memocon-SC* GL60S User's Manual-No.2
  P150 Programming Panel Basic Information (SIE-C815-14.2)



Memocon-SC GL60S

P150 Programming Panel

NOTE :
1. Inquiries about the information in this manual should be directed to your YASKAWA representative.
2.

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1. INTRODUCTION

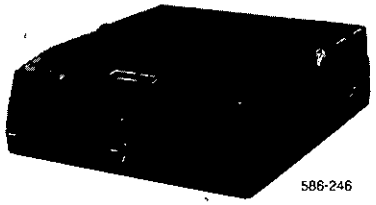
The P150 programming panel is a high-performance portable programming panel incorporating a high-performance microprocessor IAPX-186 (using MS-DOS* V2.11 for OS†), and is applicable to all the programmable controllers in the Memocon-SC series.

The P150 is a user-friendly man-machine interface featuring a large easy-to-read plasma display and two 3.5-inch floppy disk drives, using various system disks.

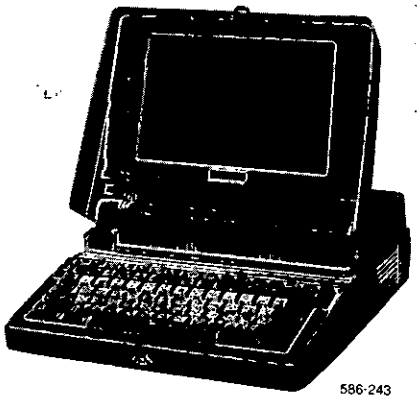
2. P150 CONSTRUCTION

2.1 P150 CONSTRUCTION

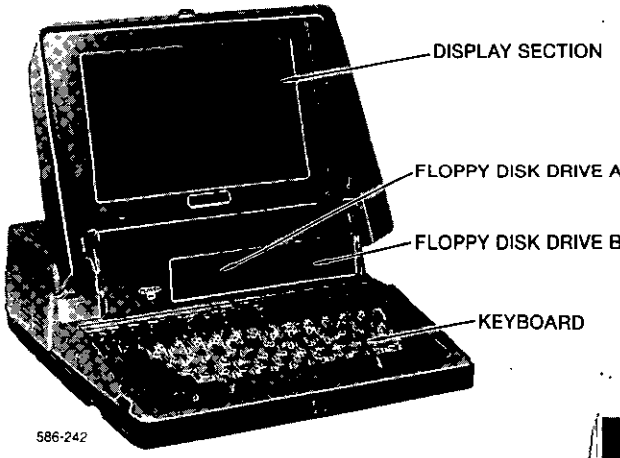
(1) With Display Section Closed



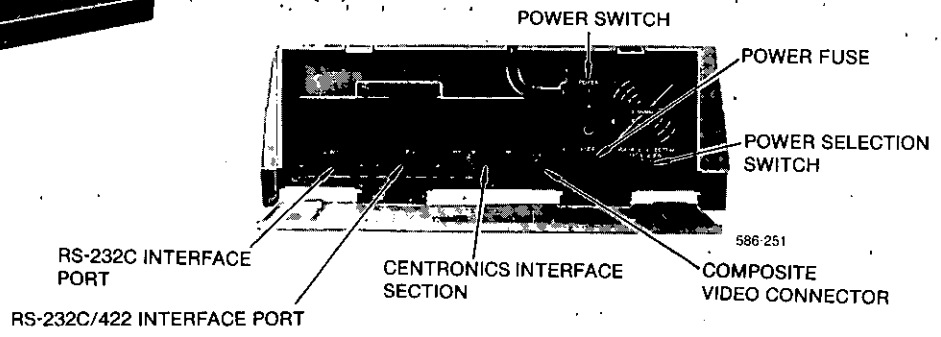
(2) With Display Section Open



(3) Front View



(4) Rear View



*MS-DOS: Trade mark of Microsoft Corp.
†OS: Operation System

Fig. 2.1 P150 Construction

2.2 P150 DISPLAY DESIGN

2.2.1 SFC (Sequential Function Chart) Display

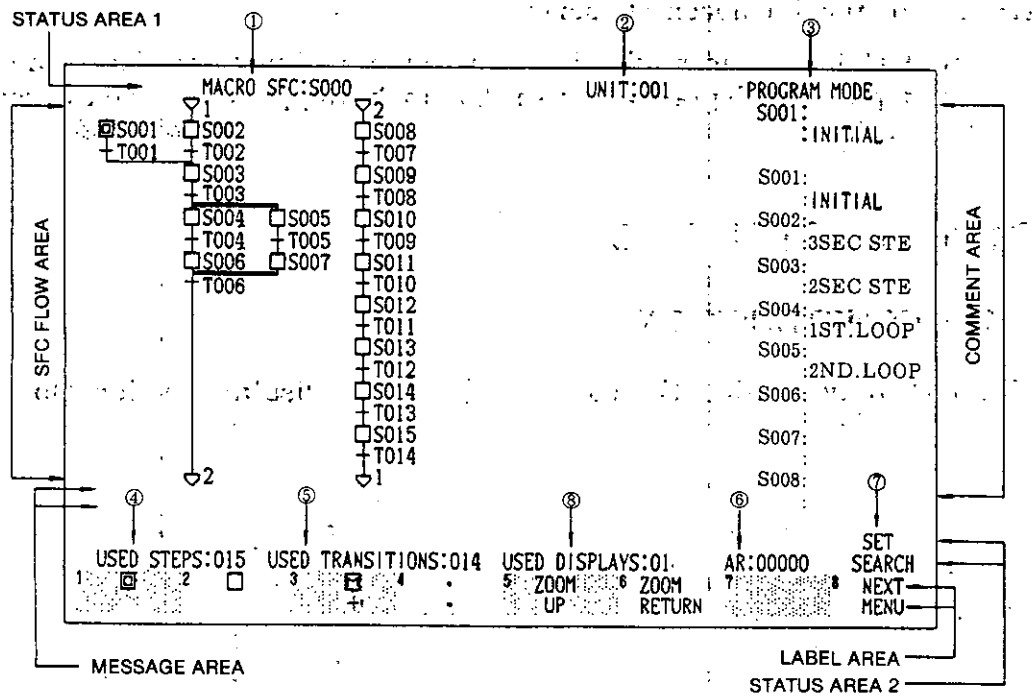


Fig. 2.2 SFC Display

(1) SFC FLOW AREA

In the area, SFC flow (only one macro SFC specified) stored in GL60S is displayed.

(2) COMMENT AREA

Comment area consists of a cursor monitor area (top position) and eight reference specified area. Comment input to step can be easily found in this area.

(3) MESSAGE AREA

Various messages for giving instructions to the operator and to indicate the operating state of P150, and various error messages are displayed here.

(4) LABEL AREA

The functions of the variable function keys [F1] through [F8] at the top of the keyboard are displayed here. ([F9] and [F10] are not used.)

(5) STATUS AREA

Displays the following 8 types of data.

① MACRO SFC: S□□□
Master Step No. of the macro SFC currently displayed.

② UNIT: □□□
The unit number of the attached GL60S.

③ □□□□□□□ MODE
The operation mode:
- PROGRAM
- MONITOR

④ USED STEP: □□□
The number of steps used.

⑤ USED TRANSITION: □□□
The number of transitions used.

⑥ AR: □□□□□
The contents of the assembly register (AR) storing the values set by the keyboard are displayed.

⑦ SET SEARCH
The cursor is positioned in this section of the screen when search parameters are to be set.

⑧ USED DISPLAYS: □□
The number of displays used.

2.2.2 Ladder Diagram Display

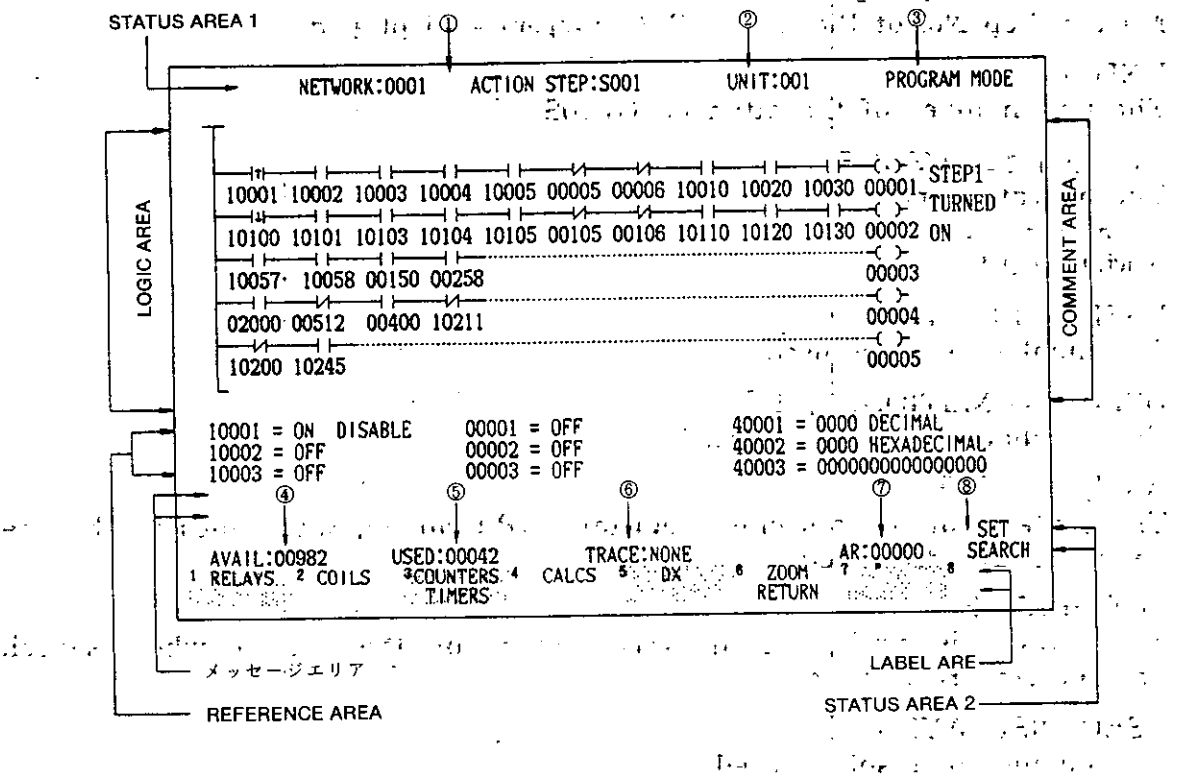


Fig. 2.3 Ladder Diagram Display

(1) LOGIC AREA

Displays network stored in GL60S memory. One specified network will be diplayed.

(2) REFERENCE AREA

Displays the status of discrete signal (coil and input relay) and contents of register in GL60S. Up to 9 (3 lines × 3 colums) status and contents are displayed.

By replacing the logic area with the expanding reference area or the expanding comment area, display of 51 max (17 lines × 3 colums) status and contents is available for the expanding reference area, and 27 max (9 lines × 3 columns) for the expanding comment area. To replace the area, refer to Table 2.1. for key functions.

(3) COMMENT AREA

Coil comment in use is automatically displayed in a network displayed (for only CPU module with expansion memory). (Option)

(4) MESSAGE AREA

Various messages for giving instructions to the operator and to indicate the operating state of P150, and various error messages are displayed here.

(5) LABEL AREA

The funcitons of the label keys [F1] through [F8] at the top of the keyboard are displayed here.

(6) STATUS AREA

Displays the following 8 types of data.

① NORMAL LADDER DIAGRAM (LADDER) ——→ NETWORK: □□□□
LADDER SEG: □

ACTION DIAGRAM (ACTION) ——→ NETWORK: □□□□
ACTION STEP: □□□

TRANSITION DIAGRAM (TRANSITION) ——→ T□□□

SUBROUTINE DIAGRAM (SUBROUTINE) ——→ NETWORK: □□□□
SUBROUTINE: □□□

② UNIT: □□□
The unit number of the attached GL60S.

③ □□□□□□□□MODE
The operation mode.

④ AVAIL: □□□□□
The total number of words of memory which have not been used and are still available.

⑤ USED: □□□□□
The total number of words of memory which have been used.

⑥ TRACE: □□□□
The number of networks currently in the trace stack.

⑦ AR: □□□□□
The contents of the assembly register (AR) storing the values set by the keyboard are displayed.

⑧ SET SEARCH
The cursor is positioned in this section of the screen when search parameters are to be set.

2.3 KEYBOARD

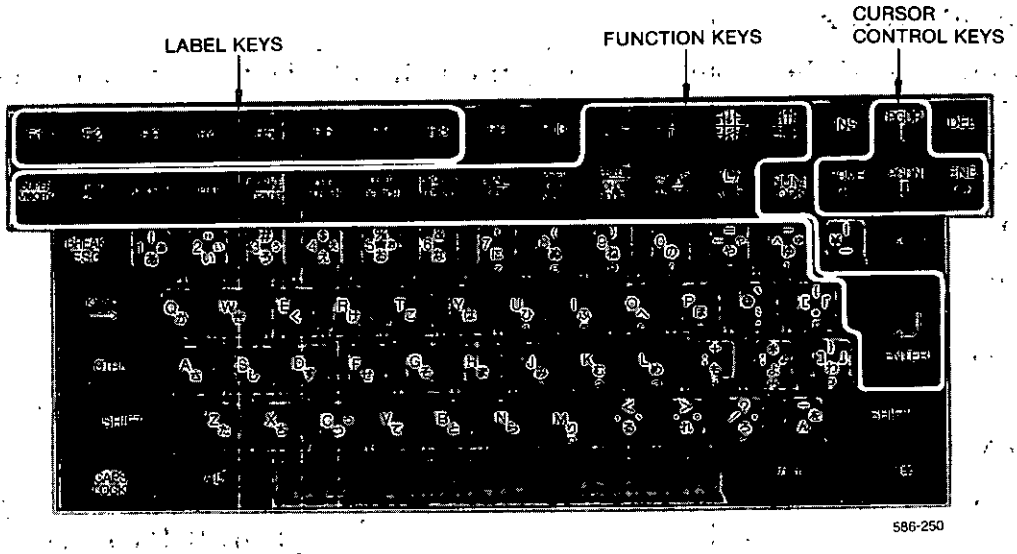


Fig. 2.4 Keyboard

(1) Cursor control keys

PGUP ↑	The cursor is shifted one position upward when this key is depressed.
PGDN ↓	The cursor is shifted one position downward when this key is depressed.
HOME ←	The cursor is shifted one position leftward when this key is depressed.
END →	The cursor is shifted one position rightward when this key is deperessed.

While these keys are kept depressed, the cursor continuously moves.

(2) Label keys

F1 to F8	The functions of these eight keys are defined by the program, and are indicated by the labels in the display.
F9 and F10	These two keys are not used.

(3) Function keys

Table 2.1 Function List of Function Keys

Key Designation	Function
SUPER VISORY	In the write-in mode and monitor mode, depressing this key calls up the display (main screen) for the supervisory functions (e.g., GL60S stop, start).
SHIFT + SUPER VISORY	Depressing these keys simultaneously causes the panel to make the initial display. This operation is required for mode change.
START NEXT	• On the logic screen A new network is inserted after the network displayed in the logic area. The power line and the cursor are displayed in the left part of the screen to start a new network. • On the SFC screen Depressing this key after zooming a macro step, which contains no expanded view, creates an expanded view of the macro step. The screen displays a macro entry and the cursor for creation of a new expanded view.
NTWK DELETE NODE	• On the logic screen The node (element) at the cursor is deleted from the displayed network. A vertical shunt, if present, is also deleted. • On the SFC screen The node (element) at the cursor is deleted from the displayed SFC. A branch and a loop, if present, are also deleted.
SHIFT + NTWK DELETE NODE	• On the logic screen The network displayed in the logic area is deleted, and the next network is automatically displayed. If the deleted network was the last in memory, the next to the last network is displayed. If these two keys are held down too long, a few networks may be deleted. • On the SFC screen The SFC displayed in the SFC area is deleted, and the screen returns to the state before the SFC was stored.
EDIT	The following edit functions are enabled: • On the logic screen Network expansion and compression in horizontal and vertical directions, network displacement, and network copying. • On the SFC screen Deletion of action circuits and transition condition circuits, SFC expansion and compression in horizontal and vertical directions, SFC displacement, and SFC copying.
RETRACE/TRACE	When the cursor is on a relay contact referencing a coil, the trace function causes the network that drives the referenced coil to be displayed. To access the trace function, depress this key. • When the cursor is on a register, the register content is displayed. • When the cursor is on a contact, ON/OFF status for input relay is displayed.
SHIFT + RETRACE/TRACE	The retrace function allows the user to return to the network that was displayed prior to performing a trace. To access the retrace function, depress these keys.

Table 2.1 Function List of Function Keys (Cont'd)

Key Designation	Function
CHG / SCREEN	Depressing this key switches the display mode. The logic and comment display screen is switched to the extended reference display screen.
SHIFT + CHG / SCREEN	The logic and extended reference display screen is switched to the comment display screen.
CONT / SEARCH	Depressing this key causes the panel to display the first network containing the complete or partial node specified in the search parameters or the SFC. This key must be depressed after each network or SFC is displayed in order to continue the search.
SHIFT + CONT / SEARCH	Depressing these keys simultaneously causes the panel to display the next network or the SFC, continuing the search. These keys must be depressed after each network or SFC is displayed in order to continue the search.
SRCH⇨ / TAB⇩⇧	Depressing this key moves the cursor to other areas. It also moves the cursor from the search data area to the logic area or the SFC area.
SHIFT + SRCH⇨ / TAB⇩⇧	Depressing these keys moves the cursor to the search data area.
ERASE / GET	Depressing this key with a network number or a reference number set in advance in AR displays the follows: • Specified network (when the cursor is in the logic area or in the SFC area) • Reference number (when the cursor is in the reference area)
SHIFT + ERASE / GET	The network or reference indicated by the cursor will be erased from the screen when these keys are depressed simultaneously. The ERASE function affects the P150 panel screen only; it does not affect the memory of the attached controller.
PREV G E T NEXT	The network or reference following the one currently displayed on the screen is displayed by depressing this key. • When the cursor is in the logic area, next network is displayed. • When the cursor is in the reference area, next reference is displayed.
SHIFT + PREV G E T NEXT	The network or reference before the one currently displayed on the screen is displayed by depressing these keys simultaneously. • When the cursor is in the logic area, previous network is displayed. • When the cursor is in the reference area, previous reference is displayed.
PRINT / CHG NODE	This key is used when writing and altering networks, and when setting search data. Depressing this key changes the label area display to the function group select display.
SHIFT + PRINT / CHG NODE	Depressing these keys simultaneously produces a hard copy of the current display. (A specified printer should be connected to the parallel port.)

Table 2.1 Function List of Function Keys (Cont'd)

Key Designation	Function
CLR AR / CLR ERR	Depressing this key deletes the error message displayed in the message area. Whenever an error message is displayed, first depress this key before executing the correct operations.
SHIFT + CLR AR / CLR ERR	Depressing these keys simultaneously clears the assembly register (AR) to 0. These keys can also erase error messages related to the AR.
ENTER	While the cursor is in the logic area or the SFC area, this key is used to store the AR content as the reference No. or the operand for the element indicated by the cursor. If nothing is in the cursor position, an element type and a vertical shunt (if any) must be specified beforehand. When the cursor is located at a hold register No. in the reference area, this key is used to store the AR content in that hold register.
*	Selects ⊣ ⊢ (NO contact) of relays.
SHIFT + *	Selects ⊣↑⊢ (transitional contact OFF to ON) of relays.
*	Selects ⊣/⊢ (NC contact) of relays.
SHIFT + *	Selects ⊣↓⊢ (transitional contact ON to OFF) of relays.
*	Selects —( )— (coil) of coil.
SHIFT + *	Selects —(L)— (latch coil) of coil.
*	Selects vertical short ⋮.
SHIFT + *	Selects vertical open : (vertical short clear).
*	Selects horizontal short •——•. For horizontal short clear, use NTWK DELETE NODE key.

* The GL60S programmer disk (Model: F60S-E001) provides the same function keys as the above. Any key of the same function can be used.

2.3 KEYBOARD (Cont'd)

(4) ASCII keys

These keys are used to input numerals, alphabet, codes and other ASCII characters, when inputting numerical data, file name, etc. These keys are operational while the カナ key is unlocked. While the カナ key is locked KATAKANA is input.

(5) Special keys

CAPS LOCK

CAPITAL LOCK KEY

When this key is depressed and locked, all the alphabet keying afterward is made in capital letters. Depressing it again unlocks it.

カナ

KANA KEY

When this key is depressed and locked, all the alphabet keying afterward are converted into KANA. Depressing it again unlocks it.

SHIFT

SHIFT KEY

This key is depressed when the characters in the shift positions of all the keys are to be input. The two shift keys have identical function.

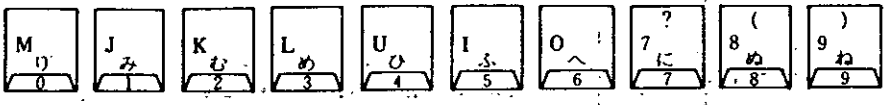
BACK SPACE KEY

This key is used to correct on input character.

NUM LOCK

NUMBER LOCK KEY

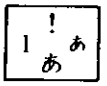
When this key is depressed and locked, all the keys shown below serve as digit keys.



When it is locked, other keys (0 , P , etc.) are used to input the symbols [: " (, ") - , " etc.]. Note that while this key is locked, the shift key is disable.

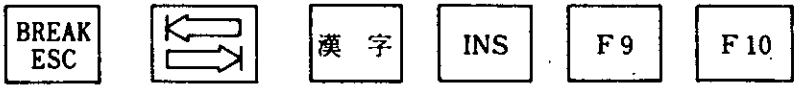
NOTE

(1) Example of keying



- To input "1" at the middle left, simply depress this key.
- To input "!" at the top, depress this key while depressing SHIFT key.
- To input "ア" at the bottom, depress カナ key, and then depress this key.
- To input "ア" at the middle right, depress カナ key, and then, depress the SHIFT key and this key simultaneously.

(2) Unused keys



(3) HIRAGANA and KATAKANA

Although the keys are labeled with HIRAGANA, actually KATAKANA is input. No HIRAGANA can be input.

3. P150 SPECIFICATION

3.1 BASIC SPECIFICATION

Table 3.1 Basic Specifications

Item	Specifications
Power Supply*	85 to 132 VAC/195 to 265 VAC (Selectable), single phase, at 47.5 to 63 Hz.
Dissipated Power*	120 VA
Ambient Temperature†	+5 to +45°C
Storage Temperature†	−20 to +60°C
Humidity*	20 to 80% RH (non-condensing)
Atmosphere*	No inflammable or corrosive gases or no excessive dust.
Grounding*	Grounded via GL60S ground line with specified communication cable.
Dielectric Strengh†	1500 VAC for 1 minute
Insulation Resistance†	50 MΩ min at 500 VDC

*Data measured with disk inserted in P150.
†Data measured with no disk inserted in P150.

3.2 PERFORMANCE SPECIFICATION

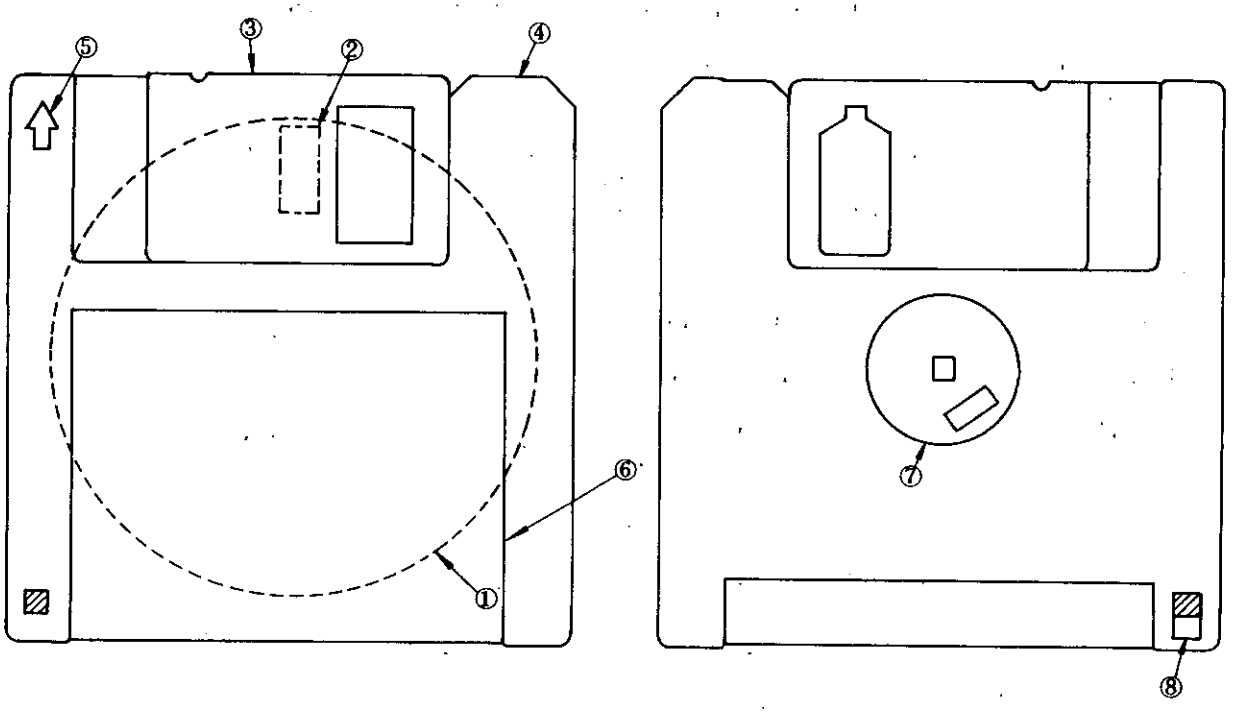
Table 3.2 Performance Specifications

Item		Specifications
Type		DISCT-P150-10
CPU		IAPX 186 (8 M Hz)
ROM		16 k bytes (bootstrap and diagnostic)
Display Screen		Plazma display, orange, size 230 × 144 mm
Display Capability	Text Display	AN*: 25 lines × 80 words
	Dot Matrix	AN*: 8 × 16 dots (25 lines)
	Character Attribute	Reverse, blink, underline, blind
	Graphic Display	640 × 400 dots
Keyboard		94 keys, sculpture type
Floppy Disk Drive		Built-in two 3.5-inch floppy disks (double sided double density)
Serial Interface		One RS-232C and one RS-232C/422 port
Parallel Interface		A Centronics spec port
Composite Video Signal Interface		For connection of external CRT
Calender watch		Battery back-up
OS†		MS-DOS‡ V 2.11
Dimensions in mm		348 (W) × 121 (H) × 435 (D)
Approx Weight		9 kg

*AN: Alpha-numeric
†OS: Operation System
‡MS-DOS: Trade mark of Microsoft Corp.

3. 3 SPECIFICATION OF FLOPPY DISK DRIVE

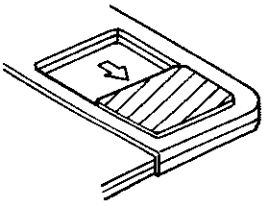
(1) Parts Name of Floppy Disk



① DISK
② HEAD WINDOW
③ SHUTTER
④ CARTRIDGE
⑤ INSERTING DIRECTION
⑥ LABEL
⑦ METAL HUB
⑧ PROTECT SWITCH*

*Protect Switch Usage

(a) Write Disable



(b) Write Enable

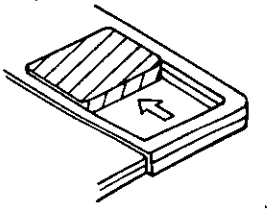


Fig. 3.1 Parts Name of Floppy Disk

3. 3 SPECIFICATION OF FLOPPY DISK DRIVE (Cont'd)

(2) Handling Floppy Disks

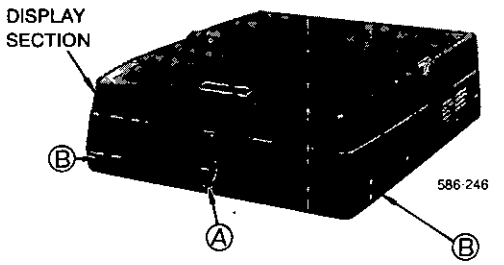
- Don't open the shutter and touch the disk surface by hand.
- Don't bring the disk close to a motor, transformer or other source of strong magnetic fields.
- Don't bring alcohol, thinner, beverages, etc. into contact with the disk.
- Don't place heavy objects on the disk.
- Don't bend or fold the disk.
- Don't expose the disk to direct sunlight or heat.
- Be sure the disk is fully inserted.
- To protect the files (avoiding damage and magnetization), remove the disk from the drive after use and store it in the case in the specified storage area.

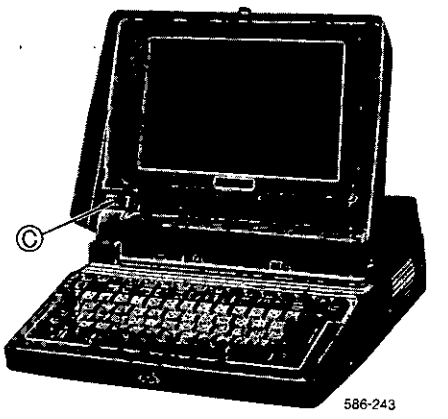
Table 3.4 Applicable Floppy Disk for P150

Model	Name	Function and Application
F60S-E001	GL60S programmer	GL60S I/O allocation; program storing, altering, monitoring, loading, saving, verifying, etc.
F60S-E002	GL60S ladder lister	Printing out of ladder diagram and program documentation for GL60S by using printer
F150-000	Blank disk	Blank disk for saving GL60S program, formated (initialized).

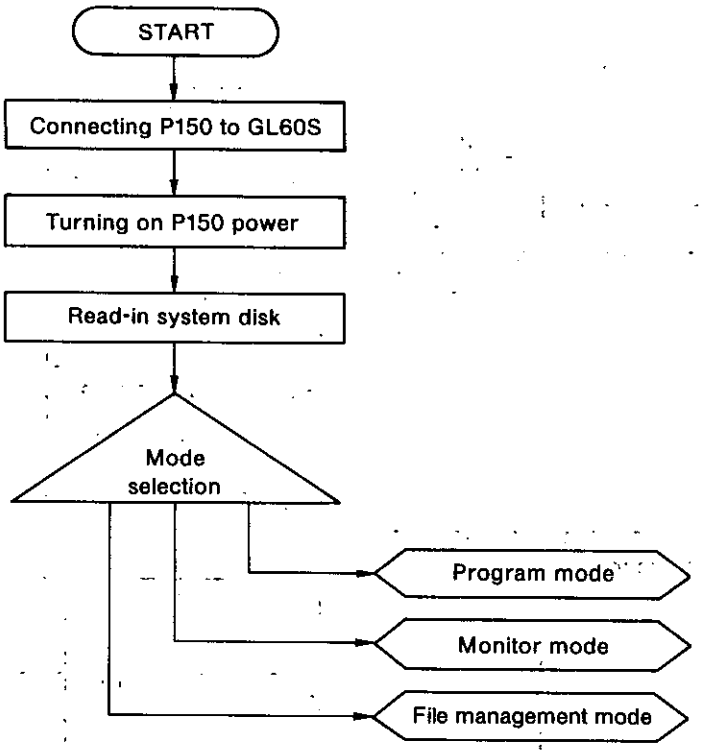
(3) Openning P150

1. Release lock Ⓐ.
2. Fully push the release latches of part Ⓑ to disengage the display section locks.
3. Lift open the display section until it locks into position with part Ⓒ.

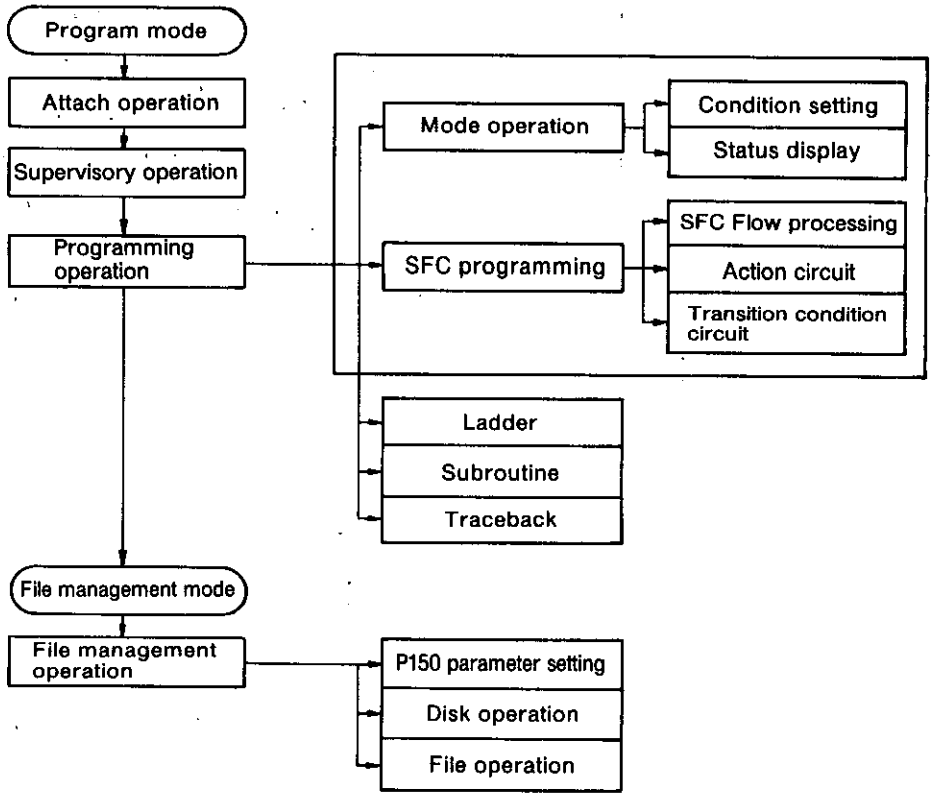




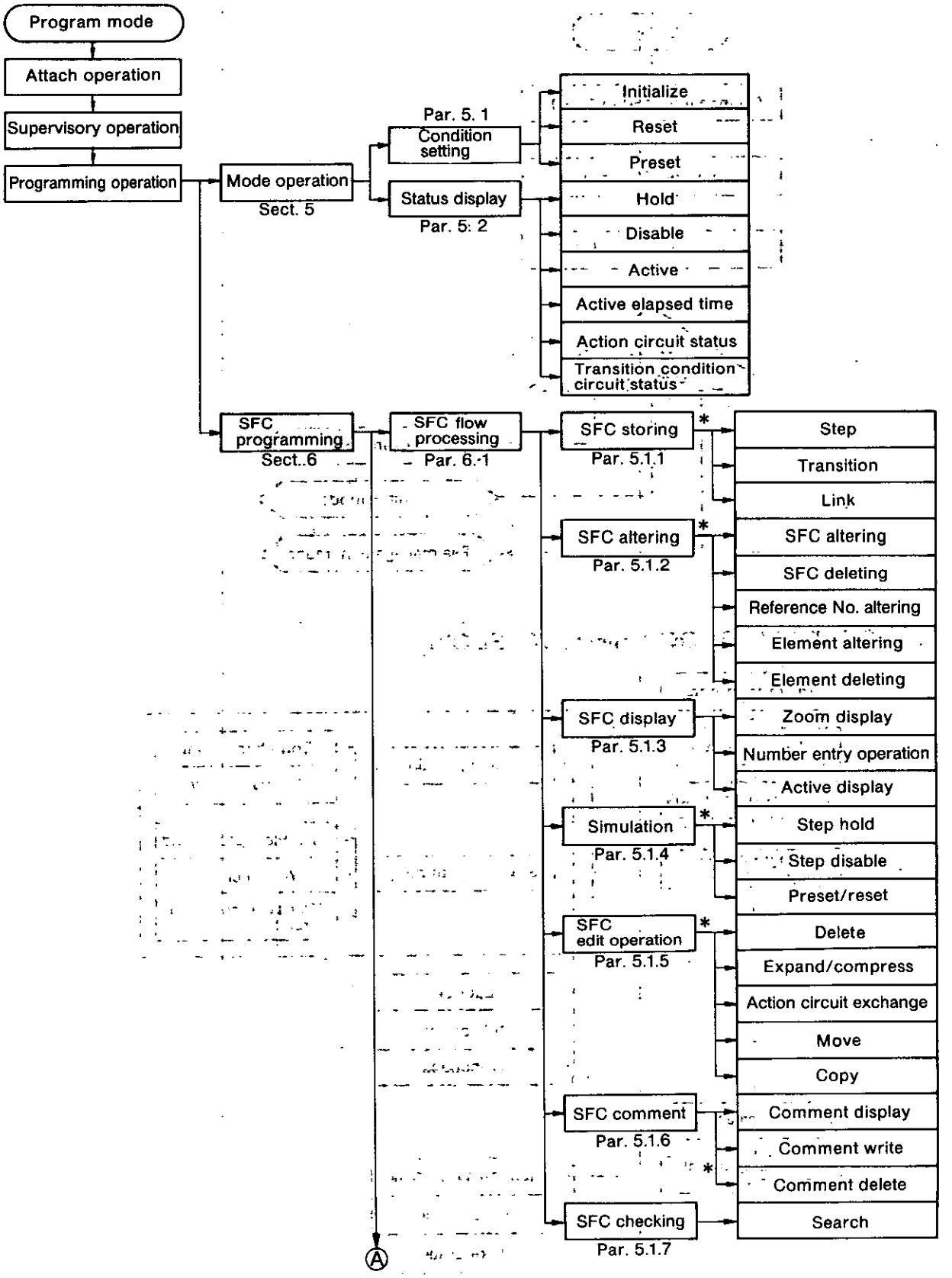
4. PROGRAMMING TREE

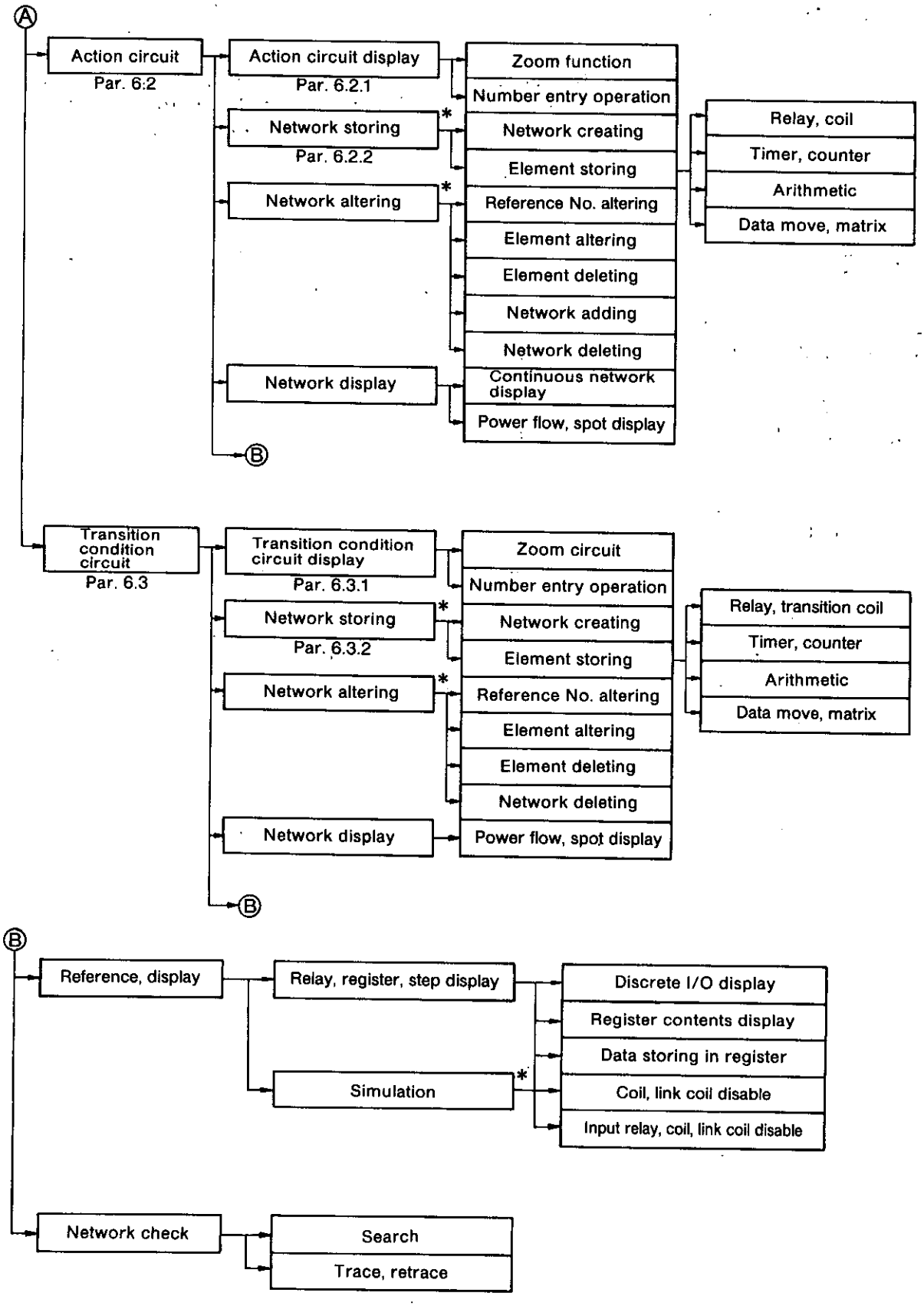


4.1 GENERAL PROGRAMMING FLOW



4.2 PROGRAMMING FLOW




Ⓐ
Action circuit
Par. 6.2
Action circuit display
Par. 6.2.1
Network storing
Par. 6.2.2
Network altering
Network display
Ⓑ
Zoom function
Number entry operation
Network creating
Element storing
Reference No. altering
Element altering
Element deleting
Network adding
Network deleting
Continuous network display
Power flow, spot display
Relay, coil
Timer, counter
Arithmetic
Data move, matrix
Transition condition circuit
Par. 6.3
Transition condition circuit display
Par. 6.3.1
Network storing
Par. 6.3.2
Network altering
Network display
Ⓑ
Zoom circuit
Number entry operation
Network creating
Element storing
Reference No. altering
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Network deleting
Power flow, spot display
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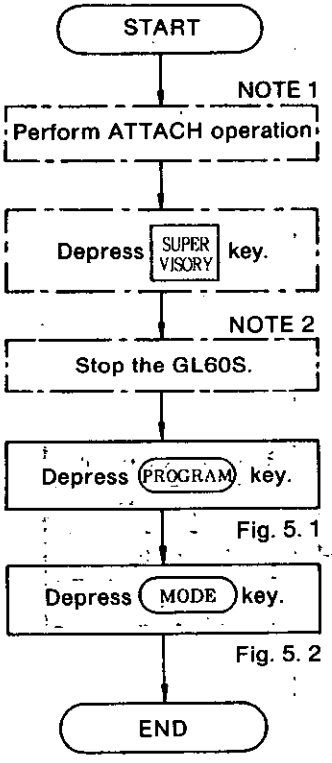
Relay, register, step display
Simulation
Discrete I/O display
Register contents display
Data storing in register
Coil, link coil disable
Input relay, coil, link coil disable
Network check
Search
Trace, retrace

5. MODE OPERATION

The mode operation is used to set conditions for processing steps referring to status of reference numbers of relays and coils, as well as to display the status of steps, etc. Shown below are the procedures down to display of the mode operation screen.



