MITSUBISHI

PROGRAMMABLE CONTROLLER

MELSEC-K

Instruction Manual

GP-80 Memory Cassette for MELSEC-K
type K6MC16E

MITSUBISHI ELECTRIC

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1. GENERAL DESCRIPTION

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1. GENERAL DESCRIPTION

Type K6MC16E memory cassette (hereinafter referred to as "K6MC16E") has been developed to load into Mitsubishi handy graphic programming panel (GP-80) and use for K series programmable controllers.

The operating method is substanitially the same as that of K8GPPE. However, when the audio cassette or printer is used, the operating method is different from that of K8GPPE. In this case, therefore, see Section 13 and 14.

This instruction manual describes the loading procedure of K6MC16E into the GP-80, and the functions and operating procedures when the K6MC16E is loaded into the GP-80.

In the instruction manual, the GP-80 loaded with K6MC16E is referred to as GP-80.

2. SYSTEM CONFIGURATION

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2. SYSTEM CONFIGURATION

2.1 Equipment List

Purchase Order Type Name	Connected Unit	Equipment		Remarks	QTY
		Description	Type Name		
K6MC16E	GP-80	Memory cassette	K6MC16E	**Memory Capacity**	1
				Sequence program / Comment	
				16000 steps / 2048 comments	
		Key sheet	K6MCAPE	Key sheet used for K series programmable controller.	1
K78CBL	GP-80 — K6HGPFE GP-80 — K3NCPU	Cable	K78CBL	Cable for connection of GP-80 and programmable controller CPU, 2m length.	1
K6HGPFE	K0CPU K0JCPU { K0J1CPU, K0J2CPU, K0J2PCPU } K2CPU { K2CPU, K2CPU-S3, K2HCPU, K2NCPU }	Interface unit	K6HGPFE	Interface unit loaded into programmable controller CPU when communication is made with programmable controller CPU. (Not required for K3NCPU and K3NCPUP2)	1
GP-80C (110 to 120VAC +10%/-15%)	K6HGPFE	Handy graphic programming panel	GP-80	Not provided with memory cassette, key sheet, power supply cable, cable and soft case.	1
GP-80B (220 to 240VAC +10%/-15%)	K3NCPU { K3NCPU, K3NCPUP2 }	Lithium battery	GP-80BAT	Battery for backup of program and comment data at the time of power failure	1
GP-80CCB	GP-80 — Audio cassette	CMT cable	GP-80CCB	Cable for connection of GP-80 and audio cassette. 0.8m length.	1
GP-80PRC	GP-80 — Printer	Power cable	GP-80PRC	Cable for connection of GP-80 and printer. 1.5m length.	1
GP-80TCB	GP-80 — K3NCPU	Transmission cable	GP-80TCB	Cable for connection of GP-80 and K3NCPUP2. 2.5m length.	1
GP-80BAT	GP-80	Lithium battery	GP-80BAT	Battery for backup of program and comment data at the time of power failure.	1
GP-80BAG	GP-80 — Power supply	Power supply	GP-80PCB	Cable for power supply, 100 to 110VAC, 50/60Hz, 2m length.	1
GP-80PCB		Soft case	GP-80BAG	Case for containing GP-80A-E and accessories.	1
115UL CBL	GP-80 ↑↓ Power Supply	Power cable (L = 2.5m)	115UL CBL	For United State and Korea	1
220VD CBL			220VD CBL	For W.Germany, Sweden, Norway, Austria	1
240UK CBL			240UK CBL	For Great Britain	1
240AU CBL			240AU CBL	For Australia	1

* Cord shape

AU cord   UL cord
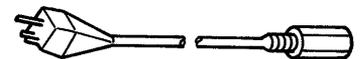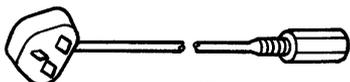
UK cord   VD cord
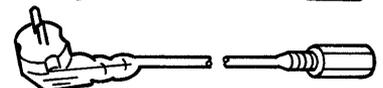
The length of each cable is 2.5m.

K6MC16E		K78CBL
K6MCA16E	K6MCAPE	
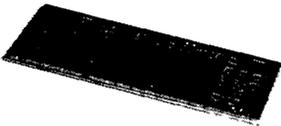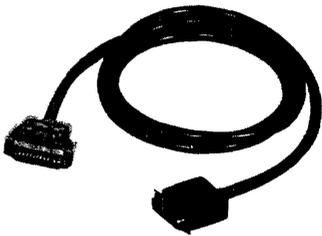
K6HGPFE	GP-80	
	GP-80	GP-80BAT
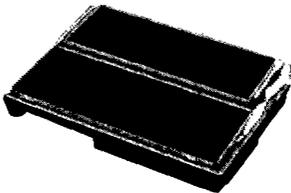
GP-80CCB	GP-80PRC	GP-80TCB

GP-80BAG

2
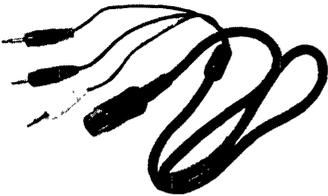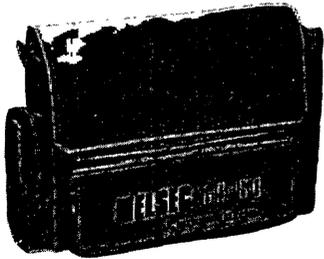
2.2 System Configuration

Connection with K3NCPU

K3NCPU

K78CBL
GP-80TCB
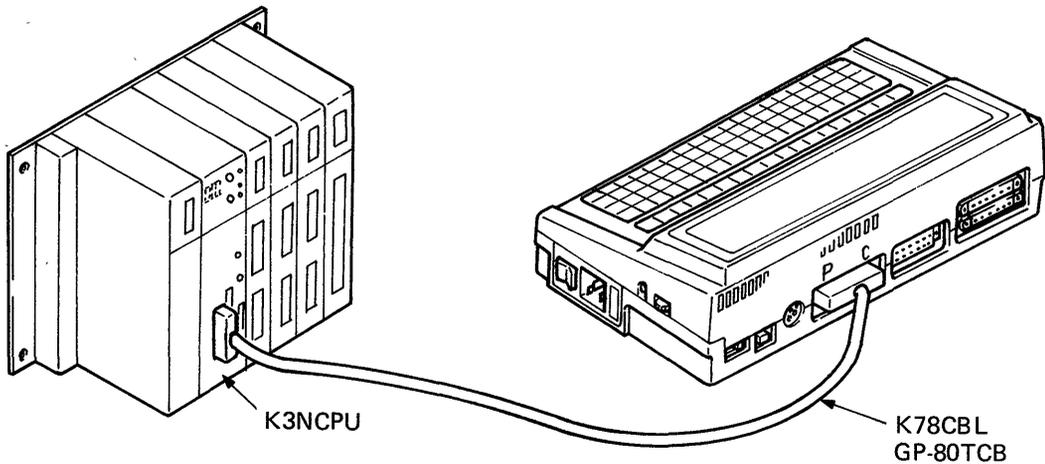
Connection with KCPU (except K3NCPU)

KCPU
(K0CPU)
(K0JCPU)
(K2CPU)
(K2NCPU)

K6HGPFE

K78CBL

Connection with printer

GP-80PRC

K6PR, K7PR, GT-10, GT-10A,
(RS-232C specifications)

Connection with audio cassette

GP-80CCB
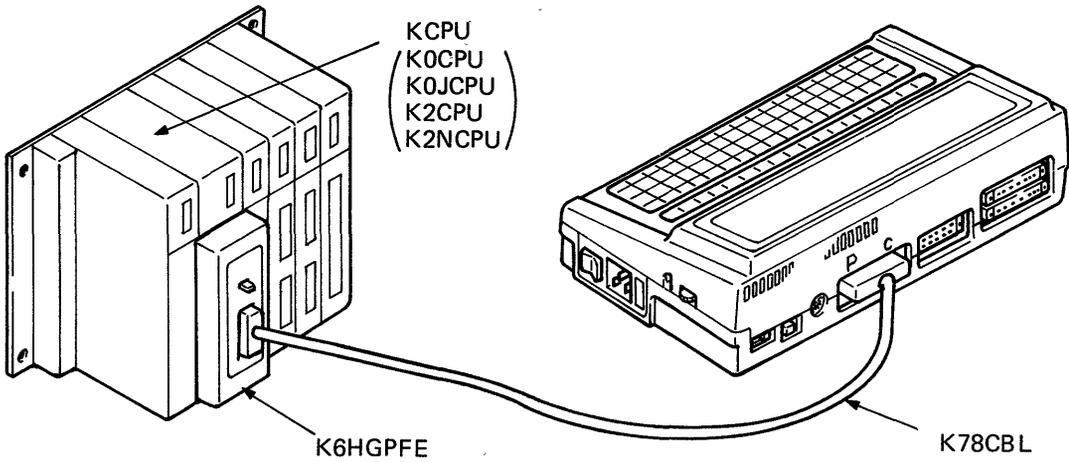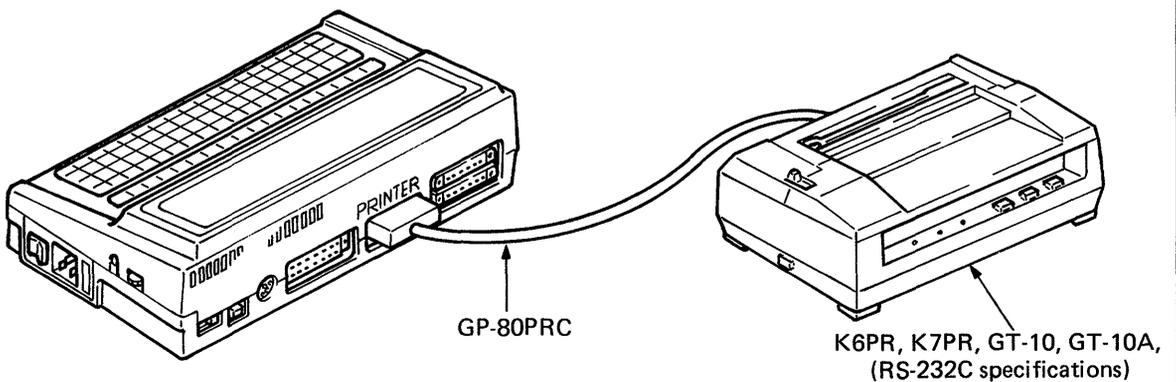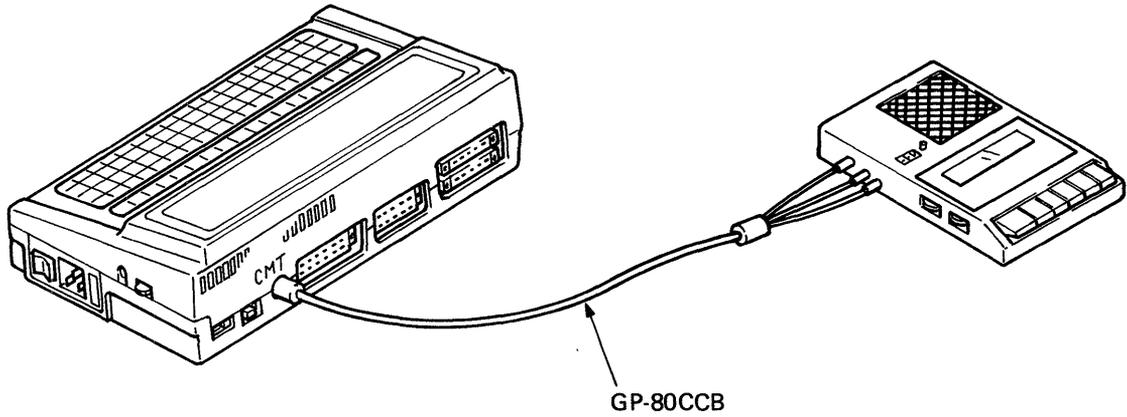
NOTE

When the GP-80F, F2, G or PM is used for K series programmable controllers, it is required to change the memory cassette to K6MCA16E and the key sheet to K6MCAPE.
(For the changing procedures, see Section 5.1.3.)

MEMO

3. SPECIFICATIONS

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3. SPECIFICATIONS

3.1 General Specifications

Item		Specifications
Power supply	GP-80C	110 to 120V AC $^{+10}_{-15}$% , 50/60Hz
	GP-80B	220 to 240V AC $^{+10}_{-15}$% , 50/60Hz
Power consumption		15VA or lower
Operating temperature		0 to 40°C
Storage temperature		−20 to 60°C
Storage humidity		10 to 90%RH (no dew condensation)
Insulation resistance		10MΩ (500V DC)
Dielectric strength		1500V AC, 1 minute
Operating ambience		There should be no corrosive gases and dust should be minimal.

3.2 Specifications of K6MCA16E and GP-80 Combination

Item		Specifications
Screen display	Standard sequence circuit	(11 contacts + 1 coil) x 7 lines
	Sequence circuit with comment	(11 contacts + 1 coil) x 3 lines (Comment is displayed in 2 lines.)
	List	14 lines
Connected unit	Programmable controller CPU	K0CPU K2CPU—⌐ K2CPU-S3 / K2HCPU / K2NCPU K0JCPU—⌐ K0J1CPU / K0J2PCPU K3NCPU—⌐ K3NCPU / K3NCPUP2
	Printer	K6PR-E, K7PR, GT-10A, general-purpose printer (RS-232C specifications)
	Audio cassete	General-purpose audio cassette
Power failure backup		4 years (when lithium battery (GP-80BAT) is connected)
External dimensions (mm)/(inch)		300/11.81(W) x 215/8.46(H) x 70/2.76(D)
Weight (kg)		2

3.3 Specifications of K6MCA16E

Item		Specifications
Memory capacity	Program memory	16,000 steps
	Comment data	2,048 comments
External dimensions (mm)/(inch)		113/4.45(W) x 66/2.60(H) x 20/0.79(D)
Weight (kg)		0.12

3.4 Specifications of Interface for GP-80 and Printer (Conforming to RS-232C)

Item	Specifications			
Connected unit	K6PRE, K7PR, GT-10A, general-purpose printer (RS-232C specifications)			
Transmission system	Conforms to EIA RS-232C.			
Transmission speed (BPS)	300, 600, 1,200, 2,400, 4,800, and 9,600 selectable			
Synchronous system	Asynchronous mode			
Mode setting	Baud rate (BPS)	Parity check	Data length and stop bit	Paper length (inch)
	300 600 1200 2400 4800 9600	None Even parity Odd parity	7 bits, 1 bit 7 bits, 2 bits 8 bits, 1 bit 8 bits, 2 bit	11 12 16

Connector specifications					
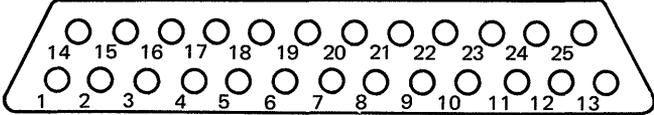
Pin No.	Symbol Abbreviation	Description		Connected Printer
				Symbol Abbreviation
1	FG	Frame ground	——	FG
2	SD	Send data		SD
3	RD	Receive data		RD
4	RTS	Request to send		DTR
5	CTS	Clear to send		DSR
7	SG	Signal ground	——	SG

3.5 Specifications of K6HGPFE

Item	Specifications
Transmission system	Conforms to EIA, RS-422.
Transmission speed	4,800 BPS
Current consumption	0.23A
Loaded model	K0CPU K0J ─── K0J1CPU / K0J2PCPU K2CPU ─── K2CPU-S3 / K2HCPU / K2NCPU
External dimensions (mm)/(inch)	88/3.46(W) x 208/8.19(H) x 33.5/1.32(D)
Weight (kg)	0.33

3.6 Specifications of Cables

3.6.1 K78CBL

Item	Specifications
Application	For connection of GP-80 and K3NCPU(P2) or K6HGPFE
Length (mm)/(inch)	2,000/78.74
Weight (kg)	0.28

3.6.2 GP-80TCB

Item	Specifications
Application	For connection of GP-80 and K3NCPU(P2)
Length (mm)/(inch)	2,500/98.43
Weight (kg)	0.4

3.6.3 GP-80PRC

Item	Specifications
Application	For connection of GP-80 and printer (RS-232C specifications)
Length (mm)/(inch)	1,500/59.06
Weight (kg)	0.4

3.6.4 GP-80CCB

Item	Specifications
Application	For connection of GP-80 and audio cassette
Length (mm)/(inch)	800/31.50
Weight (kg)	0.06

3.7 Specifications of Battery (GP-80BAT)

Item	Specifications
Rated voltage	3.4 V
Battery guarantee period	5 years
Total power failure time	Approximately 4 years
Application	For back up of program memory and comment data

MEMO

4. LIST OF FUNCTIONS

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4. LIST OF FUNCTIONS

4.1 Initial Setting

Setting	Contents	Page
Conversion of sequence program	Sequence program for K0, K0J and K2CPU is converted into sequence program for K3NCPU(P2).	36
Write during run	Write to programmable controller CPU when programmable controller CPU is running.	37
Version	Display of manufacture version and date of system ROM for K6MCA16E.	38
Operation in microcomputer mode	Write and read of microcomputer program	38

4.2 List of Functions in Various Modes

mode	Function	Contents	Page
Ladder mode	Write	Preparation of sequence program ● Preparation of new circuit ● Write by use of prepared circuit ● Rewrite of circuit	42
	Read	Display of circuit of program in memory of GP-80 ● Display of circuit by step number ● Search and circuit display by contact and coil ● Read of the last circuit by END instruction ● Read of circuit with comment	57
	Insertion	Additional insertion of circuit block or circuit symbol into existing circuit (Key operation is the same as that of write.)	64
	Deletion	Deletion of circuit block or circuit symbol from existing circuit.	66
	Conversion	Conversion of circuit, which is displayed by "write", "insertion" or "deletion" function, into program instructions.	
	Monitor (HGPFE online)	Display of programmable controller CPU operation conditions ● ON-OFF of contact and coil ● Display of temporary value of data register and timer/counter (Operation of circuit display is the same as that of read.) ● Step run in connection with K3NCPU(P2)	108

Mode	Function	Contents	Page
List mode	Write	Preparation of sequence program ● Write by instruction code of new program ● Correction of existing program	72
	Read	Display of list of program in memory of GP-80 ● Display of list by step number ● Search and list display by instruction and device number ● Search of specified contact and coil, and display of used step numbers in a list (Reference step list) ● Display of all use conditions of each I/O device (I/O use list)	73
	Insertion	Insertion of instruction code into list display (Step numbers are automatically shifted downward.)	96
	Deletion	Deletion of program from list display (Step numbers are automatically shifted upward.)	78
Comment mode	Write	Write of comment data ● Write of new comment data ● Correction of registered comment data	79
	Read	Display of comment data stored in memory of GP-80	85
KCPU mode	Write	Transfer of program or comment data from program memory or comment memory area of GP-80 to programmable controller CPU	88
	Read	Transfer of program or comment data, which are stored in programmable controller CPU, to program memory or comment data area of GP-80.	100
	Verify	Verify of contents between GP-80 and programmable controller CPU ● Verify of program between GP-80 and programmable controller CPU, and display of noncoinciding portions and the number of noncoinciding steps on the screen ● Verify of comment data between GP-80 and K3NCPU(P2)	103
	Test	Forced output of programmable controller CPU by operation keys of GP-80 ● ON-OFF of Y ● Set, reset of M, F ● Set of T, C, D Read of error code step ● Read of step number at which program error has occurred during run of programmable controller CPU	114

Mode	Function	Contents	Page
Cassette mode	Record	Recording of program or comment data in memory of GP-80 on cassette tape	122
	Replay	Replaying of program or comment data, stored in cassette tape, on GP-80.	
	Verify	Verify of program or comment data between GP-80 and cassette tape	
Printer mode		Printing of program or comment data in memory of GP-80 on printer ● Printing of circuit ● Printing of circuit with comment ● Printing of program list ● Printing of comment data ● Printing of reference step list ● Printing of I/O use list	128

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5. HANDLING

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> ### CAUTION
>
> 1. Since the case is made of plastic, do not drop or give strong shock.
>
> 2. Do not remove the printed circuit board from the case. Removal may cause board failure.
>
> 3. The memory cassette must be changed after turning off the power.
>
> 4. Never touch the connectors of memory cassette by empty hand. Touching it by empty hand may cause improper contact.

5.1 Mounting Procedures to GP-80

5.1.1 Loading of key sheet (K6MCAPE)
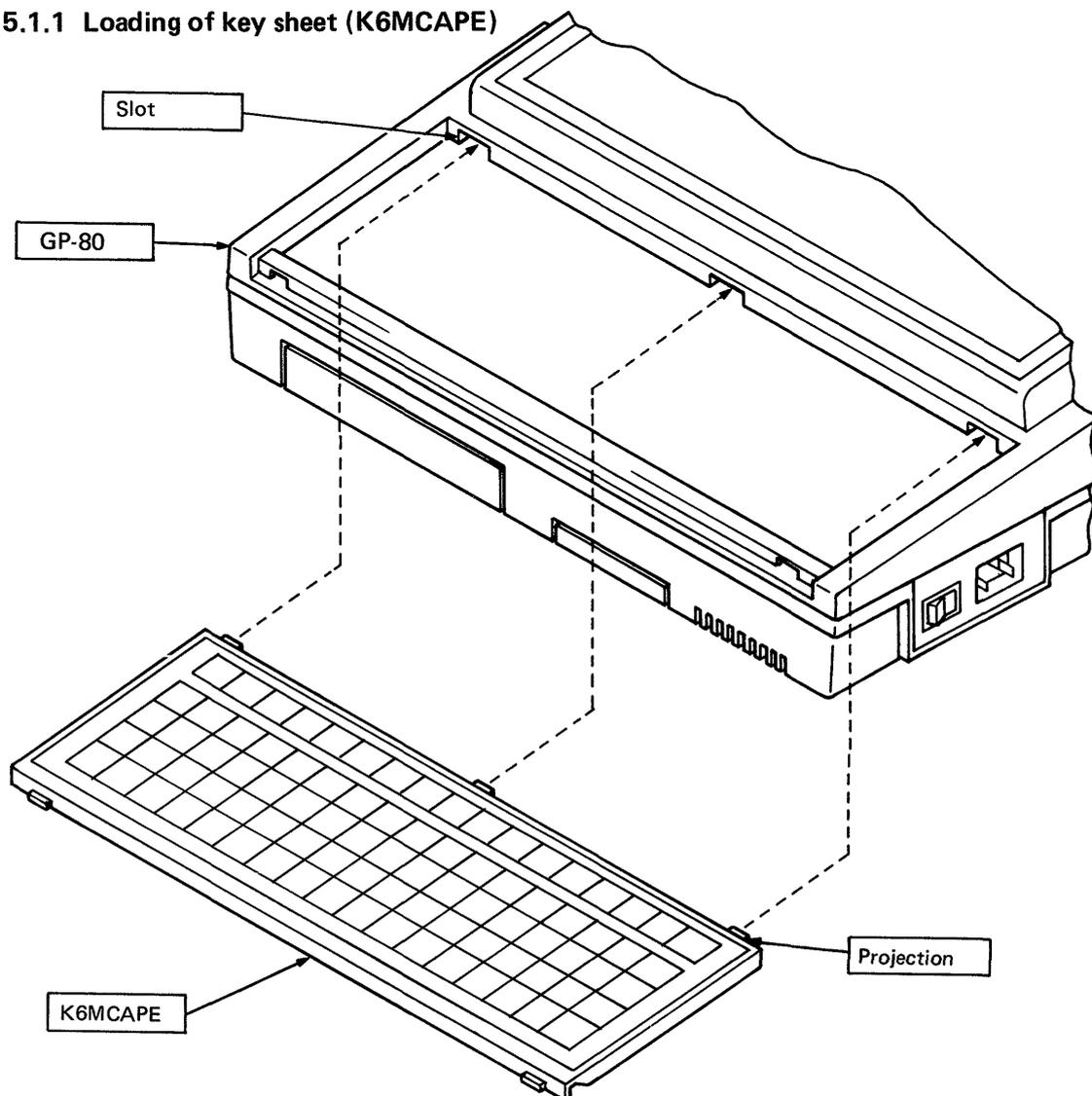
When loading the K6MCAPE to the GP-80, lock the K6MCAPE after inserting the projections of the K6MCAPE into the slots of the GP-80.

5.1.2 Loading of memory cassette (K6MCA16E)

IMPORTANT

When handling the memory cassette, never touch the connector portion of memory cassette with empty hand. Touching the connector portion with empty hand may cause improper contact.

Connector portion

GP-80

Guide rail

For guiding the memory cassette

Memory cassette
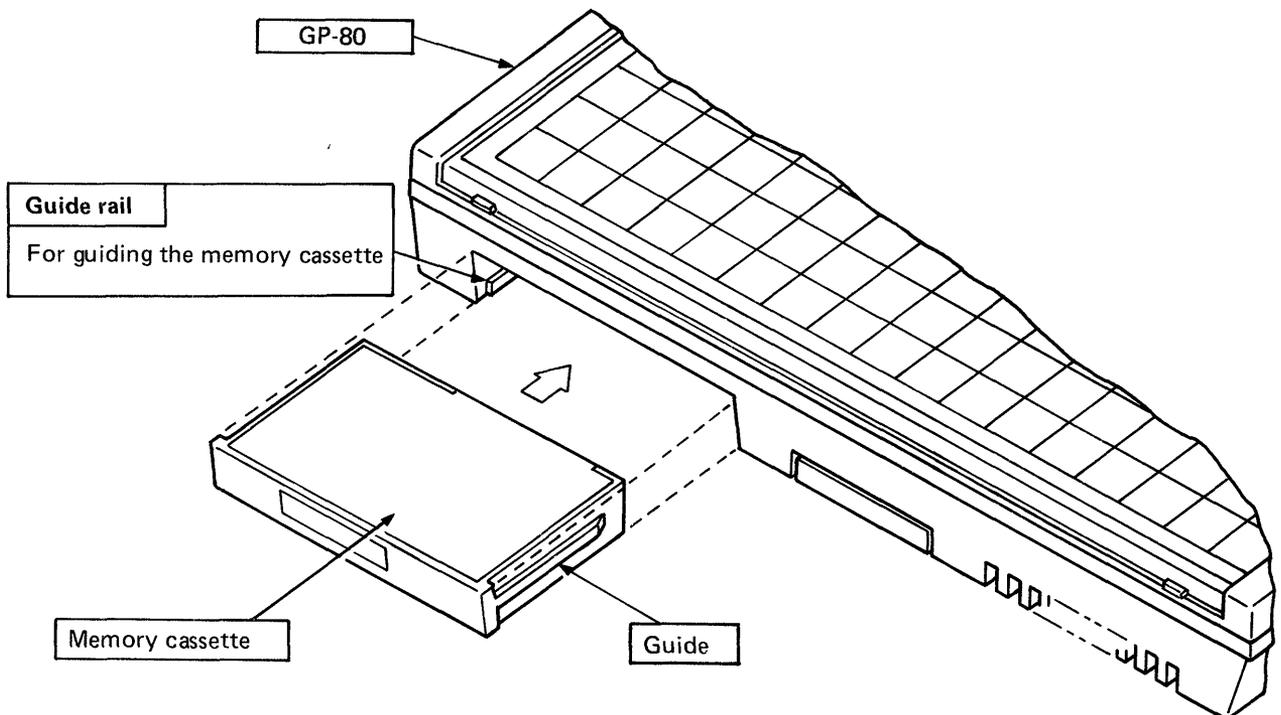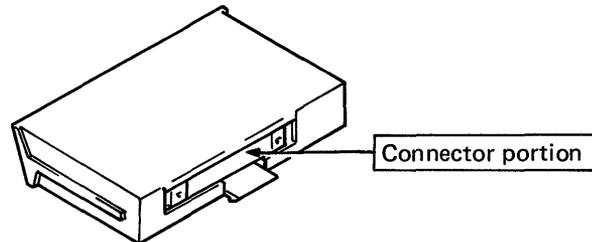
Guide

Insert the memory cassette so that the guides of the memory cassette mount on the guide rails of the GP-80.

WARNING

Load the memory cassette after turning off the power of GP-80.
If the memory cassette is loaded or unloaded with the power on, erroneous code may enter the memory cassette.

5.1.3 Key sheet and memory cassette changing procedures

This section describes the changing procedures of key sheet and memory cassette to allow the GP-80 to be used for the MELSEC-K series programmable controllers.

(1) Replacement of key sheet
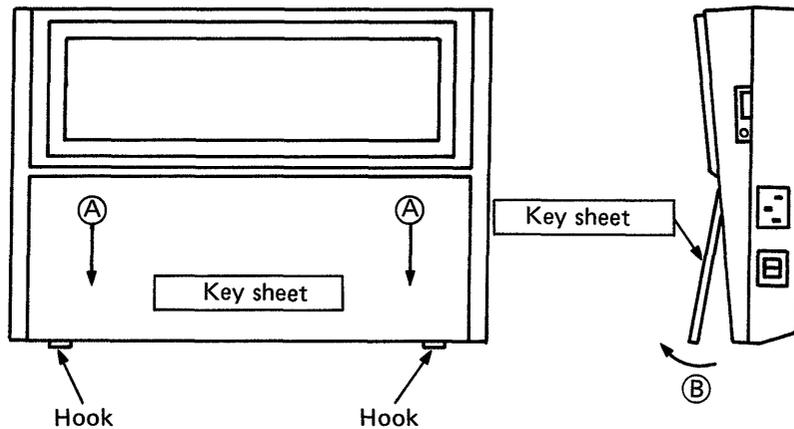
1) Lower the key sheet downward (A) to unhook, and turn the bottom of key sheet in direction (B). Then, the key sheet can be removed.

2) Load Type K6MCAPE key sheet according to Section 5.1.1.

(2) Replacement of memory cassette
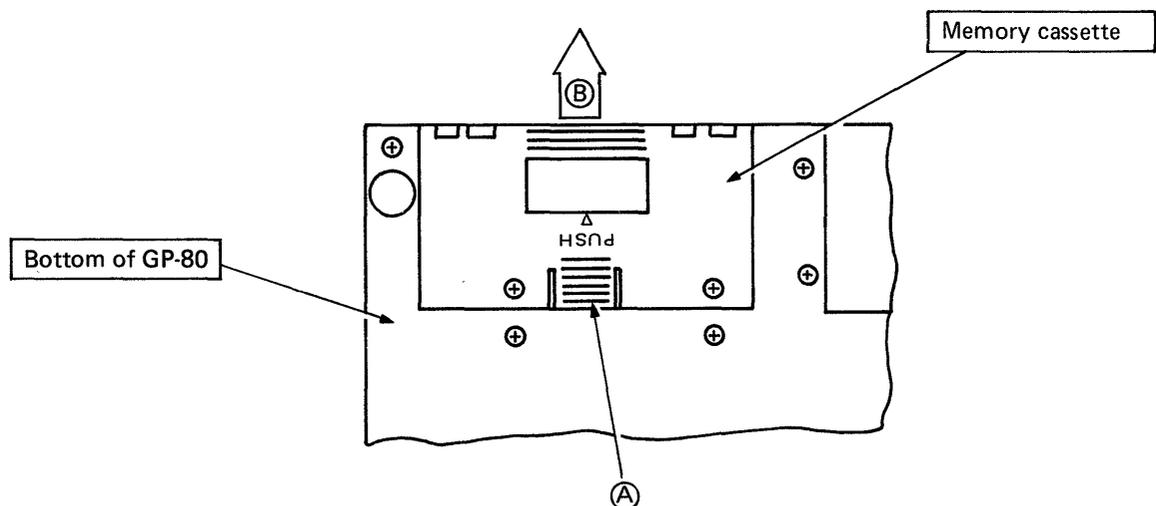
1) While simultaneously pushing portion (A) of memory cassette, pull the memory cassette in direction (B). Then, the memory cassette can be removed.

2) Load Type K6MCA16E memory cassette according to Section 5.1.2.

5.2 Loading and Unloading Procedures to and from Programmable Controller CPU

LOADING

Is connected programmable controller K3NCPU(P2)? — YES

NO

Set ON-LINE switch of K6HGPFE to "OFF-LINE" position.

Load K6HGPFE into programmable controller CPU.

Connect GP-80 and K6HGPFE by Type K78CBL cable and fix.

Connect GP-80 and K3NCPU(P2) by Type K78CBL cable and fix.

Turn on the power of GP-80.

Turn on the power of GP-80.

Set ON-LINE switch of K6HGPFE to "INITIALIZE" position and check that LED is lit. When hand is released from the switch, the switch is automatically set to "ON-LINE" position.

Adjust the brightness of screen and the beep volume for key operation by use of brightness adjust knob and volume adjust knob of GP-80.

COMPLETION

UNLOADING

Is connected programmable controller K3NCPU(P2)? — YES

NO

Set ON-LINE switch of K6HGPFE to "OFF-LINE" position.

Turn off the power of GP-80.

Disconnect Type K78CBL cable.

Unload K6HGPFE from programmable controller CPU.

COMPLETION

> **NOTE**
>
> Loading and unloading can be performed even if the programmable controller CPU is running.

5.3 Nomenclature and Explanation

5.3.1 Arrangement of Type K6MCAPE key sheet

MODE KEYS

LDR (ENG)	Used to display, write, insert, delete, monitor and test a program by use of circuit diagram. Also used to prepare comment.
LST (CUS)	Used to display, write, insert and delete a program by use of instruction list. Also used to move the cursor during preparation of comment.
K CPU	Communication can be made with programmable controller CPU.
MT	Used to record, replay and verify a program by use of audio cassette.
PR	Used to print out sequence circuit diagram, list, etc. by use of printer.

CURSOR KEYS

⬆ ⮕ ⬅ ⬇	Used to move the cursor.

LADDER SYMBOL KEYS

⊣⊢ ⊣/⊢ ⊣↑⊢ ⊣↓⊢ │ ─ ⊣○⊢ ⊣□⊢	Used for write, read, insertion, deletion, etc. in LADDER mode.

DEVICE KEYS

X	Input
Y	Output
M	Temporary memory
F	External failure memory
T	Timer
C	Counter
D	Data register
K	Constant Number of digits MC, MCR number

[MODE]

LDR (ENG)	LST (CUS)	K CPU		MT	PR		RD
⬆ 1	⊣⊢ 2	⊣/⊢ 3		X 4	T 5		
⮕ Q	⊣↑⊢ W	⊣↓⊢ E		Y R	C T		
⬅ A	│ S	─ D		M F	D G		
⬇ Z	⊣○⊢ X	⊣□⊢ C		F V	K B		

[LADDER SYMBOL]   **[I/O]**
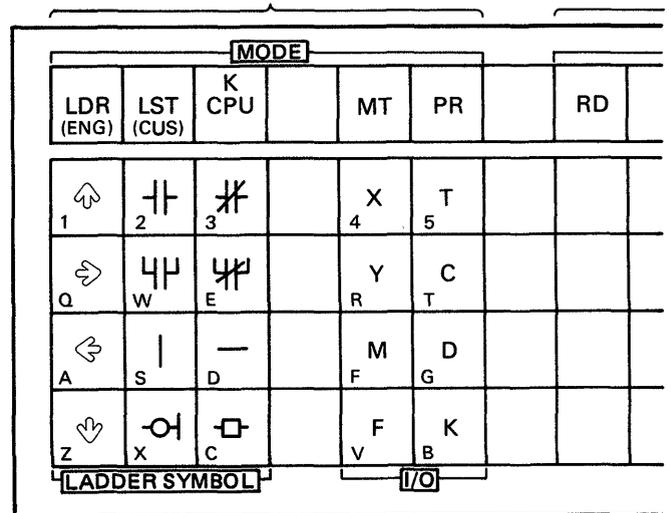
FUNCTION KEYS

Key	Description
RD	Used for read, circuit display and list display of program of programmable controller CPU.
WR	Used to write a program to programmable controller CPU and to prepare a program in LADDER and LIST modes.
CNV	Used to convert a ladder circuit diagram, which has been prepared in LADDER mode, into a sequence program.
INS	Used to additionally insert a program into existing program.
DEL	Used to delete existing program.
MNT	Used to monitor program running state and to monitor temporary values of T, C, D.
VER (COM)	Used to verify programs of programmable controller CPU and GP-80A-E and to prepare comment.
TST	Used for forced on/off of Y, set/reset of M, F, and reset of T, C, D.

SETTING KEY

Key	Description
SSN	Used to set the step number.

CLEAR KEY

Key	Description
CL	Used to clear the content of setting, message area, etc. Program of programmable controller CPU is not cleared.

COMMAND KEY

Key	Description
GO	Used at the end of a series of key operations and used to execute the preceding key operations.

INSTRUCTION KEYS

LD	AND	OR	MC	MOV	=	NOP
LDI	ANI	ORI	MCR	>	<	END
SET	ANB	ORB	PLS	+	—	
RST	SFT	CJ	OUT	BCD	BIN	

Used for preparation, read, insertion and deletion of sequence program.

NUMERAL KEYS

Key	Description
0 〜 F	Used to set the step number, I/O number, constant, etc.

FUNCTION ——————————————————— **STEP.NO**

WR	CNV	INS	DEL	MNT	VER (COM)	TST		SSN

LD C 6	AND D 7	OR E 8	MC F 9		MOV 0	= −	NOP =
LDI 8 Y	ANI 9 U	ORI A I	MCR B O		> P	<	END SP
SET 4 H	ANB 5 J	ORB 6 K	PLS 7 L		+	—	CL
RST 0 N	SFT 1 M	CJ 2	OUT 3		BCD	BIN ?	GO

NUMERAL INSTRUCTION   **INSTRUCTION**

K6MCAPE

5.3.2 GP-80

TYPE K6MCAPE KEY SHEET

For loading and unloading procedures, see Section 5.1

LIQUID CRYSTAL SCREEN

Display area of sequence circuit, instruction list, comment, etc.

TYPE K6MCA16E MEMORY CASSETTE

For loading and unloading procedures, see Section 5.1.

BRIGHTNESS ADJUST KNOB

For adjustment of brightness of screen

VOLUME ADJUST KNOB

For adjustment of beep during key operation

POWER SUPPLY CONNECTOR

POWER SWITCH

PROTECT SWITCH

Used for write operation to programmable controller CPU. Normally keep this switch at "ON" position to inhibit the write operation. When the write operation is performed, move the switch to "OFF" position to permit the write operation.

RESET SWITCH

Used to return to initial screen

NOT USED

NOT USED

CONNECTOR FOR CMT

● Connector for connection with audio cassette.
● Connection cable is GP-80CCB.

CONNECTOR FOR PRINTER

Connector for connection with printer. Conforms to RS-232C.

CONNECTOR FOR PC

Connector for connection with programmable controller CPU

Fig. 5.1 External View and Nomenclature of GP-80

6. INITIAL SETTING

6. INITIAL SETTING

6.1 Initial Screen

When the power of GP-80 is turned on or when the RESET switch is moved to ON position, the CRT displays the screen shown in Fig. 6.1.

```
K   KCPU MEM  PC

1   K1    1K  NO1

2  K2.0.J 2K  NO2

3   K3    3K  NO3

4         4K

8         8K

C        12K

F        16K
```

Fig. 6.1 Initial Screen

For details of initial screen, see below.

Key	KCPU	Memory	PC
Set value of "KCPU", "MEM" and "PC"	Set the type name of programmable controller CPU to be used.	Set the memory capacity for preparing sequence program.	Number of programmable controller CPU in parallel run

```
K    KCPU    MEM   PC

1     K1      1K   NO1

2   K2.0.J    2K   NO2

3     K3      3K   NO3

4             4K

5             5K

6             6K

7             7K

8             8K

C            12K

F            16K
```

Set value display column

Message display column

The following massages are displayed in the initial screen.
    MISOPERATED
    SELECT MODE FUNC
    BATTERY ERROR

Fig. 6.2 Screen Display

6.2 Initial Setting

For setting, press the keys which correspond to the values set to "KCPU", "MEM" and "PC" shown in Fig. 6.2. The entered values are displayed in the set value display column of Fig. 6.2. Perform initial setting by pressing the following keys:

| K | | | | | GO |

Setting of PC number

PC number		NO1	NO2	NO3
Set value		1	2	3
Device number	X, Y	0 ~ 1FF	300 ~ 4FF	600 ~ 7FF
	M	0 ~ 255	300 ~ 555	600 ~ 855
	T, C	0 ~ 127	300 ~ 427	600 ~ 727
	D	0 ~ 127	300 ~ 427	600 ~ 727
	F	0 ~ 127	300 ~ 427	600 ~ 727
	K (Master control)	0 ~ 63	300 ~ 363	600 ~ 663

Setting of Memory Capacity of Sequence Program

Memory capacity (step)	1K	2K	3K	4K	8K	12K	16K
Set value	1	2	3	4	8	C	F

Setting of Programmable Controller CPU Type Name

Set value	Connected programmable controller CPU
1	K1CPU, K1CPU-S1
2	K0CPU K0J1CPU, K0J2PCPU K2HCPU, K2CPU-S3 K2NCPU
3	K3NCPU, K3NCPUP2

Setting of Operation Mode

Set value	Item
None	Preparation and read of sequence program and comment data Read from programmable controller CPU Write to programmable controller CPU during stop Record, replay and verify by audio cassette Print-out on printer and other normal operations.
4	Conversion of sequence program for K1, K2CPU into the one for K3NCPU(P2)
7	Write to programmable controller CPU during run
8	Display of version and manufacture date
9	Read and write of microcomputer program

6

NOTE

1. When K2HCPU or K2CPU-S3 is loaded with Type KJ61 parallel data link unit and run in parallel, PC numbers are displayed for differentitation and easy view of programs of programmable controller CPUs after device numbers are converted into PC numbers inside the GP-80.

2. When other than "1" has been set to the PC number for the preparation or correction of sequence program, it is required to enter the device number which corresponds to the set value.

3. When writing to the programmable controller CPU, perform write operation by use of the device number of PC number "1".

4. When "K1" or "K3" has been selected in the setting of programmable controller CPU type name, be sure to set the PC number to "1".