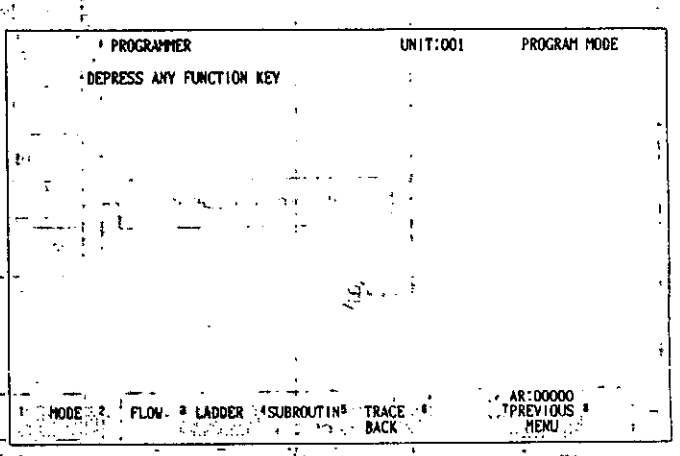


Fig. 5. 1

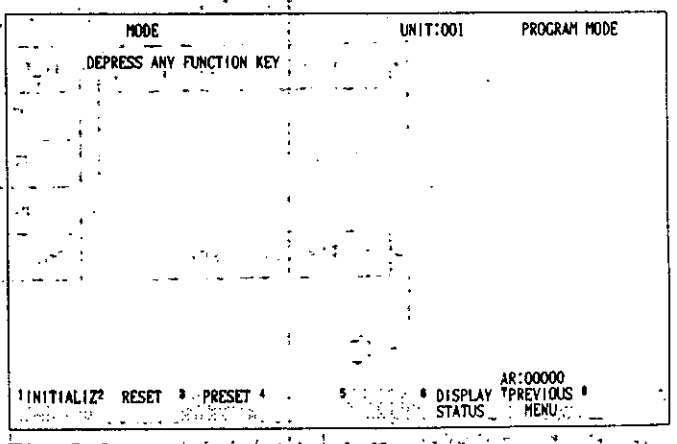


Fig. 5. 2

NOTE

1. When operation has already been completed, this step can be skipped.
2. This step is only necessary for setting conditions.
3. Three selections of condition settings are:
   - Initialize ..... INITIALIZ
   - Reset ..... RESET
   - Preset ..... PRESET
4. The six statuses listed below can be displayed after depressing DISPLAY STATUS key.
   - Step hold status ..... DISPLAY HOLD
   - Step disabled status ..... DISPLAY DISABLE
   - Step active status ..... DISPLAY ACTIVE
   - Elapsed time of step active status ..... DISPLAY TIME
   - Current status of action circuit ..... DISPLAY ACTION
   - Current status of transition condition circuit ..... DISPLAY TRANSITION

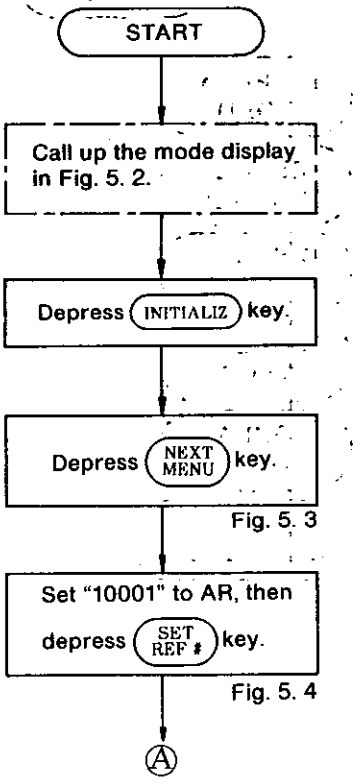
5.1 CONDITION SETTING

This section describes the operations to set conditions for processing steps referring to the status of reference numbers of relays and coils.

(1) INITIALIZE

This function sets the conditions for activating the initial step. To do this, the reference numbers of relays and coils are used.

POINT GL60S must be stopped in advance.



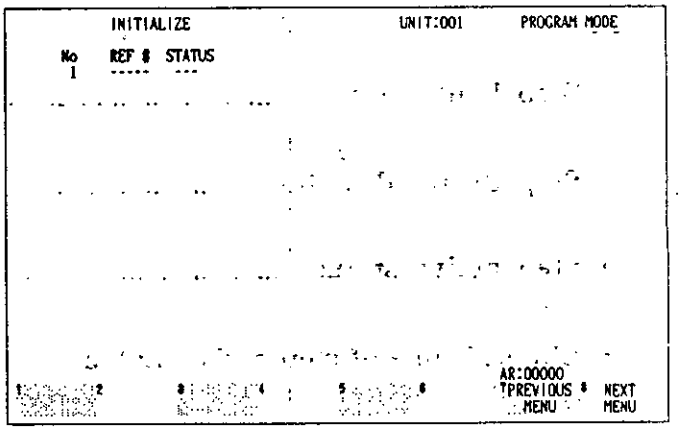


Fig. 5. 3

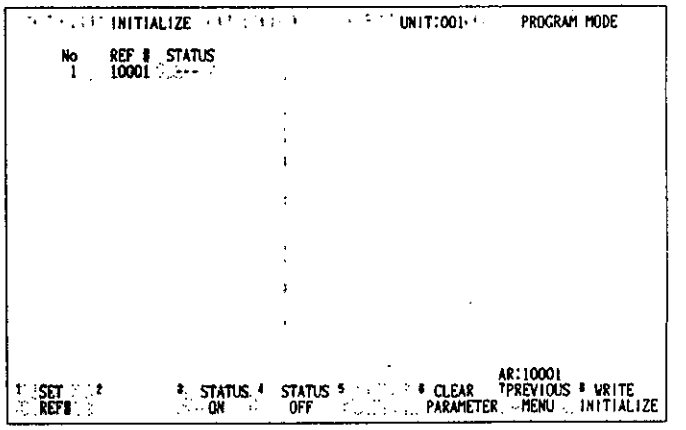
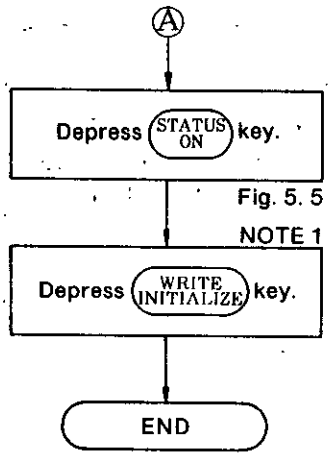


Fig. 5. 4



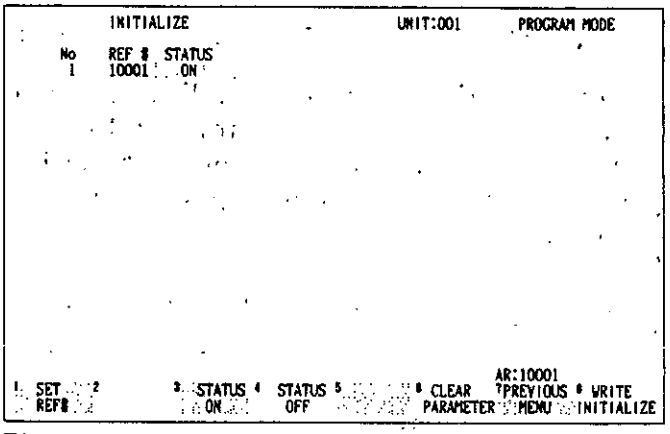


Fig. 5. 5

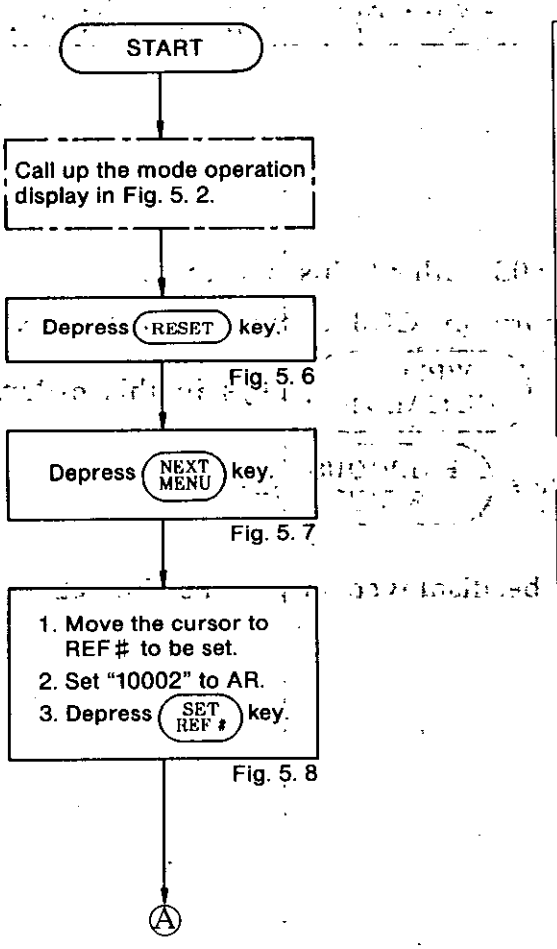
NOTE

1. No data is stored in the memory of GL60S without this operation.
2. To delete the data stored in the memory of GL60S through the above procedure, depress CLEAR PARAMETER and WRITE INITIALIZE keys in this order.
3. To return to the previous display, depress PREVIOUS MENU key.
4. Only one condition can be set.
5. In the monitor mode, the condition can be displayed but cannot be set.

(2) RESET

This function sets the conditions for inactivating a desired step. The reference numbers used for condition setting (shown under "REF #") are those of relays and coils. A desired step can be set by entering the step number of input register number under "STEP NO/REGISTER NO".

POINT GL60S must be stopped in advance.



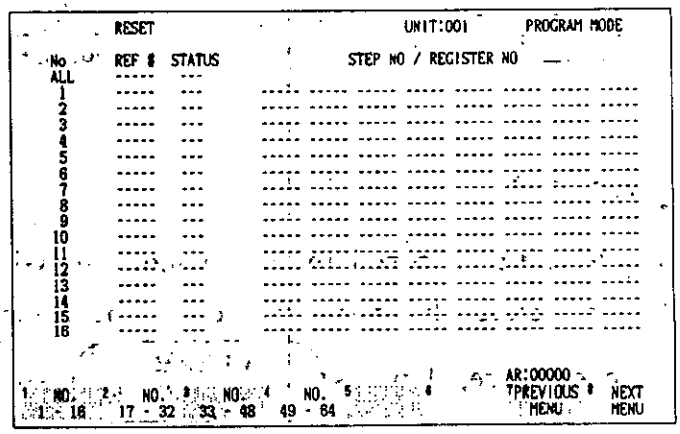


Fig. 5. 6

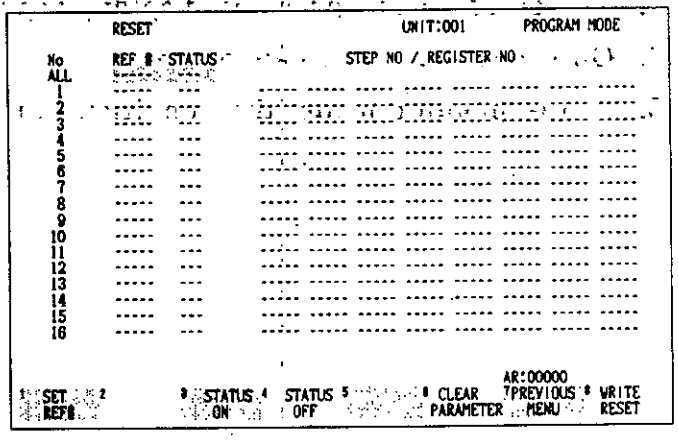


Fig. 5. 7

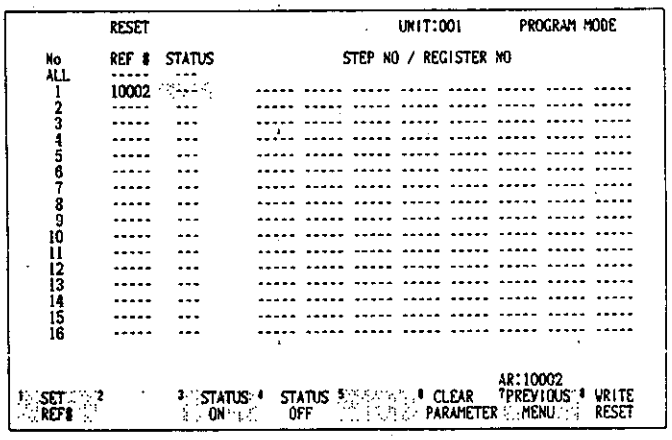
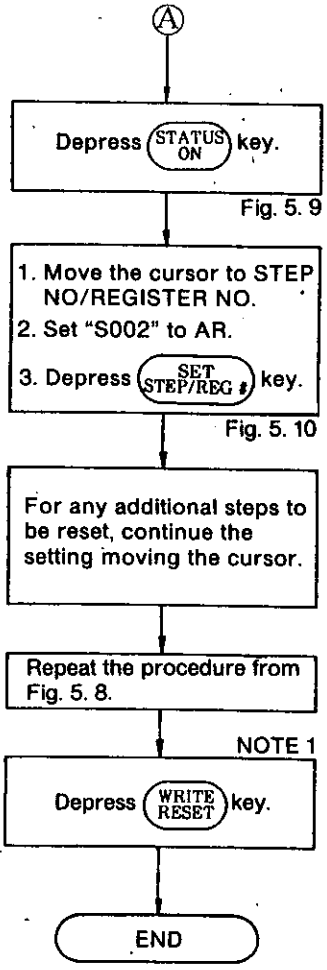


Fig. 5. 8



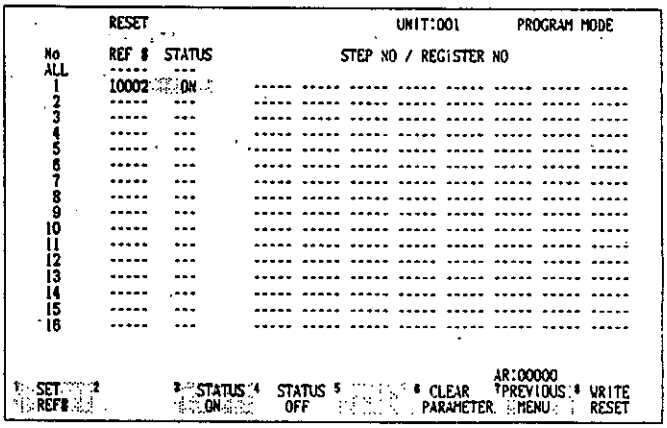


Fig. 5. 9

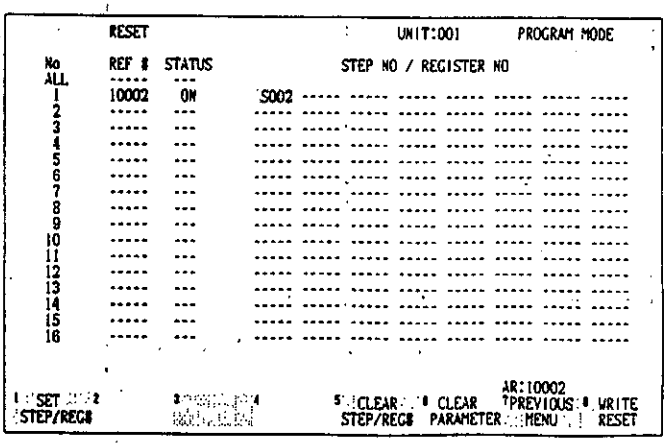


Fig. 5. 10

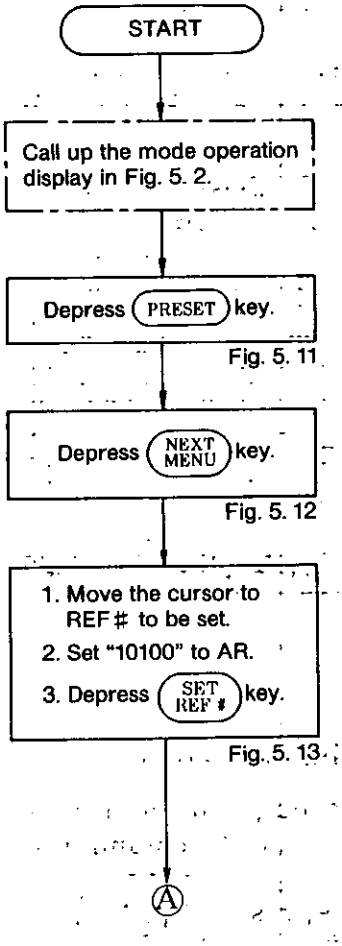
NOTE

1. No data is stored in the memory of GL60S without this operation.
2. To delete the data stored in the memory of GL60S through the above procedure, move the cursor to the number of the set (under "No" column), depress CLEAR PARAMETER or CLEAR STEP/REG# key, then depress WRITE RESET key.
3. To return to the previous display, depress PREVIOUS MENU key.
4. Up to 65 steps can be set to inactive status (under "No" column). To change the number of steps to be set on the screen, use NO 1-16 through NO 49-64 keys.
5. In the monitor mode, the RESET conditions can be displayed but cannot be set.
6. To move the cursor under the "No." column, use the cursor control keys ← ↑ ↓ → .

(3) PRESET

This function sets the conditions for activating a desired step. The reference numbers used for setting conditions (shown under "REF #") are those of relays and coils. A desired step can be set by entering the step number or input register number under "STEP NO-REGISTER-NO."

POINT GL60S must be stopped in advance.



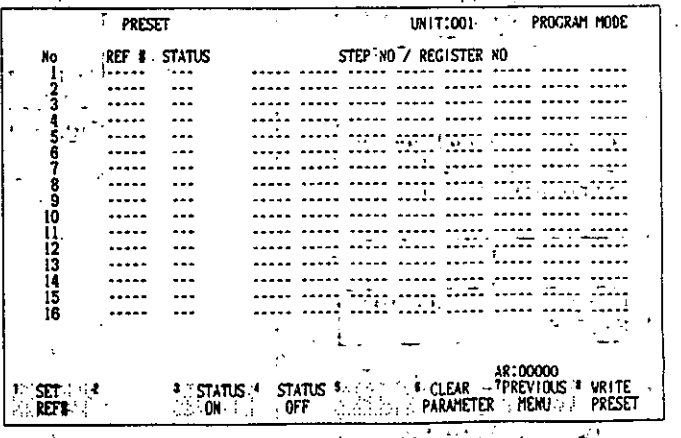


Fig. 5. 11

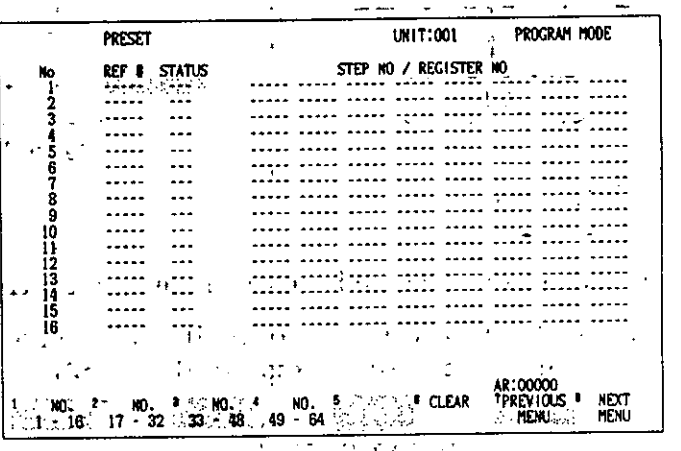


Fig. 5. 12

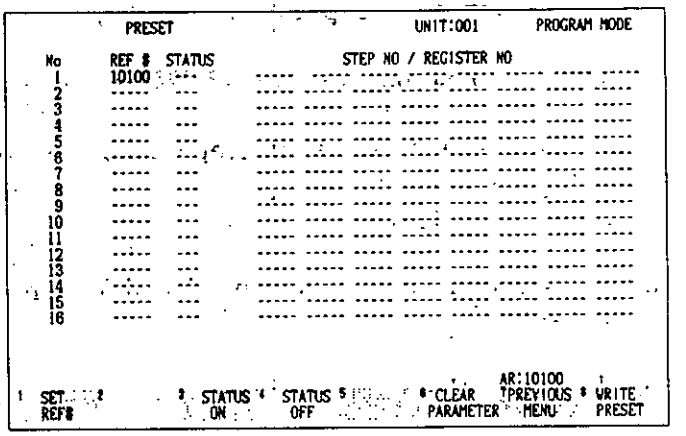
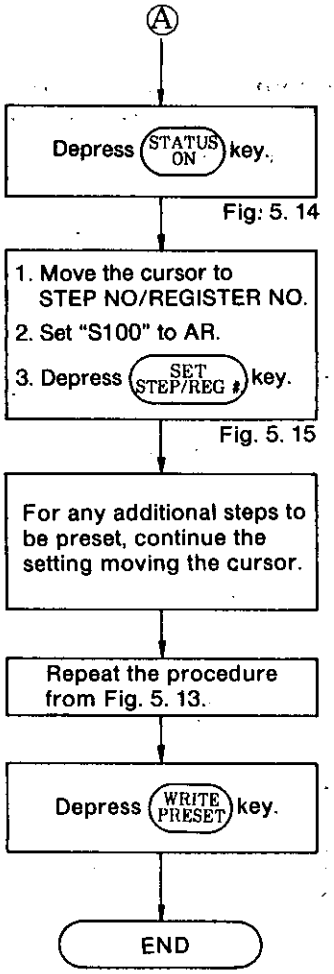


Fig. 5. 13



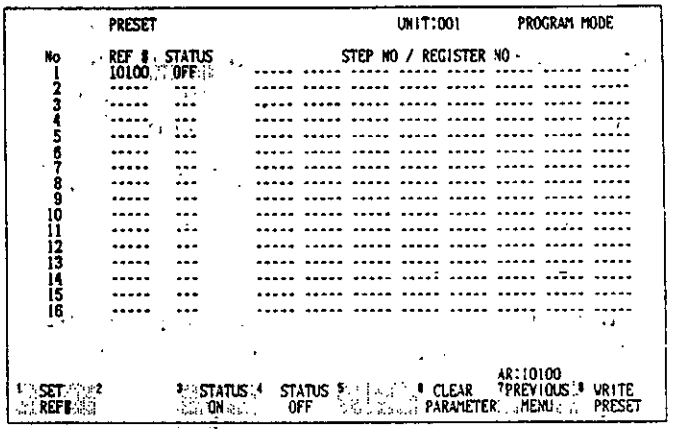


Fig. 5. 14

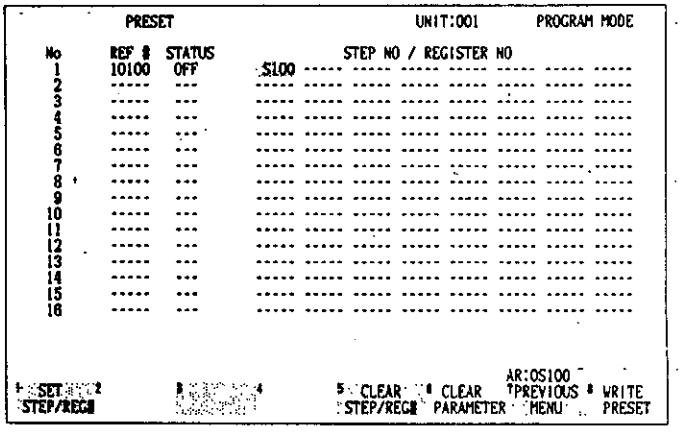


Fig. 5. 15

NOTE

1. No data is stored in the memory of GL60S without this operation.
2. To delete the data stored in the memory of GL60S through the above procedure, move the cursor to the number of the set (under "No" column), depress CLEAR PARAMETER or CLEAR STPE/REG key, then depress WRITE RESET key.
3. To return to the previous display, depress PREVIOUS MENU key.
4. Up to 64 steps can be set to inactive status (under "No" column). To change the number of steps to be set on the screen use NO 1-16 through NO 49-64 keys.
5. In the monitor mode, the RESET conditions can be displayed but cannot be set.
6. To move the cursor under the "No." column, use the cursor control keys ← ↑ ↓ →

5.2 STATUS DISPLAY

This section describes the operations to produce the following displays: the status (hold, disable, active) of a step, the elapsed time of active status for steps, and the current status of action circuits and transition condition circuits.

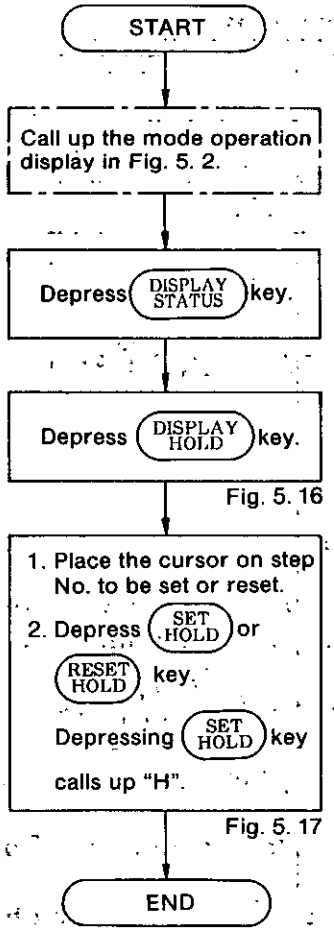
In the status display of the step, the contents can be changed.

(1) HOLD STATUS DISPLAY

This operation displays a step in hold status (i.e., one held in active status). A desired step can be set in the hold status or reset the status.

POINT

To set a step in the hold status or reset, set the memory protect switch of GL60S to OFF.



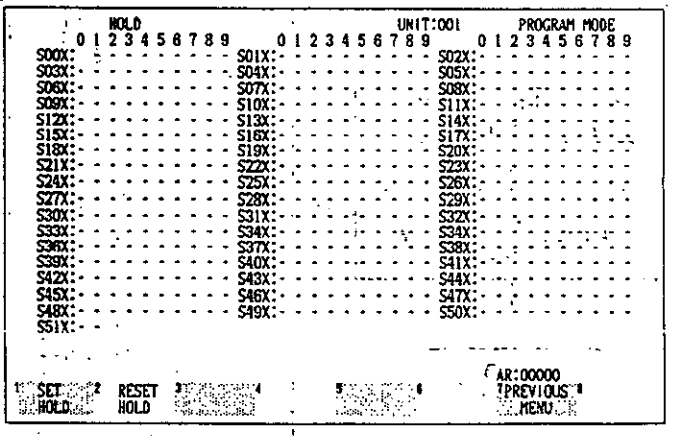


Fig. 5. 16

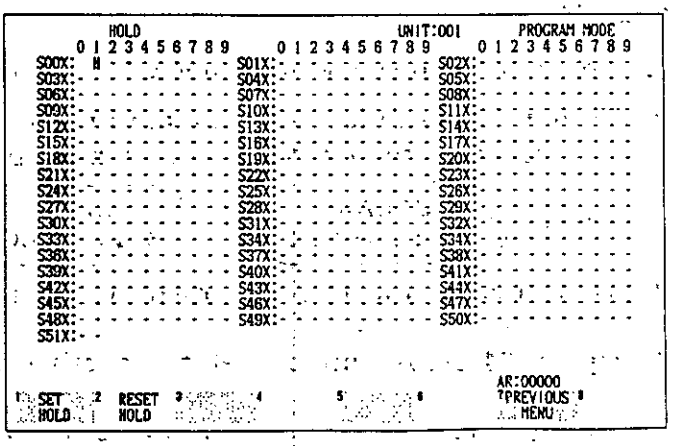


Fig. 5. 17

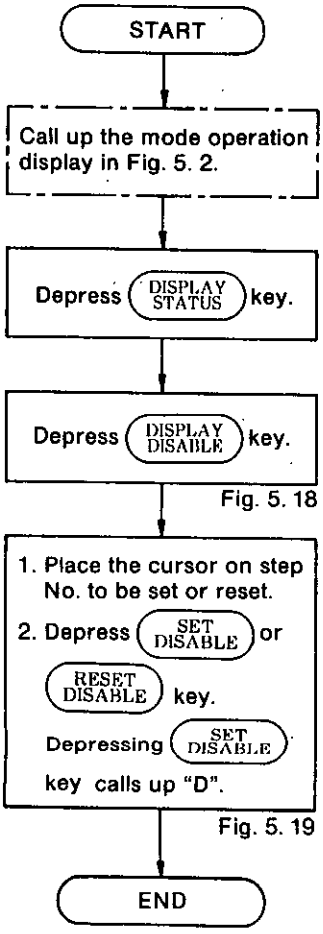
NOTE

1. Any step set in the hold status must be reset after it no longer needs to be in the hold status.
2. The SET HOLD and RESET HOLD keys do not function in the monitor mode.
3. To return to the previous display, depress PREVIOUS MENU key.

(2) DISABLE STATUS DISPLAY

This operation displays a step in the disable status (i.e., one hold from proceeding). A desired step can be set in the disable status or reset the status.

POINT To set a step in the disable status or reset, set the memory protect switch of GL60S to OFF.



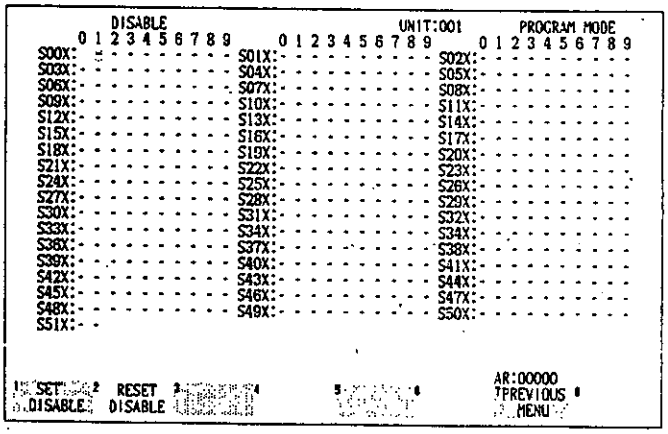


Fig. 18

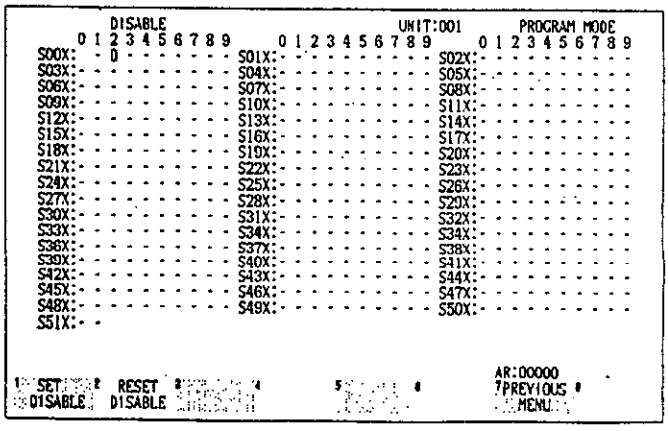


Fig. 19

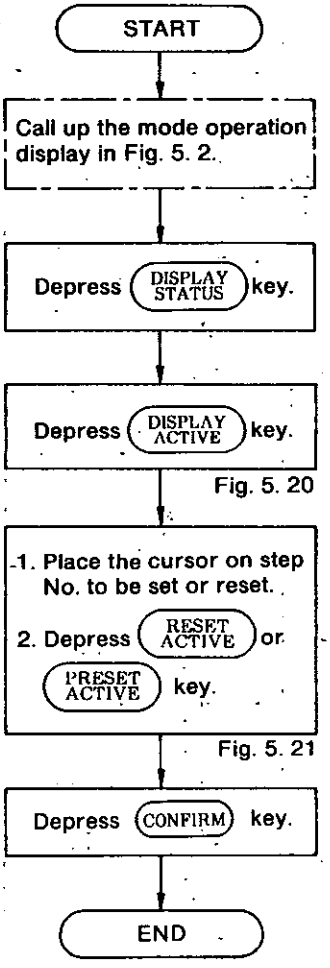
NOTE

1. Any step set in the disable status must be reset after it no longer needs to be in the disable status.
2. The SET DISABLE and RESET DISABLE keys do not function in the monitor mode.
3. To return to the previous display, derpess PREVIOUS MENU key.

(3) ACTIVE STATUS DISPLAY

This operation displays a step in the active status. A desired step can be forcibly set in the active status or reset the status.

POINT To set a step in the active status or reset, set the memory protect switch of GL60S to OFF.



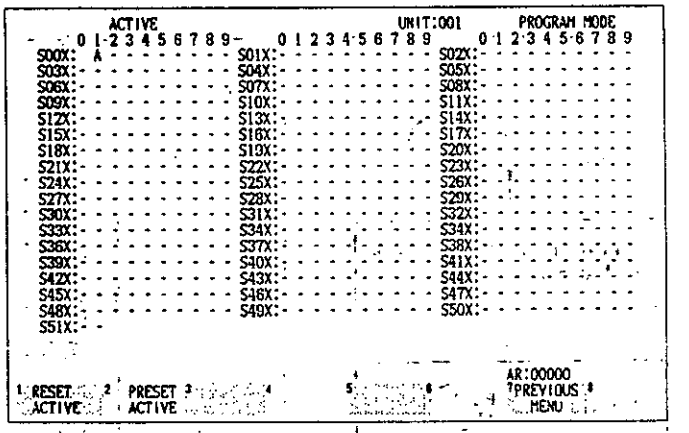


Fig. 5. 20

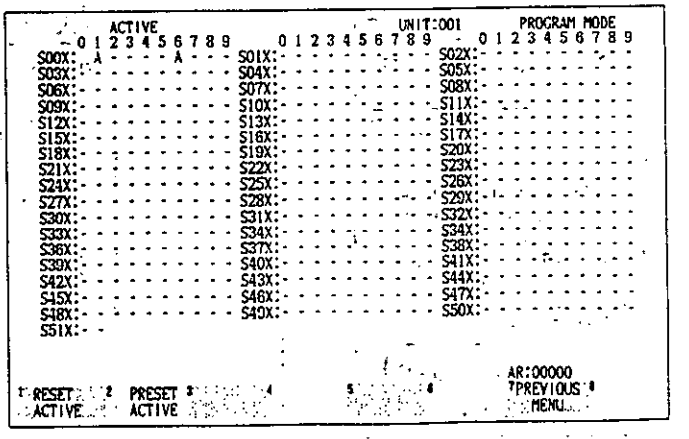


Fig. 5. 21

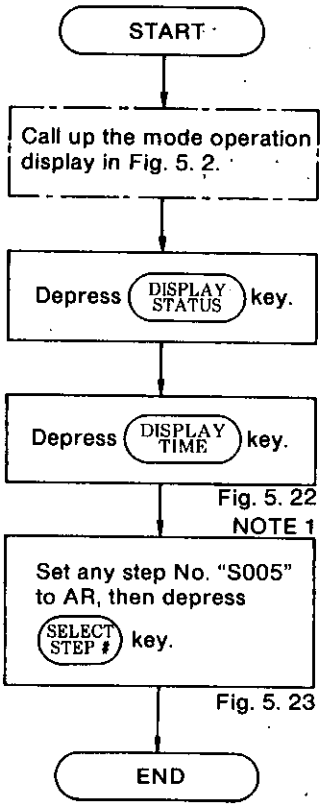
NOTE

1. The RESET ACTIVE and PRESET ACTIVE keys do not function in the monitor mode.
2. Depressing PRESET ACTIVE key calls up "A".

(4) ELAPSED ACTIVE TIME DISPLAY

This operation displays the elapsed time afater a step becomes active until it changes to inactive status.

POINT Enter the number of a step desired to be displayed. The display will cover the 32 consecutive steps starting with the step entered.



TIME CHART UNIT:001 PROGRAM MODE

STEP	A/I	TIME(SEC)	STEP	A/I	TIME(SEC)
S001	I	001.0	S017	I	000.0
S002	I	010.5	S018	I	000.0
S003	A	020.0	S019	I	000.0
S004	A	030.5	S020	I	000.0
S005	A	040.0	S021	I	000.0
S006	I	050.5	S022	I	000.0
S007	I	060.0	S023	I	000.0
S008	I	070.5	S024	I	000.0
S009	I	080.0	S025	I	000.0
S010	I	090.0	S026	I	000.0
S011	I	100.5	S027	I	000.0
S012	I	110.0	S028	I	000.0
S013	I	120.5	S029	I	000.0
S014	I	130.9	S030	I	000.0
S015	I	140.0	S031	I	000.0
S016	I	150.7	S032	I	000.0

AR:00000
?PREVIOUS
MENU

Fig. 5. 22

TIME CHART UNIT:001 PROGRAM MODE

STEP	A/I	TIME(SEC)	STEP	A/I	TIME(SEC)
S005	A	040.0	S021	I	000.0
S006	I	050.5	S022	I	000.0
S007	I	060.0	S023	I	000.0
S008	I	080.0	S024	I	000.0
S009	I	090.0	S025	I	000.0
S010	I	100.5	S026	I	000.0
S011	I	110.0	S027	I	000.0
S012	I	120.5	S028	I	000.0
S013	I	130.9	S029	I	000.0
S014	I	140.0	S030	I	000.0
S015	I	150.7	S031	I	000.0
S016	I	000.0	S032	I	000.0
S017	I	000.0	S033	I	000.0
S018	I	000.0	S034	I	000.0
S019	I	000.0	S035	I	000.0
S020	I	000.0	S036	I	000.0

AR:00005
?PREVIOUS
MENU

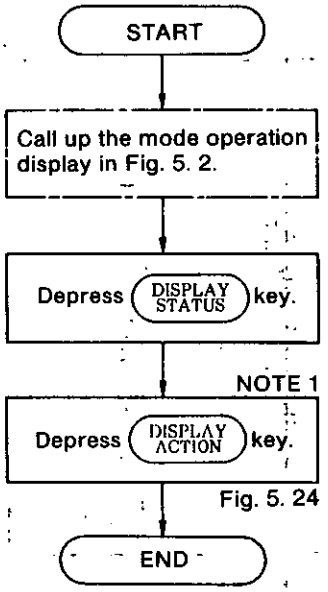
Fig. 5. 23

NOTE

1. The display called up by this operation indicates "A" for active steps and "I" for inactive steps.
2. Time setting/resetting is not possible with this operation.
3. To return to the previous display, depress PREVIOUS MENU key.

(5) ACTION CIRCUIT STATUS DISPLAY

This operation displays the current status of the action circuit associated with each step.



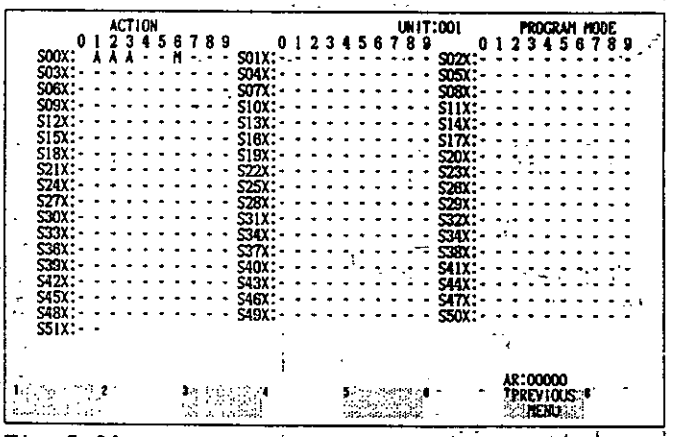


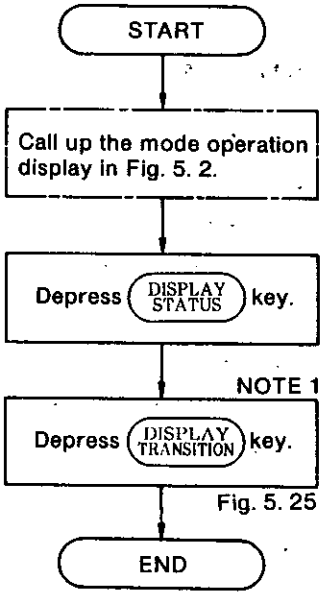
Fig. 5. 24

NOTE

1. The display called up by this operation indicates:
   - "A" for the normal steps having action circuits.
   - "M" for the macro steps having expanded views.
2. To return to the previous display, depress PREVIOUS MENU key.

(6) TRANSITION CONDITION CIRCUIT STATUS DISPLAY

This operation displays the current status of the transition condition circuit associated with each transition.



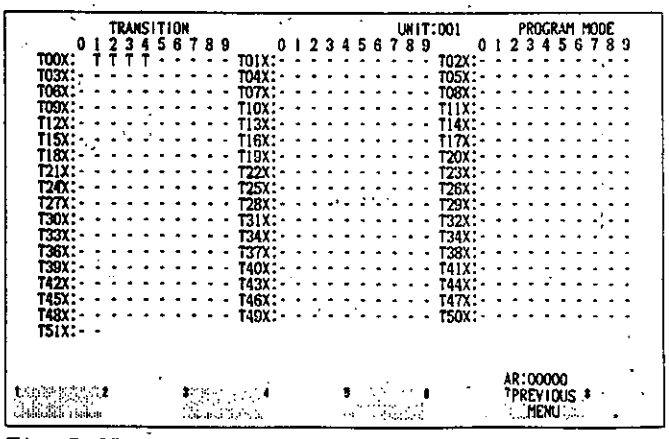


Fig. 5. 25

NOTE

1. The display called up by this operation shows "T" for the transitions having transition condition circuits.
2. To return to the previous display, depress PREVIOUS MENU key.

6. SFC PROGRAMMING OPERATION

Table 6.1 shows symbols for SFC flow processing.

Table 6. 1 SFC Element List

Type	Symbol	Designation	Input Example and Description
Step	SXXX	Initial Step	S001 Range of number: S001-S512
	SXXX	Step	S002 Range of number: S001-S512
	M SXXX	Macro Step	M S003 Range of number: S001-S512 (Dummy transition): Processed together with M SXXX.
Transition	TXXX	Transition	T001 Range of number: T001-T512
	TXXX	Counter Transition	T002 Range of number: T001-T512
Link	X	FROM	1 Any number of 1 to 8 may be used.
	X	TO	1 Any number of 1 to 8 may be used.
		Macro Entry	Automatically displayed by depressing START NEXT key in macro view; one macro entry is usable in expanded view.
		Macro Return	Up to eight macro returns are usable in expanded view.
		Convergence	T006 T007 Converges to bottom of transition; can also converge from left side (to left transition).
		Divergence	T001 T002 Diverges from top of transition; can also diverge to left side (from left transition).
		Simultaneous Convergence	T007 Converges to top of transition; can also converge from left side (to left transition).
		Simultaneous Divergence	T004 Diverges from bottom of transition; can also diverge to left side (from left transition).

Table 6.1 SFC Element List (Cont'd)

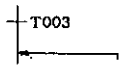
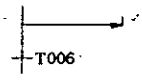
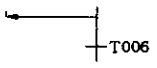
Type	Symbol	Designation	Input Example and Description
Link		Loop Input from Right	 Inputs to bottom of transition; used on input side of ⊢.
		Loop Input from Left	 Inputs to bottom of transition; used on input side of ⊣.
		Loop Output to Right	 Outputs from top of transition; used on output side of ⊢.
		Loop Output to Left	 Outputs from top of transition; used on output side of ⊣.
		Link Line	Used as downward extension line of step or transition.
		Counter Link Line	Used as vertical extension line of loop.

Table 5.2 Function Label Keys for SFC Element Deletion

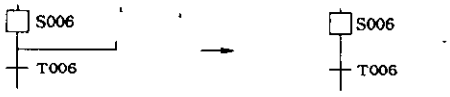
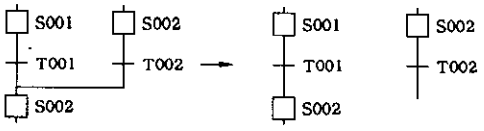
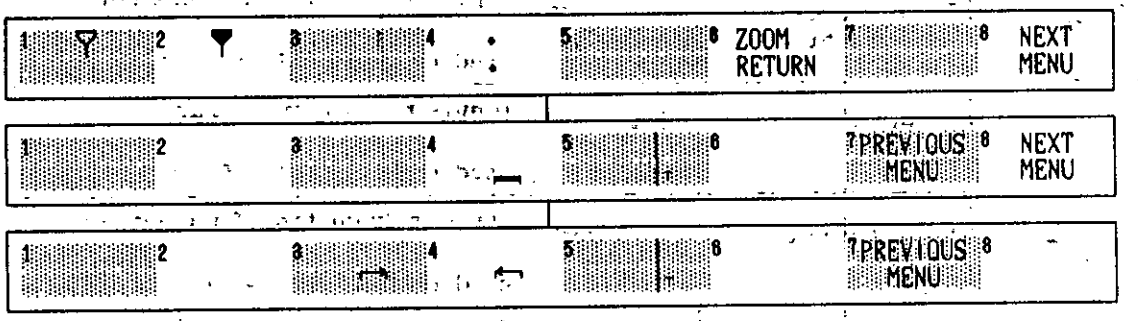
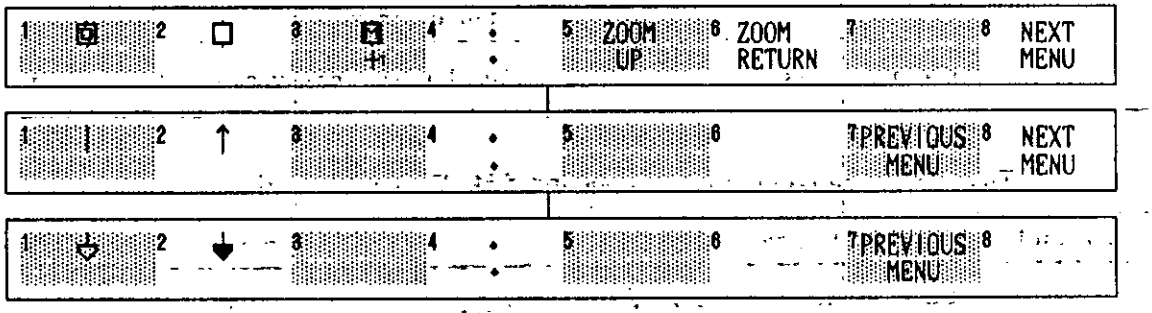
Type	Symbol	Usage	Usage Example
Element Deletion		Used to delete elements, except for divergence, convergence, loop, and macro entry.	
		Used on top side of transition to delete elements of divergence, convergence, and loop.	
		Used on bottom side of transition to delete elements of divergence, convergence, and loop.	

Table 6.3 List of Function Label Displays (Keys)

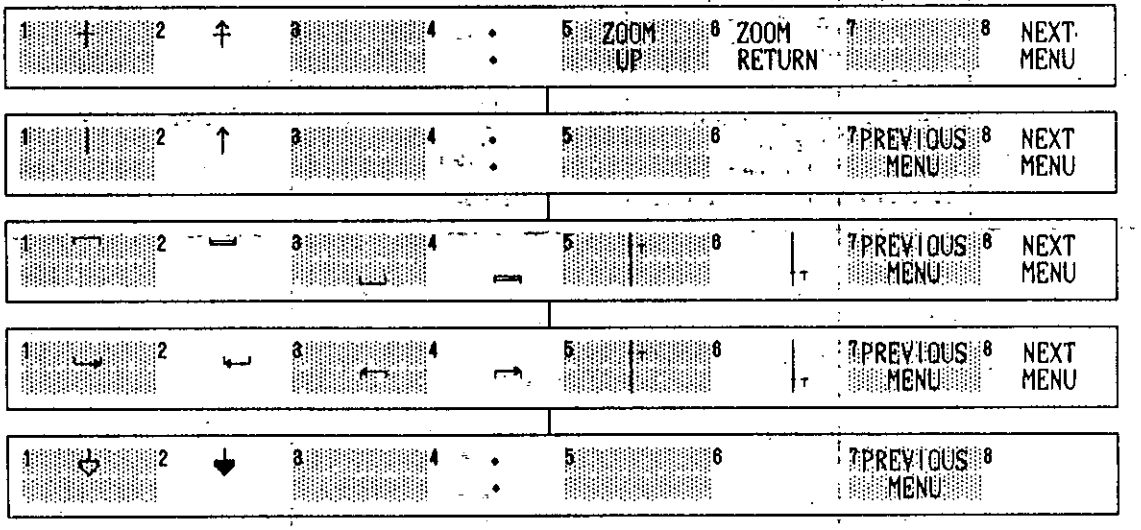
Where cursor is in FROM line:



Where cursor is in STEP line:

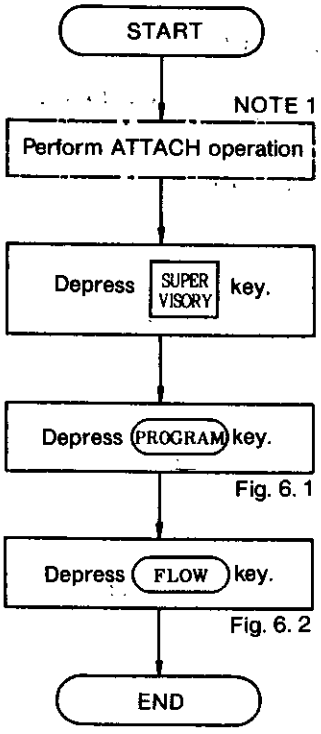


Where cursor is in TRANSITION line:



6.1 SFC FLOW PROCESSING

The SFC flow processing represents a control logic using a block diagram in a form similar to a flow chart. Shown below are the procedures down to the SFC operation display.



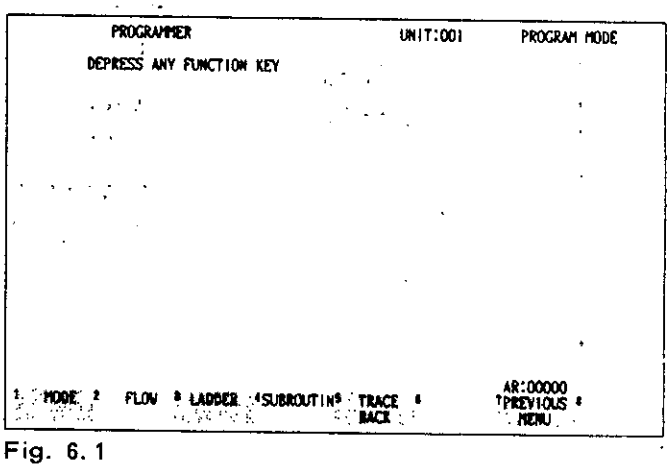


Fig. 6. 1

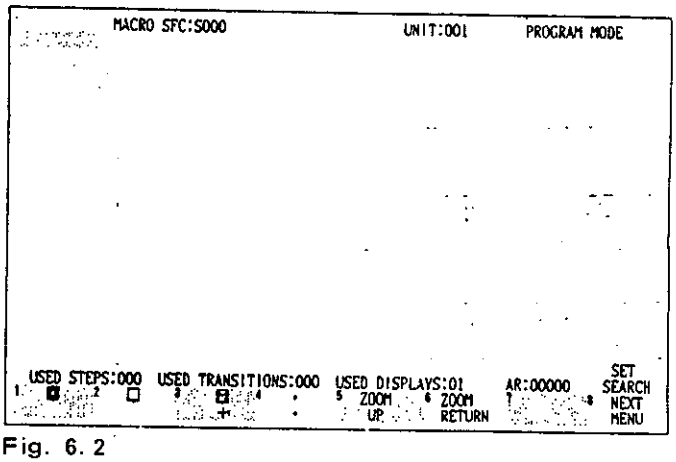


Fig. 6. 2

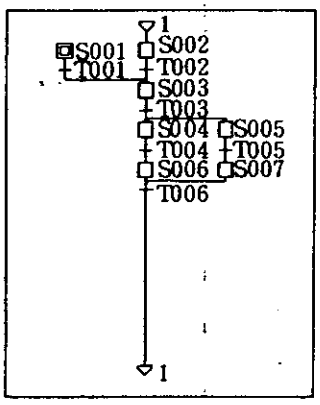
NOTE

1. When ATTACH operation has already been completed, this step can be skipped.
2. To store the SFC, operation in the program mode is required.
3. The memory protect switch of GL60S should be set to OFF. It may be in the ON position in the monitor mode.

6.1.1 SFC Storing

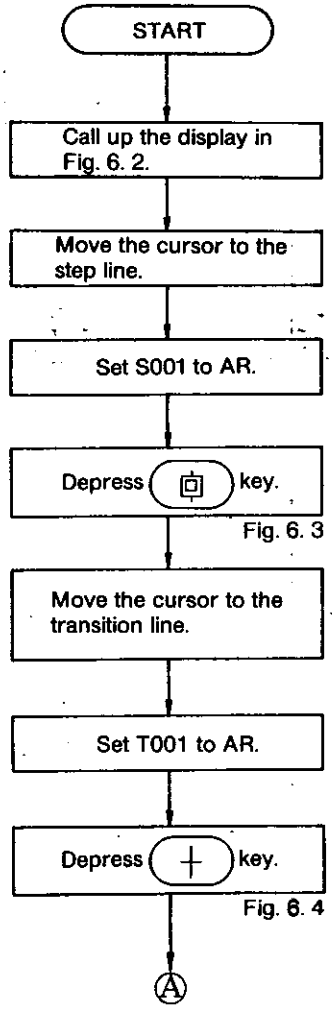
(1) SFC STORING ①

(Storing example)



POINT

- The cursor must be in the SFC area.
- Each step number and each transition number can be used only once.
- A convergence or divergence must be input in a transition line.



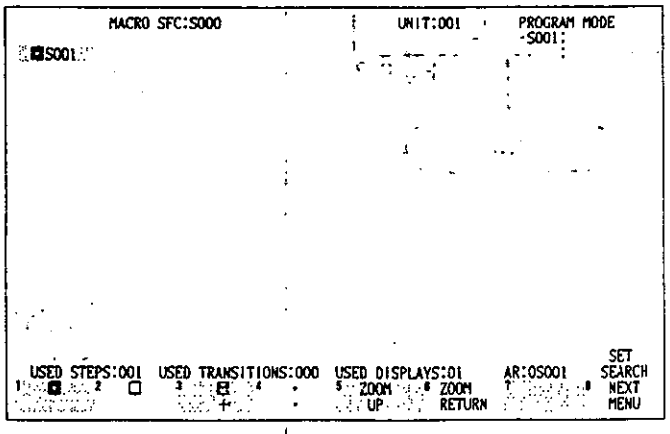


Fig. 6. 3

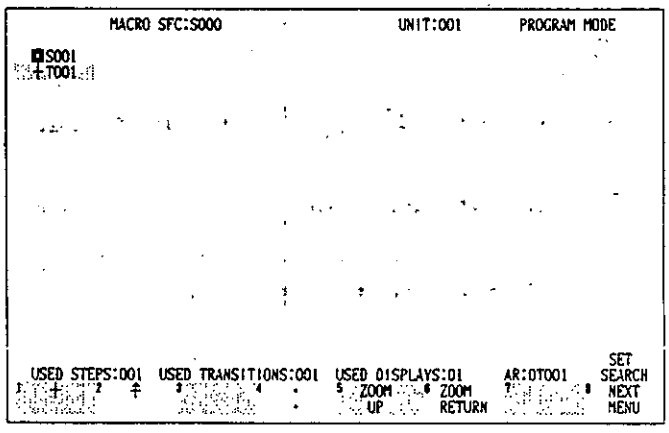


Fig. 6. 4

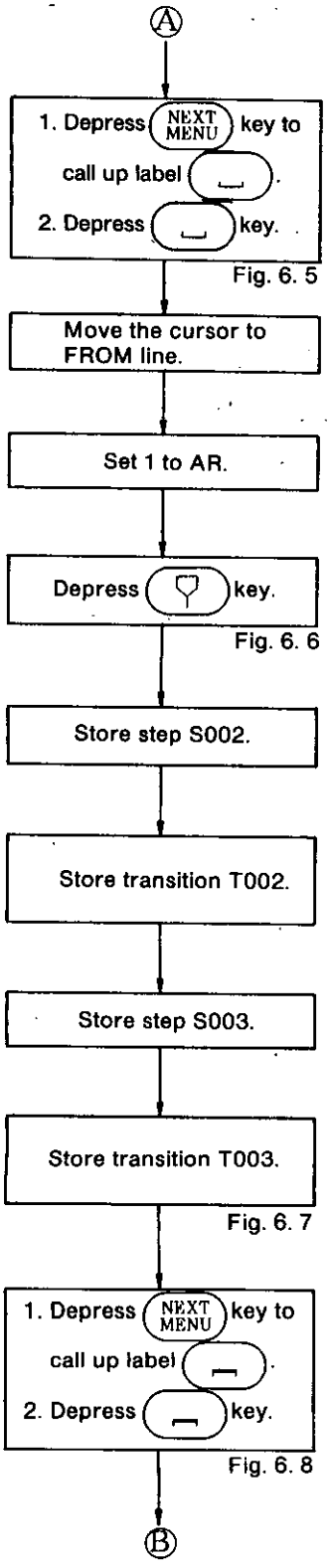


Fig. 6. 5

Fig. 6. 6

Fig. 6. 7

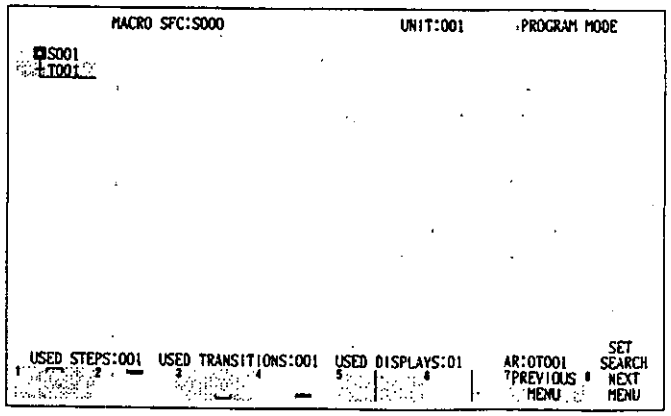


Fig. 6. 5

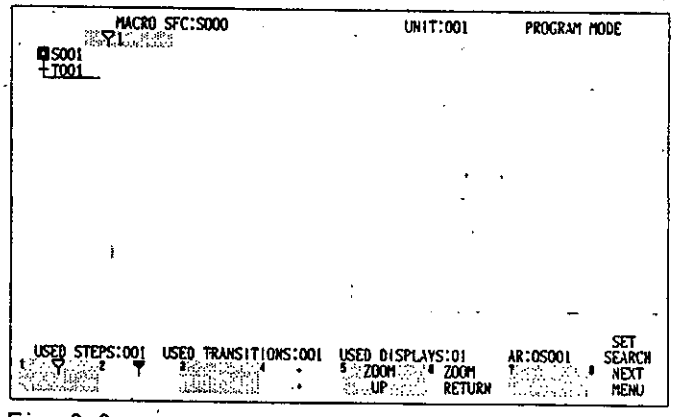


Fig. 6. 6

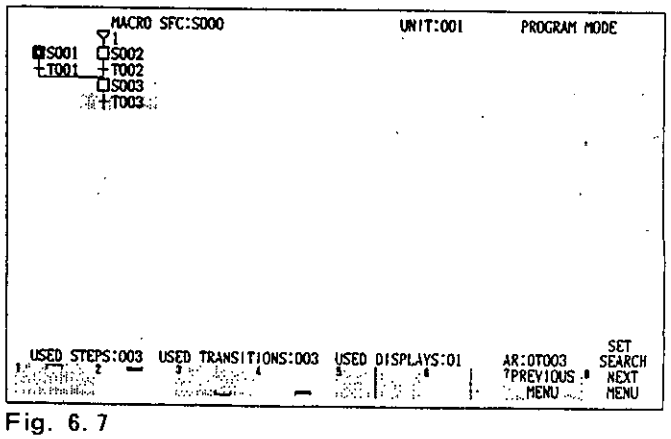


Fig. 6. 7

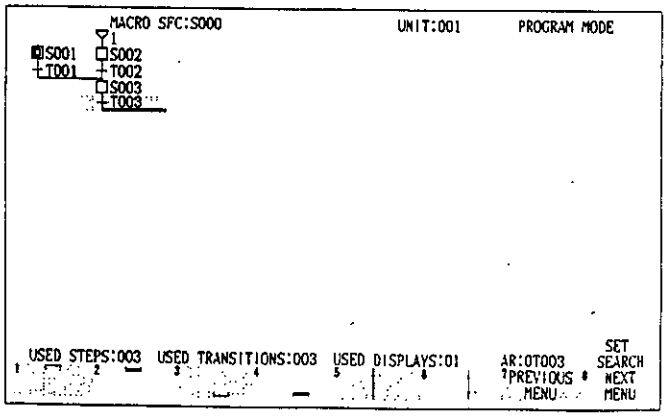


Fig. 6. 8

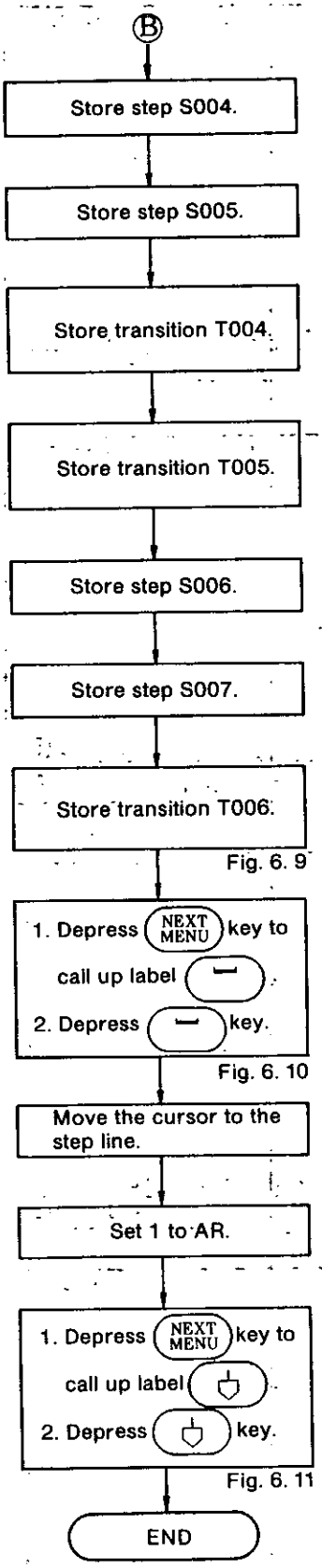


Fig. 6. 9

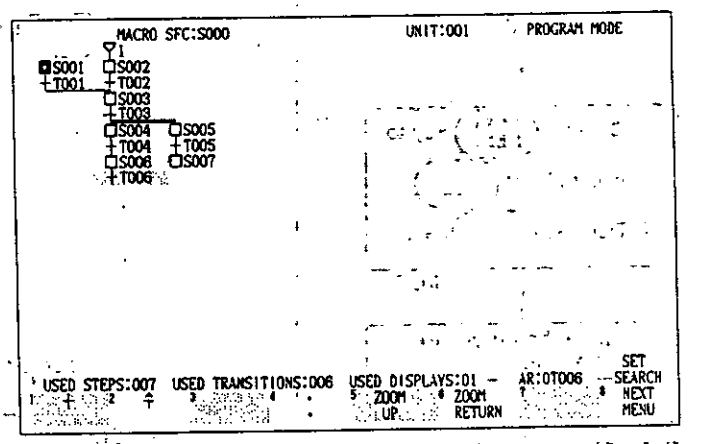


Fig. 6. 10

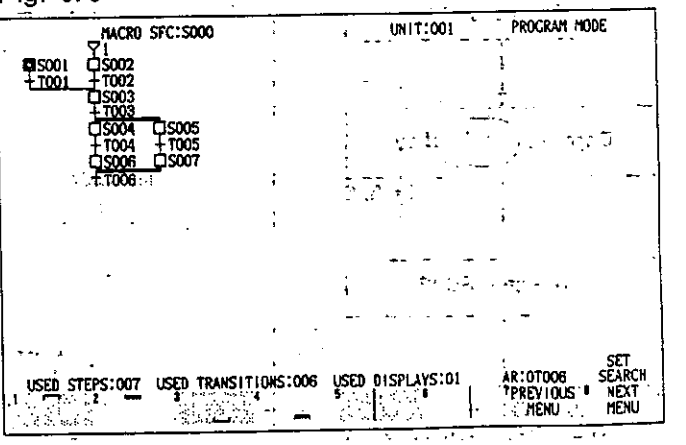
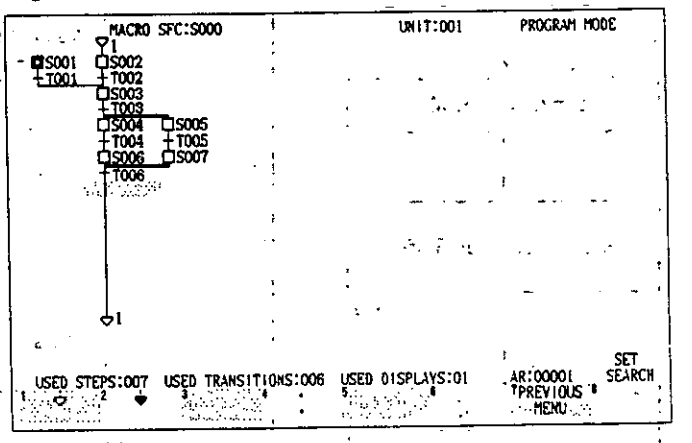


Fig. 6. 11

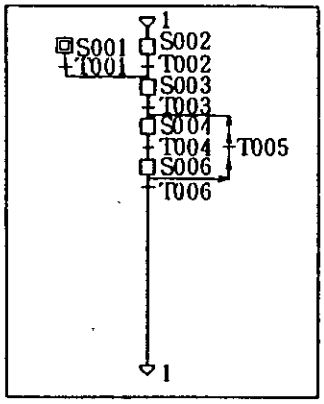


NOTE

1. Regarding the function label displays (keys) for element input, refer to Table 6. 3.
2. To enter a macro step [M] , use the [M] key. A dummy transition (⊣) alone cannot be entered.

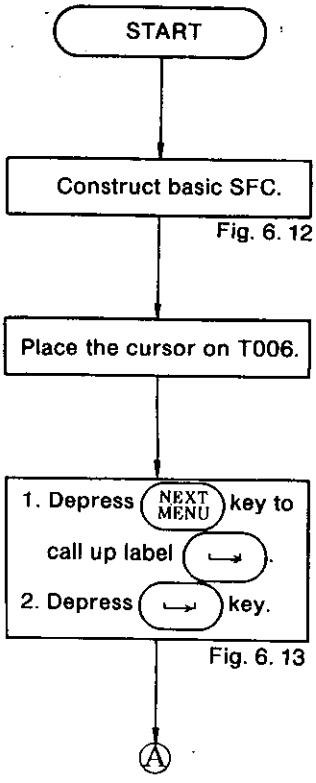
(1) SFC STORING ②

(Storing example loop)



POINT

- The cursor must be in the SFC area.
- Each step number and each transition number can be used only one.
- A loop output or loop input must be made in a transition line.



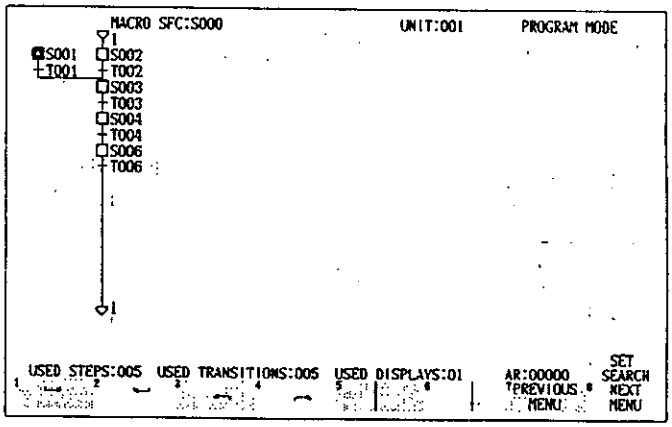


Fig. 6. 12

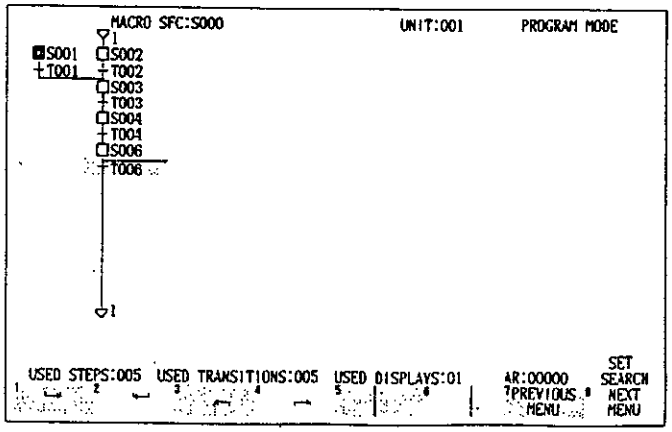


Fig. 6. 13

Ⓐ

Move the cursor to the step line.

1. Depress NEXT MENU key to call up label ↑.
2. Depress ↑ key.

Fig. 6. 14

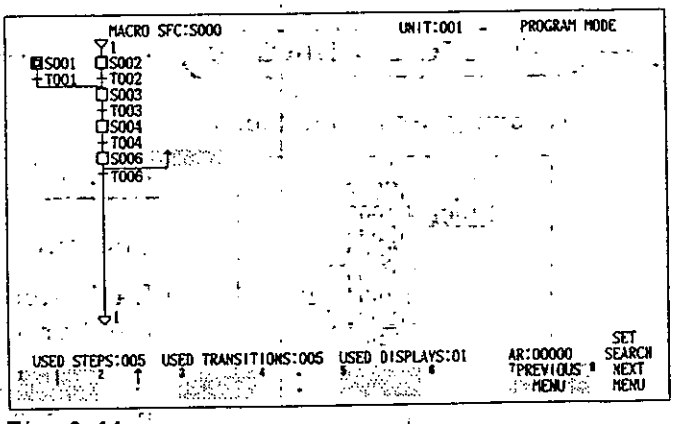


Fig. 6. 14

Move the cursor to the transition line.

Set T005 to AR.

1. Depress NEXT MENU key to call up label ↕.
2. Depress ↕ key.

Fig. 6. 15

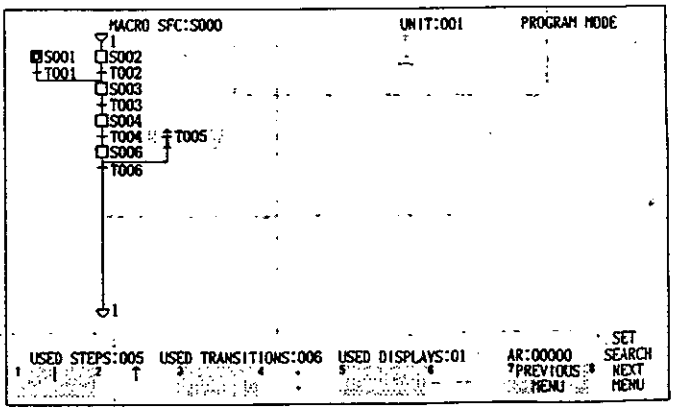


Fig. 6. 15

Move the cursor to the step line.

1. Depress NEXT MENU key to call up label ↑.
2. Depress ↑ key.

Fig. 6. 16

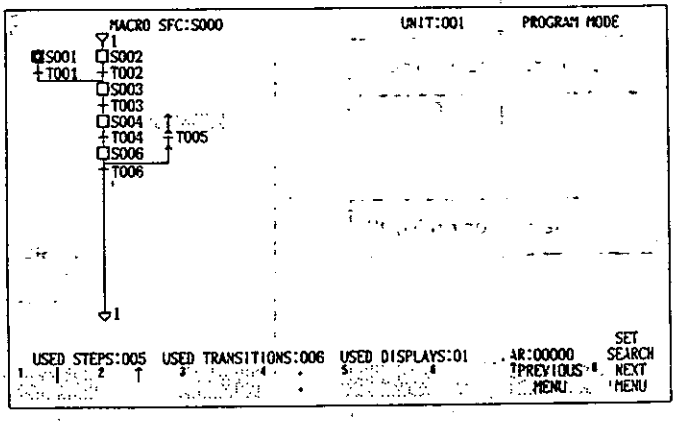


Fig. 6. 16

Place the cursor on T003.

1. Depress NEXT MENU key to call up label ←.
2. Depress ← key.

Fig. 6. 17

END

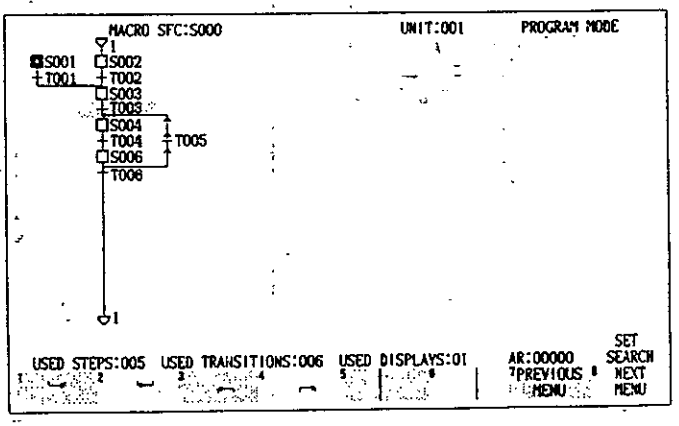
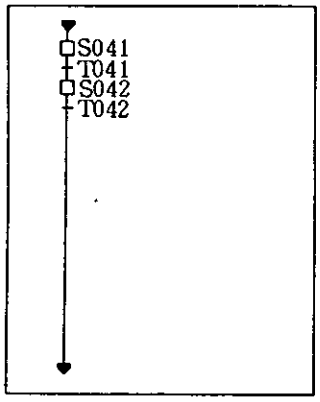


Fig. 6. 17

(1) SFC STORING ③

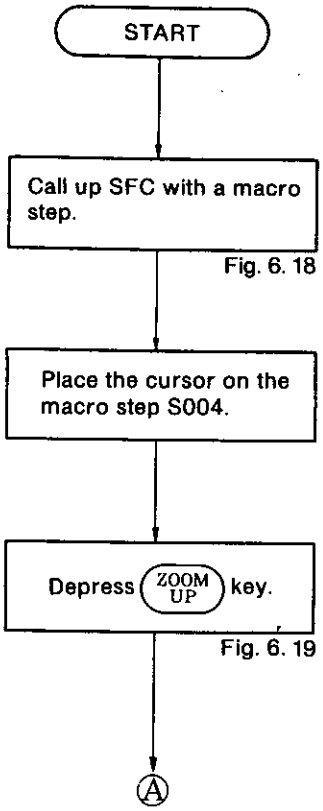
(Storing Example)
EXPANDED VIEW



POINT

- The cursor must be in the SFC area.
- Each step number and each transistion number can be used only one.
- This storing requires a macro step.