5. In regards to the setting of memory capacity, the range of memory capacity which can be specified changes depending on the setting of programmable controller CPU.

Setting of programmable controller CPU	Memory
K1	1K, 2K steps
K2, 0, J	1K, 2K, 3K, 4K steps
K3	1K, 2K, 3K, 4K, 8K, 12K, 16K steps

Example

Example 1 :   Setting procedure for normal operation

When the following keys are pressed:

[K] [3] [4] [1] [GO]

→ PC number is set to NO1.
→ Memory capacity is set to 4K steps.
→ Programmable controller CPU is set to K3NCPU(P2).
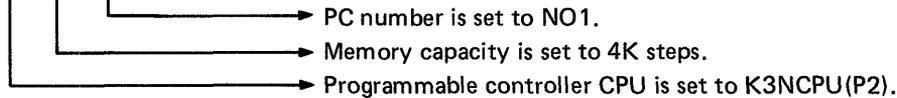
When the PC number is set to NO1 and the memory capacity is set to the maximum which corresponds to the programmable controller CPU, the settings of memory capacity and PC number can be omitted as indicated below.

[K] [1] [GO] = [K] [1] [2] [1] [GO]

[K] [2] [GO] = [K] [2] [4] [1] [GO]

[K] [3] [GO] = [K] [3] [F] [1] [GO]

CAUTION

1. When the memory capacity setting of GP-80 is different from that of programmable controller CPU in the write or read operation from the GP-80 to the programmable controller CPU, the GP-80 is given priority. Therefore, if the memory capacity setting of GP-80 is larger than that of programmable controller CPU in the write operation, "WRITE ERROR" is displayed when the memory of programmable controller CPU becomes insufficient. When the memory capacity setting of GP-80 is smaller than that of programmable controller CPU in the read operation, data are read only by the memory capacity setting of GP-80. At this time, the error message is not displayed.
    When the initial setting has been performed by omitting the setting of memory capacity and PC number, the memory capacity of GP-80 is automatically allotted to that of programmable controller CPU. Therefore, the above indicated error will not result.

2. When the initial setting has been performed without setting the memory capacity and PC number during write to the programmable controller CPU, the following may occur.
    If five or more "FFH" are consecutively stored in the RAM of programmable controller CPU, the GP-80 judges that the RAM is not loaded and immediately completes the write operation to the programmable controller CPU. Therefore, all of the program cannot be written.
    In such a case, set the memory capacity and PC number, and perform the write operation to the programmable controller CPU again.

Example

Example 2:   Setting procedure for conversion of program

The sequence program for K0, K0J and K2CPU is converted into the sequence program of K3NCPU(P2).

When the following keys are pressed:

| K | 4 | 2 | 4 | 1 | GO |

→ Set desired number among 1 to 3.
→ Memory capacity of program for K3NCPU(P2) is set to 4K steps.
→ Set desired number among 1 to 3.
→ Conversion of sequence program is set.

⇩

```
          K1.K2.K0.K0J.→K3

          PROGRAM CONVERT

          OK→PUSH "GO"

          NO→PUSH "CL"




                [.............]
```
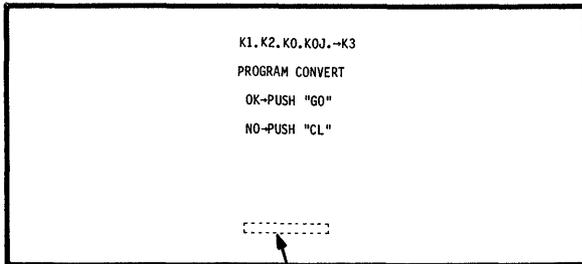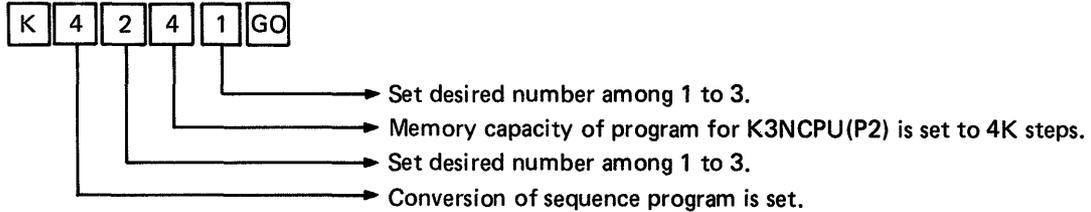
Fig. 6.3

Displays EXECUTING or COMPLETED.

By pressing the CL key, the initial screen shown in Fig. 6.4. is restored without conversion of the program.

By pressing the GO key, the program is converted. During the conversion, "EXECUTING" is displayed. After the completion of conversion, "COMPLETED" is displayed. Approximately 2 seconds after the display of "COMPLETE", the initial screen shown in Fig. 6.4. is restored.

⇩

```
        K  KCPU  MEM  PC

        1   K1    1K  NO1

        2  K2.0.J 2K  NO2

        3   K3    3K  NO3

        4         4K

        8         8K

        C         12K

        F         16K
```

Fig. 6.4

CAUTION

Since this program conversion converts only the codes for sequence instructions, the conversion of the number of device F used for application instruction and the addition of F100 for program end designation cannot be made. When the application instruction number is different, it is required to correct the addition of program end F100 after code conversion.

----Example--

Example 3:   Setting procedure for write during run

When the programmable controller CPU is running, write from the GP-80 to the programmable controller CPU can be performed.

When the following keys are pressed:

| K | 7 | 2 | 4 | 1 | GO |

→ PC number is set to NO1.
→ Memory capacity is set to 4K steps.
→ Programmable controller CPU is set to K2CPU.
→ Write during run is set.

⇩
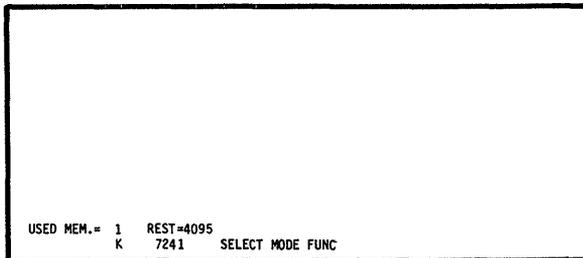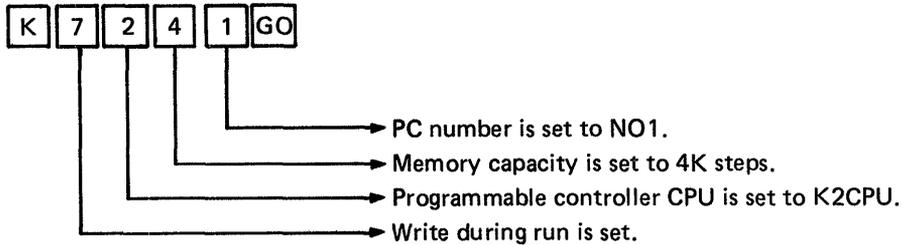
To clear the write during run, perform reset operation by use of RESET switch on GP-80.

```
USED MEM.= 1    REST=4095
         K    7241    SELECT MODE FUNC
```

Fig. 6.5

CAUTION

It is recommended to limit write operation during run to the change of set values of timers and counters. A program, of which step numbers do not change, e.g. the changes of "normal open" and "normal close" contacts and device numbers such as X, Y, M, can be written. However, since the write operation may cause control failure, avoid performing the write operation.
When a program, of which step numbers change, is written during run, CPU error results, the run of sequence program is stopped, and the "RUN" LED flickers. In such a case, be sure to perform write operation after stopping and resetting the CPU.

---Example---

Example 4: Setting procedure for version display

The manufacture version and date of system ROM, which is used for Type K6MC16E memory cassette, are displayed.

When the following keys are pressed:

| K | 8 | 2 | 4 | 1 | GO |

→ Set desired number.
→ Version display is set.

⇩

```
        MELSEC-K K6MC16
        ROM VERSION-A
        ROM-NO BD190D679
        DATE 84-12-25




            K8888
```
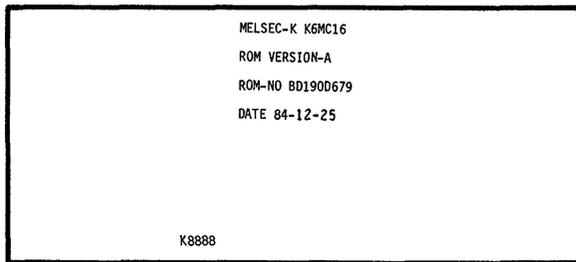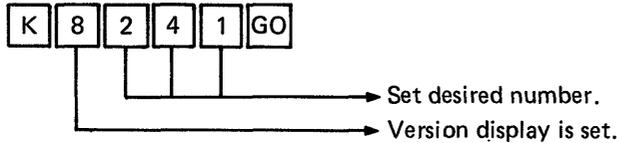
Fig. 6.6
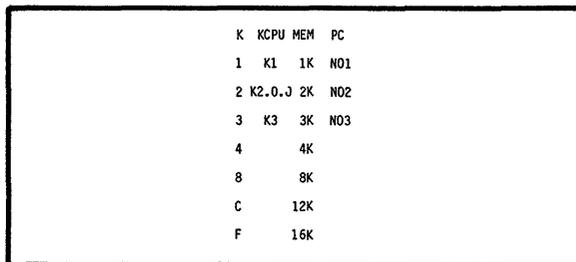
To clear, reset operation by RESET switch of GP-80A-E restores the initial screen shown in Fig. 6.7.

⇩

```
        K  KCPU MEM  PC
        1  K1   1K   NO1
        2  K2.0.J 2K  NO2
        3  K3   3K   NO3
        4       4K
        8       8K
        C       12K
        F       16K
```

Fig. 6.7

Example 5: Setting procedure for operation by microcomputer program

A microcomputer program can be prepared.

When the following keys are pressed:

| K | 9 | 2 | 4 | 1 | GO |

→ PC number is set to NO1.
→ Memory capacity is set to 4K steps.
→ Programmable controller CPU type name is set to K2CPU.
→ Microcomputer program is set.

⇩
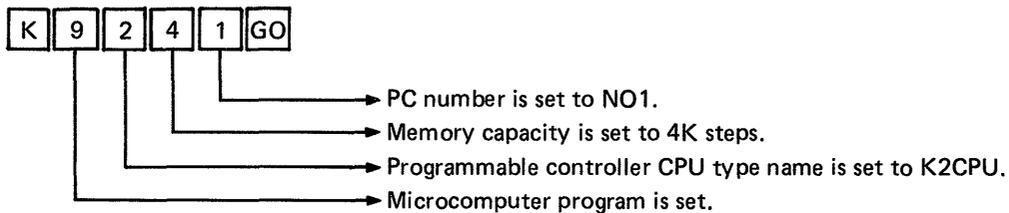
Proceed to operation described in Section 15.

6.3 Selection of Operation Mode

When the initial setting described in Section 6.2 has bee completed, the mode select screen shown in Fig. 6.8 is displayed.

```
┌──────────────────────────────────────────────────────────────┐
│                                                                │
│                                                                │
│                                                                │
│                                                                │
│                                                                │
│                                                                │
│                                                                │
│  ┌─ ─ ─ ─ ─ ─ ─ ─ ─ ─ ─ ─ ─ ─ ─ ─ ─ ─ ─ ─ ─ ─ ┐               │
│  │USED MEM.=24        RESET=4072│                               │
│  └─ ─ ─ ─ ─ ─ ─┌─ ─ ─ ─ ─ ─ ─ ─┘                               │
│               │K      24│         SELECT MODE FUNC             │
└──────────────────────────────────────────────────────────────┘
```

Displays the value set at the initial setting in Section 6.2.

Indicates the degree of memory used for sequence program which is stored in GP-80. "REST" indicates a value which is obtained by subtracting the value of used memory from that of set memory capacity.
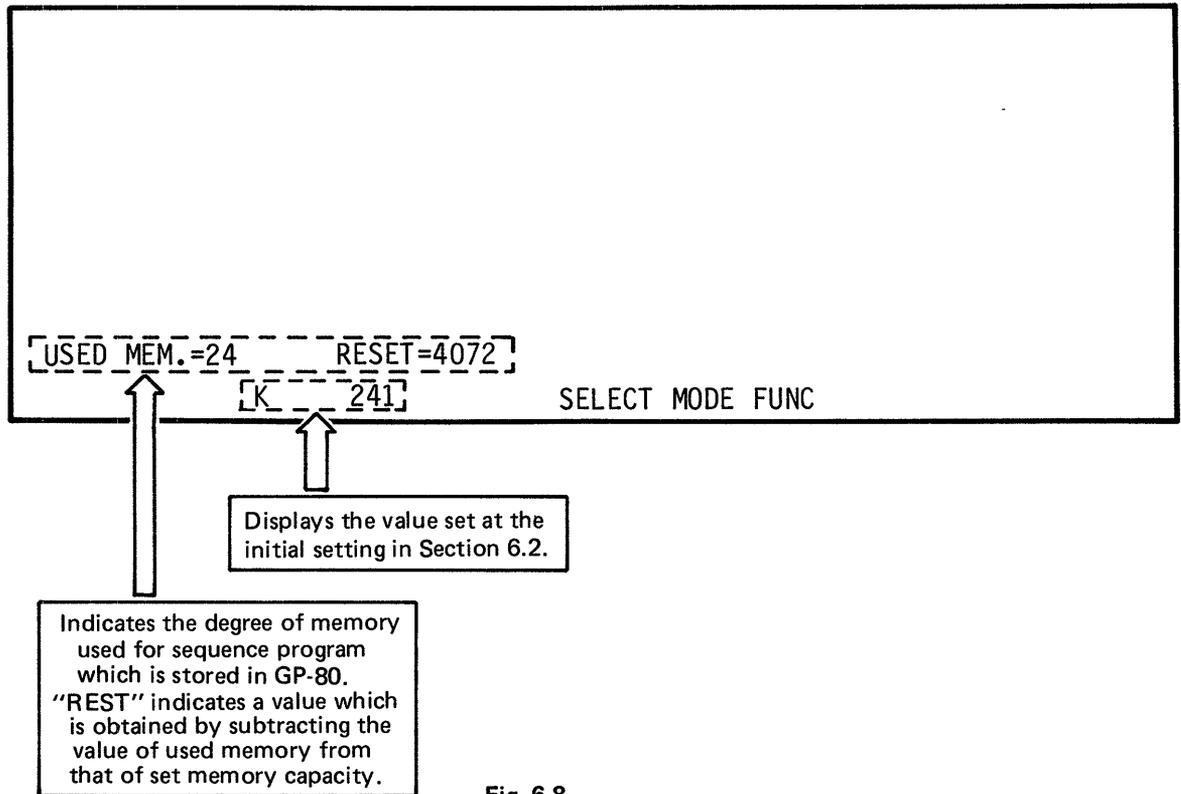
Fig. 6.8

⇩

Operation in ladder mode ⇨ Section 7 (Page 42)
Operation in list mode ⇨ Section 8 (Page 70)
Comment mode   ⇨ Section 9 (Page 84)
KCPU mode   ⇨ Section 10 (Page 96)
Monitor mode   ⇨ Section 11 (Page 108)
Test mode   ⇨ Section 12 (Page 114)
Cassette mode   ⇨ Section 13 (Page 122)
Printer mode   ⇨ Section 14 (Page 128)

NOTE

When the memory capacity is set to 12K or 16K in the initial setting of Section 6.3 and the value at USED MEM. or REST is 10K or larger, the value is displayed as shown below:

10000 step → A000
11000 step → B000
12000 step → C000
13000 step → D000
14000 step → E000
15000 step → F000

MEMO

7. OPERATION IN LADDER MODE

7. OPERATION IN LADDER MODE

7.1 Screen Display

Data instruction
(handled as coil display column)

Coil instruction
display column

Set number display column

Data instruction (handled as contact)
display column

| Step number display column |
| Entered device display column |
| Memory use display column |
| Message display column |
| Mode and function display column |
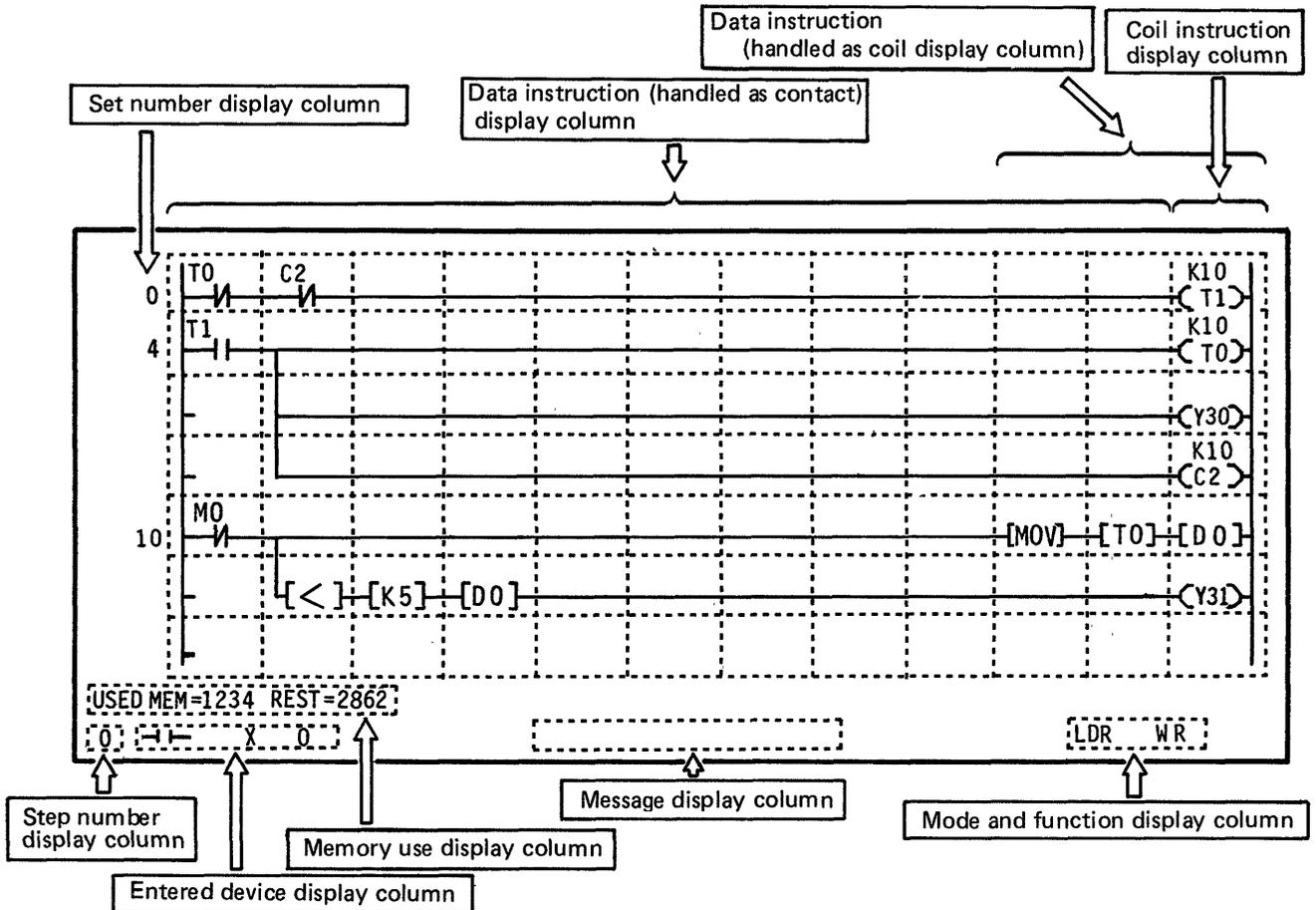
(1) In one screen, 11 contacts and 1 coil can be displayed in the horizontal direction and 7 lines can be displayed in the vertical direction.

(2) When more than 11 serial contacts are written, a return symbol is automatically provided. A maximum of 161 contacts can be written in series in one circuit block.

(3) When more than 7 lines are written, the screen scrolls upward automatically up to 22 lines. A maximum of 22 contacts can be written in parallel in one circuit block.

7.2 Key Operation for Preparation of Sequence Program in Ladder Mode

Instruction	Key Operation	Screen Display
LD	⊣⊢ X 1 0 0 GO Device number	X100
AND	(same)	X10 X100
LDI	⊣/⊢ X 1 0 1 GO Device number	X101
ANI	(same)	X10 X101
OR	⊔⊢ Y 1 5 0 GO Device number	X10 M0 X11 Y150 Y150
ORI	⊔/⊢ Y 1 5 1 GO Device number	X10 M0 X11 Y151 Y151
OUT (Except timer, counter)	─○─ Y 1 2 3 GO Device number	─⊣/⊢──────(Y123)
OUT (Timer, counter)	─○─ T 1 2 3 GO Device number K 3 2 1 GO Set value	K321 ─⊣/⊢──────(T123)
MC	─□─ MC K 2 1 GO Device number	MC ─⊣⊢──────[K21]
MCR	─□─ MCR K 2 1 GO Device number	MCR ─────────[K21]
SET	─□─ SET M 1 2 3 GO Device number	SET ─⊣⊢──────[M123]
RST	─□─ RST C 1 2 3 GO Device number	RST ─⊣⊢──────[C123]

7

Instruction	Key Operation	Screen Display
SFT	⊡ SFT M 1 2 3 GO → Device number	⊢⊣─────────────[SFT M123]
CJ	⊡ CJ GO K 1 2 3 4 GO → Step number	⊢⊣─────────────[CJ 1234]
PLS	⊡ PLS M 1 2 3 GO → Device number	⊢⊣─────────────[PLS M123]
MOV	⊡ MOV GO D 1 2 3 GO → Setting of source K 4 Y 3 0 GO → Setting of destination	⊢⊣────[MOV⊢D123⊢ K4 Y30]
> (Is greater than)	⊡ > GO D 1 2 3 GO → Setting of source D 2 3 4 GO → Setting of destination	⊢⊣───[> ⊢D123⊢D234]
< (Is less than)	⊡ < GO D 1 2 3 GO → Setting of source D 2 3 4 GO → Setting of destination	⊢⊣───[< ⊢D123⊢D234]

Instruction	Key Operation	Screen Display

=	`⊡` `=` `GO`
	
	 `D` `1` `2` `3` `GO`
	 ↓
	 Setting of source
	
	 `⊡` `D` `2` `3` `4` `GO`
	 ↓
	 Setting of destination
		—| |—————[=]{D123}{D234}—

+	`⊡` `+` `GO`
	
	 `K` `1` `2` `3` `4` `GO`
	 ↓
	 Setting of source
	
	 `D` `1` `2` `3` `GO`
	 ↓
	 Setting of destination
		—| |—————[+]{$\overset{K}{1234}$}{D123}—

−	`⊡` `−` `GO`
	
	 `K` `1` `2` `3` `4` `GO`
	 ↓
	 Setting of source
	
	 `D` `1` `2` `3` `GO`
	 ↓
	 Setting of destination
		—| |—————[−]{$\overset{K}{1234}$}{D123}—

BCD	`⊡` `BCD` `GO`
	
	 `K` `1` `2` `3` `4` `GO`
	 ↓
	 Setting of source
	
	 `D` `1` `2` `3` `GO`
	 ↓
	 Setting of destination
		—| |—————[BCD]{$\overset{K}{1234}$}{D123}—

BIN	`⊡` `BIN` `GO`
	
	 `K` `4` `X` `1` `0` `GO`
	 ↓
	 Setting of source
	
	 `D` `1` `2` `3` `GO`
	 ↓
	 Setting of destination
		—| |—————[BIN]{$\overset{K4}{X10}$}{D123}—

Instruction	Key Operation	Screen Display
Vertical line		GO	**NOTE** Move the cursor to the top of vertical line as shown at right by use of the ⬆ ⮕ ⬅ ⬇ keys.	
Horizontal line	— GO	

NOTE

When the ⊡ key is displayed on the screen in the setting of source and destination for data instruction, it is not required to press the above indicated key.

7

7.3 Preparation of Sequence Program with Ladder Symbols

7.3.1 Preparation of sequence program

```
        K  KCPU MEM  PC

        1   K1   1K  N01

        2  K2.0.J 2K N02

        3   K3   3K  N03

        4        4K

        8        8K

        C        12K

        F        16K
```
Fig. 7.1
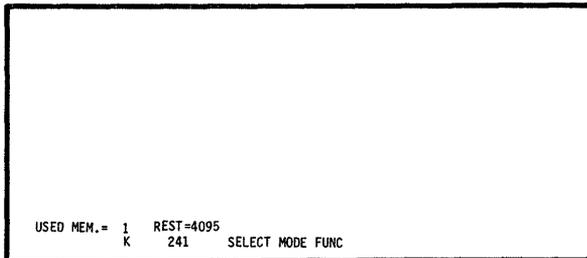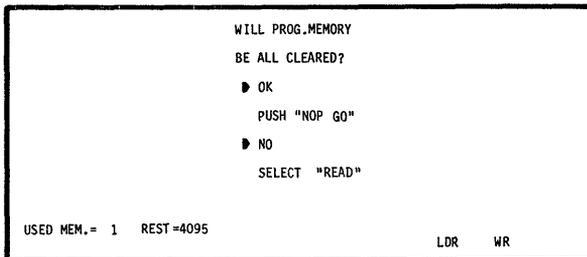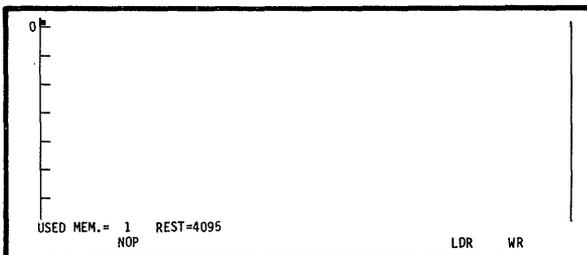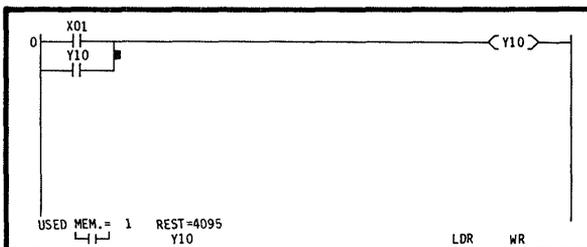
By pressing the ⎡K⎤ ⎡*1⎤ ⎡*1⎤ ⎡*1⎤ ⎡GO⎤ keys, the initial setting is completed and the screen shows Fig. 7.2.
For the setting of *1, see Section 6.2.

```
  USED MEM.= 1   REST=4095
            K   241    SELECT MODE FUNC
```
Fig. 7.2

By pressing the ⎡LDR⎤ ⎡WR⎤ keys, the mode setting is completed and Fig. 7.3 is displayed.

```
          WILL PROG.MEMORY

          BE ALL CLEARED?

          ▶ OK

            PUSH "NOP GO"

          ▶ NO

            SELECT  "READ"

  USED MEM.= 1   REST =4095
                                     LDR    WR
```
Fig. 7.3

By pressing the ⎡NOP⎤ ⎡GO⎤ keys, the program in the memory is erased and Fig. 7.4 is displayed.

By pressing the ⎡RD⎤ key, the program in the memory is not erased, and the read operation described in Section 7.4 is started. The screen displays Fig. 7.19.

```
  0 ▬

  USED MEM.= 1   REST=4095
            NOP                      LDR    WR
```
Fig. 7.4

When the screen shown in Fig. 7.4 is displayed, a sequence program can be prepared with ladder symbols. For the input method, see Section 7.1.4.

┌ EXAMPLE ─────────────────────────────────┐
│   │
│   When the following keys are pressed, the screen dis-│
│   plays Fig. 7.5.   │
│   │
│   ⎡⊣⊢⎤⎡X⎤⎡1⎤⎡GO⎤   │
│   ⎡⊸⎤⎡Y⎤⎡1⎤⎡0⎤⎡GO⎤   │
│   ⎡⊣↑⊢⎤⎡Y⎤⎡1⎤⎡0⎤⎡GO⎤   │
└───┘

```
      X01
  0 ──┤├──
      Y10   ■
    ──┤├──                            ─〈Y10〉─

  USED MEM.= 1   REST=4095
     └┤├┘      Y10                    LDR    WR
```
Fig. 7.5

When the input operation for preparation of sequence program with ladder symbols has been .completed, press the ⎡CNV⎤ ⎡GO⎤ keys to convert the circuit prepared in the screen memory area into a sequence program and store it into the program memory area. The screen displays Fig. 7.6.
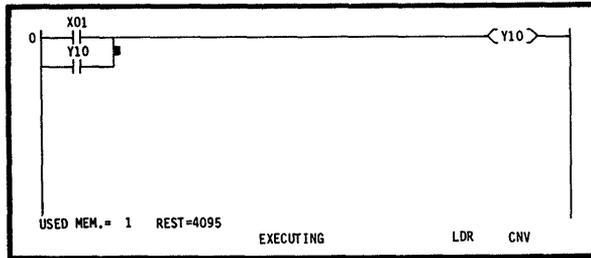
Fig. 7.6
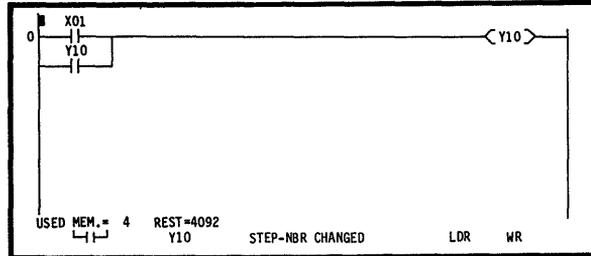
During the conversion of circuit, "EXECUTING" is displayed at the bottom of screen as shown in Fig. 7.6.
If any key is pressed in this state, the key is invalid.

Fig. 7.7

When the conversion of circuit has been completed, "STEP-NBR CHANGED" is displayed at the bottom of screen as shown in Fig. 7.7 and the next operation can be performed.
However, when there is a circuit which cannot be coverted, the circuit is not converted and "ILLOGICAL DIAGRAM" is displayed. Therefore, prepare the circuit and make conversion again.

CAUTION

1. After the preparation of sequence program in the ladder mode, be sure to convert the circuit. If another mode is selected without converting the circuit, the prepared circuit is erased.

2. One screen displays a circuit of seven lines.
   When write operation is effected exceeding seven lines during preparation of circuit, the screen performs an upward scrolling operation, and a circuit with a maximum of 22 lines can be prepared at one time.
   However, when a sequence program with more than 22 lines is written, the screen stops the upward scrolling operation at the 22th line. Therefore, after writing a circuit of 22 lines, make a conversion of the circuit, and then prepare the program. (Since a program can be prepared in one circuit block up to 22 lines, 23 or more lines cannot be written.)

3. When an error message is displayed at the time of circuit conversion, the circuit has not been converted. Therefore, rewrite the circuit to a correct one and then make the circuit conversion again.
   However, when "CJ STEP ERROR" is displayed, the circuit has been converted.

4. During preparation of a circuit in the ladder mode, the specified jump destination step number of CJ instruction changes because the program step number located behind the CJ instruction is added to the jump destination step number. Therefore, it is recommended to perform the write operation by specifying step 0 as "K0", make conversion, and then write the correct jump destination step number.

7.3.2 Line return when more than 11 contacts are written

When a contact is written in the 12th column (coil column) during write of circuit, a line return operation is automatically performed as shown below.

When it is desired to write a return symbol, perform the following operation.

Fig. 7.8

By pressing the $\boxed{-}\boxed{GO}\boxed{GO}$ ---- $\boxed{GO}$ keys, draw a horizontal line up to the 12th column as shown in Fig. 7.9.

Fig. 7.9

By pressing the following keys, write the return symbol.

$\boxed{-}\boxed{K}\boxed{*1}\boxed{GO}$

└────► Specify line return number.
Line return number is K0 to K255.

┌ EXAMPLE ──────────────────────────────────
│ By pressing the $\boxed{-}\boxed{K}\boxed{0}\boxed{GO}$ keys, the return symbol
│ is written and the cursor moves to the next line as
│ shown in Fig. 7.10.
└──

Fig. 7.10

By pressing the $\boxed{\heartsuit}$ key, move the cursor downward to the return point.
By pressing the following keys, write the return destination symbol.

$\boxed{-}\boxed{K}\boxed{*1}\boxed{GO}$

└────► Set the same number as set to column 12.

┌ EXAMPLE ──────────────────────────────────
│ By pressing the $\boxed{\heartsuit}\boxed{-}\boxed{K}\boxed{0}\boxed{GO}$ keys, the return
│ destination symbol is written as shown in Fig. 7.11.
└──

Fig. 7.11

Thereafter, prepare a circuit according to the normal preparation procedure.

NOTE

1. Manual write of return symbol leads to circuit plotting error. Therefore, avoid manual write if possible.

2. Line return is possible up to 15 times (a maximum of 161 contacts). If line return is made more than 15 times, "ILLOGICAL DIAGRAM" is displayed.

7.3.3 Write by use of prepared circuit

It is possible to prepare a new circuit by use of the prepared circuit (circuit which is stored in the sequence program area of GP-80). The procedure is described below.

By performing operation in Section 7.4 display the circuit desired to be used at the top of screen as shown in Fig. 7.12.

⇩
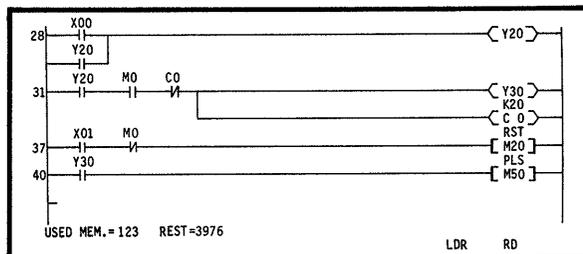
Fig. 7.12

⇩

By pressing the |WR||SSN||*1||GO| keys, set the write of used circuit the position above the specified step number. To *1, set the step number. When the step number is set to "0", the used circuit block is inserted to the position below its own position.
To add the circuit to the position below the last circuit, set "USED MEM." - 1.

┌ EXAMPLE --┐
By pressing the |WR||SSN||4||0||GO| keys, the circuit block located at top of the display screen is inserted to the position above the circuit block which includes step 40 as shown in Fig. 7.13.
When the |WR||SSN||0||GO| keys are pressed, the circuit block is inserted to the position below its own position.
└--┘

Step number where circuit
is inserted is displayed.

```
40   ■
    ┤├────────────────────────────< >──
    ┤├

USED MEM.=123   REST=3976
    ┤├                                LDR   WR
```
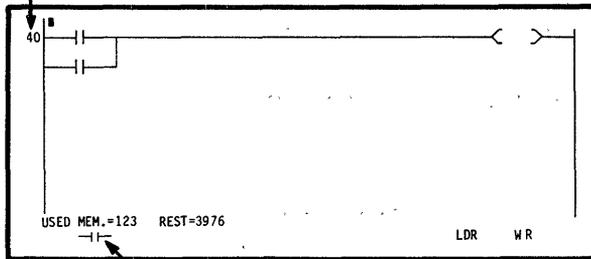
Fig. 7.13

Ladder symbol is
automatically displayed.

⇩

```
40   ■ X01
    ┤├──────────────────────────<Y30>──
     Y30
    ┤├

USED MEM.=123   REST=3976
    ┤├                                LDR   WR
```

Fig. 7.14

Enter device number.
Also specify circuit symbol only when the circuit symbols
is changed.
Each time the device number is entered, the cursor auto-
matically moves to the next entry destination.

┌ EXAMPLE ─────────────────────────────────────┐
│   │
│ By pressing the following keys, the screen as shown in │
│ Fig. 7.14 is displayed.   │
│   │
│   X   1   0   GO   │
│   │
│   Y   3   0   GO   │
│   │
│   Y   3   0   GO   │
└───┘
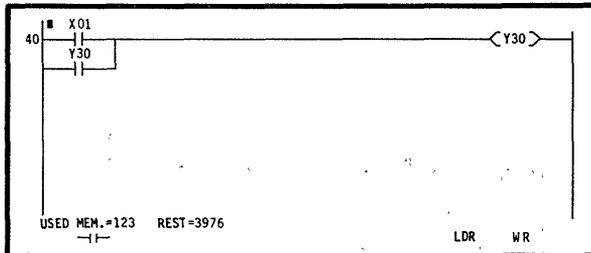
By pressing the CNV GO keys, convert the circuit and
store it to the sequence program area.
By performing the read operation, make sure that the
circuit has been added.

NOTE

If the cursor keys ⟱ , ⟰ , ⟲ , ⟳ are pressed or a function except write is selected
during the preparation of device, the cursor cannot move from one circuit symbol to
another automatically.
Therefore, the insertion or deletion of instructions can be made more easily after the
completion of circuit.

7.3.4 Examples of circuit plotting errors

Since the circuits shown on the left are wrong, the "ILLOGICAL DIAGRM" or "LOGIC ERROR" is displayed at the time of conversion, and these circuits cannot be converted. Therefore, correct them to the circuits shown on the right. (For correcting method, see Section 7.5.)

(1) Circuits which include short-circuit block (I/O number is omitted because it has no connection.)

a.

b.

c.
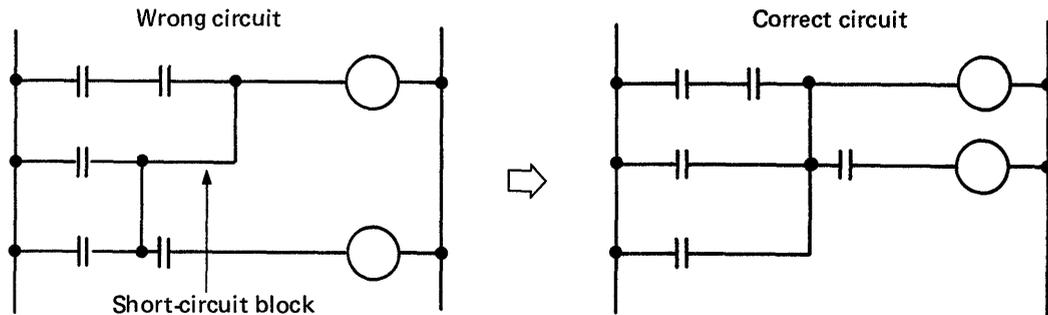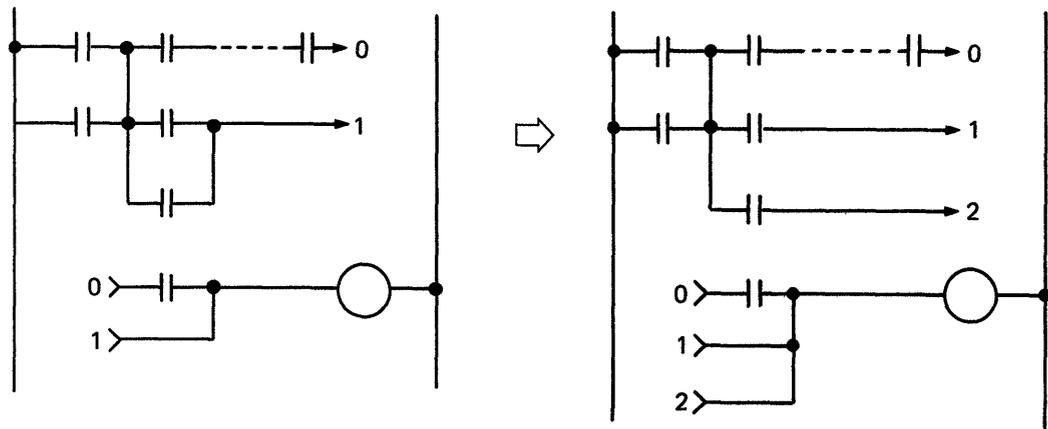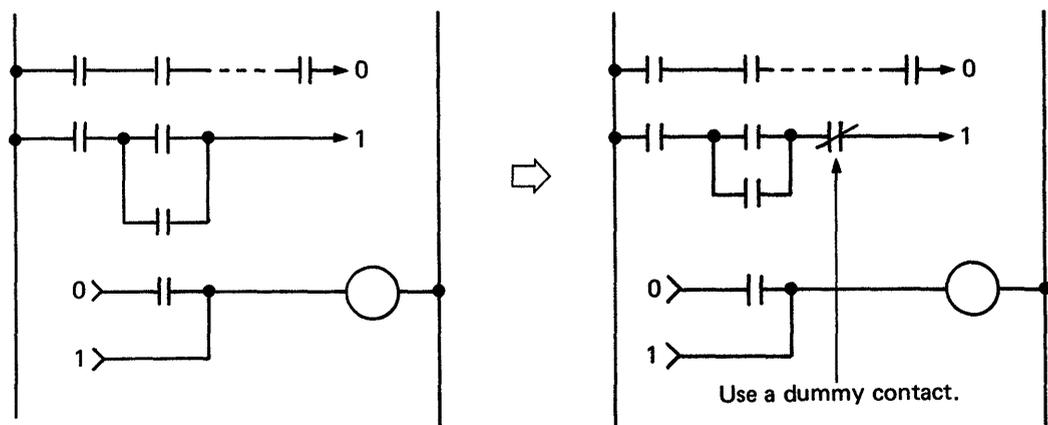
(2) Circuit which has no contact before data instruction
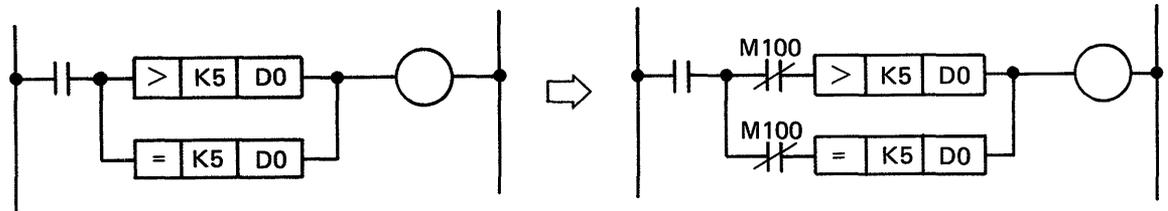
M100 is an unused dummy M.

(3) Circuit which has branch coil before contact
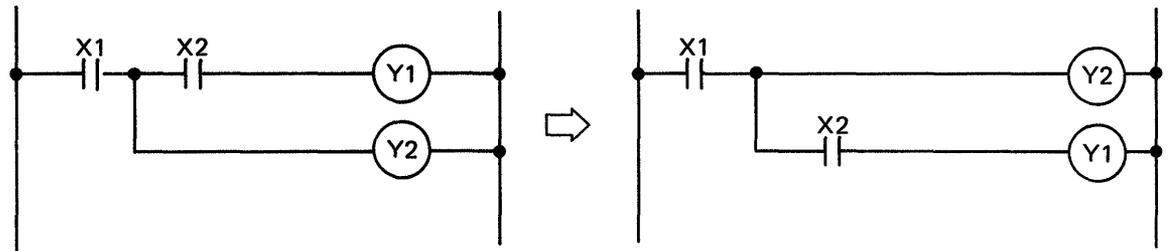
(4) Circuit which includes "OR"
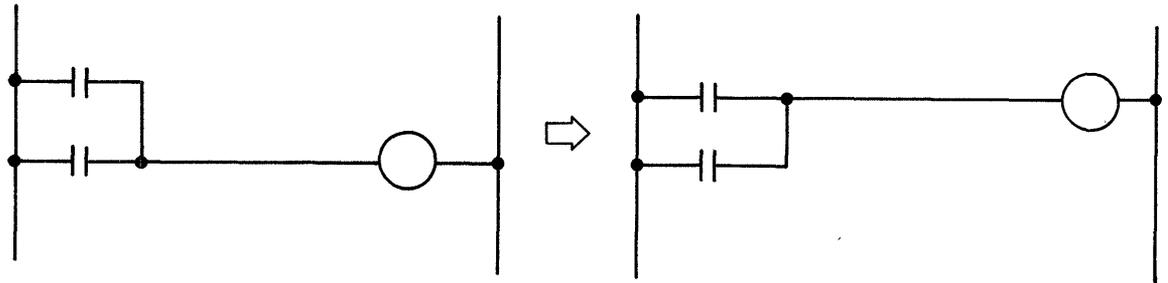
(5) Sneak path
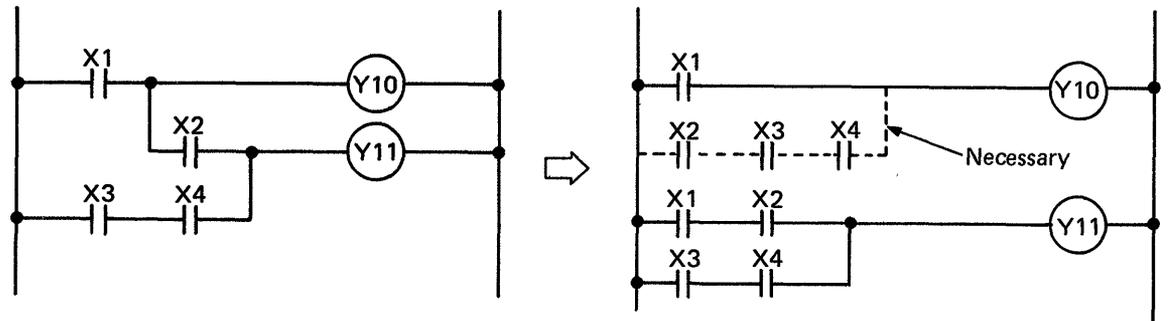
(6) Circuit which has improperly located return numbers
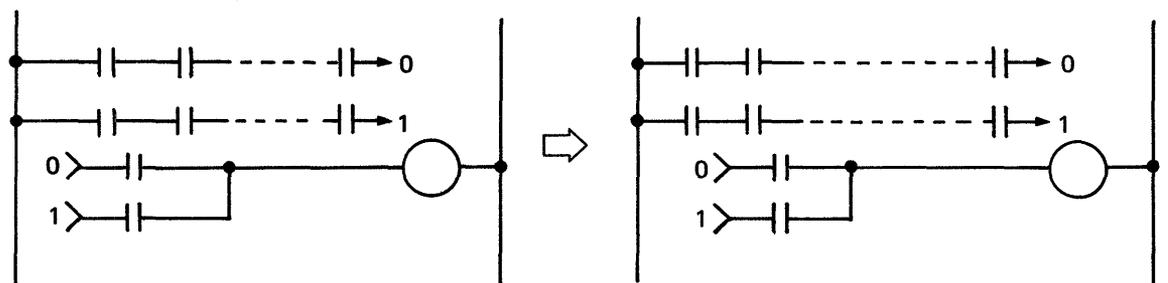
(7) Correction of return symbol
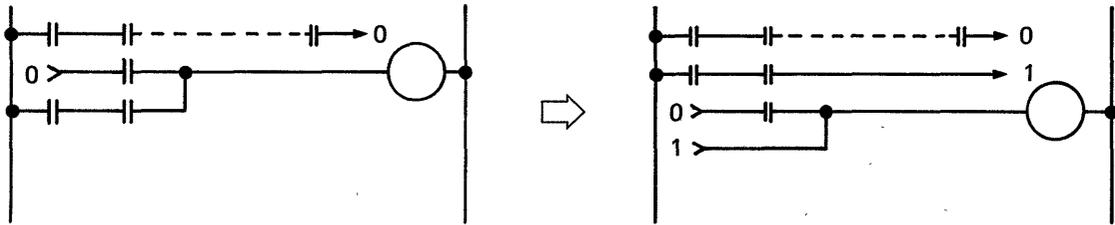
(8) Note that some contacts and circuit blocks are ignored in the following circuit.

a.

Contact X1 is ignored.

b.

Circuit block Y10 is ignored.
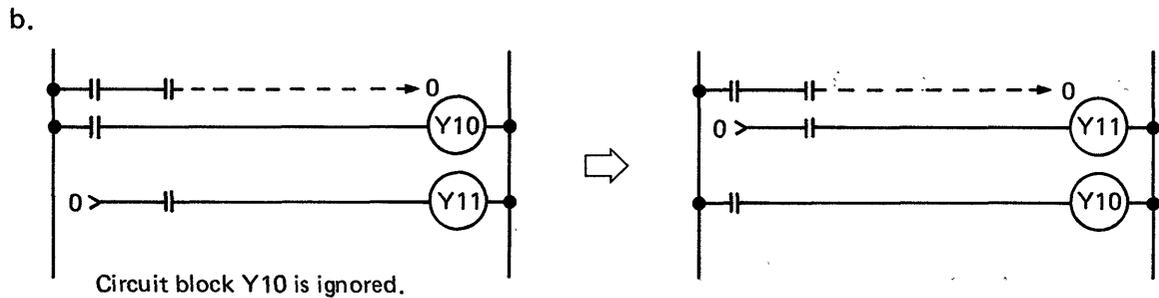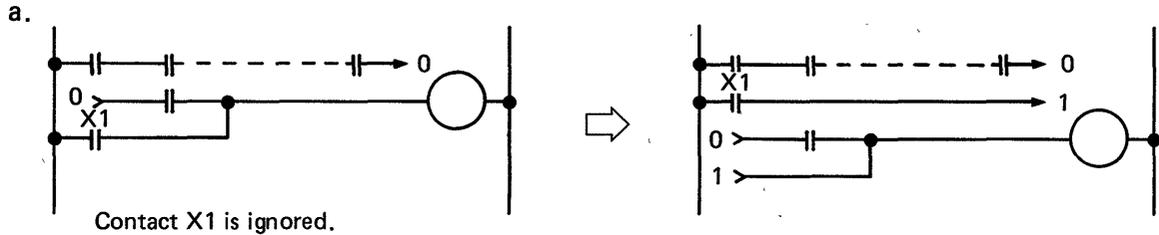
(9) Economization on the number of steps

When step capacity is insufficient, the following measures may be taken:

● "ANB" can be eliminated by bringing the OR circuit to the left bus.

● "ORB" can be eliminated by bringing the AND circuit to the upper line.

19 steps

15 steps
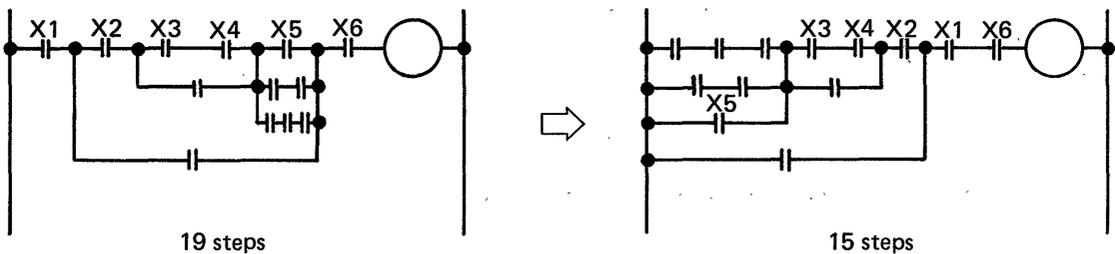
(10) Line return of 3-step instruction
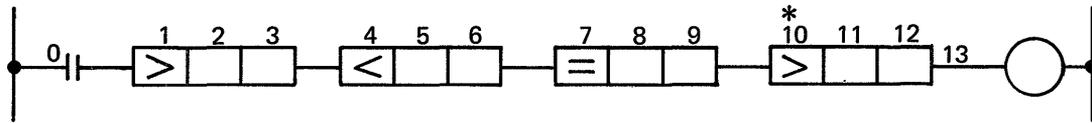
*: The step number 10 cannot be entered following 9. When the ⊟ key is pressed (horizontal line is written) (in this case, two lines), the return symbol (→, ←) is automatically displayed and the write to the next step can be performed. (When the 3-step instruction is not completed, the line return cannot be made.)

(11) Circuit examples which are wrong but can be programmed (CNV is possible) (However, list is displayed on the screen although circuit is not displayed.)

a)

b)
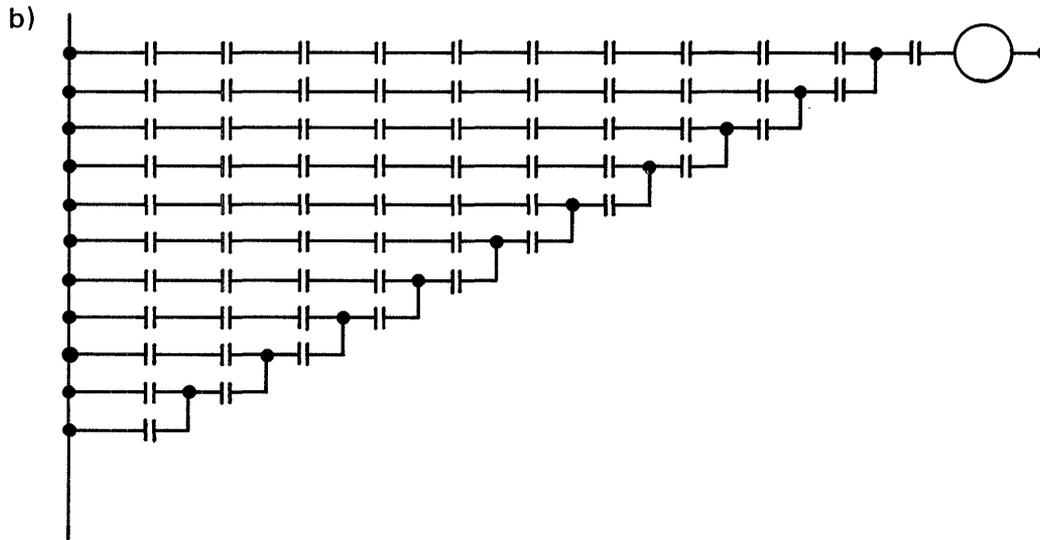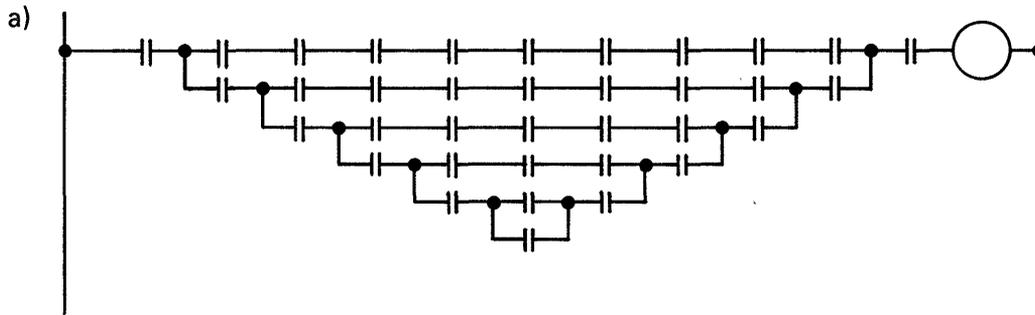
Since the above circuit is not provided with ANB or ORB instruction within eight LD instructions, the programmable controller fails to run normally.

c)

Display after conversion   Display by pressing RD key
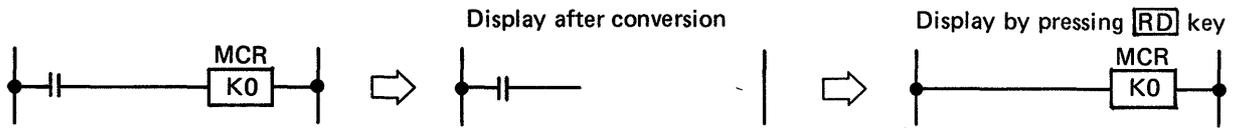
If there is a contact in front of MCR, the circuit can be converted but MCR is deleted after the conversion. When read operation is executed, the contact is deleted and the circuit is displayed with only MCR. In this case, there is discrepancy between the written circuit and the displayed circuit. Therefore, never program a circuit which has a contact in front of MCR.

(12)When the CNV key is pressed without providing a contact in front of coil as shown in Fig. 7.15, "ILLOGICAL DIAGRM" is displayed. When the contact is written as shown in Fig. 7.16 after the conversion, the circuit shown in Fig. 7.17 is displayed. If the CNV key is pressed in this state, "ILLOGICAL DIAGRM" is displayed again. Therefore, be sure to press the CNV key after correcting the circuit as shown in Fig. 7.16 again.
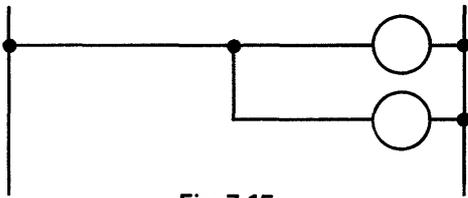
Fig. 7.15
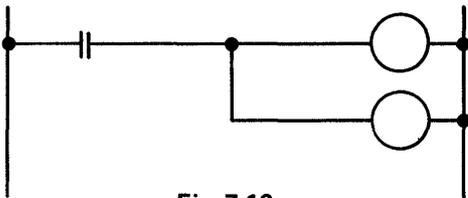
Fig. 7.16
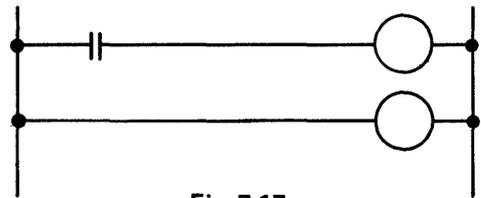
Fig. 7.17

7.4 Read of Sequence Program with Ladder Symbols

7.4.1 Read of sequence program

```
     K  KCPU MEM  PC
     1   K1   1K  NO1
     2  K2.0.J 2K NO2
     3   K3   3K  NO3
     4        4K
     8        8K
     C        12K
     F        16K
```
Fig. 7.18

By pressing the K *1 *1 *1 GO keys, the initial setting is completed and the screen shows Fig. 7.19.

For the setting of *1, see Section 6.2.
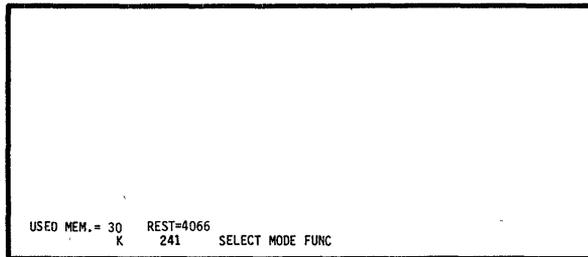
```



    USED MEM.= 30   REST=4066
          K      241    SELECT MODE FUNC
```
Fig. 7.19

By pressing the LDR RD SSN *2 GO keys, the mode setting is completed and the sequence program stored in the memory is displayed in a ladder diagram.
At *2, specify the step number to be read.

┌ EXAMPLE --┐
│ LDR RD SSN 0 GO   → Fig. 7.20 is displayed. │
│ LDR RD SSN 7 GO   → Fig. 7.21 is displayed. │
└--┘
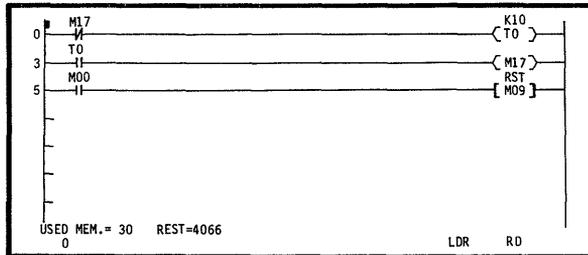
```
      M17                              K10
 0  ─┤/├──────────────────────────────(T0 )─
      T0
 3  ─┤├──────────────────────────────(M17)─
      M00                              RST
 5  ─┤├───────────────────────────────[M09]─




    USED MEM.= 30   REST=4066
         0                          LDR   RD
```
Fig. 7.20

By pressing the GO key, the succeeding circuit is displayed.

┌ EXAMPLE --┐
│ GO   → Fig. 7.21 is displayed. │
└--┘
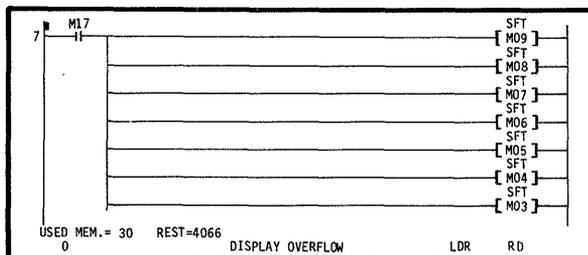
```
      M17                              SFT
 7  ─┤├───────────────────────────────[M09]─
                                       SFT
                                       [M08]─
                                       SFT
                                       [M07]─
                                       SFT
                                       [M06]─
                                       SFT
                                       [M05]─
                                       SFT
                                       [M04]─
                                       SFT
                                       [M03]─
    USED MEM.= 30   REST=4066
         0         DISPLAY OVERFLOW    LDR   RD
```
Fig. 7.21

By pressing the GO key, the succeeding circuit is displayed.

┌ EXAMPLE --┐
│ GO   → Fig. 7.22 is displayed. │
└--┘

NOTE

1. When the number of lines used for one circuit block exceeds seven, "DISPLAY OVERFLOW" is dispalyed as shown in Fig. 7.21, and in the next screen, only the rest of one circuit block is displayed as shown in Fig. 7.22.

2. If a circuit written in the list mode exceeds 22 lines in one circuit block, this circuit cannot be displayed in the ladder mode.
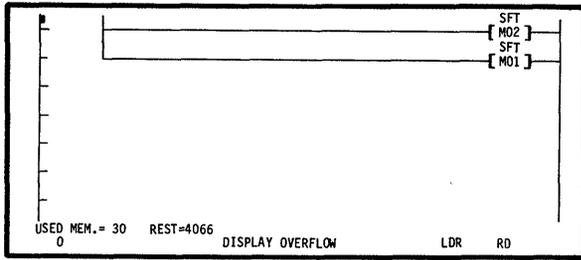
Fig. 7.22
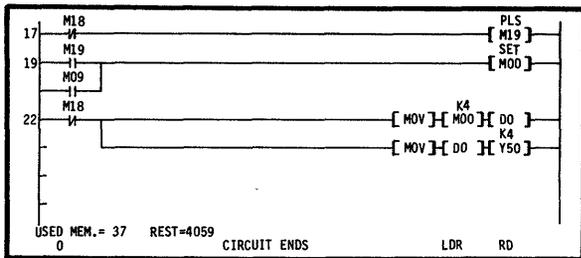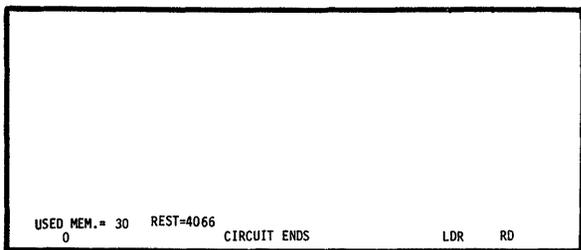
By pressing the GO key, the succeeding circuit is displayed.

┌ EXAMPLE ─────────────────────────────────┐
│ GO   → Fig. 7.23 is displayed.   │
└──┘

Fig. 7.23

When the last circuit has been displayed, "CIRCUIT ENDS" is displayed at the bottom of screen as shown in Fig. 7.24. To display the first circuit, press the following keys:

SSN 0 GO → Fig. 7.20 is displayed.

GO   → Fig. 7.24 is displayed.

Fig. 7.24

By pressing the GO key, the first circuit (Fig. 7.20) is displayed.

7.4.2 Read of preceding circuit block

─ GO ....The screen displays a circuit block which has a step number preceding the lowest step number displayed on the screen as shown in Fig. 7.26.
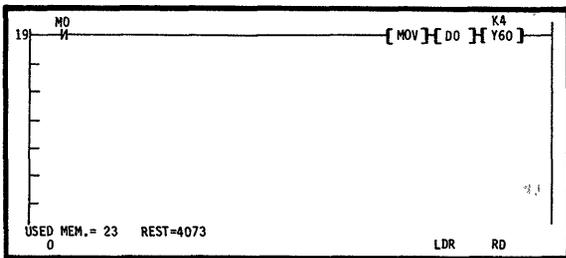
Fig. 7.25
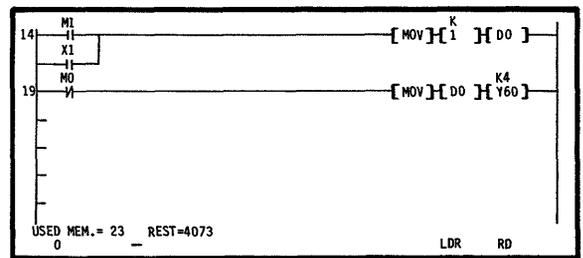
Fig. 7.26

NOTE

When it is desired to display the next circuit block after reading the preceding circuit block by pressing the ─ key, press the + GO keys.

7.4.3 Read by designation of device number

[M] [1] [9] [GO] ......Among circuit blocks which use M18 contact or coil in the program, the circuit block with the lowest step number is displayed as shown in Fig. 7.27.

[GO] ....The circuit block, which uses M18 contact or coil, with the next lowest step number is displayed as shown in Fig. 7.28.
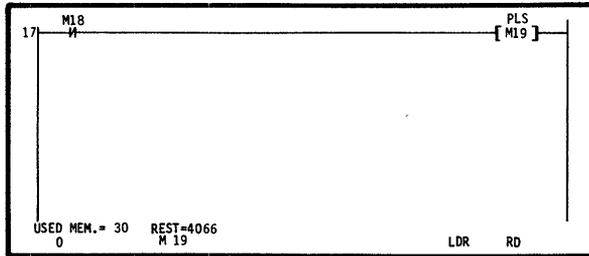
Fig. 7.27
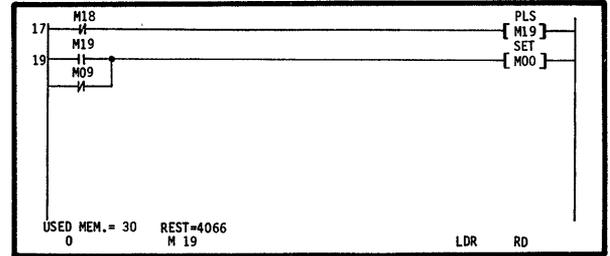
Fig. 7.28

7.4.4 Read of contact circuit by designation of device number

[⊣⊢] [M] [1] [8] [GO] ...Among circuit blocks which use M18 contact in the program, the circuit block with the lowest step number is displayed as shown in Fig. 7.29.

[GO] ....The circuit block, which uses M18 contact, with the next lowest step number is displayed as shown in Fig. 7.30.
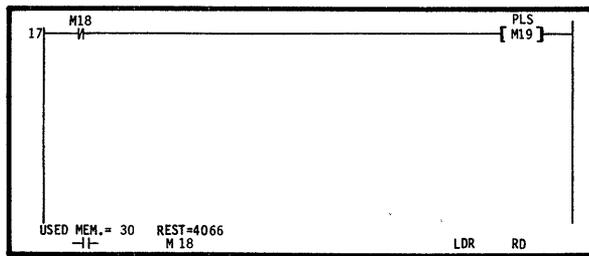
Fig. 7.29
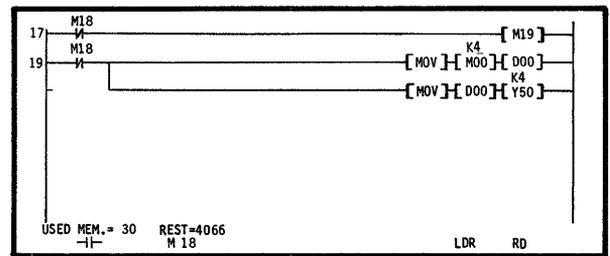
Fig. 7.30

NOTE

Operation can also be effected by using the [⊬], [⊣⊢] or [⊬] key.

7.4.5 Read of coil circuit by designation of device number

[O] [T] [0] [GO] ......Among circuit blocks which use T0 coil in the program, the circuit block with the lowest step number is displayed as shown in Fig. 7.31.
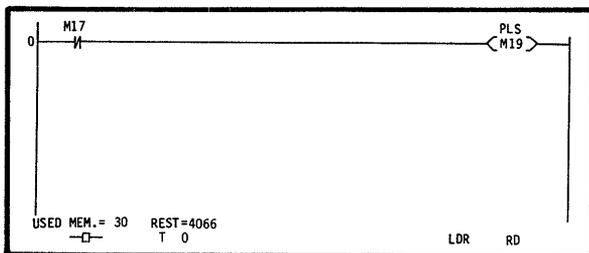
Fig. 7.31

NOTE

1. Operation can also be effected by using the ⊡ key.

2. For the MC, MCR, PLS, SFT, RST or SET instruction, press the following keys:

⊡ PLS M 1 9 GO

➤ Device number
➤ Instruction
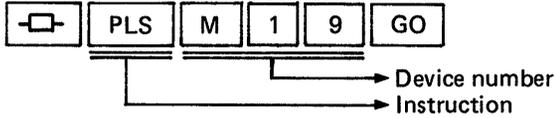
7.4.6 Read of data instruction or CJ instruction

⊡ MOV GO .....Among circuit blocks which use MOV instruction in the program, the circuit block with the lowest step number is displayed as shown in Fig. 7.32.

GO ....The circuit block, which uses MOV instruction, with the next lowest step number is displayed.
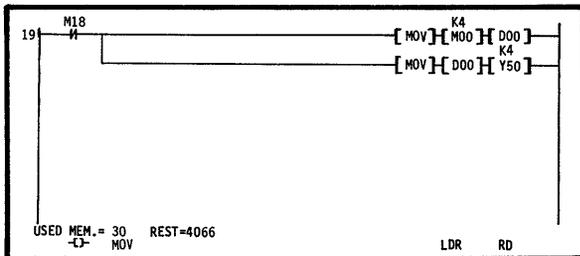
Fig. 7.32

7.4.7 Read of the last circuit

CL END GO ......The last circuit in the program is displayed as shown in Fig. 7.33.
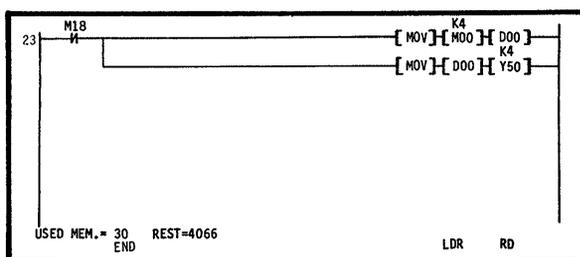
Fgi. 7.33

7.4.8 Upward and downward scrolling of screen by use of ⌂ , ⌄ keys

Move the cursor to the top or bottom of screen. By pressing the ⌂ or ⌄ key at the position, the screen is scrolled one line upward or downward as shown in Fig. 7.35.
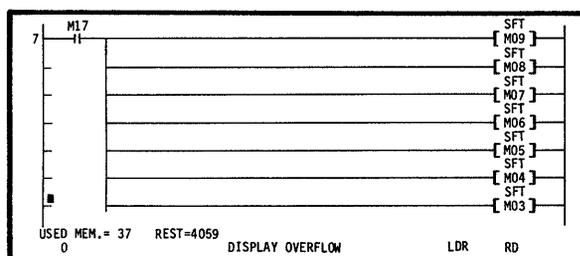
Fig. 7.34
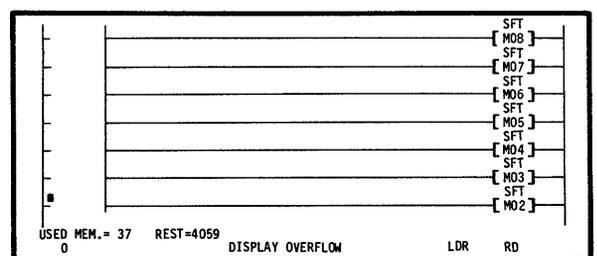
Fig. 7.35

7.4.9 Display of circuit with comment

VER
(COM) . . . . .The circuit with comment is displayed as shown in Fig. 7.37. When this key is pressed again, the screen as shown in Fig. 7.36 is restored. For the preparation of comment, see Section 9.1.
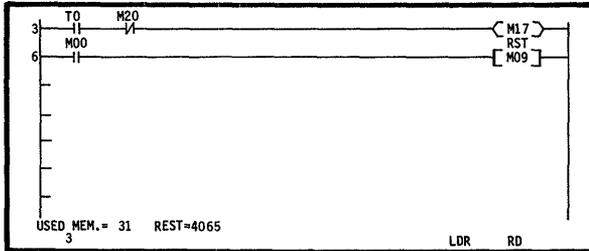
Fig. 7.36
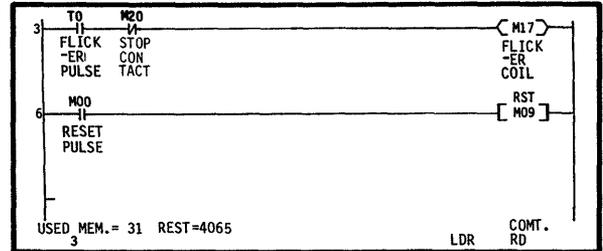
Fig. 7.37

7.4.10 Circuit which cannot be displayed

A circuit which has eight or more ORB instructions or ANB instructions consecutively cannot be displayed. Also, when there is no ORB or ANB within eight LD instructions, the circuit is not displayed.

Example:
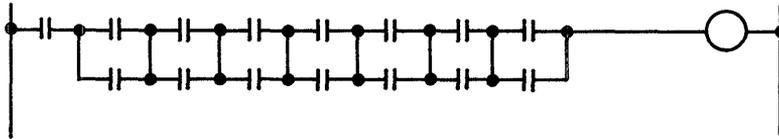
The above indicated circuit may have eight or more ANB instructions depending on the preparation method in the list mode (see Section 8). In such a case, the circuit cannot be displayed in the ladder mode. Therefore, avoid consecutively using the ANB instructions to allow the circuit to be displayed in the ladder mode.

7.5 Correction of Sequence Program with Ladder Symbols

NOTE

When a circuit with comment is displayed on the screen, the program cannot be corrected. Therefore, make correction after restoring the display of a circuit without comment.

7.5.1 Rewrite of sequence program
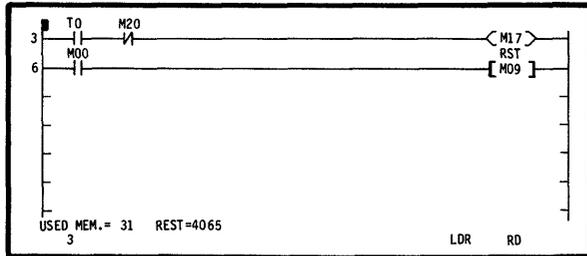
Fig. 7.38

Display a circuit block, which is desired to be corrected, according to Section 7.4 in the first line of screen.

By pressing the [WR] key, the screen displays only the circuit block in the first line as shown in Fig. 7.39. In this state, the program can be rewritten.
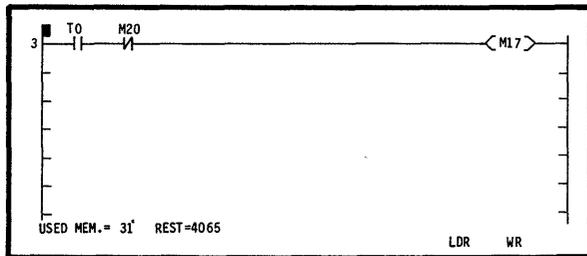
Fig. 7.39

By using the [↑] , [→] , [↓] , and/or [←] keys, move the cursor to the position of contact or coil which is desired to be corrected.

r EXAMPLE --,
: By pressing the [→] key, move the cursor to the position :
: of M20 as shown in Fig. 7.40. :
`--------------------------------------------------------`
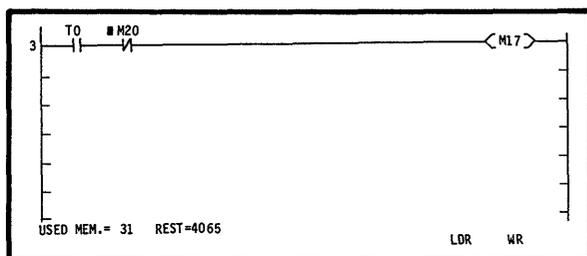
Fig. 7.40

Press keys which correspond to the device to be corrected.

r EXAMPLE --,
: By pressing the [↯][M][3][0][GO] keys, rewrite M20 to :
: M30 as shown in Fig. 7.41. :
`--------------------------------------------------------`
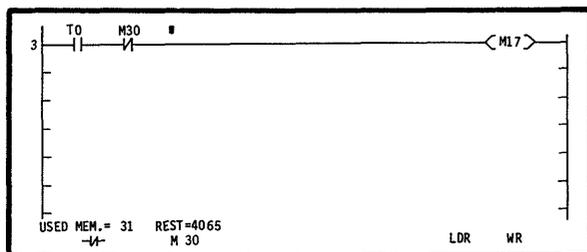
Fig. 7.41

By pressing the [CNV][GO] keys, convert the circuit and store it into the program memory area again.

NOTE

If another mode is selected or the RESET switch is pressed without converting the circuit by pressing the [CNV] [GO] keys, the rewritten contents will be invalid.
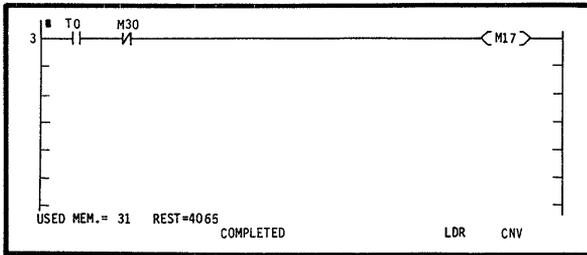
```
        TO     M30
    3   ─┤ ├────┤/├──────────────────────────────<M17>──

USED MEM.= 31    REST=4065
                        COMPLETED              LDR   CNV
```

Fig. 7.42

When the conversion of circuit has been completed, "COMPLETED" is displayed as shown in Fig. 7.42, and in this state, another mode can be selected.

7

7.5.2 Insertion of sequence program

(1) Addition of contact or coil
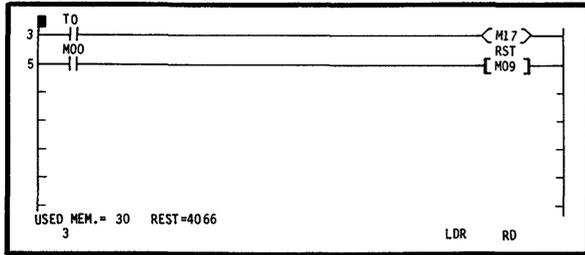
Fig. 7.43

Display a circuit block, which is desired to be corrected, according to Section 7.4 in the first line of screen.

By pressing the |INS| key, the screen displays only the first line as shown in Fig. 7.44. In this state, insertion can be made.
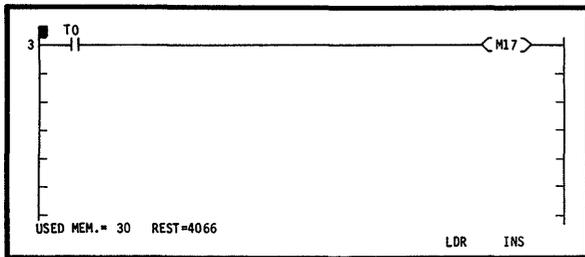
Fig. 7.44

By using the ⌂ , ⊳ , ⌄ , and/or ⊲ keys, move the cursor to the position where a new contact or coil is inserted.

┌ EXAMPLE ─────────────────────────────────
│ By pressing the ⊳ key, move the cursor to the position
│ where a contact is inserted as shown in Fig. 7.45.
└───
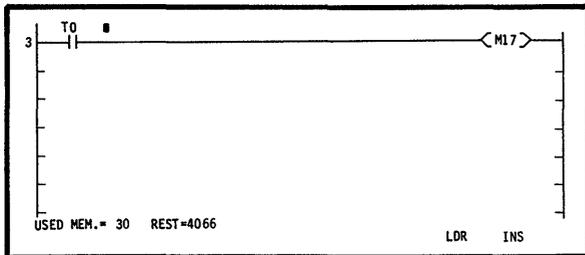
Fig. 7.45

Press keys which correspond to the device to be newly inserted.

┌ EXAMPLE ─────────────────────────────────
│ By pressing the │⫫│ │M│ │2│ │0│ │GO│ keys, insert a
│ contact in to the cursor position in Fig. 7.45, as shown in
│ Fig. 7.46.
└───
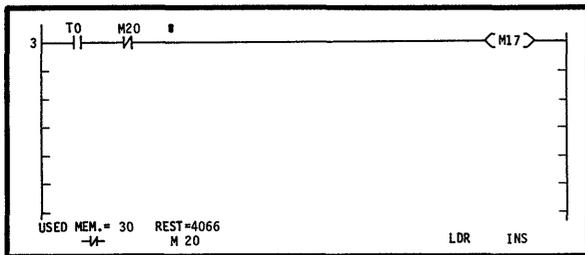
Fig. 7.46

By pressing the |CNV| |GO| keys, convert the circuit and store the inserted contact into the program memory area.

NOTE

If another mode is selected or the RESET switch is pressed without converting the circuit by pressing the |CNV| |GO| keys, the inserted contents will be invalid.
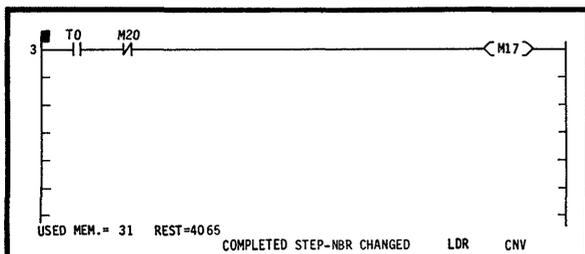
Fig. 7.47

When the conversion of circuit has been completed, "COMPLETED" is displayed as shown in Fig. 7.47, and in this state, another mode can be selected.

(2) Addition of circuit block
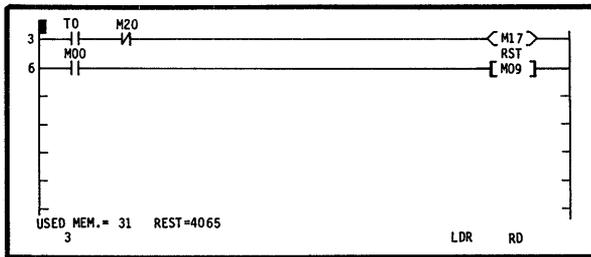
Fig. 7.48

Display a circuit block, which precedes the position where a new circuit block will be added, according to Section 7.4 in the first line of screen.

By pressing the [WR] key, the screen displays only the first line as shown in Fig. 7.49. In this state, addition can be made.
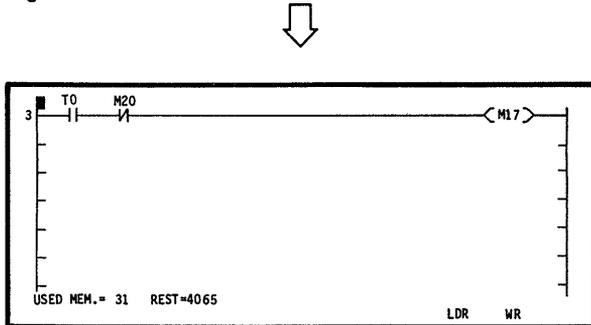
Fig. 7.49

By pressing the [SSN] [GO] keys, a step number and bus following the displayed circuit block are displayed as shown in Fig. 7.50.
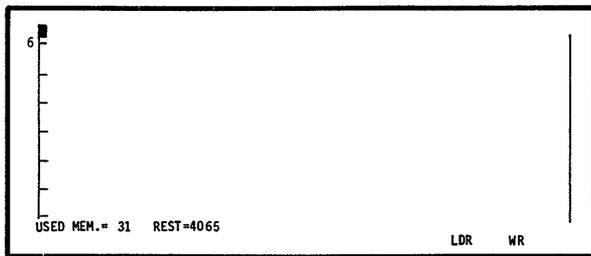
Fig. 7.50

Press keys which correspond to the program which is desired to be added.