  Macro Step Symbol: 



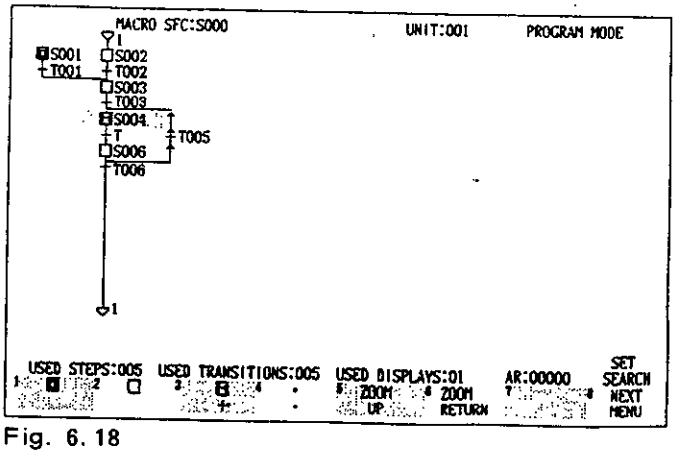


Fig. 6. 18

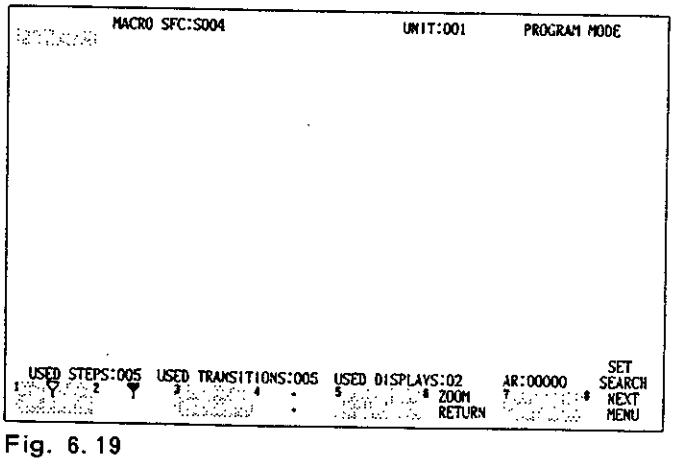


Fig. 6. 19

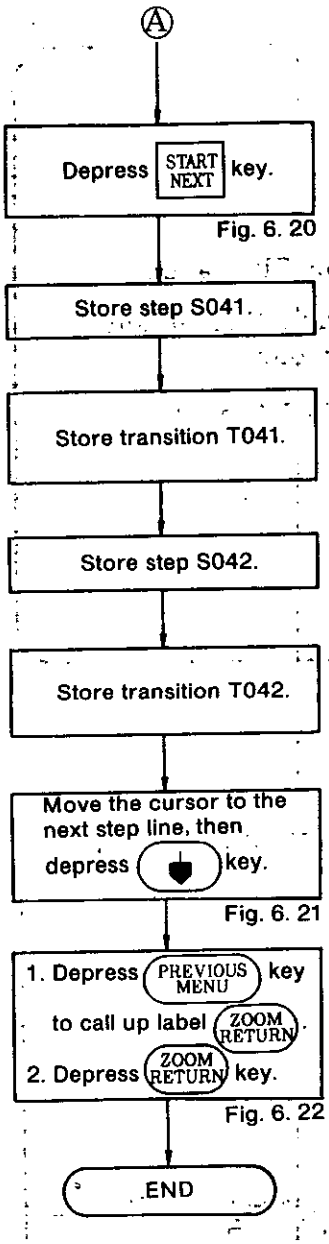


Fig. 6. 20

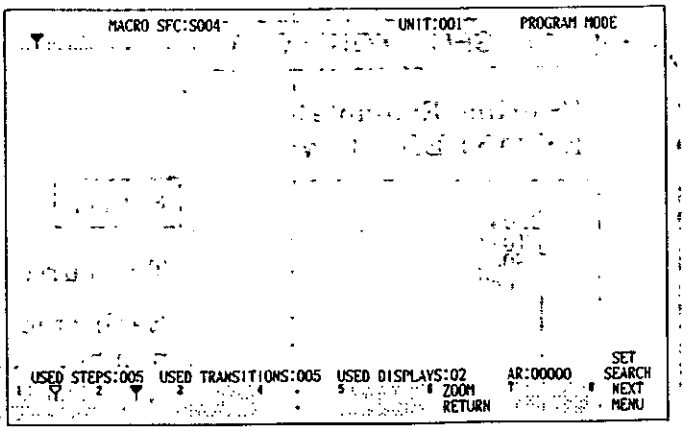


Fig. 6. 21

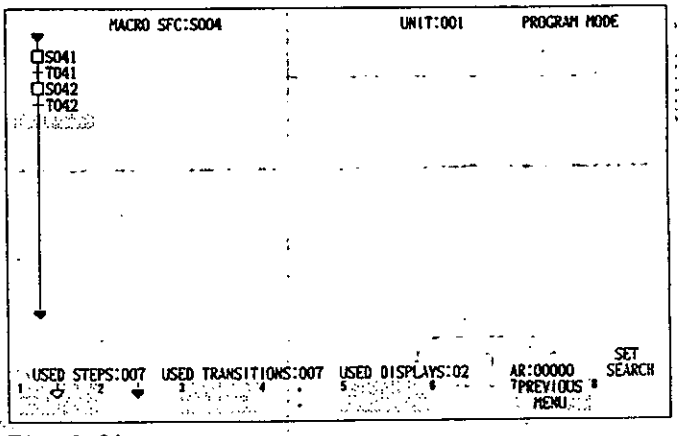
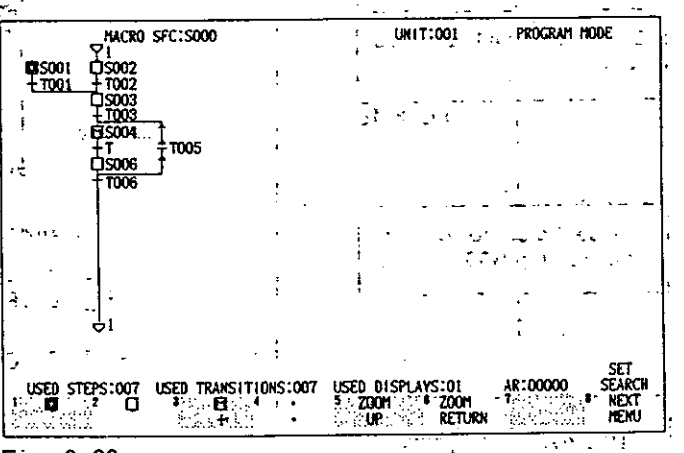


Fig. 6. 22



NOTE

1. Regarding the function label displays (keys) for element input, refer to Table 6. 3.
2. To enter a macro step [M], use the [M] key.

   A dummy transition (⊣T) alone cannot be entered.

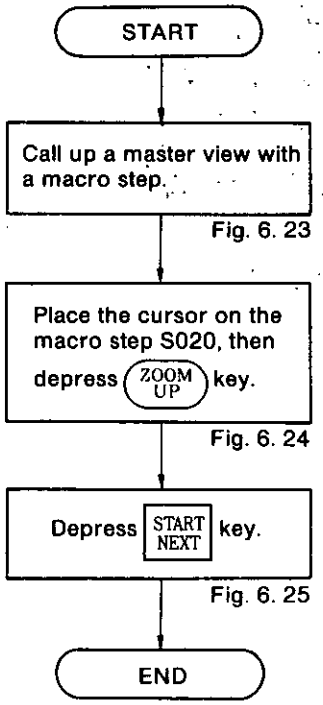
6.1.2 SFC Altering

(1) SFC ADDING

This operation creates an expanded view of SFC.

POINT

- The master view must contain a macro step (M).
- Up to 63 expanded views can be created.
- The cursor must be in the SFC area.



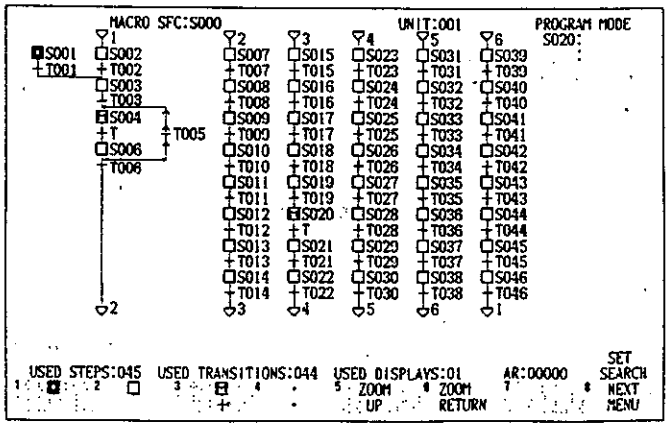


Fig. 6. 23

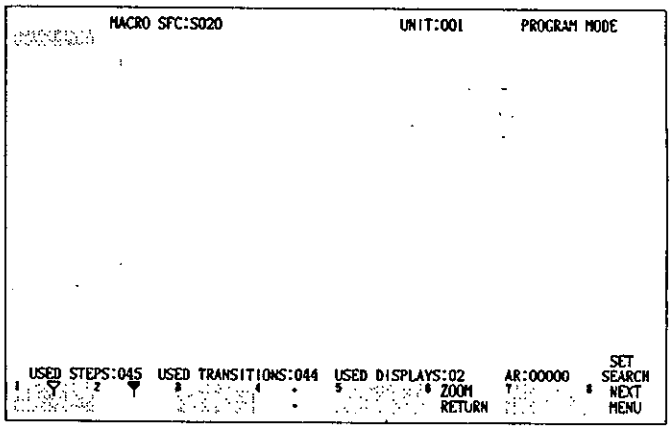


Fig. 6. 24

NOTE

1. The SFC element storing that follows the asterisked block is performed using the same operation as described in par. 6.1.1, (1) "SFC STORING ③".
2. Expanded views can also be added from an expanded view by depressing the ZOOM UP key, provided that the expanded view contains a macro step.

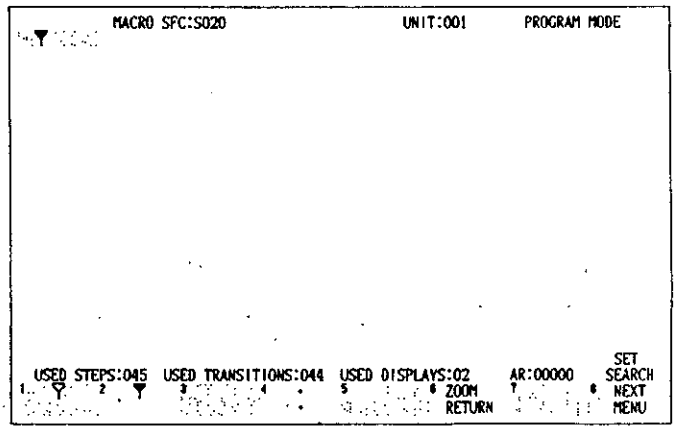
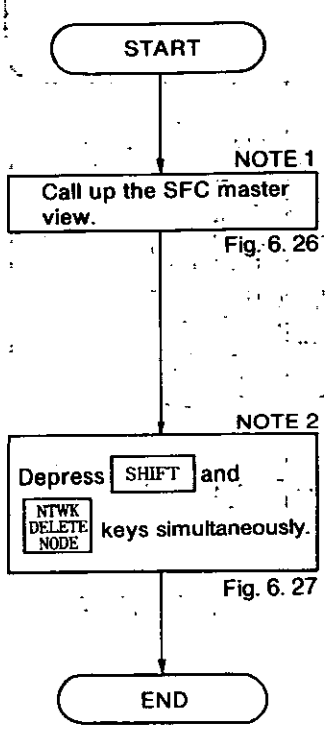


Fig. 6. 25

(2) SFC DELETING

This operation deletes a master view or a expanded view of SFC.

POINT • The cursor must be in the SFC area.



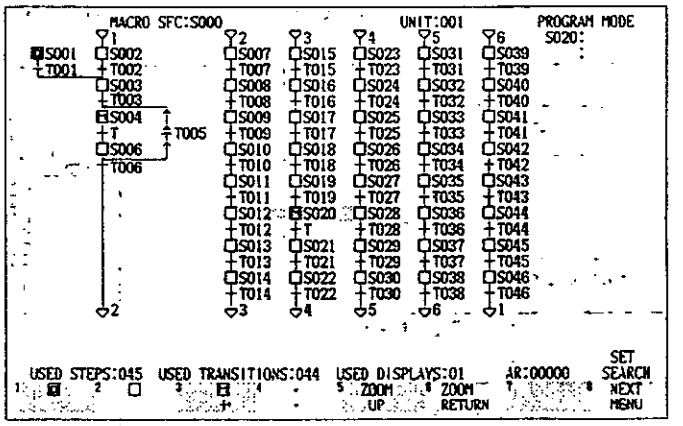


Fig. 6. 26

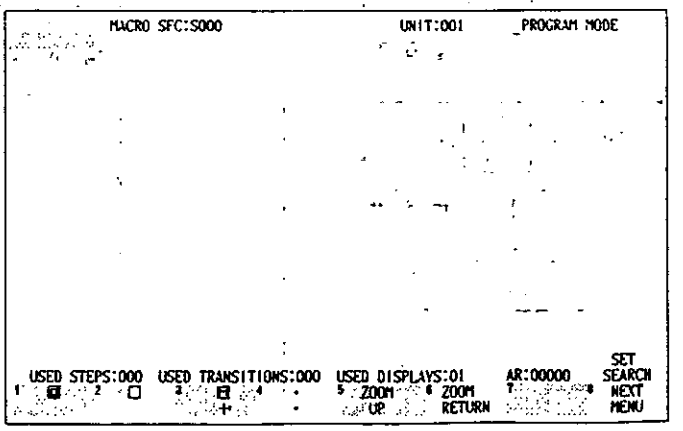


Fig. 6. 27

NOTE

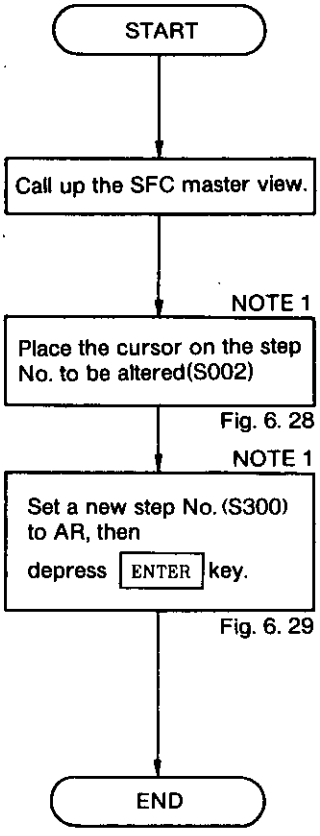
1. Where deleting the expanded views, display them by operating (ZOOM UP) key on the macro step of the master view.
2. Deletion of the expanded views uses the same operation as that for the master view.
3. The macro entry element (▼) for the expanded views can only be deleted through this operation.
4. If there is a macro step connected to an expanded view, deletion must begin with the expanded view.
5. This operation does not delete the action circuits for steps or the transition condition circuits.

(3) REFERENCE NUMBER ALTERING

This operation alters a step number or transition number.

POINT

- The cursor must be in the SFC area.
- Each step number and each transition number can be used only once.



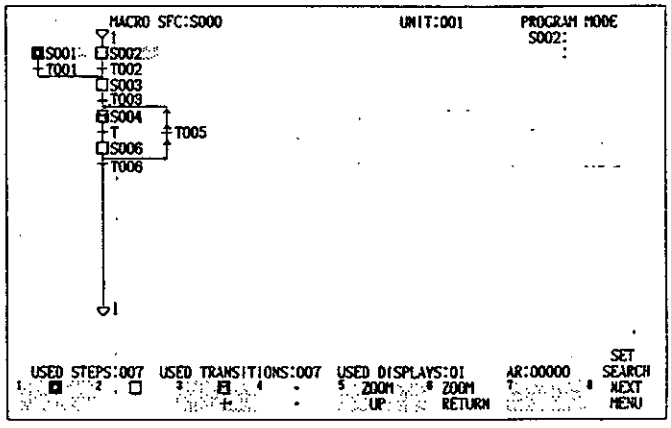


Fig. 6. 28

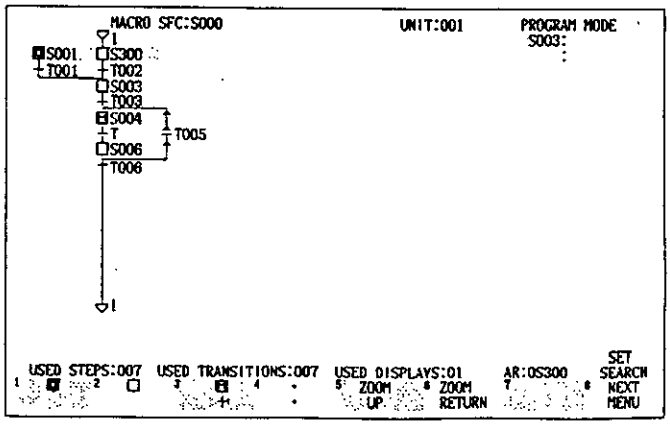


Fig. 6. 29

NOTE

1. The same operation is also used for the expanded views or the reference number of a transition.
2. The number of a macro step (M) cannot be altered if an action circuit already exists for the number to be altered.

(4) ELEMENT ALTERING

This operation alters an element only. To alter the reference number as well, see (3) above, "REFERENCE NUMBER ALTERING".

POINT • The cursor must be in the SFC area.

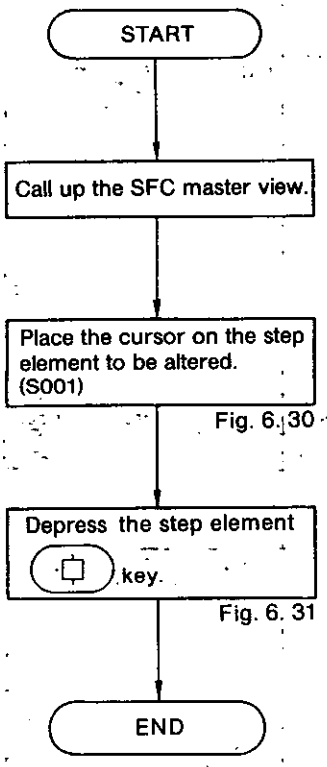


Fig. 6.30

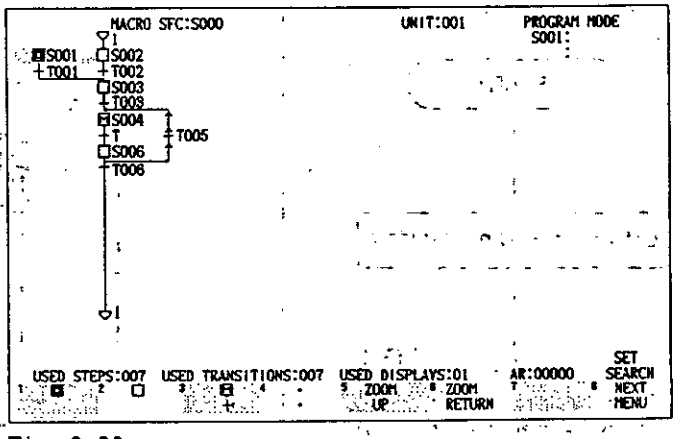


Fig. 6.31

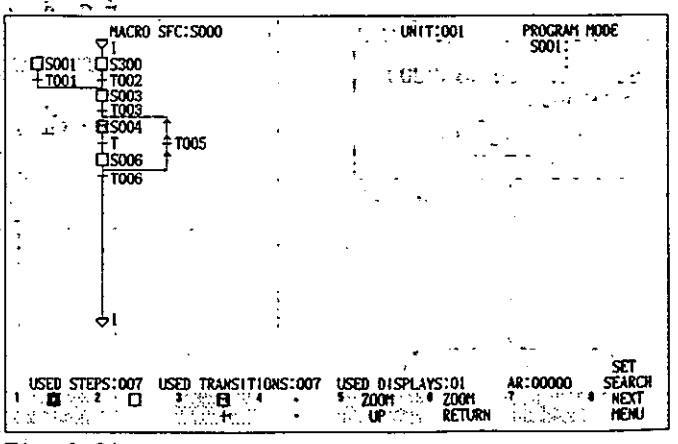
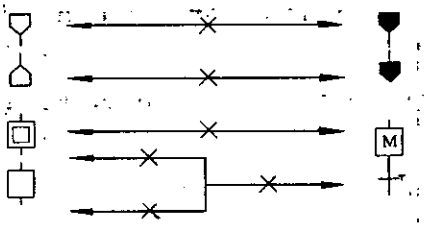


Fig. 6.31

NOTE

1. It is not possible to change an element requiring a reference number for an element not requiring a reference number, or vice versa.



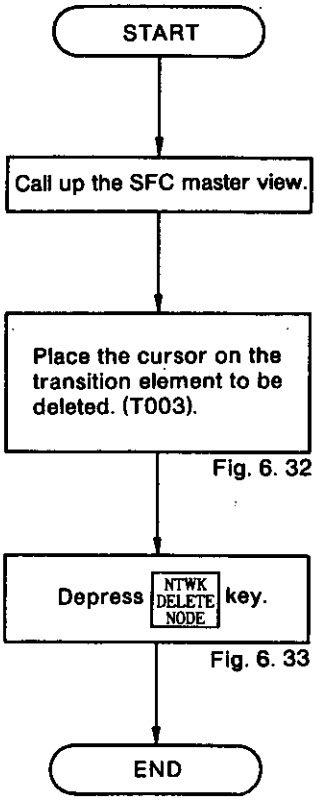
2. To alter a divergence, convergence, or loop, set the cursor at the transition element.

(5) ELEMENT DELETING ①

This operation deletes a transition, a divergence, a convergence and a loop element, one at a time.

POINT

- The cursor must be in the SFC area.



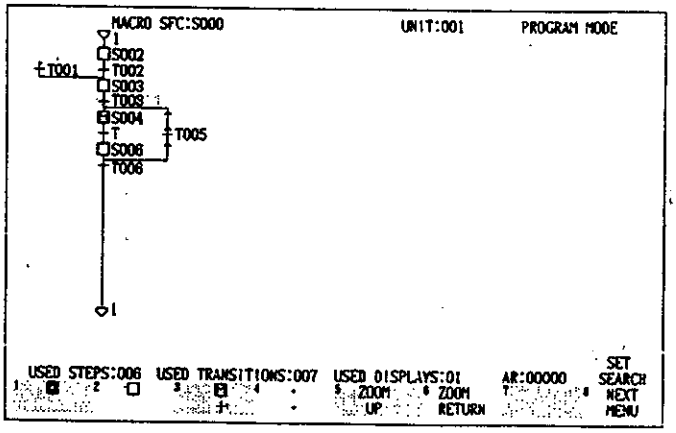


Fig. 6. 32

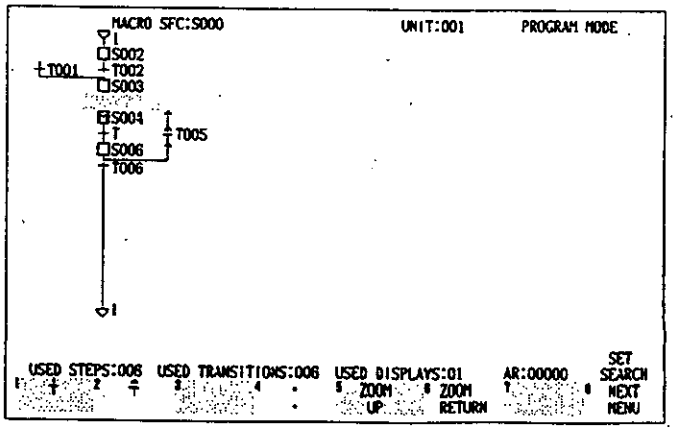


Fig. 6. 33

NOTE

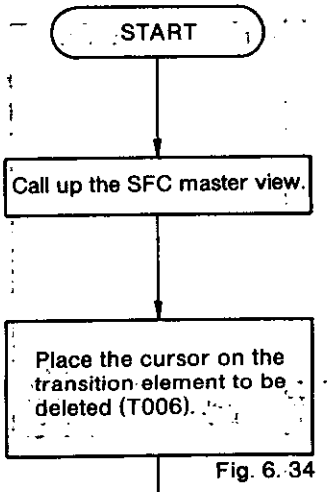
1. A macro step (M) and the associated dummy transition (⊣⊢) can be deleted if the cursor is set to either one.
2. If there is a macro step having an expanded view, deletion must begin with the expanded view.
3. This operation does not delete the action circuits for steps or the transition condition circuits.

(5) ELEMENT DELETING ②

This operation deletes a transition element only. The divergence, convergence or loop element cannot be deleted through this operation.

POINT

- The cursor must be in the SFC area.



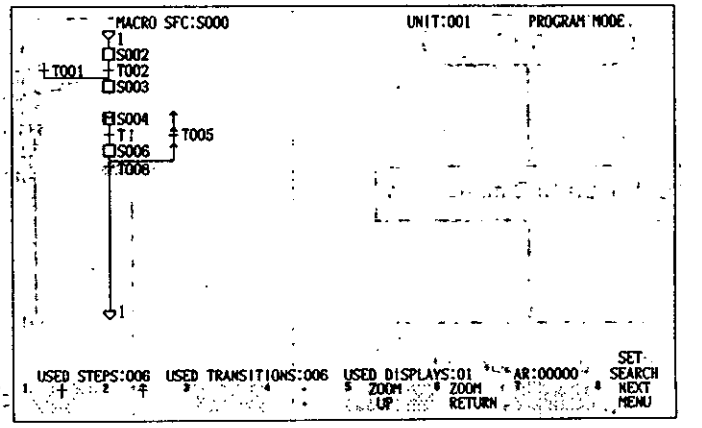


Fig. 6. 34

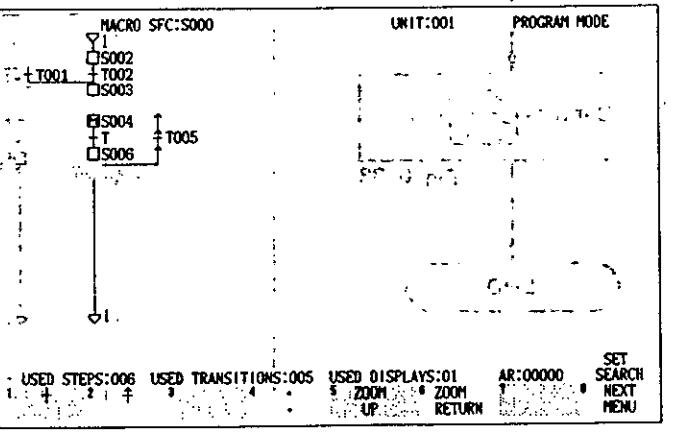


Fig. 6. 35

NOTE

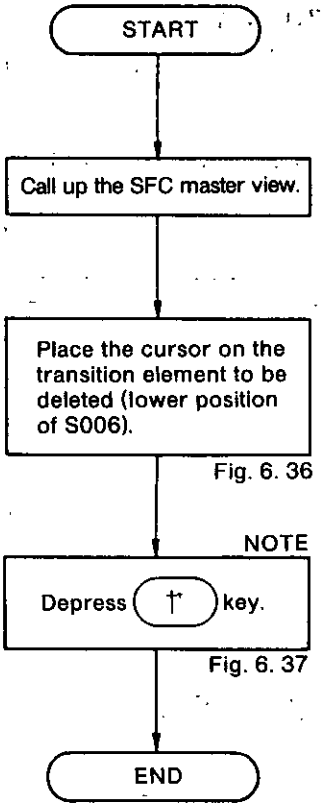
1. A macro step (M) and the associated dummy transition (⊣T⊢) can be deleted if the cursor is set to either one.
2. If there is a macro step having an expanded view, deletion must begin with the expanded view.
3. This operation does not delete the action circuits for steps or the transition condition circuits.

(5) ELEMENT DELETING ③

This operation deletes only the divergence, convergence or loop element. Elements other than these cannot be deleted through this operation.

POINT

- The cursor must be in the SFC area.



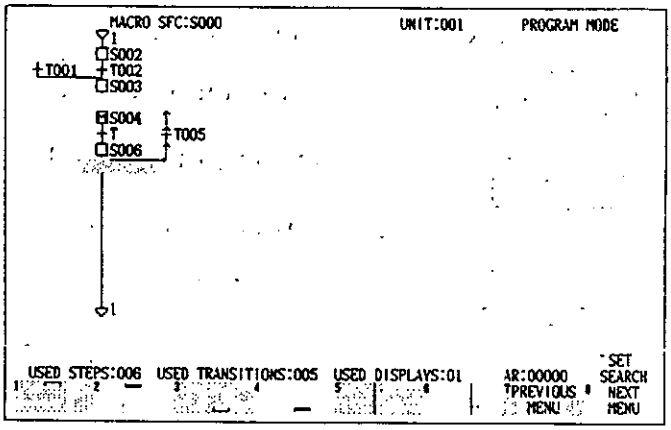


Fig. 6. 36

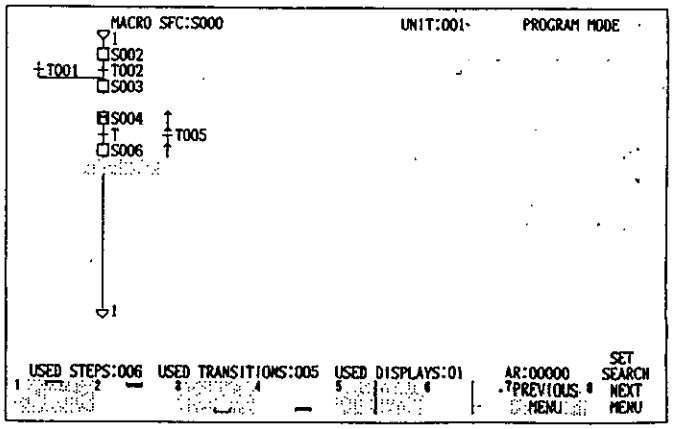


Fig. 6. 37

NOTE

To delete the divergence, convergence or loop which have been input under the transition element, use (┼).

6.1.3 SFC Display

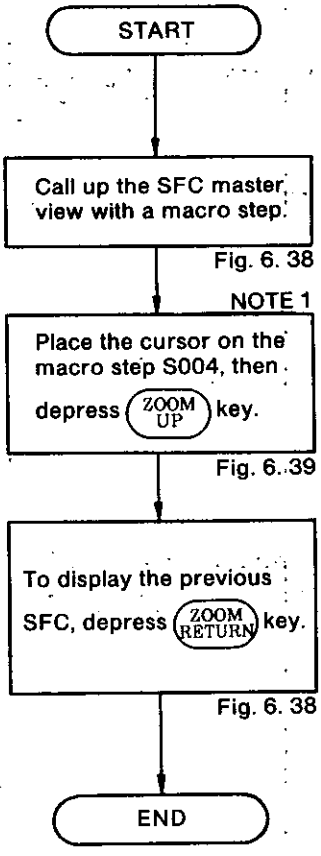
This section describes the operations to display an SFC that has been stored in memory. The procedure down to the display of the master view is the same as described in Par. 6.1 "SFC FLOW PROCESSING".

(1) ZOOM DISPLAY

This operation displays an expanded view from the macro step of the master or expanded view of an SFC. The label keys (ZOOM UP) and (ZOOM RETURN) are used in this operation.

POINT

- The master or expanded view must contain a macro step ([M]).
- The cursor must be in the SFC area.



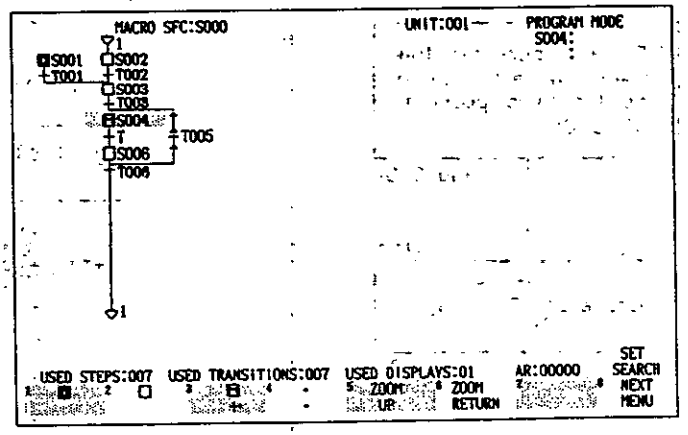


Fig. 6. 38

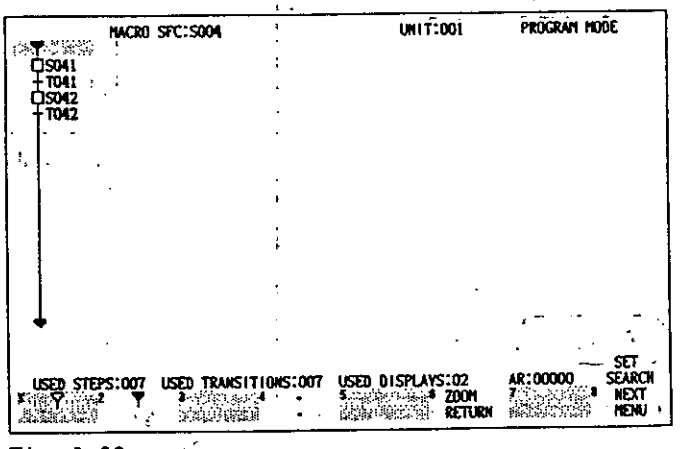


Fig. 6. 39

NOTE

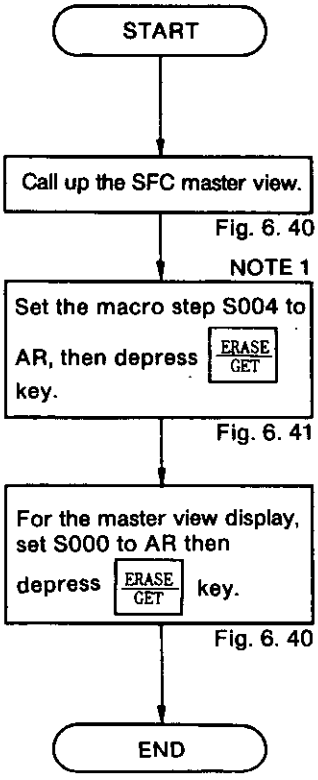
1. If there is no expanded view, a new expanded view is displayed. Then the SFC storing operation can be continued.
2. If a macro step is used in Fig. 6.39, continue operation with (ZOOM UP) key.

(2) NUMBER ENTRY DISPLAY

In this operation, a desired step number is entered to call up the SFC screen. This involves use of the function key [ERASE / GET].

POINT

- The step number for the master view is fixed at "S000"
- The cursor must be in the SFC area.



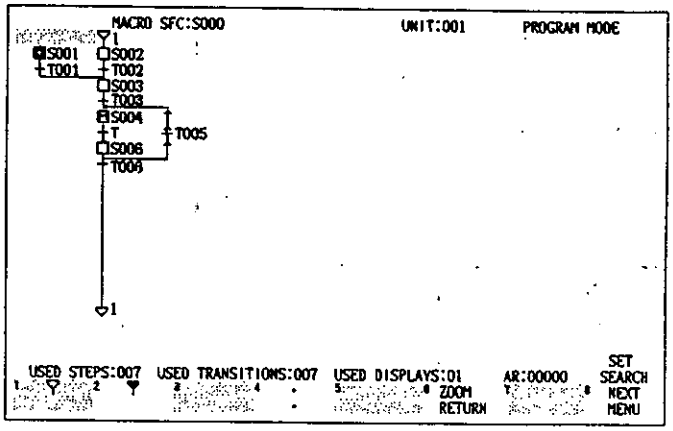


Fig. 6. 40

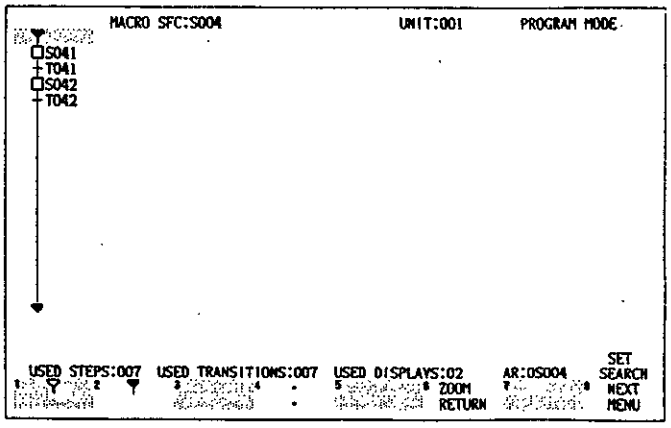


Fig. 6. 41

NOTE

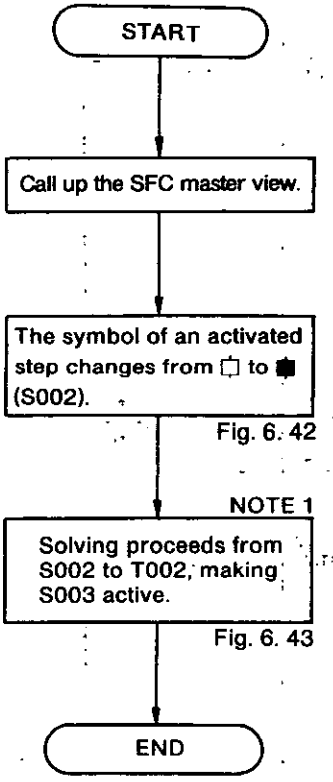
1. If there is no expanded view, a new expanded view is displayed. Then the SFC storing operation can be continued.
2. The expanded view is called up in one of the two cases, where: the step number of the expanded view is used as a macro step, or the previous macro step screen remains when the reference number of the macro step has been altered.

(3) ACTIVE DISPLAY

This operation permits seeing how each step of SFC evolves into active status.

POINT

• GL60S should be started.