EXAMPLE

┤├ [T] [0] [GO]
┤○ [C] [1] [GO]
┤□ [K] [1] [0] [0] [GO]   The screen displays Fig. 7.51.
┤├ [C] [1] [GO]
┤○ [Y] [4] [0] [GO]
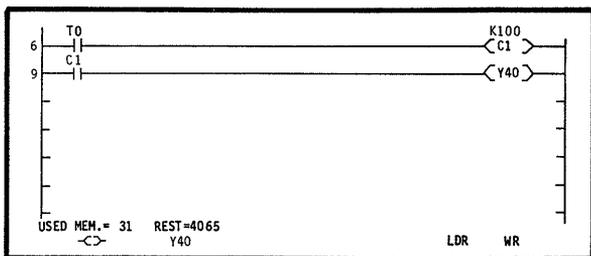
Fig. 7.51

By pressing the [CNV] [GO] keys, convert the circuit and store the added program into the program memory area.

NOTE

If another mode is selected or the RESET switch is pressed without converting the circuit by pressing the [CNV] [GO] keys, the added program will be invalid.
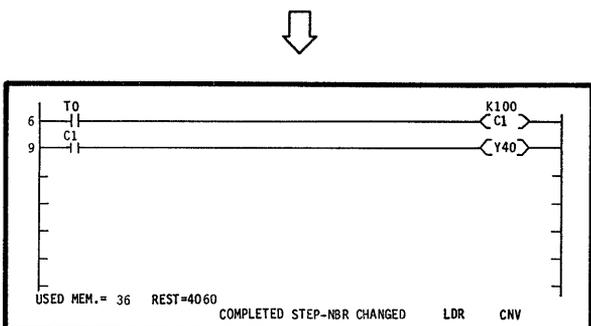
Fig. 7.52

When the conversion of circuit has been completed, "STEP-NBR CHANGED" is displayed as shown in Fig. 7.52, and in this state, another mode can be selected.

7.5.3 Deletion of sequence program

(1) Deletion of contact or coil
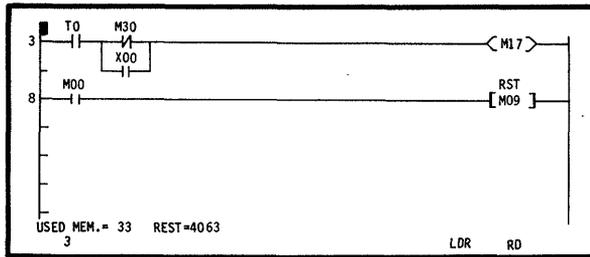
Fig. 7.53

Display a circuit block, which is desired to be corrected, according to Section 7.4 in the first line of screen.

By pressing the [DEL] key, the screen displays only the circuit block in the first line as shown in Fig. 7.54. In this state, deletion can be made.
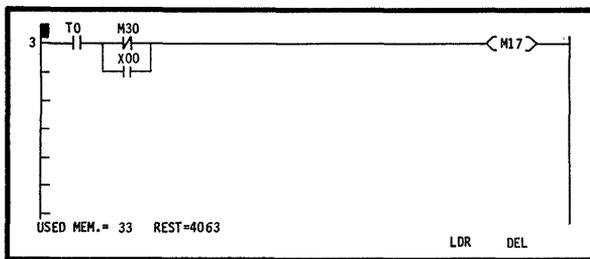
Fig. 7.54

By using the ⬆, ➡, ⬇, and/or ⬅ keys, move the cursor to the position of contact or coil which is desired to be deleted.

┌ EXAMPLE ─────────────────────────────
│ By pressing the ➡ and ⬇ keys, move the cursor to the position of X00 as shown in Fig. 7.55.
└──────────────────────────────────────
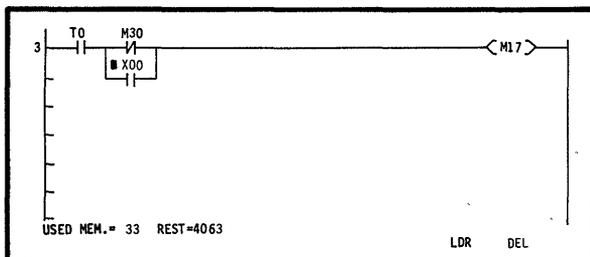
Fig. 7.55

By pressing the [ꓩꓩ] [GO] keys, delete a parallel contact as shown in Fig. 7.56.
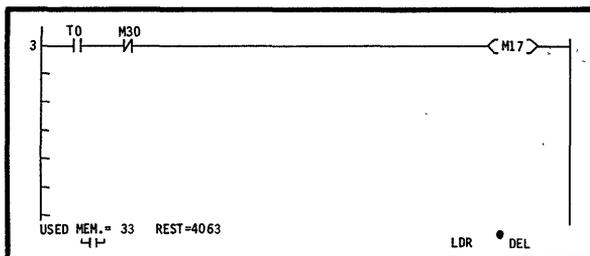
Fig. 7.56

By pressing the [CNV] [GO] keys, convert the corrected circuit and store it into the program memory area.

NOTE

If another mode is selected or the RESET switch is pressed without converting the circuit by pressing the [CNV] [GO] keys, the deleted contents will be not be deleted and remain in the memory.
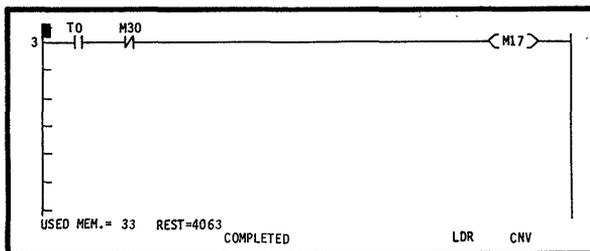
Fig. 7.57

When the conversion of circuit has been completed, "COMPLETED" is displayed as shown in Fig. 7.57, and in this state, another mode can be selected.

NOTE

Since the deleted contact or coil changes to NOP instruction, the number of used memory does not change.

(2) Deletion of one circuit block
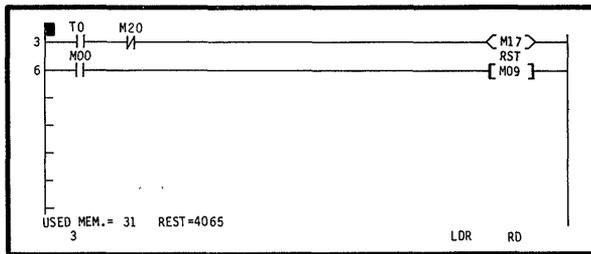
Fig. 7.58

Display a circuit block, which is desired to be corrected, according to Section 7.4 in the first line of screen.

By pressing the DEL key, the screen displays only the circuit block in the first line as shown in Fig. 7.59.
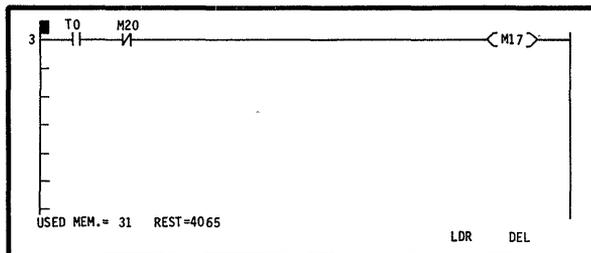
Fig. 7.59

By pressing the key, "DELETE 1-CIRCUIT" message is displayed as shown in Fig. 7.60.
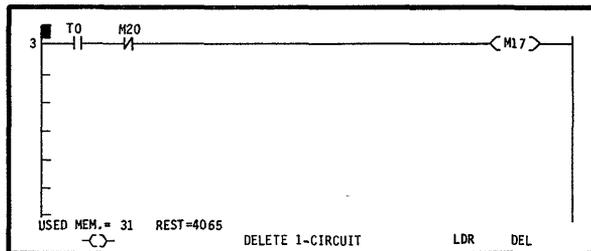
Fig. 7.60

By pressing the GO key, the displayed circuit block is deleted and the screen turns to the one shown in Fig. 7.62.

By pressing the CL key, the "DELETE 1-CIRCUIT" message disappears and the deletion of circuit block becomes invalid.

NOTE

1. When one circuit block is deleted, it is not required to convert the circuit.

2. Since the deleted circuit block changes to the NOP instruction, the value at the USED MEM. column does not change.
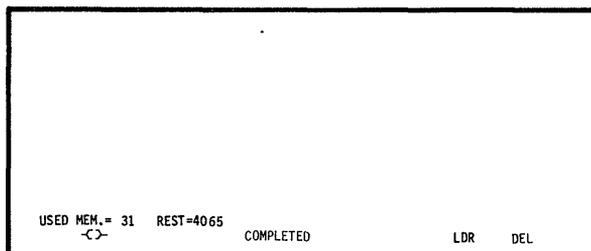
Fig. 7.61

MEMO

8. OPERATION IN LIST MODE

8. OPERATION IN LIST MODE

8.1 Key Operation for Preparation of Sequence Program in List Mode

Instruction	Key Operation	Instruction	Key Operation
LD	[LD/C] [X] [SFT/1] [RST/0] [RST/0] [GO] — Device number	SFT	[SFT/1] [M] [SFT/1] [CJ/2] [OUT/3] [GO] — Device number
LDI	[LDI/8] [X] [SFT/1] [RST/0] [RST/0] [GO] — Device number	CJ	[CJ/2] [GO] · [K] [SFT/1] [CJ/2] [OUT/3] [SET/4] [GO] — Step number
AND	[AND/D] [M] [SFT/1] [CJ/2] [OUT/3] [GO] — Device number		
ANI	[ANI/9] [M] [SFT/1] [CJ/2] [OUT/3] [GO] — Device number	PLS	[PLS/1] [M] [SFT/1] [CJ/2] [OUT/3] [GO] — Device number
OR	[OR/E] [Y] [SFT/1] [ANB/5] [RST/0] [GO] — Device number	MOV	[MOV] [GO] · [D] [SFT/1] [CJ/2] [OUT/3] [GO] — Setting of source · [K] [SET/4] [Y] [OUT/3] [RST/0] [GO] — Setting of destination
ORI	[ORI/A] [Y] [SFT/1] [ANB/5] [RST/0] [GO] — Device number		
OUT (Except timer, counter)	[OUT/3] [Y] [SFT/1] [CJ/2] [OUT/3] [GO] — Device number	> (Is greater than)	[>] [GO] · [D] [SFT/1] [CJ/2] [OUT/3] [GO] — Setting of source · [D] [CJ/2] [OUT/3] [SET/4] [GO] — Setting of destination
OUT (Timer, counter)	[OUT/3] [T] [SFT/1] [CJ/2] [OUT/3] [GO] — Device number · [K] [SFT/1] [CJ/2] [OUT/3] [SFT/4] [GO] — Set value		
ANB	[ANB/5] [GO]	< (Is less than)	[<] [GO] · [D] [SFT/1] [CJ/2] [OUT/3] [GO] — Setting of source · [D] [CJ/2] [OUT/3] [SFT/4] [GO] — Setting of destination
ORB	[ORB/6] [GO]		
MC	[MC/F] [K] [SFT/1] [CJ/2] [GO] — Device number	=	[=] [GO] · [D] [SFT/1] [CJ/2] [OUT/3] [GO] — Setting of source · [D] [SFT/2] [CJ/3] [OUT/4] [GO] — Setting of destination
MCR	[MCR/B] [K] [SFT/1] [CJ/2] [GO] — Device number		
SET	[SET/4] [M] [SFT/1] [CJ/2] [OUT/3] [GO] — Device number		
RST	[RST/0] [M] [SFT/1] [CJ/2] [OUT/3] [GO] — Device number		

8

Instruction	Key Operation	Instruction	Key Operation
+	[+][GO] [K][SFT 1][CJ 2][OUT 3][SET 4][GO] Setting of source [D][SFT 1][CJ 2][OUT 3][GO] Setting of destination	BCD	[BCD][GO] [K][SFT 1][CJ 2][OUT 3][SET 4][GO] Setting of source [D][SFT 1][CJ 2][OUT 3][GO] Setting of destination
−	[−][GO] [K][SFT 1][CJ 2][OUT 3][SET 4][GO] Setting of source [D][SFT 1][CJ 2][OUT 3][GO] Setting of destination	BIN	[BIN][GO] [K][SET 4][X][SFT 1][RST 0][GO] Setting of source [D][SFT 1][CJ 2][OUT 3][GO] Setting of destination

8.2 Preparation of Sequence Program with List Symbols

```
           K  KCPU  MEM  PC

           1   K1    1K   N01

           2  K2.0.J  2K   N02

           3   K3    3K   N03

           4         4K

           8         8K

           C        12K

           F        16K
```

Fig. 8.1

By pressing the [K] [*1] [*1] [*1] [GO] keys, the initial setting is completed and the screen shows Fig. 8.2.

For the setting of *1, see Section 6.2.

```




           USED MEM.= 36   REST=4060
                  K     241    SELECT MODE FUNC
```

Fig. 8.2

By pressing the [LST] [RD] [SSN] [0] [GO] keys, a program beginning with step 0, which is stored in the memory, is displayed as shown in Fig. 8.3.

```
         ▶  0  LDI  M 17
            1  OUT  T  0
            2  K     10
            3  LD   T  0
            4  ANI  M 20
            5  OUT  M 17
            6  LD   T  0
            7  OUT  C  1
            8  K    100
            9  LD   C  1
           10  OUT  Y040
           11  LD   M  0
           12  RST  M  9
           13  LD   M 17
         USED MEM.= 36   REST=4060
            0                          LDR   RD
```

Fig. 8.3

By pressing the following keys, the memory contents are initialized.

[WR] [SSN] [0] [GO]

[NOP] [K] [4] [0] [9] [5] [GO]

The last step number

```
         ▶  0  NOP
            1  NOP
            2  NOP
            3  NOP
            4  NOP
            5  NOP
            6  NOP
            7  NOP
            8  NOP
            9  NOP
           10  NOP
           11  NOP
           12  NOP
           13  NOP
         USED MEM.=      REST=
            0    NOP 2045              LDR   WR
```

Fig. 8.4

Enter a sequence program with list symbols. For input method, see Section 8.1.

┌ EXAMPLE ──────────────────────────────┐

[LDI] [T] [0] [GO]

[ANI] [C] [3] [GO]

[OUT] [T] [1] [GO]   } The program is written as shown in Fig. 8.5.

[K] [5] [0] [GO]

[END] [GO]

└──────────────────────────────────────┘

```
            0  LDI  T  0
            1  ANI  C  3
            2  OUT  T  1
            3  K     50
            4  LD   T  1
            5  OUT  T  0
            6  K     50
            7  OUT  C  3
            8  K    100
            9  OUT  Y 50
         ▶ 10  END
           11  NOP
           12  NOP
           13  NOP
         USED MEM.= 11   REST=4085
            0    END                   LDR   WR
```

Fig. 8.5

8.3 Read of Sequence Program with List Symbols

8.3.1 Read of sequence program

```
           K   KCPU MEM  PC

           1    K1   1K  N01

           2  K2.0.J 2K  N02

           3    K3   3K  N03

           4         4K

           8         8K

           C        12K

           F        16K
```
Fig. 8.6

By pressing the K *1 *1 *1 GO keys, the initial setting is completed and the screen shows Fig. 8.7.

For the setting of *1, see Section 6.2.

```



              USED MEM.= 36   REST=4060
                         K     241     SELECT MODE FUNC
```
Fig. 8.7

By pressing the LST RD SSN *1 GO keys, the mode setting is completed and the sequence program stored inside the memory is displayed with list symbols.
At *1, specify a step number to be read.

┌ EXAMPLE --┐
| |
| LST RD SSN 0 GO   → Fig. 8.8 is displayed. |
| |
| LDR RD SSN 2 1 GO → Fig. 8.9 is displayed. |
└---┘

```
   ▶  0  LDI  M 17
      1  OUT  T  0
      2  K       10
      3  LD   T  0
      4  ANI  M 20
      5  OUT  M 17
      6  LD   T  0
      7  OUT  C  1
      8  K      100
      9  LD   C  1
     10  OUT  Y040
     11  LD   M  0
     12  RST  M  9
     13  LD   M 17
  USED MEM.= 36   REST=4060
      0                             LDR    RD
```
Fig. 8.8

By pressing the GO key, steps 14 through 27 are displayed as shown in Fig. 8.9.

```
     14  SFT  M  9
     15  SFT  M  8
     16  SFT  M  7
     17  SFT  M  6
     18  SFT  M  5
     19  SFT  M  4
     20  SFT  M  3
   ▶ 21  SFT  M  2
     22  SFT  M  1
     23  LDI  M 18
     24  PLS  M 19
     25  LD   M 19
     26  OR   M  9
     27  SET  M  0
  USED MEM.= 36   REST=4060
      0                             LDR    RD
```
Fig. 8.9

By pressing the GO key, steps 28 through 41 are displayed as shown in Fig. 8.10.

```
     28  LDI  M 18
     29  MOV
     30  K4   M  0
     31       D  0
     32  MOV
     33       D  0
     34  K4   Y 50
   ▶ 35  END
     36  NOP
     37  NOP
     38  NOP
     39  NOP
     40  NOP
     41  NOP
  USED MEM.= 36   REST=4060
      0                             LDR    RD
```
Fig. 8.10

By pressing the GO key, steps 42 through 55 are displayed.
By pressing the SSN 0 GO keys, the screen displays Fig. 8.8.
By pressing the — GO keys, the screen displays Fig. 8.8.

8.3.2 Read by designation of device number

RD M 0 GO . . . . . . Among portions which use M0 contact or coil in the program, the portion with the lowest step number is displayed as shown in Fig. 8.11.

GO . . . . .The portion, which uses M0 contact or coil, with the next lowest step number is displayed as shown in Fig. 8.12.

```
     4  ANI   M 20
     5  OUT   M 17
     6  LD    T  0
     7  OUT   C  1
     8  K        100
     9  LD    C  1
    10  OUT   Y040
 ▶  11  LD    M  0
    12  RST   M  9
    13  LD    M 17
    14  SFT   M  9
    15  SFT   M  8
    16  SFT   M  7
    17  SFT   M  6
USED MEM.= 36    REST=4060
          M  0                    LDR   RD
```
Fig. 8.11

```
    20  SFT   M  3
    21  SFT   M  2
    22  SFT   M  1
    23  LDI   M 18
    24  PLS   M 19
    25  LD    M 19
    26  OR    M  9
 ▶  27  SET   M  0
    28  LDI   M 18
    29  MOV
    30  K4    M  0
    31        D  0
    32  MOV
    33        D  0
USED MEM.= 36    REST=4060
     0    M  0                    LDR   RD
```
Fig. 8.12

8.3.3 Read of instruction by designation of device number

RD LD T 0 GO . . . .Among T0 contacts which are used for LD instruction in the program, the coil with the lowest step number is displayed as shown in Fig. 8.13.

GO . . . . .The T0 contact, which is used for LD instruction, with the next lowest step number is displayed as shown in Fig. 8.14.

```
     0  LDI   M 17
     1  OUT   T  0
     2  K        10
 ▶   3  LD    T  0
     4  ANI   M 20
     5  OUT   M 17
     6  LD    T  0
     7  OUT   C  1
     8  K        100
     9  LD    C  1
    10  OUT   Y040
    11  LD    M  0
    12  RST   M  9
    13  LD    M 17
USED MEM.= 36    REST=4060
          LD    T  0              LDR   RD
```
Fig. 8.13

```
     0  LDI   M 17
     1  OUT   T  0
     2  K        10
     3  LD    T  0
     4  ANI   M 20
     5  OUT   M 17
 ▶   6  LD    T  0
     7  OUT   C  1
     8  K        100
     9  LD    C  1
    10  OUT   Y040
    11  LD    M  0
    12  RST   M  9
    13  LD    M 17
USED MEM.= 36    REST=4060
          LD    T  0              LDR   RD
```
Fig. 8.14

8.3.4 Read of the last step in program

RD END GO . . . . .The END instruction in the program is read as shown in Fig. 8.15.

```
    28  LDI   M 18
    29  MOV
    30  K4    M  0
    31        D  0
    32  MOV
    33        D  0
    34  K4    Y 50
 ▶  35  END
    36  NOP
    37  NOP
    38  NOP
    39  NOP
    40  NOP
    41  NOP
USED MEM.= 36    REST=4060
     0    END                     LDR   RD
```
Fig. 8.15

8.3.5 Read of reference step list

RD 卄 M 0 GO . . . . .All M0 contacts and coils used in the program are displayed as shown in Fig. 8.16.

GO . . . . .When all the contacts and coils cannot be displayed in one screen, they are displayed in the next screen.

```
REF.STEP LIST

M  0  STEP  CIRCUIT     STEP  CIRCUIT     STEP  CIRCUIT     STEP  CIRCUIT
       11    ⊣⊢          27   -[]- SET     30   -[]-




USED MEM.= 36   REST=4060
                M  0    COMPLETED                          LDR    RD
```

Fig. 8.16

8.3.6 Read of I/O use list

RD M GO . . . . .Among device numbers in the program, used Ms are displayed as shown in Fig. 8.17.

GO . . . . .Device numbers following the displayed device numbers in the preceding screen are displayed as shown in Fig. 8.18.

```
IO USE LIST
         <1 → USED>      <0 → UNUSED>    <E → ERR>

         ⊣⊢ -()-         ⊣⊢ -()-         ⊣⊢ -()-        ⊣⊢ -()-

  M  0  1  1       M  8  1  1       M 16  0  0       M 24  0  0
  M  1  1  1       M  9  1  1       M 17  1  1       M 25  0  0
  M  2  1  1       M 10  1  0  E    M 18  1  0  E    M 26  0  0
  M  3  1  1       M 11  1  0  E    M 19  1  1       M 27  0  0
  M  4  1  1       M 12  1  0  E    M 20  1  0  E    M 28  0  0
  M  5  1  1       M 13  1  0  E    M 21  0  0       M 29  0  0
  M  6  1  1       M 14  1  0  E    M 22  0  0       M 30  0  0
  M  7  1  1       M 15  1  0  E    M 23  0  0       M 31  0  0
USED MEM.= 36   REST=4060
                M
```

Fig. 8.17

```
IO USE LIST
         <1 → USED>      <0 → UNUSED>    <E → ERR>

         ⊣⊢ -()-         ⊣⊢ -()-         ⊣⊢ -()-        ⊣⊢ -()-

  M 32  0  0       M 40  0  0       M 48  0  0       M 56  0  0
  M 33  0  0       M 41  0  0       M 49  0  0       M 57  0  0
  M 34  0  0       M 42  0  0       M 50  0  0       M 58  0  0
  M 35  0  0       M 43  0  0       M 51  0  0       M 59  0  0
  M 36  0  0       M 44  0  0       M 52  0  0       M 60  0  0
  M 37  0  0       M 45  0  0       M 53  0  0       M 61  0  0
  M 38  0  0       M 46  0  0       M 54  0  0       M 62  0  0
  M 39  0  0       M 47  0  0       M 55  0  0       M 63  0  0
USED MEM.= 36   REST=4060
                M
```

Fig. 8.18

NOTE

1. Used contacts and coils are indicated by 1 and unused ones by 0. When only contact or coil is used, E (for error) is displayed. However, when only the coil of external failure memory F or output Y is used, when only the destination of data register D is used, or when only the contact of input X or temporary memroy M254, M255 (MA22, MA23 when K3CPU has been selected), E is not displayed.

2. For data registers D, the source is displayed in the contact column and the destination in the coil column.

3. For the device number K of master control, press the following keys:

   RD C K GO

4. The coil of input X is indicated by "1" when the input X is used for the destination of data instruction.

8.4 Correction of Sequence Program with List Symbols

8.4.1 Rewrite of sequence program

```
    14  SFT  M   9
    15  SFT  M   8
    16  SFT  M   7
    17  SFT  M   6
    18  SFT  M   5
    19  SFT  M   4
    20  SFT  M   3
 ●  21  SFT  M   2
    22  SFT  M   1
    23  LDI  M  18
    24  PLS  M  19
    25  LD   M  19
    26  OR   M   9
    27  SET  M   0
USED MEM.= 36    REST=4060
                                    LDR    RD
```

Fig. 8.19

Display an instruction having a step number, which is desired to be corrected, on the screen. By pressing the WR key, specify the write mode.

```
    14  SFT  M   9
    15  SFT  M   8
    16  SFT  M   7
    17  SFT  M   6
    18  SFT  M   5
    19  SFT  M   4
    20  SFT  M   3
 ●  21  SFT  M   2
    22  SFT  M   1
    23  LDI  M  18
    24  PLS  M  19
    25  LD   M  19
    26  OR   M   9
    27  SET  M   0
USED MEM.= 36    REST=4060
                                    LDR    WR
```

Fig. 8.20

By using the ⬆ and/or ⬇ keys, move the cursor to the portion which is desired to be corrected.

┌ EXAMPLE ─────────────────────────────────┐
│   │
│ By pressing the ⬇ key five times, move the cursor to the │
│ position of step number 26 as shown in Fig. 8.21.   │
└──┘

```
    14  SFT  M   9
    15  SFT  M   8
    16  SFT  M   7
    17  SFT  M   6
    18  SFT  M   5
    19  SFT  M   4
    20  SFT  M   3
    21  SFT  M   2
    22  SFT  M   1
    23  LDI  M  18
    24  PLS  M  19
    25  LD   M  19
 ●  26  OR   M   9
    27  SET  M   0
USED MEM.= 36    REST=4060
                                    LDR    WR
```

Fig. 8.21

Press keys which correspond to the device to be rewritten.

┌ EXAMPLE ─────────────────────────────────┐
│   │
│ By pressing the ORI M 2 5 GO keys, rewrite OR M9 │
│ to ORI M25 as shown in Fig. 8.22.   │
└──┘

```
    14  SFT  M   9
    15  SFT  M   8
    16  SFT  M   7
    17  SFT  M   6
    18  SFT  M   5
    19  SFT  M   4
    20  SFT  M   3
    21  SFT  M   2
    22  SFT  M   1
    23  LDI  M  18
    24  PLS  M  19
    25  LD   M  19
 ●  26  ORI  M  25
    27  SET  M   0
USED MEM.= 36    REST=4060
         ORI   M 25                 LDR    WR
```

Fig. 8.22

The rewrite of step number 26 has been completed.
To rewrite an instruction having another step number on the screen, perform the same operation as described above beginning with the movement of cursor.
To rewrite an instruction having a step number which is not displayed on the screen, perform the same operation after setting the RD mode and displaying the sequence program on the screen.

MELSEC-**K**

NOTE

1. When "K3" has been selected for programmable controller CPU type name in the initial setting, and the number of digits has been specified at both S (source) and D (destination) in the write operation of data instruction, the number of digits of S (source) is changed to the number of digits specified at D (destination).

```
┌──────────┐        ┌──────────┐        ┌──────────┐
│ MOV      │        │ MOV      │        │ MOV      │
│          │   ⇨    │  K4  M  0│   ⇨    │  K2  M  0│
│          │        │          │        │          │
│          │        │          │        │  K2  Y 20│
└──────────┘        └──────────┘        └──────────┘
```

The number of digits of S (source) has been set to 4.

When the number of digits of D (destination) is set to 2, the number of digits of S (source) is changed to 2.
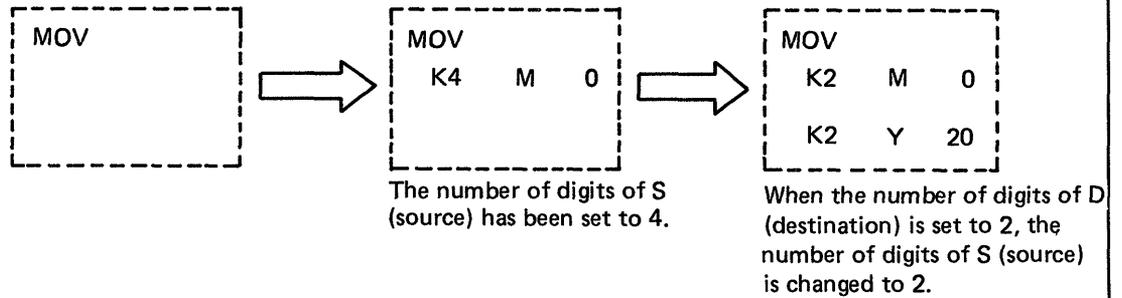
2. When "K3" has been selected for the programmable controller CPU type name in the initial setting and a mistake is made in the correction of CJ instruction or data instruction, the instruction may change.

```
┌──────────┐        ┌──────────┐        ┌──────────┐
│ MOV      │        │ NOP      │        │ MOV      │
│  K4  M  0│   ⇨    │  K   M  0│   ⇨    │  K1  M  0│
│          │        │          │        │          │
│     D   0│        │     D   0│        │     D   0│
└──────────┘        └──────────┘        └──────────┘
```

When MOV is rewritten to NOP by mistake, the display of digit number disappears.

When NOP is corrected to MOV, the display of digit number changes to 1.
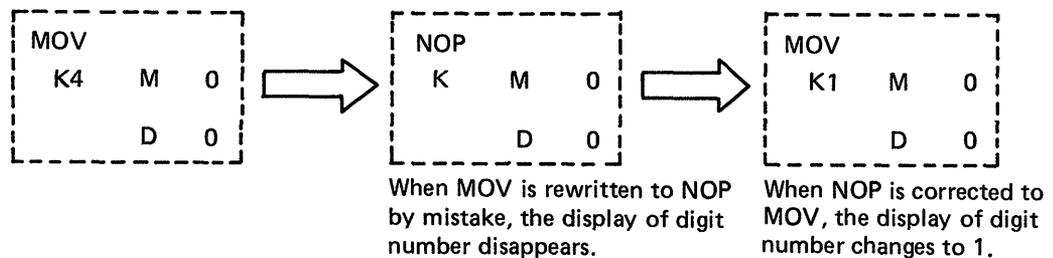
8.4.2 Insertion of sequence program

```
 ▶  0  LDI  M 17
    1  OUT  T  0
    2  K     10
    3  LD   T  0
    4  ANI  M 20
    5  OUT  M 17
    6  LD   T  0
    7  OUT  C  1
    8  K    100
    9  LD   C  1
   10  OUT  Y040
   11  LD   M  0
   12  RST  M  9
   13  LD   M 17
 USED MEM.= 36    REST=4060
    0                           LDR   RD
```

Fig. 8.23

Display an instruction having a step number, which is desired to be corrected, on the screen. By pressing the INS key, specify the insert mode.

```
 ▶  0  LDI  M 17
    1  OUT  T  0
    2  K     10
    3  LD   T  0
    4  ANI  M 20
    5  OUT  M 17
    6  LD   T  0
    7  OUT  C  1
    8  K    100
    9  LD   C  1
   10  OUT  Y040
   11  LD   M  0
   12  RST  M  9
   13  LD   M 17
 USED MEM.= 36    REST=4060
                            LDR   INS
```

Fig. 8.24

By using the ⬆ and/or ⬇ keys, move the cursor to the position of instruction which is located next to the instruction to be added.

┌─EXAMPLE─────────────────────────────────┐
By pressing the ⬇ key nine times, move the cursor to the position shown in Fig. 8.25, whereby an instruction will be inserted between step numbers 8 and 9.
└───┘

```
    0  LDI  M 17
    1  OUT  T  0
    2  K     10
    3  LD   T  0
    4  ANI  M 20
    5  OUT  M 17
    6  LD   T  0
    7  OUT  C  1
    8  K    100
 ▶  9  LD   C  1
   10  OUT  Y040
   11  LD   M  0
   12  RST  M  9
   13  LD   M 17
 USED MEM.= 36    REST=4060
                            LDR   INS
```

Fig. 8.25

Press keys which correspond to the device to be inserted.

┌─EXAMPLE─────────────────────────────────┐
By pressing the OUT Y 3 0 GO keys, the instruction is inserted as shown in Fig. 8.26. LD C1 and the following instructions are shifted down to the next step numbers.
└───┘

```
    0  LDI  M 17
    1  OUT  T  0
    2  K     10
    3  LD   T  0
    4  ANI  M 20
    5  OUT  M 17
    6  LD   T  0
    7  OUT  C  1
    8  K    100
    9  OUT  Y030
 ▶ 10  LD   C  1
   11  OUT  Y040
   12  LD   M  0
   13  RST  M  9
 USED MEM.= 37    REST=4059
    0                       LDR   INS
```

Fig. 8.26

When an instruction is inserted, the instructions located below the inserted instruction are shifted down to the next step numbers, and also the jump destination number of CJ instruction is changed automatically.

8.4.3 Deletion of sequence program

```
   14  SFT  M   9
   15  SFT  M   8
   16  SFT  M   7
   17  SFT  M   6
   18  SFT  M   5
   19  SFT  M   4
   20  SFT  M   3
 ● 21  SFT  M   2
   22  SFT  M   1
   23  LDI  M  18
   24  PLS  M  19
   25  LD   M  19
   26  OR   M   9
   27  SET  M   0
USED MEM.= 36    REST=4060
    21                              LDR    DEL
```

Fig. 8.27

Display an instruction having a step number, which is desired to be corrected, on the screen. By pressing the [DEL] key, specify the delete mode.

```
   14  SFT  M   9
   15  SFT  M   8
   16  SFT  M   7
   17  SFT  M   6
   18  SFT  M   5
   19  SFT  M   4
   20  SFT  M   3
   21  SFT  M   2
   22  SFT  M   1
   23  LDI  M  18
   24  PLS  M  19
   25  LD   M  19
 ● 26  OR   M   9
   27  SET  M   0
USED MEM.= 36    REST=4060
                                    LDR    DEL
```

Fig. 8.28

By using the ⌂ and/or ⌄ keys, move the cursor to the position of instruction which is to be deleted.

```
   14  SFT  M   9
   15  SFT  M   8
   16  SFT  M   7
   17  SFT  M   6
   18  SFT  M   5
   19  SFT  M   4
   20  SFT  M   3
   21  SFT  M   2
   22  SFT  M   1
   23  LDI  M  18
   24  PLS  M  19
   25  LD   M  19
 ▶ 26  OR   M   9
   27  SET  M   0
USED MEM.= 36    REST=4060
                                    LDR    DEL
```

Fig. 8.29

By pressing the [GO] key, the instruction where the cursor is located is deleted as shown in Fig. 8.30. Also, SET M0 and the following instructions are shifted up to the preceding step numbers.

```
   14  SFT  M   9
   15  SFT  M   8
   16  SFT  M   7
   17  SFT  M   6
   18  SFT  M   5
   19  SFT  M   4
   20  SFT  M   3
   21  SFT  M   2
   22  SFT  M   1
   23  LDI  M  18
   24  PLS  M  19
   25  LD   M  19
 ▶ 26  SET  M   0
   27  LDI  M  18
USED MEM.= 35    REST=4061
                                    LDR    DEL
```

Fig. 8.30

When an instruction is deleted, the instructions located below the deleted instruction are shifted up to the preceding step numbers, and also the jump destination number of CJ instruction is changed automatically.

8.4.4　Batch deletion of NOPs

Removes all NOP instructions used in a program.

```
        14  SFT  M  9
        15  SFT  M  8
        16  SFT  M  7
        17  SFT  M  6
        18  SFT  M  5
        19  SFT  M  4
        20  SFT  M  3
      ● 21  SFT  M  2
        22  SFT  M  1
        23  NOP
        24  NOP
        25  LDI  M 18
        26  PLS  M 19
        27  LD   M 19
USED MEM.= 37    REST=4059
     0                              LDR   RD
```

Fig. 8.31

As shown in Fig. 8.33, NOPs written in the program are deleted.
By pressing the DEL NOP GO keys, "EXECUTING" is displayed on the screen. When the execution is completed, "COMPLETED" is displayed as shown in Fig. 8.32 and the values shown at USED MEM. and REST change according to the deletion of NOPs.

```
        14  SFT  M  9
        15  SFT  M  8
        16  SFT  M  7
        17  SFT  M  6
        18  SFT  M  5
        19  SFT  M  4
        20  SFT  M  3
      ● 21  SFT  M  2
        22  SFT  M  1
        23  NOP
        24  NOP
        25  LDI  M 18
        26  PLS  M 19
        27  LD   M 19
USED MEM.= 35    REST=4061
     0     NOP        COMPLETED     LDR   DEL
```

Fig. 8.32

When "COMPLETED" is displayed, NOPs are not deleted from the screen as shown in Fig. 8.32. Actually, however, NOPs have already been deleted. For confirmation, perform read operation by pressing the RD SSN 2 1 GO keys. Then, the screen displays a list from which NOPs have been deleted as shown in Fig. 8.33.

```
        14  SFT  M  9
        15  SFT  M  8
        16  SFT  M  7
        17  SFT  M  6
        18  SFT  M  5
        19  SFT  M  4
        20  SFT  M  3
      ● 21  SFT  M  2
        22  SFT  M  1
        23  LDI  M 18
        24  PLS  M 19
        25  LD   M 19
        26  OR   M  9
        27  SET  M  0
USED MEM.= 35    REST=4061
     0                              LDR   RD
```

Fig. 8.33

8

8.4.5 Write of NOPs

WR NOP GO . . . . .The instruction where the cursor is located is rewritten to NOP.

```
        4  ANI  M 20
        5  OUT  M 17
     ▶  6  LD   T  0
        7  OUT  C  1
        8  K    100
        9  LD   C  1
       10  OUT  Y040
       11  LD   M  0
       12  RST  M  9
       13  LD   M 17
       14  SFT  M  9
       15  SFT  M  8
       16  SFT  M  7
       17  SFT  M  6
USED MEM.= 36   REST=4060
                            LDR   RD
```

Fig. 8.34

```
        4  ANI  M 20
        5  OUT  M 17
        6  NOP
     ▶  7  OUT  C  1
        8  K    100
        9  LD   C  1
       10  OUT  Y040
       11  LD   M  0
       12  RST  M  9
       13  LD   M 17
       14  SFT  M  9
       15  SFT  M  8
       16  SFT  M  7
       17  SFT  M  6
USED MEM.= 36   REST=4060
       NOP                  LDR   WR
```

Fig. 8.35

WR SSN *1 GO
NOP K *2 GO . . . . .All instructions from *1 to *2 are rewritten to NOPs.

*1 and *2 indicate step numbers.

┌ EXAMPLE ───
│ WR SSN 2 5 GO
│ NOP K 3 1 GO . . . .Instructions at steps 25 to 31 are rewritten to NOPs as shown in Fig. 8.37.
└───

```
       20  SFT  M  3
       21  SFT  M  2
       22  SFT  M  1
       23  LDI  M 18
       24  PLS  M 19
       25  LD   M 19
       26  OR   M  9
    ▶  27  SET  M  0
       28  LDI  M 18
       29  MOV
       30  K4   M  0
       31       D  0
       32  MOV
       33       D  0
USED MEM.= 36   REST=4060
                            LDR   RD
```

Fig. 8.36

```
    ▶  25  NOP
       26  NOP
       27  NOP
       28  NOP
       29  NOP
       30  NOP
       31  NOP
       32  MOV
       33       D  0
       34  K4 Y 50
       35  END
       36  NOP
       37  NOP
       38  NOP
USED MEM.= 36   REST=4060
       NOP                  LDR   WR
```

Fig. 8.37

MEMO

9. COMMENT MODE

9

9. COMMENT MODE

This section describes the write and read operations of comment when a circuit with comment is displayed

---

CAUTION

1. In regards to the read or write operation of comment, the comment mode cannot be effected during operation in another mode (ladder, list, KCPU, cassette or printer). Therefore, start the read or write operation of comment after displaying the initial screen by use of the "RESET" switch of GP-80 unit.
   When shifting from the comment mode to another mode, also start with the operation of initial screen by use of the "RESET" switch.

2. A comment can be prepared when any of "K1", "K2" and "K3" has been selected in the initial setting. However, write to the programmable controller is possible only when the auxiliary memory card (K3MB1) is loaded in K3NCPU(P2).

3. When the $\boxed{\begin{array}{c} \text{VER} \\ \text{(COM)} \end{array}}$ key is pressed during operation in the comment mode, the display returns to the comment memory area clear screen.

---

(1) Setting ranges of devices

Setting Ranges of Devices

	Initial Setting		
	K1	**K2, K0, K0J**	**K3**
K (Master control)	K0 ~ 63	K0 ~ 63	K0 ~ 63
X.Y (Input, output)	X.Y0 ~ FF	X.Y0 ~ FF	X.Y0 ~ 7FF
M (Temporary memory)	M0 ~ 255	M0 ~ 255	M0 ~ A23
T.C (Timer, counter)	T.C0 ~ 127	T.C0 ~ 127	T.C0 ~ 255
F (External failure memory)	F0 ~ 127	F0 ~ 127	F0 ~ 191
D (Data register)	D0 ~ 127	D0 ~ 127	D0 ~ A23

(2) Valid keys for preparation of comment

There are two modes for the preparation of comment - English/numeral and cursor movement. The specifying methods are as follows:

$\boxed{\begin{array}{c} \text{LDR} \\ \text{(ENG)} \end{array}}$ . . . . .Press this key to enter a character (alphabet or numeral) written at the bottom left of each key.

$\boxed{\begin{array}{c} \text{LST} \\ \text{(CUS)} \end{array}}$ . . . . .Press this key to move the cursor by $\boxed{\Uparrow}$, $\boxed{\Downarrow}$, $\boxed{\Rightarrow}$, $\boxed{\Leftarrow}$ and keys.

9.1 Preparation of Comment

```
          K  KCPU MEM  PC
          1   K1   1K  N01
          2  K2.0.J 2K  N02
          3   K3   3K  N03
          4       4K
          8       8K
          C       12K
          F       16K
```
Fig. 9.1

By pressing the ⬜K⬜ ⬜*1⬜ ⬜*1⬜ ⬜*1⬜ ⬜GO⬜ keys, the initial setting is completed and the screen shows Fig. 9.2.

For the setting of *1, see Section 6.2.

```



          USED MEM.= 1   REST=4095
                 K    241    SELECT MODE FUNC
```
Fig. 9.2

By pressing the ⬜VER (COM)⬜ key, the comment memory area clear screen is displayed as shown in Fig. 9.3.

```
          WILL COMT.MEMORY
          BE ALL CLEARED?
          ● OK
            PUSH "K3 GO"
          ● NO
            PUSH "GO"
```
Fig. 9.3

By pressing the ⬜K⬜ ⬜3⬜ ⬜GO⬜ keys, the comment memory area is initialized and the comment limit setting screen shown in Fig. 9.4 is displayed.

```
          COMT.DATA MODE
          DISP.COMT.LIMIT
            K ■  -
            X.Y  -
            M    -
            T.C  -
            F    -
   USED MEM.= 0  REST=2048  D  -
```
Fig. 9.4

By pressing the ⬜↧⬜ key, move the cursor to the device to which a comment is desired to be written.

┌ EXAMPLE ────────────────────────────
Press the ⬜↧⬜ key once to move the cursor to X, Y (input, output) as shown in Fig. 9.5. For the comment limit, see Section 9. (1).
└─────────────────────────────────────

```
          COMT.DATA MODE
          DISP.COMT.LIMIT
            K    -
            X.Y■ -
            M    -
            T.C  -
            F    -
   USED MEM.= 0  REST=2048  D  -
```
Fig. 9.5

By pressing the ⬜*1⬜ ⬜GO⬜ keys, set the start number of limit to which the comment is written.
*1 indicates the device number.

┌ EXAMPLE ────────────────────────────
When the ⬜0⬜⬜GO⬜ keys are pressed, the start number is set to "0" as shown in Fig. 9.6, and the comment can be written beginning with X0 or Y0.
└─────────────────────────────────────

9

```
              COMT.DATA MODE

              DISP.COMT.LIMIT

                  K      -

                  X.Y    0- ■

                  M      -

                  T.C    -

                  F      -

   USED MEM.=  0   REST=2048    D    -
                     X  0    SET FINAL NO.
```
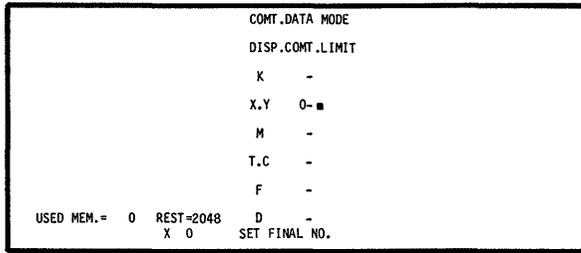
Fig. 9.6
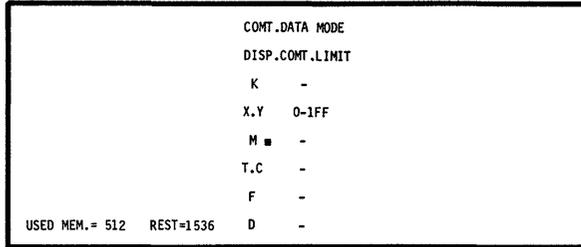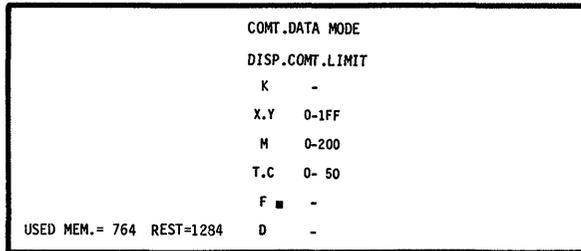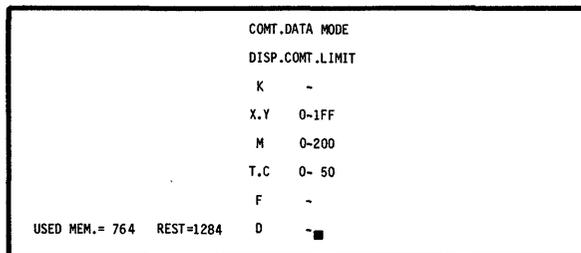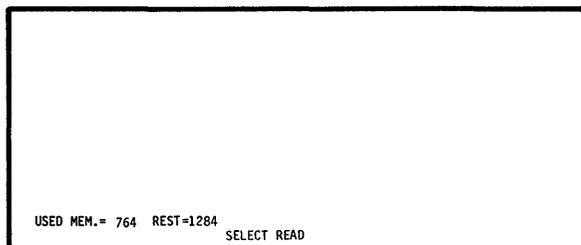
By pressing the ⬚*1 GO keys, set the last number of limit to which the comment is written.
*1 indicates the device number.

┌ EXAMPLE ···
¦ When the ⬚1 ⬚F ⬚F GO keys are pressed, the last
¦ number is set to "1FF" as shown in Fig. 9.7. By this
¦ setting, the comment can be written in the range of X.Y0 to
¦ 1FF. Also, the cursor moves to the next device.
└···

```
              COMT.DATA MODE

              DISP.COMT.LIMIT

                  K      -

                  X.Y    0-1FF

                  M ■    -

                  T.C    -

                  F      -

   USED MEM.= 512   REST=1536    D    -
```

Fig. 9.7

Like X.Y (input, output), set the range of device to which the comment is desired to be written.
When there are devices which do not require comments, move the cursor to the next device by use of the ⬚ key.

```
              COMT.DATA MODE

              DISP.COMT.LIMIT

                  K      -

                  X.Y    0-1FF

                  M      0-200

                  T.C    0- 50

                  F ■    -

   USED MEM.= 764   REST=1284    D    -
```

Fig. 9.8

After the completion of setting of devices to which comments are desired to be written, move the cursor to the last number setting position of D (data register) by use of the ⬚ and/or ⬚ keys.

```
              COMT.DATA MODE

              DISP.COMT.LIMIT

                  K      -

                  X.Y    0-1FF

                  M      0-200

                  T.C    0- 50

                  F      -

   USED MEM.= 764   REST=1284    D    -■
```

Fig. 9.9

By pressing the GO key, the limit setting is completed and the device select screen shown in Fig. 9.10 is displayed.

```
   USED MEM.= 764   REST=1284
                     SELECT READ
```

Fig. 9.10

By pressing the RD ⬚*1 GO keys, specify the device.
Set a device (K, X, Y, M, T, C, F, D) to *1.

┌ EXAMPLE ···
¦ By pressing the RD ⬚X GO keys, the X,Y area is
¦ displayed as shown in Fig. 9.11.
└···

```
                              COMT.LIMIT  X. YO-X. YIFF
        12345 67890 12345
   X.Y 0
   X.Y 1
   X.Y 2
   X.Y 3
   X.Y 4
   X.Y 5
   X.Y 6
   X.Y 7


USED MEM.= 764 REST=1284
            X                                RD
```
Fig. 9.11
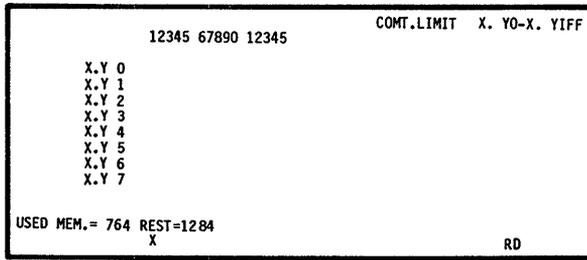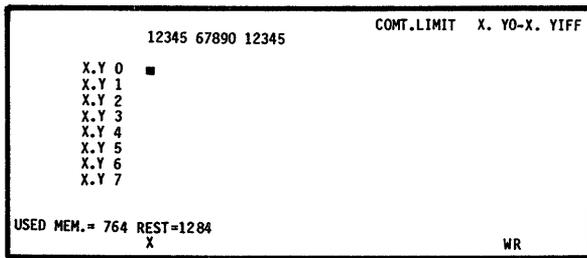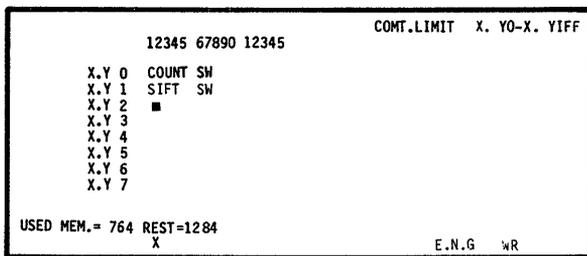
By pressing the [WR] key, specify the write mode. As shown in Fig. 9.12, the cursor is displayed and flickers.

```
                              COMT.LIMIT  X. YO-X. YIFF
        12345 67890 12345
   X.Y 0  ■
   X.Y 1
   X.Y 2
   X.Y 3
   X.Y 4
   X.Y 5
   X.Y 6
   X.Y 7


USED MEM.= 764 REST=1284
            X                                WR
```
Fig. 9.12

Write comments.

EXAMPLE

LDR (ENG)	C	O	U	N	T	S	W	GO
LDR (ENG)	S	I	F	T	SP	S	W	GO

By pressing the keys shown below, Fig. 9.13 is displayed on the screen and the comments are stored in the comment memory area.

```
                              COMT.LIMIT  X. YO-X. YIFF
        12345 67890 12345
   X.Y 0  COUNT SW
   X.Y 1  SIFT  SW
   X.Y 2  ■
   X.Y 3
   X.Y 4
   X.Y 5
   X.Y 6
   X.Y 7


USED MEM.= 764 REST=1284
            X                         E.N.G  WR
```
Fig. 9.13

NOTE

1. A maximum of 15 characters of comment can be written to one device as shown below.
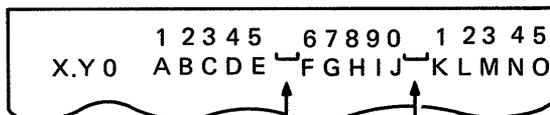
```
        1 2345   67890   1 23 45
   X.Y0  ABCDE ⌐FGHIJ⌐KLMNO
```
Spaces are provided automatically.

In the display of circuit with comment, the comment is displayed in three lines of five characters as shwon below.

```
   X0
   ├┤├──
   A B C D E
   F G H I J
   K L M N O
```
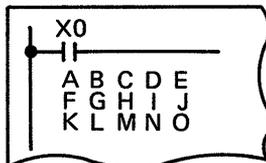
2. When there is a device number which does not require the write of comment, the cursor can be moved to the next device number by pressing the [GO] key.

3. Devices, which have not been specified in the setting of comment limit, are displayed on the screen. However, when the [WR] key is pressed, the "MISOPERATED" error message is displayed.

9
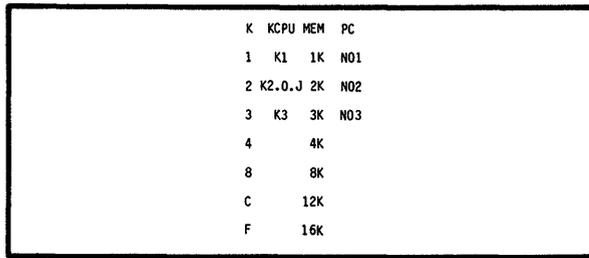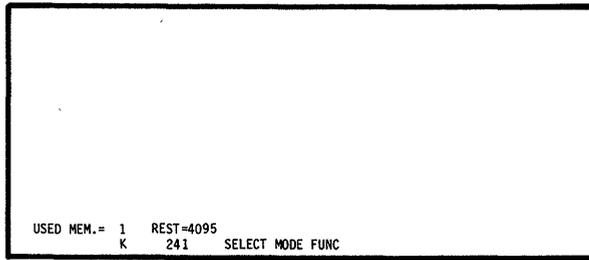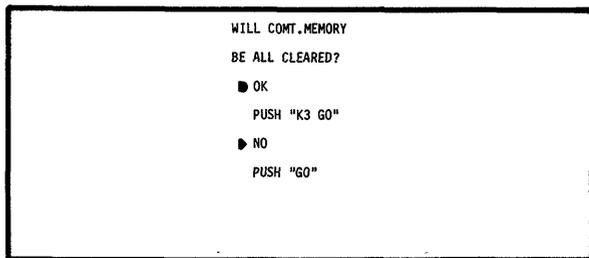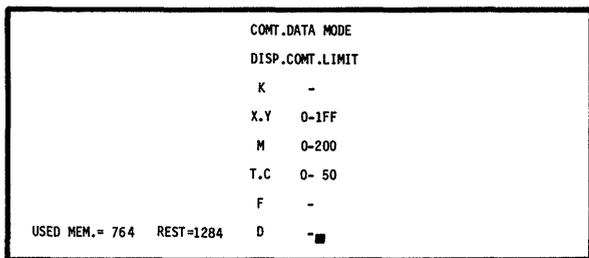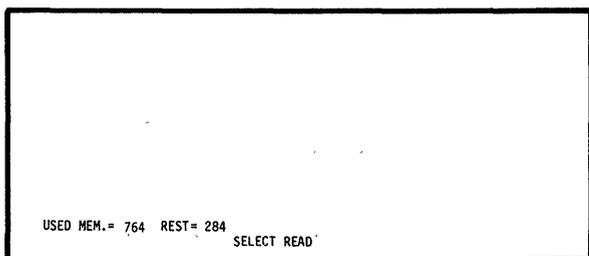
9.2 Read of Comment

```
K  KCPU MEM  PC

1   K1   1K  NO1

2  K2.0.J 2K  NO2

3   K3   3K  NO3

4       4K

8       8K

C      12K

F      16K
```

Fig. 9.14

By pressing the ⌷K⌷ ⌷*1⌷ ⌷*1⌷ ⌷*1⌷ ⌷GO⌷ keys, the initial setting is completed and the screen shows Fig. 9.15.

For the setting of *1, see Section 6.2.

```
USED MEM.=  1   REST=4095
       K      241    SELECT MODE FUNC
```

Fig. 9.15

By pressing the ⌷VER (COM)⌷ key, the comment memory area clear screen is displayed as shown in Fig. 9.16.

```
WILL COMT.MEMORY

BE ALL CLEARED?

▶ OK

   PUSH "K3 GO"

▶ NO

   PUSH "GO"
```

Fig. 9.16

By pressing the ⌷GO⌷ key, the comment limit setting screen shown in Fig. 9.17 is displayed.

```
COMT.DATA MODE

DISP.COMT.LIMIT

    K     -

    X.Y   0-1FF

    M     0-200

    T.C   0- 50

    F     -

USED MEM.= 764   REST=1284   D   -■
```

Fig. 9.17

By pressing the ⌷GO⌷ key, the device select screen shown in Fig. 9.18 is displayed.

```
USED MEM.= 764  REST= 284
                 SELECT READ
```

Fig. 9.18

By pressing the ⌷RD⌷ ⌷*1⌷ ⌷*2⌷ ⌷GO⌷ keys, specify the device and device number to be read.
*1 indicates the device (K, X, Y, M, T, C, F, D).
*2 indicates the device number.

┌ EXAMPLE ┄┄┄┄┄┄┄┄┄┄┄┄┄┄┄┄┄┄┄┄┄┄┄┐

When the ⌷RD⌷ ⌷X⌷ ⌷0⌷ ⌷GO⌷ keys are pressed, the comments of X.Y0 to 7 are displayed as shown in Fig. 9.19.
When the ⌷RD⌷ ⌷X⌷ ⌷8⌷ ⌷GO⌷ keys are pressed, the comments of X.Y8 to F are displayed as shown in Fig. 9.20.

└┄┄┄┄┄┄┄┄┄┄┄┄┄┄┄┄┄┄┄┄┄┄┄┄┄┄┄┄┄┘

```
                              COMT.LIMIT  X. YO-X. YIFF
        12345 67890 12345

  X.Y 0   COUNT SW
  X.Y 1   SIFT  SW
  X.Y 2
  X.Y 3
  X.Y 4
  X.Y 5
  X.Y 6   MOTOR A
  X.Y 7   MOTOR B


USED MEM.= 764 REST=1284
              X                              RD
```
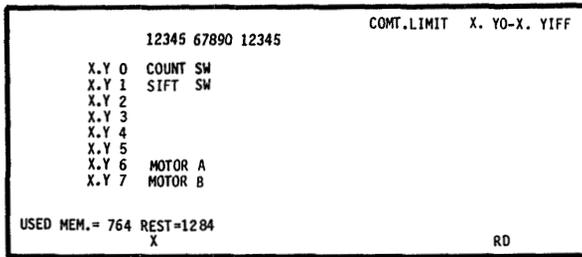
Fig. 9.19
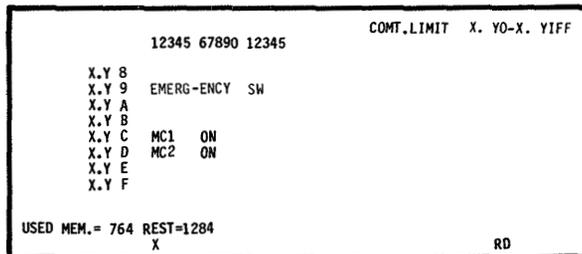
By pressing the GO key, the comments are displayed as shown in Fig. 9.20, beginning with the next device number.
By pressing the RD *1 *2 GO keys, another device can be specified.
*1 indicates the device (K, X, Y, M, T, C, F, D).
*2 indicates the device number.

```
                              COMT.LIMIT  X. YO-X. YIFF
        12345 67890 12345

  X.Y 8
  X.Y 9   EMERG-ENCY  SW
  X.Y A
  X.Y B
  X.Y C   MC1    ON
  X.Y D   MC2    ON
  X.Y E
  X.Y F


USED MEM.= 764 REST=1284
              X                              RD
```

Fig. 9.20

By pressing the GO key, the comments are displayed beginning with the next device number.
By pressing the RD X 0 GO keys, the screen returns to the display shown in Fig. 9.19.

- When it is desired to change the display from the presently shown devices to other devices, press the following keys, and the other devices can be specified.

  RD *1 *2 GO
  → Device number
  → Device (K, X, Y, M, T, C, F, D)
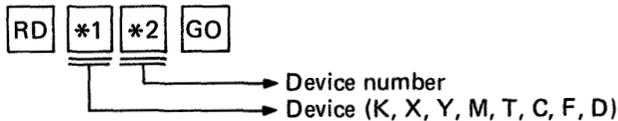
- When it is desired to restore the comment memory area clear screen, press the VER (COM) key, and the screen shown in Fig. 9.16 is restored.

- To cancel the comment mode, press the RESET switch of GP-80 unit.

9.3 Correction of Comment

9.3.1 Correction of comment limit setting screen

(1) Correction of comment limit
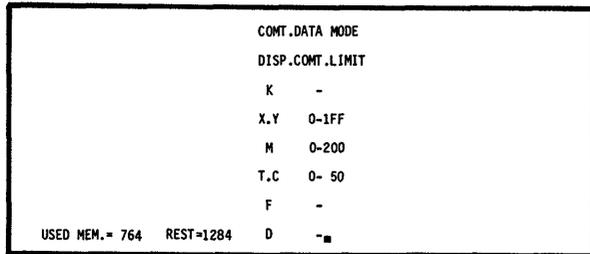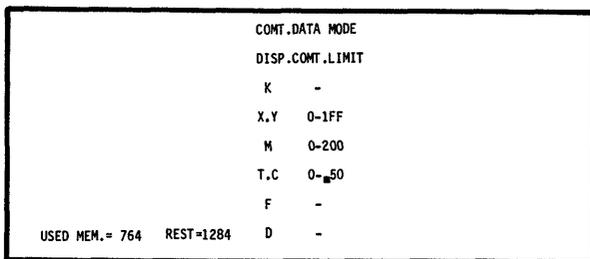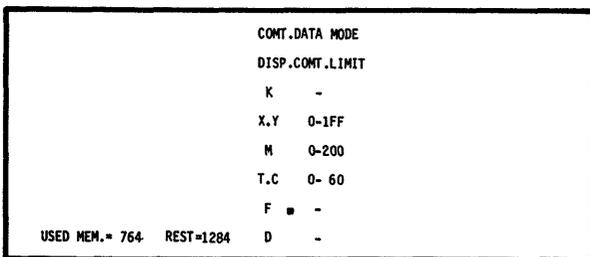
```
            COMT.DATA MODE
            DISP.COMT.LIMIT
              K     -
              X.Y   0-1FF
              M     0-200
              T.C   0- 50
              F     -
  USED MEM.= 764   REST=1284   D    -■
```

Fig. 9.21

Display the comment limit setting screen.
By use of the ⌄ , ⌃ , ⌄ and ⌄ keys, move the cursor to the position which is desired to be corrected.

┌ **EXAMPLE** ....
By pressing the ⌃ ⌃ key twice, move the cursor to the position of the last number of T.C.
└...

⬇

```
            COMT.DATA MODE
            DISP.COMT.LIMIT
              K     -
              X.Y   0-1FF
              M     0-200
              T.C   0-■50
              F     -
  USED MEM.= 764   REST=1284   D    -
```

Fig. 9.22

By pressing the [*1] [GO] keys, newly enter the device number.

┌ **EXAMPLE** ....
By pressing the [6] [0] [GO] keys, rewrite the last number to "60" as shown in Fig. 9.23.
└...

⬇

```
            COMT.DATA MODE
            DISP.COMT.LIMIT
              K     -
              X.Y   0-1FF
              M     0-200
              T.C   0- 60
              F  ■  -
  USED MEM.= 764   REST=1284   D    -
```

Fig. 9.23

CAUTION

When the newly written device limit is smaller than the limit before rewriting, the comments which have been written outside the newly written device limit are all cleared.

EXAMPLE

When the limit is changed from | X.Y 0 - 1FF | to | X.Y 10 - 100 |, the comments which have been written at X.Y0 to 9 and X.Y101 to 1FF are cleared.

(2) Deletion of comment limit of specified device

```
        COMT.DATA MODE

        DISP.COMT.LIMIT

        K      -

        X.Y    0-1FF

        M      0-200

        T.C    0- 50

        F      -

USED MEM.= 764   REST=1284   D    -■
```

Fig. 9.24

Display the comment limit setting screen.
By use of the ⟨♡⟩ ⟨♤⟩ ⟨⇨⟩ and ⟨⇦⟩ keys, move the cursor to the position which is desired to be corrected.

┌─ EXAMPLE ─────────────────────────────────────┐
│ By pressing the ⟨⇨⟩ key once and then the ⟨♤⟩ key three │
│ times, move the cursor to the position of the start number │
│ of M. │
└──┘

```
        COMT.DATA MODE

        DISP.COMT.LIMIT

        K      -

        X.Y    0-1FF

        M  ■   0-200

        T.C    0- 50

        F      -

USED MEM.= 764   REST=1284   D    -
```

Fig. 9.25

By pressing the |GO| key, the "CLEAR COMT-LIMIT" confirmation message is displayed on the screen as shown in Fig. 9.26.

```
        COMT.DATA MODE

        DISP.COMT.LIMIT

        K      -

        X.Y    0-1FF

        M  ■   0-200

        T.C    0- 50

        F      -

USED MEM.= 764   REST=1284   D    -
                 COMT.LIMIT CLEAR
```

Fig. 9.26

By pressing the |GO| key, the limit setting of device where the cursor is located is erased, and the comments stored in the comment memory area are also cleared.

```
        COMT.DATA MODE

        DISP.COMT.LIMIT

        K      -

        X.Y    0-1FF

        M  ■   -

        T.C    0- 50

        F      -

USED MEM.= 563   REST=1485   D    -
```

Fig. 9.27

9.3.2 Correction of comment

(1) Addition and rewriting of comment

```
              12345 67890 12345          COMT.LIMIT  X. YO-X. YIFF

     X.Y 0   COUNT SW
     X.Y 1   SIFT  SW
     X.Y 2
     X.Y 3
     X.Y 4
     X.Y 5   MOTOR A
     X.Y 6   MOTOR B
     X.Y 7


  USED MEM.= 764 REST=1284
              X                                         RD
```
Fig. 9.28

Read the device number to be corrected according to the operation in Section 9.2.
By pressing the WR key, select the write mode. As shown in Fig. 9.29, the cursor is displayed.

```
              12345 67890 12345          COMT.LIMIT  X. YO-X. YIFF

     X.Y 0   ▊OUNT SW
     X.Y 1   SIFT  SW
     X.Y 2
     X.Y 3
     X.Y 4
     X.Y 5   MOTOR A
     X.Y 6   MOTOR B
     X.Y 7


  USED MEM.= 764 REST=1284
              X                                         RD
```
Fig. 9.29

By use of the LST(CUS) , ⇩ , ⇧ , ⇨ and ⇦ keys, move the cursor to the position to be corrected.

┌ EXAMPLE ---
│
│ By pressing the ⇩⇩⇩ key three times, move the cursor
│ to the position of X.Y3 as shown in Fig. 9.30.
└--

```
              12345 67890 12345          COMT.LIMIT  X. YO-X. YIFF

     X.Y 0   COUNT SW
     X.Y 1   SIFT  SW
     X.Y 2
     X.Y 3   ▊
     X.Y 4
     X.Y 5   MOTOR A
     X.Y 6   MOTOR B
     X.Y 7


  USED MEM.= 764 REST=1284
              X                                         RD
```
Fig. 9.30

Write (add) a comment.

┌ EXAMPLE ---
│
│ [LDR(ENG)] [M] [O] [T] [O] [R] [D] [GO]
│
│ By pressing the following keys, the comment is added as
│ shown in Fig. 9.31.
└--

```
              12345 67890 12345          COMT.LIMIT  X. YO-X. YIFF

     X.Y 0   COUNT SW
     X.Y 1   SIFT  SW
     X.Y 2
     X.Y 3   MOTOR D
     X.Y 4   ▊
     X.Y 5   MOTOR A
     X.Y 6   MOTOR B
     X.Y 7


  USED MEM.= 764 REST=1284
              X                                         RD
```
Fig. 9.31

Correct a comment.

┌ EXAMPLE ---
│
│ [LST(CUS)] [⇨] [⇨] [⇨] [⇨] [⇨] [⇨]
│
│ [LDR(ENG)] [C] [GO]
│
│ Change "MOTOR A" at X.Y5 to "MOTOR C" as shown in
│ Fig. 9.32.
└--

```
              12345 67890 12345          COMT.LIMIT  X. YO-X. YIFF

     X.Y 0   COUNT SW
     X.Y 1   SIFT  SW
     X.Y 2
     X.Y 3
     X.Y 4
     X.Y 5   MOTOR A
     X.Y 6   ▊OTOR B
     X.Y 7


  USED MEM.= 764 REST=1284
              X                                         RD
```
Fig. 9.32

(2) Deletion of comment

```
                  12345 67890 12345              COMT.LIMIT   X. YO-X. YIFF

        X.Y 0   COUNT SW
        X.Y 1   SIFT  SW
        X.Y 2
        X.Y 3
        X.Y 4
        X.Y 5   MOTOR A
        X.Y 6   MOTOR B
        X.Y 7


 USED MEM.= 764 REST=1284
                 X                                                    RD
```
Fig. 9.33

Read the device number to be corrected according to the operation in Section 9.2.
By pressing the |WR| key, select the write mode. As shown in Fig. 9.34, the cursor is displayed.

⇩

```
                  12345 67890 12345              COMT.LIMIT   X. YO-X. YIFF

        X.Y 0   ◼OUNT SW
        X.Y 1   SIFT  SW
        X.Y 2
        X.Y 3
        X.Y 4
        X.Y 5   MOTOR A
        X.Y 6   MOTOR B
        X.Y 7


 USED MEM.= 764 REST=1284
                 X                                                    RD
```
Fig. 9.34

By use of the ⌷CUS⌷, ⌷↓⌷ and ⌷↑⌷ keys, move the cursor to the head position of device number to be corrected.

┌ EXAMPLE ·······································
│ By pressing the ⌷↓⌷ key five times, move the cursor
│ downward to the position of X.Y5 as shown in Fig. 9.35.
└··

⇩

```
                  12345 67890 12345              COMT.LIMIT   X. YO-X. YIFF

        X.Y 0   COUNT SW
        X.Y 1   SIFT  SW
        X.Y 2
        X.Y 3
        X.Y 4
        X.Y 5   ◼OTOR A
        X.Y 6   MOTOR B
        X.Y 7


 USED MEM.= 764 REST=1284
                 X                                                    RD
```
Fig. 9.35

By pressing the |GO| key, the comment of device number where the cursor is located is erased as shown in Fig. 9.36.

⇩

```
                  12345 67890 12345              COMT.LIMIT   X. YO-X. YIFF

        X.Y 0   COUNT SW
        X.Y 1   SIFT  SW
        X.Y 2
        X.Y 3
        X.Y 4
        X.Y 5
        X.Y 6   ◼OTOR B
        X.Y 7


 USED MEM.= 764 REST=1284
                 X                                                    RD
```
Fig. 9.36

MEMO

10. KCPU MODE

10

10. KCPU MODE

10.1 Write to Programmable Controller CPU

10.1.1 Write to type K0J, K0 or K2 programmable controller CPU

Perform initial setting according to the operation in Section 6.2.

⇩

Write sequence program to GP-80 according to the operation in Section 7.3 or Section 8.2.

⇩

Set the "RUN/STOP" switch of programmable controller CPU to "STOP" position.

NOTE

When write operation is performed with the programmable controller CPU running, "CANT WRT.PC-RUN" error message is dispalyed.

⇩

Move "PROTECT" switch of GP-80 unit to "OFF" position to allow write to programmable controller CPU.

NOTE

When the following operation is performed after the PROTECT switch is set to IION" position, "WRITING FORBIDDN" error message is displayed in Fig. 10.2.

⇩

By pressing the $\boxed{\genfrac{}{}{0pt}{}{K}{CPU}}$ key, specify the KCPU mode. The screen changes to the display shown in Fig. 10.1.

The $\boxed{\genfrac{}{}{0pt}{}{K}{CPU}}$ key is valid when any screen except the initial setting screen is displayed.

⇩

USED MEM.=123   REST=3973

KCPU
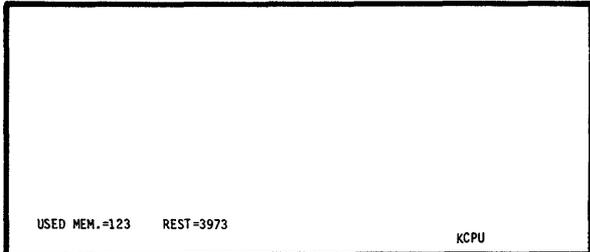
Fig. 10.1

By pressing the $\boxed{WR}$ $\boxed{GO}$ keys, the contents of sequence program area of GP-80 are written to the programmable controller CPU. The screen displays "EXECUTING" as shown in Fig. 10.2.

NOTE

The sequence program is written in the memory capacity set by the initial setting.

⇩

```
┌─────────────────────────────────────┐
│                                      │
│                                      │
│                                      │
│                                      │
│                                      │
│                                      │
│  USED MEM.=123    REST=3973          │
│                      EXECUTING          KCPU WR │
└─────────────────────────────────────┘
```

Fig. 10.2

When write is completed, "COMPLETED" is displayed as shown in Fig. 10.3.

```
┌─────────────────────────────────────┐
│                                      │
│                                      │
│                                      │
│                                      │
│                                      │
│                                      │
│  USED MEM.=123    REST=3973          │
│                      COMPLETED          KCPU WR │
└─────────────────────────────────────┘
```

Fig. 10.3

10
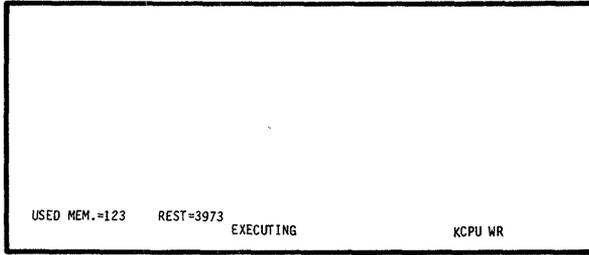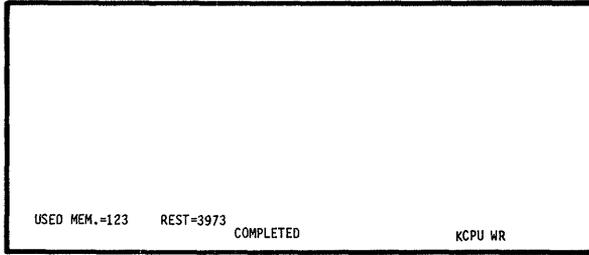
10.1.2 Write to type K3NCPU programmable controller CPU

Perform initial setting according to the operation in Section 6.2.

⇩

Write sequence program or comment data to GP-80 according to the operation in Section 7.3 or Section 8.2.

⇩

Set the "RUN/STOP" switch of programmable controller CPU to "STOP" position.

NOTE

When write operation is performed with the programmable controller CPU running, "CANT WRT.PC-RUN" error message is displayed.

⇩

Move "PROTECT" switch of GP-80 unit to "OFF" position to allow write to programmable controller CPU.
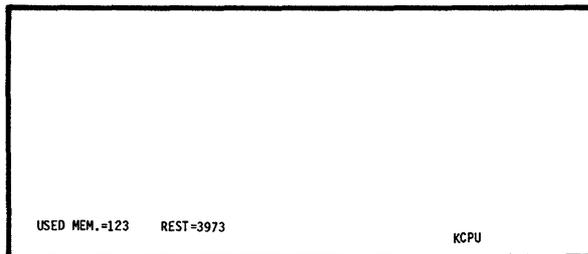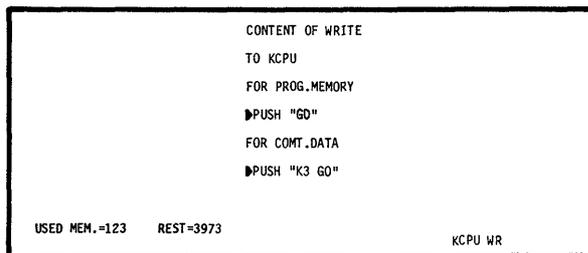
NOTE

When the following operation is performed after the PROTECT switch is set to "ON" position, "WRITING FORBIDDN" error message is displayed in Fig. 10.6.

⇩

By pressing the ⌷K CPU⌷ key, specify the KCPU mode. The screen changes to the display shwon in Fig. 10.4.

⇩

By pressing the ⌷WR⌷ key, the sequence program/comment data select screen is displayed as shown in Fig. 10.5.

```
USED MEM.=123    REST=3973
                                      KCPU
```

Fig. 10.4

⇩

```
              CONTENT OF WRITE
              TO KCPU
              FOR PROG.MEMORY
              ▶PUSH "GO"
              FOR COMT.DATA
              ▶PUSH "K3 GO"

USED MEM.=123    REST=3973
                                    KCPU WR
```

Fig. 10.5

By pressing the ⌷GO⌷ key, the contents of sequence program area of GP-80 are written to the K3NCPU.
By pressing the ⌷K⌷⌷3⌷⌷GO⌷ keys, the contents of comment data area of GP-80 are written to the auxiliary memory of K3NCPU.

The screen displays "EXECUTING" as shown in Fig. 10.6.

NOTE

1. The sequence program is written in the memory capacity set by the initial setting.

2. Comment data can be written only when Type K3MB1 auxiliary memory is loaded to K3NCPU.

⇩

```
┌─────────────────────────────────────────┐
│              CONTENT OF WRITE             │
│              TO KCPU                       │
│              FOR PROG.MEMORY              │
│              ▶PUSH "GO"                    │
│              FOR COMT.DATA                 │
│              ▶PUSH "K3 GO"                 │
│                                           │
│  USED MEM.=123    REST=3973               │
│                    EXECUTING      KCPU WR │
└─────────────────────────────────────────┘
```

Fig. 10.6

⇩

When write is completed, "COMPLETED" is displayed as shown in Fig. 10.7.

```
┌─────────────────────────────────────────┐
│              CONTENT OF WRITE             │
│              TO KCPU                       │
│              FOR PROG.MEMORY              │
│              ▶PUSH "GO"                    │
│              FOR COMT.DATA                 │
│              ▶PUSH "K3 GO"                 │
│                                           │
│  USED MEM.=123    REST=3973               │
│                    COMPLETED      KCPU WR │
└─────────────────────────────────────────┘
```

Fig. 10.7

10.2 Read from Programmable Controller CPU

10.2.1   Read from type K0J, K0 or K2 programmable controller CPU

Perform initial setting according to the operation in Section 6.2.

⬇

By pressing the |K CPU| key, specify the KCPU mode. The screen changes to the display shown in Fig. 10.8.

⬇

```
USED MEM.=123    REST=3973
                                        KCPU
```
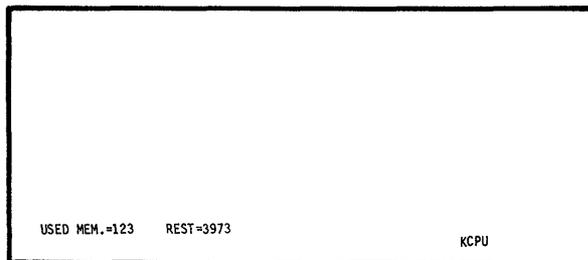
Fig. 10.8

By pressing the |RD| |GO| keys, the sequence program inside programmable controller CPU is read to the sequence program area of GP-80. The screen displays "EXECUTING" as shown in Fig. 10.9.

NOTE

The sequence program is read in the memory capacity set by the initial setting.

⬇

```
USED MEM.=123    REST=3973
                     EXECUTING        KCPU RD
```
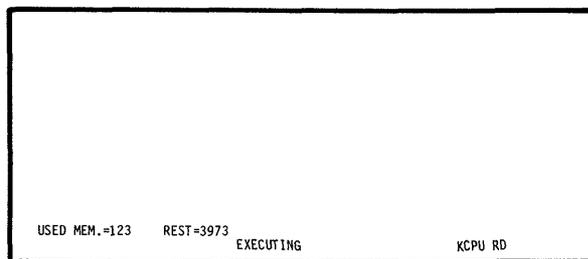
Fig. 10.9

When read is completed, "COMPLETED" is displayed as shown in Fig. 10.10.

⬇

```
USED MEM.=123    REST=3973
                     COMPLETED        KCPU RD
```
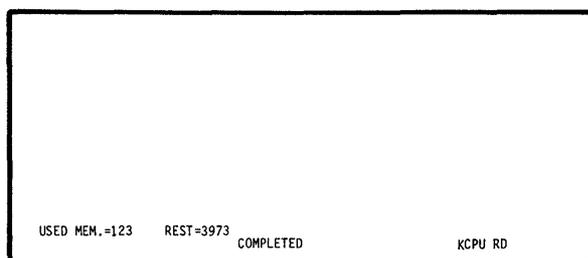
Fig. 10.10

After the completion, check the contents read to GP-80 according to the read operation in Section 7.4 or Section 8.3.

NOTE

When the number of used memory for the program of programmable controller CPU is larger than the memory capacity set to GP-80, the program cannot be read to the last.
At this time, the number of used memory may not be displayed.

10.2.2 Read from type K3NCPU programmable controller CPU

Perform initial setting according to the operation in Section 6.2.

⇩

By pressing the ⌷K CPU⌷ key, specify the KCPU mode. The screen changes to the display shown in Fig. 10.11.

⇩
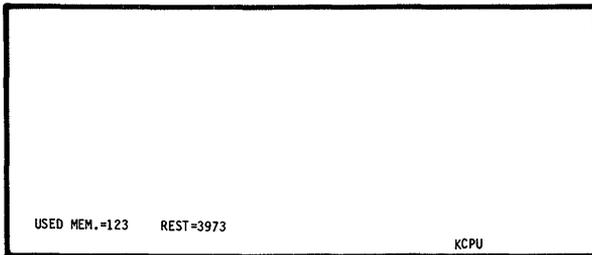
```
┌─────────────────────────────┐
│                             │
│                             │
│                             │
│                             │
│                             │
│                             │
│  USED MEM.=123   REST=3973  │
│                        KCPU │
└─────────────────────────────┘
```
Fig. 10.11

By pressing the ⌷RD⌷ key, the sequence program/comment data select screen is displayed as shown in Fig. 10.12.

⇩
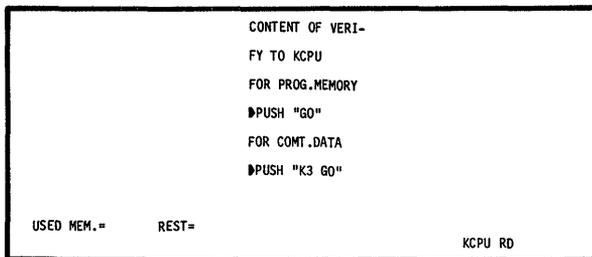
```
┌─────────────────────────────┐
│          CONTENT OF VERI-   │
│          FY TO KCPU         │
│          FOR PROG.MEMORY    │
│          ▶PUSH "GO"         │
│          FOR COMT.DATA      │
│          ▶PUSH "K3 GO"      │
│                             │
│  USED MEM.=    REST=        │
│                     KCPU RD │
└─────────────────────────────┘
```
Fig. 10.12

By pressing the ⌷GO⌷ key, the sequence program inside K3NCPU is read to these sequence program area of GP-80. By pressing the ⌷K⌷ ⌷3⌷ ⌷GO⌷ keys, the comment data written in K3MB1, which is loaded in K3NCPU, is read to the comment data area of GP-80.

The screen displays "EXECUTING" as shown in Fig. 10.13.

NOTE

The sequence program is read in the memory capacity set by the initial setting.

⇩
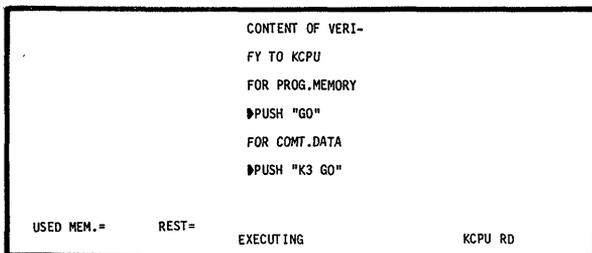
```
┌─────────────────────────────┐
│          CONTENT OF VERI-   │
│          FY TO KCPU         │
│          FOR PROG.MEMORY    │
│          ▶PUSH "GO"         │
│          FOR COMT.DATA      │
│          ▶PUSH "K3 GO"      │
│                             │
│  USED MEM.=    REST=        │
│          EXECUTING  KCPU RD │
└─────────────────────────────┘
```
Fig. 10.13

When read is completed, "COMPLETED" is displayed as shown in Fig. 10.14.