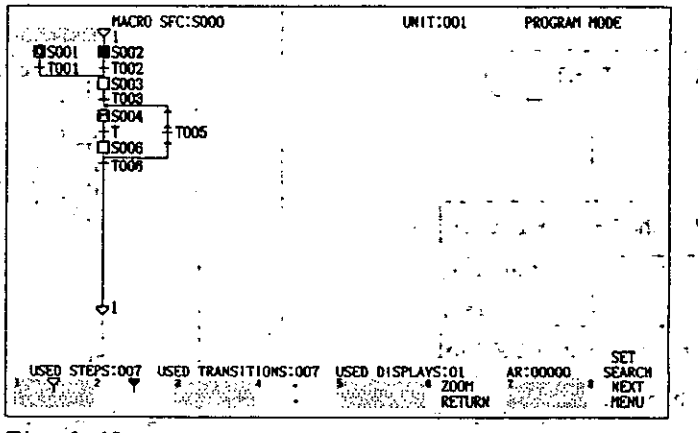


Fig. 6. 42

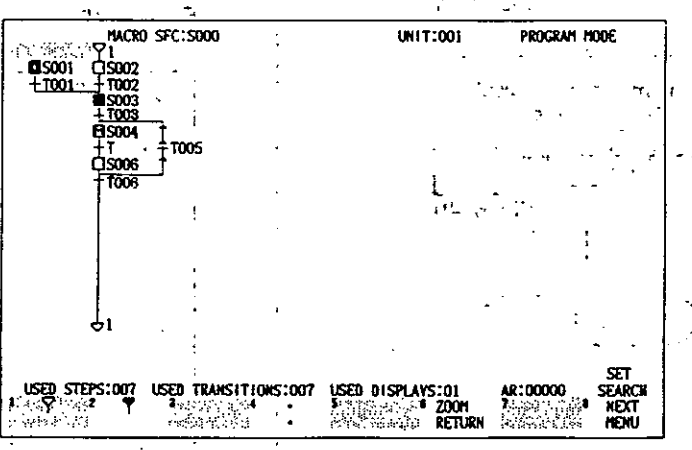


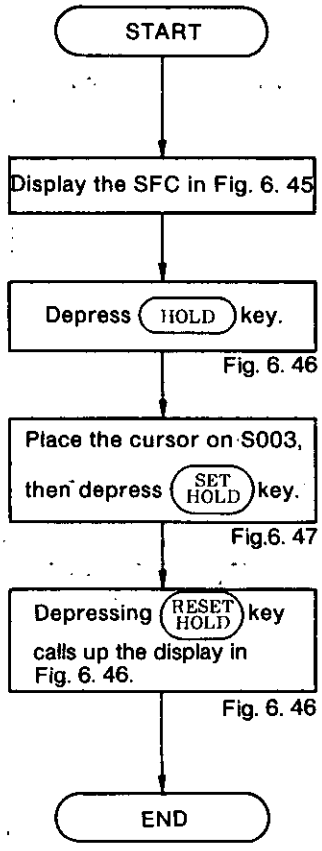
Fig. 6. 43

NOTE

1. The element displayed for the active step changes from □ to ■.
2. If GL60S is out of operation, the active step remains displayed as ■; without proceeding to the next step.

6.1.4 SFC Simulation

This section illustrates how to set or reset the simulated status of a step. This operation is the same as the status altering described in Par. 5. 2 "STATUS DISPLAY", except for use of the function key [EDIT]. Shown below is the procedure down to the display of the simulation screen.



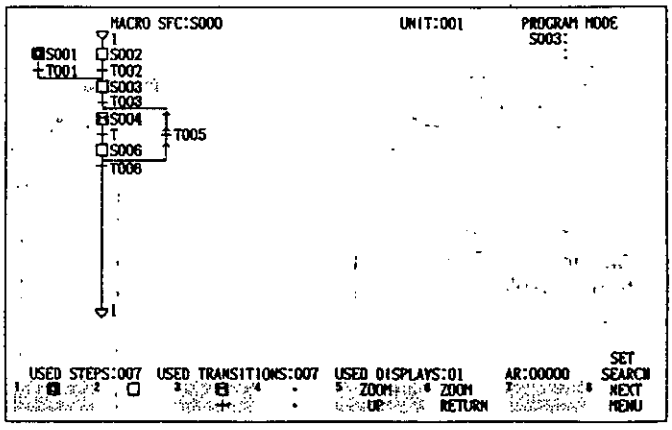


Fig. 6. 44

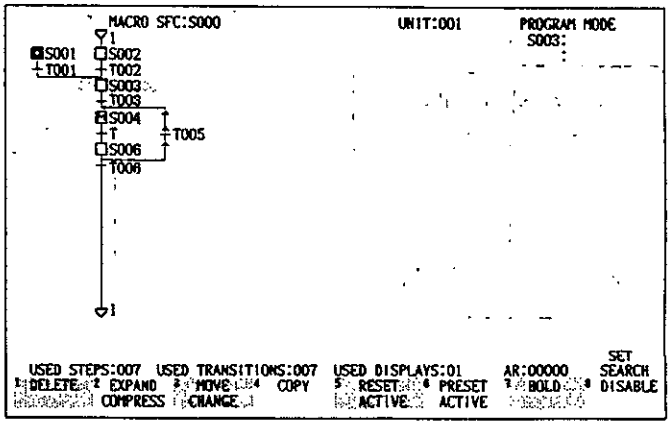


Fig. 6. 45

NOTE

1. This operation is only available in the program mode.
2. The memory protect switch of GL60S must be set to OFF.
3. To recover the normal SFC operation after this operation, reset the hold or disable status if it has been set.
4. To recover the normal SFC operation after any simulated resetting or presetting of a step, follow NOTE 3 above, then resume operation from the initial step.
5. To return to the original label, depress [EDIT] and [PRINT / CHG / NODE] keys in this order.

(1) HOLD OPERATION

This operation holds a step (so the step is maintained in active status).

POINT

- The cursor must be set to the step to be altered.
- Active status does not proceed from an active-held step to the next step.

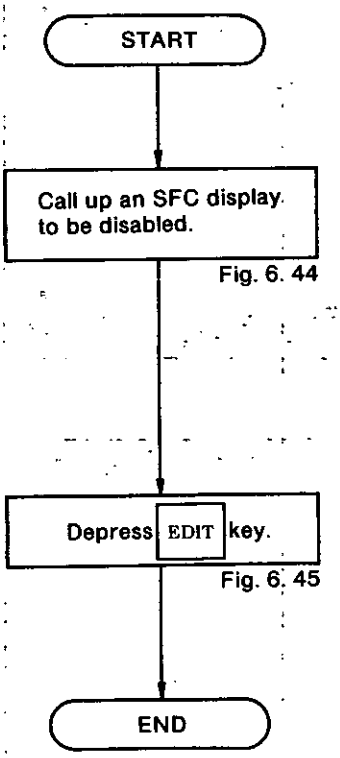


Fig. 6. 44

Fig. 6. 45

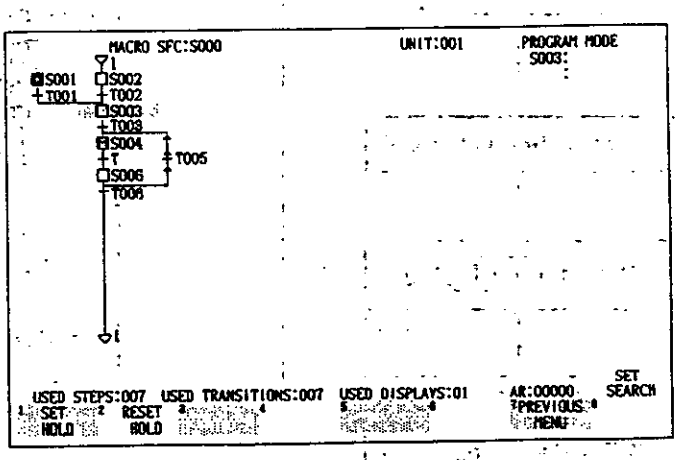


Fig. 6. 46

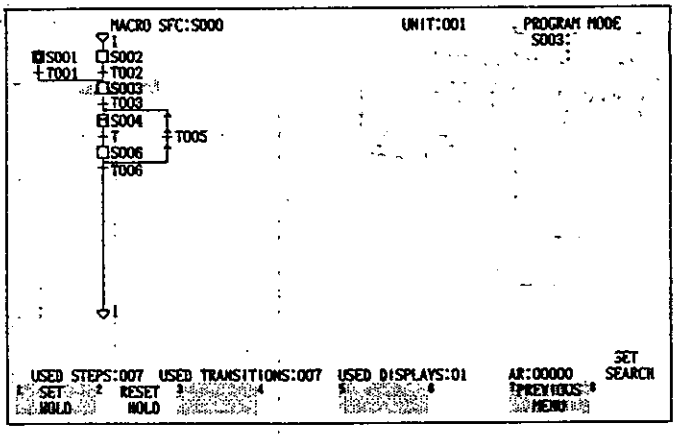


Fig. 6. 47

NOTE

1. (SET HOLD) key is effective for an inactive step only.
2. (RESET HOLD) key is effective for an active step only.
3. A step in held with (SET HOLD) key should be reset with (RESET HOLD) key to clear the hold status.

(2) DISABLE OPERATION

This operation disables a step (so that step proceeding is disabled).

POINT

- The cursor must be set to the step to be altered.
- Active status does not proceed to a disabled step.

START

Display the SFC in Fig. 6. 45.

Depress (DISABLE) key.

Fig. 6. 48

Place the cursor on S003, then depress (SET DISABLE) key.

Fig. 6. 49

Depressing (RESET DISABLE) key calls up the display in Fig. 6. 48.

Fig. 6. 48

END

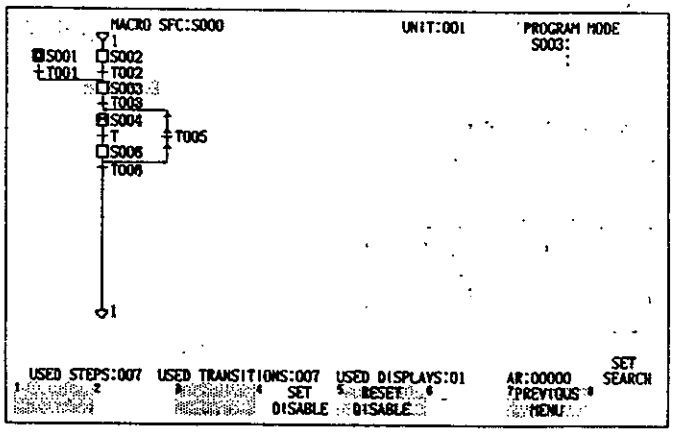


Fig. 6. 48

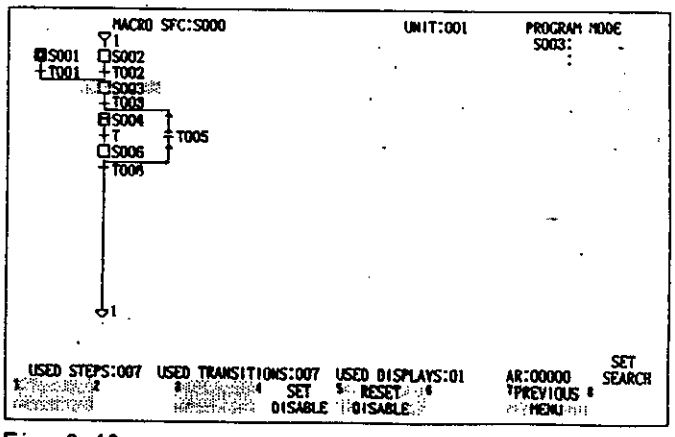


Fig. 6. 49

NOTE

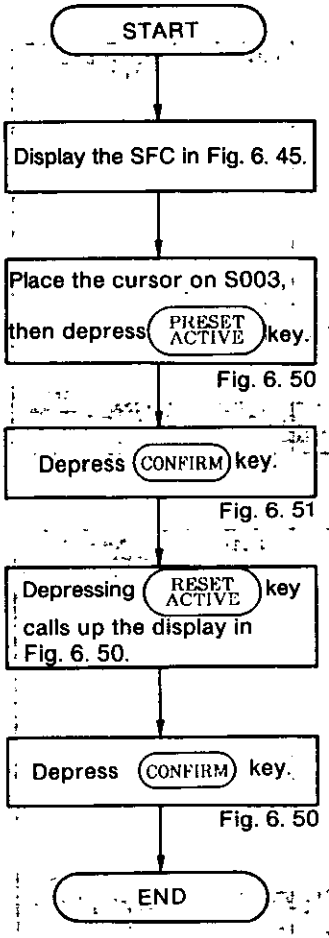
1. (SET DISABLE) key is not effective for a step which is in active or hold status.
2. (RESET DISABLE) key is not effective for a step which is in hold status.
3. A step disabled with (SET DISABLE) key should be reset with (RESET DISABLE) key to clear the disable status.

(3) PRESET/RESET OPERATION

Preset operation activates a step. Reset operation inactivates a step.

POINT

- The cursor must be set to the step to be altered.



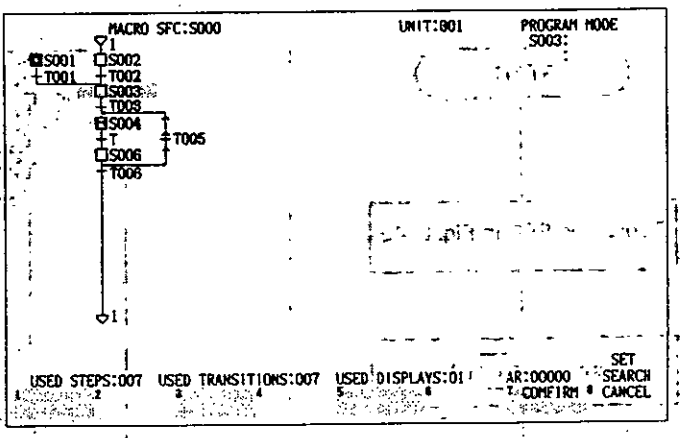


Fig. 6. 50

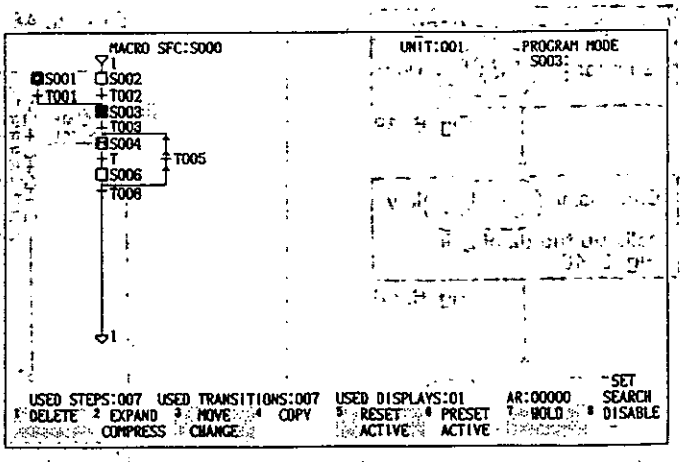


Fig. 6. 51

NOTE

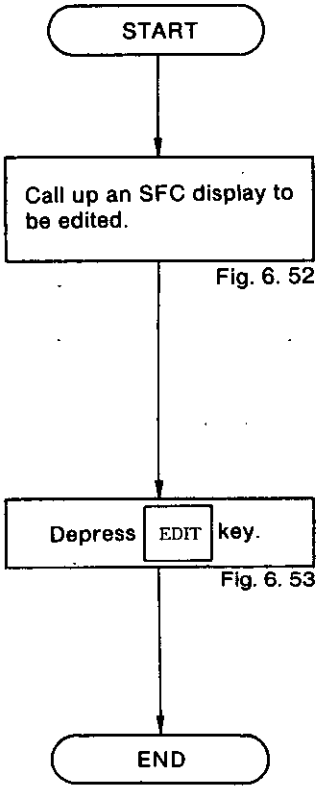
1. PRESET ACTIVE key is not effective for an active step.
2. RESET ACTIVE key is not effective for an inactive step.

6.1.5 SFC Edit Operation

This section describes the operations for editing the flow of an SFC. The editing uses the function key [EDIT].

- Simultaneously deleting an element and action circuit (transition condition circuit) of an SFC. ..... (DELETE)
- Expanding/compressing the lines or columns of an SFC flow (EXPAND COMPRESS)
- Moving an element, or changing an action circuit between steps (MOVE CHANGE)
- Copying a line or column of an SFC flow ..... (COPY)

Shown below are the procedures down to display of the edit operation screen.



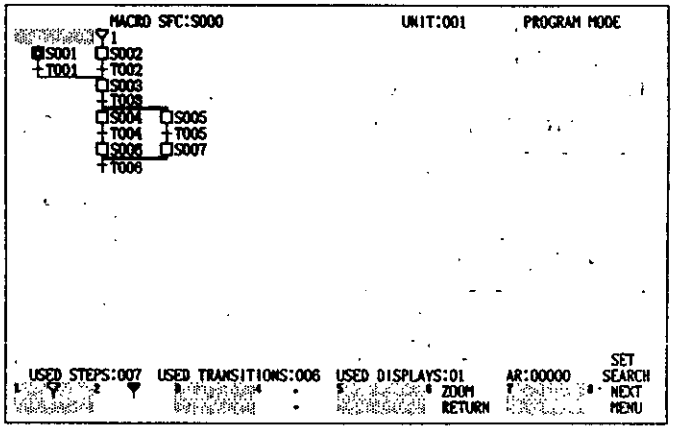


Fig. 6. 52

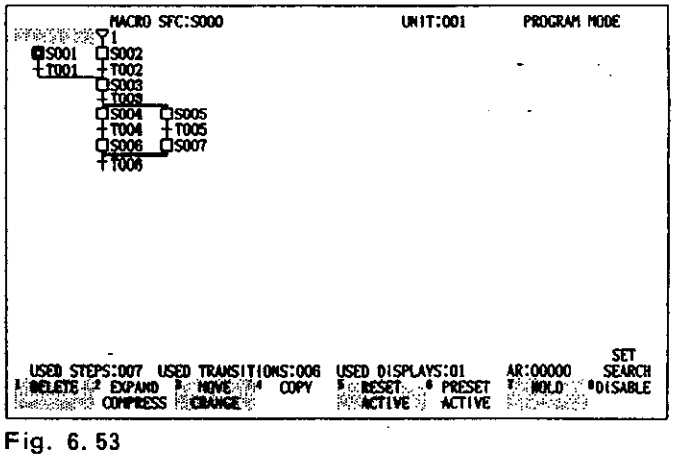


Fig. 6. 53

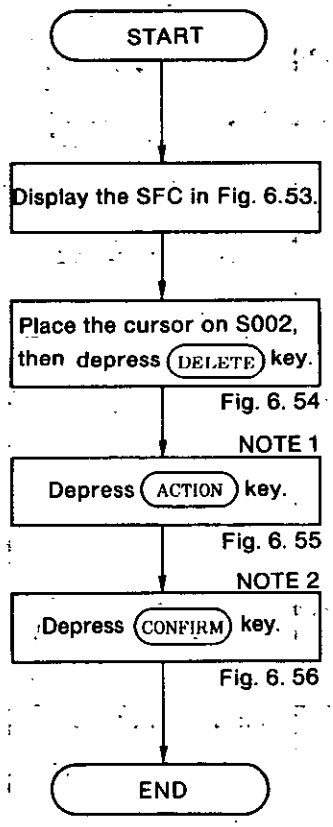
NOTE

1. This operation is only available in the program mode.
2. The memory protect switch of GL60S must be set to OFF.
3. To return to the original labels, depress [PRINT / CHG / NODE] key.

(1) DELETE

This operation simultaneously deletes a step element and action circuit, or a transition element and transition condition circuit, for an SFC.

NOTE The GL60S memory protect switch must be set to OFF.



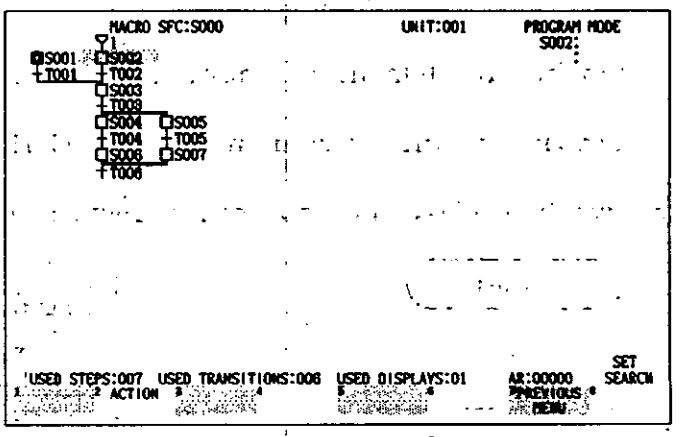


Fig. 6. 54

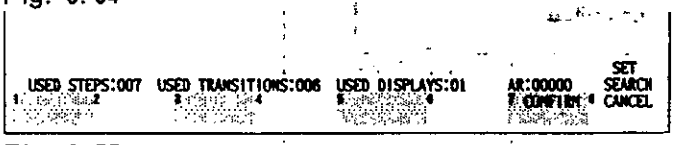


Fig. 6. 55

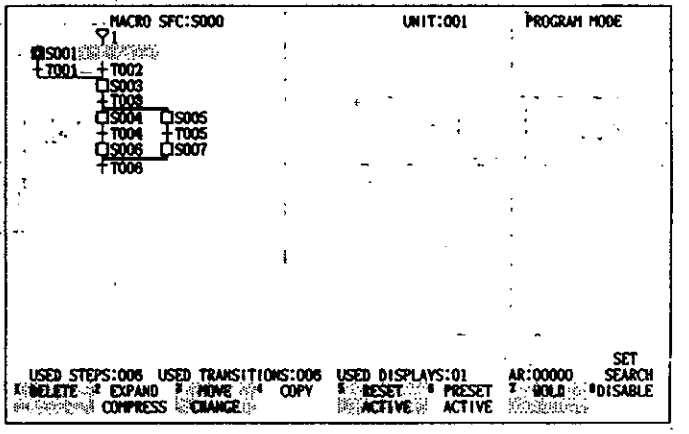


Fig. 6. 56

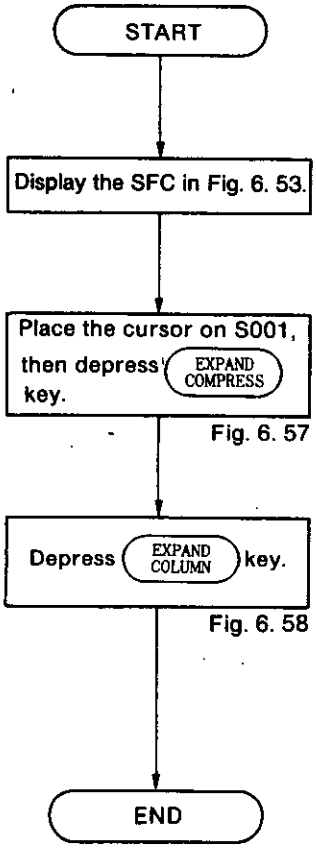
NOTE

1. If the cursor is on a transition element, depress (TRANSITION) key.
2. Depressing (CANCEL) key at this point causes a return to the display of Fig. 6. 54.
3. This operation is not effective for an active step.
4. For a macro step, deletion must start with the expanded view.

(2) EXPAND/COMPRESS ①

This operation expands an SFC to the next column on the right. The result is a simultaneous move of all elements includidng those in the cursor-placed column.

POINT The GL60S memory protect switch must be set to OFF.



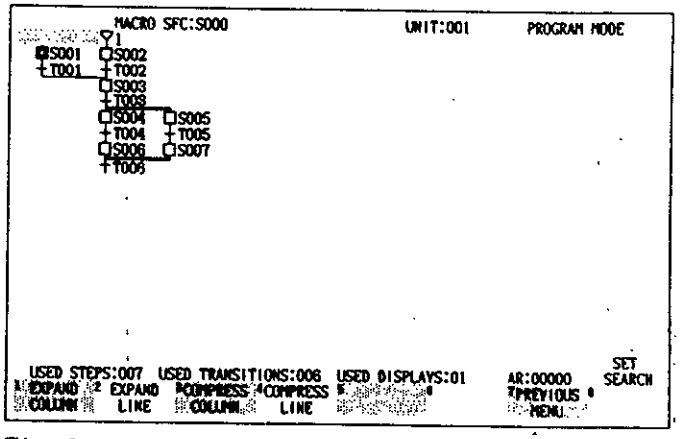


Fig. 6. 57

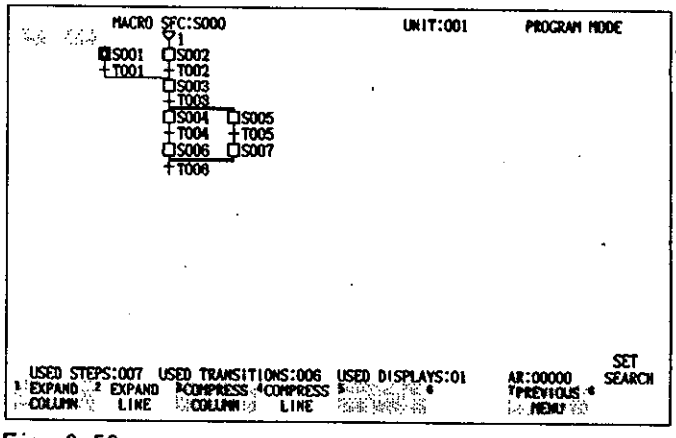


Fig. 6. 58

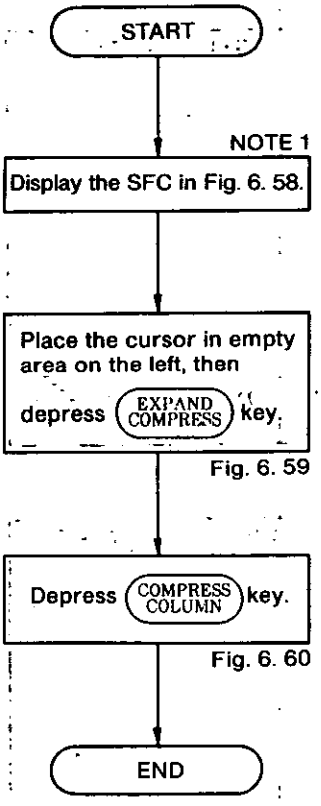
NOTE

1. The eighth column must not contain any element.
2. The seventh column must not contain a divergence, convergence, or loop.
3. This operation is not possible if there is an active step in columns to the right of the cursor-placed column.
4. To recover the label keys shown in Fig. 6. 53, derpess EDIT or PREVIOUS MENU key.

(2) EXPAND/COMPRESS ②

This operation compresses on SFC to the next column on the left. The result is a simultaneous move of all elements on the right from the cursor.

POINT The GL60S memory protect switch must be set to OFF.



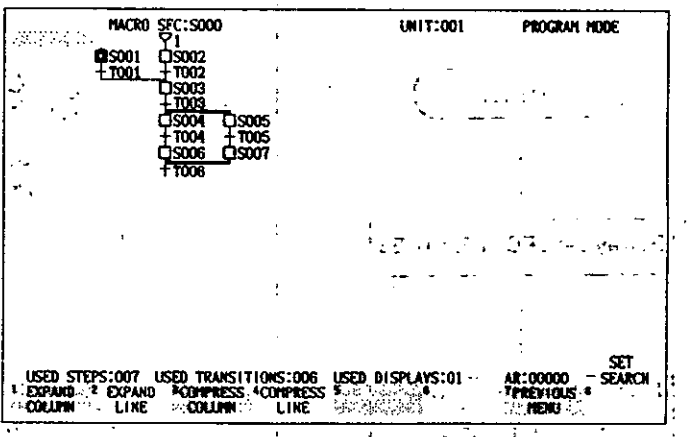


Fig. 6. 59

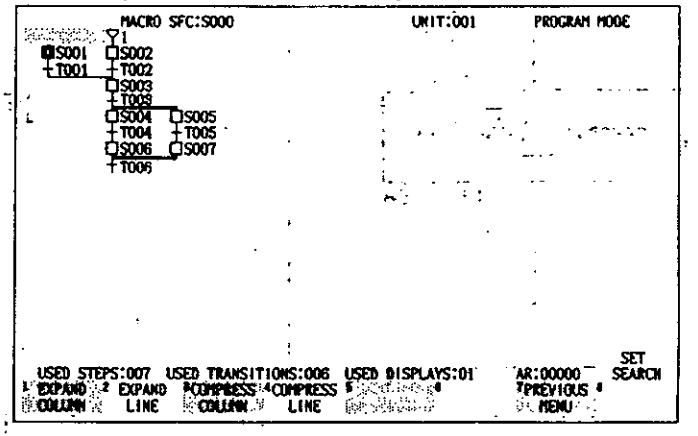


Fig. 6. 60

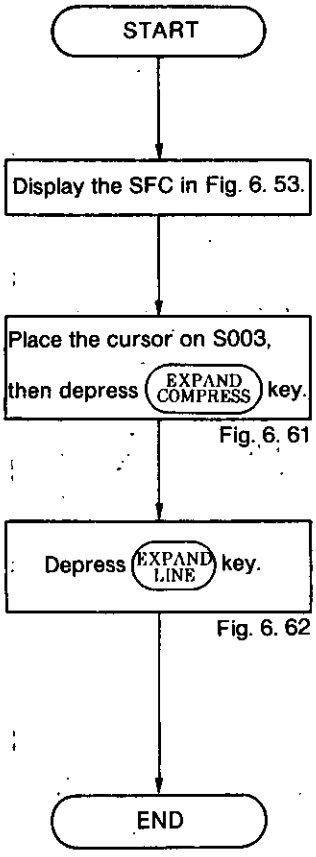
NOTE

1. This block applies when the labels are as shown in Fig. 6. 53.
2. There must be no element at the cursor position.
3. This operation is not possible if there is an active step in columns to the right of the cursor.
4. To recover the label keys shown in Fig. 6. 53, derpess EDIT or PREVIOUS MENU key.

(2) EXPAND/COMPRESS ③

This operation expends an SFC to the next lower line. The result is a simultaneous move of all elements including those in the cursor-placed line.

POINT The GL60S memory protect switch must be set to OFF.



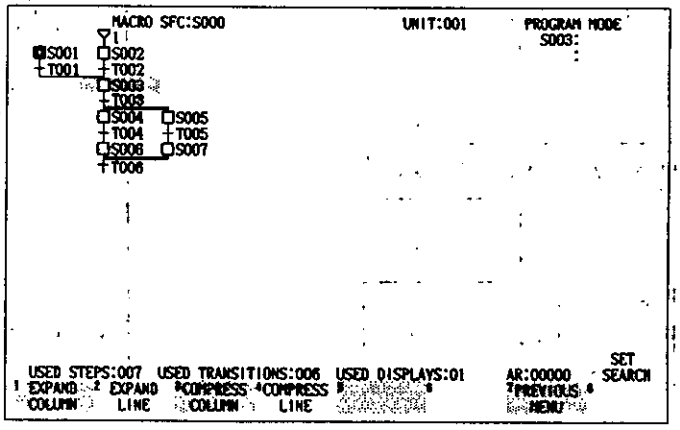


Fig. 6. 61

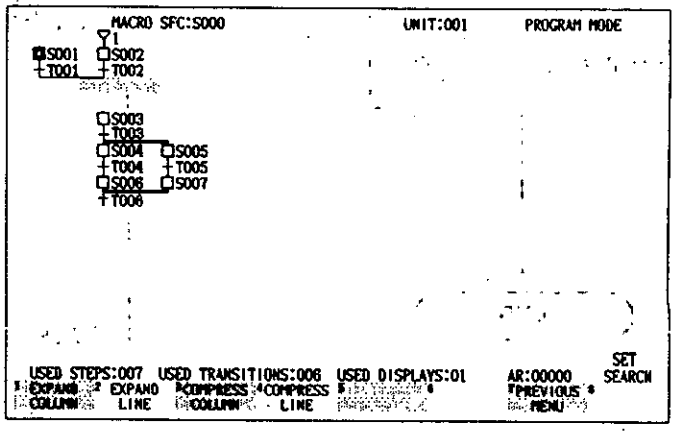


Fig. 6. 62

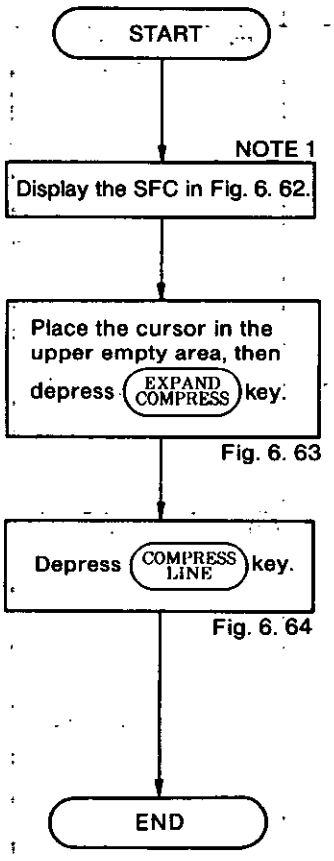
NOTE

1. There must be available the 8th step line and the 8th transition column which are empty and do not contain a TO (⇩) or macro return (⇓).
2. This operation is not possible if there is an active step in lines under the cursor-placed position.
3. To recover the label keys shown in Fig. 6. 53, depress EDIT or PREVIOUS MENU key.
4. This operation is not possible if the cursor is on a FROM or TO line.

(2) EXPAND/COMPRESS ④

This operation compresses an SFC to the next upper line. The result is a simultaneous move of all elements under the cursor.

POINT The GL60S memory protect switch must be set to OFF.



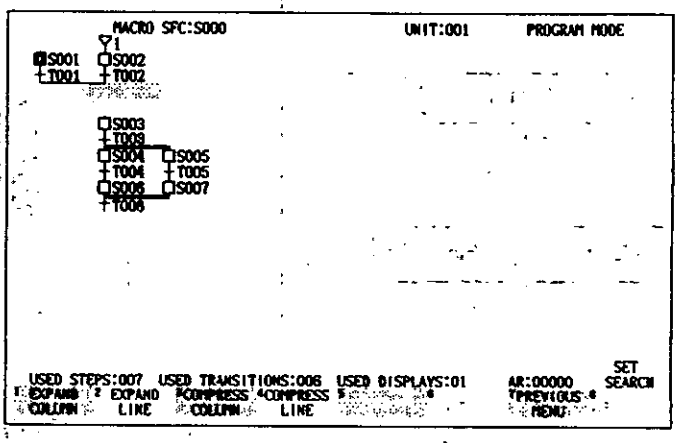


Fig. 6. 63

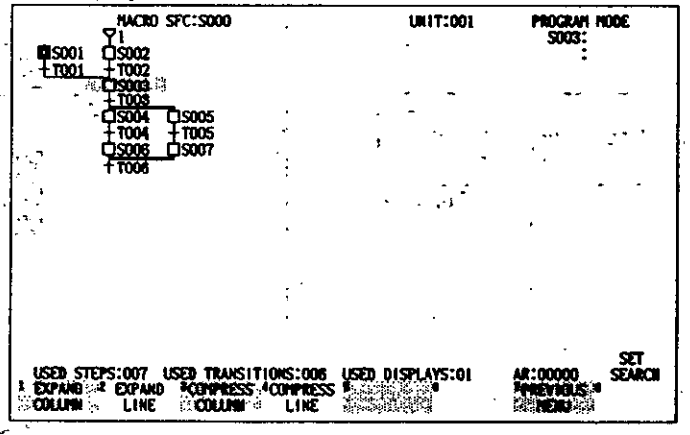


Fig. 6. 64

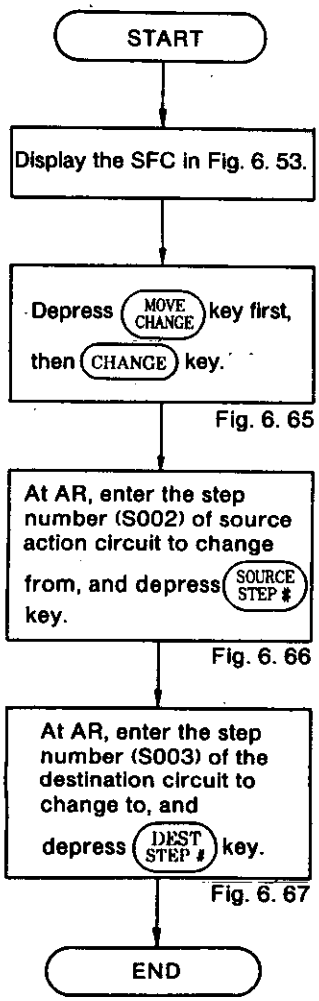
NOTE

1. This block applies when the labels are as shown in Fig. 6. 53.
2. There must be no element at the cursor position.
3. This operation is not possible if there is an active step in lines under the cursor.
4. To recover the label keys shown in Fig. 6. 53, depress EDIT or PREVIOUS MENU key.

(3) ACTION CIRCUIT EXCHANGE

This operation automatically changes an action circuit between two arbitrary steps. GL60 will immediately perform a solve using the action circuit that has been changed.

POINT The GL60S memory protect switch must be set to OFF.



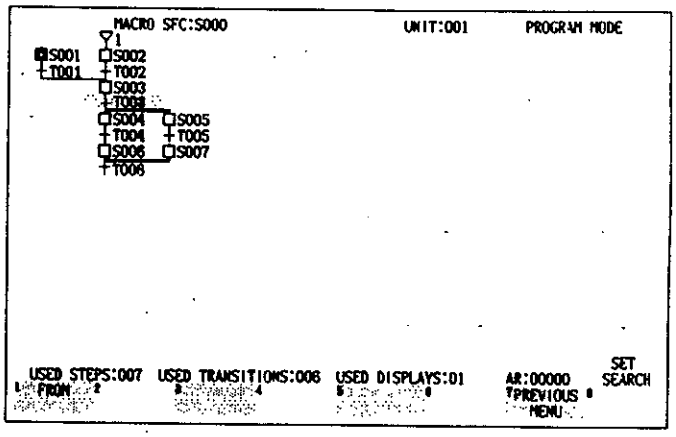


Fig. 6. 65

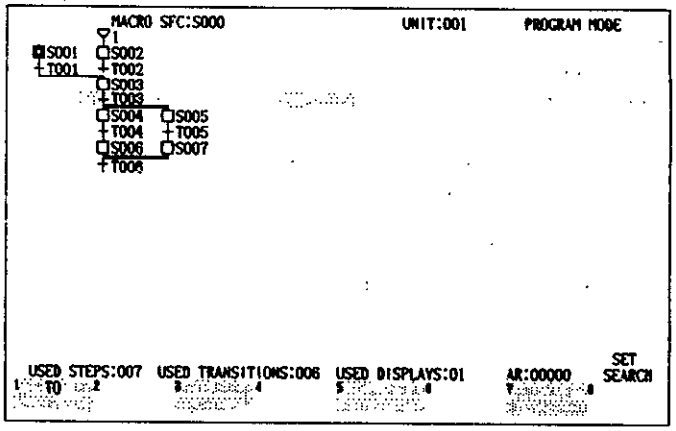


Fig. 6. 66

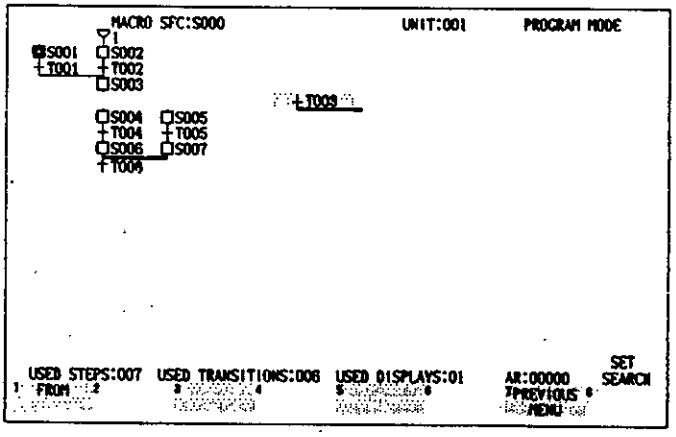


Fig. 6. 67

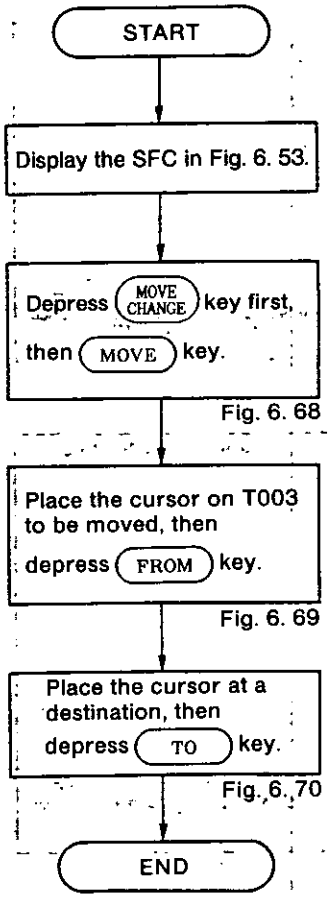
NOTE

1. Under the GL60S running, performing this operation may change the action. Care must be taken with this operation.
2. This operation is not possible on an active step.