⇩

```
                    CONTENT OF READ
                    FROM KCPU
                    FOR PROG.MEMORY
                    ▶PUSH "GO"
                    FOR COMT.DATA
                    ▶PUSH "K3 GO"

  USED MEM.=123   REST=3937
                    COMPLETED              KCPU RD
```

Fig. 10.14

After the completion, check the contents read from the programmable controller CPU according to the read operation of sequence program in Section 7.4 or Section 8.3 or the read operation of comment data in Section 9.2.

NOTE

When the number of used memory for the program of programmable controller CPU is larger than the memory capacity set to GP-80, the program cannot be read to the last.
When there is no END instruction at this time, USED MEM. and RESET are not displayed.

10.3 Verify between GP-80 and Programmable Controller CPU

10.3.1 Verify with type K0J, K0 or K2 programmable controller CPU

Perform initial setting according to the operation in Section 6.2.

⇩

Perform write to programmable controller CPU according to the operation Section 10.1 or perform read from programmable controller CPU according to the operation in Section 10.2.

⇩

By pressing the [K CPU] key, specify the KCPU mode. The screen changes to the display shown in Fig. 10.15.

⇩

```
USED MEM.=123    REST=3973
                                              KCPU
```
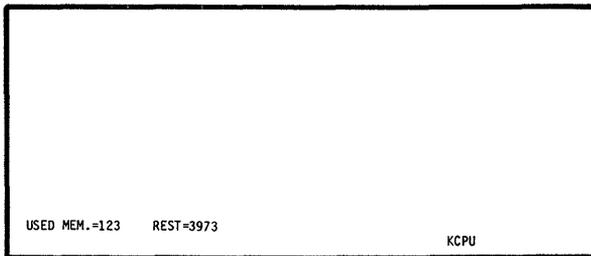
Fig. 10.15

By pressing the [VER] [GO] keys, the sequence program of GP-80 and that of programmable controller CPU are verified.
The screen displays "EXECUTING" as shown in Fig. 10.16.

⇩

```
USED MEM.=123    REST=3973
                      EXECUTING              KCPU VER
```
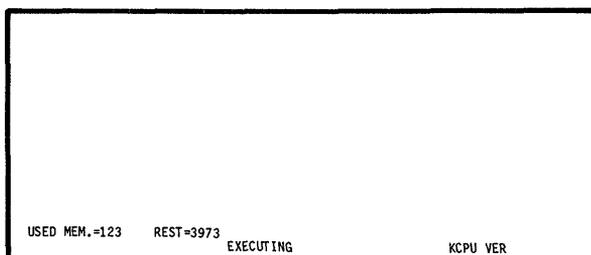
Fig. 10.16

When verify is completed without error, "COMPLETED" is displayed as shown in Fig. 10.17.
When noncoinciding portions are found, "VERIFY ERROR" message and noncoinciding portions are displayed as shown in Fig. 10.18.

⇩

```
USED MEM.=123    REST=3973
                      COMPLETED              KCPU VER
```
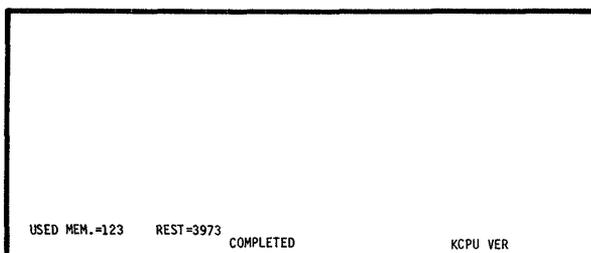
Fig. 10.17

Cursor is displayed at noncoinciding portion.
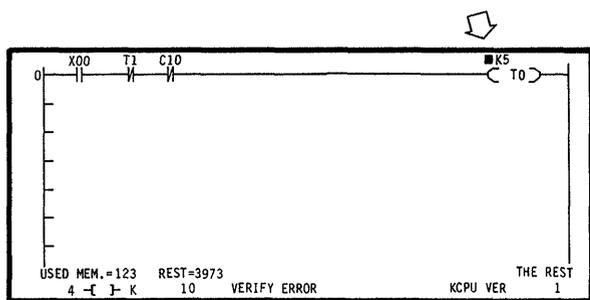
Fig. 10.18

Instruction on programmable controller CPU side

Noncoinciding portions are displayed in order of circuit blocks with lower step numbers.
By pressing the GO key, the next noncoinciding portion is displayed as shown in Fig. 10.19.

The number of noncoinciding portions is displayed.
A maximum of 16000 portions are displayed. In the display of circuit, however, a maximum of 30 portions are displayed.
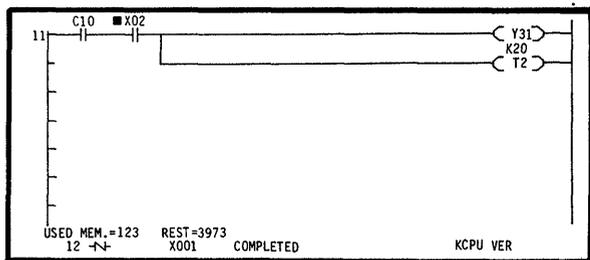
Fig. 10.19

When the last circuit block is displayed, "COMPLETED" is displayed and "THE REST" disappears.

10.3.2 Verify with type K3NCPU programmable controller CPU

Perform initial setting according to the operation in Section 6.2.

⇩

Perform write to programmable controller CPU according to the operation Section 10.1 or perform read from programmable controller CPU according to the operation in Section 10.2.

⇩

By pressing the [K CPU] key, specify the KCPU mode. The screen changes to the display shown in Fig. 10.20.

⇩

```
USED MEM.=123    REST=3973
                                    KCPU
```

Fig. 10.20

By pressing the [VER] key, the sequence program memory verify/comment data verify select screen is displayed as shown in Fig. 10.21.

⇩

```
              CONTENT OF VERI-
              FY TO KCPU
              FOR PROG.MEMORY
              ▶PUSH "GO"
              FOR COMT.DATA
              ▶PUSH "K3 GO"

USED MEM.=123    REST=3973
                                  KCPU VER
```

Fig. 10.21

By pressing the [GO] key, the sequence program of GP-80 and that of K3NCPU are verified.
By pressing the [K] [3] [GO] keys, the comment data of GP-80 and that of K3NCPU are verified.
The screen displays "EXECUTING" as shown in Fig. 10.22.

⇩

```
              CONTENT OF VERI-
              FY TO KCPU
              FOR PROG.MEMORY
              ▶PUSH "GO"
              FOR COMT.DATA
              ▶PUSH "K3 GO"

USED MEM.=123    REST=3973
              EXECUTING            KCPU VER
```

Fig. 10.22

When verify is completed without error, "COMPLETED" is displayed as shown in Fig. 10.23.
When noncoinciding portions are found, "VERIFY ERROR" message and noncoinciding portions are displayed as shown in Fig. 10.24.

⇩

```
            CONTENT OF VERI-
            FY TO KCPU
            FOR PROG.MEMORY
            ◗PUSH "GO"
            FOR COMT.DATA
            ◗PUSH "K3 GO"


  USED MEM.=123    REST=3973
                       COMPLETED              KCPU VER
```
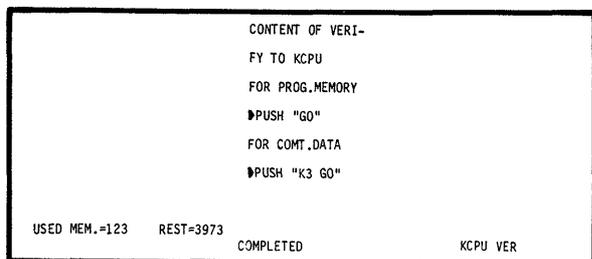
Fig. 10.23

Cursor is displayed at noncoinciding portion.

⇩

```
      X00    T1   C10                          ■K5
  0 ──┤├────┤╱├──┤├──                       ─( T0 )
    │
    │
    │
    │
    │
    │
  USED MEM.=123   REST=3973                        THE REST
     4 ─( )─ K    10    VERIFY ERROR       KCPU VER      1
```

Noncoinciding portions are displayed in order of circuit blocks with lower step numbers.
By pressing the GO key, the next noncoinciding portion is displayed as shown in Fig. 10.25.

The number of noncoinciding portions is displayed.
A maximum of 16000 portions are displayed.
In the display of circuit, however, a maximum of 30 portions are displayed.

Fig. 10.24 ◁

Instruction on programmable controller CPU side

⇩

```
      C10   ■X02
  11 ──┤├───┤├──────────────────┬─────────( Y31 )
    │                           │           K20
    │                           └─────────( T2 )
    │
    │
    │
    │
  USED MEM.=123   REST=3973
     12 ─╱╲─      X001   COMPLETED         KCPU VER
```
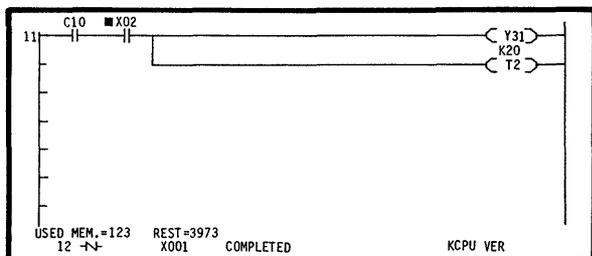
When the last circuit block is displayed, "COMPLETED" is displayed and "THE REST" disappears.

Fig. 10.25

10.4 High-Speed Processing of WR RD VER

In the write, read, and verify operations in the KCPU mode, high-speed processing can be performed by specifying the step numbers of program.

┌─ EXAMPLE: ──┐
│   │
│ KCPU WR SSN 0 K 200 GO   │
│   │
│ Since step numbers 0 to 200 are written to the KCPU by the above key operation, processing │
│ time is reduced.   │
│   │
│   │
│ KCPU WR GO   │
│   │
│ By the above key operation, all the memory range specified by the initial setting is processed. │
└──┘

11. MONITOR MODE

1

11. MONITOR MODE

CAUTION

When K0CPU is in data link, monitor operation cannot be performed in connection with K0CPU.

11.1 Monitor Operation Procedure

The state of sequence program run by the programmable controller CPU is monitored in the ladder mode.

Perform initial setting according to the operation in Section 6.2.

⇩

Read sequence program of programmable controller CPU to GP-80 according to the operation in Section 10.2.

⇩

By pressing [LDR] [MNT] keys, specify monitor function. The screen changes to the display shown in Fig. 11.1.

NOTE

When the program in ladder mode has already been displayed on the screen, monitor can be initiated by pressing only the [MNT] key.

⇩

When "VERIFY ERROR" is displayed, detect noncoinciding portion according to the operation in Section 10.3 and correct the program.

⇩

USED MEM.=20   REST=4076   LDR   MNT
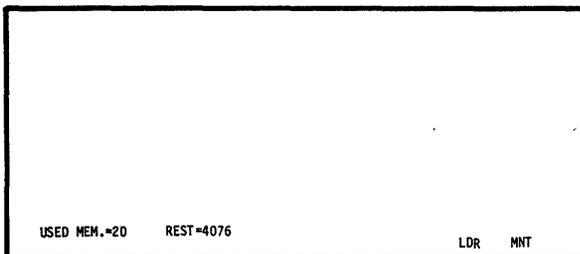
Fig. 11.1

By pressing the following keys, specify the step number of circuit block to be monitored.

[SSN] [*1] [GO]
⎣_____➤Specify step number.

┌ EXAMPLE ─────────────────────────────────┐
│ By pressing the [SSN] [0] [GO] keys, the program is dis- │
│ played, beginning with step 0, as shown in Fig. 11.2. │
└──┘

⇩
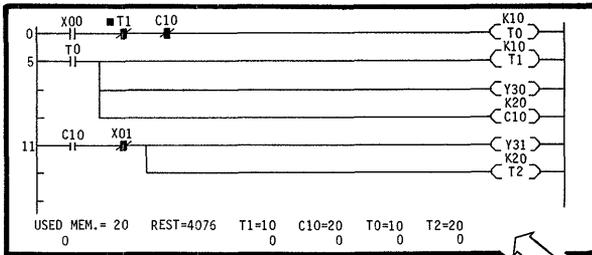
Fig. 11.2

By pressing the ☐GO key, the next circuit is displayed.

NOTE

When monitor has been initiated by pressing the ☐MNT key, perform the following operation to display the next circuit.

☐SSN ☐*1 ☐GO
└──▶ Specify step number.
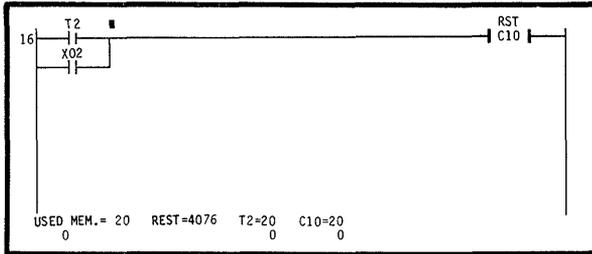
Fig. 11.3

In message area, a maximum of four values are displayed among set value and temporary value of T (timer) and C (counter) and temporary value of D (data register).

NOTE

A circuit in the monitor mode can be displayed by performing the read operation of sequence program by use of ladder symbols in Section 7.4.

Ladder symbols during monitor

OFF	ON

NOTE

During monitor of RST instruction, when the set condition has held, ⌐[ ]⌐ is displayed, and
when the set condition has not held, ⌐[ ]⌐ is displayed.

11.2 Stop of Monitor Screen

The screen during monitor is stopped with the programmable controller CPU running. In the GP-80, on/off control is triggered by the following operation:

CL ....Monitor is stopped with the screen which is being displayed the instant key is pressed.

SSN 1 ⊣⊢ C 1 0 GO ....When the contact of counter C10 is turned from OFF to ON, the screen is stopped.

→ Specify device number.

→ Specify contact or coil symbol.

Specify 1 or 0.
1 : OFF → ON
0 : ON → OFF

MNT ....Monitor is resumed.
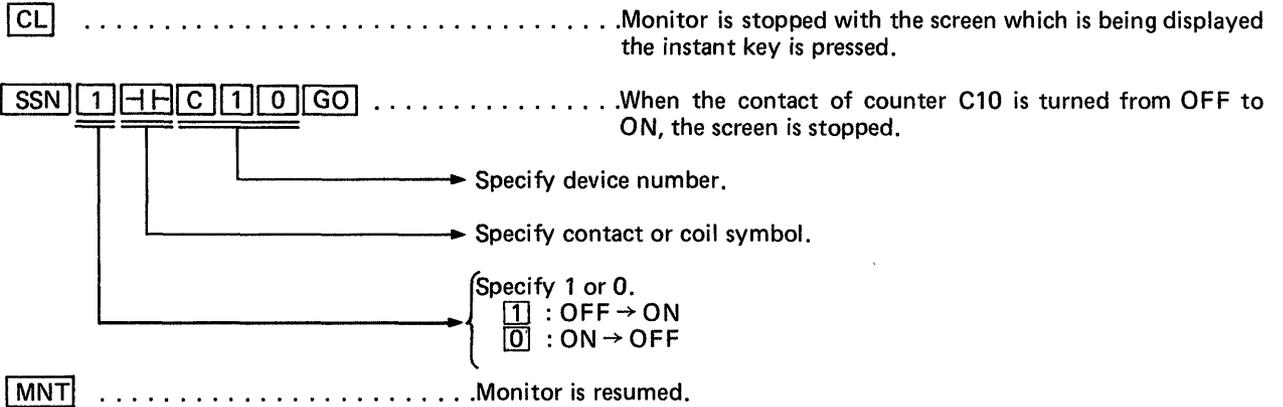
NOTE

1. Only one stop point can be set for each stop operation.

2. If the set contact or coil does not hold its state for 0.5 second or more, the state cannot be detected. In this case, therefore, monitor cannot be stopped.

3. Contact and coil which are not displayed on the screen can also be specified.

4. When monitor is stopped, buzzer beeps for approximately one second.

11.3 Display of Temporary Value of D (data register)

(1) Definition in BIN code

```
    M0
  ──┤╱├────────────[ MOV │ K37 │ D0 ]──
```

37 is stored to data register D0 in binary code.
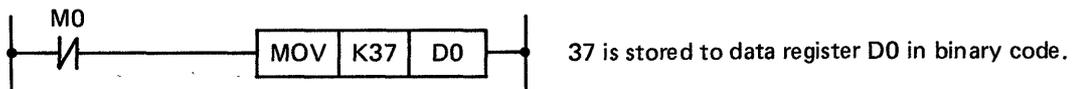
Data register D0 is displayed on the screen as shown below.

Contents of D0

0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	1

128 64 32 16 8 4 2 1
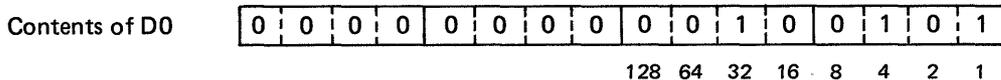
Since D0 is displayed in decimal number, (32 + 4 + 1 = 37) is displayed.

11

(2) Definition in BCD code

| | MOV | K37 | D0 | 37 is stored to data register D0 in binary code. |
| | BCD | D0 | D1 | 37 stored in D0 in binary code is converted to BCD and stored to D1. |

Contents of D0

| 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 1 |

128 64 32 16 8 4 2 1

BCD

Contents of D1

| 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 1 | 1 | 1 |

80 40 20 10 8 4 2 1
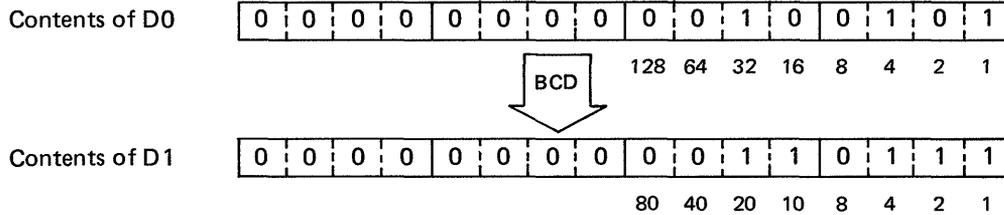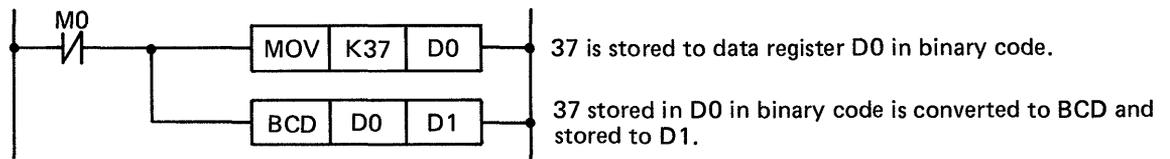
Since the contents of D1 stored in BCD code are displayed in BIN code when the temporary value of D1 is displayed, $(32 + 16 + 4 + 2 + 1 =)$ 55 is displayed.

| 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 1 | 1 | 1 |

128 64 32 16 8 4 2 1

MEMO

12. TEST MODE

1

12. TEST MODE

The test mode is a function which forcibly turns on and off a device for the programmable controller CPU on the side of GP-80.

```
┌─────────────────────────────────────────────┐
│ Perform initial setting according to the     │
│ operation in Section 6.2.                     │
└─────────────────────────────────────────────┘
                      ⇩
┌─────────────────────────────────────────────┐
│ By pressing KCPU    TST keys, select the test │   When monitor is being performed, press only the TST key
│ function of KCPU mode.                         │   to select the test function.
└─────────────────────────────────────────────┘
                      ⇩
Perform operation in Section 12.1 and
thereafter.
```

The operations described in Section 12.1 to 12.3 can also be performed during run of programmable controller or monitor operation of GP-80.

However, the run of programmable controller CPU has priority over the operation of GP-80. In a sequence program as shown in Fig. 12.1, therefore, when Y3F is turned on by GP-80 with X0 off, Y3F turns off immediately after OUT Y3F is executed.
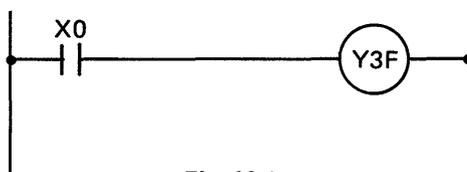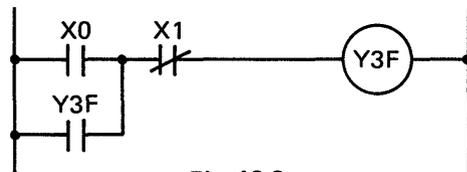
Fig. 12.1   **Fig. 12.2**

12.1 On and Off of Forced Output and Latch Unit (when KL61 is used)

Y 2 0 GO .... Coil of Y20 is forcibly turned on. The screen displays the state of Y20 as shown in Fig. 12.3.

GO .... Coil of Y20 is forcibly turned off. In the screen, the indication of state changes as shown in Fig. 12.4.

Thereafter, the coil is turned on and off alternately by pressing the GO key.


```
USED MEM.=123   REST=3973
                Y 20      ON            KCPU TST
```

Fig. 12.3


```
USED MEM.=123   REST=3973
                Y 20      OFF           KCPU TST
```
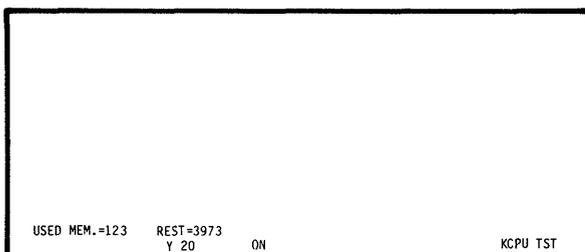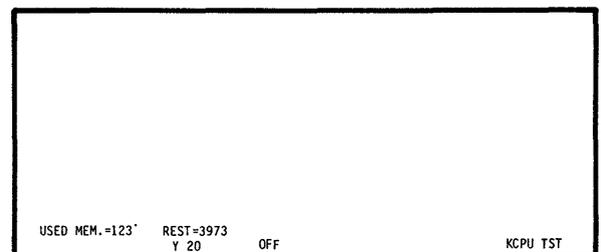
Fig. 12.4

12.2 Forced Set and Forced Reset

M (temporary memory) and F (external failure memory) are forcedly set and reset, and T (timer), C (counter) and D (data register) are forcedly reset.

SET M 0 GO . . . . Coil of M0 is forcedly set (ON). The screen displays the state of M0 as shown in Fig. 12.5.

GO . . . . Coil of device number, which follows the device number display on the screen, is forcedly set (ON). The screen displays the state of M1 as shown in Fig. 12.6.


```
USED MEM.=123    REST=3973
            SET M  0        ON
                                        KCPU TST
```

$\Rightarrow$

```
USED MEM.=123    REST=3973
            SET M  1        ON
```
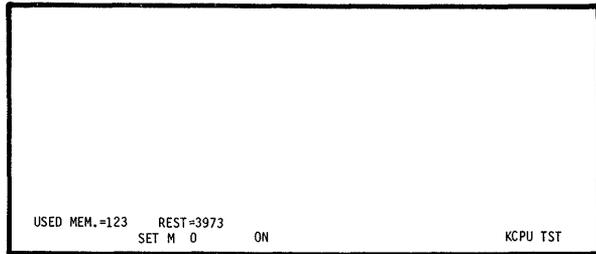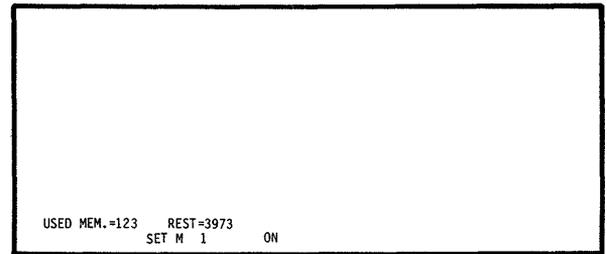
Fig. 12.5   **Fig. 12.6**

> **NOTE**
>
> When T (timer) or C (counter) is reset, temporary value and contact of T or C are reset.

12.3 Change of Temporary Value

The temporary value of T (timer), C (counter) or D (data register) is forcedly changed.

SSN 2 0 T 2 GO . . . . Temporary value of timer T2 is forcedly changed to 20.

→ Device
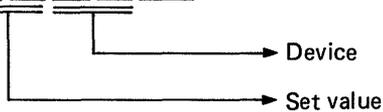
→ Set value

> **NOTE**
>
> When the temporary value is changed after T or C has timed up or counted up, counting is not resumed even if the changed value is smaller than the set value. To resume counting, turn off the condition prior to the coil of T or C.

12

12.4 Read of Error Code during Stop of Programmable Controller

The programmable controller CPU stops immediately after an error code is generated, and the RUN LED flickers to warn the operator of the occurrence of error. At this time, the error code can be detected by the following procedure.

Perform initial setting according to the operation in Section 6.2.

By pressing KCPU RD GO keys, read program from programmable controller CPU.

By pressing the TST K GO keys, display error step number as shown in Fig. 12.7.

```
USED MEM.=123    REST=3973                    ERR. STEP
              K                    KCPU TST            0
```

Fig. 12.7

Step number with error code is displayed. When "0" is displayed, there is no error.

12.5 Step Run

When the GP-80 is connected to Type K3NCPU programmable controller, this function allows the stop of sequence program each time the following software processing instruction is executed.

SET F0 ~ 191	OUT F0 ~ 191	PLS M0 ~ 255	+
RST Y0 ~ 255	OUT T0 ~ 255	CJ	−
RST F0 ~ 191	OUT C0 ~ 255	MOV	>
RST C0 ~ 255	MC K0 ~ 63	BIN	<
SFT M0 ~ 255	MCR K0 ~ 63	BCD	=

(1) Operating procedure

Perform initial setting according to the operation in Section 6.2.

⇩

Move RUN/STOP switch of K3NCPU to "STEP RUN" position.

⇩

Read sequence program of K3NCPU to GP-80 according to operation in Section 10.1.

⇩

Monitor the circuit, which is checked by step run, according to operation in chapter 11.

⇩

Next page

NOTE

When step run is performed in a state except "STEP RUN", "MISOPERATED" error message is displayed.
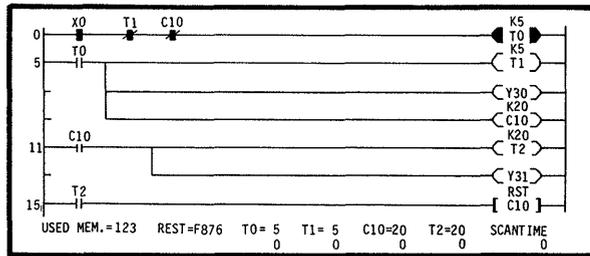
Fig. 12.8

By pressing the [TST] [SSN] [*1] [K] [*2] [GO] keys, stop the run of sequence program at the step number set to *1 after the number of scan times set to *2.
*1 indicates the step number at which run is stopped.
*2 indicates the number of scans (set in the range of " to 9999)

EXAMPLE

By pressing the [TST] [SSN] [6] [K] [5] [0] [0] [GO] keys, run is stopped at the software processing instruction in step 6 after 500 scans. The screen in Fig. 12.9 is displayed.
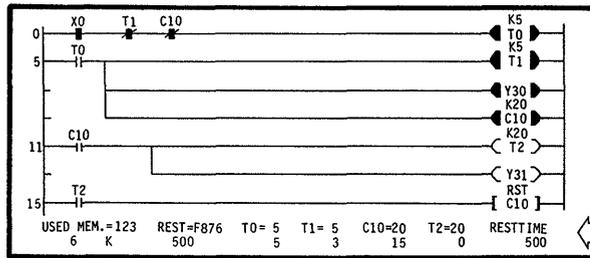
Fig. 12.9

After the set number of scans is executed, run stops at the set step number as shown in Fig. 12.10.

Remaining number of scan times of stop address
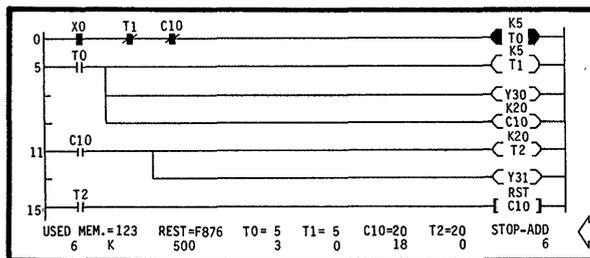
Fig. 12.10

By pressing the [GO] key, run stops at the software processing instruction located next to the stop position. The value at "STOP-ADD" changes as shown in Fig. 12.11.

Step number, at which run is stopped, is displayed.
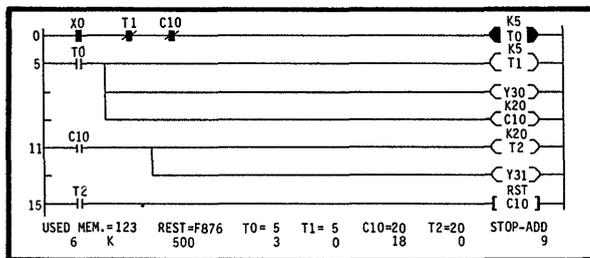
Fig. 12.11

(2) Cancel of step run

When it is desired to cancel the step run, press the following keys:

By pressing the [TST] [K] [0] [GO] keys, step run can be canceled.

(3) Misoperation

When misoperation has been performed, the monitor function stops. Therefore, start with the monitor operation again. By pressing the [MNT] key, specify monitor again and perform the operation shown in Fig. 12.8.

(4) Simulative operation of timer

The temporary value of timer during step run is processes as described below:

10ms timer . . . ."1" is added per 1 scan.
100ms timer . . . ."1" is added per 10 scan.

NOTE

1. When a software processing instruction is not at the specified step number, the run is stopped at the first software processing instruction which is located below the specified step number.

2. During step run, the K3NCPU in a data link system makes dummy communication with a linked channel per 50ms. The transferred images of X/Y are the same as those in normal communication made each time OUT F100 is executed. This is because if only refresh similar to that during normal run is performed during step run, the output of linked channel is turned off by the communication interruption timer in the linked channel of remote I/O or local side.

3. When a step specified as a stop address is passed due to the non-execution of CJ, interrupt program, etc., the passed step is also counted as one of operation scanning times.
   Also, for example, the stop address is set to 1000 and the number of scans is set to 1, and there is a CJ instruction to step 1200 at step 800. When this instruction is executed, program run stops at the first software processing instruction which is located below step 1200.

MEMO

13. CONVERSION OF SEQUENCE PROGRAM

13. CASSETTE MODE

This section explains the operating procedure of record, replay and verify of sequence program and comment data on a cassette tape with the GP-80 connected to the audio cassette.

WARNING

1. The cassette mode of GP-80 is not compatible with the cassette functions of Type K6MTFE audio cassette interface and Type K6PRT handy recorder. Therefore, the tape recorded by the K6MTFE or K6PRT cannot be replayed by the GP-80, and the tape recorded by the GP-80 cannot be replayed by the K6MTFE or K6PRT.

2. If shock is given to the audio cassette or the tape speed or volume is changed during recording and replaying, error may be produced in the data. Therefore, never give shock or change the tape speed or volume.

Connection of Type GP-80CCB cable to audio cassette

Audio cassette   Type GP-80CCB cable
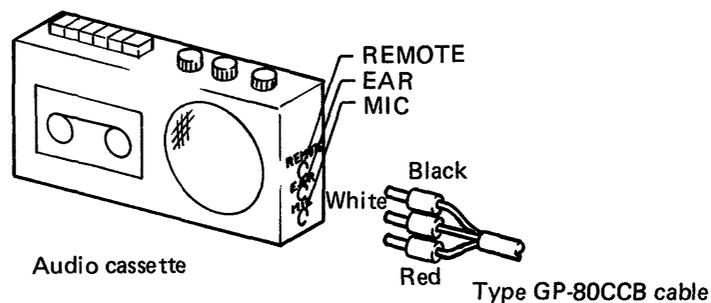
The audio cassette without "REMOTE" terminal can also be used. However, since "REMOTE ON" and "REMOTE OFF" operations from the GP-80 cannot be performed on this type of audio cassette, it is required to operate the audio cassette each time the above described operation is effected.

```
┌─────────────────────────────────────┐
│ Connect GP-80 and audio cassette by Type │
│ GP-80CCB cable.                       │
└─────────────────────────────────────┘
```

⇩

```
┌─────────────────────────────────────┐
│ By pressing  MT  key, specify the cassette mode. │
│                                       │
│ Screen changes to the display shown in Fig. │
│ 13.1.                                 │
└─────────────────────────────────────┘
```

The MT key is effective when any screen except the initial setting screen is displayed.

⇩

```
┌─────────────────────────────────────┐
│ Press the RECORD or REPLAY button of │
│ audio cassette.                       │
└─────────────────────────────────────┘
```

⇩

```
┌─────────────────────────────────────┐
│              K FUNCTION              │
│           ▶1 RECORD                  │
│            2 REPLAY                  │
│            3 VERIFY                  │
│                                       │
│                    REMOTE OFF   MT   │
└─────────────────────────────────────┘
```
Fig. 13.1
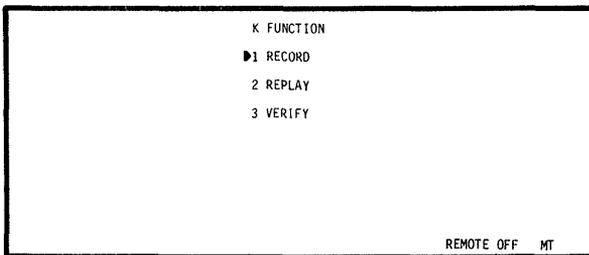
By pressing the following keys, select the function.

$\boxed{K}\ \boxed{*1}\ \boxed{GO}$

$\boxed{1}$: Record on tape
$\boxed{2}$: Replay from tape
$\boxed{3}$: Verify with tape

⇩

```
┌─────────────────────────────────────┐
│              K ARER                  │
│           ▶1 PRG.MEMORY             │
│            2 AUX.MEMORY             │
│                                       │
│                    REMOTE OFF   MT   │
└─────────────────────────────────────┘
```
Fig. 13.2
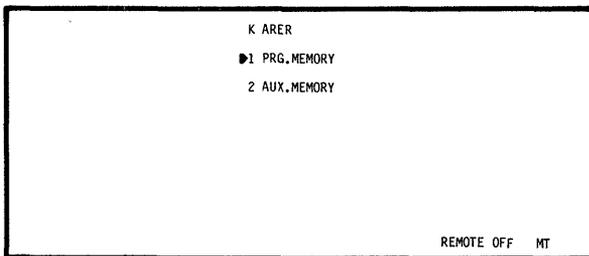
By pressing the following keys, select the sequence program or comment data.

$\boxed{K}\ \boxed{*1}\ \boxed{GO}$

$\boxed{1}$: Sequence program area
→ Screen shown in Fig. 13.3 is displayed.
$\boxed{2}$: Comment data area
→ Screen shown in Fig. 13.7 is displayed.

NOTE

The auxiliary memory can be specified irrespective of the setting of programmable controller CPU in the initial setting.

(PRG. MEMORY has been specified) ⇩

```
┌─────────────────────────────────────┐
│              LIMITATION              │
│           START STEP   0            │
│           FINAL STEP▶  0            │
│                                       │
│                    REMOTE OFF   MT   │
└─────────────────────────────────────┘
```
Fig. 13.3

By pressing the ⬆ key, move the cursor to the position of "START STEP" as shown in Fig. 13.4.

NOTE

The set "0" to START STEP, start operation with Fig. 14.5 without moving the cursor.
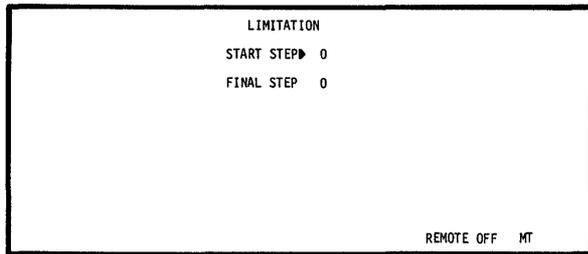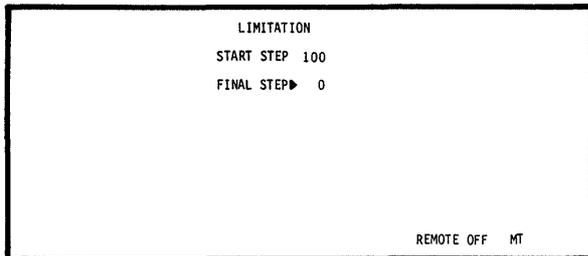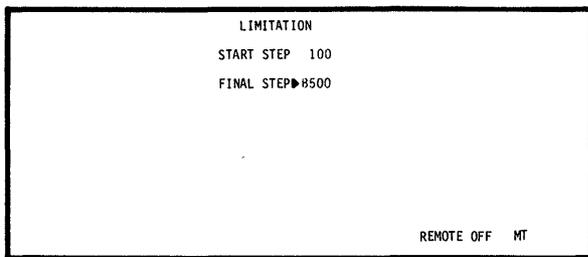
⇩

13. CASSETTE MODE

MELSEC-**K**

```
        LIMITATION
   START STEP▶  0
   FINAL STEP   0




                    REMOTE OFF   MT
```
Fig. 13.4

By pressing the ⁜1 ⁜1 ⁜1 ⁜1 GO keys, set START STEP.
To ⁜1, set the number of steps.

NOTE

When 10K or larger steps are set, set the number of steps as shown below:

10000 steps	→	A000
11000 steps	→	B000
12000 steps	→	C000
13000 steps	→	D000
14000 steps	→	E000
15000 steps	→	F000

┌ EXAMPLE ─────────────────────────────┐
When the 1 0 0 GO keys are pressed, "100" is set to START STEP as shown in Fig. 13.5.
└──────────────────────────────────────┘

```
        LIMITATION
   START STEP  100
   FINAL STEP▶  0




                    REMOTE OFF   MT
```
Fig. 13.5

By pressing the ⁜1 ⁜1 ⁜1 ⁜1 GO keys, set FINAL STEP.
To ⁜1, set the number of steps.

NOTE

1. If the value at FINAL STEP is smaller than that at START STEP, "MISOPERATED" error message is displayed. At this time, set FINAL STEP again.

2. In regards to the setting of the final step, the maximum number of steps changes depending on the setting of programmable controller CPU type name in the initial setting.
   K1 0 to 2047 steps
   K2 0 to 4095 steps
   K3 0 to F999 steps (0 to 16000 steps)
   If the final step is specified exceeding the above range, "MISOPERATED" error message is displayed.

┌ EXAMPLE ─────────────────────────────┐
When B 5 0 0 GO keys are pressed, "11500" is set to FINAL STEP as shown in Fig. 13.6.
└──────────────────────────────────────┘

```
        LIMITATION
   START STEP  100
   FINAL STEP▶8500




                    REMOTE OFF   MT
```
Fig. 13.6

By pressing the GO key, the setting of step number limit is completed, and the screen shown in Fig. 13.7 is displayed.
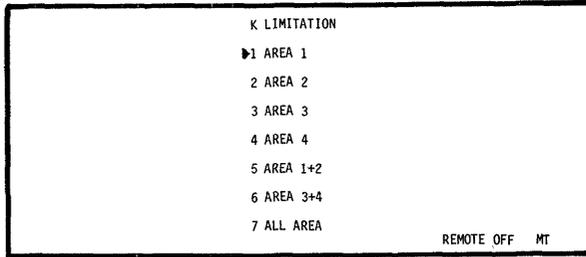
```
                K LIMITATION
        ▶1 AREA 1
         2 AREA 2
         3 AREA 3
         4 AREA 4
         5 AREA 1+2
         6 AREA 3+4
         7 ALL AREA
                                    REMOTE OFF   MT
```
Fig. 13.7

By pressing the following keys, designation of auxiliary memory area is completed, and the screen shown in Fig. 13.8 is displayed.

[K] [*1] [GO]

- [1]: 1st to 529th comments are set.
- [2]: 531st to 1075th comments are set.
- [3]: 1077th to 1621st comments are set.
- [4]: 1623rd to 2048th comments are set.
- [5]: 1st to 1075th comments are set.
- [6]: 1077th to 2048th comments are set.
- [7]: 1st to 2048th comments are set.

NOTE

The 530th comment is stored in both AREA 1 and 2, the 1076th comment in both AREA 2 and 3, and the 1622nd comment in both AREA 3 and 4. Therefore, when recording and replaying, proceed as described below:

- To record or replay the 530th comment, specify AREA 1 and 2.
- To record or replay the 1076th comment, specify AREA 2 and 3.
- To record or replay the 1622nd comment, specify AREA 3 and 4.
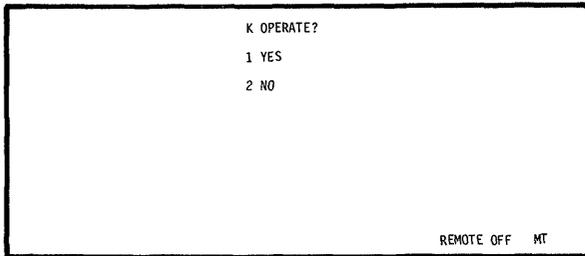
```
                K OPERATE?
         1 YES
         2 NO




                                    REMOTE OFF   MT
```
Fig. 13.8

By pressing the following keys, select the execution.

[K] [*1] [GO]

- [1]: As shown in Fig. 13.9, "EXECUTING" message is displayed and execution is initiated.
- [2]: The screen returns to the display shown in Fig. 13.1. The cursor has moved to the specified position.
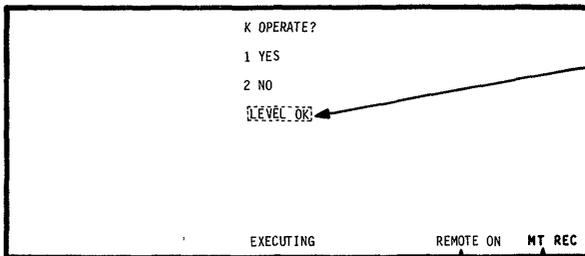
```
                K OPERATE?
         1 YES
         2 NO
         [LEVEL OK]




              EXECUTING      REMOTE ON   MT REC
```
Fig. 13.9

Displayed only when replay or verify is performed. When the volume level of audio cassette is low, "LEVEL NG" is displayed. Even when volume level is proper, "LEVEL NG" is displayed approximately 7 seconds after the start of execution.

Displays the function which is being executed.

Audio cassette automatically executes operation.

```
          K OPERATE?
          1 YES
          2 NO




          [COMPLETED]        REMOTE OFF    MT
```
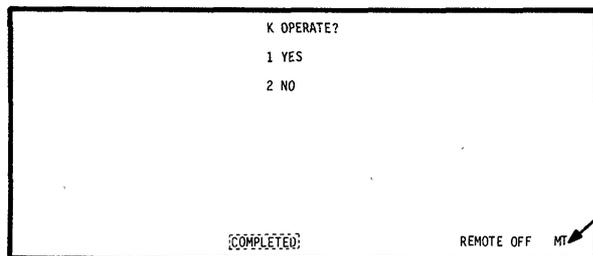
Fig. 13.10

When execution has been completed or error has occurred, audio cassette is automatically stopped.

When error occurs, "LEVEL ERROR", "REPLAY ERROR" or "VERIFY ERROR" is displayed.

NOTE

1. When it is desired to interrupt the execution, pressing the [CL] key restores the screen shown in Fig. 14.1.

2. When it is desired to cancel the cassette mode, press another mode (LDR, LST, PR) key.

3. When the record function has been selected, error message is not displayed even if the audio cassette is not connected. Therefore, caution must be exercised. This also applies when error has occurred in the audio cassette.

4. When the replay or verify operation is performed, specify the area name which has been used for recording to the cassette tape. If a different area is specified, the operation will be executed without resulting in error. In the verify operation, however, "VERIFY ERROR" may be displayed.

(Example)

When recording has been performed with "AREA 1 + 2" specified in the record operation, be sure to specify "AREA 1 + 2" also in the replay or verify operation.

14. PRINTER MODE

14

14. PRINTER MODE

This section describes the operating procedure of printing out sequence program and comment data with the GP-80 connected to the printer.

CAUTION

In regards to circuits which cannot be prepared in the ladder mode, such as a circuit which results in "CIRCUIT OVERFLOW" in circuit read and a circuit which results in "ILLO-GICAL DIAGRM" in circuit write, print-out cannot be performed by the printer.

Connect GP-80 and RS-232C connector of printer by Type GP-80PRC cable.

⇩

Turn on the power of printer.

⇩

By pressing PR key, specify printer mode. Screen changes to the display shown in Fig. 14.1.

The PR key is effective when any screen except the initial setting screen is displayed.

⇩

```
        K PRINTER
    ▶1 K6PRE (PICA)
     2 K6PRE (ELITE)
     3 K6PR-K (PICA)
     4 K6PR-K (ELITE)
     5 K7PR
     6 GT-10
     7 OTHERS
                              PR
```
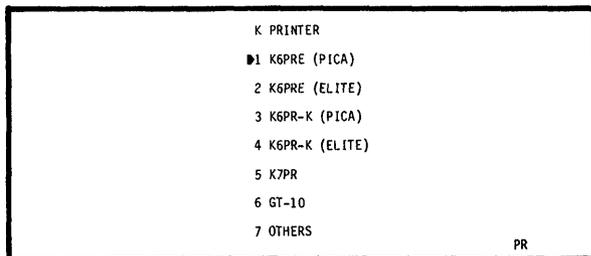
Fig. 14.1

By pressing the following keys, select the printer type.

K *1 GO

1 : K6PRE (PICA) [*1]

2 : K6PRE (ELITE) [*1]   Screen shown in Fig. 14.6 is display-

3 : K6PR-K (PICA) [*2]   ed.

4 : K6PR-K (ELITE) [*2]

5 : K7PR . . . . .Screen shown in Fig. 14.2 is displayed.

6 : GT-10 . . . . .Screen shown in Fig. 14.6 is displayed.

7 : OTHERS. . .Screen shown in Fig. 14.2 is displayed.

⇩

NOTE

*1: The difference between pica and elite is as des-
cribed below:
　　　Pica . . . . .Standard character
　　　Elite . . . . .Character with small width and
　　　　　　　　　standard height

*2: K6PR-K is Japanese Type.

(See APPENDIX 3. on page 155.)

(K7PR or OTHERS has been selected)
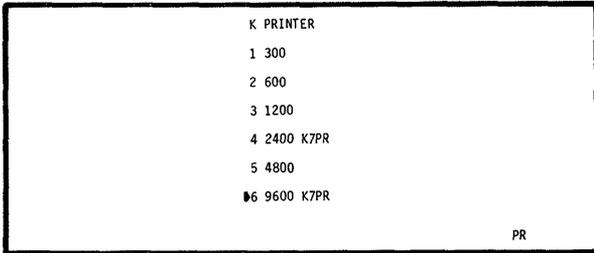
```
              K PRINTER
           1  300
           2  600
           3  1200
           4  2400 K7PR
           5  4800
          ▶6  9600 K7PR

                                    PR
```
Fig. 14.2

By pressing the following keys, select the baud rate.

| K | *1 | GO |

- $\boxed{1}$: 300 baud
- $\boxed{2}$: 600 baud
- $\boxed{3}$: 1200 baud
- $\boxed{4}$: 2400 baud (K7PR-GPC)
- $\boxed{5}$: 4800 baud
- $\boxed{6}$: 9600 baud (K7PR-DRW)
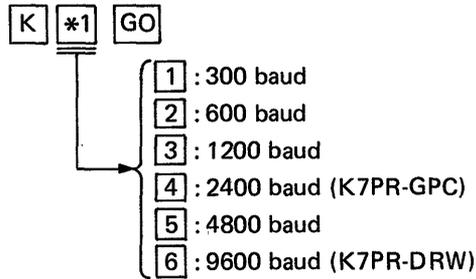
NOTE

When K7PR has been selected, only 2400 baud or 9600 baud can be set. If baud rate other than these is set, "MISOPERATED" error message is displayed. When the baud rate of K7PR has been set to other than 2400 baud or 9600 baud, set the baud rate to 2400 or 9600 baud.

(OTHERS has been selected)
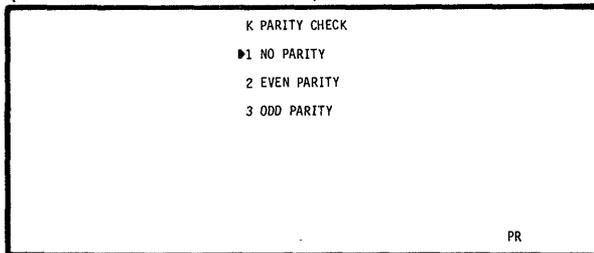
```
           K PARITY CHECK
          ▶1  NO PARITY
           2  EVEN PARITY
           3  ODD PARITY



                                    PR
```
Fig. 14.3

By pressing the following keys, select the presence or absence of parity check.

| K | *1 | GO |

- $\boxed{1}$: No parity check
- $\boxed{2}$: Even parity
- $\boxed{3}$: Odd parity

(OTHERS has been selected)
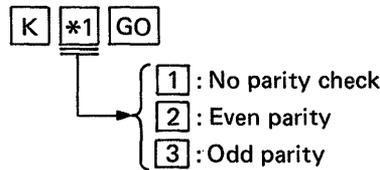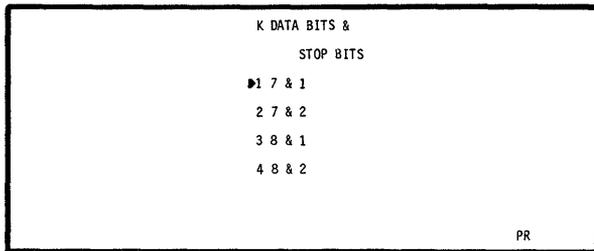
```
          K DATA BITS &
              STOP BITS
          ▶1  7 & 1
           2  7 & 2
           3  8 & 1
           4  8 & 2

                                    PR
```
Fig. 14.4

By pressing the following keys, select the data length and stop bit.

| K | *1 | GO |

- $\boxed{1}$: Data length - 7 bits, stop bit - 1 bit
- $\boxed{2}$: Data length - 7 bits, stop bit - 2 bits
- $\boxed{3}$: Data length - 8 bits, stop bit - 1 bit
- $\boxed{4}$: Data length - 8 bits, stop bit - 2 bits

(K7PR or OTHERS has been selected)
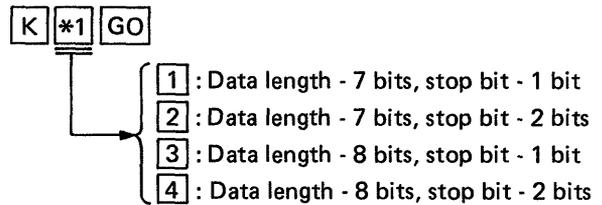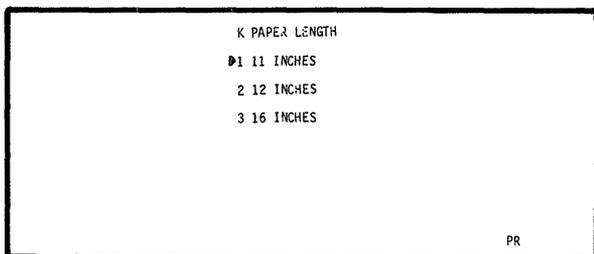
```
           K PAPER LENGTH
          ▶1  11 INCHES
           2  12 INCHES
           3  16 INCHES



                                    PR
```
Fig. 14.5

By pressing the following keys, select the paper length.

| K | *1 | GO |

- $\boxed{1}$: Paper length - 11 inches
- $\boxed{2}$: Paper length - 12 inches
- $\boxed{3}$: Paper length - 16 inches

```
                K MODE
               ▶1 SINGLE
                2 PLURAL




                                        PR
```

Fig. 14.6

```
┌ ─ ─ ─ ─ ─ ─ ─ ─ ┐     ┌ ─ ─ ─ ─ ─ ─ ─ ─ ┐
│                 │     │                 │
│  Single setting:│     │  Plural setting:│
│  To Section 14.1│     │  To Section 14.2│
│                 │     │                 │
└ ─ ─ ─ ─ ─ ─ ─ ─ ┘     └ ─ ─ ─ ─ ─ ─ ─ ─ ┘
```
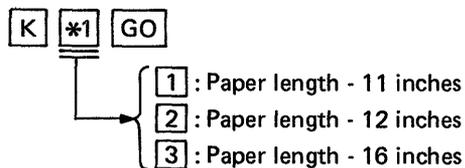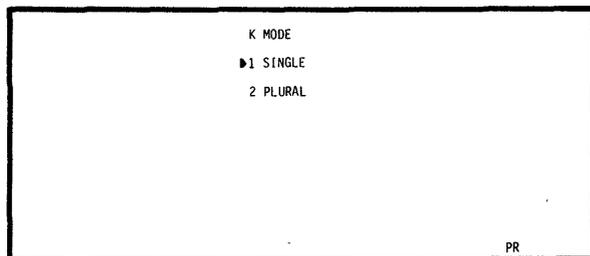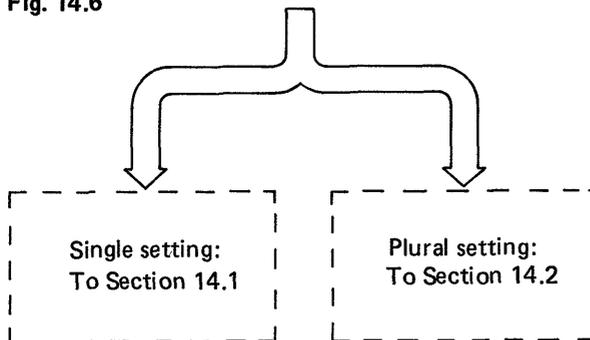
By pressing the following keys, select single setting or plural setting.

K *1 GO

1 : Single setting . . . . . .To Section 14.1

2 : Plural setting . . . . . .To Section 14.2

NOTE

The difference between single setting and plural setting is as described below:

Single setting . . .Only one setting of the following settings can be performed at one time.

Plural setting . . .Plural settings of the following settings can be performed at one time.

- Pring-out of circuit
- Print-out of list
- Print-out of reference step list
- Print-out of I/O use list
- Print-out of comment list

14.1 SINGLE Setting

```
              K PRINT MODE
           ▶1 CIRCUIT
            2 LIST
            3 REF STEP LIST
            4 IO USE LIST
            5 COMMENT LIST

                                    PR
```
Fig. 14.7

By pressing the following keys, select the object of printing.

[K] [*1] [GO]

[1] : Printing of circuit . . .Screen shown in Fig. 14.8 is displayed.

[2] : Printing of list
[3] : Printing of ref. step list   Screen shown
[4] : Printing of I/O use list   in Fig. 14.9 is displayed.
[5] : Printing of comment list
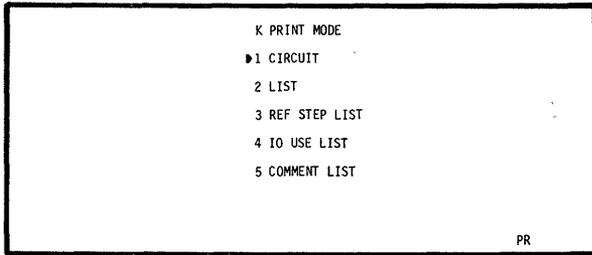
(CIRCUIT has been selected)

```
              K WITH COMMENT?
           ▶1 YES
            2 NO

                                    PR
```
Fig. 14.8

By pressing the following keys, select the printing of circuit with or without comment.

[K] [*1] [GO]

[1] : Printing of circuit with comment

[2] : Printing of circuit without comment

```
              K LIMITATION
           ▶1 ALL AREA
            2 LIMIT

                                    PR
```
Fig. 14.9

By pressing the following keys, select the limit of printing.

[K] [*1] [GO]

[1] : Printing of all area
      — Screen shown in Fig. 14.10 is displayed.
[2] : Setting of limit of printing
      The displayed screen changes as described below depending on the setting in Fig. 14.7.

Circuit } . . . . . . Screen shown in Fig. 14.3
List   }   is displayed.
Ref. step list } . . . Screen shown in Fig. 14.4
I/O use list   }   is displayed.
Comment list · · · · Screen shown in Fig. 14.5
                      is displayed.

```
              K PRINT OK?
           ▶1 YES
            2 NO

                                    PR
```
Fig. 14.10

By pressing the following keys, select the execution of printing.

[K] [*1] [GO]

[1] : As shown in Fig. 14.11, "EXECUTING" message is displayed and execution is initiated.
[2] : The screen returns to the display shown in Fig. 14.1.
      In each screen, the cursor moves to the specified position.

```
                K PRINT OK?
                1 YES
                2 NO




                EXECUTING                    PR
```
Fig. 14.11

⬇
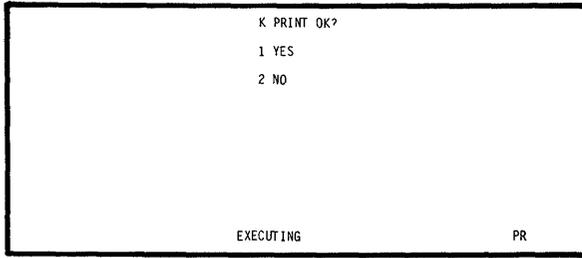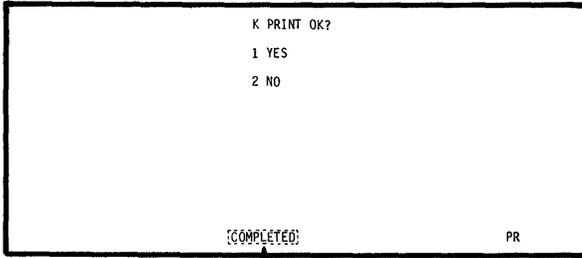
When printing is completed, "COMPLETED" is displayed as shown in Fig. 14.12.

By pressing the CL key, printing can be stopped. The screen displays Fig. 14.13.

NOTE

When the printer is not connected or when the power of printer is off, the CL key is invalid. In this case, however, the "PRINTER ERROR" error message is displayed in approximately one second. After the error message is displayed, pressing the CL key restores the screen shown in Fig. 14.10.
When the power of printer is turned off or the cable is disconnected during printing, "PRINTER ERROR" is displayed in approximately two minutes and 30 seconds.

```
                K PRINT OK?
                1 YES
                2 NO




                [COMPLETED]                  PR
```
Fig. 14.12

When the printer is not connected or when the power of printer is off, "PRINTER ERROR" is displayed.
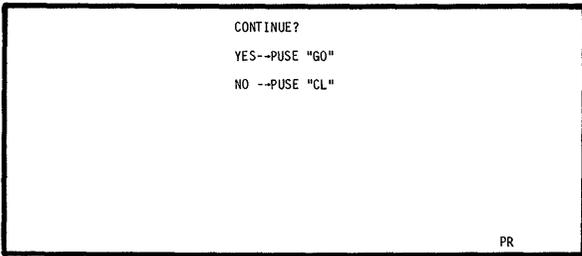
```
                CONTINUE?
                YES--PUSE "GO"
                NO --PUSE "CL"




                                             PR
```
Fig. 14.13

By pressing the GO key, the screen returns to the display shown in Fig. 14.11 and execution is resumed.

By pressing the CL key, the screen returns to the display shown in Fig. 14.1.

14.2 PLURAL Setting
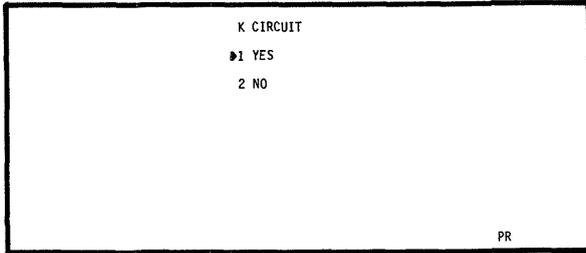
```
                K CIRCUIT
              ▶1 YES
                2 NO




                                        PR
```
Fig. 14.14

By pressing the following keys, select the printing in ladder mode.

[K] [*1] [GO]
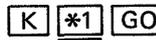
{
[1] : Printing in ladder mode
  — Screen shown in Fig. 14.15 is displayed.
[2] : No printing in ladder mode
  — Screen shown in Fig. 14.17 is displayed.
}
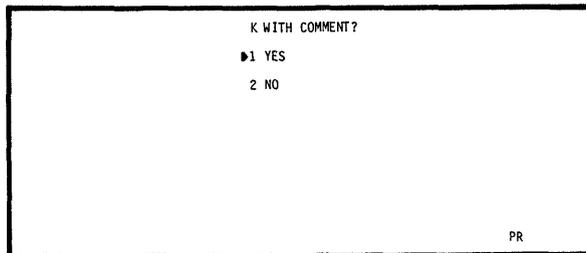
```
             K WITH COMMENT?
              ▶1 YES
                2 NO




                                        PR
```
Fig. 14.15

By pressing the following keys, select the printing of circuit with or without comment.
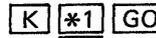
[K] [*1] [GO]

{
[1] : Printing of circuit with comment
[2] : Printing of circuit without comment
}
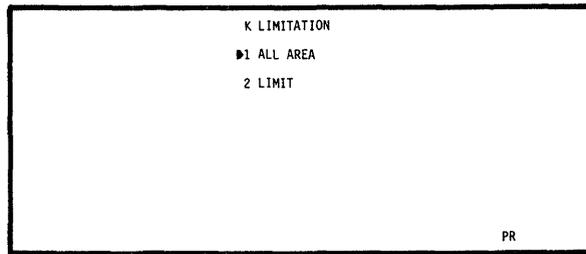
```
               K LIMITATION
              ▶1 ALL AREA
                2 LIMIT




                                        PR
```
Fig. 14.16

By pressing the following keys, select the limit of printing.

[K] [*1] [GO]
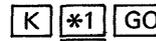
{
[1] : Printing of all area
  — Screen shown in Fig. 14.17 is displayed.
[2] : Setting of limit of printing
  — Set the limit according to Section 14.3.
}
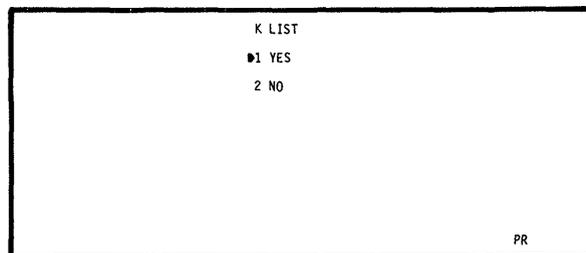
```
                 K LIST
              ▶1 YES
                2 NO




                                        PR
```
Fig. 14.17

By pressing the following keys, select the printing in list mode.

[K] [*1] [GO]

{
[1] : Printing in list mode
  — Screen shown in Fig. 14.18 is displayed.
[2] : No printing in list mode
  — Screen shown in Fig. 14.19 is displayed.
}
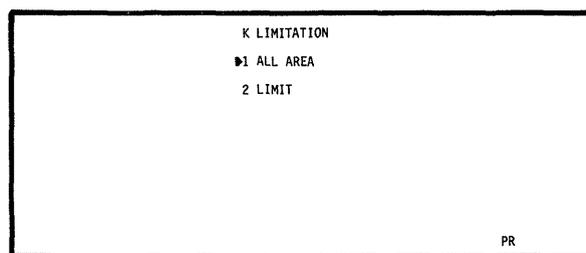
```
               K LIMITATION
              ▶1 ALL AREA
                2 LIMIT




                                        PR
```
Fig. 14.18

By pressing the following keys, select the limit of printing.
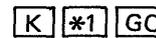
[K] [*1] [GO]

{
[1] : Printing of all area
  — Screen shown in Fig. 14.19 is displayed.
[2] : Setting of limit of printing
  — Set the limit according to Section 14.3.
}
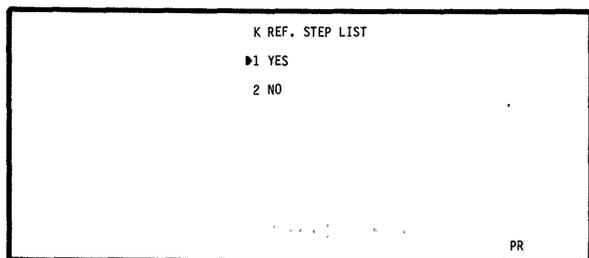
```
        K REF. STEP LIST

      ▶1 YES

       2 NO




                              PR
```
Fig. 14.19

By pressing the following keys, select the printing of ref. step list.

$\boxed{K}\ \boxed{*1}\ \boxed{GO}$

$\boxed{1}$: Printing of ref. step list
— Screen shown in Fig. 14.20 is displayed.
$\boxed{2}$: No printing of ref. step list
— Screen shown in Fig. 14.21 is displayed.
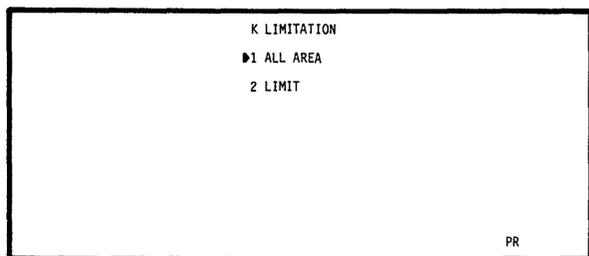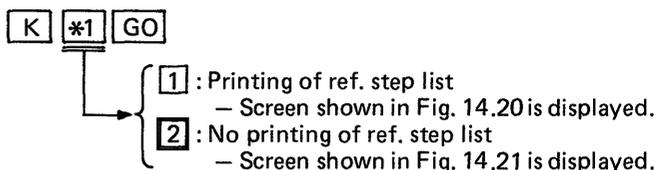
```
         K LIMITATION

      ▶1 ALL AREA

       2 LIMIT




                              PR
```
Fig. 14.20

By pressing the following keys, select the limit of printing of ref. step list.

$\boxed{K}\ \boxed{*1}\ \boxed{GO}$

$\boxed{1}$: Printing of ref. step list of all devices
— Screen shown in Fig. 14.21 is displayed.
$\boxed{2}$: Setting of limit of device to be printed
— Set the limit according to Section 14.4.
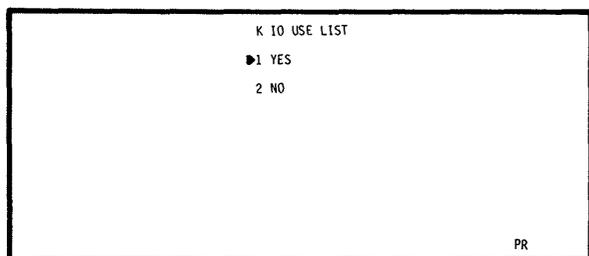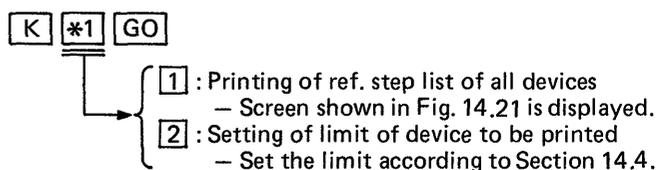
```
         K IO USE LIST

      ▶1 YES

       2 NO




                              PR
```
Fig. 14.21

By pressing the following keys, select the printing of I/O use list.

$\boxed{K}\ \boxed{*1}\ \boxed{GO}$

$\boxed{1}$: Printing of I/O use list
— Screen shown in Fig. 14.22 is displayed.
$\boxed{2}$: No printing of I/O use list
— Screen shown in Fig. 14.23 is displayed.
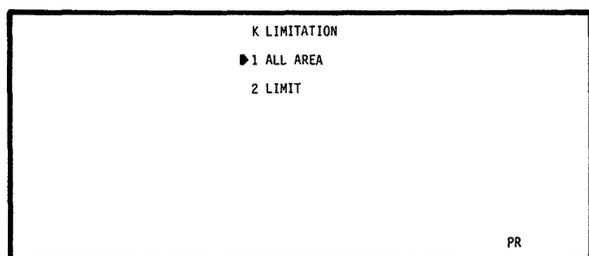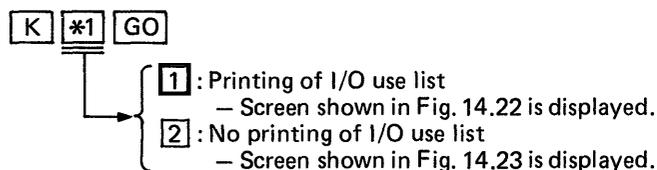
```
         K LIMITATION

      ▶1 ALL AREA

       2 LIMIT




                              PR
```
Fig. 14.22

By pressing the following keys, select the limit of printing of I/O use list.

$\boxed{K}\ \boxed{*1}\ \boxed{GO}$

$\boxed{1}$: Printing of I/O use list of all devices
— Screen shown in Fig. 14.23 is displayed.
$\boxed{2}$: Setting of limit of device to be printed
— Set the limit according to Section 14.4.
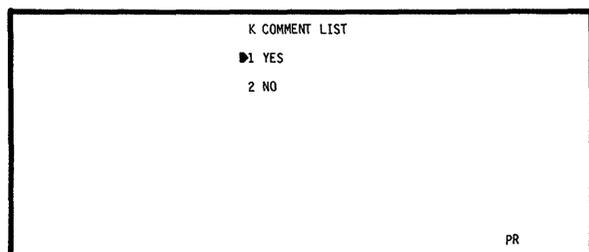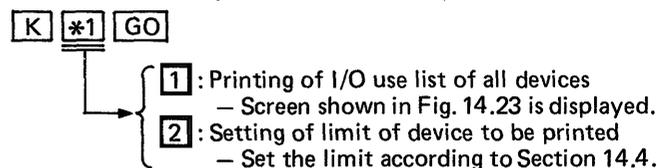
```
         K COMMENT LIST

      ▶1 YES

       2 NO




                              PR
```
Fig. 14.23

By pressing the following keys, select the printing of comment list.

$\boxed{K}\ \boxed{*1}\ \boxed{GO}$

$\boxed{1}$: Printing of comment list
— Screen shown in Fig. 14.24 is displayed.
$\boxed{2}$: No printing of comment list
— Screen shown in Fig. 14.25 is displayed.
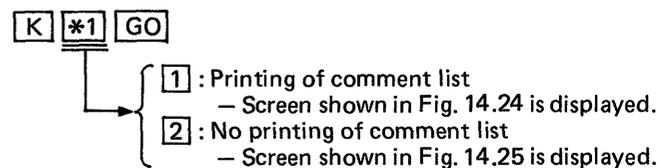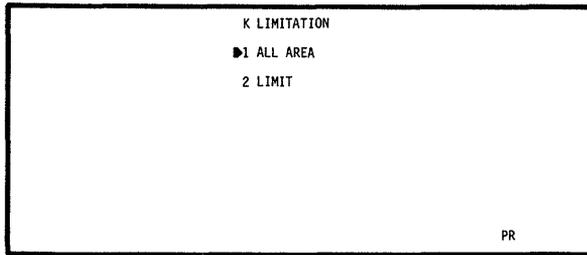
```
            K LIMITATION
         ▶1 ALL AREA
          2 LIMIT




                                    PR
```
Fig. 14.24

By pressing the following keys, select the limit of printing of comment list.

[K] [*1] [GO]

[1] : Printing of comment list of all devices
— Screen shown in Fig. 14.25 is displayed.
[2] : Setting of limit of device to be printed
— Set the limit according to Section 14.5.

⬇
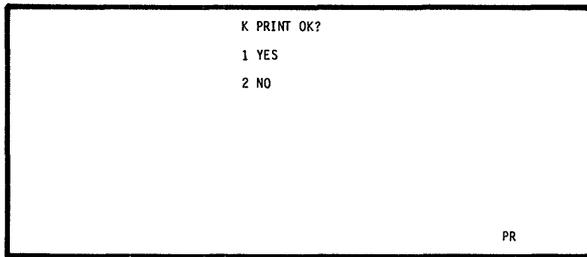
```
            K PRINT OK?
          1 YES
          2 NO




                                    PR
```
Fig. 14.25

By pressing the following keys, select the execution of printing.

[K] [*1] [GO]

[1] : As shown in Fig. 14.26, "EXECUTING" message is displayed and execution is initiated.
[2] : The screen returns to the display shown in Fig. 14.1.
In each screen, the cursor moves to the specified position.
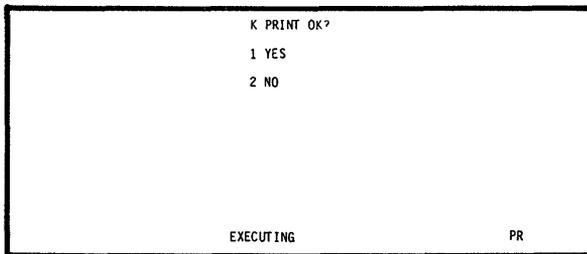
```
            K PRINT OK?
          1 YES
          2 NO



            EXECUTING          PR
```
Fig. 14.26

When printing is completed, "COMPLETED" is displayed as shown in Fig. 14.27.

By pressing the [CL] key, printing can be stopped. The screen displays Fig. 14.28.

NOTE

When the printer is not connected or when the power of printer is off, the [CL] key is invalid. In this case, however, the "PRINTER ERROR" error message is displayed in approximately one second.
After the error message is displayed, pressing the [CL] key restores the screen shown in Fig. 14.10.
When the power of printer is turned off or the cable is disconnected during printing, "PRINTER ERROR" is displayed in approximately two minutes and 30 seconds.

⬇
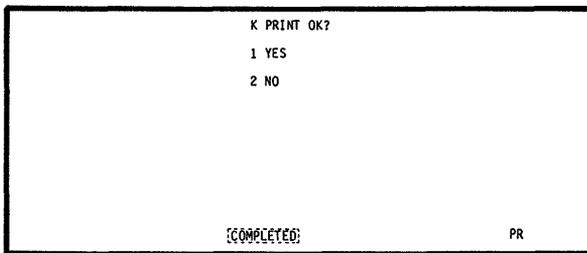
```
            K PRINT OK?
          1 YES
          2 NO




            [COMPLETED]        PR
```
Fig. 14.27

When the printer is not connected or when the power of printer is off, "PRINTER ERROR" is displayed.
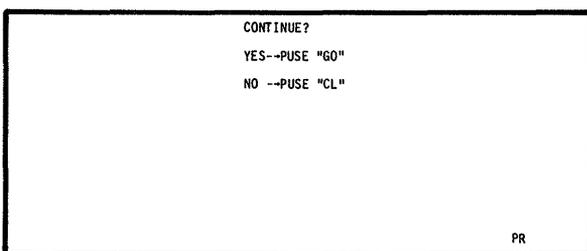
```
            CONTINUE?
          YES-→PUSE "GO"
          NO -→PUSE "CL"




                                    PR
```
Fig. 14.28

By pressing the [GO] key, the screen returns to the display shown in Fig. 14.26 and execution is resumed.

By pressing the [CL] key, the screen returns to the display shown in Fig. 14.1.

14.3 Setting Procedure When LIMITATION of Circuit or List Has Been Selected
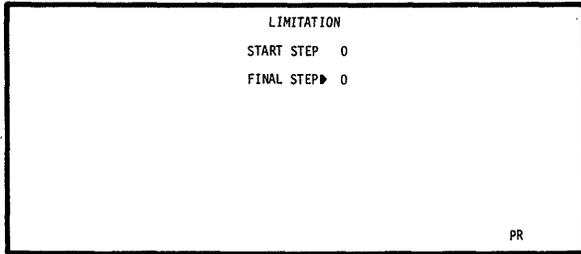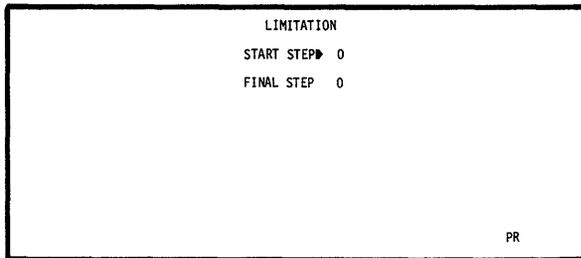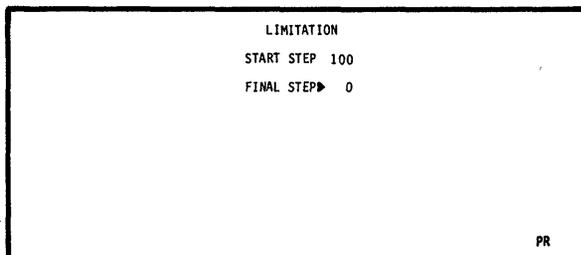
```
              LIMITATION

         START STEP    0

         FINAL STEP▶   0




                                        PR
```
Fig. 14.29
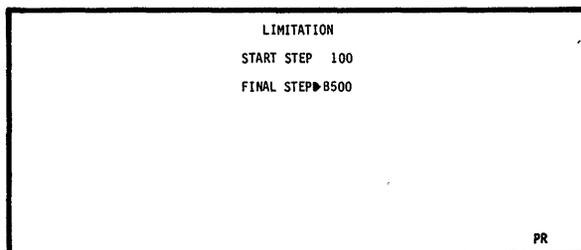
By pressing the 🔼 key, move the cursor to the position of "START STEP" as shown in Fig. 14.30.

NOTE

To set "0" to START STEP, do not move the cursor but start operation with Fig. 14.31.

⬇

```
              LIMITATION

         START STEP▶  0

         FINAL STEP   0




                                        PR
```
Fig. 14.30

By pressing the ✻1 ✻1 ✻1 ✻1 GO keys, set START STEP.
To ✻1, set the number of steps.

NOTE

When 10K or larger steps are set, set the number of steps as shown below:

```
              10000 steps → A000
              11000 steps → B000
              12000 steps → C000
              13000 steps → D000
              14000 steps → E000
              15000 steps → F000
```

EXAMPLE

When the 1 0 0 GO keys are pressed, "100" is set to START STEP as shown in Fig. 14.31.

⬇

```
              LIMITATION

         START STEP  100

         FINAL STEP▶   0




                                        PR
```
Fig. 14.31

By pressing the ✻1 ✻1 ✻1 ✻1 GO keys, set FINAL STEP.
To ✻1, set the number of steps.

NOTE

If the value at FINAL STEP is smaller than that at START STEP, "MISOPERATED" error message is displayed. At this time, set FINAL STEP again.

EXAMPLE

When B 5 0 0 GO keys are pressed, "11500" is set to FINAL STEP as shown in Fig. 14.32.

⬇

```
              LIMITATION

         START STEP  100

         FINAL STEP▶8500




                                        PR
```
Fig. 14.32

By pressing the GO key, the setting of step number limit is completed, and the screen indicated below is displayed.

SINGLE has been selected
— Screen shown in Fig. 14.10 is displayed.
PLURAL has been selected
— Screen shown in Fig. 14.17 or Fig. 14.19 is displayed.

14.4 Setting Procedure When LIMITATION of Ref. Step List Has Been Selected
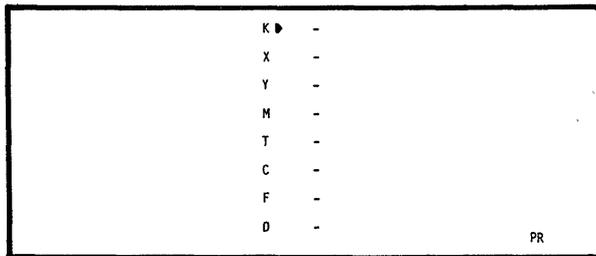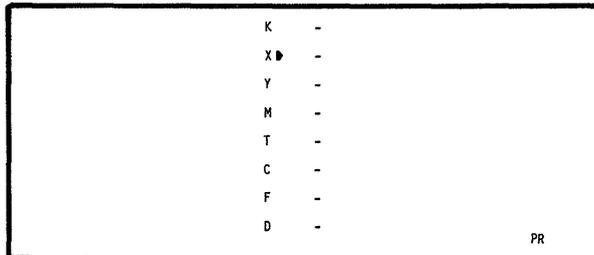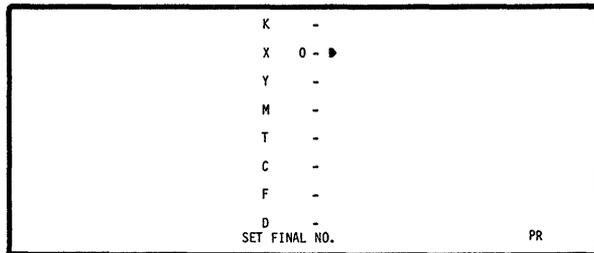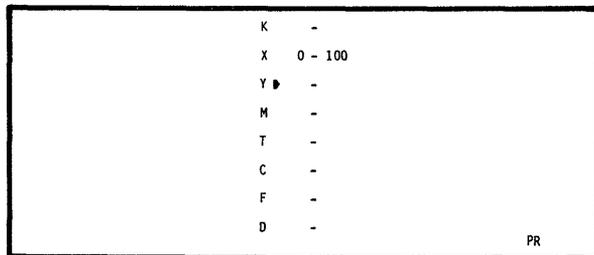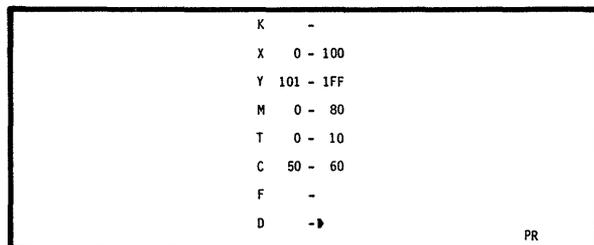
```
K ▶    -
X      -
Y      -
M      -
T      -
C      -
F      -
D      -
                        PR
```
Fig. 14.33

By use of the ⬇ ⬆ ➡ ⬅ keys, move the cursor to the position of device which is desired to be printed.

NOTE

When only one of the start number or final number is specified, the cursor cannot be moved by the ⬇ or ⬆ key.

┌ EXAMPLE ──────────────────────────────────┐
Press the ⬇ key once to move the cursor to the position of X as shown in Fig. 14.34.
└──┘

⇩

```
K      -
X ▶    -
Y      -
M      -
T      -
C      -
F      -
D      -
                        PR
```
Fig. 14.34

By pressing the *1 GO keys, set the start number of device to be printed.
The cursor moves to the final number setting position and the "SET FINAL NO." message is displayed.
To *1, set the device number.

┌ EXAMPLE ──────────────────────────────────┐
By pressing the 0 GO keys, the start number is set to "0" as shown in Fig. 14.35, and the start of printing is set to X0.
└──┘

⇩

```
K      -
X      0 - ▶
Y      -
M      -
T      -
C      -
F      -
D      -
       SET FINAL NO.     PR
```
Fig. 14.35

By pressing the *1 GO keys, set the final number of device to be printed.
The cursor moves to the start number setting position of the next device.
To *1, set the device number.

┌ EXAMPLE ──────────────────────────────────┐
By pressing the 1 0 0 GO keys, the final number is set to "100" as shown in Fig. 14.36, and the print limit is set to X0 to 100.
└──┘

⇩

```
K      -
X      0 - 100
Y ▶    -
M      -
T      -
C      -
F      -
D      -
                        PR
```
Fig. 14.36

Like X (input), set the limit of device to be printed.
When the setting of limit has been completed, move the cursor to the final number setting position of D (data register) as shown in Fig. 14.37.

NOTE

For the setting limit of device, see Section 9. When the setting is performed exceeding the setting limit, "IO NBR ERROR" is displayed.

⇩

```
K      -
X      0 - 100
Y      101 - 1FF
M      0 - 80
T      0 - 10
C      50 - 60
F      -
D      - ▶
                        PR
```
Fig. 14.37

By pressing the GO key, the limit setting is completed and the screen indicated below is displayed.
  SINGLE has been selected
    → Screen shown in Fig. 14.10 is displayed.
  PLURAL has been selected
    → Screen shown in Fig. 14.21 or Fig. 14.23 is displayed.