(4) MOVE

This operation moves an SFC element within the same SFC sereen. One element is moved at a time; together with the divergence, convergence and loop which belong to the transition of the element being moved.

POINT The GL60S memory protect switch must be set to OFF.



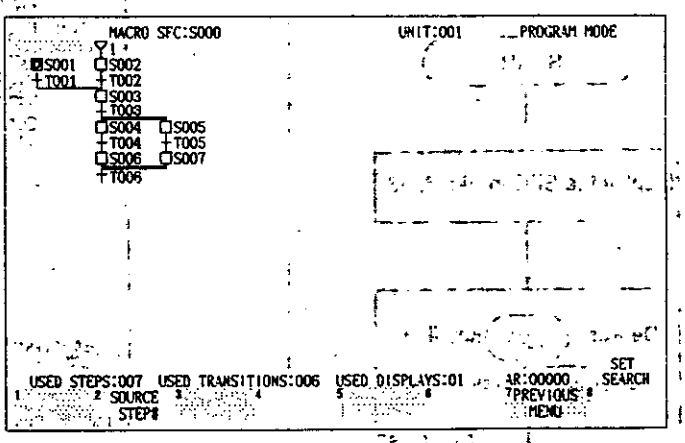


Fig. 6. 68

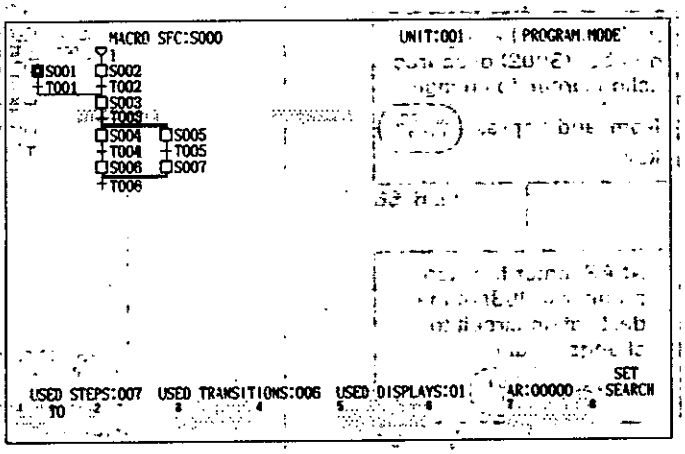


Fig. 6. 69

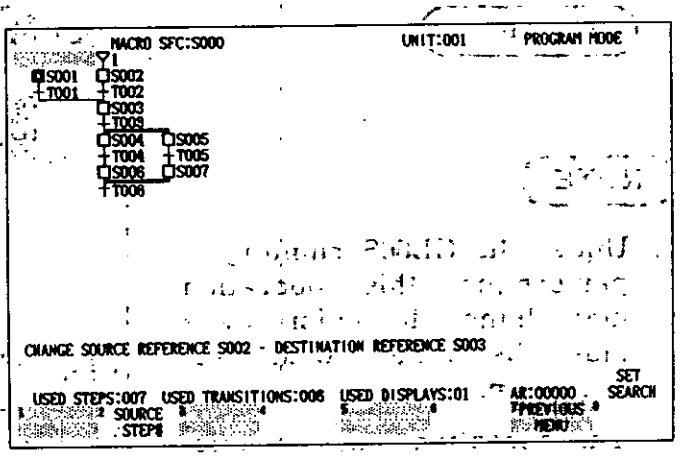


Fig. 6. 70

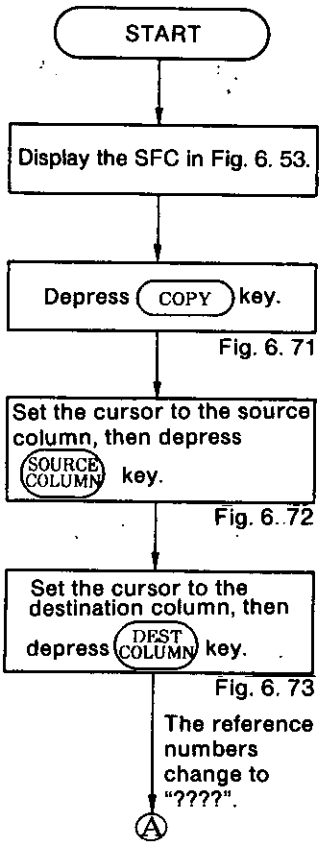
NOTE

1. This move cannot be made if the destination contains another element.
2. The destination can only be specified on the line of the same element.
3. This operation is not possible on an active step.

(5) COPY ①

This operation copies elements in a column to another column.

POINT The GL60S memory protect switch must be set to OFF.



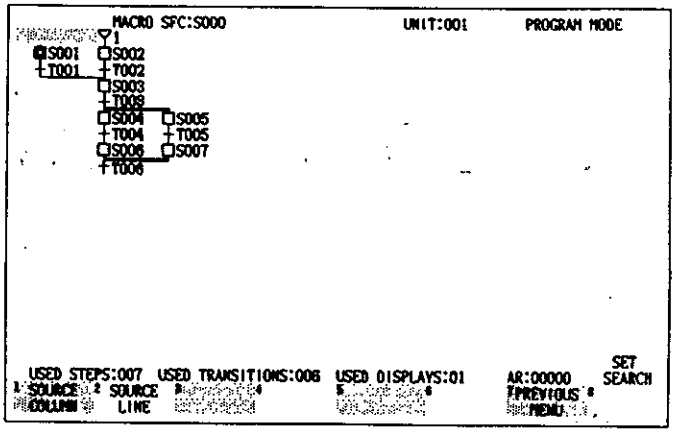


Fig. 6. 71

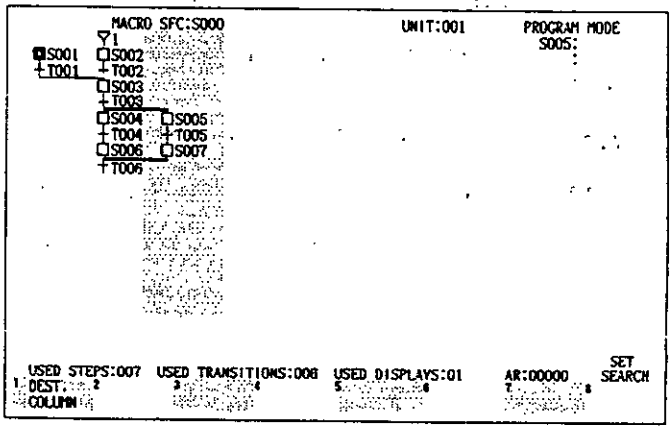


Fig. 6. 72

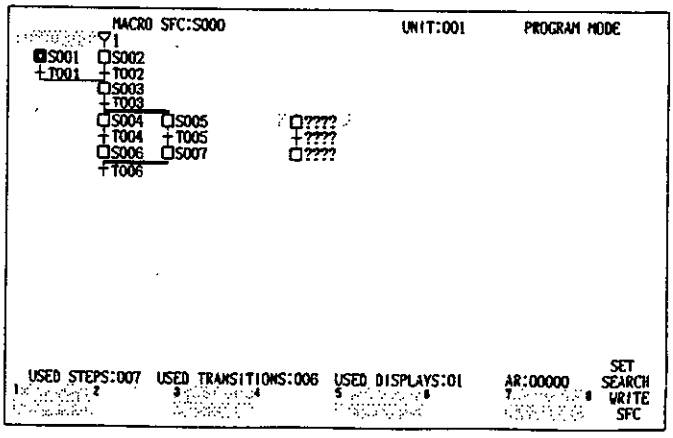


Fig. 6. 73

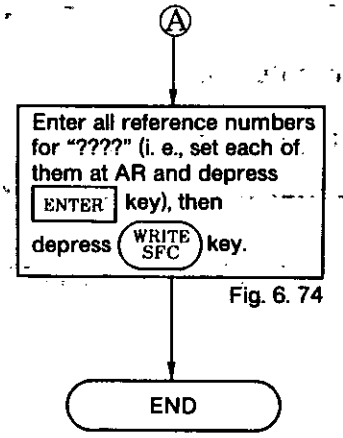


Fig. 6. 74

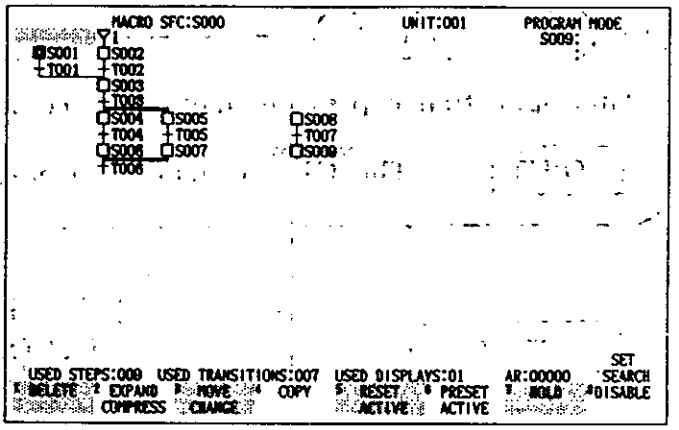


Fig. 6. 74

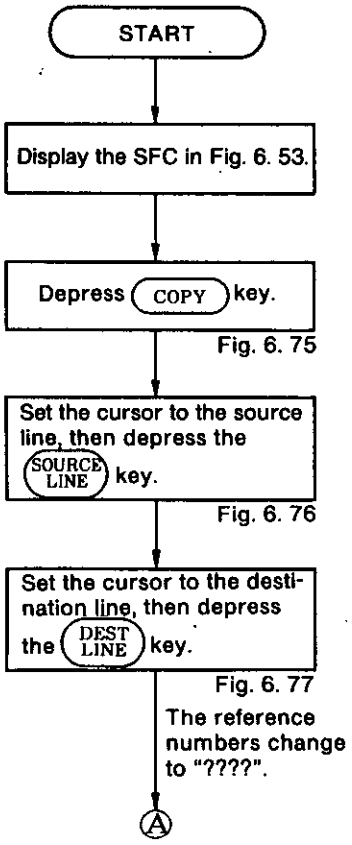
NOTE

1. The destination column must be entirely empty.
2. A macro entry (▼) that may be on the source line (FROM) is not copied to the destination.
3. An initial step (▣), if any, is not copied either.
4. The destination line is on the same line as in the original SFC.

(5) COPY ②

This operation copies elements in a line to another line.

POINT The GL60S memory protect switch must be set to OFF.



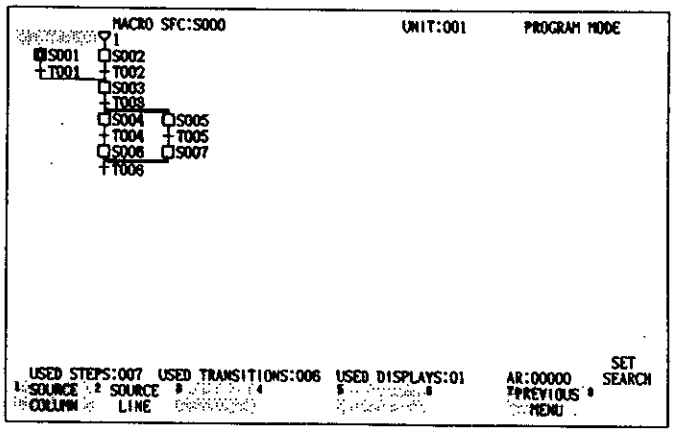


Fig. 6. 75

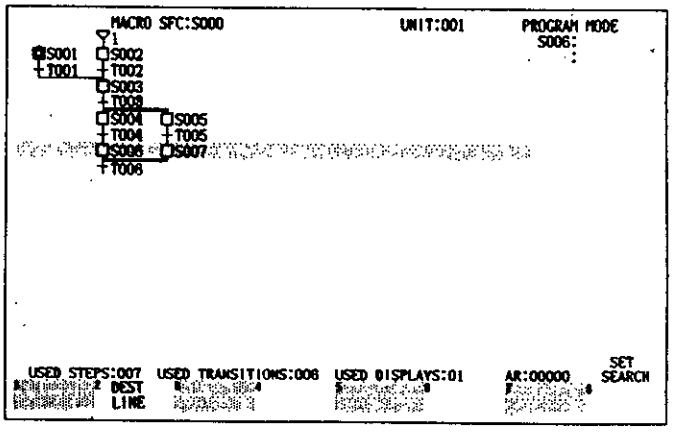


Fig. 6. 76

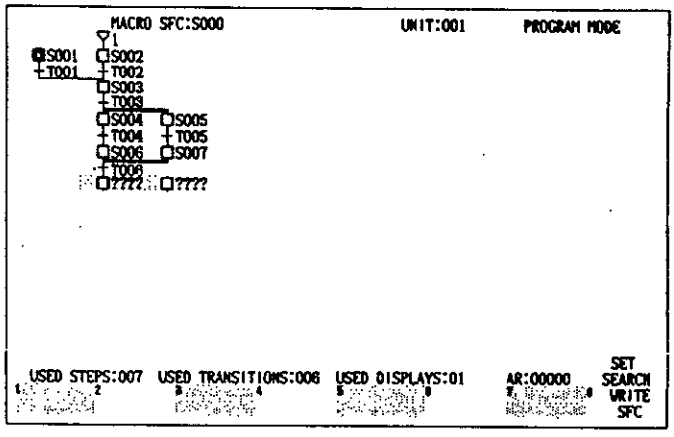


Fig. 6. 77

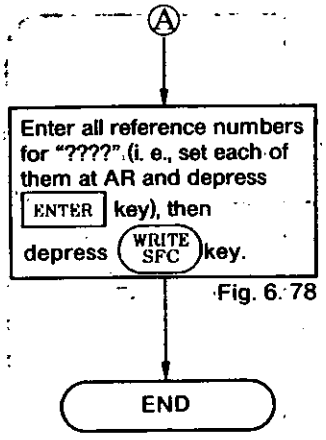


Fig. 6.78

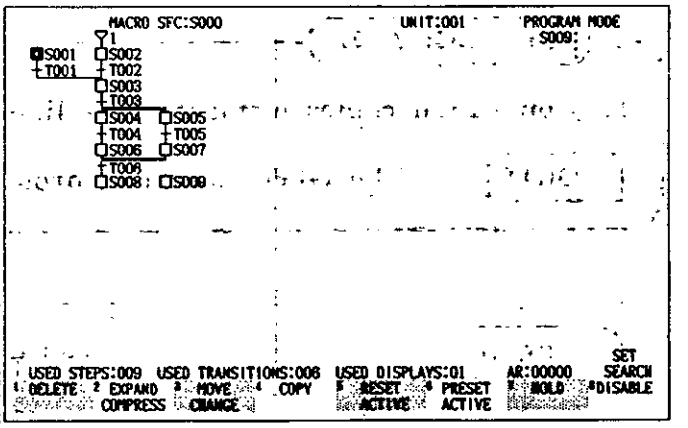


Fig. 6.78

NOTE

1. The destination line must be entirely empty.
2. A macro entry (▼), if any, cannot be copied.
3. An initial step (⊡), if any, cannot be copied either.
4. A step is copied to a step line, or a transition is copied to a transition line.

6.1.6 SFC Comment Editing

This section describes the operations for entering a comment for each step of SFC flow and for displaying the entered comments. Up to eight characters can be entered in each comment. Fig. 6.79 shows the comment editing area and an SFC flow.

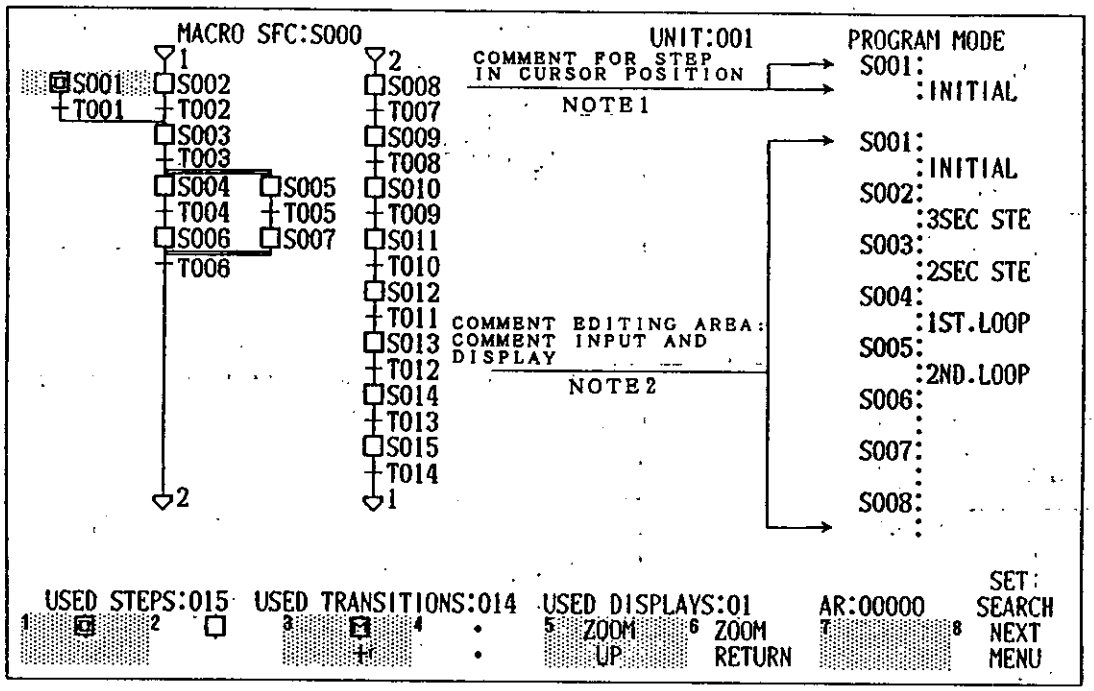


Fig. 6.79

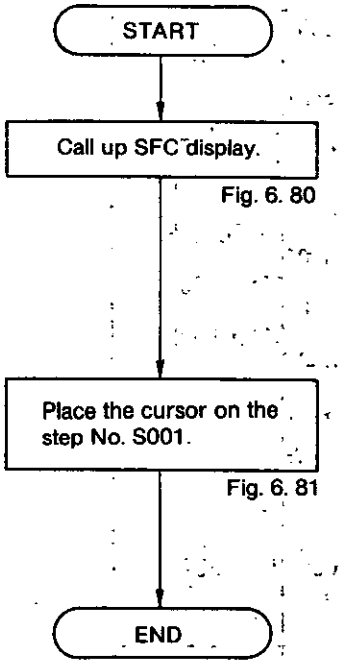
NOTE

1. A comment is only displayed when the cursor is placed on a step number of SFC flow.
2. To delete a comment for a step from the comment editing area on the screen, set the cursor to that step, then depress [SHIFT] and [ERASE / GET] keys simultaneously.

(1) COMMENT DISPLAY ①

This operation displays the comment for a step of SFC flow by setting the cursor to that step.

POINT The cursor must be set to the corresponding step number.



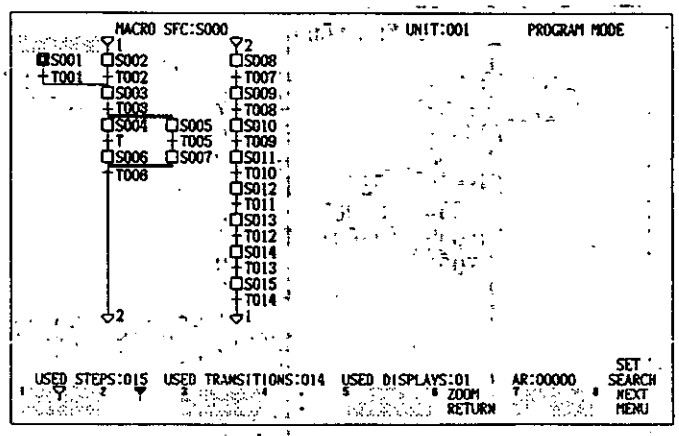


Fig. 6. 80

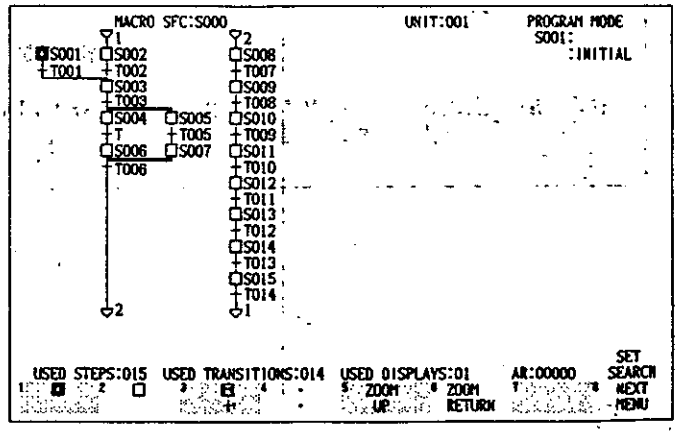


Fig. 6. 81

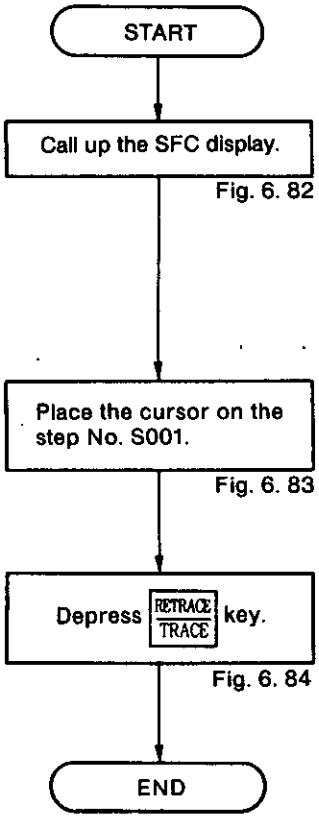
NOTE

The comment area called up through this operation cannot be used for comment editing (writing/deleting).

(1) COMMENT DISPLAY ②

In this operation, the comment for a step of SFC flow is displayed in the comment editing area by setting the cursor to that step number and then depressing [RETRACE / TRACE] key.

POINT The cursor must be set to the corresponding step number.



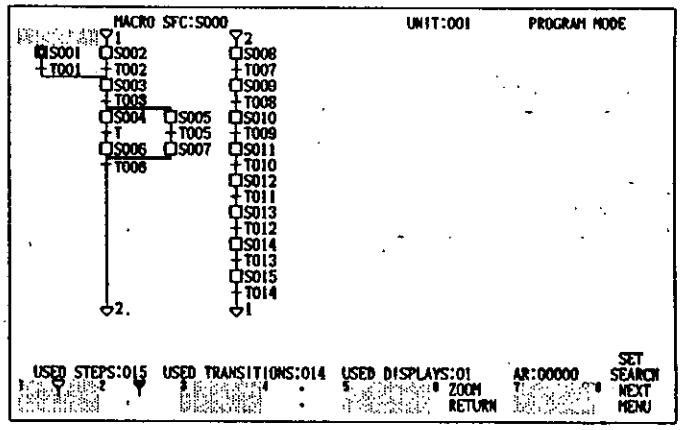


Fig. 6. 82

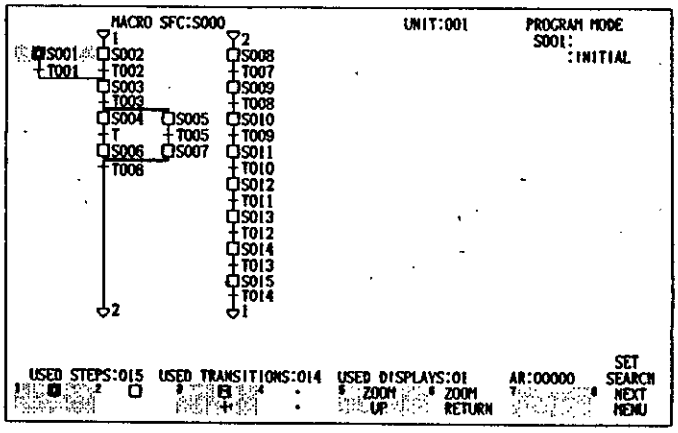


Fig. 6. 83

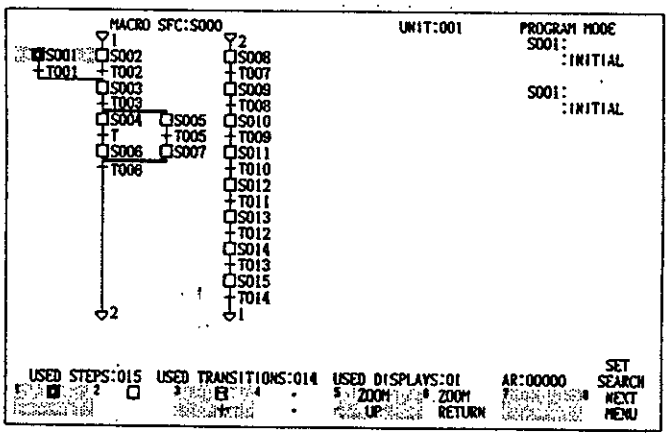


Fig. 6. 84

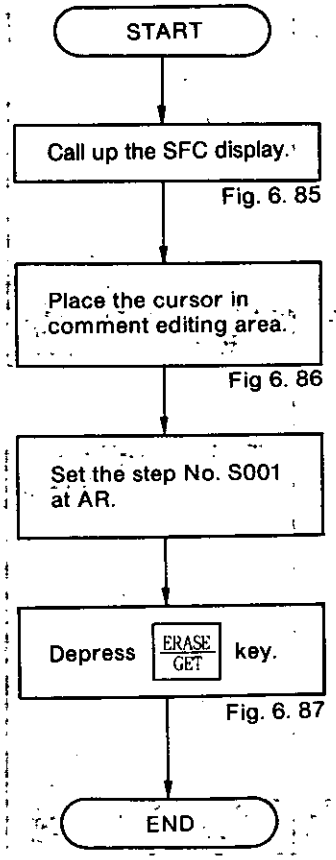
NOTE

The comment area called up through this operation can be used for comment editing (writing/deleting).

(1) COMMENT DISPLAY ③

In this operation, a comment is displayed by setting the cursor in the comment editing area on the SFC screen, entering a step number and then depressing [ERASE/GET] key.

POINT The cursor must be set in the comment editing area on the SFC display.



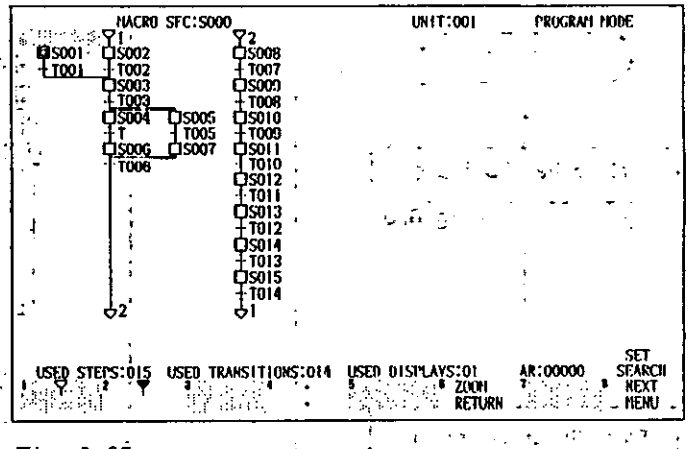


Fig. 6. 85

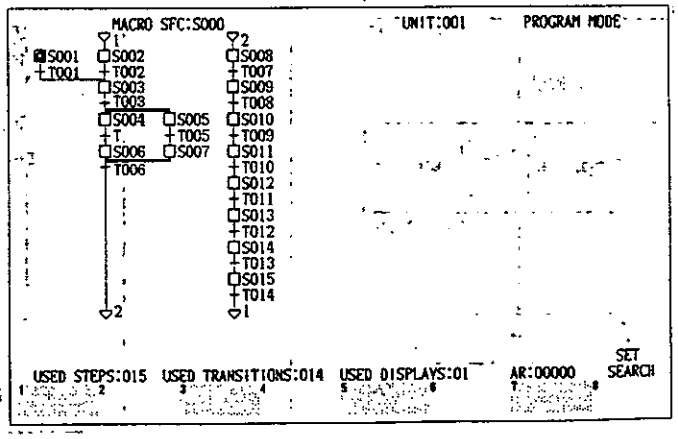


Fig. 6. 86

NOTE

The comment area called up through this operation can be used for comment editing (writing/deleting).

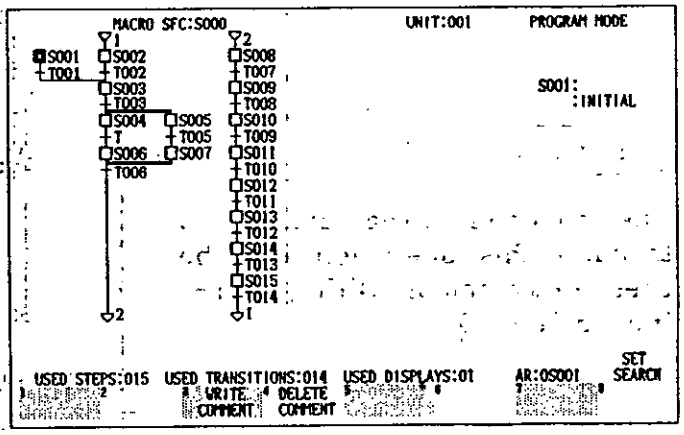
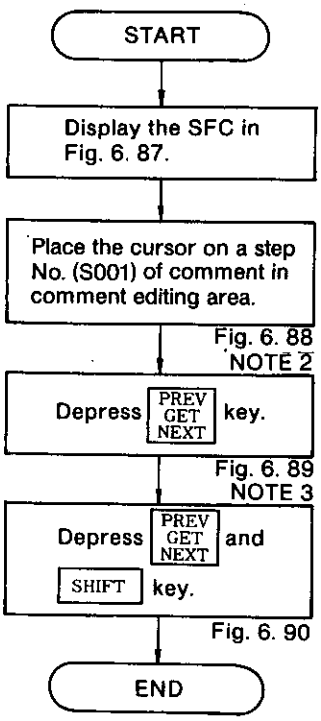


Fig. 6. 87

(1) COMMENT DISPLAY ④

This operation displays comments for each successive step in the comment editing area on the SFC screen. PREV GET NEXT key is used alone, or together with SHIFT key.

POINT The cursor must be set in the comment editing area on the SFC display.



NOTE

1. The comment area called up through this operation can be used for comment editing (writing/deleting).
2. * 1: This is to display the next step number. Only the cursor position is changed on the display.
3. * 2: This is to display the previous step number. The step number at the cursor position moves to the next lower line, with the previous step number appearing at the cursor position.

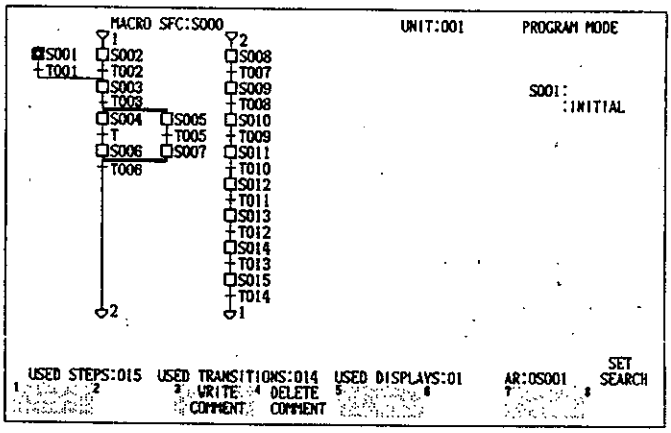


Fig. 6. 88

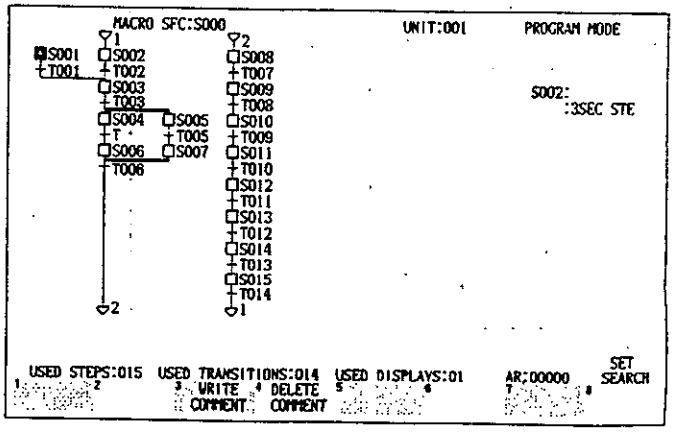


Fig. 6. 89

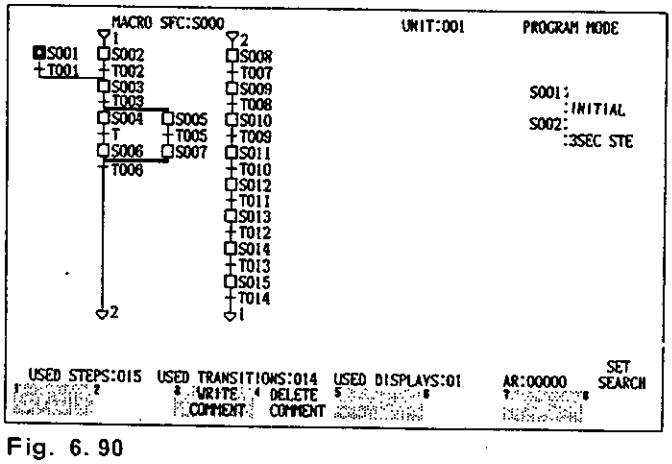


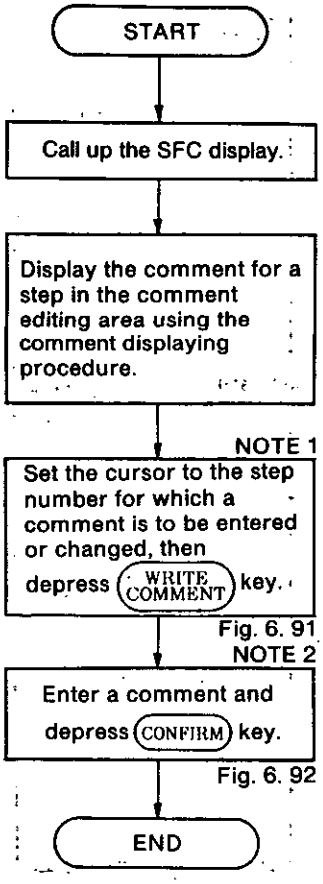
Fig. 6. 90

(2) COMMENT WRITE

This operation enters a comment for a step.

POINT

- Up to eight characters can be entered for each comment.
- The cursor must be set in the comment editing area.
- The memory protect switch of GL60S must be set to OFF.



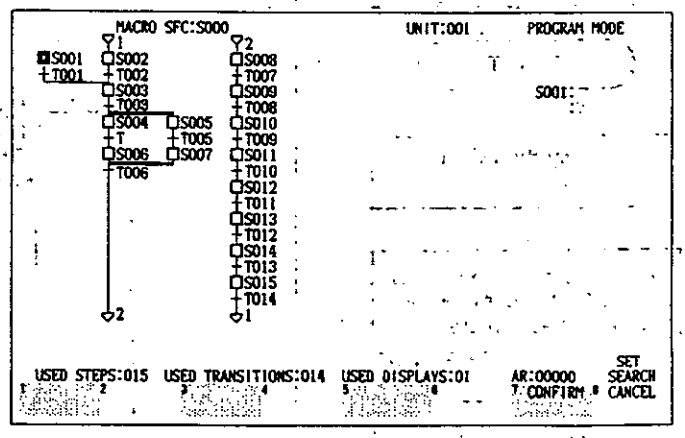


Fig. 6. 91

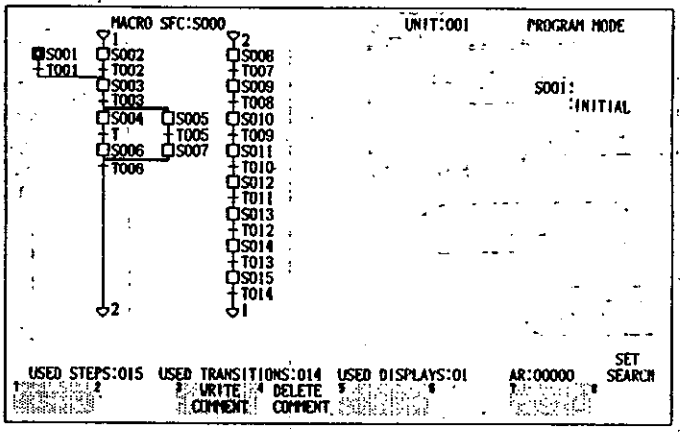


Fig. 6. 92

NOTE

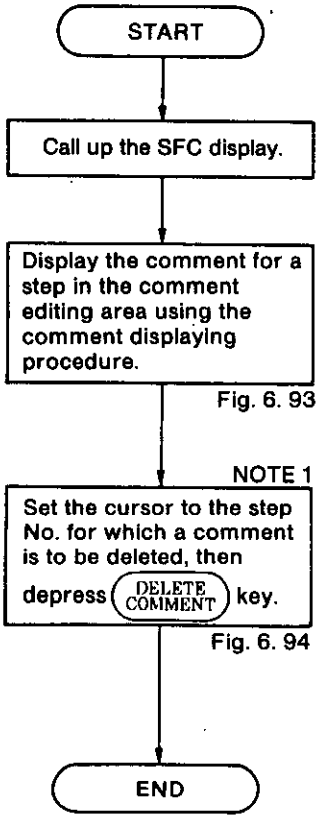
1. Move the cursor using the cursor control keys ← ↑ ↓ →.
2. Depressing CANCEL key reverts to the comment which was effective before the new comment was entered.
3. To change the comment, change any characters by moving the smaller cursor using the cursor control keys ← ↑ ↓ →, then depress CONFIRM key. (Only the characters changed at the smaller-cursor position actually are changed.)

(3) COMMENT DELETE

This operation deletes the comments for a step.

POINT

- The cursor must be set in the comment editing area.
- The memory protect switch of GL60S must be set to OFF.



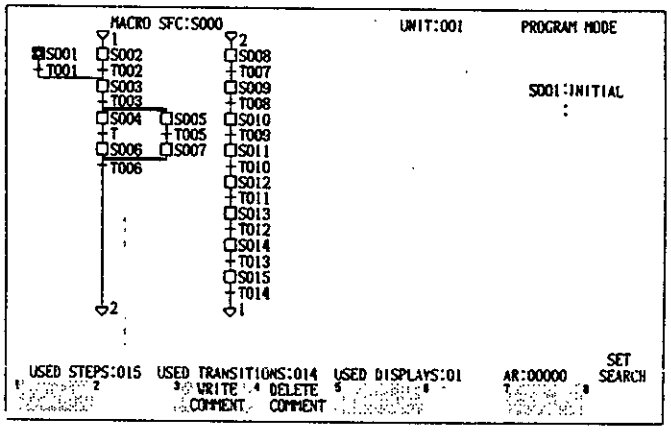


Fig. 6. 93

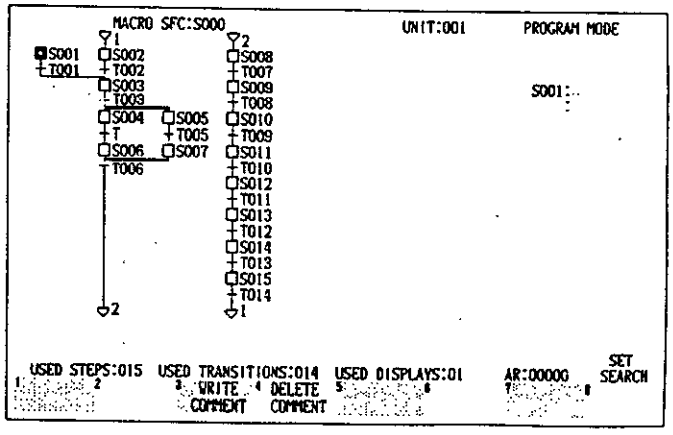


Fig. 6. 94

NOTE

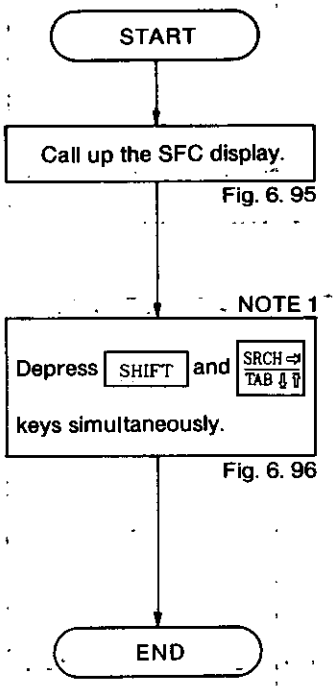
1. Move the cursor using the cursor control keys ← ↑ ↓ → .
2. This function is useful when deleting the entire comment for a step.

6.1.7 SFC Checking

This section describes the operation for searching the SFC elements (steps, transitions) stored in the memory. Five types of search are available:

- Search for element only
- Search for reference number only
- Search for a combination of element and reference number
- Search for hold step
- Search for disable step

Shown below are the procedures down to the cursor movement required for setting search data.



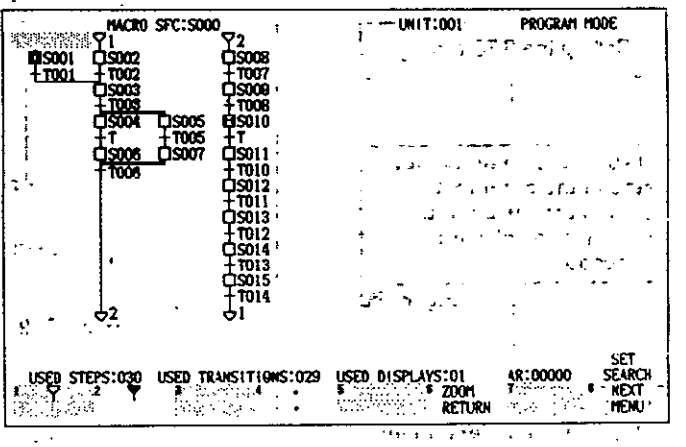


Fig. 6. 95

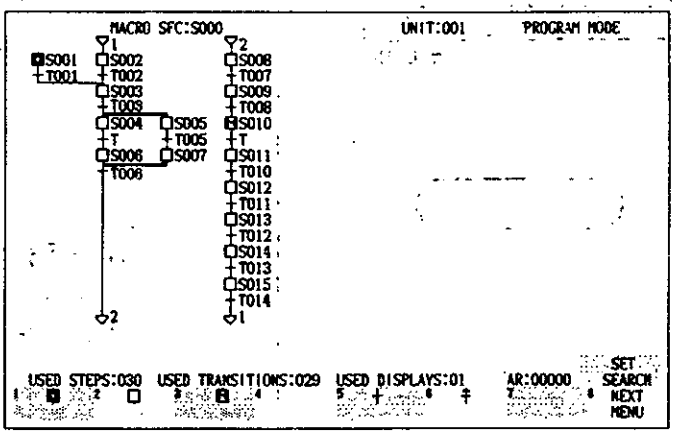


Fig. 6. 96

NOTE

1. This is the only operation available for moving the cursor to the data setting position.
2. To return the cursor to the SFC flow area, depress SRCH→ / TRB↑↓ key.

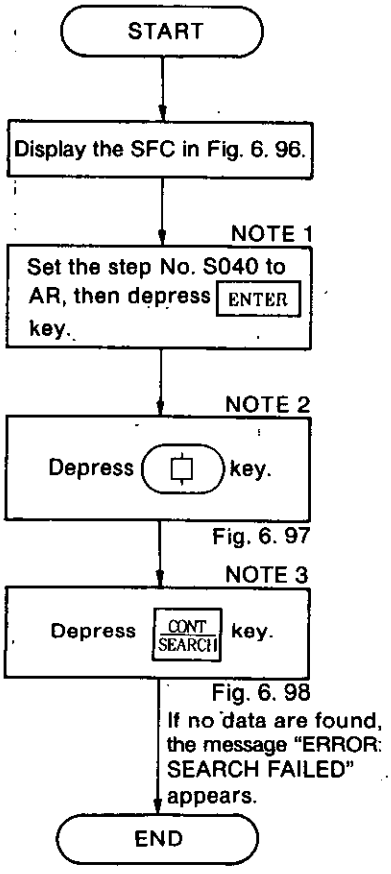
(1) SEARCH ①

This search begins by setting one of the three data types of elements listed below. Then the search seeks for the SFC screen containing the element and displays that SFC screen.

(1) Search for element only
(2) Search for reference number only
(3) Search for a combination of element and reference number

POINT

- Set search data after placing the cursor to the position. [SET SEARCH]
- Five types of elements that can be searched are: ▣, □, Ⓜ, ┼ and ┼.



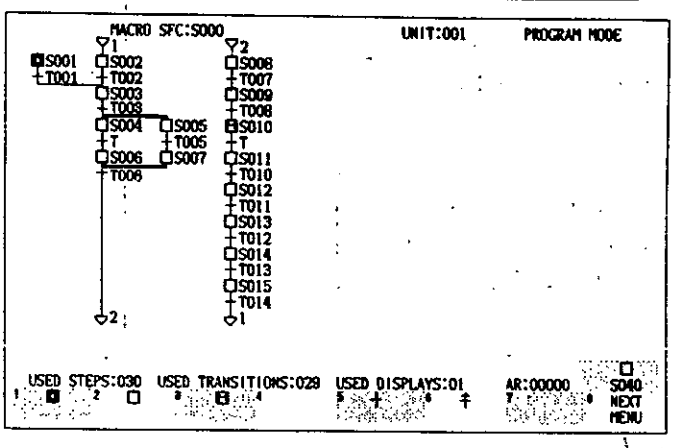


Fig. 6. 97

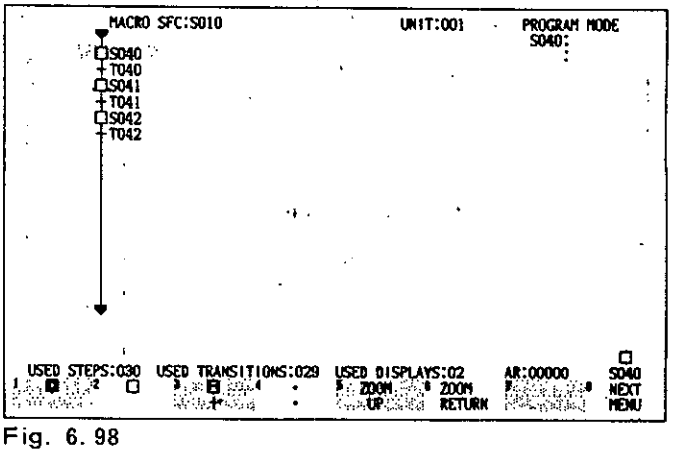


Fig. 6. 98

NOTE

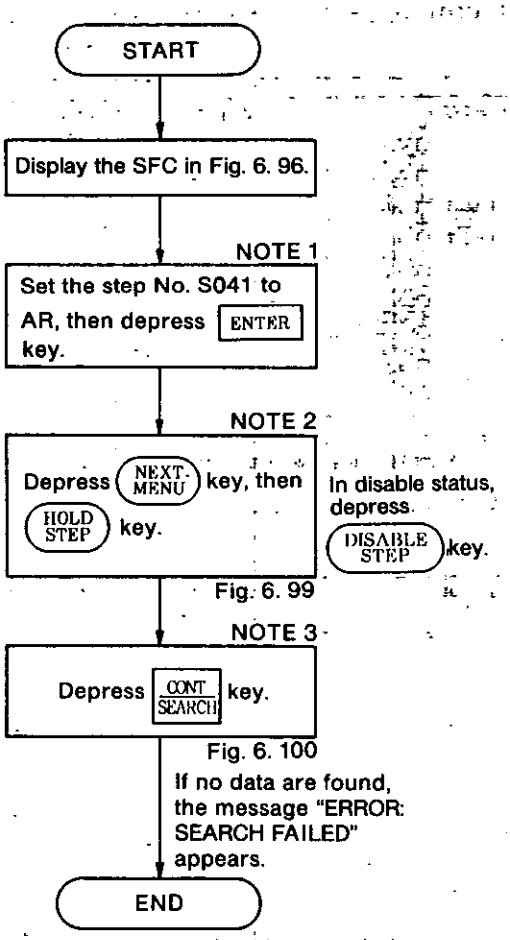
1. This operation is not required for a search of an element only.
2. This operation is not required for a search of a reference number only.
3. In a search for an element only, simultaneously depress [SHIFT] and [CONT SEARCH] keys to continue the search.
4. If the search is for an element only, or if a reference number is set earlier than an element, the reference number area is indicated as [ALL].

(1) SEARCH ②

This operation searches for a step in hold or disable status, and indicates whether or not that step is used in an SFC flow. The search may be for a status only or for a combination of status and reference number. The search content is displayed in the message area.

POINT

- Set search data after placing the cursor to position. (SET SEARCH)



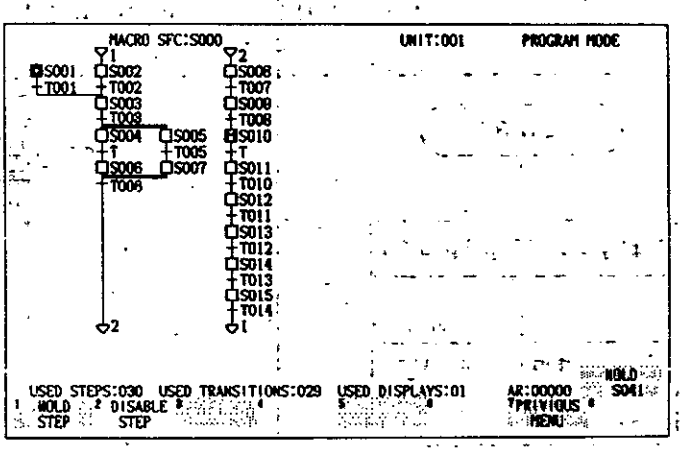


Fig. 6. 99

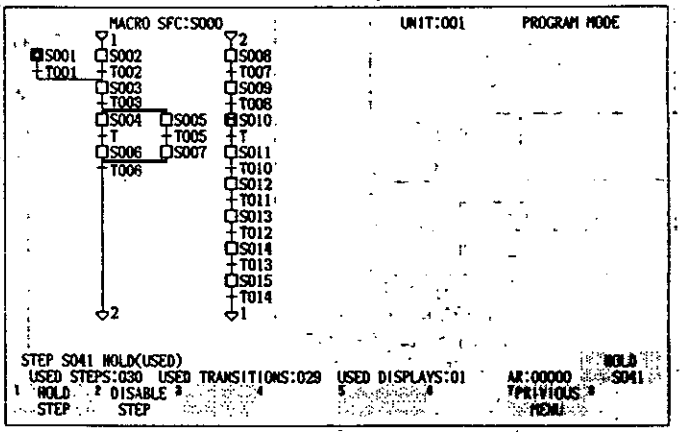


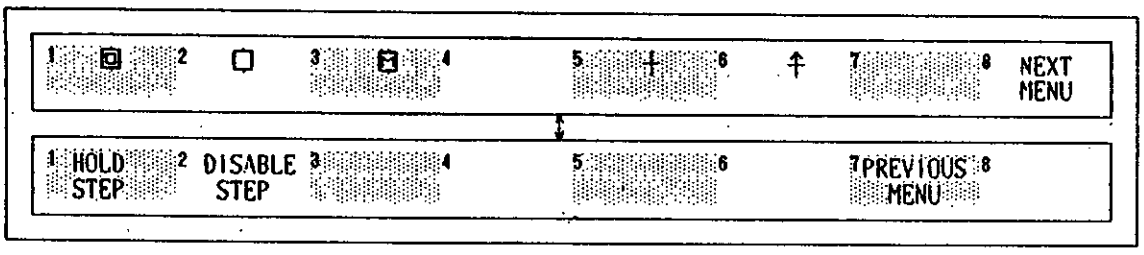
Fig. 6. 100

In Fig. 6. 100, if the step found in the search is not used in an SFC flow and is in hold status, it is displayed as "STEP S041 HOLD (NOT USED)".

NOTE

1. This operation is not required for a search of a status only.
2. If the search is for a status, it cannot search for a reference number only.
3. To continue the search, simultaneously depress [SHIFT] and [CONT / SEARCH] keys.
4. If the search is for a status only, or if a reference number is set earlier than a status, the reference number area is indicated as [ALL].
5. When a reference number is specified, the search seeks for the reference numbers following the specified number.

Table 6.4 List of Function Label Displays (Keys) under Search Operation



6.2 SFC ACTION CIRCUIT

An action circuit depicts the control or each step in an SFC flow, using a ladder diagram. The contents of an action circuit are the same as those handled in network processing — refer to the P150 PROGRAMMING PANEL BASIC INFORMATION (SIE-C815-14.2). However, to store action circuits, a memory area for action circuits must be reserved in GL60S. This memory area is reserved in units of 1 kW.

Action circuits can contain as many networks as required for each step. The procedure for reserving the memory area for action circuits is described in the system configuration of the P150 PROGRAMMING PANEL BASIC INFORMATION (SIE-C815-14.2). After memory reservation, the screen should look like one shown in Fig. 6.101.

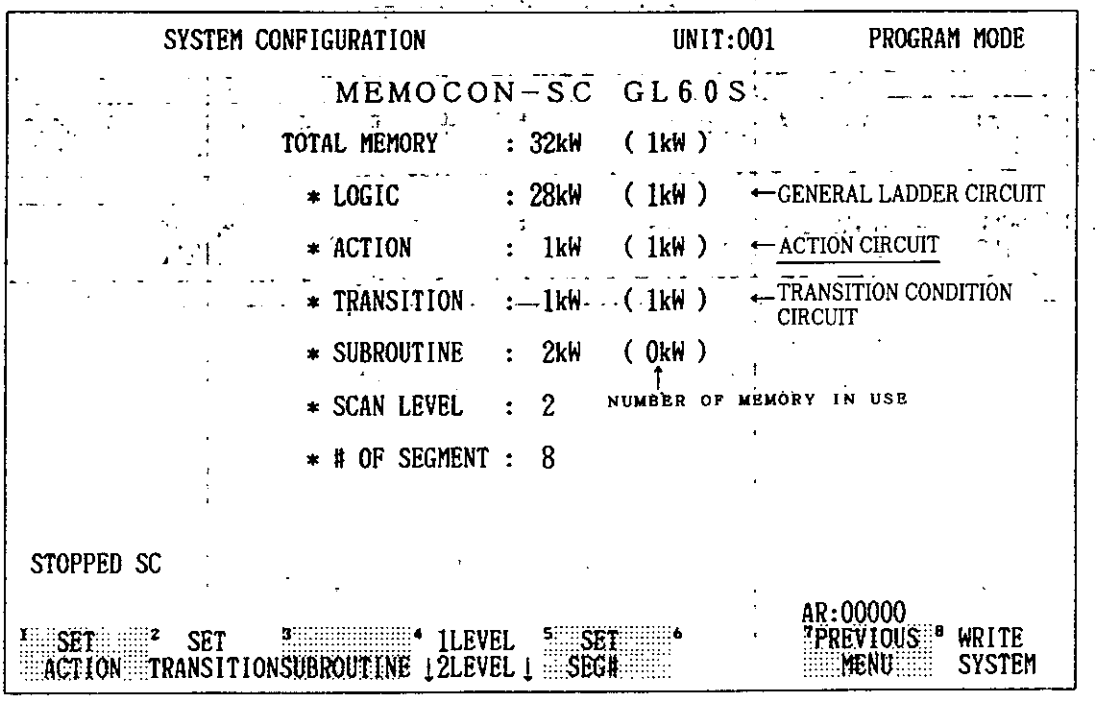


Fig. 6.101

This manual covers only a part of the procedures for action circuit displaying and network circuit storing. For fundamental procedures, read the ladder circuit section of the P150 PROGRAMMING PANEL BASIC INFORMATION (SIE-C815-14.2).

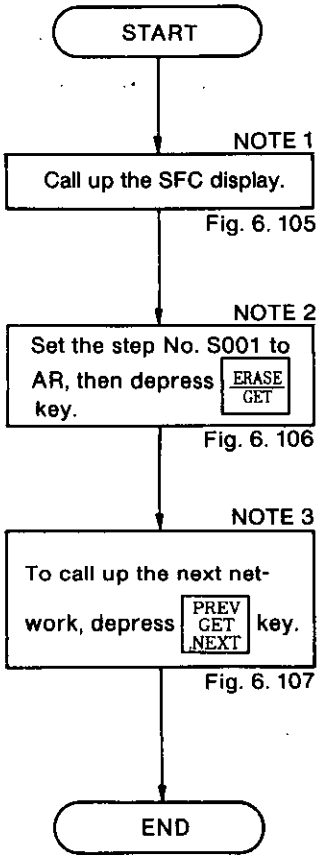
6.2.1 Action Circuit Display

Action circuits can be displayed by either of two methods: setting the cursor to a desired step in an SFC flow and depressing (ZOOM UP) key, or entering a desired step number and depressing [ERASE / GET] key.

(1) ZOOM DISPLAY

Action circuits are displayed by setting the cursor to a desired step in an SFC and depressing (ZOOM UP) key.

POINT • The cursor must be set to the desired step.



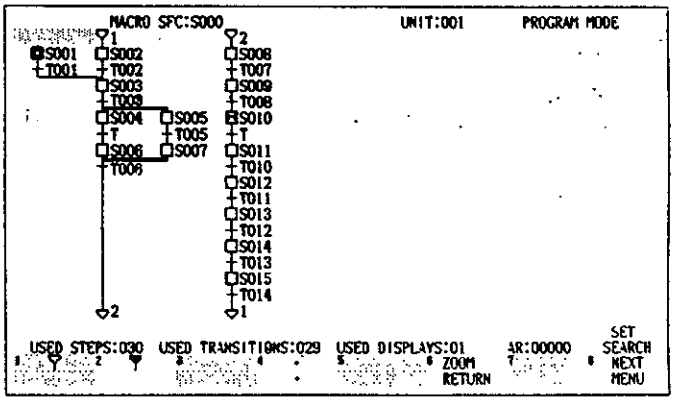


Fig. 6. 102

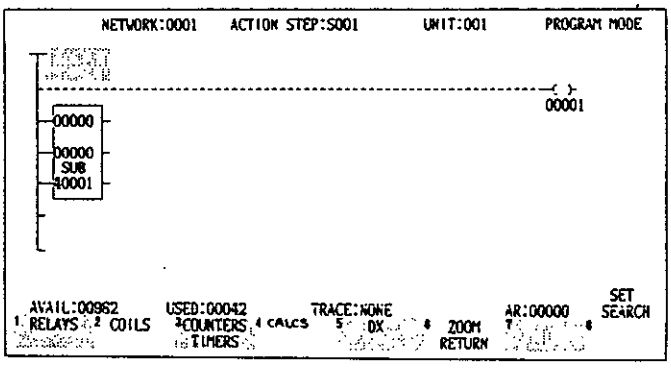


Fig. 6. 103

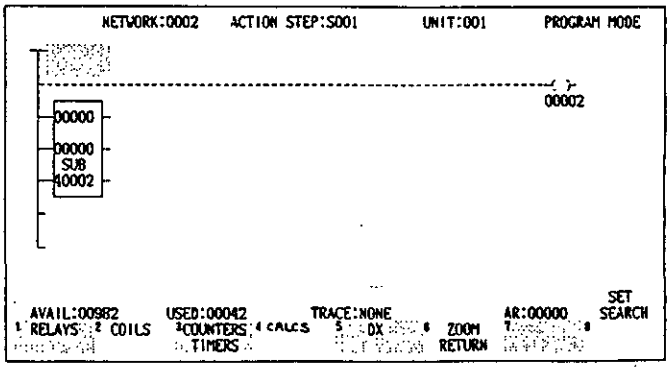


Fig. 6. 14

NOTE

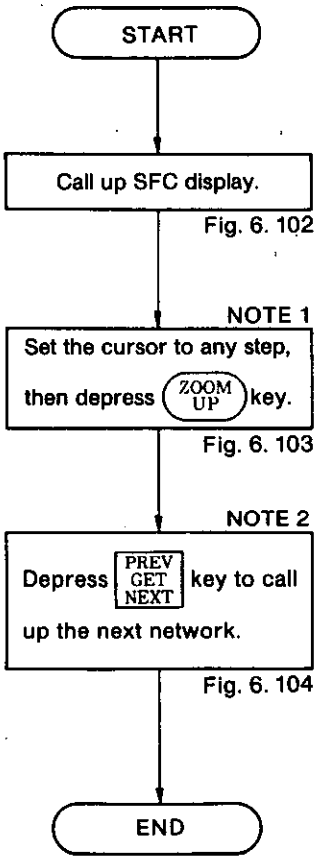
1. If no circuit is stored in the memory, the display shows "NETWORK:00000".
2. To call up the previous network, depress SHIFT and PREV GET NEXT keys simultaneously.
3. Networks for action circuits can only be called up through the operation of NOTE 1. Depressing PREV GET NEXT key after merely entering a network number would read out the general network in the ladder circuit form.
4. To return to the SFC screen from the display of Fig. 6.103 or 6.104, depress ZOOM RETURN key.
5. Macro steps (M) do not have an action circuit. Therefore, depressing ZOOM UP key at a macro step will call up the SFC screen for that macro step.

(2) NUMBER ENTRY DISPLAY

Action circuits are displayed by entering a desired step number in an SFC and depressing [ERASE / GET] key.

POINT

• The cursor must be set in SFC area.



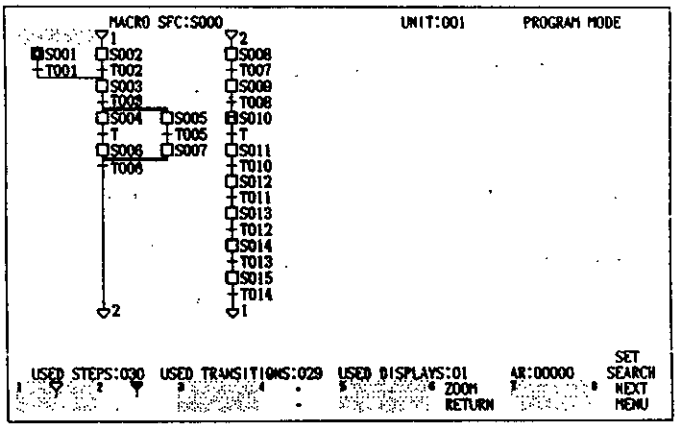


Fig. 6. 105

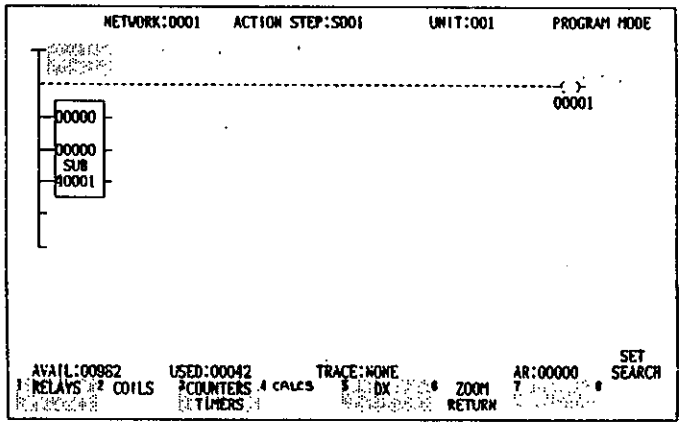


Fig. 6. 106

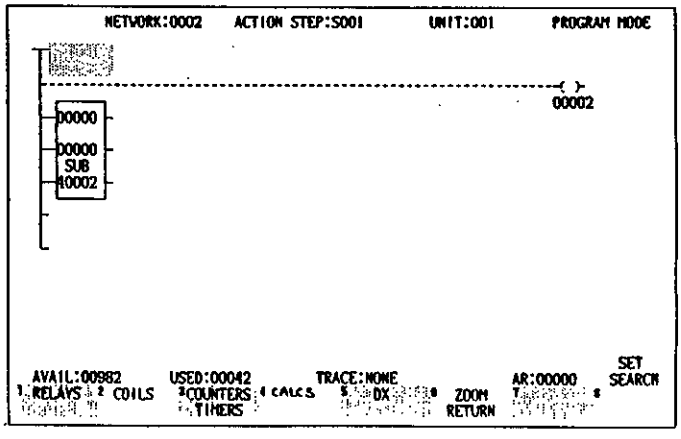


Fig. 6. 107

NOTE

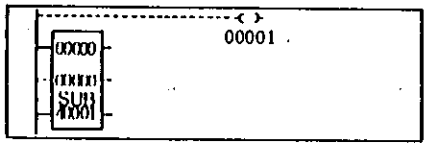
1. The general network screen for ladder circuits may be used for this purpose.
2. If no circuit is stored in the memory, the display shows "NETWORK:00000".
3. To call up the previous network, depress [SHIFT] and [PREV GET NEXT] keys simultaneously.
4. Networks for action circuits can only be called up through the operation of NOTE 2. Depressing [PREV GET NEXT] key after merely entering a network number would read out the general network in the ladder circuit form.
5. To return to the SFC screen from the display of Fig. 6.106 or 6.107, enter S000 at AR and depress [ERASE / GET] key to recover the master view. To recover the expanded view, enter the step number of expanded view at AR and depress [ERASE / GET] key. The zoom function depressing (ZOOM RETURN) key is also available for the return.
6. Macro steps ([M]) do not have an action circuit. Therefore, if the step number entered is one for a macro step, the SFC screen for that macro step will be called up.

6.2.2 Network Storing

The networks of action circuits are stored in the same way as for the general networks of ladder diagrams. The only difference is the way in which the zoom function is operated on the action circuit display.

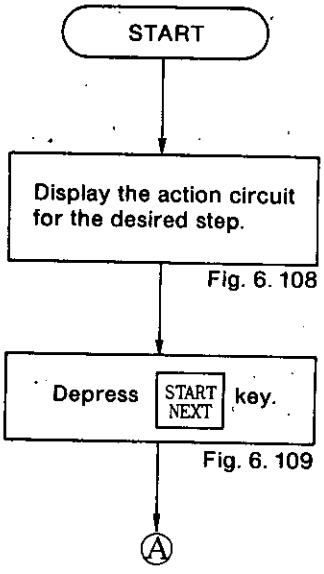
(1) NETWORK STORING

(Storing example)



POINT

- The cursor must be set at the logic area.
- The GL60S memory protect switch must be set to OFF.



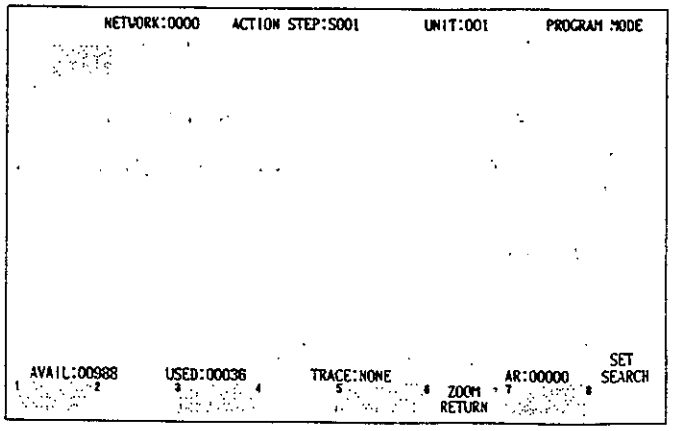


Fig. 6. 108

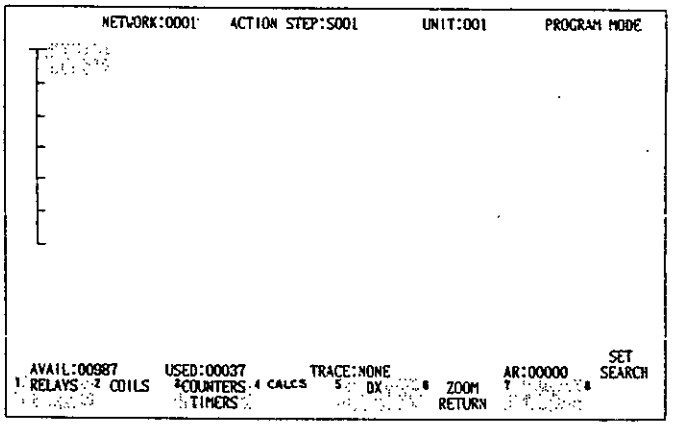


Fig. 6. 109

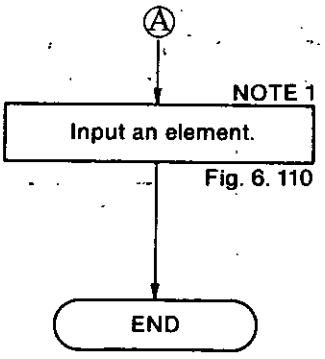


Fig. 6. 110

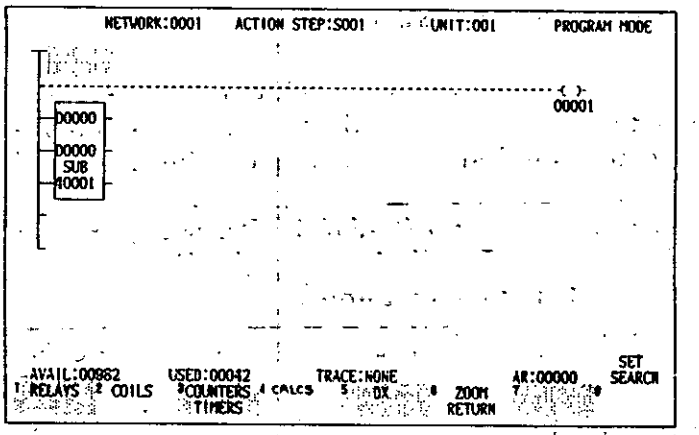


Fig. 6. 110

NOTE

1. To store the next network, depress [START NEXT] key. On the screen of the next network that appears, perform network storing operation.
2. The contact of any step number can be used for the general ladder diagrams.

   Example: ⊣ ⊢ ⊣/⊢ ⊣↑⊢ ⊣↓⊢

3. Entry of an action circuit may not be always required.
4. A search in network checking operation will not be limited to the range of action circuits, but it will cover the whole range including transition condition circuits and general ladder circuits.

6.3 SFC TRANSITION CONDITION CIRCUIT

A transition circuit is one in which a higher step proceeds to the lower step on a transition in an SFC flow. Transition circuits are described in the ladder diagram. The contents of a transition condition circuit is the same as those handled in network processing — refer to the P150 PROGRAMMING PANEL BASIC INFORMATION (SIE-C815-14.2).
However, to store transition condition circuits, a memory area for action circuits must be reserved in GL60S. This memory area is reserved in units of 1 kW.

A transition condition circuit consists of one network for each transition. This circuit must be stored for each transition.

The procedure for reserving the memory area for transition condition circuits is described in the system configuration of the P150 PROGRAMMING PANEL BASIC INFORMATION (SIE-C815-14.2). After memory reservation, the screen should look like one shown in Fig. 6.111.

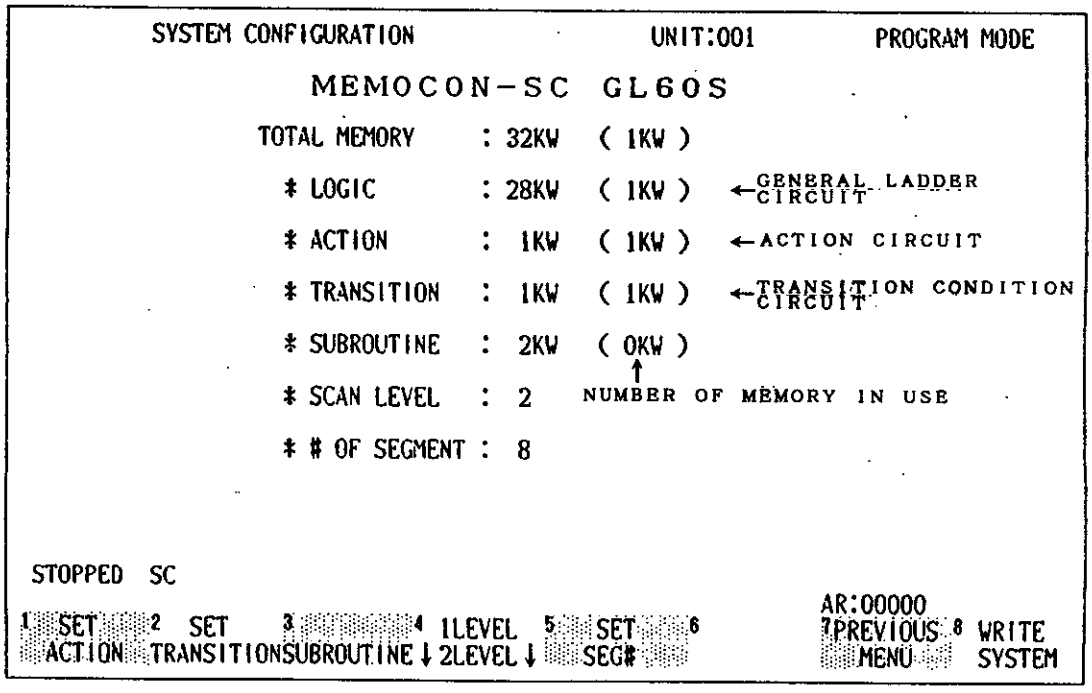


Fig. 6.111

This manual covers only a part of the procedures for transition condition circuit displaying and network circuit storing. For fundamental procedures, read the ladder circuit section of the P150 PROGRAMMING PANEL BASIC INFORMATION (SIE-C815-14.2).

6.3.1 Transition Condition Circuit Display

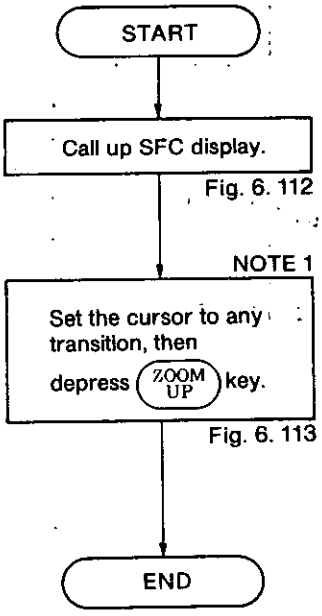
Transition condition circuits can be displayed by either of two methods; setting the cursor to a desired transition in an SFC flow and depressing (ZOOM UP) key, or entering a desired transition number and depressing [ERASE / GET] key.

(1) ZOOM DISPLAY

Transition condition circuits are displayed by setting the cursor to a desired transition in an SFC and depressing (ZOOM UP) key.

POINT

• The cursor must be set to the desired step.



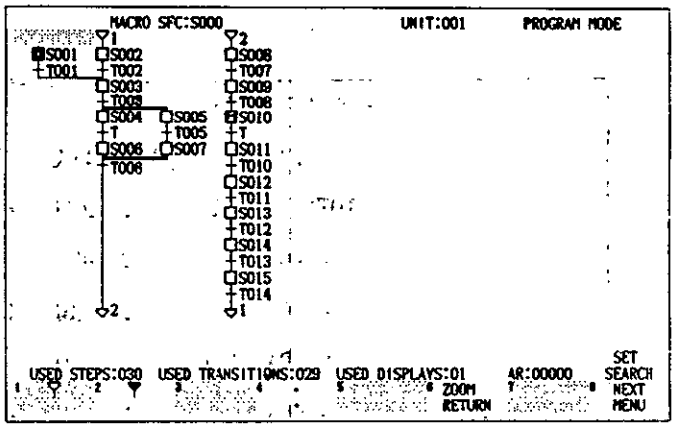


Fig. 6. 112

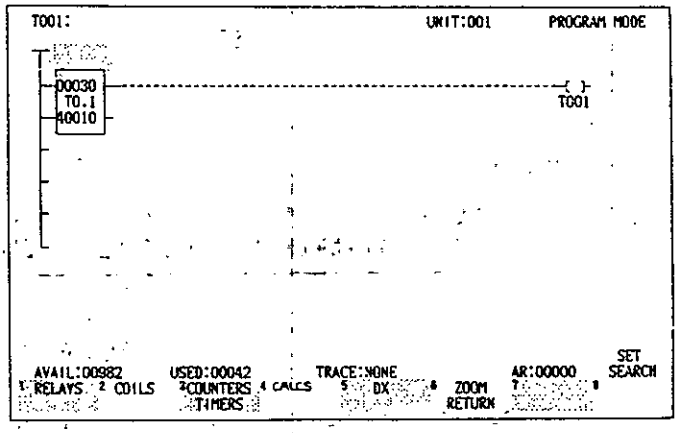


Fig. 6. 113

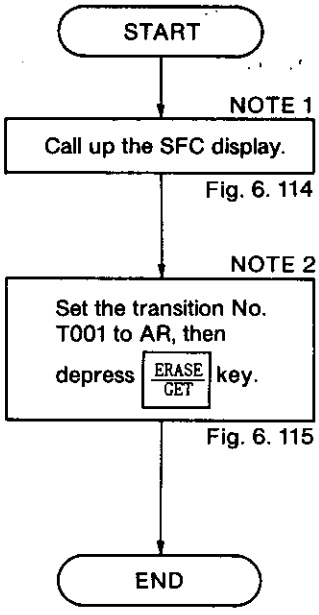
NOTE

1. If no circuit is stored in the memory, the screen for storing the transition circuit appears.
2. To return to the SFC screen from the display of Fig. 6.113, depress (ZOOM RETURN) keys.
3. Dummy transitions (⊣⊢) do not have a transition condition circuit.