NOTE

The limit setting can be corrected by the same operation as the correction of comment in Section 9.3.

14. PRINTER MODE

14.5 Setting Procedure When LIMITATION of Comment List Has Been Selected
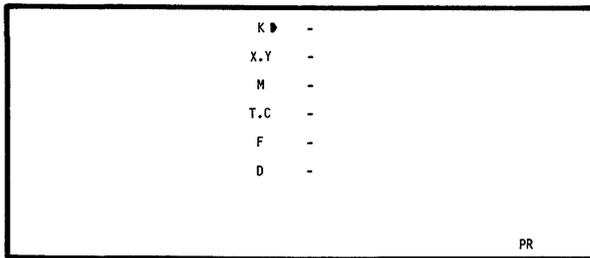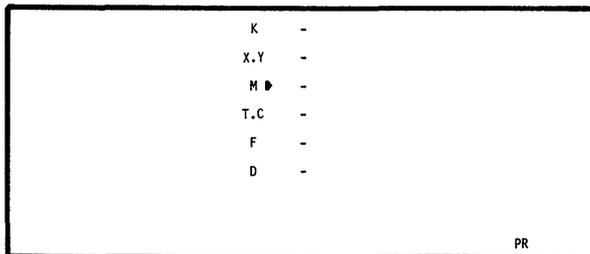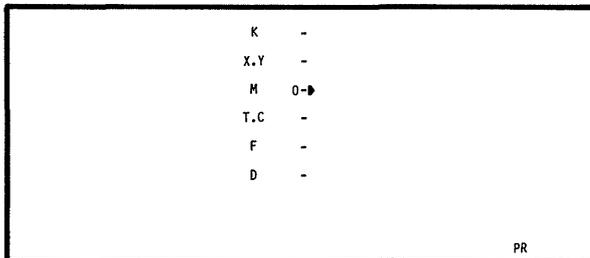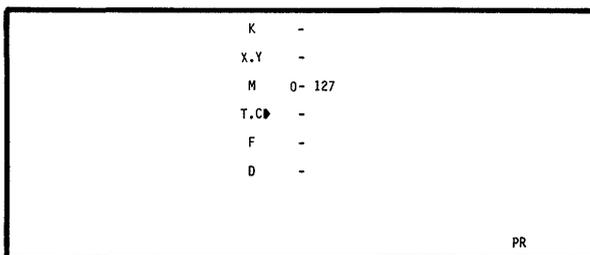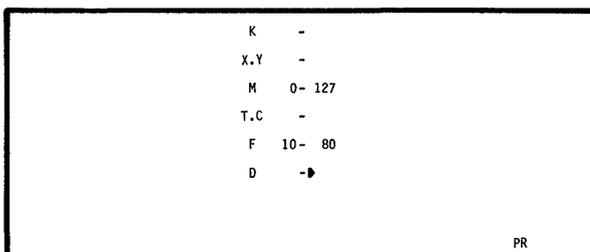
```
K ▶   -
X.Y   -
M     -
T.C   -
F     -
D     -
                        PR
```
Fig. 14.38

By use of the ⟨↻⟩ ⟨↺⟩ ⟨↦⟩ ⟨↤⟩ keys, move the cursor to the position of device which is desired to be printed.

NOTE

When only one of the start number or final number is specified, the cursor cannot be moved by the ⟨↻⟩ or ⟨↺⟩ key.

┌ EXAMPLE ─────────────────────────
Press the ⟨↻⟩ key twice to move the cursor to the position of M as shown in Fig. 14.39.

```
K     -
X.Y   -
M ▶   -
T.C   -
F     -
D     -
                        PR
```
Fig. 14.39

By pressing the ⟨*1⟩ ⟨GO⟩ keys, set the start number of device to be printed.
The cursor moves to the final number setting position and the "SET FINAL NO." message is displayed.
To *1, set the device number.

┌ EXAMPLE ─────────────────────────
By pressing the ⟨0⟩ ⟨GO⟩ keys, the start number is set to "0" as shown in Fig. 14.40, and the start of comment list printing is set to M0.

```
K     -
X.Y   -
M     0-▶
T.C   -
F     -
D     -
                        PR
```
Fig. 14.40

By pressing the ⟨*1⟩ ⟨GO⟩ keys, set the final number of device to be printed.
The cursor moves to the start number setting position of the next device.
To *1, set the device number.

┌ EXAMPLE ─────────────────────────
By pressing the ⟨1⟩ ⟨2⟩ ⟨7⟩ ⟨GO⟩ keys, the final number is set to "127" as shown in Fig. 14.41, and the print limit is set to M0 to 127.

```
K     -
X.Y   -
M     0- 127
T.C ▶ -
F     -
D     -
                        PR
```
Fig. 14.41

Like M (temporary memory), set the limit of device to be printed.
When the setting of limit has been completed, move the cursor to the final number setting position of D (data register) as shown in Fig. 14.42.

NOTE

For the setting limit of device, see Section 9. When the setting is performed exceeding the setting limit, "IO NBR ERROR" is displayed.

```
K     -
X.Y   -
M     0- 127
T.C   -
F     10- 80
D     -▶
                        PR
```
Fig. 14.42

By pressing the ⟨GO⟩ key, the limit setting is completed and the screen indicated below is displayed.
SINGLE has been selected
→ Screen shown in Fig. 14.10 is displayed.
PLURAL has been selected
→ Screen shown in Fig. 14.25 is displayed.

NOTE

The limit setting can be corrected by the same operation as the correction of comment in Section 9.3.

15. OPERATION IN MICROCOMPUTER MODE

15

15. OPERATION IN MICROCOMPUTER MODE

The K2CPU-S3, K2HCPU, K2NCPU and K3NCPU(P2) allow program to be prepared with micro-computer instructions.

15.1 Read of Microcomputer Instruction

```
    K  KCPU MEM  PC

    1   K1   1K  N01

    2  K2.0.J 2K  N02

    3   K3   3K  N03

    4        4K

    8        8K

    C       12K

    F       16K
```

Fig. 15.1

By pressing the K 9 *1 *1 *1 GO keys, perform the initial setting.
For the setting of *1, see Section 6.2.

```
USED MEM.= 1    REST=4095
K      9241     SELECT MODE FUNC
```

Fig. 15.2

By pressing the LDR TST keys, specify read/write of microcomputer program from the memory area of GP-80A-E.
By pressing the LST TST keys, specify read/write of microcomputer program from the memory area of pro-grammable controller CPU.

NOTE

The LST TST key are valid only when the GP-80 and programmable controller CPU are connected. If the GP-80 is not connected with the programmable controller CPU or the K6HGPFE is in offline mode, "PC NOT RESPOND" error message is displayed when Fig. 15.4 is displayed on the screen.

```
        0  1  2  3  4  5  6  7  8  9  A  B  C  D  E  F
USED MEM.= 16   REST=4080
                                    LDR   TST
```

Fig. 15.3

By pressing the SSN *1 *1 *1 *1 GO keys, set the address displayed on the screen.
To *1, set the address.

┌ EXAMPLE ─────────────────────────────────
│ By pressing the SSN 9 0 0 0 GO keys, the
│ contents of address 9000 in the program area of GP-80A-E
│ are displayed as shown in Fig. 15.4.
└───

```
    9000 = 00
        0  1  2  3  4  5  6  7  8  9  A  B  C  D  E  F
USED MEM.= 16   REST=4080
9000                                LDR   TST
```

Fig. 15.4

By pressing the GO key, the contents of next address are displayed as shown in Fig. 15.5.

```
9000 = 00 = 00
       0   1   2   3   4   5   6   7   8   9   A   B   C   D   E   F
USED MEM.= 16    REST=4080
                                                LDR     TST
```
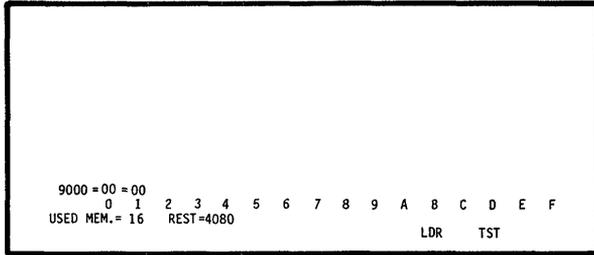
Fig. 15.5

When the display of one line is completed by pressing the GO key, the screen performs an upward scrolling operation and displays the next address as shown in Fig. 15.6.

```
9000 = 00 = 00 = 00 = 00 = 00 = 00 = 00 = 00 = 00 = 00 = 00 = 00 = 00 = 00 = 00 = 00
9010 = 00
       0   1   2   3   4   5   6   7   8   9   A   B   C   D   E   F
USED MEM.= 16    REST=4080
                                                LDR     TST
```
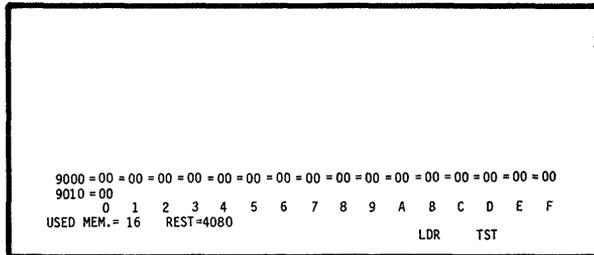
Fig. 15.6

To display the contents of another address, set another address by pressing the SSN *1 *1 *1 *1 GO keys.
To *1, set the address.

EXAMPLE --

By pressing the SSN 8 0 0 0 GO keys, Fig. 15.7 is displayed.

```
9000 = 00 = 00 = 00 = 00 = 00 = 00 = 00 = 00 = 00 = 00 = 00 = 00 = 00 = 00 = 00 = 00
9010 = 00
8000 = 00
       0   1   2   3   4   5   6   7   8   9   A   B   C   D   E   F
USED MEM.= 16    REST=4080
                                                LDR     TST
```
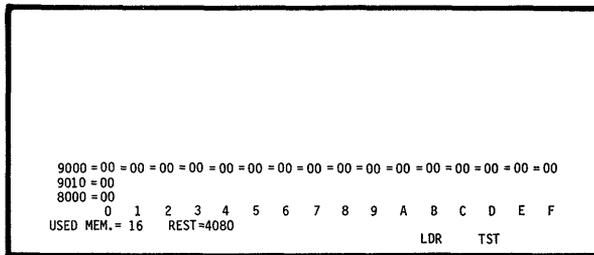
Fig. 15.7

15.2 Write of Microcomputer Instruction

Read the address, where microcomputer instruction is written, according to Section 15.3 as shown in Fig. 15.8.

⇩

```
9000 = 00 = 00 = 00 = 00 = 00 = 00
       0   1   2   3   4   5   6   7   8   9   A   B   C   D   E   F
USED MEM.= 16    REST=4080
                                              LDR    TST
```
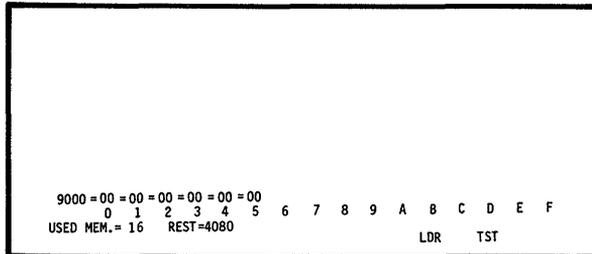
Fig. 15.8

By pressing the ⌐K⌐ ⌐*1⌐ ⌐*1⌐ ⌐GO⌐ keys, write a micro-computer instruction to the last address of displayed address (e.g. address 9005 in Fig. 15.8).
To *1, set the microcomputer instruction.

┌ EXAMPLE ─────────────────────────────────┐
By pressing the ⌐K⌐ ⌐3⌐ ⌐E⌐ ⌐GO⌐ keys, write the micro-computer instruction "3E" to address 9005 as shown in Fig. 15.9.
└──┘

⇩

```
9000 = 00 = 00 = 00 = 00 = 00 = 3E = 00
       0   1   2   3   4   5   6   7   8   9   A   B   C   D   E   F
USED MEM.= 16    REST=4080
9000       K       3E                          LDR    TST
```
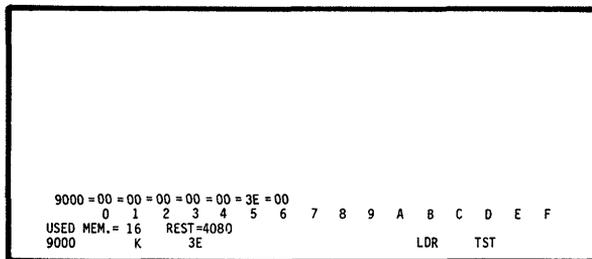
Fig. 15.9

By pressing the ⌐K⌐ ⌐*1⌐ ⌐*1⌐ ⌐GO⌐ keys, write a micro-computer instruction to the next address.
To *1, set the microcomputer instruction.

By pressing the ⌐GO⌐ key, the next address is displayed without changing the contents.

CAUTION

1. The area where the microcomputer program is written differs depending on the starting operation as described below:
   - When the system is started by pressing the ⌐LDR⌐ ⌐TST⌐ keys, the microcomputer program is written to the sequence program area of GP-80.

   - When the system is started by pressing the ⌐LST⌐ ⌐TST⌐ keys, the microcomputer program is directly written to the programmable controller CPU.

2. When the microcomputer program is written to the programmable controller CPU, write operation cannot be effected to the address which is loaded with ROM or the address which is not loaded with the IC memory. When the write operation is performed, "VERIFY ERROR" error message is dispalyed.

15.3 Caution for Combination of Microcomputer Program and Sequence Program

If a sequence program is inserted or deleted after the preparation of microcomputer program, the addresses of microcomputer program may be shifted, resulting in damage of program. Therefore, when correction is made by debugging, changing, etc. of sequence program, the damage of micro-computer program can be prevented by performing the following operation.

For K2CPU-S3, K2HCPU or K2NCPU

To prevent the damage of microcomputer program, perform the initial setting by pressing the K 2 2 1 GO keys, thereby selecting the memory capacity only for the sequence program.

For K3NCPU(P2)

To prevent the damage of microcomputer program, perform the initial setting by pressing the K 3 4 1 GO keys, thereby selecting the memory capacity only for the sequence program, or write FFH, FFH, FFH, FFH, AAH, 55H to the K3NCPU(P2) at positions beginning with the divisions of memory (A000H, C000H, E000H), reset the K3NCPU(P2), perform initial setting to desired memory capacity, and correct the sequence program.

15

15.4 Memory Map of KCPU
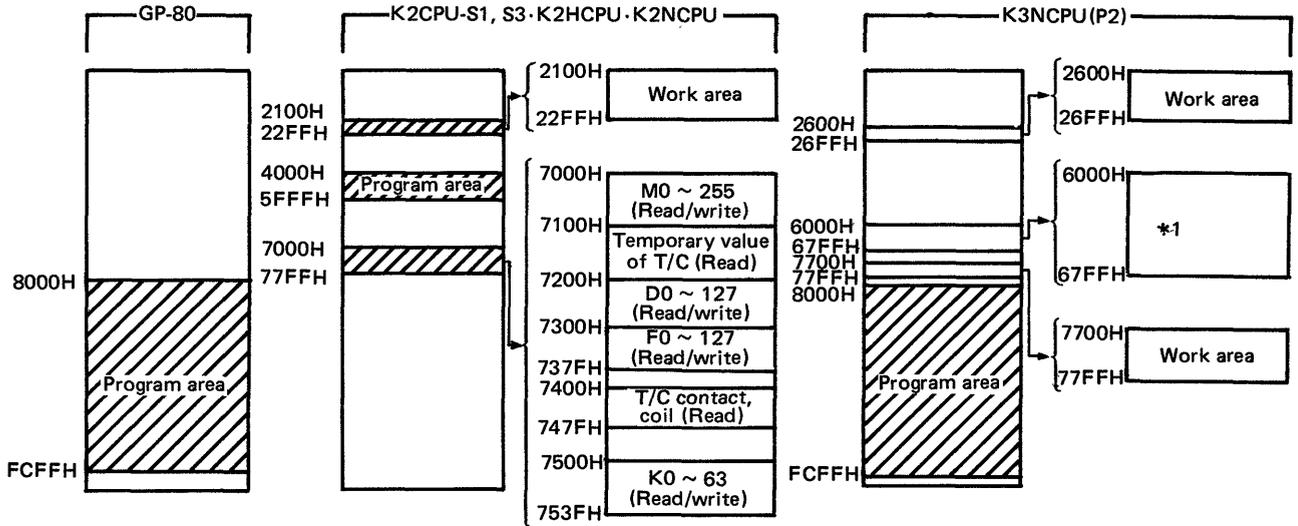
*1: The 6000H to 67FFH data memory area inside K3NCPU(P2) is used as four memory areas of data register (D), input image (X), output image (Y) and data area (M, T, C, F). Since read and write of each area are controlled by subroutine, execute by use of CALL instruction.
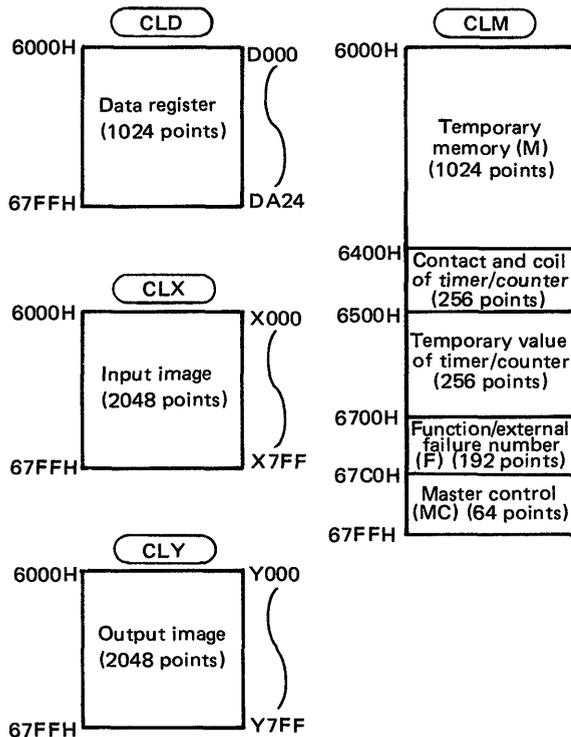
Subroutines for read and write of data memory area

Memory area name	Subroutine name	Instruction word	Machine language

Data register (D)	CLD	PUSH PSW
		LD A, E0H
		LD 22F8H, A
		LD 2E00H, A
		POP PSW
		RET
			F5
			3E, E0
			32, F8, 22
			32, 00, 2E
			F1
			C9

Input image (X)	CLX	PUSH PSW
		LD A, E8H
		LD 22F8H, A
		LD 2E00H, A
		POP PSW
		RET
			F5
			3E, E8
			32, F8, 22
			32, 00, 2E
			F1
			C9

Output image (Y)	CLY	PUSH
		LD A, E2H
		LD 22F8H, A
		LD 2E00H, A
		POP PSW
		RET
			F5
			3E, F0
			32, F8, 22
			32, 00, 2E
			F1
			C9

Data area (M, T, C, F)	CLM	PUSH PSW
		LD A, 0CH
		LD 22F8H, A
		LD 2E00H, A
		POP PSW
		RET
			F5
			3E, 0C
			32, F8, 22
			32, 00, 2E
			F1
			C9

15.5 Internal Configuration of Data Memory

Data register (D)

- The data register consists of two bytes.

B7		B0
	(L)	
	(H)	

B15   B2
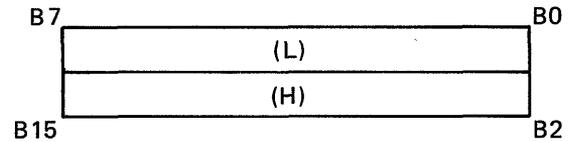
Input image memory

- The input image memory consists of one byte.
- B0 stores on/off data.
- Use ※ mark (B1 to B7) after masking.

B7	B6	B5	B4	B3	B2	B1	B0
※	※	※	※	※	※	※	0/1
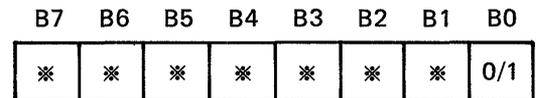
Output image memory

- The output image memory consists of one byte.
- B0 stores on/off data.
- Use ※ mark (B1 to B7) after masking.

B7	B6	B5	B4	B3	B2	B1	B0
※	※	※	※	※	※	※	0/1
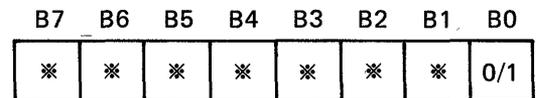
M, F, MC

- M, F and MC consist of one byte.
- B0 stores on/off data.
- Use ※ mark (B1 to B7) after masking.

B7	B6	B5	B4	B3	B2	B1	B0
※	※	※	※	※	※	※	0/1
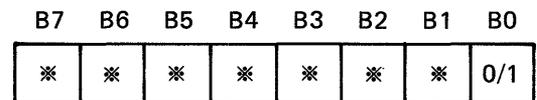
Contact and coil of timer and counter

- The contact and coil of timer and counter consist of one byte.
- B0 stores on/off data of contact.
- B7 stores on/off data of coil.
- Use ※ mark (B1 to B7) after masking.

B7	B6	B5	B4	B3	B2	B1	B0
0/1	※	※	※	※	※	※	0/1
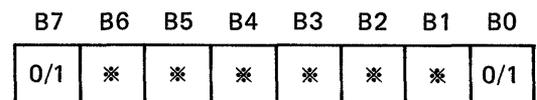
Temporary value of timer and counter

- The temporary value of timer and counter consists of two bytes.

B7		B0
	(L)	
	(H)	

B15   B8

15
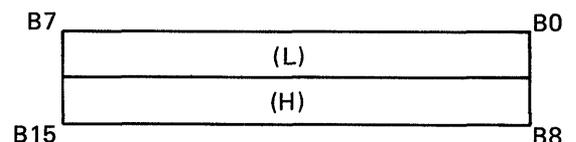
15.6 Microcomputer Program Call Example

Specify the call of microcomputer program by a sequence program as shown below.

For K2CPU-S3, K2HCPU, K2NCPU

- To *1, set step number (head of microcomputer program) located below the END instruction step number of sequence program.
  Example: In the case of sequence program of 2K steps
  K 2048

- To D127, set the jump destination step number (head of microcomputer program). However, when D127 = 0, the microcomputer program is not executed.

- Return destination after the execution of microcomputer program

For K3NCPU(P2)

- To *1, set 1 to 3. $\begin{cases} 1 = A000H \sim BFFFH \\ 2 = C000H \sim DFFFH \\ 3 = E000H \sim FFFFH \end{cases}$

- To DA23, specify the block which stores 1 to 3 and is used for microcomputer program.

- To *2, set the program start address in microcomputer program specified in DA23.

- DA02 stores the address specified in *2.

- When OUT F172 turns on, the specified head address of microcomputer program is called and executed.

- Return destination after the execution of microcomputer program

16. ERROR MESSAGE LIST

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16. ERROR MESSAGE LIST

This section shows a list of error messages which are displayed at the bottom center of the screen. When the error message is displayed, take corrective action before proceeding to the next operation.

No.	Display	Contents	Corrective Action
1	CJ STEP ERROR	Specified jump destination step number of CJ instruction is smaller than the step number of CJ instruction, or specified step number is larger than the step number of memory capacity set in the initial setting.	Check jump destination step number and change it to a correct number.
2	MISSING END INS.	Sequence program is not provided with END instruction.	Write "END" instruction in list mode.
3	PC NOT RESPOND	The power of programmable controller CPU is off.	Turn on the power of programmable controller CPU.
		ON-LINE switch of K6HGPFE is at "OFF-LINE" position.	Move the switch to "ON-LINE" position.
		Cable is not connected or is faulty.	Check presence of cable. Reinsert the cable. Check continuity of cable.
		Programmable controller CPU has been reset during communication.	Operate the GP-80 again.
		Error has occurred in the programmable controller CPU during communication.	After removing the cause of error, reset the programmable controller CPU and operate the GP-80 again.
4	CAN T WRT. PC-RUN	Write operation has been performed in KCPU mode during run of programmable controller CPU.	After setting programmable controller CPU to "stop" state, operate the GP-80 again. When it is desired to perform write operation during run, perform initial setting by pressing K 7 □ □ □ GO key. (See Example 3 in Section 6.2.)
5	SELECT KCPU	GO key has been pressed without performing setting in the initial setting.	Perform correct initial setting. (See Example 1 in Section 6.2.)
6	K1.K2.K3. SELECT?	Type of connected programmable controller CPU is different from that of CPU which has been specified at initial setting.	Reset GP-80 and perform correct initial setting again. (See Example 1 in Section 6.2.)
		Comment data has been written to programmable controller CPU when the programmable controller CPU is not K3NCPU(P2).	Comment data can be written only when the programmable controller CPU is K3NCPU(P2).
		Cable or K6HGPFE is defective.	Reinsert cable or reload K6HGPFE. Check continuity of cable with circuit tester, etc.
7	MIS.K3 NOT OPE.	Comment data has been read or verified from the programmable controller CPU when the programmable controller CPU is not K3NCPU(P2).	Comment data can be read or verified only when the programmable controller CPU is K3NCPU(P2).

No.	Dispaly	Contents	Corrective Action
8	IO NBR ERROR	Device number, which cannot be specified, has been written during write of sequence program. In the initial setting, PC number has been set to "1" but device number has not been specified to correspond to the PC number.	Check device number and operate the GP-80 again.
9	IO MISINSTRUCTED	Monitor stop by use of data register has been specified. Device, which cannot be used, has been specified in test mode.	Perform operation by use of correct device.
10	CHRACT.MEMRY ERR	System RAM or GP-80 unit is defective.	Change GP-80 unit.
11	ILLOGICAL DIAGRAM	There is circuit which cannot be converted during perparation of sequence program in ladder mode. (See Section 7.3.4.)	Rewrite to correct circuit.
12	LOGIC ERROR		
13	CIRCUIT OVERFLOW	It has been attempted to display a circuit in ladder mode; e.g. a circuit of which one circuit block has 23 or more lines, a circuit which has 161 or more serial contacts, a circuit which has 8 or more consecutive ANB or ORB instructions, and a circuit which has 9 or more consecutive LD instruction.	Rewrite to correct circuit.
14	WRITING FORBIDDN	Write to programmable controller CPU has been performed when "PROTECT" switch of GP-80 unit is at "ON" position.	Move PROTECT switch to "OFF" position and operate the GP-80 again.
15	COMT-MEMORY OVER	The used number of comment memory has is 2049 or more.	Reduce the used number of comment memory to 2048 or less.
16	PRG.STEP-NBR ERR	Step number, which is outside the range of memory capacity specified at initial setting, has been specified during read of sequence program. Consecutive write of NOP has been performed by specifying a step number which is larger than the specified memory capacity.	Perform initial setting again, or speciry correct step number.
17	MISOPERATED	A key, which cannot be entered, has been pressed. Wrong operating method has been used.	Press a correct key. Perform correct operation again.
18	PROGRAM OVERFLOW	After the preparation of circuit in the ladder mode, memory capacity set at initial setting has been exceeded during conversion of the circuit.	Increase memory capacity set at initial setting, or reduce the number of steps after reconsidering sequence program, e.g. deletion of NOP.
19	VERIFY ERROR	Sequence program or comment data in GP-80 does not coincide with sequence program or comment data in programmable controller CPU.	Check non-coinciding portion and correct the program.
		Comment data has been verified when K3MB1 is not loaded in K3NCPU(P2).	Load K3MB1 into K3NCPU(P2).
		Comment data has been verified during error of K3MB1.	Check if K3MB1 is correctly loaded. Change K3MB1 and check.
		During write operation in microcomputer mode, ROM is loaded in the programmable controller CPU, or IC memory is not loaded.	Check the IC memory inside programmable controller CPU and load RAM correctly.

No.	Display	Contents	Corrective Action
20	BATTERY ERROR	Voltage of battery in GP-80 has reduced or battery is not connected. However, this message is displayed only when internal capacitor is not charged at power-on.	Change or connect battery.
21	PRINTER ERROR	Power or SEL switch of printer is off.	Turn on the power or SEL switch of printer.
		Printer is not provided with paper.	Insert paper into the printer.
		Cable is not connected or is faulty.	Connect or change the cable.
22	VERIFY ERROR	Contents do not coincide with each other when contents of GP-80 and cassette tape are verified in cassette mode.	Check non-coinciding portion and correct the program.
23	REPLAY ERROR	Read setting limit is larger than sequence program capacity or comment data capacity of cassette tape.	Match setting limit.
		Error code has been recorded on cassette tape.	Re-record the program or comment data.
		The power of audio cassette has been turned off or the cable has been disconnected during replay operation.	Turn on the power or re-connect the cable, return the audio cassette to the initial state, and perform operation again.
		The area of cassette tape which stores program or comment data has error.	Re-record the program or comment data on a new cassette tape.
24	LEVEL ERROR	Volume level of audio cassette is low during replay or verify from audio cassette.	Increase volume level of audio cassette.
		The power of audio cassette has been turned off during level check or the power has been off from the beginning.	Turn on the power, return the audio cassette to the initial state, and perform operation again.
		The cable has been disconnected during level check or the cable has not been connected from the beginning.	Connect the cable, return the audio cassette to the initial state, and perform operation again.
		In replay or verify operation, a cassette tape has not been loaded in the audio cassette.	Check cassette tape.
		In replay or verify operation, operation cannot be performed due to the fault of cable.	Change the cable and check.
		The area of level check range of cassette tape has error.	Re-record program or comment data on a new cassette tape.
25	WRITE ERROR	Memory, which stores sequence program, is not loaded in programmable controller CPU or ROM is loaded when write is performed to programmable controller CPU. Type K3MB1 auxiliary memory card is not loaded in K3NCPU(P2) when comment data is written.	Load RAM or K3MB1 to programmable controller CPU.
		The RAM/ROM select switch of programmable controller CPU is at ROM position.	Move the select switch to RAM position and check that RAM is loaded.
26	INSTRCT. CODE ERROR	Error code, which cannot be converted to sequence instruction, has been written due to noise, etc.	Rewrite to normal instruction. Also, be careful of noise of power supply, etc.

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No.	Display	Contents	Corrective Action
27	MISINSTRUCTED	Instruction, which does not conform to grammar, has been written.	Rewrite instruction in a manner conforming to grammar.
28	MEMORY PROT. ON	Memory protect switch of programmable controller CPU is at "ON" position when write to programmable controller CPU is performed.	Move memory protect switch to "OFF" position.
29	DUPLI-COIL EXIST	Coil has been used twice during preparation of sequence program.	In principle, do not specify the same coil two or more times except T, C, and F. Correct device number. However, when the same device number is used for SET and RST instructions, the error message is also displayed, but in this case, it is not error.

MEMO

17. MAINTENANCE

1

17. MAINTENANCE

(1) Do not use and store the unit at locations and environments described below:

    1) Use at locations where ambient temperature is outside the range of 0°C and 40°C.

    2) Storage at locations where ambient temperature is outside the range of −20°C and 60°C.

    3) Locations where ambient humidity is outside the range of 10 and 90%RH.

    4) Locations where dew condensation takes place due to sudden temperature changes.

    5) Locations exposed to the weather or the direct rays of the sun.

    6) Locations where there exist corrosive gases, oil mist, salt, etc. or locations where there are a lot of conductive power such as dust and iron filings.

(2) Use the printer and tape recorder after throughly reading their respective Instruction Manuals.

(3) Do not store the tape at locations where temperature is high, humidity is high or the tape is exposed to strong magnetism.

(4) When the tape is stored for a long time, replay the tape on a tape recorder and rewind it every 6 months.

IMPORTANT

(1) Design the system so that the protection and safety circuits, which are furnished to protect the programmable controller from troubles, are located externally of the cabinet.

(2) Since the printed circuit boards are mounted with electronic parts, which will be adversely affected by static electricity, handle them as described below when they are directly handled.

    1) Ground human body and work bench.

    2) Do not directly touch the conductive areas of printed circuit board and its electrical parts with a non-grounded material.

    3) With this instruction manual, Mitsubishi Electric Corporation does not warrant the enforcement of industrial property and other rights nor grants licenses. Also, Mitsubishi Electric Corporation disclaims all the responsibility for problems on the industrial property attributable to the use of the contetns of this instruction manual.

APPENDIX

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1. PROCESSING TIME

(1) Processing time of audio cassette

Processing Area		Processing Time		
		Record	Replay	Verify
Sequence program	1K step	4 minutes	4 minutes	4 minutes
	4K steps	8 minutes 5 seconds	8 minutes 10 seconds	8 minutes 15 seconds
	16000 steps	24 minutes	24 minutes 10 seconds	24 minutes 30 seconds
Comment data	Area a	8 minutes 5 seconds	8 minutes 10 seconds	8 minutes 5 seconds
	Areas 1 + 2	13 minutes 35 seconds	13 minutes 35 seconds	13 minutes 35 seconds
	All areas	24 minutes 35 seconds	24 minutes 35 seconds	24 minutes 45 seconds

∗: Time in the above table includes level check time.

(2) Processing time of printer

Processing Mode		Processing Time
Circuit	Pica	6 seconds/line
	Elite	7 seconds/line
List	Pica	53 seconds/page
	Elite	70 seconds/page

∗: Time in the above table indicates the value by use of Type K6PRE printer.

2. PRINTER OUTPUT CODES

As the codes output from the GP-80 to the printer, the JIS codes are used for alphabets and numerals. However, for special symbols such as contacts and coils, the following codes are output.

Display of GP-80A-E	Codes Output to Printer (Hexadecimal)		Display of GP-80A-E	Codes Output to Printer (Hexadecimal)	
	K6PRE	K7PR, general-purpose printer		K6PRE	K7PR, general-purpose printer
—┤ ├—	80, 81	5D, 5B	—— (Horizontal line)	99	2D
—┤/├—	82, 83	5D, 2F, 5B	│ (Vertical line)	9A	7C
—( )—	84, 85	2B, 29	——→	9E	2D, 3E
—[ ]—	86, 87	5B, 5D			

For special symbols which are not shown in the above table, the JIS codes are used as in the case of alphabets and numerals.

MEMO

3. CIRCUIT PRINT-OUT EXAMPLE (83% Reduction)

(1) When print type of K6PRE is pica
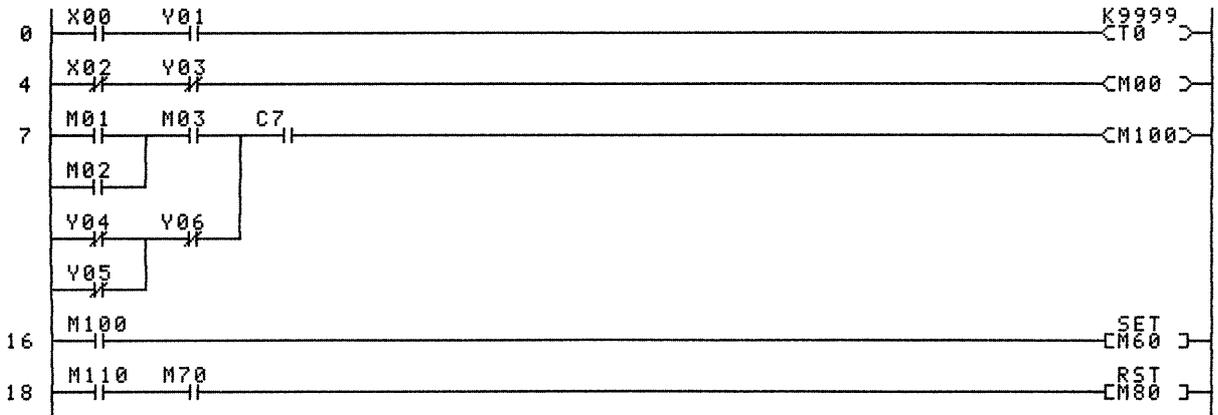
```
      | X00    Y01                                              K9999
  0   |--| |---| |---------------------------------------------<T0  >
      | X02    Y03
  4   |--|/|---|/|----------------------------------------------<M00 >
      | M01    M03    C7
  7   |--| |---| |----| |-----------------------------------------<M100>
      | M02     |      |
      |--| |----+      |
      | Y04    Y06     |
      |--|/|---|/|-----+
      | Y05    |
      |--|/|---+
      | M100                                                    SET
  16  |--| |-----------------------------------------------------[M60 ]
      | M110   M70                                               RST
  18  |--| |---| |-----------------------------------------------[M80 ]

CIRCUIT ENDS
```

(2) When print type of K6PRE is elite
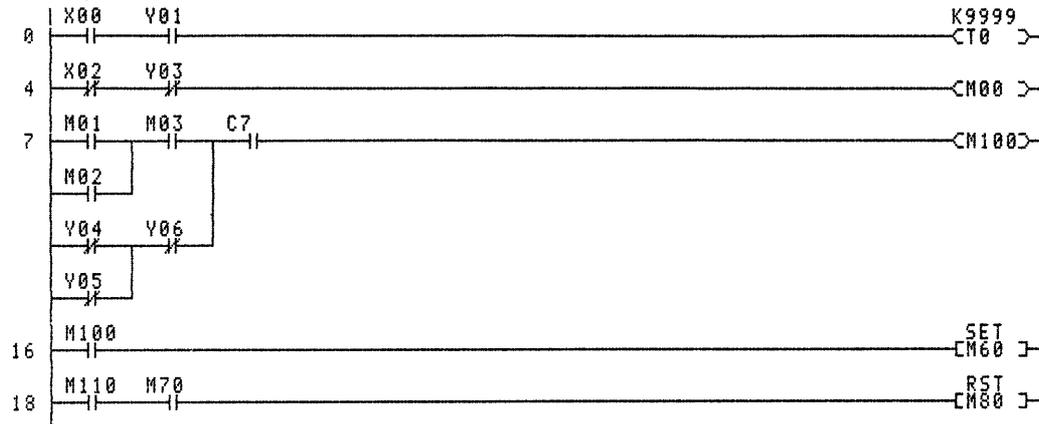
```
      | X00    Y01                                              K9999 |
  0   |--| |---| |---------------------------------------------<T0  >|
      | X02    Y03
  4   |--|/|---|/|----------------------------------------------<M00 >|
      | M01    M03    C7
  7   |--| |---| |----| |-----------------------------------------<M100>|
      | M02     |      |
      |--| |----+      |
      | Y04    Y06     |
      |--|/|---|/|-----+
      | Y05    |
      |--|/|---+
      | M100                                                    SET |
  16  |--| |-----------------------------------------------------[M60 ]|
      | M110   M70                                               RST |
  18  |--| |---| |-----------------------------------------------[M80 ]|

CIRCUIT ENDS
```

(3) When K7PR or general-purpose printer is used
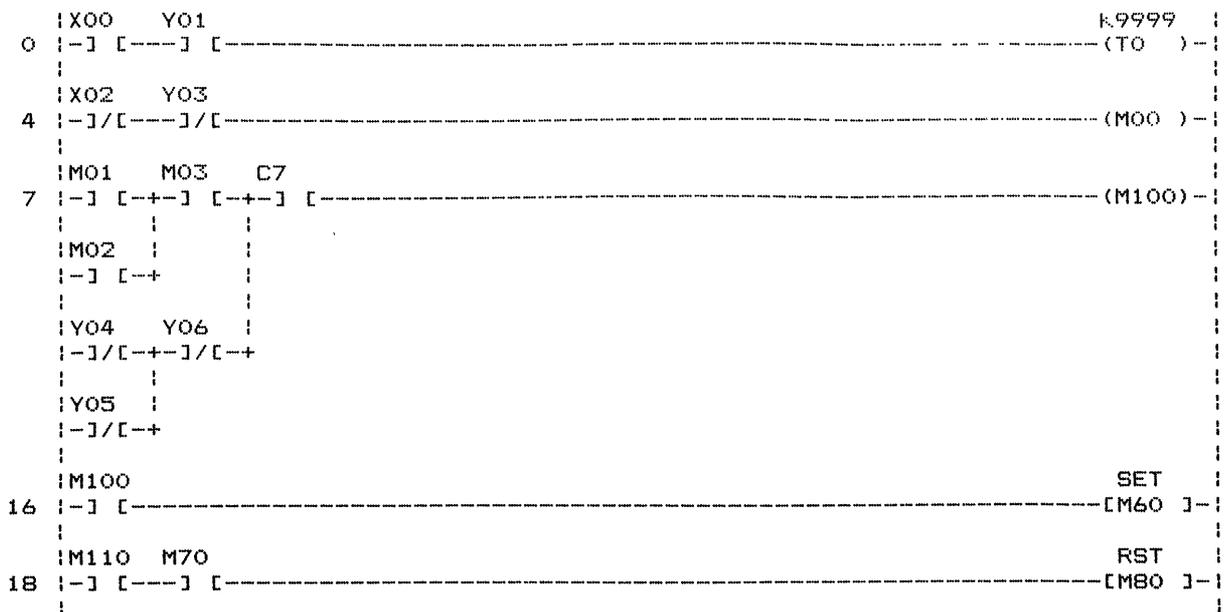
```
      !X00    Y01                                              K9999 !
  0   !-] [---] [------------------------------------ -- -------(TO   )-!
      !
      !X02    Y03
  4   !-]/[---]/[-------------------------------------------------(MOO )-!
      !
      !MO1    MO3    C7
  7   !-] [-+-] [-+-] [---------------------------------------------(M100)-!
      !     !      !
      !MO2  !      !
      !-] [-+      !
      !     !      !
      !YO4    YO6  !
      !-]/[-+-]/[-+
      !     !
      !YO5  !
      !-]/[-+
      !
      !M100                                                     SET  !
  16  !-] [-------------------------------------------------------[M60 ]-!
      !
      !M110   M70                                                RST  !
  18  !-] [---] [-----------------------------------------------[M80 ]-!
      !                                                               !

CIRCUIT ENDS
```

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