(2) NUMBER ENTRY DISPLAY

Transition condition circuits are displayed by entering a desired transition number in an SFC and depressing [ERASE / GET] key.

POINT • The cursor must be set in SFC area.



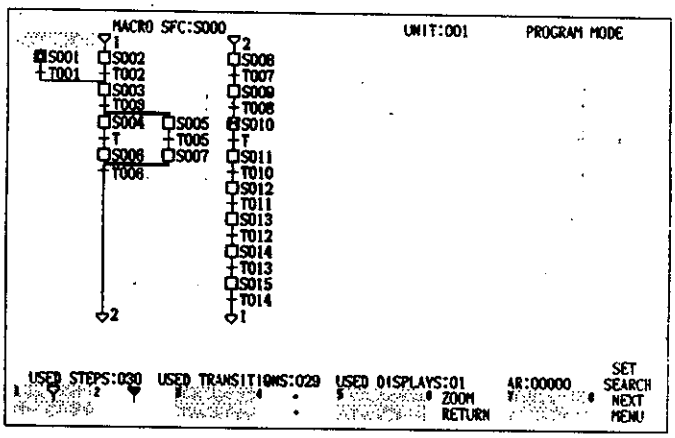


Fig. 6. 114

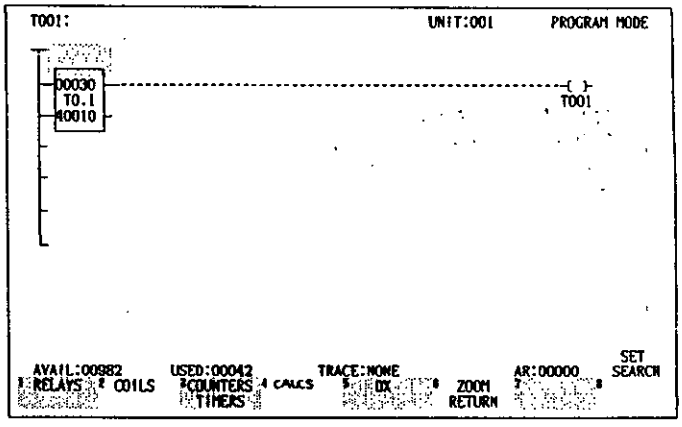


Fig. 6. 115

NOTE

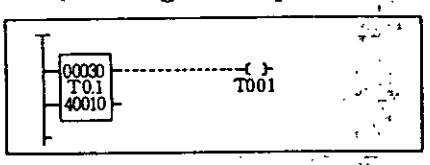
1. The general network screen for ladder circuits may be used for this purpose.
2. If no circuit is stored in the memory, the screen for storing the transition circuit appears.
3. To return to the SFC screen from the display of Fig. 6.115, enter S000 at AR and depress [ERASE / GET] key to recover the master view. To recover the expanded view, enter the step number of the expanded view at AR and depress [ERASE / GET] key. The zoom function (depressing (ZOOM RETURN) key is also available for the return.

6.3.2 Network Storing

The networks of transition condition circuits are stored in the same way as for the general networks of ladder diagrams. The only difference is the way in which the zoom function is operated on the transition condition circuit display.

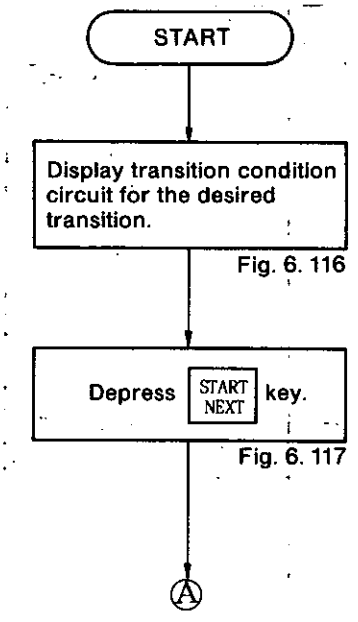
(1) NETWORK STORING

(Storing example)



POINT

- The cursor must be set in logic area.
- The GL60S memory protect switch must be set to OFF.



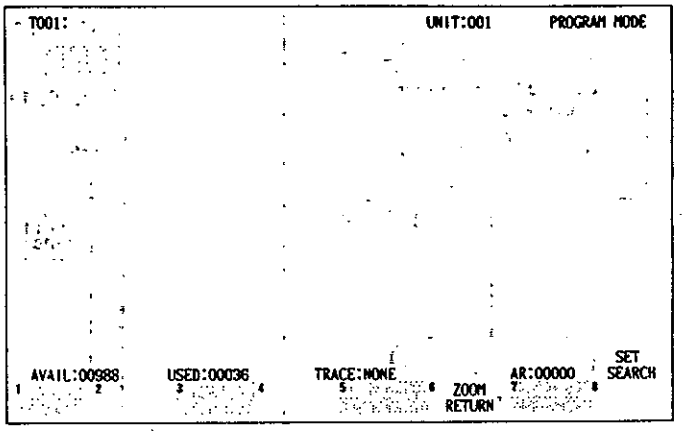


Fig. 6. 116

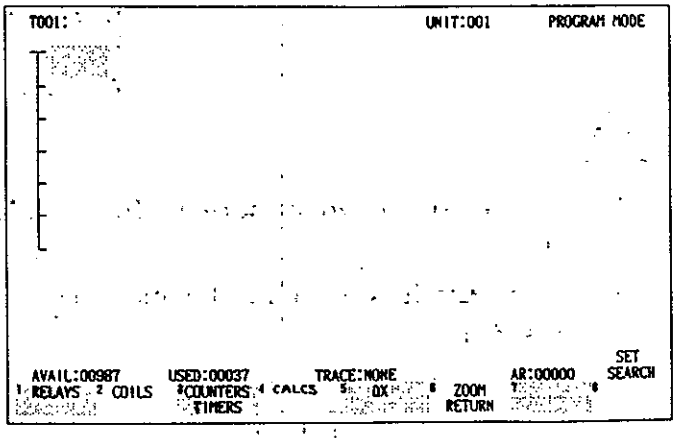
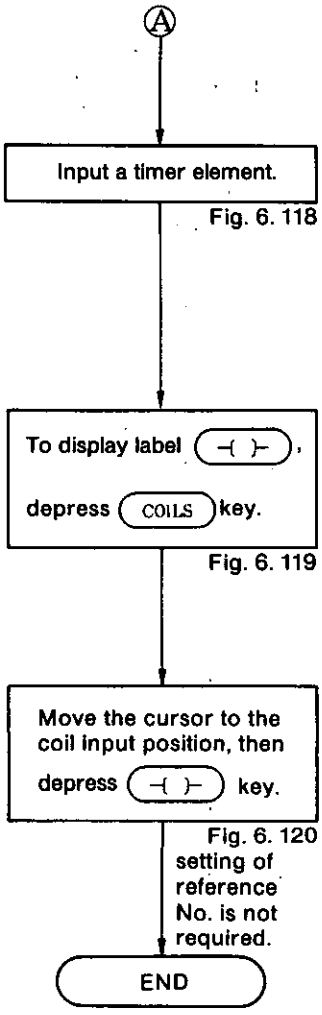


Fig. 6. 117



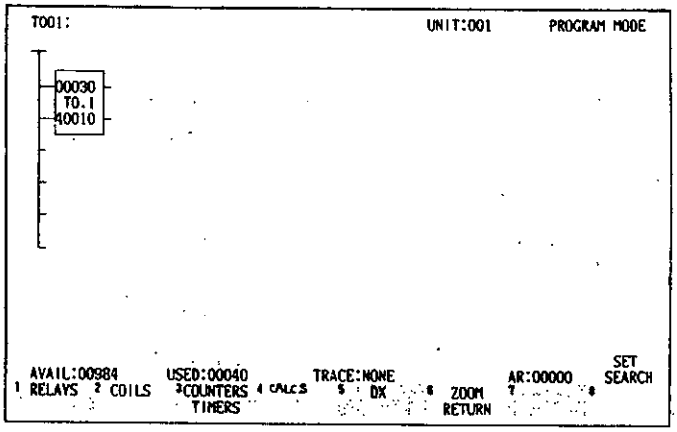


Fig. 6. 118

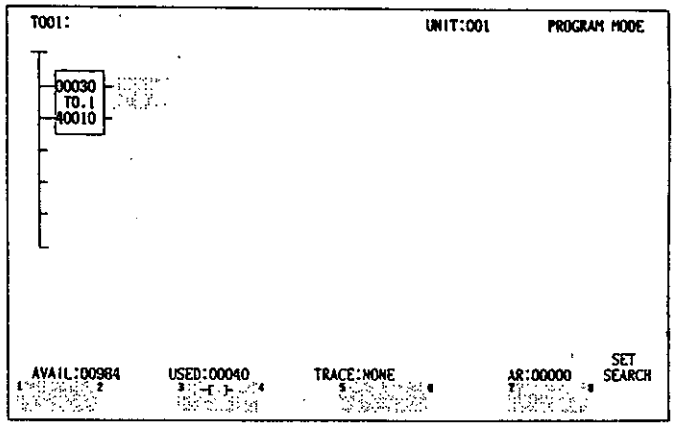


Fig. 6. 119

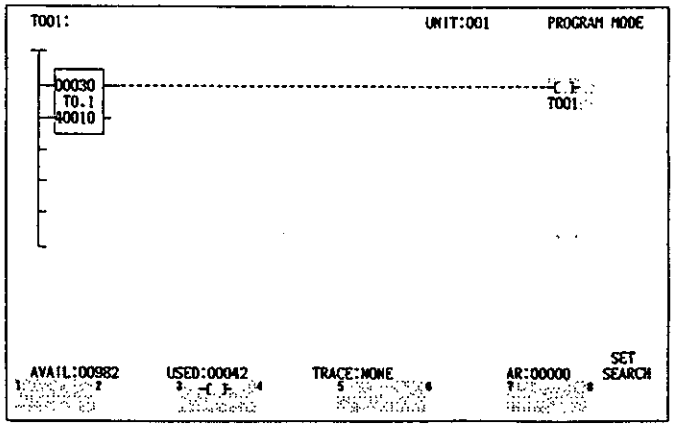


Fig. 6. 120

NOTE

1. When a transition coil is entered, a reference number need not be entered. Reference numbers are fixed for the corresponding transitions.
2. The general coils: -[ ]- or -[L]- cannot be entered.
3. Transition condition circuits are necessary for the transitions used in the SFC flow. Be sure to enter transition coils even if transition condition circuits may not be necessary.
4. A search will not be limited to the range of transition condition circuits, but it will cover the whole range including action circuits and ladder circuits.
5. Once a transition coil is solved in a transition condition circuit, this prevents solving of the elements in the columns to the right of the transition coil and in the lines under the transition coil. Refer to Fig. 6.121.

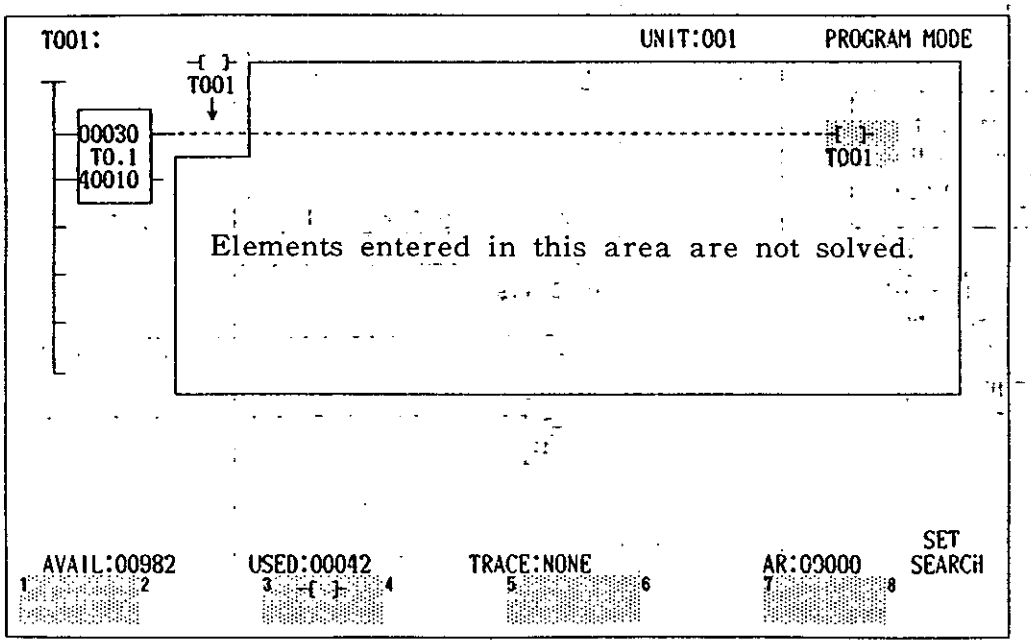


Fig. 6.121

7 MESSAGES

7.1 OPERATION ERROR MESSAGES

Table 7.1 Error Messages for Operation

Error Message	Description	Action
# OF COIL MUST BE MULTIPLES OF 16	The first reference number or the number of references in the discrete for the high speed station allocation is invalid.	A reference number must be multiple of 16 plus 1, and the number of references must be multiple of 16.
# OF COIL MUST BE MULTIPLES OF 8	The first reference number or the number of references in the discrete for the I/O allocation is invalid.	A reference number must be multiple of 8 plus 1, and the number of references must be multiple of 8.
* * CAUTION: REFERENCE MULTIPLY IN TRAFFIC COP * *	The reference number already exists.	If the number may be set, depress (PROCEED) key ; if not, select another number.
ADDRESS LIMIT	The reference number, the number of references, or the size exceeds the limit.	Select a valid number.
ANOTHER SC SAVED FILE	In load or verify operation, the file type is wrong.	Depress [CLR AR / CLR ERR] key.
AR NOT DECIMAL	Data format is not of decimal type.	Enter decimal data.
CAN NOT COPY SYSTEM DISK	The system disk was inserted in drive B, and (FILE COPY) key was depressed.	Insert a disk in drive B.
CAN NOT CREATE FILE	In save operation, a file creation error occurred.	Perfom a disk check operation. Change the data disk.
CAN NOT DELETE SYSTEM FILE	The system disk was inserted in drive B, and (DELETE) key was depressed.	Insert a data in drive B.
CAN NOT DELETE	In delete operation, "COMMAND. COM" was selected.	Select a correct file.
CAN NOT DISPLAY SYSTEM FILE	The system disk was inserted in drive B, and (DIRECTORY) key was depressed.	Insert a data disk in drive B.
CAN NOT LOGIN-UNIT HAS PROGRAMMER ATTACHED	Only one programming panel may be attached to a GL60S at a time in write mode.	Attach one programming panel in monitor mode.
CAN NOT READ DISK	In load or verify operation, a disk data read error occurred.	Depress [CLR AR / CLR ERR] key.
CAN NOT RENAME SYSTEM FILE	The system disk was inserted in drive B, and the (RENAME) key was depressed.	Insert a data disk in drive B.
CAN NOT RENAME	The "COMMAND. COM" file cannot be renamed.	Select a correct file.
CAN NOT USED THE DISK	An unfomatted disk was inserted in drive B, and a disk or a file operation other than formatting was attempted.	Insert a correct disk.
CAN NOT WRITE TO DISK	In save operation, a disk data write error occurred.	Depress [CLR AR / CLR ERR] key.
COIL NOT ALLOWED HERE	A coil cannot be placed on the left side of another element.	Place the coil in the correct position.

Table 7.1 Error Messages for Operation (Cont'd)

Error Message	Description	Action
COIL NOT DISABLED	The (FORCE ON) or (FORCE OFF) key was depressed when the coil had not been disabled.	Disable the coil.
COIL NOT IN A NETWORK	The requested coil has not yet been used.	Depress [CLR AR / CLR ERR] key.
COIL USED	The requested coil has already been programmed.	Change the reference number of the coil.
COMPRESS NOT ALLOWED DUE TO LINE #8	Line compression was attempted when the cursor was on line 8 (line 8S or 8T) of the SFC screen.	Depress [CLR AR / CLR ERR] key.
COMPRESS NOT ALLOWED DUE TO COLUMN #8	Column compression was attempted when the cursor was in column 8 of the SFC screen.	Depress [CLR AR / CLRERR] key.
COMPRESS NOT ALLOWED DUE TO ROW #7	Horizontal compression was attempted when the cursor was on line 7 of the network screen.	Depress [CLR AR / CLR ERR] key.
CONTROLLER RUNNING LOAD NOT ALLOWED	An attempt to load save data was made when the GL60S was running.	Stop the GL60S and try again.
CONTROLLER RUNNING	The attempted action is not allowed when the controller is running.	Stop the controller and try again.
DISK NOT INSERTED OR DISK ERROR	The disk is not in the drive, or is defective.	Insert or change the disk.
DISK WRITE PROTECTED	A file operation or save operation was attempted to the write-protected data disk.	Make the disk write-permitted.
DUMMY TRANSITION NOT ALLOWED TO COPY	Copying a line is not allowed when the line where the cursor is positioned contains only a dummy transition condition (+) on the SFC screen.	Depress [CLR AR / CLR ERR] key.
DUMMY TRANSITION NOT ALLOWED TO MOVE	Moving a dummy transition condition is not allowed when the cursor is positioned at it on the SFC screen.	Depress [CLR AR / CLR ERR] key.
END OF LOGIC MEMORY	[PREV GET NEXT] key was depressed when the last network was displayed on the screen.	Depress [CLR AR / CLR ERR] key.
EXIST ACTION LADDER	A macro step cannot be stored in the area with the specified step number because the area already contains an ACTION circuit.	Change the step number.
EXIST MACRO SFC	A step or an initial step cannot be stored in the area with the specified step number because the area already contains an expanded view.	Change the step number.
EXPAND NOT ALLOWED DUE TO COLUMN # 8	Column expansion was attempted when the cursor was in column 8 on the SFC screen.	Depress [CLR AR / CLR ERR] key.
EXPAND NOT ALLOWED DUE TO LINE # 8	Line expansion was attempted when the cursor was on line 8 (line 8S or 8T) of the SFC screen.	Depress [CLR AR / CLR ERR] key.

Table 7.1 Error Messages for Operation (Cont'd)

Error Message	Description	Action
FILE ALREADY EXIST. OVERWRITE OK ?	An attempt was made to save the file whose file name already exists on the data disk.	Depress (COMMENCE) or (CANCEL) key.
FILE NOT FOUND	In load or verify operation, a file name which does not exist was specified.	Enter a correct file name.
FROM USED	On the SFC screen, an attempt was made to store a connector with the duplicate number.	Change the connector number.
FUNCTION NOT ALLOWED	A wrong function key was depressed.	Depress a correct key.
GOSUB NOT USED	An attempt was made to perform ZOOM RETURN from the subroutine circuit when the "GOSUB" had not been stored.	Depress [CLR AR / CLR ERR] key.
I/O ALLOCATION FULL	The number of I/O allocation points for the discrete I/O modules exceeded 4096, or the points for the register input and output modules exceeded 512.	Reallocation is required.
I/O SLOT FULL	The number of slots for the discrete I/O module, or that for register I/O module exceeded 256.	Reallocation is required.
ILLEGAL CHANNEL NUMBER	To display the I/O allocation, a number other than 1, 2 or 3 was set to AR, and (SELECT CHANNEL) was depressed.	Set a correct channel number.
ILLEGAL LINE	Copying or moving to the line is not allowed.	Depress [CLR AR / CLR ERR] key.
ILLEGAL POINTS	In I/O allocation, the number of points per slot exceeds 129, and in high speed station allocation, the number of points per station exceeds 4097.	Change the number of points.
ILLEGAL PORT PARAMETER	The port parameter setting is wrong (baud rate, device, address or delay).	Change the parameter setting.
ILLEGAL RACK NUMBER	When the I/O allocation was to be displayed, an illegal rack number was specified before (SELEDT RACR) key was depressed.	Set a correct rack number.
ILLEGAL SEGMENT NUMBER	When the number of segments was to be set, or when the segment boundaries were to be displayed, an illegal number (other than a number in the range of 1 to 8) was set before (SET SEG#) or (SELECT SEGMENT) key was depressed.	Set a correct number.
ILLEGAL SIZE	The size of the LADDER area must be greater than that of the USED area.	Depress [CLR AR / CLR ERR] key.
ILLEGAL STATION NUMBER	When the I/O allocation was to be displayed, an illegal station number was set before (SELECT STATION) key was depressed.	Set a correct station number.
ILLEGAL STEP NUMBER	When the mode step elasped time was to be displayed, an illegal step number(other than a number in the range of S001 to S512) was set before (SELECT STEP#) key was depressed.	Set a correct step number.
ILLEGAL STEP OR REGISTER NUMBER	When the mode was to be reset or preset, illegal step number or register number was set before (SET STEP/REG#) key was depressed.	Set a correct step or register number.
INITIAL STEP NOT ALLOWED EXCEPT S000	An attempt was made to store an initial step in an expanded view.	Depress [CLR AR / CLR ERR] key.

Table 7.1 Error Messages for Operation (Cont'd)

Error Message	Description	Action
INITIAL STEP USED	The initial step is already in use.	Depress CLR AR / CLR ERR key.
INVALID DATA	Decimal data exceeding 9999 or hexadecimal data exceeding FFFF cannot be stored in the register.	Change the value.
INVALID DATE	In load operation, an attempt was made to enter a date in the wrong format.	Enter the date correctly.
INVALID FILE NAME	The specified file name does not exist on the disk or cannot be used.	Change the file name.
INVAID MENU NO.	An invalid menu number was entered.	Reenter a valid menu number (1; 2, or 3).
INVALID NETWORK NUMBER	A non-existing network number was specified for move segment operation.	Depress CLR AR / CLR ERR key.
INVALID REFERENCE NUMBER	The specified reference number is out of range.	Change the number.
INVALID REPLACEMENT	Alteration of an element, as from timer to ADD, is not allowed.	Depress CLR AR / CLR ERR key.
INVALID UNIT NUMBER	An invalid unit number was set and an attach operation was performed.	Select a number in the range of 1 to 247.
LAST NETWORK IN SEGMENT X	The number of segments must not less than m because segment m contains a network.	Depress CLR AR / CLR ERR key.
LIMIT OF INPUT ASSIGNMENT	Input allocation exceeds the limit.	Reallocate the input modules.
LIMIT OF OUTPUT ASSIGNMENT	Output allocation exceeds the limit.	Reallocate the output modules.
MACRO ENTRY NOT ALLOWED TO COPY	An attempt to copy a macro entry was made.	Depress CLR AR / CLR ERR key.
MEMORY PROTECT ON	The memory size cannot be altered when the IOP. COM memory protect switch is on.	Turn off the memory protect switch.
MISCOMPARE IN PROGRAM AREA	A verify error was detected in the program area.	Retry the operation from the first step.
MISCOMPARE IN SYSTEM AREA	A verify error was detected in the system area.	Retry the operation from the first step.
MISCOMPARE IN TRAFFIC COP AREA	A verify error was detected in the T-COP area.	Retry the operation from the first step.
MISCOMPARE PROGRAM SIZE	The size of the file being verified is inconsistent with that of SC program memory.	Depress CLR AR / CLR ERR key.

Table 7.1 Error Messages for Operation (Cont'd)

Error Message	Description	Action
MISCOMPARE SAVE DATA SIZE	The size of the saved data is inconsistent with that of SC memory.	Depress CLR AR / CLR ERR key.
MOVE NOT ALLOWED DUE TO COLUMN # 8	Branches or loops cannot be moved to column 8 on the SFC screen.	Depress CLR AR / CLR ERR key.
NETWORK NOT FOUND HIGHEST # : XXXXX	A non-existing network number was set.	Set a correct network number.
NO AVAIL MEMORY	There is not enough space to store the element.	Depress CLR AR / CLR ERR key.
NO CONDITION DATA	An attempt to perform a trace back operation was made without setting conditions.	Set the conditions.
NO ELEMENT AT CURSOR COLUMN	Copying a column is not allowed when no element is in the column where the cursor positioned.	Depress CLR AR / CLR ERR key.
NO ELEMENT AT CURSOR LINE	Copying a line is not allowed when no element is on the line where the cursor is positioned.	Depress CLR AR / CLR ERR key.
NO ELEMENT AT CURSOR	An operation such as deletion cannot be performed when there is no element at the cursor position.	Depress CLR AR / CLR ERR key.
NO ELEMENT TO COMPRESS	When editing the SFCs or networks, compression is not allowed if there is no element on the lines or in the columns subsequent to the cursor.	Depress CLR AR / CLR ERR key.
NO ELEMENT TO EXPAND	When editing the SFCs, expansion is not allowed if there is no element on the lines or in the columns subsequent to the cursor.	Depress CLR AR / CLR ERR key.
NO EMPTY SPACE	When there is no available space in the reference area, tracing was attempted by moving the cursor to the register position. Or when there is on available space in the comment area on the SFC screen, tracing was attempted by moving the cursor to the step position.	Depress CLR AR / CLR ERR key.
NO NETWORK IN THE CONTROLLER	ERASE GET or PREV GET NEXT key was depressed when no network was stored in ladder area of the GL60S.	Depress CLR AR / CLR ERR key.
NO NETWORK ON SCREEN	Deleting a network cannot be performed when no network is displayed.	Depress CLR AR / CLR ERR key.
NO SEARCH PARAMETERS	A search operation was attempted without setting the search parameters.	Set the search parameters.
NO SYSTEM DISK	The system disk is not in drive A.	Insert the system disk in drive A.
NOT ALLOWED DUE TO COIL	An element or a vertical shunt cannot be stored on the break line for the coil.	Depress CLR AR / CLR ERR key.
NOT ATTACHED TO THE CONTROLLER	The attempted operation must be performed after an attach operation.	Perform an attach operation.
NOT COMMENT FILE	In load or verify operation, the specified file is not the comment file.	Select a correct file.

Table 7.1 Error Messages for Operation (Cont'd)

Error Message	Description	Action
NOT CPU FILE	In load or verify operation, the specified file is not for the CPU.	Select a correct file.
NOT DATA IN THE DISK (ACTION)	In load or verify operation, data in the area indicated by parentheses does not exist in the disk file.	Retry the operation.
NOT DATA IN THE DISK (LADDER)	In load or verify operation, data in the area indicated by parentheses does not exist in the disk file.	Retry the operation.
NOT DATA IN THE DISK (SFC TABLE)	In load or verify operation, data in the area indicated by parentheses does not exist in the disk file.	Retry the operation.
NOT DATA IN THE DISK (SUBROUTINE)	In load or verify operation, data in the area indicated by parentheses does not exist in the disk file.	Retry the operation.
NOT DATA IN THE DISK (TOTAL SUM)	In load or verify operation, data in the area indicated by parentheses does not exist in the disk file.	Retry the operation.
NOT DATA IN THE DISK (TRANSITION)	In load or verify operation, data in the area indicated by parentheses does not exist in the disk file.	Retry the operation.
NOT DATA IN THE DISK (ENTRY TABLE)	In load or verify operation, data in the area indicated by parentheses does not exist in the disk file.	Retry the operation.
NOT DATA IN THE DISK (EXPAND DATA)	In load or verify operation, data in the area indicated by parentheses does not exist in the disk file.	Retry the operation.
NOT DATA IN THE DISK (TRACE BACK)	In load or verify operation, data in the area indicated by parentheses does not exist in the disk file.	Retry the operation.
NOT DATA IN THE DISK (USER STATUS)	In load or verify operation, data in the area indicated by parentheses does not exist in the disk file.	Retry the operation.
NOT DATA IN THE DISK (CONFIGURATION)	In load or verify operation, data in the area indicated by parentheses does not exist in the disk file.	Retry the operation.
NOT DATA IN THE DISK (MACHINE TABLE)	In load or verify operation, data in the area indicated by parentheses does not exist in the disk file.	Retry the operation.
NOT DATA IN THE DISK (SYSTEM STATUS)	In load or verify operation, data in the area indicated by parentheses does not exist in the disk file.	Retry the operation.
NOT DATA IN THE DISK (EXPAND COMMENT)	In load or verify operation, data in the area indicated by parentheses does not exist in the disk file.	Retry the operation.
NOT ENOUGH MEMORY	There is not enough space on the data disk to save or copy data.	Use a new data disk.
NOT ENOUGH ROOM TO COMPRESS	There is not enough space for a compression operation.	Depress CLR AR / CLR ERR key.
NOT ENOUGH ROOM TO COPY	There is not enough space for copying data.	Depress CLR AR / CLR ERR key.

Table 7.1 Error Messages for Operation (Cont'd)

Error Message	Description	Action
NOT ENOUGH ROOM TO EXPAND	There is not enough space for an expansion operation.	Depress CLR AR / CLR ERR key.
NOT ENOUGH ROOM TO MOVE	There is not enough space for moving an SFC.	Depress CLR AR / CLR ERR key.
NOT EXPAND DATA FILE	In load or verify operation, the specified file is not for the EXPAND DATA.	Select a correct file.
NOT IN PROGRAM MODE	Program alteration cannot be performed in the monitor mode.	Select the program mode.
NOT SAVED FILE	The specified file was not saved by the loader.	Depress CLR AR / CLR ERR key.
ONLY DECIMAL OR HEXADEDIMAL CHARACTERS ALLOWED IN AR	A character other than 0 to 9, A to F, S, T or R was set to AR.	Depress CLR AR / CLR ERR key.
PROGRAMMING GOING ON	The network cannot be displayed in the monitor mode.	Retry the operation from the first step.
REF # NOT SET UP	When setting the trace back parameters, ON or OFF cannot be set without setting a reference number.	Set a reference number.
REFERENCE ON ALTERNATE SCREEN	Tracing was performed when the input relay or the status of the register was displayed at the cursor position in the expanding reference area.	Display the expanding reference area.
SC NOT CONNECTED OR POWER OFF	The SC is not connected to the GL60S, or an attach operation was attemoted when the power to the GL60S was not on.	Connect to the GL60S, or turn on the GL60S.
SC SAMPLING BUSY	The waveform cannot be displayed when the trace back conditions have not yet been established.	Depress CLR AR / CLR ERR key.
SEARCH FAILED	The searched parameter is not found.	Depress CLR AR / CLR ERR key.
SFC FLOW ERROR	When an SFC was stored, an unallowable connection was attempted.	Connect correctly.
SFC MEMORY FULL	A new expanded view cannot be created exceeding 64 displays.	Depress CLR AR / CLR ERR key.
SPECIFY CH # OR ST #	In high speed station allocation, (PREVIOVS MENU) key was depressed when the channel or station number has not yet been set.	Set the channel or station number.
SPECIFY POINTS OR SIZE PARAMETER	In allocation, (PREVIOVS MENU) was depressed when the number of points or the size has not been set.	Set the number of points or the size.
SPECIFY REF # PARAMETER	In allocation, the number of points or the size cannot be set prior to the reference number.	Set the reference number.

Table 7.1 Error Messages for Operation (Cont'd)

Error Message	Description	Action
SPECIFY STATUS OR STEP/REGISTER NO PARAMETER	When resetting or presetting the mode, (PREVIOUS MENU) key was depressed without setting the step number or the register number.	Set the step number or the register number.
SPECIFY TIME IN MULTIPLES OF 10	A multiple of 10 must be set for the constant sweep time.	Change the value to a multiple of 10.
SPECIFY TIME PARAMETER	(COMMENCE) key was depressed without setting the constant sweep time.	Set the time.
START OF LOGIC MEMORY	SHIFT and PREV GET NEXT keys were depressed when the first network was displayed.	Depress CLR AR / CLR ERR key.
STEP ACTIVE	On the SFC screen, attempt to delete or move an active step was made.	Depress CLR AR / CLR ERR key.
STEP HOLD	Steps in the hold cannot be disabled.	Cancel the hold mode.
STEP DISABLED	The mode of the steps cannot be changed from the disable mode to the hold mode without cancelling the disable mode.	Cancel the disable mode.
STEP NOT USED	When the step had not been stored, a zoom return from the action circuit was attempted.	Depress CLR AR / CLR ERR key.
STEP USED	The specified step number is already in use.	Specify another step number.
TIMEOUT ERROR-PRINTER	Communication time ran out when date was being output to a printer.	Depress CLR AR / CLR ERR key.
TRACE STACK EMPTY	Retracing was performed when the status display for TRACE was "NONE".	Depress CLR AR / CLR ERR key.
TRANSITION NOT USED	When the transition condition had not been stored, a zoom return from the transition circuit was attempted.	Depress CLR AR / CLR ERR key.
TRANSITION USED	The specified transition condition number is alerady in use.	Change the transition condition number.
VERTICAL NOT ALLOWED IN THIS ROW	A vertical shunt cannot be stored on line 7.	Depress CLR AR / CLR ERR key.

7. 2 MESSAGE ERROR

Message	Message	Message
ATTACHING	SC ALL COMMENT MEMORY CLEAR REQUESTED	VERIFY REQUESTED
CONSTANT SWEEP CANCEL	SC ALL DATA MEMORY CLEAR REQUESTED	XXXXX MISCOMPARE : VERIFY COMPLETE
CONSTANT SWEEP INVOKED	SC ALL SFC MEMORY CLEAR REQUESTED	DELETE XXX-XX
CONSTANT TIME : XXXXX	SC ALL TRAFFIC COP MEMORY CLEAR REQUESTED	RENAME XXX-XX TO ( )
DISCRETE XXXXX DISABLED (NOT USED)	SC ASCII T-COP MEMORY CLEAR REQUESTED	COPY XXX-XX TO DRIVE A :
DISCRETE XXXXX DISABLED (USED)	SC CONSTANT REGISTER DATA MEMORY CLEAR REQUESTED	NO OTHER COIL DISABLED
DISCRETE XXXXX DISABLED	SC HOLD REGISTER DATA MEMORY CLEAR REQUESTED	
DISKCOPY REQUESTED	SC I/O T-COP MEMORY CLEAR REQUESTED	
FD DATA SIZE (XXXXX) W BIGGER THAN SC' S	SC LADDER MEMORY CLEAR REQUESTED	
FD DATA SIZE (XXXXX) W SMALLER THAN SC' S	SC MODE MEMORY CLEAR REQUESTED	
LOAD COMPLETE	SC SFC COMMENT MEMORY CLEAR REQUESTED	
LOAD REQUESTED	SC SFC GRAPH MEMORY CLEAR REQUESTED	
POWER DISPLAY INVALID-NETWORK SKIPPED	SC H SPEED ST T-COP MEMORY CLEAR REQUESTED	
READING HOLD	SC SUBROUTINE MEMORY CLEAR REQUESTED	
READING DISABLE	SC TRANSITION MEMORY CLEAR REQUESTED	
READING ACTIVE	SEARCHING	
READING TIME CHART	SEGMENT BOUNDARY CROSSED	
READING ACTION	SINGLE SWEEP TRIGGERED	
READING TRANSITION	STEP SXXX DISABLED (NOT USED)	
READING TRAFFIC COP	STEP SXXX DISABLED (USED)	
RUNNING SC	STEP SXXX HOLD (NOT USED)	
SAVE COMPLETE	STEP SXXX HOLD (USED)	
SAVE REQUESTED	STOPPED SC	
SC START REQUESTED	SYSTEM CONFIGURATION WRITTEN	
SC STOP REQUESTED	TRACE BACK COMPLETE	
SC ACTION MEMORY CLEAR REQUESTED	VERIFY COMPLETE	

7.3 SYSTEM ERROR MESSAGE

Error Message	Description	Action
CRC FAILURE	An error was found in the data received from the GL60S. (CRC check error)	Retry the operation from the first step.
INVALID ADDRESS	An error was found in the data received from the GL60S. A wrong floppy disk was used.	Retry the operation from the first step. Use the floppy disk for the GL60S.
INVALID CHARACTER	An error was found in the data received from the GL60S. A wrong floppy disk was used.	Retry the operation from the first step. Use the floppy disk for the GL60S.
INVALID COMMAND	An error was found in the data received from the GL60S. A wrong floppy disk was used.	Retry the operation from the first step. Use the floppy disk for the GL60S.
INVALID NODE	An error was found in the data received from the GL60S. A wrong floppy disk was used.	Retry the operation from the first step. Use the floppy disk for the GL60S.
INVALID PAGE	An error was found in the data received from the GL60S. A wrong floppy disk was used.	Retry the operation from the first step. Use the floppy disk for the GL60S.
INVALID PARAMETER	An error was found in the data received from the GL60S. A wrong floppy disk was used.	Retry the operation from the first step. Use the floppy disk for the GL60S.
INVALID RANGE	An error was found in the data received from the GL60S. A wrong floppy disk was used.	Retry the operation from the first step. Use the floppy disk for the GL60S.
INVALID TYPE	An error was found in the data received from the GL60S. A wrong floppy disk was used.	Retry the operation from the first step. Use the floppy disk for the GL60S.
NO END OF LOGIC MEMORY	Data indicating the end of the program (EOL) does not exist.	Refer to the user's manual.
P150 UART STATUS ERROR	An error was found in the data received by the P150. (This error may be caused by external noise.)	Retry the operation from the first step. (Keep the device away from the source of the noise.)
SC CRC FAILURE	The P150 received a response from the GL60S that an error was found in the received data. (This error may be caused by external noise.)	Retry the operation from the first step.
SC UART STATUS ERROR	The P150 received a response from the GL60S that an error was found in the received data. (This error may be caused by external noise.)	Retry the operation from the first step.
STOPPED SC SYSTEM ERROR : XXX-XXX	Displays the GL60S stop status in hexadecimal notation.	Refer to the user' s manual.
TIMEOUT ERROR-COMMUNICATIONS DOWN	This message is displayed when the P150 does not receive a response after transmitting a signal to the GL60S.	Check the parameters (P150 and GL60S) and cables. Check the GL60S by turning the power swith ON and OFF and then ON again.
FATAL I/O ERROR MUST INITIALIZE RESET SEQUENCE	Another operation was performed after an error occurred during data communication with the GL60S.	Retry the operation from the first step.
COM FATAL ERROR	The P150 received a response from the GL60S that an error was found in the received data.	Retry the operation from the first step.

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